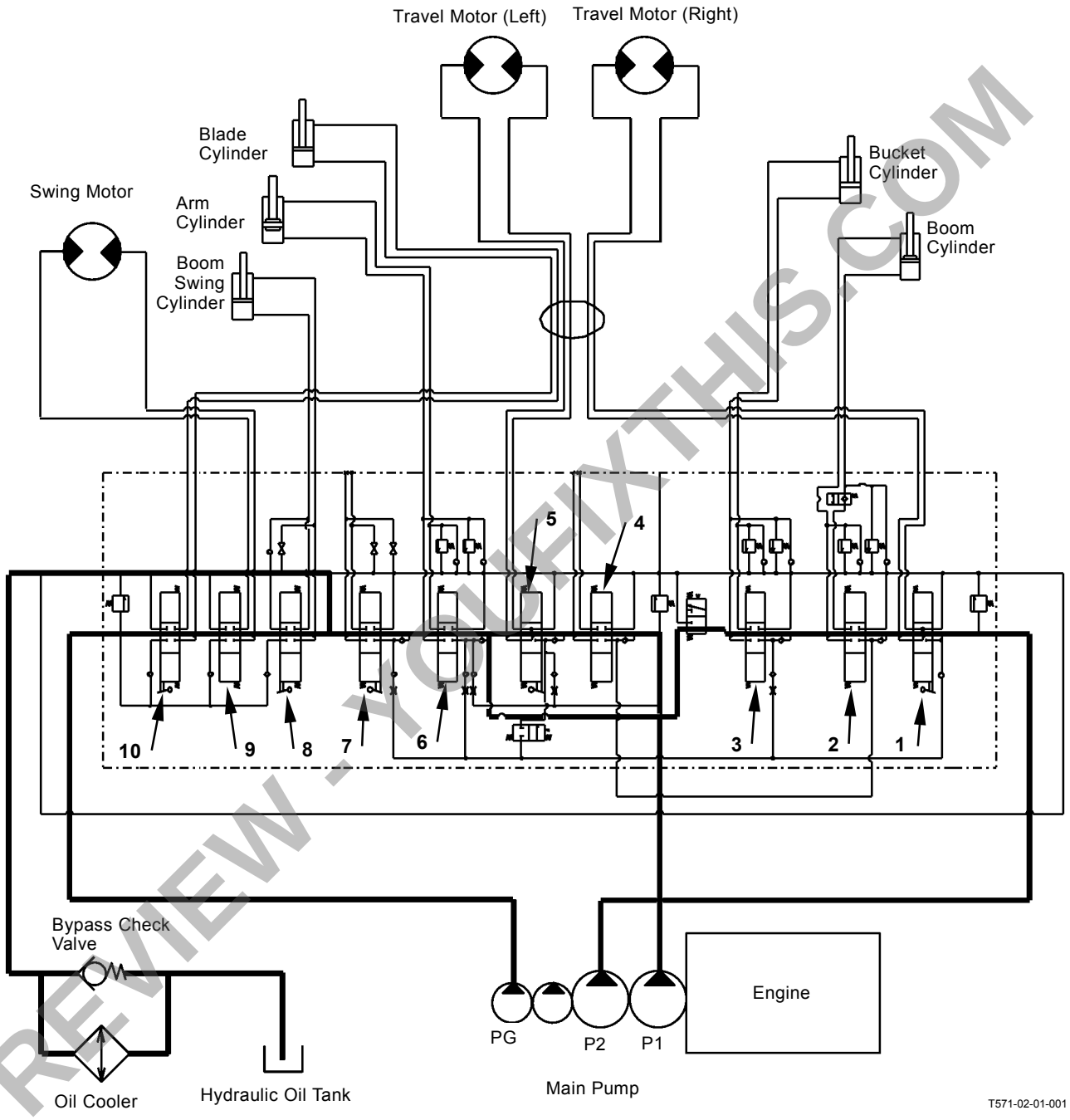
Attach to Vol.No.T585E-NA

EX50u ELECTRICAL CIRCUIT

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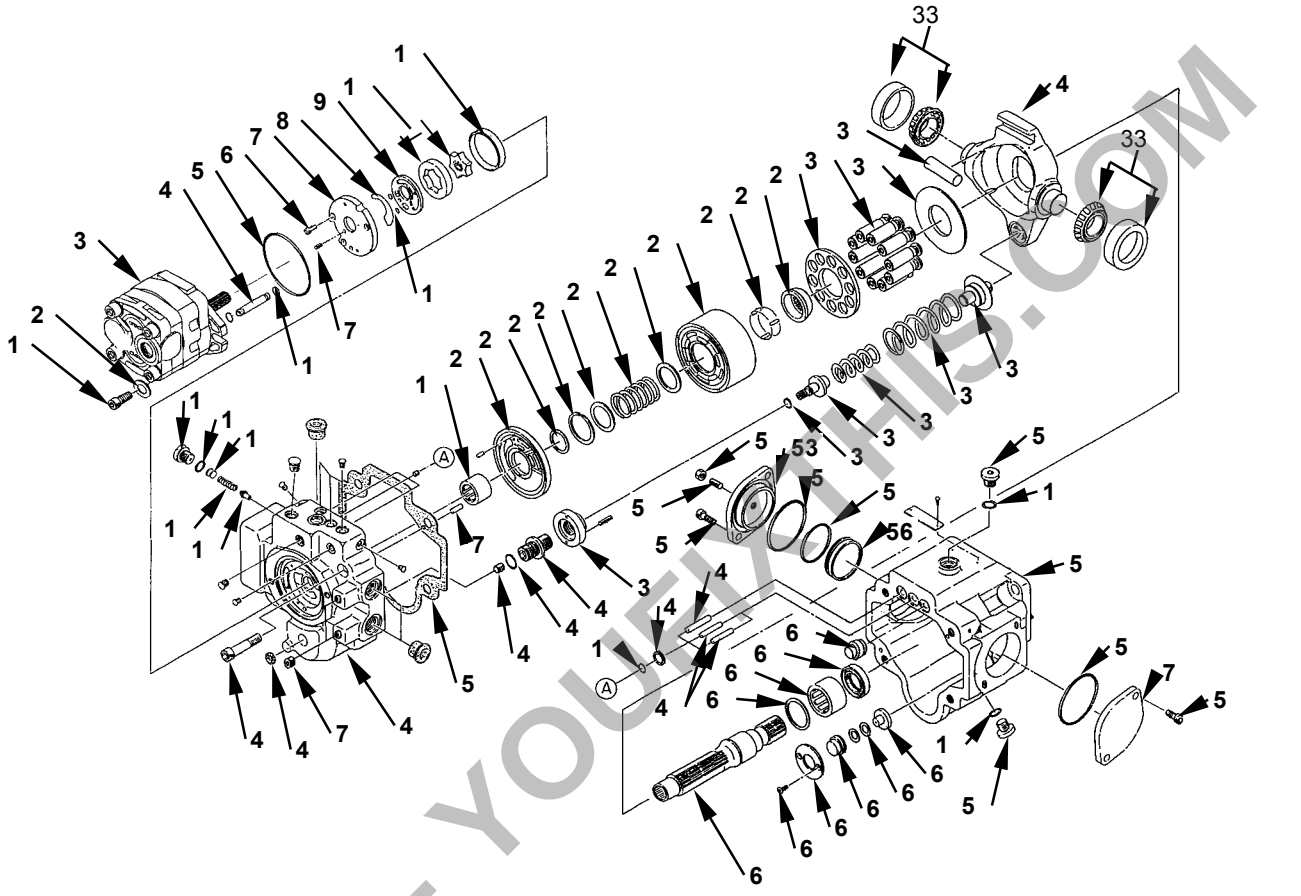


1 - Travel (Right)
2 - Boom 1
3 - Bucket
4 - Boom 2
5 - Travel (Left)
6 - Arm
7 - Auxiliary
8 - Boom Swing
9 - Swing
10 - Blade

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DISASSEMBLE PUMP DEVICE



1 - Socket Bolt
2 - Washer
3 - Gear Pump
4 - Bushing
5 - O-Ring
6 - Socket Bolt
7 - Cover
8 - O-Ring
9 - Loading Plate
10 - Trochoid Rotor Assembly
11 - Bushing
12 - O-Ring
13 - O-Ring
14 - Plug
15 - O-Ring
16 - Shim
17 - Spring
18 - Poppet
19 - Needle Bearing
20 - Valve Plate
21 - Thrust Washer
22 - Snap Ring
23 - Spring Holder
24 - Spring
25 - Collar
26 - Cylinder Block
27 - Pin
28 - Retainer Holder
29 - Retainer Plate
30 - Plunger Assembly
31 - Thrust Plate
32 - Pin
33 - Bearing
34 - Spring Seat
35 - Spring
36 - Spring
37 - Spring Seat
38 - O-Ring
39 - Spring Seat
40 - Set Bolt
41 - O-Ring
42 - Set Screw
43 - Port Block
44 - Nut
45 - Socket Bolt
46 - Swash Plate
47 - Backup Ring
48 - Pin
49 - Pin
50 - Nut
51 - Set Screw
52 - Socket Bolt
53 - Trunnion Cover
54 - O-Ring
55 - O-Ring
56 - Bushing
57 - Plug
58 - Gasket
59 - Housing
60 - Stopper
61 - Oil Seal
62 - Needle Bearing
63 - Thrust Washer
64 - Shaft
65 - Screw
66 - Plate
67 - Stopper
68 - Spring
69 - Bushing
70 - Trunnion Cover
71 - Spring Pin
72 - Plug
73 - Pin

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TORQUE CHART

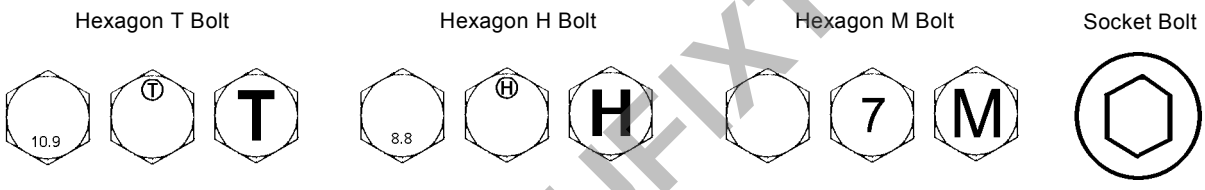
CAUTION: Use tools appropriate for the work to be done. Makeshift tools and procedures can create safety hazards. For loosening and tightening nuts and bolts, use correct size tools. Otherwise, tightening tools may slip, potentially causing personal injury.



SA-040

Bolt Types

Tighten nuts or bolts correctly to torque specifications. Four different types and grades of bolt are employed. Make sure to employ correct bolts and tighten them correctly when assembling the machine or components.



W162-01-01-001

Specified Tightening Torque Chart

Bolt Dia.	Wrench Size	Hexagon Size Wrench	T Bolt, Socket bolt			H Bolt			M Bolt		
			N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)	N·m	(kgf·m)	(lbf·ft)
M 8	13	6	29.5	(3)	(22)	19.5	(2)	(14.5)	9.8	(1)	(7.2)
M 10	17	8	64	(6.5)	(47)	49	(5)	(36)	19.5	(2)	(14.5)
M 12	19	10	108	(11)	(80)	88	(9)	(65)	34	(3.5)	(25.5)
M 14	22	12	175	(18)	(130)	137	(14)	(101)	54	(5.5)	(40)
M 16	24	14	265	(27)	(195)	205	(21)	(152)	78	(8)	(58)
M 18	27	14	390	(40)	(290)	295	(30)	(220)	118	(12)	(87)
M 20	30	17	540	(55)	(400)	390	(40)	(290)	167	(17)	(123)
M 22	32	17	740	(75)	(540)	540	(55)	(400)	215	(22)	(159)
M 24	36	19	930	(95)	(690)	690	(70)	(505)	275	(28)	(205)
M 27	41	19	1370	(140)	(1010)	1030	(105)	(760)	390	(40)	(290)
M 30	46	22	1910	(195)	(1410)	1420	(145)	(1050)	540	(55)	(400)
M 33	50	24	2550	(260)	(1880)	1910	(195)	(1410)	740	(75)	(540)
M 36	55	27	3140	(320)	(2310)	2400	(245)	(1770)	930	(95)	(690)

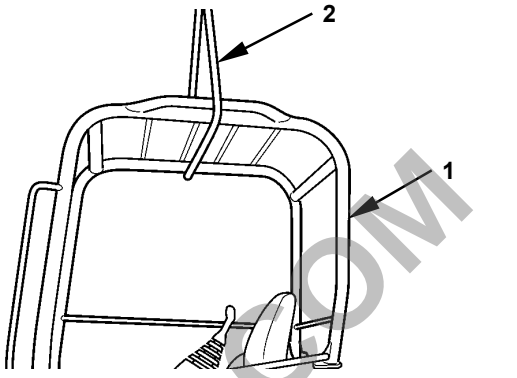
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REMOVE AND INSTALL CANOPY

Removal

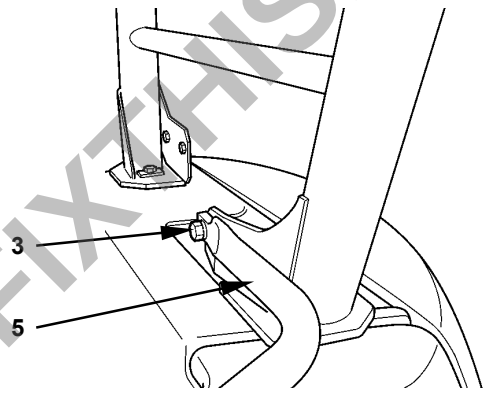
1. Attach sling belt (2) to canopy (1).



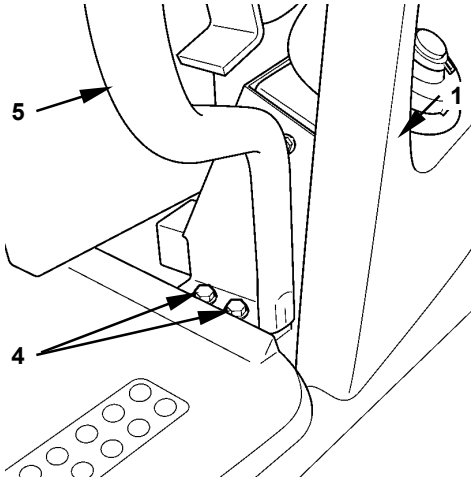
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2. Loosen bolts (3) and (4) (2 used) to remove handrail (5).

: 17 mm

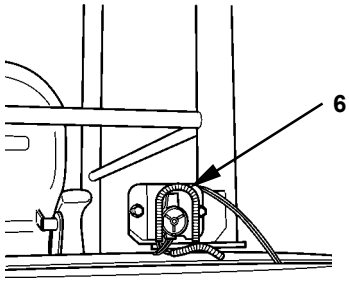


W571-02-01-002



W571-02-01-006

3. Disconnect connector from travel alarm (6).



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ENGINE SYSTEM TROUBLESHOOTING

Starter does not rotate

YES

No voltage or less than 12 V at terminal B.

With key switch positioned as shown in the table below, check if each terminal voltage on starter is normal.

YES

Unit: V

Key Switch / Terminal	OFF	ON	START
B(M8)	12	12	12
#50	0	0	12

NO

Check if battery voltage and electrolyte density are normal.

- Voltage: 12 volts or more
- Density: 1.28 or more

No voltage or less than 12 V at terminal #50 (S) with key switch at START position.

- Key switch: START

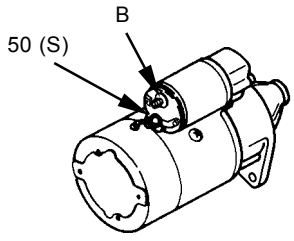
NO

(When key switch is turned to the START position, if voltage at terminal B is lower than 9 volts, battery may be faulty.)

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Starter voltage check

1. Turn key switch to the ON or START position.
2. Contact minus (–) probe of a circuit tester to the machine (ground to unpainted area like bolt head) and plus (+) probe terminals to the starter terminal respectively, and check voltages. (Measure with the harness connected.)

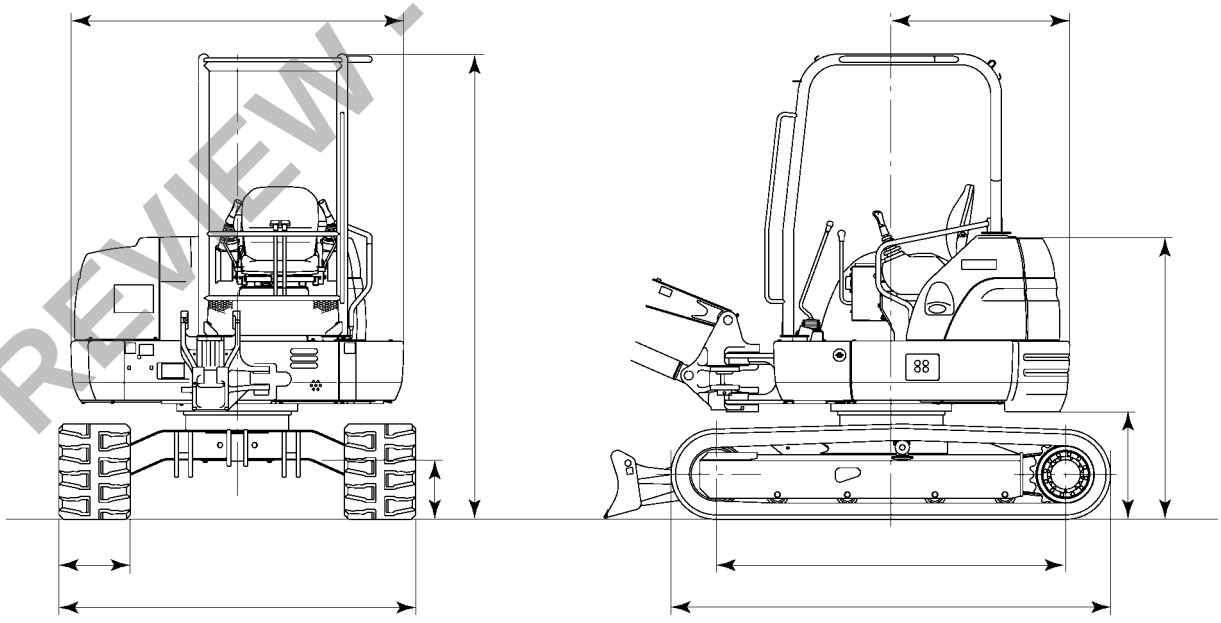


T533-07-02-001

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SPECIFICATIONS

Item	Unit	Canopy	Cab
Front Attachment	–	Boom swing type	
Bucket Capacity (Heaped)	m^3	0.16 (5.7 ft^3): PCSA (0.14: CECE)	
Operating Weight	kg (lb)	4590 (10119)	4700 (10362)
Base Machine Weight	kg (lb)	3390 (7474)	3500 (7716)
Engine	–	ISUZU 4LE1 27.9 kW/2000 min^{-1}(38 PS/2000 rpm)	
A: Overall Width	mm (ft in)	1865 (6′ 1″)	
B: Cab Height	mm (ft in)	2610 (8′ 7″)	2665 (8′ 9″)
C: Rear End Swing Radius	mm (ft in)	1000 (3′ 3″)	
D: Minimum Ground Clearance	mm (ft in)	335 (1′ 1″)	
E: Counterweight Clearance	mm (ft in)	600 (2′) (Rubber Crawler)	
F: Engine Cover Height	mm (ft in)	1580 (5′ 2″)	
G: Undercarriage Length	mm (ft in)	2460 (8′ 1″) (Rubber Crawler)	
H: Undercarriage Width	mm (ft in)	2000 (6′ 7″)	
I: Sprocket Center to Idler Center	mm (ft in)	1955 (6′ 5″)	
J: Track Shoe Width	mm (ft in)	400 (16″) (Rubber Crawler)	
Ground Pressure	kPa (kgf/cm^2, psi)	26.5 (0.27, 3.8)	27.1 (0.28, 3.98)
Swing Speed	min^{-1} (rpm)	7.4	
Travel Speed (Fast/Slow)	km/h (mph)	4.5/2.5 (2.8/1.55)	
Gradeability	% (deg.)	58 (30)	



M586-11-001

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OPERATIONAL PERFORMANCE STANDARD

This Operational Performance Standard values are listed below.
Refer to the correspondence section in T4-2 and after for the details of measurement method.

The value in ( ) is shown for reference only.
* The standard measurement condition is as follows;
  Engine Speed Control Lever: Full Stroke
  Hydraulic Oil Temperature: 50±5 °C

Item	Operational Performance Standard	Remarks
ENGINE SPEED min^{-1}		
Maximum Speed	2150^{+50}_{-25}	
Minimum Speed	1050±50	
ENGINE COMPRESSION PRESSURE kPa (kgf/cm^2)	304 (31) or more	
VALVE CLEARANCE (IN, EX) mm	0.4±0.05	
NOZZLE INJECTION PRESSURE MPa (kgf/cm^2)	13.2 (135)	
INJECTION TIMING (Before Top Dead Center) deg.	12°±1.5°	
TRAVEL SPEED sec/20 m		
Fast Speed Mode (Rubber Crawler/Steel Crawler)	16.0±1.5/18.7±1.5	
Slow Speed Mode (Rubber Crawler/Steel Crawler)	29.0±1.5/29.7±1.5	
TRACK REVOLUTION SPEED sec/3 rev		
Fast Speed Mode (Rubber Crawler/Steel Crawler)	12.5±1.5/13.7□}1.5	
Slow Speed Mode (Rubber Crawler/Steel Crawler)	22.0±1.5/22.8±1.5	
MISTRACK (Fast Speed¥Slow Speed) mm/20 m	200 or less	
TRAVEL PARKING FUNCTION rev	1/6 or less	
TRAVEL MOTOR LEAKAGE mm/3 min	0 or less	
SWING SPEED sec/3 rev	24.0±1.5	
SWING FUNCTION DRIFT mm/90°	150 or less	
SWING MOTOR LEAKAGE mm/5 min	Brake on : 0 Brake off : 120	
MAXIMUM SWINGABLE SLANT ANGLE deg.	20 or possibly more	
SWING BEARING PLAY mm	0.6 to 0.9	Allowable Limit: (2)
HYDRAULIC CYLINDER CYCLE TIME sec		
Boom Raise	2.3±0.3	
Boom Lower	3.0±0.3	
Arm Roll-in	2.7±0.3	
Arm Roll-out	2.0±0.3	
Bucket Roll-in	3.4±0.3	
Bucket Roll-out	2.3±0.3	
Right Boom Swing	9.0±0.5	
Left Boom Swing	7.0±0.5	
Blade Raise	2.2±0.5	
Blade Lower	2.9±0.5	

NOTE: 1 mm=0.03937 in

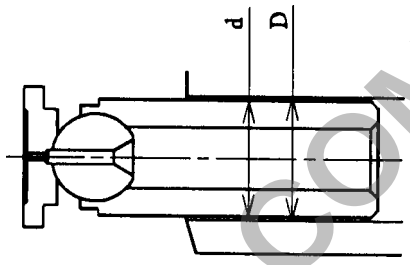
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MAINTENANCE STANDARDS

Main Pump

1. Clearance between the cylinder block bore and plunger

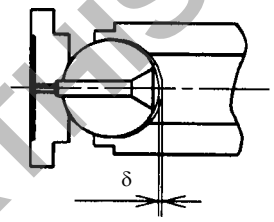
   (D-d): 0.040 mm or less.



W571-02-03-006

2. Clearance between the plunger tip and shoe bottom

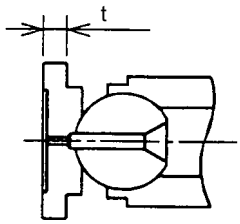
   δ: 0.2 mm or less.



W571-02-03-005

3. Shoe thicknes

   t: 2.9 mm or more.



W571-02-03-007

4. Cylinder block, valve plate
   thrust plate, retainer plate
   retainer holder

   Make sure that there is no damage, wear, or seizure on the sliding surfaces.
   If damage depth is deep replace with a new one.

NOTE: 1 mm = 0.03937 in

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Bleeding Air from Hydraulic System

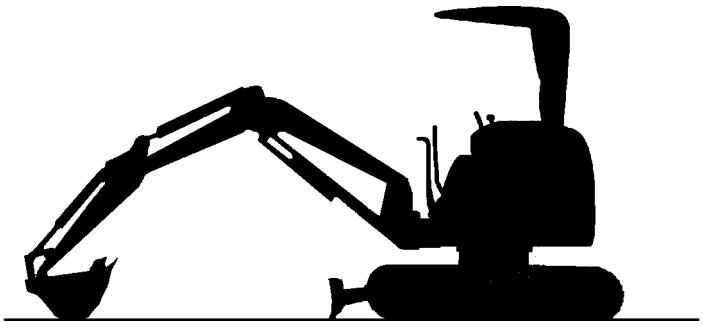
When hydraulic oil is drained, the suction filter or the suction lines are replaced, or the removal and installation of the pump, swing motor, travel motor or cylinder is done, bleed air from the hydraulic system in the following procedures:

IMPORTANT: If the engine is started with air trapped in the hydraulic pump housing, damage to the pump may result.
If the hydraulic motor is operated with air trapped in the hydraulic motor housing, damage to the motor may result.
If the cylinder is operated with air trapped in the cylinder tube, damage to the cylinder may result.
Be sure to bleed air before starting the engine.

- Bleeding Air from Hydraulic Pump
  - Remove the air bleeding plug from the top of the pump and fill the pump housing with hydraulic oil.
  - After the pump housing is filled with hydraulic oil, temporarily tighten the plug. Then, start the engine and run at slow idle speed.
  - Slightly loosen the plug to bleed air from the pump housing until hydraulic oil oozes out.
  - After bleeding all the air, securely tighten the plug.

- Bleeding Air from Travel Motor / Swing Motor
  - With the drain plug / hose on travel motor / swing motor removed, fill the motor case with hydraulic oil.

- Bleeding Air from Hydraulic Circuit
  - After refilling hydraulic oil, start the engine. While operating each cylinder, swing motor and travel motor evenly, operate the machine under light loads for 10 to 15 minutes. Slowly start each operation (never fully stroke the cylinders during initial operation stage). As the pilot oil circuit has an air bleed device, air trapped in the pilot oil circuit will be bled while performing the above operation for approx. 5 minutes.
  - Reposition the front attachment to check hydraulic oil level.
  - Stop the engine. Recheck hydraulic oil level. Replenish oil as necessary.



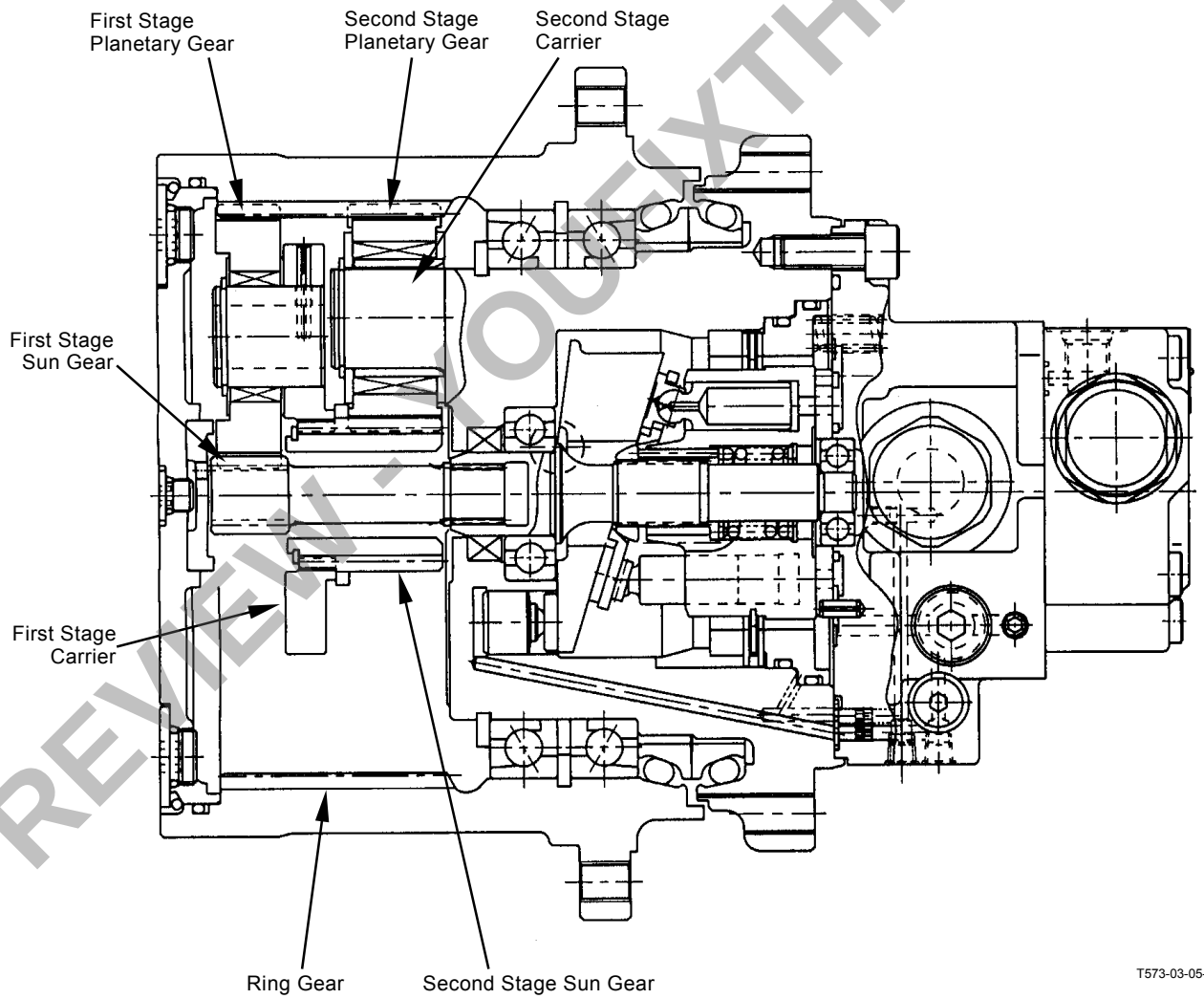
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TRAVEL REDUCTION GEAR

The travel motor rotates the shaft, and the rotation is transmitted to the first stage sun gear. The rotation of the first stage sun gear is reduced by the first stage planetary gear and the first stage carrier, and is transmitted to the second stage sun gear. The rotation of the second stage sun gear is reduced by the second stage planetary gear and the second stage carrier (united with the travel motor housing).
As second stage carrier and travel motor housing is united into one part, the rotation of the second stage planetary gear is transmitted to sprocket via the ring gear.



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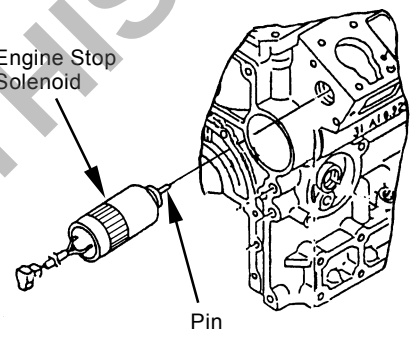
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Starter rotates but engine does not start.

- The faulty engine and the faulty electrical circuit are suspected. This page describes the trouble-shooting of electrical circuit (fuel pump, engine stop solenoid).
  In case of faulty engine, refer to "Engine Shop Manual".
- Check the connection of wiring first.

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YES



T573-05-02-005

Disconnect fuel line that goes to engine at fuel pump. Check if fuel is delivered when key switch is turned ON.

NO

Check if fuel filter is restricted.

YES

NO

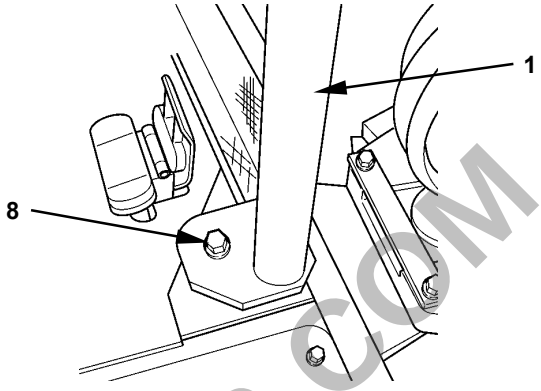
Disconnect fuel pump connector. Check if terminal #1 on harness end connector is 12V.

・Key switch: ON

YES

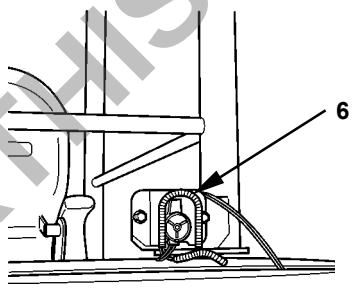
NO

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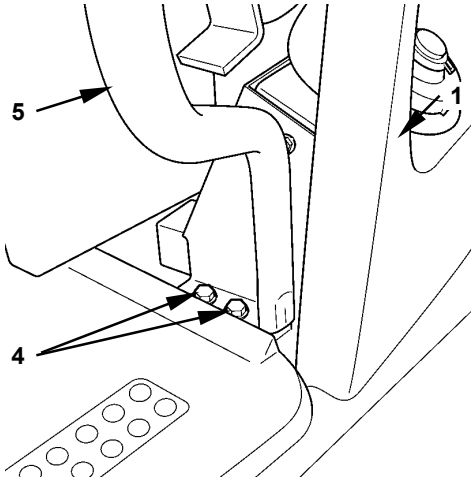
3. Connect the connectors to travel alarm (6).



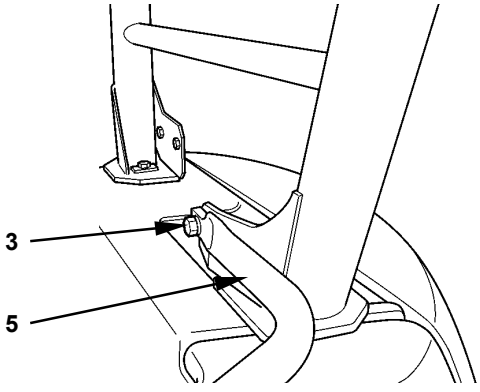
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4. Tighten bolts (3) and (4) (2 used) to install handrail (5).

: 17 mm
: 49 N·m (5 kgf·m, 36 lbf·ft)



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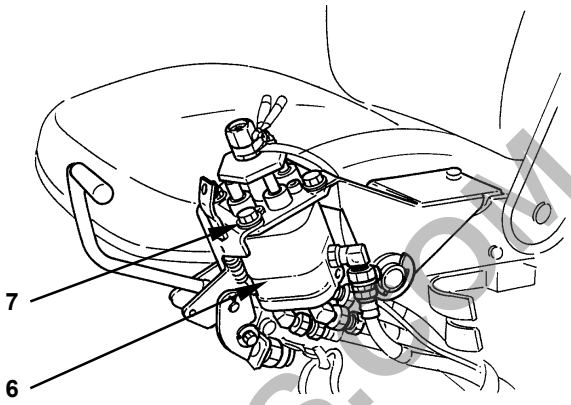
Installation

1. Install pilot valve (6) and tighten bolts (7).

   : 13 mm
   : 9.8 N·m (1 kgf·m, 7.2 lbf·ft)

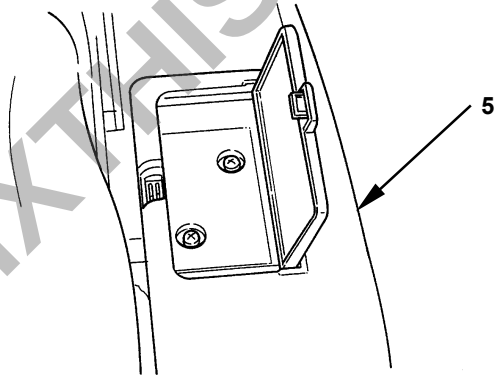
2. Connect all hoses and harnesses.

   : 19 mm
   : 29 N·m (3 kgf·m, 21 lbf·ft)



W532-02-06-003

3. Install cover (5).

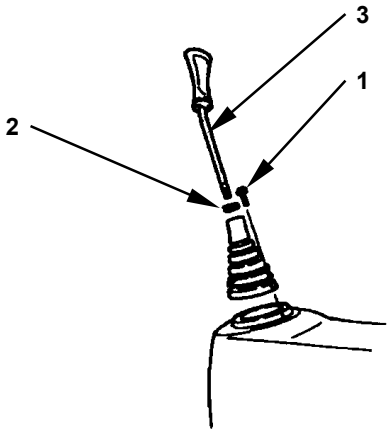


W532-02-06-002

4. Connect harnesses in the boot. Install lever (3) and tighten nut (2). Install pins (1) to secure the boot.

   : 22 mm
   : 135 N·m (14 kgf·m, 100 lbf·ft)

IMPORTANT: After connecting the hoses, fill the hydraulic oil tank with oil to the correct level. Start the engine and check the hoses for oil leaks.



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24. Install spool (76), rings (60) (2 used), springs (59) (2 used) and O-rings (58) (2 used) into body (67), then install plugs (57) (2 used).

    : 36 mm
    : 196 to 245 N·m
    (20 to 25 kgf·m, 144 to 180 lbf·ft)

25. Install shuttle spool (73), O-ring (74) and plug (75) onto body (67).

    : 8 mm
    : 46 to 51 N·m
    (4.7 to 5.3 kgf·m, 34 to 38 lbf·ft)

26. Install spool (69), O-ring (71) and plug (72) onto body (67).

    : 5 mm
    : 12 to 23 N·m
    (1.2 to 2.3 kgf·m, 8.7 to 17 lbf·ft)

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SECTION 1

GENERAL INFORMATION

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RECOMMENDED LUBRICATING OIL	26

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REASSEMBLY

1. CYLINDER HEAD ASSEMBLY

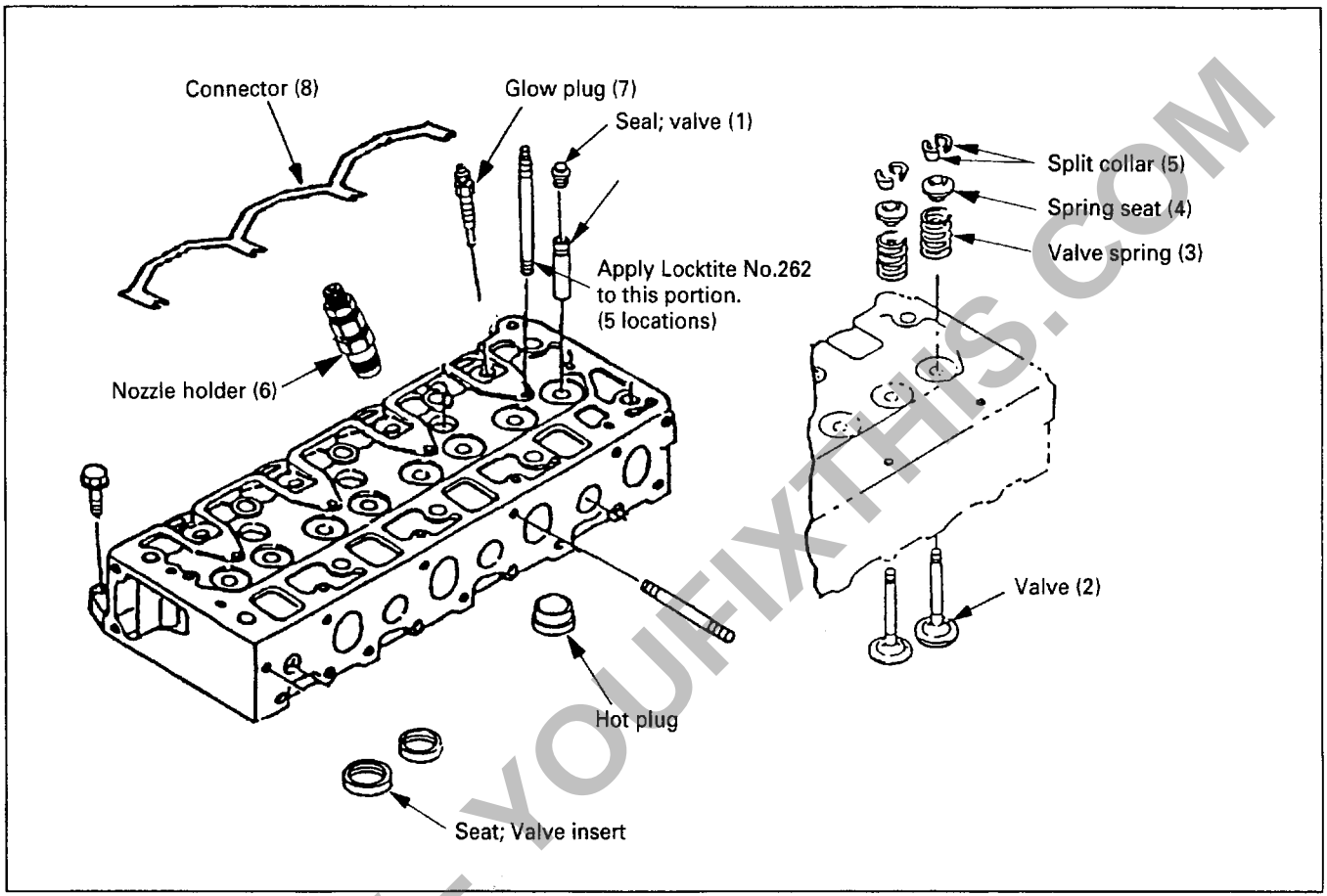


Fig. 116

Important Operations

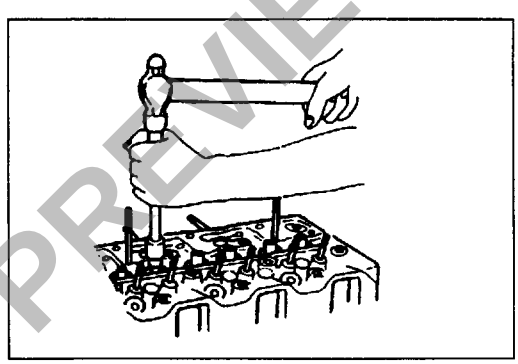


Fig. 117

Valve Stem Oil Seal

1. Lubricate the oil seals and valve stem sealing area with engine oil.
2. Use a valve stem oil seal installer to install the oil seal.

   Valve Stem Oil Seal Installer: 5-8840-9007-0

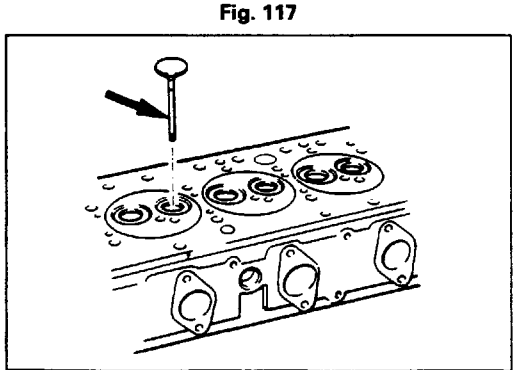


Fig. 118

Intake and Exhaust Valves

1. Place the cylinder head on a flat wooden surface.
2. Lubricate valve stems with engine oil.
3. Install the valves to the intake or exhaust guides.

   Install the valves to their original lapped valve seats.

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