Technical Manual

EX33Mu, 58Mu

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INTRODUCTION

TO THE READER

- This manual is written for an experienced technician to provide technical information needed to maintain and repair this machine.

  · Be sure to thoroughly read this manual for correct product information and service procedures.
  · If you have any questions or comments regarding the contents of this manual.

  Please contact using "Service Manual Revision Request Form" at the end of this manual.
  (Note: Do not tear off the form. Copy it for usage.):

  Publications Marketing & Product Support
  Hitachi Construction Machinery Co. Ltd.
  TEL: 81-298-32-7173
  FAX: 81-298-31-1162

- Two types of manual are available. One is Technical Manual(T/M). The other is Workshop Manual(W/M).
  Use the manuals according to purpose.

  · Information included in the T/M:
  technical information needed for redelivery and delivery, operation and activation of all devices and systems, operational performance tests, and troubleshooting procedures.

  · Information included in the W/M:
  technical information needed for maintenance and repair of the machine, tools and devices needed for maintenance and repair, maintenance standards, and removal/installation and assemble/disassemble procedures.

ADDITIONAL REFERENCES

- Please refer to the materials listed below in addition to this manual.

  · The Operator's Manual
  · The Parts Catalog
  · Operation Manual of the Engine
  · Parts Catalog of the Engine
  · Hitachi Training Material

PAGE NUMBER

- Each page has a number, located on the center lower part of the page, and each number contains the following information:

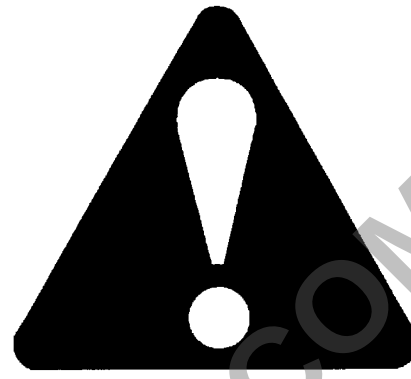
  Example: T 01-03-05

  - 05 → Consecutive Page Number for Each Group
  - 03 → Group Number
  - 01 → Section Number
  - T → T: Technical Manual W: Workshop Manual

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RECOGNIZE SAFETY INFORMATION

- This is the **SAFETY ALERT SYMBOL.**
  - When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.
  - Follow recommended precautions and safe operating practices.



001-E01A-0001-2 SA-001

UNDERSTAND SIGNAL WORDS

- On machine safety signs, signal words designating the degree or level of hazard – DANGER, WARNING, or CAUTION – are used with the safety alert symbol.
  - **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
  - **WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
  - **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
  - **DANGER or WARNING safety signs** are located near specific hazards. General precautions are listed on **CAUTION safety signs.**
- **CAUTION** also calls attention to safety messages in this manual.
- To avoid confusing machine protection with personal safety messages, a signal word **IMPORTANT** indicates a situation which, if not avoided, could result in damage to the machine.
- ***NOTE*** indicates an additional explanation for an element of information.

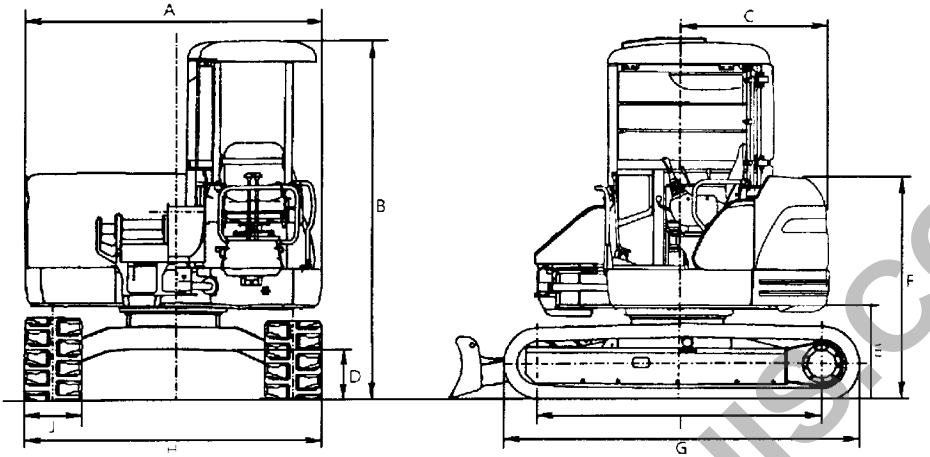


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SPECIFICATIONS



M588-11-001

Description \ Model	33Mu		58Mu	
	Canopy	Cab	Canopy	Cab
Type of Front-End Attachment	Boom Swing Type			
Bucket Capacity m^3 (yd^3)	0.09 (※0.12)		0.24 (※0.31)	
Machine Weight kg (lb)	3 100 (6 840)	3 130 (6 900)	5 550 (12 240)	5 580 (12 300)
Base Machine Dry Weight kg(lb)	2 330 (5 140)	2 360 (5 200)	4 110 (9 060)	4 140 (9 130)
Engine	KUBOTA D1503-KA 16.9 kW / 2 000 min^{-1} (23 PS / 2 000 rpm)		ISUZU 4LE1 29.4 kW / 2 100 min^{-1} (40 PS / 2 100 rpm)	
A: Overall Width mm (ft in)	1 670 (5′ 6″)		2 090 (6′ 10″)	
B: Canopy Cab Height mm (ft in)	2 505 (8′ 3″)		2 570 (8′ 5″)	
C: Rear-End Swing Radius mm (ft in)	845 (2′ 9″)		1 055 (3′ 6″)	
D: Minimum Ground Clearance mm (ft in)	330 (1′ 1″)		330 (1′ 1″)	
E: Counterweight Clearance mm (ft in)	595 (1′ 11″) (Rubber Crawler)		660 (2′ 2″) (Rubber Crawler)	
F: Engine Cover Height mm (ft in)	1 540 (5′ 1″)		1 610 (5′ 3″)	
G: Undercarriage Length mm (ft in)	2 015 (6′ 7″) (Rubber Crawler)		2 515 (8′ 3″) (Rubber Crawler)	
H: Undercarriage Width mm (ft in)	1 620 (5′ 4″)		2 040 (6′ 8″)	
I: Sprocket Center to Idler Center mm (ft in)	1 590 (5′ 3″)		2 000 (6′ 7″)	
J: Track Shoe Width mm (ft in)	300 (12″) (Rubber Crawler)		400 (16″) (Rubber Crawler)	
Ground Pressure kPa (kgf/cm^2)	29.1 (0.30)	29.4 (0.30)	31.2 (0.32)	31.4 (0.32)
Swing Speed min^{-1} (rpm)	10		11	
Travel Speed (Fast / Slow) km (h)	4.0 / 2.4		4.4 / 2.7	
Gradeability % (Degree)	58 (30)		58 (30)	

NOTE: Figures marked with ※ equals CECE heaped capacity.

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COMPONENT INTERCHANGEABILITY LIST

The following list shows the component interchangeability among the different models.

Only the components connected with the bold line " ——— " are interchangeable between models.

Description \ Model		33Mu	30-2	58Mu	55UR
Upperstructure	Engine	●	●	●	●
	Pump Device	●	●	●	●
	Swing Device	●	●	●	●
	Control Valve	●	●	●	●
	Pilot Valve	●	●	●	●
	Boom-Swing Cylinder	●	●	●	–
Undercarriage	Travel Device	●	●	●	●
	Swing Bearing	●	●	●	●
	Center Joint	●	●	●	●
	Track Adjuster	●	●	●	●
	Front Idler	●	●	●	●
	Upper Roller	●	●	●	●
	Lower Roller	●	●	●	●
	Rubber Crawler	●	●	●	●
	Blade	●	●	●	●
	Blade Cylinder	●	●	●	●
Front attachment	Boom	●	●	●	●
	Arm	●	●	●	●
	Bucket	●	●	●	●
	Boom Cylinder	●	●	●	●
	Arm Cylinder	●	●	●	●
	Bucket Cylinder	●	●	●	●

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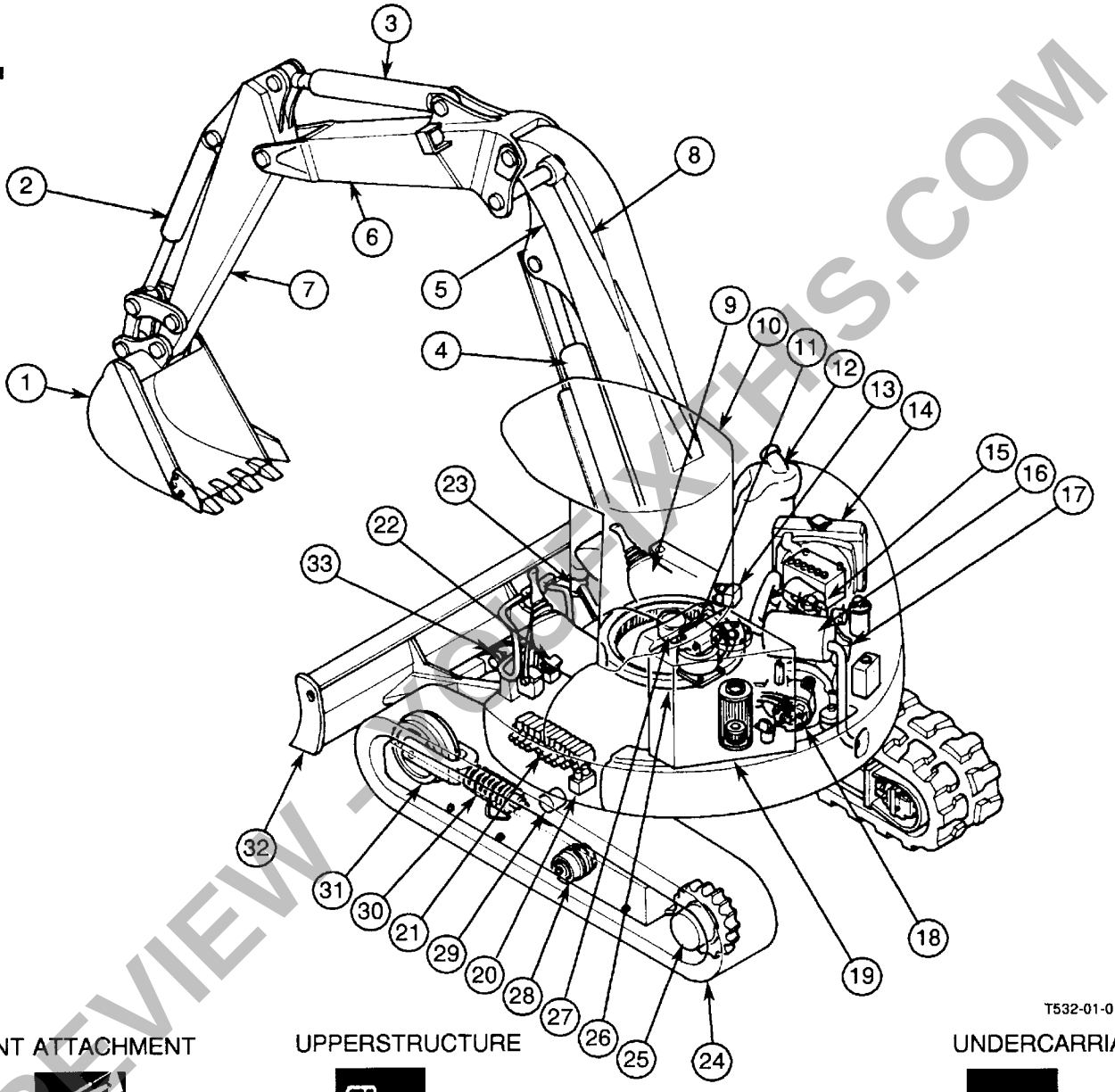
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OUTLINE

The hydraulic excavator consists of three main sections, front attachment, upper structure and undercarriage.

33Mu



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FRONT ATTACHMENT

1— Bucket
2— Bucket Cylinder
3— Arm Cylinder
4— Boom Cylinder
5— Lower Boom
6— Upper Boom
7— Arm
8— Cross Rod

UPPERSTRUCTURE

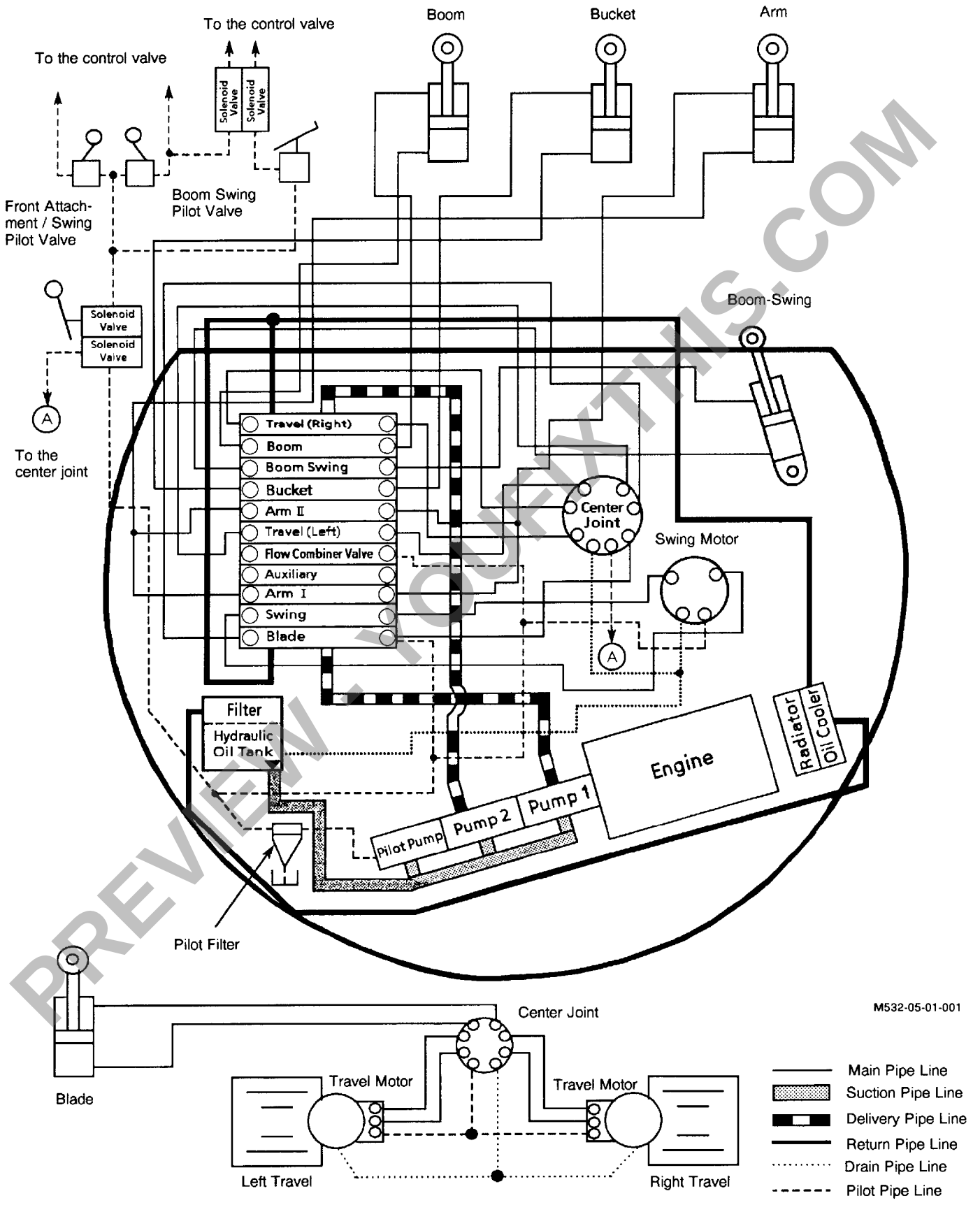
9— Pilot Valve (Front Attachment)
10— Canopy
11— Swing Device
12— Fuel Tank
13— Solenoid Valve (Pilot Control Shut-Off Lever, Travel Speed Selector)
14— Radiator
15— Air Cleaner
16— Muffler
17— Engine
18— Pump Device
19— Hydraulic Oil Tank
20— Proportional Solenoid Valve (Auto Boom-Stop)
21— Control Valve
22— Pilot Valve (Boom-Swing)
23— Boom-Swing Cylinder

UNDERCARRIAGE

24— Track
25— Travel Device
26— Swing Bearing
27— Center Joint
28— Lower Roller
29— Upper Roller
30— Track Adjuster
31— Front Idler
32— Blade
33— Blade Cylinder

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Hydraulic Circuit 33Mu



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PURPOSE

Performance tests are used to quantitatively check the performance level of each function and component.

Kinds of Tests

1. Machine Performance Tests: To check machines functional performances, such as those of the engine, travel, swing and hydraulic cylinders.
2. Hydraulic Component Performance Tests: To check function of each hydraulic component, such as hydraulic pumps, motors, and valves.

Purpose of Tests

1. To evaluate the function of each component by comparing measured data with specifications.
2. To restore machines performance to its original level by repairing or replacing components as necessary, based on test evaluation results.
3. To attain safe and economical machine operation.

Performance Standard

The performance standard is shown in this section as "STANDARD" to compare with when evaluating measured data.

Precautions for Evaluation

1. Be sure to take performance standards "STANDARD" into account when evaluating measured data.
2. Also, take machines total operation hours, working conditions, and past maintenance record into consideration.

As the machine is operated for a long period of time, performance gradually deteriorates. The expected machine performance level after repairing, replacing, or readjusting parts on an older machine must be realistically considered.

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PREPARATION FOR PERFORMANCE TESTS

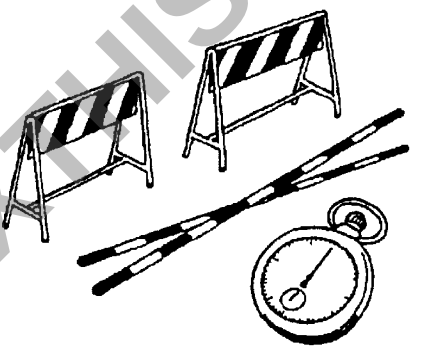
Observe the following rules in order to carry out performance tests accurately and safely.

The Machine

1. Before testing, inspect the machine. If any failure or damage is found, be sure to repair it beforehand.
2. Before testing, consult the record of daily and monthly inspections.
   Determine the extent to which they have been conducted properly.

Preparations

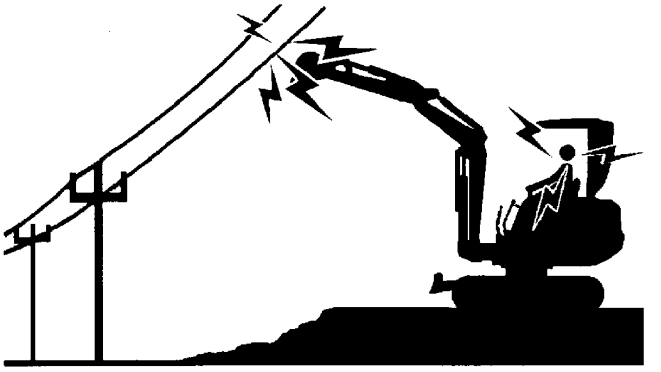
1. Select a firm, level surface, long enough to travel more than 20 m (65 ft 7 in.) straight and wide enough to make a full swing with the front attachment fully extended.
2. Provide necessary tools and measuring instruments for testing. Utilize the Dr. EX when applicable.
3. Be sure to rope off the test area and provide signboards to keep unauthorized personnel out.
4. Provide required test weight or an object having an equivalent weight.



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Precautions

1. Before testing, be sure to agree on the signals to be employed for communication among co-workers. Once the test is started, communicate with each other using these signals and be sure to follow them.
2. While testing, always pay attention to surroundings, such as ground stability, obstacles within and around the test area, power lines, etc., so as to operate the machine safely within the test area.
3. Operate the machine carefully and always give priority to safety.
4. When disconnecting hydraulic lines, be sure to drain hydraulic oil into proper containers, so as to avoid contaminating the ground or making the machine dirty.
5. After completing the test, be sure to clean the test area and the machine, and properly dispose of waste oil and any rags used in the cleaning.



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Make Precise Measurements

1. Accurately calibrate test instruments in advance in order to obtain correct data.
2. Perform tests under the exact test conditions prescribed for each test.
3. Repeat tests and reconfirm that the test data obtained matches repeatedly.
   Use mean values of multiple measurements.
4. Always strive to improve your testing techniques.

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	Item \ Model	33Mu	58Mu	
3-11	**Cylinder Drift Check** (mm/5 min)			
	Boom Cylinder(Retraction)	10≧	10≧	
	Arm Cylinder(Extension)	10≧	15≧	
	Bucket Cylinder(Retraction)	10≧	10≧	
	Blade Cylinder(Extension)	3≧	3≧	
	Dig Function Drift	150≧	150≧	
3-12	**Control Lever and Pedal Operating Force** (kgf)			
	Boom	1.5≧	1.5≧	
	Arm	1.5≧	1.5≧	
	Bucket	1.5≧	1.5≧	
	Swing	1.5≧	1.5≧	
	Travel	2.0≧	2.0≧	
	Blade	2.5≧	2.5≧	
	Boom Swing	8.0≧	8.0≧	
	Engine Speed Control	5.0≧	5.0≧	
3-13	**Control Lever and pedal Stroke** (mm)			
	Boom	93 ± 5	93 ± 5	
	Arm	93 ± 5	93 ± 5	
	Bucket	93 ± 5	93 ± 5	
	Swing	93 ± 5	93 ± 5	
	Travel	93 ± 10	98 ± 10	
	Blade	70 ± 10	70 ± 10	
	Boom Swing	14 ± 5	14 ± 5	
	Engine Speed Control	163 ± 10	163 ± 10	
4-1	**Pilot Pressure** (kgf/cm^2)	65 ± 5	65 ± 5	
4-2	**Main Relief Valve Pressure Setting** (kgf/cm^2)	220 ± 10	260 ± 10	
	Flow Rate (L/min)			
4-3	**Overload Relief Valve Pressure Setting (Reference)** (kgf/cm^2)	250 ± 10	280 ± 10	
	Flow Rate (L/min)			
4-4	**Swing Motor Relief Valve Pressure Setting** (kgf/cm^2)	170 ± 10	245 ± 10	
	Flow Valve (L/min)			

NOTE: 1 kgf = 9.807 N
1kgf / cm^2 = 0.09807 MPa

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TROUBLESHOOTING



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FAULT CODE LIST

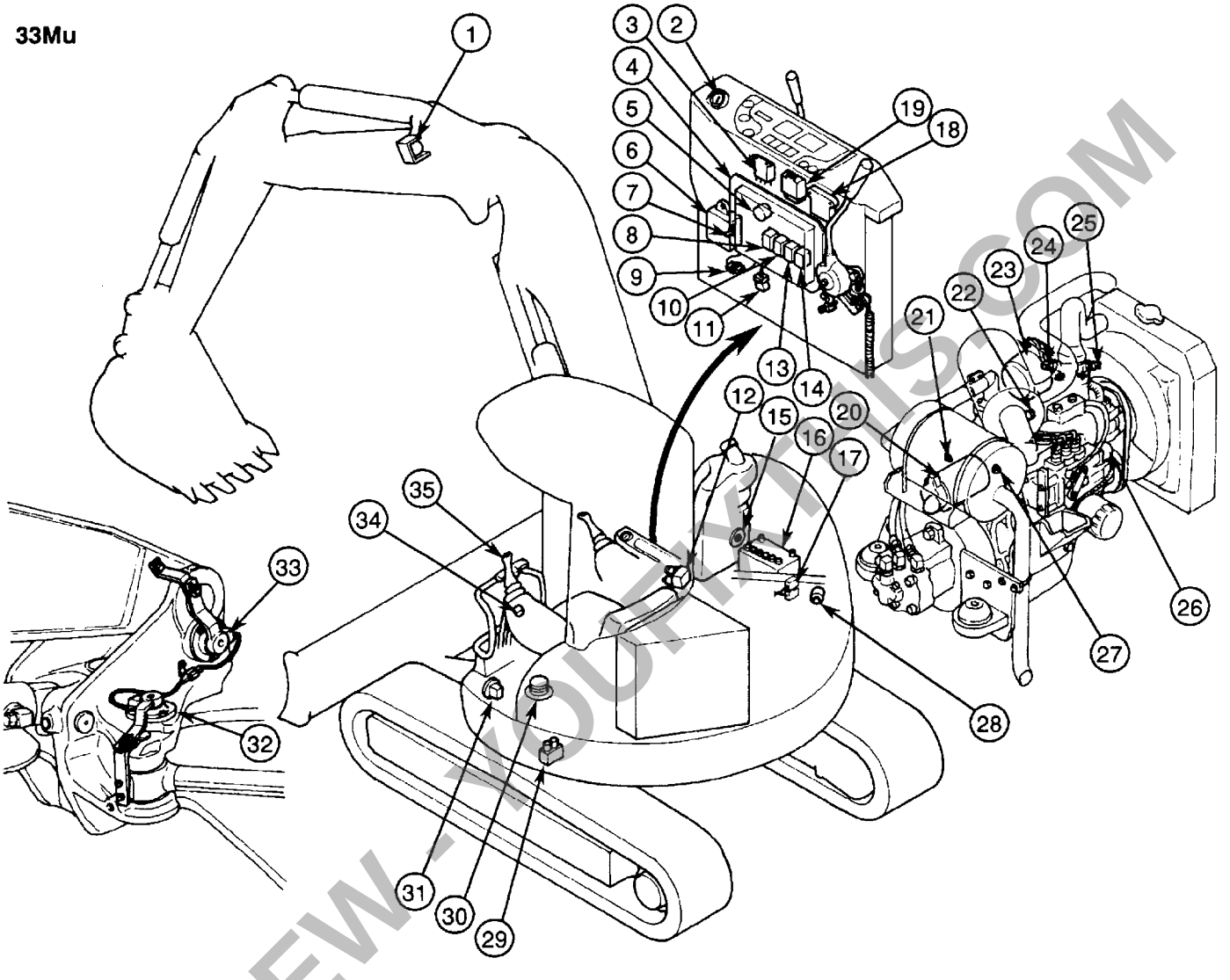
Code	Description	Note
10 11 12 18 19 1A 1B 1C 1D 20	Abnormal CPU Condition Code Register Abnormal CPU General Register Abnormal CPU Mode Diagnosis (One Chip Mode) Abnormal Interruption Test Abnormal 16 Bit Timer (CH1) Abnormal 16 Bit Timer (CH2) Abnormal 16 Bit Timer (CH3) Abnormal 8 Bit Timer Abnormal Internal Watch Dog Abnormal RAM Read / Write	
40 41 43	Solenoid Disconnection / Short Circuit (Boom Raise) Solenoid Disconnection / Short Circuit (Clockwise Swing) Pilot Shut-Off Relay Disconnection / Short Circuit	After repairing, turn key switch ON to return to normal operation. Buzzer Sound Mode: Long Intermittent Sound
50 51 54 55	Boom Sensor Disconnection / Short Circuit (0 V Side) Swing Sensor Disconnection / Short Circuit (0 V Side) Boom Sensor Disconnection / Short Circuit (5 V Side) Swing Sensor Disconnection / Short Circuit (5 V Side)	After repairing, turn key switch ON to return to normal operation. Buzzer Sound Mode: Continuous Sound
60 62 64 66	Faulty Boom Sensor Initial Set Value (Lower Limit) Faulty Swing Sensor Initial Set Value (Lower Limit) Faulty Boom Sensor Initial Set Value (Upper Limit) Faulty Swing Sensor Initial Set Value (Upper Limit)	Initial set operation is not executed. (Previous initial set value does not change.) Sensor input signal shall be checked in the initial set position. Buzzer Sound Mode: Continuous Sound
70 71 74 75	Excessive Boom Sensor Output Variation (0 V Side) Excessive Swing Sensor Output Variation (0 V Side) Excessive Boom Sensor Output Variation (5 V Side) Excessive Swing Sensor Output Variation (5 V Side)	Turn key switch ON to return to normal operation. (If the same trouble is repeated, the sensor mayhave failed.) Buzzer Sound Mode: Continuous Sound
80 81 84 85	Abnormal Boom Sensor Angle (0 V Side) Abnormal Swing Sensor Angle (0 V Side) Abnormal Boom Sensor Angle (5 V Side) Abnormal Swing Sensor Angle (5 V Side)	After repairing, turn key switch ON to return to normal operation. Buzzer Sound Mode: Continuous Sound
A0 A1	Abnormal 12 V Power Voltage (10 V or Less) Abnormal 12 V Power Voltage (16 V or Greater)	System Indicator Blinks. Deactivate the system to move the front attachment.

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ELECTRICAL PART LATOUT

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1— Work Light
2— Key Switch
3— Glow Plug Relay
4— Controller
5— Buzzer (Auto Boom-Stop)
6— Fuse Box
7— Emergency Release Switch (Auto Boom-Stop)
8— Travel Speed Control Relay
9— Initial Set Connector (Auto Boom-Stop)
10— Work Light Relay
11— Connector (Dr. EX)
12— Solenoid Valve (Pilot Control Shut-Off Lever, Travel Speed Control)
13— Horn Relay
14— Pilot Control Shut-Off Valve Relay
15— Fuel Level Sensor
16— Battery
17— Fusible Link
18— Starter Controller
19— Preheat Timer
20— Starter
21— Engine Oil Pressure Switch
22— Air Filter Restriction Switch
23— Alternator
24— Overheat Switch
25— Glow Plug Sensor
26— Engine Stop Solenoid
27— Coolant Temperature Sensor
28— Fuel Pump
29— Proportional Solenoid Valve (Auto Boom-Stop)
30— Travel Speed Control Switch
31— Horn
32— Swing Angle Sensor
33— Boom Angle Sensor
34— Pilot Control Shut-Off Lever
35— Horn Switch

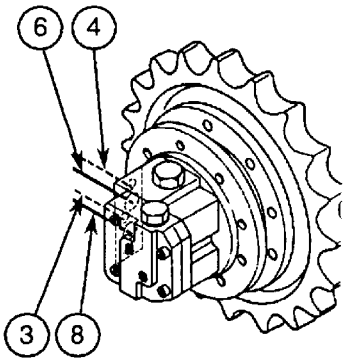
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CENTER JOINT

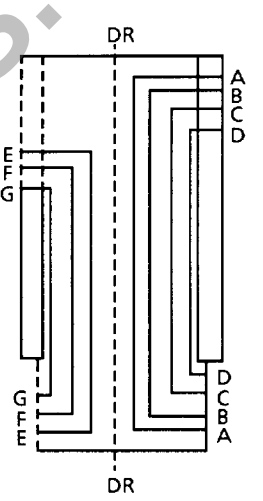
The center joint is a 360°- rotating joint. When the upperstructure rotates, the center joint avoids twisting of hoses and allows hydraulic oil to flow or from the travel motors and blade cylinder. Spindle (10) is attached to the undercarriage with four bolts, and body (5) is attached to the upperstructure with a lock pin.

Accordingly, when the upperstucture rotates, spindle (10) stays stationary together with the undercarriage, and body (5) rotates.Pressure oil flows into right and left travel motors (12) and blade cylinder (13) via oil passages in body (5) and spindle (10). Seals (11) prevent oil leaks from clearance between spindle (10) and body (5).

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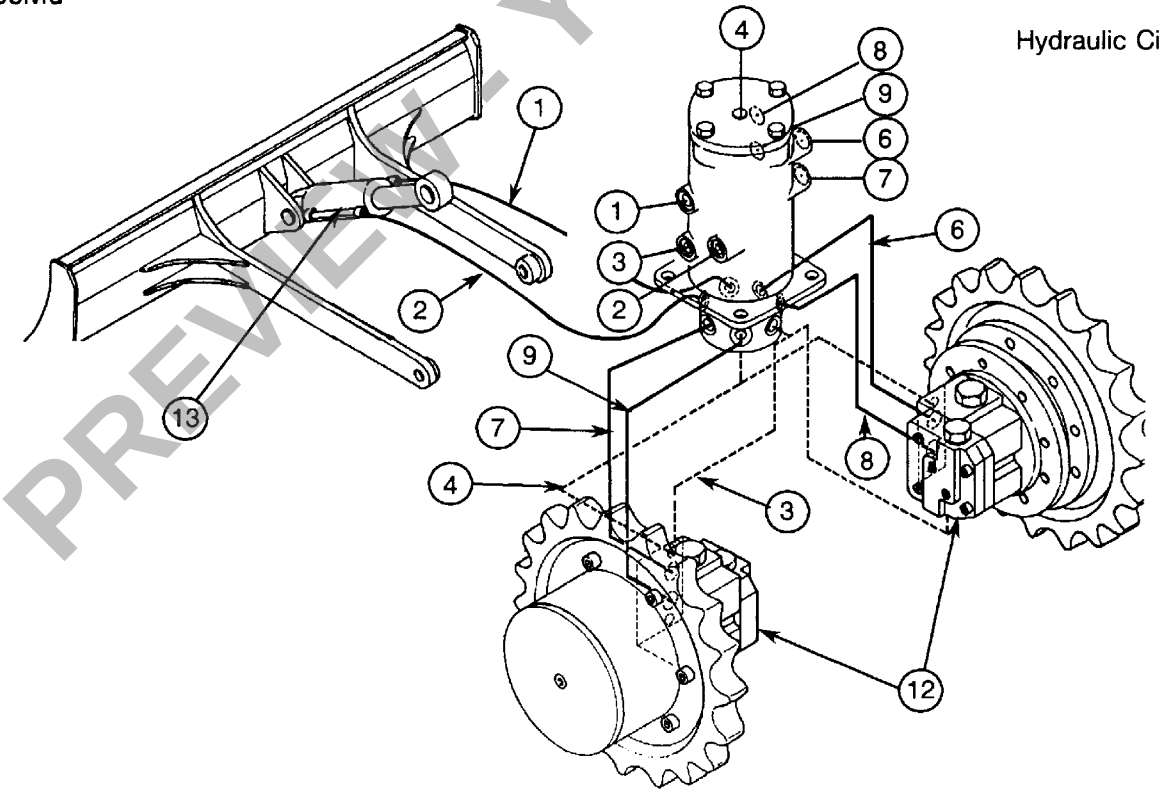


T532-03-03-001



Hydraulic Circuit Diagram

58Mu



T554-03-03-001

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2.3 VALVE CLEARANCE

NOTE: 1. Measure while the engine is cool.
2. Before starting, clean the head cover and cover mounting vicinity to prevent dust from entering the engine.

Preparation:

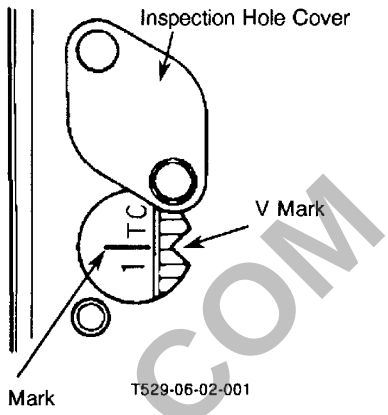
1. Remove the head cover.
2. Locate the top dead center (TDC) in the compression stroke. Refer to the following description for locating the TDC of No.1 piston
   33Mu: Align 『 1TC mark 』 on the flywheel with 『 V mark 』 on the rear end plate.
   58Mu: Align 『 Mark groove 』 on the crank pulley with 『 TDC mark 』 on the timing gear case cover.

NOTE: Remove the glow plug on each cylinder to easily rotate the flywheel.

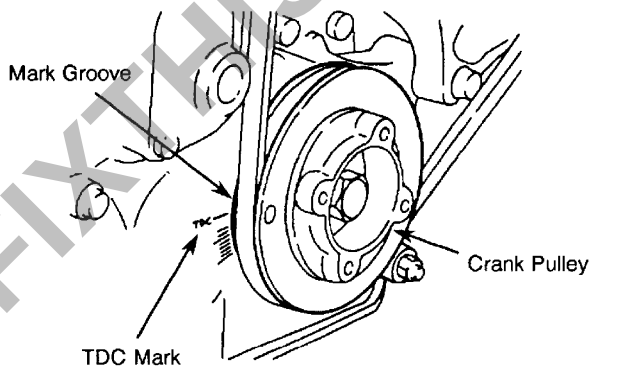
Measurement:

1. Measure the valve clearance between the rocker arm and the valve.
2. When the measurement is started from No.1 cylinder, measure the clearance of the valves marked "○" in the following table.

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(33Mu)

Cylinder No.	1		2		3	
Valve	I	E	I	E	I	E
Cylinder No.1 at top dead center	○	○		○	○	
Cylinder No.2, 3 at top dead center			×			×

(58Mu)

Cylinder No.	1		2		3		4	
Valve	I	E	I	E	I	E	I	E
Cylinder No.1 at top dead center	○	○	○			○		
Cylinder No.4 at top dead center				×	×		×	×

I : Intake Valve
E: Exhaust Valve

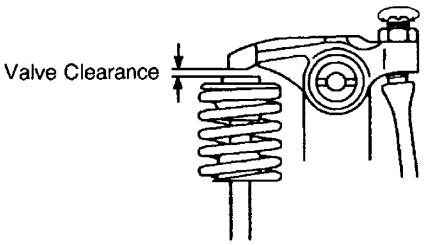
3. Turn the flywheel 360°. Then, measure the valve indicated with the mark "×."

Evaluation:

Refer to the Performance Standard Table in Group T06-05.

Adjustment:

If the results are outside the specification, adjust the clearance using the adjusting bolt. Then, lock the bolt with the lock nut.



T532-06-02-001

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6. Current Correction
When the current correction item is selected, boom and swing deceleration current value can be corrected by ±100 mA. Use this function when deceleration speed is too slow. In addition, boom raise stop position in front of the cab can be corrected by ±20° when the stop position is too close or too afar.

CAUTION: When temperature is low, oil viscosity increases, reducing valve response. Thereby, if correction is made to minus (–) side on the machine with the standard cab or canopy, potential of boom collision with the cab or canopy will increase. Never attempt to correct to minus (–) side.

Screen Flow Chart

Refer to the the screen flow chart shown on page 16 and 17.

NOTE: Swing displayed on Dr.EX screen shows Boom-Swing.

Screen Description

1. Title Screen

```
Dr.EX
58Mu        33Mu
F1  :  Start
F10:  Machine Model Menu
```

F1 : Go to the Operation Menu Screen
F10: Go to the Model Screen

2. Operation Menu Screen

```
          Select Item
F1  :  Fault Code Display
F2  :  Fault Code Deletion
F3  :  Troubleshooting
F4  :  Zone Check
F5  :  Monitor Display
F6  :  Current Correction
```

F1 : Go to the Stored Fault Code Screen.
F2 : Go to the Fault Code Deletion Screen.
F3 : Go to the Troubleshooting Screen.
F4 : Go to the Zone Check Screen.
F5 : Go to the Item Monitoring Screen.
F6 : Go to the Current Correction Menu Screen.

3. Stored Fault Code Screen
Fault Code List & Selection Screen

```
Detected Fault Codes:
40  F0  F2  F1

F1 :← F2 : → F5 : Prev
F7 : Next ↓ ENT : More Info
```

F1, F2: Move the cursor to select the fault code.
F5 : Go back to the Operation Menu Screen.
F6 : Refer to the previous page. (When the fault code are listed on two pages, this key is displayed.)
F7 : Refer to the next page. (When the fault code are listed on two pages, this key is displayed.)
ENT : Go to the More Information Screen.

More Information Screen

```
Fault Code: 40

Solenoid Disconnection /
Short Circuit (Boom Raise)

Touch any key
```

4. Fault Code Deletion
Fault Code Deletion Screen

```
Delete all fault codes?

F1:  Yes        F5:  NO
```

F1: Delete fault codes and go to the Fault Code Deletion Completed Screen.
F5: Do not delete fault codes and go back to the Operation Menu Screen.

NOTE: Do not delete the fault code until the troublecause is detected. Recommended to write this info down.

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SAFETY ALERT SYMBOL AND HEADLINE NOTATIONS

In this manual, the following safety alert symbol and signal words are used to alert the reader to the potential for personal injury or machine damage.

⚠ This is the safety alert symbol. When you see this symbol, be alert to the potential for personal injury.
Never fail to follow the safety instructions prescribed along with the safety alert symbol.
The safety alert symbol is also used to draw attention to component/part weights.
To avoid injury and damage, be sure to use appropriate lifting techniques and equipment when lifting heavy parts.

- ⚠ **CAUTION:** indicated a potentially hazardous situation which could, if not avoided, result in personal injury or death.
- **IMPORTANT:** indicates a situation which, if not conformed to the instructions, could result in damage to the machine.
- *NOTE:* indicates supplementary technical information or know-how.

UNITS USED

- SI Units (International System of Units) are used in this manual.
  MKSA system units and English units are also indicated in parentheses just behind SI units.
  Example: 24.5 MPa (250 kgf/cm^2, 3 560 psi)

  A table for conversion from SI units to other system units is shown below for reference purposes.

Quantity	To Convert From	Into	Multiply By
Length	mm	in	0.039 37
	mm	ft	0.003 281
Volume	L	US gal	0.264 2
	L	US qt	1.057
	m^3	yd^3	1.308
Weight	kg	lb	2.205
Force	N	kgf	0.101 97
	N	lbf	0.224 8
Torque	N·m	kgf·m	1.019 7
	N·m	lbf·ft	0.737 5

Quantity	To Convert From	Into	Multiply By
Pressure	MPa	kgf/cm^2	10.197
	MPa	psi	145.0
Power	kW	PS	1.360
	kW	HP	1.341
Temperature	°C	°F	°C × 1.8 + 32
Velocity	km/h	mph	0.621 4
	min^{-1}	rpm	1.0
Flow rate	L/min	US gpm	0.264 2
	mL/rev	cc/rev	1.0

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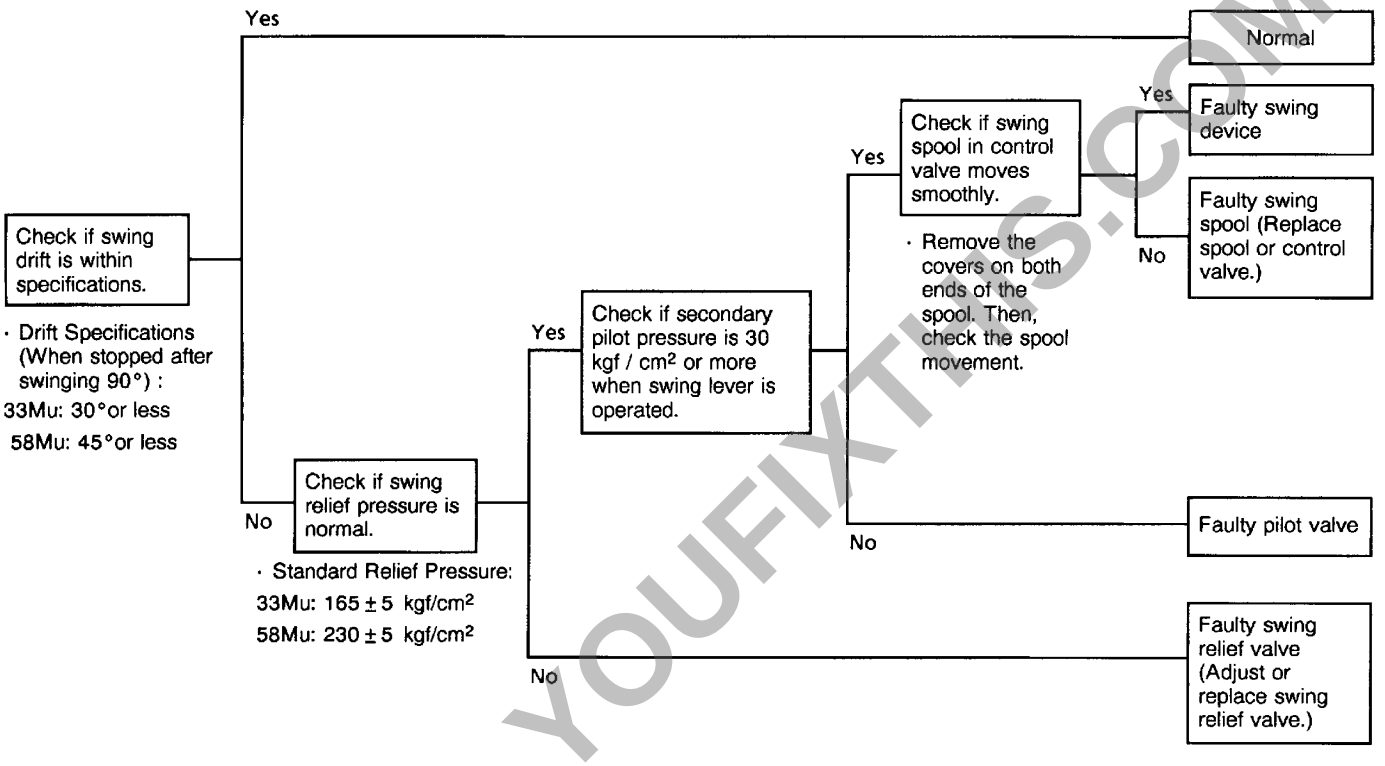
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S-3 Swing drift is large when swing is stopped.

Guidance:
When swing drifts roughly, the related swing brake valve may have trouble. When swing drifts smoothly, the related spool in the control valve may be impaired.

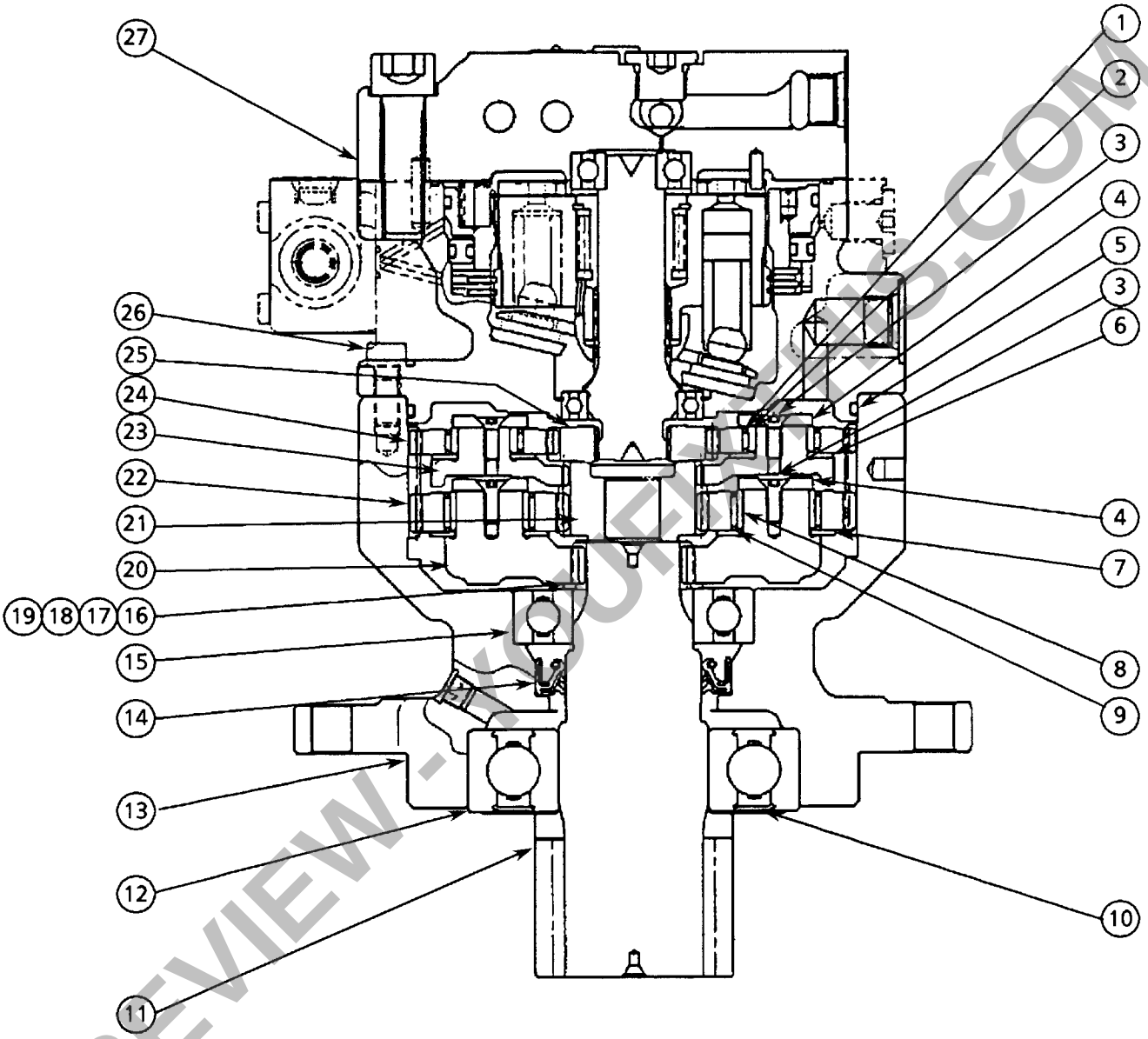


NOTE: 1kgf/cm² = 0.09807 MPa

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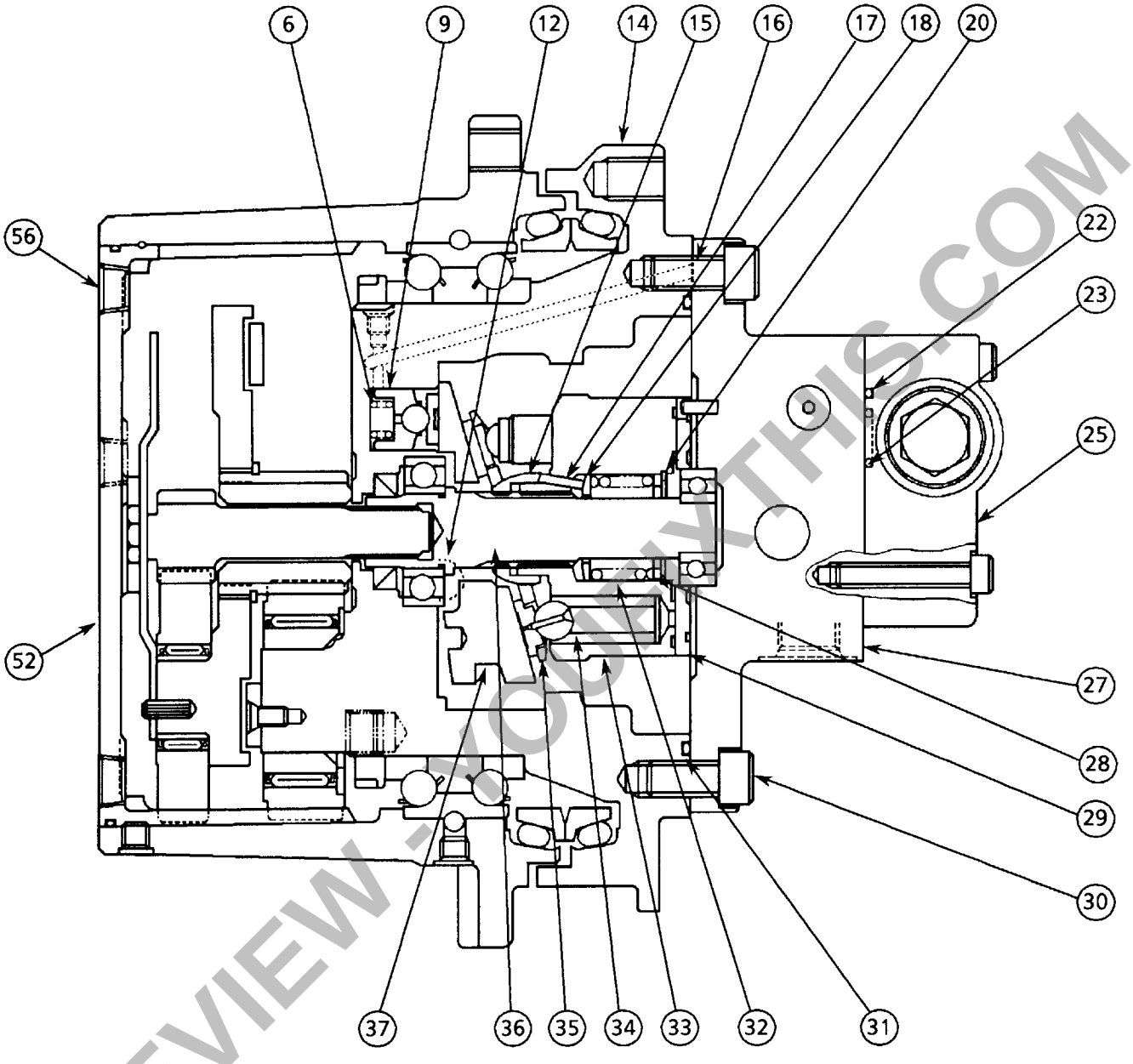
DISASSEMBLE AND ASSEMBLE SWING REDUCTION GEAR (33Mu)



T525-02-03-001

1— Needle Bearing (4 used)
2— Inner Race (4 used)
3— Flat Head Bolt (8 used)
4— Thrust Plate (2 used)
5— O-Ring
6— Thrust Washer (4 used)
7— Thrust Washer (4 used)
8— Inner Race (4 used)
9— Needle Bearing (4 used)
10— Plate
11— Shaft
12— Ball Bearing
13— Ring Gear (Case)
14— Oil Seal
15— Ball Bearing
16— Retaining Ring
17— Shim (0.05 mm)
18— Shim (0.1 mm)
19— Shim (0.3 mm)
20— Second Stage Carrier
21— Second Stage Sun Gear
22— Second Stage Planetary Gear (4 used)
23— First Stage Carrier
24— First Stage Planetary Gear (4 used)
25— First Stage Sun Gear
26— Socket Bolt (4 used)
27— Swing Motor

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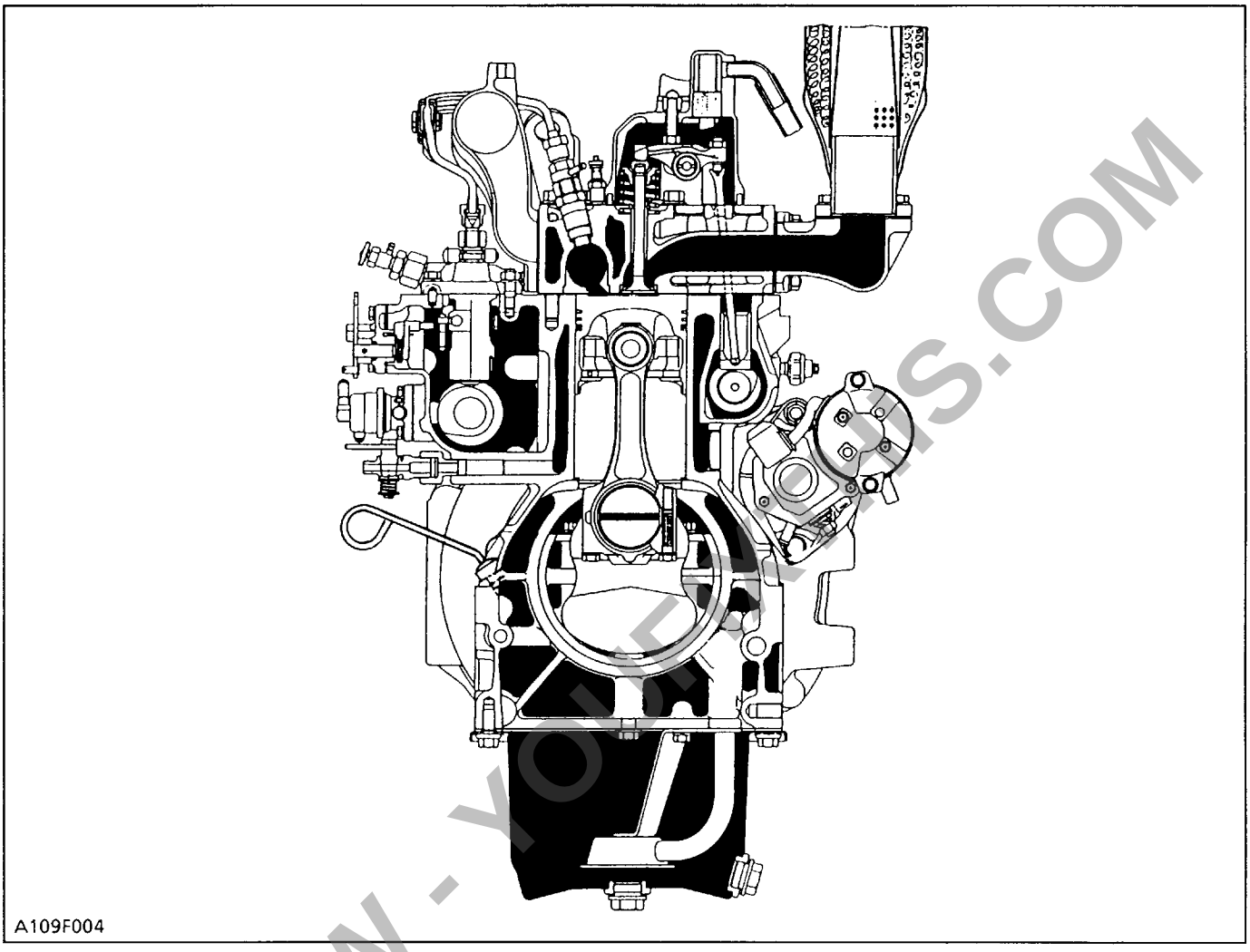


W533-03-02-001

6— Spring (2 used)
9— Swash Plate Control Piston (2 used)
12— Steel Ball (2 used)
14— Housing
15— Holder
16— O-Ring
17— Pin (3 used)
18— Collar
20— Retaining Ring
22— O-ring (3 used)
23— O-Ring (2 used)
25— Valve Housing
27— Brake Valve
28— Washer
29— Valve Plate
30— Socket Bolt (6 used)
31— O-Ring
32— Spring
33— Rotor
34— Plunger (9 used)
35— Retainer
36— Shaft
37— Swash Plate
52— Cover
56— Plug (3 used)

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F CARACTERISTIQUES F ALLGEMEINES



A109F004

Les moteus moteur de série 92,4 mm de course sont de moteur diesel à 4 temps, à cylindres verticaux et refroidissement par eau. Ils incorporent les technologies les plus avancées KUBOTA. Les Nouveau TVCS (Système de combustion à trois turbulences) de KUBOTA, les pompes d'injection Bosch type bien connues, et une conception bien équilibrée donnent à ces moteurs une puissance accrue, une consommation très basse, un faible niveau de vibrations et un fonctionnement silencieux.

■ NOTA

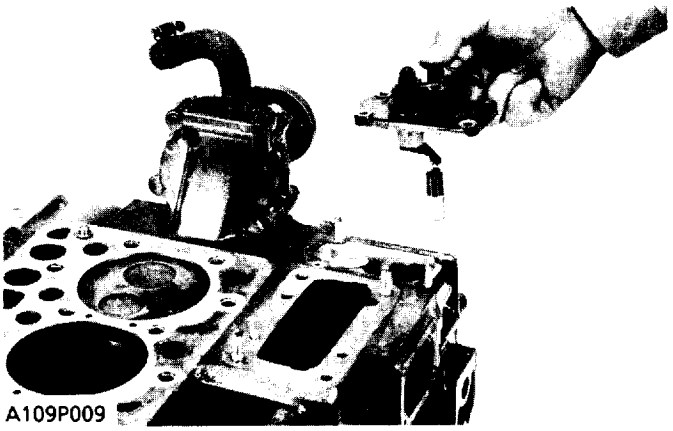
- La chambre d'explosion, auparavant modèle N-TVCS, des appareils produits depuis Janvier 1994 a été remplacée par le modèle E-TVCS, plus écologique et produisant des gaz d'échappement moins polluants.
  Le modèle des chambres d'explosion suivantes sera indiqué par E-TVCS.
  Modèle de la chambre d'explosion :
  E-TVCS Numéro de sprie : postérieur à
  D1403 ; 12212 et au-delà
  D1703 ; 4254 et au-delà
  V1903 ; 1563 et au-delà
  V2203 ; 60897 et au-delà
  F2803 ; 105568 et au-delà

Bei den Motoren Serienmotor mit 92,4 mm Hub handelt es sich um vertikale, wassergekühlte, Viertakt-Dieselmotoren. Sie sind nach der neuesten Technologie KUBOTAS ausgelegt. Mit der Das neue TVCS (Drei-Wirbel-Verbrennungssystem) von KUBOTA, der bekannten Einspritzpumpe Typ von Bosch und der durchdachten, ausgewogenen Konstruktion bieten sie höhere Leistung, geringen Kraft-stoffvrebrauch sowie vibrationsarmen und ruhigen Lauf.

■ ANMERKUNG

- In allen ab 1. Januar 1994 produzierten Anlagen wurde der bisherige Brennkammertyp N-TVCS durch den neu entwickelten Typ E-TVCS ersetzt, der dank reinerer Abluft besonders umweltfreundlich ist.
  Die folgenden Beschreibungen beziehen sich auf den Brennkammertype E-TVCS.
  Brennkammertyp :
  E-TVCS Seriennummern :
  D1403 ; 12212 und darüber
  D1703 ; 4254 und darüber
  V1903 ; 1563 und darüber
  V2203 ; 60897 und darüber
  F2803 ; 105568 und darüber

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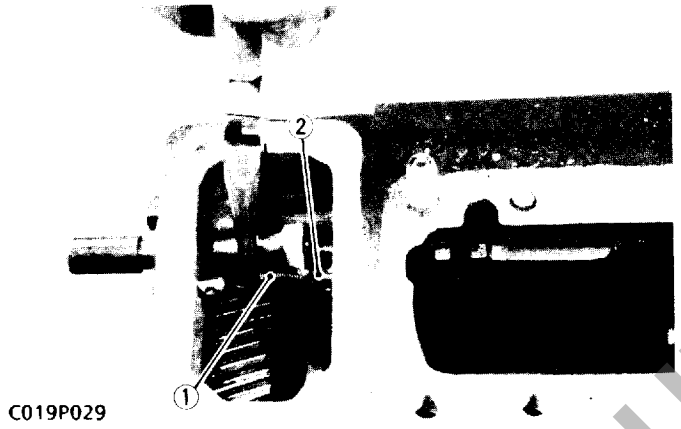

A109P009

Speed Control Plate

1. Remove the speed control plate with the governor springs 1 and 2.

(When reassembling)

- Be careful not to drop the governor springs 1 and 2 into the gear case.
- Apply a liquid gasket (Three Bond 1215 or equivalent) to both sides of the speed control plate gasket.



C019P029

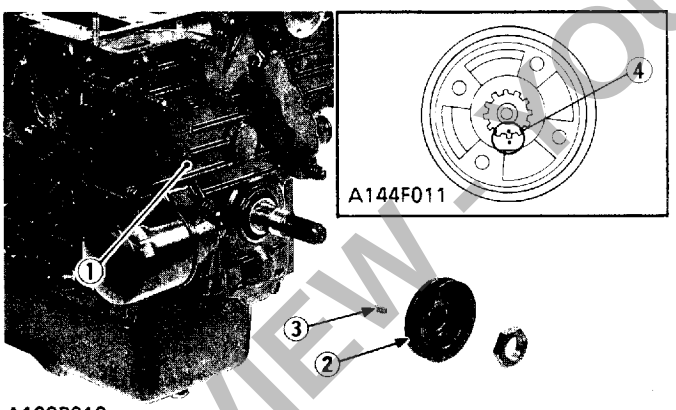
Start Spring

1. Remove the start spring (1) from the fork lever 1 (2).

(When reassembling)

- Be careful not to drop the start spring into the gear case.
- Hook the start spring so that the longer hook is on the fork lever side.

(1) Start Spring
(2) Fork Lever 1



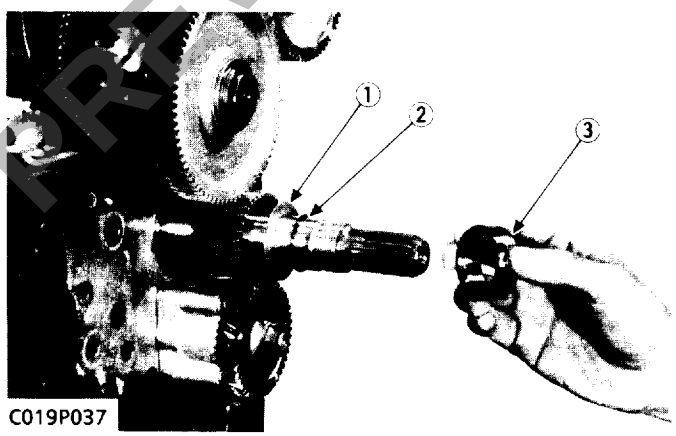
A144F011
A109P010

Gear Case

1. Pull out the fan drive pulley (2) with a puller.
2. Remove the feather key (3).
3. Remove the gear case (1).

(When reassembling)

- Apply a liquid gasket (Three Bond 1215 or equivalent) to both sides of the gear case gasket.
- Grease thinly to the oil seal, and install it, ensuring the lip does not come off.
- Install the pulley (F2803) to the crankshaft, aligning the marks (4) on them.



C019P037

Crankshaft Oil Slinger

1. Remove the crankshaft collar (3).
2. Remove the O-ring (2).
3. Remove the crankshaft oil slinger (1).

(1) Crankshaft Oil Slinger
(2) O-ring
(3) Crankshaft Collar

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GASKET LOCATION

1. LOCATIONS WHERE GASKETS ARE USED

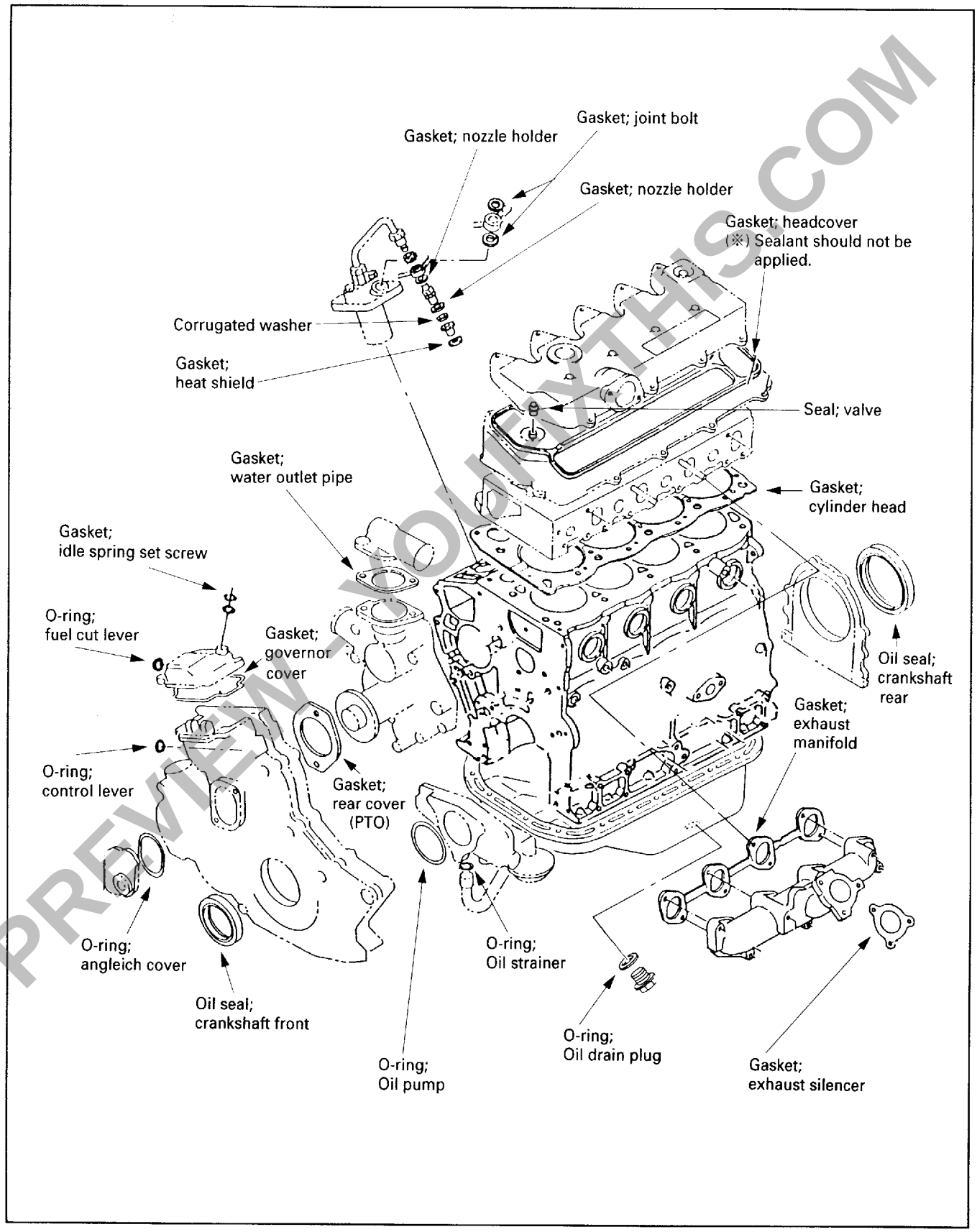


Fig. 19

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