3. SPCIFICATIONS AND PERFORMANCE

■ SPEED AND GRADEABILITY

Model		SK25SR-2 (with Rubber Shoe)	
Serial No		PV08-20001~, PV09-22001~	
Item			
Slewing Speed	min^{-1} {rpm}	9.4 {9.4}	
Travel Speed	km/h (mph)	Low (1st.)	High (2nd.)
		2.5 (1.6)	4.3 (2.7)
Gradeability	%(degree)	58(30)	

■ ENGINE

Model (YANMAR)		3TNE74-NYBB
Type		Vertical,4-cycle,water cooled diesel engine
Number of cylinders-Bore X Stroke		3-ø74mm X 78mm
Total Displacement	L	1.01
Rated Output	kW/min^{-1} {PS/rpm}	13.2/2,400 {18.0/2,400}
Maximum Torque	N·m/min^{-1} {kgf·m/rpm}	60.8/1,700 {6.2/1,700}
Starter	V X kW	12 X 1.0
Generator (Dynamo)	V X A	12 X 20

■ HYDRAULIC COMPONENTS

Hydraulic Pump	Variable displacement axial piston gearpump
Slewing Motor	Axial piston
Travel Motor	Axial psiton 2 speed motor
Control Valve	with 10 spools
Cylinder (Boom,Arm,Swing Bucket,Dozer)	Double acting cylinder
Return filter	Paper filter with safety valve (30μ)

■ OFFSET DIGGING · DOZER

Mechanism		Boom swing operation by cylinder stroke
Boom swing angle degree	Right	58
	Left	82 (Cab spec : 65)
Strokes of dozer (Up / Down)	mm	320/330 (12.6 /13.0)

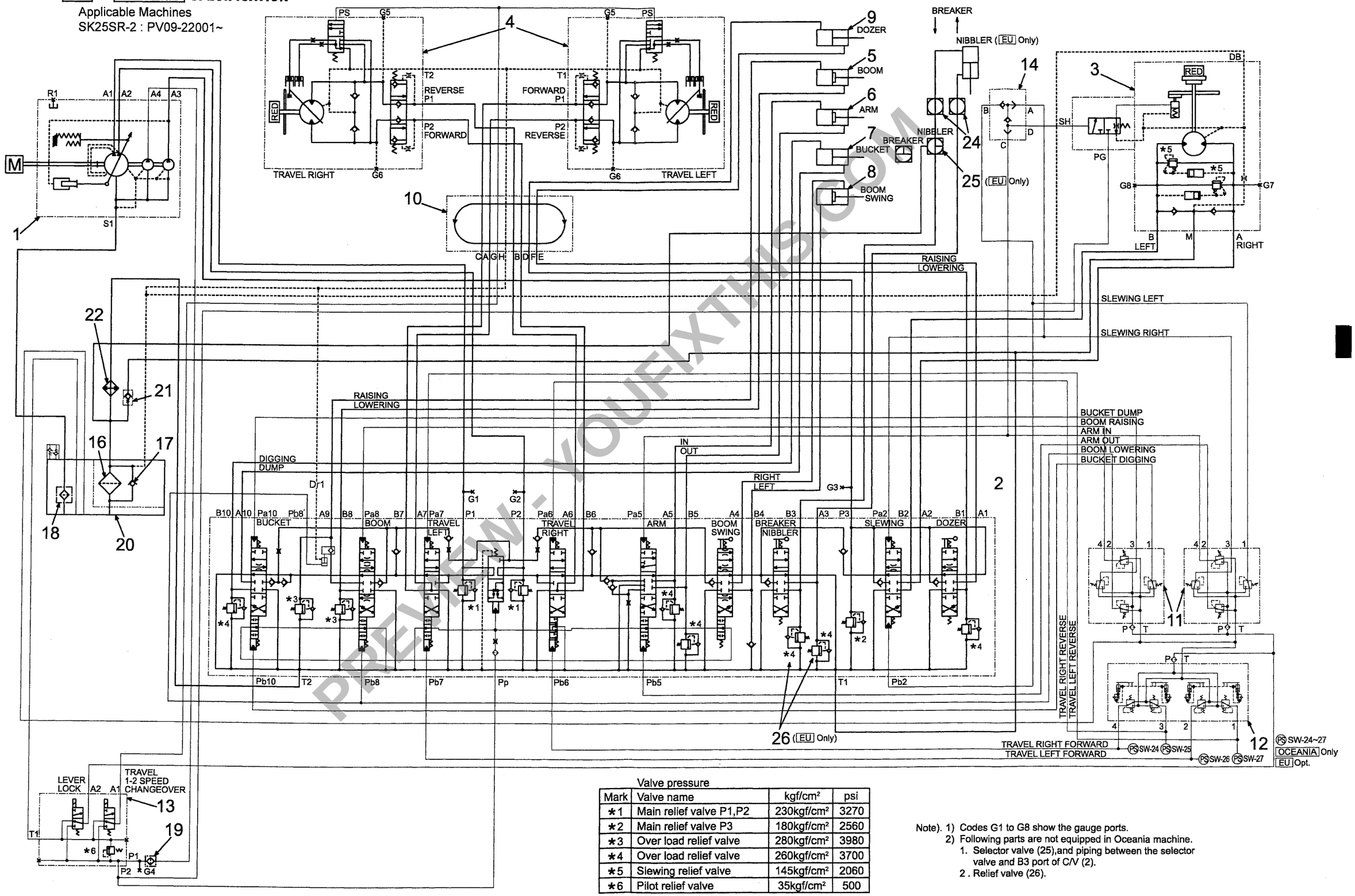
Unit:kg (lb)

■ WEIGHT	EU & OCEANIA	USA
Machine Weight	Rubber shoe	←
	2,410 (5310)	2,440 (5380)
Upper slewing body	1,160 (2560)	1,190 (2620)
Travel system	930 (2050)	←
Attachment (Boom+STD Arm+STD Bucket)	260 (570)	←
Oil & Water	60 (130)	←

Note : This figure is calculated with Japanese standard bucket.
Bucket weight 47 kg (104 lb)

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Applicable Machines
SK25SR-2 : PV09-22001~



Valve pressure

Mark	Valve name	kgf/cm²	psi
*1	Main relief valve P1,P2	230kgf/cm²	3270
*2	Main relief valve P3	180kgf/cm²	2560
*3	Over load relief valve	280kgf/cm²	3980
*4	Over load relief valve	260kgf/cm²	3700
*5	Slewing relief valve	145kgf/cm²	2060
*6	Pilot relief valve	35kgf/cm²	500

Note). 1) Codes G1 to G8 show the gauge ports.
2) Following parts are not equipped in Oceania machine.
1. Selector valve (25),and piping between the selector valve and B3 port of C/V (2).
2 . Relief valve (26).

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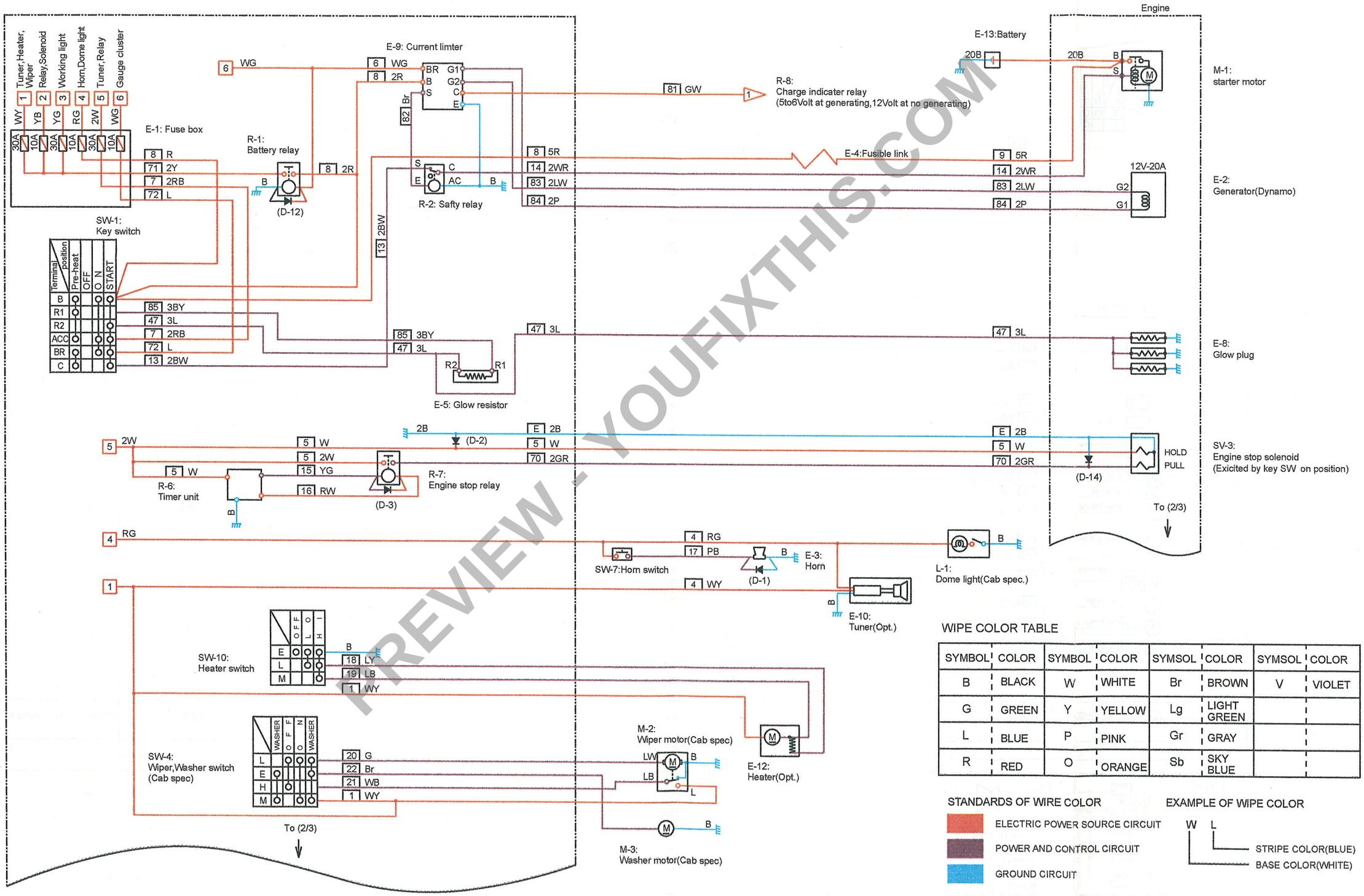
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2. ELECTRIC CIRCUIT DIAGRAM

2A. ELECTRIC CIRCUIT DIAGRAM (1 / 3)

Applicable Machines

SK25SR-2 : PV08-20001~



WIPE COLOR TABLE

SYMBOL	COLOR	SYMBOL	COLOR	SYMSOL	COLOR	SYMSOL	COLOR
B	BLACK	W	WHITE	Br	BROWN	V	VIOLET
G	GREEN	Y	YELLOW	Lg	LIGHT GREEN		
L	BLUE	P	PINK	Gr	GRAY		
R	RED	O	ORANGE	Sb	SKY BLUE		

STANDARDS OF WIRE COLOR

- ELECTRIC POWER SOURCE CIRCUIT
- POWER AND CONTROL CIRCUIT
- GROUND CIRCUIT

EXAMPLE OF WIPE COLOR

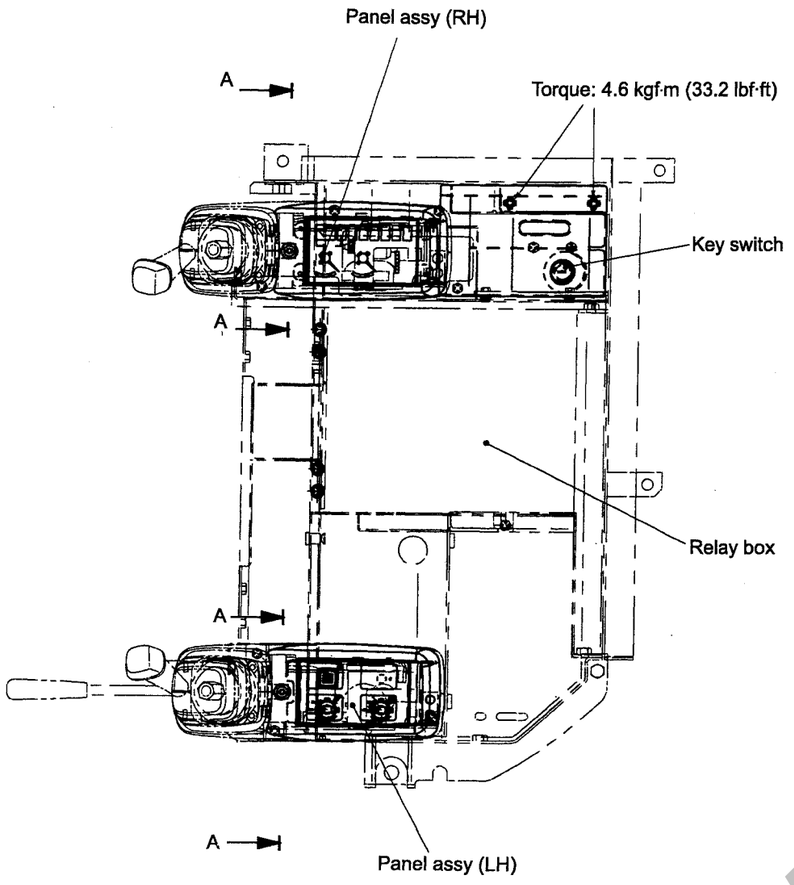
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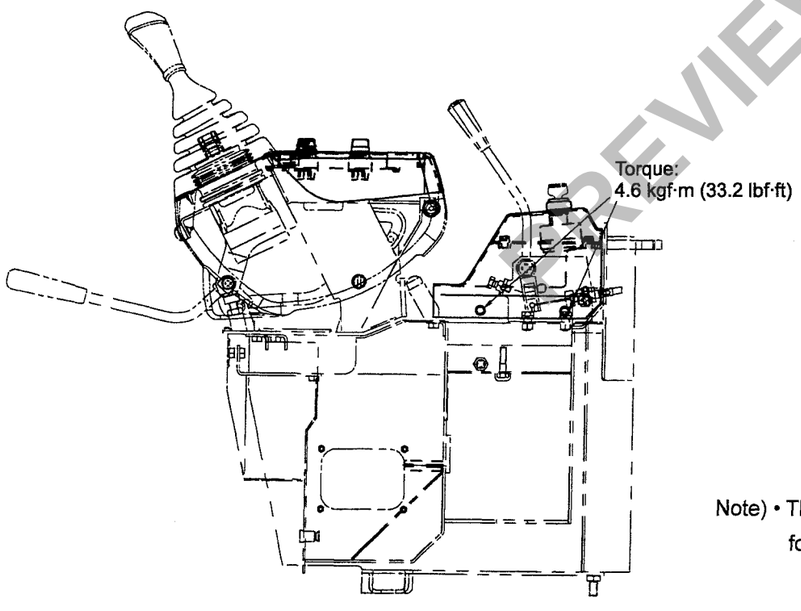
- STRIPE COLOR(BLUE)
- BASE COLOR(WHITE)

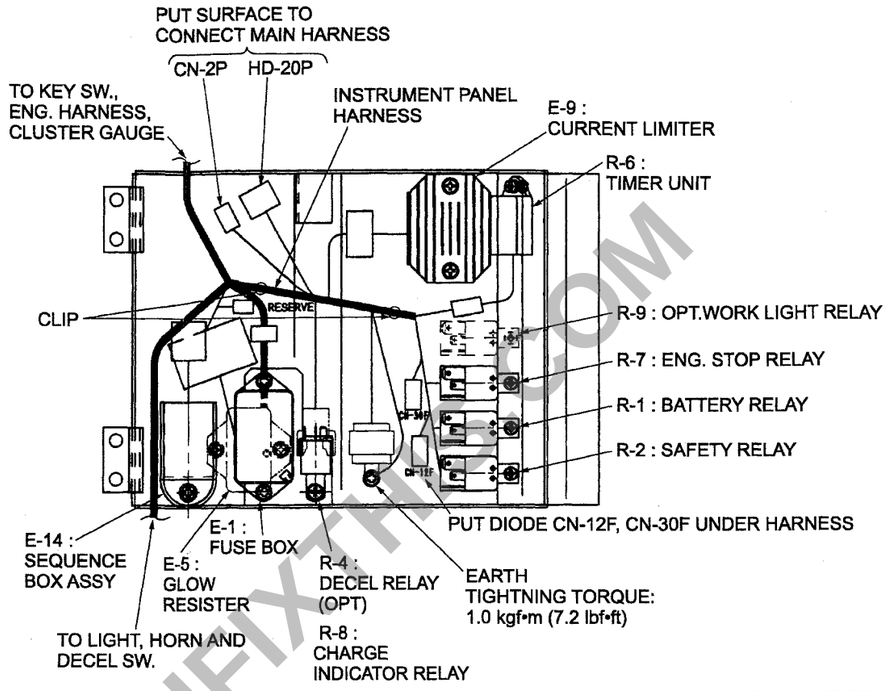
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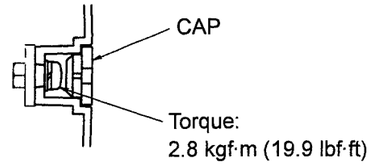
3.4.3 Instrument Panel Portion



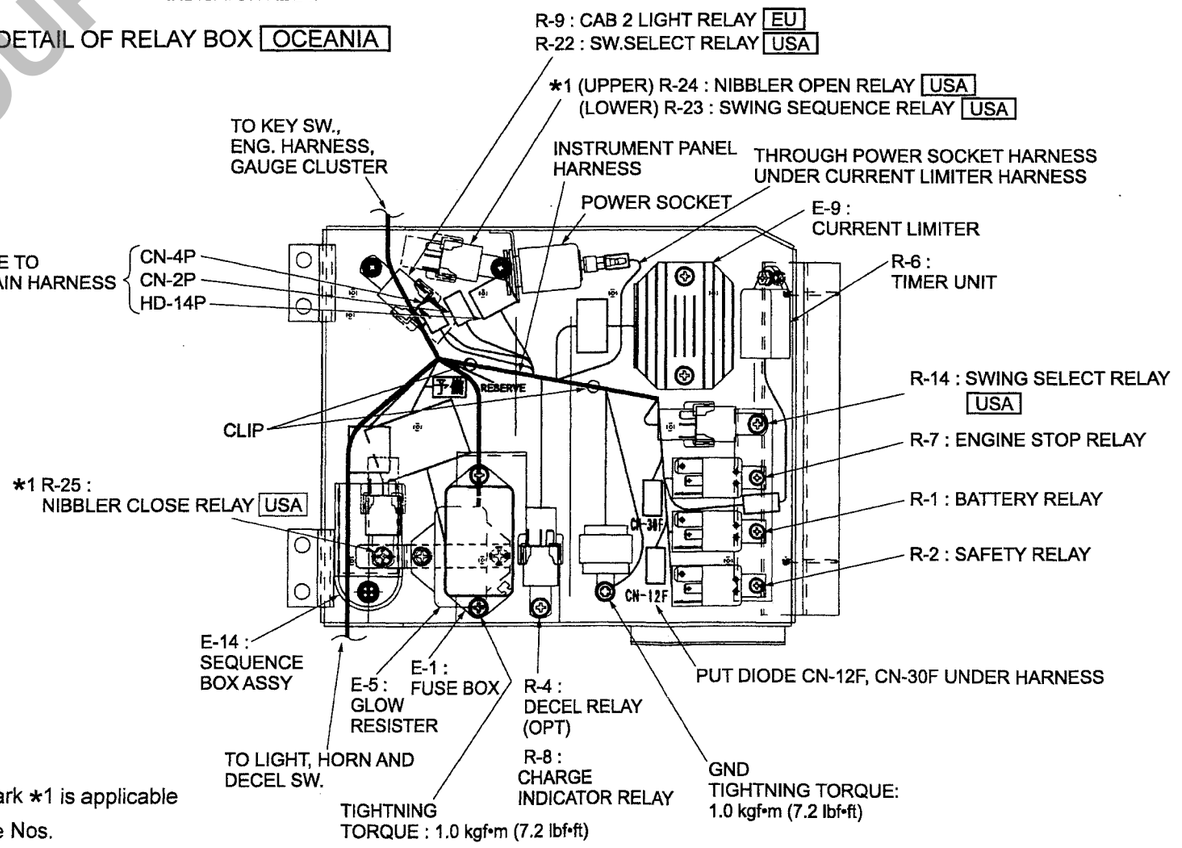




DETAIL OF RELAY BOX OCEANIA



SECTION A-A (2places)



DETAIL OF RELAY BOX EU & USA

Note) • The part Nos. with the mark *1 is applicable for the following Machine Nos.
*1 SK25SR-2 : PV08-20763-

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1. GENERAL PRECAUTIONS

Troubleshooting provides the process to investigate the cause of trouble in order when a trouble occurred. This manual describes the way how to solve the specific phenomenon systematically as quick as possible. For the troubleshooting concerning the inside of equipment, refer to the troubleshooting for each manual of the equipment.

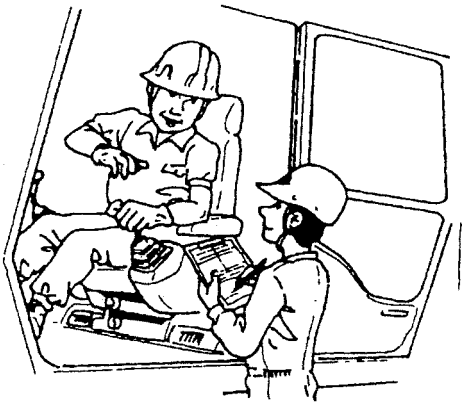
1.1 CONFIRM ACTUAL TROUBLED CONDITIONS AT SITE

(1) Get to the site as quickly as possible.
Verify the machine model, serial number, situation of trouble and field, and notify possible arrival time to the user.



Make field investigation.

(2) Verify background of trouble occurred.
1) Model name and serial number.
2) Kind of attachment.
Check that the combination of attachments was proper and that the operating manner was not unreasonable.
3) Operating time on the hour-meter.
4) Record of troubles.
First trouble or repeated trouble.
5) History of the trouble and additional modifications.
Reoccurrence of the same trouble in the past or trouble due to additional modification.



Verifying background of trouble occurred.

(3) How to diagnose trouble
1) Verify defective part.
2) Reproduce the troubled conditions.
3) Where the defective part can not be verified, surmise the possible causes systematically.
4) Verify the surmised cause.
5) Report estimated repairing method, procedures and term to the user.

(4) Explanation of the cause of trouble
1) Explain the cause of trouble to the user.
For example, explain the oil leakage through the piston is caused by defect on the piston rod. And the proper operating manner of the machine should be explained to the user to prevent reoccurrence of the same kind of trouble.
2) Handling of damaged parts
The damaged parts to be claimed and returned are the evidence, so they should be handled with care. For example, protect them from invasion of water, soil, etc., into ports on a hydraulic equipment, etc., at the returning them. And also use care not to give any damages and breakage for transport.



Diagnosing trouble by means of troubleshooting.

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SK25SR-2

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S5PV0301E① 2001-10	S5PV0301E② 2003-01			ATTACHMENT	PV03
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S5PV1201E① 2001-10	S5PV1201E② 2003-01			STANDARD MAINTENANCE TIME TABLE	PV12
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S5PV2201E① 2001-10	S5PV2201E② 2003-01		SYSTEM	HYDRAULIC SYSTEM	PV22
S5PV2301E① 2001-10	S5PV2301E② 2003-01			ELECTRICAL SYSTEM	PV23
S5PV2401E① 2001-10	S5PV2401E② 2003-01			COMPONENTS SYSTEM	PV24
—	—				
—	—				
S5PV3101E 2000-12	S5PV3101E① 2003-01		DISASSEMBLING	WHOLE DISASSEMBLING & ASSEMBLING	PV31
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			OPT		
PV08-20001~	PV08-20001~ PV09-22001~			APPLICABLE MACHINES	

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1.1 GENERAL SAFETY INFORMATION

WARNING

Do Not operate or perform any maintenance on this machine until all instructions found in the OPERATION & MAINTENANCE MANUAL have been thoroughly read and understood.
Improper operation or maintenance of this machine may cause accidents and could result in serious injury or death.
Always keep the manual in the operator's seat pocket.
If it is missing or damaged, place an order with an authorized KOBELCO Distributor for a replacement.
If you have any questions, please consult an authorized KOBELCO Distributor.

1. Most accidents, which occur during operation, are due to neglect of precautionary measures and safety rules. Sufficient care should be taken to avoid these accidents. Erroneous operation, lubrication or maintenance services are very dangerous and may cause injury or death of personnel. Therefore all precautionary measures, NOTES, DANGERS, WARNINGS and CAUTIONS contained in this manual and on the machine should be read and understood by all personnel before starting any work with or on the machine.

2. Operation, inspection, and maintenance should be carefully carried out, and safety must be given the first priority. Messages of safety are indicated with marks. The safety information contained in this manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.

3. Messages of safety appear in this manual and on the machine. All messages of safety are identified by the words "DANGER", "WARNING" and "CAUTION".

   a. **DANGER** –Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and is represented as follows:

DANGER

   b. **WARNING** –Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and is represented as follows:

WARNING

   c. **CAUTION** –Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against possible damage to the machine and its components and is represented as follows:

CAUTION

4. It is very difficult to forecast every danger that may occur during operation. However, safety can be ensured by fully understanding proper operating procedures for this machine according to methods recommended by KOBELCO.

5. While operating the machine, be sure to perform work with great care, so as not to damage the machine, or allow accidents to occur.

6. Continue studying this manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

WARNING

The proper and safe lubrication and maintenance for this machine, recommended by KOBELCO, is outlined in the OPERATOR'S MANUAL for this machine.
Improper performance of lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the OPERATOR'S MANUAL before performing any lubrication or maintenance.

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1.2 SAFETY PRECAUTIONS

The serviceman or mechanic may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table for SK25SR-2 is shown in page 02-1-4 of chapter SPECIFICATIONS in this mannal.

The following is a list of basic precautions that must always be observed.

1. Read and understand all Warning plates and decals on the machine before Operating, Maintaining or Repairing this machine.

2. Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.

3. Disconnect the battery and hang a "Do Not Operate" tag in the Operator's Compartment. Remove ignition keys.

4. If possible, make all repairs with the machine parked on a level, hard surface. Block the machine so it does not roll while working on or under the machine. Hang a "Do Not Operate" tag in the Operators Compartment.

5. Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.

⚠ WARNING ⚠

Do not operate this machine unless you have read and understand the instructions in the OPERATORS MANUAL. Improper machine operation is dangerous and could result in injury or death.

6. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.

7. Lower the bucket, blade or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, blade or other attachment is blocked correctly to prevent it from dropping unexpectedly.

8. Use steps and grab handles when mounting or dismounting a machine. Clean any mud, grease, oil or debris from steps, walkways or work platforms before using. Always face the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.

9. To avoid back injury, use a hoist when lifting components which weigh 23 kg (50 lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.

10. To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and components.

11. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and carefully pry cover loose to relieve any spring or other pressure, before removing the last two bolts or nuts completely.

12. Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

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2.2 ARM MAINTENANCE STANDARDS

(1) Clearance of pin and bushing

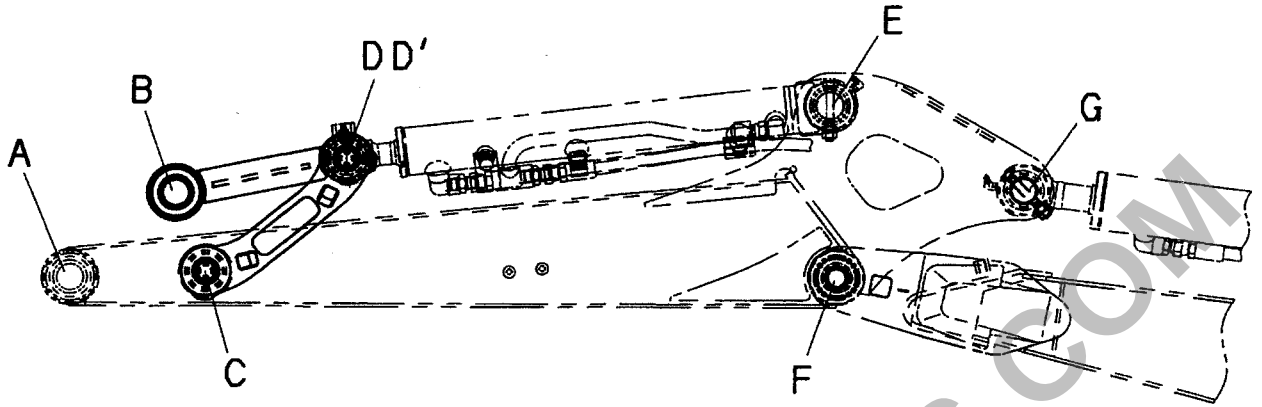


Fig. 2-2 Clearance of pin and bushing

Table 2-2 Unit : mm(in)

Pos	Item	Pin parts No.	Standard dimensions			Clearance			Remedy
			Pin dia.	Tolerance on pin dia.	Tolerance on bushing	Standard value	Repairable level	Service limit	
A	Arm point (Connected part of bucket)	PM12B01292P1	ø35 (1.378)	-0.020 -0.050 (-0.0008 -0.0020)	+0.069 +0.020 (+0.0027 +0.0008)	0.119 0.040 (0.0047 0.0016)	0.7 (0.028)	1.0 (0.039)	Replace bushing or pin
B	Bucket link (Bucket side)								
C	Idler link (Connected part of arm)	[PM12B01275P1] PM12B01321P1							
D	Bucket link (Idler link side)								
D'	Bucket cylinder (Rod side)				+0.150 +0.050 (+0.0060 +0.0020)	0.200 0.070 (0.0079 0.0028)			
E	Bucket cylinder (Head side)	PM12B01219P1			+0.180 +0.050 (+0.0071 +0.0020)	0.183 0.076 (0.0091 0.0028)			
F	Arm foot (Connected part of boom)	PM12B01278P1	ø40 (1.575)		+0.062 +0.010 (+0.0024 +0.0004)	0.112 0.030 (0.0044 0.0012)			
G	Arm cylinder (Rod side)	PV12B01180P1			+0.180 +0.050 (+0.0071 +0.0020)	0.230 0.070 (0.0091 0.0028)			

(Note) • The tolerance for bushing inside diameter means the dimension after fitting of it into the place.
• The part number for pins may be changed owing to improvement, use them only for reference.
• The part Nos. in [ ] are applicable foe the following Machine Nos.
SK25SR-2 : PV08-20001~, PV09-22001~22106

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4. MEASURING HYDRAULIC OIL PRESSURE

4.1 STANDARD FOR OIL PRESSURE MEASUREMENT

(1) Hydraulic Instruments

70 kgf/cm² (1000 psi) pressure gauge .....1 set
500 kgf/cm² (7110 psi) pressure gauge ...3 sets
Surface Thermometer .....1 set
Pressure Measuring Kit and
Oil Analyzing Equipment .....1 set

(2) Measuring cleanliness of hydraulic oil

⚠ After releasing air in the hydraulic oil tank, open the cover and sample oil in the hydraulic tank, and measure with the instrument for analysis. If the measured value is over the standard value, replace the return filter and/or change the hydraulic oil.

4.2 PRESSURE MEASUREMENT AND ADJUSTMENT

4.2.1 Main Circuit Pressure

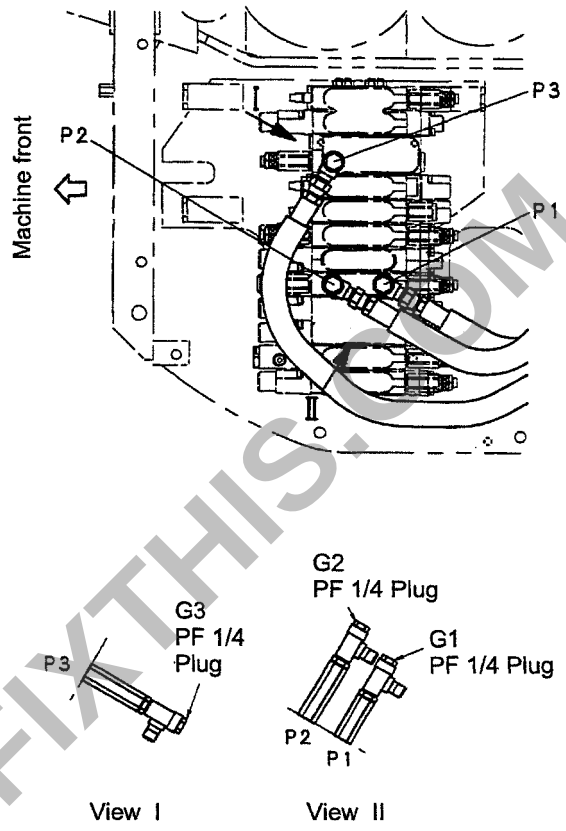
(1) Measuring Conditions

Engine speed : High idling
Hydraulic oil temperature: 50 ~ 60 °C (122 ~ 140 °F)
Coolant temperature (on radiator surface) : 60~90 °C (140 ~ 194 °F)

(2) Pressure Measuring Procedures

1) Set the pressure gauge to the pressure detecting port (plugged G1,G2,G3), and operate the circuit to be measured to measure the relief pressure.
2) When the main relief pressure is being within the standard range, the measurement for the over load relief pressure may be omitted.
3) If the main relief pressure is lower than the standard range, tighten up the main relief valve by half turn [pressure increase by 125 kgf/cm² (1780 psi)], then measure the pressure at over lode relief valve.
4) After adjustment for the over load relief pressure, return back the main relief pressure within the standard range.

Operating Circuit	Press. Detecting Port		Relief Valve
	Port Location	Size	
Boom, Bucket & Travel (left)	G1	PF1/4	MR1
Arm & Travel (right) Swing	G2		MR2
Dozer, N & B Slew	G3		MR3



Remove PF 1/4 plug and install press.gauge.

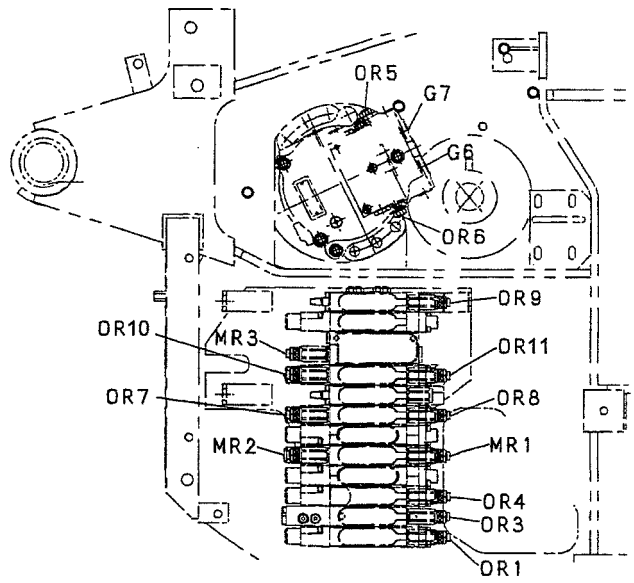


Fig. 4-1 Main hyd. oil pressure measurememt

Location of over load relief valve

OR1	Bucket in	OR7	Arm in
OR3	Boom up	OR8	Arm out
OR4	Boom down	OR9	Dozer down
OR5	Slewing left	OR10	Nibbler close
OR6	Slewing right	OR11	Nibbler open

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3.8-1 SWING OPERATION CIRCUIT KAI

Pilot hydraulic type with control lever

3.8.1-1 Swing (left) operation circuit

(1) Swing operation

The pilot secondary pressure oil is discharged from pilot valve (11) by the left swing operation. The pressure oil flows into Pb4 port on the control valve (2) through selector valve (23), and changes the swing valve spool.

⚠ Operate the swing lever regularly, leaving the switch on the upper part of the left control lever pressed,the function of pilot line for slewing changes to swing function while selector valve (23) is actuated, and the swing operation starts. If this switch is released,swing operation is continued till the left control lever is placed in neutral position.
When returning left control lever to neutral position,selector valve (23) changes to former state and pilot control line returns to slewing circuit.

(2) Main circuit

1) Supply circuit to cylinder (8)

The delivery oil from A2 port of the variable pump flows into P3 port of control valve (2), and is supplied to the H side of cylinder (8) through B4 port by way of the swing valve.

■ The spool of the swing valve controls the oil quantity supplied to the cylinder beacuse the appropriate oil quantity is returned in the tank circuit taking advantage of the throttling effect of P2 by-pass when the swing is operated. Therefore both swing left and right operations are gradually moved.

3.8-2 SWING OPERATION CIRCUIT EU & OCEANIA

Cable driving type by means of control pedal

3.8.1 Swing (left) operation circuit

(1) Swing operation

By sifting the control pedal to swing (left) operation position, the cable is drawn and the spool of swing valve (2) is switched. The swing operation is carried out regardless of the lever lock similar to the dozer because the pilot pressure oil is not applied.

(2) Main circuit

1) Supply circuit to cylinder (8)

The delivery oil from A2 port of the variable pump flows into P3 port of control valve (2), and is supplied to the H side of cylinder (8) through B4 port by way of the swing valve.

■ The spool of the swing valve controls the oil quantity supplied to the cylinder beacuse the appropriate oil quantity is returned in the tank circuit taking advantage of the throttling effect of P2 by-pass when the swing is operated. Therefore both swing left and right operations are gradually moved.

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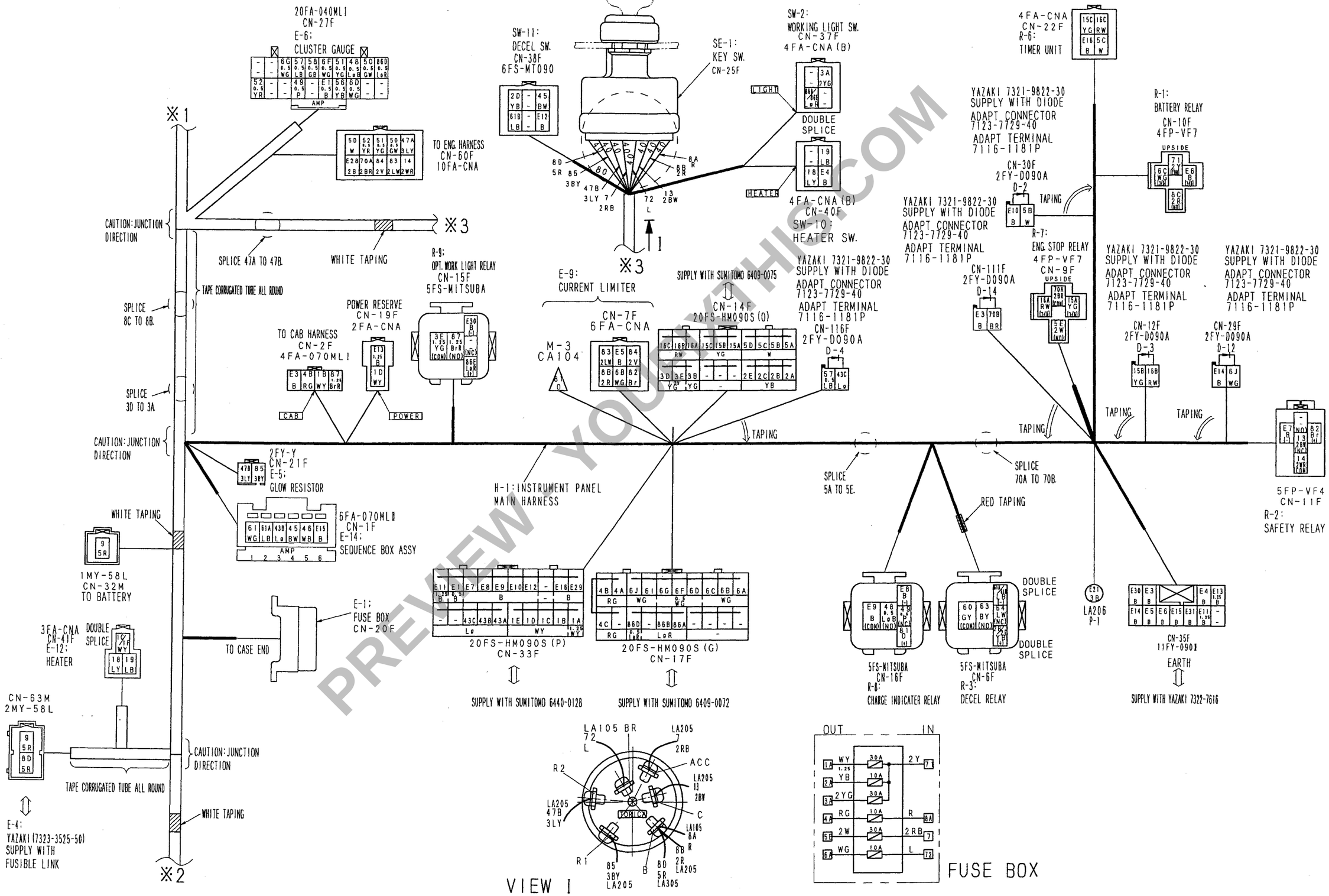
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4.4 DETAIL OF HARNESS & CABLE

4.4.1-1 Instrument panel & main harness EU (Code H-1-1) - (1/3)



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(2) Dumping mechanism

1) In case of neutral position,

Push rod (214) is pushed up by dumping spring(336) through piston(224), and holds at the position shown in Fig. 3-3.

2) Where the control section is inclined from the neutral position,

By rotating the cam clockwise, the push rod on the port 1 side is pushed down, and the piston also moves down.

Then, the oil in the dumping piston chamber is discharged through the orifice, and the simultaneously generated pressure produces dumping force.

On the other hand, the push rod on the port 2 side moves up by the dumping spring through the piston. Then, oil is sucked from the tank into the dumping piston chamber through three ball check valves. The oil outside of the piston chamber flows out through the passage leading to port T on the casing top end.

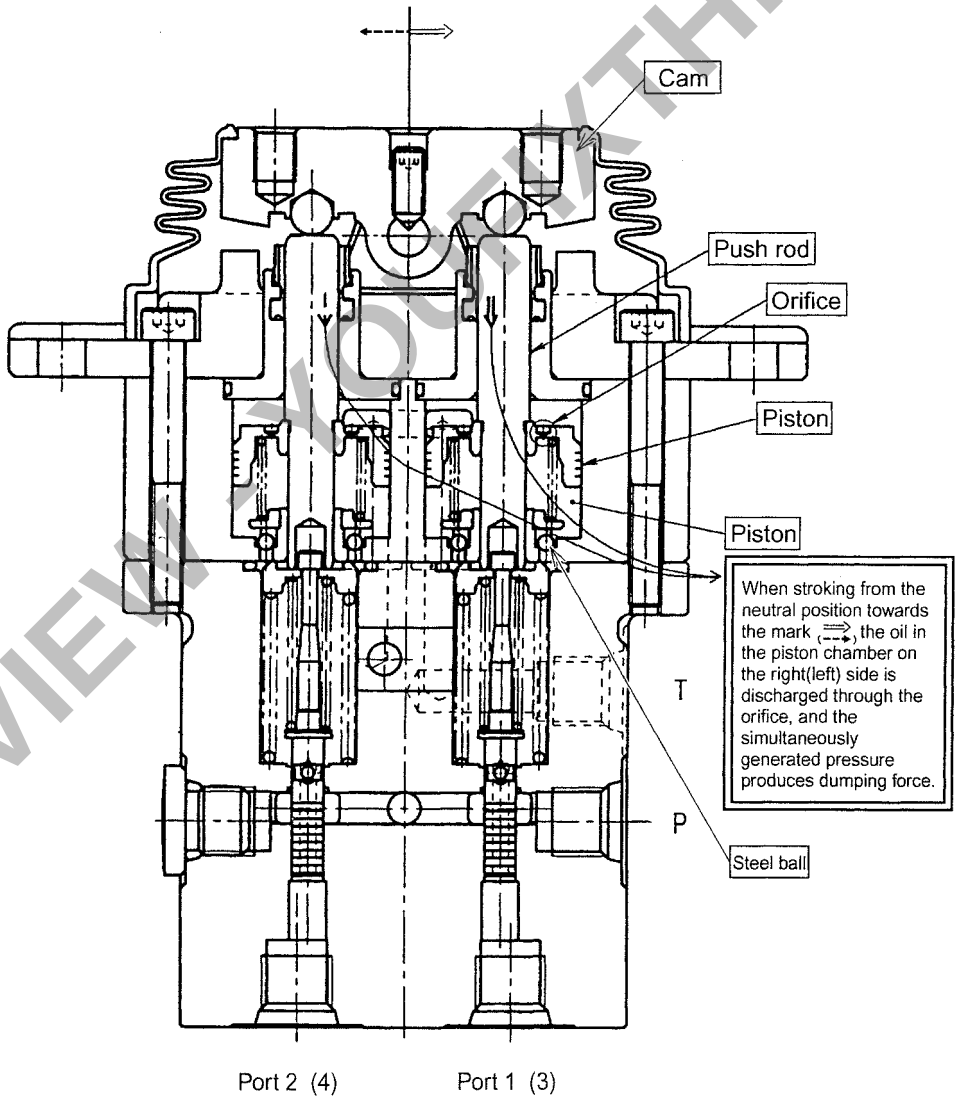
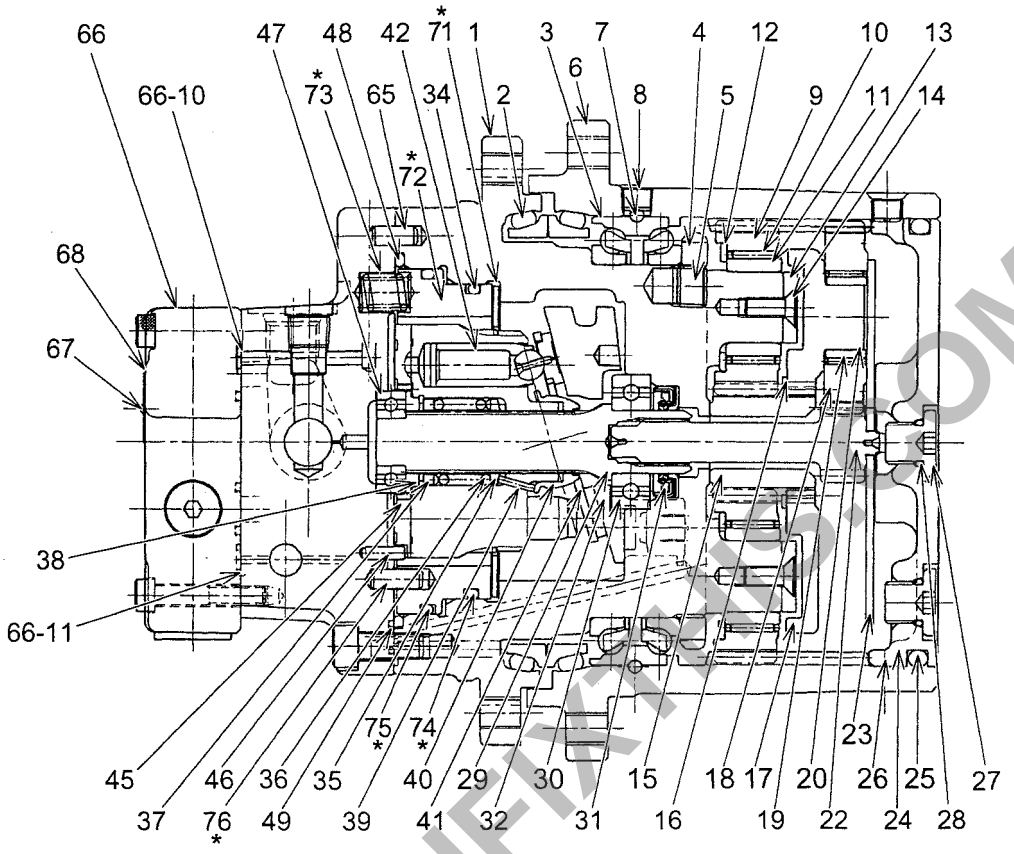


Fig. 3-6 Operation when the lever is stroked from the neutral position

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6.4 CONSTRUCTION



* marked parts indicate for parking brake. These are optional parts in EU specification.

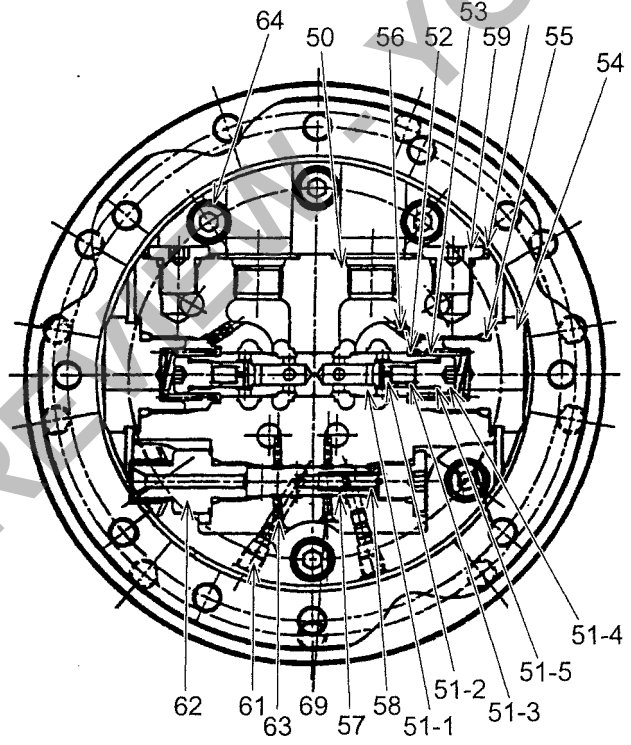
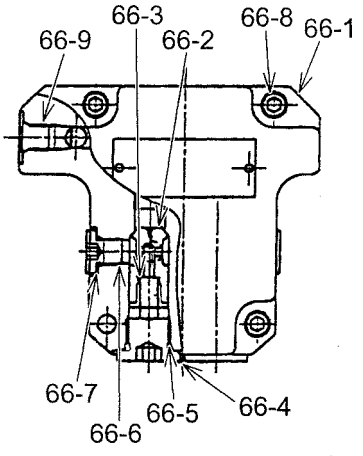
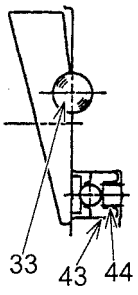


Fig. 6-3



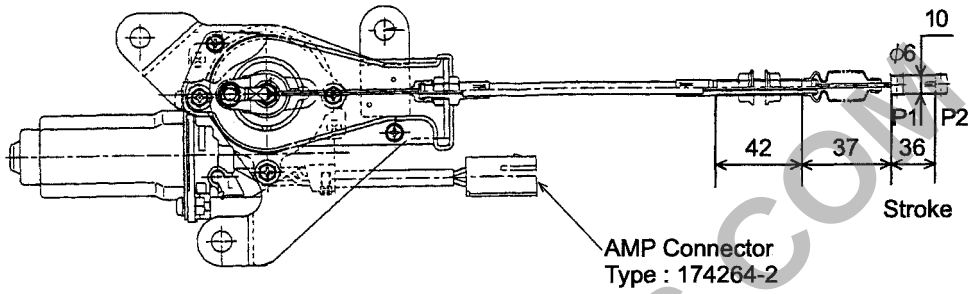
No.66 Valve assy

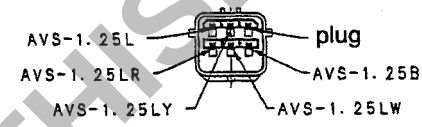


1,2 speed tilting section

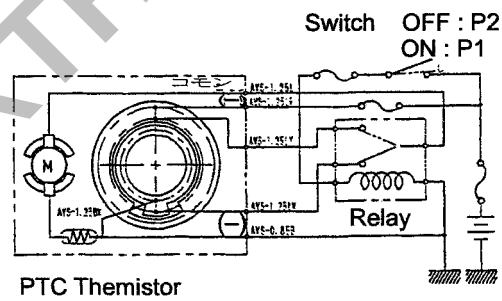
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Code No. Parts Name Parts No. Use Applicable Machine	Specifications	Description
M-4 Motor PM20S00001F2 Deceleration [EU•USA] (OCEANIA : OPT) PM06-05601~ PX09-22001~		

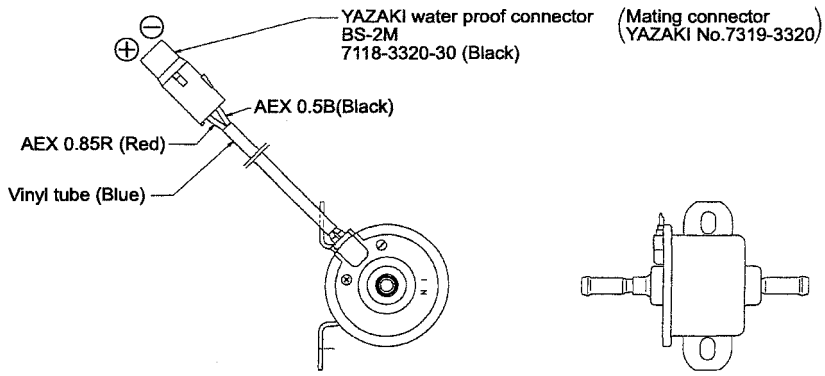


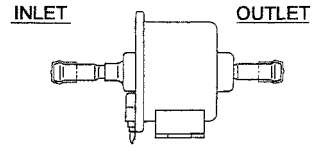


Rated voltage	12V
Stroke	36 ± 2 mm
Working force	11Kg or more
Working time	1or less
Working current	3.5A or less



M-6 Fuel pump PM22P00001P1 Auto air bleed (OPT) PM05-05001~ PV08-20001~ PM06-05601~ PV09-22001~	Rated voltage	DC12V
	Max.working current	1.5A or less
	Delivery rate	At open condition 400cc/min or more





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5) Install the back-up ring (9) and O-rings (8) (10).Then install the back-up ring (15) and O-ring (14) [for Boom,Arm and Swing Cylinder].

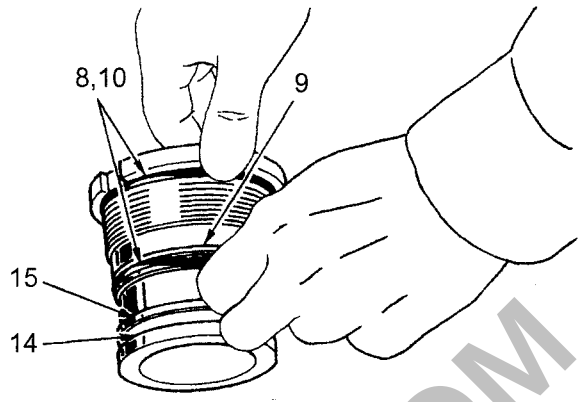


Fig. 1-24 Installing back-up ring and O-ring

(3) Assembly of piston portion :

1) Install the O-ring for the seal ring assy (21).

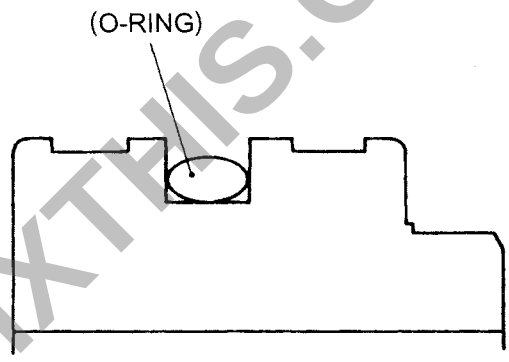


Fig. 1-25 Installing O-ring

2) Set the sliding jig (C) shown Item 1-7 on the piston (19), then quickly push the seal ring (21) onto the piston (19) with the pushing jig (D) shown Item 1-7.

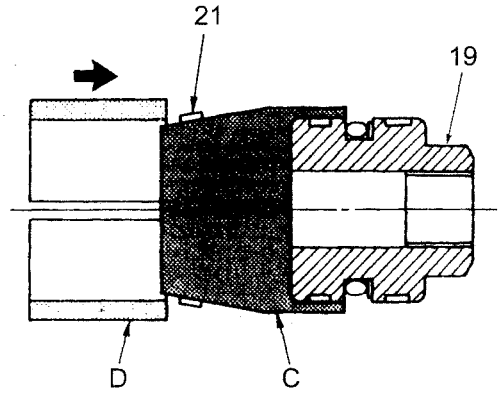


Fig. 1-26 Assembling seal ring

3) Since the seal ring (21) is stretched at the installation, reform it with the reforming jig (E) shown Item 1-7.

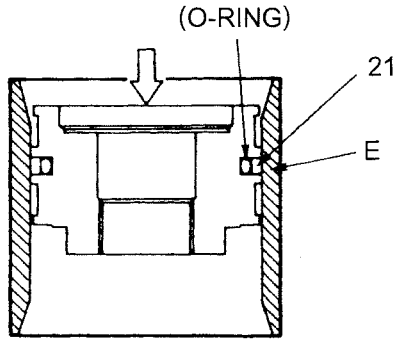


Fig. 1-27 Reforming seal ring

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13. PUMP

13.1 PREPARATION FOR REMOVAL

(1) Remove cover assy (17). (See Section 2.)
(2) Remove the counterweight. (See Section 6.)
(3) Bleed the internal pressure of hydraulic tank and drain hydraulic oil.
(See Section 8.)

13.2 REMOVAL

(1) Removing the hose and the joint connecting the pump
- Tag the hose to identify.

1) Add pilot delivery oil hose (B16).
: 22 mm

2) Remove clip (10) and disconnect suction hose (6).
: Screwdriver (-)

3) Loosen 4 capscrews (14) M12 X 35 and remove tube (12).
: 10 mm

4) Disconnect main pump delivery oil hoses (2) (3) (4).
: 22 mm

(2) Loosen 2 capscrews (B5) M10 X 30 and remove pump (B1).
: Ball joint type : 10 mm
Pump weight: 18 kg (40 lb)

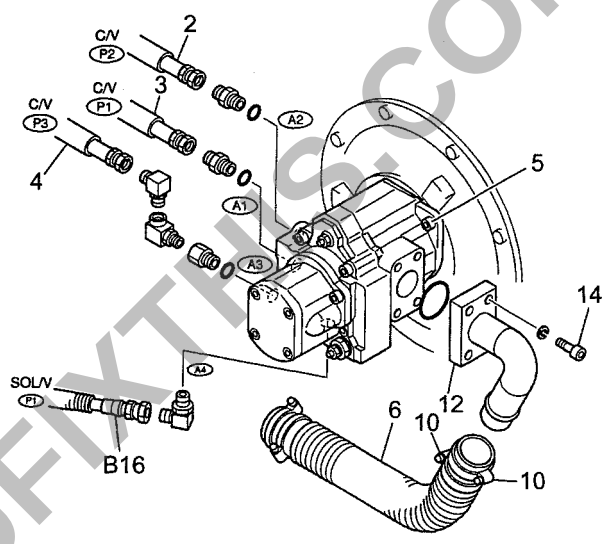


Fig. 13-1 Removing pump

13.3 INSTALLATION

Install the pump by the procedure reverse of the removal following the indication.

(1) Apply grease on the spline section of the pump input shaft.
Grease: SHELL Retinax AM grease (or equiva lent) (Molybdenum disulfide extreme pressure universal grease)

(2) Insert the pump spline section in the coupling.

(3) Install the pump with capscrew (B5).
: Ball joint type : 10 mm

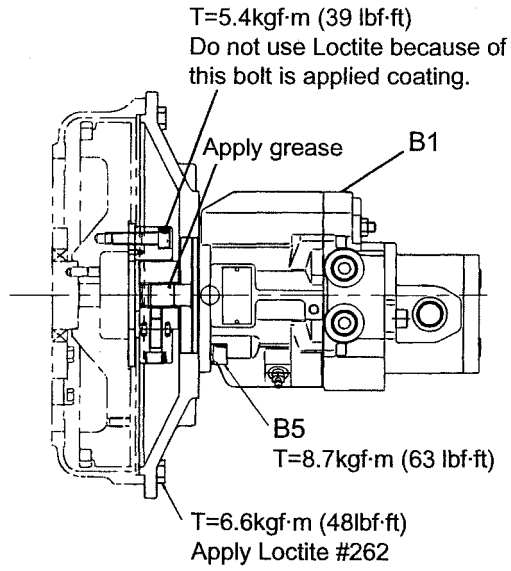


Fig. 13-2 Installing pump

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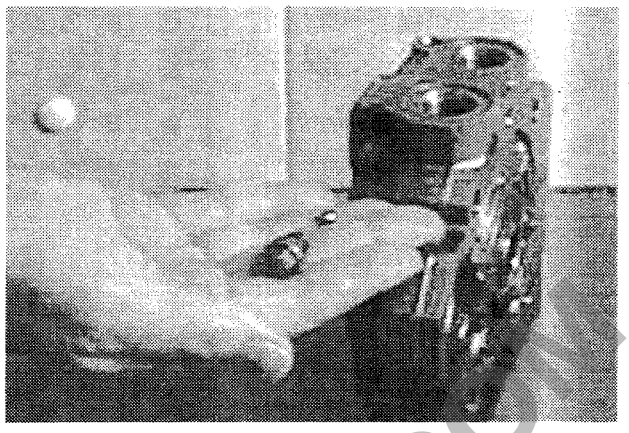
6) Assembly of cover

1. Assembling shuttle valve

Place the ball, packing and plug in.

: 10mm

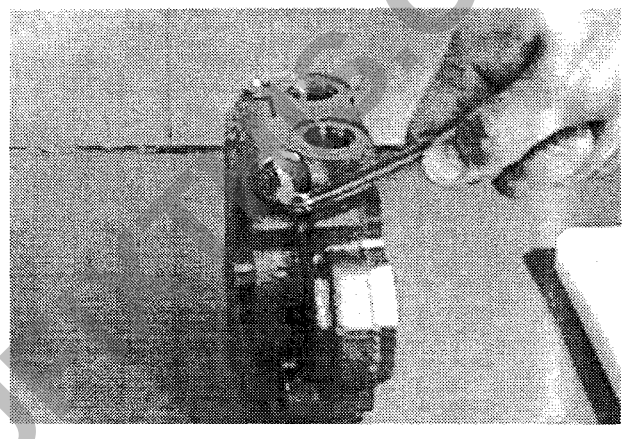
Torque : 1~1.3kgf·m (7.2~9.4 lbf·ft)



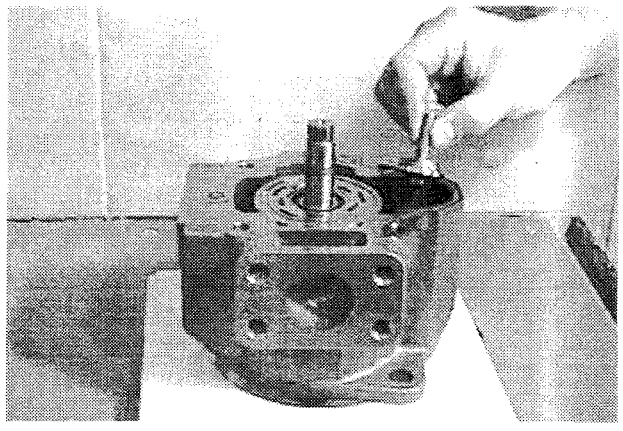
2. Attach and tighten the plug.

: 8mm

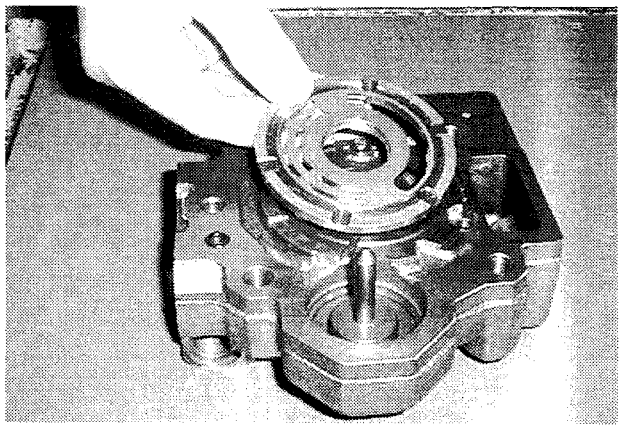
Torque : 4~5.2kgf·m (29~38 lbf·ft)



3. Apply grease on the rear side of the spring seat to prevent it from dropping and place it in the cover.



4. Apply grease on the rear surface of the control plate to prevent it from dropping and place it in the cover meeting the hole for positioning pin.

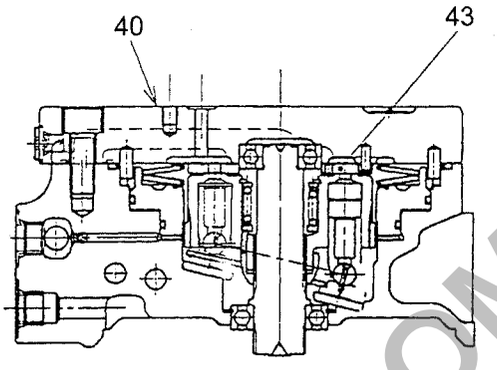


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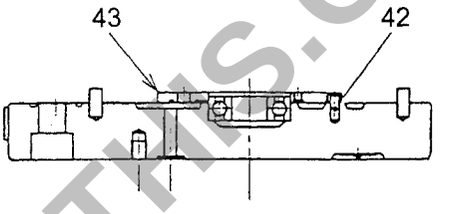
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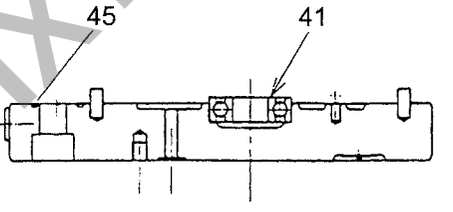
2-2. Remove valve plate (43) and pin (42).

[Note] : Valve plate (43) may be left on the motor side.

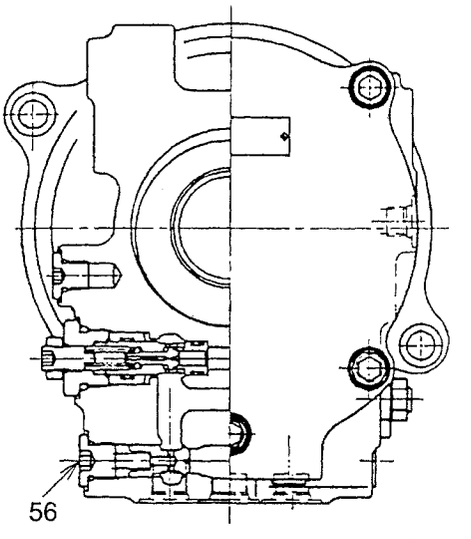


2-3. Take out ball bearing (41).
Take out O-ring (45).

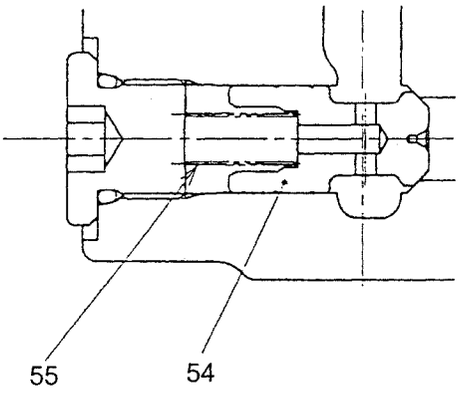




2-4. Disassemble check valve
2-4-1. Loosen and remove plug (56).



2-4-2. Remove check valve (54) and spring (55).



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2) Move the crawler forward slowly by inserting the pry-bar in the master pin hole on the end of the crawler and assisting so that the sprocket engages with the track link, and also assist so that the crawler catches the normal position and engages with the front idler using pry-bar.

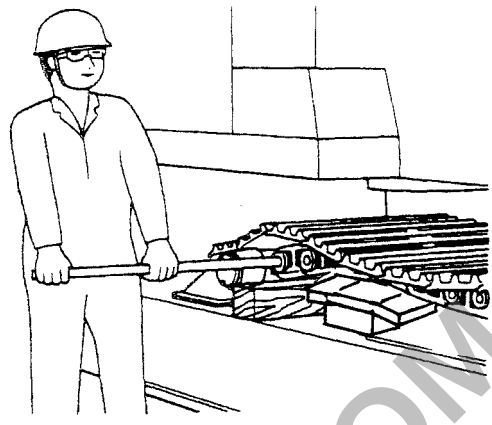


Fig. 2-14 Installing crawler

3) Hook chain block to the upper and lower parts of the shoe plate, and align the master pin hole pulling by the chain block.

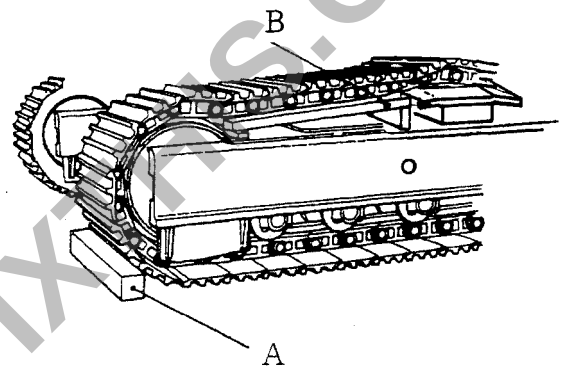


Fig. 2-15 Alignment of pin holes

4) Align master link holes on the both ends of the crawler link with the link holes inserting pry-bar, apply master pin drawing out jig (a) used when removed and press fit master pin by hammer.

⚠ When large hammer is used, be careful not to be injured by scattering broken piece.

- Apply molybdenum grease to the master pin before press fitting.

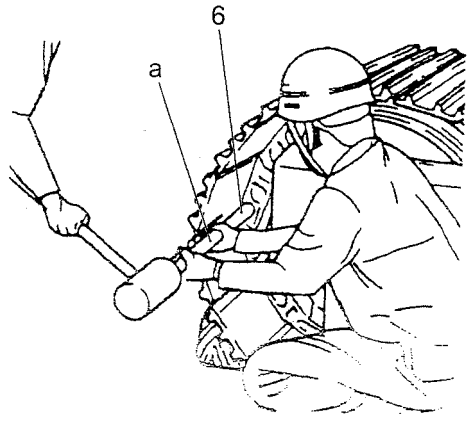


Fig. 2-16 Press fitting of master pin

5) After press fitting master pin (6), insert lock pin (8) and bend the top end in advance.

6) After completion of installation, adjust the tension of crawler by the same procedure of the rubber crawler.

: 19mm

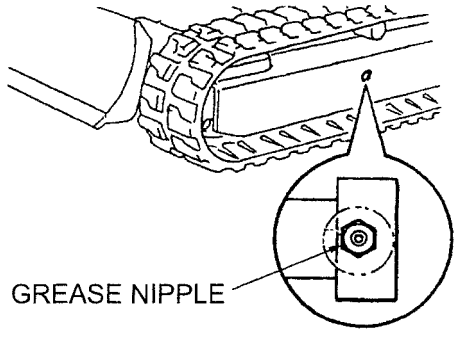
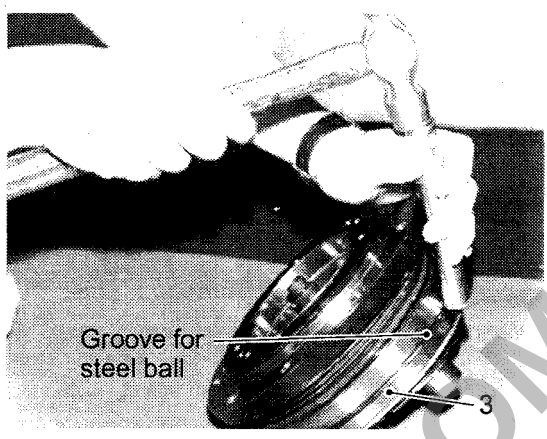


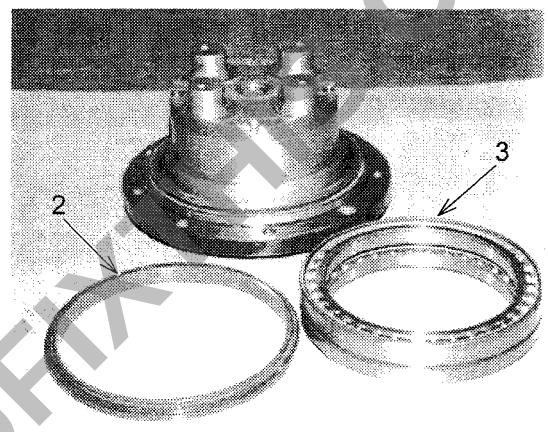
Fig. 2-17 Extension of track link

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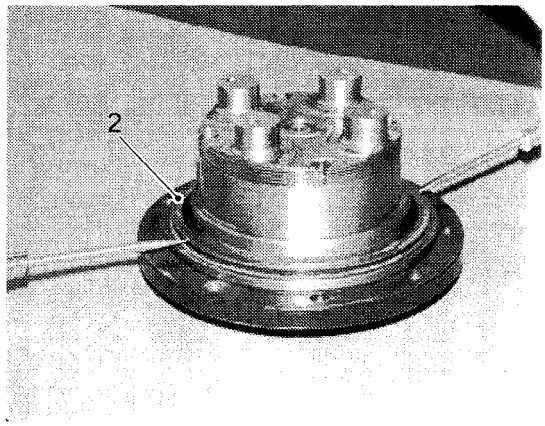
11) Apply pry-bar to the groove for steel balls (7), and remove angular bearing (3) striking it by hammer.
Jig : Pry-bar



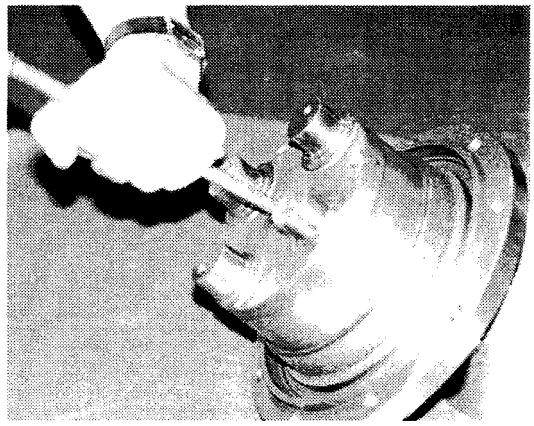
12) Remove floating seal (2) and angular bearing (3).



13) Remove other floating seal (2) with two drivers.



14) Apply pry-bar to the hole of spline, and remove shaft (29) striking it by hammer.
Jig : Pry-bar



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3-(1)

Travel 1 & 2 speed change can not be carried out.

When key is switched ON, (regardless of 1,2 speed mode)

Voltage of yellow-black harness of connector (CN-109F) of travel 2-speed solenoid valve (SV-2) is 12V.
- NO → Disconnection of harness between fuse box and travel 1&2-speed solenoid valve (SV-2) → Check on harness.
- YES ↓

Voltage of white-green harness of connector (CN-1F) of holding circuit unit (E-14) is 12V.
- NO → Disconnection of harness between fuse box and holding circuit unit(E-14) → Check on harness.
- YES ↓

No.6 fuse is blown.
- NO → Harness is short-circuited to frame. → Check harness on the short-circuited section.
- Check that line in fuse box is free from disconnection.

After selector switch was switched on,

Voltage of light green harness of connector (CN-109F) of travel 1&2-speed solenoid valve (SV-2) is 0V.
- YES → Check on travel 1&2-speed solenoid valve. (To Trouble-shooting for Hydraulic System)
- NO ↓

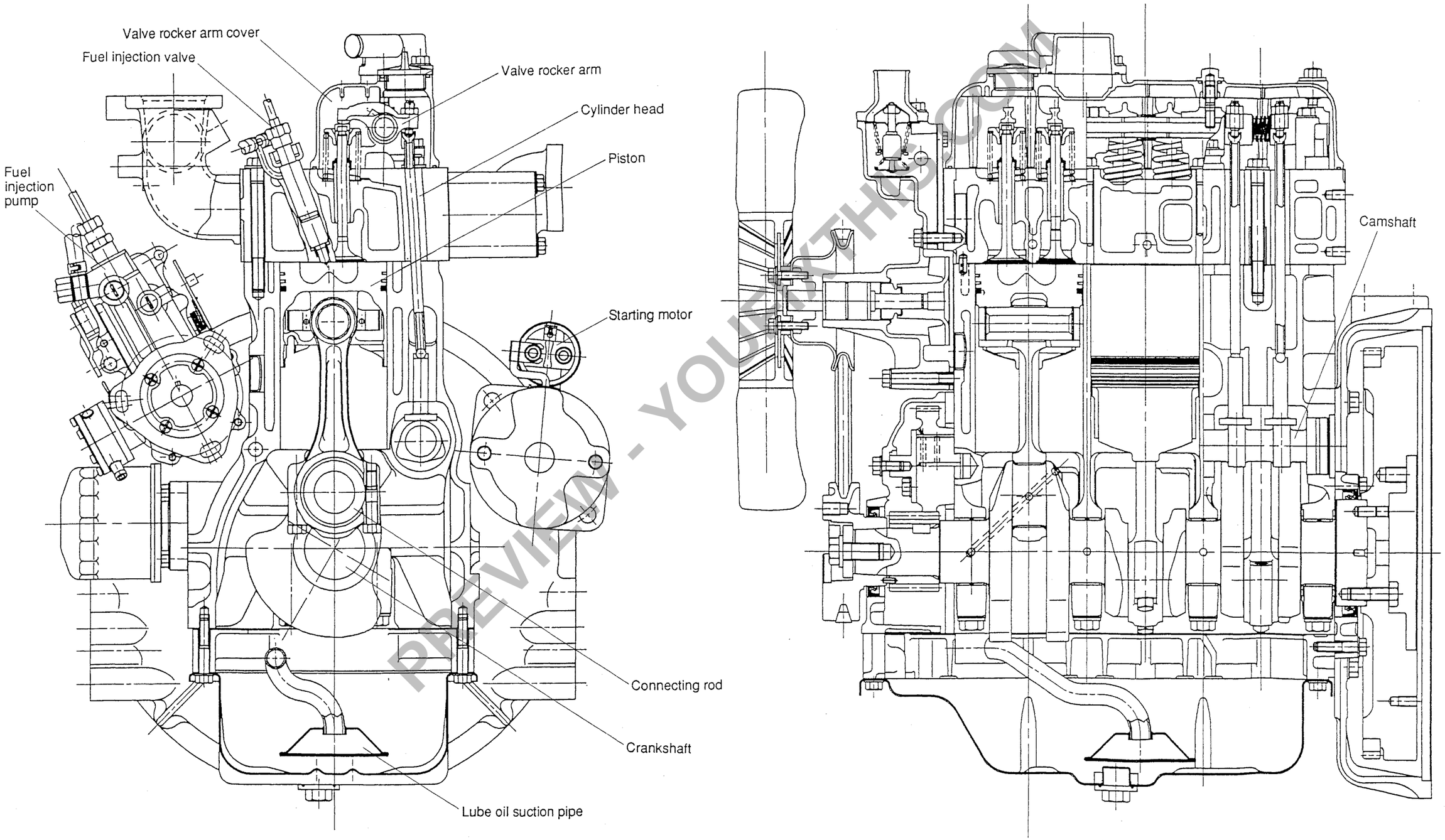
Voltage of light green line of connector (CN-1F) of holding circuit unit (E-14) is 0V.
- YES → Disconnection of harness between travel 1&2-speed solenoid valve and holding circuit unit → Check on harness.
- NO ↓

Voltage of white-black harness of connector (CN-1F) of holding circuit unit (E-14) when travel 1&2-speed selector switch is pressed.
- NO → Check on harness of travel 1&2-speed switch, and between travel 1&2-speed switch and holding circuit unit.
- YES → Check on holding circuit unit

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2-2. Direct Injection System



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7-2. Cylinder block

1. Checking the cylinder block

(1) Visually check to see if the cylinder block is free from water leak, oil leak and cracks. If any cylinder block is suspected to be cracked, check it by color check.

(2) Replace the cylinder block if badly damaged and incorrectable.

(3) Thoroughly clean each oil hole. Make sure that it is not clogged.

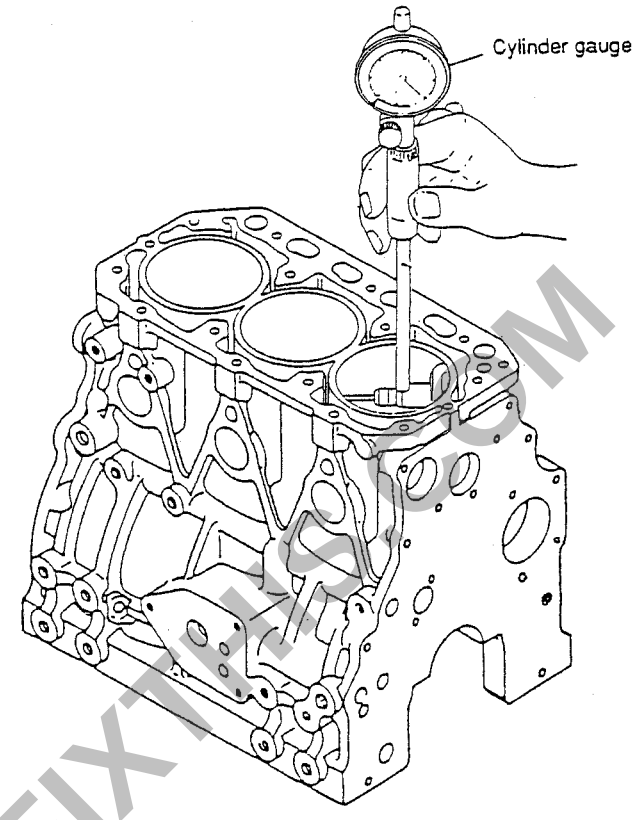
2. Measuring the bore and distortion of the cylinder

Measure the bore of each cylinder with a cylinder gauge. Measure the cylinder at point a, approx. 20 mm below the crest of the liner, and at points b and c at equal pitch (a–b = b–c).
Obtain distortion (roundness and cylindricity of each cylinder) from the measured values as follows:

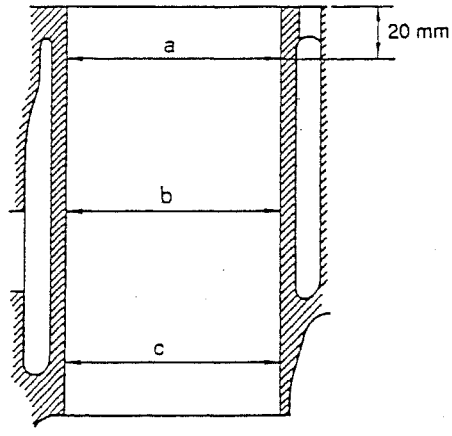
- ○ Roundness:
  Difference between max. and min. bore values on the same cross section of each liner.
- ○ Cylindricity:
  Difference between max. and min. bore values in the same direction of each liner.

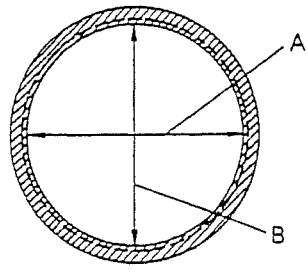
Honing (honing and boring) is required when the measured value exceeds the limit.

* *For oversized piston and piston ring, refer to this chapter, 7-4, 8.*



(Measuring the cylinder bore)





Note: Measurement should be made at a, b and c in the directions of A and B.

(Cylinder bore measuring positions)

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