HYDRAULIC EXCAVATOR

SHOP MANUAL model SK25SR SK30SR SK35SR

This is the shop manual for KOBELCO hydraulic excavator. Contained is the necessary technical data concerning the maintenance and repair of this model. The manual is divided into the following four major sections ; GENERAL, SYSTEMS, COMPONENTS and PROCEDURE.

*GENERAL

PW01.	SPECIFICATION	PW04.	MAINTENANCE STANDARD AND TEST PROCEDURE
—	OPERATION AND CONTROLS (Refer to Operators Manual)	—	PREVENTIVE MAINTENANCE (Refer to Operators Manual)
PW03.	LOCATION AND WEIGHT OF COMPONENTS	PW07.	WORKING STANDARD

*SYSTEMS

PW12.	HYDRAULIC SYSTEM	PW22.	CONTROL SYSTEM
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PW18.	TRAVEL SYSTEM		
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*COMPONENTS

12.	HYDRAULIC PUMP	16.	SWIVEL JOINT
13.	CONTROL VALVE	17.	HYDRAULIC CYLINDER
14.	OTHER VALVES		
15.	HYDRAULIC MOTOR	50.	ENGINE

*PROCEDURE

When checking or repairing the machine we suggest that you refer to this manual carefully. We hope that reference to this manual will help to maintain a hight level of working efficiency and reliability. For further details on maintenance and cheks refer to the "OPERATORS MANUAL" which has been supplied with the machine.

Although all data was correct at the time of printing, due to continual design changes and improvements, some contents may not conform to the actual machine. Take special care to order parts only after confirming the validity of the part number in the "PARTS MANUAL".

If you notice any explanatory discrepancies, after consulting one of our representatives, please updata your manual according to the latest data. However, in the event of any specification changes, we will issue revised edition.

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Book code No. S5PW0001E②

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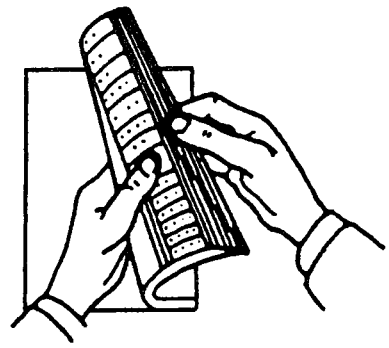
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SHOP MANUAL model SK25SR SK30SR SK35SR

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○How to Index each Shop Manual Section
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GENERAL

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3. SPECIFICATIONS AND PERFORMANCE

● SPEED AND GRADABILITY

Model		SK25SR							
Applicable Machines		PV10001~PV12000				PV12001~			
Item \ Shoe Type		Rubber		Steel		Rubber		Steel	
Slewing Speed	rpm	8.8							
Travel Speed	km/h (mph)	Low	High	Low	High	Low	High	Low	High
		2.7 (1.7)	4.9 (3.0)	2.5 (1.6)	4.6 (2.9)	2.5 (1.6)	4.4 (2.7)	2.4 (1.5)	4.2 (2.6)
Gradability		30°(58%)							

● ENGINE

Item \ Model	SK25SR
Model	3TNE78A-YBB
Type	4-Cycle, vertical, water-cooled, 3-cylinder
Number of Cylinders-Bore×Stroke	3−78㎜×84㎜ (3.07in×3.31in)
Total Displacement cc (cu.in)	1,204 (73.47)
Rated Output/Rotation Speed Ps/rpm	21.2/2,350
Maximum Torque/Rotation kgf·m (ft·lbs)/rpm	8.0 (58) /1,500
Starter	12V/1.2kW
Alternator	12V/40A

● HYDRAULIC COMPONENTS

Item \ Model	SK25SR
Hydraulic Pump	Variable displacement axial piston+gear pump
Hydraulic Motor (Slewing)	Axial piston motor
Hydraulic Motor (Travel)	Axial piston, 2-speed motor
Control Valve	9-functions multiple control valve
Cylinder (Boom, Arm, Bucket, Swing, Dozer blade)	Double action cylinder
Return filter	Safety valve containing filter type (10 μ)

● SIDE DIGGING

Item \ Model		SK25SR
Type		Boom swing by hydraulic cylinder
Boom Swing Angle	Canopy	55°(Right) / 85°(Left)
	Cab	55°(Right) / 70°(Left)

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1. CANOPY OR CAB (OPT)

1.1 REMOVAL AND INSTALLATION OF CANOPY ASSY

Fig. 1-1 shows the constitution of canopy assy.
Carry out the removal and installation referring to Fig. 1-1 and Table 1-1.
Weight of canopy : 38kg (84lbs)

Component parts

No.	NAME	Q'TY	
		A	B
1	CANOPY	1	1
2	SUPPORT	1	1
3	SEMS BOLT	4	4
4	CAPSCREW	4	4
5	SEMS BOLT	10	5
6	HAND RAIL	1	4
7	HAND RAIL	1	4
※8	RUBBER	(1)	—
9	RUBBER	1	1
10	LOCK WASHER	4	4
11	WASHER	4	4
14	LOCK WASHER	—	4
15	WASHER	—	4
16	CAPSCREW	—	4
17	HOOK	—	1
18	RUBBER	—	1

Note 1 : For the quantity of A and B, refer to the following table for the aplicable machine number.

	SK25SR	SK30SR	SK35SR
A	PV10001~10618	PW07001~07992	PX05001~05196
B	PV10619~	PW07993~	PX05197~

Note 2 :※ No. 8 RUBBER has disused for the following machine numbers and after.

PV10239~	PW07421~	PX05003~

Table 1-1 Tightening torque

No.	Hex. (㎜)	Torque : kgf·m (ft·lbs)
3, 5, 16	17	3.5±0.4(25±3)
4	19	6.1±0.6(44±4)

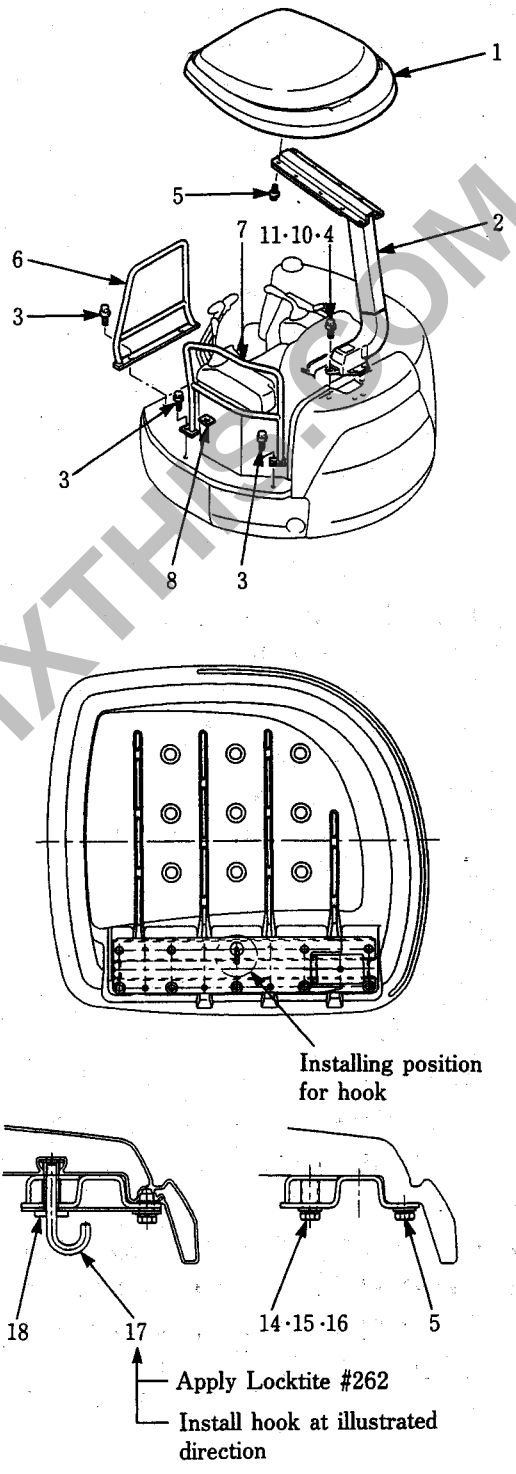


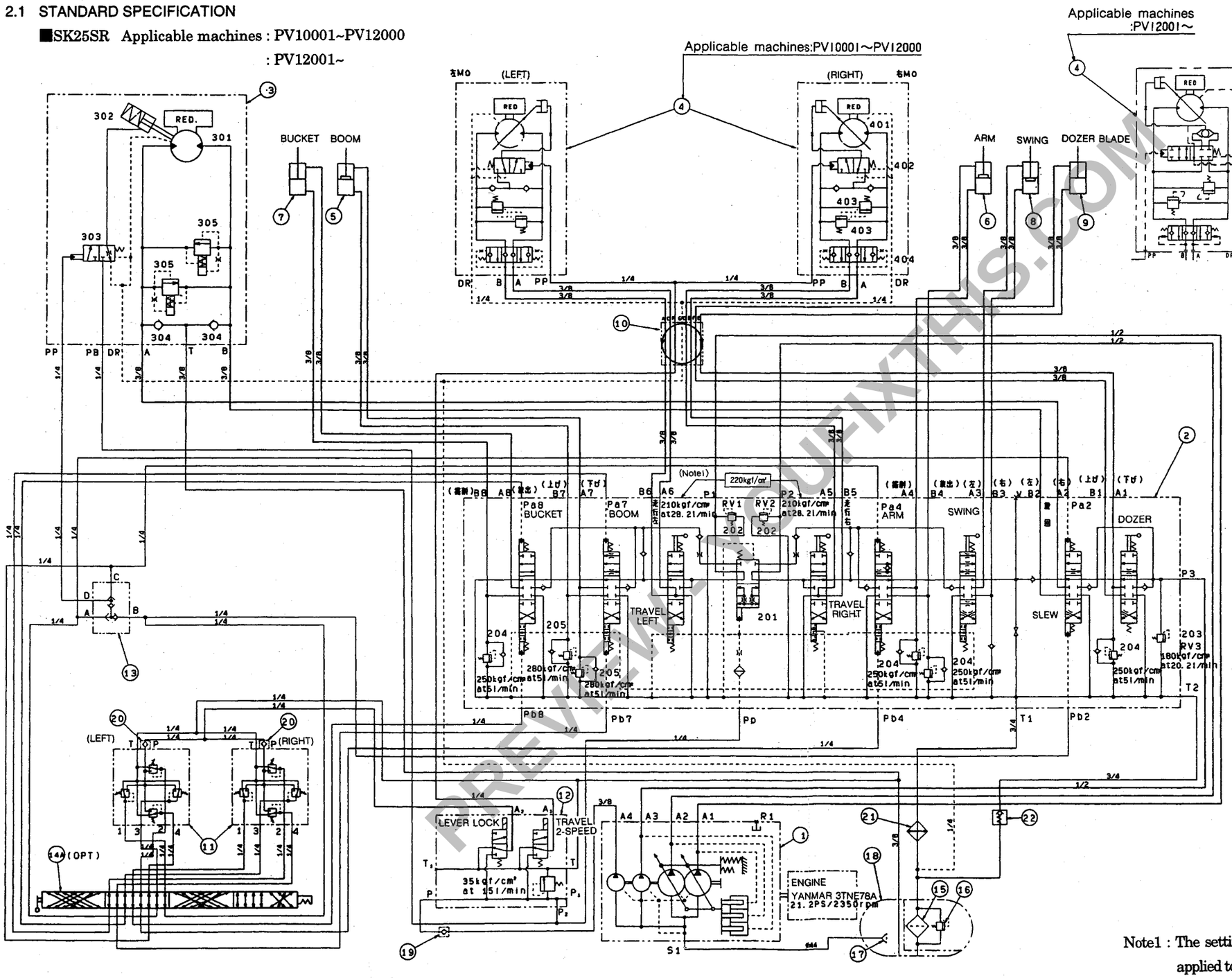
Fig. 1-1 Removal and installation of canopy assy

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2. HYDRAULIC CIRCUITS AND COMPONENT MODELS

2.1 STANDARD SPECIFICATION

■SK25SR Applicable machines : PV10001~PV12000
: PV12001~



No	NAME	MODEL No.	PART No.
1	PUMP	AP2D12	PV10V00003F1
2	CONTROL VALVE	BCV-35-EC9	PV30V00020F1 〔PV30V00021F1〕
3	SLEW MOTOR	PCL-50-21B	PV15V00010F1
4	TRAVEL MOTOR	PHV-250-37 〔PHV-250-45〕	PV15V00008F1 〔PV15V00014F1〕
5	BOOM CYLINDER	φ70×φ40×530	PV01V00021F1
6	ARM CYLINDER	φ70×φ40×535	PV01V00022F1
7	BUCKET CYLINDER	φ60×φ35×418	PV01V00023F1 〔PV01V00035F1〕
8	SWING CYLINDER	φ75×φ40×476	PV01V00024F1
9	DOZER BLADE CYLINDER	φ80×φ45×156	PV01V00025F1
10	SWIVEL JOINT	YV-7104	PV55V00001F1
11	PILOT VALVE	TH40M	PH30V00002F1 〔PW30V00018F1〕
12	SOLENOID VALVE	2KWE5A-20	PH35V00001F1
13	SHUTTLE VALVE	–	PH26V00001F1
14A	MULTI CONTROL VALVE	K16AR6-11	2436U2621F1
15	RETURN FILTER	Y-2502	PR50V00002P1
16	RELIEF VALVE	Y-1740	PR50V00003F1
17	SUCTION STRAINER	Y-1405	2446R344F1
18	HYDRAULIC TANK	–	PW33H00010P1 〔PW33H00013F1〕
19	LINE FILTER	Y-410200	PY50V00001F1
20	FILTER	–	PU03H01009P1
21	OIL COOLER	–	PW05P00014F1
22	CHECK VALVE	LV08-35	PW21V00003F1

※marked item is option.

Note : · This is for reference only, because the model number might be changed due to improvement.
· The model numbers and part numbers in 〔 〕 are applicable for and after the machine number PV12001.

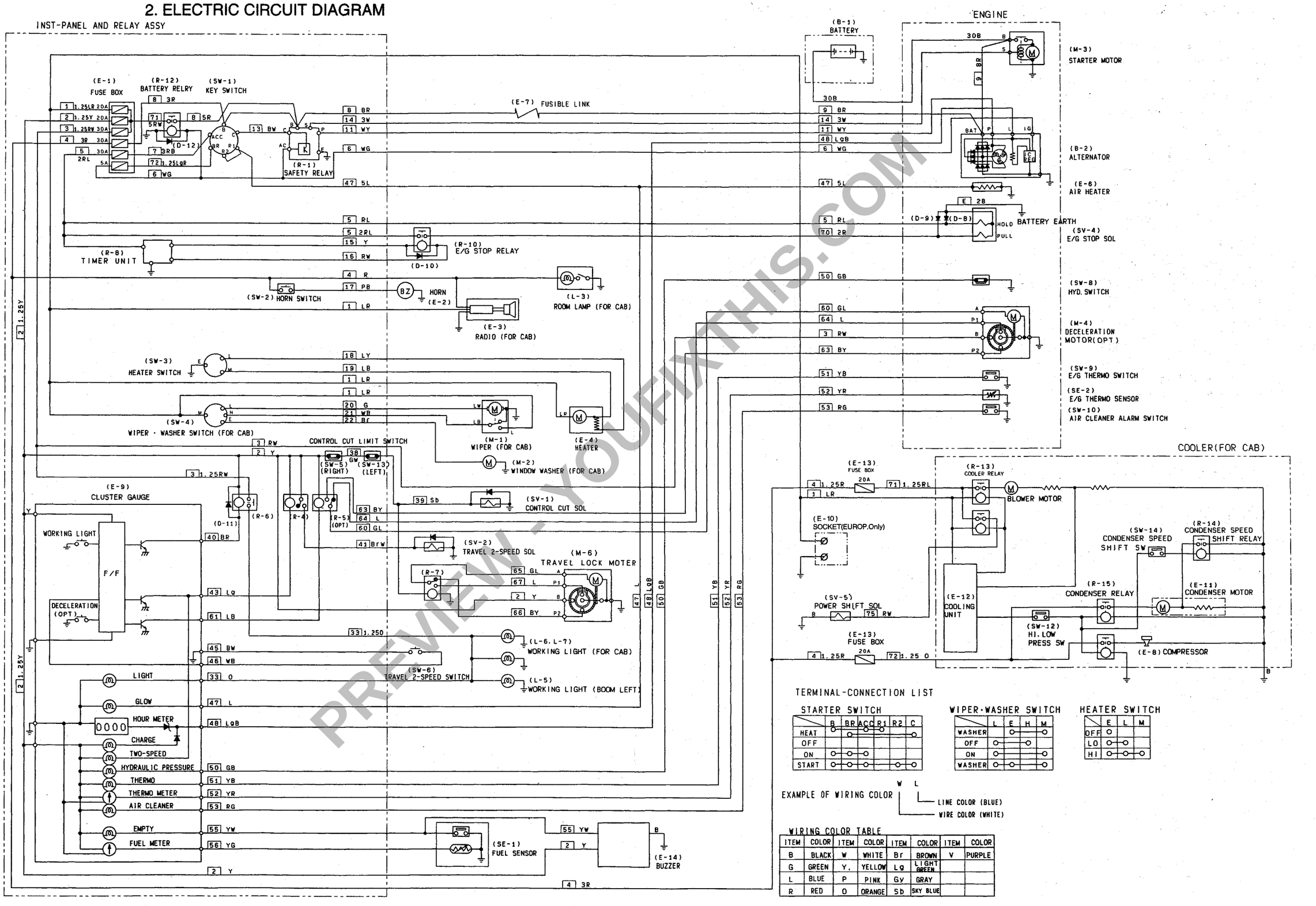
No	PART NAME	No	PART NAME
201	TRAVEL STRAIGHT VALVE	303	TIME DELAY VALVE
202	MAIN RELIEF VALVE	304	CHECK VALVE
203	MAIN RELIEF VALVE	305	RELIEF VALVE
204	PORT RELIEF VALVE	401	HYDRAULIC MOTOR
205	PORT RELIEF VALVE	402	2-SPEED CONTROL VALVE
301	HYDRAULIC MOTOR	403	RELIEF VALVE
302	PARKING BRAKE	404	COUNTERBALANCE VALVE

Note1 : The setting pressure shown in ▭ for the main relief valve is to be applied to the machine number on and after PV12001.

Fig. 1 Hydraulic diagram

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2. ELECTRIC CIRCUIT DIAGRAM



TERMINAL-CONNECTION LIST

STARTER SWITCH

	B	BR	ACC	R1	R2	C
HEAT	○					○
OFF						
ON	○		○			
START	○		○		○	○

WIPER·WASHER SWITCH

	L	E	H	M
WASHER		○		○
OFF	○			
ON	○			
WASHER	○	○		○

HEATER SWITCH

	E	L	M
OFF	○		
LO	○		○
HI	○	○	○

EXAMPLE OF WIRING COLOR: W L — L: LINE COLOR (BLUE); W: WIRE COLOR (WHITE)

WIRING COLOR TABLE

ITEM	COLOR	ITEM	COLOR	ITEM	COLOR	ITEM	COLOR
B	BLACK	W	WHITE	Br	BROWN	V	PURPLE
G	GREEN	Y	YELLOW	Lg	LIGHT GREEN		
L	BLUE	P	PINK	Gy	GRAY		
R	RED	O	ORANGE	Sb	SKY BLUE		

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1. TIGHTENING TORQUES FOR CAPSCREWS AND NUTS

Tables 1 and 2 indicate tightening torques applicable to cases where no special note is given.
Overtightening of bolts may result in a twist-off and a fracture under load.
Insufficient tightening may lead to a loosening or loss of bolts. Always tighten bolts to proper torques.

Table 1 Standard tightening torques for metric coarse screw threads unit : kgf·m (ft·lbs)

Classification	4	T	7	T	10	T
Nominal size	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 6 P=1	0.45±0.05 (3.3±0.4)	0.38±0.04 (2.7±0.3)	0.98±0.1 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (13±1)	1.5±0.15 (11±1)
M 8 P=1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.7±0.7)	2.4±0.2 (17±1)	2.0±0.2 (14±1)	4.3±0.4 (32±3)	3.6±0.4 (26±3)
M10 P=1.5	2.2±0.2 (16±1)	1.83±0.18 (13±1)	4.7±0.5 (34±4)	4.0±0.4 (29±3)	8.5±0.9 (61±7)	7.2±0.7 (52±5)
M12 P=1.75	3.7±0.4 (27±3)	3.2±0.3 (23±2)	8.1±0.8 (59±6)	6.8±0.7 (49±5)	14.6±1.5 (110±11)	12.3±1.2 (89±9)
M14 P=2	5.9±0.6 (43±4)	5.0±0.5 (36±4)	12.8±1.3 (93±9)	10.8±1.1 (78±8)	23±2 (170±14)	19.5±1.9 (140±14)
M16 P=2	9.0±0.9 (65±7)	7.6±0.7 (55±5)	19.5±2.0 (140±14)	16.4±1.6 (120±12)	35±4 (250±29)	29±3 (210±22)
M18 P=2.5	12.4±1.2 (90±9)	10.5±1.0 (76±7)	27±3 (200±22)	23±2 (170±14)	49±5 (350±36)	41±4 (300±29)
M20 P=2.5	17.5±1.7 (130±12)	14.7±1.4 (110±10)	38±4 (270±29)	32±3 (230±22)	68±7 (490±51)	57±6 (410±43)
M22 P=2.5	23±2 (170±14)	19.6±2.0 (140±14)	51±5 (370±36)	43±4 (310±29)	92±9 (670±65)	77±8 (560±58)
M24 P=3	30±3 (220±22)	24±3 (170±22)	65±7 (470±51)	53±5 (380±36)	118±12 (850±87)	96±10 (690±72)
M27 P=3	44±4 (320±29)	36±4 (260±29)	96±10 (690±72)	78±8 (560±58)	173±17 (1300±120)	140±14 (1000±100)
M30 P=3.5	60±6 (430±43)	50±5 (360±36)	131±13 (950±94)	110±11 (800±80)	235±24 (1700±170)	198±20 (1400±140)
M33 P=3.5	81±8 (590±58)	68±7 (490±51)	176±18 (1300±130)	148±15 (1100±110)	317±32 (2300±230)	266±27 (1900±200)
M36 P=4	105±10 (760±72)	88±9 (640±65)	227±23 (1600±170)	190±19 (1400±140)	409±41 (3000±300)	343±34 (2500±250)

Table 2 Standard tightening torques for metric fine screw threads unit : kgf·m (ft·lbs)

Classification	4	T	7	T	10	T
Nominal size	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 8 P=1	1.15±0.11 (8.3±0.8)	0.97±0.1 (7.0±0.7)	2.5±0.2 (18±1)	2.1±0.2 (15±1)	4.5±0.4 (33±3)	3.8±0.4 (27±3)
M10 P=1.25	2.3±0.2 (17±1)	1.91±0.19 (14±1)	4.9±0.5 (35±4)	4.2±0.4 (30±3)	8.9±0.9 (64±7)	7.5±0.7 (54±5)
M12 P=1.25	4.0±0.4 (29±3)	3.4±0.3 (25±2)	8.7±0.9 (63±7)	7.3±0.7 (53±5)	15.7±1.6 (110±12)	13.2±1.3 (95±9)
M16 P=1.5	9.4±0.9 (68±7)	7.9±0.8 (57±6)	20±2 (140±14)	17.2±1.7 (120±12)	37±4 (270±29)	31±3 (220±22)
M20 P=1.5	19±1.9 (140±14)	15.8±1.6 (110±12)	41±4 (300±29)	34±3 (250±22)	74±7 (540±51)	62±6 (450±43)
M24 P=2	32±3 (230±22)	27±3 (200±22)	70±7 (510±51)	58±6 (420±43)	126±12 (910±87)	105±10 (760±72)
M30 P=2	65±6 (470±43)	54±5 (390±36)	142±14 (1000±100)	118±12 (850±87)	255±26 (1800±190)	212±21 (1500±150)
M36 P=3	109±11 (790±80)	91±9 (660±65)	238±23 (1700±170)	198±20 (1400±140)	428±43 (3100±310)	357±36 (2600±260)

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2. TROUBLE DIAGNOSTIC LIST

Class	Reference No.	Parts / Malfunction condition		Engine				Electric unit													Hydraulic unit												
								Power supply system				Power generation and stop system							Operation system and others					Pump			Valve							Actuator		
				Fuel system	Cooling system	Lubrication system	Suction exhaust system and others	Battery	Fusible link	Fuse	Key switch	Safety Relay	Starter motor	Alternator & Air heater	Battery relay	Timer unit	E/G Stop relay	E/G Stop SOL	Gauge cluster	Control cut Limit switch	Control cut SOL	Travel 1,2-speed SW&SOL	Travel lock motor & relay	Main pump	Trochoid pump	Gear pump	Travel & ATT main R/V	Main gear pump R/V	Ports R/V	Travel straight valve	Travel spool	ATT spool	Check valve	Shuttle valve	Slewing motor unit	Travel motor unit	Hydraulic cylinder
Engine	1	Not start.	Starter doesn't rotate.	○				○	○	○	○	○	○	○	○																				
			Starter rotate.	○				○								○	○	○																	
	2	Starts, but stops.		○												○																			
	3	Not stop.														○	○	○																	
	4	The engine malfunctions.		○	○		○																												
Pump	5	The engine revolution falls when loaded.																						○											
	6	The pump malfunctions.																						○	○	○									
Travel	7	Travel operations is unavailable.								○										○	○		○							○				○	
	8	Travel speed is slow.					○												○			○	○	○						○				○	
	9	Travel power is poor.																	○			○					○		○					○	
	10	Travel motion deflects.																						○						○	○				○	
Slewing	11	Slewing operation unavailable.																		○	○										○			○		
	12	Slewing speed is slow.					○																	○												
	13	Slewing power is poor.																										○	○					○		
	14	Slewing operations is unavailable.																													○		○	○		
Attachment	15	Attachment is unoperatable.																		○	○			○							○					
	16	Attachment speed is slow.					○																	○							○					○
	17	Attachment power is poor.																									○		○						○
	18	Attachment operation is unavailable.																												○		○				○

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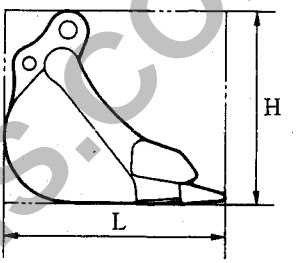
Table of abbreviations

E/G : ENGINE
SOL : SOLENOID
SW : SWITCH
ATT : ATTACHMENT
C/V : CONTROL VALVE
R/V : RELIEF VALVE
V : VALVE

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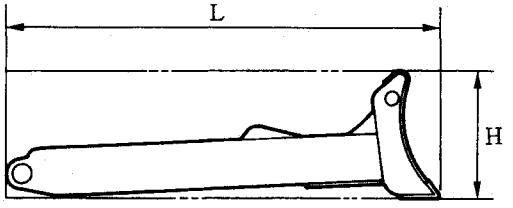
3.4 OVERALL SPECIFICATIONS OF BUCKET

Model	SK25SR	SK30SR	SK35SR
Bucket Capacity	0.08m³(0.105cu.yd)	0.09m³(0.118cu.yd)	0.11m³(0.144cu.yd)
Total length× Total height× Total width L×H×W mm (ft·in)	635×535×500 (2'1"×1'9"×1'8")	640×620×500 (2'1"×2'0"×1.8")	705×610×500 (2'4"×2'0"×1'8")
Weight kg (lbs)	46(101)	71(157)	82(181)



3.5 OVERALL SPECIFICATIONS OF DOZER BLADE

Model	SK25SR	SK30SR	SK35SR
Total length× Total height× Total width L×H×W mm (ft·n)	1030×320×1550 (3'5"×1'1"×5'1")	1055×320×1550 (3'6"×1'1"×5'1")	1185×325×1550 (3'11"×1'1"×5'1")
Weight kg (lbs)	112(247)	117(258)	129(284)



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3.9 DOZER BLADE OPERATING CIRCUIT

The operation is conducted by the operation pedal which is connected to the link mechanism. The dozer and slew are independent from each other, and the circuits are made in parallel.

3.9.1 Dozer Brade-Down Operating Circuit

(1) Dozer brade Operation

At pushing down the operating lever for forward, the link mechanism connected to the lever shifts the dozer spool in control valve(2). Since the pilot pressure is not utilized for it, as same case as the swing, it is actuated regardless to the lever lock.

(2) Main Circuit

1) Supply Circuit for Cylinder(9)

The oil discharged from the P3 port on gear pump enters into the P3 port on control valve(2), and led to the A1 port through dozer valve. The pressurized oil passed through the swivel joint(10) is supplied to the H side of dozer cylinder to actuate dozer brade-down motion.

3.9.2 Dozer Brade-Up Operating Circuit

(1) Dozer Brade Operation

At pulling down the operating lever backward, the link mechanism connected to the lever shifts the dozer spool in control valve(2).

(2) Main Circuit

1) Supply Circuit for Cylinder(9)

The oil discharged from the P3 port on gear pump enters into the P3 port on control valve(2), and led to the B1 port through dozer valve. The pressurized oil passed through the swivel joint(10) is supplied to the R side of dozer cylinder to actuate dozer brade-up motion.

3.9.3 Dozer Brade/Slew compound Operating Circuit

Because the circuits for dozer brade and slew are made in parallel in inside circuits of control valve(2), the compound operation preferentially actuates either of lighter load. Each circuit for dozer brade and slew has an independent circuit for which the oil is supplied from the P3 port on gear pump which is specially provided for each of them. Accordingly, it is actuated steadily without receiving any influence from the actuation for bucket and/or arm, etc.

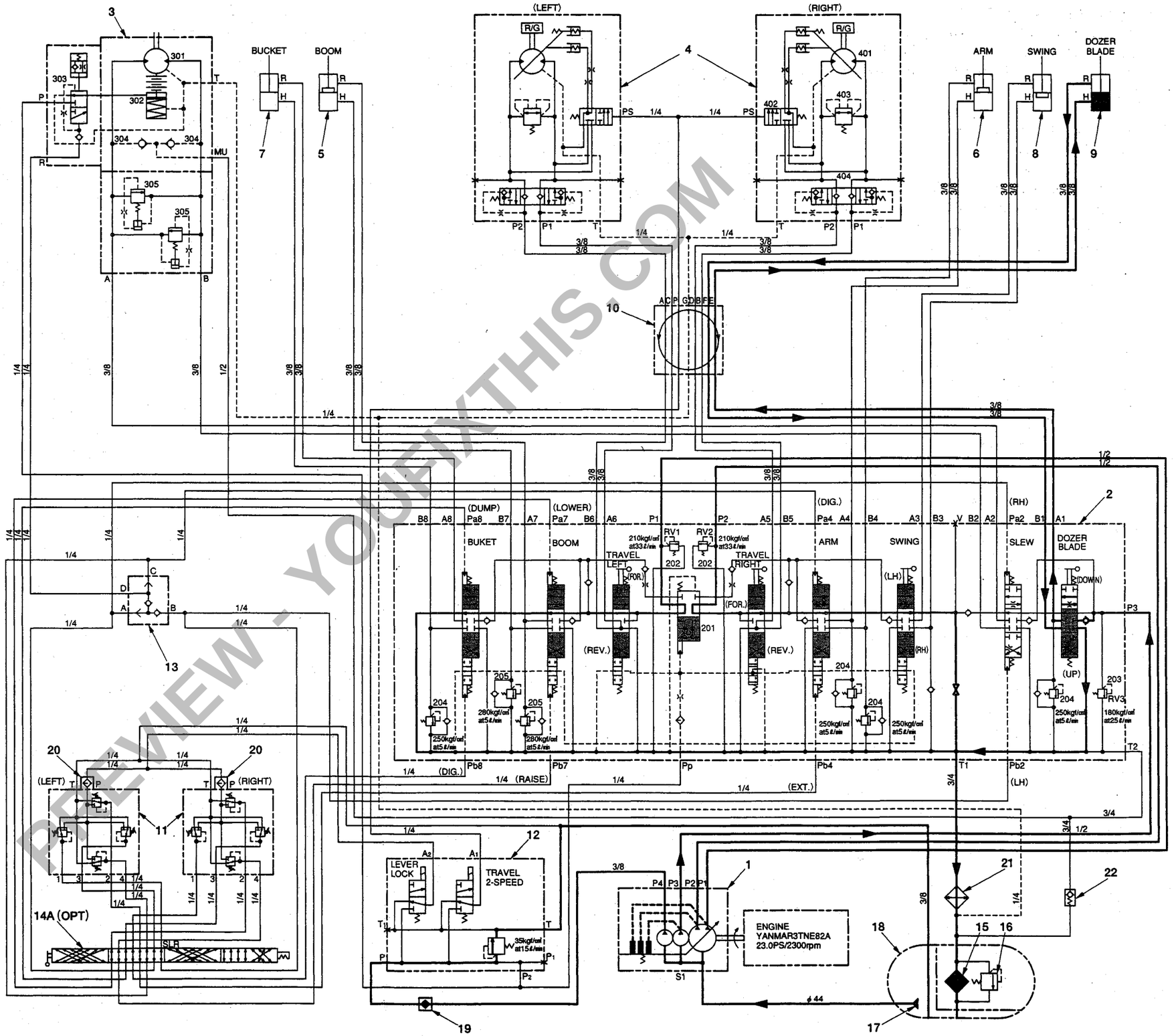


Fig. 17 Dozer blade-Down operating circuit

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Applicable Machines

SK25SR : PV10001~

SK30SR : PW07001~

SK35SR : PX05001~

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Revision	Date of Issue	Remarks
First edition	May, 1997	S5PW1801E S
First revision	March, 1998	S5PW1801E① S

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(2A) Thrust-wise clearance

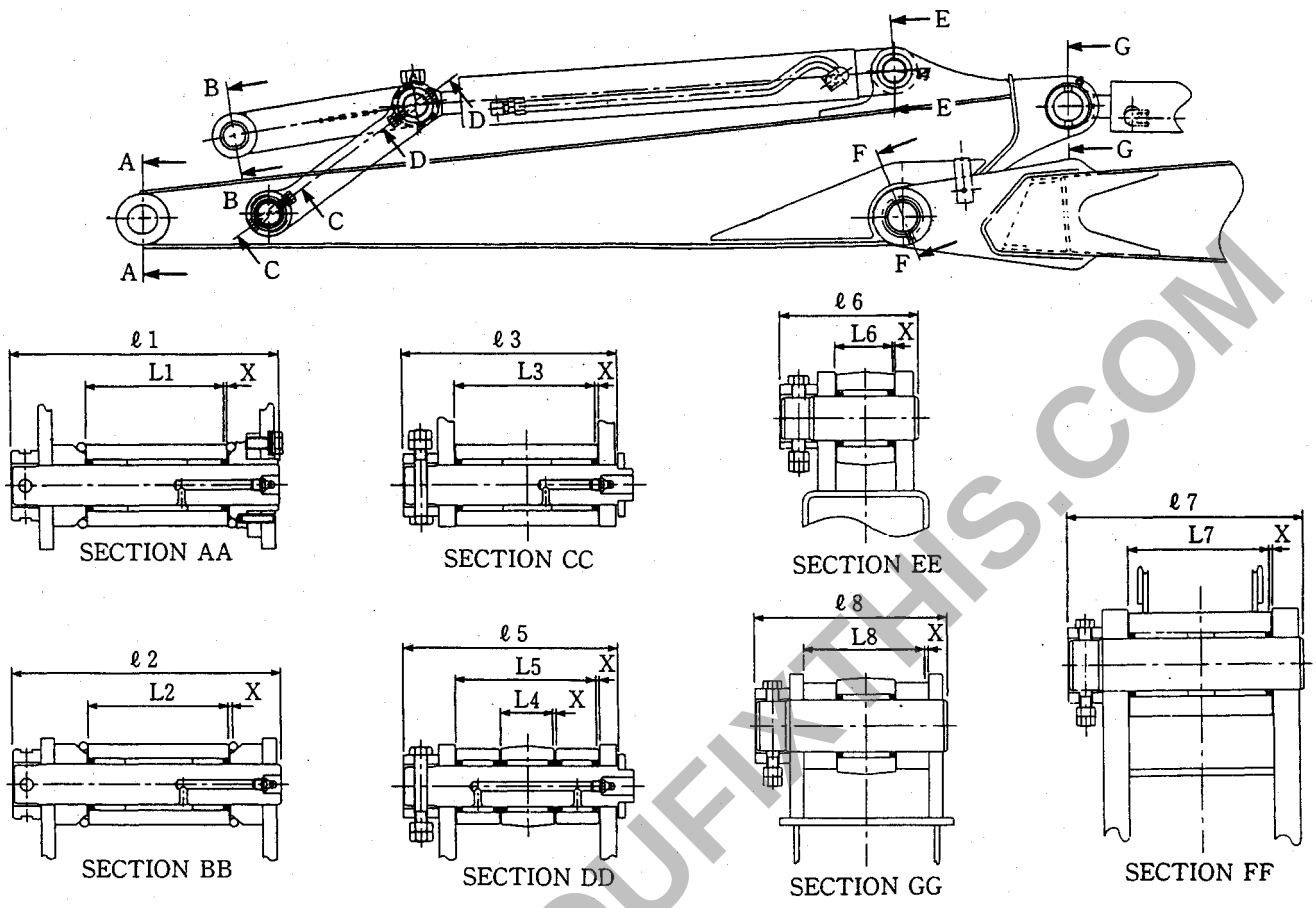


Fig. 17A Thrust-wise clearance

■SK25SR Applicable Machines PV10001～PV12000 Unit : mm (in)

Pos.	Item		Standard dimension		Shim adjusted clearance X (total of both sides)			Pin length		Remedy
			Code	Dimension	Standard value	Reference value for remedy	Serviceability limit	Code	Dimension	
A	Arm point	Arm	L1	$122^{-0.2}_{-0.4}$ ($4.803^{-0.008}_{-0.016}$)	0.1~1.0 (0.004~0.039)	1.5 (0.059)	2.0 (0.079)	ℓ1	226 (8.90)	Shim adjustment
		Bucket		$124^{+0.2}_{-1.2}$ ($4.882^{+0.008}_{-0.047}$)						
B	Bucket link	Link side	L2	$122^{-0.2}_{-0.4}$ ($4.803^{-0.008}_{-0.016}$)	0.6~1.0 (0.024~0.039)			ℓ2	226 (8.90)	
		Bucket		$124^{+0.2}_{-1.2}$ ($4.882^{+0.008}_{-0.047}$)						
C	Idler link (Connected part of arm)	Arm	L3	$122^{-0.2}_{-0.4}$ ($4.803^{-0.008}_{-0.016}$)	Less than 0.5 (0.020)			ℓ3	177 (6.97)	
		Link side		— (—)						
D	Bucket link (Rod side)	Rod side	L4	$40^{0}_{-0.5}$ ($1.575^{0}_{-0.020}$)	0.6~1.0 (0.024~0.039)			ℓ5	177 (6.97)	
		Link side		43 ± 0.5 (1.693 ± 0.020)						
	Bucket link (Idler link side)	Bucket link	L5	$122^{+0.2}_{-0.8}$ ($4.803^{+0.008}_{-0.031}$)						
		Idler link		— (—)						
E	Bucket cylinder (Head side)	Head side	L6	$40^{0}_{-0.5}$ ($1.575^{0}_{-0.020}$)	0.6~2.0 (0.024~0.079)	2.5 (0.098)	3.0 (0.118)	ℓ6	100 (3.94)	
		Arm		$42^{+1.0}_{0}$ ($1.654^{+0.039}_{0}$)						
F	Arm foot	Arm	L7	$108^{-0.2}_{-0.4}$ ($4.252^{-0.008}_{-0.016}$)	Less than 0.5 (0.020)	1.5 (0.059)	2.0 (0.079)	ℓ7	181(7.13) ※195(7.68)	
		Boom		$110^{+1.0}_{0}$ ($4.331^{+0.039}_{0}$)						
G	Arm cylinder (Rod side)	Rod side	L8	$50^{0}_{-0.5}$ ($1.969^{0}_{-0.020}$)	0.6~2.0 (0.024~0.079)	2.5 (0.098)	3.0 (0.118)	ℓ8	118 (4.65)	
		Arm		$51^{+1.0}_{0}$ ($2.008^{+0.039}_{0}$)						

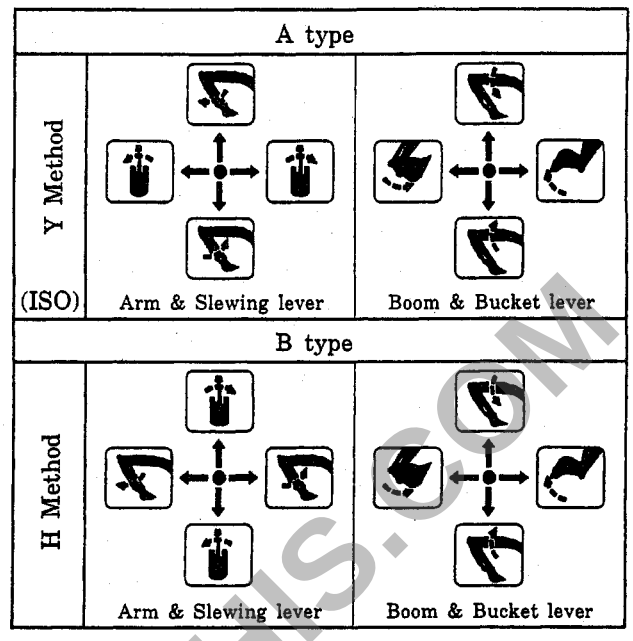
(Note) •The ※ marked dimensions are applicable for the machine number PV10859～12000.

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3) A/B super shifter (option)
On a machine to which an A/B super shifter control valve is installed, the levers may be changed to two types (Y, and H)
If Y and H types are compared, the RH levers are the same and only the LH levers differ i. e. the lever types may be changed between Y and H types if only the operating modes of the left levers are changed.

⚠ WARNING

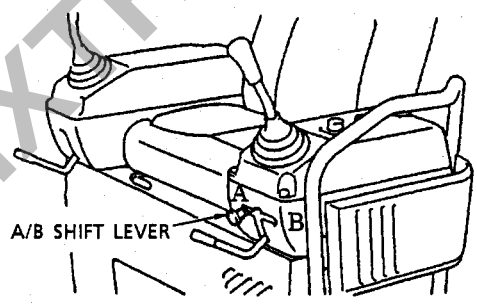
Always lower the bucket to the ground and stop the engine before switching the A · B mode.

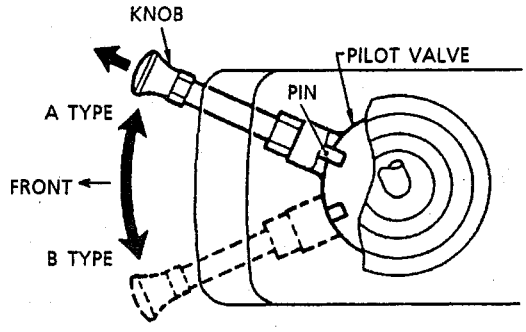


- Procedure of selecting operating patterns
If the knob of the A/B shift lever located in front of the LH operating lever stand is drawn out after the engine stops, the pin comes off from the lock hole of the valve and moves both ways.

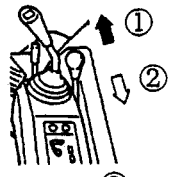
A type → Turn it 50 degrees toward the operator.
B type → Turn it 50 degrees toward the outside.

If you let your hand free from the knob, the pin enters the lock hole and the lever is locked. Make sure that the lever is locked and that the operating method is changed.

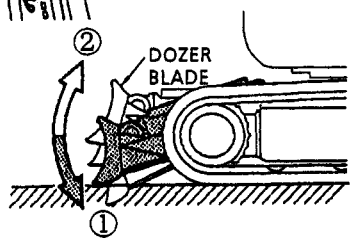




(3) Pedal
Release the pedal lock when the pedal is used. Keep the pedal locked when not used.
1) RH pedal (swing)
Forward (toe step) ····· Left swing
Back (heel step) ····· Right swing
2) LH pedal (option)
Regarding the hydraulic breaker, refer to the separate manual.



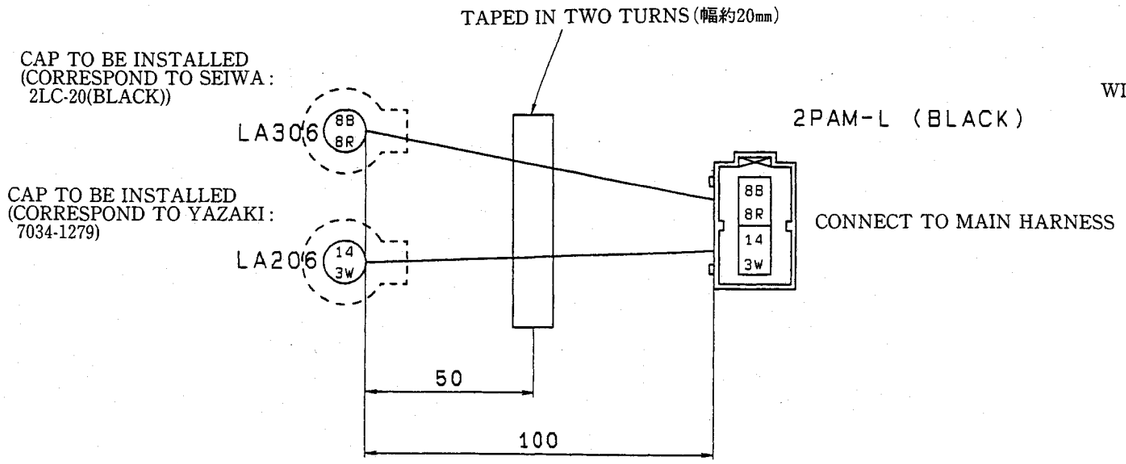
(4) Dozer lever
Forward press ····· Dozer blade lowers.
Back pull ····· Dozer blade raises.



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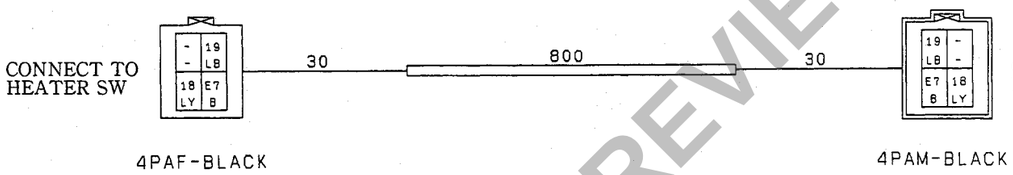
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(2) HARNESS (Safety relay) : (No. B2)



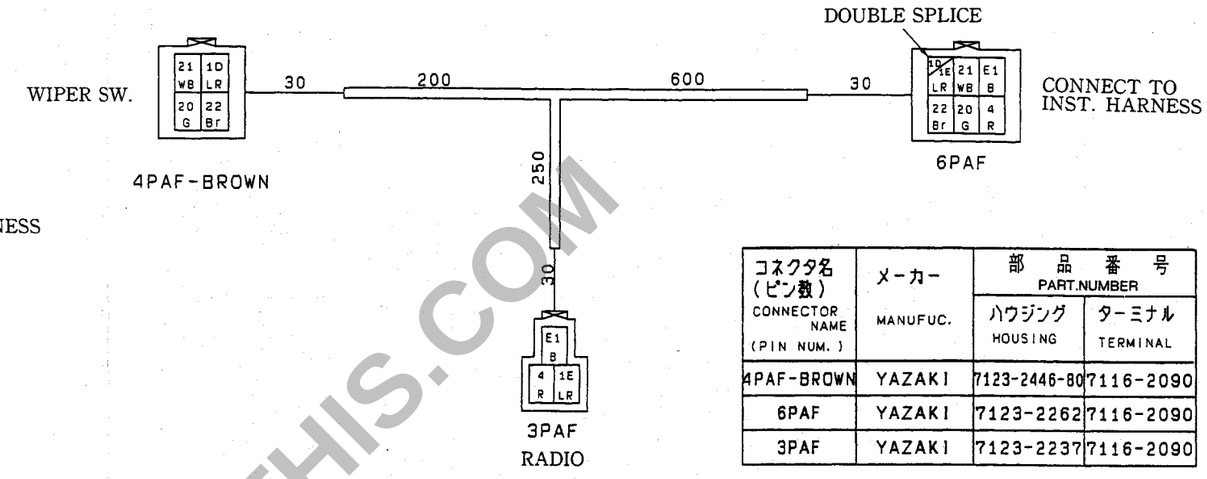
コネクタ名 (ピン数) CONNECTOR NAME (PIN NUM.)	メーカー MANUFUC.	部品番号 (PART. NUMBER)] ハウジング HOUSING	ターミナル TERMINAL	ハーネスシール HARNESS SEAL	リテーナ RETAINER ロックプレート LOCK PLATE	ウメ栓 SEALING PLUG
2PAM-L (BLACK)	YAZAKI	7122-4123-30	7114-3251 7114-3250		7154-6420-80	

(3) HARNESS (Heater switch) : (No. B3)



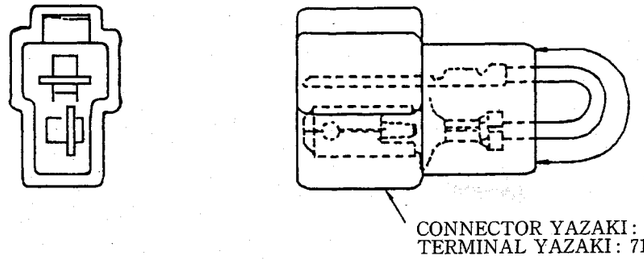
コネクタ名 (ピン数) CONNECTOR NAME (PIN NUM.)	メーカー MANUFUC.	部品番号 PART.NUMBER ハウジング HOUSING	ターミナル TERMINAL
4PAF-BLACK	YAZAKI	7123-2446-30	7116-2090
4PAM-BLACK	YAZAKI	7122-2446-30	7114-2020

(4) HARNESS (Wiper switch · Radio) : (No. B4)

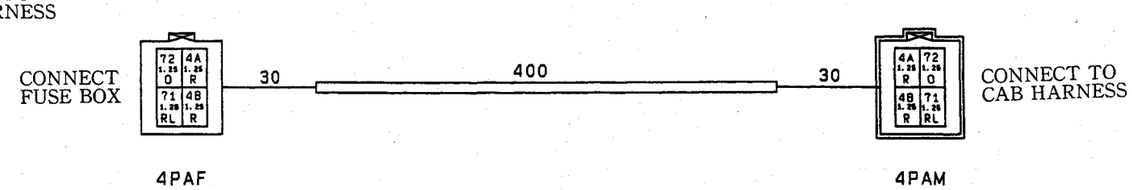


コネクタ名 (ピン数) CONNECTOR NAME (PIN NUM.)	メーカー MANUFUC.	部品番号 PART.NUMBER ハウジング HOUSING	ターミナル TERMINAL
4PAF-BROWN	YAZAKI	7123-2446-80	7116-2090
6PAF	YAZAKI	7123-2262	7116-2090
3PAF	YAZAKI	7123-2237	7116-2090

(5) JAMPER CONNECTOR (For right LS) : (No. B6)



(6) COOLER HARNESS (Fuse side) : (No. C3)

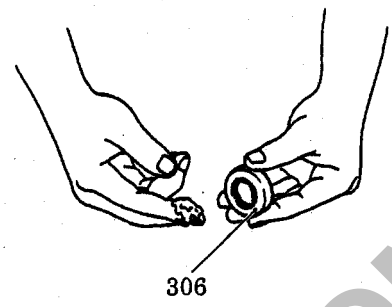


コネクタ名 (ピン数) CONNECTOR NAME (PIN NUM.)	メーカー MANUFUC.	部品番号 PART.NUMBER ハウジング HOUSING	ターミナル TERMINAL
4PAF	YAZAKI	7123-2446	7116-2090
4PAM	YAZAKI	7122-2446	7114-2020

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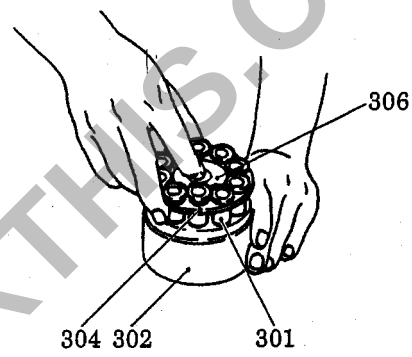
(11) Apply grease on guide (306).



PY-B84

Fig. 57 Apply grease on guide (306)

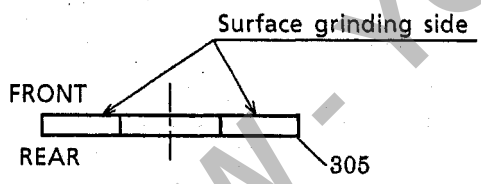
(12) Install guide (306) between retainer (304) and cylinder block (302) and insert pistons (301) in the holes of cylinder block (302).



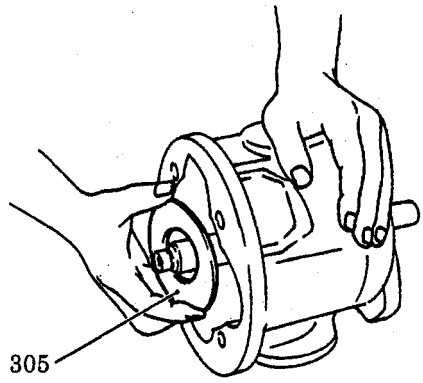
PY-B84

Fig. 58 Installing piston (301)

(13) Install plate (305) in hanger (201). In this case, apply grease on the rear surface of plate (305) to prevent dropping.



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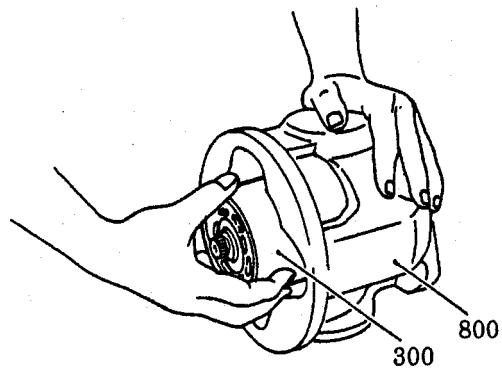


PY-B84

Fig. 59 Installing plate (305)

(14) Align rotary group (300) with spline of shaft (101), and install it to inside of housing (800).

- Apply grease on the sliding surface of piston shoe and the sliding surface to the control plate (402) of cylinder block (302).



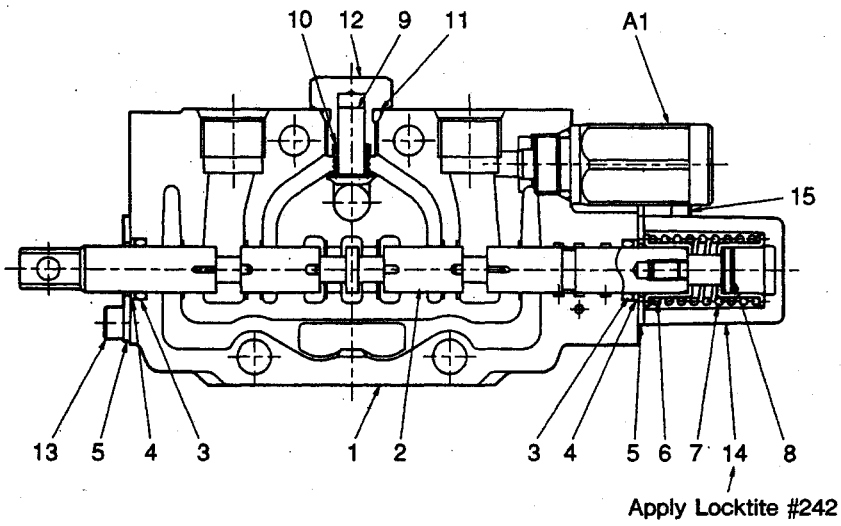
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Fig. 60 Installing rotary group (300)

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(5) SWING ASSY (SECTION D-D)



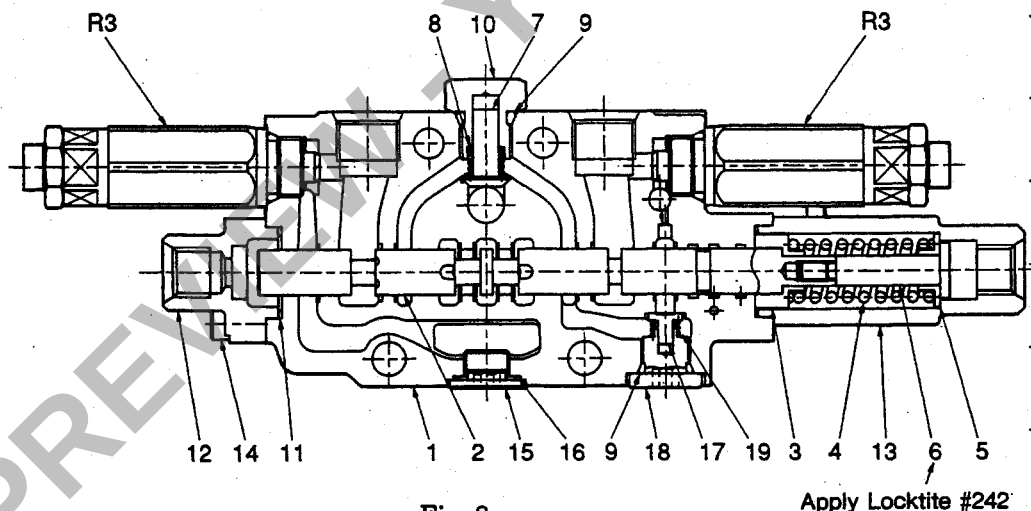
No.	Tightening torque kgf·m(ft·lbs)
8	0.4~0.5(2.9~3.6)
13 15	0.6~0.7(4.3~5.1)
12 A1	4(29)

Fig. 7

No.	NAME	Q'TY	No.	NAME	Q'TY	No.	NAME	Q'TY
1	BODY	1	6	SPRING SEAT	2	11	O-RING	1
2	SPOOL	1	7	SPRING	1	12	PLUG	1
3	O-RING	2	8	SPOOL END	1	13	SOCKET BOLT	2
4	DUST WIPER	2	9	POPPET (CHECK VALVE)	1	14	COVER	1
5	SEAL PLATE	2	10	SPRING	1	15	SOCKET BOLT	2

※Anti-cavitation valve(A1) is included in overall component parts.

(6) ARM ASSY (SECTION E-E)



No.	Tightening torque kgf·m(ft·lbs)
6	0.4~0.5 (2.9~3.6)
14	0.6~0.7 (4.3~5.1)
15 18	1(7.2)
10 R3	4(29)

Fig. 8

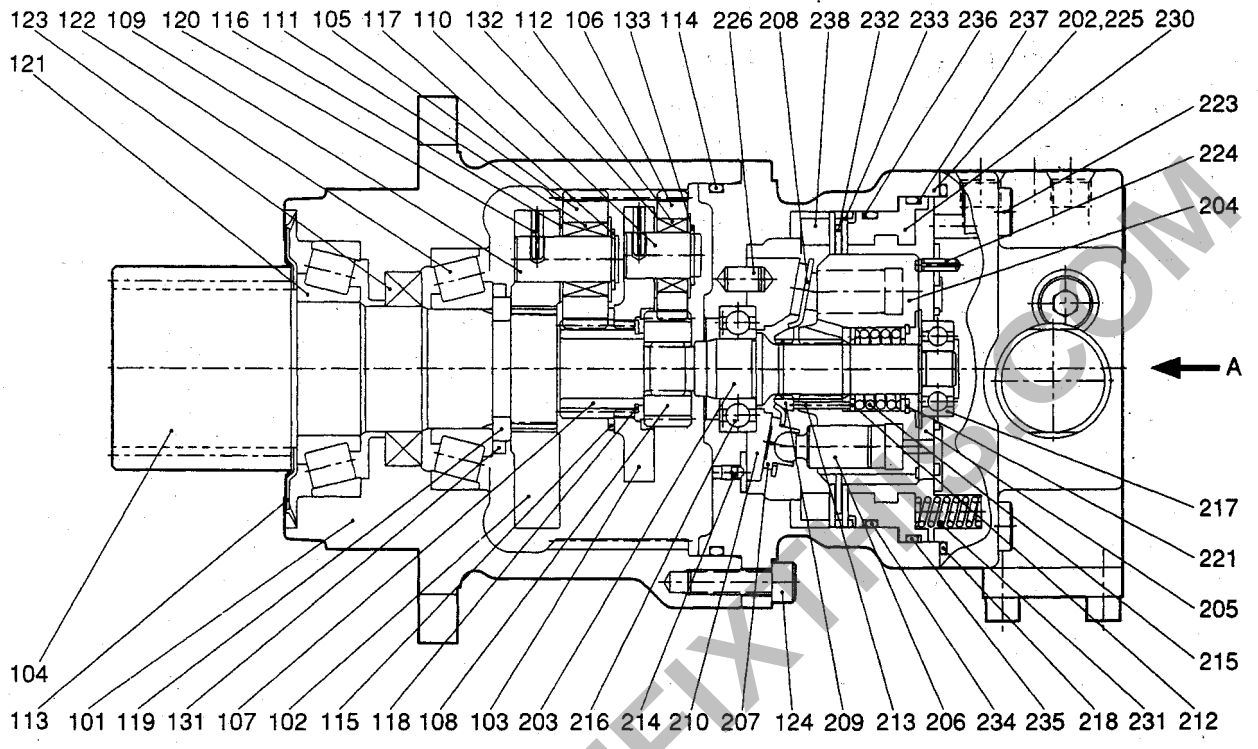
No.	NAME	Q'TY	No.	NAME	Q'TY	No.	NAME	Q'TY
1	BODY	1	8	SPRING	1	15	PLUG	1
2	SPOOL	1	9	O-RING	2	16	O-RING	1
3	SPRING SEAT	1	10	PLUG	1	17	POPPET (CHECK VALVE)	1
4	SPRING	1	11	O-RING	2	18	PLUG	1
5	SPRING SEAT	1	12	COVER	1	19	SPRING	1
6	SPOOL END	1	13	COVER	1			
7	POPPET (CHECK VALVE)	1	14	SOCKET BOLT	4			

※Port relief valve(R3) is included in overall component parts.

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2. CONSTRUCTION AND OPERATION

2.1 CONSTRUCTION



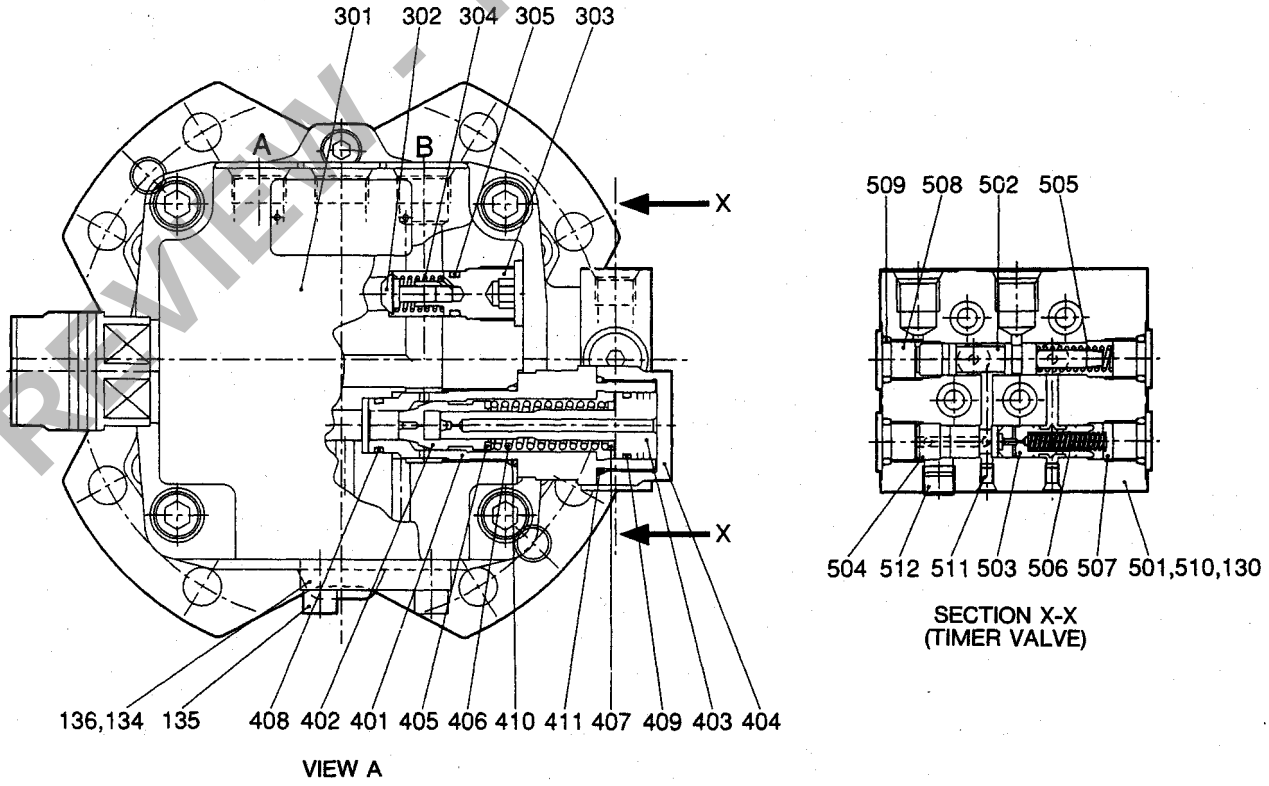


Fig. 2 Cross-sectional view of slewing motor unit

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19) Install the balancing ring (M26) to the valve housing (M31) aligning the recesses on the balancing ring to the pins (M29).

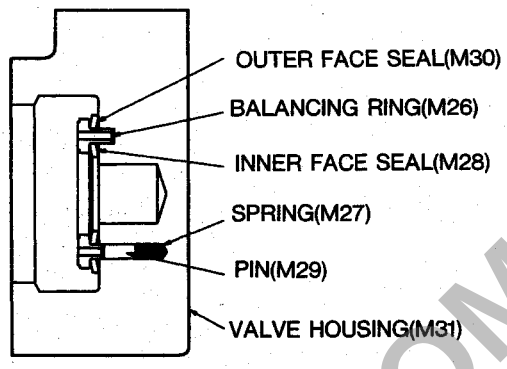


Fig. 53

20) Install the O-ring (M38)(M40) to the valve housing (M31).
Install the valve (M25) to the valve housing (M31) supporting the balancing ring (M26) with a long and slender bar (such as a screw driver) not to allow dropping off of the balancing ring.
- At that time, install it aligning the drain hole on the valve plate to the drain hole on the valve housing.

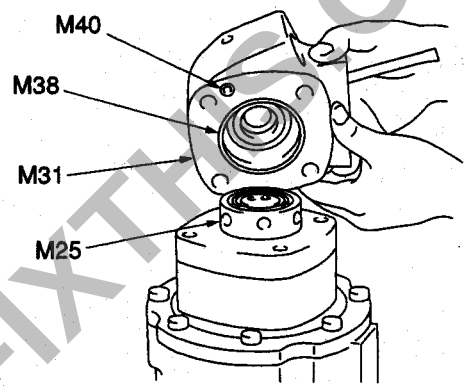


Fig. 54

21) Tighten up the capscrews (M41) applying Locktite #242 to the threaded portion.
: 16㎜
Tightening torque: 7 kgf·m (51ft·lbs)

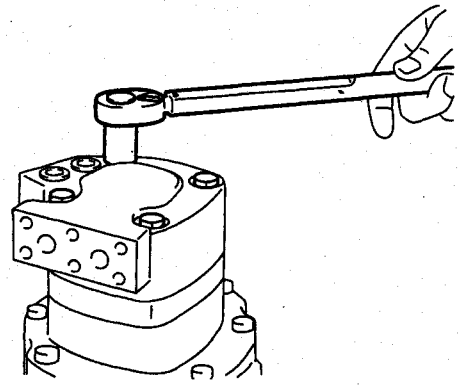


Fig. 55

22) Install the O-rings (T15) to the timer valve body (T1). And tighten up the timer valve assy with the socket bolts (T16).
: 5㎜
Tightening torque:
1.5±0.1kgf·m (10.8±0.7ft·lbs)

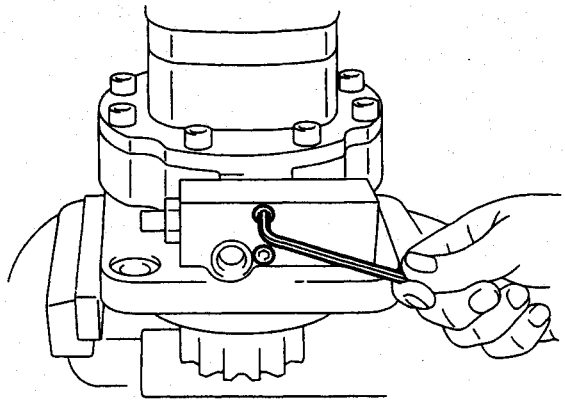
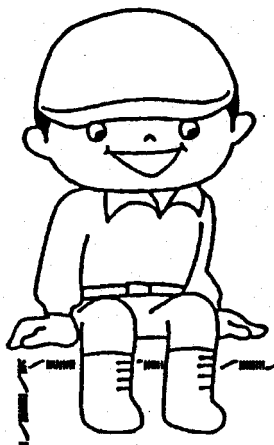


Fig. 56

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PREFACE

This manual covers the hydraulic motor (for travel).
In addition to the motor, a reduction unit and brake valve are integratedly incorporated in this hydraulic motor. Furthermore, a high/low 2-speed changeover mechanism is also incorporated in the hydraulic motor.
(The parking brake is to be optionally installed.)

Models	Applicable Machines	Notes	Models	Applicable Machines	Notes
SK25SR	PV10001~12000	Spec.1			
SK25SR	PV12001~	Spec.1A			
SK35SR	PX05001~05600	Spec.2			
SK35SR	PX05601~06500	Spec.3			
SK35SR	PX06501~	Spec.4			

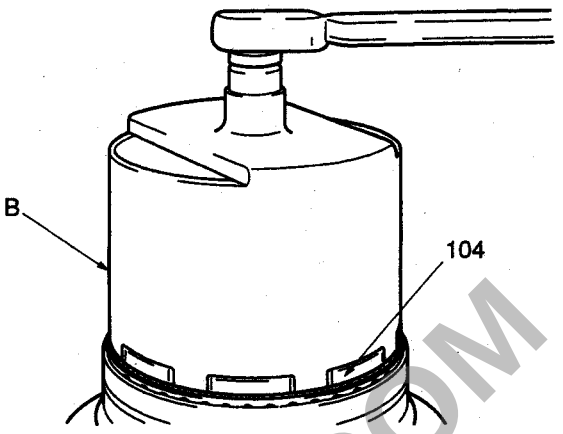
Revision	Date of Issue	Remarks
First edition	July, 1997	S5150474E S
First revision	March, 1998	S5150474E① S
Second revision	April, 1999	S5150474E② S

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(5) Install the ring nut (104).
- Using the tightening jig (B), install it so that there is no clearance against the angular bearing.

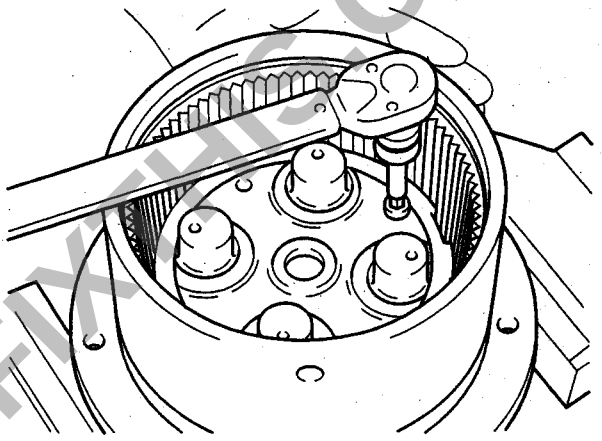
Tightening torque :
20±1.0kgf·m(145±7ft·lbs)



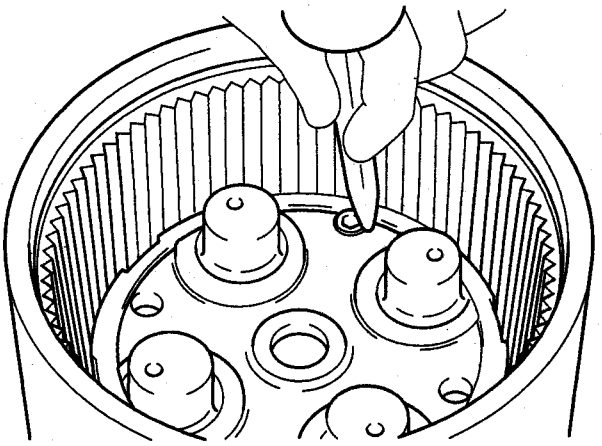
(6) Install the plug (105).
- Do not use any sealing tape.

: 6㎜

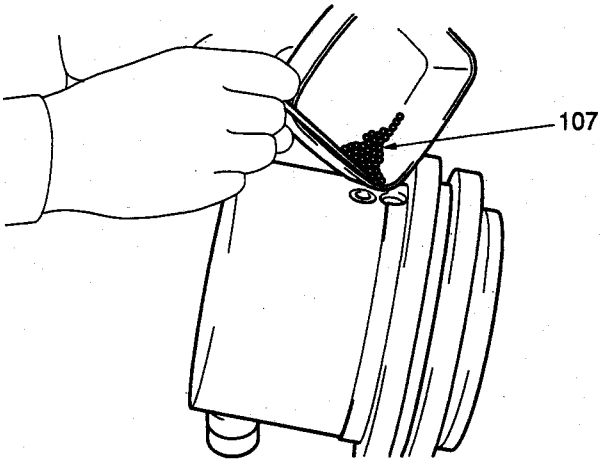
Tightening torque :
1.5±0.5kgf·m(11±4ft·lbs)



(7) Lock the plug (105) with a punch at two points.



(8) Put in the steel balls (107).



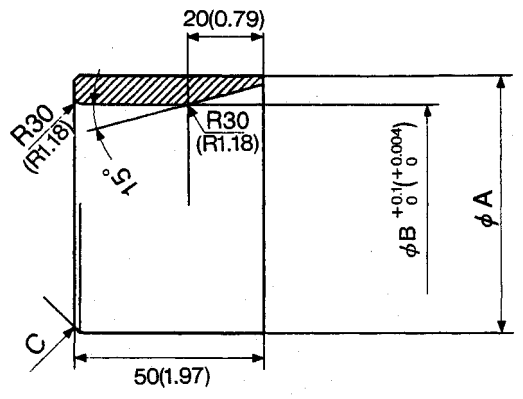
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(5) Curing Jig (E) : for Seal Ring

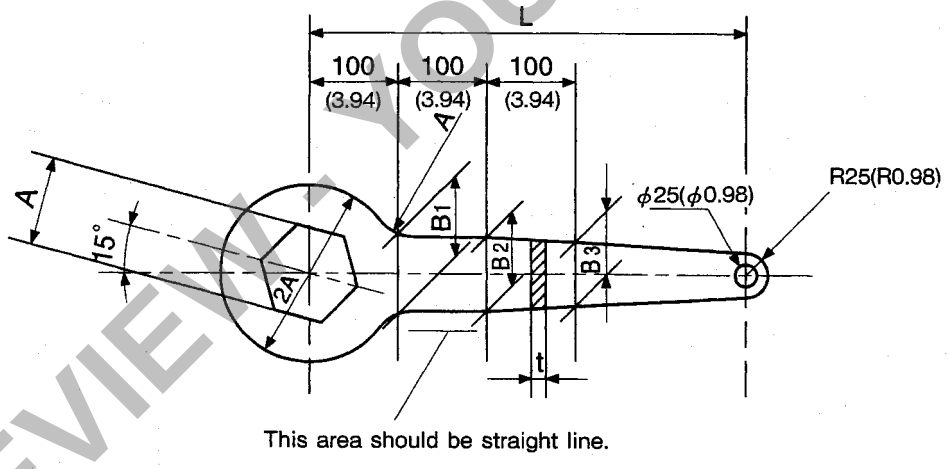
Unit : mm(in)



Material : STKM13C or equivalent

Applicable Cylinder		Dimension	
SK25SR	SK35SR		
Boom Arm	Bucket	A	85(3.35)
		B	70(2.76)
Bucket	—	A	75(2.95)
		B	60(2.36)
Swing	—	A	90(3.54)
		B	75(2.95)
Dozer	Arm	A	95(3.74)
		B	80(3.15)
—	Boom	A	100(3.94)
		B	85(3.35)
—	Dozer	A	105(4.13)
		B	90(3.54)

(6) Ring Wrench (F) : for Piston Nut.



Masterial : SS410P, Cut out by gas burner, then finish by grinder.

Unit : mm(in)

Applicable Cylinder		A	L=300(11.8)			L=500(19.7)			
SK25SR	SK25SR		B1	B2	t	B1	B1	B3	t
Boom, Arm Bucket	Bucket	41(1.61)	95(3.74)	67(2.64)	16(0.63)	104(4.09)	90(3.54)	73(2.87)	16(0.63)
Swing	—	50(1.97)							
Dozer	Boom, Arm Dozer	55(2.17)							

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5.2.3 Modification of Arm

Attach the additional parts shown in the Table 20 to the arm of standard specification by means of welding in accordance with the Fig. 25.

Note : • Use the welding rod with the weld symbol B (for mild steel 50 kg grade).

Symbol for Q'ty	Arm Part No.	Applicable Machine No.
A	PW12B00036F1	PW07001～09500
B	PW12B00036F2	PW09501～

Table 20 Additional Parts for Arm Modification

No.	PART NO.	NAME	Q'TY A	Q'TY B	No.	PART NO.	NAME	Q'TY A	Q'TY B
2	PV12B01152P1	PLATE	2	2	4	PW12B01061P1	PLATE	1	1
	(PV46H01004P1)	(before Modification)	(2)	—	5	PW12B01062P1	PLATE	1	1
3	PW12B01060P1	PLATE	1	1					

Note : The part numbers are subject to change due to improvement or modification.
Use them for your reference only.

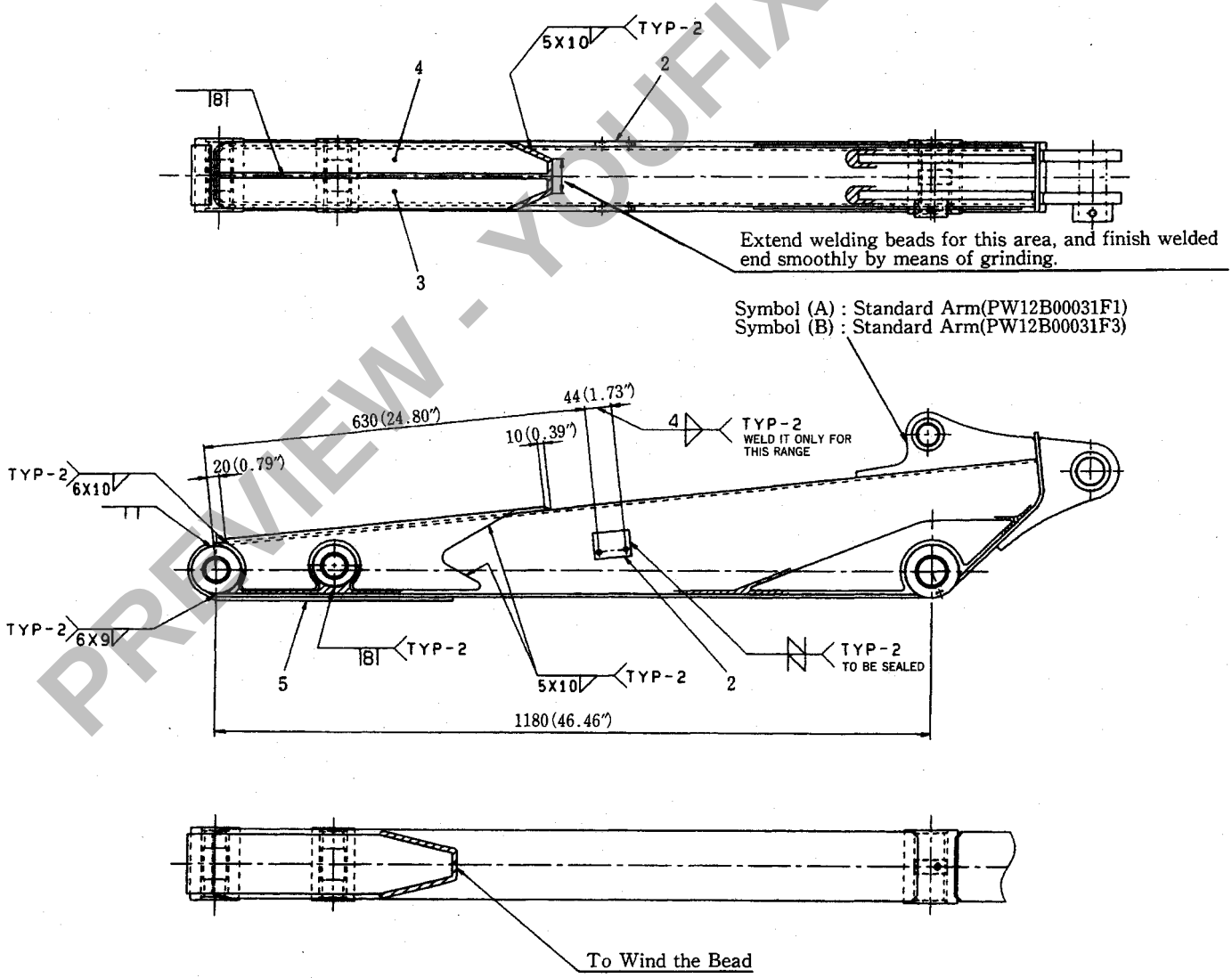


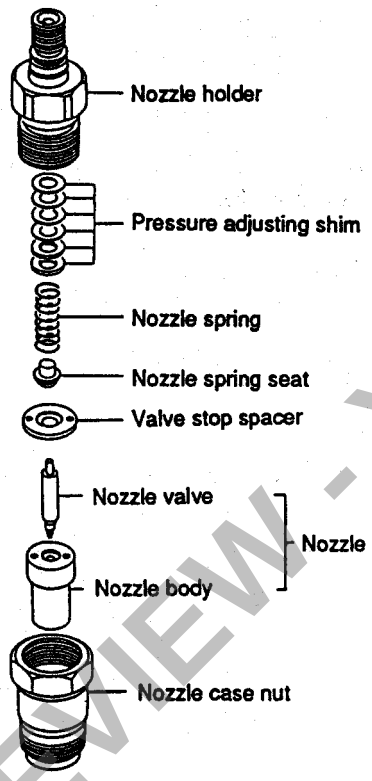
Fig. 25 Arm Modification (SK30SR)

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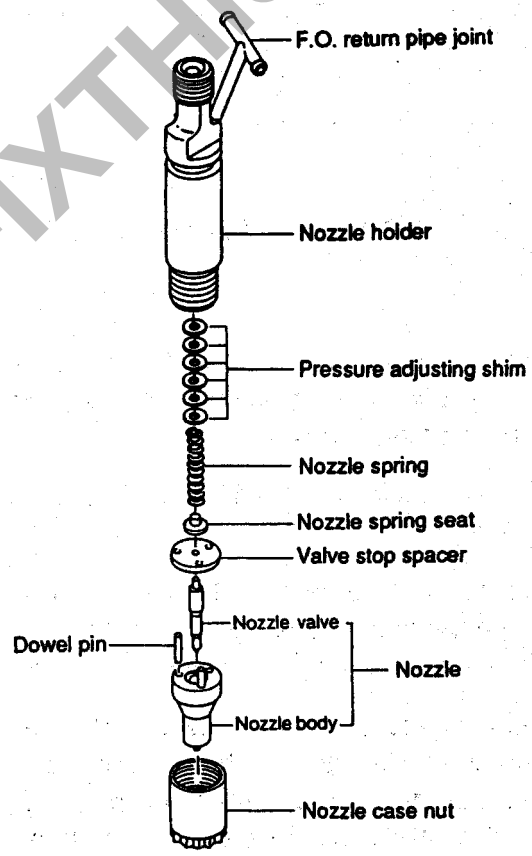
	Type of pressure adjusting shim thickness (mm)	Injection pressure adjustment
Indirect injection system	0.1, 0.2, 0.3, 0.4, 0.5	Increase the pressure adjusting shim the thickness by 0.1 mm and the injection pressure is increased by 7-10 kgf/cm².
Direct injection system	0.13, 0.15, 0.18, 0.4, 0.5, 0.8	Increase the pressure adjusting shim thickness by 0.1 mm and the injection pressure is increased by about 19 kgf/cm².

[Reference: Structure of fuel injection valve]

(Indirect injection system)



(Direct injection system)



2. Checking the spray patterns

While pumping the lever of the nozzle tester 4-6 times per second at the specified injection pressure (Refer to Chapter 1, specifications and performance), check the spray patterns. If the following trouble is found, clean or replace the nozzle.

(1) Make sure that the pattern is neither stream nor sliver.

(2) Ensure that fuel is sprayed conically around the nozzle center line and that a fuel injection spreading angle is 5-10° in the indirect injection system or approx. 150° in the direct injection system.

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9-2 Cylinder Block

(Unit: mm)

Item \ Model		2/3TNE68		3TNE74		3TNE78A	
		Standard	Wear limit	Standard	Wear limit	Standard	Wear limit
Cylinder bore		68.000 ~68.030	68.20	74.000 ~74.030	74.20	78.000 ~78.030	78.20
Cylinder bore	L mark	68.020 ~68.030		74.020 ~74.030		78.020 ~78.030	
	M mark	68.010 ~68.020		74.010 ~74.020		78.010 ~78.020	
	S mark	68.000 ~68.010		74.000 ~74.010		78.000 ~78.010	
Cylinder roundness		0.00 ~0.01	0.03	0.00 ~0.01	0.03	0.00 ~0.01	0.03
Cylindricity		0.00 ~0.01	0.03	0.00 ~0.01	0.03	0.00 ~0.01	0.03

Item \ Model		3TNE82A 3/4TNE82		3/4TNE84(T)		3/4TNE88	
		Standard	Wear limit	Standard	Wear limit	Standard	Wear limit
Cylinder bore		82.000 ~82.030	82.20	84.000 ~84.030	84.20	88.000 ~88.030	88.20
Cylinder bore	L mark	82.020 ~82.030		84.020 ~84.030		88.020 ~88.030	
	M mark	82.010 ~82.020		84.010 ~84.020		88.010 ~88.020	
	S mark	82.000 ~82.010		84.000 ~84.010		88.000 ~88.010	
Cylinder roundness		0.00 ~0.01	0.03	0.00 ~0.01	0.03	0.00 ~0.01	0.03
Cylindricity		0.00 ~0.01	0.03	0.00 ~0.01	0.03	0.00 ~0.01	0.03

9-3 Valve rocker arm

(Unit: mm)

Item \ Model		2/3TNE68		3TNE74		3TNE78A/82A, 3/4TNE82, 3/4TNE84(T), 3/4TNE88	
		Standard	Wear limit	Standard	Wear limit	Standard	Wear limit
Intake & Exhaust rocker arm	Rocker arm shaft outside dia.	9.972~9.987	9.95	11.966~11.984	11.95	15.966~15.984	15.95
	Rocker arm bushing inside dia.	10.000~10.020	10.09	12.000~12.020	12.09	16.000~16.020	16.09
	Oil clearance	0.013~0.048	0.14	0.016~0.054	0.14	0.016~0.054	0.14
Pushrod bending		0.03 or less	—	0.03 or less	—	0.03 or less	—
Tappet	Tappet stem outside dia.	17.950~17.968	17.93	20.927~20.960	20.90	11.975~11.990	11.93
	Tappet guide hole inside dia.	18.000~18.018	18.05	21.000~21.021	21.05	12.000~12.018	12.05
	Oil clearance	0.032~0.068	0.12	0.040~0.094	0.15	0.010~0.043	0.12

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