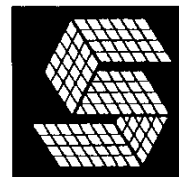


Workshop Manual

EX200-2

SECTION 01 SPECIFICATIONS



CONTENTS

Group 01-Tightening Torque

Tightening Torque

Specification W01-01-01

Group 02- Painting Standard

Painting Standard W01-02-01

SPECIFICATIONS/Tightening Torque

EX200-2

Tightening Torque Specifications

No.	Descriptions	Bolt Dia mm	Qty	Wrench Size in (mm)	Torque N·m (kgf·m, lbf·ft)
1	Engine cushion rubber mounting bolt	18	4	1.06 (27)	392.28 (40.0, 289.32)
2	Engine bracket mounting bolt	12	8	0.75 (19)	88.26 (9.0, 65.10)
3	Hydraulic oil tank mounting bolt	16	4	0.94 (24)	205.95 (21.0, 151.89)
4	Fuel tank mounting bolt	16	4	0.94 (24)	205.95 (21.0, 151.89)
5	ORS fittings for hydraulic hoses and piping			0.75 (19) 0.87 (22) 1.06 (27) 1.26 (32) 1.42 (36) 1.61 (41)	29.42 (3.0, 21.70) 39.23 (4.0, 28.93) 93.17 (9.5, 68.71) 137.30 (14.0, 101.26) 176.53 (18.0, 130.19) 205.95 (21.0, 151.89)
		* 1-3/16"-12 * 1-7/16"-12			
6	Pump mounting bolt	10	8	0.67 (17)	49.04 (5.0, 36.17)
7	Control valve mounting bolt	14	4	0.87 (22)	137.30 (14.0, 101.26)
8	Swing device mounting bolt	22	12	1.26 (32)	735.53 (75.0, 542.48)
9	Swing motor mounting bolt	12	8	0.39 (10)	88.26 (9.0, 65.10)
10	Battery mounting bolt	10	2	0.67 (17)	49.04 (5.0, 36.17)
11	Cab mounting bolt	16	4	0.94 (24)	205.95 (21.0, 151.89)
12	Swing bearing mounting bolt to upperstructure	22	30	1.26 (32)	637.46 (65.0, 470.15)
	Swing bearing mounting bolt to undercarriage	22	36	1.26 (32)	735.53 (75.0, 542.48)
13	Travel device mounting bolt	20	28	1.18 (30)	617.84 (63.0, 455.68)
14	Travel reduction device cover mounting bolt	12	32	0.75 (19)	107.88 (11.0, 79.56)
15	Sprocket mounting bolt	20	16	1.18 (30)	470.74 (48.0, 347.18)
16	Track guard mounting bolt	18	8	1.06 (27)	451.12 (46.0, 332.72)
17	Upper roller mounting bolt	16	16	0.94 (24)	264.79 (27.0, 195.29)
18	Lower roller mounting bolt	18	64	1.06 (27)	451.12 (46.0, 332.72)
19	Track shoe mounting bolt	20	376	1.18 (30)	794.37 (81.0, 585.87)
20	Cover mounting bolt	10 12		0.67 (17) 0.75 (19)	49.04 (5.0, 36.17) 88.26 (9.0, 65.10)
21	Counterweight mounting bolt	36	4	2.17 (55)	1912.37 (195.0, 1410.44)
22	Front pin holding nut	20	12	1.18 (30)	539.39 (55.0, 397.82)

* : UNF thread

- Note: (1) Apply lubricant (e.g. white zinc B solved into spindle oil) to bolts and nuts to stabilize friction coefficient of them.
 (2) Make sure bolt and nut threads are clean before installing.
 (3) Apply Loctite to threads before installing and tightening swing bearing mounting bolts.

SPECIFICATIONS/Tightening Torque

EX200-2

Torque Chart

- (1) Be sure to use bolts of correct length. Too long bolts cannot be tightened as the bolt tip bottoms the tapped hole. Too short bolts cannot develop sufficient tightening force due to shorter thread lengths.
- (2) Tighten bolts or nuts correctly to torque specifications. Three kinds of bolts T, H and M, different in material, are used. Make sure to select correct bolts and tighten correctly when assembling the machine or components.



T-Bolt



H-Bolt



M-Bolt

W105-01-01-002

Metric Bolt Torque Chart

Nominal Dia (mm)	T-bolt (SCM3) N·m (kgf·m, lbf·ft)	H-bolt (S40C) N·m (kgf·m, lbf·ft)	M-bolt (SS41) N·m (kgf·m, lbf·ft)	Wrench Size in (mm)
6			3.33-4.22 (0.34-0.43, 2.46-3.11)	0.39 (10)
8	29.42 (3.0, 21.70)	19.61 (2.0, 14.47)	8.83-9.81 (0.90-1.00, 6.51-7.23)	0.51 (13)
10	63.75 (6.5, 47.02)	49.04 (5.0, 36.17)	19.61 (2.0, 14.47)	0.67 (17)
12	107.88 (11.0, 79.56)	88.26 (9.0, 65.10)	34.32 (3.5, 25.32)	0.75 (19)
14	176.53 (18.0, 130.19)	137.30 (14.0, 101.26)	53.94 (5.5, 39.78)	0.87 (22)
16	264.79 (27.0, 195.29)	205.95 (21.0, 151.89)	78.46 (8.0, 57.86)	0.94 (24)
18	392.28 (40.0, 289.32)	294.21 (30.0, 216.99)	117.68 (12.0, 86.80)	1.06 (27)
20	735.53 (75.0, 542.48)	392.28 (40.0, 289.32)	166.72 (17.0, 122.96)	1.18 (30)
22		539.39 (55.0, 397.82)	215.75 (22.0, 159.13)	1.26 (32)
24		686.49 (70.0, 506.31)	274.60 (28.0, 202.52)	1.42 (36)
27	1912.37 (195.0, 1410.44)	1029.74 (105.0, 759.47)	392.28 (40.0, 289.32)	1.61 (41)
30	2549.82 (260.0, 1880.58)	1422.02 (145.0, 1048.79)	539.39 (55.0, 397.82)	1.81 (46)
33	3138.24 (320.0, 2314.56)	1912.37 (195.0, 1410.44)	735.53 (75.0, 542.48)	1.97 (50)
36	3138.24 (320.0, 2314.56)	2402.72 (245.0, 1772.09)	931.67 (95.0, 687.14)	2.17(55)

W01-01-02

SPECIFICATIONS / Tightening Torque

EX200-2

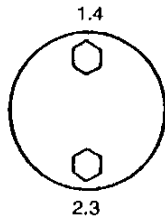
Inch Bolt Torque Chart

Nominal Dia (in)	T-bolt (SCM3) N·m (kgf·m, lbf·ft)	M-bolt (SS41) N·m (kgf·m, lbf·ft)
3/8"		13.73- 17.65 (1.4- 1.8, 10.13- 13.02)
1/2"		33.34- 47.07 (3.4- 4.8, 24.59- 34.72)
5/8"		69.63- 87.28 (7.1- 8.9, 69.63- 64.37)
3/4"	539.39 (55.0, 397.82)	127.49- 156.91 (13.0-16.0, 94.03- 115.73)
7/8"	931.67 (95.0, 687.14)	205.95- 254.98 (21.0- 26.0, 151.89- 188.06)
1"	1372.98 (140.0, 1012.62)	304.02- 274.85 (31.0-38.0, 224.22- 274.85)

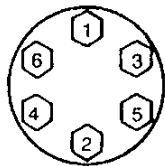
Note: The torques given are standard figures. Any figures specifically described in this manual has priority.
 ex. EX220-2 Swing bearing mounting bolts: Bolt dia 0.87 in (22 mm)
 Tightening torque
 637.46~735.53 N·m(65~75 kgf·m, 470.15~542.48 lbf·ft)

- (3) When tightening two or more bolts, tighten them alternately as shown below to be sure that they are tightened evenly.

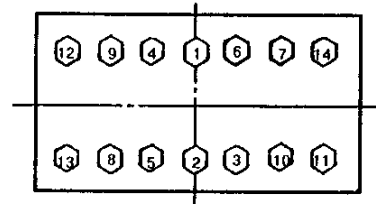
Equally tighten upper and lower alternately



Tighten diagonally



Tighten from center and diagonally



W105-01-01-003

SPECIFICATIONS/Tightening Torque

EX200-2

ORS (Split Flange) Hexagonal Socket Head Bolt Tightening Torque Specifications

Nominal Size of Split Flange (in)	Applicable Pressure 205.95 bar (210 kg/cm ² , 2986.2 psi)		
	Torque N·m (kgf·m, lbf·ft)	UNF	Bolt Dia (D) in (mm)
1/2"	24.52 (2.5, 18.08)	5/16"-18	ϕ 7.9
3/4"	39.23 (4.0, 28.93)	3/8"-16	ϕ 9.5
1"	44.13 (4.5, 32.55)	3/8"-16	ϕ 9.5
1-1/4"	58.84 (6.0, 43.40)	7/16"-14	ϕ 11.1
1-1/2"	78.46 (8.0, 57.86)	1/2"-13	ϕ 12.7
2"	88.26 (9.0, 65.10)	1/2"-13	ϕ 12.7
2-1/2"	122.59 (12.5, 90.41)		
Nominal Size of Split Flange (in)	Applicable Pressure 411.89 bar (420 kg/cm ² , 5972.4 psi)		
	Torque N·m (kgf·m, lbf·ft)	UNF	Bolt Dia (D) in (mm)
1/2"	24.52 (2.5, 18.08)		ϕ 7.9
3/4"	44.13 (4.5, 32.55)	3/8"-16	ϕ 9.5
1"	63.75 (6.5, 47.02)	7/16"-14	ϕ 11.1
1-1/4"	98.07 (10.0, 72.33)	1/2"-13	ϕ 12.7
1-1/2"	176.53 (18.0, 130.19)	5/8"-11	ϕ 15.9
2"	294.21 (30.0, 216.99)	3/4"-10	ϕ 18.9
Note: (1) Bolt Diameter (D): (2) Torque tolerance is ± 10%.			

ORS Coupling Nut Tightening Torque Specifications

Nut Threads		Tightening Torque N·m (kgf·m, lbf·ft)	Wrench Size in (mm)
Nominal Size mm	UNF		
ϕ 12	13/16"-16	93.17 (9.5, 68.71)	1.06 (27)
ϕ 15	1"-14	137.30 (14.0, 101.26)	1.26 (32)
ϕ 19	1-3/16"-12	176.53 (18.0, 130.19)	1.42 (36)
ϕ 25	1-7/16"-12	205.95 (21.0, 151.89)	1.61 (41)
Note: Wrench size changes according to the hose fittings.			

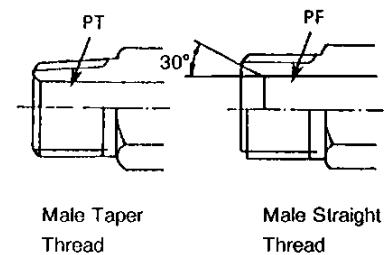
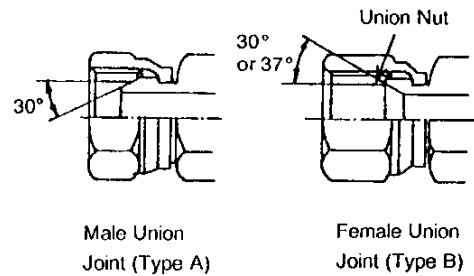
W01-01-04

SPECIFICATIONS/Tightening Torque

EX200-2

Pipe Thread Connection-Union Joint Tightening Torque Specifications

- (1) Be sure to tighten union nuts to specifications. Be careful not to over-tighten union nuts as the female threads may be damaged by excessive force.
- (2) Many kind of fittings are used for hose connections. Check for thread pitch, taper or straight threads before tightening.



Tightening Torque Specifications

W105-01-01-004

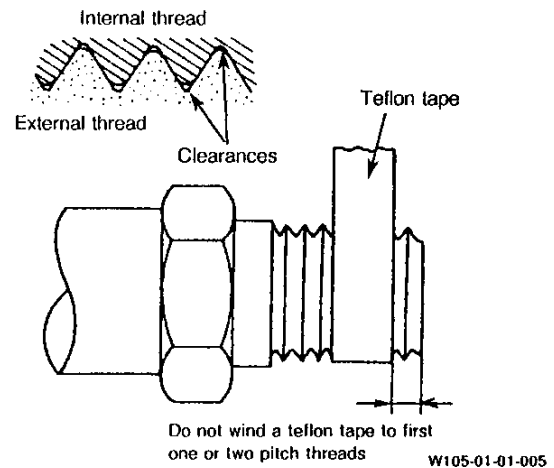
Nominal Thread Size in	Tightening Torque N·m (kgf·m, lbf·ft)		Wrench Size in (mm)
	Union Joint (High pressure)	Pipe Threads (Low pressure)	
1/8"		14.71 (1.5, 10.85)	0.39 (10)
1/4"	49.04 (5.0, 36.17)	19.61 (2.0, 14.47)	0.57 (19)
3/8"	68.65 (7.0, 50.63)	29.42 (3.0, 21.70)	0.87 (22)
1/2"	93.17 (9.5, 68.71)	49.04 (5.0, 36.17)	1.62 (27)
5/8"	137.30 (14.0, 101.26)	68.65 (7.0, 50.63)	1.26 (32)
3/4"	176.53 (18.0, 130.19)	68.65 (7.0, 50.63)	1.42 (36)
1"	205.95 (21.0, 151.89)	107.88 (11.0, 79.56)	1.61 (41)
1-1/4"	343.25 (35.0, 253.16)	156.91 (16.0, 115.73)	1.97 (50)
1-1/2"	539.39 (55.0, 397.82)	196.14 (20.0, 144.66)	2.36 (60)
2"	588.42 (60.0, 433.98)	254.98 (26.0, 188.06)	2.76 (70)

Note: The torques given are for female thread of SS41. If female thread is of cast iron, the torque must be reduced approximately 10%.

SPECIFICATIONS/Tightening Torque

EX200-2

- (3) Apply Teflon tape to threads just enough to fill up thread clearances, as shown. Do not to apply too much to avoid loosening of the screw.



SPECIFICATIONS/Painting Standards

EX200-2

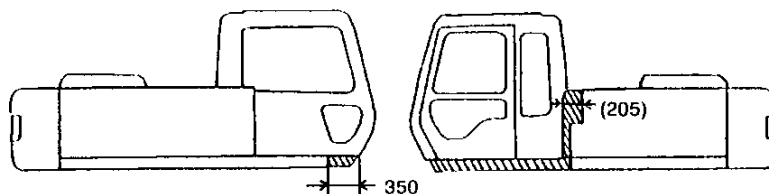
Painting Standards

Painting color and color codes for the main components are as follows:

Part Name	Color	Color Code	Manufacturer	Remarks
◦ Upperstructure (exterior) ◦ Front Attachment	Taxi Yellow	YR-01		Phtalic acid paint
◦ Main Frame and Covers (* partly) (See the sketch below.)	Coral White	LF-113-045 (SP-413)	Kansai Paint Co.	
◦ Upperstructure (interior)	Gray	N4.0		Phtalic acid paint
◦ Track	Black	N1.0		Phtalic acid paint
◦ Floor Plate	Beige	H4-224	* ANPI	
◦ Cab: Interior and Exterior Front Window Sashes, Cross Pieces and U-Bolt	Coral White Charcoal Gray	LF-113-045 (SP-413) LE-113-230	Kansai Paint Co. Kansai Paint Co.	
◦ Travel Levers, Lock Lever and Foot Rest	Black	N2.0		
◦ Hand rails	Charcoal Gray	LE-113-230	Kansai Paint Co.	
◦ Suspension Lifter	Black	N2.0		
◦ Duct Box	Light Gray	N2.0		

* : AN PI : Association of Nippon Painting Industries

Drawing showing painting dimensions of coral white on main frame and cover partly



W105-01-03-001

SECTION 02 UPPERSTRUCTURE



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Swing Dampener valve	W02-13-06
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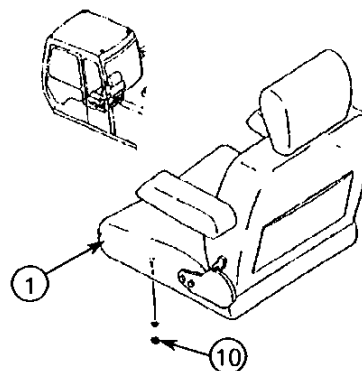
UPPERSTRUCTURE / Cab

EX200-2

Remove and install cab Remove cab

1. Remove nuts (10) and seat (1).

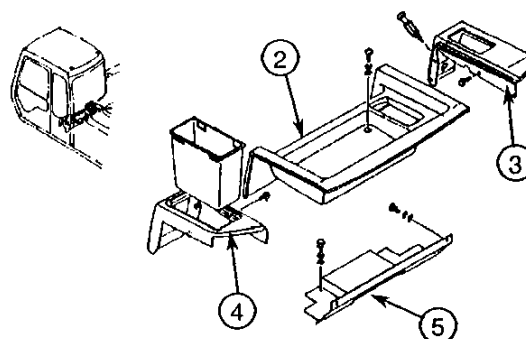
 : 13 mm



W105-02-01-001

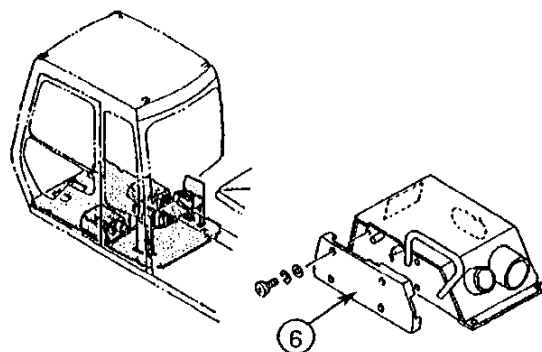
1. Remove covers (2),(3),(4) and (5).

 : 13 mm



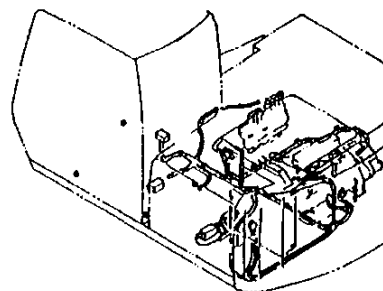
W105-02-01-002

3. Remove cover(6).



W105-02-01-003

4. Disconnect wire harness junction box and connectors. (Wiper motor, radio antenna, cab ground and dome light.)

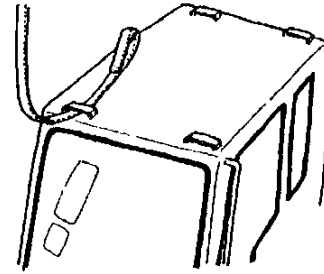


W105-02-01-004

UPPERSTRUCTURE / Cab

EX200-2

5. Attach cab to hoist using lifting straps.

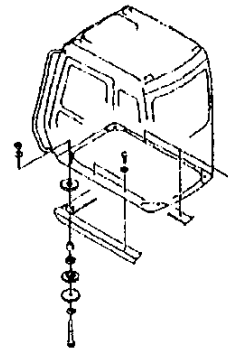


W105-02-01-005

6. Remove bolts(9)

 : 17mm

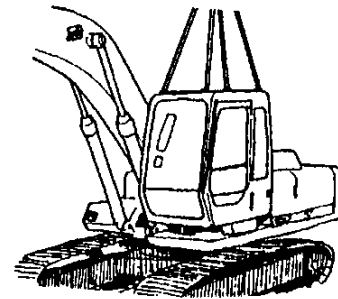
 : 8mm



W105-02-01-006

7. Carefully remove cab.

 **CAUTION:** The approximate weight of cab is 230 kg (507 lb).



W105-02-01-007

UPPERSTRUCTURE / Cab

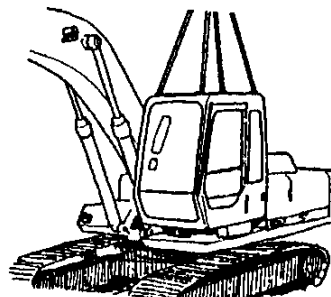
EX200-2

Install cab

1. Install cab onto frame.



CAUTION: The approximate weight of cab is 230 kg (507 lb)



W105-02-01-007

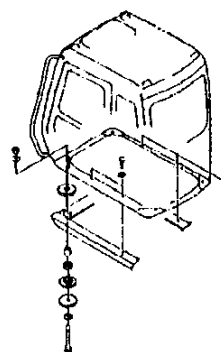
2. Tighten bolts(9).



: 17 mm



: 49 N.m (5 kgf.m, 36 lbf.ft)

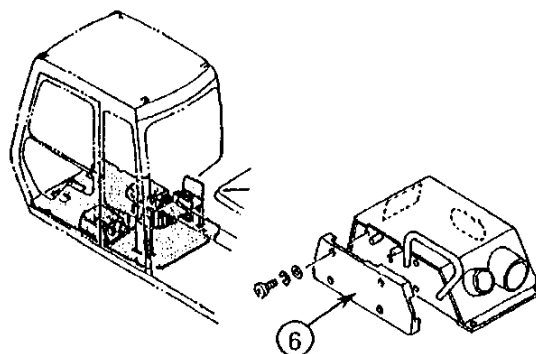


W105-02-01-006

3. Install cover (6).



: 4.9N·m (0.5 kgf.m, 3.6 lbf.ft)



W105-02-01-003

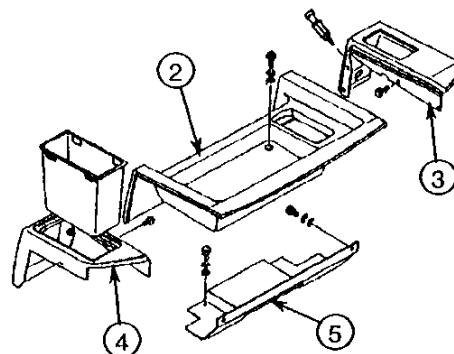
4. Install covers (5),(4),(3) and (2).



: 17 mm



: 19.6N·m (2 kgf.m, 14.5 lbf.ft)



W105-02-01-008

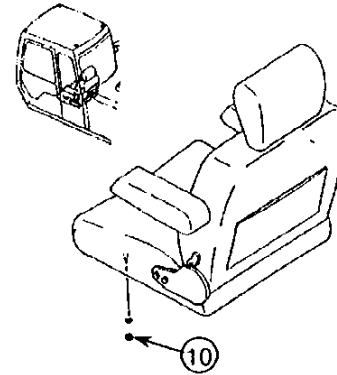
UPPERSTRUCTURE / Cab

EX200-2

5. Install seat and tighten nuts (10).

 : 13 mm

 : 19.6 N.m (2 kgf.m, 14.5 lbf.ft)



W105-02-01-001

6. Connect wire harness junction box and connectors.

UPPERSTRUCTURE / Counterweight

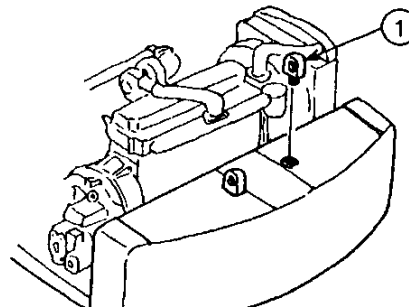
EX200-2

REMOVE AND INSTALL COUNTER-WEIGHT.

Remove Counterweight

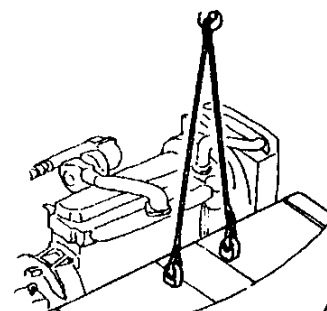
1. Remove caps from Counterweight.
Install lifting tools (1) to the Counterweight.
Lifting tool: ST0017

CAUTION: The approximate weight of Counterweight is 5050 kg (11130 lb)



W105-02-02-001

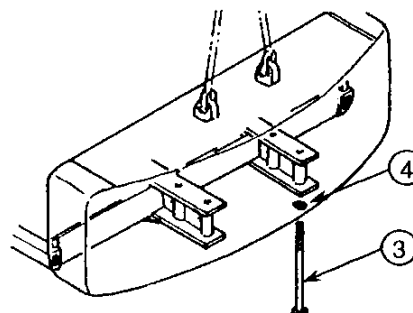
2. Fasten slings and hoist to counter weight.



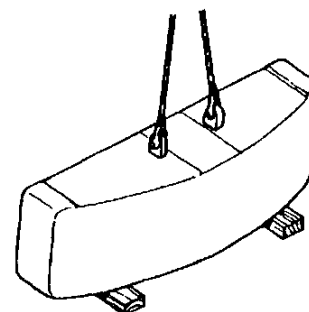
W105-02-02-002

3. Remove four bolts (3) and washers (4).

 : 55 mm



W105-02-02-003



W105-02-02-004

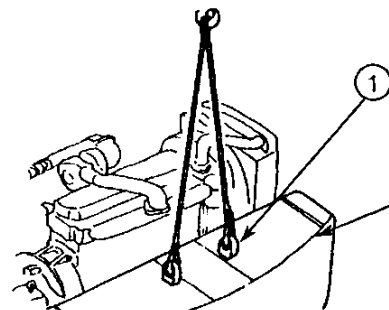
UPPERSTRUCTURE / Counterweight

EX200-2

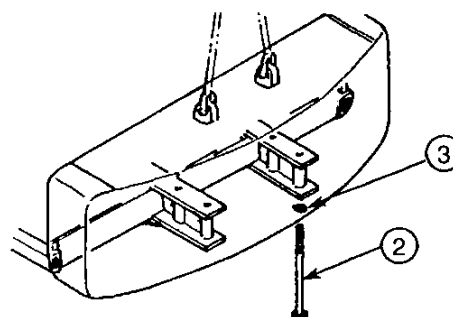
Install counterweight

1. Attach lifting tools (1) to the counterweight.
Fasten hoist to counterweight.
Install four bolts (1) and washers (3) to counterweight and tighten temporarily.

 : 55 mm



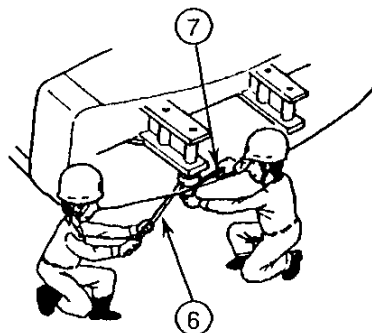
W105-02-02-002



W105-02-02-003

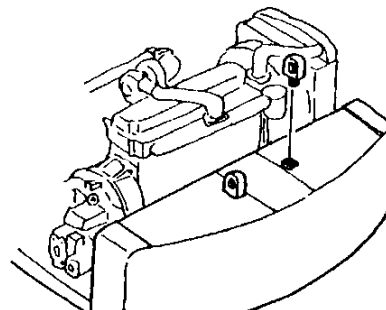
2. Lower counterweight.
Tighten four bolts.

 : 55 mm
 : 195 kgf·m (1912 N.m ,1410 lbf.ft)



W105-02-02-005

3. Remove lifting tools.
Install caps to counterweight.



W105-02-02-001

W02-02-02

UPPERSTRUCTURE / Main Frame

EX200-2

REMOVE AND INSTALL MAIN FRAME

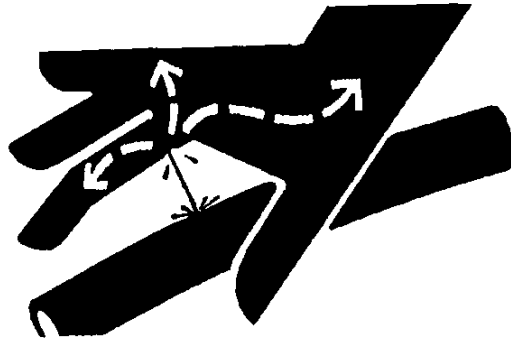
1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



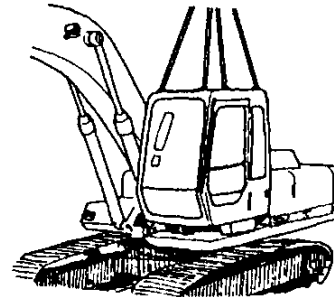
SA-031

Remove Main Frame

1. Remove cab assembly.
(See Remove Cab in this section.)



CAUTION : The approximate weight of cab is 230 kg (507 lb).

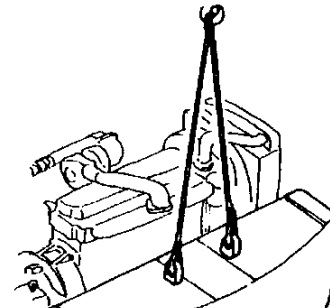


W105-02-03-001

2. Remove counterweight
(See Remove Counterweight in this section.)



CAUTION : The approximate weight of counterweight is 3900 kg (8598 lb).



W105-02-02-002

W02-03-01

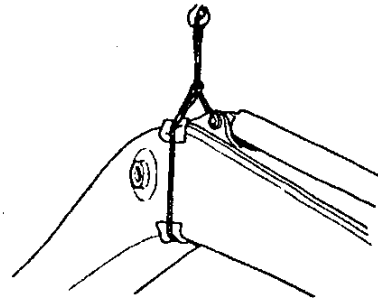
UPPERSTRUCTURE / Main Frame

EX200-2

3. Disconnect front attachment assembly from upper-structure.
(See Remove Front Attachment in this section.)



CAUTION :The approximate weight of front attachment assembly is 2780 kg (6129 lb).



W105-02-03-002

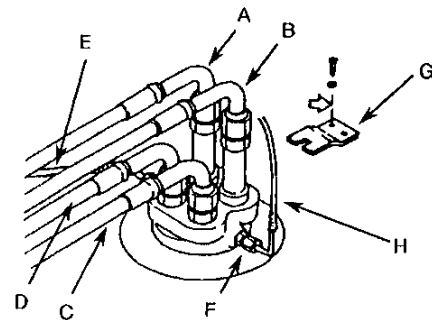
4. Drain hydraulic oil from the oil tank, and disconnect hydraulic lines (A - E) on top of center joint.

Disconnect hose (H) and remove adapter (F) from center joint.

Remove stopper (G) from center joint.



: 19 mm, 22 mm, 27 mm and 36mm



W105-02-03-003

UPPERSTRUCTURE / Main Frame

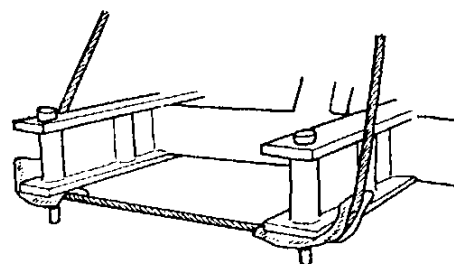
EX200-2



CAUTION : The approximate weight of main frame is 3148 kg (6940 lb).

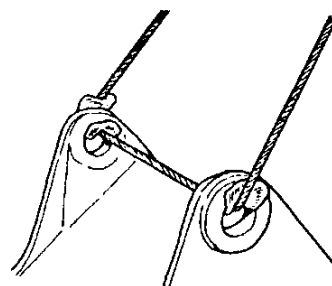
IMPORTANT : Make sure rear slings do not touch engine.

5. Fasten hoist to front and rear of main frame and use lever-blocks to make sure main frame stays level.



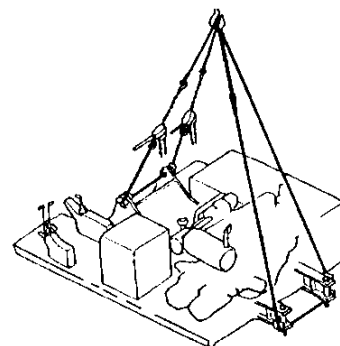
Rear

W105-02-03-004



Front

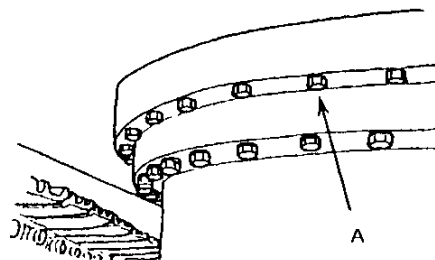
W105-02-03-005



W105-02-03-006

6. Remove bolts (A) from swing bearing.

 : 30 mm



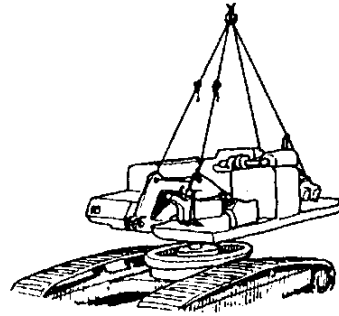
W105-02-03-007

UPPERSTRUCTURE / Main Frame

EX200-2

7. Lift main frame up slightly from undercarriage.
Level main frame by adjusting with lever-blocks.

Remove main frame.



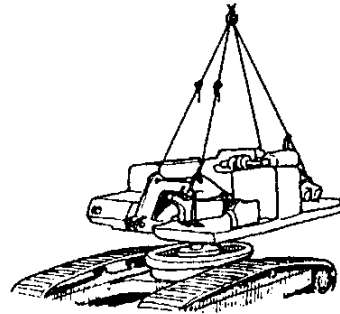
W105-02-03-008

UPPERSTRUCTURE / Main Frame

EX200-2

Install Main Frame

1. Fasten hoist to front and rear of main frame.
2. Level main frame by adjusting with lever-blocks and lower main frame over undercarriage.

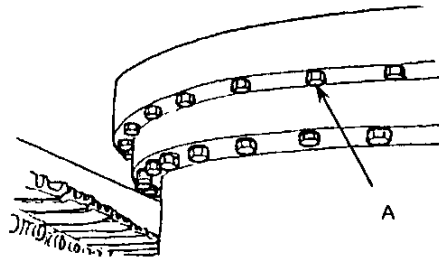


W105-02-03-008

3. Install bolts (A) on swing bearing and tighten temporary.
4. Install main frame and tighten bolts to specification.

 : 30 mm

Tightening Torque : 510 N·m (52 kgf·m, 376 lbf·m)



W105-02-03-007

5. Install adapter (F) and connect hose (H) on the center joint.

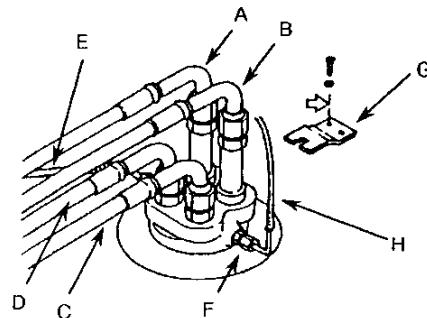
 : 19 mm

Tightening Torque : 29 N·m (3 kgf·m, 22 lbf·m)

6. Connect lines (A - E).

 : 22 mm and 27 mm

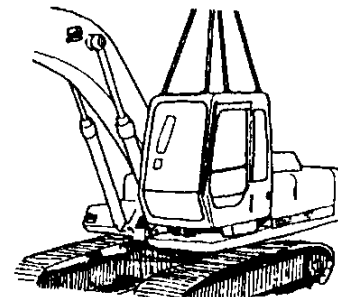
Tightening Torque : 40 N·m (4 kgf·m, 29 lbf·m)
: 93 N·m (9.5 kgf·m, 69 lbf·m)



W105-02-03-003

7. Install stopper (G).

8. Install cab.
(See Install Cab in this section.)
9. Install counterweight.
(See Install Counterweight in this section.)
10. Install front attachment assembly.
(See Install Front Attachment in this section.)



W105-02-03-001

UPPERSTRUCTURE / Pump Device

EX200-2

REMOVE AND INSTALL PUMP DEVICE

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Remove the cover on the upside of pump.
3. Disconnect connectors (2), (3), (4) and (6). Disconnect hoses (5), (8) and (9) and pipe (7).

CAUTION: The weight of pump device assembly is 122 kg (269 lb).

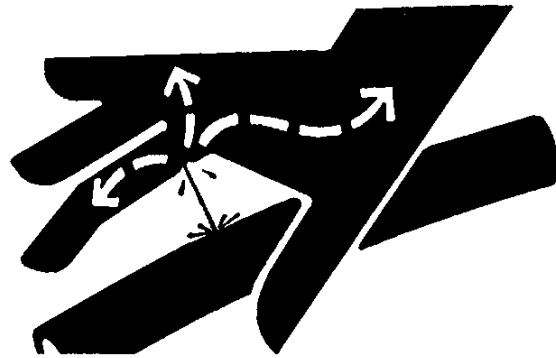
4. Remove the nipple from the pump and install eye bolts to the pump device assembly to sling it with a wire rope.
5. Remove pump device mounting bolts (1).
6. Hoist the device.

Installation

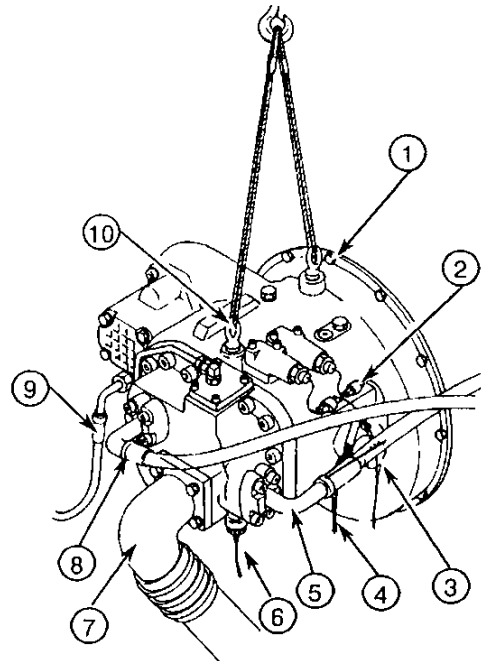
1. Tighten bolts (1).
2. Connect hoses (5), (8), (9) and pipe (7), and sensor connectors (2), (3), (4) and (6).
3. Remove eye bolts and wire rope and install the pump hood cover.

Torque specifications

Pump device mounting bolt	
Torque	5.0 kgf·m (49.0 Nm) (36.0 lbf·ft)
Main pump delivery hose bolt	
Torque	7.5 kgf·m (73.5 Nm) (54.2 lbf·ft)
Suction pipe bolt	
Torque	9.5 kgf·m (93.1 Nm) (68.7 lbf·ft)
Pilot pump delivery hose bolt	
Torque	7.0 kgf·m (68.6 Nm) (50.6 lbf·ft)



SA-031



W107-02-04-001

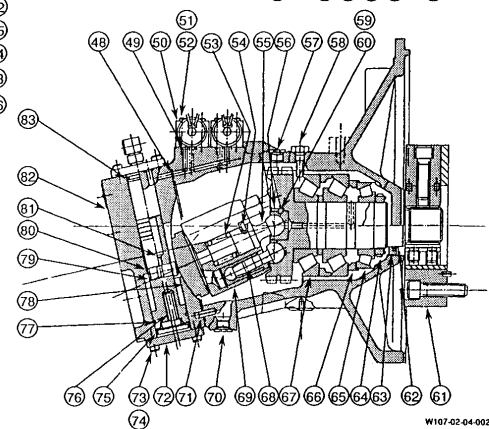
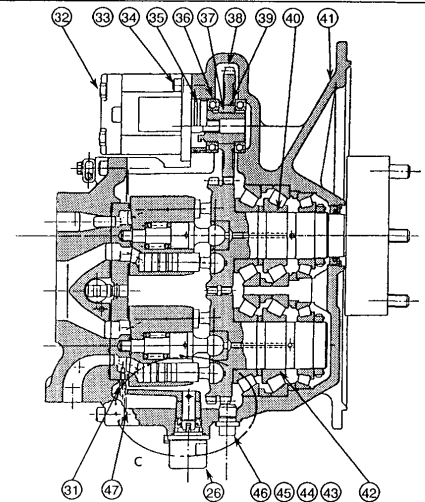
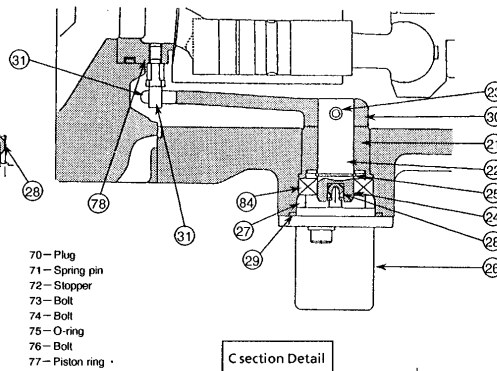
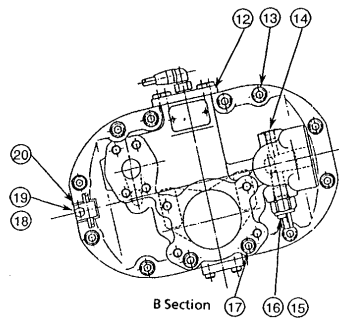
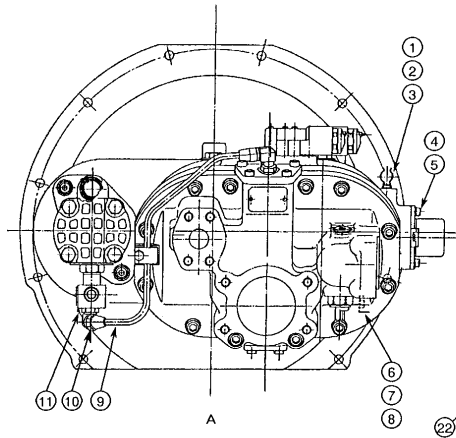
- 1 – Mounting bolts
- 2 – Connectors
- 3 – N sensor connector
- 4 – A-sensor connector
- 5 – Main pump delivery hose
- 6 – P sensor
- 7 – Main pump suction pipe
- 8 – Main pump delivery hose
- 9 – Pilot pump delivery hose
- 10 – Eye bolt

UPPERSTRUCTURE / Pump Device

EX200-2

ASSEMBLING OF PUMP SYSTEM

PUMP SYSTEM PARTS LIST



- | | | |
|-------------------|---------------------|---------------------|
| 1— Spring washer | 24— Washer | 47— Packing |
| 2— Bolt | 25— Retaining ring | 48— O-ring |
| 3— Clamp | 26— A sensor | 49— O-ring |
| 4— Bolt | 27— Spacer | 50— Solenoid valve |
| 5— Spring washer | 28— Spring plate | 51— Washer |
| 6— Bracket | 29— O-ring | 52— Bolt |
| 7— Bolt | 30— Feed back lever | 53— Spring |
| 8— Spring washer | 31— Pin | 54— Pin |
| 9— Pipe | 32— Gear pump | 55— Center shaft |
| 10— Pipe fitting | 33— Washer | 56— Holder |
| 11— Adapter | 34— Bolt | 57— Ball |
| 12— Servo cover | 35— O-ring | 58— Plug |
| 13— Bolt | 36— Bearing | 59— O-ring |
| 14— Plug | 37— Shall | 60— Plug |
| 15— O-ring | 38— Gear | 61— Coupling |
| 16— P sensor | 39— Key | 62— Retaining ring |
| 17— Bolt | 40— Disk | 63— Oil seal |
| 18— Bolt | 41— Casing | 64— Bearing nut |
| 19— Spring washer | 42— Disk | 65— Bearing |
| 20— Clamp | 43— O-ring | 66— Spacer |
| 21— Bushing | 44— Washer | 67— Bearing |
| 22— Shaft | 45— Bolt | 68— Piston assembly |
| 23— Spring pin | 46— N sensor | 69— Rotor |

- | |
|------------------|
| 70— Plug |
| 71— Spring pin |
| 72— Stopper |
| 73— Bolt |
| 74— Bolt |
| 75— O-ring |
| 76— Bolt |
| 77— Piston ring |
| 78— Sector valve |
| 79— Servo piston |
| 80— Pin |
| 81— Screw |
| 82— Head |
| 83— O-ring |
| 84— Oil seal |

W02-04-03

W107-02-04-002

UPPERSTRUCTURE / Pump Device

EX200-2

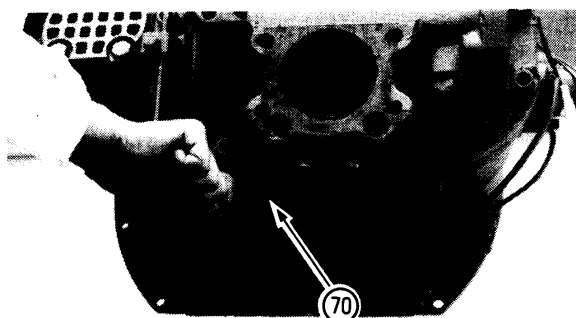
DISASSEMBLE PUMP DEVICE

PRECAUTIONS FOR DISASSEMBLY

- Clean the pump device exterior before disassembly.
Be careful not to get sensors wet with water.
- Be careful not to fall down sensors while disassembling or assembling as they may become malfunction due to shock load applied.

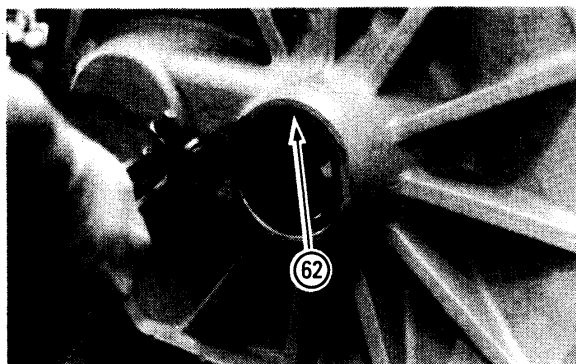
1. Remove drain plug (70) and drain oil.

 : 13 mm



W107-02-04-004

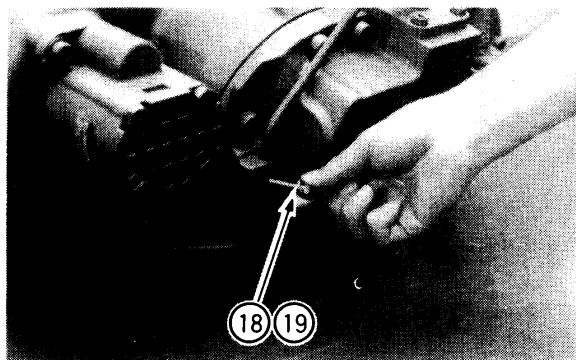
2. Remove retaining ring (62).



W107-02-04-005

3. Loosen the bolt (18) and remove clamp (20).

 : 13 mm



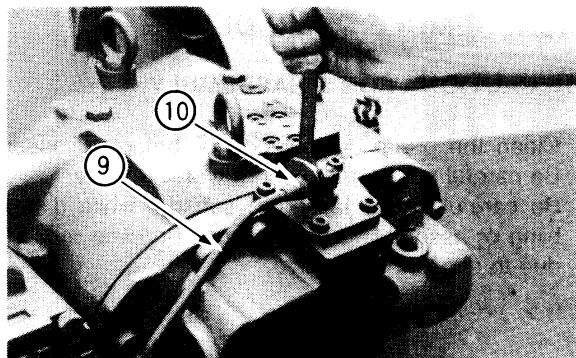
W107-02-04-006

UPPERSTRUCTURE / Pump Device

EX200-2

4. Loosen pipe fitting (10) to remove pipe (9).

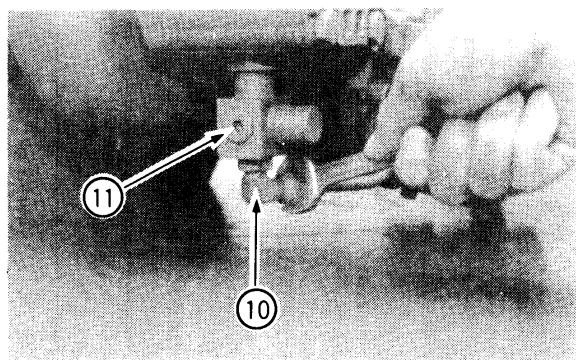
 :17 mm



W107-02-04-007

5. Remove adaptor (11) and pipe (10) from gear pump (32).

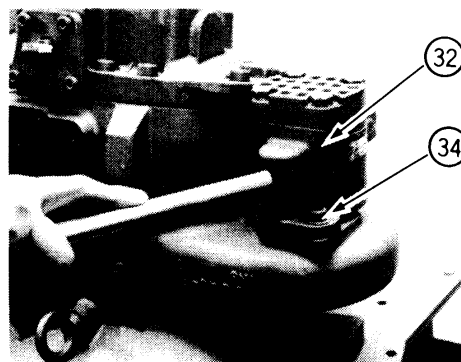
 :19 mm



W107-02-04-008

6. Remove bolts (34) and, washers (33) and remove gear pump (32). Remove O-ring (35) from casing (41).

 :8 mm



W107-02-04-009

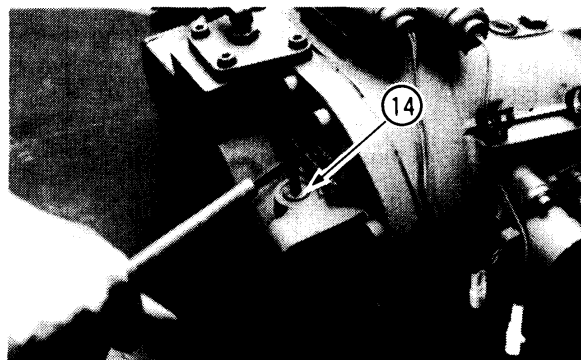
UPPERSTRUCTURE / Pump Device

EX200-2

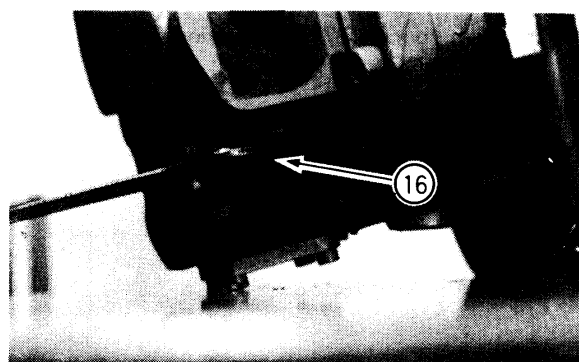
7. Remove plug (14) and P sensor (16).
Remove O-ring (15) from P sensor (16).

 : 4 mm

 : 30 mm



W107-02-04-010

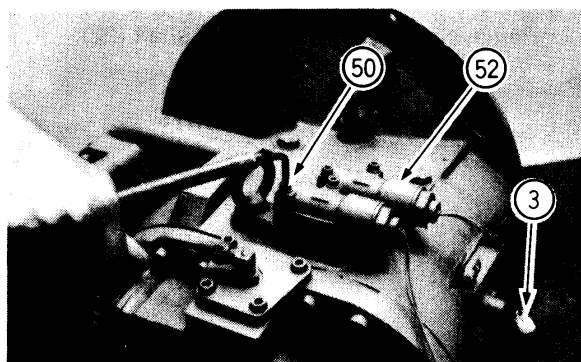


W107-02-04-011

8. Remove the connector from clamp (3).
Remove solenoid valve mounting bolts (52) and washers (51). And then remove clamp mounting bolts (2), spring washer (1), and O-ring (49).
Remove connector from bracket (6), and bolt (7) and spring washer (8).

 : 4 mm

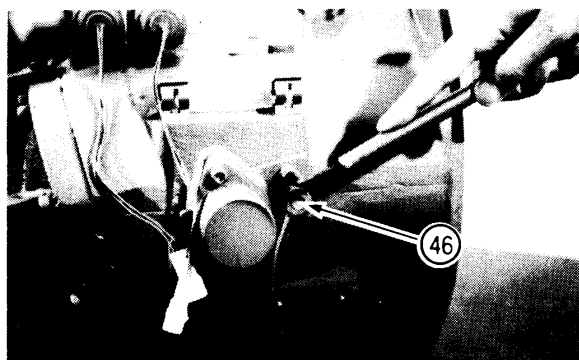
NOTE: Mark the solenoid valves to aid in assembly.



W107-02-04-012

9. Remove bolts (45) and washer (44) to remove N sensor (46). And then remove O-ring (43) from N sensor (46).

 : 5 mm



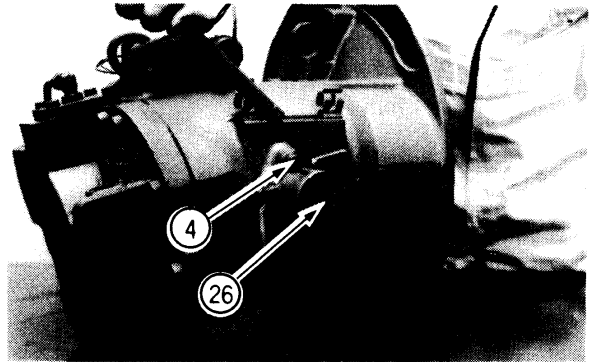
W107-02-04-013

UPPERSTRUCTURE / Pump Device

EX200-2

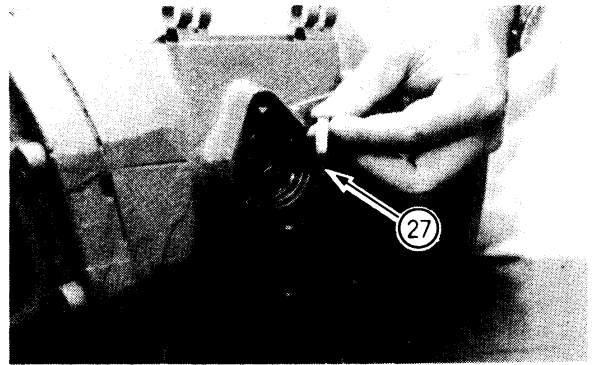
10. Remove mounting bolts (4) and spring washer (5) to remove A-sensor (26), and then remove O-ring (29).

 : 5 mm



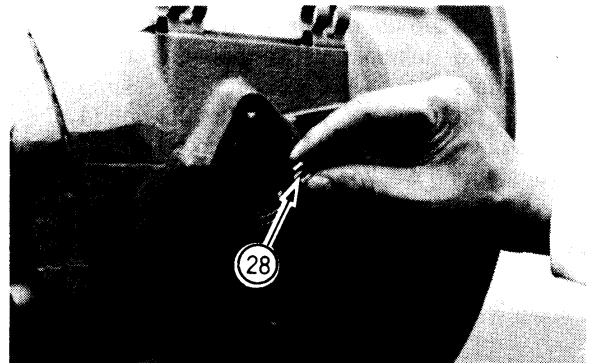
W107-02-04-014

11. Remove spacer (27) from casing (41).



W107-02-04-015

12. Remove spring plate (28) from shaft (22).



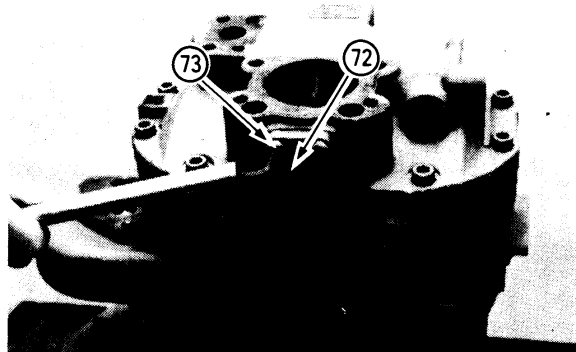
W107-02-04-016

UPPERSTRUCTURE / Pump Device

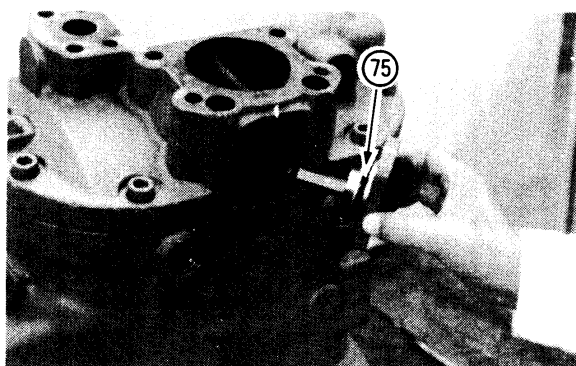
EX200-2

13. Remove bolts (73), (74), and stopper (72).
 Remove O-ring (75) from stopper (72).
 Remove bolt (76) from stopper (72) if any damages are found on bolt (76).
 Remove servo cover mounting bolts (73), (74), and servo cover (12).
 Remove O-ring (83) from servo cover (12).

 : 6 mm



W107-02-04-017

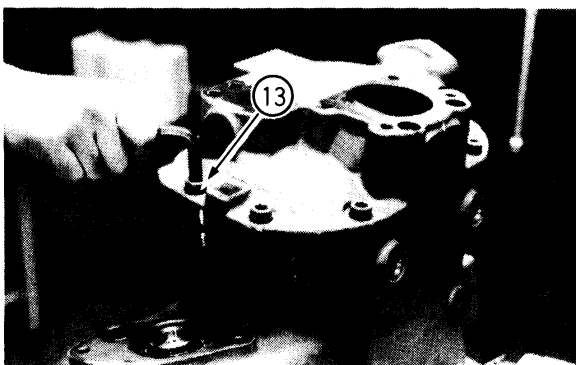


W107-02-04-018

14. Remove bolts (13) and (17).
 Attach hoist to head (82) using eyebolts and remove the head from casing (41).

 : 6 mm

NOTE: Take care when removing head (82) from casing (41) as spring pin (71) is knocked in the head.



W107-02-04-019



W107-02-04-020

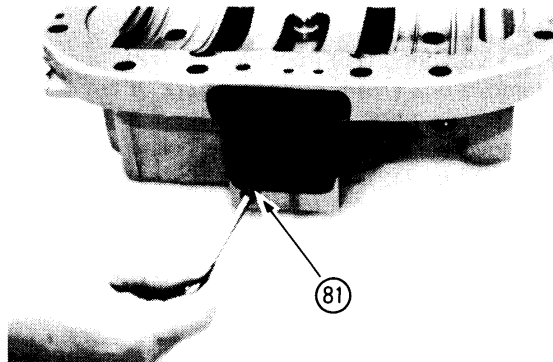
UPPERSTRUCTURE / Pump Device

EX200-2

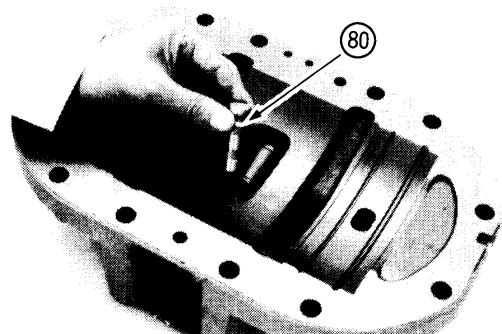
15. Loosen screw (81) and pull out pin (80).
Remove servo piston (79) and piston ring (77).

 : 5 mm

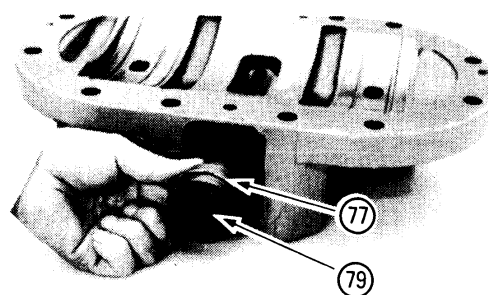
NOTE: Loosen screw (81) carefully as Loctite is applied on it.



W107-02-04-021



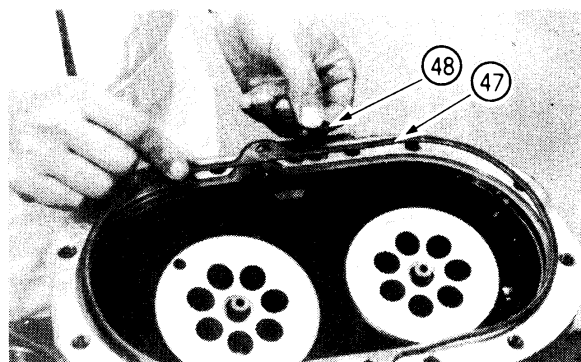
W107-02-04-022



W107-02-04-023

16. Remove packing (47) and O-ring (48).

NOTE: No need to remove spring pin (71).



W107-02-04-024

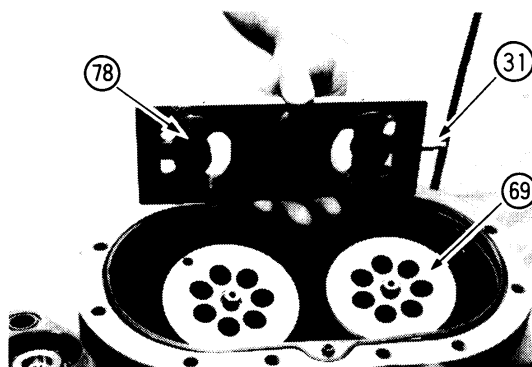
W02-04-10

UPPERSTRUCTURE / Pump Device

EX200-2

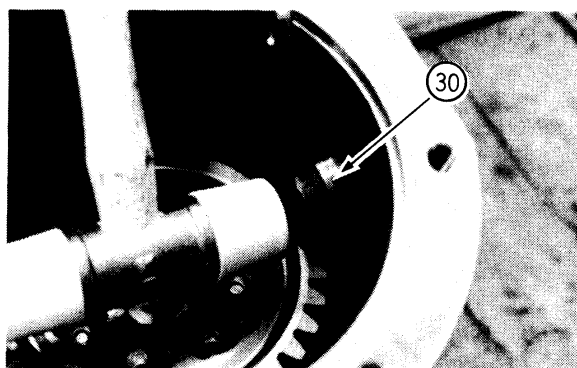
17. Remove sector valve (78) from rotor (69).

NOTE: No need to remove pin (31) from sector valve (78) unless the pin is damaged.

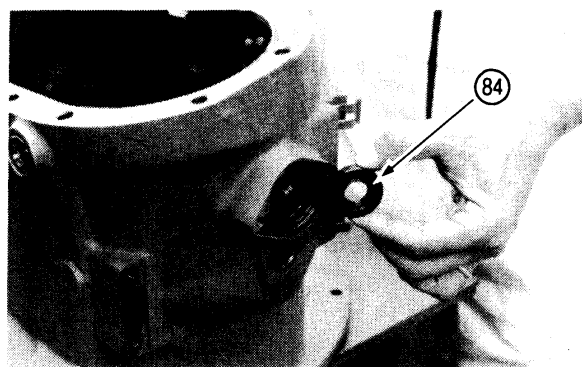


W107-02-04-025

18. Use a plastic hammer to tap the edge of feedback lever (30) in order to push oil seal (84) out.



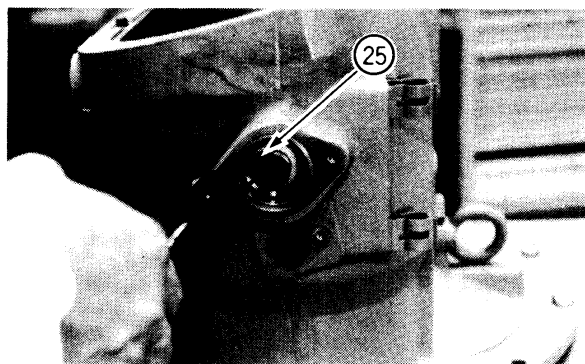
W107-02-04-026



W107-02-04-027

19. Remove retaining ring (25).

~~2015~~

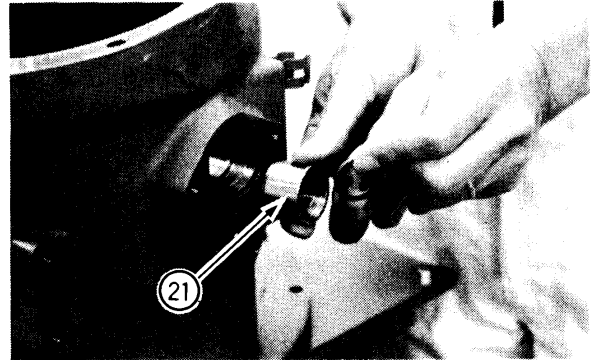


W107-02-04-028

UPPERSTRUCTURE / Pump Device

EX200-2

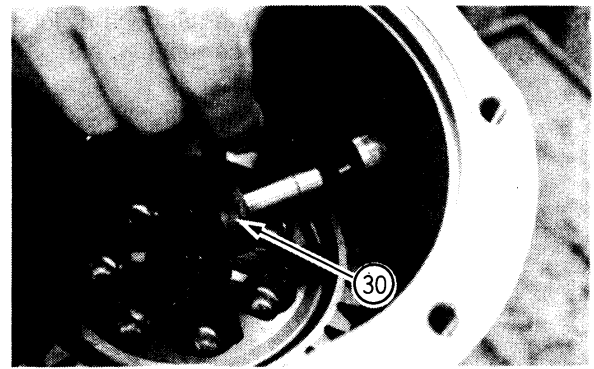
20. Remove washer and push out bushing (21).



W107-02-04-029

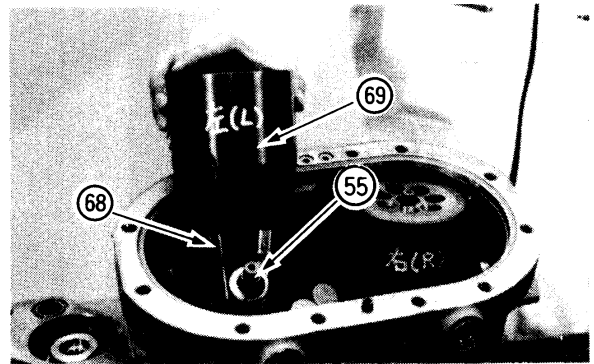
21. Pull out the lever and shaft assembly.

NOTE: No need to remove spring pin (23) in feed-back lever (30).



W107-02-04-030

22. Remove rotor (69). Center shaft (55) and pistons (68) remain on the disk.



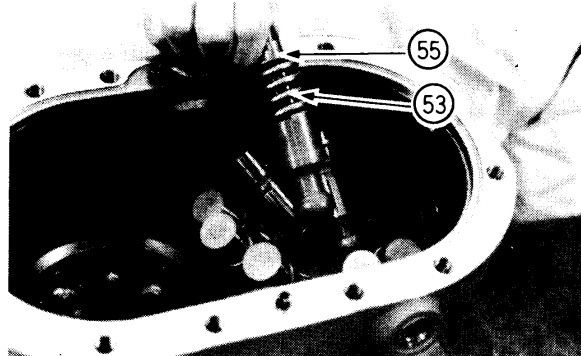
W107-02-04-031

UPPERSTRUCTURE / Pump Device

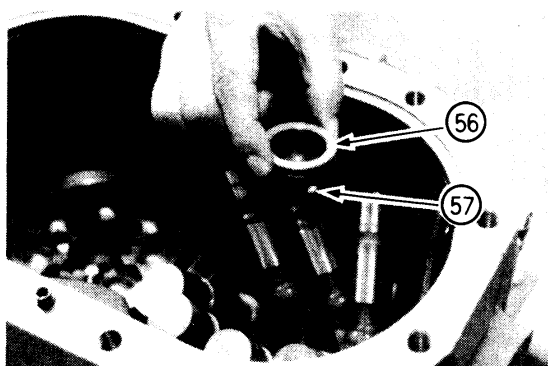
EX200-2

23. Remove center shaft (55). Remove spring (53) from center shaft (55). Remove holder (56) from disks (40) and (42) respectively. Remove ball (57) from holder (56).

NOTE: No need to remove pin (54) from center shaft (55).

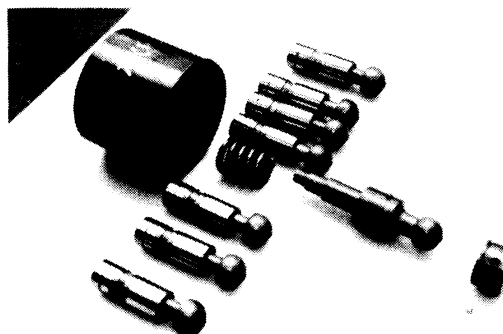


W107-02-04-032



W107-02-04-033

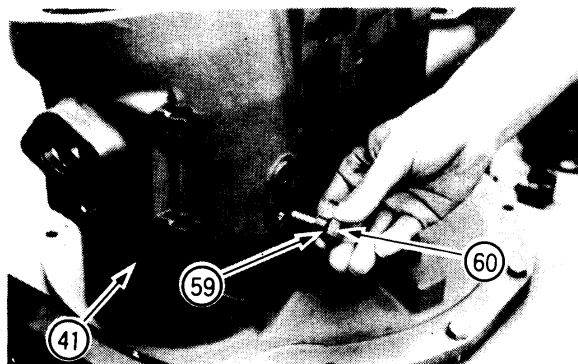
24. Remove pistons (68) from disks (40) and (42).



W107-02-04-034

25. Remove bearing setting plug (60) from casing (41) and remove O-ring (59) from plug (60).

 : 19 mm

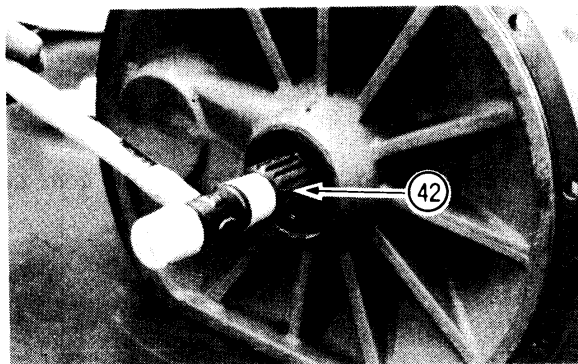


W107-02-04-035

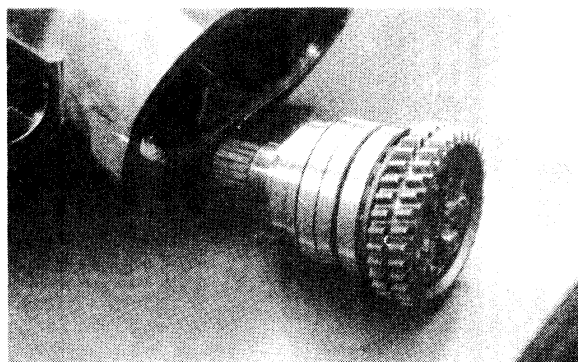
UPPERSTRUCTURE / Pump Device

EX200-2

26. Remove the retaining ring from casing (41).
Tap disk (40) out of casing (41) with a plastic hammer.



W107-02-04-037

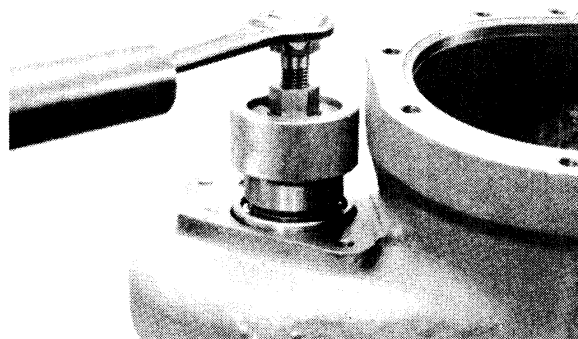


W107-02-04-038

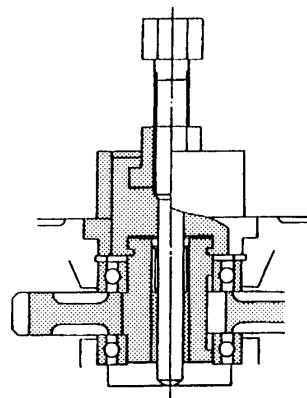
27. Remove bearing (36) using jig.

Jig: ST 1393

 : 24 mm



W107-02-04-039



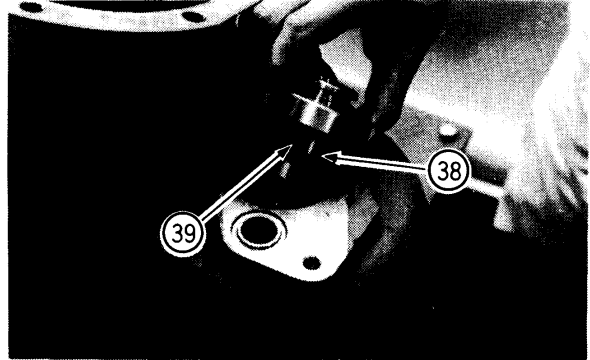
W107-02-04-040

W02-04-14

UPPERSTRUCTURE / Pump Device

EX200-2

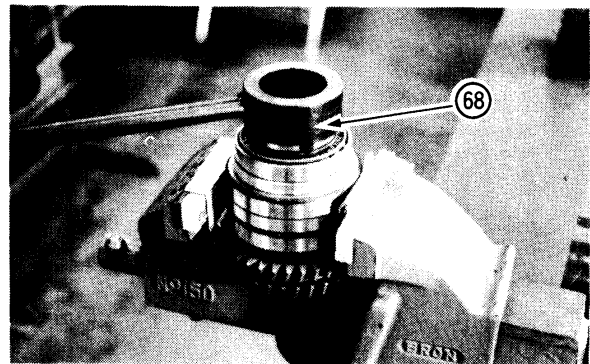
28. Remove gear (38).
Remove key (39) from shaft (37)
Remove bearing (36) from shaft (37) using a press.



W107-02-04-041

29. Remove bearing nut (68) and remove the bearings.

Tool: ST 3058



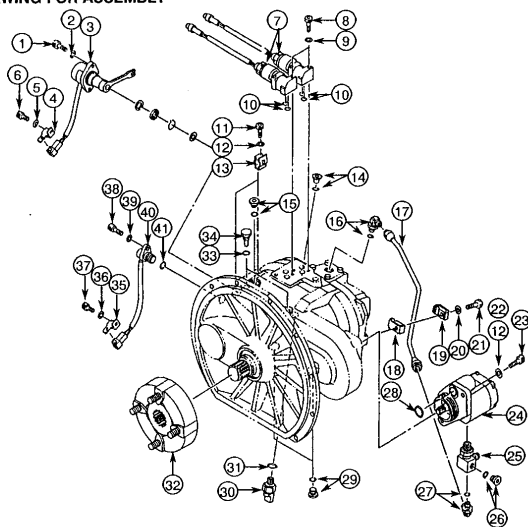
W107-02-04-042

UPPERSTRUCTURE / Pump Device

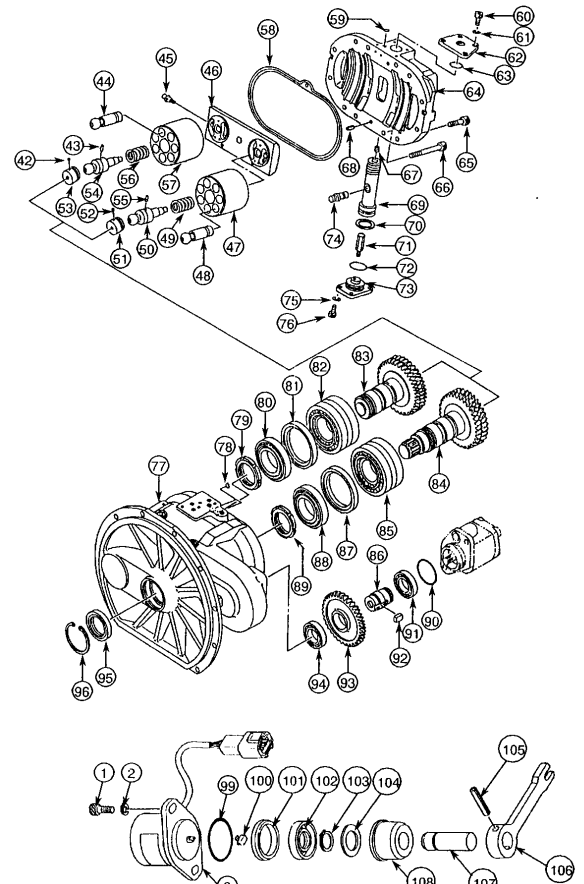
EX200-2

ASSEMBLE PUMP DEVICE

PUMP DEVICE DRAWING FOR ASSEMBLY



- | | | | |
|-------------------|------------------|------------------|---------------------|
| 1— Bolt | 28— O-ring | 55— Pin | 82— Bearing |
| 2— Washer | 29— Plug | 56— Spring | 83— Disk drive |
| 3— A sensor | 30— DP sensor | 57— Rotor | 84— Disk drive |
| 4— Bracket | 31— O-ring | 58— Packing | 85— Bearing |
| 5— Washer | 32— Coupling | 59— O-ring | 86— Shaft |
| 6— Bolt | 33— Bolt | 60— Bolt | 87— Spacer |
| 7— HSV | 34— Plug | 61— Washer | 88— Bearing |
| 8— Bolt | 35— Bracket | 62— Servo cover | 89— Bearing nut |
| 9— Washer | 36— Washer | 63— O-ring | 90— O-ring |
| 10— O-ring | 37— Bolt | 64— Head | 91— Bearing |
| 11— Bolt | 38— Bolt | 65— Bolt | 92— Key |
| 12— Washer | 39— Washer | 66— Bolt | 93— Pilot gear |
| 13— Clamp | 40— N sensor | 67— Screw | 94— Bearing |
| 14— Plug | 41— O-ring | 68— Spring pin | 95— Oil seal |
| 15— Plug & O-ring | 42— Ball | 69— Servo piston | 96— Retaining ring |
| 16— Fitting | 43— Pin | 70— Ring | 99— O-ring |
| 17— Pipe | 44— Piston | 71— Bolt | 100— Spring plate |
| 18— Clamp | 45— Pin | 72— O-ring | 101— Spacer |
| 19— Clamp | 46— Sector valve | 73— Stopper | 102— Oil seal |
| 20— Washer | 47— Rotor | 74— Pin | 103— Retaining ring |
| 21— Bolt | 48— Piston | 75— Washer | 104— Washer |
| 22— Washer | 49— Spring | 76— Bolt | 105— Spring pin |
| 23— Bolt | 50— Center shaft | 77— Casing | 106— Feedback lever |
| 24— Gear pump | 51— Holder | 78— O-ring | 107— Shaft |
| 25— Adapter | 52— Ball | 79— Bearing nut | 108— Bushing |
| 26— Plug | 53— Holder | 80— Bearing | |
| 27— Fitting | 54— Center shaft | 81— Spacer | |



W107-02-04-043

W02-04-17

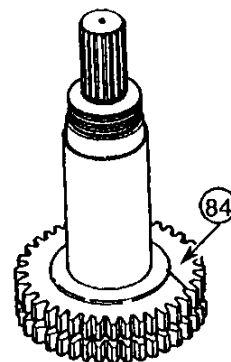
UPPERSTRUCTURE / Pump Device

EX200-2

ASSEMBLE PUMP

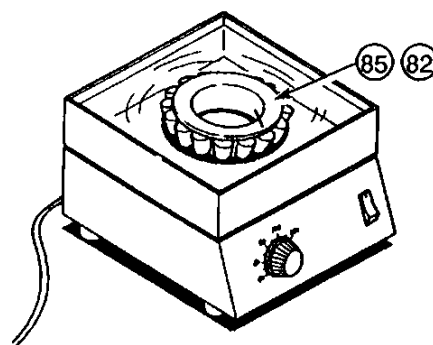
«Assemble Disk Drive Subassembly»

1. Place drive disk (84) vertically, as illustrated.



W107-02-04-044

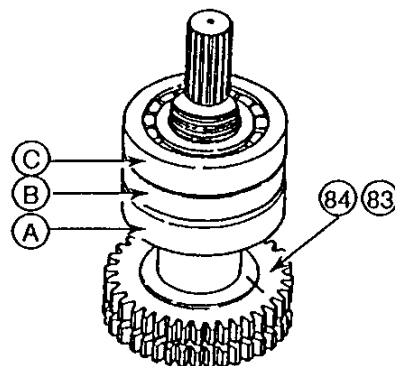
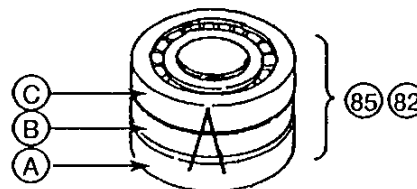
2. Heat main bearing inner race (85) to 80 to 150 °C (176 to 302 °F).



W107-02-04-045

3. Install bearings (85) onto disk drive (84) in the order and direction as illustrated.

NOTE: After the installation of bearing, apply a film of oil to rotating parts.

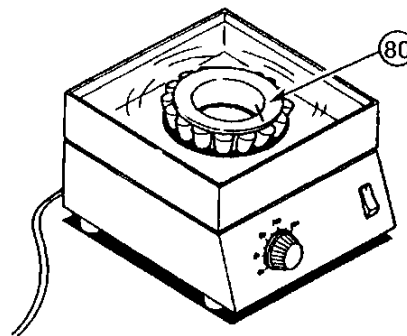


W107-02-04-046

UPPERSTRUCTURE / Pump Device

EX200-2

4. Heat bearing inner race (88) to 80 - 150 °C (176 to 302 °F).

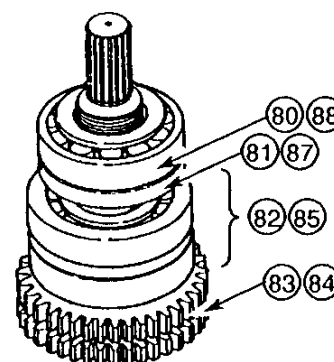


W107-02-04-047

5. Install spacer (81) and bearing inner races (88) on drive disk (84).

Make sure that there is no play in axial direction among main bearing (85) and spacer and bearing (88).

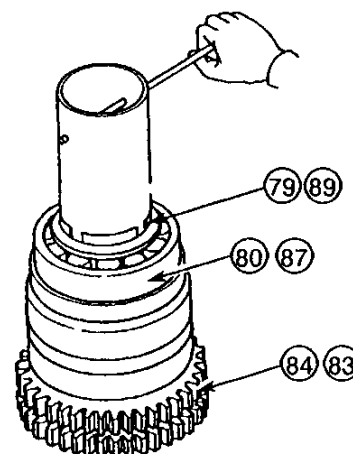
NOTE: After installing the bearings and spacer, lubricate them with hydraulic oil.



W107-02-04-048

6. Install bearing nut (79) on drive disk (84) and tighten it to about 45 N·m (4 to 5 kgf·m) (29 to 36 lbf·ft) using bearing nut wrench.

NOTE: Apply hydraulic oil to the threads before attaching bearing nuts (79) (89).



W107-02-04-049

W02-04-20

UPPERSTRUCTURE / Pump Device

EX200-2

«Set Bearing Preload»

NOTE: Be sure to set bearing preload while all parts are at normal temperature.

7. Set the preload tool (ST: 3070) on the drive disk and tighten bolts to bearing outer race.

Attach the torque wrench and rotate it a few times.

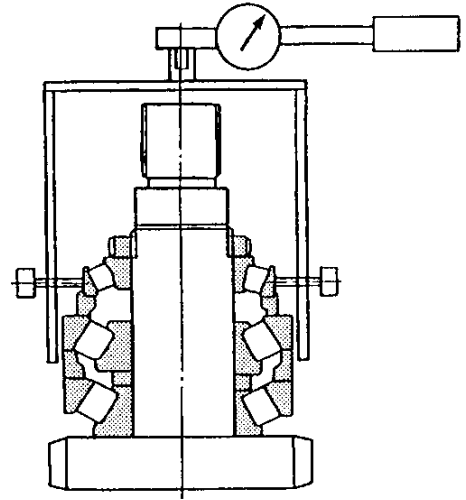
Read the (starting) torque.

Carefully tighten the bearing nut, rotate the torque wrench again and read the torque value. Repeat this procedure until the following specified torque is obtained.

Torque Specification: $0.20 \pm 0.5 \text{ kgf}\cdot\text{m}$
(1.96 N·m 4.90 N·m)
(1.45 lbf·ft - 3.62 lbf·ft)

NOTE: When the torque value exceeds the maximum, loosen bearing nut (79) and hammer the end of disk drive shaft to release the load, and then tighten bearing nut (79) again.

Repeat stops 1 to 7 on drive disk (83), main bearing (82), bearing (80) and bearing nut (79) for assembling and preloading.



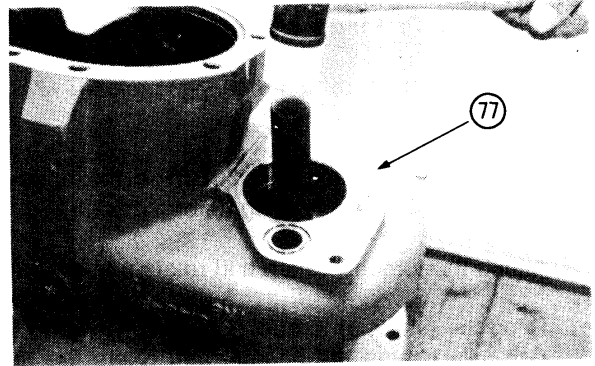
W107-02-04-052

UPPERSTRUCTURE / Pump Device

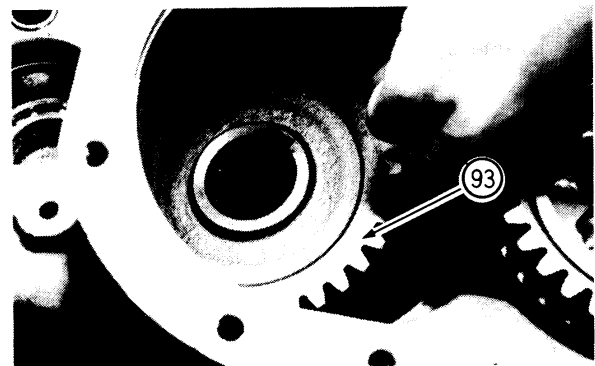
EX200-2

«Assemble Pilot Gear Pump»

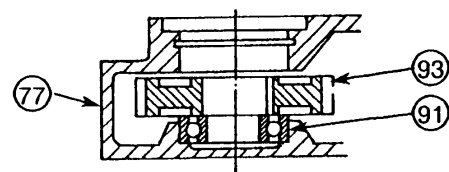
8. Place casing (77) as illustrated.
Install bearing (91) as illustrated below. Insert pilot gear (93) from the hole for gear installation and set it on bearing (91).



W107-02-04-053



W107-02-04-054



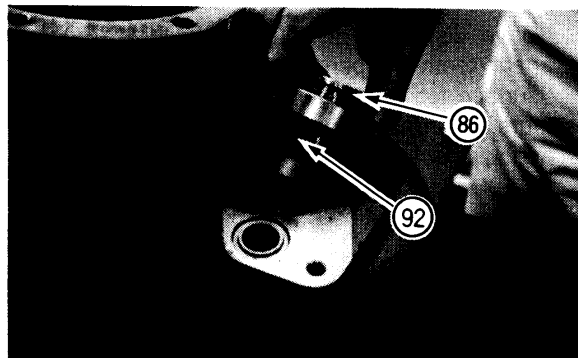
W107-02-04-055

UPPERSTRUCTURE / Pump Device

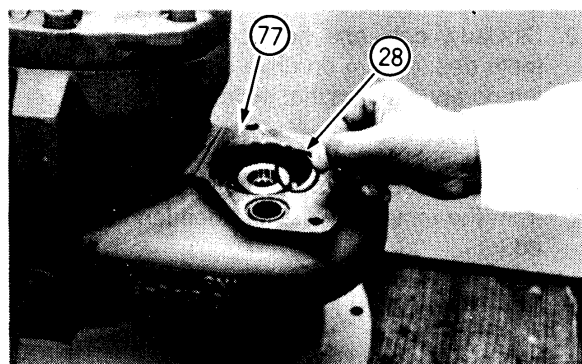
EX200-2

9. Attach key (92) to shaft (86) and press the shaft into pilot gear (93) and bearing (91). Install bearing (94) on shaft (86).

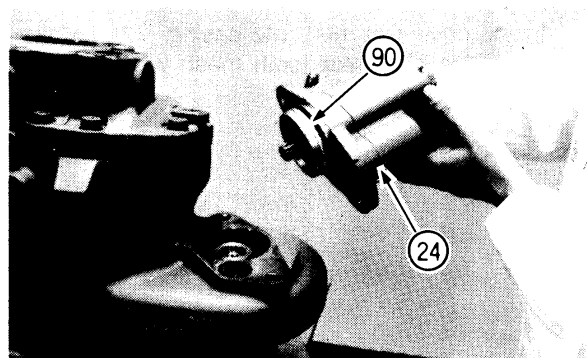
Attach O-ring (28) to casing (77) as shown. Install O-ring (90) on gear pump (24). Install gear pump (24) on casing (77).



W107-02-04-055



W107-02-04-057



W107-02-04-058

«Assemble Disk Drive Assembly»

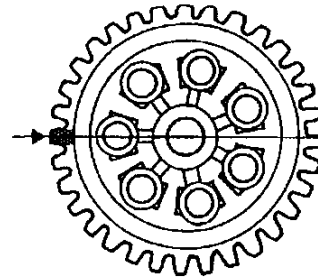
10. Apply grease to the bores of casing (77).

UPPERSTRUCTURE / Pump Device

EX200-2

11. Drive disk (84) is equipped with external helical gear teeth on periphery and seven holes on disk surface for piston seating. Out of seven hole centers, only one aligns with helical teeth addendum as shown because of odd number of seven.

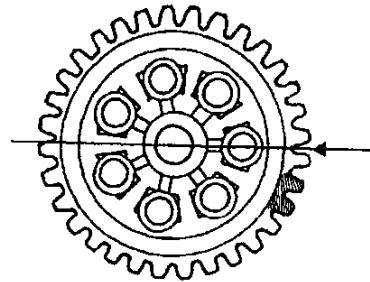
Make identification mark on that addendum.



W136-02-04-050

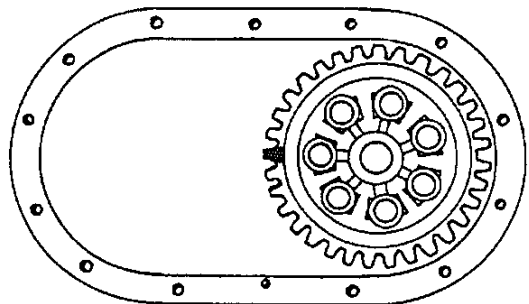
12. Similarly, only one hole center aligns with helical teeth dedendum on drive disk (83) surface. Make temporary mark on that dedendum.

Make identification mark on two teeth both sides of the 2nd dedendum counted in clockwise direction from the temporary marked dedendum as illustrated.



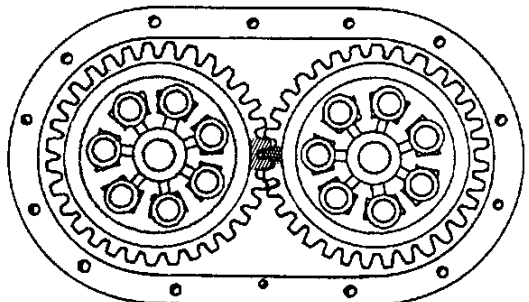
W136-02-04-059

13. Install drive disk (84) into casing (77). Make sure that drive disk gear teeth mesh with those of pilot gear (93) correctly.



W136-02-04-061

14. Install drive disk (83) into casing (77) in the position where the marked tooth of drive disk (83) meshes with the marked teeth of drive disk (84), as shown.



W136-02-04-062

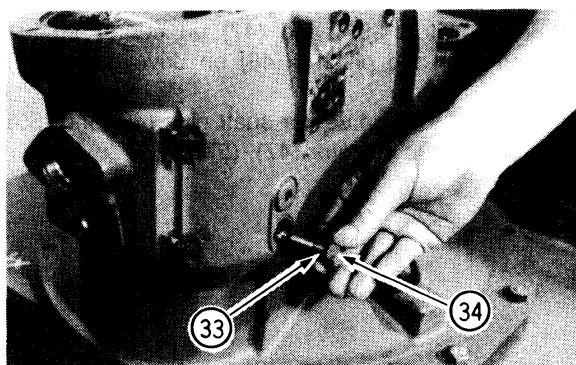
UPPERSTRUCTURE / Pump Device

EX200-2

15. Attach O-ring (33) to plug (34), and install them in to casing (77) in order to secure the drive disks in position.

 : 19 mm

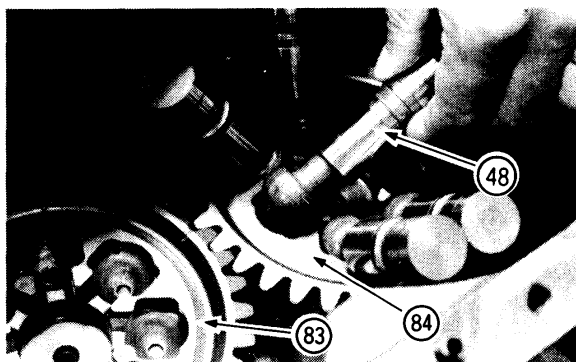
 : 2 kgf·m(49.0 N·m)
(14.4 lbf·ft)



W107-02-04-063

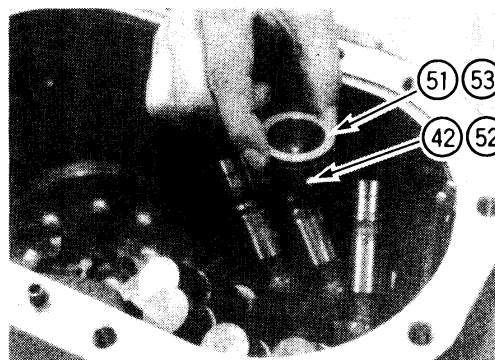
16. Install pistons (48) on disk (84) and (83).

NOTE: Apply a film of oil to the piston seating holes on disks (84) and (83).



W107-02-04-064

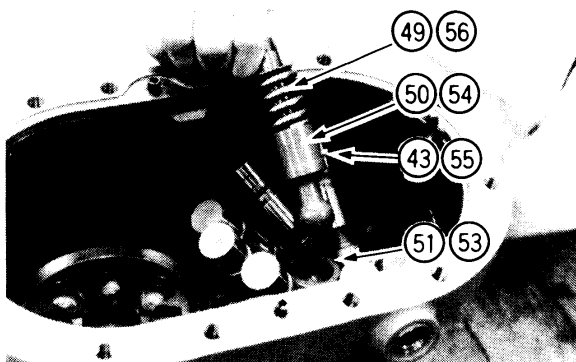
17. Apply grease on ball (42), and install it onto holder (51).
Install holder (51) on drive disk (84).
Repeat this step for ball (52), holder (53) and drive disk (83).



W107-02-04-065

18. If removed, install pin (43) on center shaft (50).
Attach spring (49) to center shaft (50). Install center shaft (50) into holder (51) on disk (84).

Repeat this step for pin (55), center shaft (54) spring (56) holder (53) and drive disk (83).



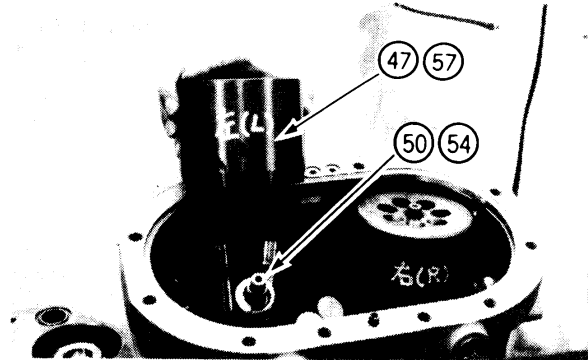
W107-02-04-066

UPPERSTRUCTURE / Pump Device

EX200-2

19. Install rotors (57) and (47) on center shafts (50) and (54) and pistons (48) on drive disks (84) and (83).

Be sure to align center shaft pins (43) and (55) with the grooves on rotor (47), (57) bores.



W107-02-04-067

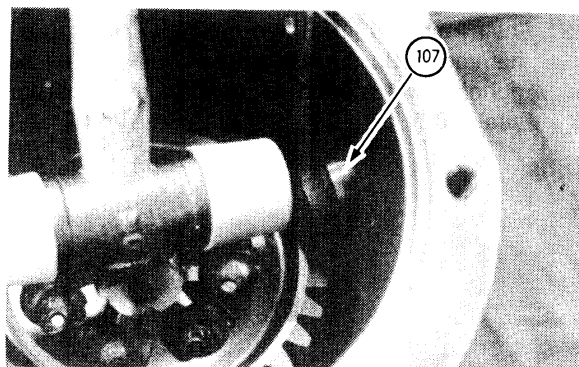
UPPERSTRUCTURE / Pump Device

EX200-2

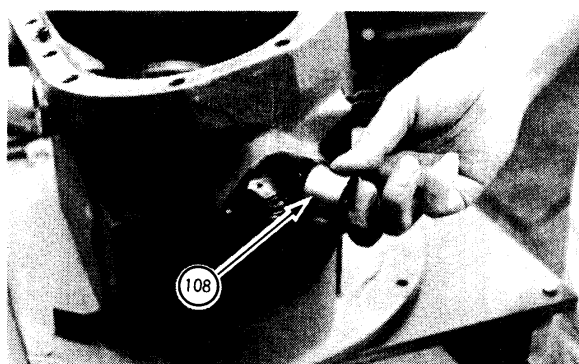
20. Install lever and shaft (107) assembly into casing (77) using a plastic hammer from the inside of the casing.

Install bushing (108), washer (104) and retaining ring (103) into casing (77) from the outside of the casing to secure shaft (107) in position.

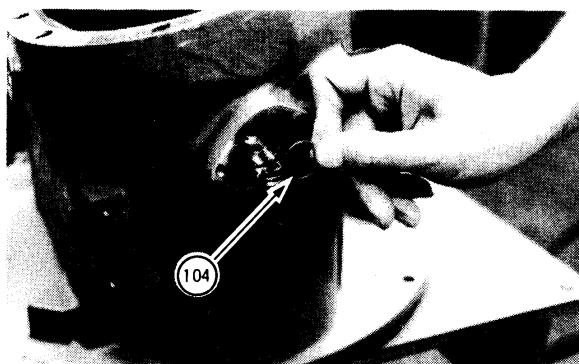
NOTE: If shaft (107) and spring pin (105) are removed from feedback lever (106), assemble them before installation.



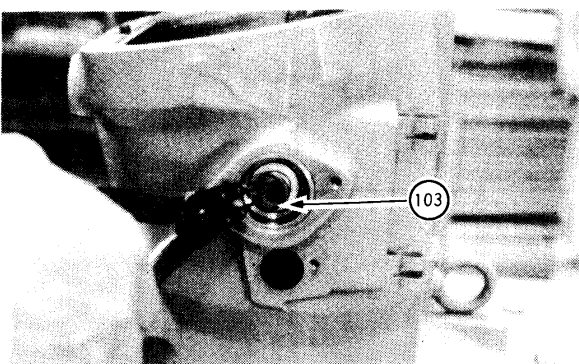
W107-02-04-069



W107-02-04-068



W107-02-04-070



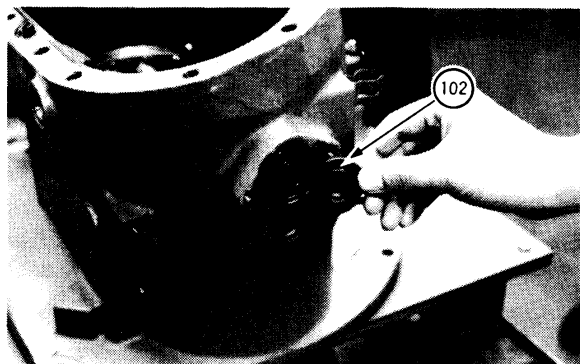
W107-02-04-071



UPPERSTRUCTURE / Pump Device

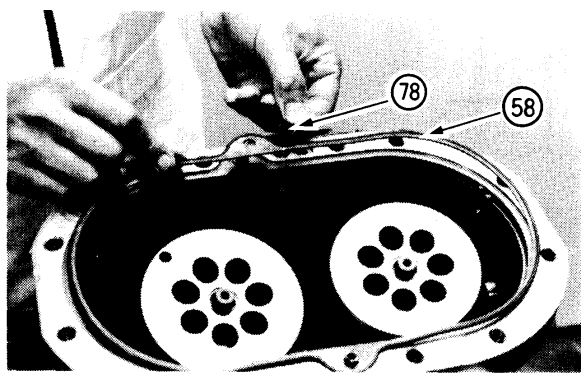
EX200-2

21. Install oil seal (102) into casing (77) using a plastic hammer. Be sure to apply Loctite to oil seal periphery, and grease to main lip and dust lip of oil seal (102).



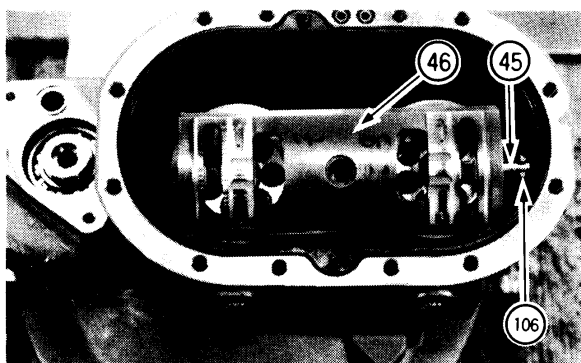
W107-02-04-072

22. Inspect that packing (58) is uniform in all over thickness. If not uniform, replace it with correct one. Apply a film of hydraulic oil or grease to packing (58) and O-ring (78) and install packing (58) and O-ring (78) into casing (77).



W107-02-04-073

23. Apply oil to the concave surface of rotor (57). Apply Loctite to threads of new pin (45). Engage pin (45) with the slit of feedback lever (106) and make the concave surface of rotor (57) tightly contact with sector valve (46).

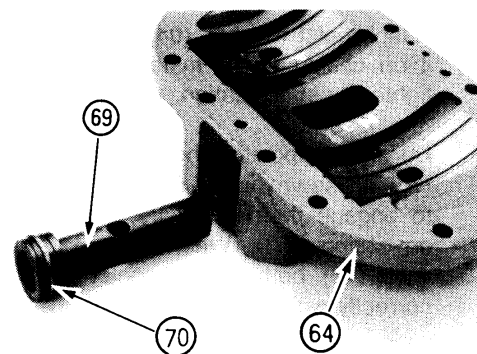


W107-02-04-074

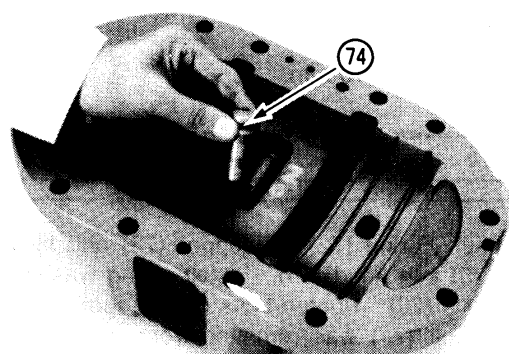
UPPERSTRUCTURE / Pump Device

EX200-2

24. Attach ring (70) to servo piston (69), and insert piston (69) in to head (64).
 Install pin (74) on piston (69).
 Install screw (67) into piston (69) to secure pin (74).
 Be sure to apply Loctite to screw (67) before installing.

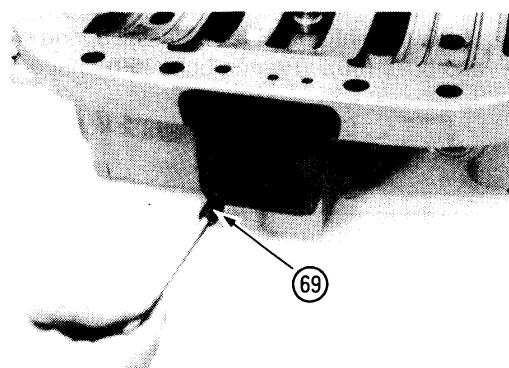


W107-02-04-075



W107-02-04-076

└ : 5 mm
 ─ : 2.5 kgf·m (24.5 N·m)
 (18.0 lbf·ft)



W107-02-04-077

UPPERSTRUCTURE / Pump Device

EX200-2

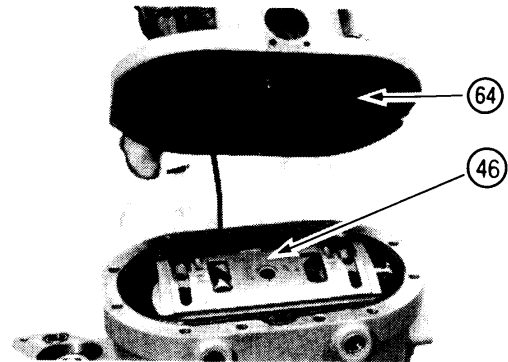
25. Attach hoist to head (64) using eyebolts and install it on casing (77). Install bolts (65) and (66) and tighten to specification.

Be sure to position both sector valve (46) and pin (74) on servo piston (69) at maximum tilting angle to engage them correctly when placing head (64) on casing (77). When pin (74) aligns with sector valve (46), both ends of sector valve (46) also meet correctly with the both sides of hollow in head (64).

Tighten head mounting bolts (65) and (66) by hand until head (64) closely comes into contact with casing (77) then retighten bolts (65) and (66) to the specified torque.

 : 10 mm

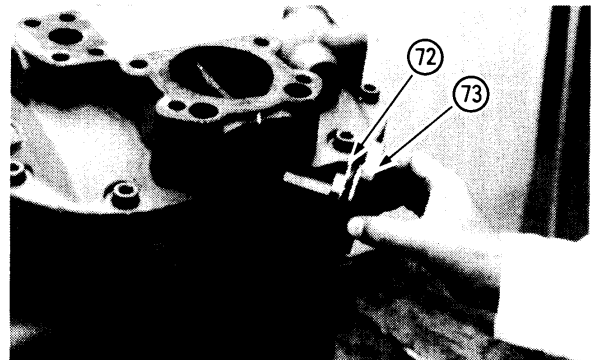
 : 11 kgf·m



W107-02-04-078

- 2 Attach O-ring (72) to stopper (73) and install stopper (73) into head (64). Install spring washers (75) and bolts (76). Tighten bolts (76) to specification. If bolt (71) was removed from stopper (73) for replacement, apply Loctite to new bolt (71) and install it on stopper (73). Attach O-ring (63) to servo cover (62) and install cover (62) into head (64). Install spring washers (61) and bolts (60). Tighten bolts (60) to specification.

 : 6 mm  : 2 kgf·m



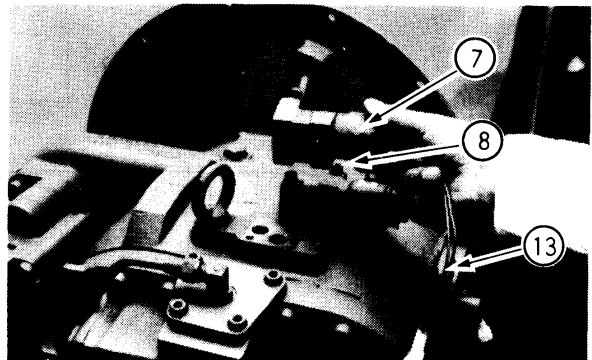
W107-02-04-079

27. Install HSV (7) on casing (77). Install washers (9) and bolts (8). Tighten bolts (8) to specification.

Install clamps (13), washers (12) and bolts (11) on casing (77). Tighten bolts to specification. Attach the solenoid valve connectors to clamps (13).

 : 4mm

 : 1 kgf·m



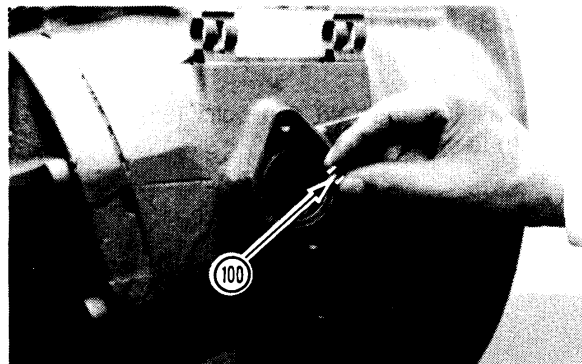
W107-02-04-080

UPPERSTRUCTURE / Pump Device

EX200-2

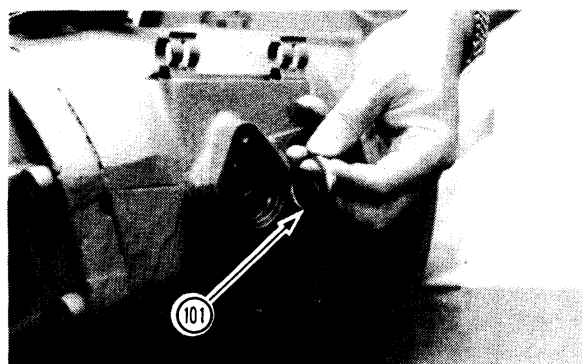
« Install Sensor »

28. Apply grease on spring plate (100) and install spring plate (100) in to shaft (107).



W107-02-04-081

29. Install spacer (101) in to casing (77).



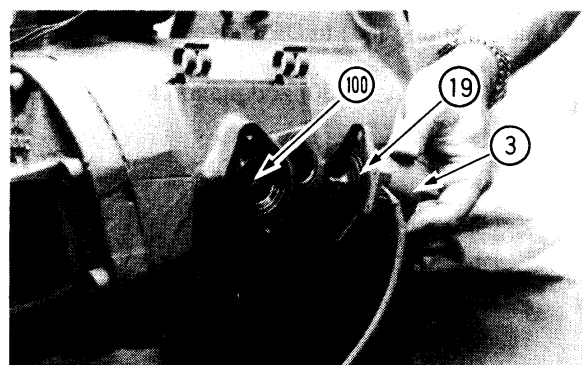
W107-02-04-082

30. Attach O-ring (99) to A-sensor (3).
Install A-sensor (3) on casing (77) with the shaft punch mark facing towards N-sensor and the shaft flat top inserted in spring plate. (with this position, sensor lead cable is positioned on the opposite side, as shown)

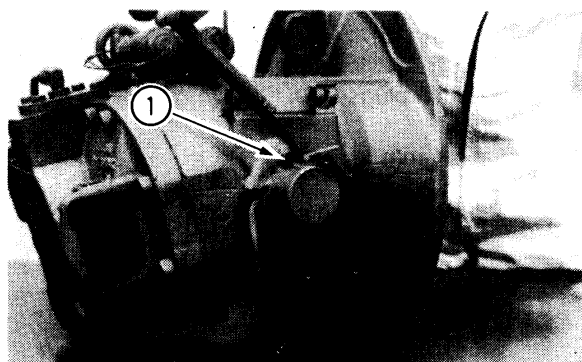
Install washers (2) and bolts (11), and tighten to specification.

 : 5mm

 : 2.5 kgf·m (24.5 N·m)
(18.0 lbf·ft)



W107-02-04-083



W107-02-04-084

UPPERSTRUCTURE / Pump Device

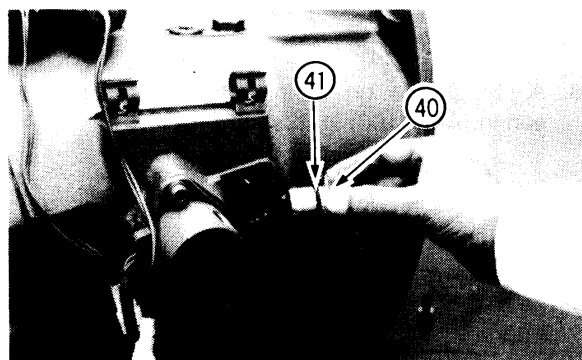
EX200-2

31. Attach O-ring (41) to N-sensor (40) and install N-sensor (40) on casing (77).

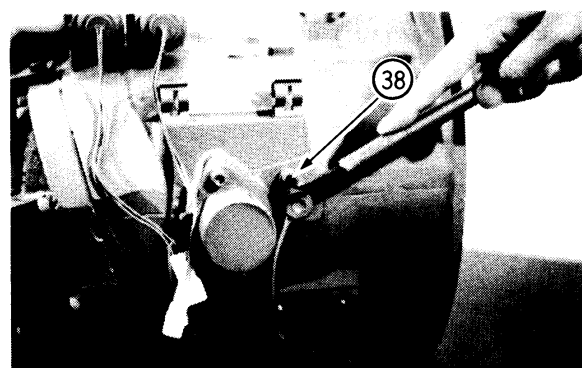
Install washers (39) and bolts (38). Tighten bolts (38) to specification.

 : 5mm

 : 2.5 kgf·m (24.5 N·m)
(18.0 lbf·ft)



W107-02-04-085



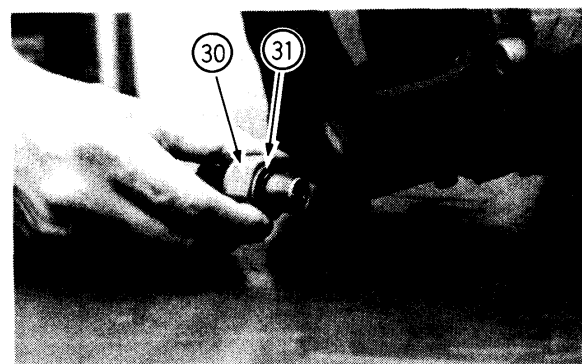
W107-02-04-086

32. Attach O-ring (31) to DP sensor (30).

Install DP sensor (30) and tighten to specification.

 : 30 mm

 : 7 kgf·m (68.6 N·m)
(50.6 lbf·ft)



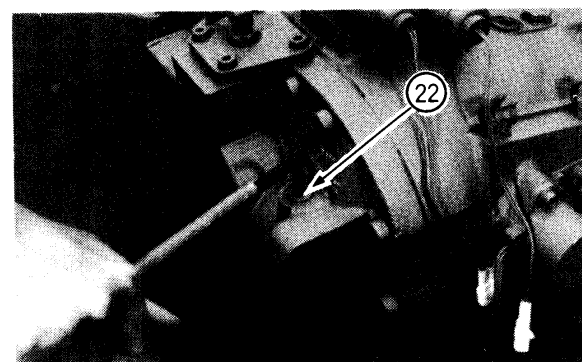
W107-02-04-087

33. Install plug (15).

Install drain plugs (29).

 : 4 mm

 : 2 kgf·m (19.6 N·m)
(14.4 lbf·ft)



W107-02-04-088

W02-04-32

UPPERSTRUCTURE / Pump Device

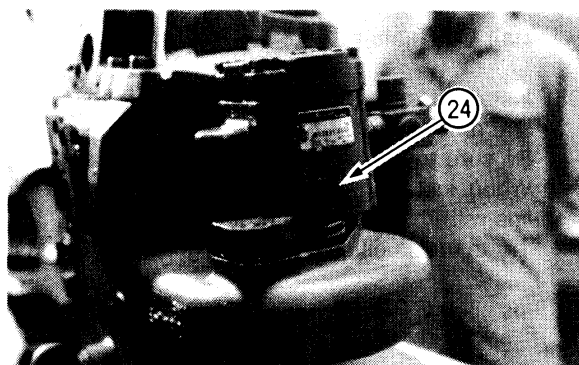
EX200-2

«Assemble Gear Pump and Pipes»

34. Install gear pump (24), with washers (22) and bolts (23).

 : 8 mm

 : 5 kgf·m



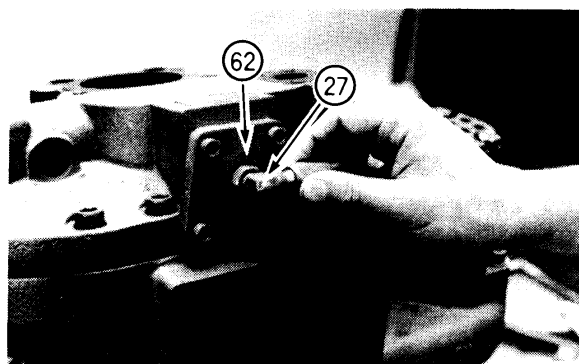
W107-02-04-089

35. Connect pipe fitting (27) to servo cover (62) temporarily.

Be sure to apply grease to pipe ends before connecting.

 : 19 mm

 : 3.5 kgf·m (49.0 N·m)
(25.3 lbf·ft)

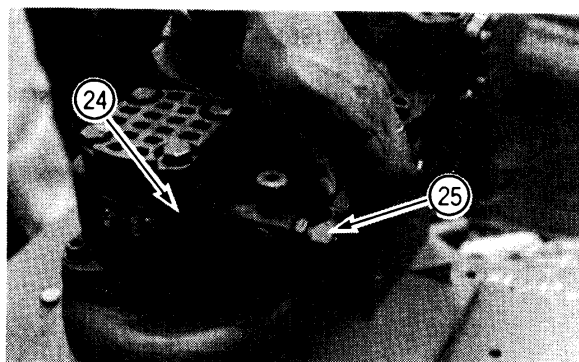


W107-02-04-090

36. Connect adaptor (25) to gear pump (24).

 : 19 mm

 : 3.5 kgf·m (49.0 N·m)
(25.3 lbf·ft)

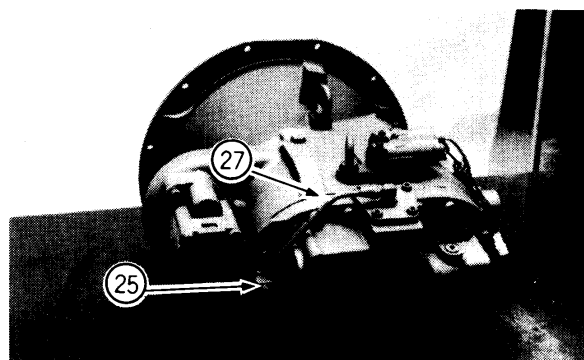


W107-02-04-091

37. Connect pipe fitting (27) to adaptor (25) temporarily.

Be sure to apply grease to pipe ends before connecting.

Fully tighten both fittings (27) on servo cover (62) and gear pump adaptor (25).



W107-02-04-092

UPPERSTRUCTURE / Pump Device

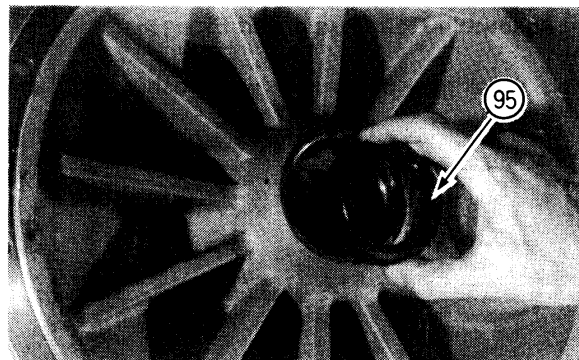
EX200-2

◀ Install Oil Seals ▶

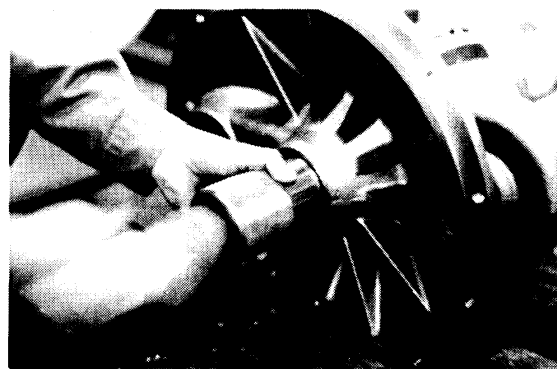
38. Install oil seal (95) into casing (77) using installer and a hammer.

Be sure to apply grease to the dust lip and main lip.
When installing, take care not to damage oil seal lips with the spline teeth of disk drive (84).
Try to install oil seal (95) straight using the installer.

Installer: ST 2569



W107-02-04-093

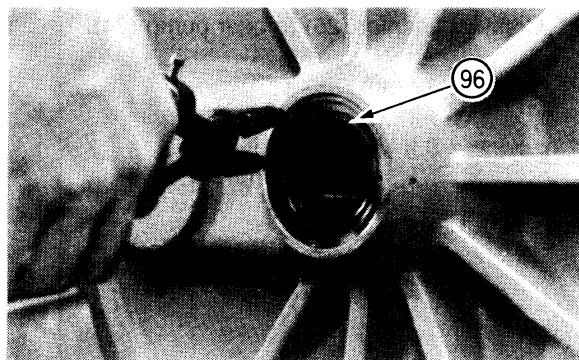


W107-02-04-094

39. Install retaining ring (96).

NOTE: In case coupling (32) is removed, install it.

~~3015~~



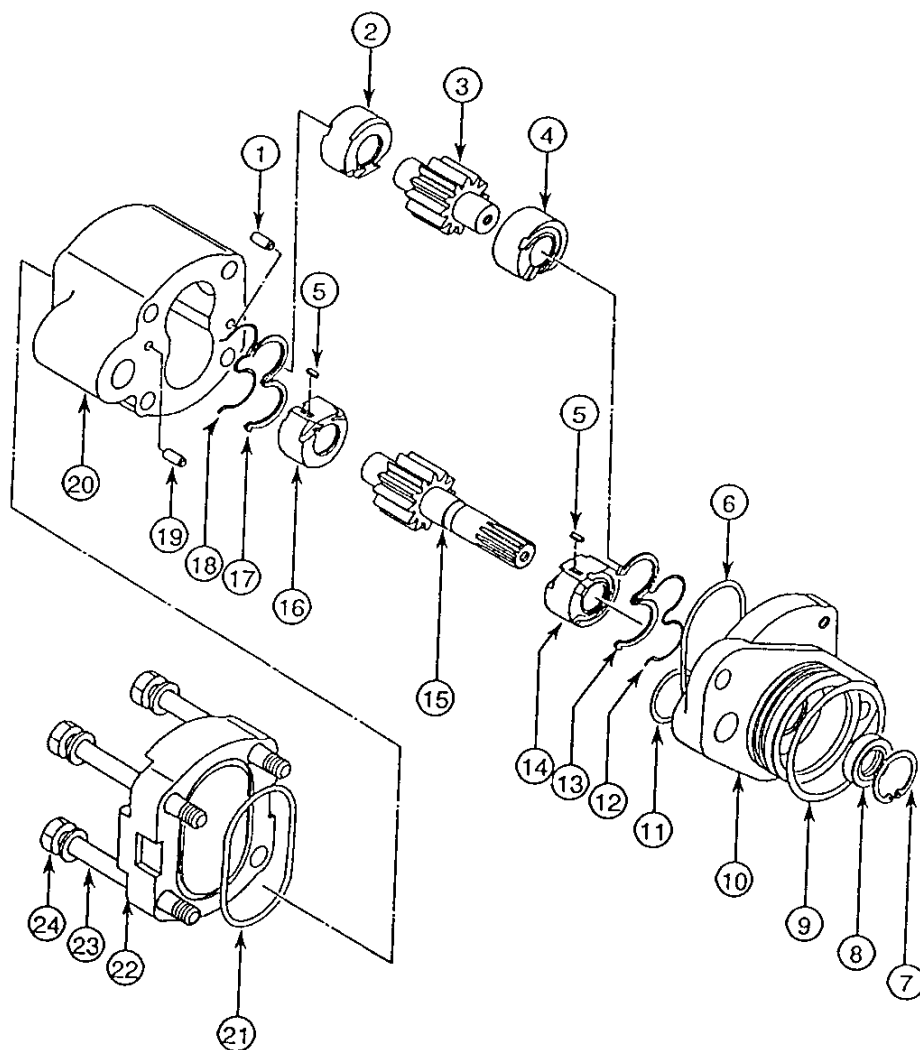
W107-02-04-095

UPPERSTRUCTURE / Pump Device

EX200-2

DISASSEMBLE AND ASSEMBLE PILOT GEAR PUMP

Pilot Gear Pump Drawing



W105-02-04-096

- | | | | |
|------------|-------------------|------------------|-------------|
| 1— Pin | 7— Retaining ring | 13— Seal | 19— Pin |
| 2— Bushing | 8— Oil seal | 14— Bushing | 20— Housing |
| 3— Gear | 9— O-ring | 15— Gear | 21— O-ring |
| 4— Bushing | 10— Flange | 16— Bushing | 22— Cover |
| 5— Key | 11— O-ring | 17— Seal | 23— Bolt |
| 6— O-ring | 12— Back-up ring | 18— Back-up ring | 24— Washer |

UPPERSTRUCTURE / Pump Device

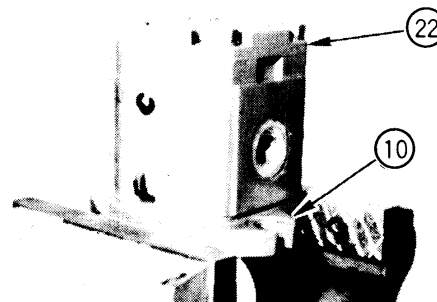
EX200-2

DISASSEMBLE PILOT GEAR PUMP

Precautions for Disassembly

- Clean outside of the pump.
- Before disassembling, mark on mating boundaries between cover (22) and housing (20)(delivery side), and housing (20) and flange (10) (suction side) respectively to aid assembly.

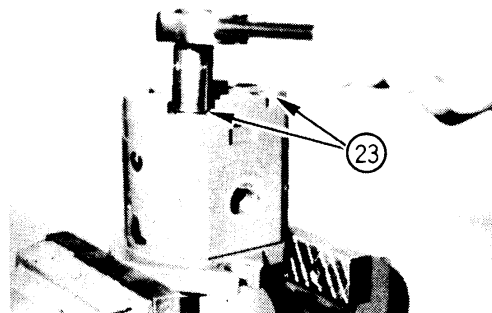
1. With cover (22) side facing upwards, secure flange (10) with a vise.



W107-02-04-097

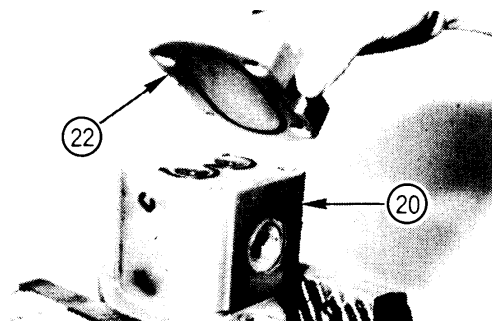
2. Loosen four bolts (23) and remove them.

 : 17 mm



W107-02-04-098

3. Remove cover (22) from housing (20).



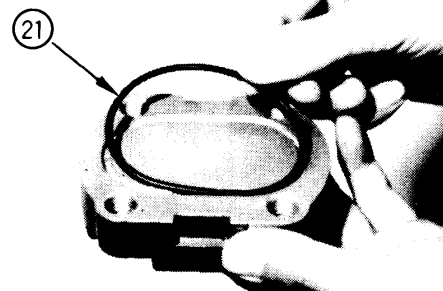
W107-02-04-099

W02-04-36

UPPERSTRUCTURE / Pump Device

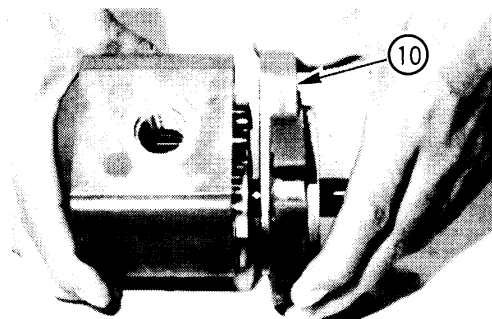
EX200-2

4. Remove O-ring (21) from cover (22).



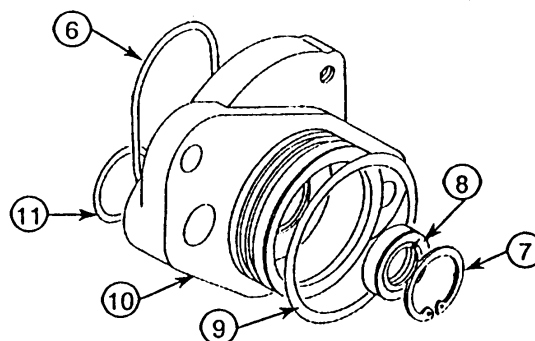
W107-02-04-100

5. Remove flange (10) from housing (20).



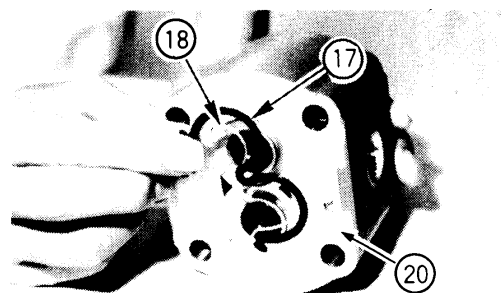
W107-02-04-101

6. Remove O-rings (11) and (6) from flange (10).
Remove retaining ring (7) from flange (10).
Remove oil seal (8) from flange (10).



W107-02-04-102

7. Remove backup ring (18) and seal (17) located on cover (22) side from bushings (2) and (16).



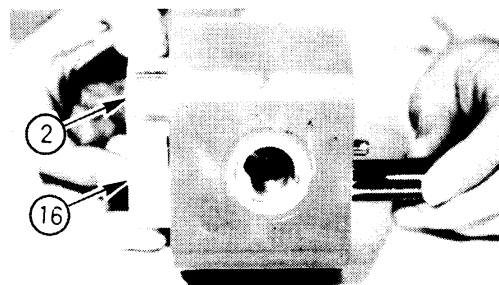
W107-02-04-105

UPPERSTRUCTURE / Pump Device

EX200-2

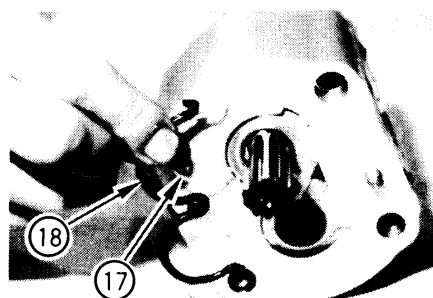
8. Push out bushings (2) and (16) with gear (15) to remove them from housing (20).

NOTE: Be careful not to fall out key (5) provided between bushings when removing.



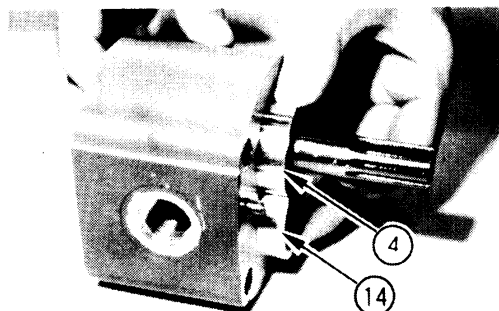
W107-02-04-106

9. Remove backup ring (12) and seal (13) located on flange (10) side from bushings (4) and (14).



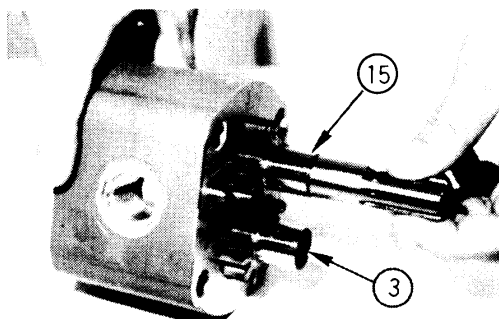
W107-02-04-107

10. Remove bushings (4) and (14).



W107-02-04-108

11. Remove gears (3) and (15).



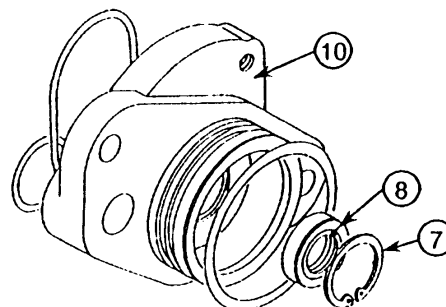
W107-02-04-109

UPPERSTRUCTURE / Pump Device

EX200-2

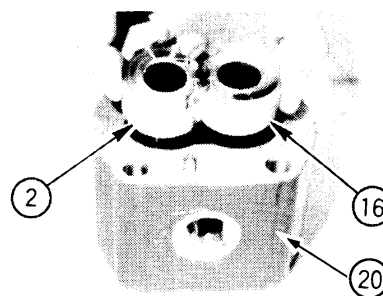
Assemble Pilot Gear

1. Install oil seal (8) into flange (10).
Install retaining ring (7) in flange (10).



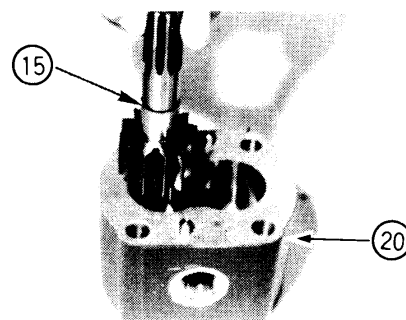
W107-02-04-102

2. Install bushings (16) and (2) with seal grooves facing downwards into housing (20).



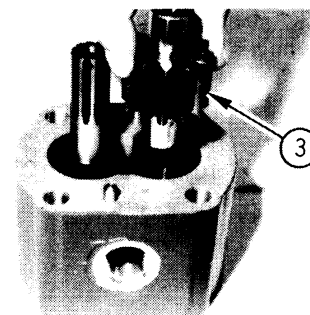
W107-02-04-112

3. Install gear (11) in housing (20).



W107-02-04-113

4. Install gear (3).

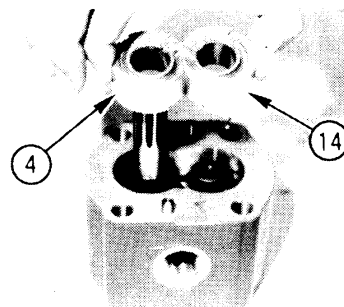


W107-02-04-114

UPPERSTRUCTURE / Pump Device

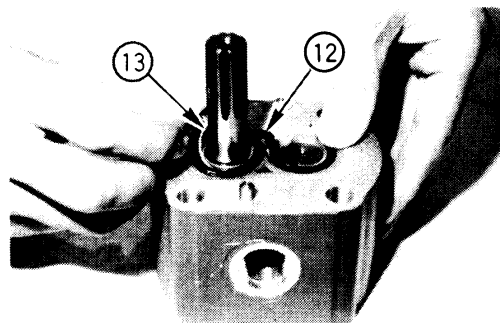
EX200-2

5. Install bushings (4) and (14) with seal grooves facing upwards into housing (20).



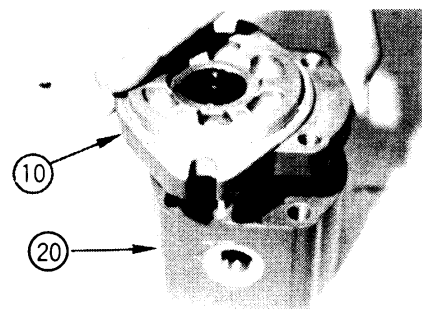
W107-02-04-115

6. Install backup ring (12) and seal (13) in the seal grooves of bushings (4) and (14).



W107-02-04-116

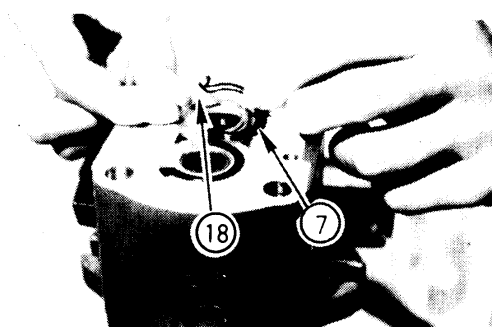
7. Install flange (10) on housing (20).



W107-02-04-118

8. Overturn the assembly and secure it with a vise. Install backup ring (18) and seal (17) in the seal grooves of bushings (2) and (16).

NOTE: Be careful not to fall out bushings and gears already installed in the housing when overturning the assembly.



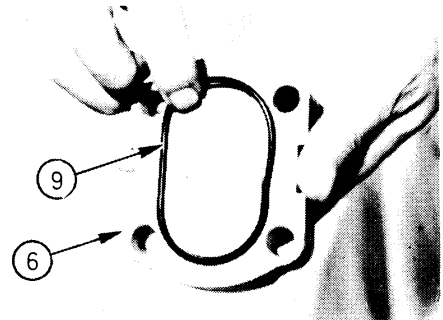
W107-02-04-119

W02-04-40

UPPERSTRUCTURE / Pump Device

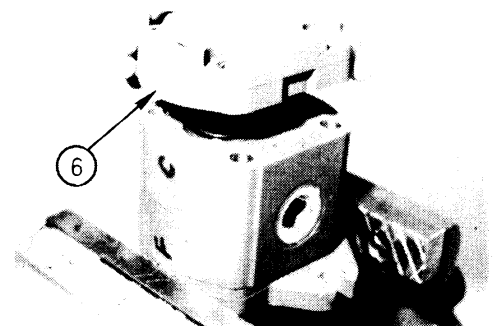
EX200-2

9. Install O-ring (21) to cover (22).



W107-02-04-120

10. Install cover (22) on housing (20).

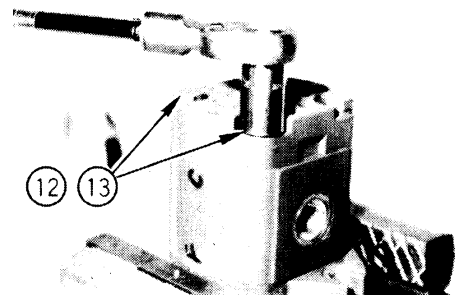


W107-02-04-121

11. Install washers (23) and bolts (24) and tighten the bolts.

 : 17 mm

 : 39~44 N·m (4 ~4.5kgf·m) (29~33 lbt·ft)



W107-02-04-122

UPPERSTRUCTURE / Control Valve

EX200-2

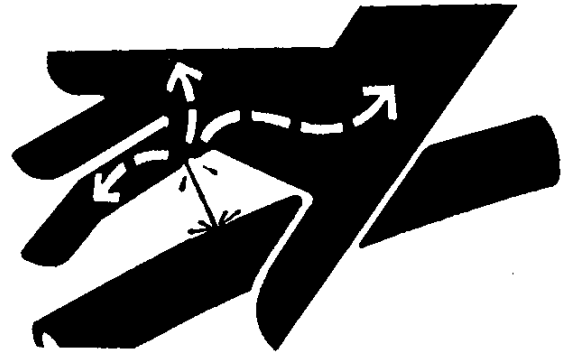
Remove and Install Control Valve

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

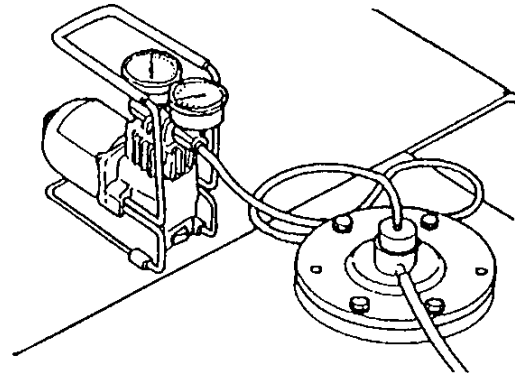


SA-031

« Remove the control valve »

2. Remove the cover of the top of the control valve, and cover of the hydraulic tank, then drain the air. Remove the cap of the hydraulic tank.
3. Operate the vacuum pump for negative-pressure raises in the hydraulic oil tank.

NOTE: Continued operations the vacuum pump until completed disconnect the any pipings.



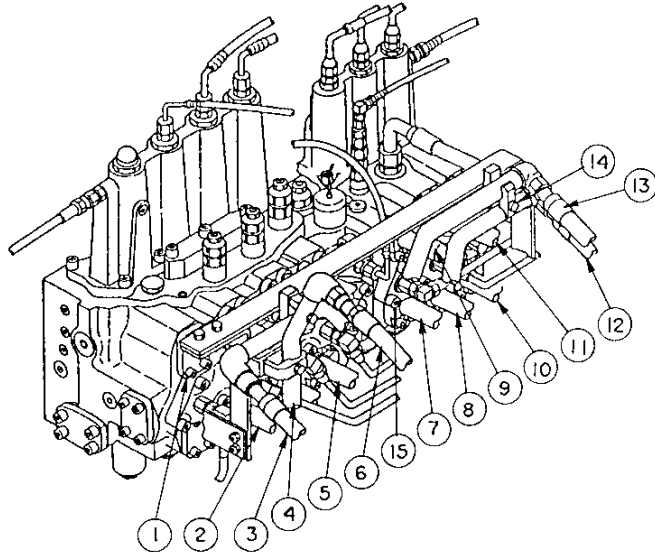
W107-02-05-001

UPPERSTRUCTURE / Control Valve

EX200-2

4. Remove bolt(1), clamp fixed bolt (14) propel pipings (8) to (11) and front pipings (2) to (7), (12) to (13), then install the supports at there.

- | | |
|----------------|----------------------|
| (1), (4) | (To boom cylinder) |
| (3), (5), (12) | (To bucket cylinder) |
| (6), (13) | (To arm cylinder) |
| (7), (15) | (To swing motor) |
| (8) to (11) | (To center joint) |



W107-02-05-002

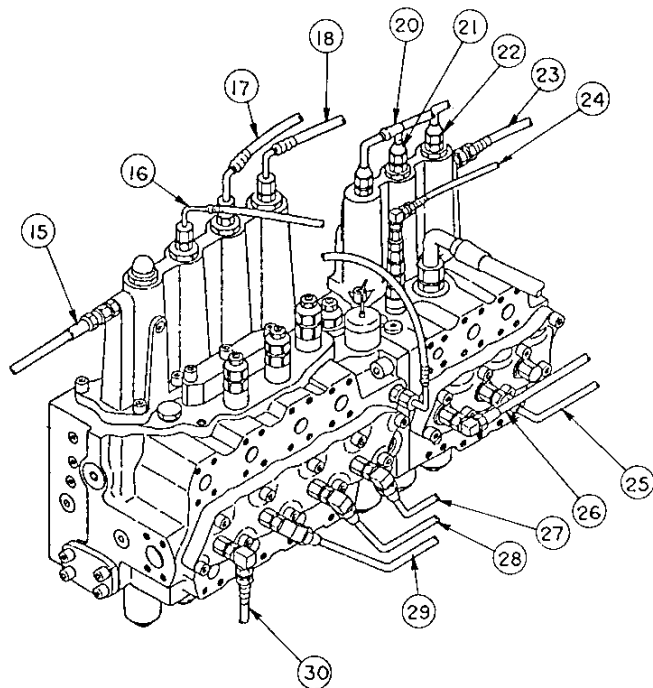
5. Remove pilot pipings (15) to (30).

- | | |
|------------------|---------------------------|
| (15), (19), (30) | (To hydraulic tank) |
| (16), (17) | (To shockless valve) |
| (18), (28) | (To shuttle valve) |
| (21), (22) | (To propel shuttle valve) |
| (23) to (30) | (To solenoid valve unit) |



CAUTION:

weight;
control valve assembly 172 kg (375 lbf.)
3-spool control valve 53 kg (117 lbf.)
4-spool control valve 119 kg (262 lbf.)



W107-02-05-003

W02-05-02

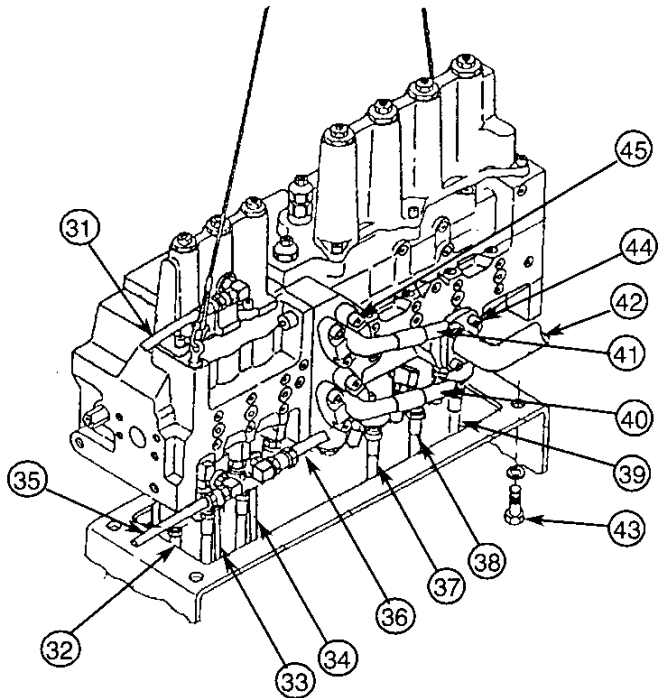
UPPERSTRUCTURE / Control Valve

EX200-2

6. Remove pilot pipings (31) to (39), bolt (44) for delivery pipings (40), (41), bolt (45) for return piping (42), and install the I-bolts on the control valve assembly.

Install the lifting wire into the I-bolts for completely lifting the control valve assembly then lift it.

- | | |
|------------------|---------------------------|
| (31), (42) | (To hydraulic oil tank) |
| (32), (39) | (To shuttle valve) |
| (33), (34), (36) | (To propel shuttle valve) |
| (37), (38) | (To shockless valve) |
| (40), (41) | (From main pump) |



W107-02-05-004

«Install control valve»

1. Install pilot pipings (1) to (6) into the control valve assembly. Install I-bolts onto the c/v assembly and lift it by crane. Install the control valve assembly onto the bracket and fixed bolts (7). Install pilot pipings (8) to (10), delivery piping (11), (12) and cooling piping (13) onto the control valve assembly then tighten by fixed bolts (14), (15).

 : 19 mm

 : 3 kgf-m (29.4 N·m, 21.7 lbf-ft)

 : 22 mm

 : 4 kgf-m (39.2 N·m, 28.9 lbf-ft)

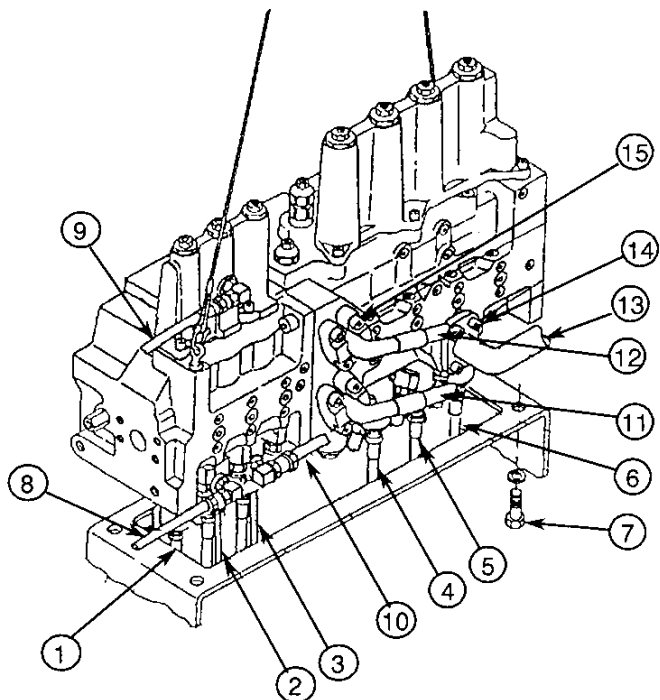
 : 6 mm

 : 2.5 kgf-m (24.5 N·m, 18.1 lbf-ft)

 : 8 mm

 : 5 kgf-m (49 N·m, 36.2 lbf-ft)

Lifting tool : ST 0001



W107-02-05-004

UPPERSTRUCTURE / Control Valve

EX200-2

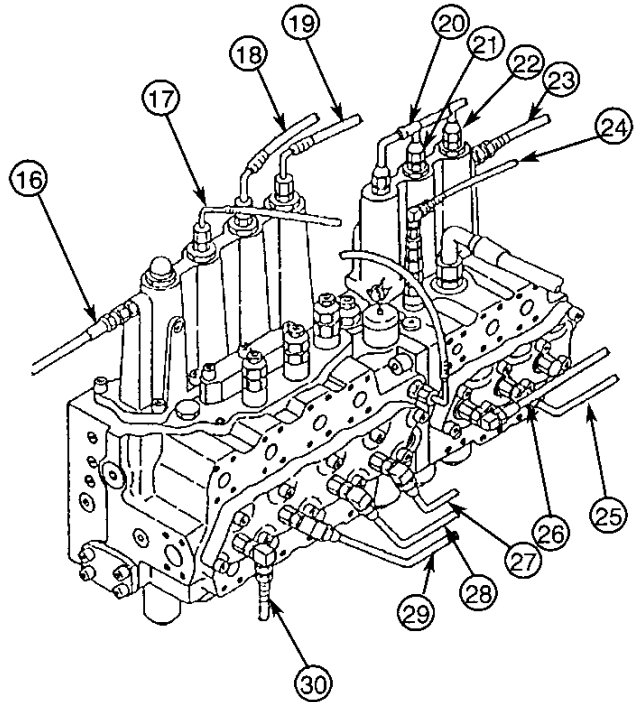
2. Install pilot pipings (16) to (30) onto the control valve assembly.

 : 17 mm

 : 2 kgf·m (19.6 N·m, 14.5 lbf·ft)

 : 19 mm

 : 3 kgf·m (29.4 N·m, 21.7 lbf·ft)



W107-02-05-003

3. Tighten fixed bolts (45) to pipings of (38) to (41) for propel, piping (37) for swing, pipings (12), (13) and (32) to (36) for front. Tighten bolt (31) for support and bolt (44) for clamp.

 : 19 mm

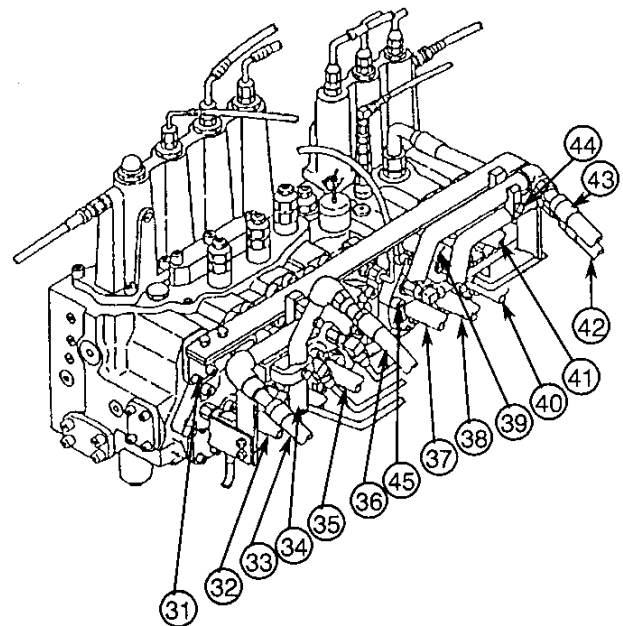
 : 3 kgf·m (29.4 N·m, 21.7 lbf·ft)

 : 6 mm

 : 2.5 kgf·m (24.5 N·m, 18.1 lbf·ft)

 : 8 mm

 : 5 kgf·m (49 N·m, 36.2 lbf·ft)



NOTE: Confirmed the hydraulic oil level with normal for control valve and recheck the hydraulic oil leak or not.

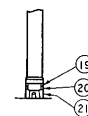
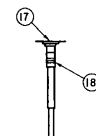
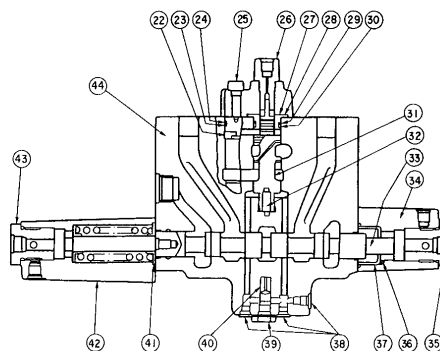
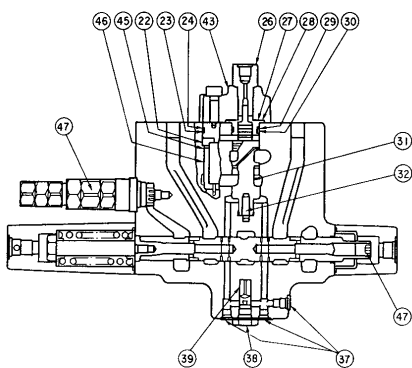
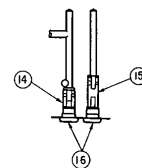
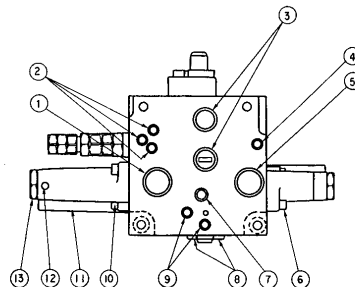
W107-02-05-002

W02-05-04

UPPERSTRUCTURE / Control Valve

EX200-2

- | | | | |
|------------|-------------------|-------------------|------------------------|
| 1 - O-ring | 14 - Filter | 27 - Collar | 40 - Shuttle |
| 2 - O-ring | 15 - Filter | 28 - O-ring | 41 - O-ring |
| 3 - O-ring | 16 - Plug | 29 - Back-up ring | 42 - Cover |
| 4 - O-ring | 17 - Plug | 30 - O-ring | 43 - Plug |
| 5 - O-ring | 18 - Plug | 31 - Spool | 44 - Spool |
| 6 - Bolt | 19 - O-ring | 32 - Spring | 45 - Spring |
| 7 - O-ring | 20 - Back-up ring | 33 - Bolt | 46 - Poppet |
| 8 - Plug | 21 - Plug | 34 - Cover | 47 - Main relief valve |
| 9 - O-ring | 22 - Plug | 35 - Plug | 48 - Plug |
| 10 - Bolt | 23 - O-ring | 36 - O-ring | 49 - Plug |
| 11 - Cap | 24 - Back-up ring | 37 - Spacer | |
| 12 - Plug | 25 - Bolt | 38 - Plug | |
| 13 - Plug | 26 - Cover | 39 - Plug | |



W02-05-05

UPPERSTRUCTURE / Control Valve

EX200-2

Disassemble control valve

1. Clean the control valve assembly and put it on the work bench.

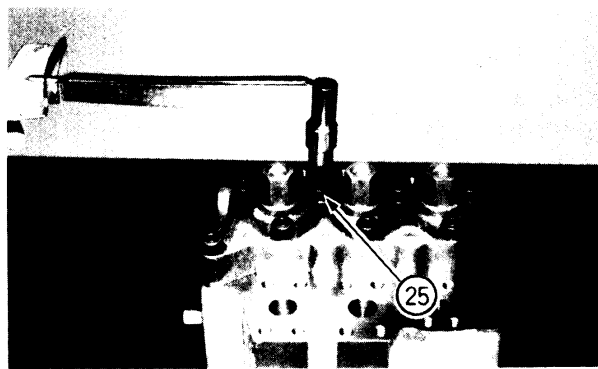
NOTE: When removed O-rings and rubber parts so on, must be replaced to new one, never used it again.

When installed O-ring or buck-up ring, applied grease or hydraulic oil on it.

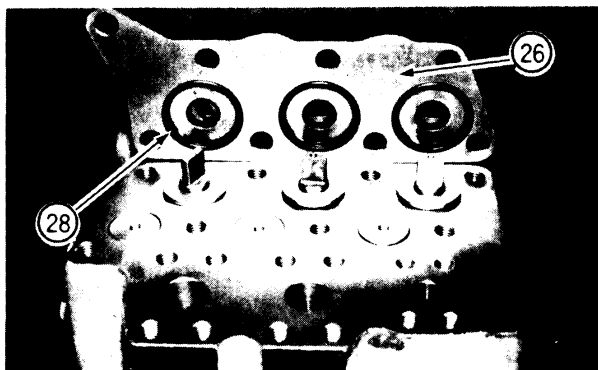
Disassemble the 3-spool side of control valve

«Disassemble for variable compensated valve»

2. Remove bolt (25), O-ring (28) from cover (26).



W107-02-05-005



W107-02-05-006

UPPERSTRUCTURE / Control Valve

EX200-2

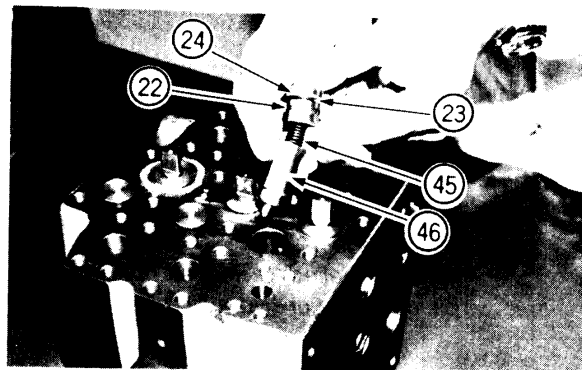
«Disassemble for Load check valve»

3. Remove O-ring (23), buck-up ring (24) from plug (22).
Remove spring (45) from poppet (46).

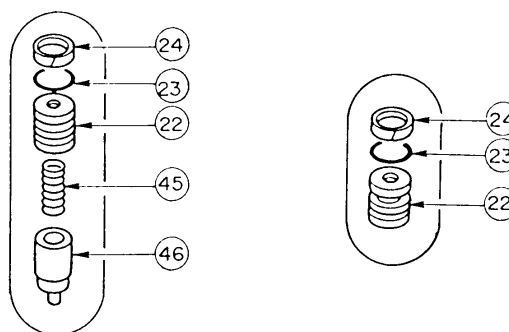
Poppet (46) : (For swing)

Spring (21) : (For swing)

NOTE: If harden to remove the plug, using a pulled-up bolt (6mm).



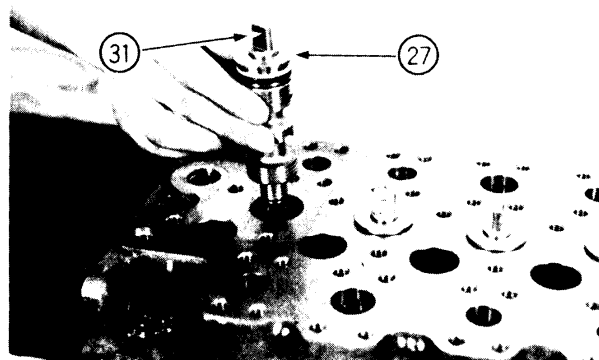
W107-02-05-007



W107-02-05-008

4. Remove the variable compensated valve assembly.
Remove collar (27), O-ring (30) and buck-up ring (29).
Remove spring (32) from spool (31).

NOTE: Put the location marked on each valves.



W107-02-05-009

W02-05-08

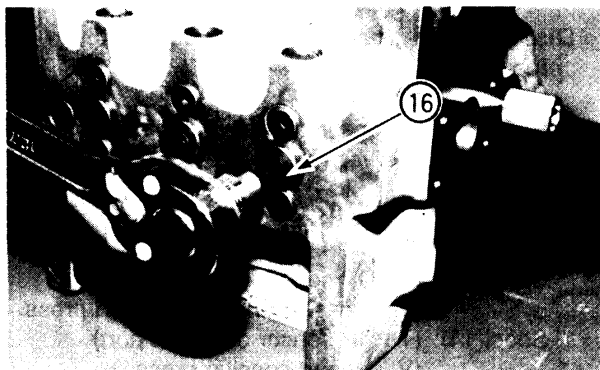
UPPERSTRUCTURE / Control Valve

EX200-2

«Disassemble for shuttle valve»

5. Remove plug (16) and O-Ring from plug.
Remove the shuttle valve assembly, steel boll and O-Ring from control valve.

 : 5 mm



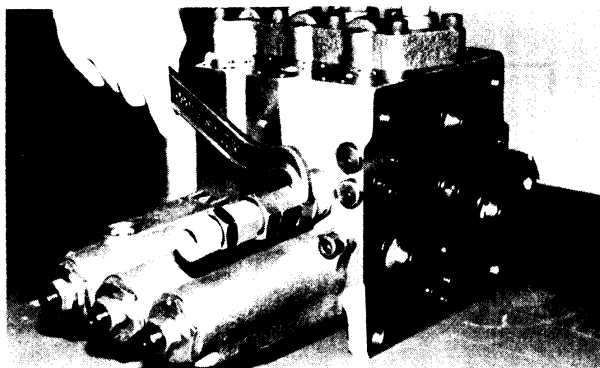
W107-02-05-011

«Disassemble the Main relief system»

6. Remove relief valve assembly (47) from control valve.

NOTE: Unload valve is provided at 4-spool side of control valve.

 : 27 mm



W107-02-05-012



W107-02-05-013

UPPERSTRUCTURE / Control Valve

EX200-2

«Disassemble for the DP sensor of pressure plug»

7. Remove DP sensor (16), O-ring, spool (15), (14) from control valve.

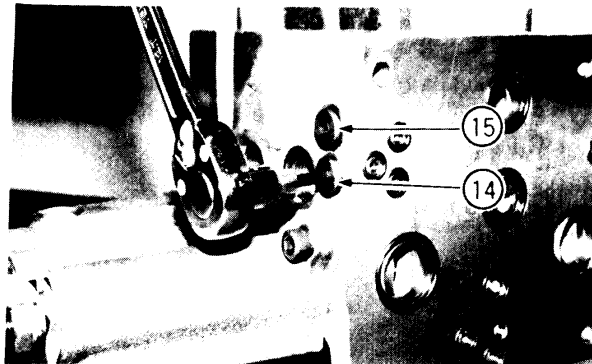
 : 8 mm

Spool(15): (To DP sensor of press. port)
(Vp press. (Pump discharged press.)

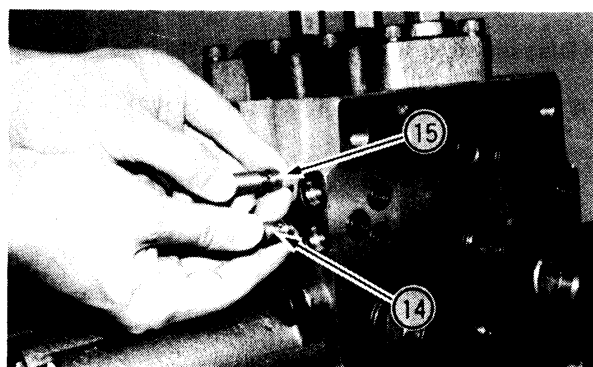
Spool(14): (To DP sensor of press. port)
(VLs (Load sensing press.)

NOTE: Do not loose the filter when disassembled the Spool (14), (15).

 : 8 mm



W107-02-05-014

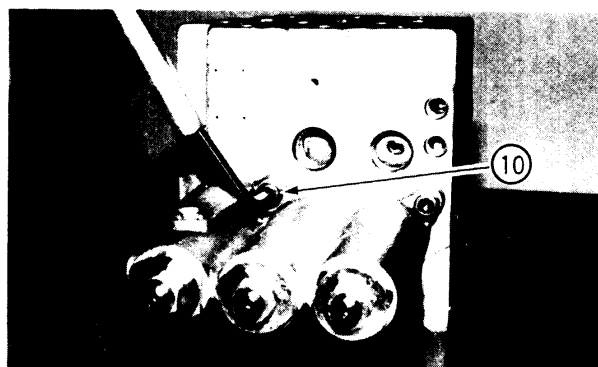


W107-02-05-015

«Disassemble for upper cover»

8. Loosen bolt (10).

 : 8 mm



W107-02-05-016

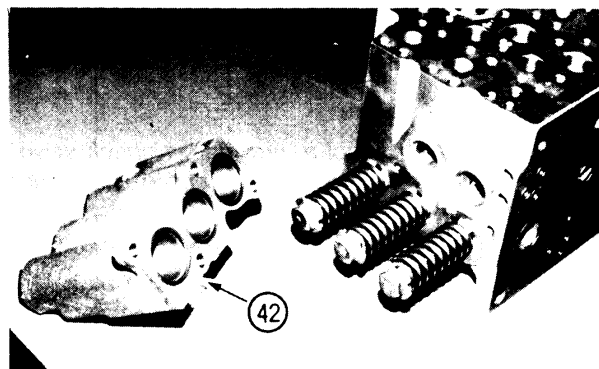
UPPERSTRUCTURE / Control Valve

EX200-2

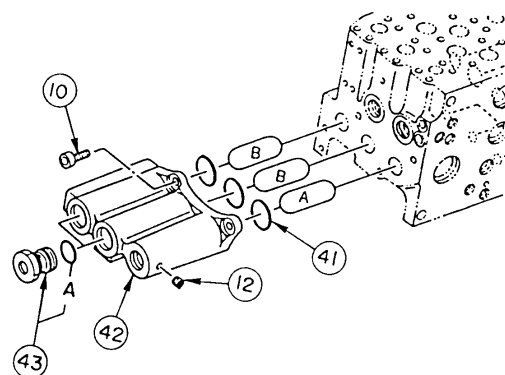
9. Remove cover (42) and O-Ring (41).

NOTE: Remove plug (12), (43) when judgment removing.

 : 8 mm



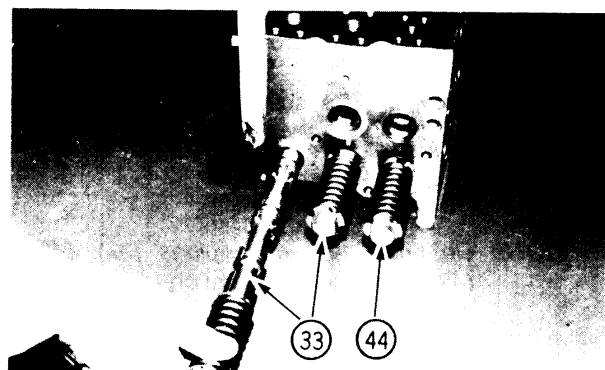
W107-02-05-017



W107-02-05-018

« Disassemble for spools »

10. Remove spools assembly (33) and (34) from control valve.



W107-02-05-019

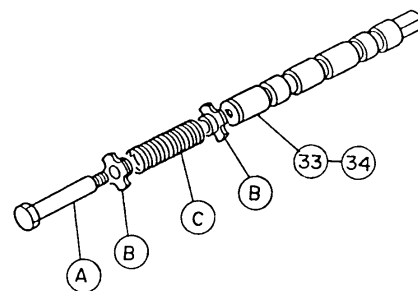
UPPERSTRUCTURE / Control Valve

EX200-2

11. Remove bolt (A), spring (C) and seat (B) from spools (33), (34).

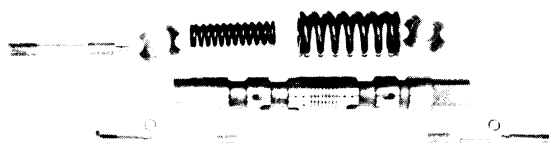
NOTE: Swing spool is provided a check valve, but it not disassemble except to abnormal condition.

*NOTE: Spool (33) (For travel R, L)
Spool (44) (For swing)*



W107-02-05-020

 : 17 mm



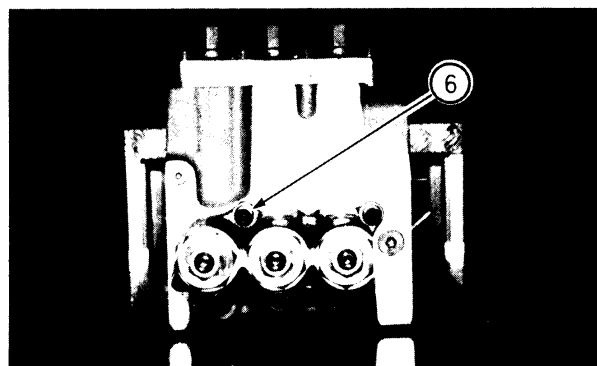
W107-02-05-021

«Disassemble for under cover»

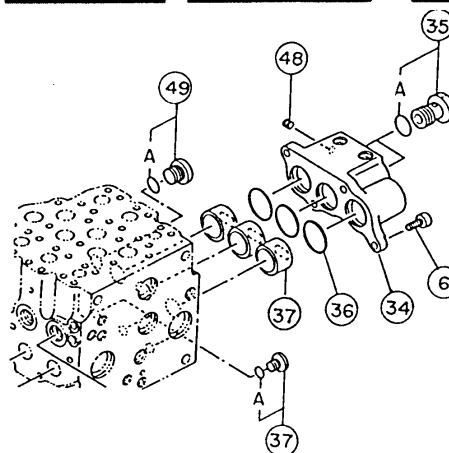
12. Remove bolt (6) for cover (34), O-Ring (36) and spacer (37).

 : 8 mm

NOTE: Do not disassemble plugs (37), (48) and (49) except to abnormal conditions.



W107-02-05-022



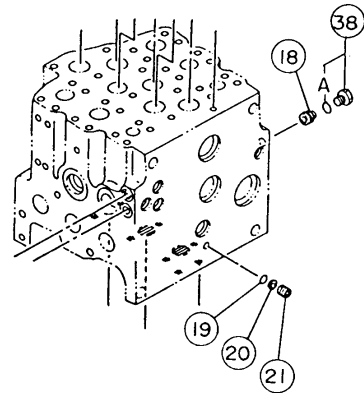
W107-02-05-023

W02-05-12

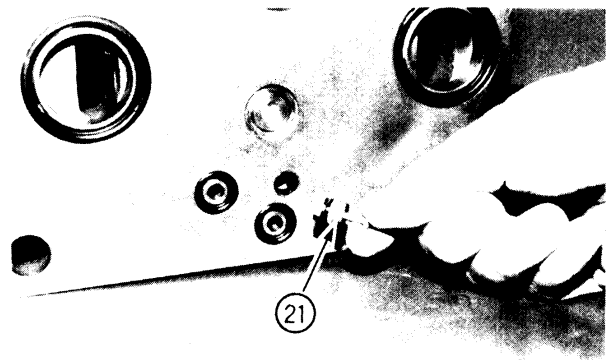
UPPERSTRUCTURE / Control Valve

EX200-2

13. Do not disassemble other plugs (38) and (21) except to abnormal conditions.



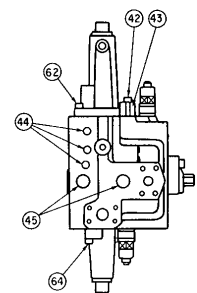
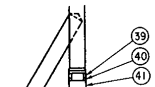
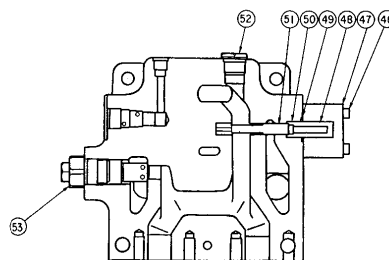
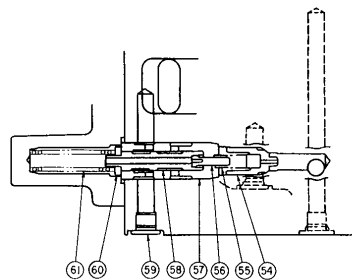
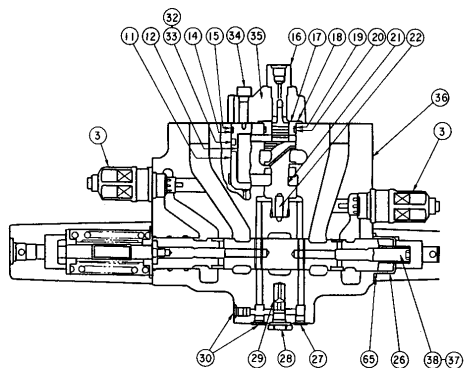
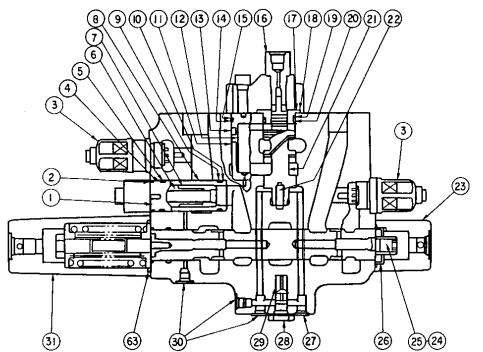
W107-02-05-024



W107-02-05-025

UPPERSTRUCTURE / Control Valve

EX200-2



- | | | | | |
|---------------------------|------------------|------------------|------------------------|--------------|
| 1- Plug | 18- Plug | 31- Upper cover | 46- Bolt | 61- Spring |
| 2- O-ring | 17- Collar | 32- Plug | 47- Cap | 62- Bolt |
| 3- Over load relief valve | 18- O-ring | 33- Plug | 48- Spring | 63- O-ring |
| 4- Back-up ring | 19- Back-up ring | 34- Bolt | 49- O-ring | 64- Bolt |
| 5- O-ring | 20- O-ring | 35- Flange | 50- Spring seat | 65- O-ring |
| 6- Spring | 21- Spool | 36- Housing | 51- Spool | 66- Lock nut |
| 7- Poppet | 22- Spring | 37- Spool | 52- Plug | 67- Lock nut |
| 8- sleeve | 23- Under cover | 38- Spool | 53- Surge relief valve | 68- Plug |
| 9- O-ring | 24- Spool | 39- O-ring | 54- Poppet | 69- O-ring |
| 10- Back-up ring | 25- Spool | 40- Back-up ring | 55- Spring | 70- O-ring |
| 11- Poppet | 26- Spacer | 41- Plug | 56- Piston | 71- Plug |
| 12- Spring | 27- Plug | 42- Bolt | 57- Sleeve | 72- O-ring |
| 13- Plug | 28- Plug | 43- Plate | 58- Spool | 73- O-ring |
| 14- O-ring | 29- Shuttle | 44- Plug | 59- Plug | 74- Adjuster |
| 15- Back-up ring | 30- Plug | 45- Plug | 60- Spring seat | |

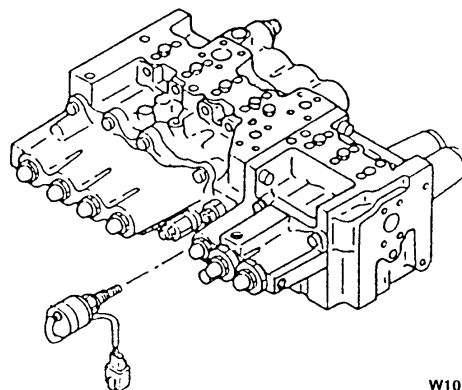
W02-05-15

UPPERSTRUCTURE / Control Valve

EX200-2

«Disassemble for control valve»

1. Clean the control valve assembly and put it on the work bench.
Remove DP (Differential pressure) sensor from the control valve.

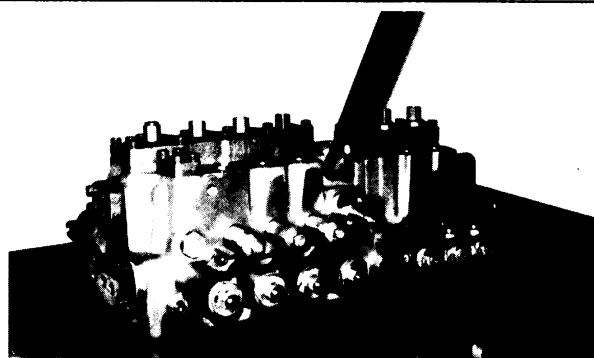


W107-02-05-027

«Disassemble 4-spool and 3-spool side»

2. Remove the attached bolts for connecting with 4-spool and 3-spool side.

 : 12 mm



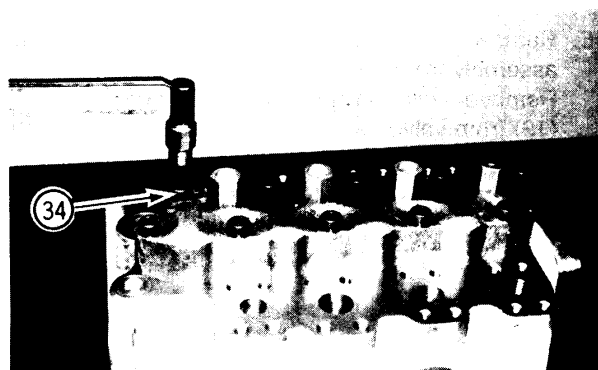
W107-02-05-028

Disassemble for 4-Spool Side

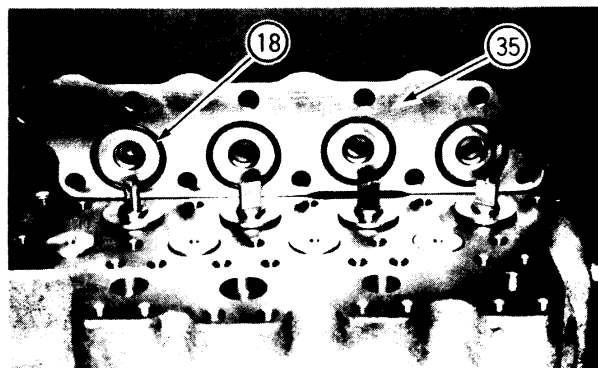
«Disassemble for variable pressure compensated valve»

3. Remove bolts (34), flange (35) and O-ring (18).

 : 8 mm



W107-02-05-029



W107-02-05-030

UPPERSTRUCTURE / Control Valve

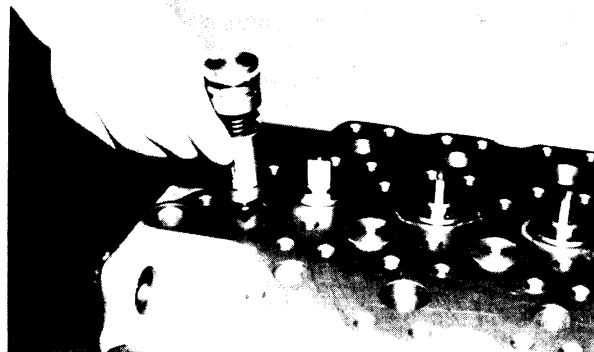
EX200-2

«Disassemble for load check valve»

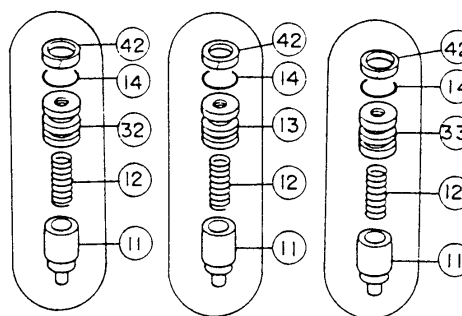
4. Remove O-ring (14), back-up ring (15) from plugs (33), (13) and (42).
Remove spring (12) from poppet (11).

Plug (32) (For bucket)
Plug (13) (For boom, Arm)
Plug (33) (For extra)

NOTE: If harden to remove the plugs, using a removing bolt (6 mm).



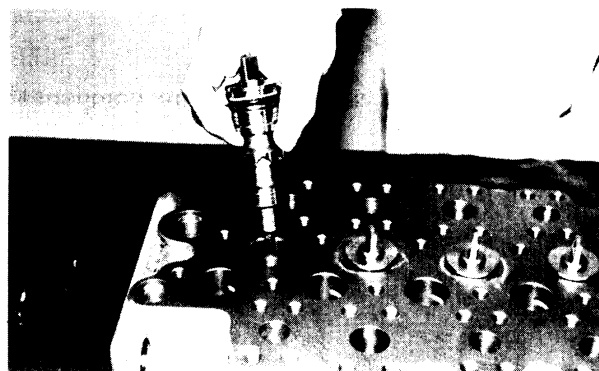
W107-02-05-031



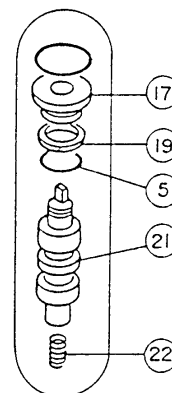
W107-02-05-032

5. Remove the variable pressure compensated valve assembly from control valve.
Remove collar (17), O-ring (5) and back-up ring (19) from valve.
Remove spring (22) from spool (21).

NOTE: Put the index No. onto the each sections.



W107-02-05-033



W107-02-05-034

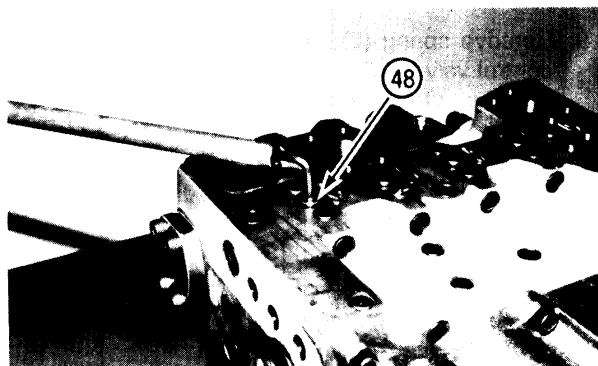
UPPERSTRUCTURE / Control Valve

EX200-2

«Disassemble for shuttle valve»

6. Remove plug (28) and O-ring.
Remove shuttle valve assembly (29), ball and O-ring shuttle valve.

 : 5 mm

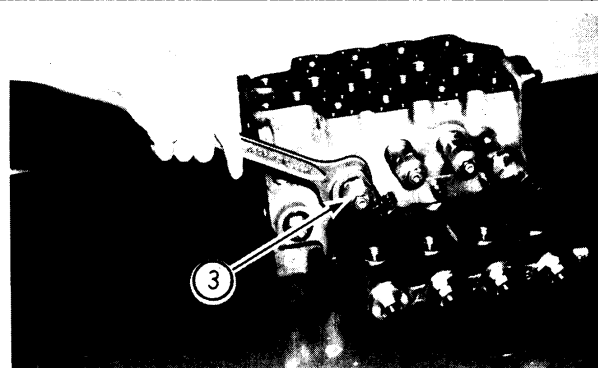


W107-02-05-035

«Disassemble for overload relief valve (combination valve)»

7. Remove overload relief valve assembly (3) from control valve.

NOTE: Put the index No. onto the each section.

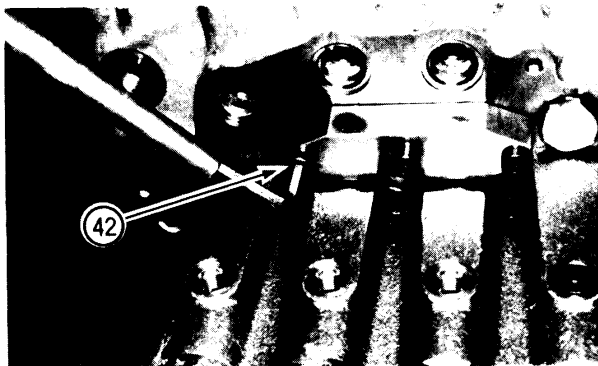


W107-02-05-036

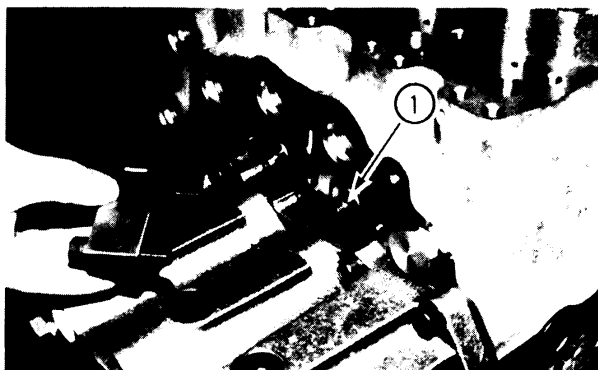
«Disassemble for holding valve (Lock valve)»

8. Remove bolts (42), plug (1) and O-ring (20).

 : 27 mm



W107-02-05-037

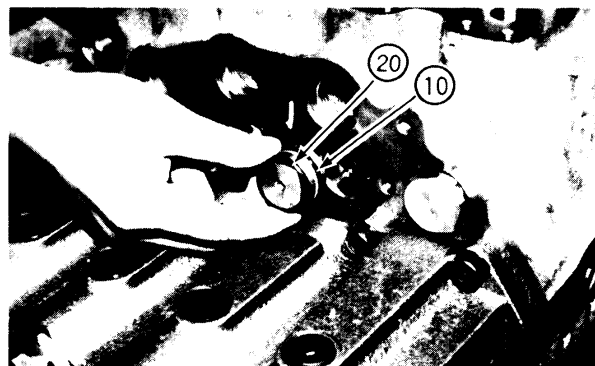


W107-02-05-038

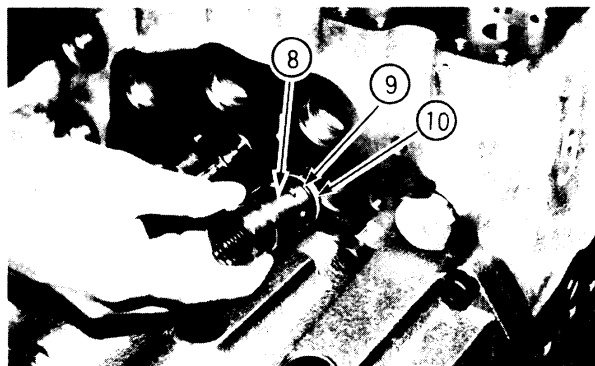
UPPERSTRUCTURE / Control Valve

EX200-2

9. Remove spring (6), poppet (7) and sleeve (8) from control valve.
Remove O-ring (9) and back-up ring (10) from valve.



W107-02-05-039

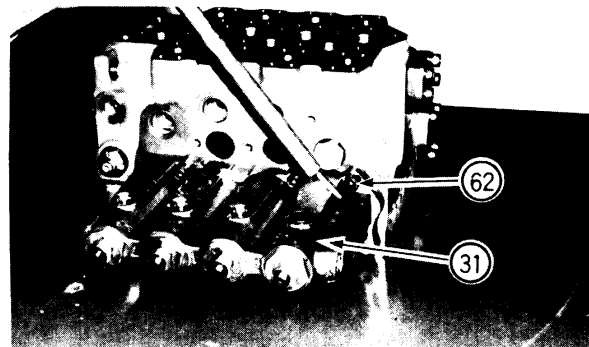


W107-02-05-040

«Disassemble for upper cover»

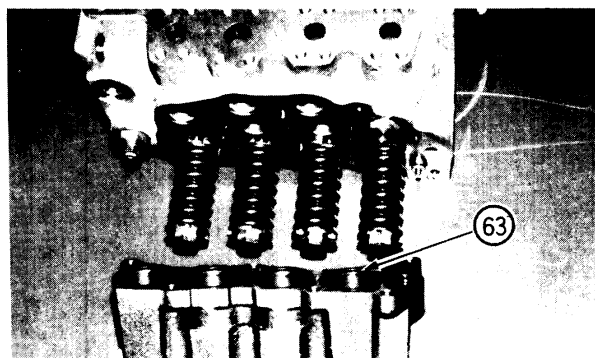
10. Remove bolts (62) and cover (31) from control valve.

 : 8 mm



W107-02-05-041

11. Remove O-ring (63) from cover (31).



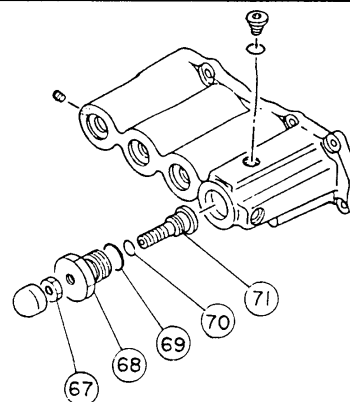
W107-02-05-042

UPPERSTRUCTURE / Control Valve

EX200-2

12. Remove lock nut (67), plug (68) and adjuster (71).

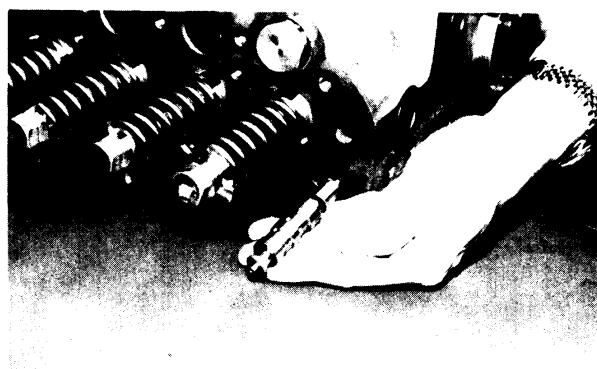
NOTE: Remove plug if replacement is necessary.



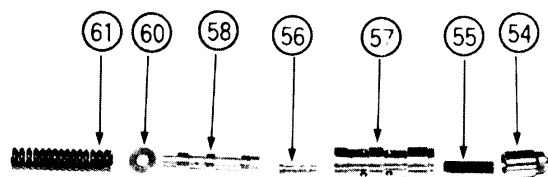
W107-02-05-043

«Disassemble for regenerative valve of arm»

13. Remove spring (61), spring seat (60) spool (58), piston (56), sleeve (57), spring (55) and poppet (54).



W107-02-05-044

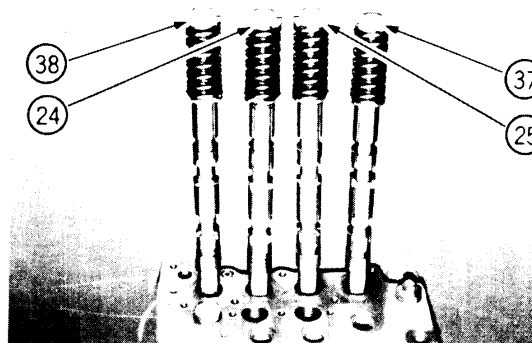


W107-02-05-045

«Disassemble for spool»

14. Remove spools assembly (38), (37) (25) and (24) from control valve.

Spool (24) (For Arm)
Spool (25) (For Boom)
Spool (37) (For Bucket)
Spool (38) (For Extra)



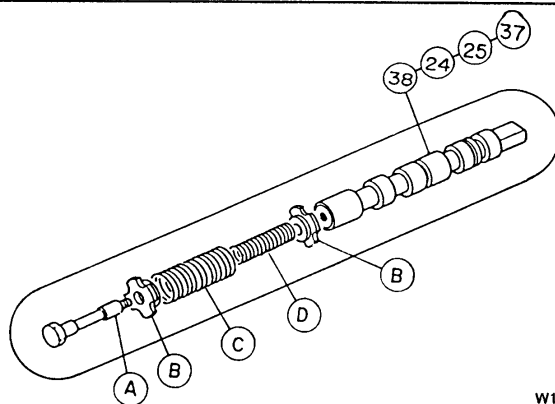
W107-02-05-046

UPPERSTRUCTURE / Control Valve

EX200-2

15. Remove bolt (A) from each spools (38), (24), (25) and (37).
Remove spring (C), (D) and seat (B) from spool.

 : 17 mm

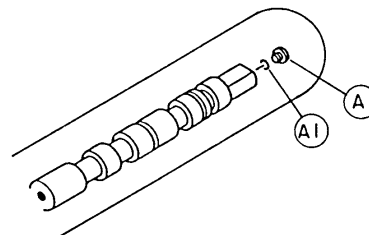


W107-02-05-047

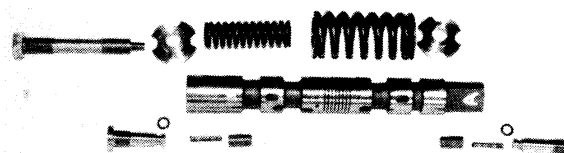
16. Remove plug (A) and O-ring (A1) from spool.

NOTE: Bucket spool is provided a check (valve with one side) and boom spool (both side). Do not disassemble the bucket spool and boom spool.

 : 17 mm



W107-02-05-048

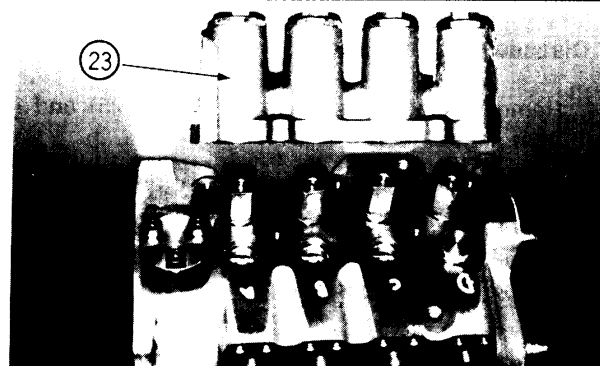


W107-02-05-049

«Disassemble for under cover»

17. Remove attached bolts (63) from cover (23) and O-ring (65) from cover (23).

 : 8 mm



W107-02-05-050

W02-05-22

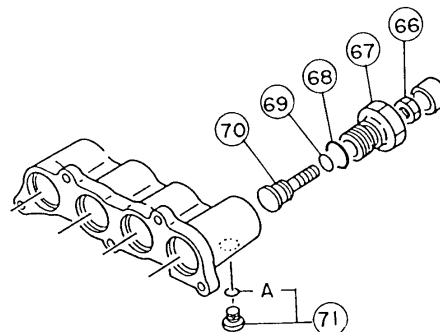
UPPERSTRUCTURE / Control Valve

EX200-2

18. Remove lock-nut (66), plug (71), O-rings (72), (73) and adjuster (74).

NOTE: Remove plug (71) and O-ring if replacement is necessary.

 : 8 mm

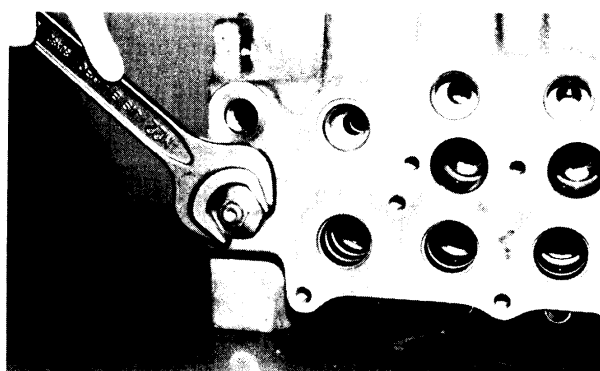


W107-02-05-

«Disassemble for surge relief valve»

19. Remove surge relief assembly (53) from control valve.

 : 27 mm



W107-02-05-052



W107-02-05-

UPPERSTRUCTURE / Control Valve

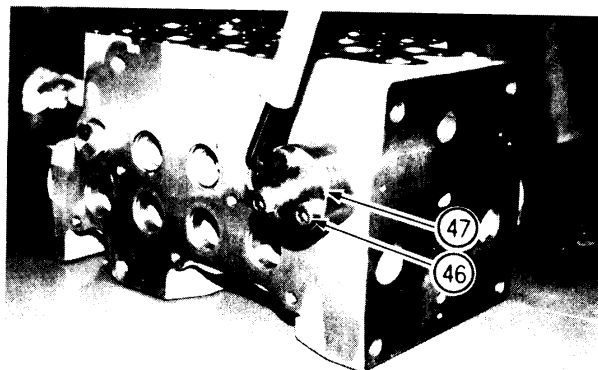
EX200-2

«Disassemble for system pressure regulator (unload valve)»

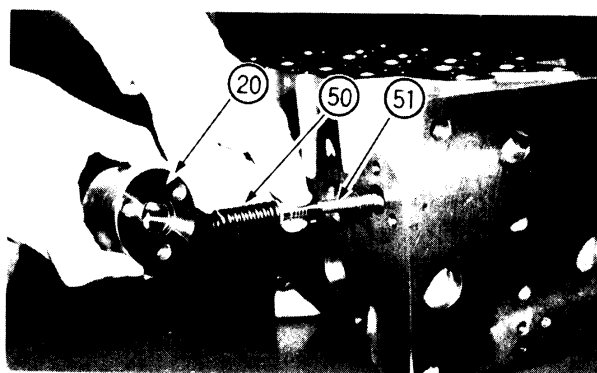
20. Loosen bolt (46) and remove cap (47), O-ring (49), spring (50) and spool (51).

NOTE: System pressure regulator is provided onto the 3-spool side of control valve.

 : 8 mm



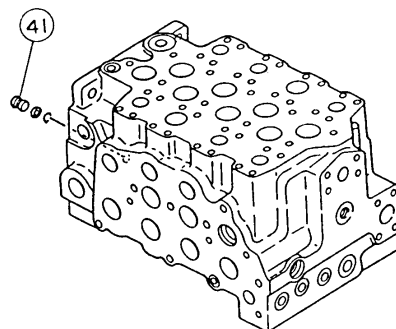
W107-02-05-053



W107-02-05-054

21. Remove plug (41), if replacement is necessary.

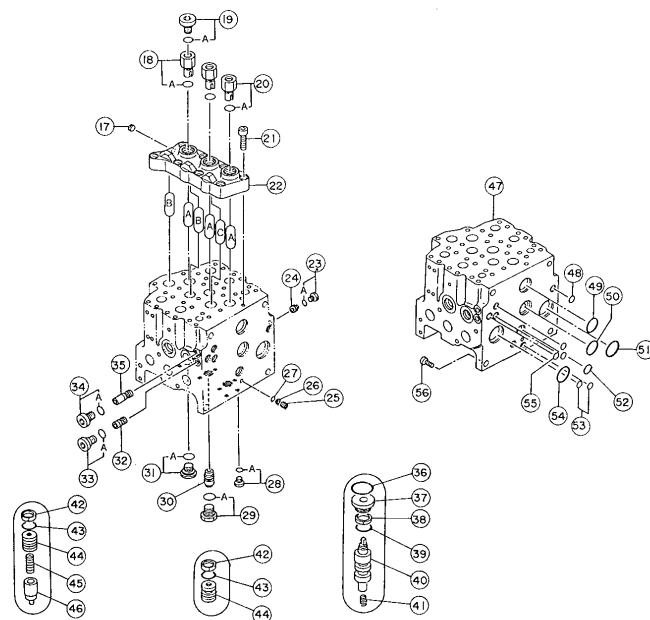
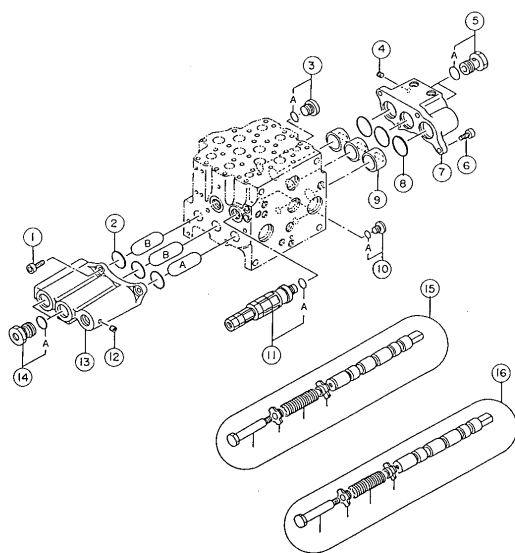
 : 6 mm



W107-02-05-055

UPPERSTRUCTURE / Control Valve

EX200-2



- | | | | | |
|-----------------------|---------------------|---------------------|-------------------|------------|
| 1— Bolt | 13— Upper cover | 25— Plug | 37— Collar | 49— O-ring |
| 2— O-ring | 14— Plug and O-ring | 26— Filter | 38— Buck-up ring | 50— O-ring |
| 3— Plug and O-ring | 15— Spool | 27— O-ring | 39— O-ring | 51— O-ring |
| 4— O-ring | 16— Spool | 28— Plug and O-ring | 40— Spool | 52— O-ring |
| 5— Plug and O-ring | 17— Plug | 29— Plug and O-ring | 41— Spring | 53— O-ring |
| 6— Bolt | 18— Plug and O-ring | 30— Shuttle | 42— Back-up ring | 54— O-ring |
| 7— Under cover | 19— Plug and O-ring | 31— Plug and O-ring | 43— O-ring | 55— O-ring |
| 8— O-ring | 20— Plug and O-ring | 32— Filter | 44— Plug | 56— Bolt |
| 9— Spacer | 21— Bolt | 33— Plug and O-ring | 45— Spring | |
| 10— Plug and O-ring | 22— Flange | 34— Plug and O-ring | 46— Poppet | |
| 11— Main relief valve | 23— Plug and O-ring | 35— Filter | 47— Control valve | |
| 12— Plug | 24— Plug | 36— O-ring | 48— O-ring | |

W02-05-25

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for 3-spool control valve»

Clean the all installing parts.

Line up the all assembly parts for assembly procedure.

«Assemble for spools (For swing spool) »

1. Install back-up ring (B) and O-ring (C) onto plug (8). Install poppet (D), spring (K) and plug (A) onto spool (F) in order to these items. Other side is same procedure as bellows. Install back-up ring (H), O-ring (I) onto plug (G). Install poppet (E), spring (J) and plug (G) onto spool (F) in order to these items.

NOTE: Apply loctite to thread part of plug (8) and plug (9).

Install spring seat (N), spring (M), spring seat (L) onto spool end (O) and it screw into spool (16).

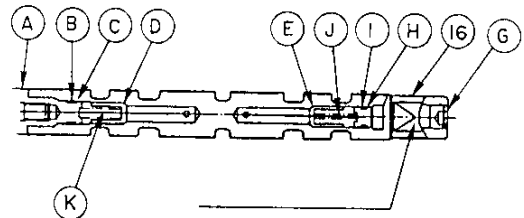
NOTE: Apply loctite onto thread part of spool end (O).

 : 6 mm

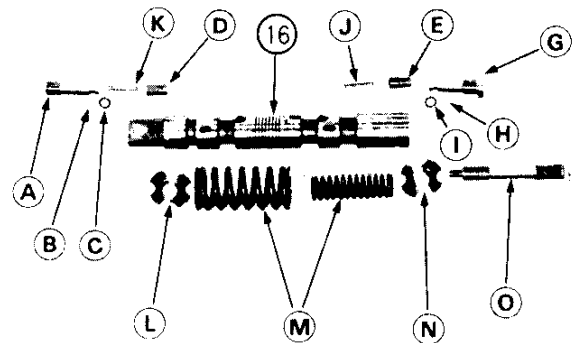
 : 1.5 kgf·m (14 N·m, 10 lbf·ft)

 : 10 mm

 : 2.5 kgf·m (24 N·m, 18 lbf·ft)



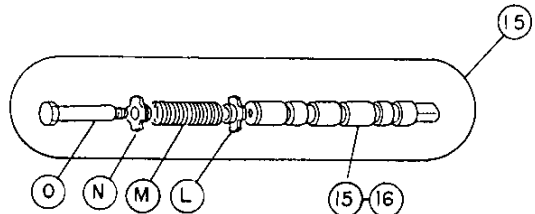
W107-02-05-057



W107-02-05-058

2. (Assemble for travel spool) (R. L)
Install spring seat (N), spring (M), and spring seat (L) onto spool end (O), and it screw into spool (15).

NOTE: Apply loctite onto thread part of spool end (O).



W107-02-05-059

UPPERSTRUCTURE / Control Valve

EX200-2

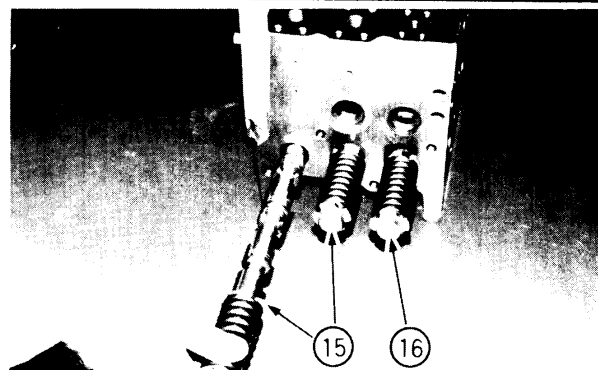
«Assemble for spool assembly»

3. Insert spool assembly (16) and two spools assembly (15) into the control valve.

NOTE: Apply hydraulic oil onto spool assembly before installed.

Spool (16) (For swing)

Spool (15) (For travel R.L)



W107-02-05-060

«Assemble for upper cover»

4. Install O-ring into plug (14) and attached it into cover (13).
Install plug (12) onto cover and O-rings (2) into cover.

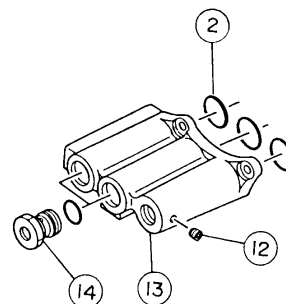
NOTE: Surely install ball and plug when removed plug (14).

 : 3 mm

 : 0.7~0.9 kgf·m (8 N·m, 6 lbf·ft)

 : 5 mm

 : 2.5 kgf·m (24 N·m, 18 lbf·ft)

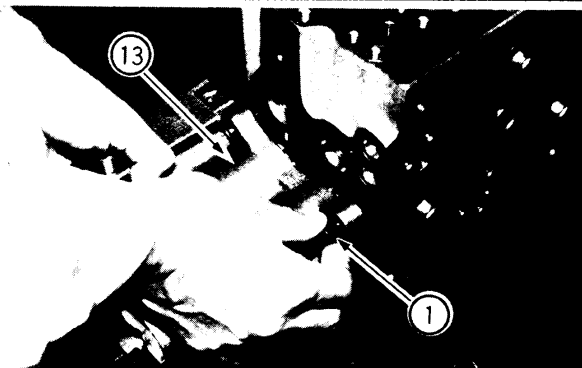


W107-02-05-061

5. Install cover (13) and tighten bolt (1).

 : 8 mm

 : 6.2 kgf·m (60 N·m, 44 lbf·ft)



W107-02-05-062

UPPERSTRUCTURE / Control Valve

EX200-2

« Assemble for plug of DP sensor »

6. Install plugs (32), (35) into housing.
Install O-rings into plug (34) and plug (33), then insert it onto housing.

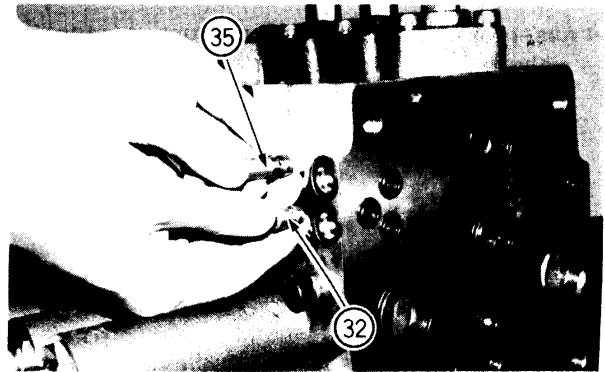
NOTE: Do not loosen filters when removed it from plugs (32), (35).

Spool (34) (For oil passage to DP sensor)
(VP press (Pump discharged press.)

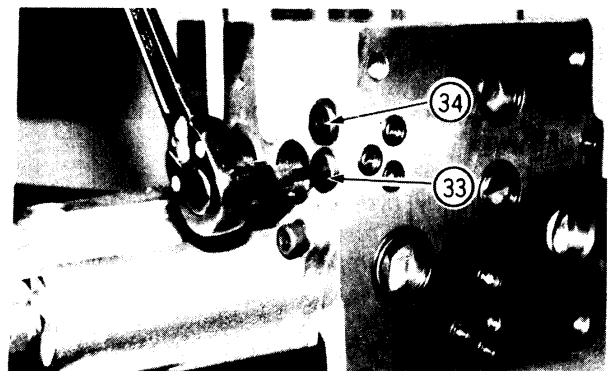
Spool (33) (For oil passage to DP sensor)
(VLS press. (Load sensing press, return from actuator)

 : 6 mm

 : 3 kgf·m (29 N·m, 21 lbf·ft)



W107-02-05-063



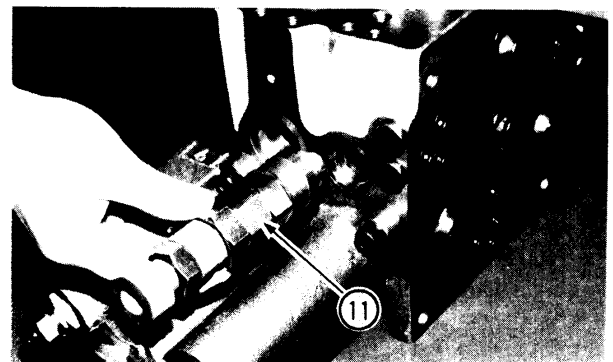
W107-02-05-064

« Assemble for main relief system »

7. Install main relief valve assembly (11) into housing.

 : 32 mm

 : 8~9 kgf·m (88 N·m, 65 lbf·ft)



W107-02-05-065

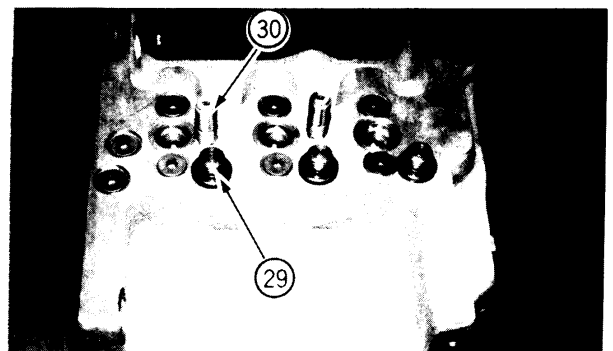
« Assemble for shuttle valve »

8. Insert shuttle valve (30) into housing.
Install O-ring onto plug (29) and it into housing.

 : 5 mm

 : 1.6~1.9 kgf·m (18 N·m, 13 lbf·ft)

NOTE: Surely install the plug and ball when removed it from shuttle valve (30).



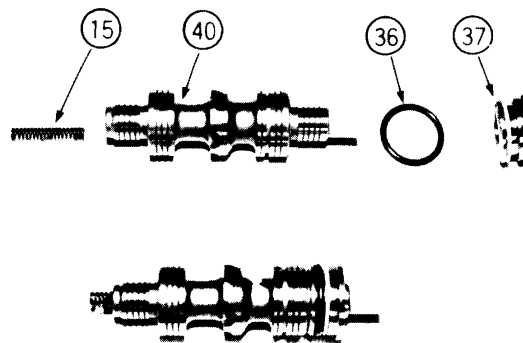
W107-02-05-066

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for variable pressure compensated valve»

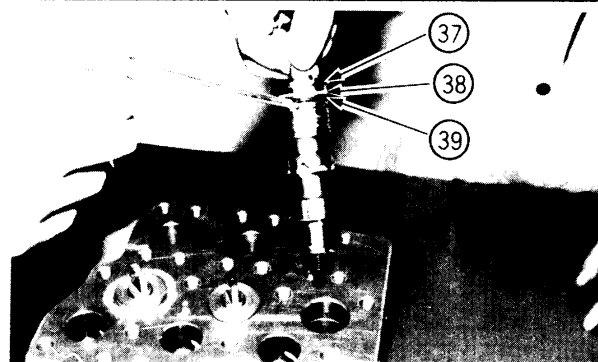
9. Install spring (15) onto spool (40).
Insert spool (40) into control valve.



W107-02-05-068

10. Install O-ring (39), back-up ring (38) onto bushing (37).
Install O-ring (36) onto spool (40) and insert it into housing.

NOTE: Apply hydraulic oil onto sliding surface of spool.
Must be replacement the O-ring when removed it.

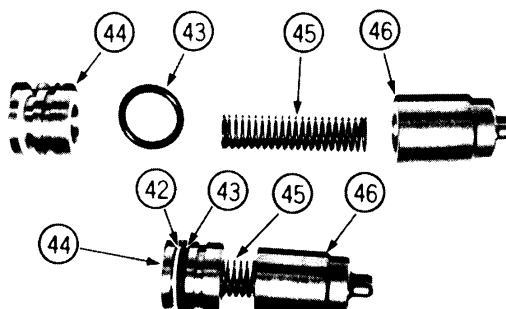


W107-02-05-069

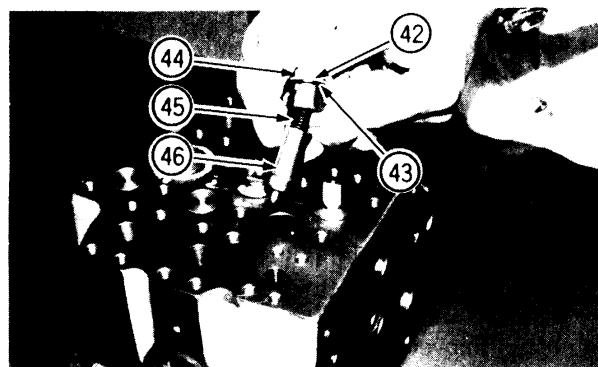
«Assemble for load check valve»

11. Install O-ring (43) and back-up ring (42) onto sleeve (44).
Install valve assembly (42) to (46) into control valve housing.

NOTE: Spring (45) (For swing)
Poppet (46) (For swing)



W107-02-05-070



W107-02-05-071

UPPERSTRUCTURE / Control Valve

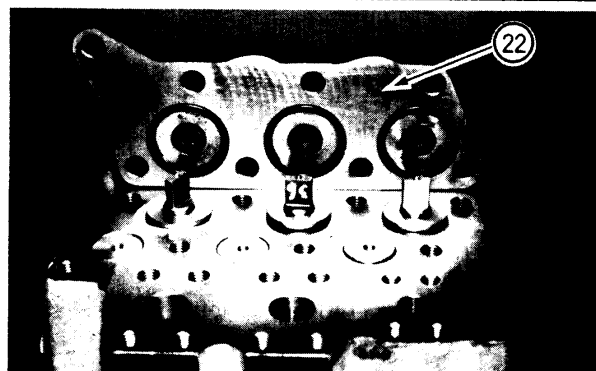
EX200-2

12. Install the O-ring into flange (22) and tighten bolts (21).

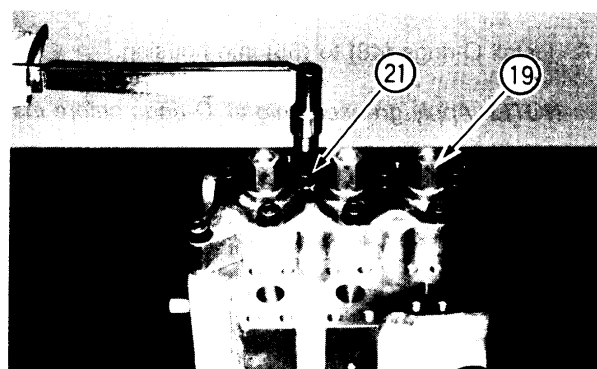
NOTE: Surely install the O-ring when removed plug (20) and (19).

 : 5 mm

 : 1.5 kgf·m



W107-02-05-072



W107-02-05-073

« Assemble for under cover »

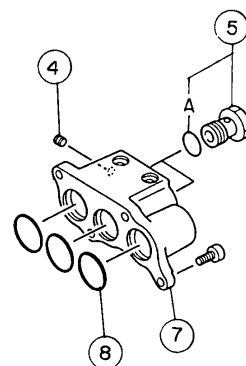
13. Install plug (5) with O-ring into cover (7).
Install plug (4) into cover (7).
Install O-rings (8) into cover (7).

 : 5 mm

 : 1.5 kgf·m (14 N·m, 10 lbf·ft)

 : 22 mm

 : 9~11 kgf·m (107 N·m, 79 lbf·ft)

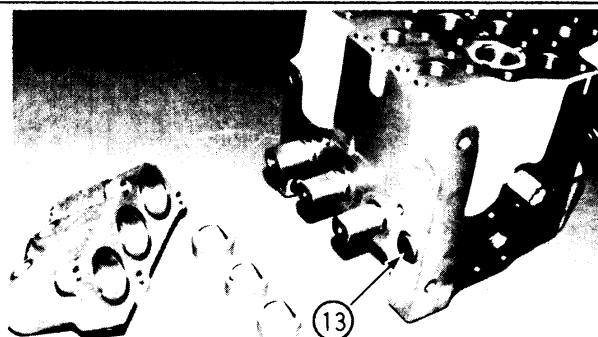


W107-02-05-074

14. Install plug (3) with O-ring into housing.
Install spacer (9) onto spool, cover (7) onto control valve and tighten bolts (6).

 : 4 mm

 : 0.8 kgf·m (6 N·m, 5 lbf·ft)



W107-02-05-075

UPPERSTRUCTURE / Control Valve

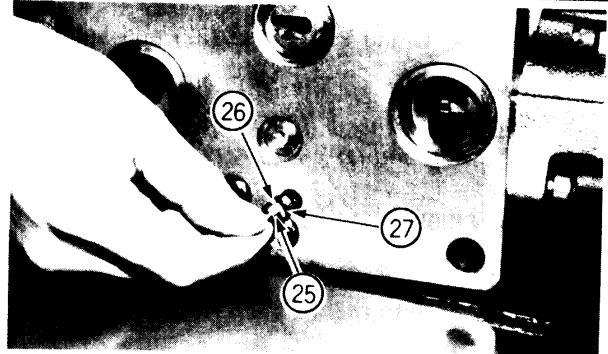
EX200-2

«Assemble for plug of alignment surface to 3-spool and 4-spool»

15. Install back-up ring (26) and O-ring (27) onto plug (25).
Install plug (25) into housing.

 : 5 mm

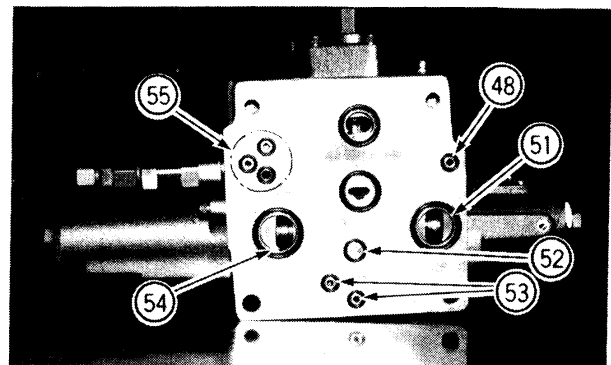
 : 1.5 kgf·m (14 N·m, 10 lbf·ft)



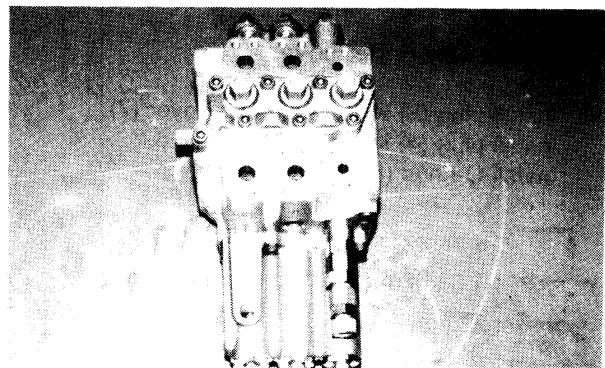
W107-02-05-076

16. Install O-rings (48) to (55) into housing.

NOTE: Apply greases onto all O-rings before install.



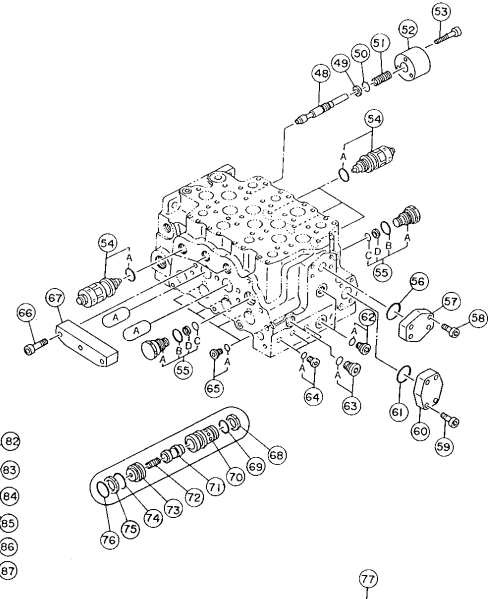
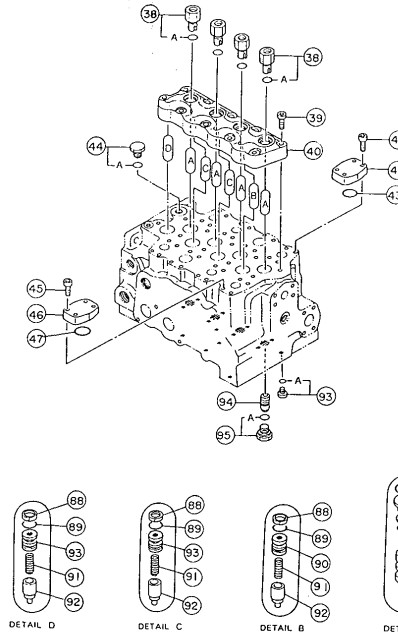
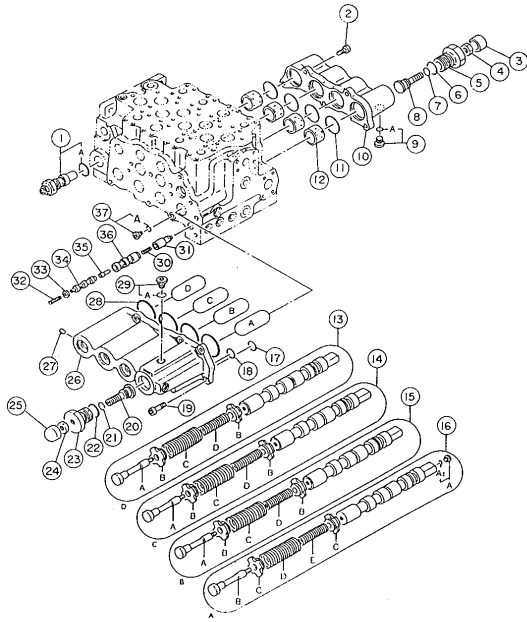
W107-02-05-077



W107-02-05-078

UPPERSTRUCTURE / Control Valve

EX200-2



- 1— Surge relief valve assembly
- 2— Bolt
- 3— Cap
- 4— Lock nut
- 5— Plug
- 6— O-ring
- 7— O-ring
- 8— Adjuster
- 9— Plug
- 10— Cap
- 11— O-ring
- 12— Spacer
- 13— Spool assembly
- 14— Spool assembly
- 15— Spool assembly
- 16— Spool assembly

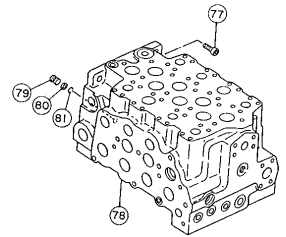
- 17— Cap
- 18— O-ring
- 19— Bolt
- 20— Adjuster
- 21— O-ring
- 22— O-ring
- 23— Plug
- 24— Nut
- 25— Cap
- 26— Cap
- 27— Plug
- 28— O-ring
- 29— Plug and O-ring
- 30— Spring
- 31— Poppet
- 32— Spring

- 33— Spring seat
- 34— Spool
- 35— Piston
- 36— Sleeve
- 37— Plug and O-ring
- 38— Plug and O-ring
- 39— Bolt
- 40— Flange
- 41— Bolt
- 42— Cap
- 43— O-ring
- 44— Plug and O-ring
- 45— Bolt
- 46— Cap
- 47— O-ring
- 48— Spool

- 49— Spring seat
- 50— O-ring
- 51— Spring
- 52— Cap
- 53— Bolt
- 54— Overload relief valve and O-ring
- 55— Plug
- 56— O-ring
- 57— Cap
- 58— O-ring
- 59— O-ring
- 60— Cap
- 61— Plug
- 62— Plug and O-ring
- 63— Plug and O-ring
- 64— Plug and C-ring

- 65— Plug and O-ring
- 66— Bolt
- 67— Plate
- 68— Back-up ring
- 69— O-ring
- 70— Sleeve
- 71— Poppet
- 72— Spring
- 73— Plug
- 74— O-ring
- 75— Back-up ring
- 76— O-ring
- 77— Spool assembly
- 78— Control valve
- 79— Plug
- 80— Back-up ring

- 81— O-ring
- 82— O-ring
- 83— Collar
- 84— Back-up ring
- 85— O-ring
- 86— Spool
- 87— Spring
- 88— Back-up ring
- 89— O-ring
- 90— Plug
- 91— Spring
- 92— poppet



W02-05-33

UPPERSTRUCTURE / Control Valve

EX200-2

Assemble for 4-Spool Control Valve

Clean the all installing parts.

Line up the all assembly parts for assembly procedure.

«Assemble for spool»

1. Layout spool component parts for structure as shown. (Boom, Arm, Bucket)
 Install back-up ring (G), O-ring (H) onto plug (F).
 Install poppet (I) into spring (P) and plug assembly (F) into spool (M).
 Install O-ring (K) and back-up ring (L) onto plug (N).
 Install spring (O) onto poppet (J) and insert poppet assembly with plug assembly (N) into spool (M).

 : 3 mm

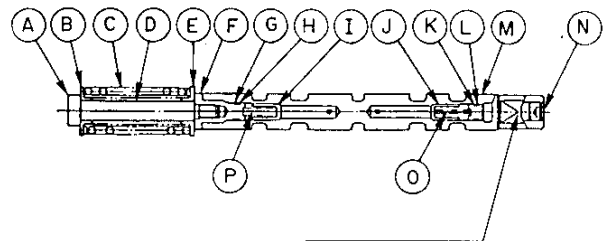
 : 1.5 kgf·m (14 N·m, 10 lbf·ft)

Tightening torque :

NOTE: Bucket spool is not provided poppets (I), (J) and springs (O), (P).

NOTE: Extra spool is provided the plug (N).

NOTE: Apply loctite with thread part of plug (N).



W107-02-05-080

UPPERSTRUCTURE / Control Valve

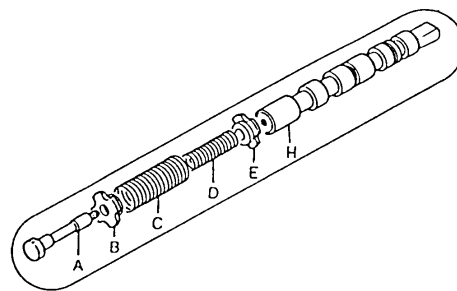
EX200-2

2. Install spring seat (B), spring (C), (D) and spring seat (E) into spring (A) and insert assembly part into spool (H).

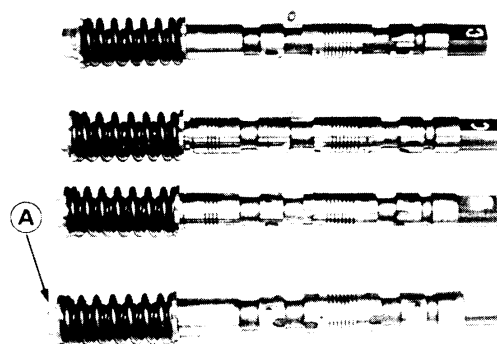
 : 8 mm

 : 1.5 kgf·m (14 N·m, 10 lbf·ft)

NOTE: Apply loctite onto thread part of spool end (A).



W107-02-05-081



W107-02-05-082

«Assemble for spool assembly»

3. Insert spool assembly parts (13), (14), (15), (16) into control valve.

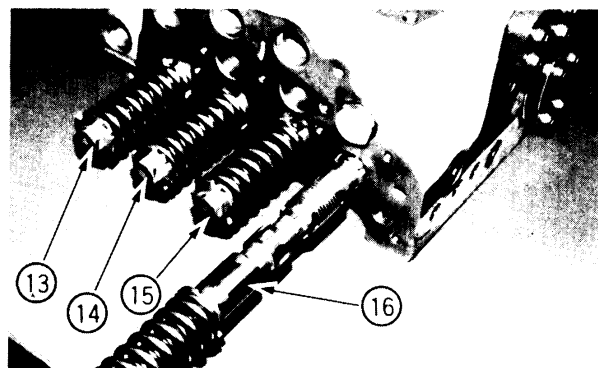
NOTE: Apply hydraulic oil onto the sliding surface of spool before install.

Spool (13) (For Bucket)

Spool (14) (For Boom)

Spool (15) (For Arm)

Spool (16) (For Extra)



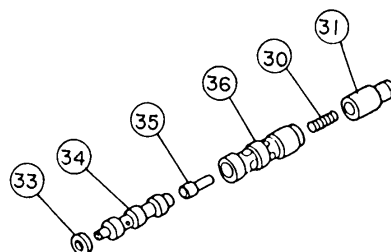
W107-02-05-083

UPPERSTRUCTURE / Control Valve

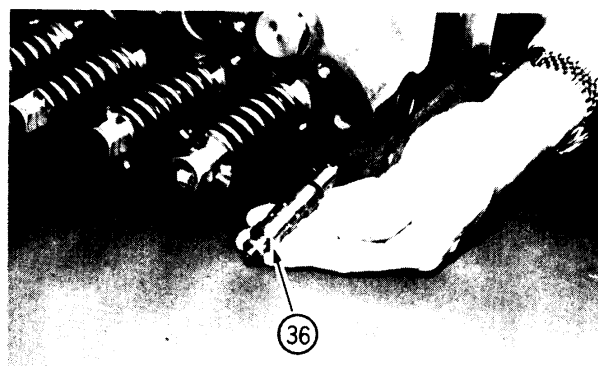
EX200-2

4. Install spring (30) onto poppet (31).
Install spindle (35), spool (34) onto spool (36) and
spring seat (33) onto spool (34), then insert into
control valve.

NOTE: Apply hydraulic oil onto sliding surface of
spool.



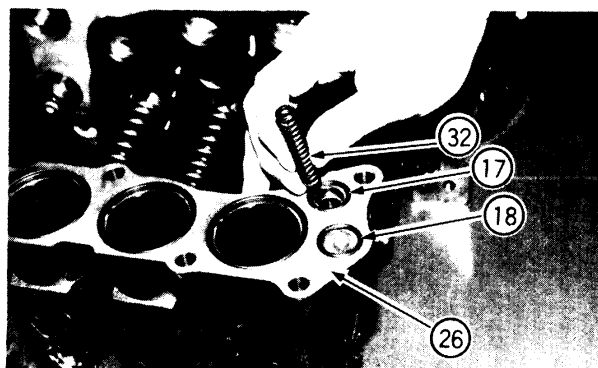
W107-02-05-084



W107-02-05-085

5. Install O-ring (28), (17) and (18) into cover (26) and
spring (32) into cover (26).

NOTE: Apply grease on the O-ring.



W107-02-05-086

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for upper cover»

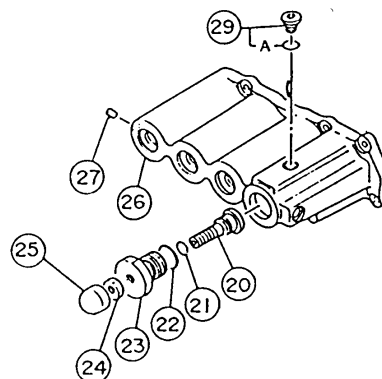
6. Install O-rings onto plug (29), (27) and insert it into cover (26).
Install O-ring (21) onto adjuster (20), and insert it into cover (26).
Install O-ring (22) onto plug (23) and insert it into cover (26).
Install lock-nut (24) onto adjuster (20) and cap (25) onto adjuster (20).

: 14 mm、22 mm、42 mm

: 7~8 kgf·m (78 N·m, 57 lbf·ft)

: 9~11 kgf·m (107 N·m, 79 lbf·ft)

NOTE: Adjuster is provided only at extra spool.

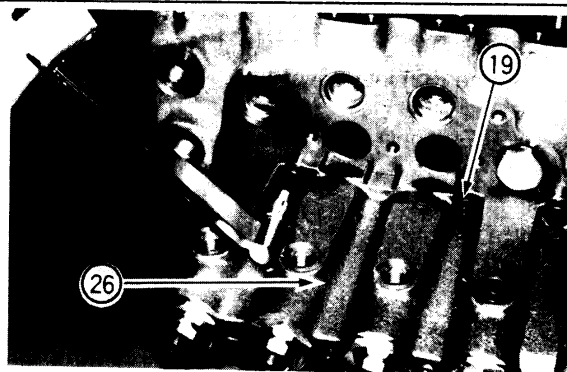


W107-02-05-087

7. Install cover (26) and bolts (19).

: 8 mm

: 6 kgf·m (58 N·m, 43 lbf·ft)



W107-02-05-088

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for under cover»

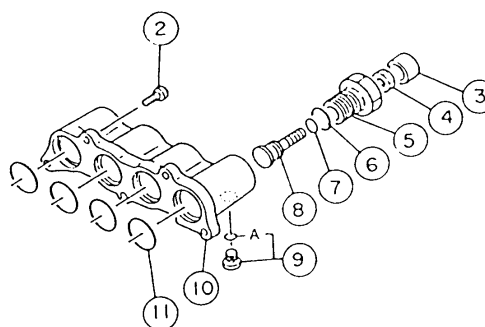
8. Install O-rings onto plug (9) and insert plug (9) onto cover (10).
Install O-ring (7) onto adjuster (8) and insert it into cover (10).
Install O-ring (6) onto plug (5) and insert plug (5) into cover (10).
Install lock-nut (4) and cap (3) onto adjuster (8).
Install O-ring (11) into cover (10).

: 14 mm、22 mm、42 mm

: 7~8 kgf·m (78 N·m, 57 lbf·ft)

: 9~11 kgf·m (107 N·m, 79 lbf·ft)

NOTE: Adjuster is provided only at extra spool.

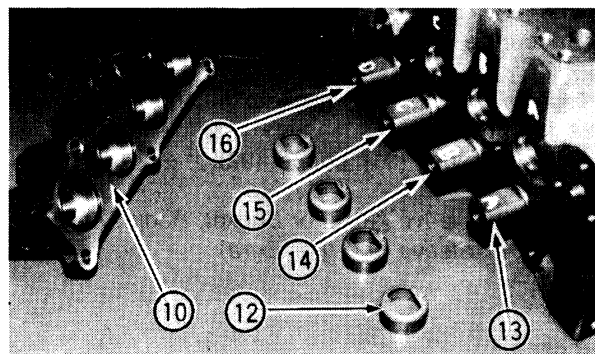


W107-02-05-089

9. Install spacers (12) onto each spools (13), (14), (15) and (16).
Install cover (10) and bolts (2).

: 8 mm

: 6.2 kgf·m (60 N·m, 44 lbf·ft)



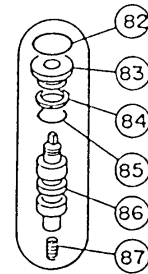
W107-02-05-090

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for variable pressure compensated valve»

10. Install O-ring (85), back-up ring (84) onto bushing (83) and insert it into spool (86).
Install spring (87), O-ring (82) onto spool (86).

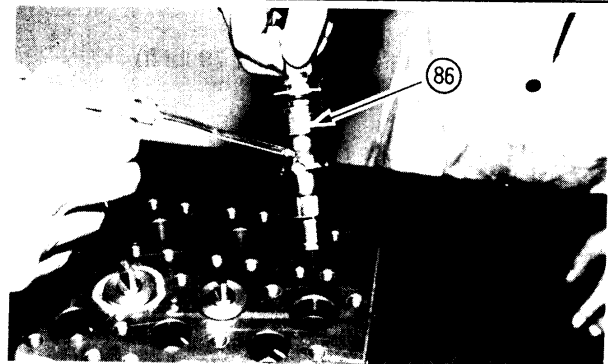


DETAIL A

W107-02-05-091

11. Insert spool assembly (86) into control valve (78).

NOTE: Apply hydraulic oil on spool (86).

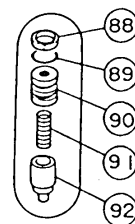


W107-02-05-092

«Assemble for load check valve»

12. Install O-ring (89), back-up ring (88) onto sleeves (90), (93).
Install spring (91), poppet (92).

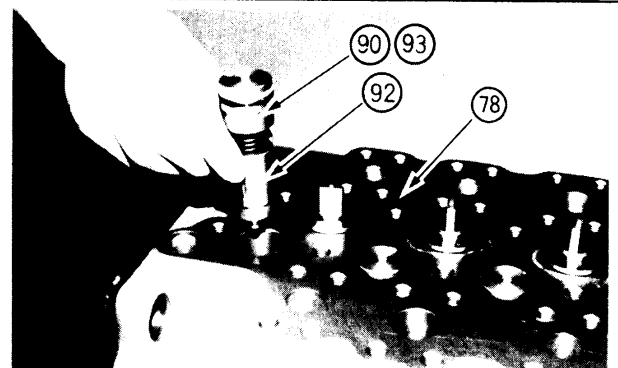
*NOTE: Sleeve (90) (For Bucket, Boom, Arm)
Sleeve (93) (For Extra)*



W107-02-05-093

13. Insert sleeves assembly (90), (93) into control valve (78).

NOTE: Apply hydraulic oil onto sleeve assembly (90), (93).



W107-02-05-094

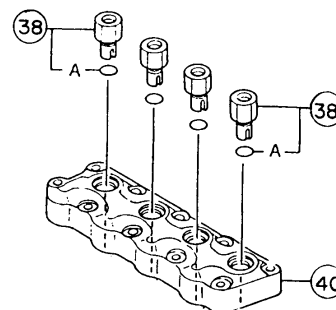
UPPERSTRUCTURE / Control Valve

EX200-2

14. Install O-ring onto plug (38), and plug (38) onto flange (40).

 : 22 mm

 : 5.2 kgf·m (50 N·m, 37 lbf·ft)

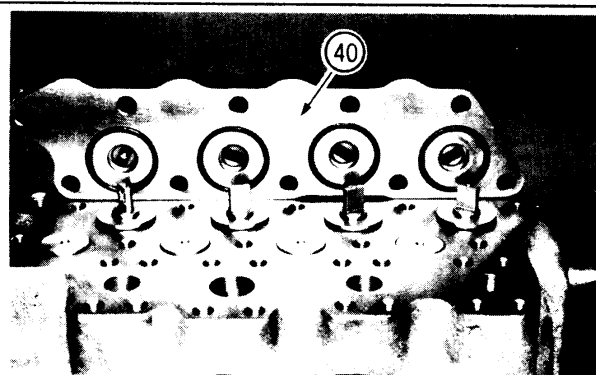


W107-02-05-095

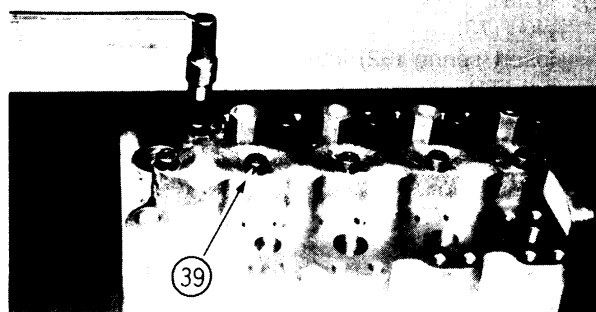
16. Install O-ring onto flange (40) and tighten bolts (39).

 : 10 mm

 : 6.2 kgf·m (60 N·m, 44 lbf·ft)



W107-02-05-096



W107-02-05-097

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for holding valve»

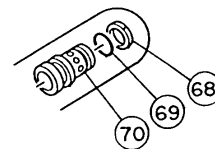
16. Install O-ring (69), back-up ring (68) onto sleeve (70).
Insert sleeve assembly (70) into control valve (78).

NOTE: Apply hydraulic oil onto O-ring (69) and back-up ring (68).

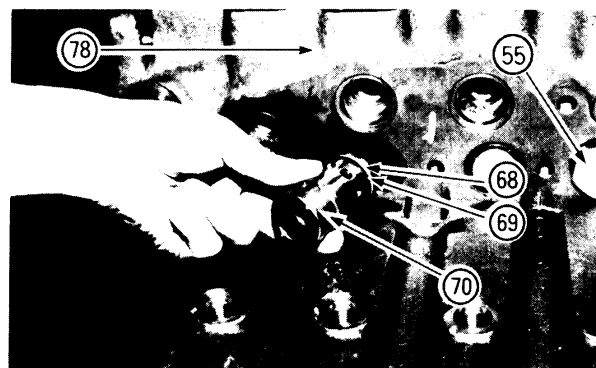
NOTE: Install O-ring and back-up ring onto plug (55) and tighten with slightly.

 : 32 mm

 : 8.5 kgf·m (83 N·m, 61 lbf·ft)



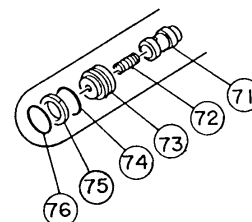
W107-02-05-098



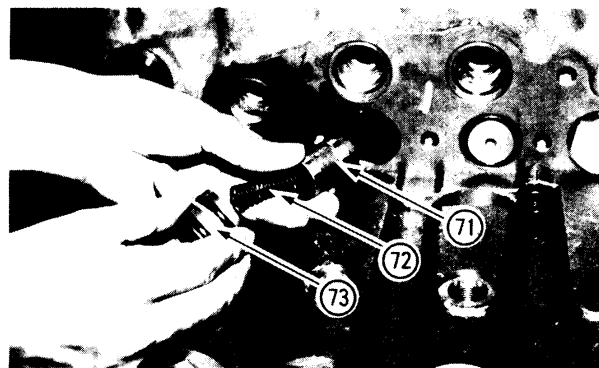
W107-02-05-099

17. Install O-ring (74), (76) and back-up ring (75) onto plug (73).
Insert spring (92) into poppet (71) and install poppet (71) into control valve (78).

NOTE: Apply hydraulic oil onto O-ring and poppet.



W107-02-05-100



W107-02-05-101

UPPERSTRUCTURE / Control Valve

EX200-2

18. Install plate (67) and tighten bolts (66).

 : 8 mm

 : 6.2 kgf·m (60 N·m, 44 lbf·ft)



W107-02-05-102

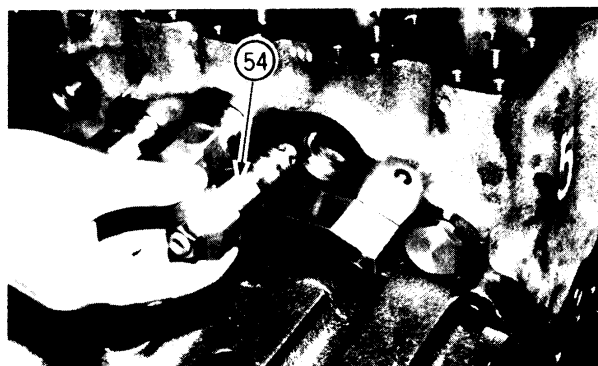
«Assemble for overload relief valve»

19. Install overload relief valve assembly (54) into control valve.

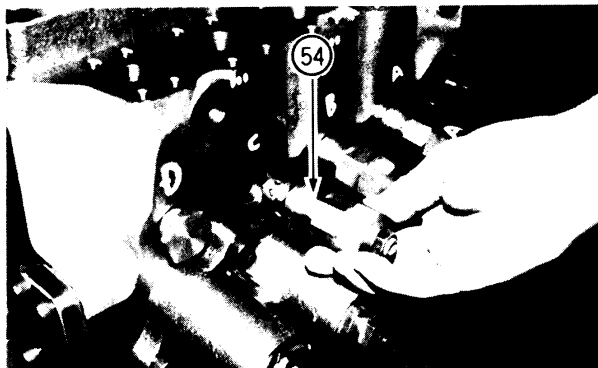
NOTE: See details of disassembly and assembly for overload relief valve at this section.

 : 5 mm

 : 1.5 kgf·m (14 N·m, 10 lbf·ft)



W107-02-05-103



W107-02-05-104

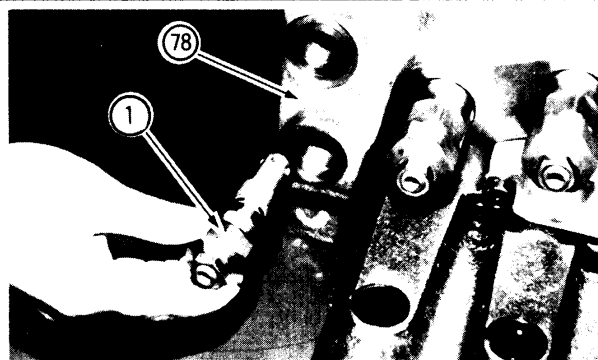
«Assemble for surge relief valve»

20. Install surge relief valve assembly (16) into control valve (78).

 : 8 mm

 : 5.2 kgf·m (50 N·m, 37 lbf·ft)

NOTE: See details of disassembly and assembly for surge relief valve at this section.



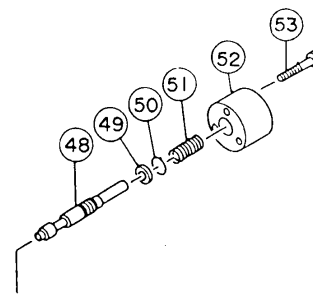
W107-02-05-105

UPPERSTRUCTURE / Control Valve

EX200-2

«Assemble for main relief system (For unload valve)»

21. Install spring seat (49), spring (51) onto spool (48).
Install O-ring (50) into cap (52).



W107-02-05-106

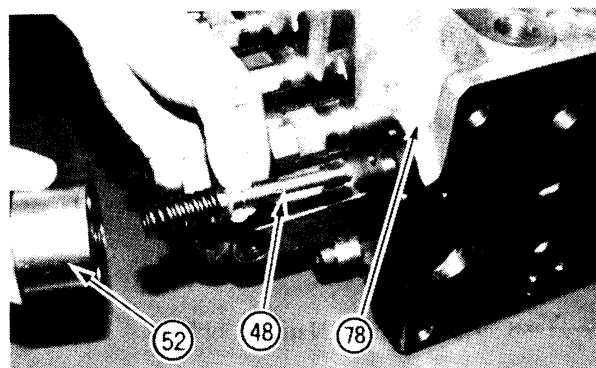
22. Insert spool assembly (48) into control valve (78).
Install cap (52) onto control valve and tighten bolts (53).

NOTE: Apply hydraulic oil onto sliding surface of spool.

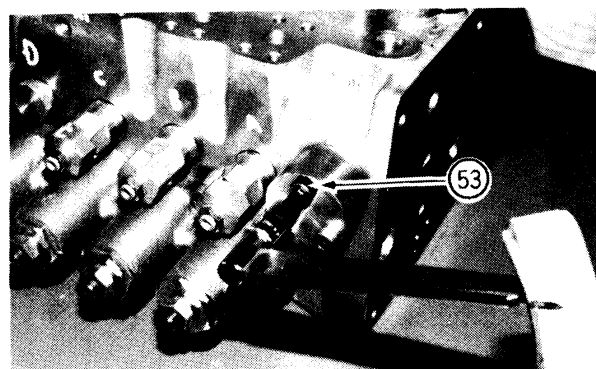
NOTE: Main relief system is provided at 3-spool control valve side.

 : 8 mm

 : 6.2 kgf·m (60 N·m, 44 lbf·ft)



W107-02-05-107



W107-02-05-108

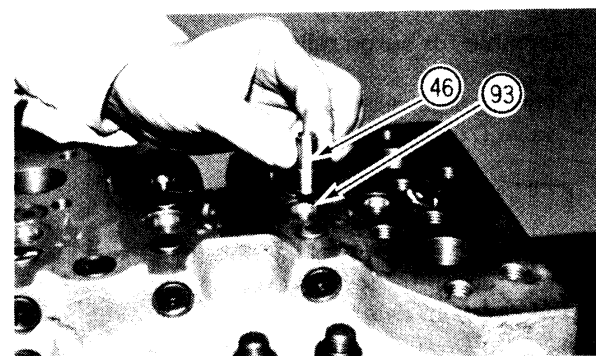
«Assemble for shuttle valve»

23. Install O-ring onto plug (93), and insert shuttle valve assembly (46) into control valve.

NOTE: Apply hydraulic oil onto shuttle valve (46).

 : 5 mm

 : 1.5 kgf·m (14 N·m, 10 lbf·ft)



W107-02-05-109

UPPERSTRUCTURE / Control Valve

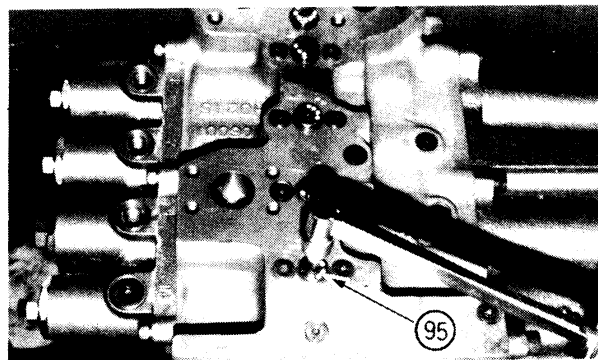
EX200-2

24. Install the O-ring into plug (95) and tighten plug.

*NOTE: Must be keep the steal ball when removed the shuttle valve (46).
Surely insert the ball when install the shuttle valve.*

 : 8 mm

 : 5.2 kgf·m (50 N·m, 37 lbf·ft)

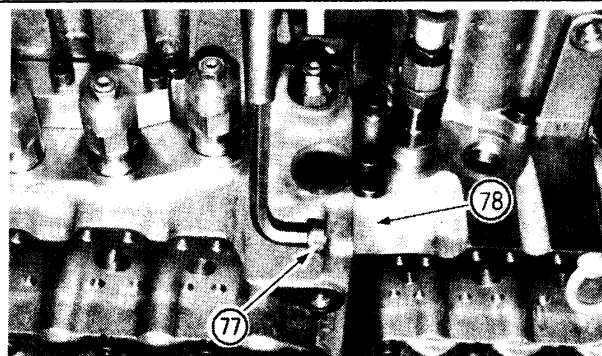


W107-02-05-110

25. Connect the 3-spool side to 4-spool of control valve (78) and tighten bolts (77).

 : 12 mm

 : 17 kgf·m (166 N·m, 122 lbf·ft)



W107-02-05-111

26. Install other plugs and tighten it surely.

 : 10 mm

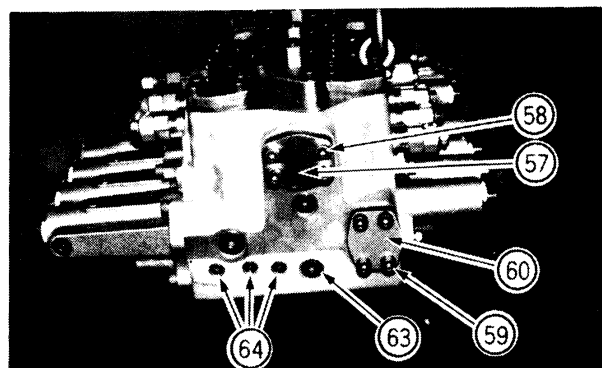
 : 7 kgf·m (68 N·m, 50 lbf·ft)

 : 8 mm

 : 4 kgf·m (39 N·m, 28 lbf·ft)

 : 5 mm

 : 1.5 kgf·m (14 N·m, 10 lbf·ft)

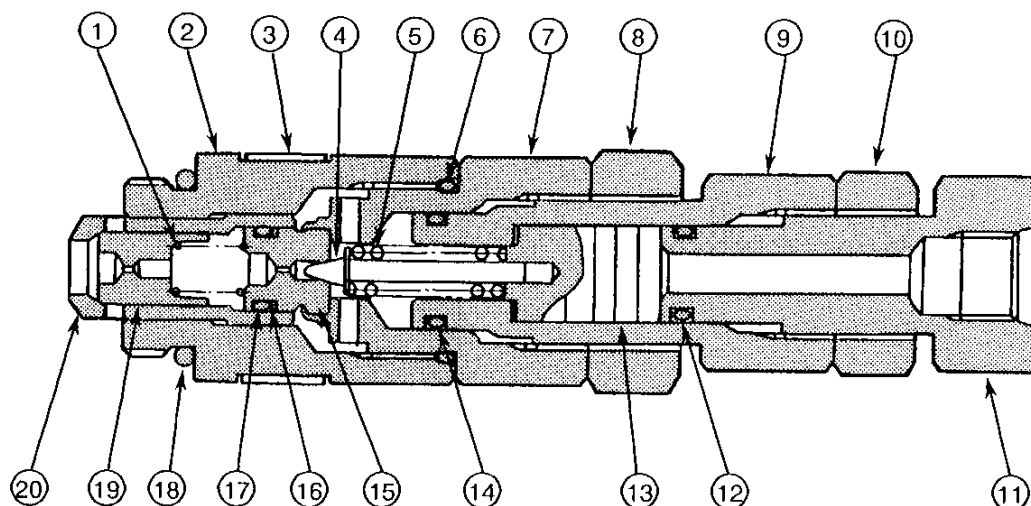


W107-02-05-112

UPPERSTRUCTURE / Control Valve

EX200-2

Main relief valve (LS line relief valve) drawing for disassembly



W107-02-05-114

- | | | | |
|-----------|-----------|------------|------------------|
| 1- Spring | 6- O-ring | 11- Plug | 16- Back-up ring |
| 2- Cap | 7- Plug | 12- O-ring | 17- O-ring |
| 3- Sheet | 8- Nut | 13- Piston | 18- O-ring |
| 4- Poppet | 9- Plug | 14- O-ring | 19- Poppet |
| 5- Spring | 10- Nut | 15- Sheet | 20- Sleeve |

W02-05-46

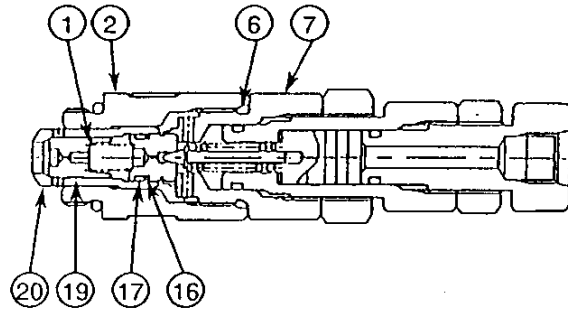
UPPERSTRUCTURE / Control Valve

EX200-2

« Disassembly of main relief valve »

1. Remove plug (7) from the valve assembly.
Remove O-ring (6) from plug (7).
Remove back-up ring and O-ring (17) from sheet (15).
Remove sleeve (20) from cap (2).
Remove poppet (19) and spring (1) from sleeve.

 : 32 mm

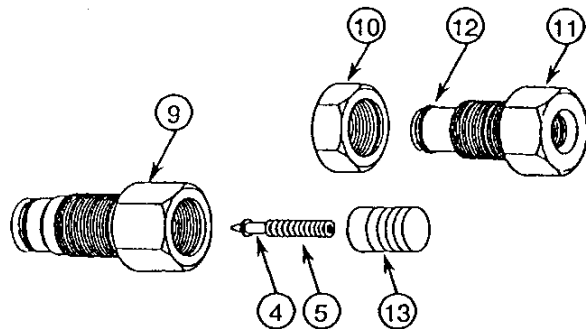


W107-02-05-115

2. Remove lock nut (10) and plug (11).
Remove O-ring (12) from plug (11).
Remove piston (13), poppet (4) and spring (5) from plug (9).

 : 27 mm

 : 32 mm

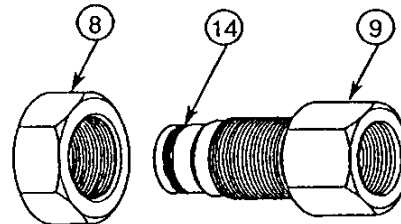


W107-02-05-116

3. Remove lock nut (8) and plug (9).
Remove O-ring (14) from plug (9).

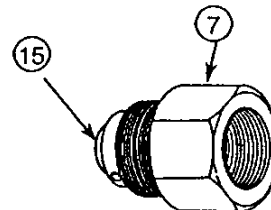
 : 27 mm

 : 32 mm



W107-02-05-117

4. Do not detach sheet (15) from plug (7).

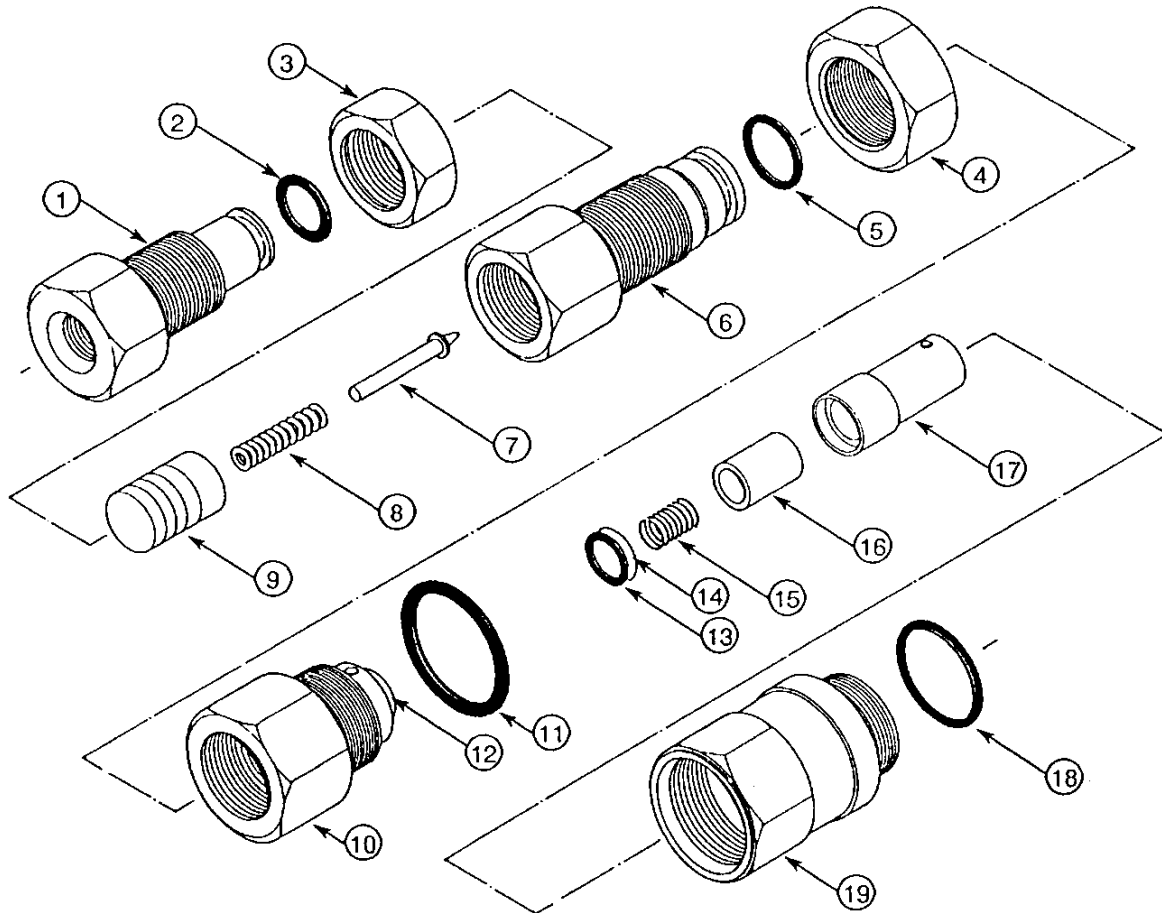


W107-02-05-118

UPPERSTRUCTURE / Control Valve

EX200-2

Main relief valve drawing for assembly



- 1— Plug
- 2— O-ring
- 3— Lock nut
- 4— Lock nut
- 5— O-ring

- 6— Plug
- 7— Poppet
- 8— Spring
- 9— Piston
- 10— Plug

- 11— O-ring
- 12— Sheet
- 13— O-ring
- 14— Back-up ring
- 15— Spring

- 16— Poppet
- 17— Sleeve
- 18— O-ring
- 19— Cap

W02-05-48

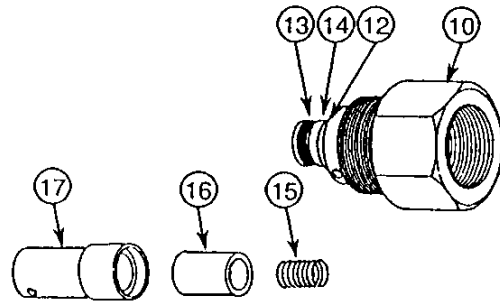
UPPERSTRUCTURE / Control Valve

EX200-2

« Assembly of main relief valve »

1. Insert poppet (16) and spring (15) into sleeve (17).
Install O-ring (13) and back-up ring (14) to sheet (12).
Install sleeve (17) to sheet (12).

NOTE: Sheet (12) is bolted into plug (10).

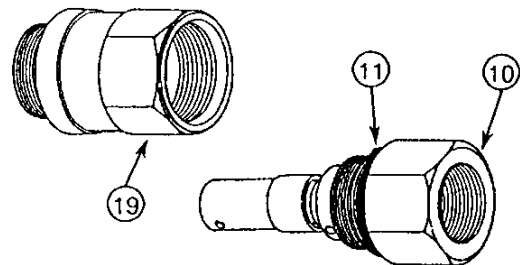


W107-02-05-120

2. Install O-ring (11) to plug (10).
Install plug (10) assembly to cap (19).

: 32 mm

: 8~9 kgf·m (88 N·m, 65 lbf·ft)



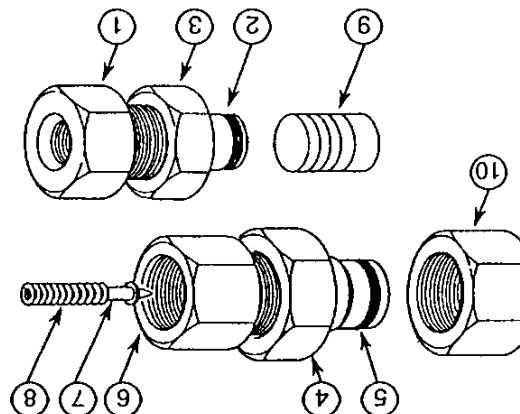
W107-02-05-121

3. Install lock nut (4) and O-ring (5) to plug (6).
Attach spring (8) and poppet (11) into piston (9) and then install piston (9) to plug (6).
Install plug (6) to plug (10).
Install lock nut (3) and O-ring (2) to plug (1), then install plug (1) to plug (6) assembly.

NOTE: Install plug (1) to plug (6) according to the detention measured on disassemble procedure.

: 27 mm, 32 mm

: 2 kgf·m, 8~9 kgf·m (88 N·m, 65 lbf·ft)

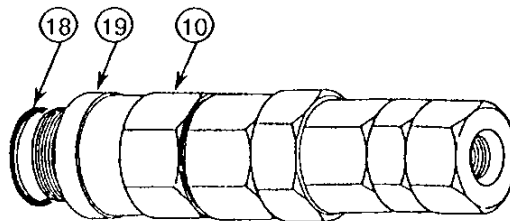


W107-02-05-122

UPPERSTRUCTURE / Control Valve

EX200-2

4. Install O-ring (18) to cap (19).



W107-02-05-123

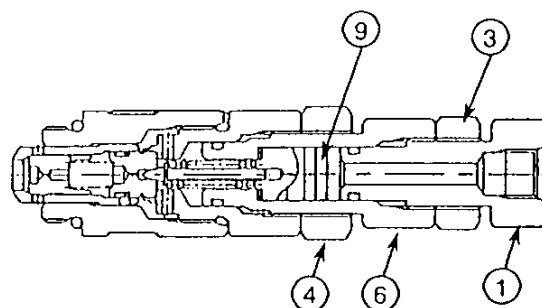
«Pressure adjustment of main relief system (Adjustment of high pressure side)»

1. Loosen lock nut (3), carefully tighten plug (1) until piston (9) touches the bottom of plug (6).
Tighten lock nut (3).

: 27 mm

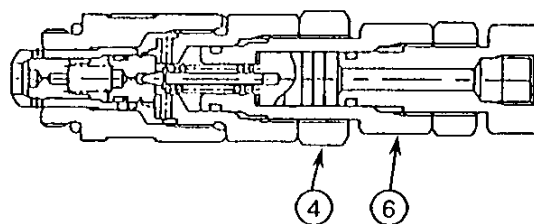
: 2 kgf·m (19 N·m, 14 lbf·ft)

: 7~8 kgf·m (78 N·m, 57 lbf·ft)



W107-02-05-124

2. Loosen lock nut (4).
By rotating plug (3), adjust the pressure until the desired pressure is obtained.



W107-02-05-125

3. Tighten lock nut (4).

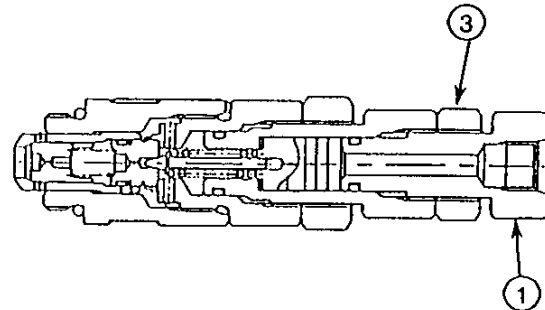
W02-05-50

UPPERSTRUCTURE / Control Valve

EX200-2

« Adjustment of low pressure side »

1. Loosen lock nut (3).
Loosen plug (1) counterclockwise until the desired pressure is obtained.
Tighten lock nut (3).

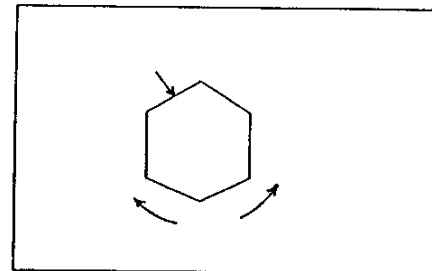


W107-02-05-126

Pressure adjustment

Unit : kgf cm²

Adjustment plug revolution	Change in pressure	
	High pressure side	Low pressure side
1	290	217
1/2	145	108.5
3/4	91.6	72.3
1/4	72.5	54.2



W107-02-05-127

« Adjustment of over load relief valve (Combination valve), (Port relief valve) »

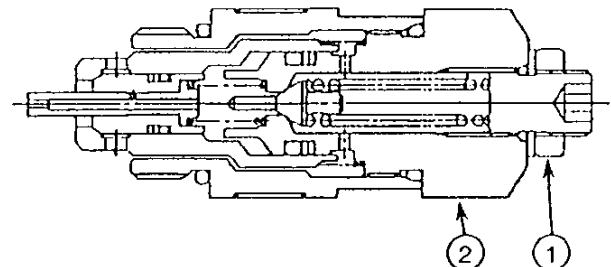
1. Loosen lock nut (1) and turn adjustment plug (2) to adjust.
The pressure goes up when adjustment plug is turned right, and goes down when adjustment plug is turned left.
Tighten lock nut (1).

Structure of overload relief valve

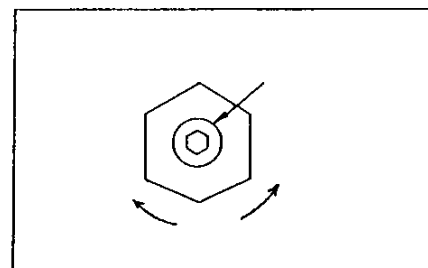
Adjustment plug / To increase pressure / To decrease pressure

Pressure decrease (Reference)

Adjustment plug revolution	High pressure side
1	Approx. 181
1/2	Approx. 90.5
3/4	Approx. 60.0
1/4	Approx. 45.0



W105-02-07-



2. After the adjustment, check the set pressure.

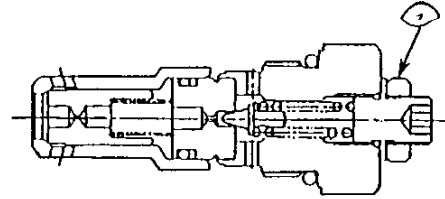
W105-02-07-

UPPERSTRUCTURE / Control Valve

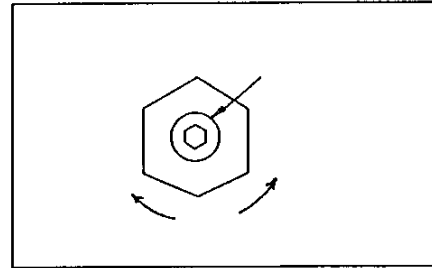
EX220-2

«Pressure adjustment of main relief valve (Surge cut relief valve)»

1. To adjust the main relief valve pressure, loosen lock nut (1) and turn adjustment plug (2).
When the specified pressure is obtained, tighten the lock nut (1).
The pressure goes up when the adjustment plug is turned right, and goes down when the adjustment plug is turned left.
2. After the adjustment, check the set pressure.



W105-02-07-



W105-02-07-

UPPERSTRUCTURE / Swing Device

EX200-2

Removal and Installation of Swing Device

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

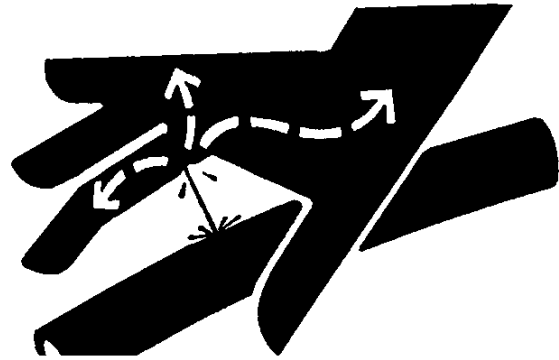
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Disconnect pipes (1), (3), (5), (6), and (7).

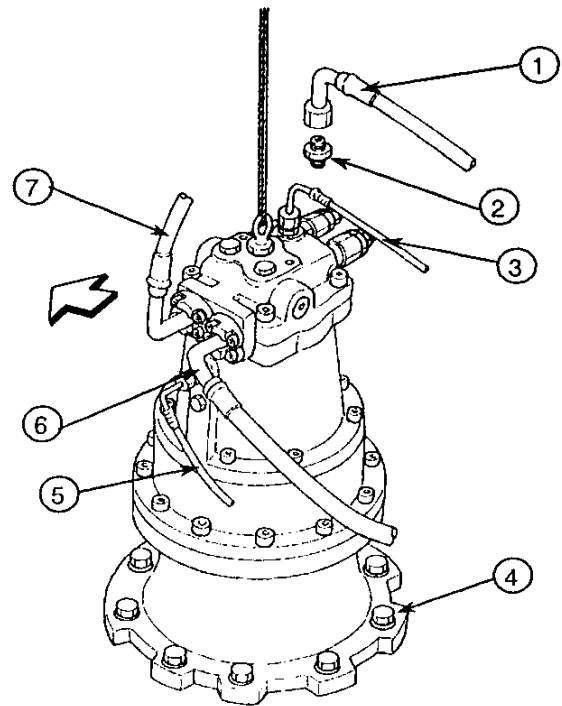
CAUTION:

Weight of swing unit assembly is 305 kg. (672 lb)
Weight of swing motor assembly is 50 kg. (110 lb)
Weight of swing device assembly is 255 kg. (562 lb)

3. Attach the swing motor to hoist using an eyebolt.
4. Remove bolts (4) to remove the swing motor.
5. Remove the swing motor.
6. When installing the swing motor, apply liquid packing to the swing device and the frame fitting side.
7. Install the swing unit and tighten bolts (4).
8. Connect pipes (1), (3), (5), (6) and (7).



SA-031



Tightening torque

Hose on swing motor make-up side

Tightening torque 18.0 kgf-m (176.5 N.m) (130.1 lbf.ft)

Hose on motor drain side

Tightening torque 4.0 kgf-m (39.2 N.m) (28.9 lbf.ft)

Swing drive mounting bolt

Tightening torque 55.0 kgf-m (539.3 N.m) (397.8 lbf.ft)

Hose on swing brake release side

Tightening torque 3.0 kgf-m (29.4 N.m) (21.6 lbf.ft)

Hose on right side of swing motor

Tightening torque 2.5 kgf-m (24.5 N.m) (18.0 lbf.ft)

Hose on left side of swing motor

Tightening torque 2.5 kgf-m (24.5 N.m) (18.0 lbf.ft)

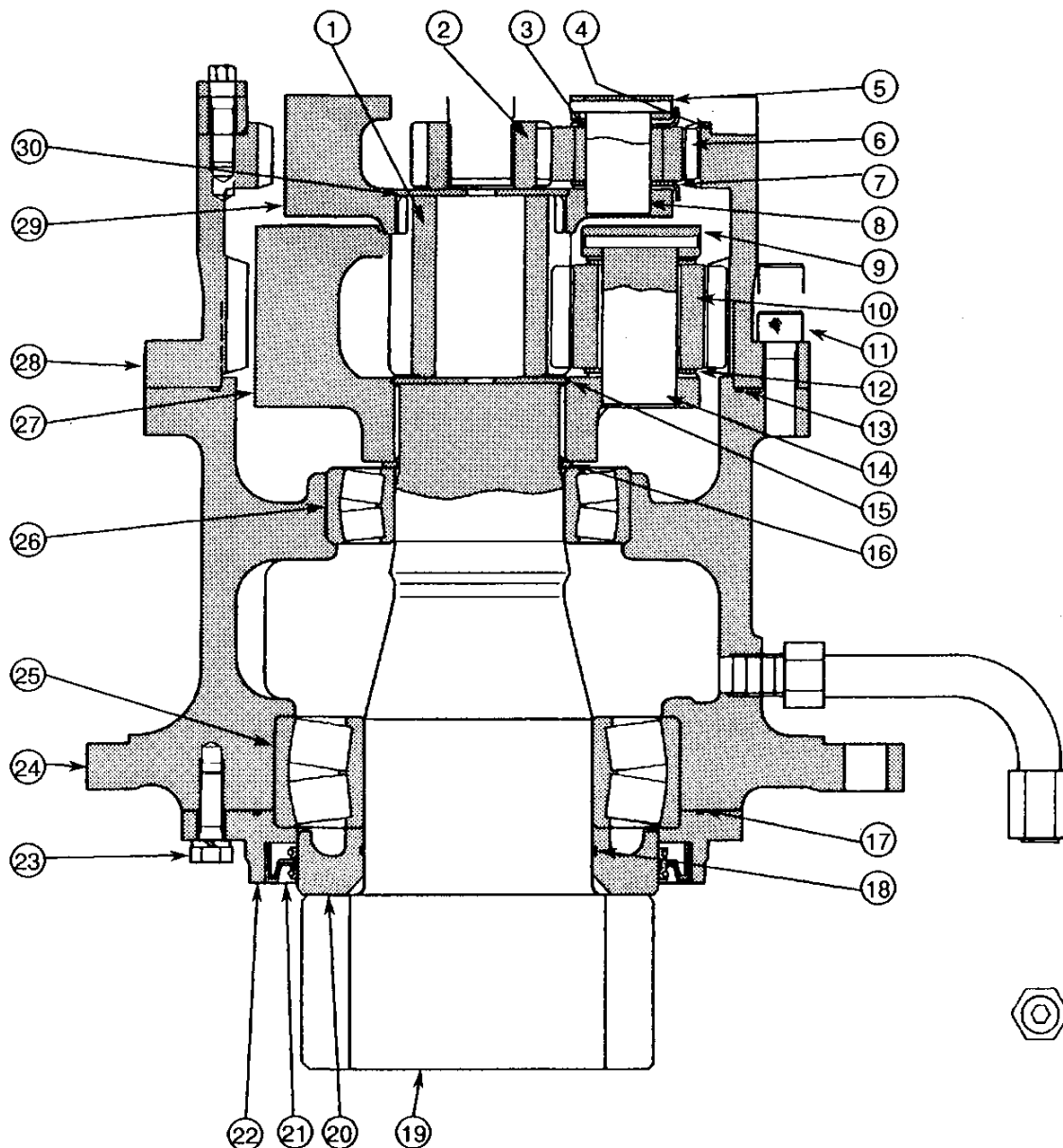
W107-02-06-001

- 1- To control valve on make-up side of swing motor
- 2- Adapter for swing motor make-up
- 3- To hydraulic tank on drain side of swing motor
- 4- Swing device mounting bolt
- 5- To control valve on swing brake release side
- 6- To control valve on right side of swing motor
- 7- To control valve on left side of swing motor

UPPERSTRUCTURE / Swing Device

EX200-2

SWING DEVICE DRAWING FOR DISASSEMBLY



W107-02-06-002

- | | | | |
|---------------------------------|-----------------------------------|---------------------|----------------------------|
| 1- Sun gear (Second stage) | 9- Spring pin | 17- O-ring | 25- Bearing |
| 2- Sun gear | 10- Planetary gear (Second stage) | 18- O-ring | 26- Bearing |
| 3- Needle bearing | 11- Socket bolt | 19- Propeller shaft | 27- Carrier (Second stage) |
| 4- O-ring | 12- Thrust plate | 20- Sleeve | 28- Ring gear |
| 5- Spring pin | 13- O-ring | 21- Oil seal | 29- Carrier (First stage) |
| 6- Planetary gear (First stage) | 14- Pin | 22- Cover | 30- Thrust plate |
| 7- Thrust plate | 15- Thrust plate | 23- Bolt | |
| 8- Pin | 16- Retaining ring | 24- Housing | |

W02-06-02

UPPERSTRUCTURE / Swing Device

EX200-2

« Disassembly of swing device »

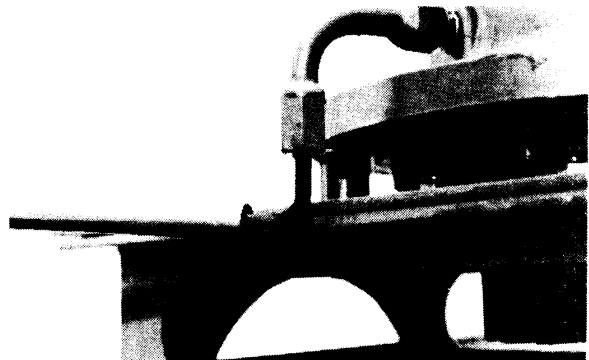
Clean the swing device before disassembling.

1. Loosen drain plug (1) and drain the gear oil.
Disconnect the drain pipe.

 : 10 mm (Drain plug)

 : 29 mm (Drain pipe)

Weight of swing unit is 305 kg (672 lb)

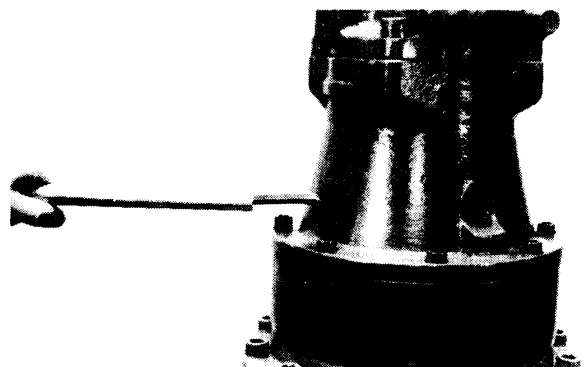


W107-02-06-003

2. Place the swing unit on a working table and remove the eight hex socket head bolts.

 : 10 mm

ST 5088



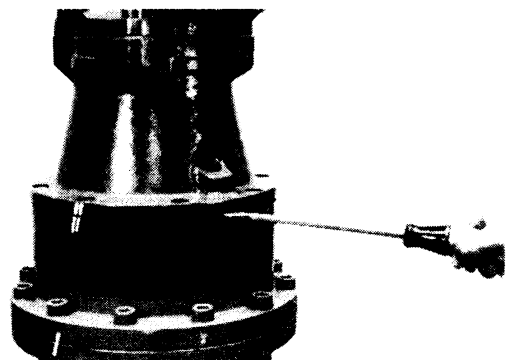
W107-02-06-004

REMOVAL OF MOTOR

3. Insert a screwdriver etc. in the groove around the motor to pry up the motor housing, then sling the motor.

Note: Make match marks for the ease of assembling.

Weight of motor is 50 kg (110 lb)

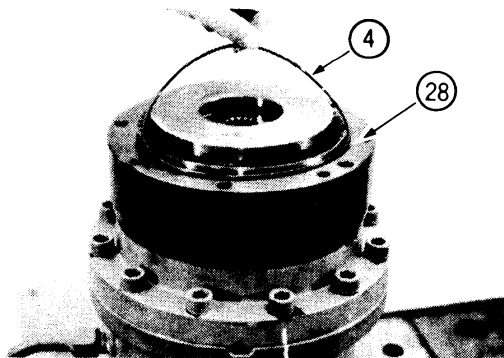


W107-02-06-005

UPPERSTRUCTURE / Swing Device

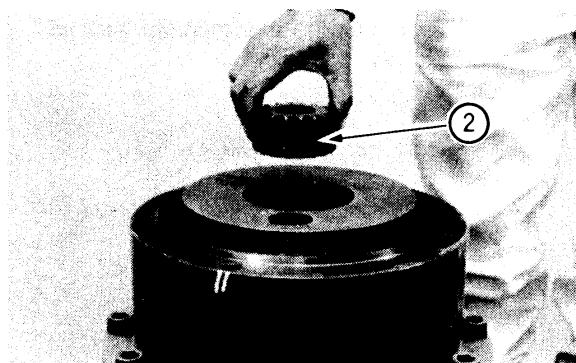
EX200-2

4. Remove O-ring (4) from ring gear (28).



W107-02-06-006

5. Remove sun gear (2) of the first stage.



W107-02-06-007

6. Remove carrier assembly (29) of the first stage.

Note: At this time, the thrust plate is removed together.

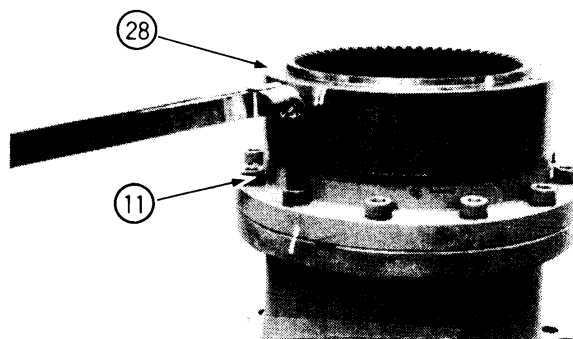


W107-02-06-008

7. Loose 12 bolts (11), and remove ring gear (28).

 : 14 mm

NOTE: Make match marks for the ease of assembling.



W107-02-06-009

W02-06-04

UPPERSTRUCTURE / Swing Device

EX200-2

8. Attach ring gear (28) to hoist using eyebolts.
Remove ring gear (28).

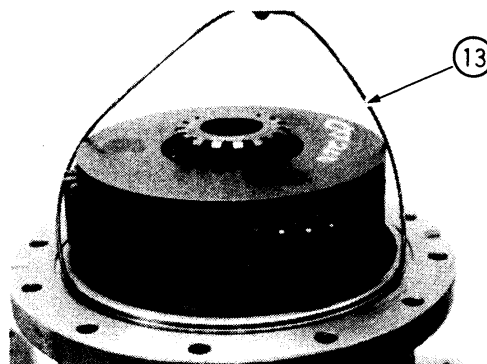
NOTE: If the ring gear is sticking to the case, insert a screwdriver etc. in a cut part of the case to pry it up.

Jig: ST 0002



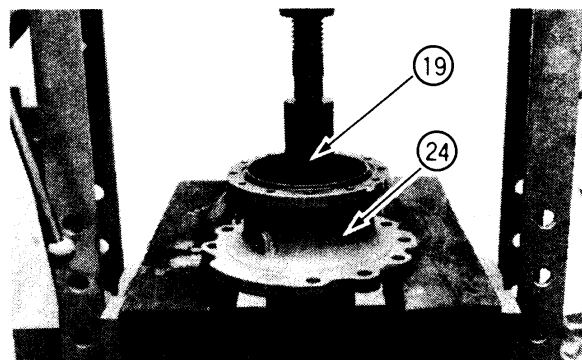
W107-02-06-010

9. Remove O-ring (13) from the housing.



W107-02-06-011

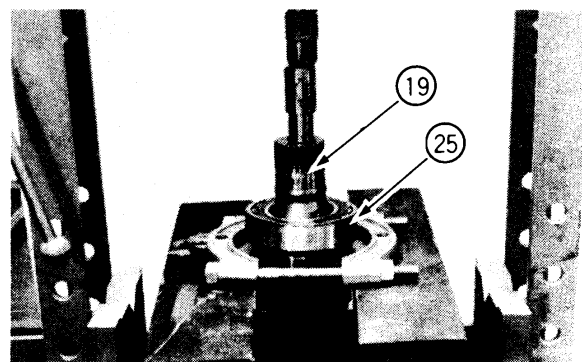
10. Place housing (24) on the press and pull out propeller shaft (19) with the press.



W107-02-06-012

11. Turn over the propeller shaft (19) and install the special tool (ST 1253), then pull out bearing (25), cover (22), and sleeve (20).

Jig: ST 1253

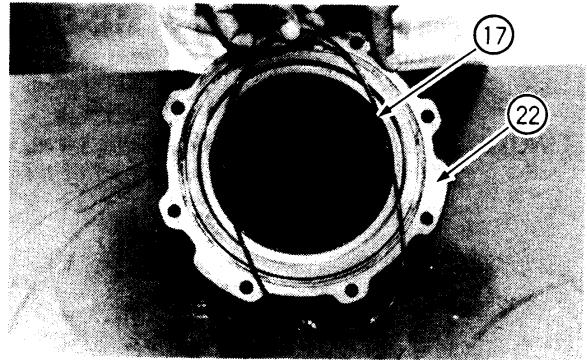


W107-02-06-013

UPPERSTRUCTURE / Swing Device

EX200-2

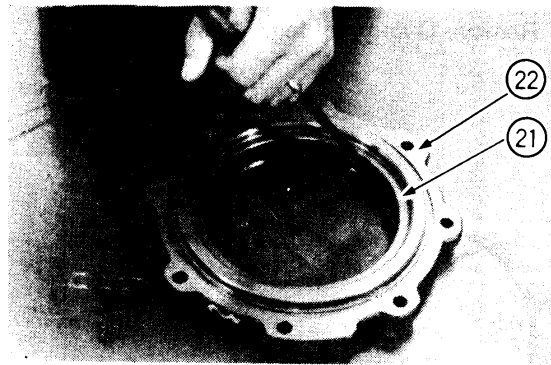
12. Remove O-ring (17) from cover (22).



W107-02-06-014

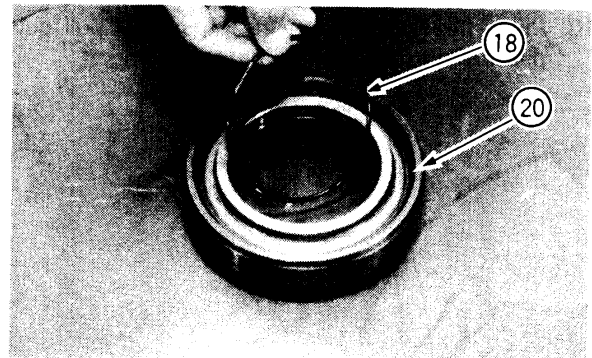
13. Remove oil seal (21) from cover (22).

NOTE: The oil seal which is removed forcibly with a screwdriver etc. cannot be used again.



W107-02-06-015

14. Remove O-ring (18) from sleeve (20).

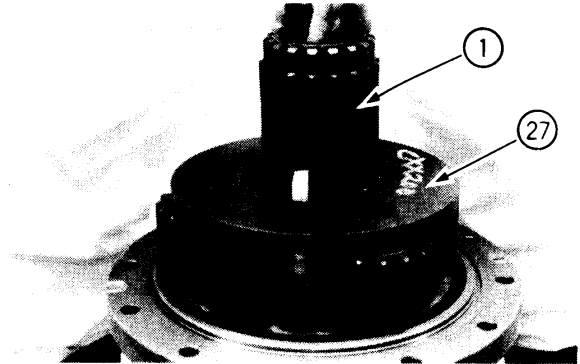


W107-02-06-016

UPPERSTRUCTURE / Swing Device

EX200-2

15. Remove sun gear (1) of the second stage, and remove carrier assembly (27) of the second stage.

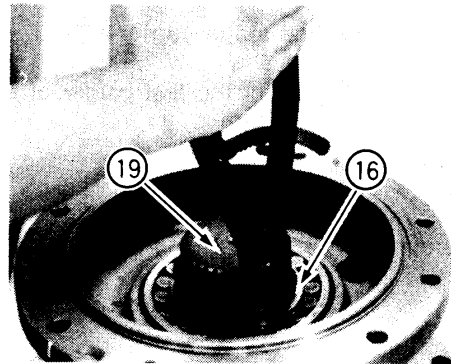


W107-02-06-017



W107-02-06-018

16. Remove retaining ring (16) from propeller shaft (19).

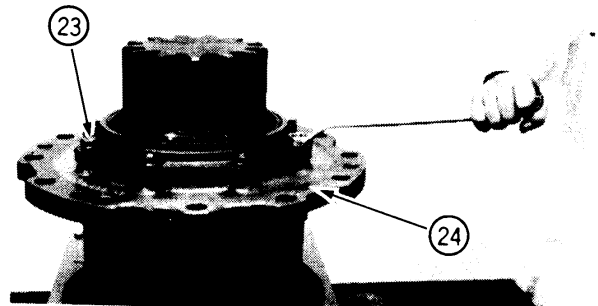


W107-02-06-019

17. Turn over housing (24) and loosen bolts (23) to remove the cover.

 : 19 mm

NOTE: Insert a screwdriver etc. in the periphery of the cover to pry it up.



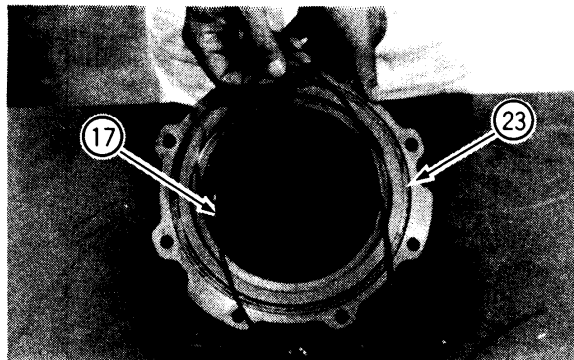
W107-02-06-020

W02-06-07

UPPERSTRUCTURE / Swing Device

EX200-2

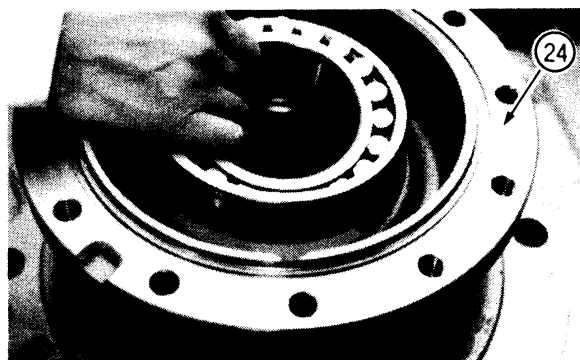
18. Remove O-ring (17) from cover (22).



W107-02-06-021

19. Turn over housing (24) and pull out bearing (26).

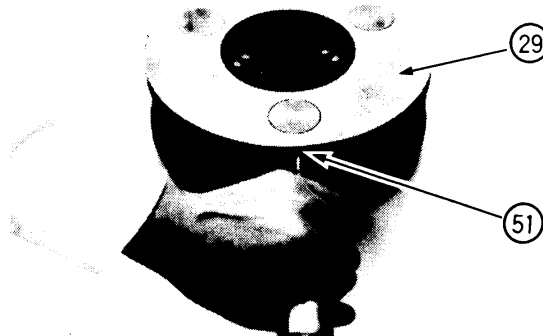
NOTE: The bearing can be removed easily by hands.



W107-02-06-022

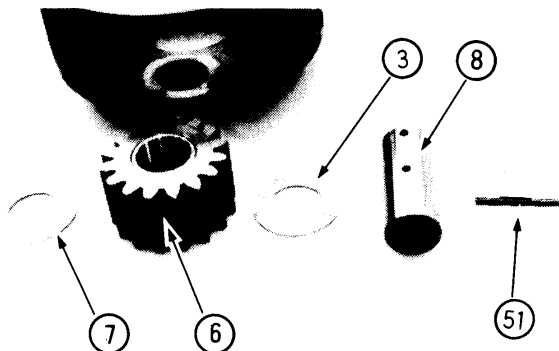
«Disassembly of the first stage carrier»

20. Pull spring pin (51) out of the first carrier of stage using a pin punch (ST 1389)



W107-02-06-023

21. Remove pin (8), planetary gear (6), thrust plate (7), and needle bearing (3).



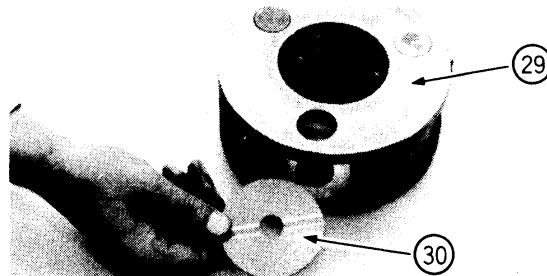
W107-02-06-024

W02-06-08

UPPERSTRUCTURE / Swing Device

EX200-2

22. Remove thrust plate (30) from carrier (29).



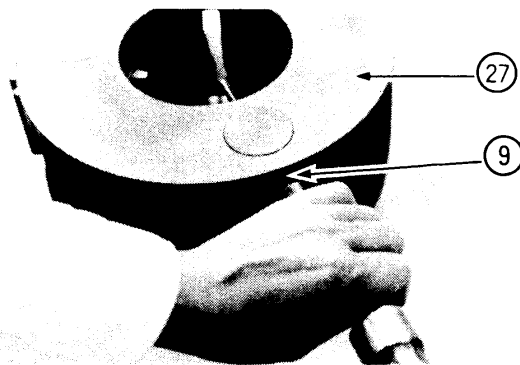
W107-02-06-025

« Disassembly of the second stage carrier »

23. Push spring pin (9) out of carrier assembly (27) of the second stage with the pin punch.

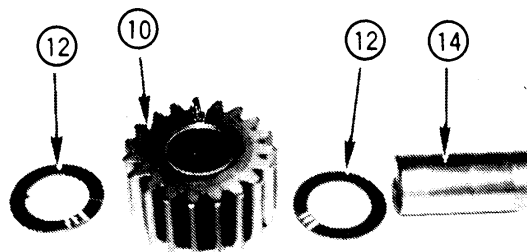
Spring pin puller

Jig: ST 1389 ($\phi 6.0$, Length: 65 mm)



W107-02-06-026

24. Remove pin (14), planetary gear (10), and thrust plate (12).



W107-02-06-027

25. Remove thrust plate (15) from carrier (27).

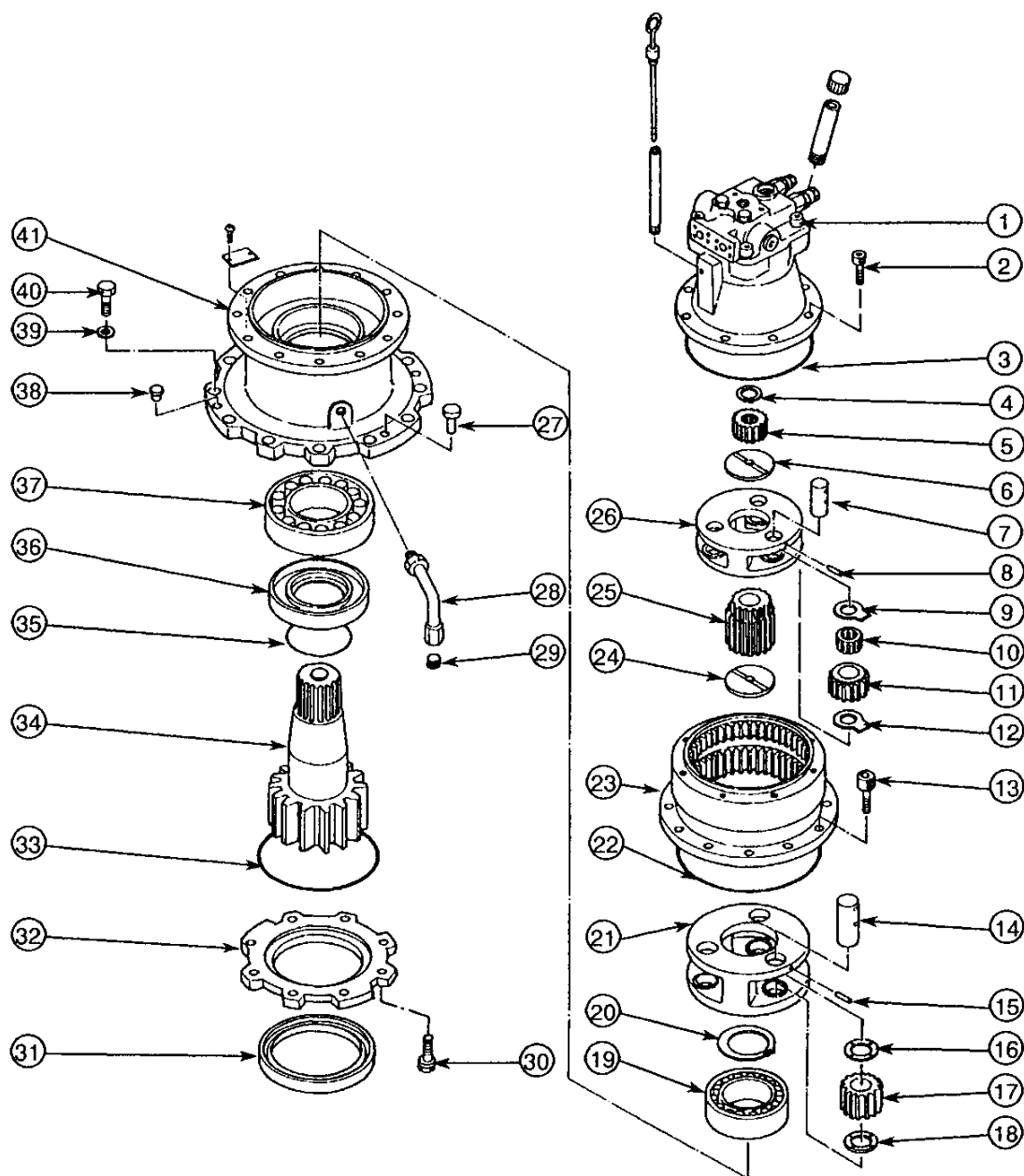


W107-02-06-028

UPPERSTRUCTURE / Swing Device

EX200-2

SWING DEVICE DRAWING FOR ASSEMBLY



W107-02-06-029

- | | | | |
|-------------------------|----------------------------|-----------------------------|---------------------|
| 1— Swing motor assembly | 12— Thrust plate | 23— Ring gear | 34— Propeller shaft |
| 2— Bolt | 13— Socket bolt | 24— Thrust plate | 35— O-ring |
| 3— O-ring | 14— Pin | 25— Sun gear (Second stage) | 36— Sleeve |
| 4— Retaining ring | 15— Spring pin | 26— Carrier (First stage) | 37— Bearing |
| 5— Sun gear | 16— Thrust plate | 27— Knock pin | 38— Knock pin |
| 6— Thrust plate | 17— Planetary gear | 28— Pipe | 39— Washer |
| 7— Pin | 18— Thrust plate | 29— Plug | 40— Bolt |
| 8— Spring pin | 19— Bearing | 30— Bolt | 41— Housing |
| 9— Thrust plate | 20— Retaining ring | 31— Oil seal | |
| 10— Needle bearing | 21— Carrier (Second stage) | 32— Cover | |
| 11— Planetary gear | 22— O-ring | 33— O-ring | |

UPPERSTRUCTURE / Swing Device

EX200-2

« Assembly of swing device »

Precautions for assembling

Observe the following points before assembling the swing device.

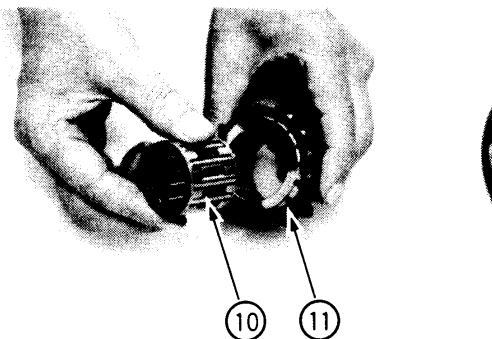
- o Wash each part with cleaning solvent and dry with compressed air.
- o Check that metal powder or cleaning solvent is completely removed from the housing.
- o Be sure to remove oil from surfaces to which liquid packing will be applied.
- o Apply grease to the needle bearing inner bores when inserting them.

- o Apply sufficient lubricant to sliding or rotating parts.

Before assembling the swing drive, assemble the carrier.

« Assembly of the first stage carrier »

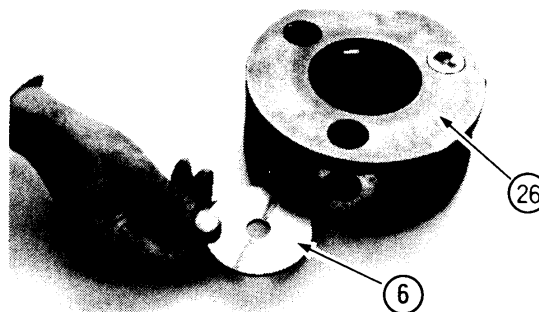
1. Install needle bearing (10) to planetary gear (11).



W107-02-06-030

2. Put thrust plate (6) in carrier (26).

NOTE: Set the thrust plate with its groove side up.



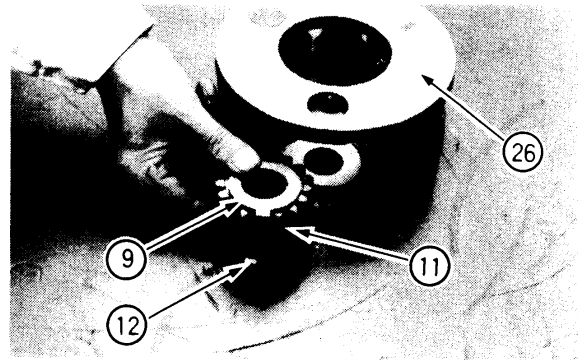
W107-02-06-031

UPPERSTRUCTURE / Swing Device

EX200-2

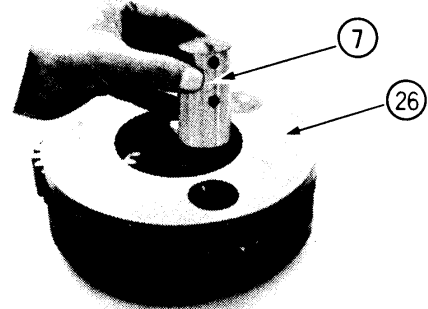
3. Install planetary gear (11) and thrust plates (9) and (12) to carrier (26).

Note: Set thrust plates (9) and (12) with their oil groove side positioned towards the gear. (Set the thrust plates with their bent parts along the periphery of the flange of the carrier.)



W107-02-06-032

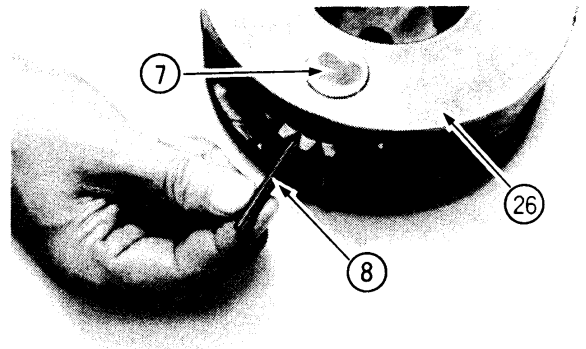
4. Drive the pin (7) into carrier (26).
Align the pin hole and carrier hole.



W107-02-06-033

5. With the slit of spring pin (8) facing up wards, use a hammer to tap spring pin (8) into carrier (26) and pin (7), as illustrated.

NOTE: Drive the spring pin (8) with its slit directed to the end face of the pin (7).

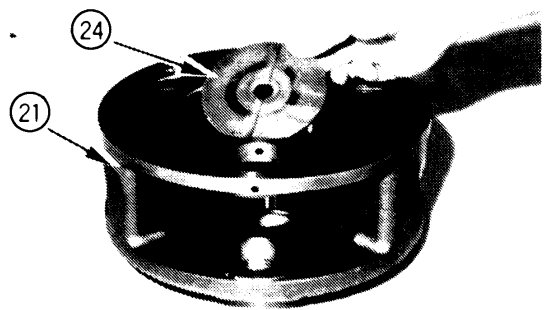


W107-02-06-034

«Assembly of the second stage carrier»

6. Insert thrust plate (24) into carrier (21).

NOTE: Be sure to face the oil groove side up wards.

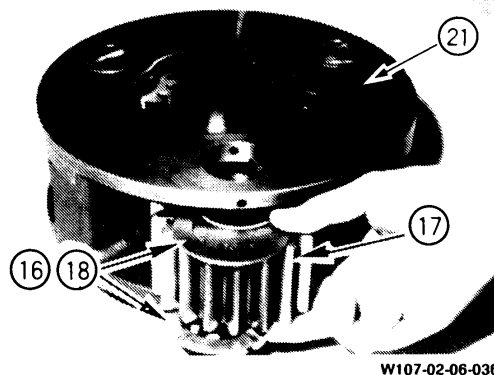


W107-02-06-035

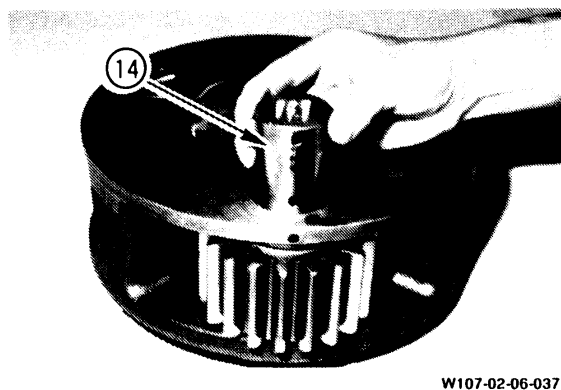
UPPERSTRUCTURE / Swing Device

EX200-2

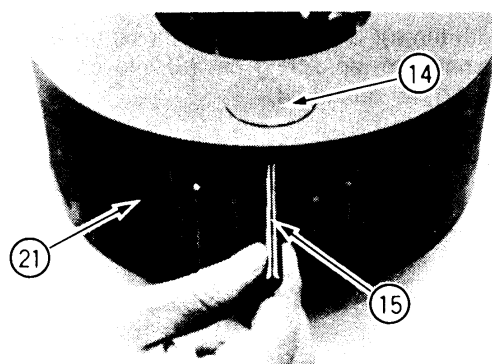
7. Install planetary gear (17) and thrust plates (16) and (18) to carrier (21).



Drive pin (14) into the carrier
Align the pin hole and the carrier hole..

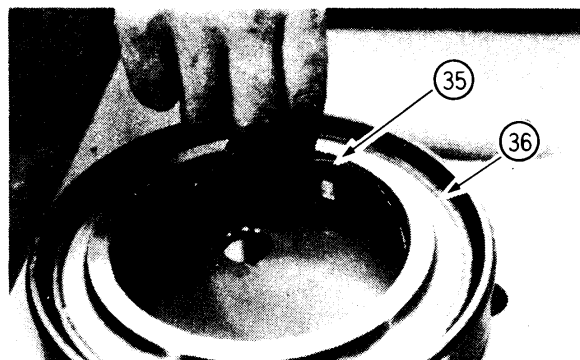


8. With the slit of spring pin (15) facing up wards, use a hammer to tap spring pin (15) into carrier (21) and pin (14), as illustrated.



9. Install O-ring (35) to sleeve (36).

NOTE: Apply a film of grease to O-ring (35).

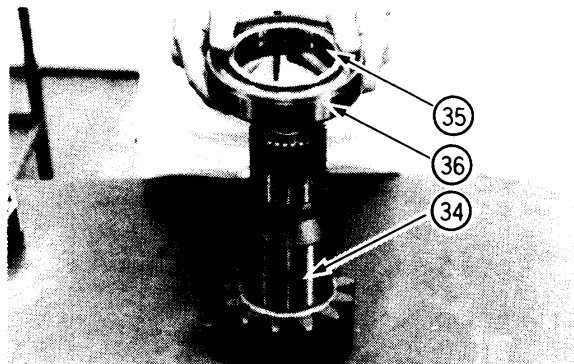


UPPERSTRUCTURE / Swing Device

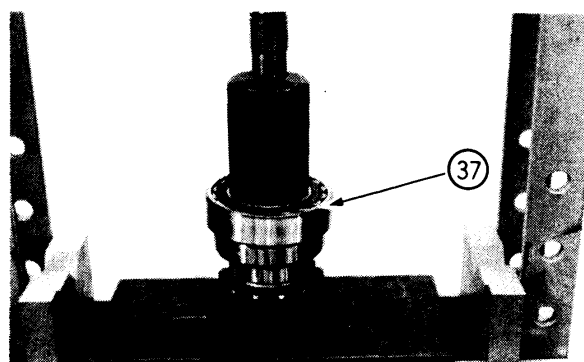
EX200-2

10. Install sleeve (36) and bearing (37) to propeller shaft (34).
Using special tool (ST 2562) to press down on shaft.

ST 2562

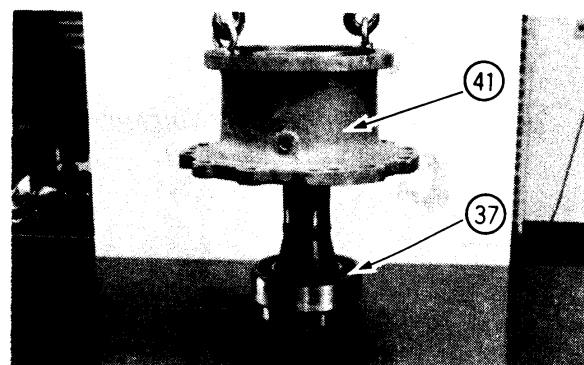


W107-02-06-040



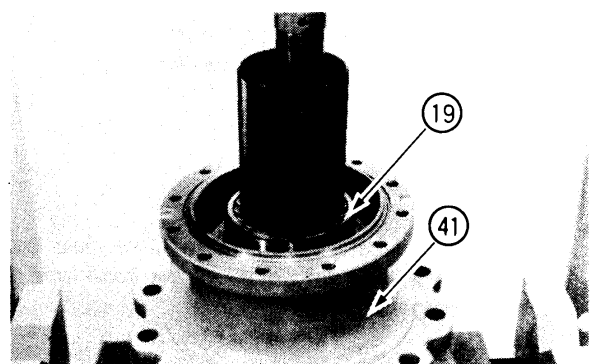
W107-02-06-041

11. Attach housing (41) to hoist using two eyebolts (ST 0007).
Mount housing (41) on bearing (37) to fit.



W107-02-06-042

12. Apply grease to housing (41) and bearing (19).
Insert bearing (19) into housing (41) using specig tool (ST 2562).

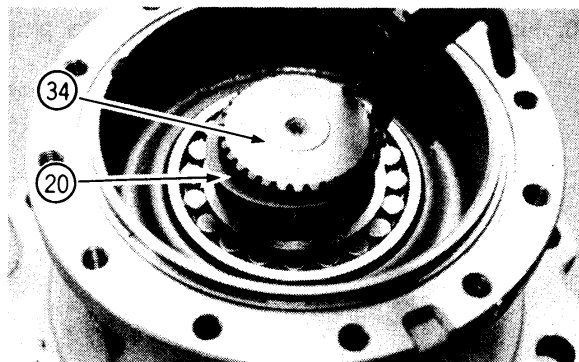


W107-02-06-043

UPPERSTRUCTURE / Swing Device

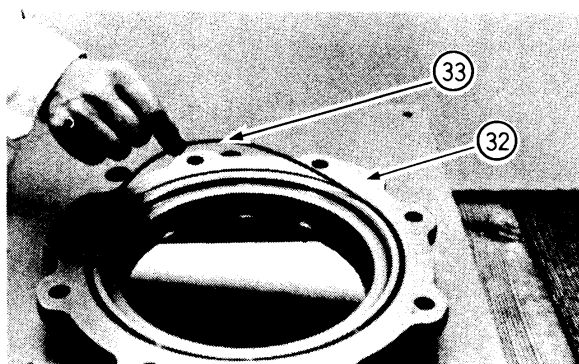
EX200-2

13. Install retaining ring (20) to the groove of propeller shaft (34).



W107-02-06-044

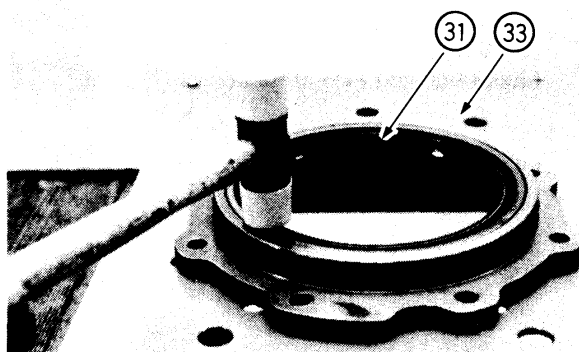
14. Install O-ring (33) on cover (32).



W107-02-06-045

15. Apply grease to oil seal (31) lip.
Install oil seal (31) on cover (32).

NOTE: Apply liquid packing (THREEBOND 1215) to the fitting part of the cover.

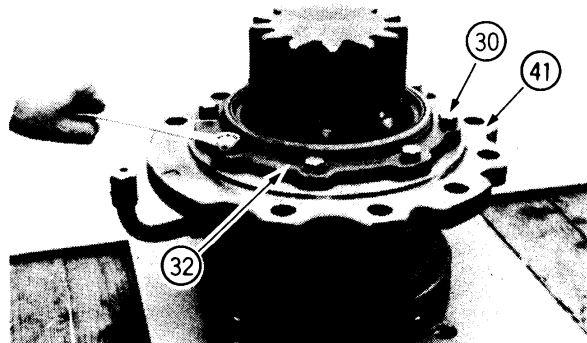


W107-02-06-046

16. Turn over housing (41) and install cover (32) to it, then secure cover (32) with the bolts (30).



NOTE: When installing the cover, take care that the oil seal lip will not touch the tooth end of the propeller shaft.

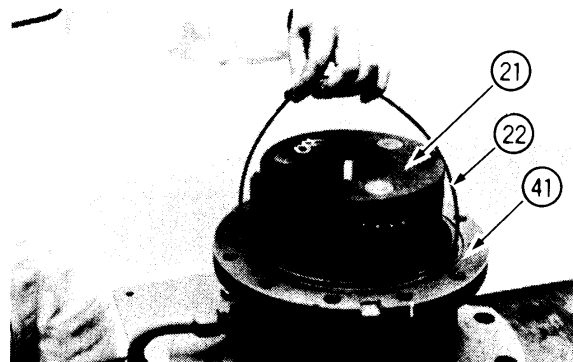


W107-02-06-047

UPPERSTRUCTURE / Swing Device

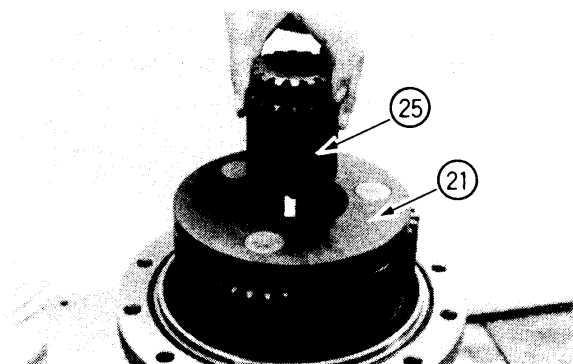
EX200-2

17. Turn over housing (41) and set the second-stage carrier assembly (21) to the spline of propeller shaft (34), then install O-ring (22) to housing (41).



W107-02-06-048

18. Insert second-stage sun gear (25) into second-stage carrier assembly (21).



W107-02-06-049

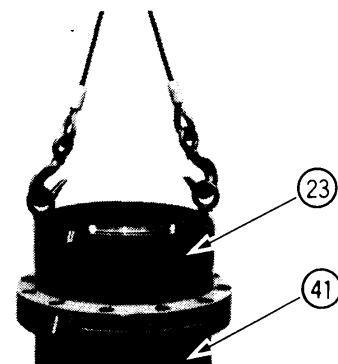
19. Attach ring gear (23) to hoist using two eyebolts (ST 0002).
Install ring gear (23) into housing (41), then secure it with bolts (13).

Note: When installing, match the match marks of the ring gear and housing to each other.

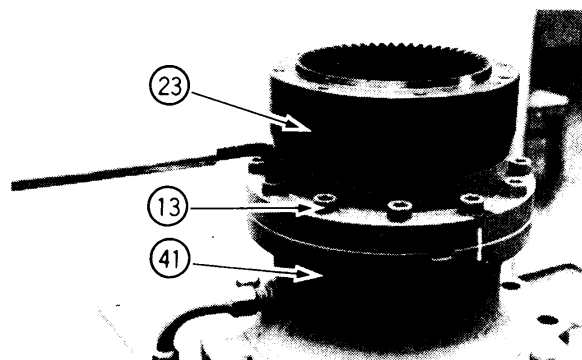
 : 14 mm

 : 21 kgf·m (205.9N.m 151.8 lbf.ft)

ST 0002



W107-02-06-050

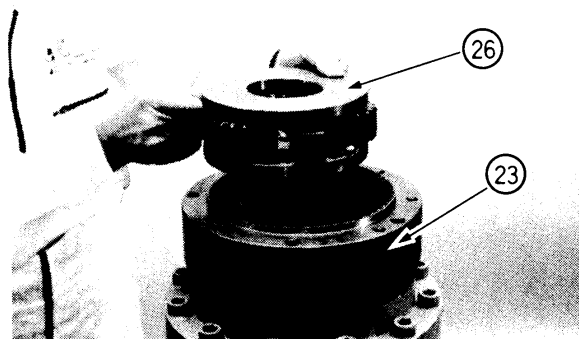


W107-02-06-051

UPPERSTRUCTURE / Swing Device

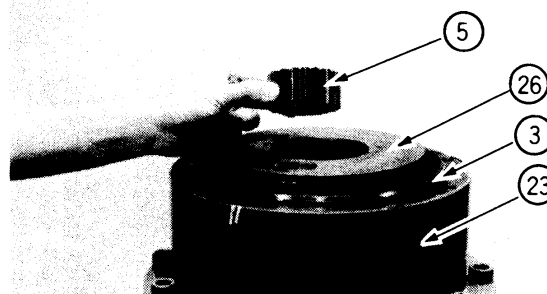
EX200-2

20. Install first-stage carrier assembly (26) to ring gear (23).



W107-02-06-052

21. Install O-ring (3) to ring gear (23), then insert sun gear (5) (facing the joggled side down wards.) into first-stage carrier.

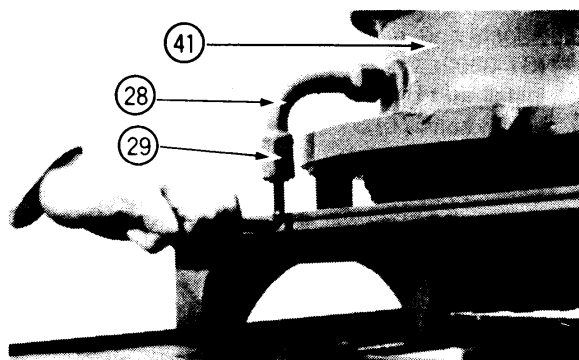


W107-02-06-053

22. Install plug (29) to drain pipe (28), then install them to housing (41).
Supply gear oil to the swing transmission.

Gear oil: Approx. 8.2 liters
(2.1 usgal. 1.8 Impgal)

 : 10 mm
 : 9.5 kgf·m (93.1 N.m 68.7 lbf.ft)
 : 27 mm
 : 5 kgf·m (49.0 N.m 36.1 lbf.ft)

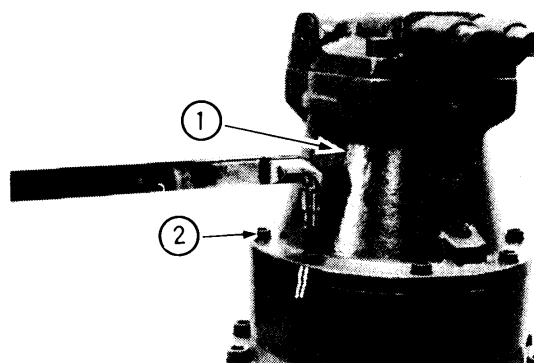


W107-02-06-054

23. Checking the match marks, install motor (1) and secure it with hex socket head bolts (2).

 : 10 mm
 : 9 kgf·m (88.2 N.m 65.0 lbf.ft)

Check the oil level gauge.



W107-02-06-055

UPPERSTRUCTURE / Swing Device

EX200-2

REMOVAL AND INSTALLATION OF SWING MOTOR

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

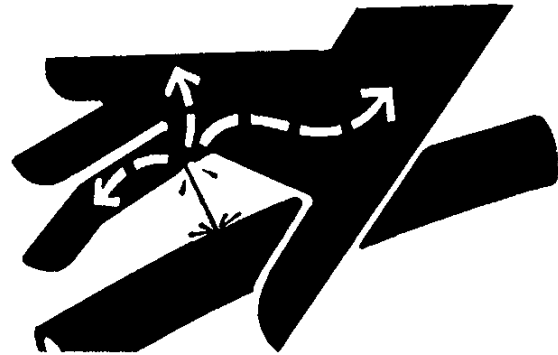
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

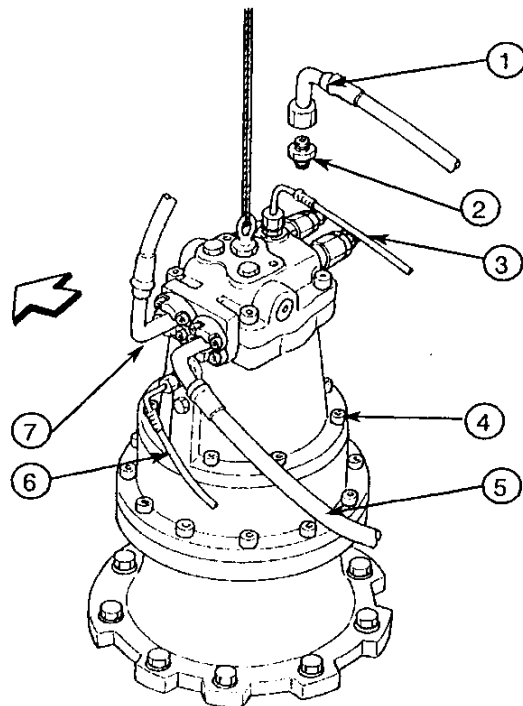
2. Disconnect pipes (1), (3), (5), (6), and (7).

CAUTION:
Weight of swing motor assembly is 42 kg. (93 lb)

3. Attach the swing motor to hoist using an eye bolt.
4. Remove bolts (4) to remove the swing motor.
5. Remove the swing motor.
6. When installing the swing motor, apply LOCTITE to the device side.
7. Apply LOCTITE to bolts (4) and tighten them.
8. Connect pipes (1), (3), (5), (6) and (7).



SA-031



W107-02-06-059

Tightening torque

Hose on swing motor make-up side

Tightening torque 18.0 kgf-m (176.5 N.m) (130.1 lbf.ft)

Hose on motor drain side

Tightening torque 4.0 kgf-m (39.2 N.m) (28.9 lbf.ft)

Swing drive mounting bolt

Tightening torque 9.0 kgf-m (88.0 N.m) (65.0 lbf.ft)

Hose on right side of swing motor

Tightening torque 2.5 kgf-m (24.5 N.m) (18.0 lbf.ft)

Hose on left side of swing motor

Tightening torque 2.5 kgf-m (24.5 N.m) (18.0 lbf.ft)

1 - To control valve on make-up side of swing motor

2 - Adapter for swing motor make-up

3 - To hydraulic tank on drain side of swing motor

4 - Swing motor mounting bolt

5 - To control valve on right side of swing motor

6 - To control valve on swing brake release side

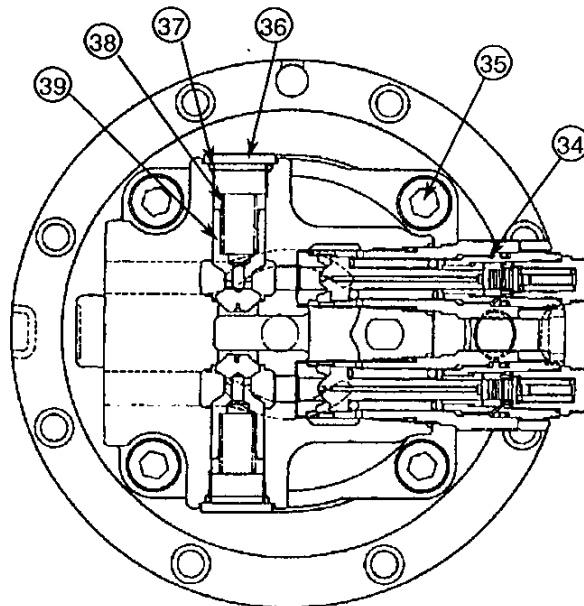
7 - To control valve on left side of swing motor

W02-06-19

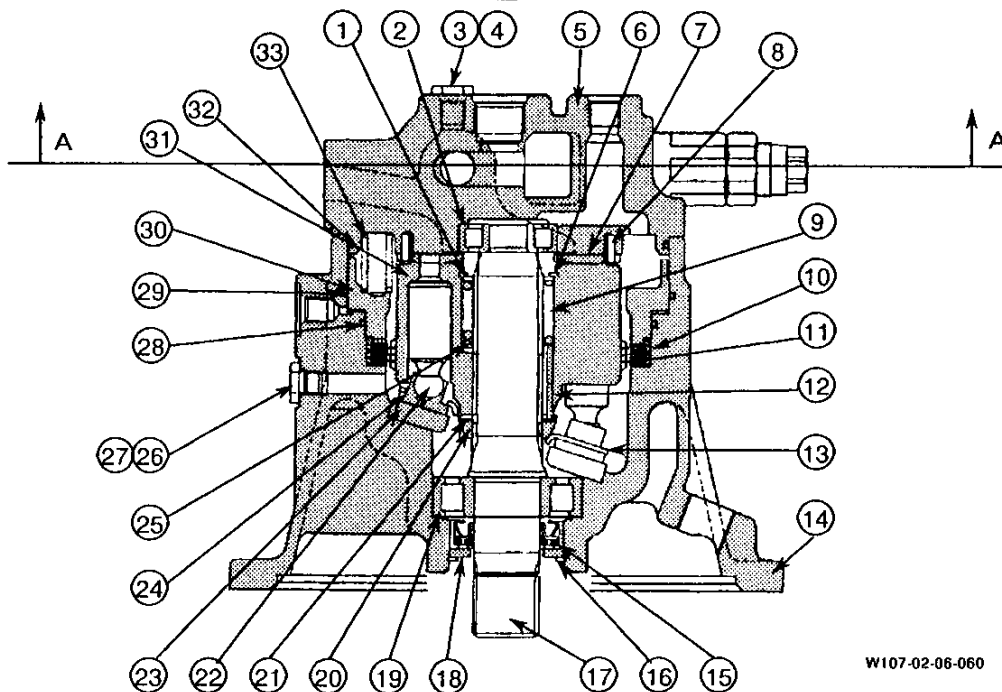
UPPERSTRUCTURE / Swing Device

EX200-2

SWING MOTOR DRAWING FOR DISASSEMBLY



Section A-A



W107-02-06-060

- | | | |
|--|--------------------------|-----------------------------|
| 1— Spacer | 14— Casing | 27— O-ring |
| 2— Bearing | 15— Oil seal | 28— O-ring |
| 3— Plug | 16— Retaining ring | 29— O-ring |
| 4— O-ring | 17— Shaft (Output shaft) | 30— Brake piston |
| 5— Valve casing (Brake valve assembly) | 18— Seal cover | 31— Cylinder block assembly |
| 6— Retaining ring | 19— Bearing | 32— O-ring |
| 7— Valve plate | 20— Holder | 33— Spring |
| 8— Pin | 21— Spacer | 34— Relief valve assembly |
| 9— Spring | 22— Piston assembly | 35— Bolt |
| 10— Plate | 23— Plate | 36— Plug |
| 11— Friction plate | 24— Shoe | 37— O-ring |
| 12— Push rod | 25— Spacer | 38— Spring |
| 13— Retainer plate | 26— Plug | 39— Poppet |

W02-06-20

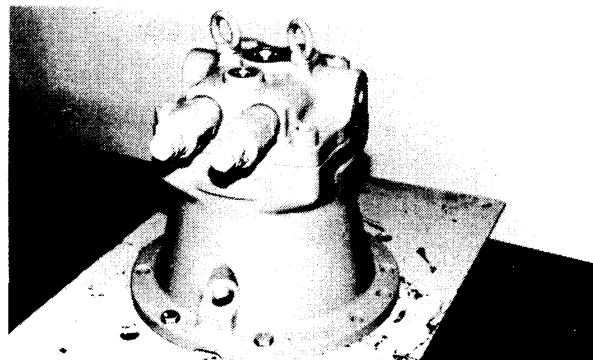
UPPERSTRUCTURE / Swing Device

EX200-2

« Disassembly of swing motor »

Before disassembling the swing motor, clean its outside.
Sling the motor assembly and place it on the working table.

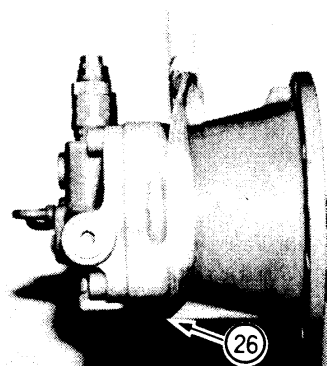
Working table: ST 5088



W107-02-06-061

1. Remove plug (26) and drain the oil from the motor.

 : 19 mm



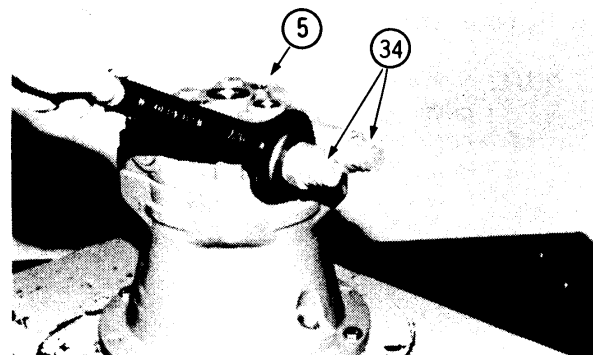
W107-02-06-062

« Removal of relief valve assembly »

2. Remove relief valve assembly (34) from valve casing (5).

NOTE: Do not disassembly the relief valve assembly it self .(If any parts of the assembly is removed, the set pressure charges.)

 : 41 mm

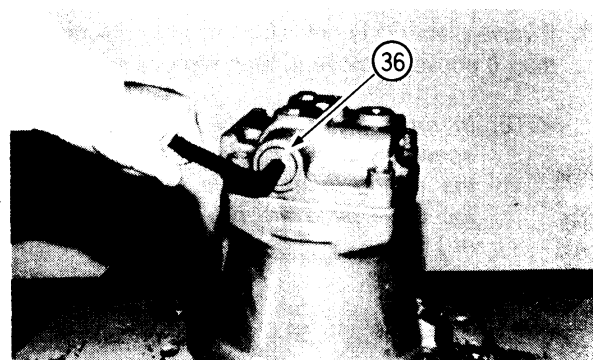


W107-02-06-063

« Removal of make-up valve »

3. Remove plug (36).

 : 14 mm

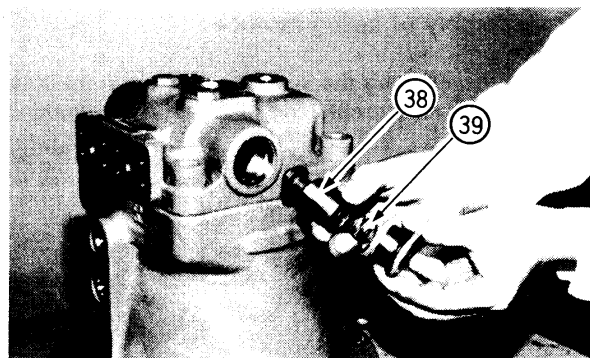


W107-02-06-064

UPPERSTRUCTURE / Swing Device

EX200-2

4. Take out spring (38) and poppet (39).

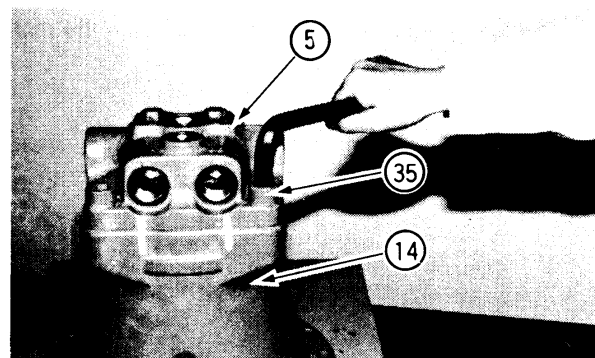


W107-02-06-065

5. Mark the edge of break valve casing (5) and casing (14) to aid in assembly.
Remove four socket bolts (35).

 : 14 mm

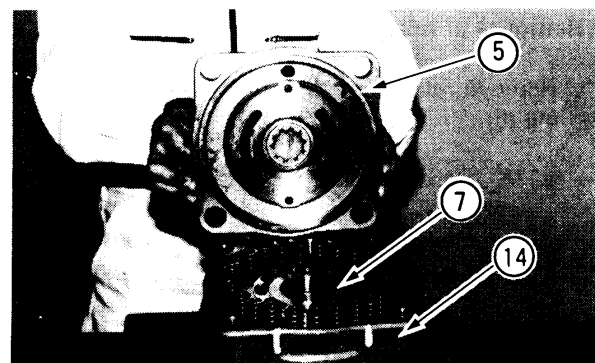
Note: Note that valve casing (5) will be raised by spring (33) for parking brake.



W107-02-06-066

6. Remove valve casing (5) from casing (14).

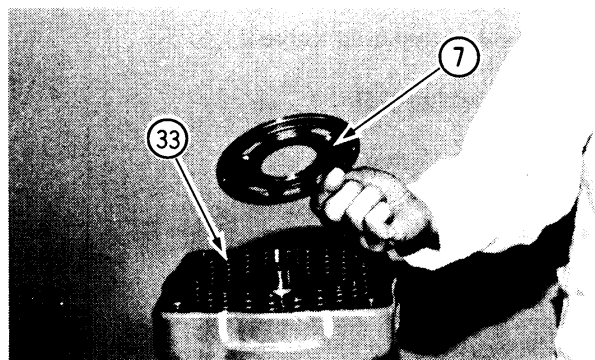
NOTE: Since valve plate (7) may be removed together at this time, carefully remove valve casing (5) so that valve plate (7) will not drop.



W107-02-06-067

7. If valve plate (7) is not removed from the cylinder in step 6 above, remove it, then remove spring (33).

NOTE: In case prying up the valve plate with a screwdriver, etc., take care not to damage the sliding faces. (Note that both sides of the valve plate are different from each other.)



W107-02-06-068

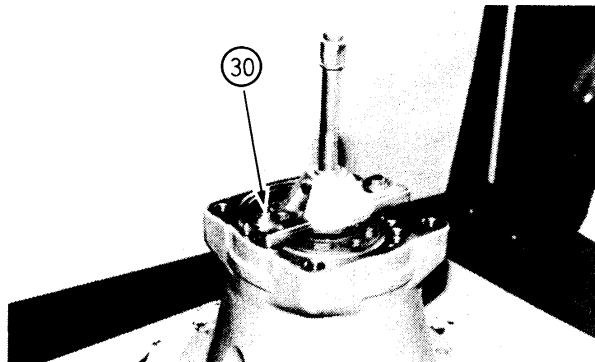
W02-06-22

UPPERSTRUCTURE / Swing Device

EX200-2

8. Using the special tool (ST 1385), install the bolt to brake piston (30), and tighten it to remove brake piston (30) from casing (14).

ST 1385



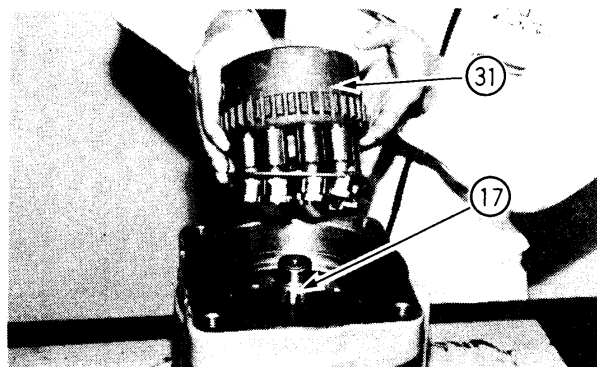
W107-02-06-069

9. Remove O-rings (28) and (29) from casing (14).



W107-02-06-070

10. Remove cylinder block assembly (31) from shaft (17).

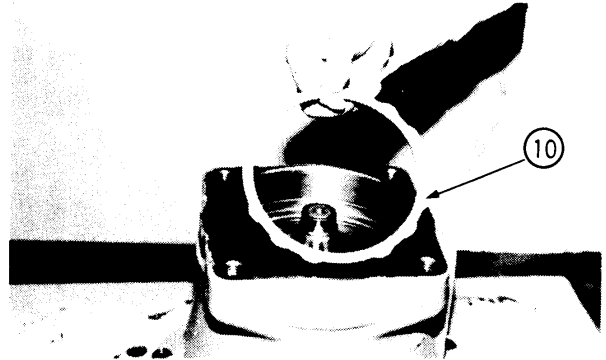


W107-02-06-071

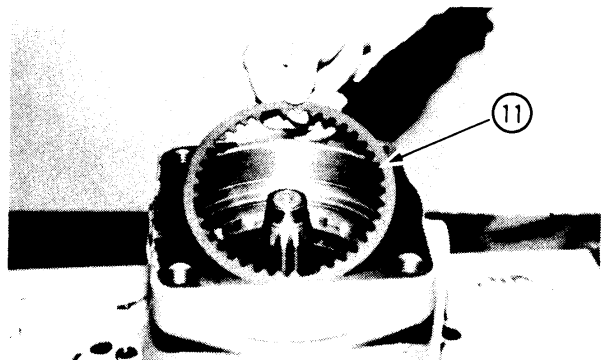
UPPERSTRUCTURE / Swing Device

EX200-2

11. Remove friction plate (11) and plate (10) from casing (14).

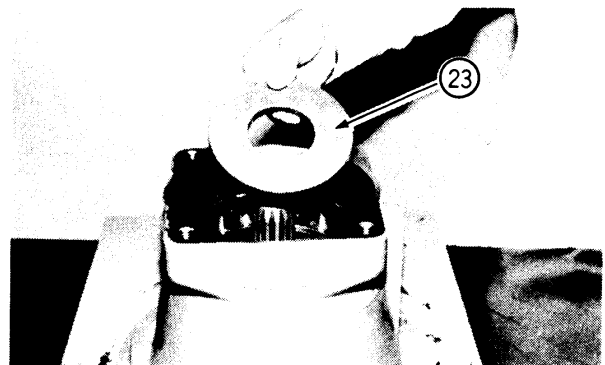


W107-02-06-072



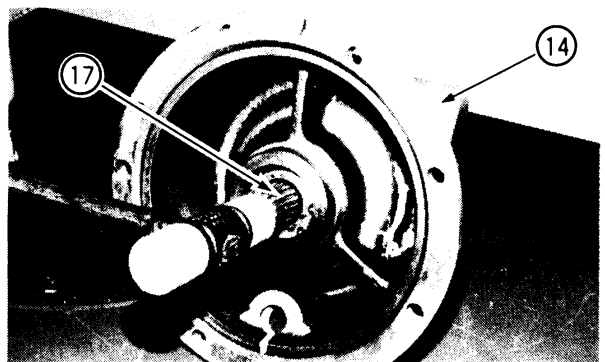
W107-02-06-073

12. Remove thrust plate (23).



W107-02-06-074

13. Place casing (14) on its side, and tap shaft (17) with a plastic hammer to push it out.



W107-02-06-075

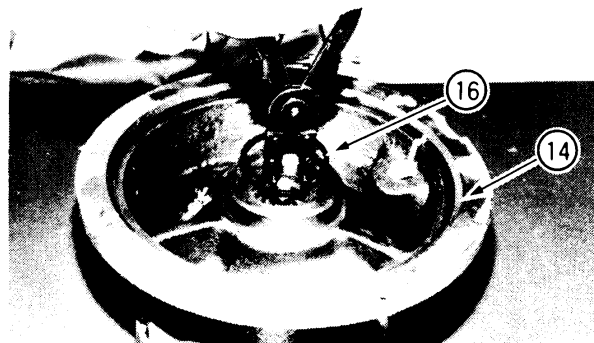
W02-06-24

UPPERSTRUCTURE / Swing Device

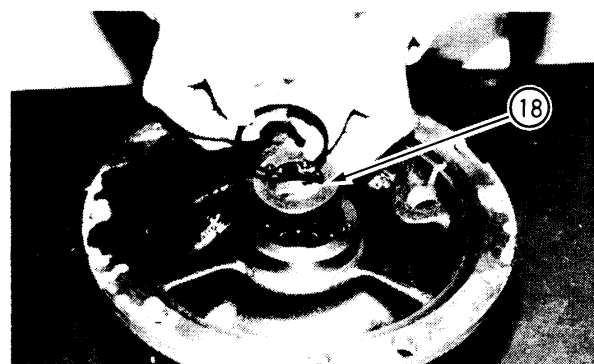
EX200-2

14. Remove retaining ring (16) from casing (14), then remove seal cover (18).

~~3015~~



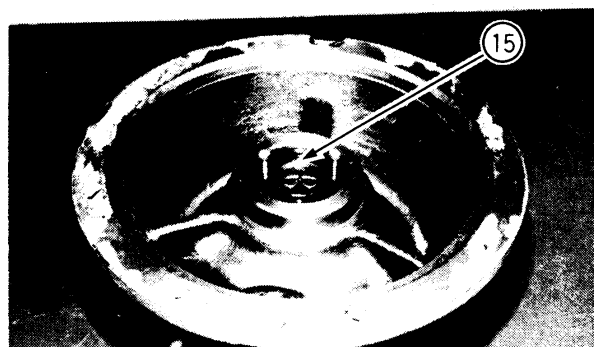
W107-02-06-076



W107-02-06-077

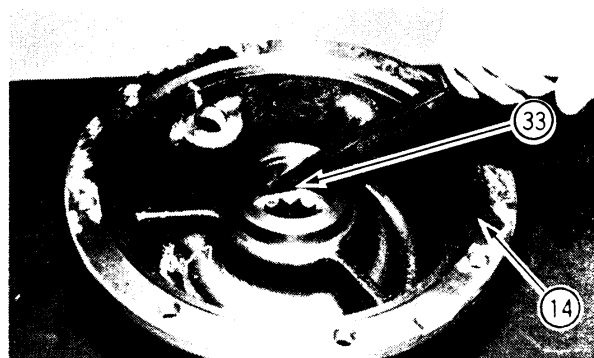
15. Install special tool (ST 1390) to oil seal (15) to pull it out.

ST 1390



W107-02-06-078

16. Remove the outer race of bearing (33) from casing (14).

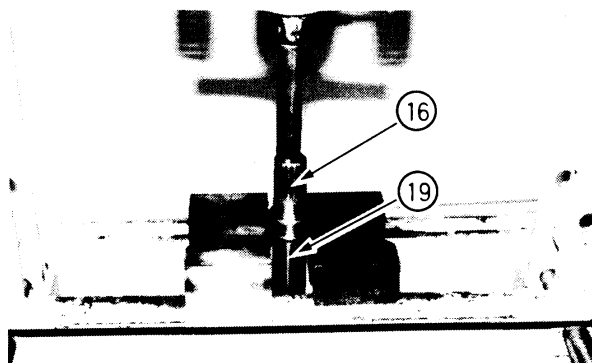


W107-02-06-079

UPPERSTRUCTURE / Swing Device

EX200-2

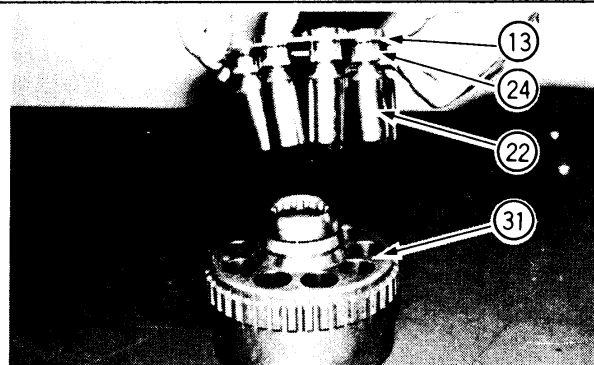
17. Pull the inner race out of bearing (19) from shaft (16).



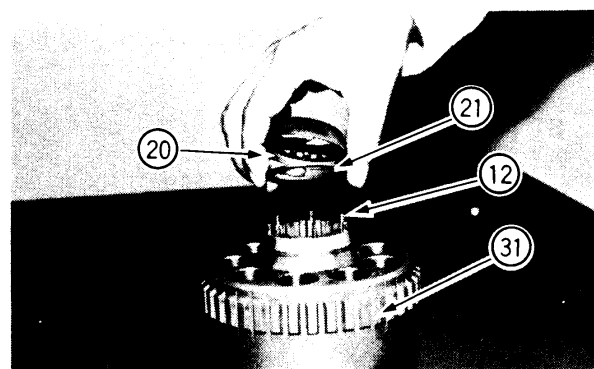
W107-02-06-080

18. Disassemble cylinder block assembly (31) pulled out in step 10.

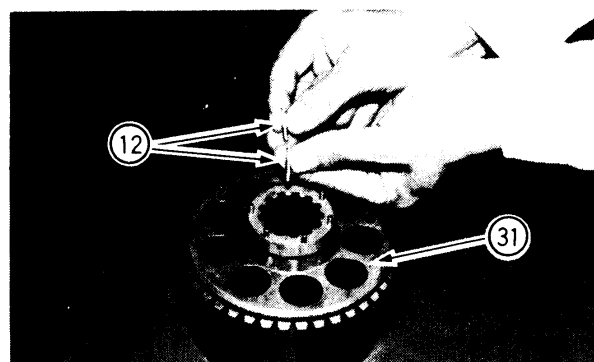
PARTS: Cylinder block (31), piston (22), shoe (24), retainer plate (13), retainer holder (20), spacer (21), push rod (12).



W107-02-06-081



W107-02-06-082



W107-02-06-083

W02-06-26

UPPERSTRUCTURE / Swing Device

EX200-2

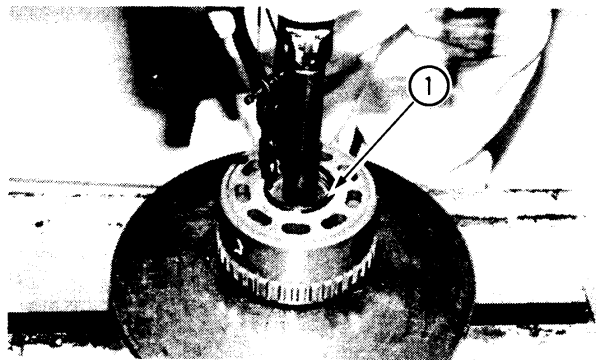
19. Press spacer (1) with special tool (ST 4113) to remove snap ring (6).



ST 4113



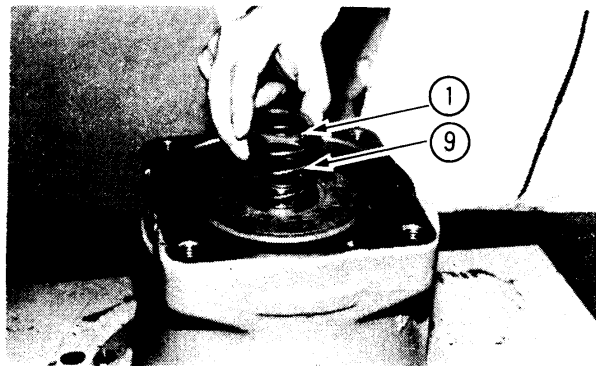
CAUTION: When removing the snap ring (6), be sure to press the spacer (1) with the special tool etc. In case of trying to remove without special tool snap ring (6), spacer (1) or / and snap ring (6) may jump out. Thus, severe injury could result.



W107-02-06-084

20. Remove spacer (1), spring (9), and spacer (25).

NOTE: The thicker spacer (1) is on retaining ring (6) side.

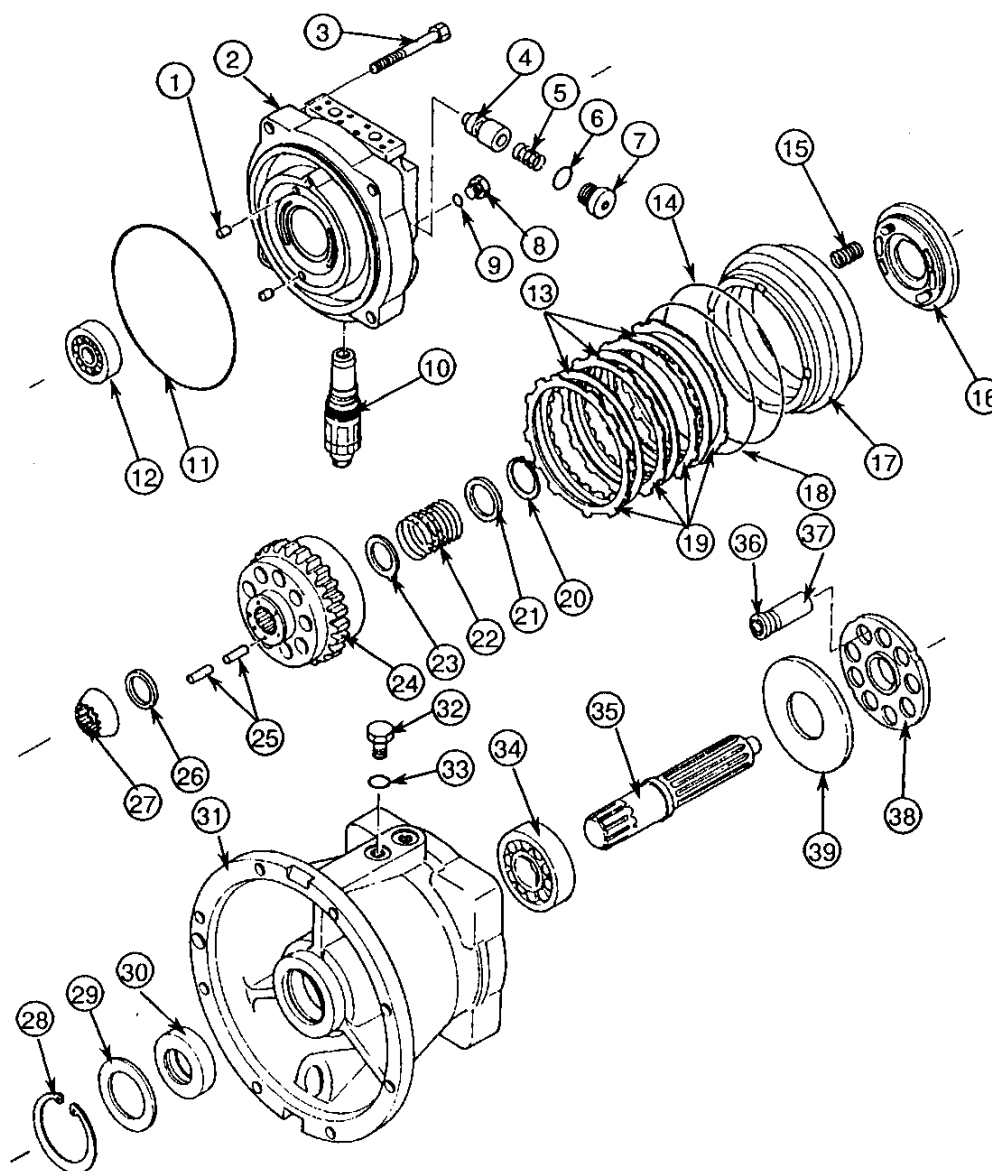


W107-02-06-085

UPPERSTRUCTURE / Swing Device

EX200-2

SWING MOTOR DRAWING FOR ASSEMBLY



- 1— Pin
- 2— Valve casing
- 3— Bolt
- 4— Check valve
- 5— Spring
- 6— O-ring
- 7— Plug
- 8— Plug
- 9— O-ring
- 10— Relief valve assembly
- 11— O-ring
- 12— Bearing
- 13— Friction plate

- 14— O-ring
- 15— Spring
- 16— Valve plate
- 17— Brake piston
- 18— O-ring
- 19— Plate
- 20— Retaining ring
- 21— Spacer
- 22— Spring
- 23— Spacer
- 24— Cylinder block
- 25— Push rod
- 26— Spacer

- 27— Holder
- 28— Retaining ring
- 29— Plate
- 30— Oil seal
- 31— Casing
- 32— Plug
- 33— O-ring
- 34— Bearing
- 35— Shaft
- 36— Shoe
- 37— Piston assembly
- 38— Retainer plate
- 39— Plate

W107-02-06-097

W02-06-28

UPPERSTRUCTURE / Swing Device

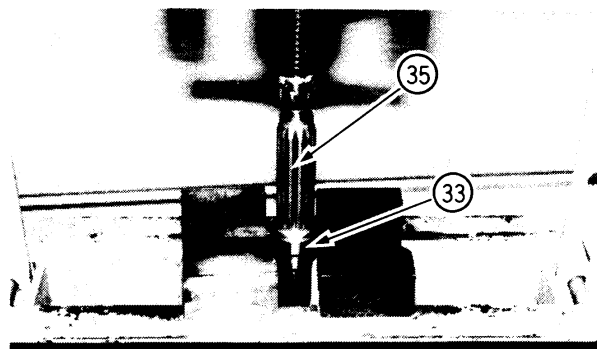
EX200-2

« Assembly of swing motor »

Before assembling, wash each part with cleaning solvent and dry with compressed air. Apply clean hydraulic oil to the internal parts before installing them.

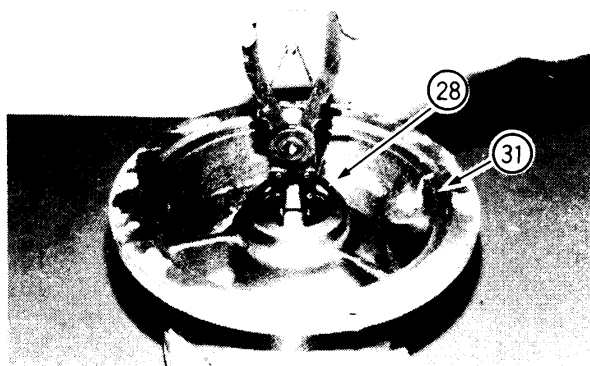
1. Install the inner race of bearing (33) to shaft (35) using special tool (ST 2318).

ST 2318



W107-02-06-098

2. Install retaining ring (28) to casing (31).



W107-02-06-099

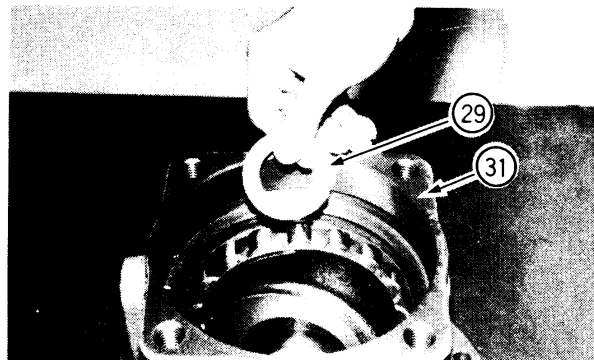
UPPERSTRUCTURE / Swing Device

EX200-2

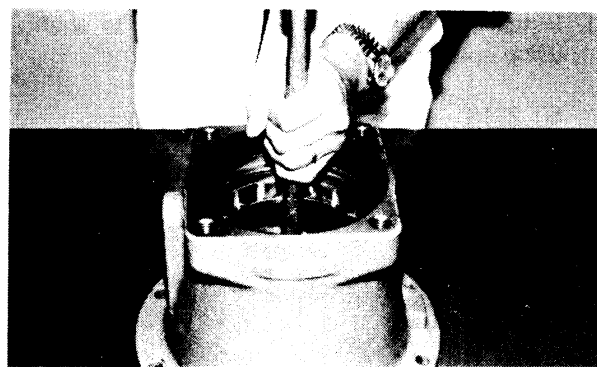
3. Turn over casing (31) and put plate (29) in it. Install oil seal (30) into casing (31) using special tool (ST 2567).

ST 2567

NOTE: Take care of the fitting direction of the oil seal.



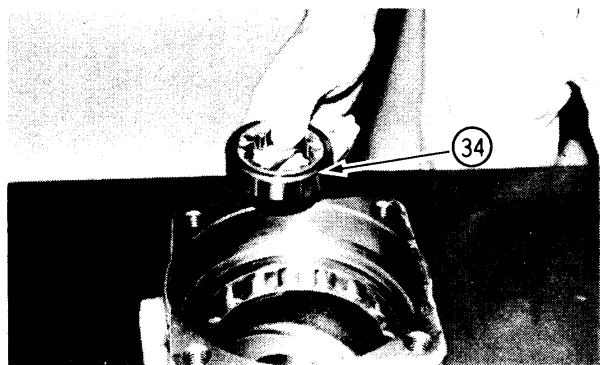
W107-02-06-100



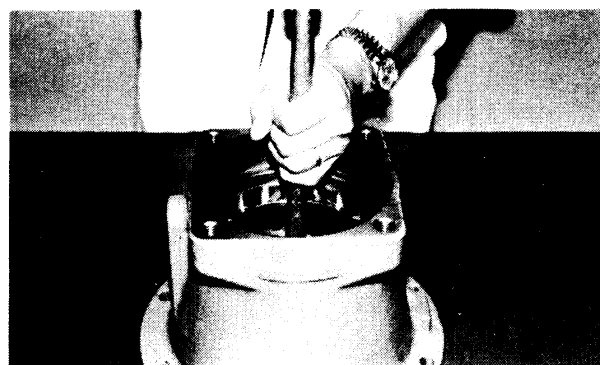
W107-02-06-101

4. Install the outer race of bearing (34) to casing (31) using special tool (ST 2565).

ST 2565



W107-02-06-102



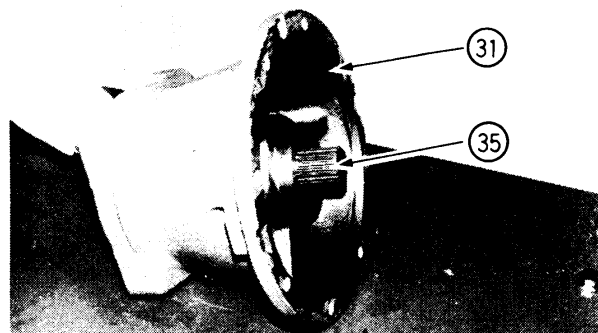
W107-02-06-103

W02-06-30

UPPERSTRUCTURE / Swing Device

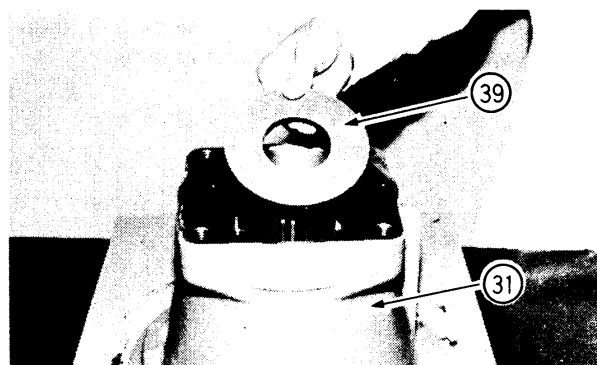
EX200-2

5. Place the casing on its side and insert shaft (35) in it.



W107-02-06-104

6. Install plate (39) in casing (31).

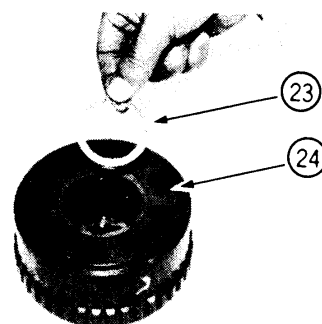


W107-02-06-105

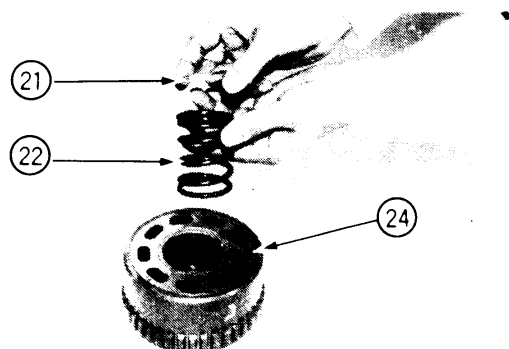
« Assembly of cylinder block »

7. Install spacer (23), spring (22), and spacer (21) in order into cylinder block (24).

NOTE: The thicker spacer (21) is on retaining ring (20) side.



W107-02-06-106



W107-02-06-107

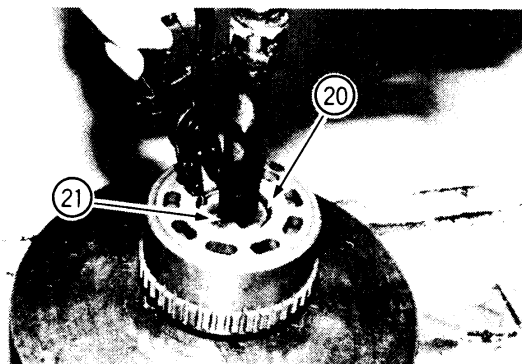
UPPERSTRUCTURE / Swing Device

EX200-2

8. Push in spacer (21) down using the special tool to make a space for retaining ring (20) to install.

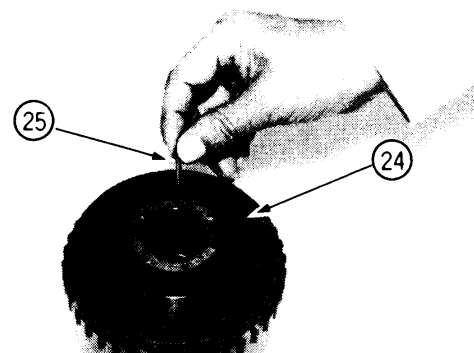


ST 4113

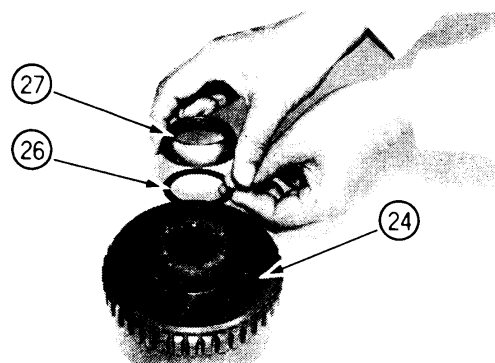


W107-02-06-108

9. Insert push rod (25) in cylinder block (24), then install spacer (26) and holder (27) in order.



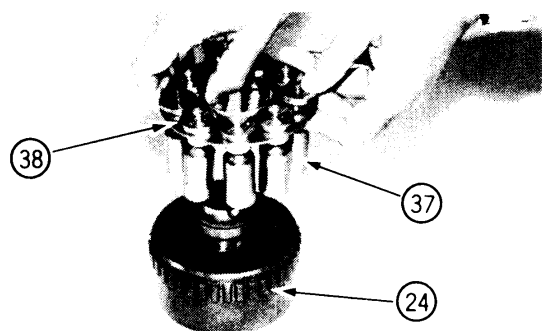
W107-02-06-109



W107-02-06-110

10. Install nine pistons (37) to retainer plate (38), then insert them in cylinder block (24).

NOTE: Before inserting pistons (37), apply hydraulic oil to the piston and holes of cylinder block (24).



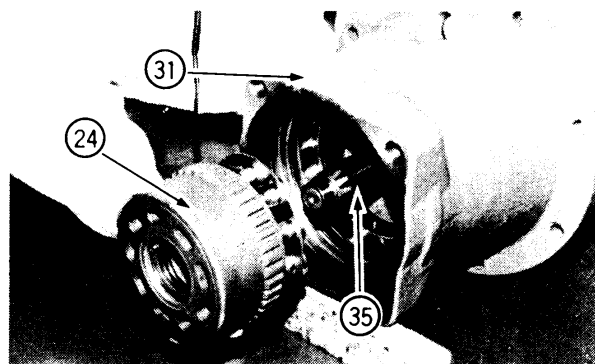
W107-02-06-111

W02-06-32

UPPERSTRUCTURE / Swing Device

EX200-2

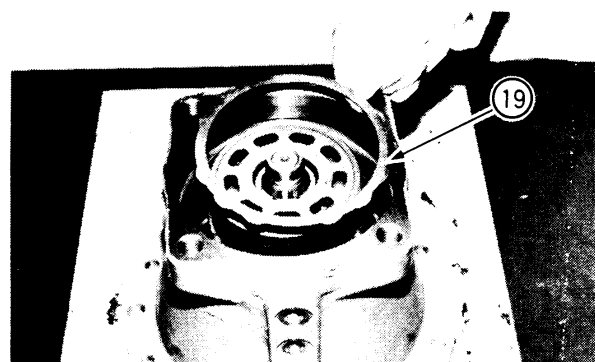
11. Place casing (31) on its side, then install cylinder block assembly (24) to shaft (35).



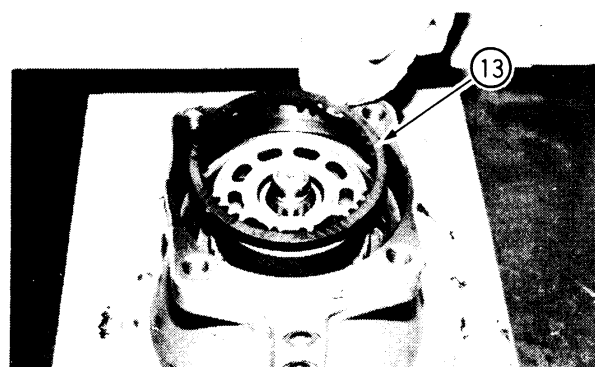
W107-02-06-112

12. Install plate (19) and friction plate (13) alternately.
Number of plates (19): 4
Number of friction plates (13): 3

NOTE: Each plate (19) has four cut parts on its outside, and each friction plate (13) has four cut parts on teeth on the spline side. Set them with those cut parts in the same direction.



W107-02-06-113

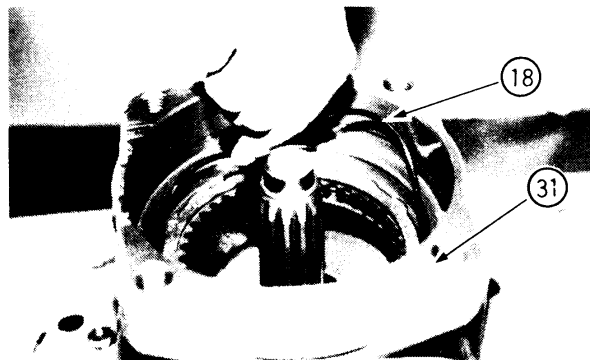


W107-02-06-114

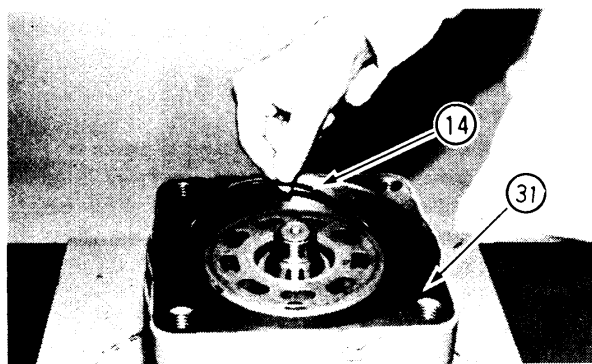
UPPERSTRUCTURE / Swing Device

EX200-2

13. Install O-rings (18) and (14) to casing (31).

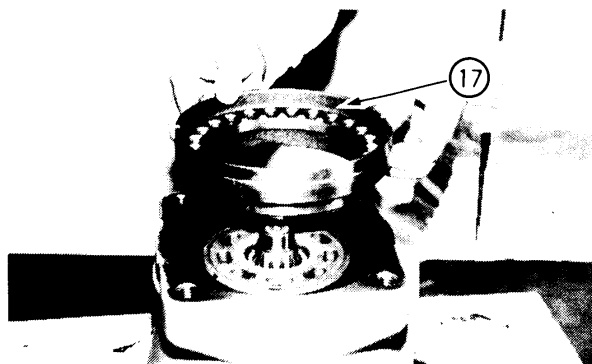


W107-02-06-115



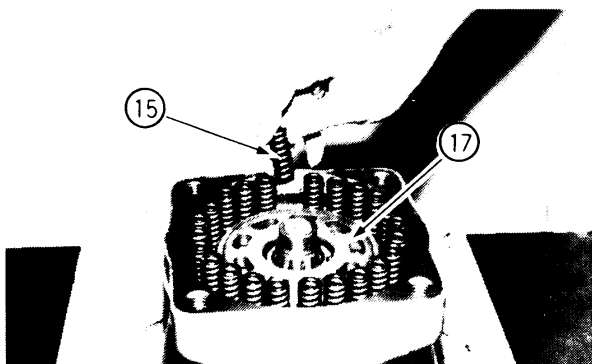
W107-02-06-116

14. Install brake piston (17) to casing (31).
If the brake piston does not enter the casing smoothly because of the resistance of the O-rings (18) and (14), evenly tap it with a plastic hammer.



W107-02-06-117

15. Install springs (15) to brake piston (17).



W107-02-06-118

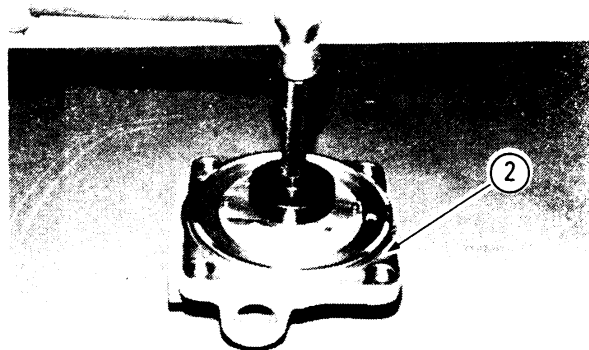
UPPERSTRUCTURE / Swing Device

EX200-2

16. Insert bearing (12) into valve casing (2) using special tool.

ST 2319

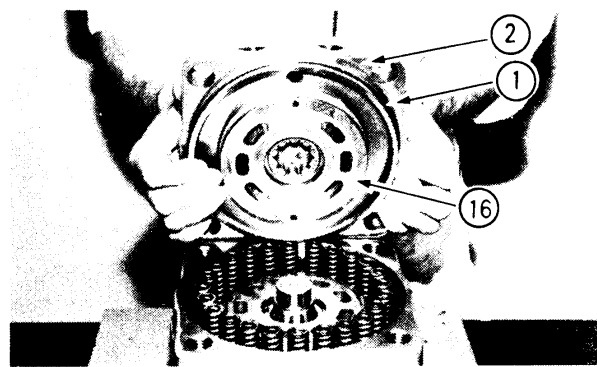
NOTE: Press the type stamped side of the bearing with the special tool.



W107-02-06-119

17. Install O-ring (1) and valve plate (16) to valve casing (2).

NOTE: Apply grease to valve plate (16) to prevent it from sliding from the body.



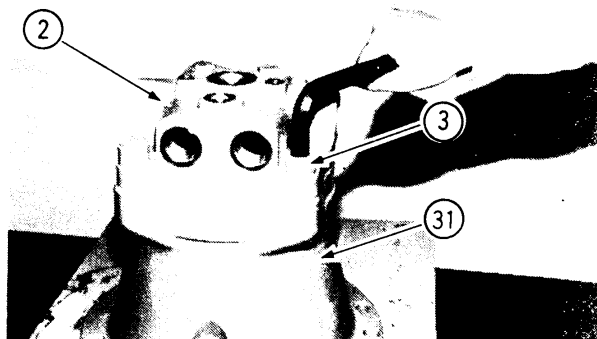
W107-02-06-120

18. Install valve casing (2) to casing (31).
Secure valve casing (2) with four socket bolts (3).

NOTE: Take care that valve plate (16) will not drop, and match the match marks made when disassembled.

 : 16 mm

 : $34 \pm 5.1 \text{ kgf}\cdot\text{m}$ ($333.4 \pm 49.0 \text{ N}\cdot\text{m}$)
($245.9 \pm 36.1 \text{ lbf}\cdot\text{ft}$)



W107-02-06-121

UPPERSTRUCTURE / Swing Device

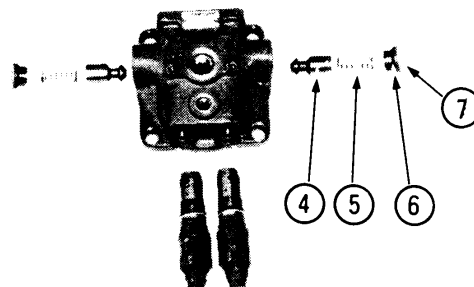
EX200-2

«Installation of make-up valve»

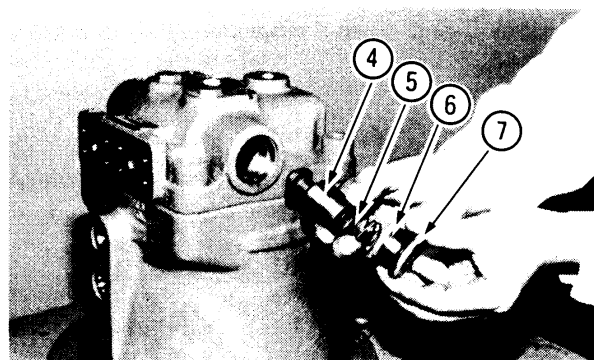
19. Install O-ring (6) to plug (7), then install poppet (4), spring (5) and plug (7) to the body.

 : 14 mm

 : $22.5 \pm 2.5 \text{ kgf}\cdot\text{m}$ ($220.6 \pm 24.5 \text{ N}\cdot\text{m}$)
($162.5 \pm 18.0 \text{ lbf}\cdot\text{ft}$)



W107-0206-122



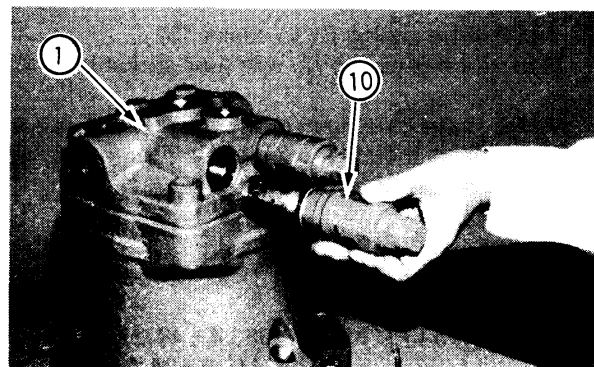
W107-0206-123

«Installation of relief valve»

20. Install relief valve assembly (10) to valve casing (01).

 : 41 mm

 : $22.5 \pm 2.5 \text{ kgf}\cdot\text{m}$ ($176.5 \pm 9.8 \text{ N}\cdot\text{m}$)
($130.1 \pm 7.2 \text{ lbf}\cdot\text{ft}$)



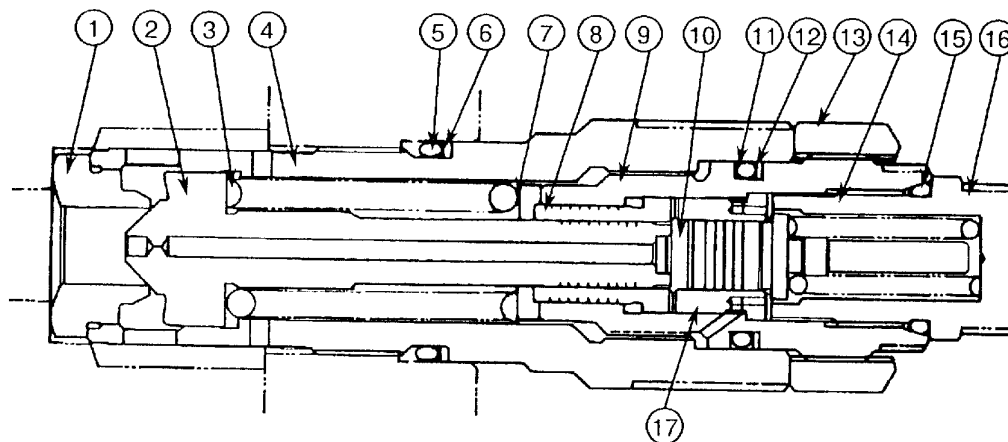
W107-0206-124

UPPERSTRUCTURE / Swing Device

EX200-2

RELIEF VALVE DRAWING FOR DISASSEMBLY

« Relief valve assembly »



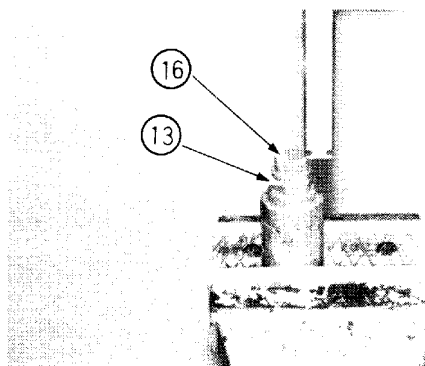
W107-02-06-086

- | | | | |
|------------|--------------------|-----------------|------------|
| 1— Seat | 6— Backup ring | 11— O-ring | 16— Plug |
| 2— Plunger | 7— Spring seat 1 | 12— Backup ring | 17— Sleeve |
| 3— Spring | 8— Piston 1 | 13— Lock nut | |
| 4— Body | 9— Adjustment plug | 14— Spring | |
| 5— O-ring | 10— Piston 2 | 15— O-ring | |

« Relief valve »

21. Before removing the relief valve, measure the end faces of lock nut (13) and plug (16), and record them.

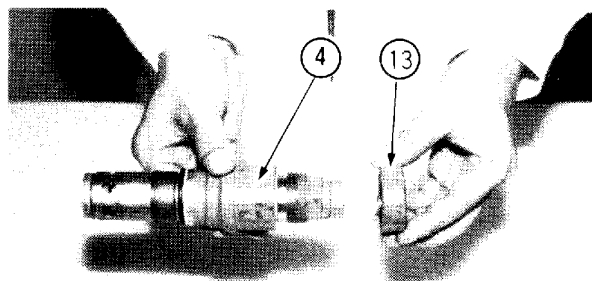
Measuring instrument: Slide calipers



W107-02-06-087

22. Hold body (4) with a vise, and remove lock nut (13).

 : 41 mm



W107-02-06-088

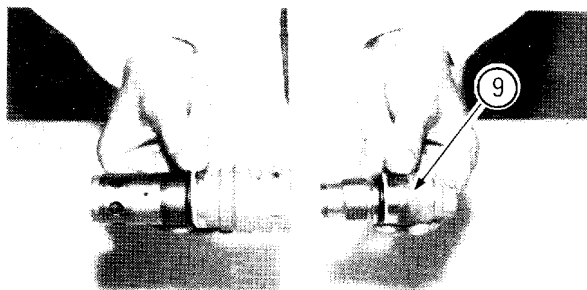
W02-06-37

UPPERSTRUCTURE / Swing Device

EX200-2

23. Remove adjustment plug (9).

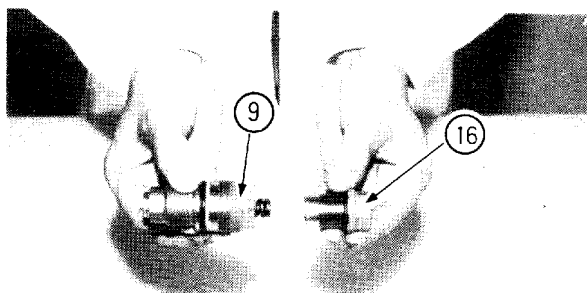
 : 27 mm



W107-02-06-089

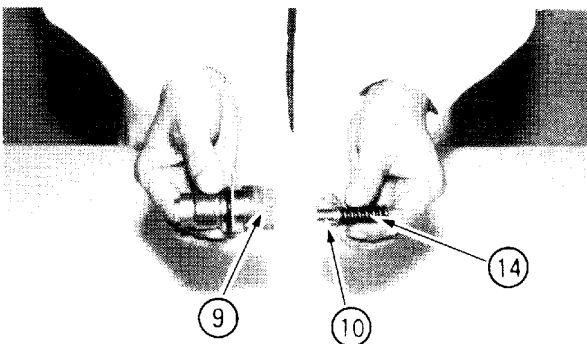
24. Hold plug (16) with the vise and remove adjustment plug (9).

 : 27 mm



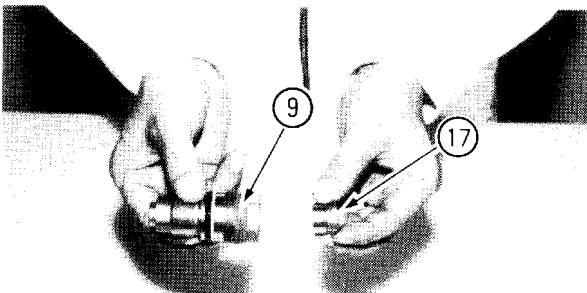
W107-02-06-090

25. Remove spring (14) and piston 2 (10) from adjustment plug (9).



W107-02-06-091

26. Remove sleeve (17) from adjustment plug (9).



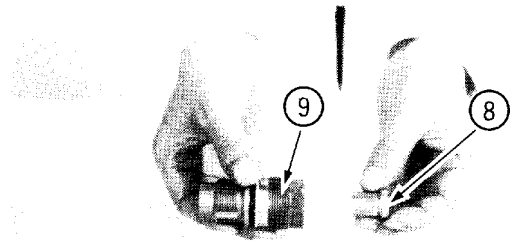
W107-02-06-092

W02-06-38

UPPERSTRUCTURE / Swing Device

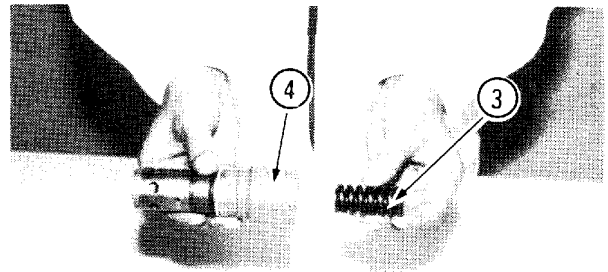
EX200-2

27. Remove piston 1 (8) from adjustment plug (9).



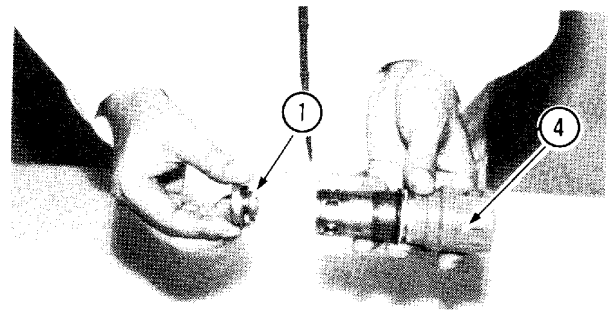
W107-02-06-093

28. Remove spring seat (7) and spring (3) from body (4).



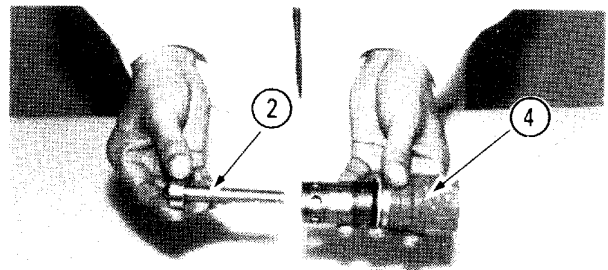
W107-02-06-094

29. Remove seat (1) from body (4).



W107-02-06-095

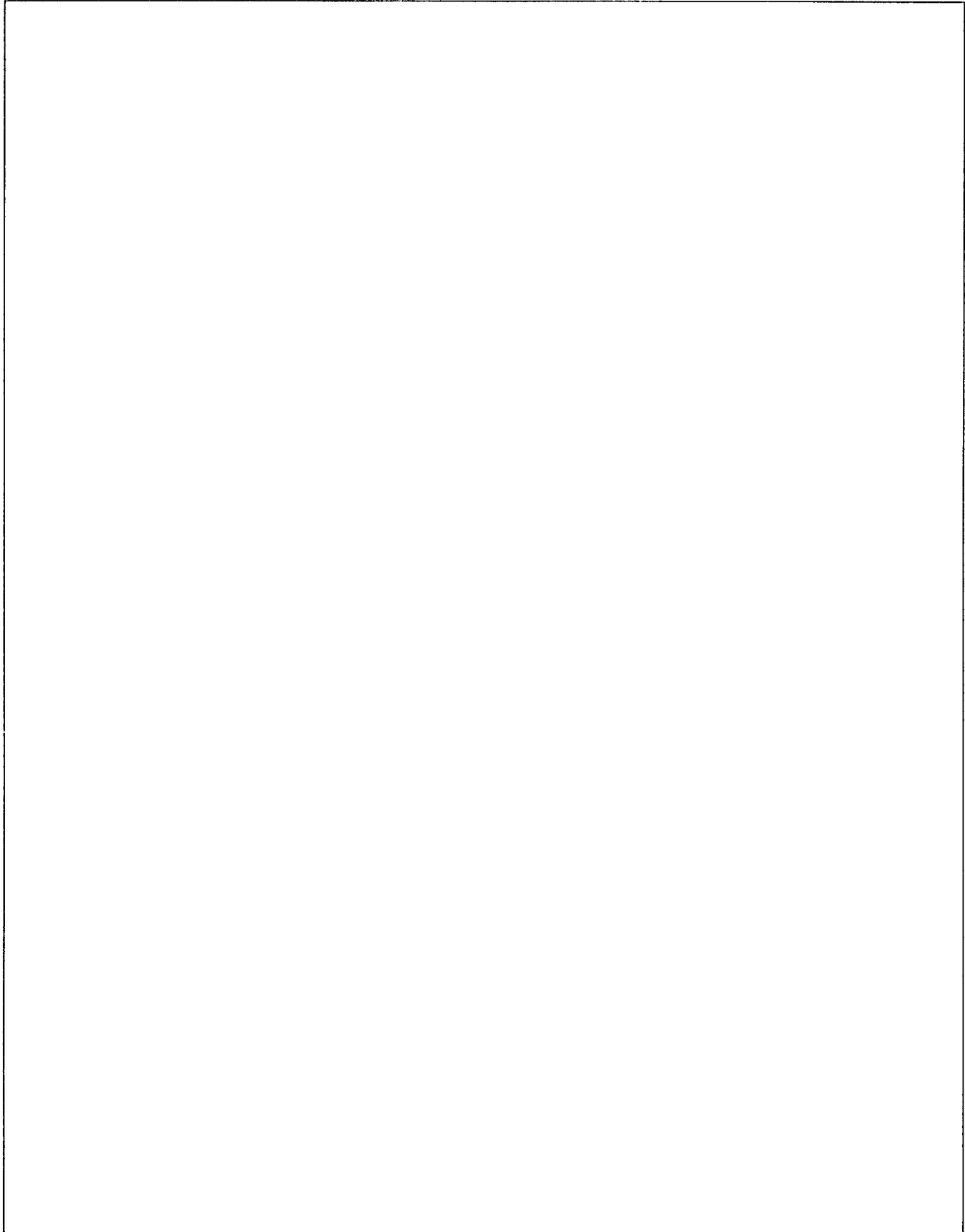
30. Remove plunger (2) from body (4).



W107-02-06-096

UPPERSTRUCTURE / Swing Device

EX200-2

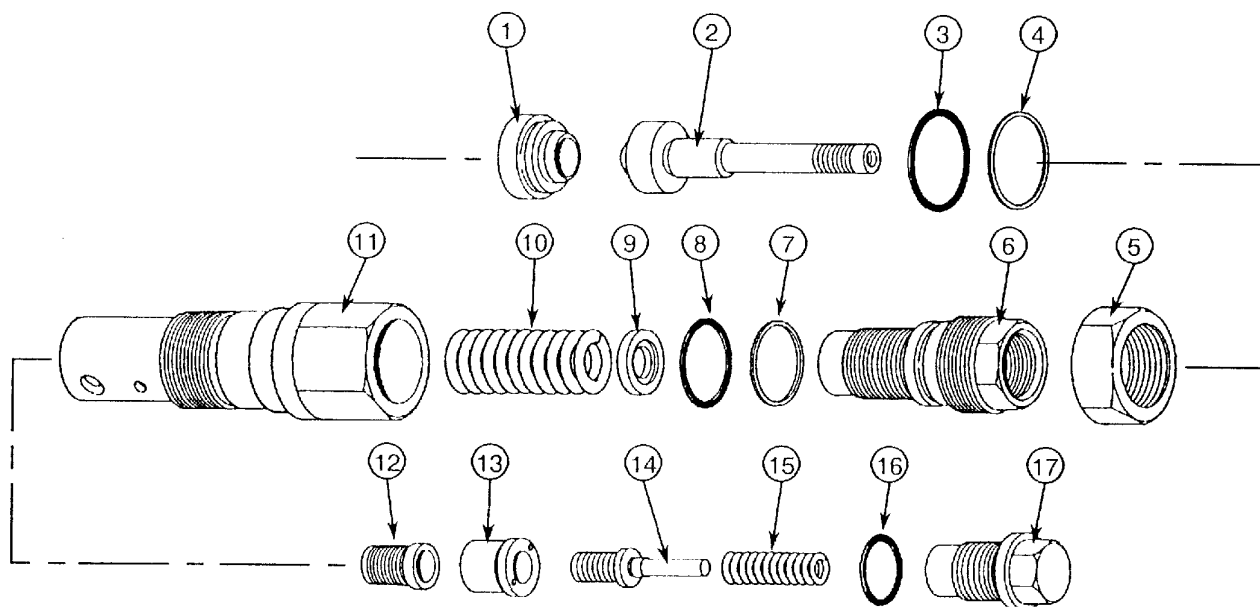


W02-06-40

UPPERSTRUCTURE / Swing Device

EX200-2

RELIEF VALVE DRAWING FOR ASSEMBLY



W107-02-06-125

- 1— Seat
- 2— Plunger
- 3— O-ring
- 4— Backup ring
- 5— Lock nut

- 6— Adjustment plug
- 7— Backup ring
- 8— O-ring
- 9— Spring
- 10— Spring

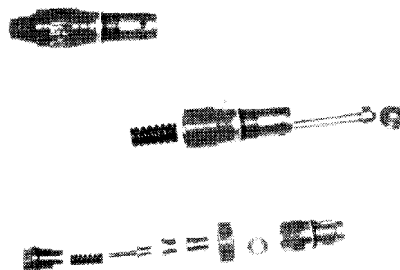
- 11— Body
- 12— Piston 1
- 13— Sleeve
- 14— Piston 2
- 15— Spring

- 16— O-ring
- 17— Plug

UPPERSTRUCTURE / Swing Device

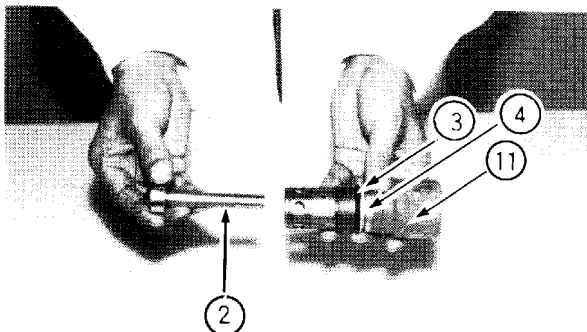
EX200-2

«Assembly of relief valve»

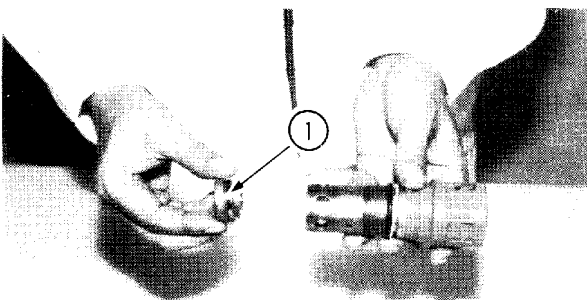


W107-02-06-126

31. Install backup ring (4) and O-ring (3) to body (11), then insert plunger (2) and install seat (1).

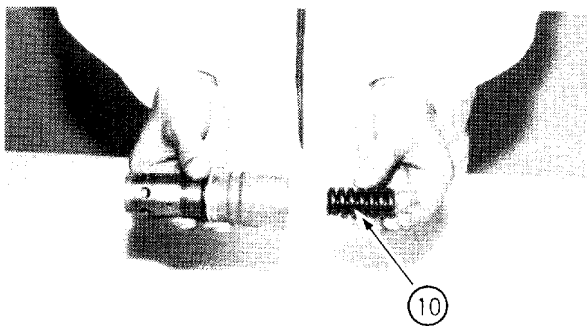


W107-02-06-127



W107-02-06-128

32. Insert spring (10) in body (11).

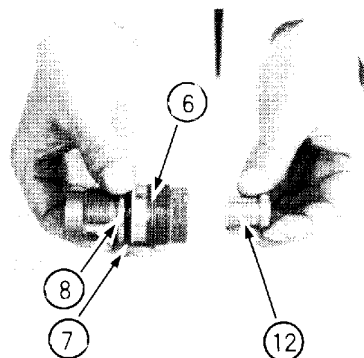


W107-02-06-129

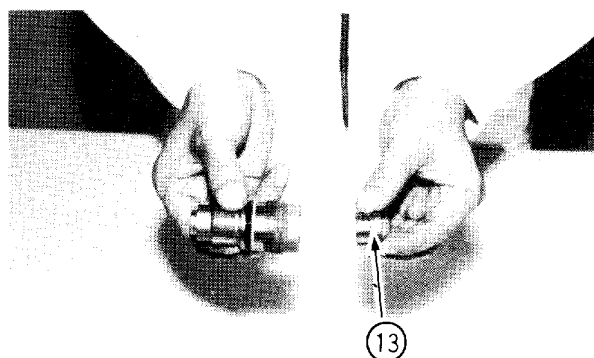
UPPERSTRUCTURE / Swing Device

EX200-2

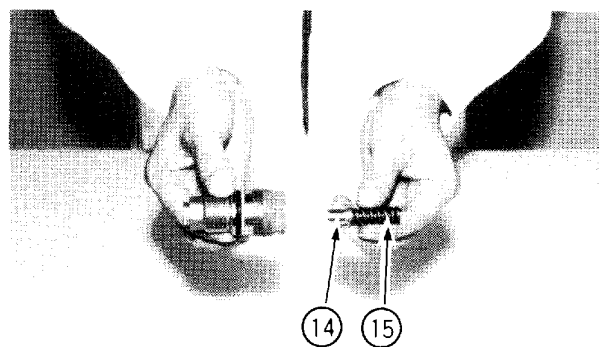
33. Install O-ring (8) and backup ring (7) to adjustment plug (6), then install the piston1 (12), sleeve (13), piston 2 (14), and spring (15) in order.



W107-02-06-130



W107-02-06-131

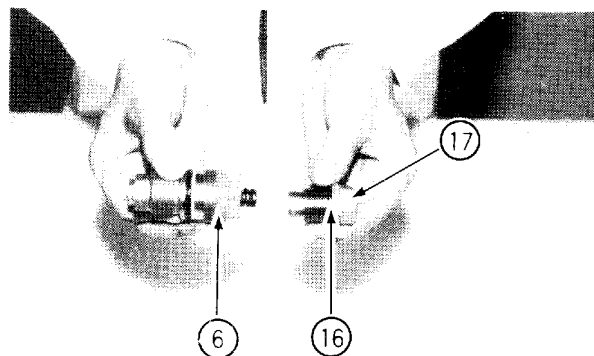


W107-02-06-132

34. Install O-ring (16) to plug (17), then install them to adjustment plug (6).

 : 27 mm

 : 12 kgf.m (117.6 N.m 87 lbf.ft)



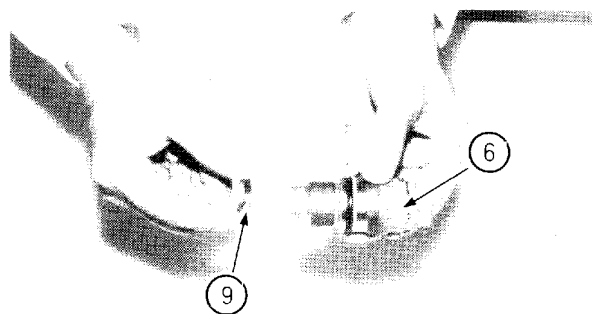
W107-02-06-133

W02-06-43

UPPERSTRUCTURE / Swing Device

EX200-2

25. Install spring seat (9) to adjustment plug (6).



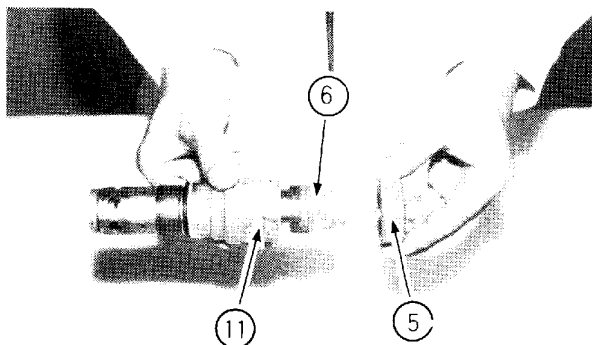
W107-02-06-134

36. Install adjustment plug (6) to body (11). Install lock nut (5) to adjustment plug (6).

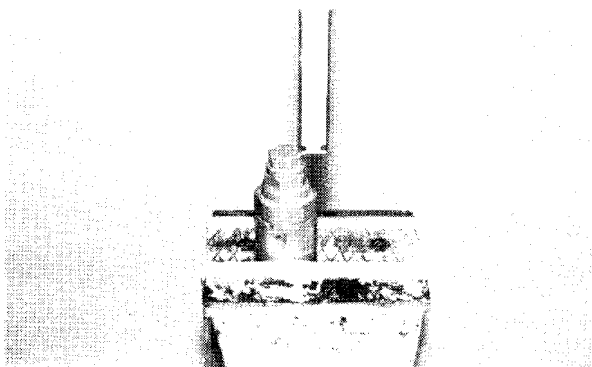
 : 41 mm

 : 13~19 kgf·m (127.4 to 186.3 N.m)
(94.0 to 137.4 lbf.ft)

NOTE: Match the plug (17) and lock nut (5) to the dimensions recorded when disassembled.



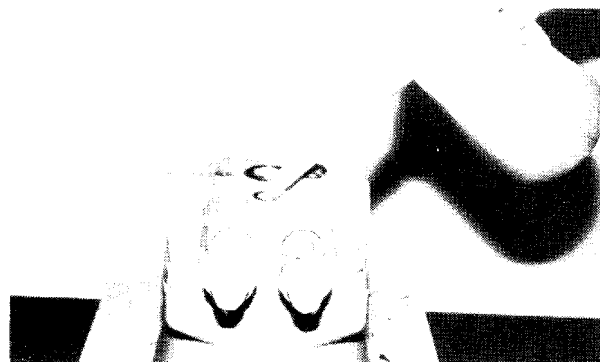
W107-02-06-135



W107-02-06-136

37. Supply hydraulic oil through the valve casing.

Hydraulic oil: 0.7 liters (0.18 US gal)



W107-02-06-137

W02-06-44

UPPERSTRUCTURE / Swing Device

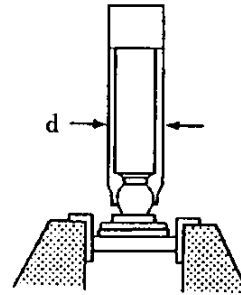
EX200-2

MAINTENANCE STANDARD

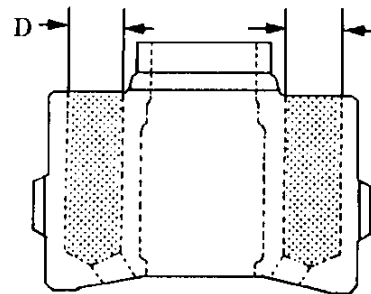
Swing motor

1. Clearance between outside diameter of piston and inside diameter of cylinder $D-d$

Standard clearance	Maximum allowable wear
0.039 mm	0.052 mm



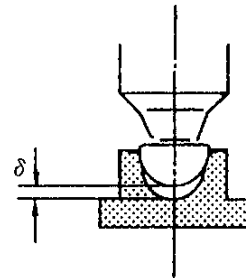
W107-02-06-138



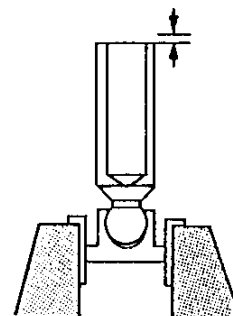
W107-02-06-139

2. Clearance between piston and shoe

Standard clearance	Maximum allowable wear
0 mm	0.3 mm



W107-02-06-140



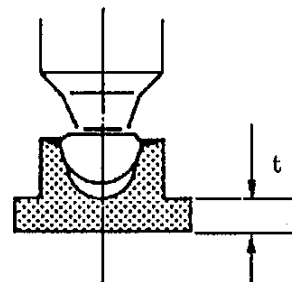
W107-02-06-141

UPPERSTRUCTURE / Swing Device

EX200-2

3. Thickness of shoe

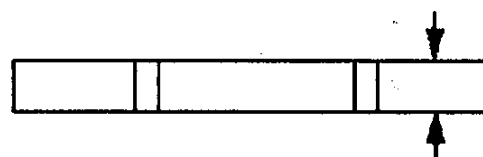
Standard clearance	Maximum allowable wear
6.0 mm	5.8 mm



W107-02-06-142

4. Thickness of friction plate

Standard clearance	Maximum allowable wear
3.78 mm	3.38 mm



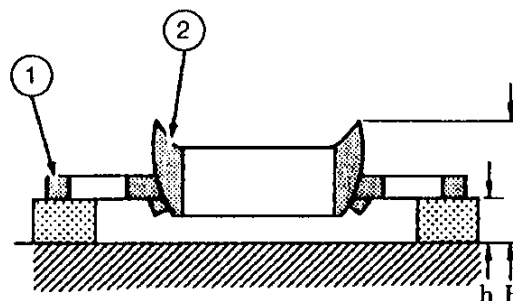
W107-02-06-143

5. Total clearance of retainer plate (1) and holder (2)

Height (H) - (h)

Standard clearance	Maximum allowable wear
7.0 mm	6.5 mm

If the dimension is reduced to below 6.5 mm, replace retainer plate (1) and holder (2).

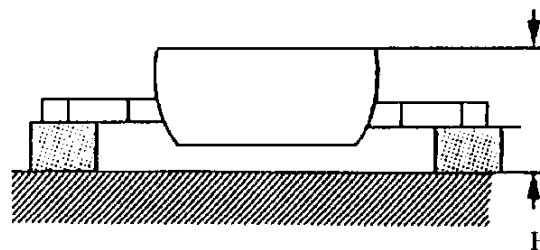


W107-02-06-146

Height (H)

Standard clearance	Maximum allowable wear
23 mm	22.5 mm

If the dimension is reduced to below 22.5 mm, replace retainer plate (1) and holder (2).



W107-02-06-147

UPPERSTRUCTURE / Swing Device

EX200-2

TOOLS USED FOR DISASSEMBLING AND ASSEMBLING**Tools**

1. Tightening tools

Unit:mm

Tool name	Size	Remarks
 Spanner	19, 27, 29,41	
 Socket wrench	19,41	
 Hex wrench	10, 14	

2. General tools

Tool name
 Blade-tip screwdriver
 Plastic hammer,  hand hammer,  snap ring pliers

3. Measuring instruments

Tool name
 Torque wrench

4. Oil, grease, liquid gasket, etc. used for assembling

1. Grease (General-purpose lithium grease)
2. THREEBOND 1215
3. Gear oil (SAE90, GL-5 grade)

UPPERSTRUCTURE / Pilot Valve

EX200-2

REMOVAL AND INSTALLATION OF LEFT PILOT VALVE FOR FRONT CONTROL

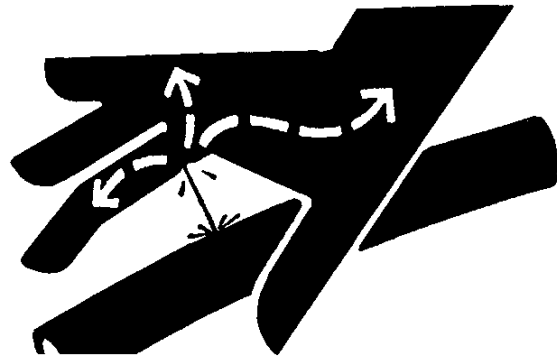
1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.
2. Loosen lock nut (1) and remove the control lever.
3. Loosen screw and remove cover.
4. Remove the cover of the control box.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

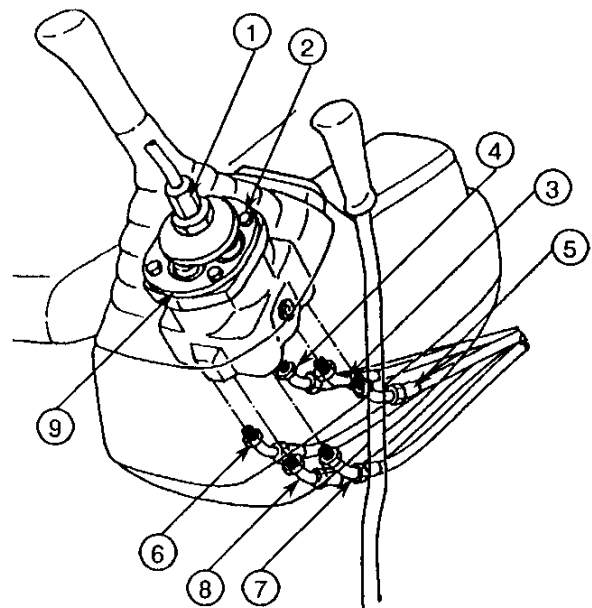
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

5. Remove hoses (3) to (8).
6. Remove bolts (2) to remove the pilot valve assembly.
7. Install the pilot valve assembly with bolts (2), then connect hoses (3) to (8).
8. Install the control lever and secure it with lock nut (1), then install the cover with bolts.
9. Reinstall the cover of the control box.



SA-031



W105-02-07-001

Tightening torque

Left-hand pilot valve mounting bolt

Tightening torque 1.0 kgf-m (9.0 N.m)(7.1 lbf.ft)

Hose to arm crowd side

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

Pilot pressure delivery hose to left-hand pilot valve

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

Hose to left swing control valve

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

Hose to right swing control valve

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

Hose to arm dump side

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

Return hose from left-hand pilot valve

Tightening torque 4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

- 1- Lock nut for fixing lever
- 2- Left-hand pilot valve mounting bolt
- 3- Hose to arm crowd side
- 4- Pilot pressure delivery hose to left-hand pilot valve (from pilot shut-off valve)
- 5- To left swing control valve
- 6- To right swing control valve
- 7- To shockless valve (arm dump side)
- 8- Return hose from left-hand pilot valve to hydraulic tank
- 9- Left-hand pilot valve

UPPERSTRUCTURE / Pilot Valve

EX200-2

REMOVAL AND INSTALLATION OF RIGHT PILOT VALVE FOR FRONT CONTROL

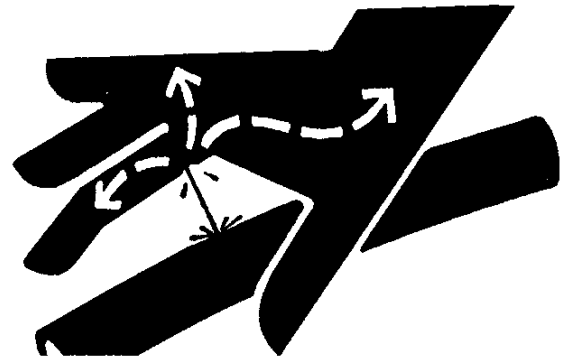
1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.
2. Loosen lock nut (1) and remove the control lever.
3. Loosen screw and remove cover.
4. Remove the cover of the control box.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

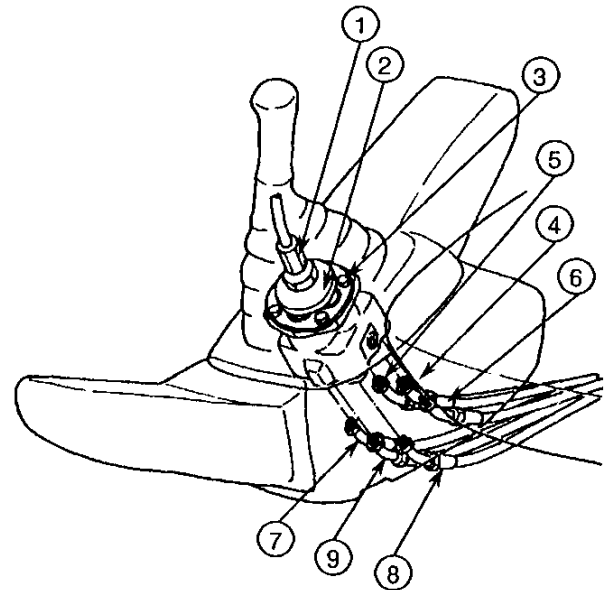
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

5. Remove hoses (3) - (8).
6. Remove bolts (2) to remove the pilot valve assembly.
7. Install the pilot valve assembly with bolts (2), then connect hoses (3) - (8).
8. Install the control lever and secure it with lock nut (1), then install the cover with bolts.
9. Reinstall the cover of the control box.



SA-031



W105-02-07-002

Tightening torque

Right-hand pilot valve mounting bolt	
Tightening torque	1.0 kgf-m (9.0 N.m)(7.1 lbf.ft)
Hose to arm crowd side	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)
Pilot pressure delivery hose to right-hand pilot valve	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)
Hose to right swing control valve	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)
Hose to right swing control valve	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)
Hose to arm dump side	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)
Return hose from right-hand pilot valve	
Tightening torque	4.0 kgf-m (39.0 N.m)(28.0 lbf.ft)

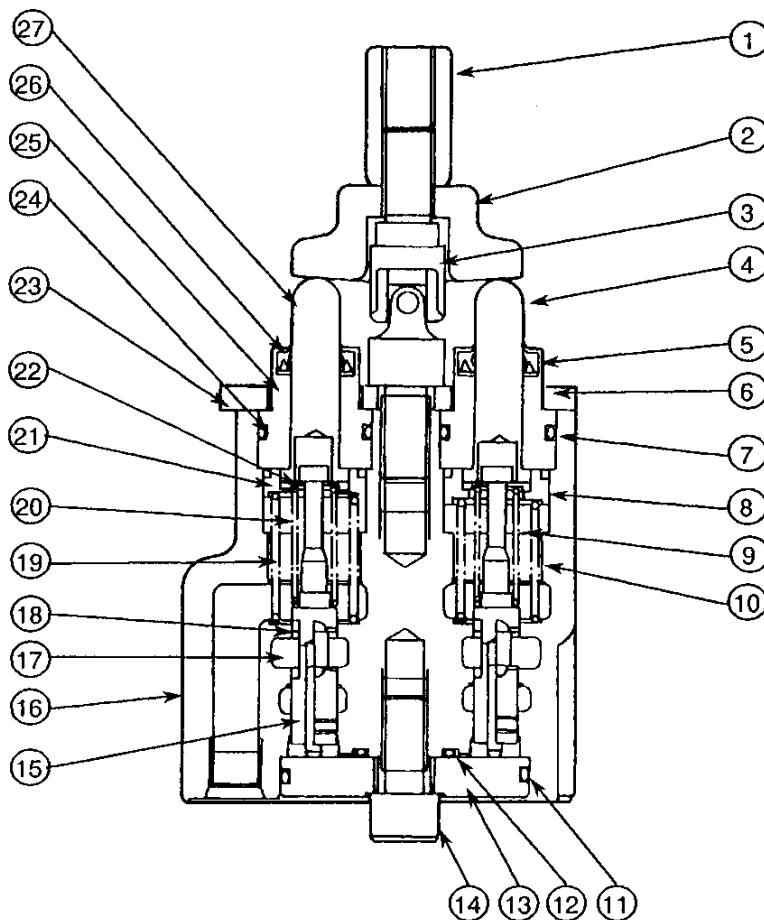
- 1- Lock nut for fixing lever
- 2- Right-hand pilot valve mounting bolt
- 3- Hose to arm crowd side
- 4- Pilot pressure delivery hose to right-hand pilot valve (from pilot shut-off valve)
- 5- To left swing control valve
- 6- To right swing control valve
- 7- To shockless valve (arm dump side)
- 8- Return hose from right-hand pilot valve to hydraulic tank
- 9- Right-hand pilot valve

W02-07-02

UPPERSTRUCTURE / Pilot Valve

EX200-2

FRONT PILOT VALVE DRAWING FOR DISASSEMBLY



W105-02-07-003

- | | | |
|--------------------------|--------------------------|---------------------------|
| 1— Screw joint | 10— Spring (Return 1, 3) | 19— Spring (Return 2, 4) |
| 2— Cam | 11— O-ring | 20— Spring (Balance 2, 4) |
| 3— Universal joint | 12— O-ring | 21— Guide spring (2, 4) |
| 4— Pusher (1, 3) | 13— Plate | 22— Spacer |
| 5— Oil seal | 14— Socket bolt | 23— Plate |
| 6— Bushing | 15— Piston | 24— O-ring |
| 7— O-ring | 16— Casing | 25— Bushing |
| 8— Spring guide | 17— Spool | 26— Oil seal |
| 9— Spring (Balance 1, 3) | 18— Shim | 27— Pusher (2, 4) |

UPPERSTRUCTURE / Pilot Valve

EX200-2

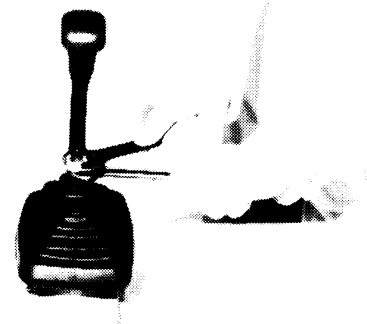
«Precautions for disassembling»

1. Since casing (16) and spool (17) are selectively fitted to each other, replace both of them at the same time.
2. Note that different springs (9), (20), (10), (19), spring guides (8) and (21), and pushers (6) and (25) are used for ports 1 and 3 and ports 2 and 4.
3. For this reason, indicate the port Nos on each part removed. Port Nos are cast on casing (16).

«Disassembling pilot valve for front control»

1. Wipe off the boot carefully and clean the outside of the valve, then place the valve unit on a table with the pusher side up.
Loosen the lock nut, and remove the control lever from the valve.
Remove the boot.

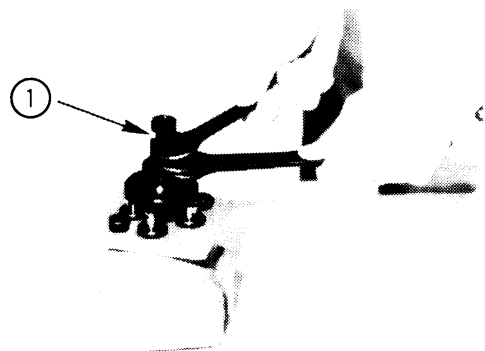
 : 19 mm, 22 mm



W105-02-07-004

2. Remove joint screw (1).

 : 19 mm, 24 mm



W105-02-07-005

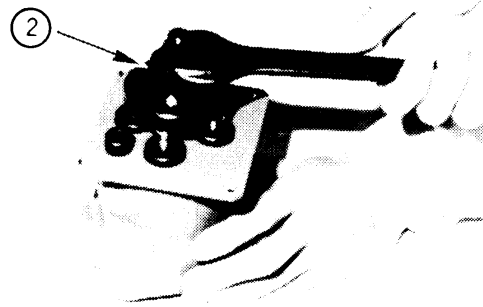
W02-07-04

UPPERSTRUCTURE / Pilot Valve

EX200-2

3. Remove cam (2).
Secure the plate with two M8 × pitch 1.25 bolts .

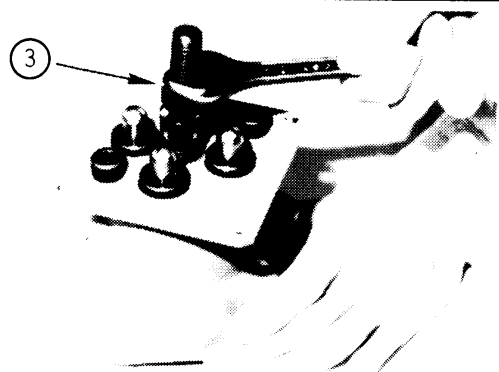
 : 24 mm



W105-02-07-006

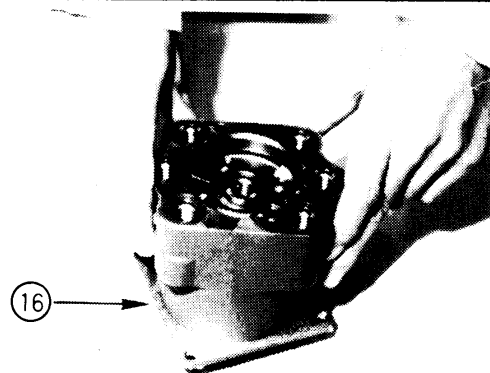
4. Loosen universal joint (3) and remove it from the casing.

 : 17 mm



W105-02-07-007

5. Turn over casing (16).

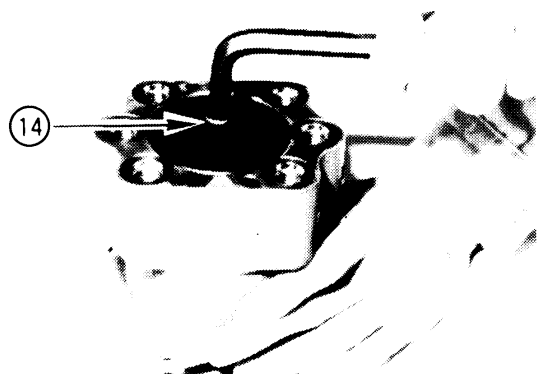


W105-02-07-008

«Disassembling of casing»

6. Loosen and remove socket bolt (14).

 : 10 mm

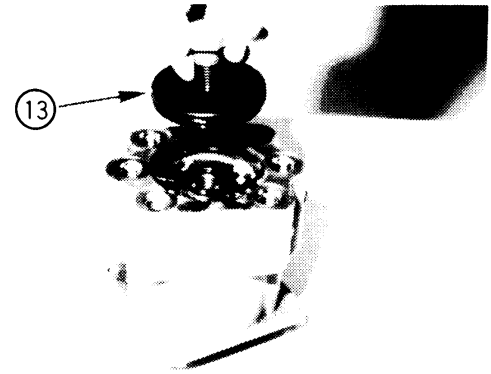


W105-02-07-009

UPPERSTRUCTURE / Pilot Valve

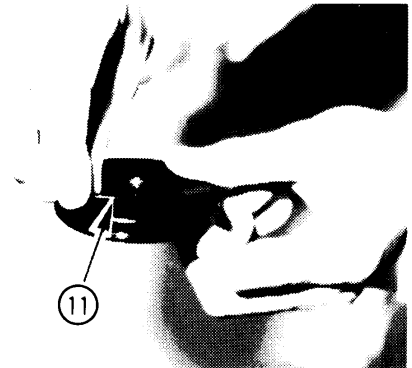
EX200-2

7. Pull out plate (13), using a pulling bolt (M16 × P2).



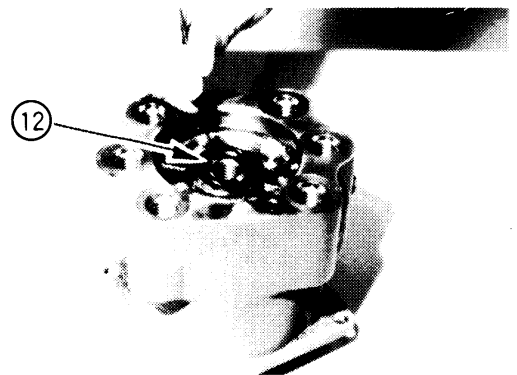
W105-02-07-010

8. Remove O-ring (11) from the plate.



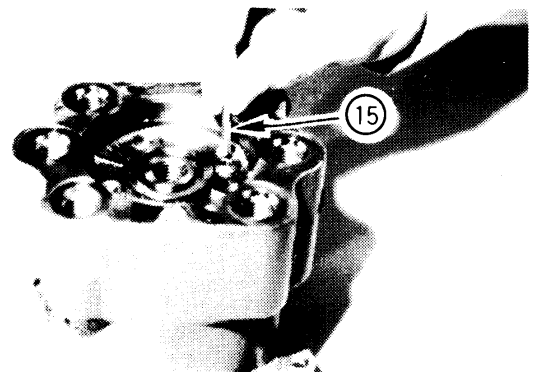
W105-02-07-011

9. Remove O-ring (12) from the casing.



W105-02-07-012

10. Remove piston (15) from spool (17) in each port.



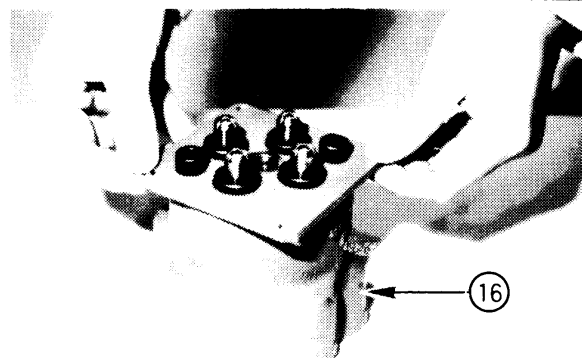
W105-02-07-013

W02-07-06

UPPERSTRUCTURE / Pilot Valve

EX200-2

11. Turn over casing (16).

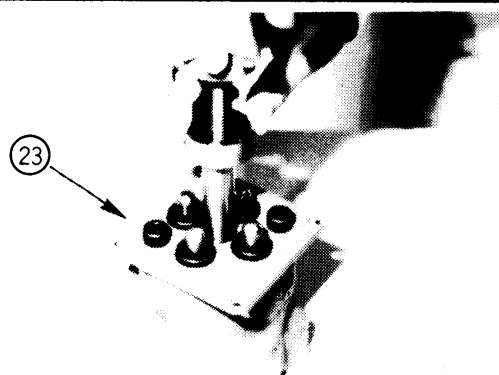


W105-02-07-014

«Disassembling of pusher assembly»

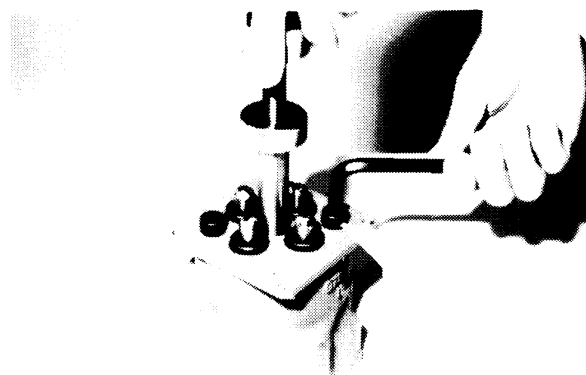
12. Install the jig to the universal joint mounting hole of the casing, then tighten plate (23).

Jig No: ST 7924



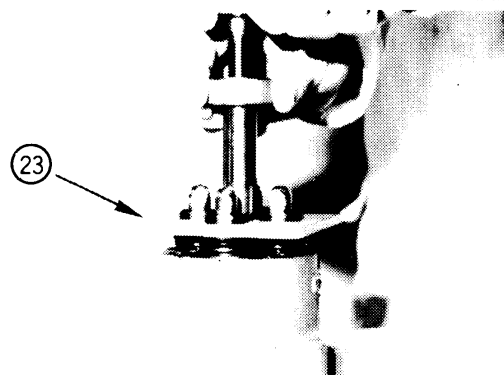
W105-02-07-015

13. Remove the two M8 × 1.25 bolts installed in step 3.



W105-02-07-016

14. Gradually loosen the jig. The spool assembly and plate (23) are lifted by spring pressure.



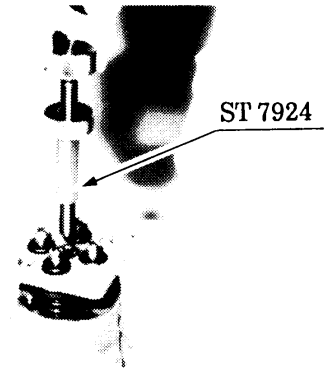
W105-02-07-017

UPPERSTRUCTURE / Pilot Valve

EX200-2

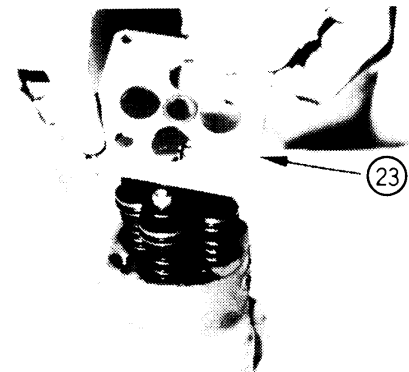
15. Remove the jig from the casing.

Jig No: ST 7924



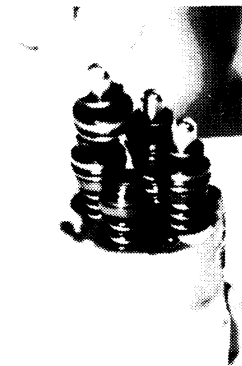
W105-02-07-018

16. Remove plate (23).



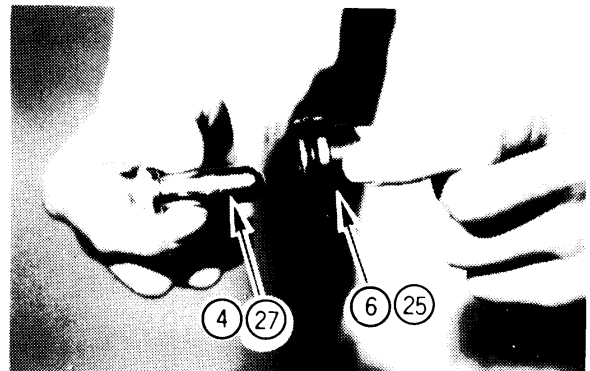
W105-02-07-019

17. Remove the pusher assembly.



W105-02-07-020

18. Remove pushers (4) and (27) from bushings (6) and (25).



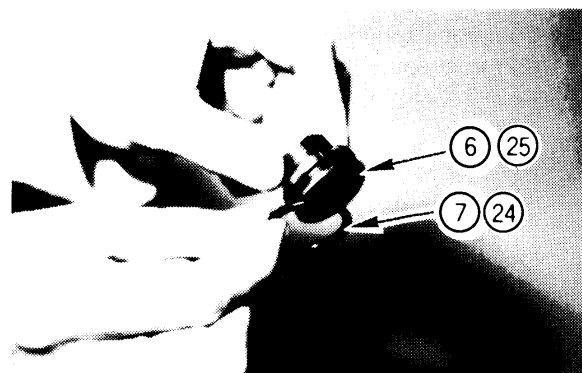
W105-02-07-021

W02-07-08

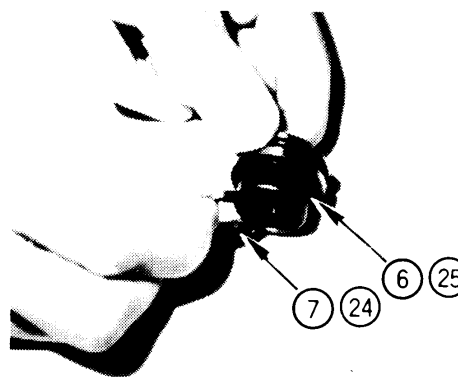
UPPERSTRUCTURE / Pilot Valve

EX200-2

19. Remove O-rings (7) and (4) from bushings (6) and (25).

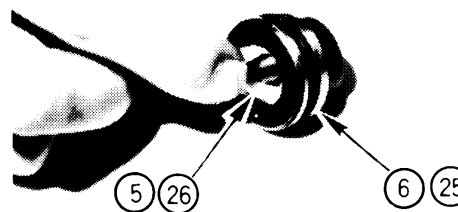


W105-02-07-022



W105-02-07-023

20. Remove oil seals (5) and (26) from bushings (6) and (25).

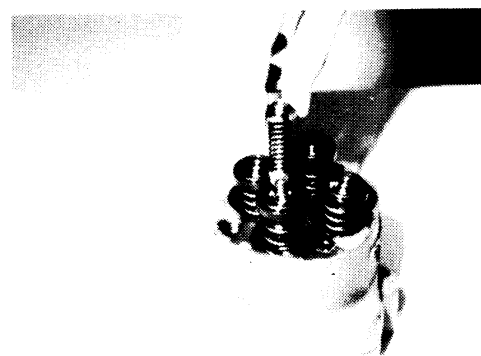


W105-02-07-024

«Disassembling of spool assembly»

21. Remove the spool assembly from each port.

NOTE: Do not forget to indicate the port No. on each port removed, in order to avoid them from becoming mixed up.

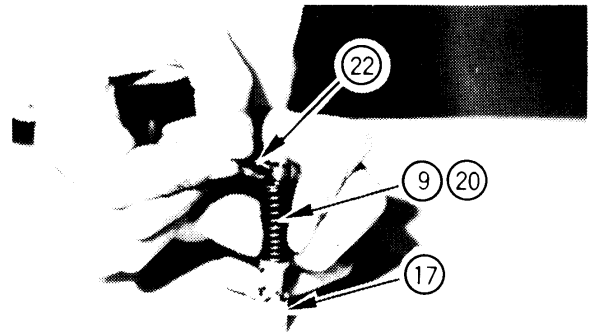


W105-02-07-025

UPPERSTRUCTURE / Pilot Valve

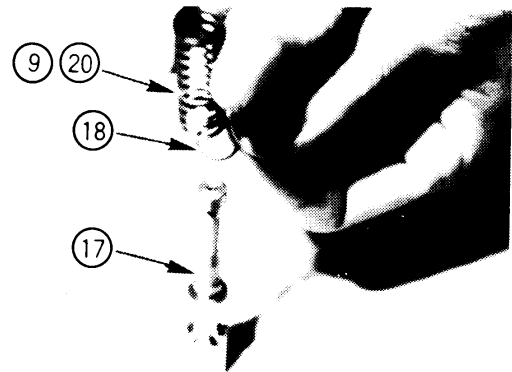
EX200-2

22. Compress springs (9) and (20), and remove spacer (22) from spool (17).



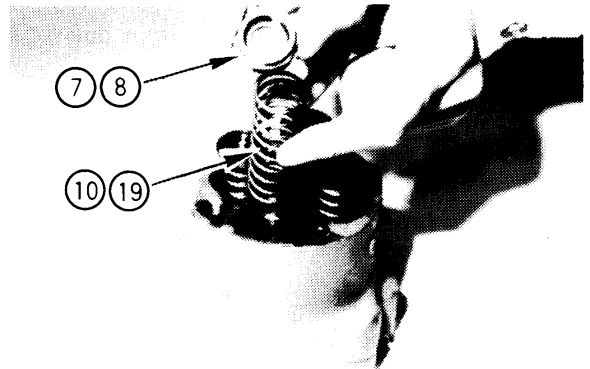
W105-02-07-026

23. Remove springs (9) and (20) and shim (18) from spool (17).



W105-02-07-027

24. Remove spring guides (8) and (1) and springs (10) and (19) from each port.

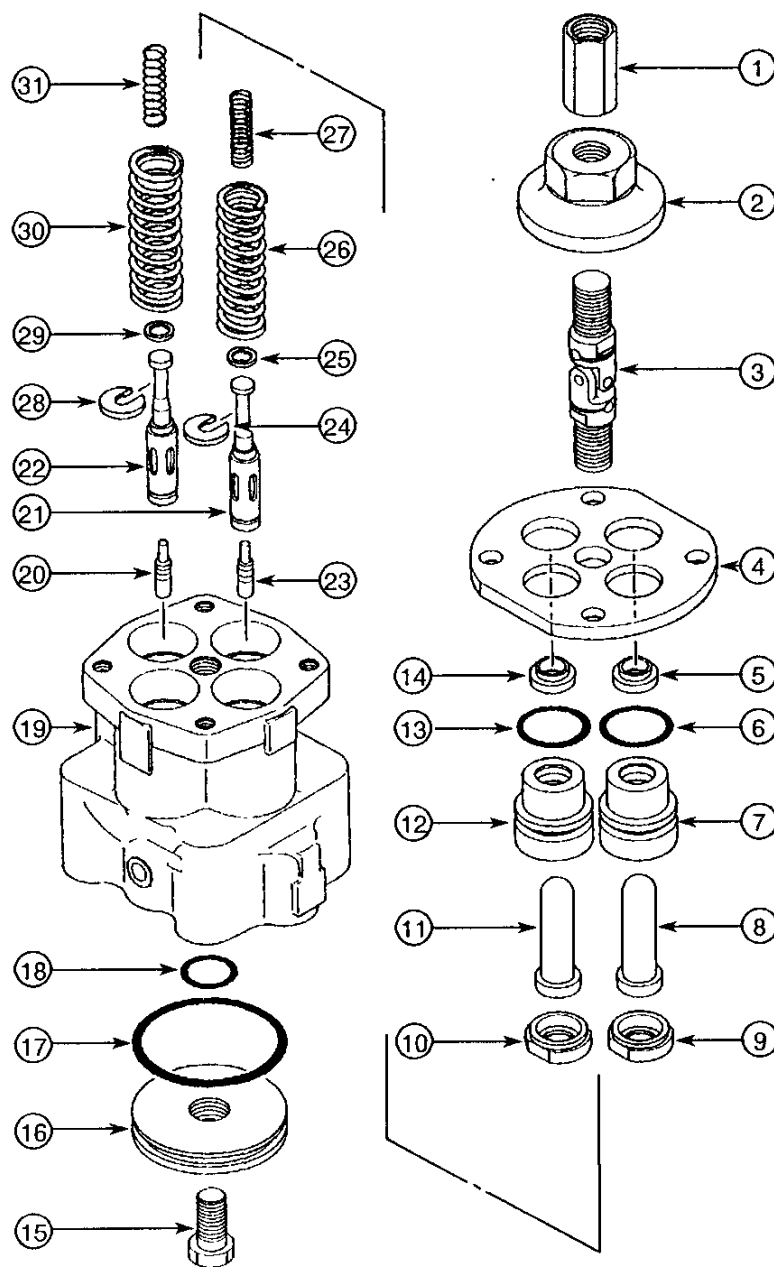


W105-02-07-028

UPPERSTRUCTURE / Pilot Valve

EX200-2

FRONT PILOT VALVE DRAWING FOR ASSEMBLY



W105-02-07-029

- 1- Joint screw
- 2- Cam
- 3- Universal joint
- 4- Plate
- 5- Oil seal
- 6- O-ring
- 7- Bushing
- 8- Pusher (1, 3)

- 9- Spring guide
- 10- Spring guide
- 11- Pusher (2, 4)
- 12- Bushing
- 13- O-ring
- 14- Oil seal
- 15- Socket bolt
- 16- Plate

- 17- O-ring
- 18- O-ring
- 19- Casing
- 20- Piston
- 21- Spool
- 22- Spool
- 23- Piston
- 24- Spacer

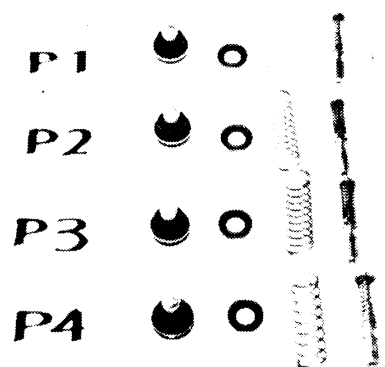
- 25- Shim
- 26- Spring
- 27- Spring
- 28- Spacer
- 29- Shim
- 30- Spring
- 31- Spring

UPPERSTRUCTURE / Pilot Valve

EX200-2

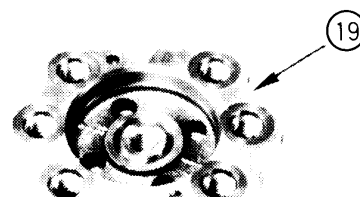
«Assembling pilot valve for front control»

1. Wash all parts, and line them up by port No.



W105-02-07-030

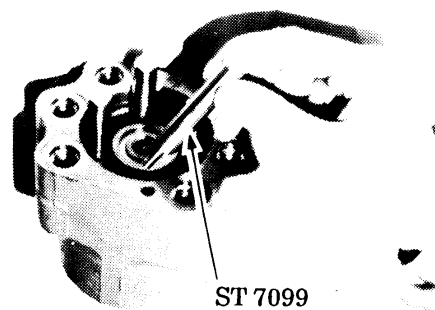
2. Turn over casing (19) and place it with the cast No. letters side down.



W105-02-07-031

3. Insert the guide jig into each port, with its thinner side down.

Jig No.: ST7099

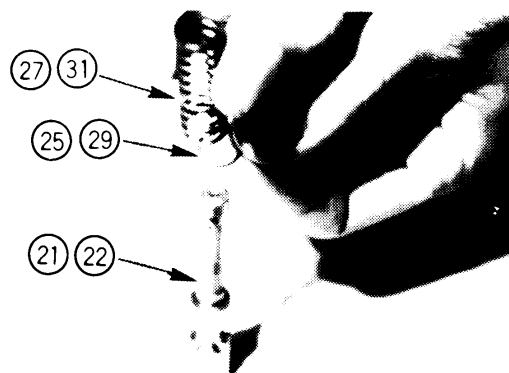


W105-02-07-032

«Assembling of spool assembly»

4. Put shims (25) and (29) and springs (27) and (31) in spools (21) and (22).

NOTE: Since the number of shims (25) and (29) is determined performance testing, take care not to lose them.



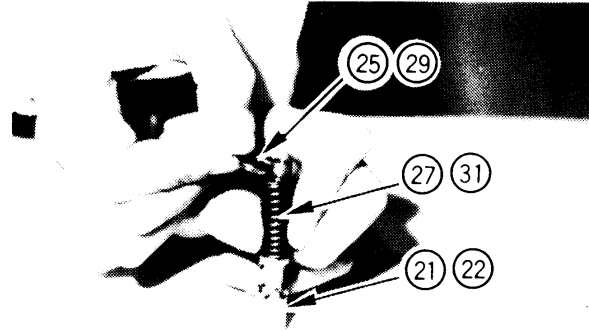
W105-02-07-033

UPPERSTRUCTURE / Pilot Valve

EX200-2

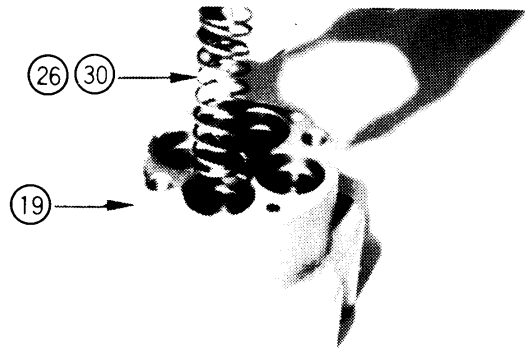
5. Compress springs (27) and (31), and put spacers (25) and (29) between spools (21) and (22) and springs (27) and (31).

NOTE: The faces of spacers (25) and (29) are different.
Be sure place them with the spring seat side down.



W105-02-07-034

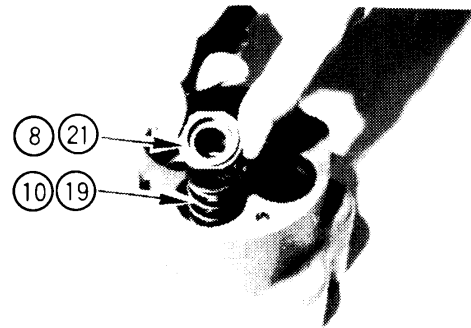
6. Place springs (26) and (30) in each port of casing (19).



W105-02-07-035

7. Place spring guides (9) and (10) on springs (26) and (30).

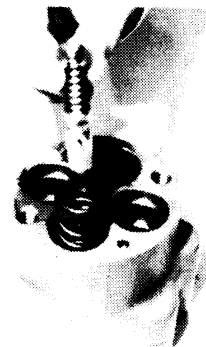
NOTE: The faces and backs of spring guides (9) and (10) are different.
Be sure place them with the spring seat side down.



W105-02-07-036

8. Insert the spool assembly into the center of spring guides (9) and (10).

NOTE: Check the port No. before inserting the spool assembly and make sure that the spool assembly is inserted into its correct port.



W105-02-07-037

UPPERSTRUCTURE / Pilot Valve

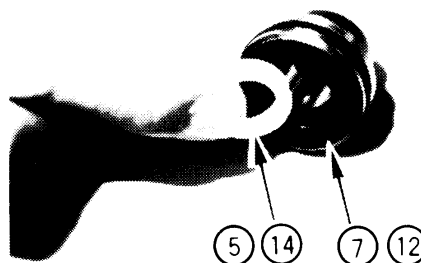
EX200-2

« Assembling of pusher assembly »

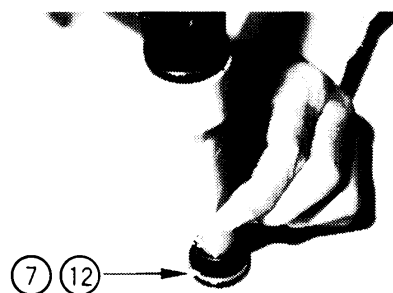
9. Apply grease to oil seals (5) and (14), and install them in bushing (7) and (12).

NOTE: The faces and backs of oil seals (5) and (14) are different.

Correct oil seal fitting tool: ST 2292

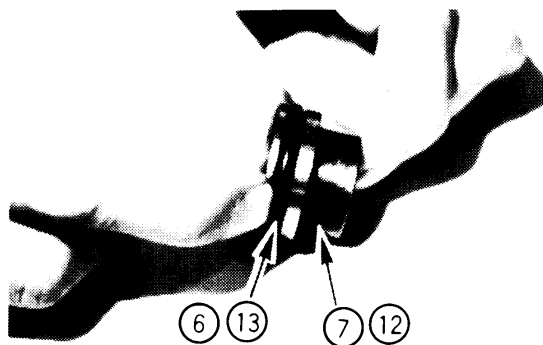


W105-02-07-038



W105-02-07-039

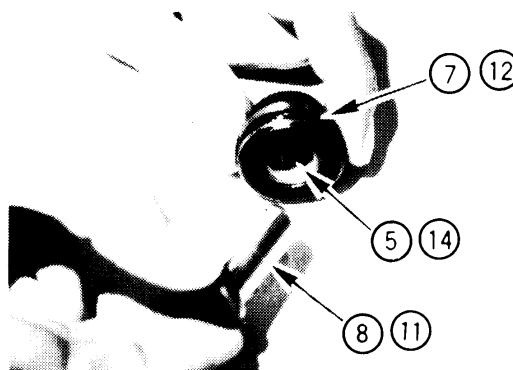
10. Install O-ring (6) and (13) to bushing (7) and (12).



W105-02-07-040

11. Insert pushers (8) and (11) into bushings (7) and (12) from the side of oil seals (5) and (14).

NOTE: Apply grease to the lips of the oil seals and dust seals as well as to the inside of the bushings.



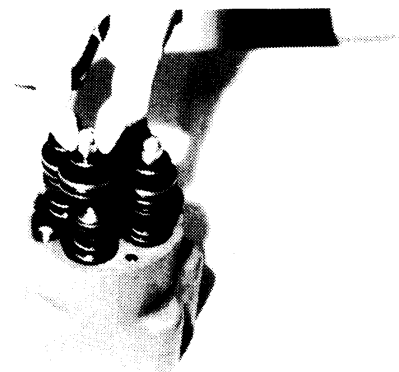
W105-02-07-041

W02-07-14

UPPERSTRUCTURE / Pilot Valve

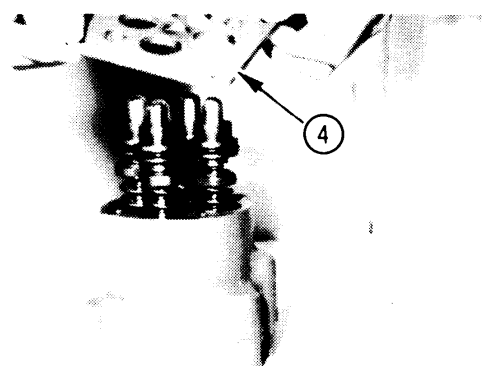
EX200-2

12. Place the four pusher assemblies on the four spool assemblies one by one.



W105-02-07-042

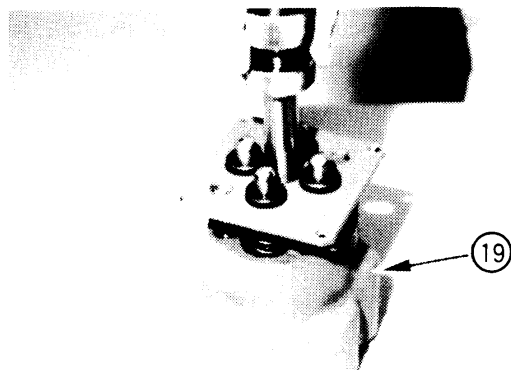
13. Install plates (4) to the top of the pushers.



W105-02-07-043

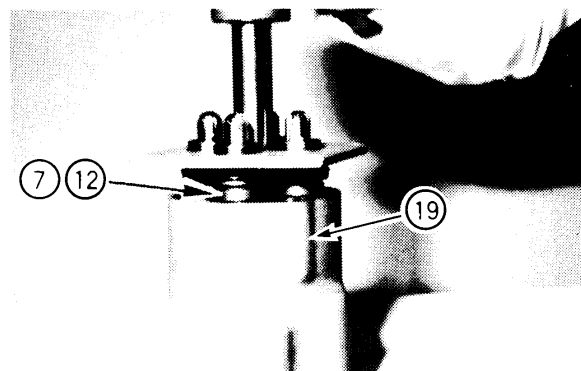
14. Install the jig to the universal joint fitting hole of casing (19).

Jig No.: ST 7924



W105-02-07-044

15. Gradually tighten the jig until the under sides of bushings (7) and (1) reach the height of the top of casing (19).



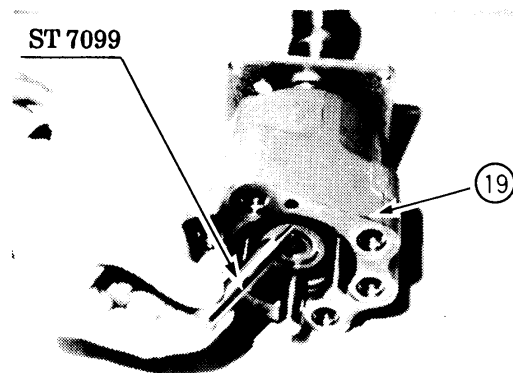
W105-02-07-045

UPPERSTRUCTURE / Pilot Valve

EX200-2

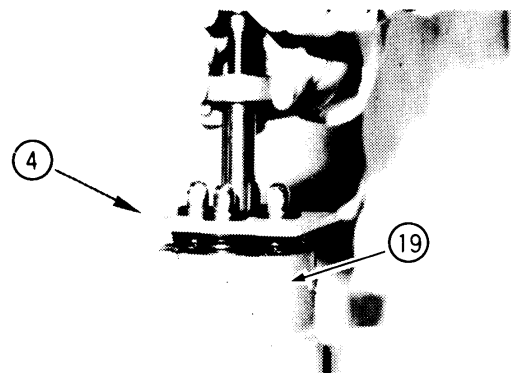
16. Remove the guide jig from the casing port (19).

Jig No: ST 7099



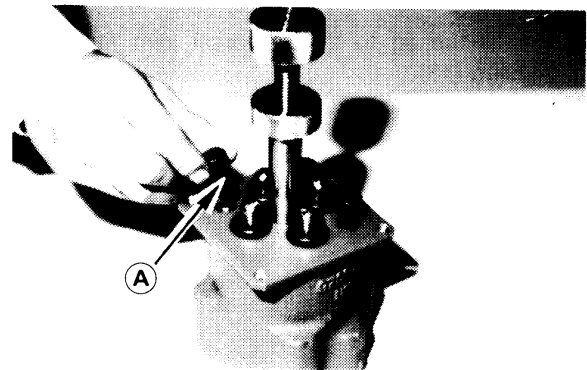
W105-02-07-046

17. Tighten the jig until plate (4) touches the top of casing (19).

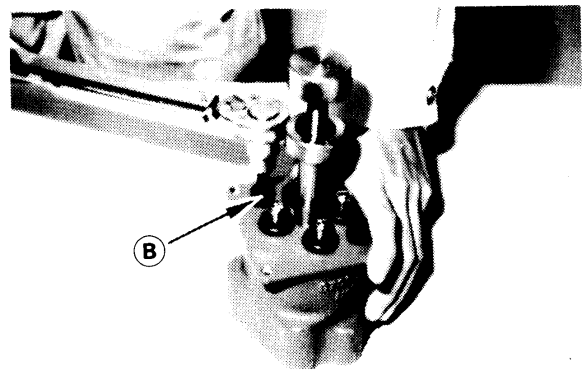


W105-02-07-047

18. Temporarily secure plate (4) with two M8 × 1.25 bolts (A) and (B).



W105-02-07-048



W105-02-07-049

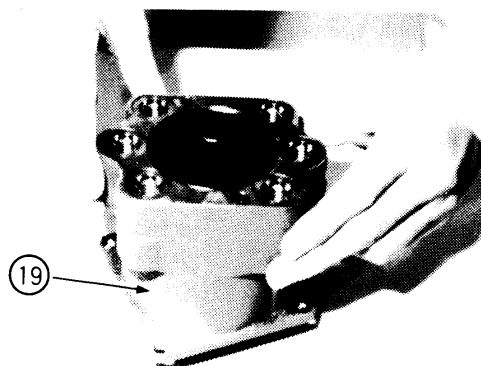
W02-07-16

UPPERSTRUCTURE / Pilot Valve

EX200-2

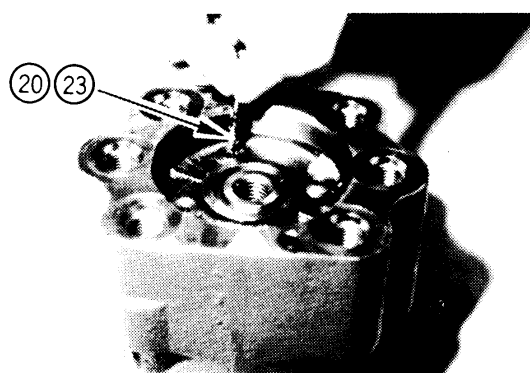
19. Remove the jig, and turn over casing (19).

Jig No: ST 7924



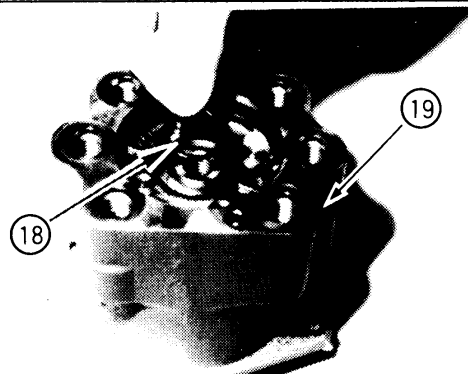
W105-02-07-050

20. Insert the small end of pistons (20) and (23) into spools (21) and (22), with the small piston ends facing the pusher side.



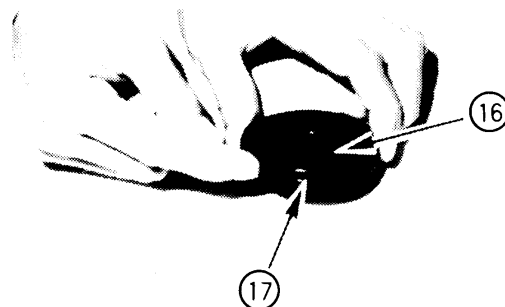
W105-02-07-051

21. Install O-ring (18) to casing (19).



W105-02-07-052

22. Install O-ring (17) to plate (16).

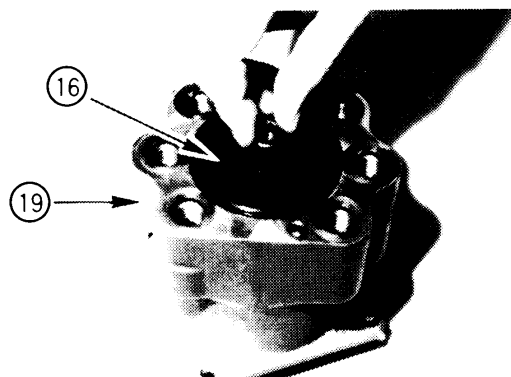


W105-02-07-053

UPPERSTRUCTURE / Pilot Valve

EX200-2

23. Apply grease to the O-ring, and install plate (16) to casing (19).

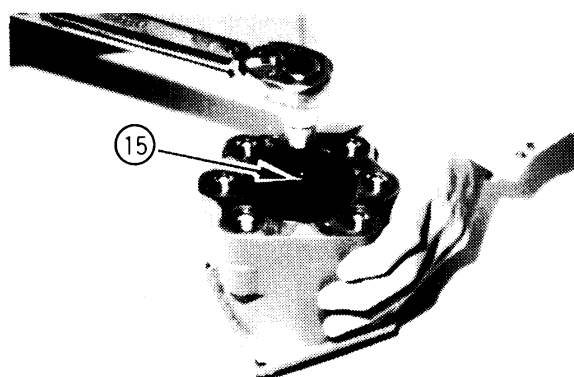


W105-02-07-054

24. Secure the plate with socket bolt.

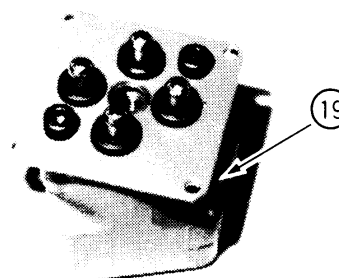
 : 5 kgf·m (49 N.m) (36 lbf.ft)

 : 24 mm



W105-02-07-055

25. Turn over casing (19).



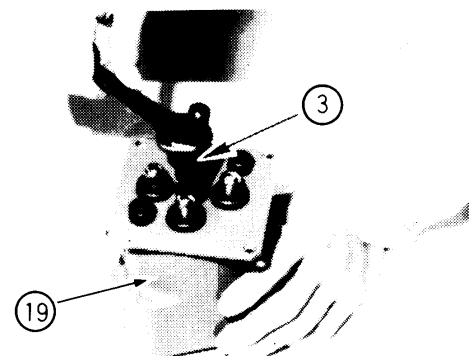
W105-02-07-056

«Assembling of cam»

26. Apply LOCTITE to universal joint (3) and install it to casing (19).

 : 2.5 kgf·m (24 N.m) (18 lbf.ft)

 : 17 mm



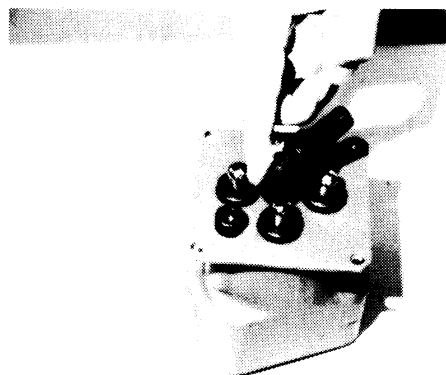
W105-02-07-057

W02-07-18

UPPERSTRUCTURE / Pilot Valve

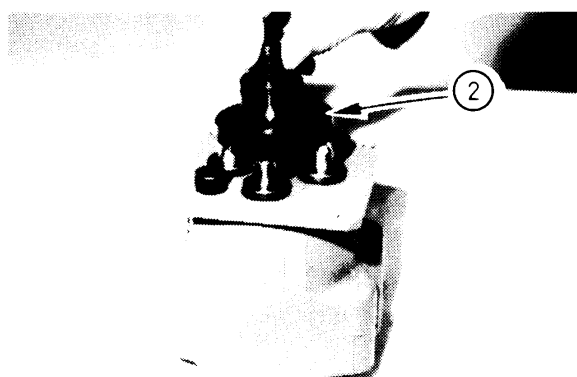
EX200-2

27. Apply grease sufficiently to the joints of the universal joint.



W105-02-07-058

28. Apply grease to the contact faces of cam (2) with the pushers, then install it on the universal joint.



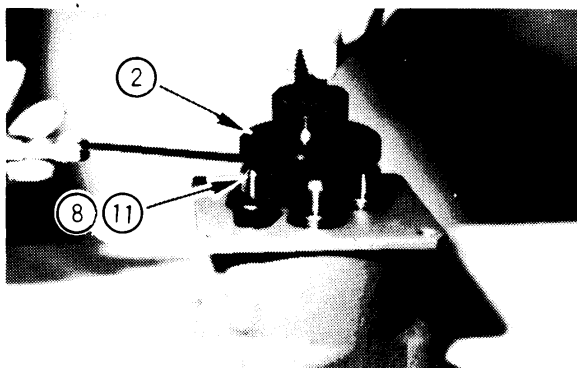
W105-02-07-059

29. Tighten joint screw (1) so that the clearance between pushers (8) and (11) and cam (2) becomes tentatively 0 to 0.2 mm.
Remove the two M8 × 1.25 bolts of used temporarily.

 : 7 to 9 kgf·m (68 to 88 N.m)
(50 to 65 lbf.ft)

 : 24 mm

NOTE: Be sure to hold cam (2) when tightening joint screw (1) to prevent universal joint (3) from being tightened together.



W105-02-07-060

30. Install the boot.



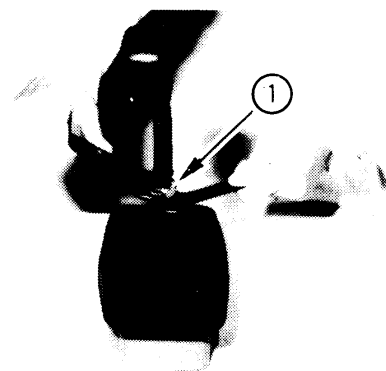
W105-02-07-061

UPPERSTRUCTURE / Pilot Valve

EX200-2

31. Install the lever to joint screw (1) and tighten the lock nut.

 : 19, 22 mm



W105-02-07-062

UPPERSTRUCTURE / Pilot Valve

EX200-2

REMOVAL AND INSTALLATION OF PILOT VALVE FOR TRAVELING CONTROL

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.
2. Remove the bolt (10), then remove the pedal (1).

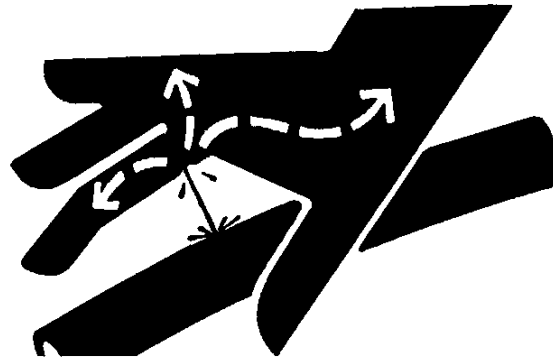


CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

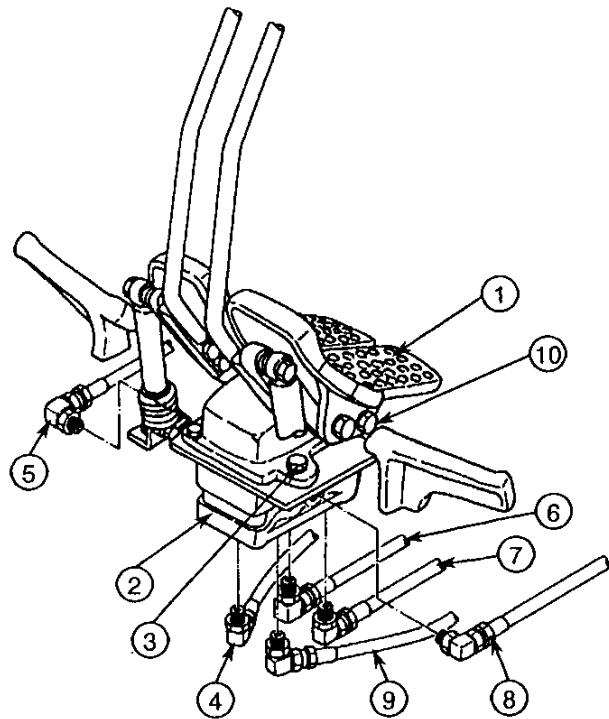
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

3. Remove the pipes (4) to (9).
4. Remove the bolts (3), then remove the pilot valve assembly.
5. Install the pilot valve assembly with the bolts (3).
6. Install the pipes (4) to (9).
7. Install the pedal (1) with the bolt (10).



SA-031



W105-02-07-063

Tightening torque

Travel pedal mounting bolt

Tightening torque 5.0 kgf-m (49 N.m) (36 lbf.ft)

Pilot valve mounting bolt

Tightening torque 5.0 kgf-m (49 N.m) (36 lbf.ft)

Hose to right forward side

Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

Hose to travel return side

Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

Hose to right reverse side

Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

Hose to left reverse side

Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

Hose to travel operation supply side

Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

Hose to left forward side

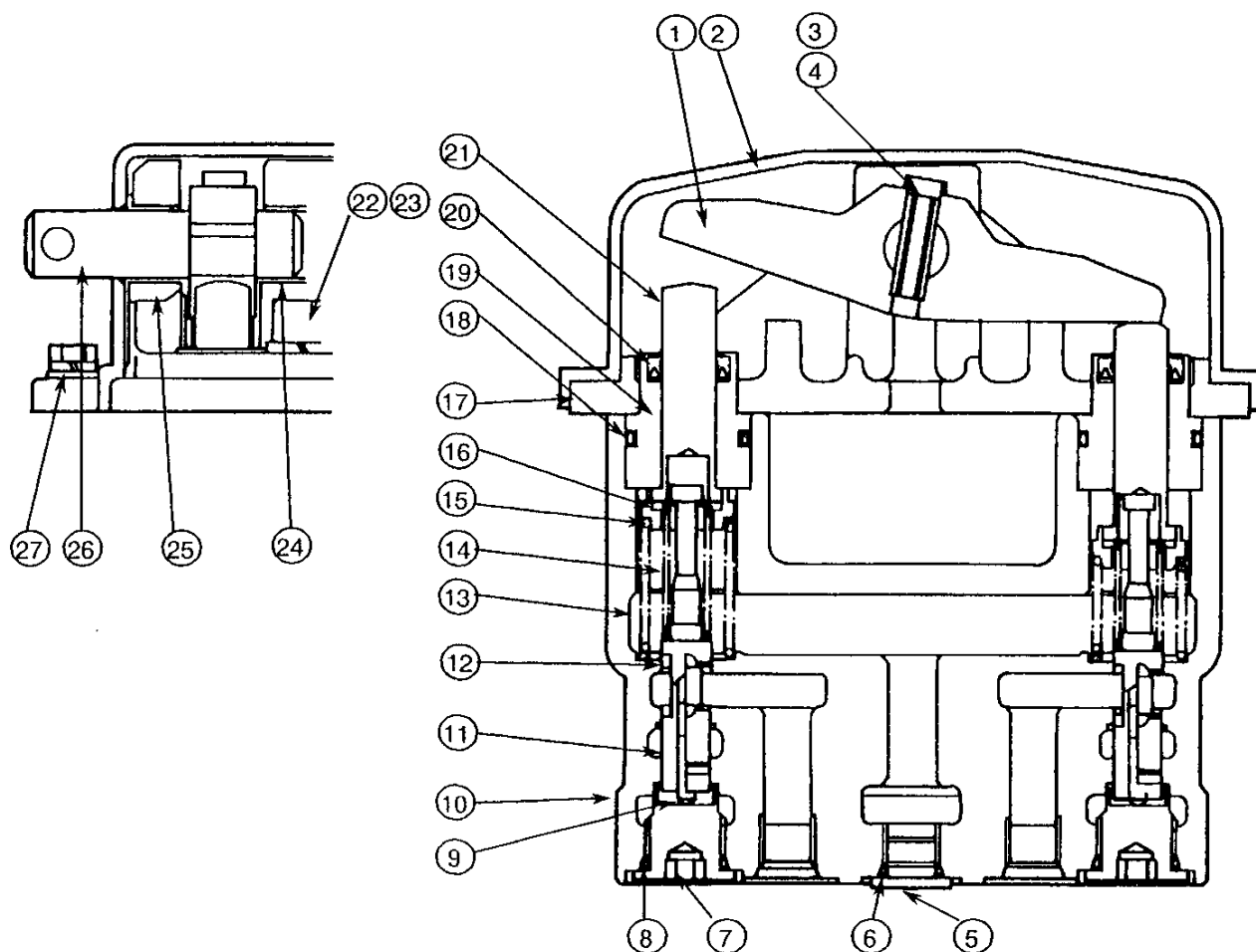
Tightening torque 4.0 kgf-m (39 N.m) (28 lbf.ft)

- 1- Travel pedal
- 2- Pilot valve
- 3- Pilot valve mounting bolt
- 4- To shockless valve on right forward side
- 5- To hydraulic tank on travel return side
- 6- To shockless valve on right reverse side
- 7- To shockless valve on left reverse side
- 8- Pressure supply side for travel operation
- 9- To lock valve on left forward side
- 10- Travel pedal mounting bolt

UPPERSTRUCTURE / Pilot Valve

EX200-2

TRAVEL PILOT VALVE DRAWING FOR DISASSEMBLY



W105-02-07-064

- | | | | |
|---------------|----------------------|------------------|-------------------|
| 1— Cam | 8— O-ring | 15— Spring guide | 22— Socket bolt |
| 2— Cover | 9— Piston | 16— Spacer | 23— Spring washer |
| 3— Spring pin | 10— Casing | 17— Holder | 24— Bushing |
| 4— Spring pin | 11— Spool | 18— O-ring | 25— Bushing |
| 5— Plug | 12— Shim | 19— Bushing | 26— Pin |
| 6— O-ring | 13— Spring (Return) | 20— Oil seal | 27— Sems bolt |
| 7— Plug | 14— Spring (Balance) | 21— Pusher | |

W02-07-22

UPPERSTRUCTURE / Pilot Valve

EX200-2

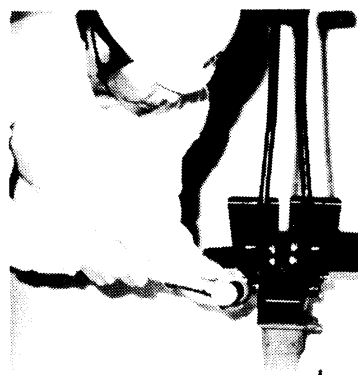
PILOT VALVE FOR TRAVELING CONTROL

- 1) Since casing (10) and spool (11) are selectively to each other.
It is impossible to replace only either of them.
- 2) Disassemble spring pins (3) and (4) using the jig.
- 3) Take care to prevent pusher (19) from jumping out when bolt (22) and holder (17) are removed.
- 4) Indicate the port Nos. on all parts removed to avoid them from becoming mixed up.
The port Nos. are cast out on the surface of casing (10).

«Disassembling of pilot valve for traveling control»

1. Wipe the boot and wash the outside of the valve, then place the valve unit on the stand with its pusher side up, and remove the spring pin.

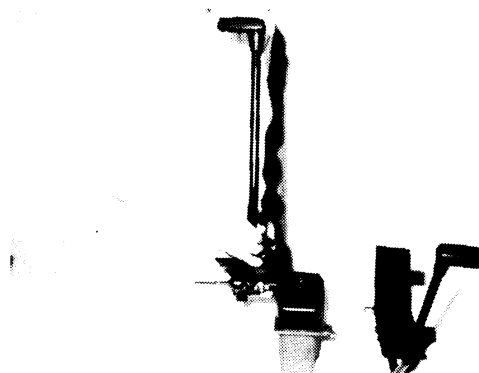
NOTE: Apply force to the spring pin only so that an excessive force will not be given to the pin. If an excessive force is given to the pin, the holder will be deformed and cannot be used anymore.



W105-02-07-065

2. Remove the levers (Left-hand and Right-hand) from the valve.

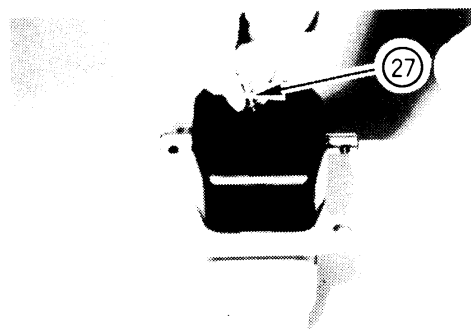
 : 19 mm, 22 mm



W105-02-07-066

3. Remove bolt (27).

 : 14 mm

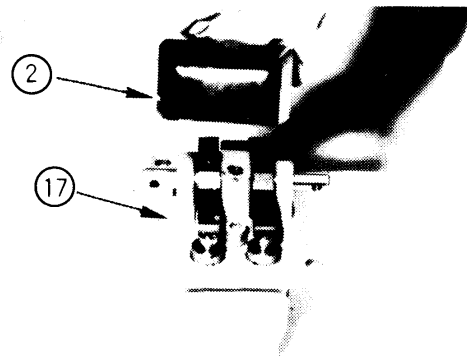


W105-02-07-067

UPPERSTRUCTURE / Pilot Valve

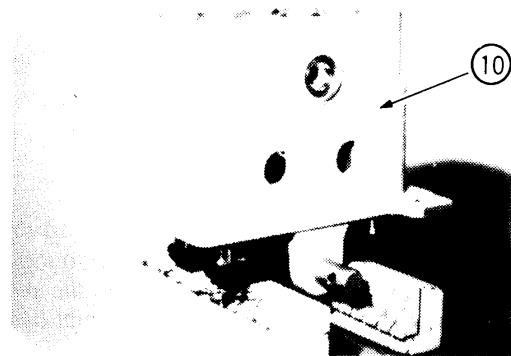
EX200-2

4. Remove cover (2) from holder (17).



W105-02-07-068

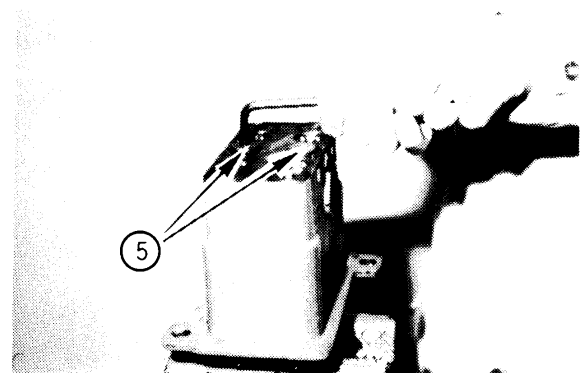
5. Turn over casing (10), and fix the holder with a vise.



W105-02-07-069

6. Remove two plugs (5) (T port and P port) from the casing.

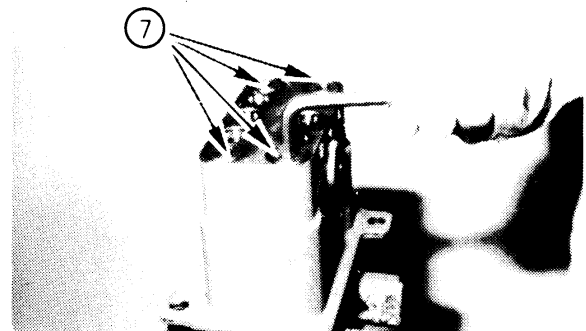
 : 6 mm



W105-02-07-070

7. Remove four plugs (7) from the casing.

 : 8 mm



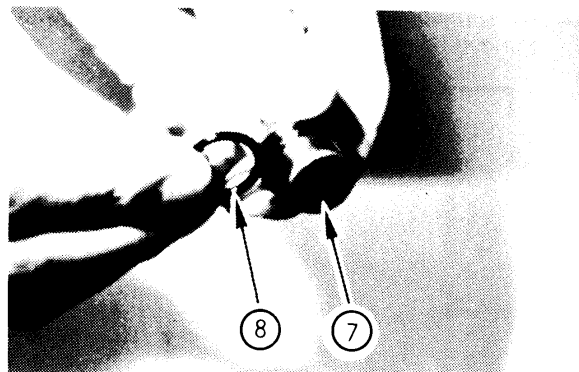
W105-02-07-071

W02-07-24

UPPERSTRUCTURE / Pilot Valve

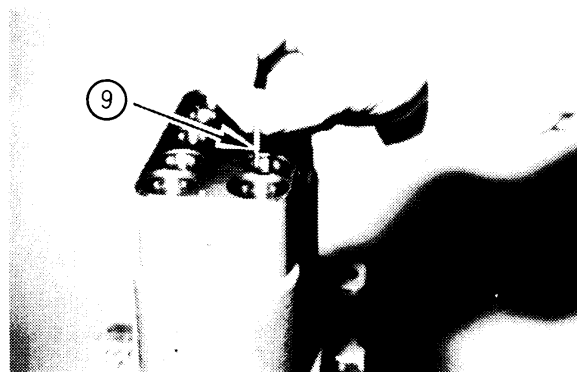
EX200-2

8. Remove O-ring (8) from plug (7).



W105-02-07-072

9. Remove piston (9) from spool (11) in each port.

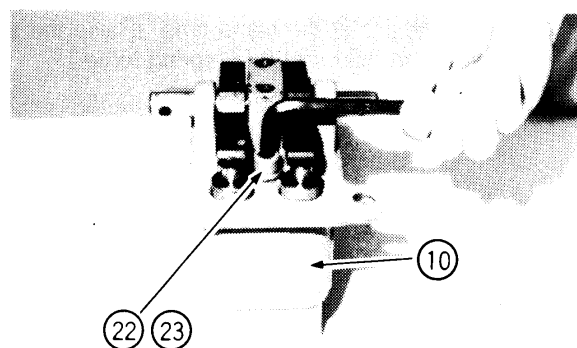


W105-02-07-073

«Disassembling of holder cam assembling»

10. Remove casing (10) from the vise and place it with its cam side up, then loosen socket bolt (22) and spring washer (23) on one side and remove them.

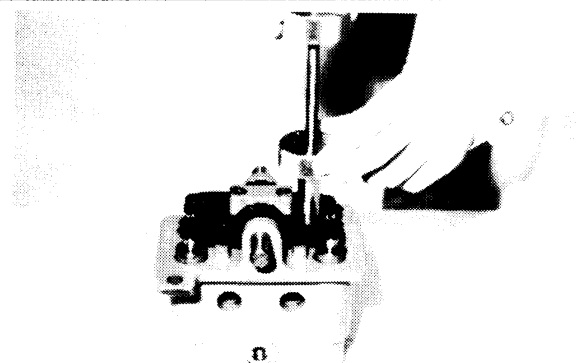
 :8 mm



W105-02-07-074

11. Install the jig.

Jig No: ST 7925



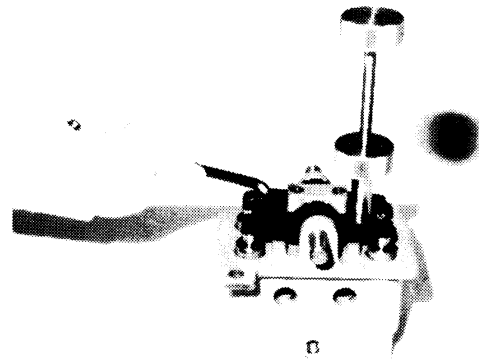
W105-02-07-075

UPPERSTRUCTURE / Pilot Valve

EX200-2

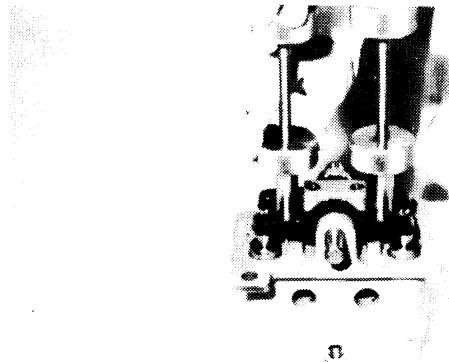
12. Loosen socket bolt (22) from the other side then remove bolt (22) and spring washer (23).

 : 6 mm



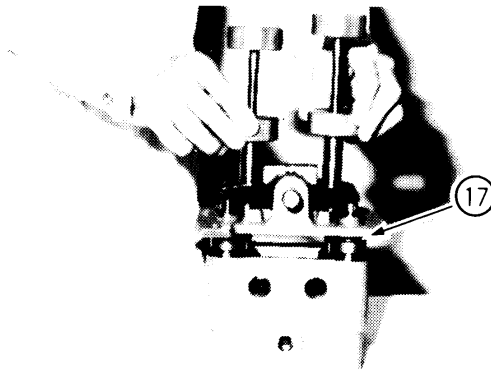
W105-02-07-076

13. Install the jig.



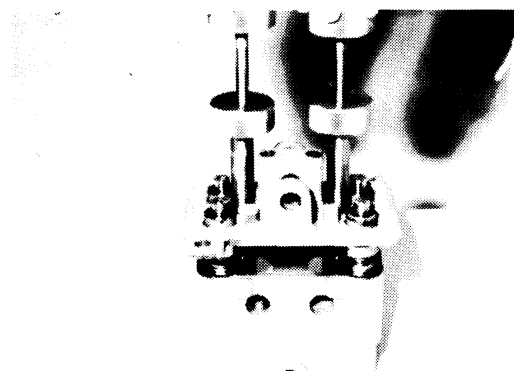
W105-02-07-077

14. Loosen both jigs at the same time. Raise the spool assembly and holder (17) by spring force.



W105-02-07-078

15. Remove the jigs.



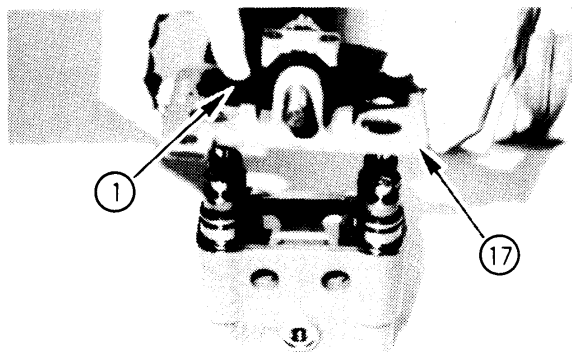
W105-02-07-079

W02-07-26

UPPERSTRUCTURE / Pilot Valve

EX200-2

16. Remove the assembly of holder (17) and cam (1).



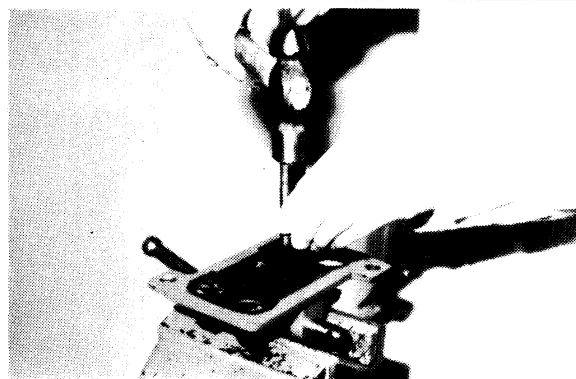
W105-02-07-080

17. Place the assembly of holder (17) and cam (1) in a vise.



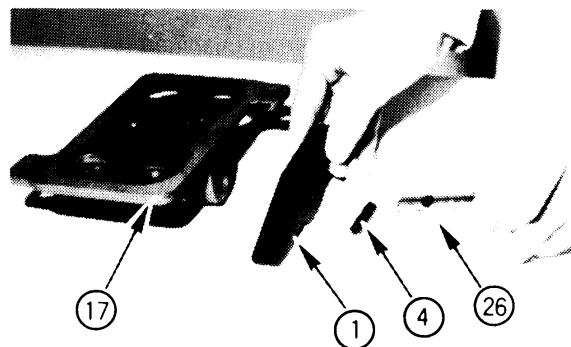
W105-02-07-081

18. Pull out spring pins (3) and (4).



W105-02-07-082

19. Remove pin (26) and cam (1) from holder (17).
Remove bushing (24) and (25).



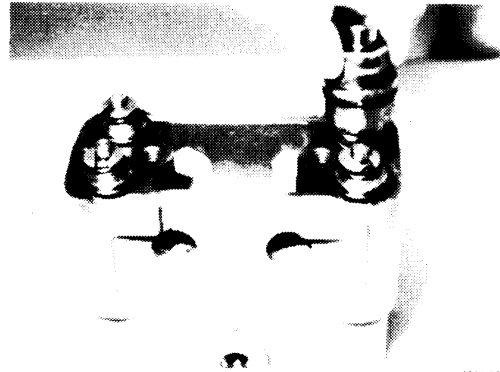
W105-02-07-083

UPPERSTRUCTURE / Pilot Valve

EX200-2

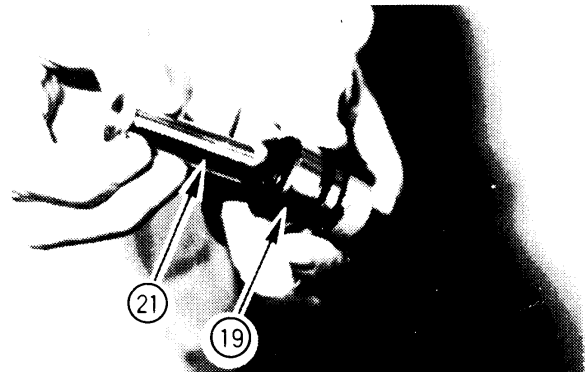
« Disassembling of pusher »

20. Remove the pusher assembly.



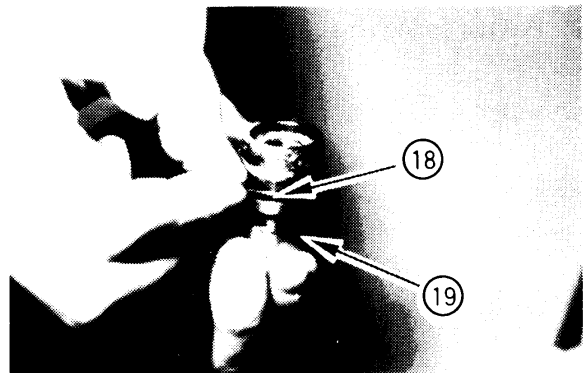
W105-02-07-084

21. Remove pusher (21) from bushing (19).



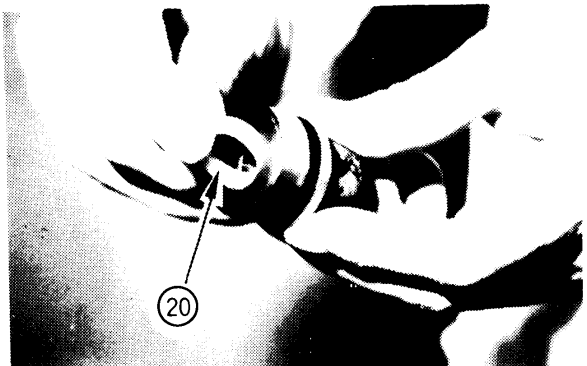
W105-02-07-085

22. Remove O-ring (18) from bushing (19).



W105-02-07-086

23. Remove oil seal (20) from bushing (19).



W105-02-07-087

W02-07-28

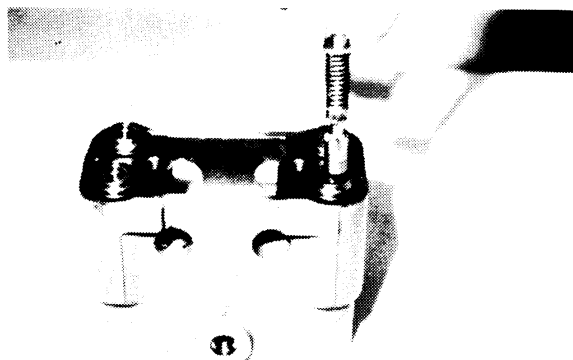
UPPERSTRUCTURE / Pilot Valve

EX200-2

«Disassembling spool assembly»

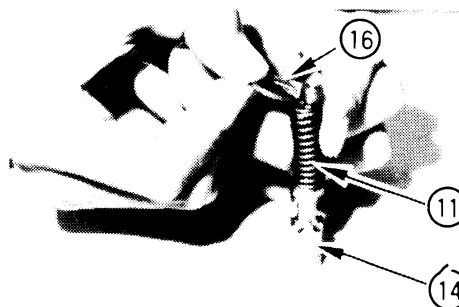
24. Remove the spool assembly from each port.

NOTE: Indicate the port No. on each port removed to avoid them becoming mixed up.



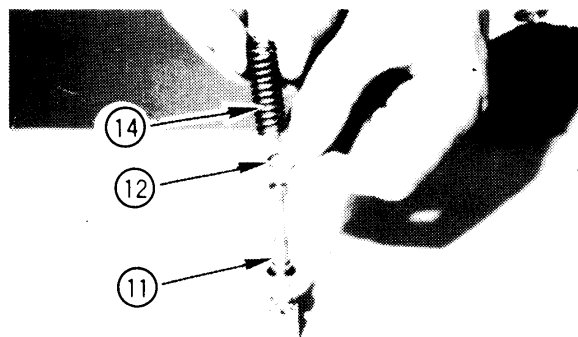
W105-02-07-088

25. Compress spring (14) and remove spacer (16) from spool (11).



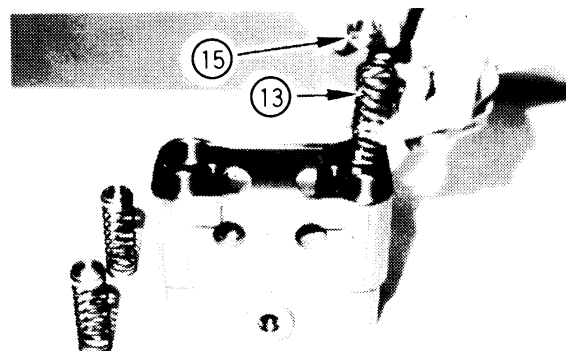
W105-02-07-089

26. Remove spring (14) and shim (12) from spool (11).



W105-02-07-090

27. Remove spring guide (15) and spring (13) from each port.

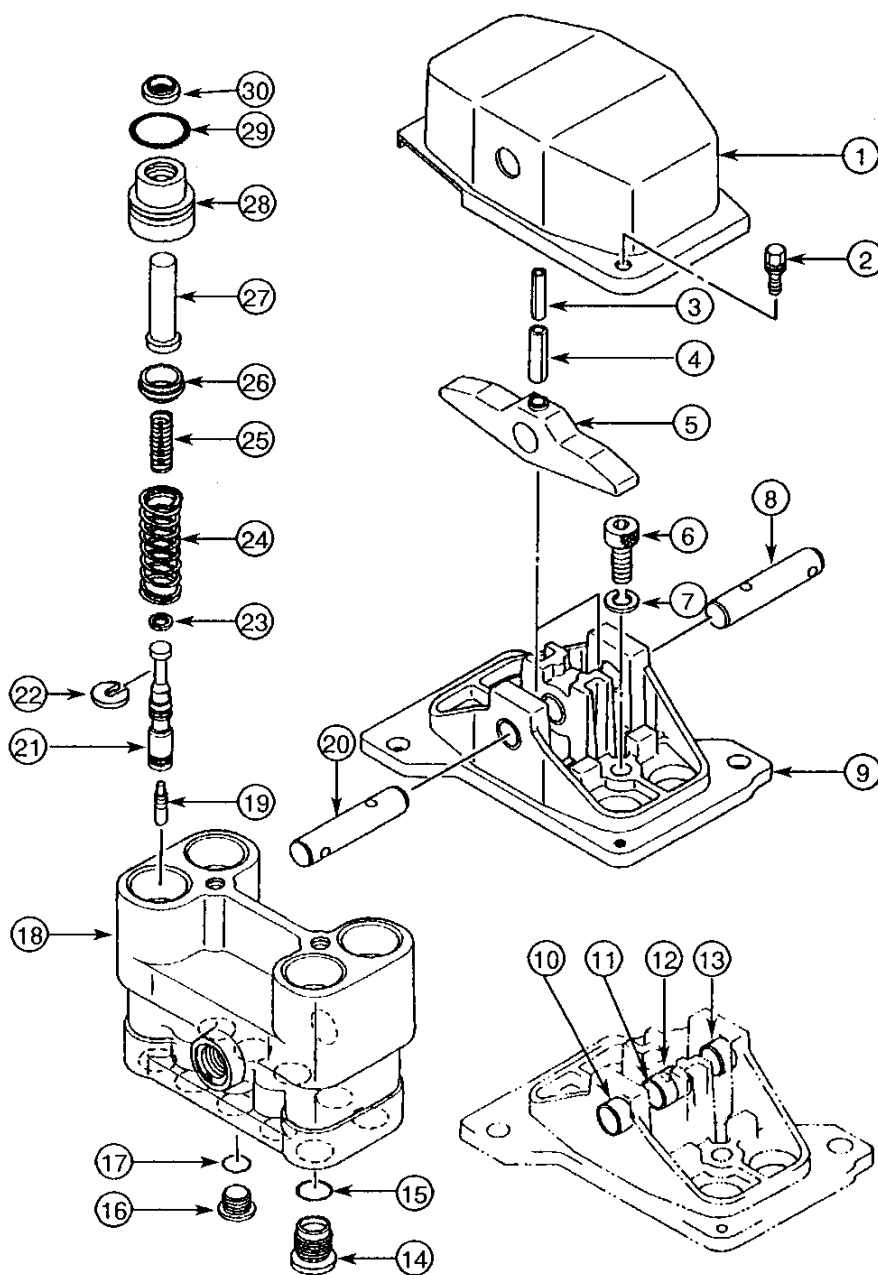


W105-02-07-091

UPPERSTRUCTURE / Pilot Valve

EX200-2

TRAVEL PILOT VALVE DRAWING FOR ASSEMBLY



W105-02-07-092

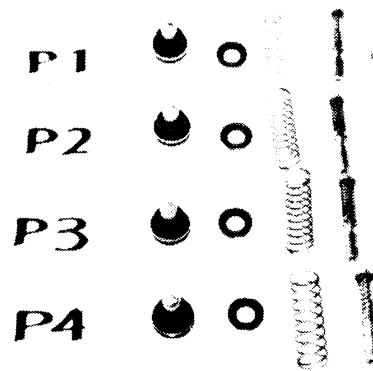
- | | | | |
|------------------|-------------|------------|-------------------|
| 1— Cover | 9— Holder | 17— O-ring | 25— Spring |
| 2— Sems bolt | 10— Bushing | 18— Casing | 26— Spring guide |
| 3— Spring pin | 11— Bushing | 19— Piston | 27— Pusher (1, 3) |
| 4— Spring pin | 12— Bushing | 20— Pin | 28— Bushing |
| 5— Cam | 13— Bushing | 21— Spool | 29— O-ring |
| 6— Socket bolt | 14— Plug | 22— Spacer | 30— Oil seal |
| 7— Spring washer | 15— O-ring | 23— Shim | |
| 8— Pin | 16— Plug | 24— Spring | |

UPPERSTRUCTURE / Pilot Valve

EX200-2

«Assembling of pilot valve for traveling»

1. Wash all the parts in oil, and divide the removed parts by the ports where they are used.

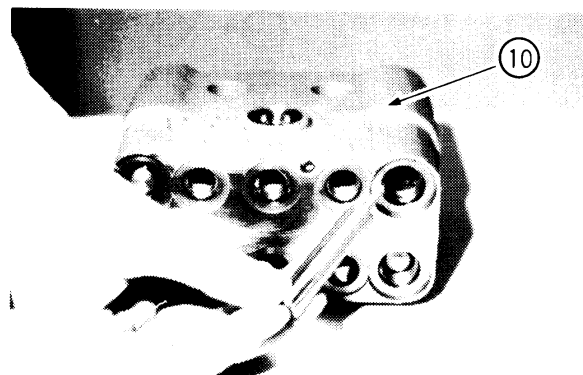


W105-02-07-093

2. Insert the guide jigs in to the four holes of casing (18).

NOTE: Insert the jigs with their thinner ends up, and take care not to damage the ports of casing (10).

Jig No: ST 7099

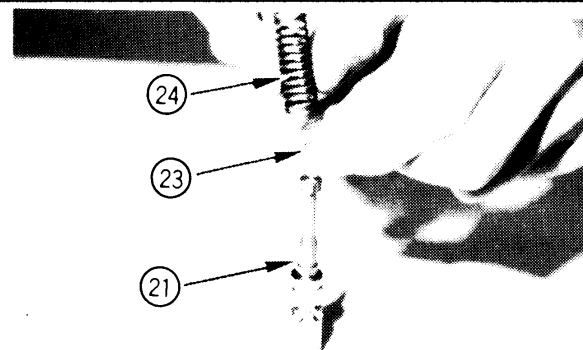


W105-02-07-094

«Assembling of spool assembly»

3. Insert shim (23) and spring (24) in spool (21).

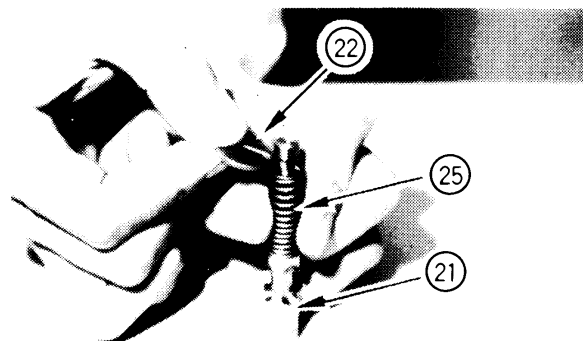
NOTE: Since the numbers of shims (23) are determined based on performance testing, take care not to lose them.



W105-02-07-095

4. Compress spring (25) and insert spacer (22) between spool (21) and spring (25) from the.

NOTE: The faces of spacer (22) are different. Insert them with their spring seat side down.

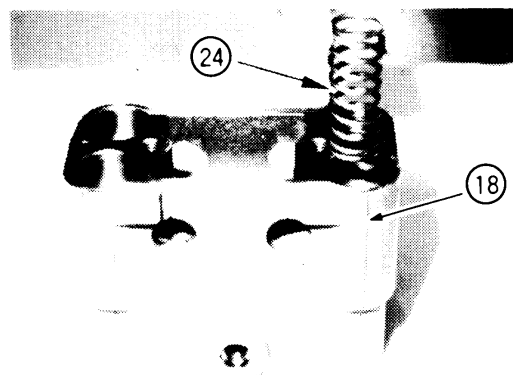


W105-02-07-096

UPPERSTRUCTURE / Pilot Valve

EX200-2

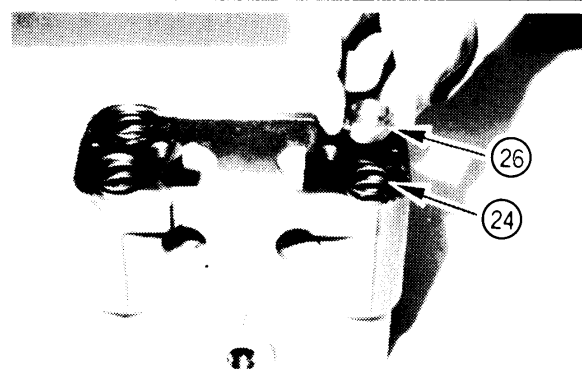
5. Insert springs (24) in the ports of casing (18).



W105-02-07-097

6. Place spring guides (26) on springs (24).

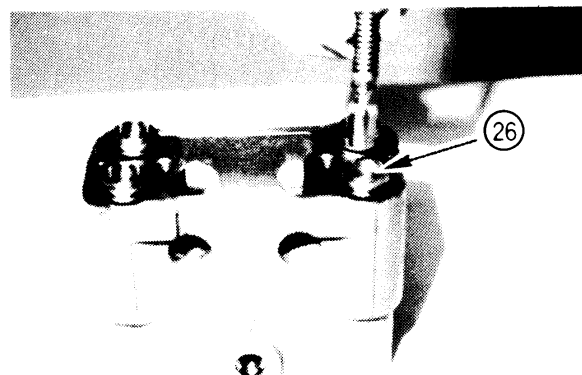
*NOTE: The faces of spring guide (26) are different the backs.
Place them with their spring seat side down.*



W105-02-07-098

7. Insert each spool assembly in the center of each spring guide (26).

NOTE: Before to check their port Nos inserting the spool assemblies, and make sure that the spool assembly is inserted into the correct port.



W105-02-07-099

UPPERSTRUCTURE / Pilot Valve

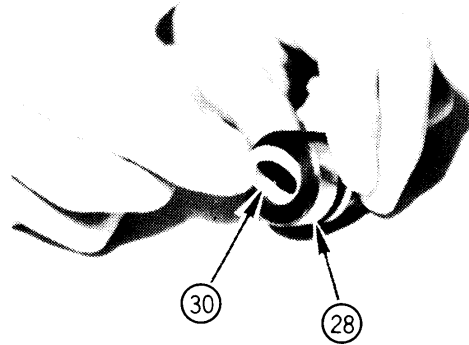
EX200-2

« Assembling of pusher assembly »

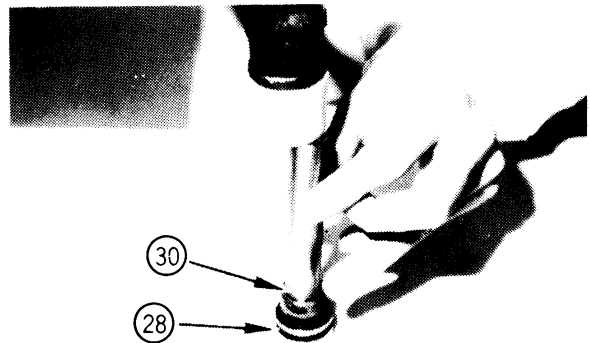
8. Apply grease to oil seal (30) and fit it to bushing (28).

Note: The faces of the oil seal (30) are different.

Oil seal fitting tool: ST 2292

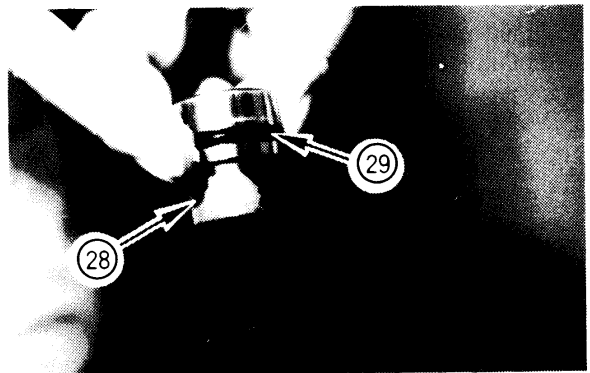


W105-02-07-100



W105-02-07-101

9. Fit O-ring (29) to bushing (28).



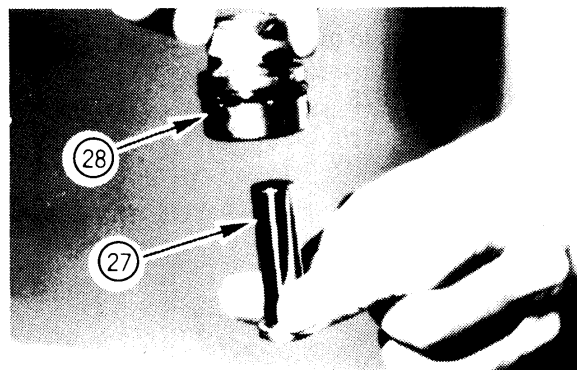
W105-02-07-102

UPPERSTRUCTURE / Pilot Valve

EX200-2

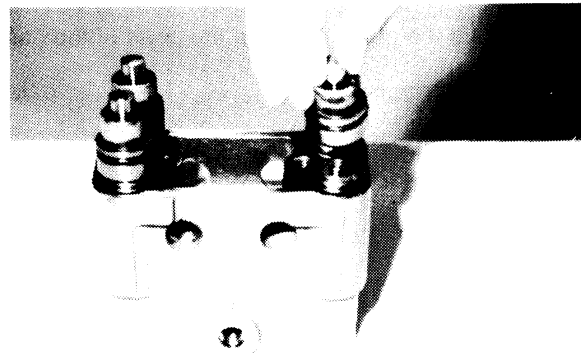
10. Insert pusher (27) in bushing (28) from oil seal (30) side.

NOTE: Apply grease to the lips of the oil seals and inside of the bushings.



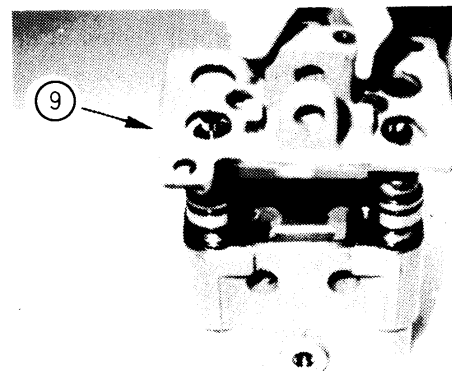
W105-02-07-103

11. Place the four pusher assemblies on the four spool assemblies one by one.



W105-02-07-104

12. Press bushings (10), (11), (12), and (13) into the holder.
Install flanged bushings (10) and (13) outside.
Install holder (9) to the top of the pusher.



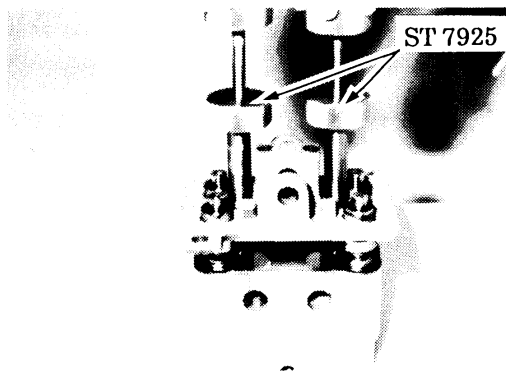
W105-02-07-105

UPPERSTRUCTURE / Pilot Valve

EX200-2

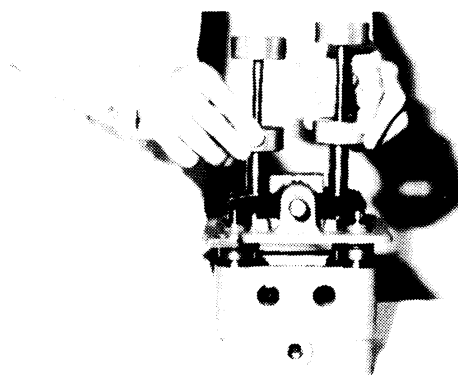
13. Install the jigs to the bolt holes of the casing.

Jig No: ST 7925



W105-02-07-106

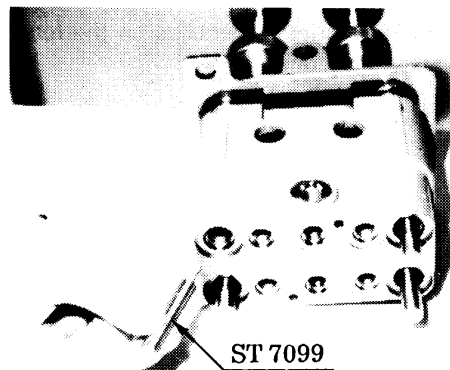
14. Gradually tighten both jigs until the underside of bushing (28) reaches the top height of casing (18).



W105-02-07-107

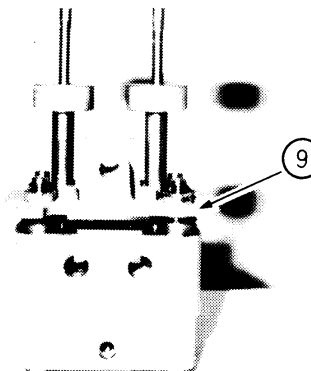
15. Remove the guide jigs from the ports of the casing.

Jig No: ST 7099



W105-02-07-108

16. Tighten both jigs until holder (9) comes in control with the top of the casing.



W105-02-07-109

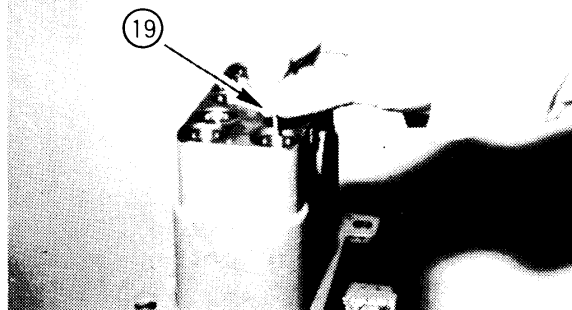
W02-07-36

UPPERSTRUCTURE / Pilot Valve

EX200-2

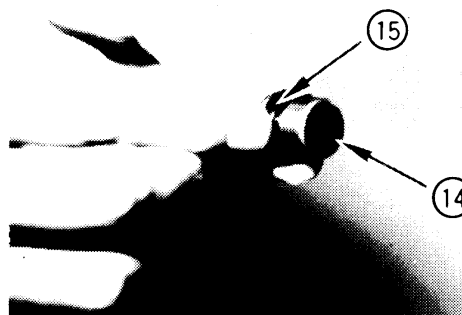
20. Insert piston (19) into spoos (21).

NOTE: Insert the pistons with their thinner ends facing the pusher side.



W105-02-07-114

21. Fit O-ring (15) on to plug (14).

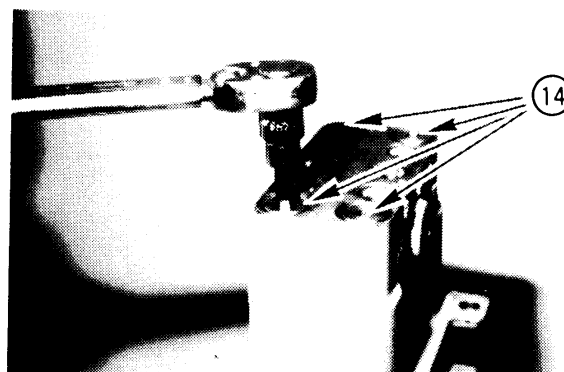


W105-02-07-115

22. Tighten four plugs (14) to the casing.

 : 5 kgf·m (49 N.m) (36 lbf.ft)

 : 8 mm

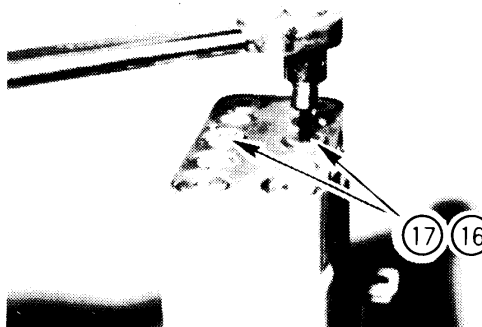


W105-02-07-116

23. Fit O-ring (17) to two plug (16), then tighten plugs (16) into the casing.

 : 2 kgf·m (19 N.m) (14 lbf.ft)

 : 6 mm



W105-02-07-117

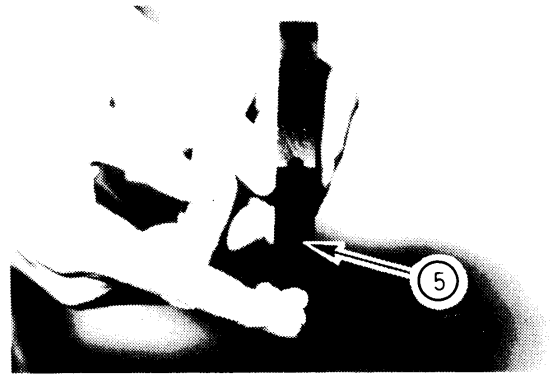
W02-07-38

UPPERSTRUCTURE / Pilot Valve

EX200-2

«Assembling cam»

24. Turn over the casing and place it on the stand. Apply grease to cam (5) and install it to holder (9).

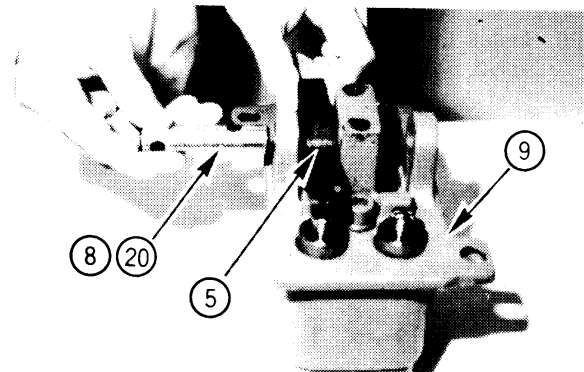


W105-02-07-118

25. Align the pin holes of holder (9) and (5), and insert pin (8) and (20) into them.

NOTE: Pins (8) and (20) be facing the correct direction in order to be installed. Inset each of them with the closer to the spring pin hole outside.

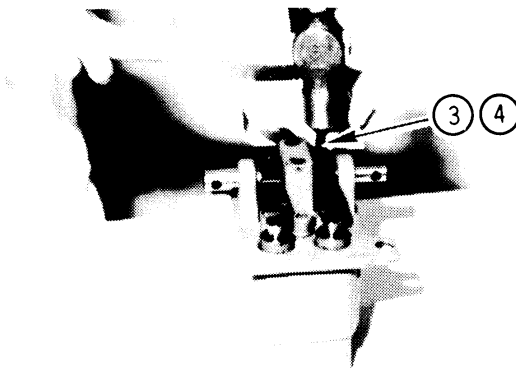
Position the pin so that the end with the spring pin hole nearest the tip is toward the outside.



W105-02-07-119

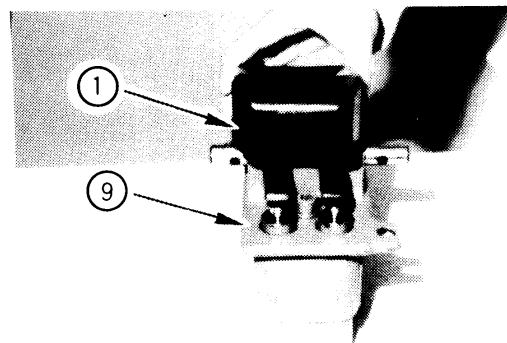
26. Drive in spring pins (3) and (4).

NOTE: Tap in spring pin (3) and (4) till they extrude down from the end of cam (5) about 3 mm. Caulk the head of the cam to prevent them from coming out.



W105-02-07-120

27. Install cover (1) to holder (9).



W105-02-07-121

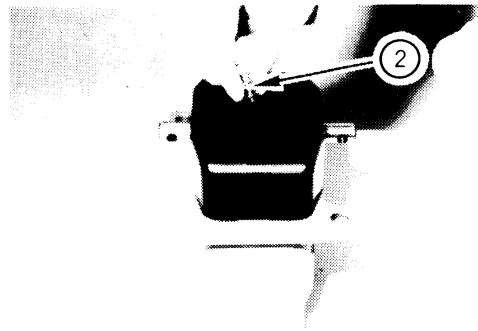
UPPERSTRUCTURE / Pilot Valve

EX200-2

28. Tighten bolt (2).

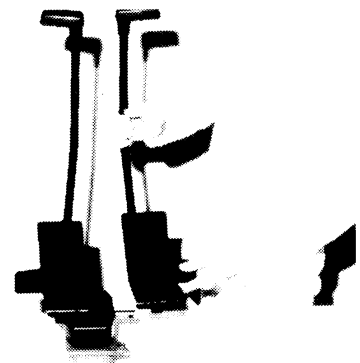
 : 0.7 kgf·m (6 N.m) (5 lbf.ft)

 : 6 mm



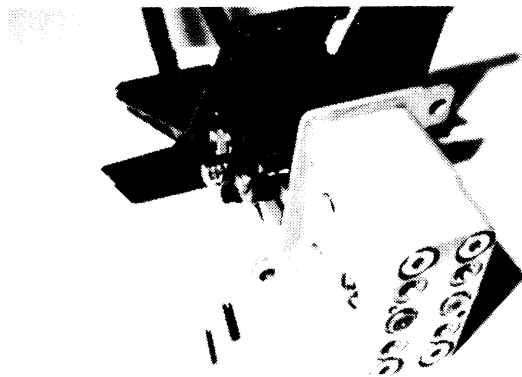
W105-02-07-122

29. Install the control levers (Right) and (Left) to the valve.



W105-02-07-123

30. Tap in the spring pins.



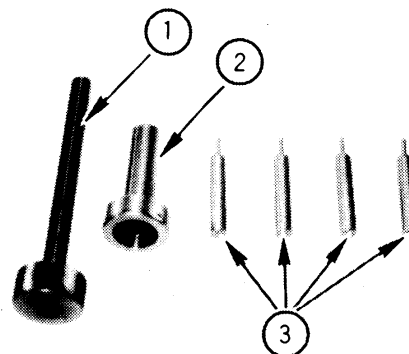
W105-02-07-124

UPPERSTRUCTURE / Pilot Valve

EX200-2

JIGS AND TOOLS

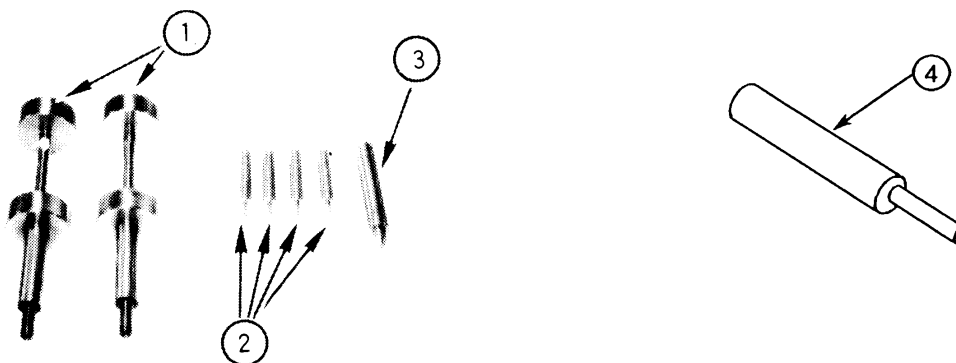
For front control pilot valve



W105-02-07-130

Symbol	Jig No.	Jig name	Remarks
(1)	ST-7088	Valve holder	For disassembling and assembling plate
(2)	ST-7087	Valve holder	For disassembling and assembling plate
(3)	ST-7099	Guide for assembling plate	For assembling spools (Commonly used for assembling holder)
(4)	ST-7924	Valve holder assembly	Including (1) and (2)

For traveling control pilot valve



W105-02-07-131

W105-02-07-132

Symbol	Jig No.	Jig name	Remarks
(1)	ST-7925	Valve holder assembly	For disassembling and assembling valve
(2)	ST-7099	Guide for assembling holder	For assembling spools (Commonly used for assembling plate)
(3)	ST-2292	Oil seal fitter	
(4)	ST-1237	Spring pin driving guide	For tapping in/out spring pin

UPPERSTRUCTURE / Pilot Valve

EX200-2

TOOLS USED FOR DISASSEMBLING AND ASSEMBLING**Tools**

1. Tightening tools

Unit:mm

Tool name	Size	Remarks
 Spanner	17, 19, 22, 24	
 Hex wrench	6, 8, 10	

W105-02-07-133

2. Measuring tools

Tool name
 Torque wrench
thickness gauge

W105-02-07-134

W02-07-42

UPPERSTRUCTURE / Shut-Off Valve

EX200-2

Removal and Installation of Pilot Shut-Off Valve

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Remove ball joint (8).
3. Disconnect pipes (2) to (7) and (10) to (12).
4. Remove mounting bolts (1) and (9) of the shut-off valve.

Installation

1. Install the shut-off valve with bolts (1) and (9).
2. Install pipes (2) to (7) and (10) to (12).
3. Install ball joint (8).

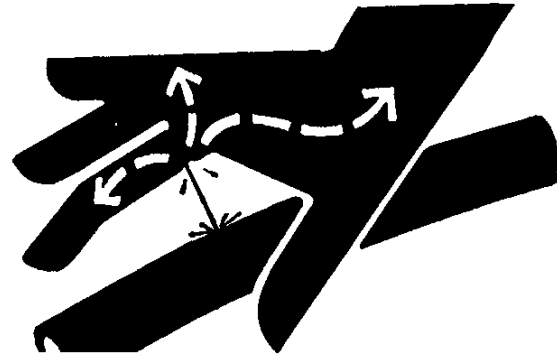
Tightening torque

Shut-off valve mounting bolt

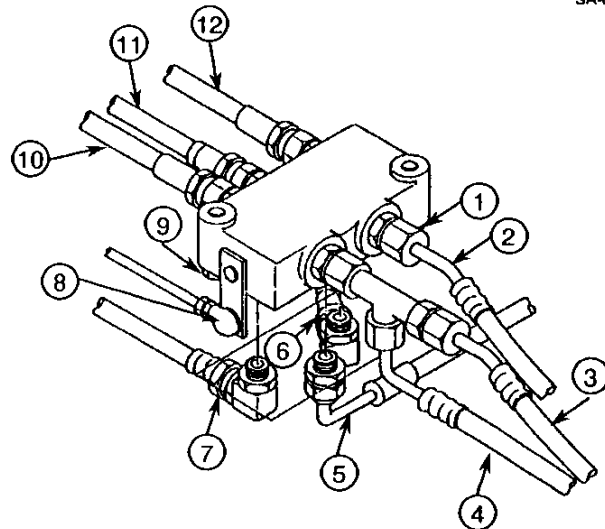
Tightening torque 5 kgf-m (49.0 N·m)
(36.1 lbf-ft)

Pilot hose

Tightening torque 4 kgf-m (39.2 N·m)
(36.9 lbf-ft)



SA-031



W105-02-08-001

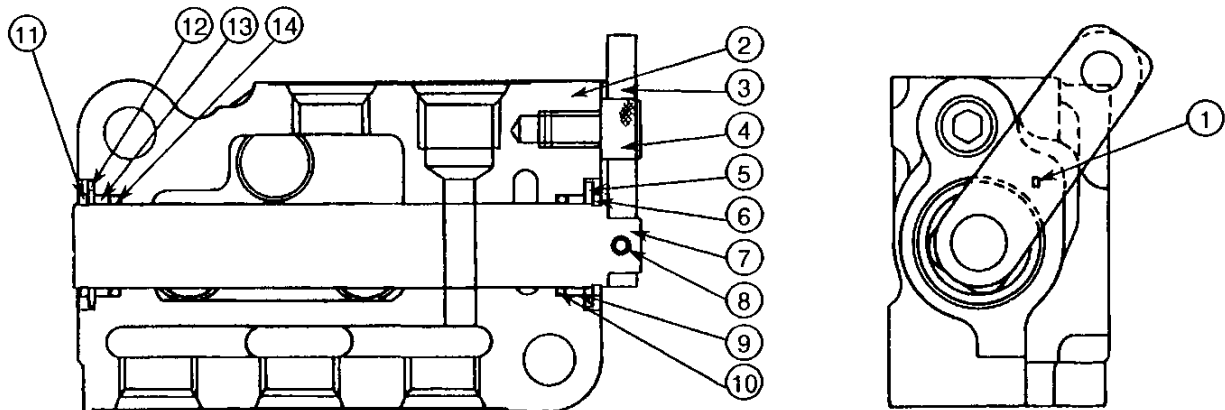
- 1- Shut-off valve mounting bolt
- 2- Pilot hose
To hydraulic tank drain
- 3- Pilot hose
To accumulator
- 4- Main pump regulator control
Pilot pressure supply hose
- 5- Drain hose from travel motor
Travel drain
- 6- Drain hose from right-hand pilot valve
(Boom, bucket)
- 7- Drain hose left-hand pilot valve (Arm, swing)
- 8- Shut-off lever ball joint
- 9- Shut-off valve mounting bolt
- 10- Pilot pressure supply hose to left-hand pilot valve
(Swing, arm)
- 11- Pilot pressure supply hose to travel pilot valve
- 12- Pilot pressure supply hose to right-hand pilot valve
(Boom, bucket)

UPPERSTRUCTURE / Shut-Off Valve

EX200-2

Disassembly and Assembly of Pilot Shut-Off Valve

Illustration of Parts



W105-02-08-003

- 1— Steel ball
- 2— Body
- 3— Lever
- 4— Socket bolt
- 5— Washer

- 6— Retaining ring
- 7— Spool
- 8— Spring pin
- 9— Backup ring
- 10— O-ring

- 11— Retaining ring
- 12— Washer
- 13— Backup ring
- 14— O-ring

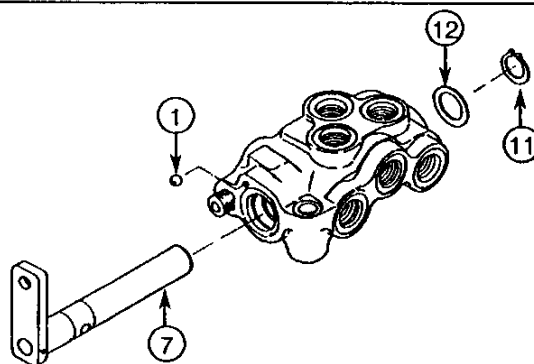
W02-08-02

UPPERSTRUCTURE / Shut-Off Valve

EX200-2

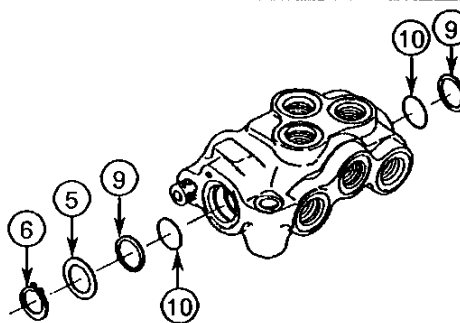
« Disassembly of pilot shut-off valve »

1. Remove retaining ring (11) and washer (12) and pull out spool (7), then remove steel ball (1).



W105-02-08-008

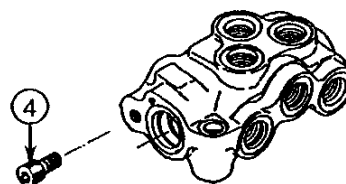
2. Remove washer (5) and retaining ring (6), then remove backup ring (9) and O-ring (10).



W105-02-08-009

3. Remove bolt (4).

└ : 6 mm



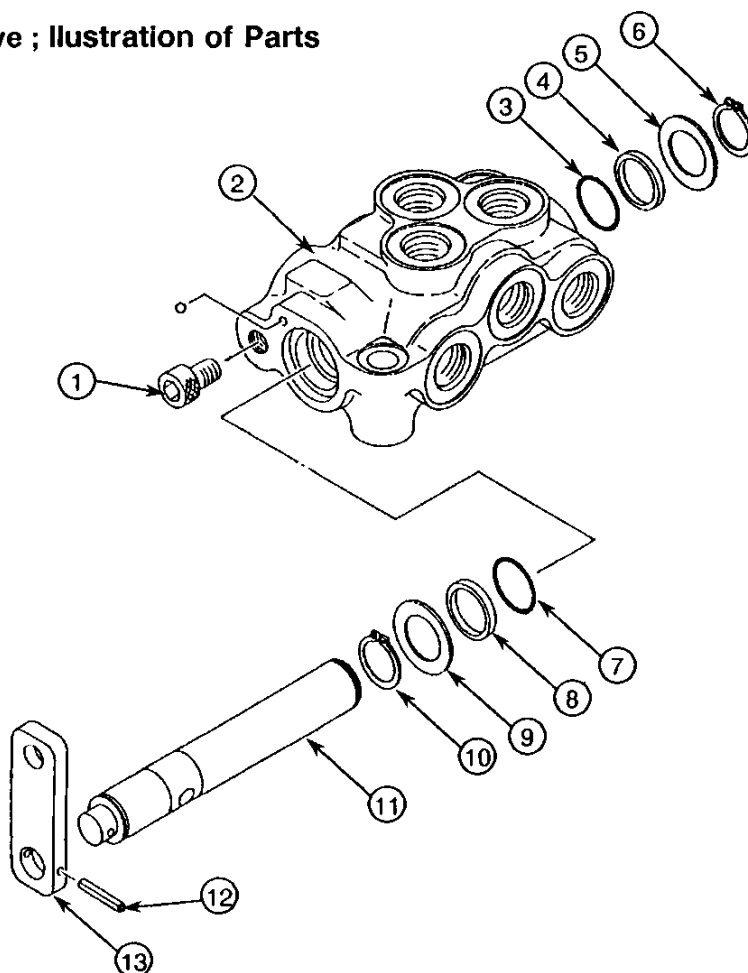
W105-02-08-010

UPPERSTRUCTURE / Shut-Off Valve

EX200-2

« Assembly of The Pilot Shut-Off Valve »

Pilot Shut-Off Valve ; Illustration of Parts



W105-02-08-002

- 1— Bolt
- 2— Body
- 3— O-ring
- 4— Backup ring
- 5— Seal plate

- 6— Retaining ring
- 7— O-ring
- 8— Backup ring
- 9— Seal plate
- 10— Retaining ring

- 11— Spool
- 12— Spring pin
- 13— Lever

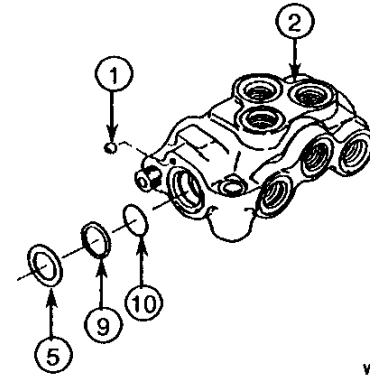
UPPERSTRUCTURE / Shut-Off Valve

EX200-2

◀ Disassembly of Shut-Off Valve ▶

1. Install O-ring (10), backup ring(9), and washer (5) to body (2), then install steel ball (1).

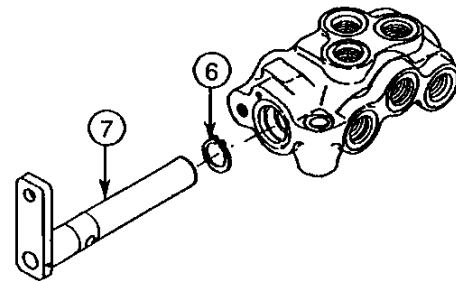
NOTE: Apply a film of grease to O-ring (10), back-up ring (9), and steel ball (1).



W105-02-08-004

2. Install retaining ring (6) to spool (7), then install spool (7) to the body.

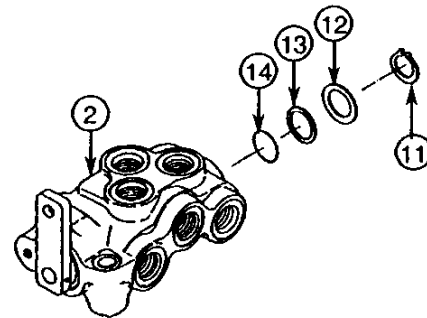
NOTE: Be sure to apply a film of hydraulic oil to the spool.



W105-02-08-005

3. Install O-ring (14), backup ring (13), and washer (12) to body (2), then install retaining ring (11) to spool (7).

NOTE: Apply a film of grease to O-ring (14) and backup ring (13).

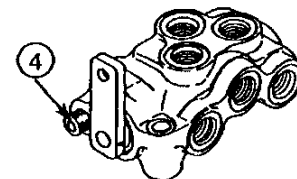


W105-02-08-006

4. Install and tighten bolt (4).

 : 6 mm

 : 4.5 kgf·m (44.1 N.m) (32.5 lbf.ft)



W105-02-08-007

W02-08-06

UPPERSTRUCTURE / Shockless Valve

EX200-2

Removal and Installation of Shockless Valve

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.



CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Disconnect pipes (2) to (7), (8) and (10) to (14).
3. Remove pressure switches (1) and (9).
4. Remove bolt (7).

Installation

1. Apply LOCTITE to bolt (8), then tighten it.
2. Connect pipes (2) to (7), (8), and (10) to (14).

Tightening torque

Pressure switch to pull arm

Tightening torque 1.6 kgf-m (1.2 N.m) (11.5 lbf.ft)

Arm out and boom lower

Tightening torque 3 kgf-m (29.4 N.m) (21.6 lbf.ft)

Heat circuit

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Boom raise side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Arm out side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Arm in side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Boom lower side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Shockless valve mounting bolt

Tightening torque 2 kgf-m (19.6 N.m) (14.4 lbf.ft)

Pressure switch to boom raise

Tightening torque 1.6 kgf-m (1.2 N.m) (11.5 lbf.ft)

Boom raise side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Boom lower side

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Arm out side

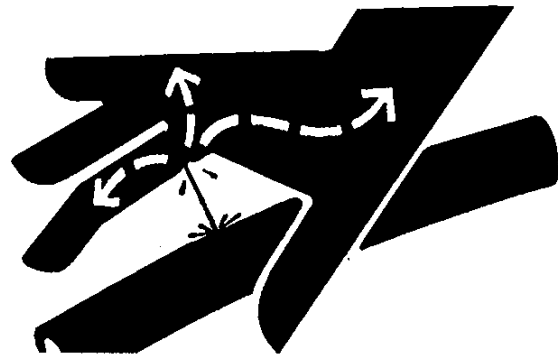
Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Arm in side

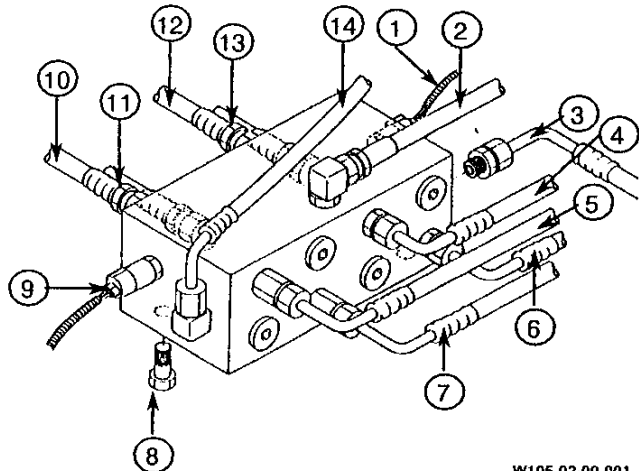
Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)

Heat circuit

Tightening torque 4 kgf-m (39.2 N.m) (28.9 lbf.ft)



SA-031



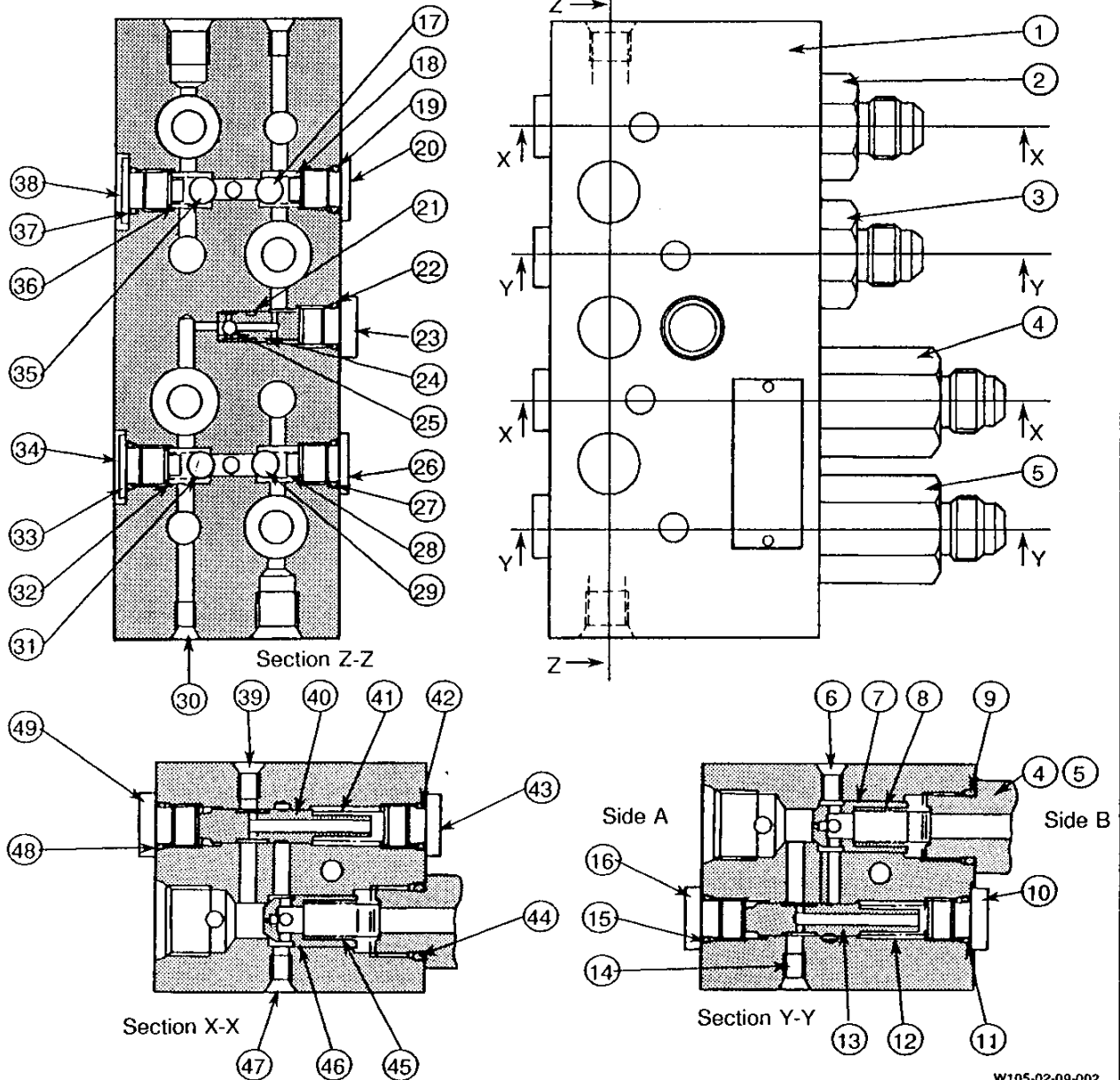
W105-02-09-001

- 1- Pressure switch for arm
- 2- Pressure switch for dump arm out and boom lower (To shuttle valve)
- 3- To hydraulic tank (heat circuit)
- 4- To arm out control valve (4-section)
- 5- To boom raise control valve (4-section)
- 6- To arm in control valve (4-section)
- 7- To boom lower control valve (4-section)
- 8- Shockless valve mounting bolt
- 9- Pressure switch to boom raise
- 10- To boom raise pilot valve
- 11- To boom lower pilot valve
- 12- To arm out pilot valve
- 13- To arm in pilot valve
- 14- From relief drain (heat circuit)

UPPERSTRUCTURE / Shockless Valve

EX200-2

SHOCKLESS VALVE DRAWING FOR DISASSEMBLING



W105-02-09-002

- | | | | |
|------------------------|------------------------|----------------------|------------------------|
| 1-- Body | 14-- Plug | 27-- O-ring | 40-- Spool (2 pieces) |
| 2-- Nipple | 15-- O-ring (2 pieces) | 28-- Spring | 41-- Spring (2 pieces) |
| 3-- Nipple | 16-- Plug (2 pieces) | 29-- Ball | 42-- O-ring |
| 4-- Nipple | 17-- Ball | 30-- Plug (2 pieces) | 43-- Plug (2 pieces) |
| 5-- Nipple | 18-- Spring | 31-- Ball | 44-- O-ring (2 pieces) |
| 6-- Plug | 19-- O-ring | 32-- Spring | 45-- Spring (2 pieces) |
| 7-- Check (2) | 20-- Plug | 33-- O-ring | 46-- Check (2 pieces) |
| 8-- Spring (2 pieces) | 21-- O-ring | 34-- Plug | 47-- Plug |
| 9-- O-ring (2 pieces) | 22-- O-ring | 35-- Ball | 48-- O-ring (2 pieces) |
| 10-- Plug (2 pieces) | 23-- Plug | 36-- Spring | 49-- Plug (2 pieces) |
| 11-- O-ring | 24-- Guide | 37-- O-ring | |
| 12-- Spring (2 pieces) | 25-- Ball | 38-- Plug | |
| 13-- Spool (2 pieces) | 26-- Plug | 39-- Plug | |

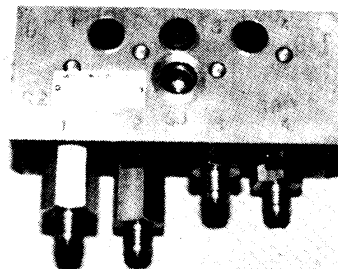
W02-09-02

UPPERSTRUCTURE / Shockless Valve

EX200-2

«Disassemble shockless valve»

1. Clean the outside of the shockless valve before disassembling it.

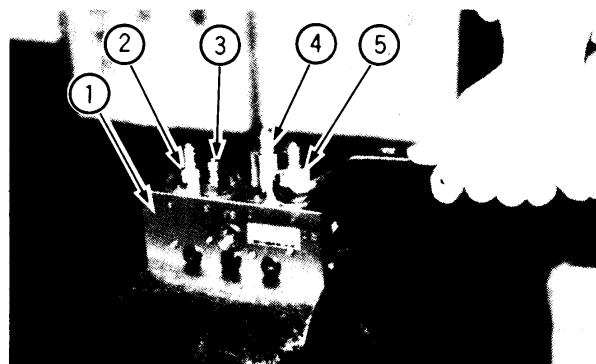


W105-02-09-003

«Check section»

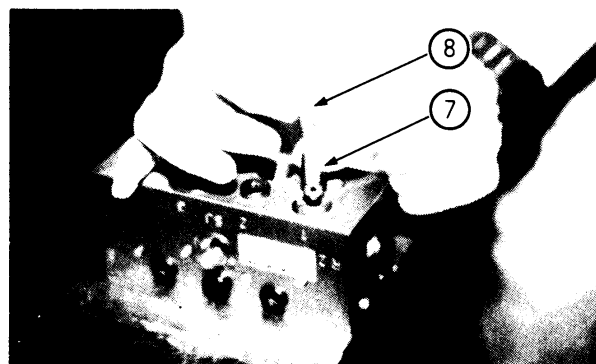
2. Remove nipples (2), (3), (4) and (5) from body (1). Remove O-rings (9) (2 places) and (44) (2 places) from nipples (2), (3), (4) and (5).

 : 22 mm



W105-02-09-004

3. Take out spring (8), checks (7) (2 places), spring (45) and checks (46) (2 places) of body (1).

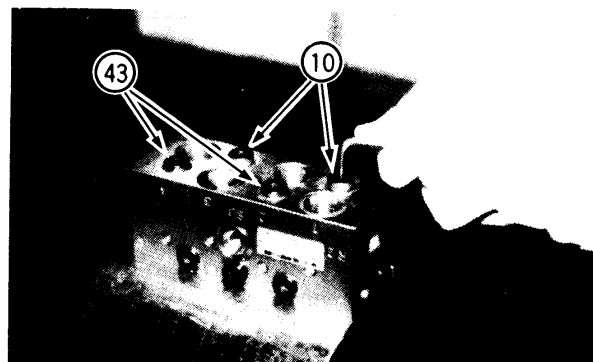


W105-02-09-005

«Changeover valve section»

4. Remove plugs (10) (2 places) and (43) (2 places) on side B from body (1). Remove O-rings (11) and (42) from plugs (10) and (43).

 : 4 mm



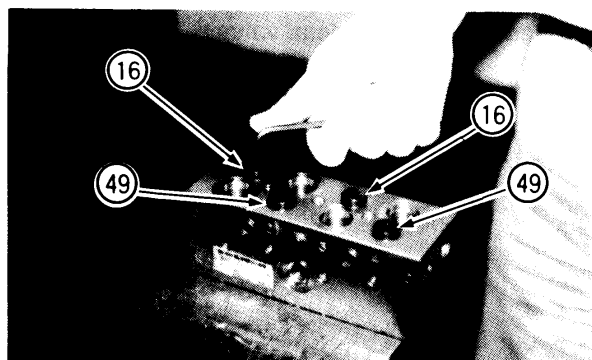
W105-02-09-006

UPPERSTRUCTURE / Shockless Valve

EX200-2

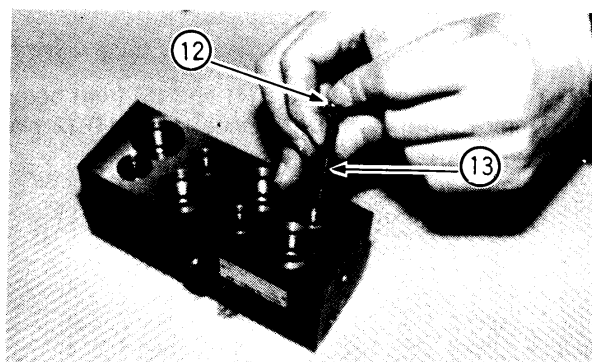
5. Remove plugs (16) (2 places) and (49) (2 places) side A. Remove O-rings (15) and (48) from plugs (16) and (49).

 : 4 mm



W105-02-09-007

6. Remove springs (12) (2 places) and (41) (2 places) and spools (13) (2 places) and (40) (2 places) from side B.

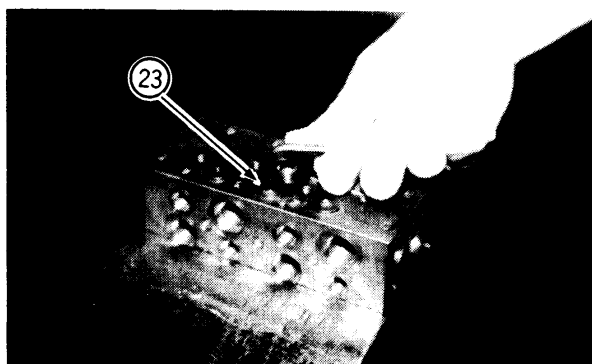


W105-02-09-008

« Shuttle valve section »

7. Remove plug (23) from body (1). Remove O-ring (22) from plug (23).

 : 4 mm



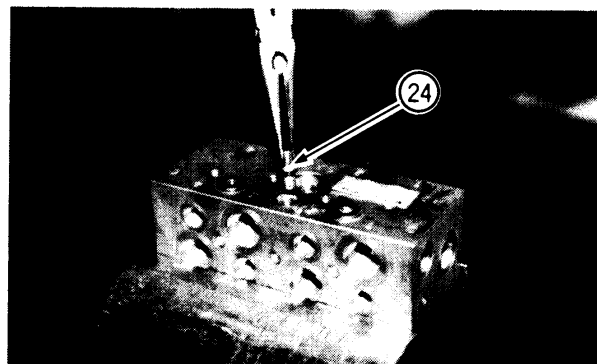
W105-02-09-009

UPPERSTRUCTURE / Shockless Valve

EX200-2

8. Remove guide (24) from body (1). Remove O-ring (21) from guide (24).

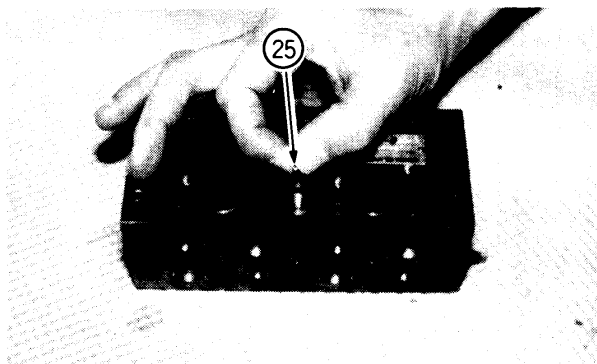
- Necessary tool: Radio pliers



W105-02-09-010

Remove ball (25) from the body.

NOTE: When removing ball (25), take care not to drop it in other oil paths.

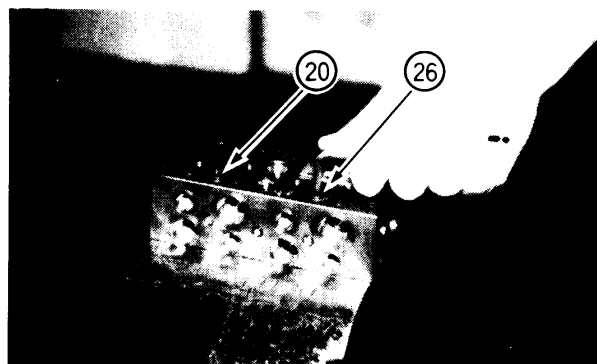


W105-02-09-011

«Check valve section of heat circuit»

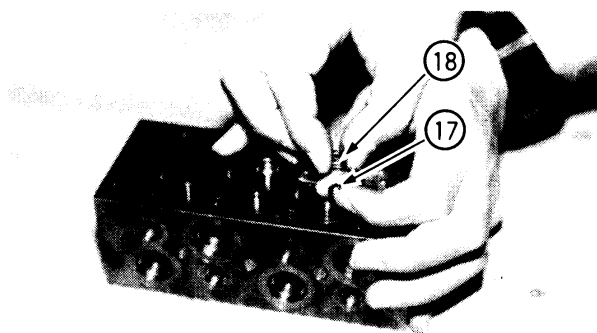
9. Remove plugs (20) and (26) from body (1). Remove O-rings (19) and (27) from plugs (20) and (26).

 : 5 mm



W105-02-09-012

10. Remove springs (18) and (28) and balls (17) and (29) from body (1).

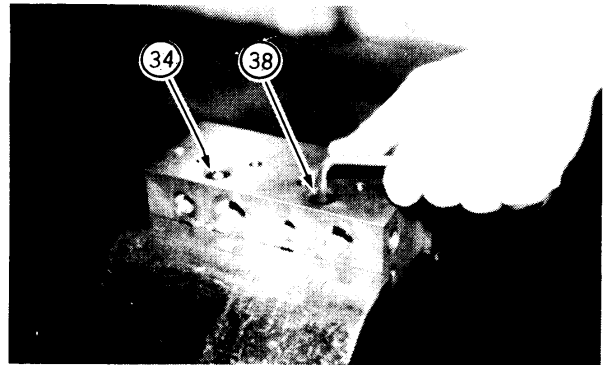


W105-02-809-013

UPPERSTRUCTURE / Shockless Valve

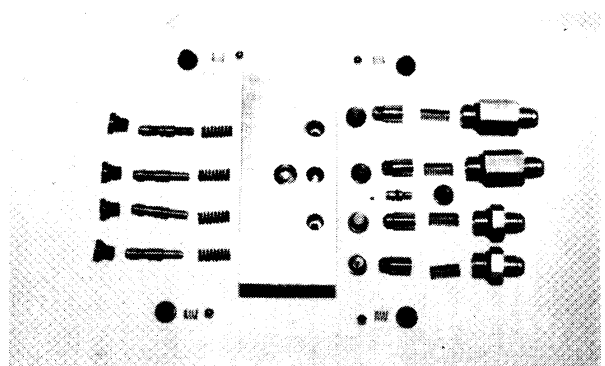
EX200-2

11. Remove plugs (34) and (38) from body (1).
Remove O-rings (33) and (37) from plugs (34) and (38). Remove the springs (32) and (36) and balls (31) and (35). Do not remove plugs (6), (14), (30), (39) and (47).



W105-02-09-014

PARTS TO BE REMOVED



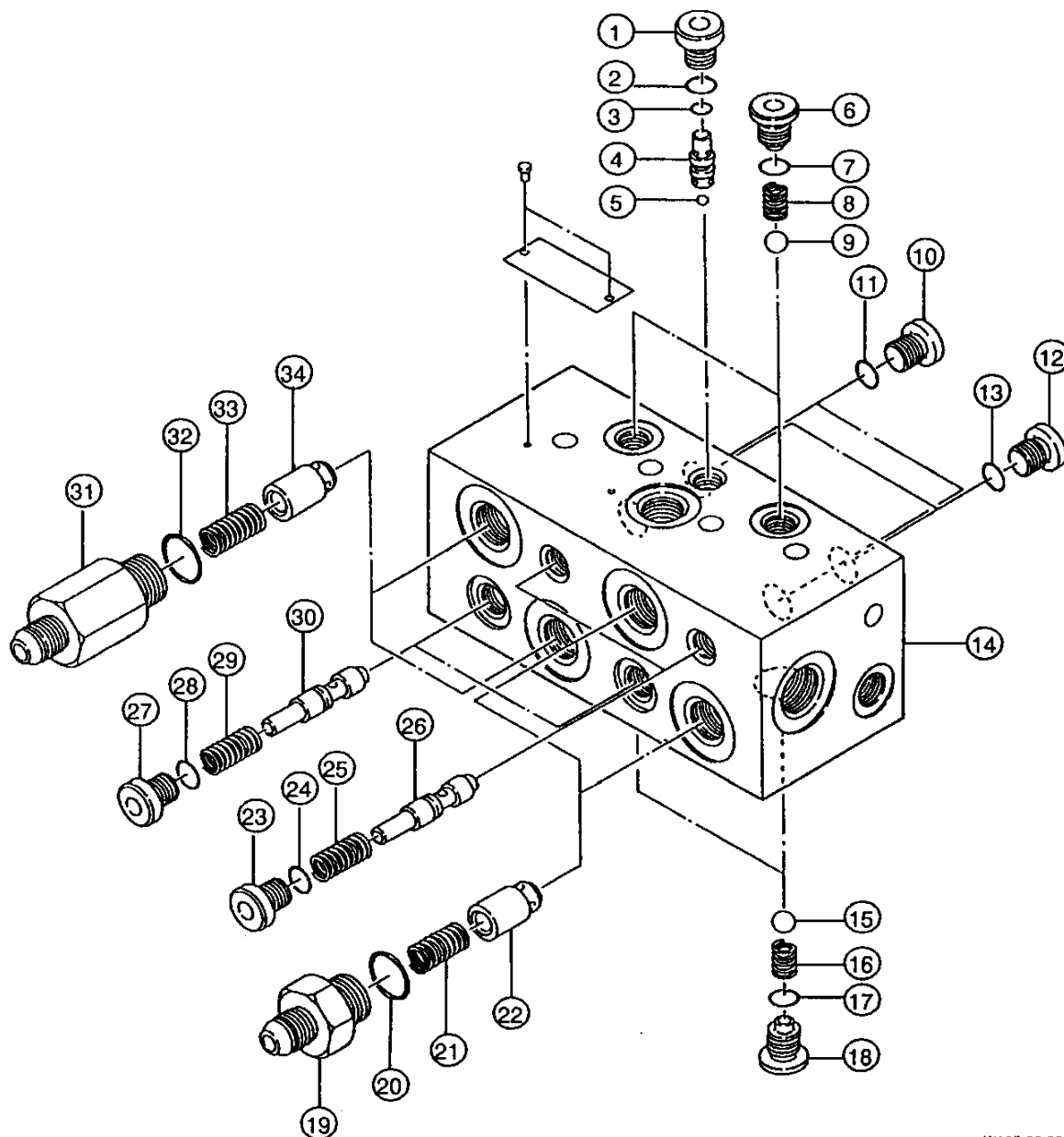
W105-02-09-015

W02-09-06

UPPERSTRUCTURE / Shockless Valve

EX200-2

SHOCKLESS VALVE DRAWING FOR ASSEMBLY



W105-02-09-016

- | | | | |
|----------------------|-----------------------|-----------------------|-----------------------|
| 1— Plug | 10— Plug (2 pieces) | 19— Nipple (2 pieces) | 28— O-ring |
| 2— O-ring | 11— O-ring (2 pieces) | 20— O-ring (2 pieces) | 29— Spring |
| 3— O-ring | 12— Plug (2 pieces) | 21— Spring (2 pieces) | 30— Spool |
| 4— Guide | 13— O-ring (2 pieces) | 22— Check (2 pieces) | 31— Nipple (2 pieces) |
| 5— Ball | 14— Body | 23— Plug | 32— O-ring (2 pieces) |
| 6— Plug (2 pieces) | 15— Ball (2 pieces) | 24— O-ring (2 pieces) | 33— Spring (2 pieces) |
| 7— O-ring (2 pieces) | 16— Spring (2 pieces) | 25— Spring | 34— Check (2 pieces) |
| 8— Spring (2 pieces) | 17— O-ring (2 pieces) | 26— Spool | |
| 9— Ball (2 pieces) | 18— Plug (2 pieces) | 27— Plug | |

UPPERSTRUCTURE / Shockless Valve

EX200-2

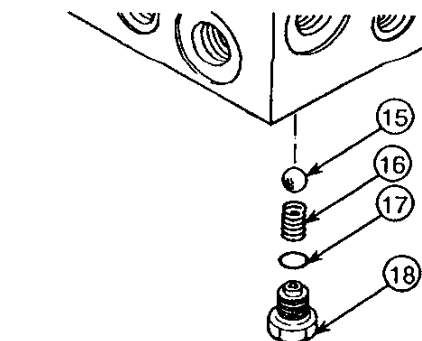
ASSEMBLE OF SHOCKLESS VALVE

« Check section of heat circuit »

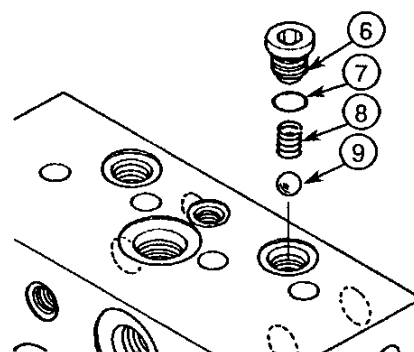
1. Install O-ring (17) to plug (18). Install ball (15), spring (16) and plug (18) in the body in order. Similarly, install ball (9), spring (8), O-ring (7) and plug (6) in the same order to the opposite side.

 : 5 mm

 : 0.75~0.95 kgf·m (7.3~9.3 N.m)
(5.4~6.8 lbf.ft)



W105-02-09-017



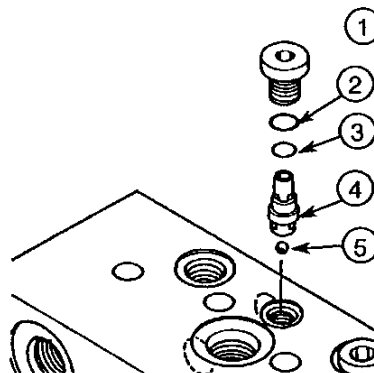
W105-02-09-018

« Shuttle section »

2. Install O-ring (2) to plug (1). Install O-ring (3) guide (4). Then install ball (5), guide (4) and plug (1) to the body in order.

 : 4 mm

 : 0.75~0.95 kgf·m (7.3~9.3 N.m)
(5.4~6.8 lbf.ft)



W105-02-09-018

W02-09-08

UPPERSTRUCTURE / Shockless Valve

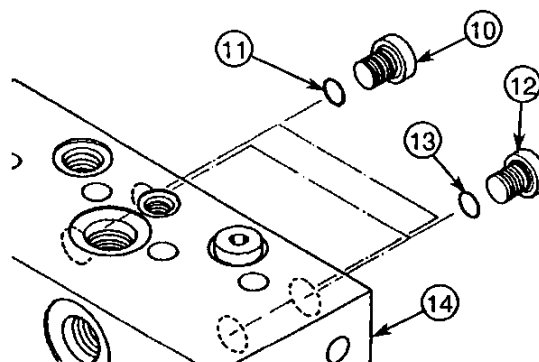
EX200-2

« Changeover valve section »

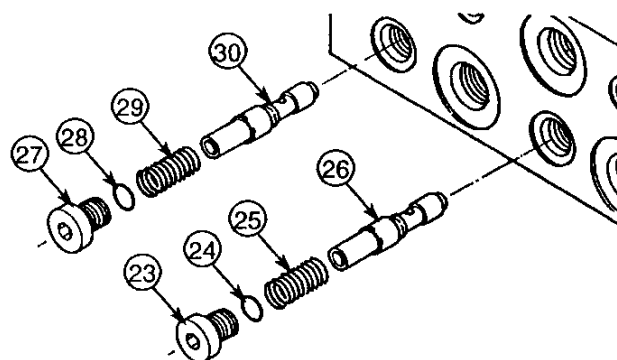
3. Install O-rings (11) and (13) to plugs (10) and (12), then install them to the body.
Install springs (29) and (25) to spools (30) and (26) and install O-rings (24) and (28) to plugs (23) and (27), then install them into the body.

 : 4 mm

 : 0.75 ~ 0.95 kgf·m (7.3 ~ 9.3 N.m)
(5.4 ~ 6.8 lbf.ft)



W105-02-09-020



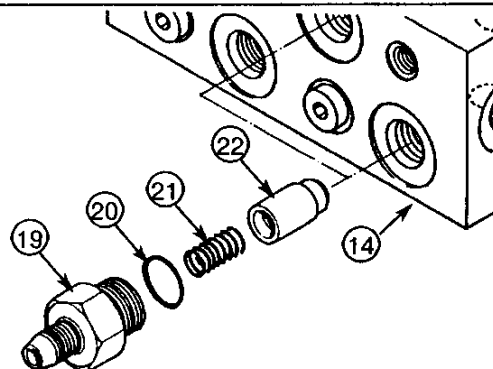
W105-02-09-021

« Check section »

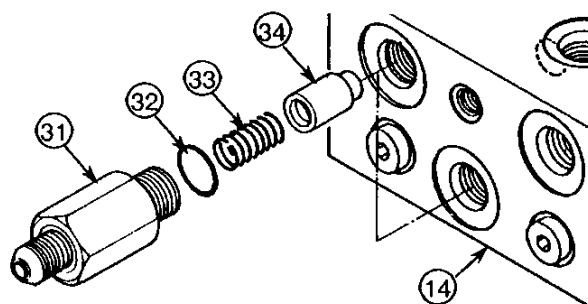
4. Install springs (21) and (33) to checks (22) and (34), then install them to the body.
Install O-rings (32) and (20) to nipples (31) and (19), then install them into the body.

 : 22 mm

 : 3.1 ~ 3.8 kgf·m (7.3 ~ 9.3 N.m)
(5.4 ~ 6.8 lbf.ft)



W105-02-09-022



W105-02-09-023

UPPERSTRUCTURE / Shockless Valve

EX200-2

TOOLS USED FOR DISASSEMBLE AND ASSEMBLE**Tools****1. Tightening Tools**

Unit: mm

Tool name	Size	Remarks
 Spanner	22	
 Hex wrench	4, 5	

W105-02-09-024

2. General tools

Tool name
Radio plier 150 (with pointed tips)

W105-02-09-025

3. Measuring tool

Tool name
 Torque wrench

W105-02-09-026

W02-09-10

UPPERSTRUCTURE / Accumulator

EX200-2

Removal and Installation of Accumulator

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

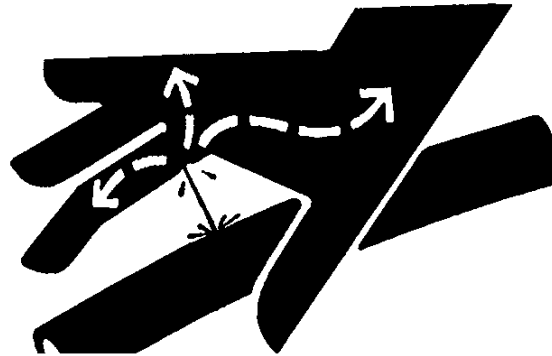
If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Be sure that pressure in the accumulator circuit pipe lines is released.
3. Loosen accumulator (2) counterclockwise 2-3 times slowly, and leave it in that position for a few minutes.
4. Purge pressure in the pipes to zero. Remove the accumulator and O-ring (3).
5. Remove gas plug (1), and discard it.
6. Apply a film of hydraulic oil to O-ring (2), and install it into the new accumulator.
7. Install new accumulator (2) to block (4).
8. Do not weld or cut the accumulator.

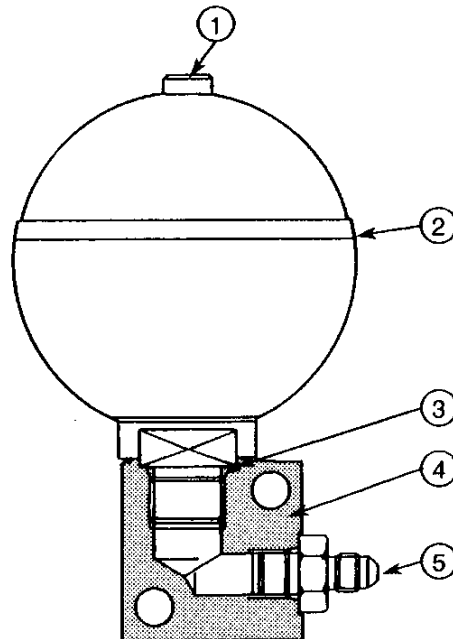
Tightening Torque

Accumulator

Tightening torque 5kgf-m (49.0 N-m)
(36.1 lbf-ft)



SA-031



W105-02-10-001

- 1— Gas Plug
- 2— Accumulator
- 3— O-ring
- 4— Block
- 5— To Nipple Check Block

UPPERSTRUCTURE / Solenoid Valve

EX200-2

Removal and Installation of Solenoid Valve

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

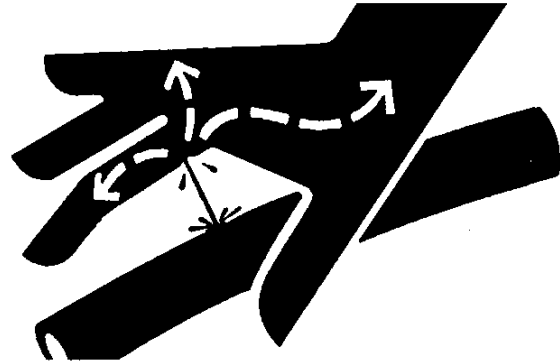
2. Remove all wire harnesses for solenoid valves from connectors.
3. Disconnect pilot pipes (1) to (15) and (17) and remove bolt (16)

Installation

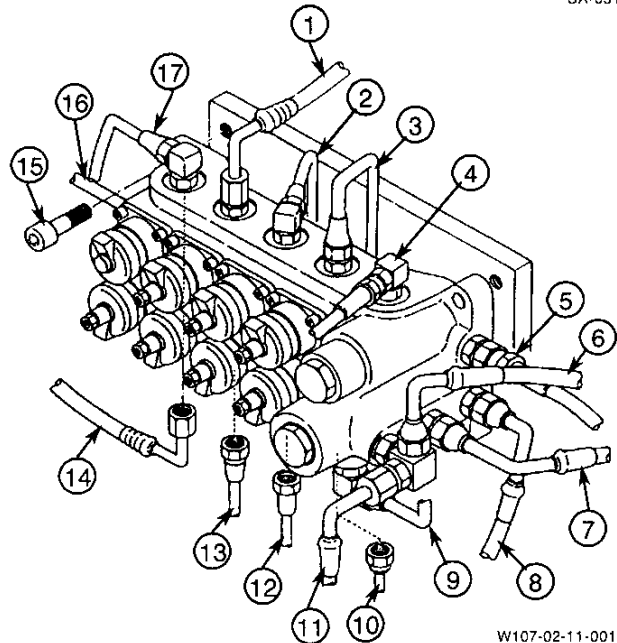
1. Install bolt (16) and connect pipes (1) to (15) and (17).

Tightening torque

Tightening torque for the proportional Solenoid valve mounting bolt	5.0kgf.m(49 N.m ,36 lbf.ft)
Tightening torque for pilot Pipes (1) to (3), (5),(14) and (16)	3.0kgf.m(29 N.m ,22 lbf.ft)
Tightening torque for pilot pipes (4)	4.0kgf.m(39 N.m ,29 lbf.ft)



SA-031

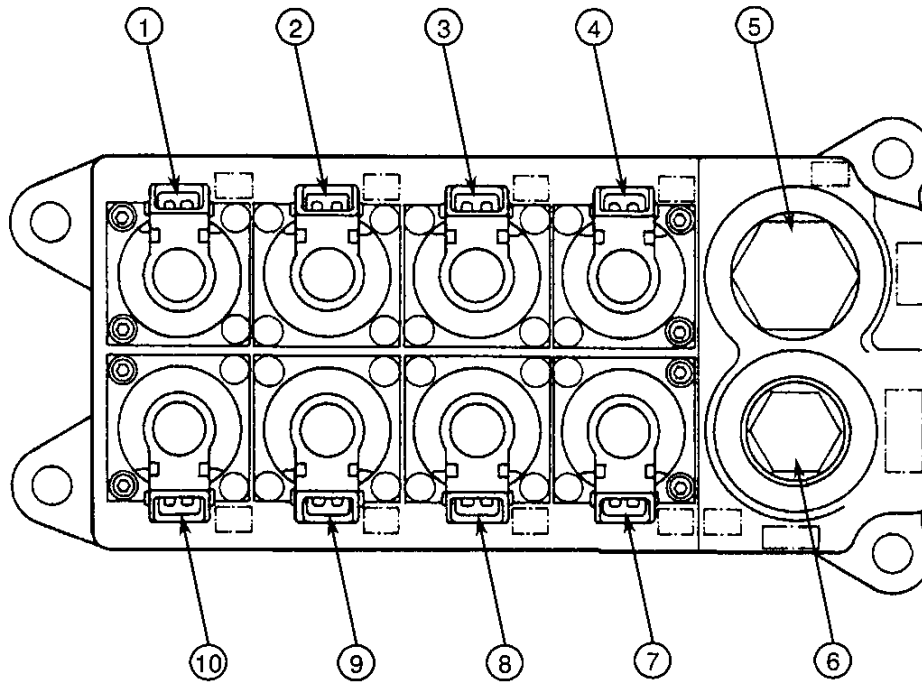


W107-02-11-001

- 1- Hose SF : Power Boost
- 2- Hose SE : Travel Pc
- 3- Hose SD : Swing Pc
- 4- Hose SG : PI
- 5- Hose T3 : To Hyd. Tank
- 6- Hose D1 : To Hyd. Tank
- 7- Hose : PB : From Pilot Filter
- 8- Hose PC : To Pilot Shut off Valve
- 9- Hose PH : To Accumulator
- 10- Hose SC : Bucket Pc
- 11- Hose D14 : To Shockless Valve
- 12- Hose SA : Boom Pc
- 13- Hose SB : Arm Pc
- 14- Hose SH : Travel Speed
- 15- Bolt
- 16- Hose SL : Swing Dumpner Valve
- 17- Hose SI : Swing Parking Brake

UPPERSTRUCTURE / Solenoid Valve

EX200-2



W107-02-11-002

- 1— Solenoid valve for swing parking
- 2— Solenoid valve for power boost
- 3— Solenoid valve for travel control
- 4— Solenoid valve for swing control
- 5— Pressure reducing valve

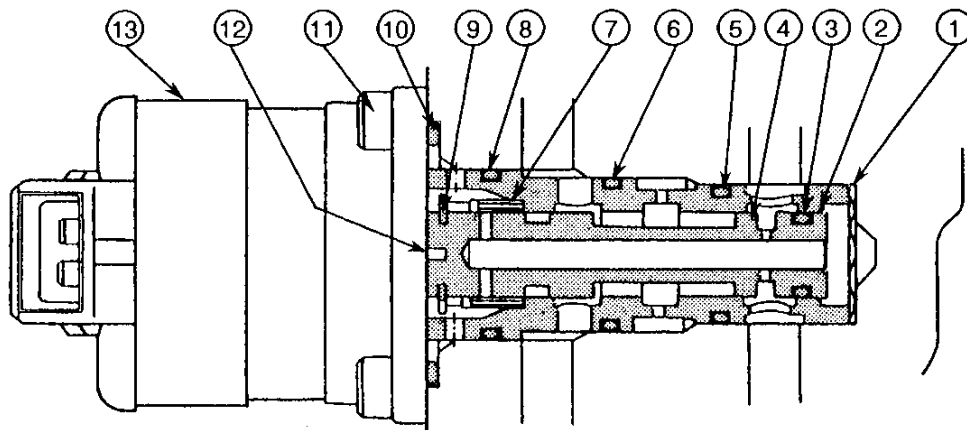
- 6— Pilot relief valve
- 7— Proportional solenoid valve for bucket control
- 8— Proportional solenoid valve for boom control
- 9— Proportional solenoid valve for arm control
- 10— Proportional solenoid valve for travel speed control

UPPERSTRUCTURE / Solenoid Valve

EX200-2

ASSEMBLY AND DISASSEMBLY OF SOLENOID VALVE FOR SWING PARKING

Solenoid valve drawing for disassembly



W107-02-11-003

1— Washer
2— Sleeve
3— O-ring
4— Spool
5— O-ring

6— O-ring
7— Spring
8— O-ring
9— Snap-ring
10— O-ring

11— Bolt
12— Rod
13— Solenoid

UPPERSTRUCTURE / Solenoid Valve

EX200-2

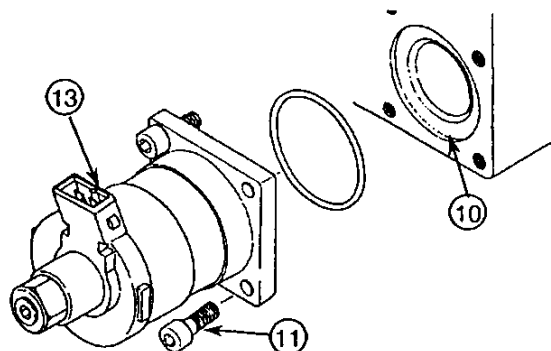
REMOVAL OF SOLENOID VALVE

NOTE: Do not tear down the solenoid valve as it is not a type to be repaired by reassembly.

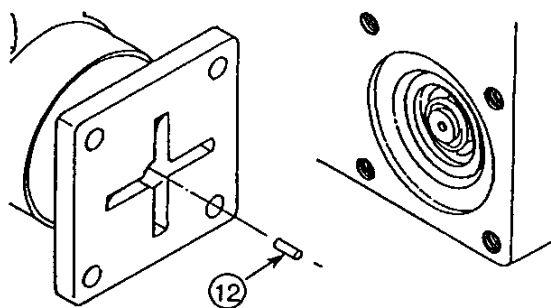
1. Loosen bolt (11) and remove solenoid (13) and O-ring (10)

 : 3 mm

NOTE: When removing solenoid (13), take care not to lose rod (12) provided in the solenoid



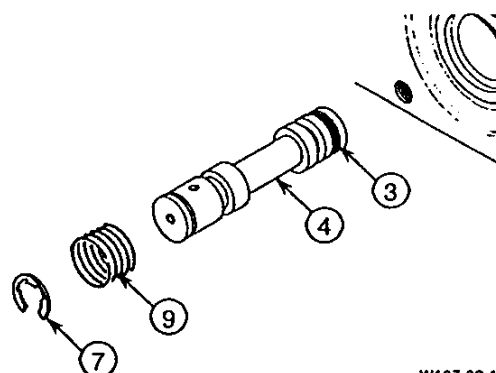
W107-02-11-005



W107-02-11-076

2. Pull spool (4) out of the sleeve and remove snap ring (7), spring (9) and O-ring (3) from the spool.

NOTE: Be sure to pull out the spool slowly.



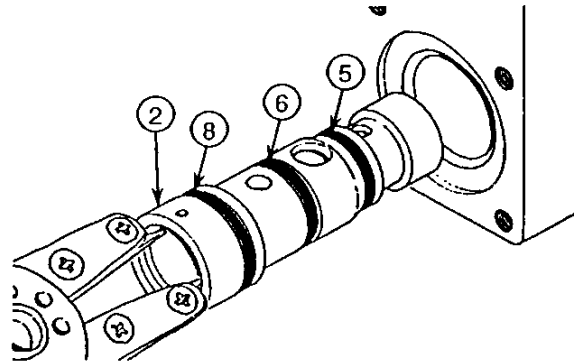
W107-02-11-006

W02-11-04

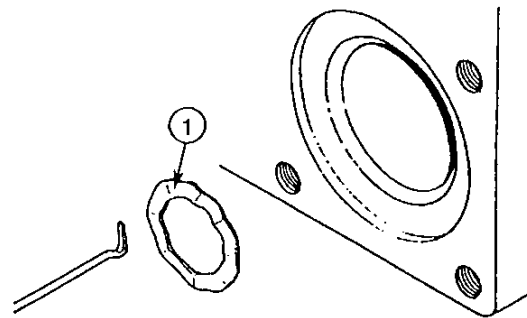
UPPERSTRUCTURE / Solenoid Valve

EX200-2

3. Remove sleeve (2), O-ring (5), (6) and (8) and washer (1).



W107-02-11-007

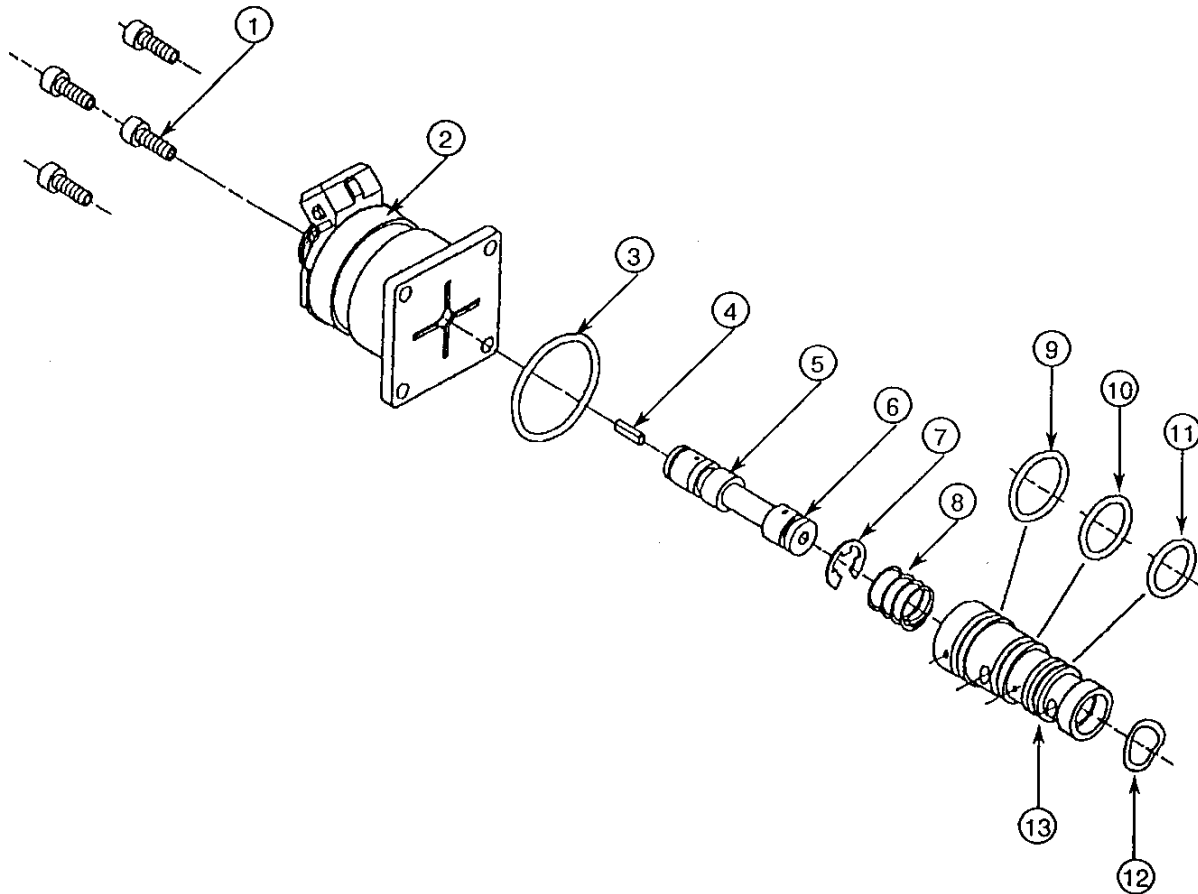


W107-02-11-008

UPPERSTRUCTURE / Solenoid Valve

EX200-2

SOLENOID VALVE DRAWING FOR ASSEMBLY



W107-02-11-009

1— Bolt
2— Solenoid
3— O-ring
4— Rod

5— Spool
6— O-ring
7— Stop ring
8— Spring

9— O-ring
10— O-ring
11— O-ring
12— Washer

13— Sleeve

W02-11-06

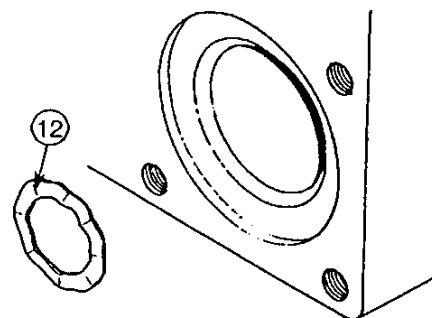
UPPERSTRUCTURE / Solenoid Valve

EX200-2

ASSEMBLY OF SOLENOID VALVE

Solenoid valve drawing for disassembly

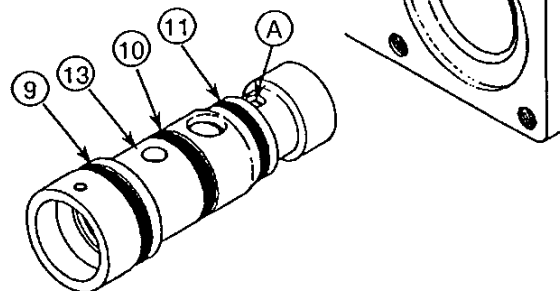
1. Install washer (12)



W107-02-11-011

2. Install O-rings (9), (10) and (11) onto sleeve (13) and insert the sleeve into the housing.

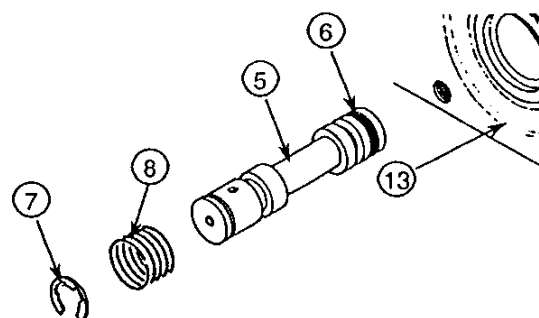
NOTE: Be sure to insert the sleeve into the housing so that port (A) direction of the sleeve comes to align with port (S1) direction of the housing.



W107-02-11-012

3. Install O-ring (6), spring (8) and snap ring (7) onto spool (5) and insert them into sleeve (13) slowly.

NOTE: Take care not to damage sleeve (13) and spool (5) when assembling.



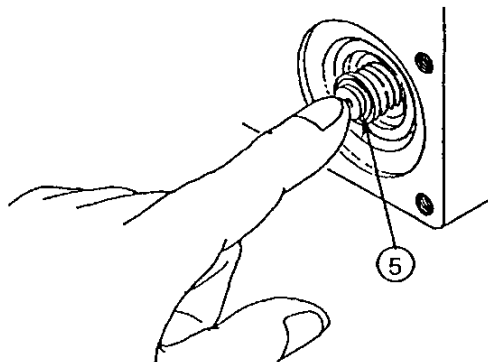
W107-02-11-006

UPPERSTRUCTURE / Solenoid Valve

EX200-2

4. After inserting spool (5), check to push spool (5) end that spool (5) slides in axial direction smoothly by 3 to 5 mm

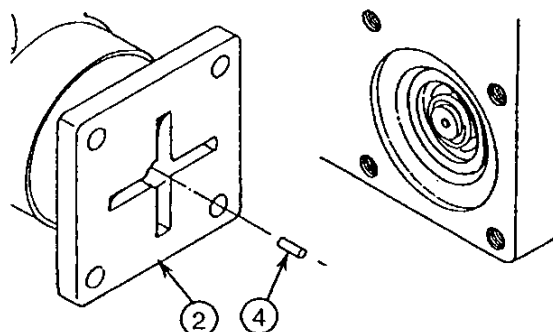
NOTE; Spool (5) shall slide smoothly without any restriction when pushed. In case that spool (5) can not move smoothly, replace the spool.



W107-02-11-014

5. Install solenoid (2).

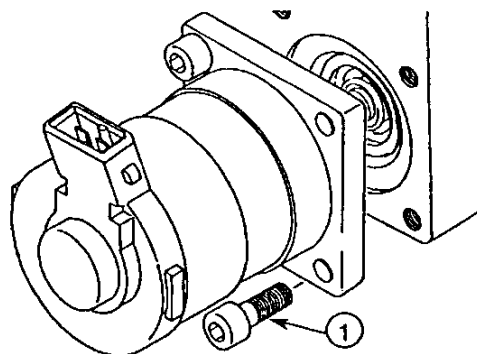
NOTE: Be careful not to slip rod (4) off solenoid (2) when installing solenoid (2).



W107-02-11-076

6. Tighten bolts (1).

 : 3 mm
 : 0.3kgf·m (3N·m2.2lbf·ft)



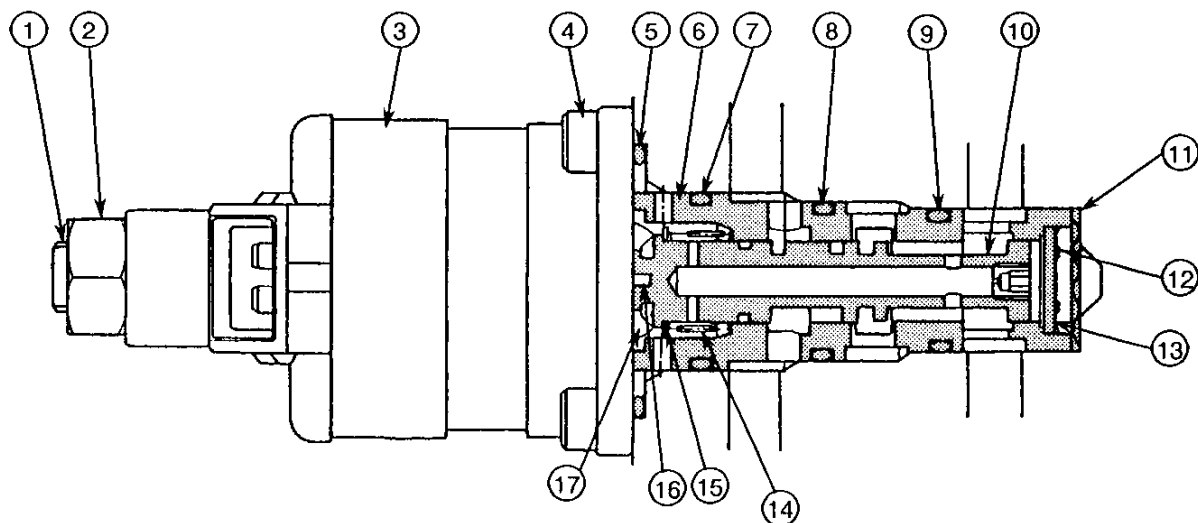
W107-02-11-016

UPPERSTRUCTURE / Solenoid Valve

EX200-2

DISASSEMBLY AND ASSEMBLY OF PROPORTIONAL SOLENOID VALVES FOR POWER BOOST, TRAVEL, SWING AND FRONT CONTROL

Proportional solenoid valve drawing for disassembly



W107-02-11-017

- 1— Adjusting bolt
- 2— Lock nut
- 3— Solenoid
- 4— Socket bolt
- 5— O-ring

- 6— Sleeve
- 7— O-ring
- 8— O-ring
- 9— O-ring
- 10— Spool

- 11— Washer
- 12— Lock washer
- 13— Plate
- 14— Spring
- 15— Washer

- 16— Spring
- 17— Diaphragm

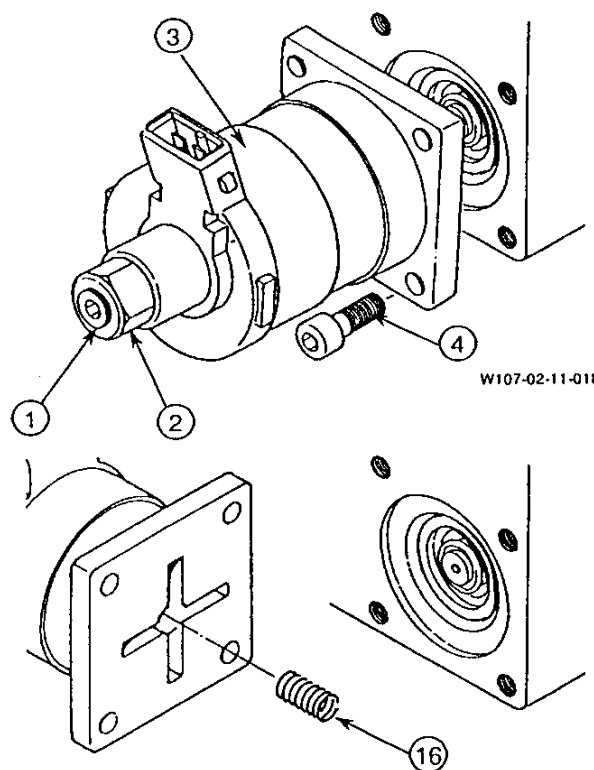
UPPERSTRUCTURE / Solenoid Valve

EX200-2

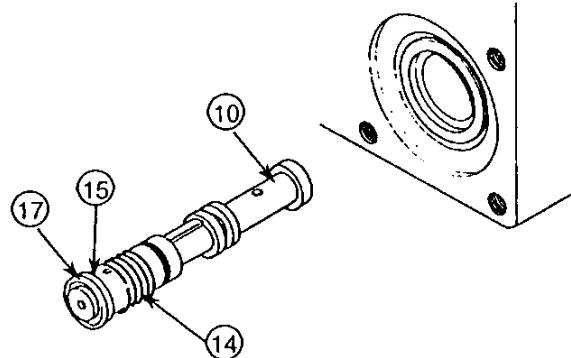
DISASSEMBLY OF PROPORTIONAL SOLENOID VALVE

1. Loosen socket bolts (4) and remove solenoid (3).

NOTE: Take care not to lose spring (16) provided in the groove of solenoid (3) when removing solenoid (3). Do not remove lock nut (2) and adjusting bolt (1) for pressure control.



2. Pull spool (10) out the sleeve together with washer (15), spring (14) and diaphragm (17).



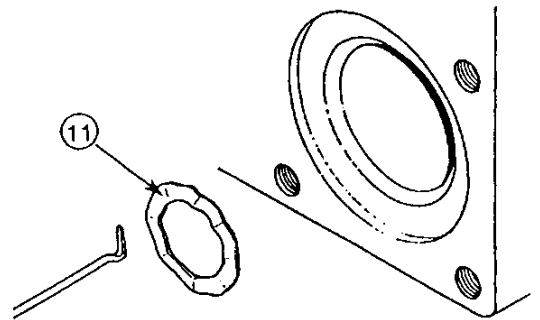
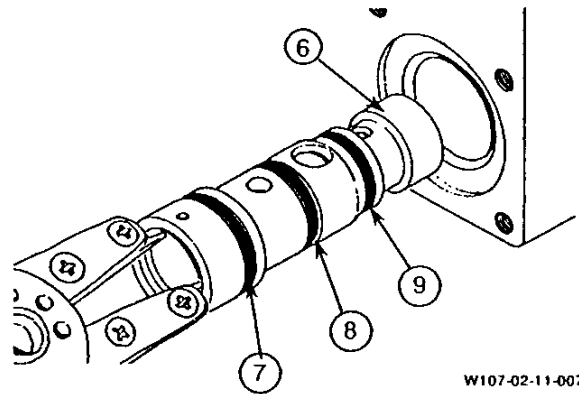
W02-11-10

UPPERSTRUCTURE / Solenoid Valve

EX200-2

3. Pull sleeve (6) out of the housing and remove O-rings (7), (8) and (9) from sleeve (6) and then take washer (11) out of the housing.

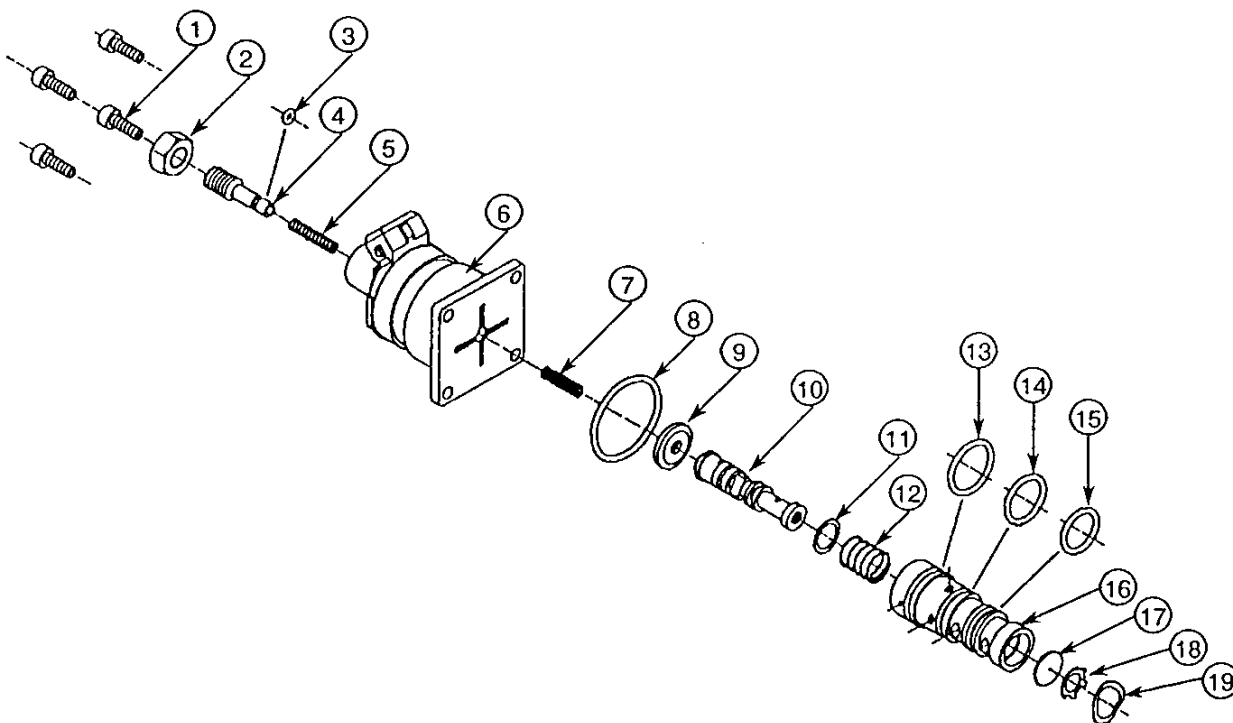
NOTE: Do not remove plate (13) and lock washer (12) from sleeve (6).



UPPERSTRUCTURE / Solenoid Valve

EX200-2

PROPORTIONAL SOLENOID VALVE DRAWING FOR ASSEMBLY



W107-02-11-023

- 1— Bolt
- 2— Lock nut
- 3— O-ring
- 4— Adjusting bolt
- 5— Spring

- 6— Solenoid
- 7— Spring
- 8— O-ring
- 9— Diaphragm
- 10— Spool

- 11— Washer
- 12— Spring
- 13— O-ring
- 14— O-ring
- 15— O-ring

- 16— Sleeve
- 17— Plate
- 18— Lock washer
- 19— Washer

W02-11-12

UPPERSTRUCTURE / Solenoid Valve

EX200-2

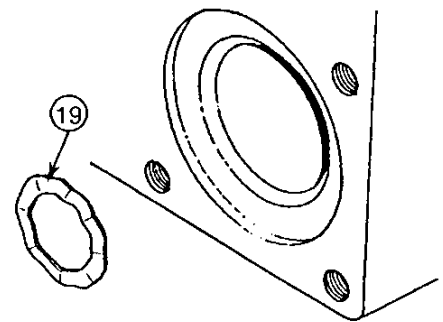
ASSEMBLY OF PROPORTIONAL SOLENOID VALVE

NOTE: Lock nut (2) and adjusting bolt (1) are not removed so that they are not required to be assembled.

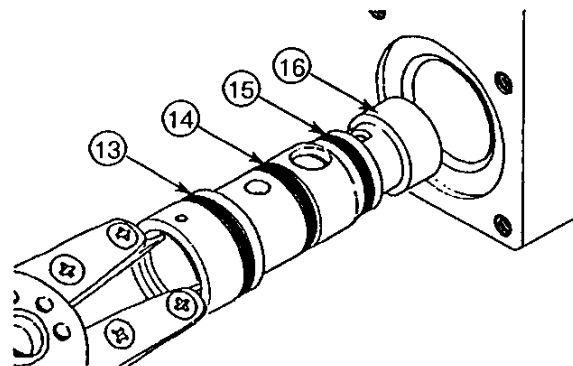
1. Install washer (19) into the housing. Install O-rings (13), (14) and (15) onto sleeve (16) and insert them into the housing.

NOTE:

1. Apply a film of grease to O-rings (13), (14) and (15).
2. Install sleeve (16) together with plate (17) and lock washer (18).
3. Apply a film of hydraulic oil to sleeve (16) and O-rings. When inserting sleeve (16), be sure to position the port direction of the sleeve to that of the housing.



W107-02-11-011



W107-02-11-007

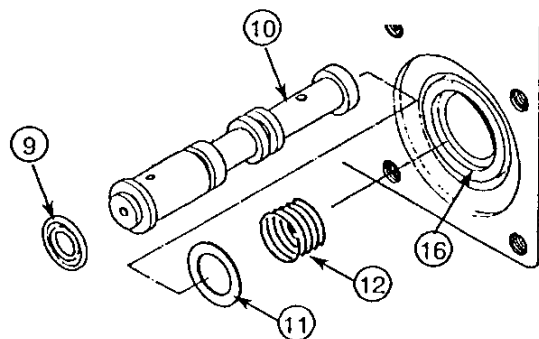
UPPERSTRUCTURE / Solenoid Valve

EX200-2

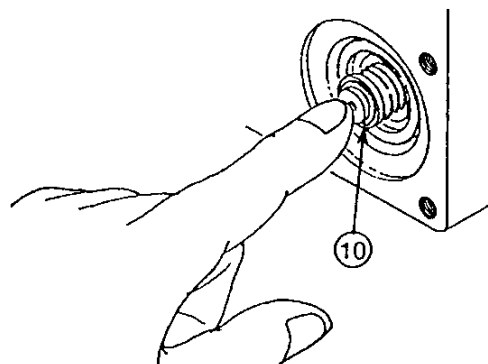
2. Install diaphragm (9), washer (11) and spring (12) to spool (10) and apply a film of hydraulic oil to them. And insert them into sleeve (16).

NOTE:

1. Take care not to damage the bore inner edges of sleeve (16) when inserting the spool assembly.
2. After inserting spool (10), check to push spool (10) end that spool (10) slides in axial direction smoothly without any restriction by 3 to 5 mm.



W107-02-11-027

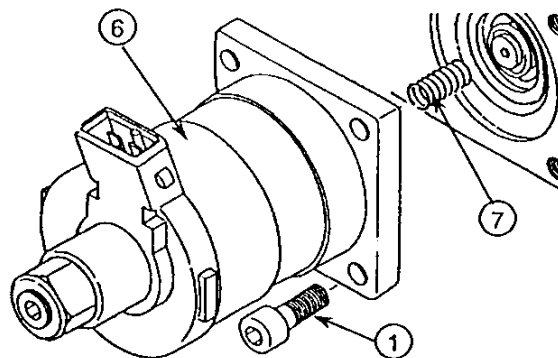


W107-02-11-014

3. Install solenoid (6) by tightening bolts (1).

NOTE: Install solenoid (6) by tightening bolts (1).
Be careful not to slip spring (7) of solenoid (6) when installing solenoid (6).

 : 3 mm
 : 0.3kgf·m (3 N·m 2.2 lbf·ft)



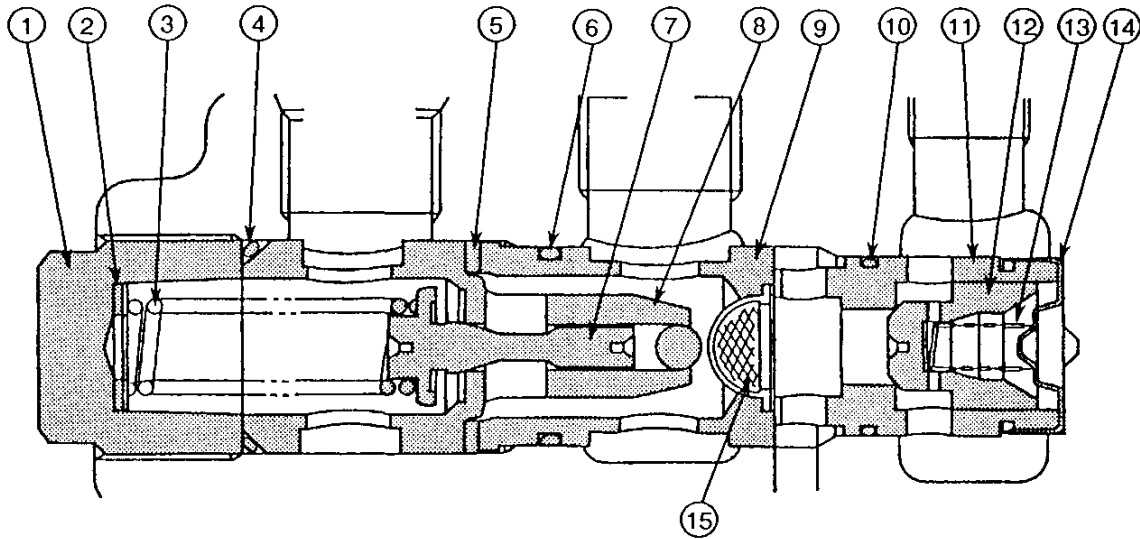
W107-02-11-029

UPPERSTRUCTURE / Solenoid Valve

EX200-2

DISASSEMBLY AND ASSEMBLY OF RELIEF VALVE

Relief valve drawing for disassembly



W107-02-11-031

1- Plug
2- Shim
3- Spring
4- O-ring

5- Gasket
6- O-ring
7- Relief valve
8- Relief valve

9- Sleeve
10- O-ring
11- Check valve
12- Check valve

13- Spring
14- Cap
15- Strainer

UPPERSTRUCTURE / Solenoid Valve

EX200-2

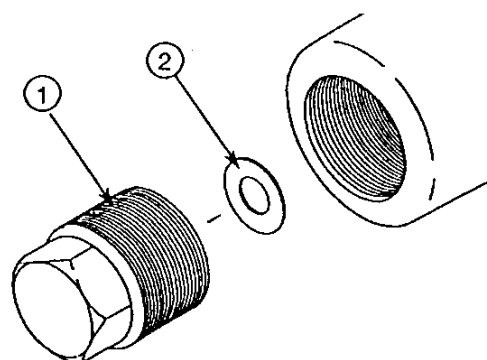
DISASSEMBLY OF RELIEF VALVE

NOTE: Remove oil and dust from the relief valve unit before disassembling.

1. Remove plug (1).

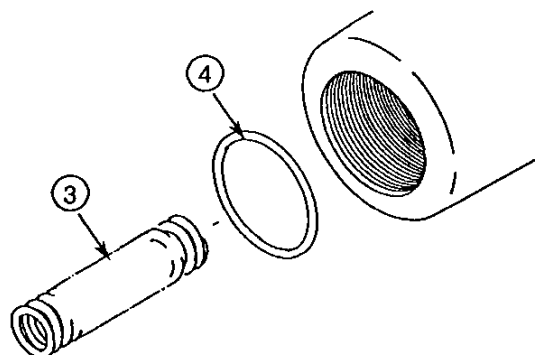
NOTE: Be careful not to lose shim (2) provided in plug (1) when removing plug (1).

 : 22 mm



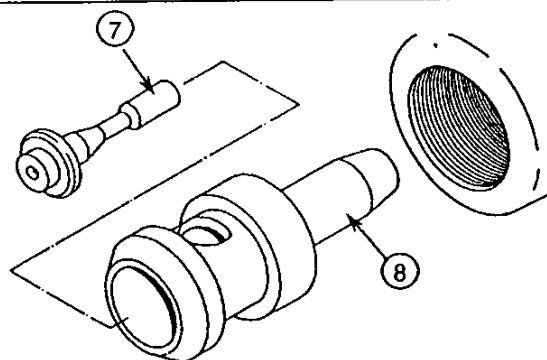
W107-02-11-032

2. Take spring (3) and O-ring (4) out of the relief valve.



W107-02-11-034

3. Remove relief valve (7) and (8).

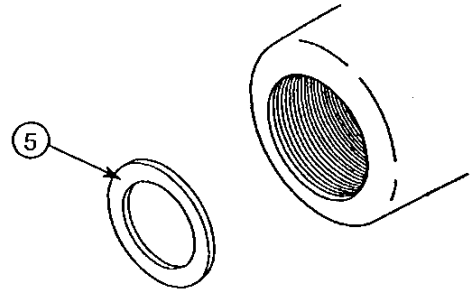


W107-02-11-035

UPPERSTRUCTURE / Solenoid Valve

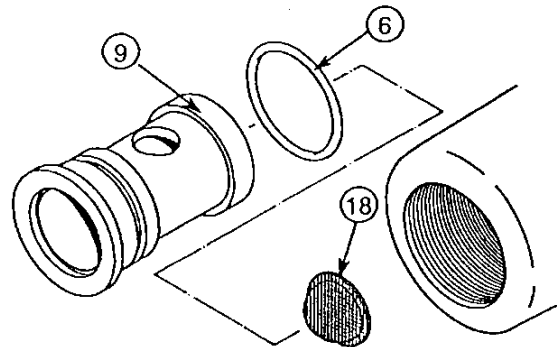
EX200-2

4. Take gasket out.



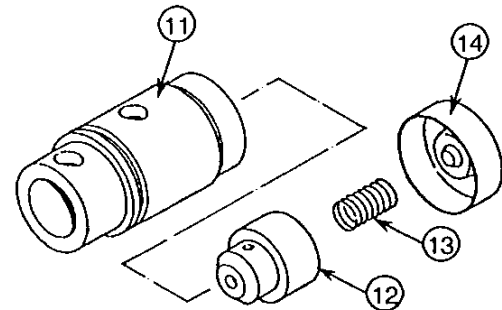
W107-02-11-036

5. Remove sleeve (9), O-ring (6) and strainer (15).



W107-02-11-038

6. Remove cap (14) from check valve (11) and remove spring (13) and check valve (12).

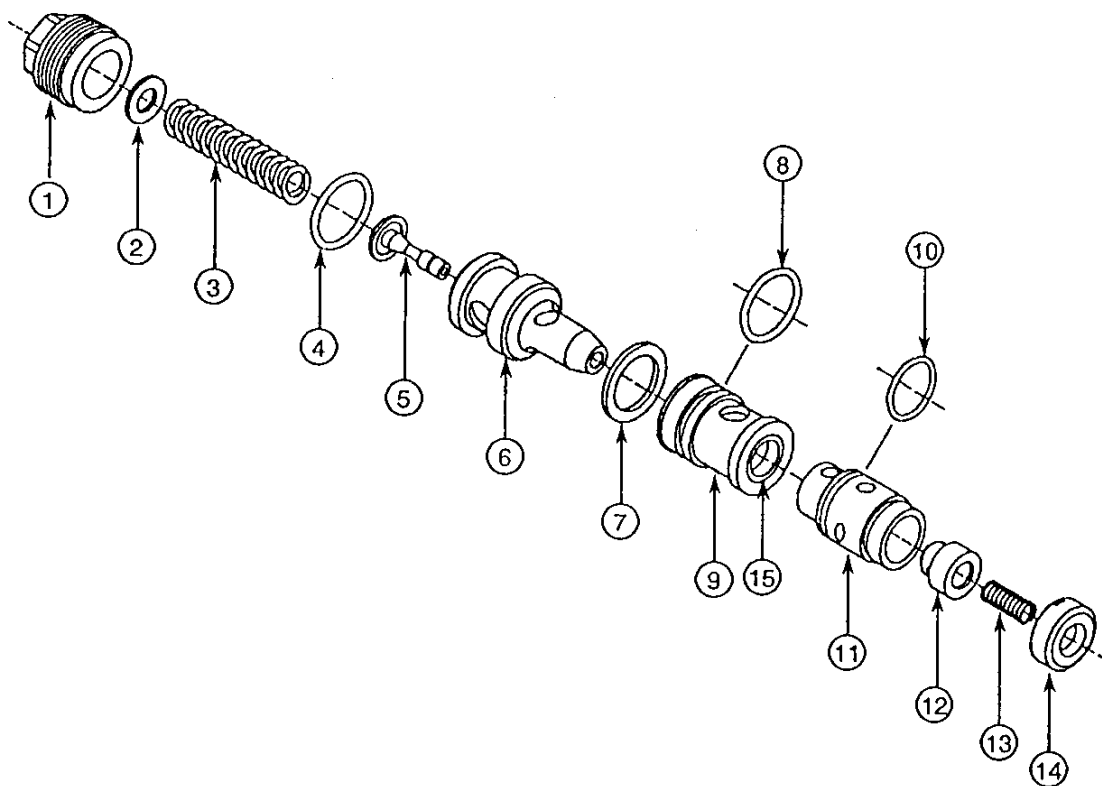


W107-02-11-040

UPPERSTRUCTURE / Solenoid Valve

EX200-2

RELIEF VALVE DRAWING ASSEMBLY



W107-02-11-042

- | | | | |
|-----------|-----------------|-----------------|--------------|
| 1— Plug | 5— Relief valve | 9— Sleeve | 13— Spring |
| 2— Shim | 6— Relief valve | 10— O-ring | 14— Cap |
| 3— Spring | 7— Gasket | 11— Check valve | 15— Strainer |
| 4— O-ring | 8— O-ring | 12— Check valve | |

W02-11-18

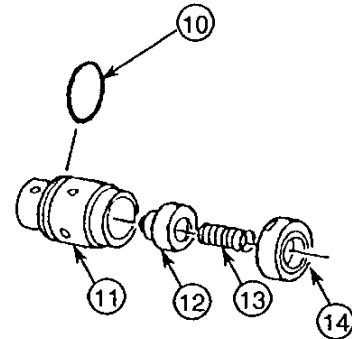
UPPERSTRUCTURE / Solenoid Valve

EX200-2

ASSEMBLY OF RELIEF VALVE

- NOTE:**
- (1) Make sure that all parts are free from notch or defect causing operational trouble.
 - (2) Wash all parts with cleaning oil and remove dust with compressed air blow.
 - (3) Be sure to reinstall all parts with same mating parts or in the same positions as they were.

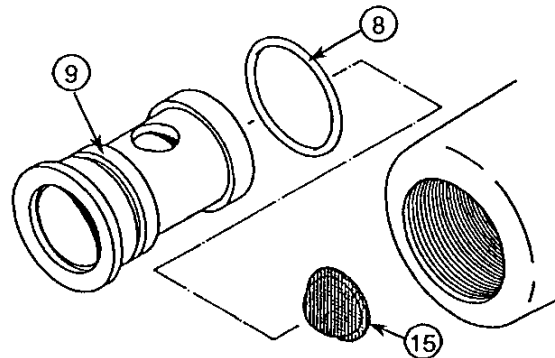
1. Install check valve (11), spring (13), cap (14) and O-ring (10) to check valve (12).



W107-02-11-044

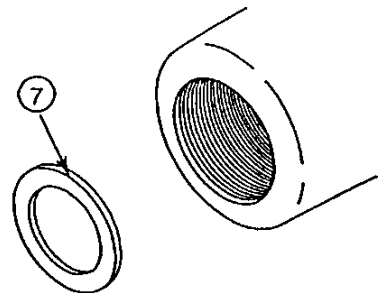
2. Install O-ring (8) and strainer (15) to sleeve (9) and insert them into the housing till the sleeve comes to contact with check valve (11).

- NOTE:**
- 1. Be careful not to damage O-ring (8).
 - 2. Apply a film of grease to O-ring (8).
 - 3. Insert the sleeve horizontally.



W107-02-11-038

3. Insert gasket (7).

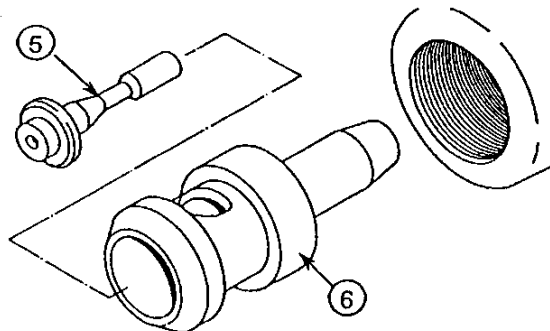


W107-02-11-037

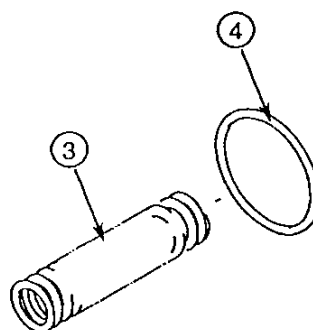
UPPERSTRUCTURE / Solenoid Valve

EX200-2

4. Insert relief valve (5) into relief valve (6) to make a subassembly of them and install the subassembly in the housing. Put O-ring (4) on relief valve (6) and place spring seat of relief valve (5).



W107-02-11-035



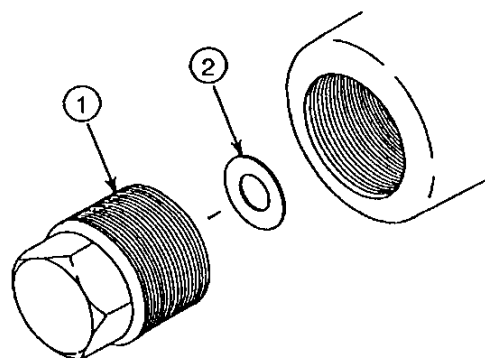
W107-02-11-053

5. Install shim (2) in plug (1) and tighten the plug to the housing.

NOTE: Take care not to fall shim (2) off.

 : 22 mm

 : 2.5 kgf·m (24N·m)(18 lbf·ft)



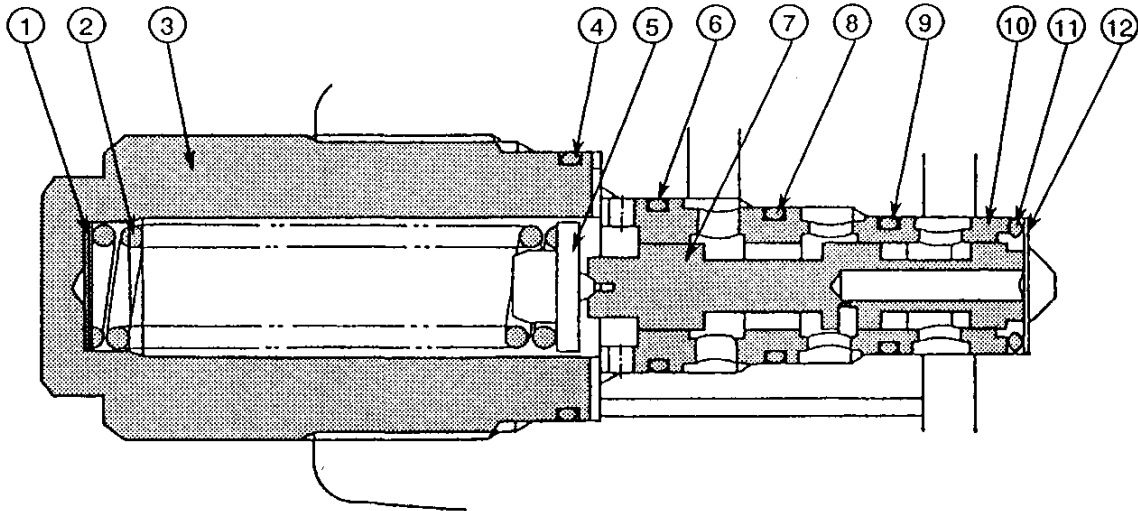
W107-02-11-032

UPPERSTRUCTURE / Solenoid Valve

EX200-2

DISASSEMBLY AND ASSEMBLY OF REDUCING VALVE

Reducing valve drawing for disassembly



W107-02-11-058

1— Shim
2— Spring
3— Plug
4— O-ring

5— Plug
6— O-ring
7— Spool
8— O-ring

9— O-ring
10— Sleeve
11— O-ring
12— Plate

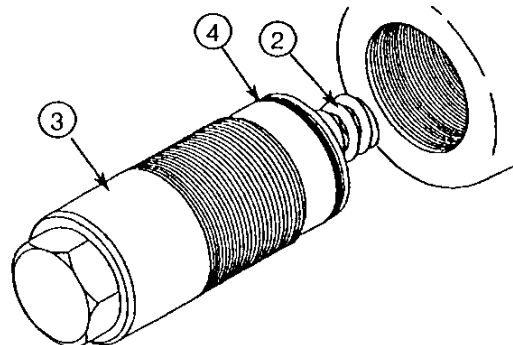
UPPERSTRUCTURE / Solenoid Valve

EX200-2

DISASSEMBLY OF REDUCING VALVE

1. Loosen plug (3) and remove spring (2) and O-ring (4).

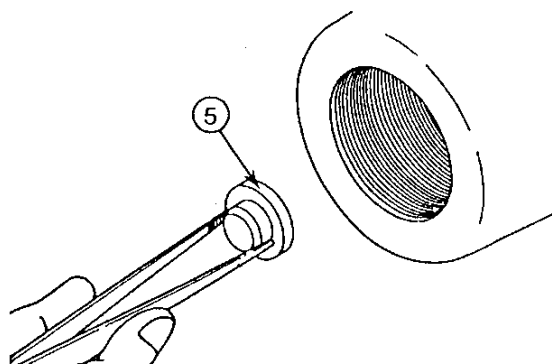
NOTE: 1. When removing plug (3), hold spring (2) with finger to prevent shim (1) and spring (2) coming out.



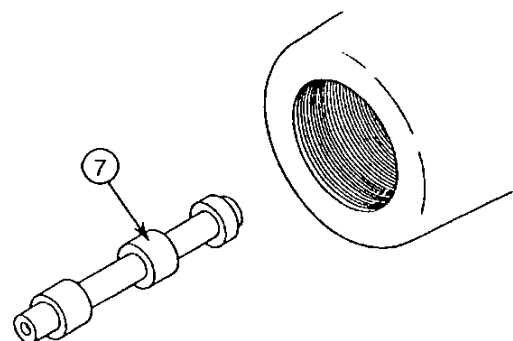
W107-02-11-059

2. Remove plug (5) and take spool (7) slowly out of sleeve (10).

NOTE: 1. Be careful not to damage corner edge inside sleeve (10) when removing spool (7).



W107-02-11-061

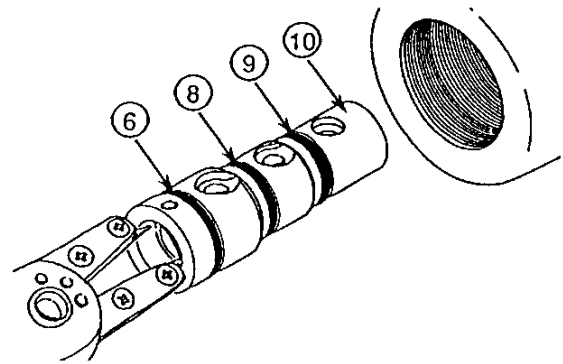


W107-02-11-062

UPPERSTRUCTURE / Solenoid Valve

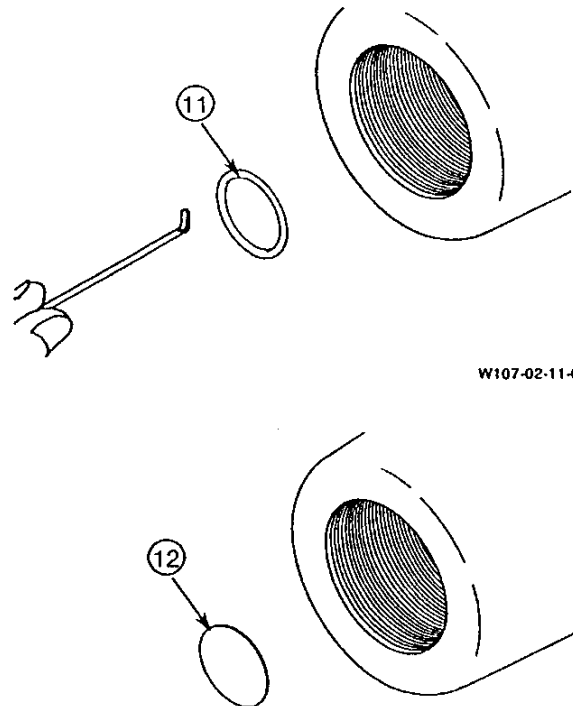
EX200-2

3. Take sleeve (10) out of the housing with a nipper and remove O-rings (6), (8) and (9).



W107-02-11-063

4. Remove O-ring (11) and plate (12).



W107-02-11-064

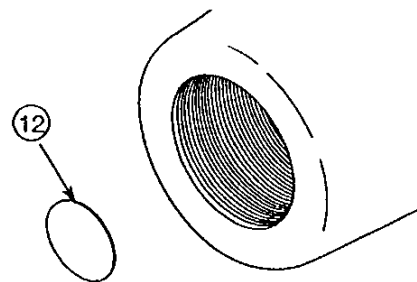
W107-02-11-065

UPPERSTRUCTURE / Solenoid Valve

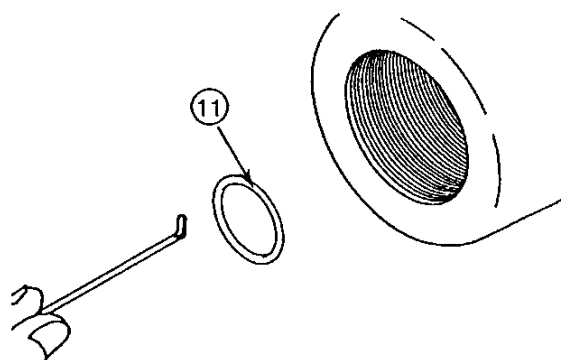
EX200-2

ASSEMBLY OF REDUCING VALVE

1. Insert plate (12) into the housing and install O-ring (11) till it comes to contact with plate (12).



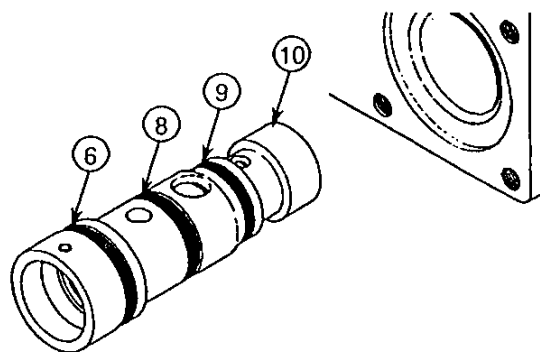
W107-02-11-065



W107-02-11-064

2. Install O-rings (6), (8) and (9) to sleeve (10) and insert them into the housing .

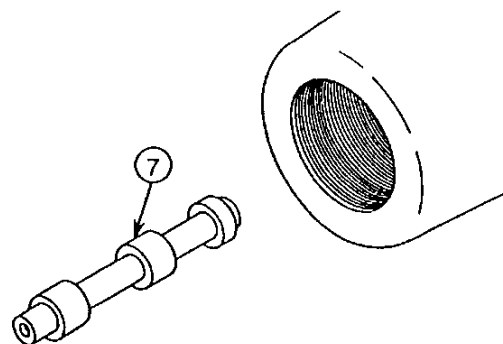
NOTE: 1. Apply a film of grease to the O-rings.
2. When inserting the sleeve , be sure to position the port direction of the sleeve to that of the housing.



W107-02-11-012

3. Insert spool (7) into sleeve (10).

NOTE: Take care not to switch the upper side of the spool to the lower side when inserting.



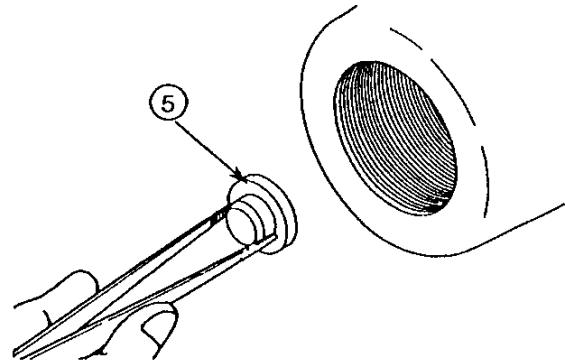
W107-02-11-062

UPPERSTRUCTURE / Solenoid Valve

EX200-2

4. Install plug (5).

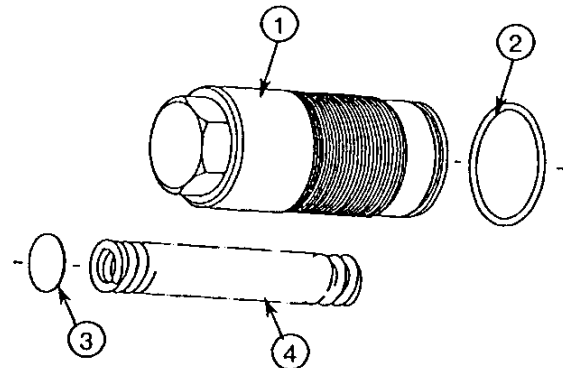
NOTE: When installing plug (5), align the spherical center of plug (5) with that of spool (7).



W107-02-11-061

5. Install shim (3), spring (4) and O-ring (2) to plug (1).

NOTE: 1. When installing spring (4) into plug (1), allow spring (4) to extrude about 30mm out of plug (1) end. Holding spring (4) with finger, install plug (1) so that spring (4) comes to contact with the spring seat of plug (1) correctly.



W107-02-11-074

UPPERSTRUCTURE / Shuttle Valve

EX200-2

Removal and Installation of Travel Shuttle Valve**Removal**

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

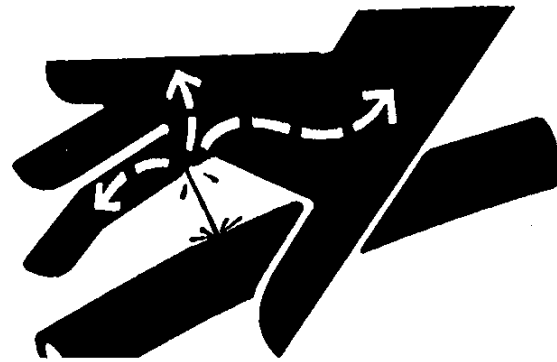
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

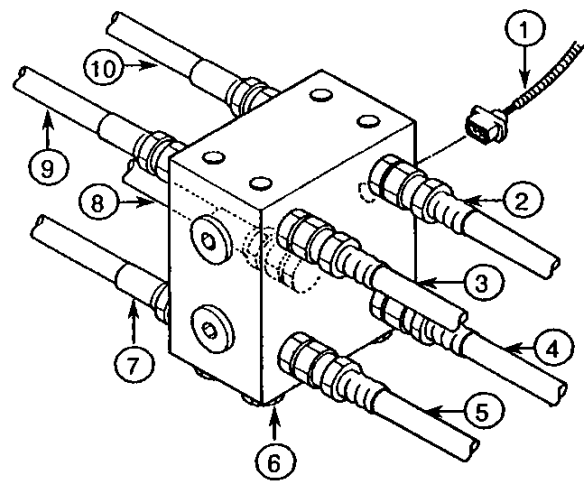
2. Disconnect travel pressure switch harness (1).
3. Disconnect pipes (2) to (5) and (7) to (10).
4. Remove bolt (6).

Installation

1. Install bolt (6).
2. Install pipes (2) to (5) and (7) to (10).
3. Connect the travel pressure switch harness (1).



SA-031

**Tightening torque**

W105-02-12-001

Pilot hose
Tightening torque 4 kgf-m (39.2 N·m)
(36.9 lbf-ft)

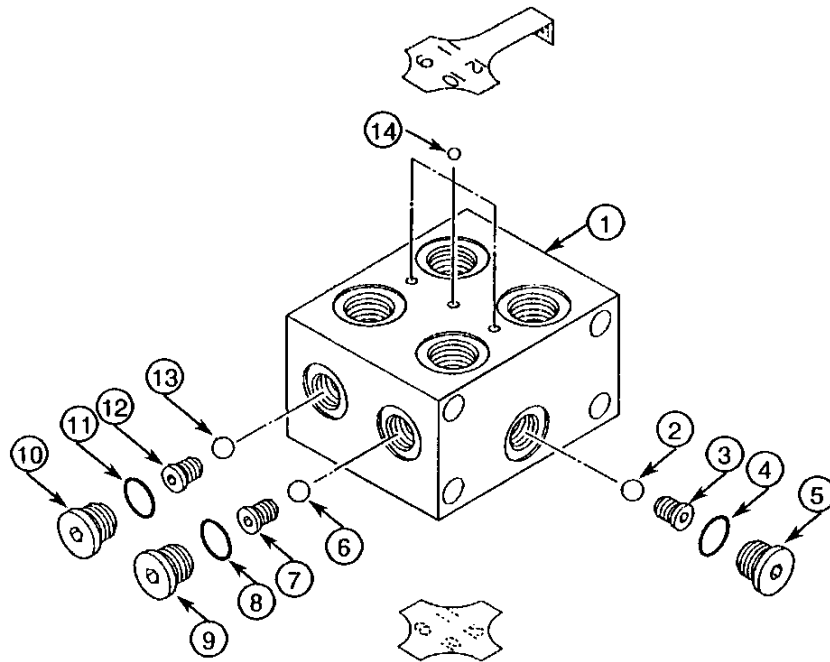
Shuttle valve mounting bolt
Tightening torque 5 kgf-m (49.0 N·m)
(36.1 lbf-ft)

- 1- Travel pressure switch harness for traveling to PVC (Pump Valve Controller)
- 2- Left forward travel pilot hose to Control valve
- 3- Right forward travel pilot hose to Control valve
- 4- Left backward travel pilot hose to Control valve
- 5- Right backward travel pilot hose to Control valve
- 6- Shuttle valve mounting bolt
- 7- Right backward travel pilot hose to Pilot valve
- 8- Left backward travel pilot hose to Pilot valve
- 9- Right forward travel pilot hose to Pilot valve
- 10- Left forward travel pilot hose to Pilot valve

UPPERSTRUCTURE / Shuttle Valve

EX200-2

TRAVEL SHUTTLE VALVE ILLUSTRATION



W105-02-12-002

- | | | | |
|-----------|-----------|------------|----------|
| 1— Body | 5— Plug | 9— Plug | 13— Ball |
| 2— Ball | 6— Ball | 10— Plug | 14— Ball |
| 3— Plug | 7— Plug | 11— O-ring | |
| 4— O-ring | 8— O-ring | 12— Plug | |

W02-12-02

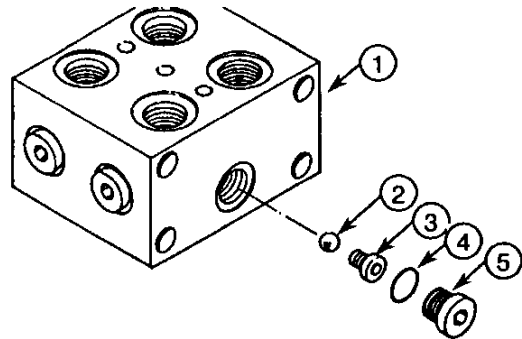
UPPERSTRUCTURE / Shuttle Valve

EX200-2

«Disassembly of travel shuttle valve»

1. Remove plug (5), O-ring (4), plug (3), and ball (2) from body (1).

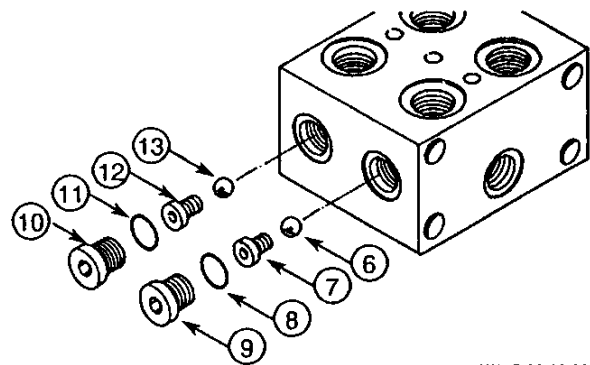
 : 10 mm (0.31 in)



W105-02-12-003

2. Remove plug (9), O-ring (8), plug (7), and ball (6) in order.
Remove (10), (11), (12), and (13) in same order.

 : 6 mm (0.23 in)

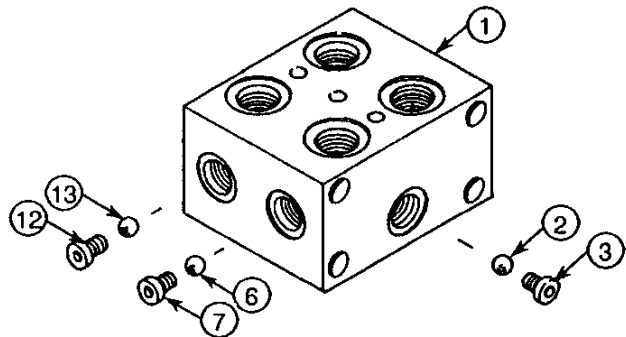


W105-02-12-004

«Assembly of shuttle valve»

1. Install ball (2) and plug (3) to body (1).
Install (6) and (7), then (12) and (13) in same order.

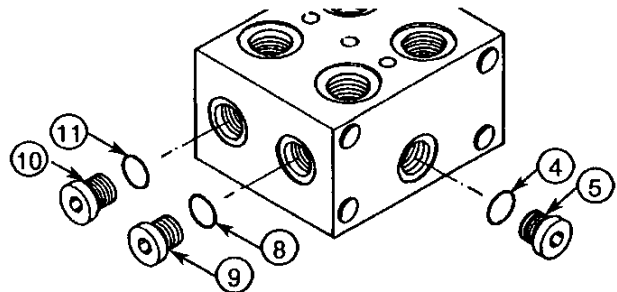
 : 2 kgf·m (19.6 N.m) (18.46 lbf.ft)



W105-02-12-005

2. Install O-ring (4) to plug (5).
Install O-rings (8) and (11) to (9) and (10).
Attach and tighten plug (5) to the body.
Attach and tighten plugs (9) and (10) to the body.

 : 2kgf·m (19.6N.m) (18.46 lbf.ft)



W105-02-12-006

UPPERSTRUCTURE / Shuttle Valve

EX200-2

Swing / Bucket Shuttle Valve

Removal and installation of shuttle valve for swing and bucket

Removal

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.



CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

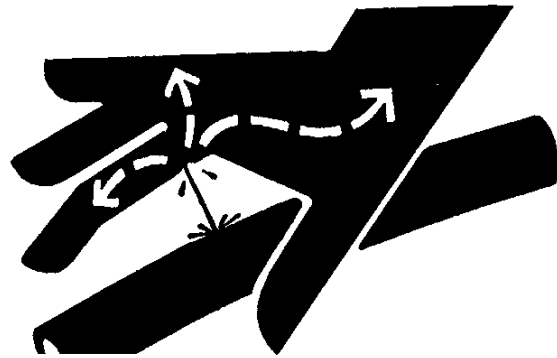
2. Disconnect swing pressure switch harness (3) and (7).
3. Disconnect pipes (1) and (2), (4) and (5), and (8) to (12).
4. Remove bolt (6).

Installation

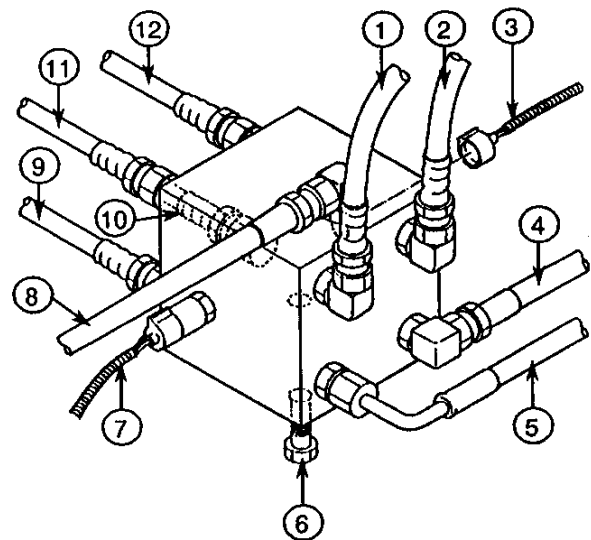
1. Install bolt (6).
2. Install pipes (1) and (2), (4) and (5), and (8) to (12).
3. Connect the swing pressure switch harness (3).
4. Connect the swing pressure switch harness (7).

Tightening torque

Pilot hose			
Tightening torque	4 kgf-m	(39.2 N-m)	(36.9 lbf-ft)
Shuttle valve mounting bolt			
Tightening torque	5 kgf-m	(49.0 N-m)	(36.1 lbf-ft)



SA-031



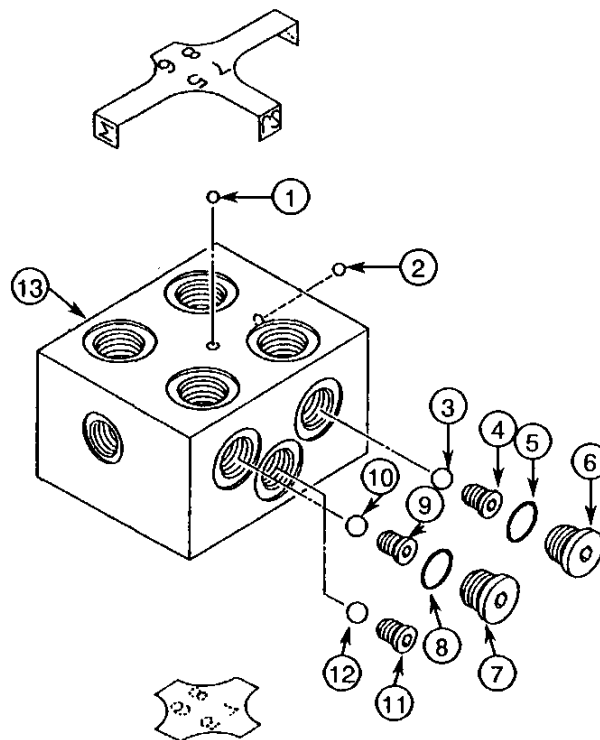
W105-02-12-007

- 1- Right swing pilot hose to Control valve
- 2- Bucket (out) pilot hose to Control valve
- 3- Bucket pressure switch harness to PVC (Pump Valve Controller)
- 4- Bucket (in) pilot hose to Control valve
- 5- Left swing pilot hose to control valve
- 6- Shuttle valve mounting bolt
- 7- Swing pressure switch harness to PVC (Pump Valve Controller)
- 8- Pilot hose to Shockless valve
- 9- Left swing pilot hose to Pilot valve
- 10- Right swing pilot hose to Pilot valve
- 11- Bucket (in) pilot hose to Pilot valve
- 12- Bucket (out) pilot hose to Pilot valve

UPPERSTRUCTURE / Shuttle Valve

EX200-2

SWING / BUCKET SHUTTLE VALVE ILLUSTRATION



W105-02-12-008

- | | | | |
|---------|-----------|----------|----------|
| 1— Ball | 5— O-ring | 9— Plug | 13— Body |
| 2— Ball | 6— Plug | 10— Ball | |
| 3— Ball | 7— Plug | 11— Plug | |
| 4— Plug | 8— O-ring | 12— Ball | |

W02-12-06

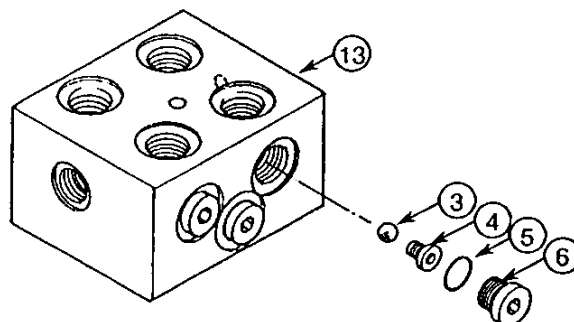
UPPERSTRUCTURE / Shuttle Valve

EX200-2

◀ Disassembly of Swing / Bucket Shuttle Valve ▶

1. Remove plug (6), O-ring (5), plug (4), and ball (3) from body (13) in order.

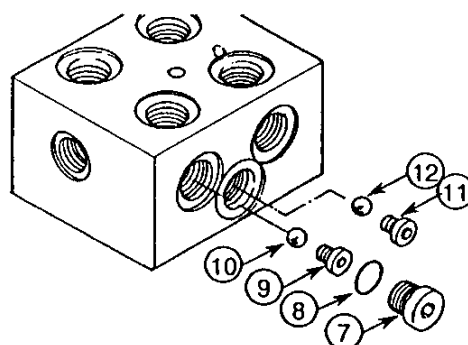
 : 6 mm



W105-02-12-009

2. Remove plug (7), O-ring (8), plug (9), ball (10), plug (11), and ball (12) in order.

 : 10 mm

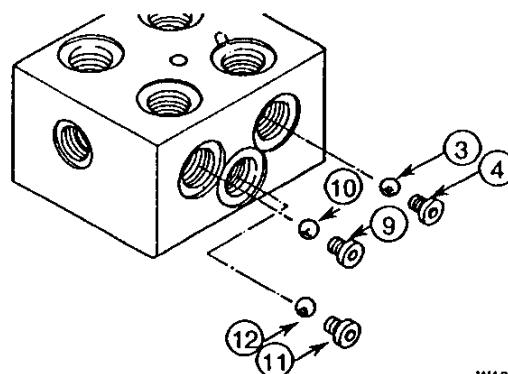


W105-02-12-010

◀ Assembly of swing / bucket shuttle valve ▶

1. Install ball (3) and plug (4) to body (13).
Install plug (9), ball (10), plug (11), and ball (12) in order.

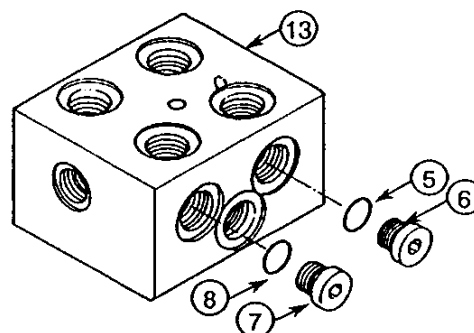
 : 2 kgf·m (19.6 N·m 18.46 lbf.ft)



W105-02-12-011

2. Install O-ring (5) to plug (6).
Install plug (7), (6), and O-ring (8), (5) to body (13).

 : 2 kgf·m (19.6 N·m 18.46 lbf.ft)



W105-02-12-012

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

REMOVE AND INSTALL SWING DAMPENER VALVE

1. Remove air from the hydraulic tank by pushing down the button on the air breather cap.



CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

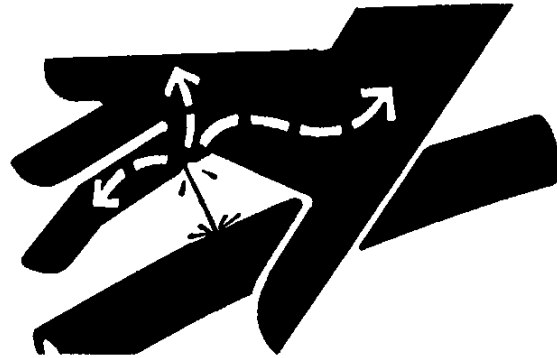
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

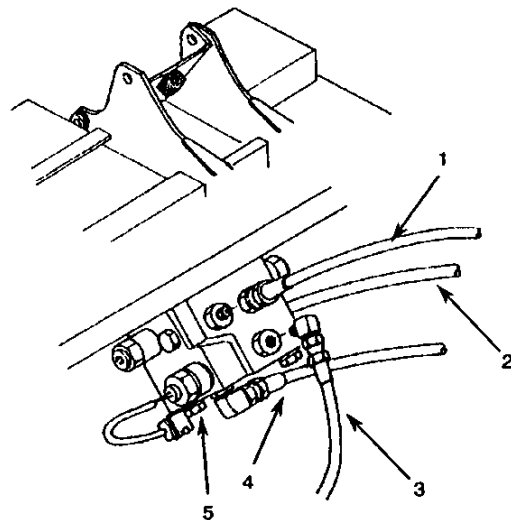
2. Disconnect lines (1)-(4).
3. Remove bolts (5).
4. Remove swing dampener valve.
Repair or replace the valve.
5. Install swing dampener valve and tighten bolts (5) to specification.
6. Connect line (1)-(4).

Tightening Torque

Pilot Line (1)-(4) : 29.5 N·m (3.0 kgf·m, 21.7 lbf·ft)
Bolts : 19.6 N·m (2.0 kgf·m, 14.5 lbf·ft)



SA-031



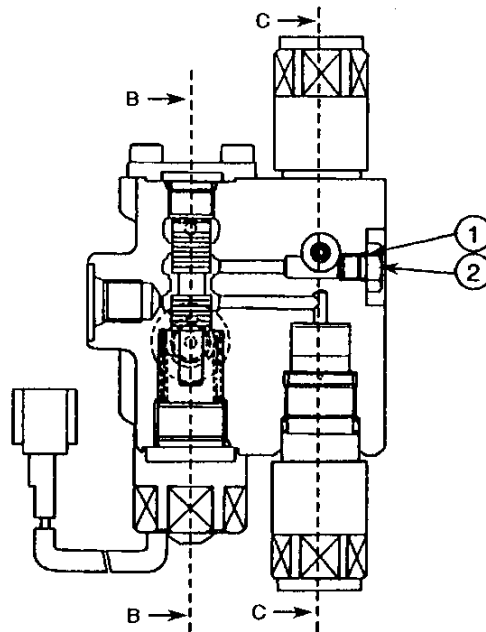
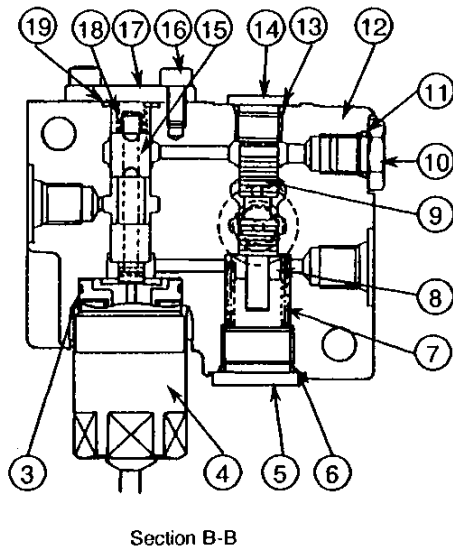
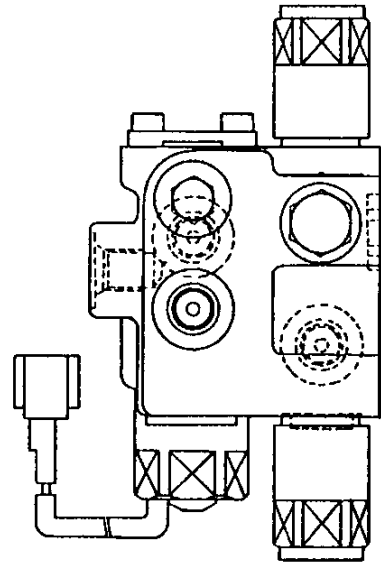
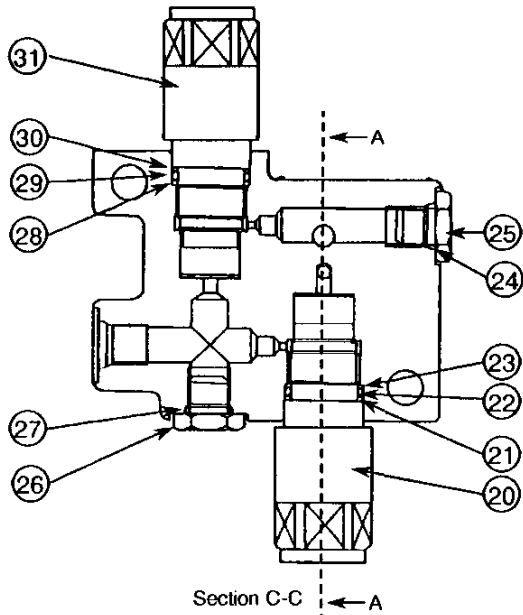
W105-02-13-001

- 1 - Pilot Line from Swing Motor
- 2 - Drain Line to Hydraulic Oil Tank
- 3 - Pilot Line to Proportional Solenoid Valve
- 4 - Pilot Line from Swing Motor
- 5 - Mounting Bolt of Swing Dampener Valve

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

DISASSEMBLE AND ASSEMBLE SWING DAMPENER VALVE



W105-02-13-015

- | | | | |
|-------------------|-----------------|-----------------|-----------------|
| 1— O-ring | 9— Spool | 17— Cover | 25— Plug |
| 2— Plug | 10— Plug | 18— Spring | 26— Plug |
| 3— O-ring | 11— O-ring | 19— O-ring | 27— O-ring |
| 4— Solenoid valve | 12— Casing | 20— Valve | 28— Backup ring |
| 5— Plug | 13— O-ring | 21— Ring | 29— O-ring |
| 6— O-ring | 14— Plug | 22— O-ring | 30— Ring |
| 7— Spring | 15— Spool | 23— Backup ring | 31— Valve |
| 8— Spring | 16— Socket bolt | 24— O-ring | |

W02-13-02

UPPERSTRUCTURE / Swing Dampener Valve

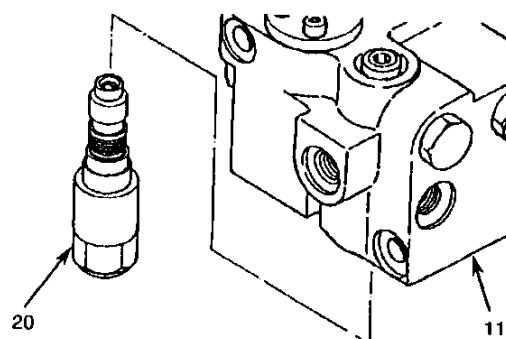
EX200-2

1. Remove the swing dampener valve from the machine and place it on a working table.

*Note: Take care that dust will not enter the valve.
Make marks on the parts shown that they can be correctly installed to their position.*

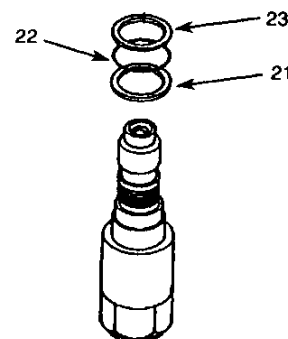
2. Remove valve (20) from casing (11).

 : 27 mm



W105-02-13-017

3. Remove backup ring (23), O-ring (22) and ring (21) from the valve.

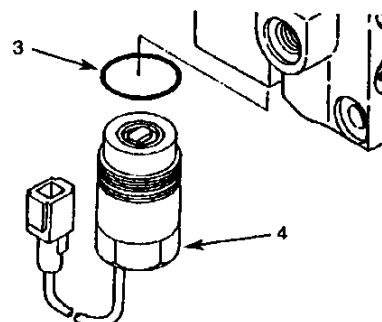


W105-02-13-018

4. Remove solenoid valve (4) from the casing.

 : 32 mm

5. Remove O-ring (3) from the solenoid valve.



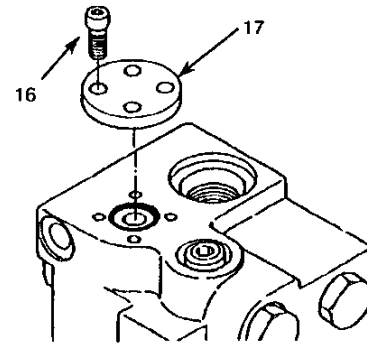
W105-02-13-019

UPPERSTRUCTURE / Swing Dampener Valve

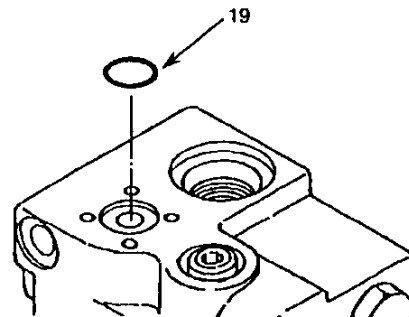
EX200-2

6. Remove socket bolts (16), cover (17) and O-ring (19) from the casing.

 : 5 mm

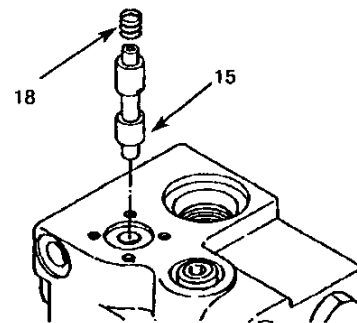


W105-02-13-021



W105-02-13-022

7. Remove spring (18) and spool (15) from the casing.



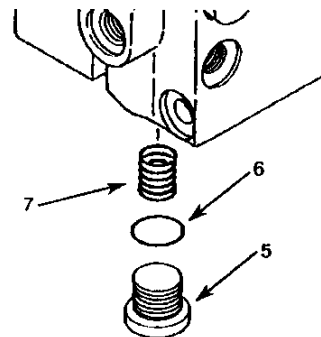
W105-02-13-023

8. Remove plug (5) from casing.

 : 10 mm

9. Remove O-ring (6) from the plug.

10. Remove spring (7) and spring seat (8) from casing.



W105-02-13-025

W02-13-04

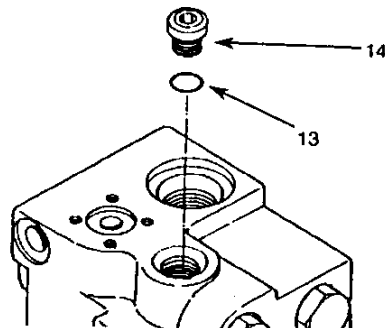
UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

11. Remove plug (14) from the casing.

 : 5 mm

12. Remove O-ring (13) from the plug.

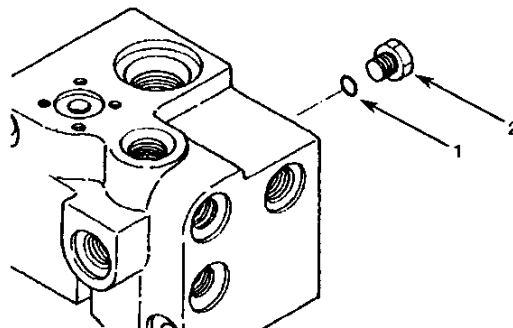


W105-02-13-027

13. Remove plug (2) from the casing.

 : 19 mm

14. Remove O-ring (1) from the plug.

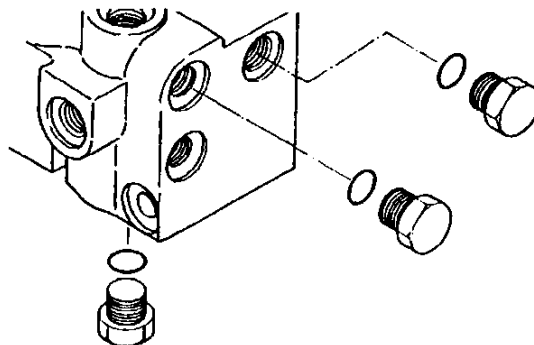


W105-02-13-029

15. Remove plugs (25), (26) and (10) from the casing.

 : 19 mm

16. Remove O-rings (24), (27) and (11) from each plug.

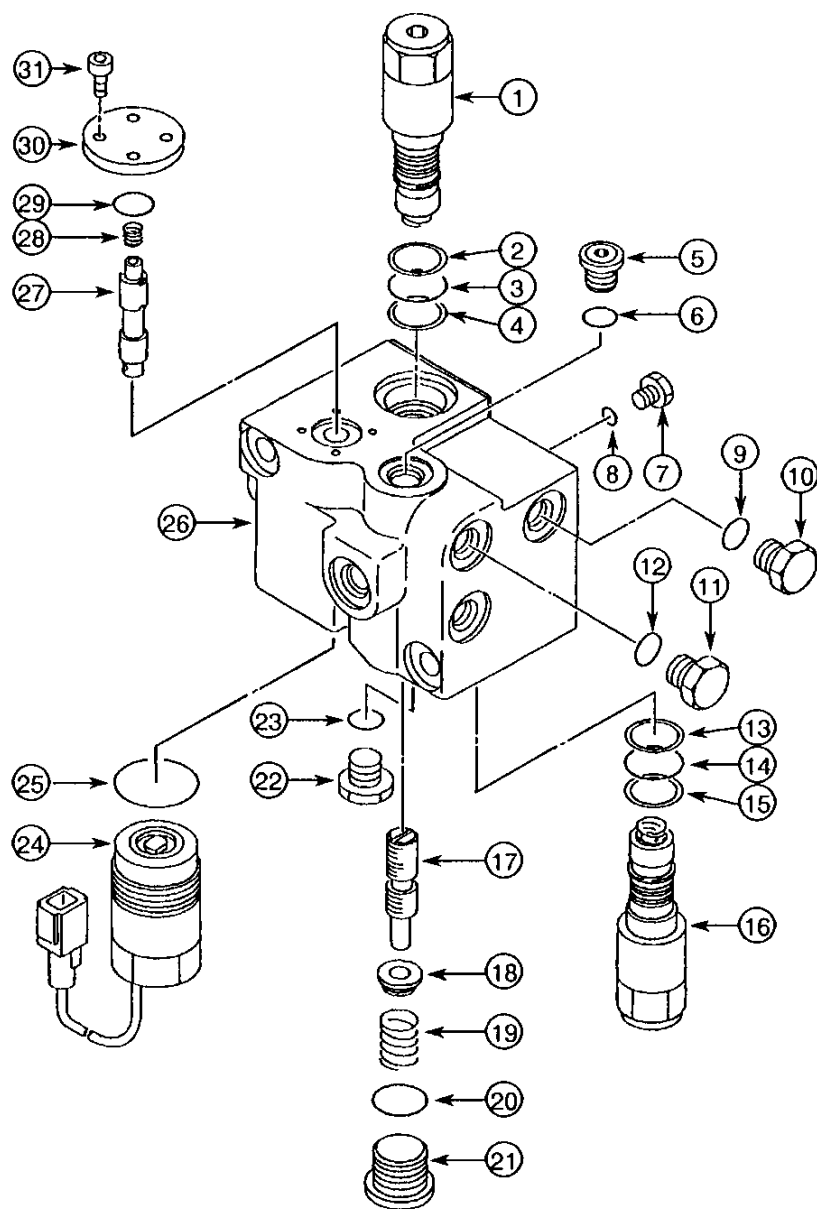


W105-02-13-030

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

ASSEMBLE SWING DAMPENER VALVE



W105-02-13-002

- | | | | |
|----------------|-----------------|-----------------|-----------------|
| 1- Valve | 9- O-ring | 17- Spool | 25- O-ring |
| 2- Ring | 10- Plug | 18- Spring seat | 26- Casing |
| 3- O-ring | 11- Plug | 19- Spring | 27- Spool |
| 4- Backup ring | 12- O-ring | 20- O-ring | 28- Spring |
| 5- Plug | 13- Backup ring | 21- Plug | 29- O-ring |
| 6- O-ring | 14- O-ring | 22- Plug | 30- Cover |
| 7- Plug | 15- Ring | 23- O-ring | 31- Socket bolt |
| 8- O-ring | 16- Valve | 24- Solenoid | |

W02-13-06

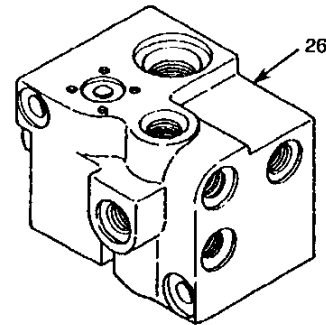
UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

«Assembling»

- Be sure to assemble the valve in a clear place.
- Be sure to install each part to its original position.
- Remove any flaw which was made when disassembled with an oilstone etc.
- Lightly apply hydraulic oil to each part for the ease of fitting.
- Replace all the O-rings with new ones.

1. Clean the casing (26) and place it on a working desk.

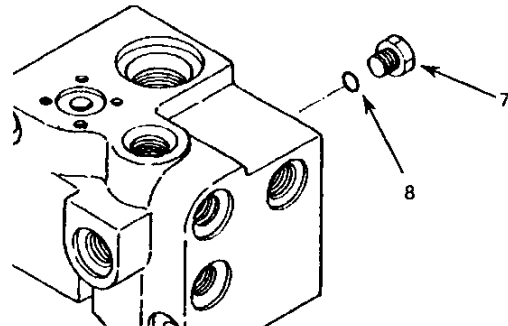


W105-02-13-003

2. Install O-ring to plug (7).
3. Install the plug to the casing.

 : 19 mm

Tightening Torque : 16.7 N·m (1.7 kgf·m, 12.3 lbf·ft)

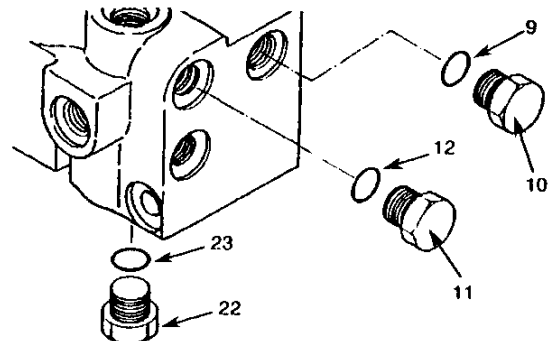


W105-02-13-004

4. Install O-rings (9), (12) and (23) to plugs (10), (11), (22).
5. Install plugs to the casing.

 : 19 mm

Tightening Torque : 36 N·m (3.7 kgf·m, 26.8 lbf·ft)



W105-02-13-030

UPPERSTRUCTURE / Swing Dampener Valve

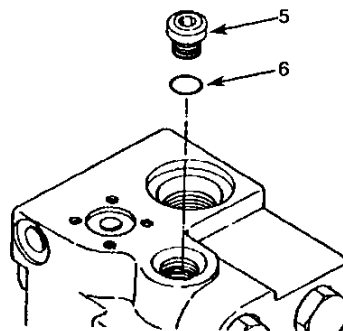
EX200-2

6. Install O-ring (6) to plug (5).

 : 5 mm

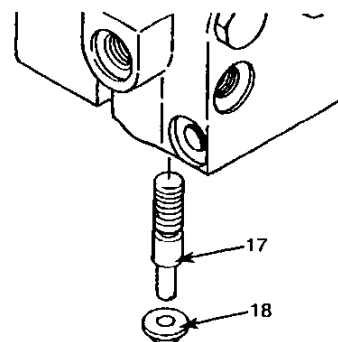
7. Install the plug to the casing and tighten to specification.

Tightening Torque : 2.6 N·m (0.27 kgf·m, 2.0 lbf·ft)



W105-02-13-027

8. Install spring seat (18) and spool (17) to the casing.



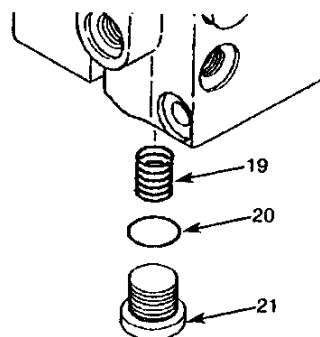
W105-02-13-007

9. Install O-ring (20) to plug (21).

10. Install spring (19) and the plug to the casing.

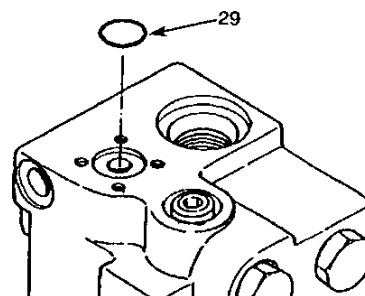
 : 10 mm

Tightening Torque : 108 N·m (11 kgf·m, 80 lbf·ft)



W105-02-13-025

11. Install O-ring (29) on the casing.



W105-02-13-009

W02-13-08

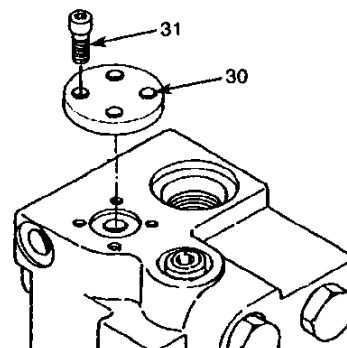
UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

12. Install cover (30) and tighten bolts (31) to specification.

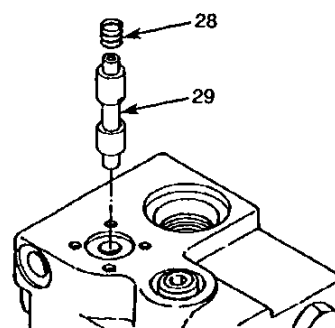
 : 5 mm

Tightening Torque : 12 N·m (1.2 kgf·m, 8.7 lbf·ft)



W105-02-13-010

13. Install spring (28) and spool (29) to the casing.



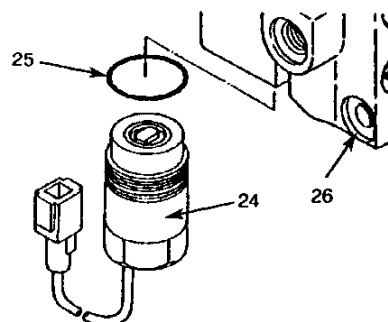
W105-02-13-023

14. Install O-ring (25) to solenoid valve (24).

15. Install the solenoid valve to the casing.

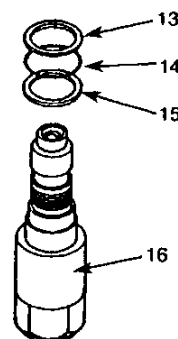
 : 32 mm

Tightening Torque : 44 N·m (4.5 kgf·m, 32.5 lbf·ft)



W105-02-13-019

16. Install O-ring (14), back up ring (13) and ring (15) to valve (16).



W105-02-13-018

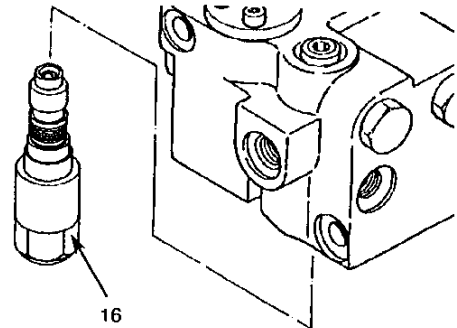
UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

17. Install valve (16) to the casing.

 : 27 mm

Tightening Torque : 68.6 N·m (7.0 kgf·m, 50.6 lbf·ft)

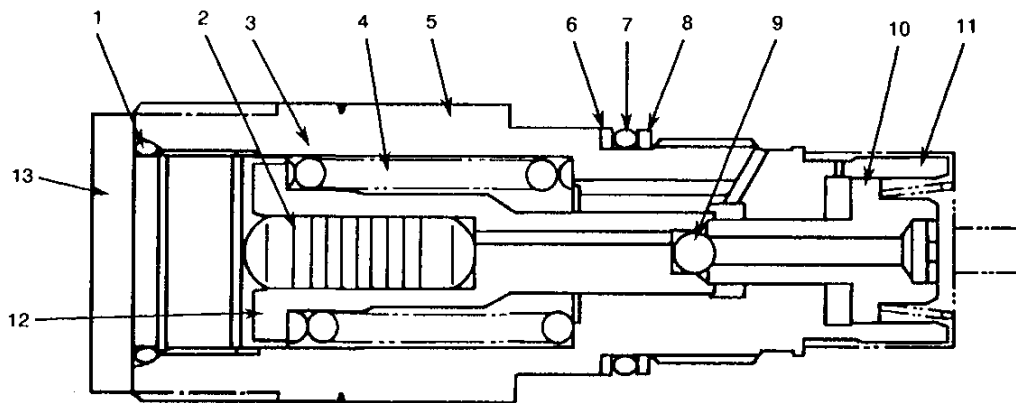


W105-02-13-017

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

DISASSEMBLE VALVE



W105-02-13-031

1— O-ring
2— Piston
3— Shim
4— Spring

5— Body
6— Backup ring
7— O-ring
8— Backup ring

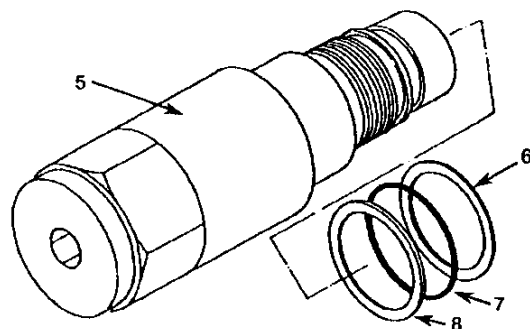
9— Bolt
10— Seal
11— Spring
12— Plunger

13— Plug

UPPERSTRUCTURE / Swing Dampener Valve

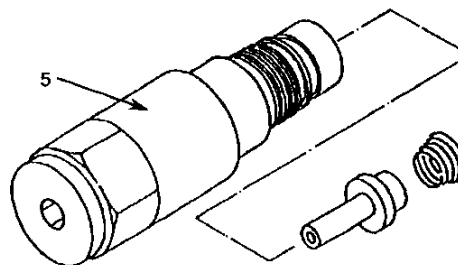
EX200-2

1. Remove back up rings (6), (8) and O-ring (7) from body (5).



W105-02-13-037

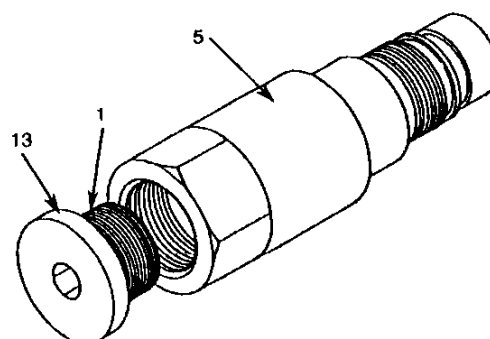
2. Remove spring (11) and spring seat (10) from the body.



W105-02-13-038

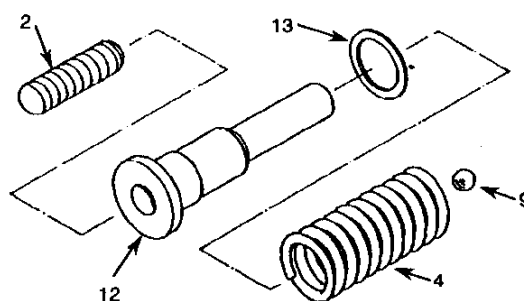
3. Hold the body with a vise.
Remove plug (13) and O-ring (1).

└ : 10 mm



W105-02-13-039

4. Remove piston (2), plunger (12), shim (13), spring (4) and ball (9) from the body in order.



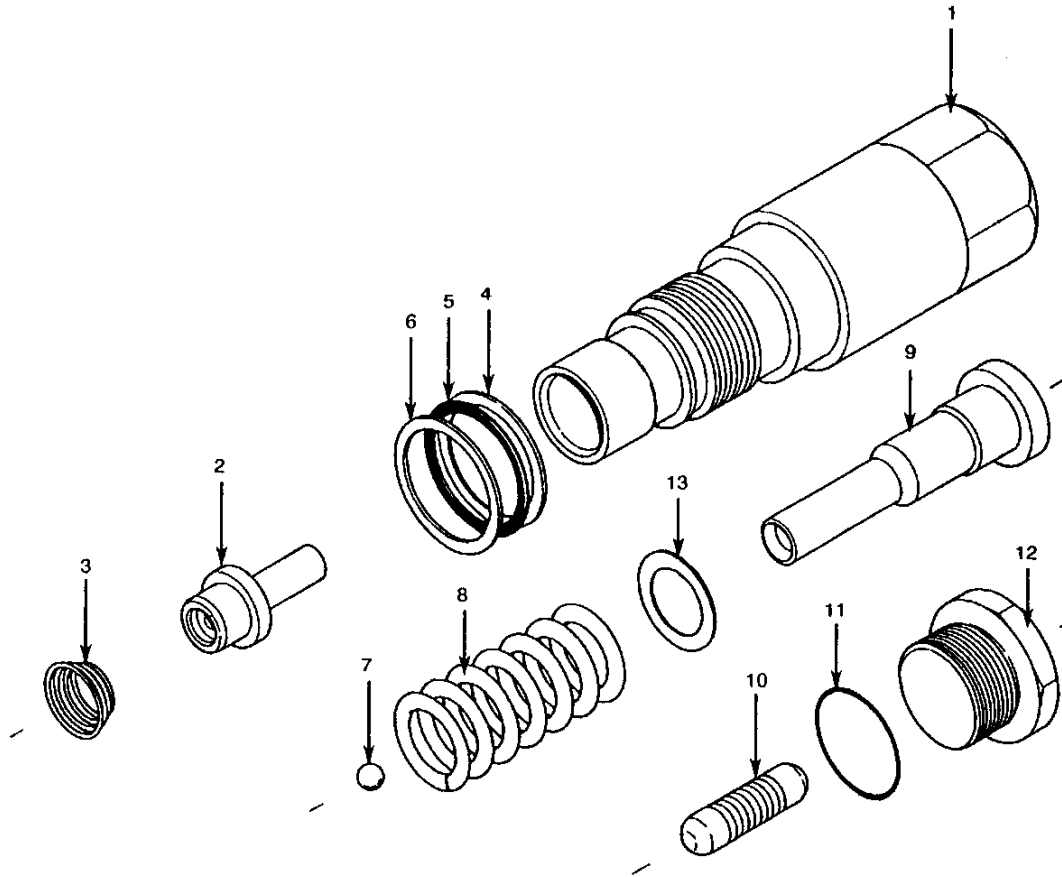
W105-02-13-040

W02-13-12

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

ASSEMBLE VALVE



W105-02-13-036

1— Body
2— Backup ring
3— O-ring
4— Backup ring

5— Seat
6— Spring
7— Ball
8— Spring

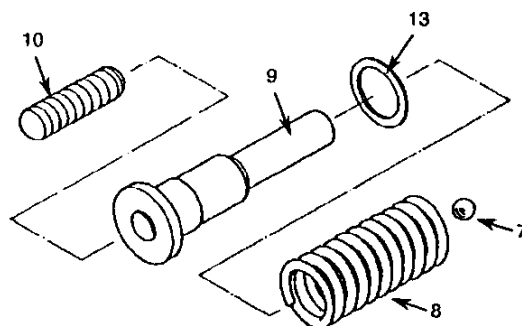
9— Shim
10— Plunger
11— Plug
12— O-ring

13— Piston

UPPERSTRUCTURE / Swing Dampener Valve

EX200-2

1. Install piston (10), shim (13), spring (8) and ball (7) to plunger (9) in order.

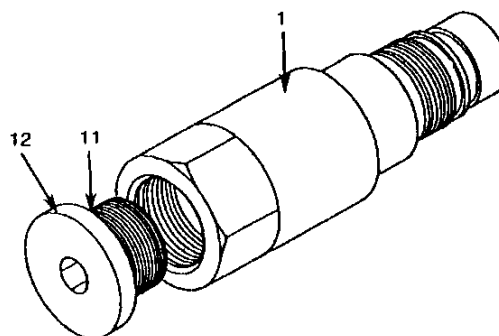


W105-02-13-040

2. Install O-ring to plug (12).
3. Install the plug to body (1).

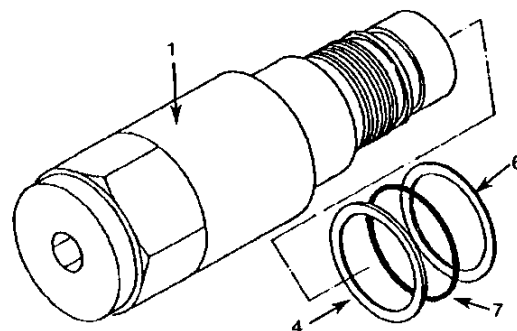
 : 10 mm

Tightening Torque : 108 N·m (10 kgf·m, 72.3 lbf·ft)



W105-02-13-039

4. Install O-ring (5) and back up rings (4), (6) to the body.

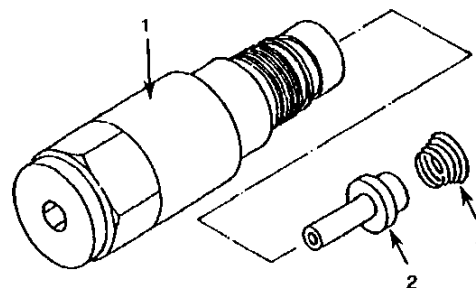


W105-02-13-037

5. Install spring seat (2) and spring (3) to the body.
Install the valve assembly to the swing dampener valve casing.

 : 27 mm

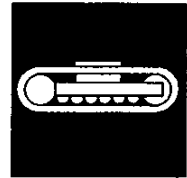
Tightening Torque : 69 N·m (7.0 kgf·m, 51 lbf·ft)



W105-02-13-038

W02-13-14

SECTION 03 UNDERCARRIAGE



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and

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Installation	W03-07-04
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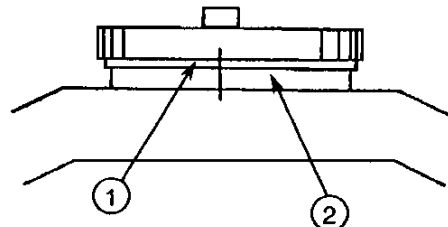
UNDERCARRIAGE / Swing Bearing

EX200-2

REMOVE AND INSTALL SWING BEARING

Remove Swing Bearing

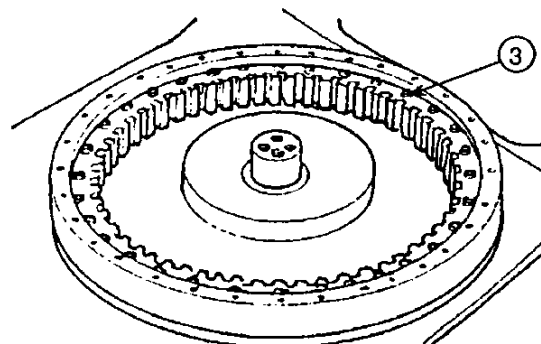
1. Put a alignment mark on swing bearing (1) and undercarriage (2).



W105-03-01-001

2. Remove bolts (3).

 : 30 mm

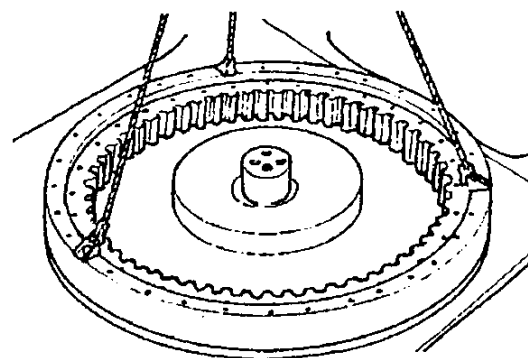


W105-03-01-002

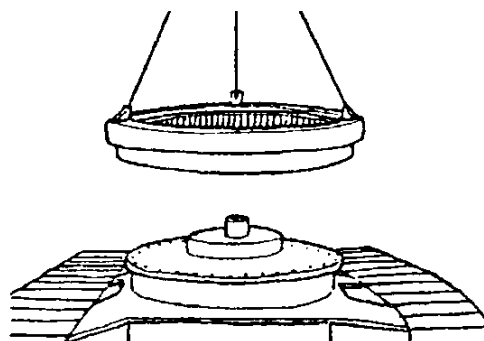
3. Attach lifting tools, hoist swing bearing and remove.

Lifting Tool : ST-0050

 **CAUTION** :The approximate weight of swing bearing is 220 kg (485 lb).



W105-03-01-003



W105-03-01-004

UNDERCARRIAGE / Swing Bearing

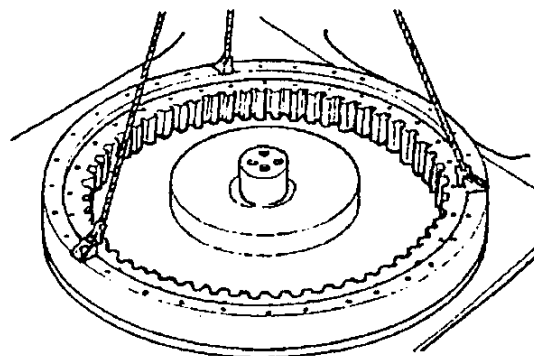
EX200-2

Install Swing Bearing

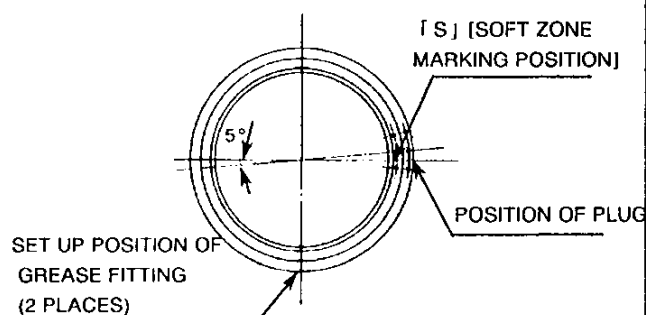
Clean the mating surfaces of swing bearing and frame.

1. Hoist the swing bearing.
Align the swing bearing with the alignment mark on undercarriage and install swing bearing.

Note : Inner race soft zone (S) and ball filler port should be placed on the same position.



W105-03-01-003

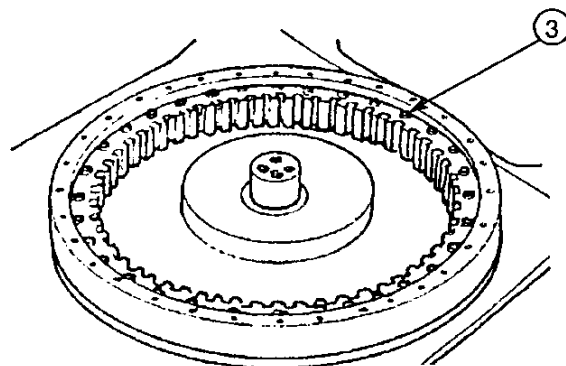


W105-03-01-005

2. Install bolts (3) and tighten to specification.

 : 30 mm

Tightening Torque 539 N·m (55.0 kgf·m, 398 lbf·ft)

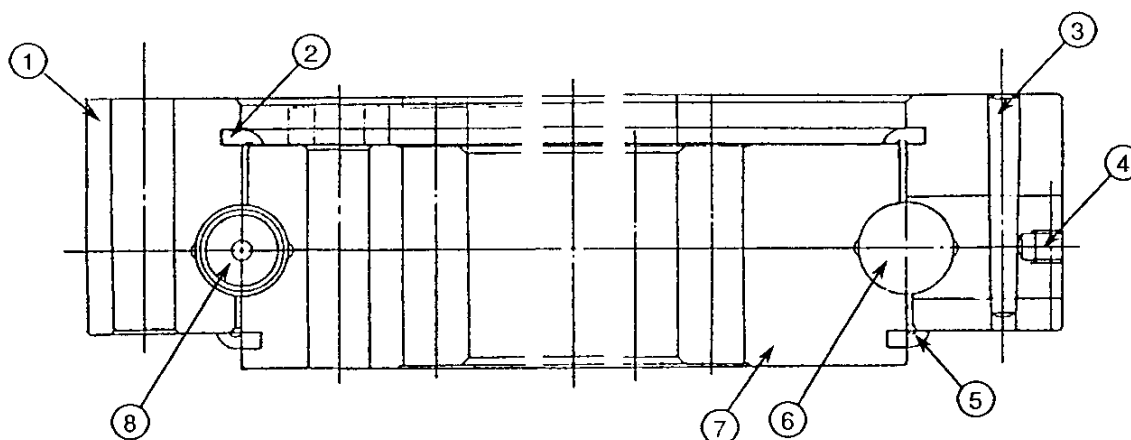


W105-03-01-002

UNDERCARRIAGE / Swing Bearing

EX200-2

DISASSEMBLE SWING BEARING



W105-03-01-006

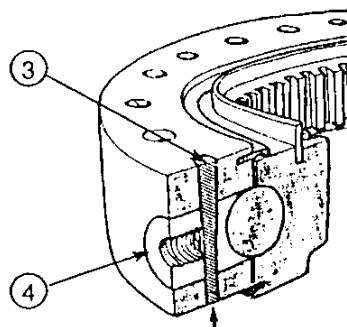
- | | | | |
|---------------|---------|---------|---------------------|
| 1- Outer Race | 3- Pin | 5- Seal | 7- Inner Race |
| 2- Seal | 4- Plug | 6- Ball | 8- Support (A), (B) |

UNDERCARRIAGE / Swing Bearing

EX200-2

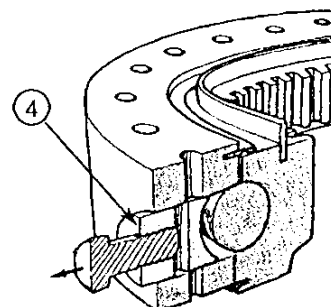
Disassemble Swing Bearing

1. Grind off calked part of taper pin (3).
Remove taper pin from bottom side of swing bearing.



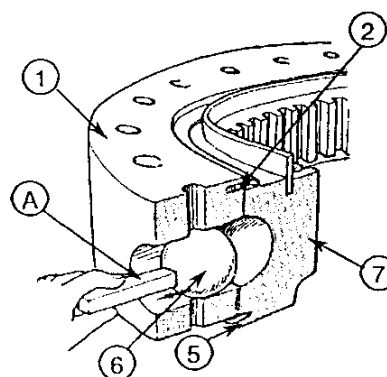
W105-03-01-007

2. Remove plug (4) using a screw (10 mm, pitch 1.25 mm) as shown.



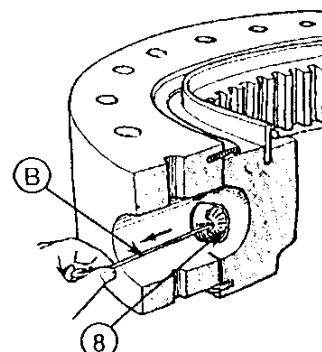
W105-03-01-008

3. Check that bearing rotates smoothly. If rotation is not smooth, replace seals.
4. Remove ball (6) using magnet.



W105-03-01-009

5. Remove support (8) using wire.
6. Rotate inner race to remove remaining balls and supports,



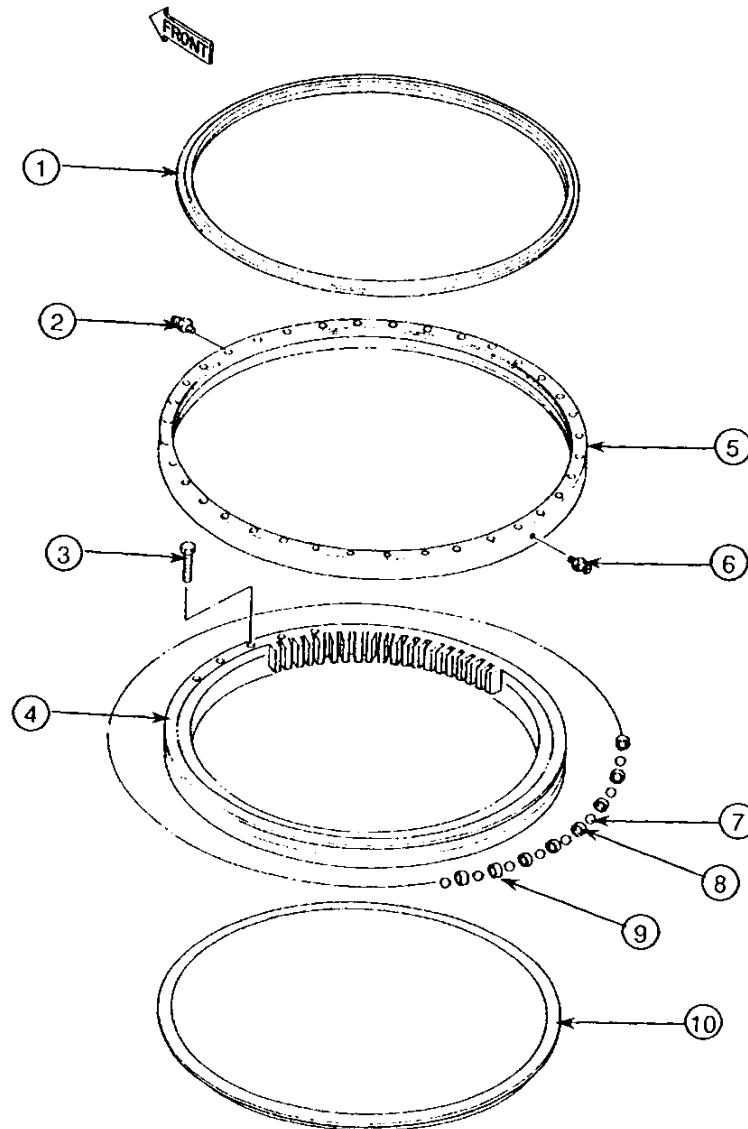
W105-03-01-010

W03-01-04

UNDERCARRIAGE / Swing Bearing

EX200-2

ASSEMBLE SWING BEARING



W105-03-01-011

- | | | | |
|------------------------|------------------------|------------|----------|
| 1- Seal | 4- Inner Race | 7- Ball | 10- Seal |
| 2- Lubrication Fitting | 5- Outer Race | 8- Support | |
| 3- Bolt | 6- Lubrication Fitting | 9- Support | |

UNDERCARRIAGE / Swing Bearing

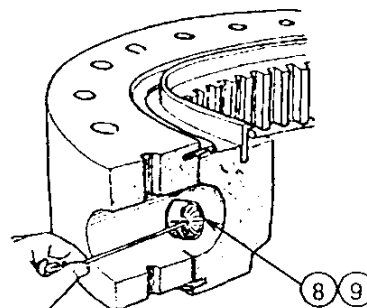
EX200-2

Assemble Swing Bearing

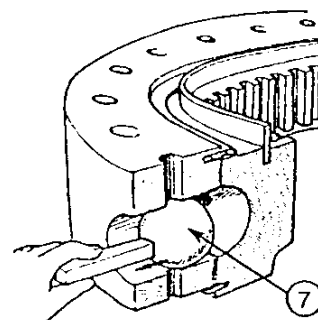
1. Apply liquid packing to seals and install seals to inner and outer races.
2. Install outer race over inner race.

3. Install support .
4. Install ball (7).
5. Rotate inner race to install remaining supports and balls.
Install the same number of thick center and thin center supports as were removed.

As needed, replace a thin center support with a thick center support to remove any excess play between supports and balls.

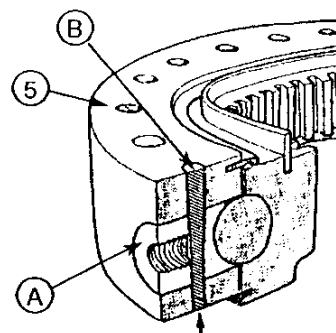


W105-03-01-010



W105-03-01-009

6. Install plug (A).
- Install taper pin (B) from top side of swing bearing and add calk.



W105-03-01-007

W03-01-06

UNDERCARRIAGE / Travel Device

EX200-2

REMOVE AND INSTALL TRAVEL DEVICE

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

2. Disconnect hydraulic lines (2), (3), (4) and (5).

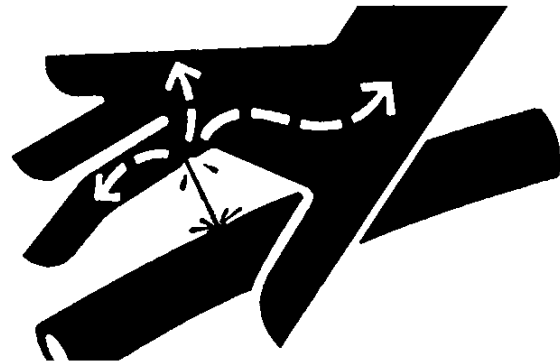
CAUTION : The approximate weight of the travel device assembly is 330 kg (728 lb)

3. Attach the travel device to hoist using an eye bolt.
4. Remove bolts (1) to remove the travel device.
5. Remove travel device and make repairs as necessary.
6. Install travel device.
7. Install bolts (1) and tighten to specification.
8. Connect hydraulic lines (2), (3), (4) and (5) and tighten fittings to specifications.

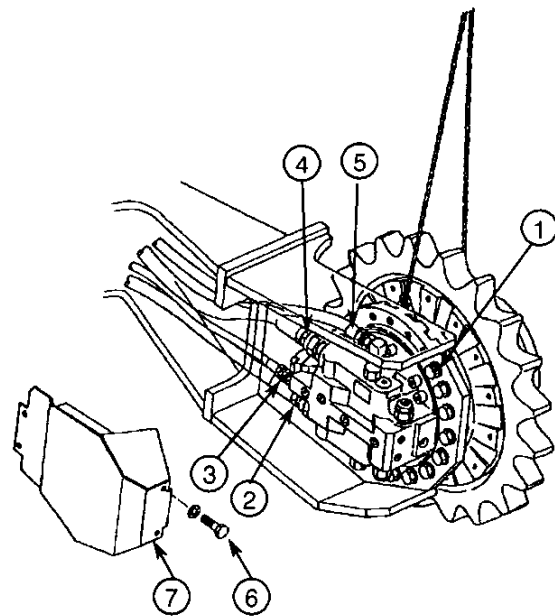
Tightening torque specifications

Travel device

Mounting bolt	620N·m (63 kgf·m, 456 lbf.ft)
Hose fitting	
(Forward port)	69 N·m (7 kgf·m, 51 lbf.ft)
Pilot hose fitting	49 N·m (5.0 kgf·m, 36 lbf.ft)
Hose fitting	
(Reverse port)	69 N·m (7 kgf·m, 51 lbf.ft)
Motor drain hose	
Fitting	49 N·m (5.0 kgf·m, 36 lbf.ft)



SA-031



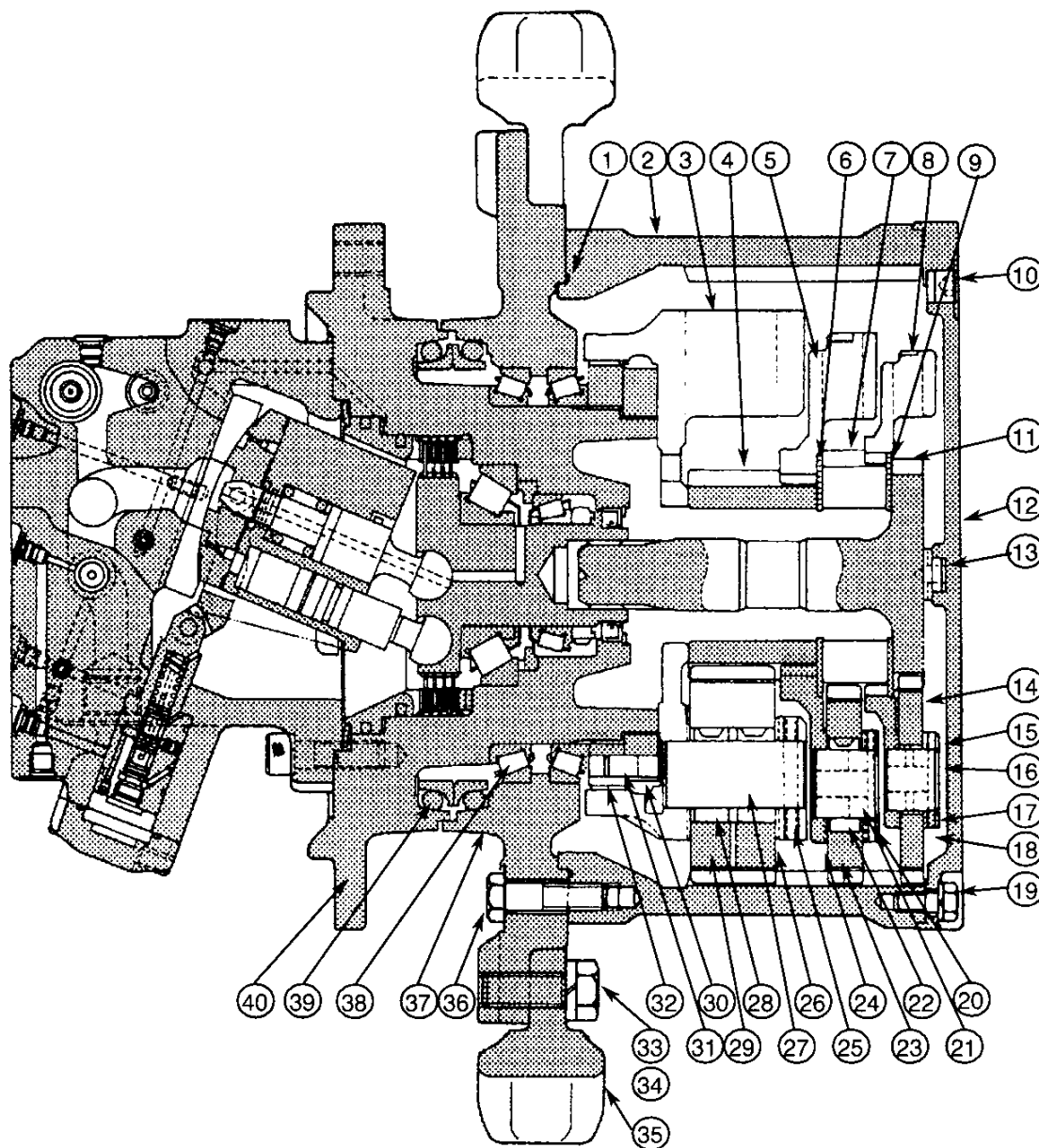
W107-03-02-001

- 1- Travel device mounting bolt
- 2- Hose (Forward port)
- 3- Pilot hose
- 4- Hose (Reverse port)
- 5- Motor drain hose
- 6- Bolts
- 7- Cover

UNDERCARRIAGE / Travel Device

EX200-2

DISASSEMBLE AND ASSEMBLE TRABEL DEVICE



W107-03-02-002

- | | | | |
|--------------|---------------------|--------------------|-------------------|
| 1— O-ring | 11— Propeller shaft | 21— Pin | 31— Knock pin |
| 2— Ring gear | 12— Cover | 22— Needle bearing | 32— Hub |
| 3— Carrier | 13— Stopper pin | 23— Planetary gear | 33— Bolt |
| 4— Sun gear | 14— Planetary gear | 24— Thrust plate | 34— Spring washer |
| 5— Carrier | 15— Needle bearing | 25— Spring pin | 35— Sprocket |
| 6— Spacer | 16— Pin | 26— Thrust plate | 36— Bolt |
| 7— Sun gear | 17— Spring pin | 27— Pin | 37— Drum |
| 8— Carrier | 18— Thrust plate | 28— Needle bearing | 38— Bearing |
| 9— Spacer | 19— Sems bolt | 29— Planetary gear | 39— Group seal |
| 10— Plug | 20— Spring pin | 30— Nut | 40— Motor |

W03-02-02

UNDERCARRIAGE / Travel Device

EX200-2

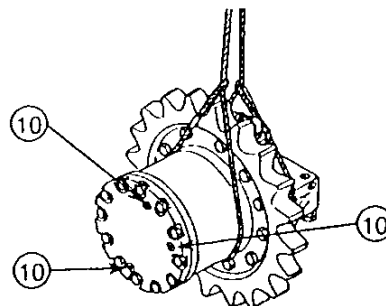
DISASSEMBLE TRAVEL DEVICE

Clean outside of travel gearbox housing.

Drain Oil from Travel Gearbox

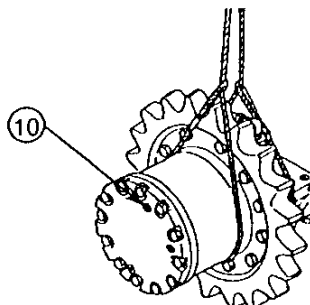
1. Lift up travel gear box using a hoist. Be sure to position air bleed plug on the top, drain plug at the bottom, and level plug to the right, as shown.

CAUTION: Do not loosen air bleed plug fully at a time. Pressurized oil will escape suddenly and the plug also may fly off causing serious injury.



W107-03-02-004

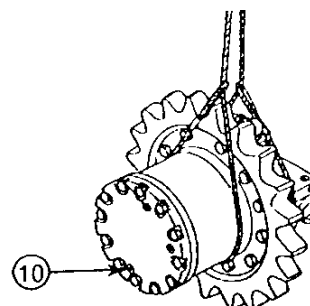
2. Slowly loosen air bleed plug 2 to 3 turns, then remove it carefully, paying attention to the residual pressure.



W107-03-02-005

3. Remove drain plug . Drain gear oil.

 : 10 mm



W107-03-02-006

UNDERCARRIAGE / Travel Device

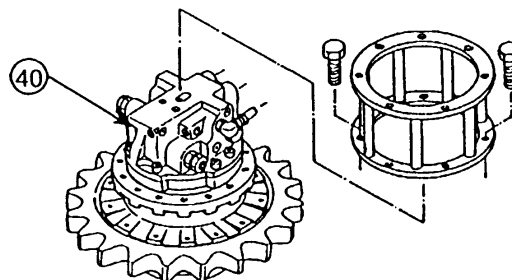
EX200-2

Attach Spacer to Travel Gearbox

4. Place travel gearbox on workbench with the motor (40) side up. Attach spacer to motor flange surface and secure it by tightening two bolts positioned symmetrically.

 : 30 mm

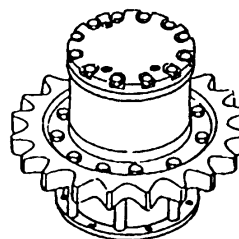
Spacer: ST 5090



W107-03-02-007

5. Rotate gearbox and spacer assembly 180°, and secure spacer on workbench with bolts.

Workbench: ST 5093

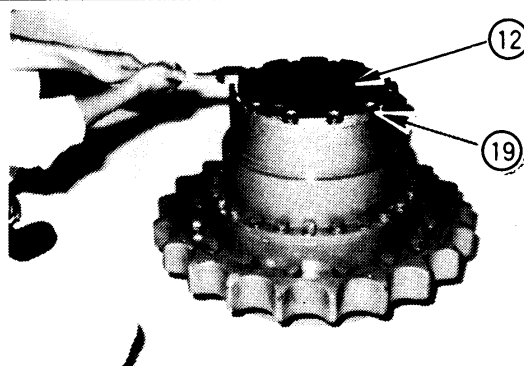


W107-03-02-008

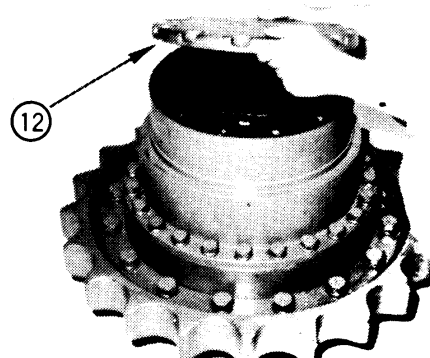
6. Remove cover mounting bolts (19) and cover (12).

 : 19 mm

Note: Insert a chisel between cover and ring gear and lightly hit it with a hammer for easier removal.



W107-03-02-009



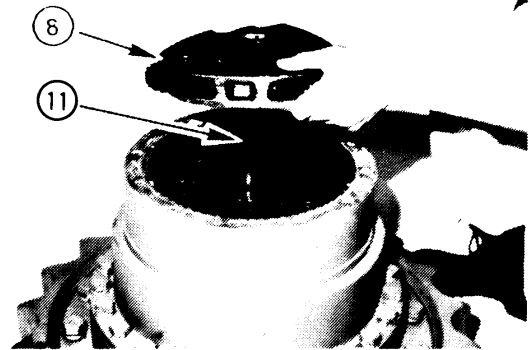
W107-03-02-010

W03-02-04

UNDERCARRIAGE / Travel Device

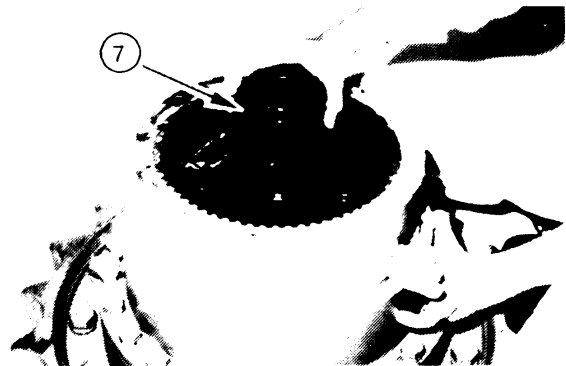
EX200-2

7. Remove propeller shaft (11) and first planet carrier (8).



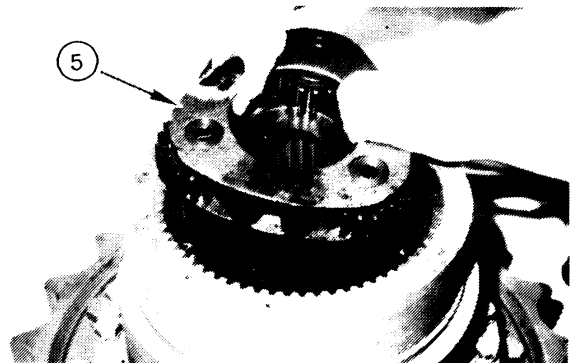
W107-03-02-011

8. Remove second sun gear (7).



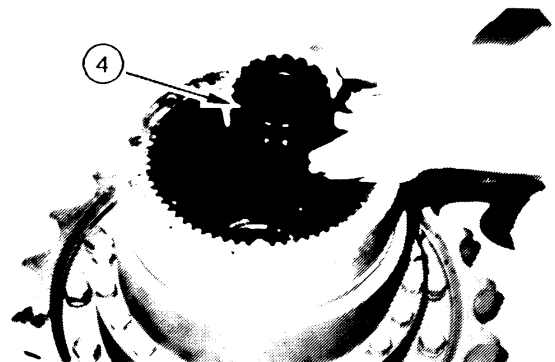
W107-03-02-012

9. Remove second planet carrier (5).



W107-03-02-013

10. Remove third sun gear (4).

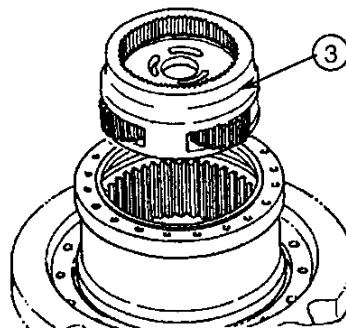


W107-03-02-014

UNDERCARRIAGE / Travel Device

EX200-2

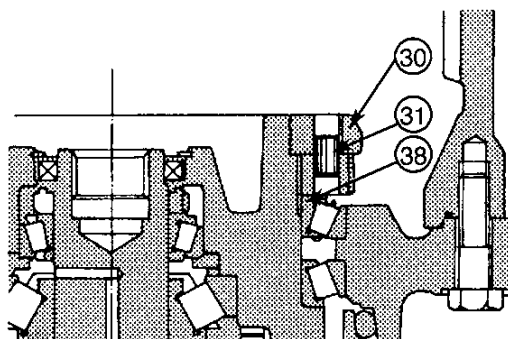
11. Remove third planet carrier (3).



W107-03-02-015

12. Push out knock pin (31) until it contacts bearing (38) end surface, using pusher to disengage nut (30).

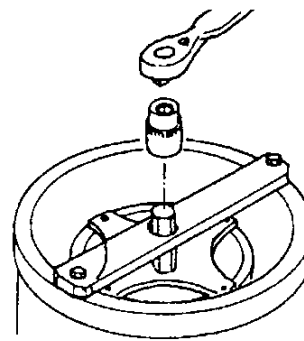
Pusher: ST 2566



W107-03-02-016

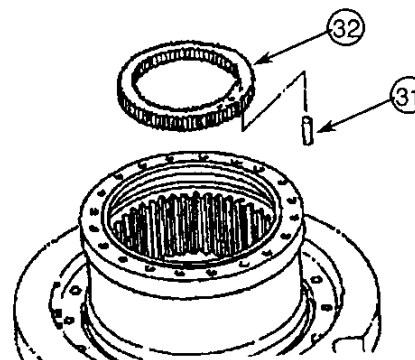
13. Loosen and remove bearing nut (30) using Travel Gearbox Nut Wrench. Be sure to fasten wrench guide plate to ring gear (2) with two bolts, as shown.

Travel Gearbox Nut Wrench:
ST-3051, 3052, 3072
M16 Bolt (L=60 to 70 mm)×2



W107-03-02-017

14. Remove hub (32) and drive out knock pin (31) from hub (32).



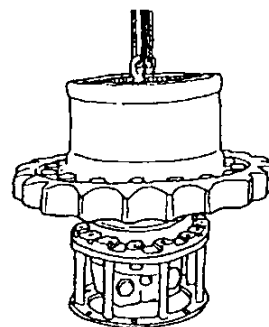
W107-03-02-018

UNDERCARRIAGE / Travel Device

EX200-2

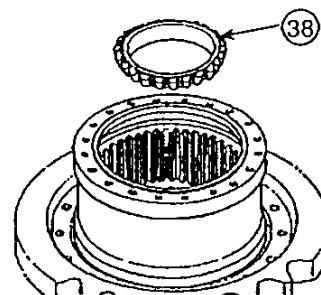
15. Lift up ring gear (2) with crane, then the motor left on the workbench.

Lifting eyebolt: ST 0002



W107-03-02-019

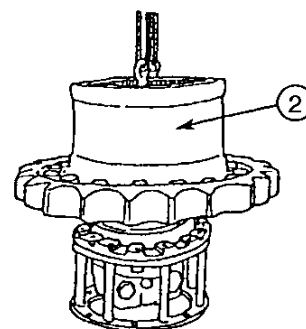
16. Remove drum (37) and ring gear (2) assembly from motor (40) using a hoist.
Motor end inner race of bearing (38) comes out together with the assembly when being removed.



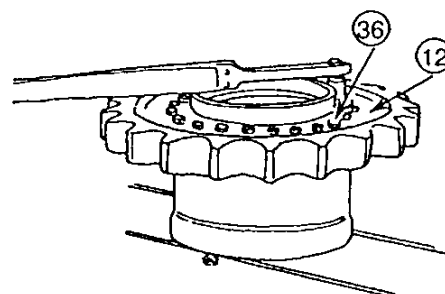
W107-03-02-020

17. Rotate drum (37) and ring gear (2) assembly 180° and secure ring gear on workbench with two bolts. Remove fastening bolts (36).

 : 24 mm



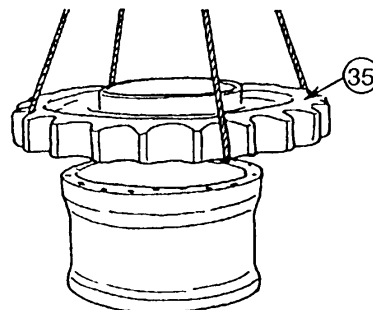
W107-03-02-022



UNDERCARRIAGE / Travel Device

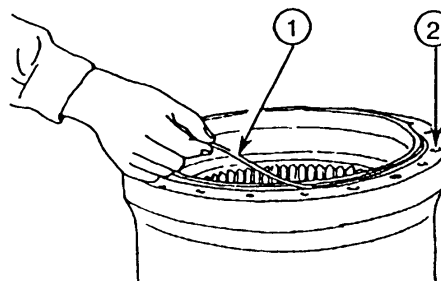
EX200-2

18. Remove sprocket (35) using a hoist.



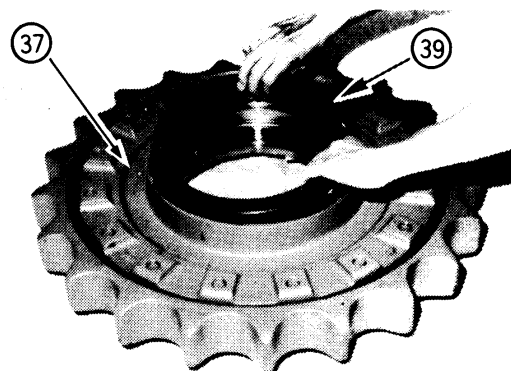
W107-03-02-023

19. Remove O-ring (1) from ring gear (2).



W107-03-02-024

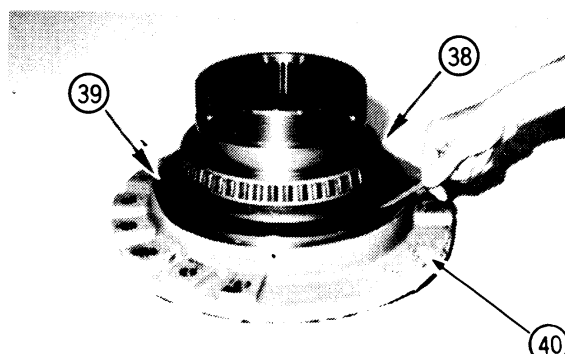
20. Remove floating seal (39) from motor (37).



W107-03-02-025

21. Remove floating seal (39) from motor (40).

Note: Remove inner race of roller bearing (38) from motor (40) if replacement is necessary.



W107-03-02-026

W03-02-08

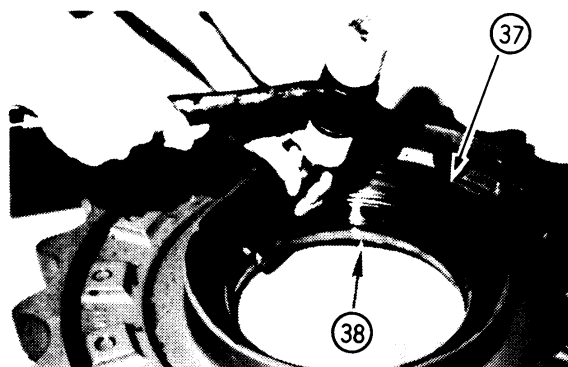
UNDERCARRIAGE / Travel Devic

EX200-2

22. Remove outer racer of bearing (38) from drum (37).



NOTE: For easier removal, lightly hit outer race using a bar and hammer, as shown.

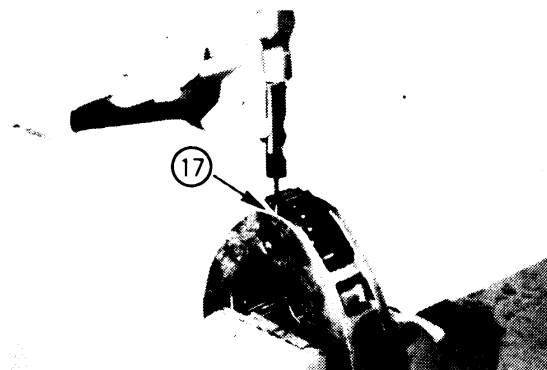


W107-03-02-027

Disassemble first planet carrier

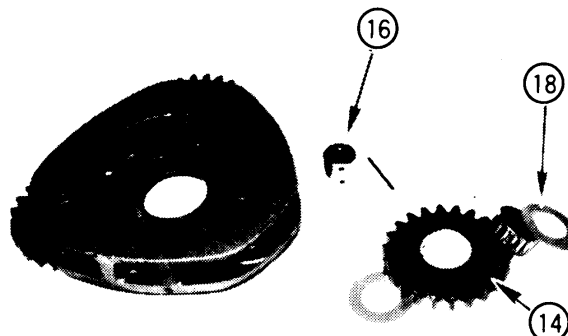
23. Remove spring pin (17) from the carrier.

Remover: ST-1391



W107-03-02-028

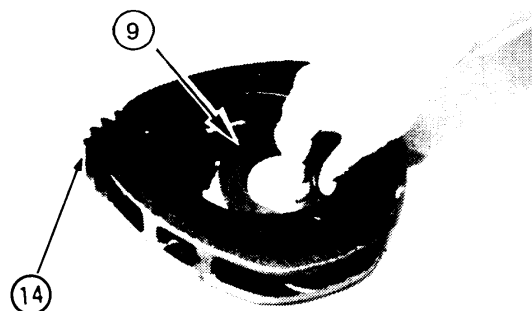
24. Remove pin (16), planetary gear (14) and thrust plate (18).



W107-03-02-029

25. Remove spacer (9).

NOTE: Repeat steps 23, 24 and 25 for other two planetary gears.



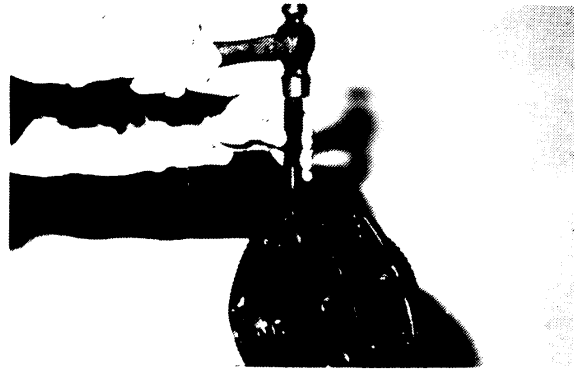
W107-03-02-030

UNDERCARRIAGE / Travel Device

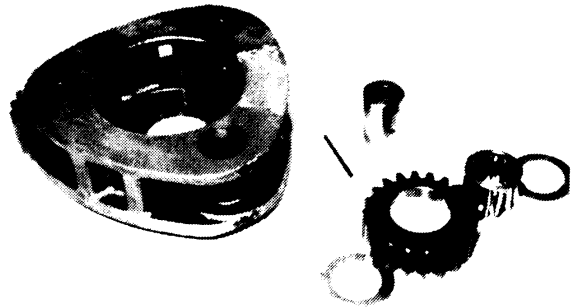
EX200-2

Disassemble second planet carrier

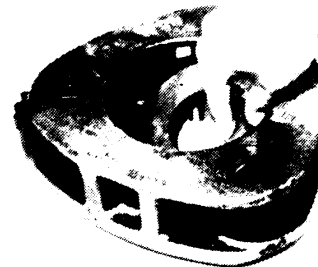
26. Remove spring pins and pins to remove planetary gears and thrust plates from second planet carrier.
(See steps (23), (24) and (25).



W107-03-02-031



W107-03-02-032



W107-03-02-033

UNDERCARRIAGE / Travel Device

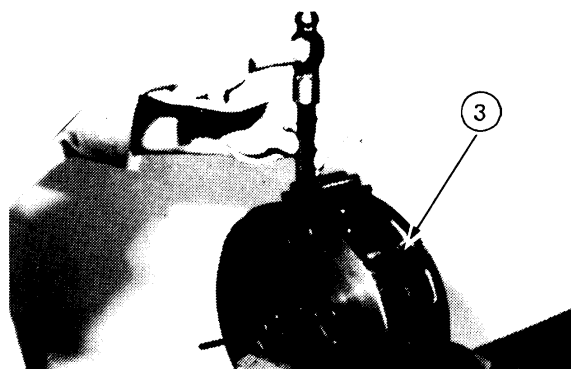
EX200-2

Disassemble third planet carrier

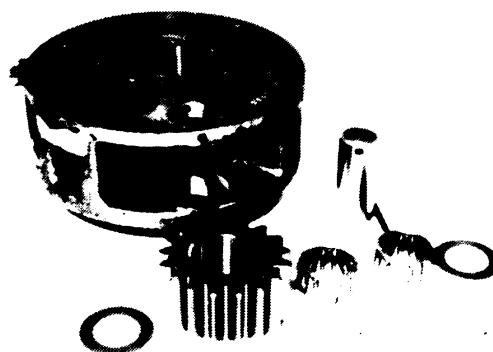
27. Remove spring pins and pins to remove planetary gears and thrust plates from third planet carrier.

(See steps (23), (24) and (25) for reference.)

NOTE: Third planet carrier has no spacers.



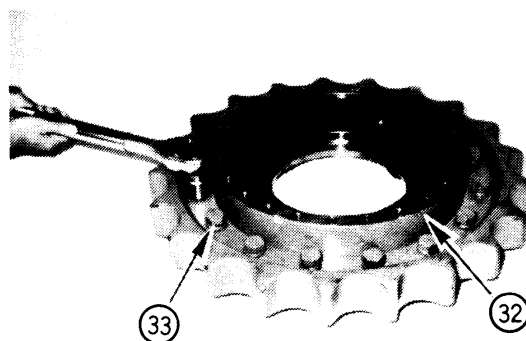
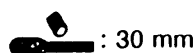
W107-03-02-034



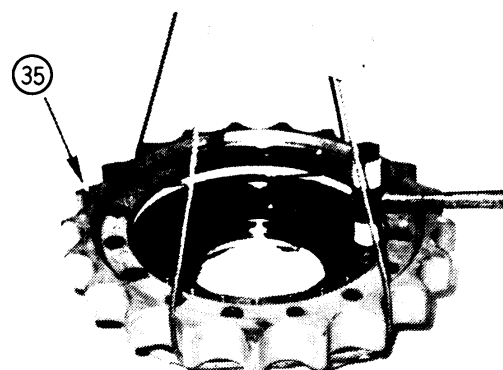
W107-03-02-035

28. Remove bolts (33).

Remove sprocket (35) from drum (37).



W107-03-02-036

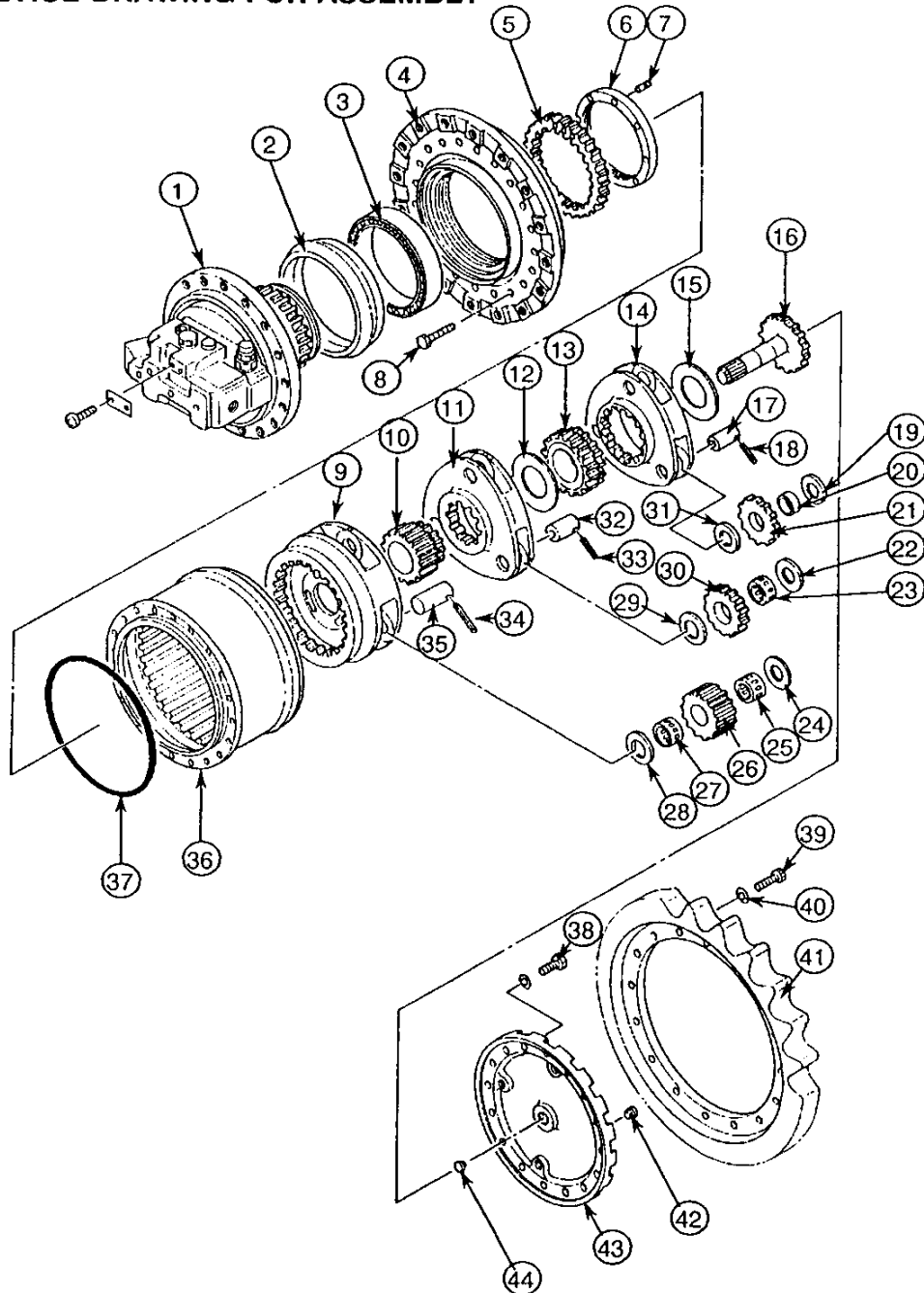


W107-03-02-037

UNDERCARRIAGE / Travel Device

EX200-2

TRAVEL DEVICE DRAWING FOR ASSEMBLY



W107-03-02-038

- | | | | |
|-------------------------|-----------------------|--------------------|-------------------|
| 1— Motor | 12— Spacer | 23— Needle bearing | 34— Spring pin |
| 2— Floating seal | 13— 2nd step sun gear | 24— Thrust plate | 35— Pin |
| 3— Taper roller bearing | 14— Carrier | 25— Needle bearing | 36— Ring gear |
| 4— Drum | 15— Spacer | 26— Planetary gear | 37— O-ring |
| 5— Hub | 16— Propeller shaft | 27— Needle bearing | 38— Bolt |
| 6— Bearing nut | 17— Pin | 28— Thrust plate | 39— Bolt |
| 7— Knock pin | 18— Spring pin | 29— Thrust plate | 40— Spring washer |
| 8— Bolt | 19— Thrust plate | 30— Planetary gear | 41— Sprocket |
| 9— Carrier | 20— Needle bearing | 31— Thrust plate | 42— Plug |
| 10— 3rd step gear | 21— Planetary gear | 32— Pin | 43— Cover |
| 11— Carrier | 22— Thrust plate | 33— Spring pin | 44— Plug |

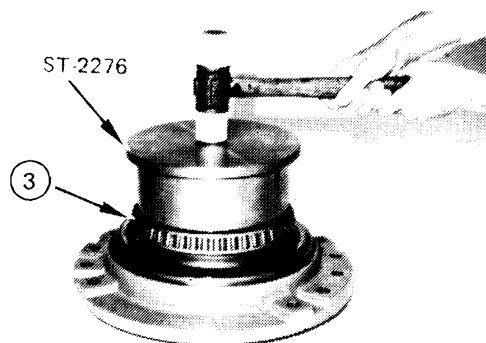
UNDERCARRIAGE / Travel Device

EX200-2

ASSEMBLE TRAVEL DEVICE

1. Install new taper bearing inner race (3) onto motor housing after heating the inner race to 50 to 70°C, (122 to 158°F). Push inner race tight against shoulder using installer after the race has cooled.

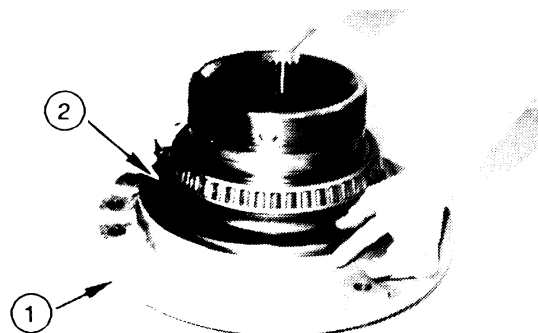
Installer: ST 2276



W107-03-02-039

2. Install the motor-end half of floating seal (2) on motor (1). Be sure to apply grease to sealing surfaces on the motor before seal installation.

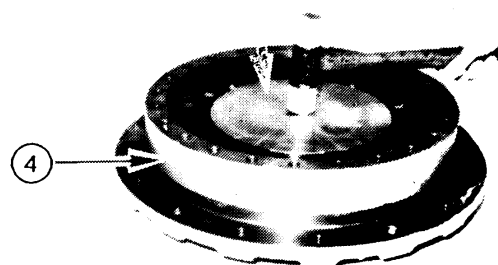
Note : For easier inserting, use a bamboo spatula to guide floating seal O-ring while installing.



W107-03-02-040

3. Install taper bearing outer race onto drum (4).

Installer: ST 2278



W107-03-02-042

W03-02-14

UNDERCARRIAGE / Travel Device

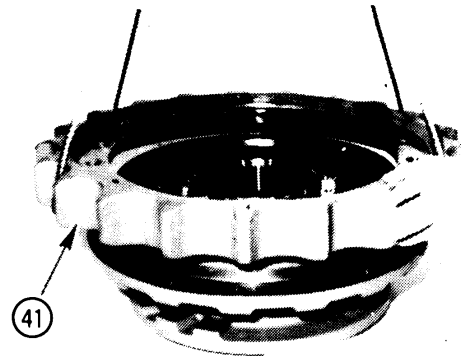
EX200-2

4. Install sprocket (5) on drum (4).
Apply Loctite #262 to bolts (29) and install.
Tighten bolts (29) to specification.

 : 24 mm

 : 27.0 kgf-m

Loctite: #262



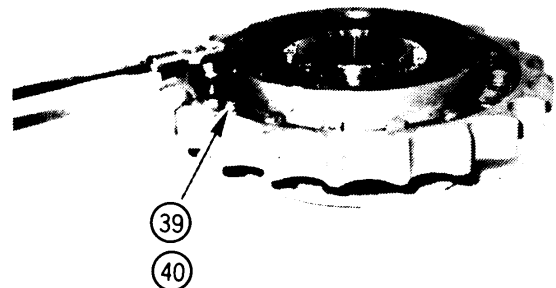
W107-03-02-043

5. Apply loctite #262 to bolts (39) and install.
Tighten bolts (39) to specification.

 : 30 mm

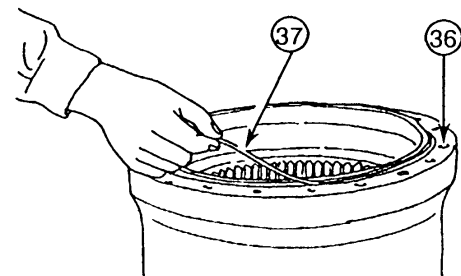
 : 48 kgf-m

Loctite: #262



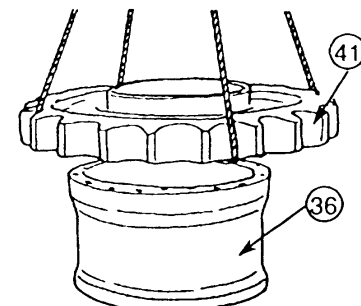
W107-03-02-044

6. Thoroughly apply grease to O-ring groove on ring gear (36). Install O-ring (37) into the groove.



W107-03-02-045

8. Install sprocket (41) and drum (43) assembly on ring gear using a hoist, aligning drum holes and screw holes on ring gear (36), as shown. Be careful that O-ring is off the groove when placing drum on ring gear.



W107-03-02-046

UNDERCARRIAGE / Travel Device

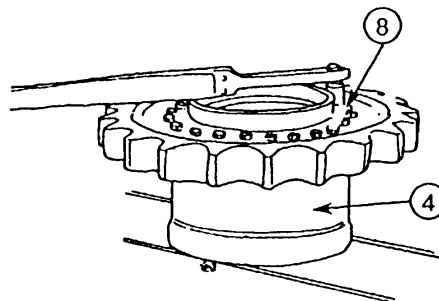
EX200-2

8. Apply Loctite #262 to bolts (8). To assemble ring gear (21) and drum (4), install and tighten bolts (8) to specification.

 : 24 mm

 : 27.0 kgf-m

Loctite: #262

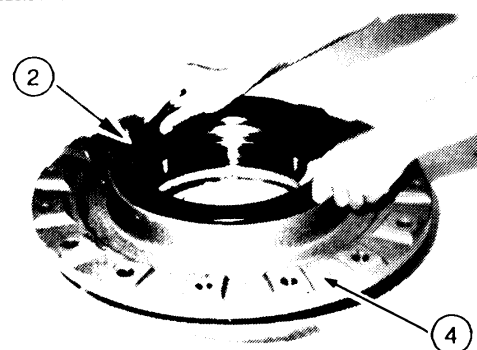


W175-03-02-047

9. Install the gearbox-end half of floating seal (2) on drum (4).

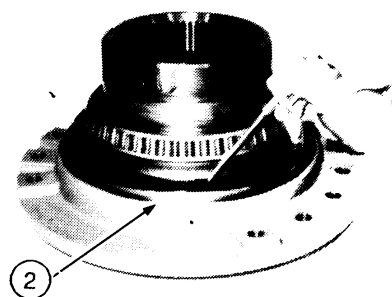
NOTE: (1) Apply grease to sealing surfaces on the motor.

(2) For easier inserting, use a bamboo spatula to guide floating seal O-ring while installing.



W175-03-02-048

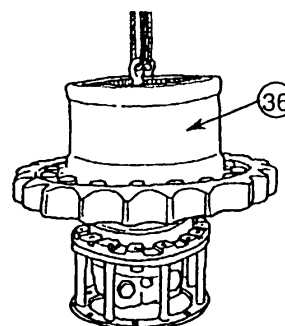
10. Apply a film of gear oil to mating surface of floating seal (2).



W175-03-02-097

11. Install drum (4) and ring gear (21) assembly on motor (1) using a hoist.

Lifting eyebolt: ST- 0002



W175-03-02-050

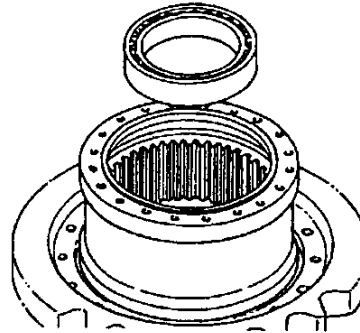
UNDERCARRIAGE / Travel Device

EX200-2

12. Install bearing inner race onto motor housing (1) after heating the inner race to 50 to 70°C (122 to 158°).

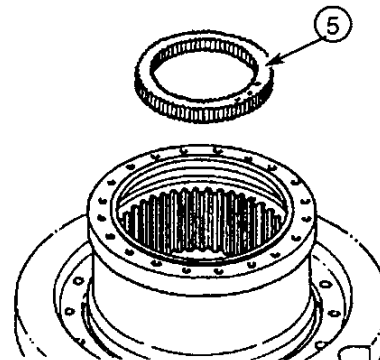
Use installer and a hammer to tap the race to seat correctly after has cooled.

Installer: ST- 2276



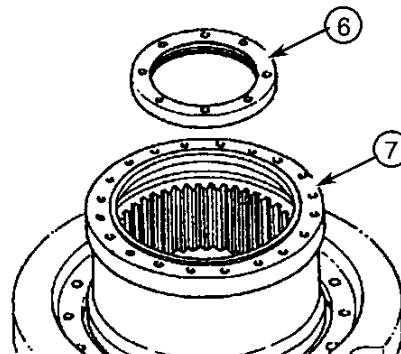
W107-03-02-051

13. Install hub (5) onto housing (1), aligning splines.



W107-03-02-052

14. Install bearing nut (6) with the uneven surface side towards the hub and tighten manually.



W107-03-02-053

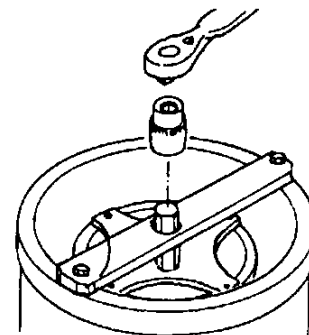
15. Tighten bearing nut (6) to specification using Travel Gearbox Nut Wrench. Be sure to fasten wrench guide plate to ring gear (36) with two bolts, as shown.

Travel Gearbox Nut Wrench:

ST 3051, 3052, 3072

M16 Bolt (L=60 to 70 mm)×2

 : 40 N·m (50 kgf·m, 362 lbf·ft)

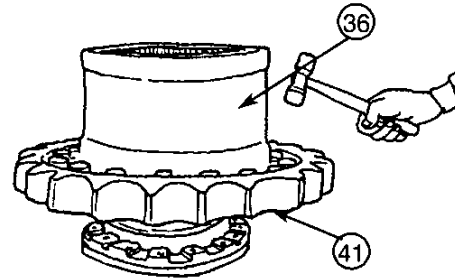


W107-03-02-017

UNDERCARRIAGE / Travel Device

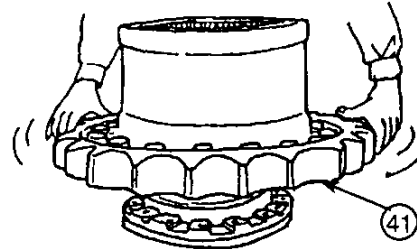
EX200-2

16. After bearing nut (6) is tightened to specification, tap ring gear (36) or sprocket (41) with a plastic hammer to remove play in bearing clearances.



W107-03-02-055

17. Turn drum three times to the right and left.



W107-03-02-056

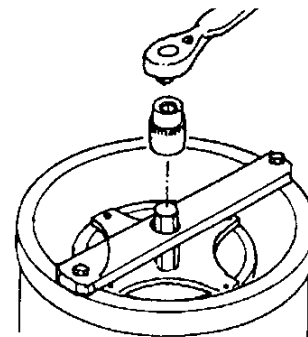
18. Tighten bearing nut (6) again to specification using Travel Gearbox Nut Wrench following Step 15. Then, remove play by tapping gear (36) or sprocket (41) following Step the bearing nut holes and hub holes.

Travel Gearbox Nut Wrench:

ST 3051, 3052, 3072

M16 Bolt (L=60 to 70 mm)×2

:50 kgf-m (490 N.m, 362 lbf-ft)

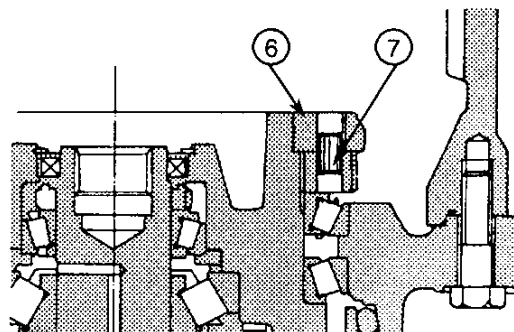


W107-03-02-017

19. Tap knock pin (7) into bearing nut (6) and hub until pin head sinks 12 mm from bearing nut surface using a hammer and installer.



Installer: ST- 2566



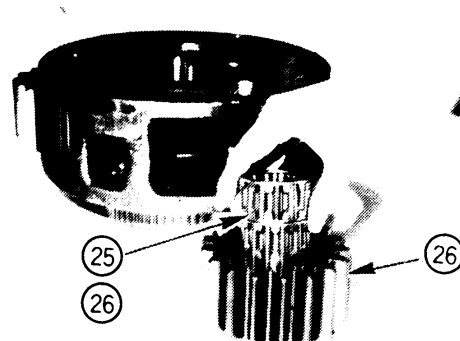
W107-03-02-016

UNDERCARRIAGE / Travel Device

EX200-2

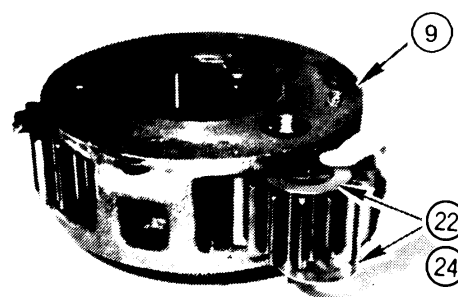
«Assemble Third Planet Carrier»

20. Install needle bearings (25) and (27) into planetary gear (26).



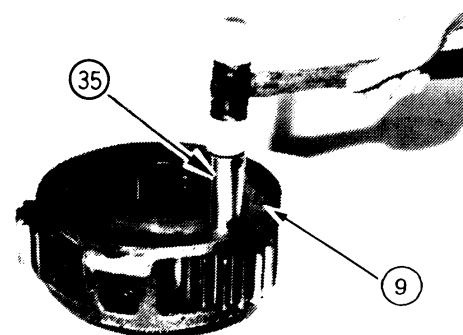
W107-03-02-059

21. Install planetary gear (26) and thrust plates (22) and (24) into carrier (9). Be sure to install thrust plates (22) and (24) with the oil groove side positioned towards the planetary gear.



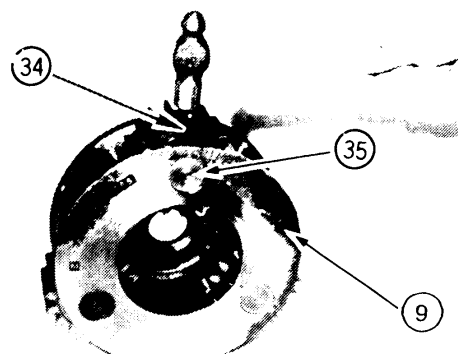
W107-03-02-060

22. Install pin (34) into carrier (9) aligning the pin hole and carrier hole.



W107-03-02-061

23. With the slit of spring pin (24) facing upward, use a hammer to spring pin into carrier (9) and pin (35).

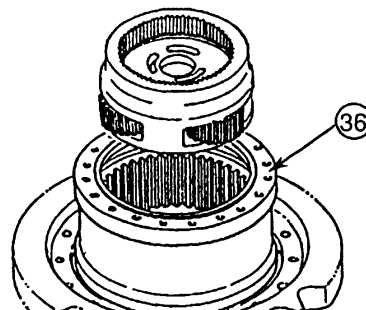


W107-03-02-062

UNDERCARRIAGE / Travel Device

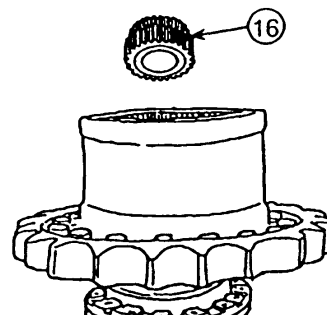
EX200-2

24. Install third planet carrier assembly in ring gear (36), aligning install splines with hub (5).



W107-03-02-063

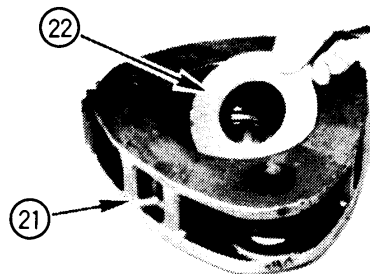
25. Install third sun gear (10) into ring gear with the reduced tip circle side up.



W107-03-02-064

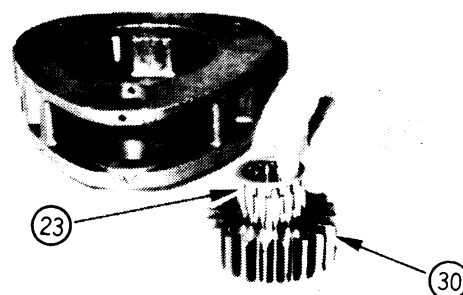
«Assemble second Planet Carrier»

26. Install spacer (12) into second planet carrier (11).



W107-03-02-065

27. Install needle bearing (23) into planetary gear (30).

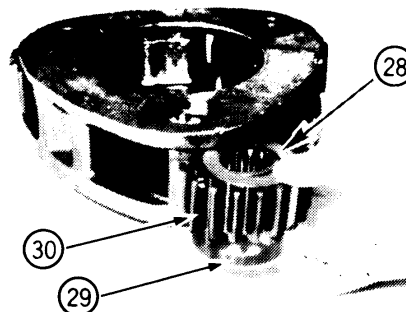


W107-03-02-066

UNDERCARRIAGE / Travel Device

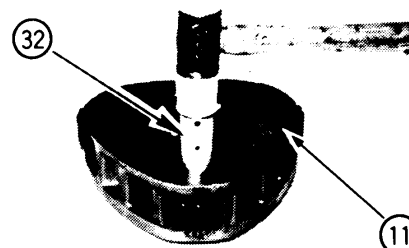
EX200-2

28. Install planetary gear (30) and thrust plates (28) and (29) into carrier (11). Be sure to install thrust plates (28) and (29) with the oil groove side positioned towards the planetary gear.



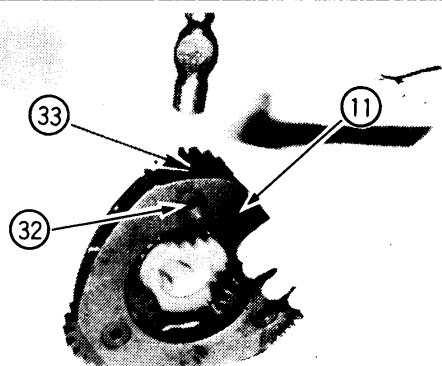
T107-03-02-067

29. Install pin (32) into carrier (11) aligning the pin hole and carrier hole.



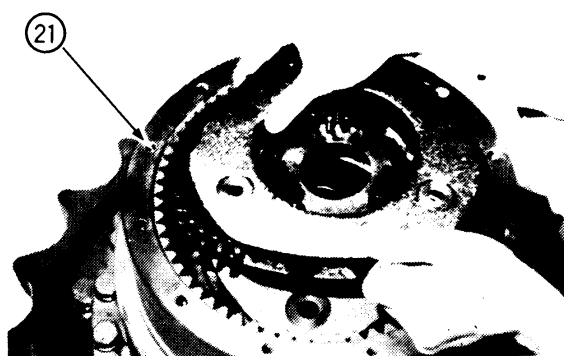
T107-03-02-068

30. With the slit of spring pin (33) facing upward, use a hammer to tap spring pin (33) into carrier (11) and pin (32).



T107-03-02-069

31. Install second planet carrier assembly in ring gear (21), aligning splines with hub (5).

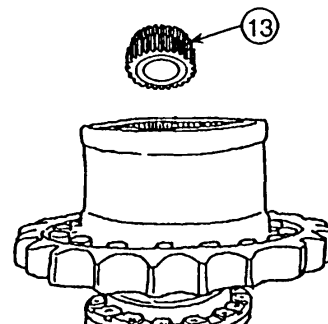


T107-03-02-070

UNDERCARRIAGE / Travel Device

EX200-2

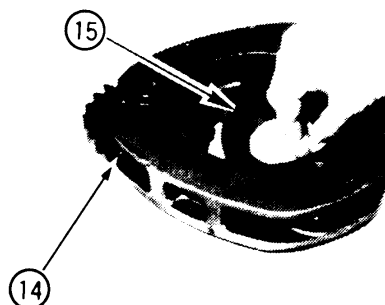
32. Install second sun gear (13) into ring gear with the reduced tip circle side up.



W107-03-02-071

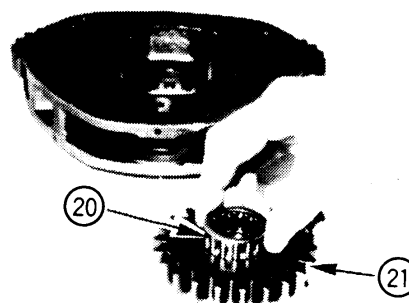
«Assemble First Planet Carrier»

33. Install spacer (15) into first planet carrier (14).



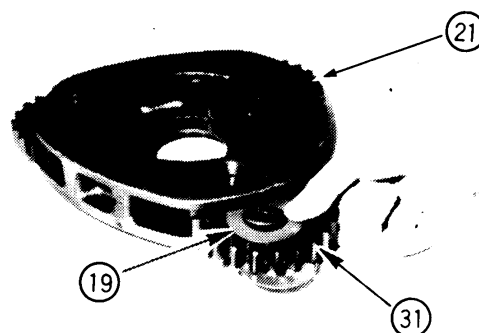
W107-03-02-072

34. Install needle bearing (20) into planetary gear (21)



W107-03-02-073

35. Install planetary gear (21) and thrust plates (19) (31) into carrier (14).



W107-03-02-074

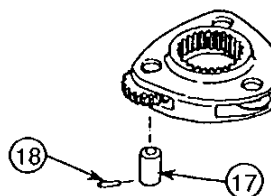
W03-02-022

UNDERCARRIAGE / Travel Device

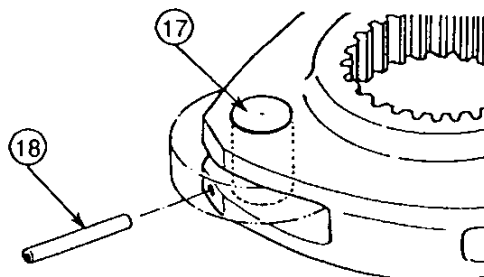
EX200-2

36. Install pin (17) into carrier (14) aligning the pin hole and carrier hole.

With the slit of spring pin (18) facing upward, use a hammer to tap spring pin (18) into carrier and pin.

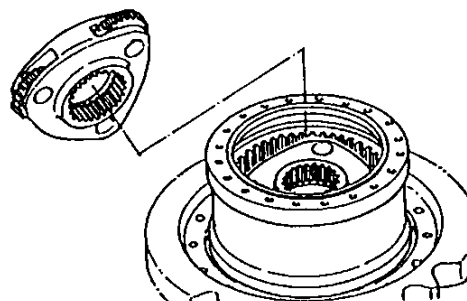


W107-03-02-075



W107-03-02-076

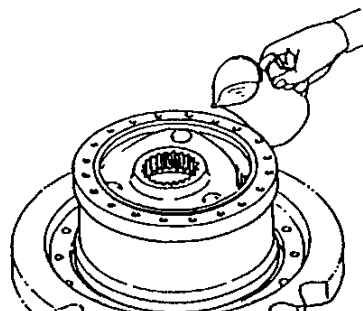
37. Install first planet carrier assembly in ring gear (36), aligning splines with second sun gear (13).



W107-03-02-077

38. Add oil to gear box.

Gear oil : 5.5 L (1.45USgal, 1.21 Imp gal)

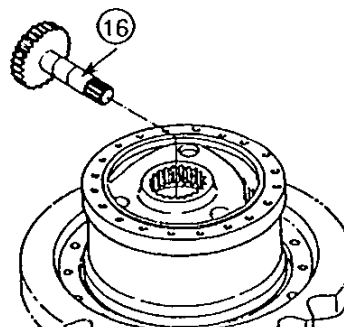


W107-03-02-078

UNDERCARRIAGE / Travel Device

EX200-2

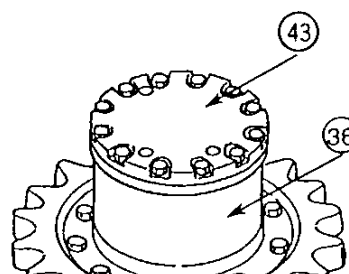
39. Install propeller shaft (16) so its gear teeth correctly mesh with planetary gears (21)



W107-03-02-079

40. Clean cover mounting surface of ring gear (36) using clean and pure primer, and apply liquid packing install coover (43) on ring gear (36), aligning bolt holes.

Liquid Packing: Three Bond 1215



W107-03-02-080

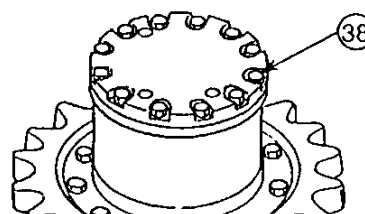
41. Install spring washers and bolts (38).
Tighten to specification.



: 19mm



: 108N.m(11.0kgf.m, 80lb.ft)

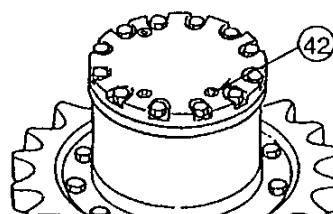


W107-03-02-081

42. Apply seal tape to plug (42), and install it to cover.



: 10 mm



W107-03-02-082

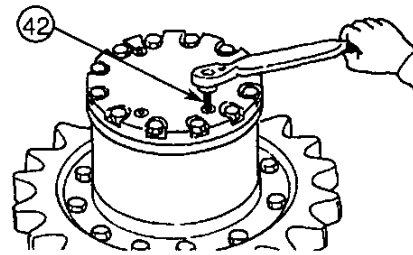
UNDERCARRIAGE / Travel Device

EX200-2

43. Tighten plug (42).

 : 10 mm

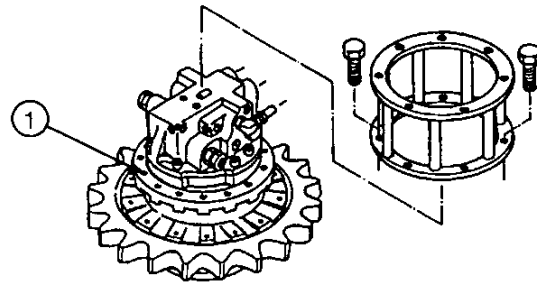
 : 49 N.m (5.0kgf.m, 36.1 lbf.ft)



W107-03-02-083

44. Turn assembly over.

Remove spacer (ST- 5090) from motor (1).



W107-03-02-084

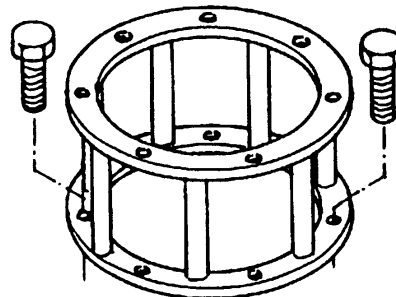
UNDERCARRIAGE / Travel Device

EX200-2

SPECIAL TOOL

A: Spacer

ST 5090



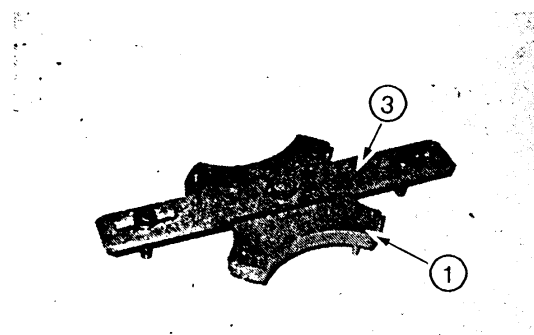
W107-03-02-086

B: Bearing nut turning set

ST 3051

ST 3052 (3)

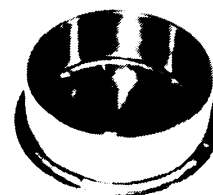
ST 3072 (1)



W107-03-02-087

C: Bearing inner race driving jig

ST 2276



W107-03-02-088

D: Bearing outer race driving jig

ST 2277



W107-03-02-089

UNDERCARRIAGE / Travel Device

EX200-2

Remove and Install travel Motor

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.

CAUTION : Escaping fluid under pressure can penetrate the skin causing serious injury.

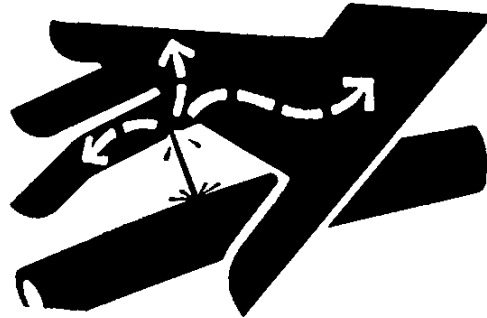
Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.

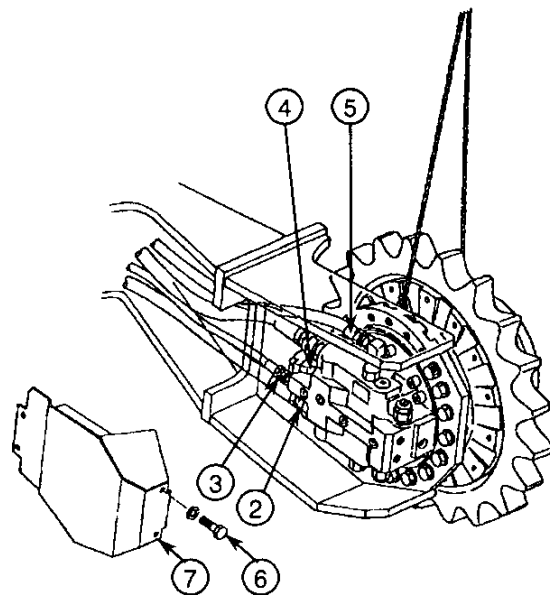
2. Disconnect hydraulic lines (2), (3), (4) and (5).

CAUTION: The approximate weight of the travel device assembly is 330 kg. (728 lb)

3. Attach travel device to a hoist.
4. Remove bolts (1) to remove travel device.
5. Remove travel travel device and make repairs as necessary.
6. Install travel device.
7. Install bolts (1) and tighten to specification.
8. Connect hydraulic lines (2), (3), (4) and (5) and tighten fittings to specifications.



SA-031

**Tightening Torque Specifications**

W107-03-02-001

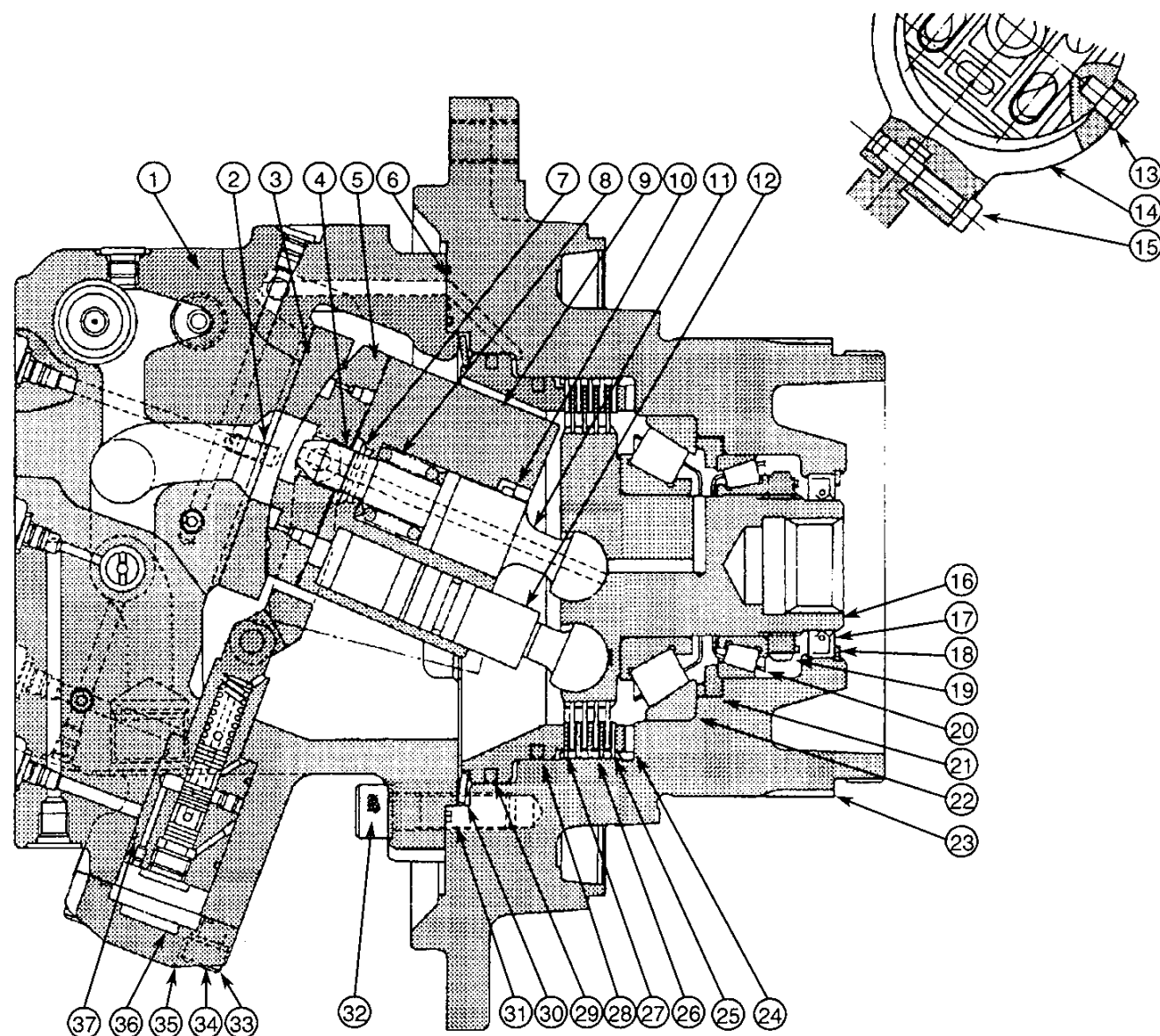
- (1) Travel device mounting bolt: 620 N·m (63 kgf·m, 456 lb·ft)
- (2) Hose fitting (Forward port): 69 N·m (7 kgf·m, 51 lb·ft)
- (3) Pilot hose fitting: 49 N·m (5 kgf·m, 36 lb·ft)
- (4) Hose fitting (Reverse port): 69 N·m (7 kgf·m, 51 lb·ft)
- (5) Motor drain hose fitting: 49 N·m (5 kgf·m, 36 lb·ft)

- 1 - Travel device mounting bolt
- 2 - Hose (Forward port)
- 3 - Pilot hose
- 4 - Hose (Reverse port)
- 5 - Motor drain hose
- 6 - Bolt
- 7 - Cover

UNDERCARRIAGE / Travel Device

EX200-2

DISASSEMBLE AND ASSEMBLE TRAVEL MOTOR



W107-03-02-090

- | | | | |
|-------------------|--------------------|--------------------|------------------|
| 1— Brake valve | 11— Center shaft | 21— Spacer | 31— O-ring |
| 2— Knock pin | 12— Piston | 22— Bearing | 32— Socket bolt |
| 3— Plate | 13— Plug | 23— Housing | 33— Socket bolt |
| 4— Bushing | 14— Link | 24— Spacer | 34— O-ring |
| 5— Valve plate | 15— Reamer bolt | 25— Plate | 35— Cover |
| 6— O-ring | 16— Drive disk | 26— Friction plate | 36— Servo piston |
| 7— Retaining ring | 17— Oil seal | 27— Piston | 37— Piston ring |
| 8— Center spring | 18— Retaining ring | 28— D-ring | |
| 9— Rotor | 19— Bearing nut | 29— D-ring | |
| 10— Pin | 20— Bearing | 30— Disk spring | |

W03-02-28A

9503

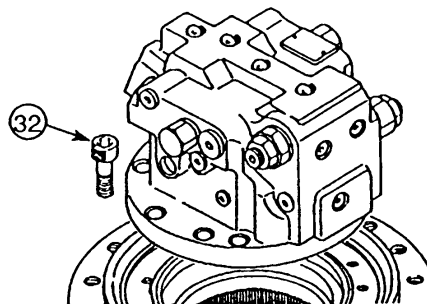
UNDERCARRIAGE / Travel Device

EX200-2

DISASSEMBLE TRAVEL MOTOR

1. Loosen socket bolts (32) and remove brake valve assembly from motor.

NOTE: It should be noted that the rotor may come out them.

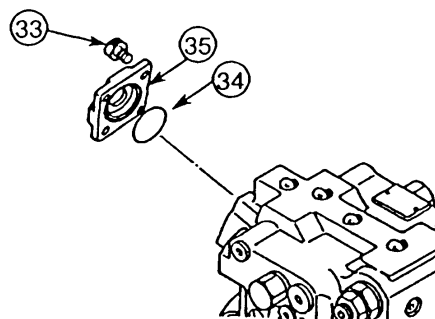


W107-03-02-091

2. Loosen socket bolts (33) and remove cover (35) and O-ring (34).

Turn over the motor.

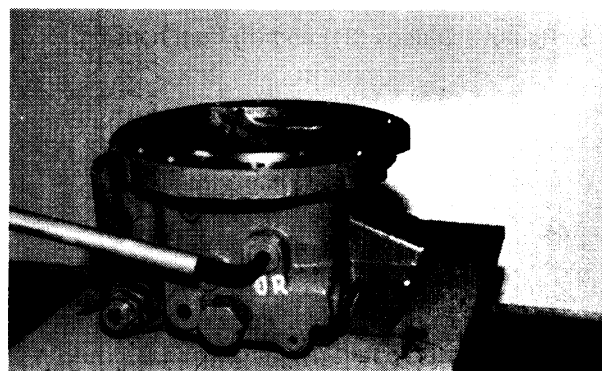
 : 10 mm



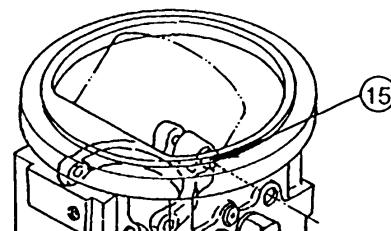
W107-03-02-093

3. Turn brake valve over:
Remove drain plug. Insert a hexagon wrench from drain plug hole and remove reamer bolt (15).

 : 8mm



W107-03-02-095



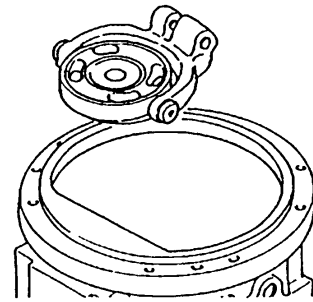
W107-03-02-094

UNDERCARRIAGE / Travel Device

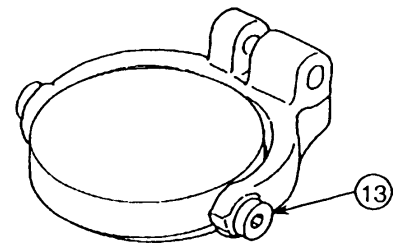
EX200-2

4. Remove servo piston assembly and valve link assembly

Note: Do not attempt to remove the plug (13) unless replacement is required.

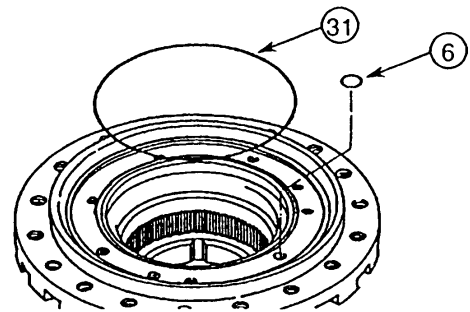


W107-03-02-096



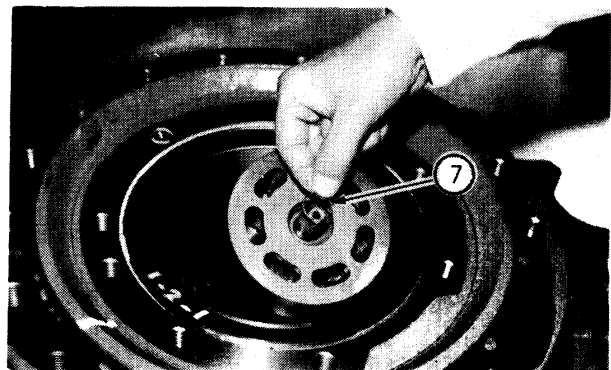
W107-03-02-098

5. Remove O-rings (31) and (6) from housing.



W107-03-02-099

6. Remove retaining ring (7).



W107-03-02-101

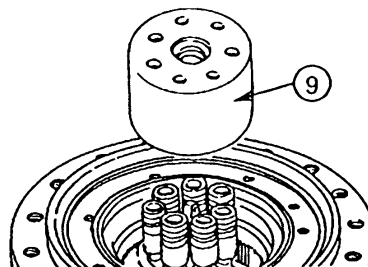
W03-02-30

UNDERCARRIAGE / Travel Device

EX200-2

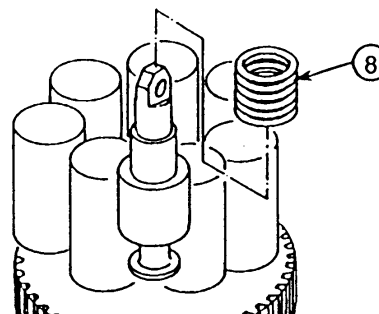
7. Remove rotor (9) from motor.

Note: Make a aligning mark on the rotor and pistons.



W107-03-02-102

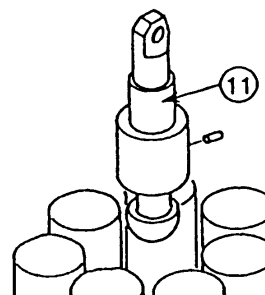
8. Remove center spring (8) from the center shaft.



W107-03-02103

9. Remove center shaft (11).

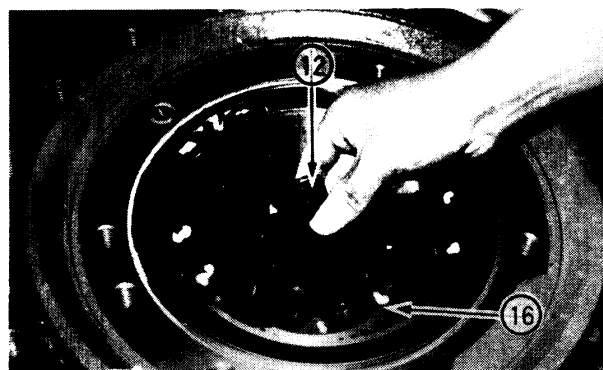
Note: Do not attempt to remove pin (10) unless replacement is required.



W107-03-02-104

10. Remove pistons (12) from disk drive (16).

Note: Make a aligning mark on the pistons and drive disk

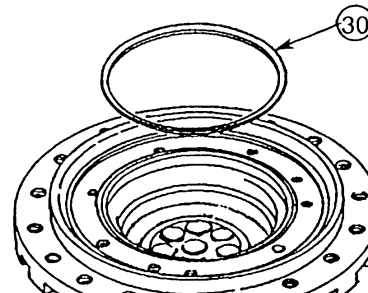


W107-03-02-105

UNDERCARRIAGE / Travel Device

EX200-2

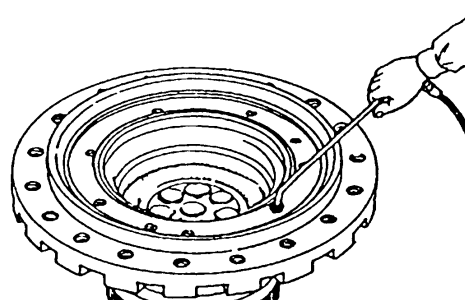
11. Remove disk spring (30) from the motor.



W107-03-02-106

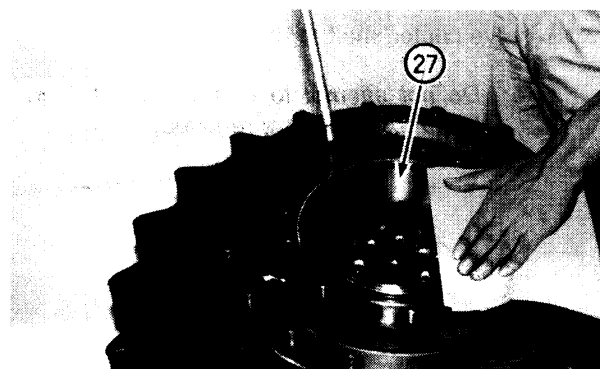
CAUTION: Be sure to reduce air pressure to 1 to 2Kgf/cm² when using compressed air. Cover piston (21) with cloths when removing the piston using compressed air to avoid sudden flying off.

IMPORTANT: Do not use a screwdriver for removing to avoid damaging housing interior accidentally.



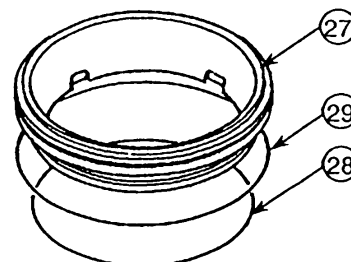
W107-03-02-107

12. Remove piston (27) from the motor while supplying 1 to 2Kgf/cm² air pressure to the brake releasing hydraulic circuit using an air pump. Air Pump (Manual air pump for bicycles can be used.)



W1070-03-02-108

13. Remove D-rings (28) and (29) from piston (27).

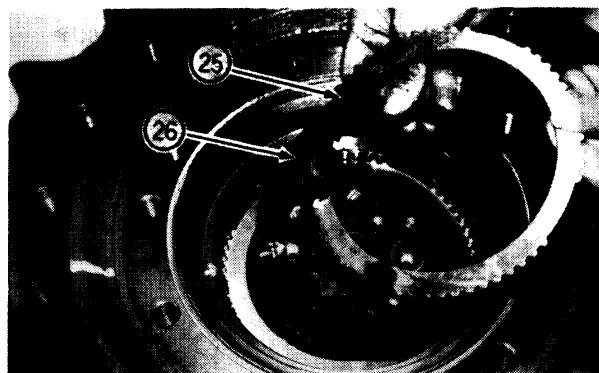


W1070-03-02-0109

UNDERCARRIAGE / Travel Device

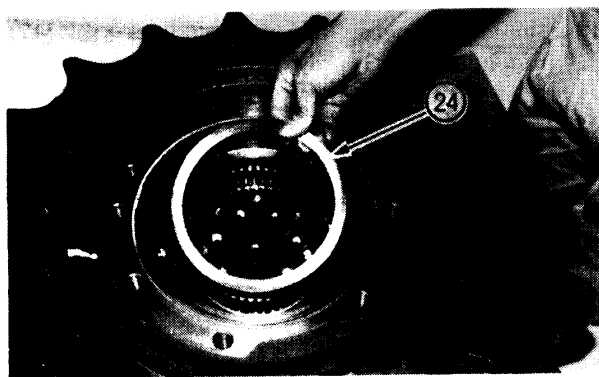
EX200-2

14. Remove plates (25) and friction plates (26) from housing.



W107-03-02-111

15. Remove Spacer (24).

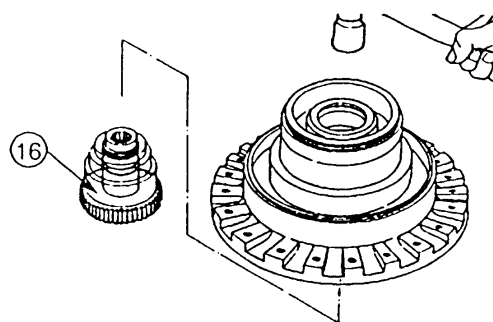


W107-03-02-113

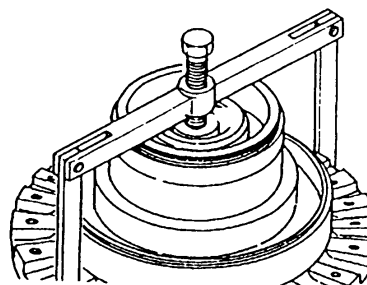
«When the travel gear box is disassembled »

16. Turn housing over, remove drive disk (16) using a plastic hammer.

Note: If the desk is not removed, press drive disk (16) out using puller.



W107-03-02-114



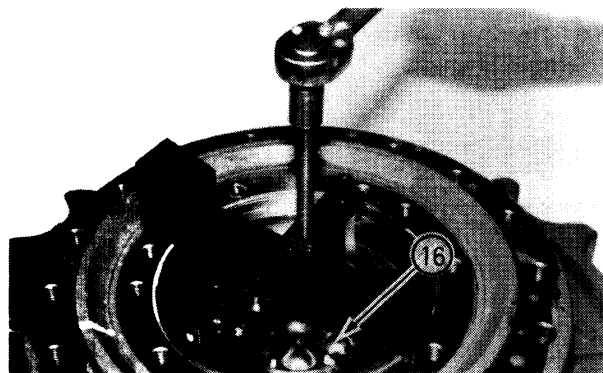
W107-03-02-115

UNDERCARRIAGE / Travel Device

EX200-2

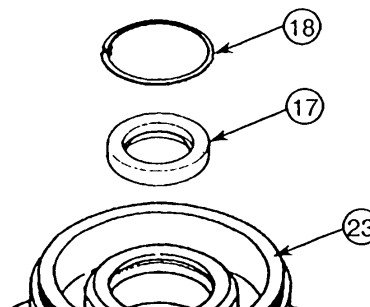
«When the trave gear box is not disassembled»

16. Pull drive disk (16) out using puller.



W107-03-02-217

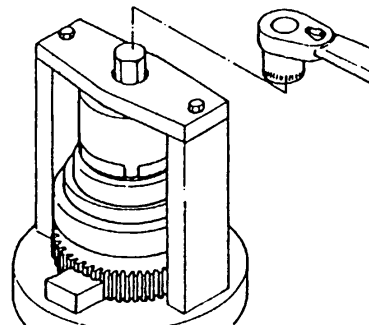
17. Remove retaining ring (18) and oil seal (17) from housing (23).



W107-03-02-117

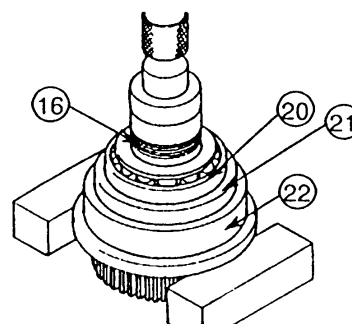
18. Put the drive disk assembly on special tool(ST-5904), and remove bearing nut (19).

Holder assembly: ST-5904
Wrench: ST-3058



W107-03-02-119

19. Remove spacer (21) and bearing (20) from drive disk (16) with a press.

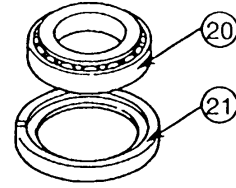


W107-03-02-121

UNDERCARRIAGE / Travel Device

EX200-2

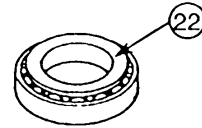
20. Remove the outer race of bearing (20) from spacer (21).



W107-03-02-123

21. Remove inner race of bearing (22) from drive disk with a press.

NOTE: Do not attempt to remove the inner race unless replacement is required.

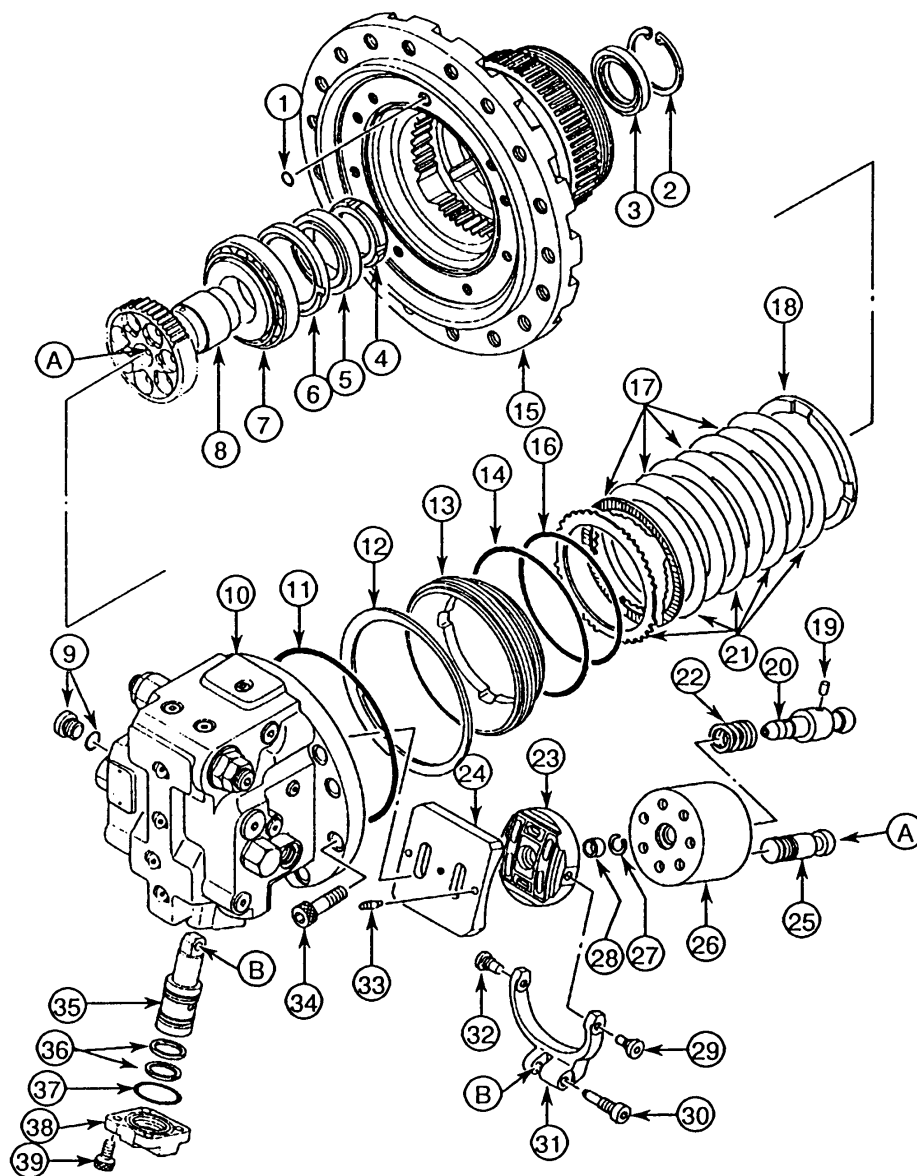


W107-03-02-124

UNDERCARRIAGE / Travel Device

EX200-2

TRAVEL MOTOR DRAWING FOR ASSEMBLY



W107-03-02-125

- | | | | |
|--------------------------|--------------------|--------------------|---------------------------|
| 1— O-ring | 11— O-ring | 21— Plate | 31— Ring |
| 2— Retaining ring | 12— Disk spring | 22— Center spring | 32— Plug |
| 3— Oil seal | 13— Piston | 23— Valve plate | 33— Knock pin |
| 4— Bearing nut | 14— O-ring | 24— Plate | 34— Bolt |
| 5— Bearing | 15— Housing | 25— Piston | 35— Servo piston assembly |
| 6— Spacer | 16— O-ring | 26— Rotor | 36— Piston |
| 7— Bearing | 17— Friction plate | 27— Retaining ring | 37— O-ring |
| 8— Drive disk | 18— Spacer | 28— Busing | 38— Cover |
| 9— Plug with O-ring | 19— Pin | 29— Plug | 39— Bolt |
| 10— Brake valve assembly | 20— Center pin | 30— Reamer bolt | |

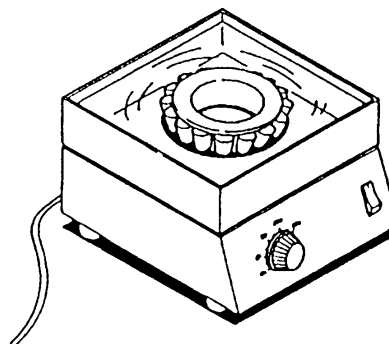
UNDERCARRIAGE / Travel Device

EX200-2

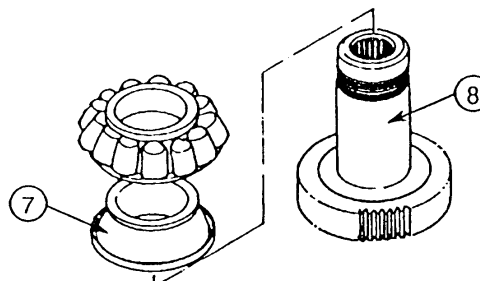
ASSEMBLE TRAVEL MOTOR

1. Heat to bearing inner race (7) to 70 to 90°C (160 to 194°F) and install it onto drive disk (8) with a press.

Installer: ST 2265

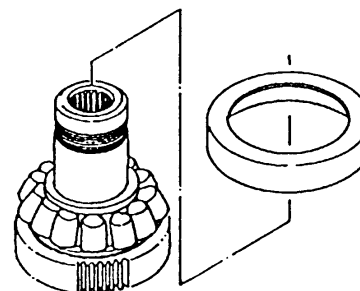


W107-03-02-127



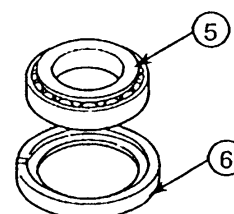
W107-03-02-126

2. Install bearing outer race (7) to the drive disk.



W107-03-02-128

3. Install bearing outer race (5) to spacer (6) using a plastic hammer.



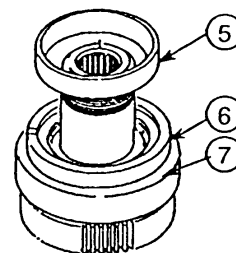
W107-03-02-129

W03-02-38

UNDERCARRIAGE / Travel Device

EX200-2

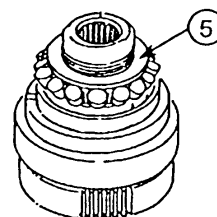
4. Install spacer (6) with bearing outer race (5) onto the drive disk.



W107-03-02-130

5. Heat bearing inner race (5) to 70 to 80°C (160 to 194° F) and install it onto the drive disk. Use bearing instraller and a plastic hammer to seat it correctly.

Instraller: ST 2265

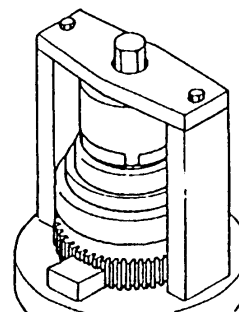


W107-03-02-131

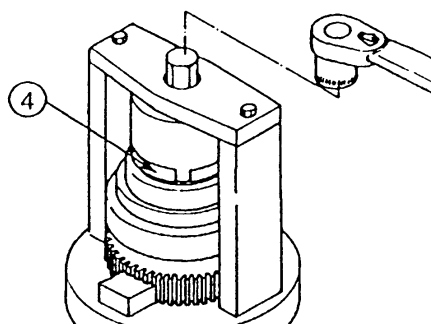
6. Put the drive disk on the holder assembly (ST-5904).

Apply lubricant to bearing nut (4).

Lubricant:Pando-18C



W107-03-02-132



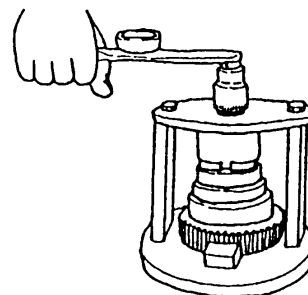
W107-03-02-133

UNDERCARRIAGE / Travel Device

EX200-2

7. Measure shaft drive torque.

Torque: 0.1 ~ 0.2 kgf.m (0.7 ~ 1.4 lbf-ft)



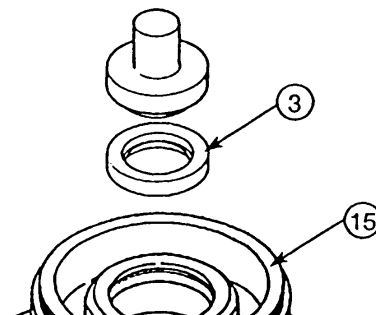
W107-03-02-134

8. Apply liquid packing to the periphery of oil seal (3).

Turn housing (15) over, install oil seal (3) into housing (15) using a press.

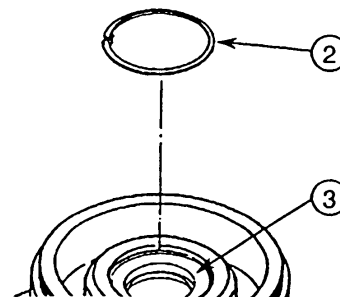
Installer: ST-2567

Liquid packing: Three bond TB 1215



W107-03-02-136

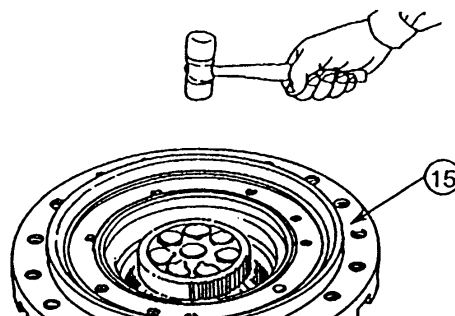
9. Apply grease to inside of oil seal (3) and install retaining ring (2) to the housing.



W107-03-02-137

10. Turn housing (15) over, and install drive disk assembly into the housing using a plastic hammer.

Note: Be sure not to damage the oil seal lip.

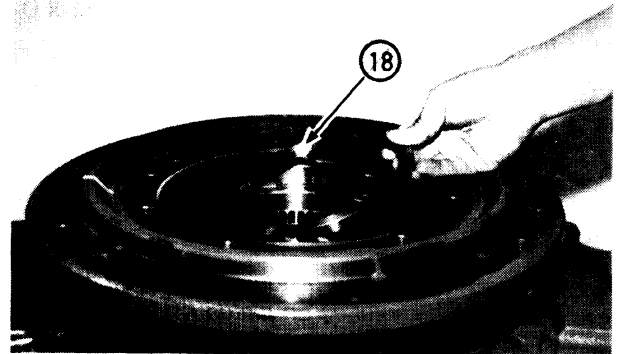


W107-03-02-138

UNDERCARRIAGE / Travel Device

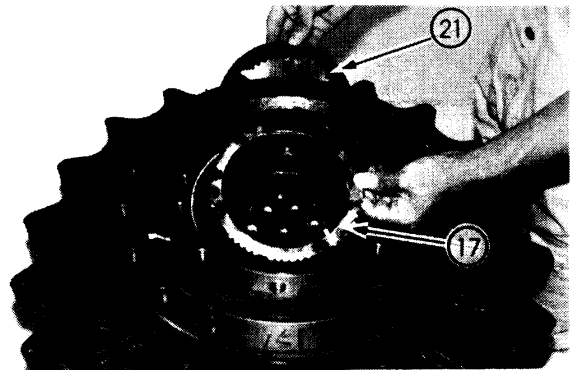
EX200-2

11. Install spacer (18) into housing with flat face of spacer upword, aligning notches of spacer and housing.

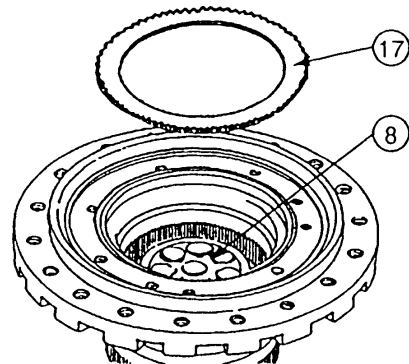


W107-03-02-140

12. Install plates (21) and friction plates (17) into housing with the splines and knotches aligned.



W107-03-02-141



W107-03-02-142

UNDERCARRIAGE / Travel Device

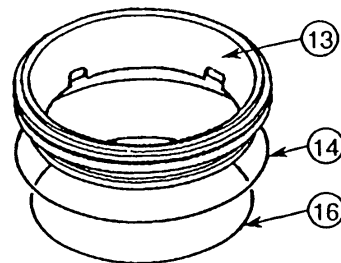
EX200-2

13. .Apply grease to D-rings (14) and (16), Install D-rings on brake piston (13).

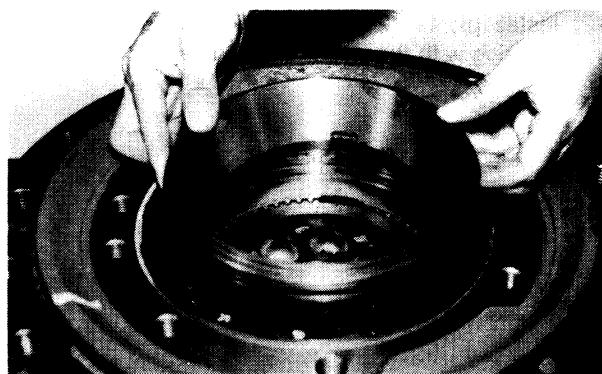
Install brake piston (13) into housing using a plastic hammer or a puller.

Instraller:ST-2547

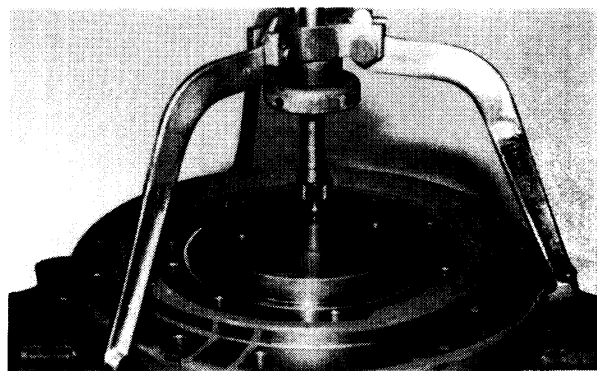
Note: *Knotches on piston end face must meet with knotches on plates (21) to allow hydraulic oil to properly lubricate parking brake.*



W107-03-02-143



W107-03-02-218

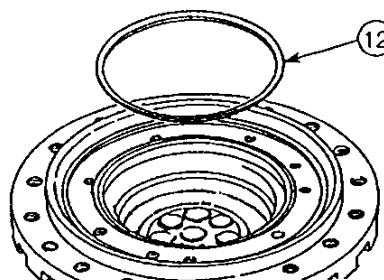


W107-03-02-219

UNDERCARRIAGE / Travel Device

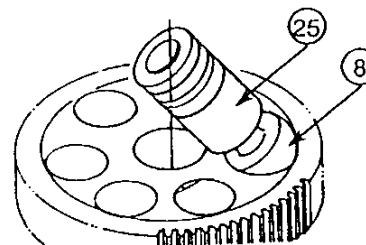
EX200-2

14. Install disk spring (12) into housing with the large diameter side facing upward.



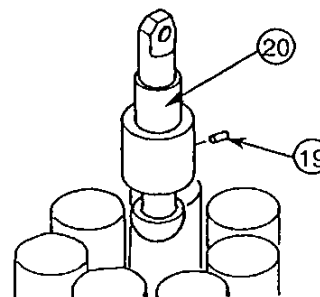
W107-03-02-145

15. Install pistons (25) in drive disc (8).



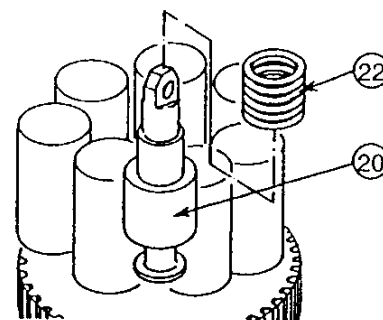
W107-03-02-146

16. Install center shaft (20) to the drive disk.



W107-063-02-147

17. Install center spring (22) on center shaft (20).

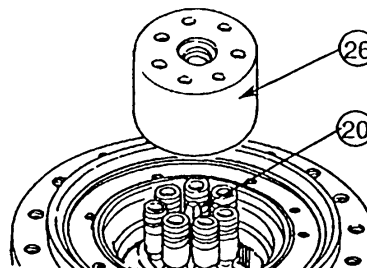


W107-03-02-148

UNDERCARRIAGE / Travel Device

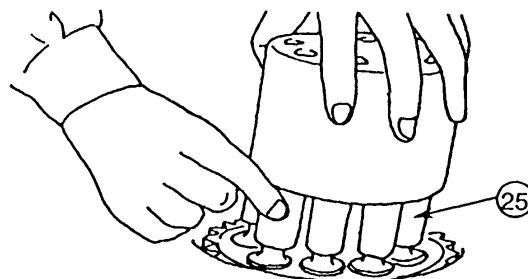
EX200-2

18. Insert center shaft (20) into roter (26) with aligning pin (19) and the groove of roter.



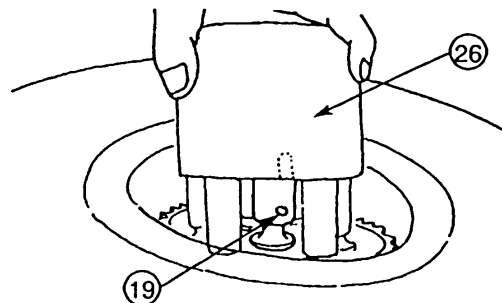
W107-03-02-149

19. Insert pistons (25) into roter. Be sure to align marks made in disassembly before inserting.



W107-03-02-0150

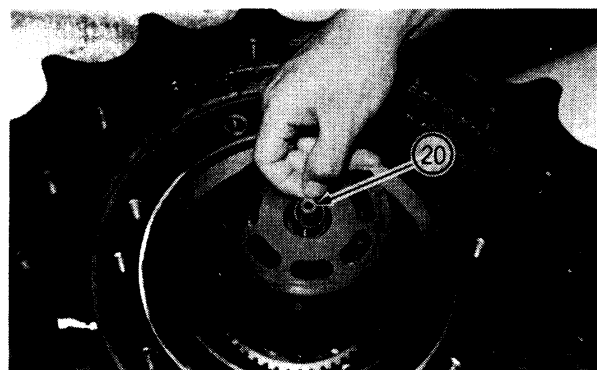
20. Be sure to match the align of pin (19) and the groove of roter again.



W107-03-02-151

21. Install retaining ring (27) on center shaft (20).

~~3015~~



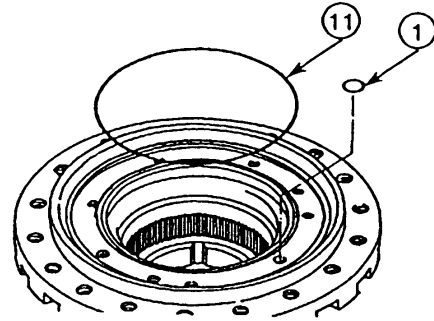
W107-03-02-152

W03-02-44

UNDERCARRIAGE / Travel Device

EX200-2

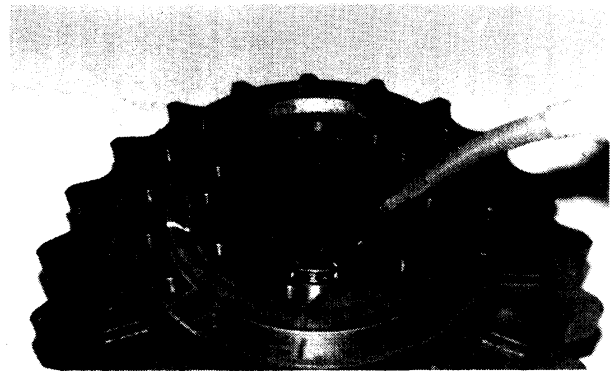
22. Install O-ring (1) and (11) on the housing.



W107-03-02-153

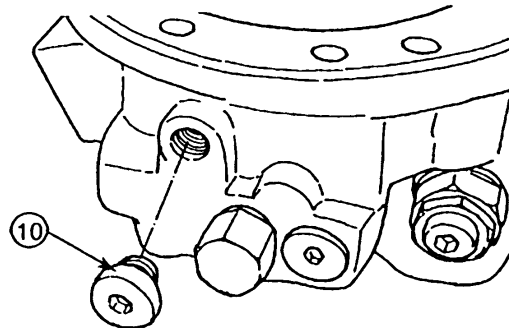
23. Fill housing with hydraulic oil .

Hydraulic oil: 1.2 ℓ (0.32 US gal, 0.26 Imp gal)



W107-03-02-154

24. Remove plug (10) from brake valve.

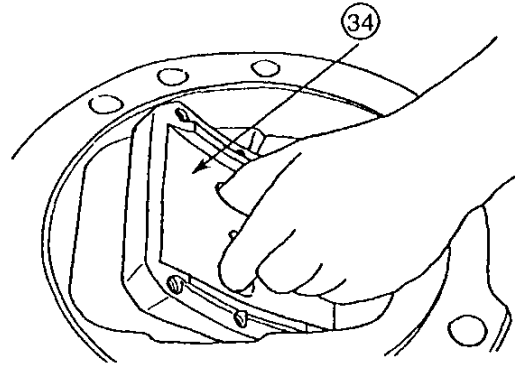


W107-03-02-155

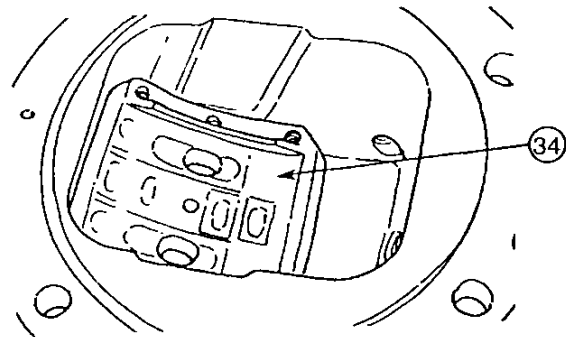
UNDERCARRIAGE / Travel Device

EX200-2

25. Install plate (34) on brake valve (10).



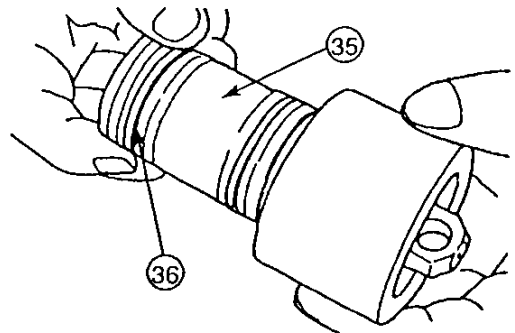
W107-03-02-157



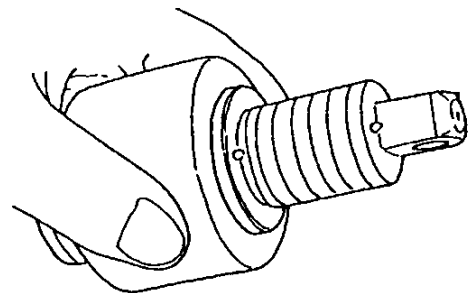
W107-03-02-158

26. Install piston ring (36) on servo piston.
Put servo piston into guide (ST-2570).

Guide: ST 2570



W107-03-02-159

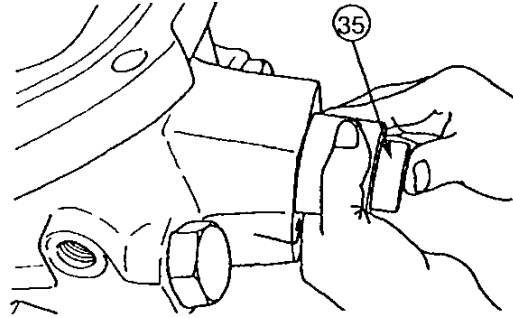


W107-03-02-160

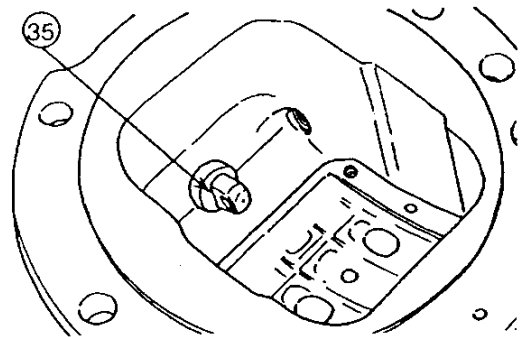
UNDERCARRIAGE / Travel Device

EX200-2

27. Install servo piston (35) into the brake valve with a guide (ST-2570).



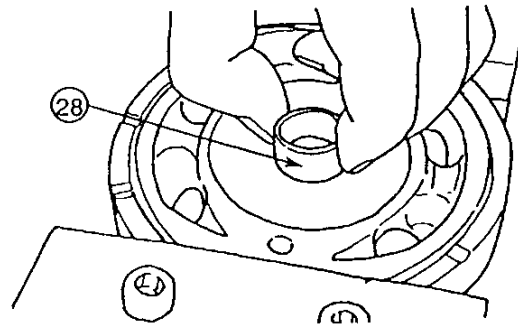
W107-03-02-161



W107-03-02-162

28. Install bushing (28) into valve plate using a puller, if replacement is required.

Puller:ST-2571



W107-03-02-164

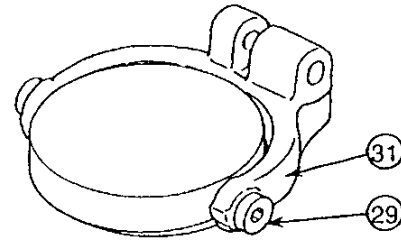
UNDERCARRIAGE / Travel Device

EX200-2

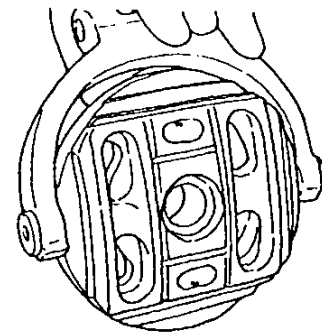
29. Apply Loctite to plug (29), and install valve plate (23) to link (31) with the plug.

Loctite:262

Note: Do not apply Loctite to the point of plug (29).



W107-03-02-166



W107-03-02-167

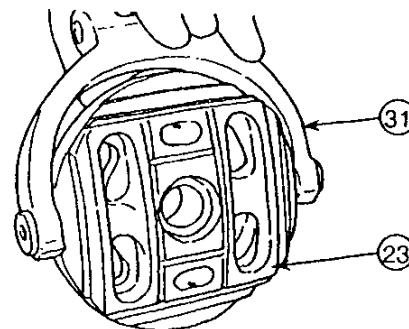
W03-02-48

UNDERCARRIAGE / Travel Device

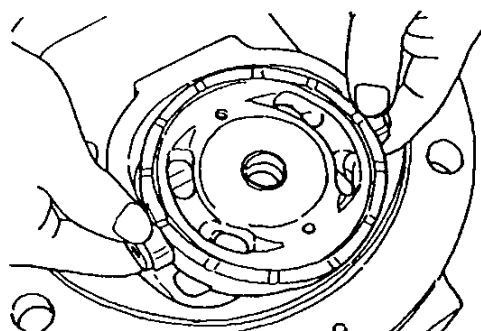
EX200-2

30. Install valve plate (23) and link (31) to plate (24) in the brake valve.

Align the groove of link (31) with servo piston (35).



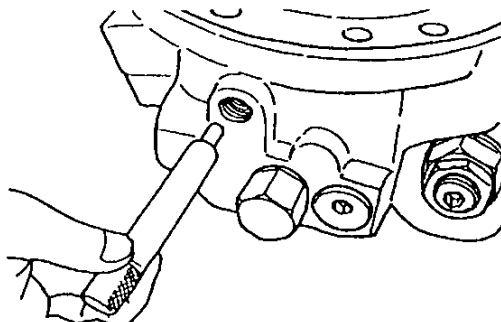
W107-03-02-170



W107-03-02-171

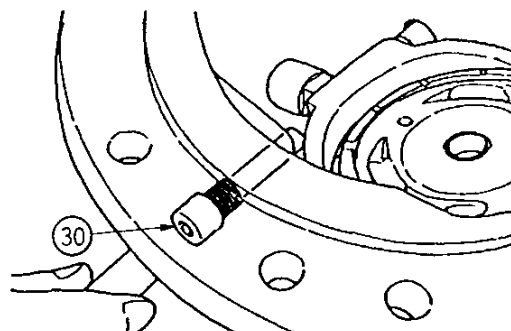
31. Put guid pin into the PF 1/2 hole as shown in fig., and align the holes of link (31) and servo piston (23).

Guid Pin: ST-7131



W107-03-02-172

32. Install reamer bolt (30) into PF 1/2 hole on the opposite side.

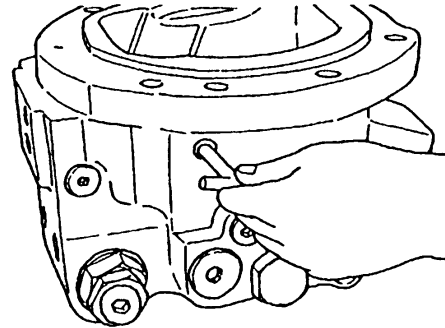


W107-03-02-174

UNDERCARRIAGE / Travel Device

EX200-2

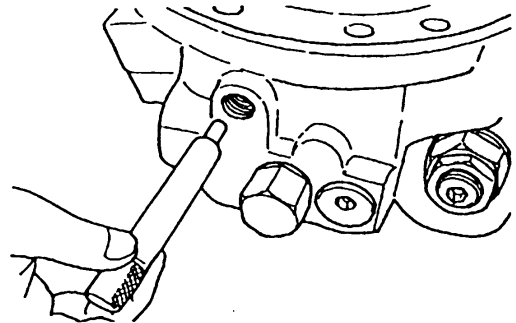
33. Tighten reamer bolt (30), and connect link (31) with servo piston (35).



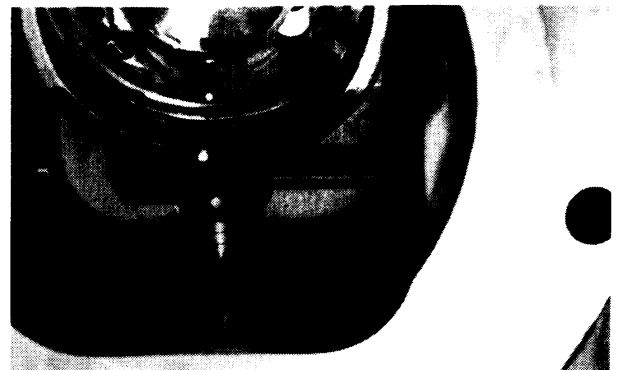
W107-03-02-175

34. Install guid pin into PF 1/8 hole on the side of brake valve.

Guid Pin:ST-7085



W107-03-02-177



W107-03-02-176

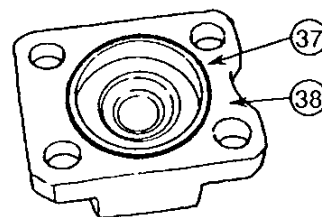
UNDERCARRIAGE / Travel Device

EX200-2

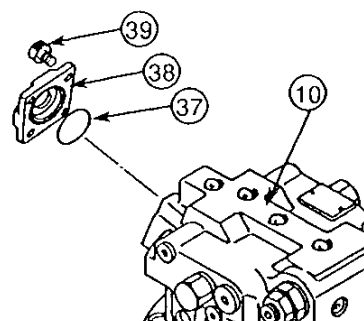
35. Install O-ring (37) to cover (38).
Install the cover to brake valve (10) with bolts(39).

 : 12 mm

 : 88 N.m (9kgf.m, 65lbf.ft)



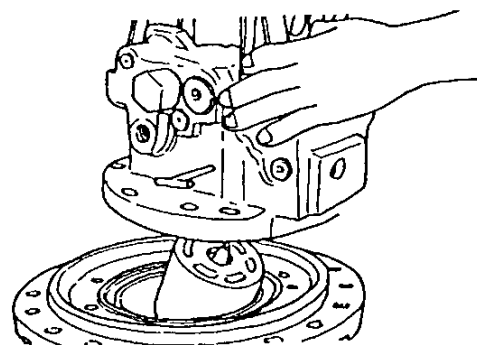
W107-03-02-180



W107-03-02-181

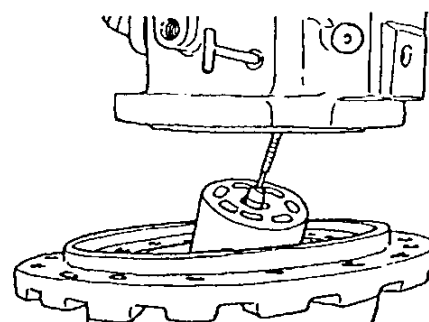
36. Install guide pin to the point of center shaft.

Guid Pin: ST-7085



W107-03-02-182

Install brake valve to the housing.



W107-03-02-183

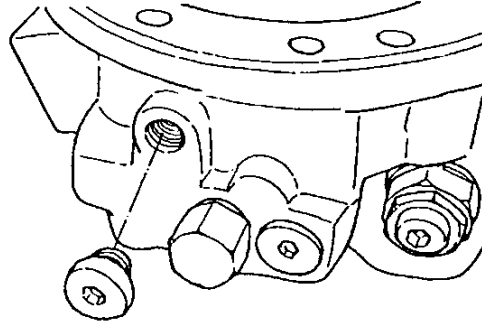
UNDERCARRIAGE / Travel Device

EX200-2

37. Install drain plug (10).

 : 9kgf.m

 : 14.7N.m (1.5kgf.m, 11lb.ft)

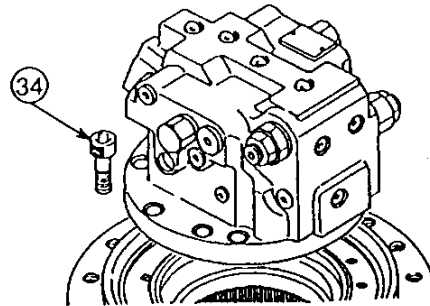


W107-03-02-185

38. Tighten eight socket bolts (34).

 : 12mm

 : 216N.m (22kgf.m, 159lb.ft)

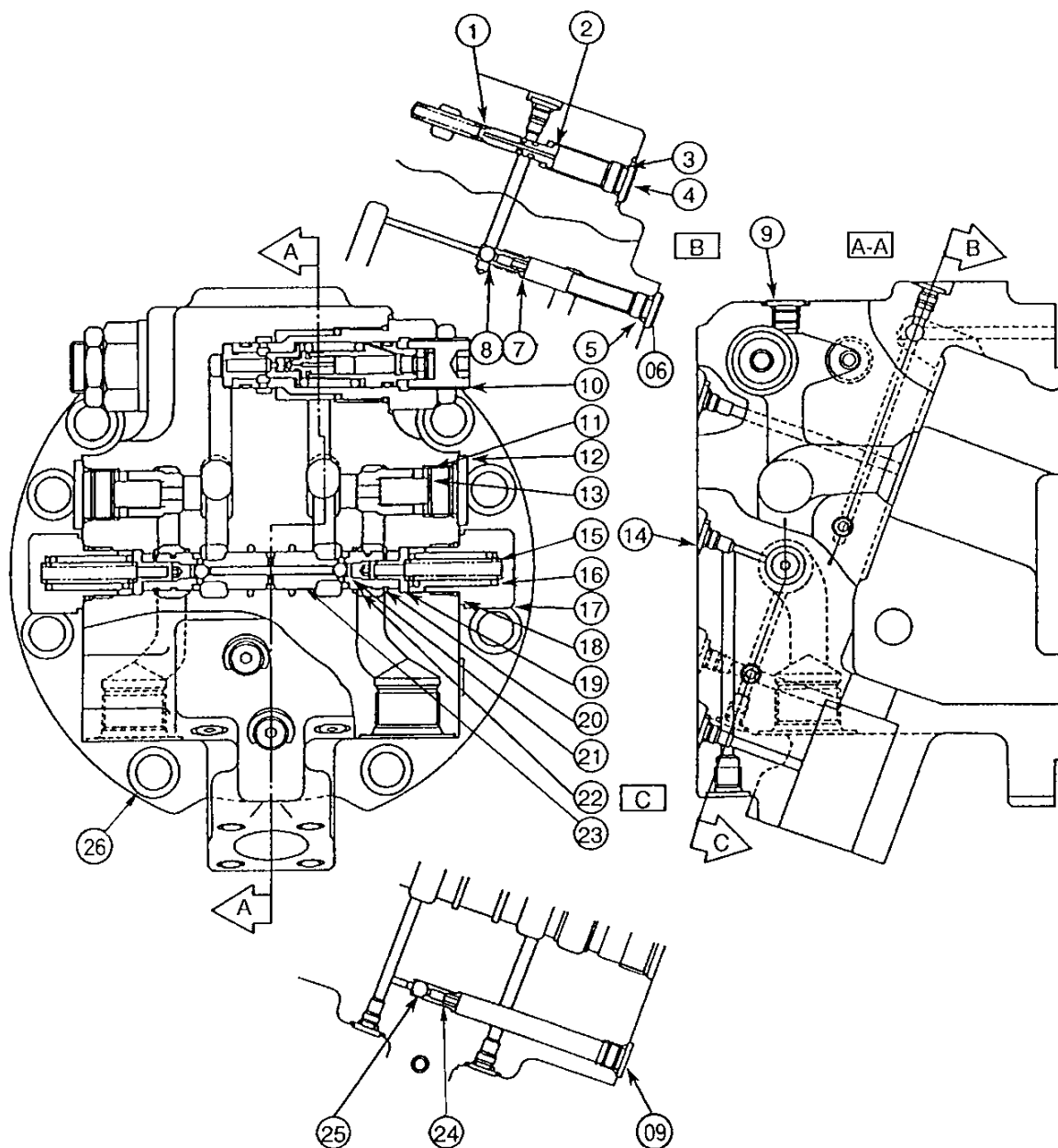


W107-03-02-184

UNDERCARRIAGE / Travel Device

EX200-2

BRAKE VALVE DRAWING FOR DIASASSEMBLY



W107-03-02-186

- | | | |
|-----------|---------------------------|-------------|
| 1- Spring | 10- Overload relief valve | 19- Stopper |
| 2- Spool | 11- Poppet | 20- Plug |
| 3- O-ring | 12- Plug | 21- Ball |
| 4- Plug | 13- Spring | 22- Spool |
| 5- O-ring | 14- Plug | 23- Spool |
| 6- Plug | 15- Spring | 24- Seal |
| 7- Seat | 16- Spring | 25- Ball |
| 8- Ball | 17- Plug | 26- Casing |
| 9- Plug | 18- O-ring | |

W03-02-54

UNDERCARRIAGE / Travel Device

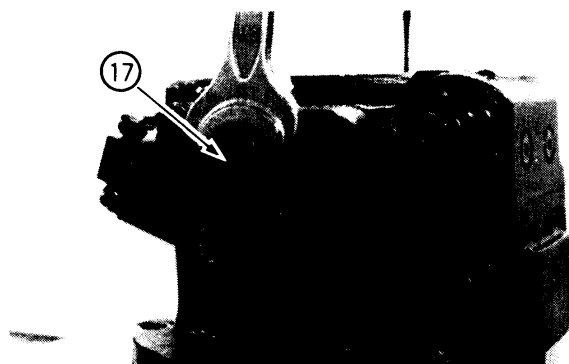
EX200-2

DISASSEMBLE BRAKE VALVE

«Disassemble counter balance valve»

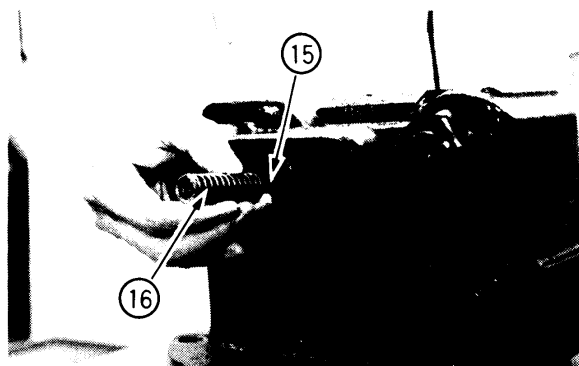
1. Remove plug (17) from the brake valve.

: 36 mm



W107-03-02-187

2. Remove springs (15) (16) and stopper (19) from the brake valve.



W107-03-02-188

3. Remove spool assembly (23) from the brake valve.



W107-03-02-189

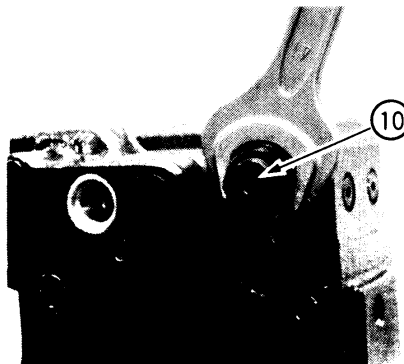
UNDERCARRIAGE / Travel Device

EX200-2

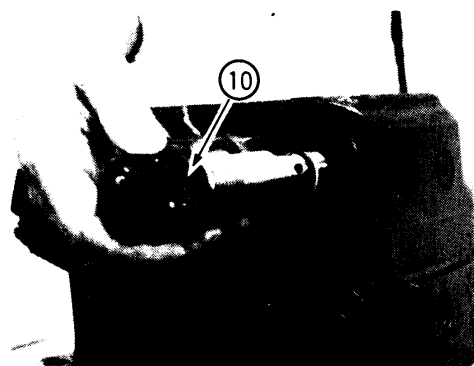
«Disassemble Overload Relief Valve»

4. Remove overload relief (10) valve as an assembly from the brake valve.

 : 41 mm



W107-03-02-190

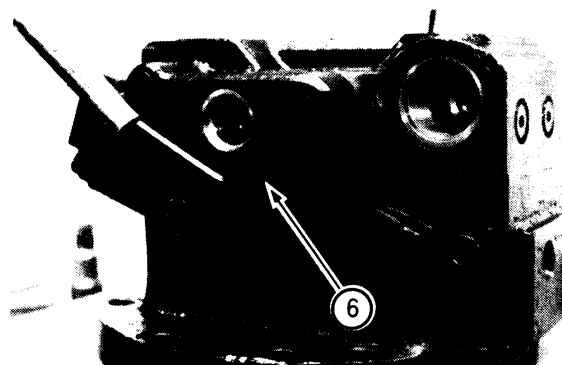


W107-03-02-191

«Disassemble Brake Releasing shuttle valve»

5. Remove plug (6) from the brake valve.

 : 6 mm



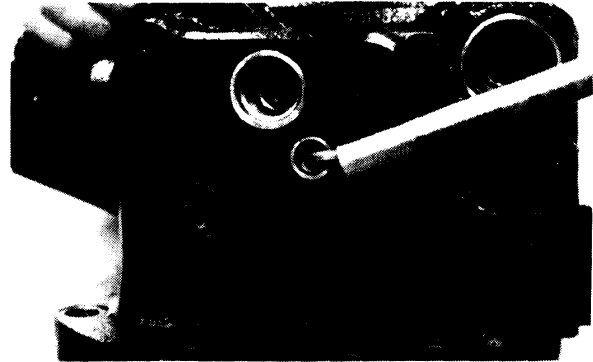
W107-03-02-192

UNDERCARRIAGE / Travel Device

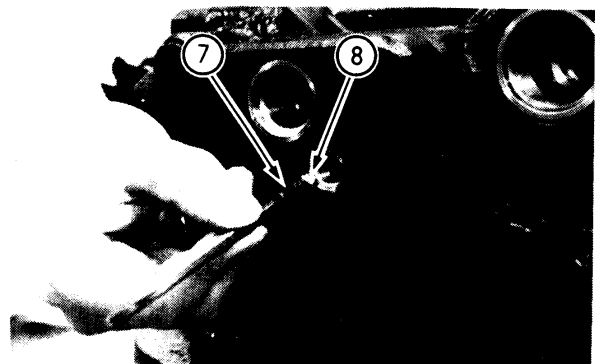
EX200-2

6. Remove seat (7) from the vrake valve.
Tilt brake valve and remove ball (8).

 : 5 mm



W107-03-02-193

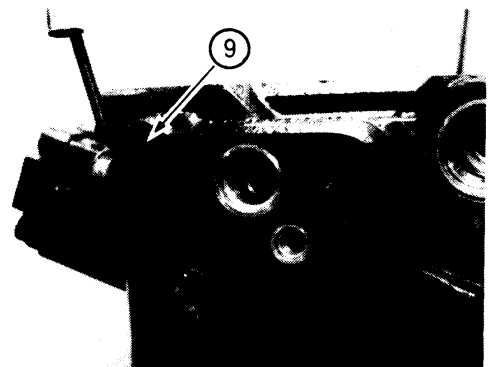


W107-03-02-194

«Disassemble servo piston shuttle valve»

7. Remove plug (9) from the brake valve.

 : 6 mm



W107-03-02-195

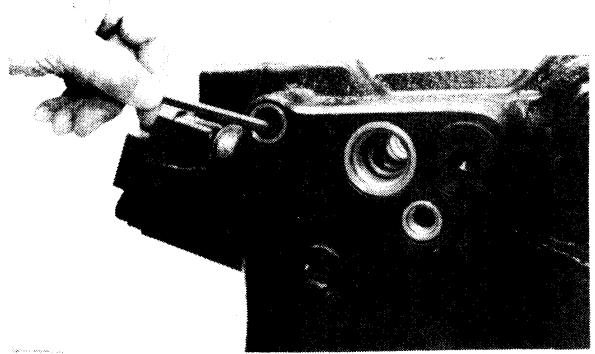
UNDERCARRIAGE / Travel Device

EX200-2

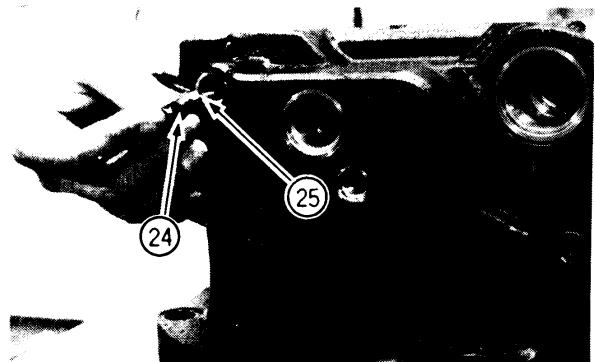
8. Remove seat (24) from the brake valve.

Tilt brake valve and remove ball (25)

 : 5 mm



W107-03-02-196

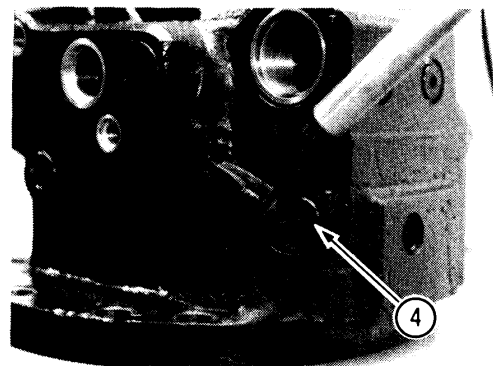


W107-03-02-197

«Disassemble reducing valve»

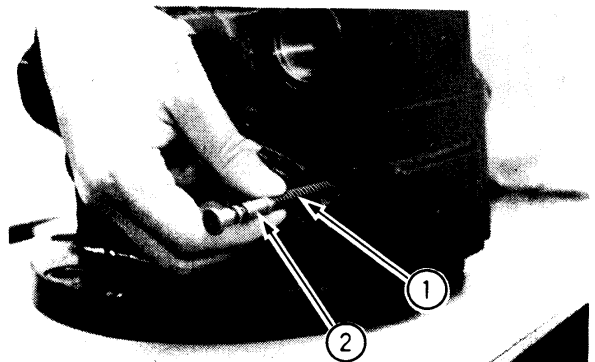
9. Remove plug (4) from the brake valve.

 : 8 mm



W107-03-02-1981

10. Remove spool (2) and spring (1) from the brake valve



W107-03-02-199

W03-02-58

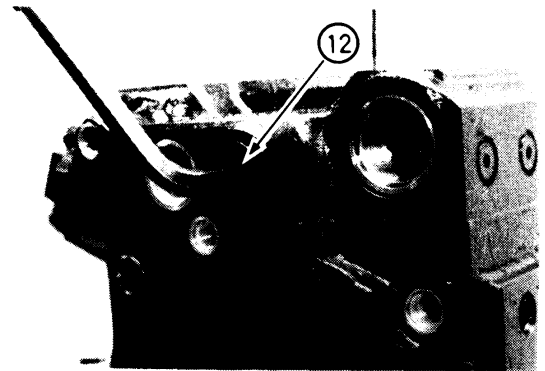
UNDERCARRIAGE / Travel Device

EX200-2

«Disassemble check valve»

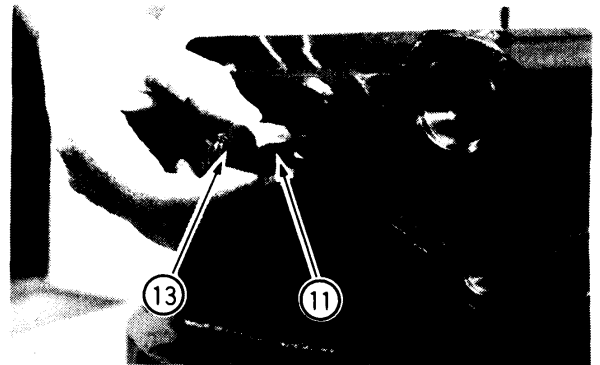
11. Remove plug (12) from the brake valve.

 : 12 mm



W107-03-02-200

12. Remove spring (13) and poppet (11) from the brake valve.

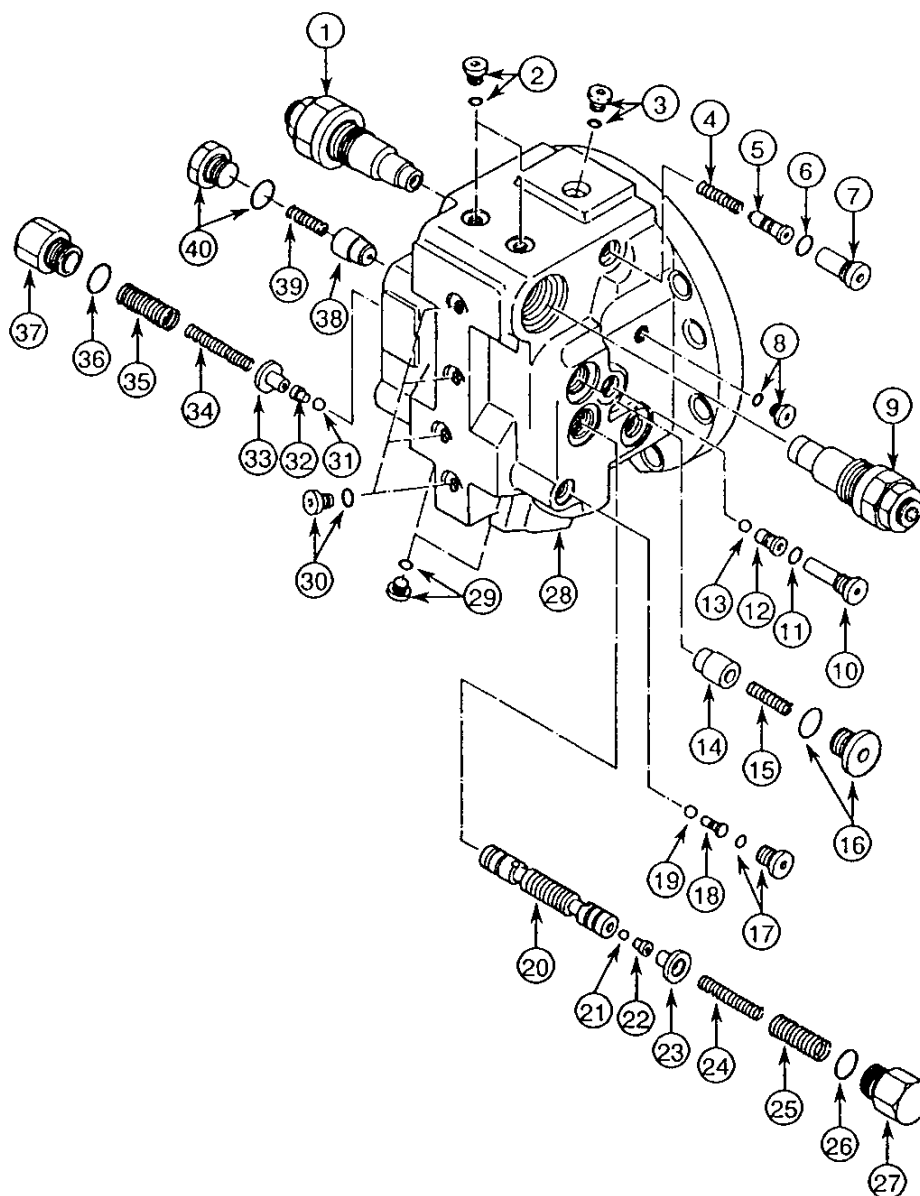


W107-03-02-201

UNDERCARRIAGE / Travel Device

EX200-2

BRAKE VALVE DRAWING FOR ASSEMBLY



- 1— Overload relief valve
- 2— Plug, O-ring
- 3— Plug, O-ring
- 4— Spring
- 5— Spool
- 6— O-ring
- 7— Plug
- 8— Plug, O-ring
- 9— Overload relief valve
- 10— Plug
- 11— O-ring
- 12— Seat
- 13— Ball
- 14— Poppet

- 15— Spring
- 16— Plug, O-ring
- 17— Plug, O-ring
- 18— Seal
- 19— Ball
- 20— Spool assembly
- 21— Ball
- 22— Plug
- 23— Stopper
- 24— Spring
- 25— Spring
- 26— O-ring
- 27— Plug
- 28— Casing

- 29— Plug, O-ring
- 30— Plug, O-ring
- 31— Ball
- 32— Plug
- 33— Stopper
- 34— Spring
- 35— Spring
- 36— O-ring
- 37— Plug
- 38— Poppet
- 39— Spring
- 40— Plug, O-ring

W107-03-02-186

W03-02-60

UNDERCARRIAGE / Travel Device

EX200-2

ASSEMBLE BRAKE VALVE

As a general rule, assembly of brake value is performed in the reverse order.

Install Overload Relief Valve

1. Install overload relief valve assembly (1) into brake valve housing and tighten to specification. Be sure to apply grease to O-ring and backup ring on the valve before installing.

 : 41 mm

 : 540 N.m (55 kgf.m, 398 lbf.ft)



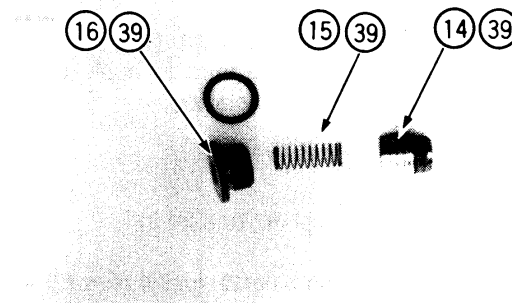
W107-03-02-203

«Assemble Check Valve»

2. Install spring (15) into poppet (14) .
Install O-ring on plug (16).
Install poppet (14) and plug (16) into the brake valve housing and tighten the plug to specification.

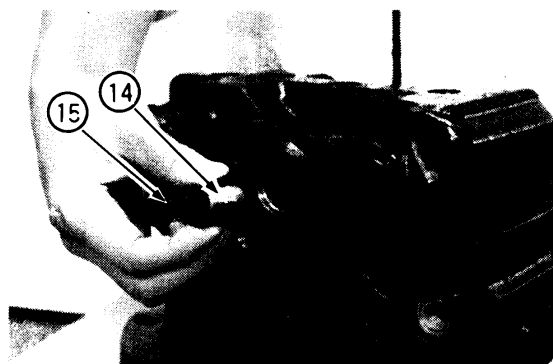
 : 12 mm

 : 177 N.m (9.5 kgf.m, 69 lbf.ft)



W107-03-02-204

Repeat this step on the other side of the brake valve.



W107-03-02-205

UNDERCARRIAGE / Travel Device

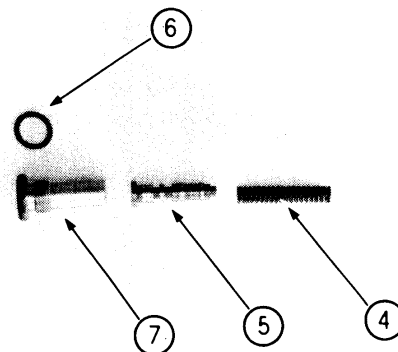
EX200-2

«Assemble Reducing Valve»

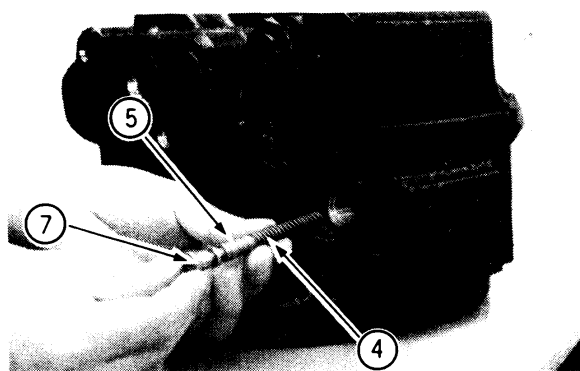
3. Install spring (4) and spool (5) into the brake valve housing.
Install O-ring(6) on plug(7).
Install plug(7) into the brake valve housing and tighten to specification.

 : 8 mm

 : 69 N.m (7.0 kgf·m, 50.6 lbf.ft)



W107-03-02-206



W107-03-02-207

«Assemble Servo Piston Shuttle Valve»

4. Install ball (13) and plug seat (12) into the brake valve housing . Be sure to apply Loctite to plug seat (12) before installing.

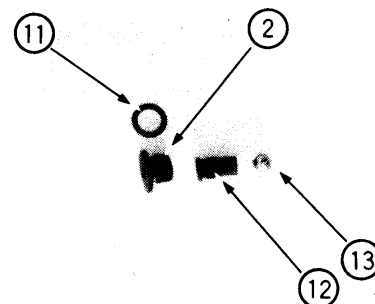
 : 5 mm

 : 15 N.m (1.5 kgf·m, 10.8 lbf.ft)

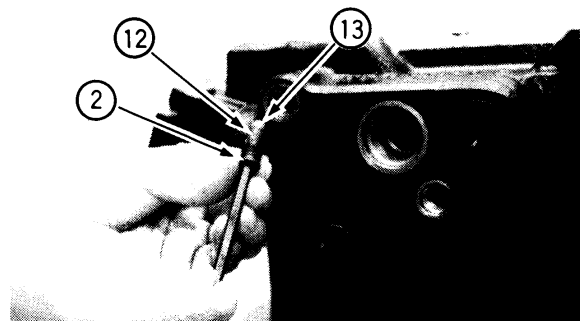
Install O-ring (11) on plug(2). Install plug (2) into the brake valve housing and tighten to specification.

 : 6 mm

 : 19.6 N.m (2.0 kgf·m, 14.5 lbf.ft)



W107-03-02-208



W107-03-02-209

W03-02-62

UNDERCARRIAGE / Travel Device

EX200-2

«Assemble Brake Releasing Shuffle Valve»

5. Install ball (13) and plug seat (12) into the brake valve housing.
Be sure to apply Loctite to plug seat (12) before installing.

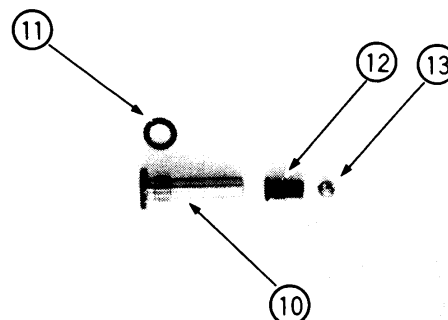
 : 5 mm

 : 15 N.m (1.5 Kgf-m, 10.8 lbf.ft)

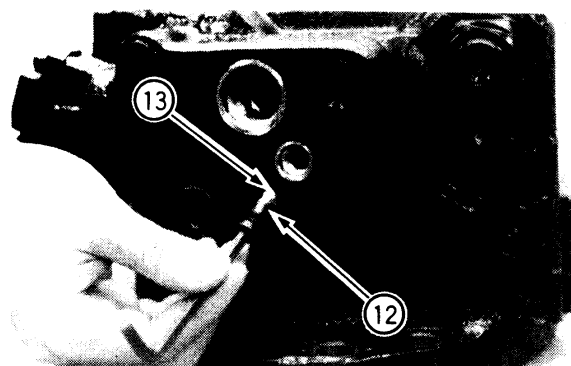
Install O-ring (11) on plug (10).
Install plug (10) into the brake valve housing and tighten to specification.

 : 6 mm

 : 19.6 N.m(2.0 kgf-m, 14.5 lbf.ft)



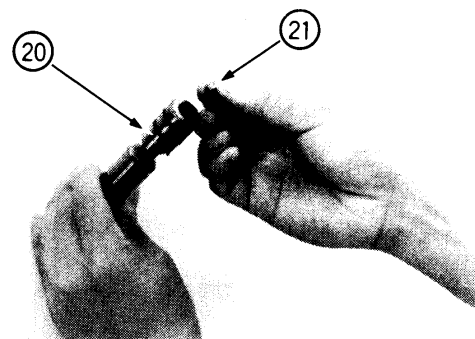
W107-03-02-210



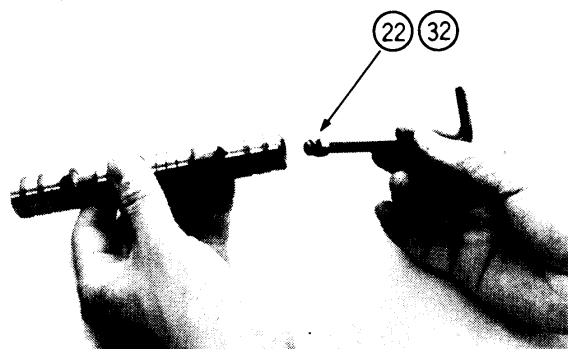
W107-03-02-211

«Assemble Counterbalance Valve»

6. Install O-ring on plug (22).
Install ball (21) and plug (22) into spool (20).



W107-03-02-212

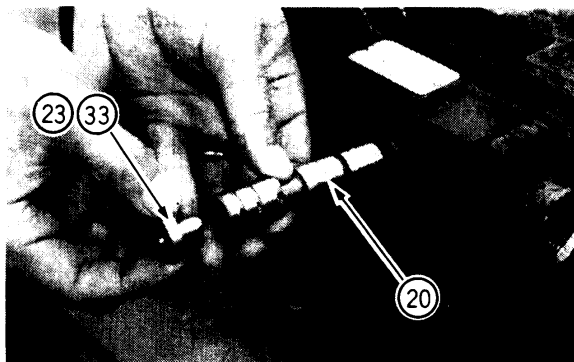


W107-03-02-2131

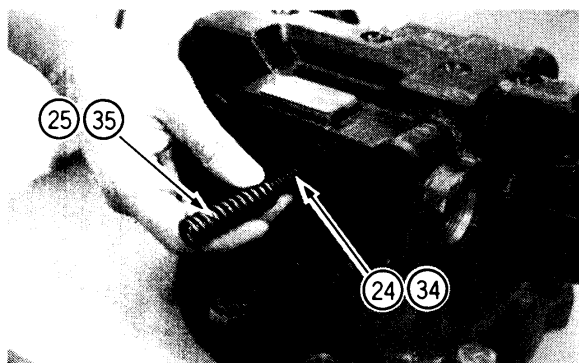
UNDERCARRIAGE / Travel Device

EX200-2

7. Insert spool (20) into brake valve housing.
Install stopper (23) and springs (24) (25) into the brake valve housing.



W107-03-02-214



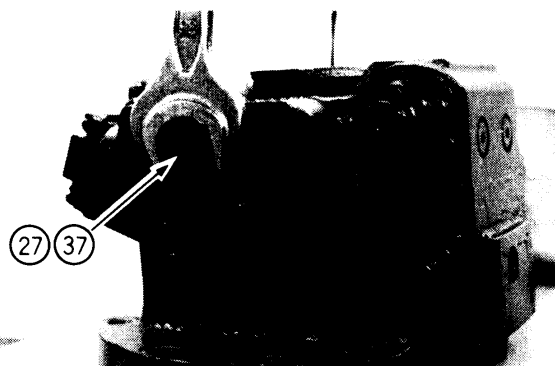
W107-03-02-215

Install O-ring (26) on plug(29).
Install plug (27) into the brake valve housing
and tighten to specification.

 : 36mm

 : 216N.m(22kgf-m, 159 lbf.ft)

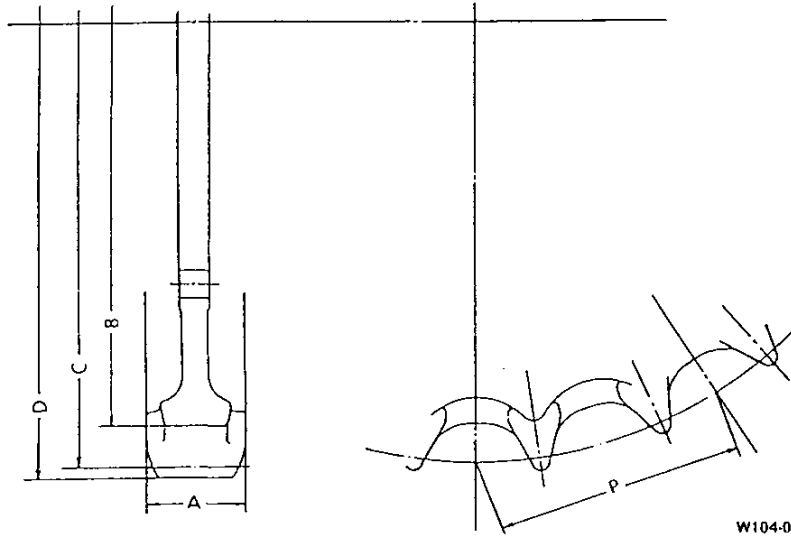
Repeat this step on the other side of the brake
valve.



W107-03-02-216

UNDERCARRIAGE / Travel Device

EX200-2

MAINTENANCE STANDARD**« Sprocket »**

W104-03-02-204

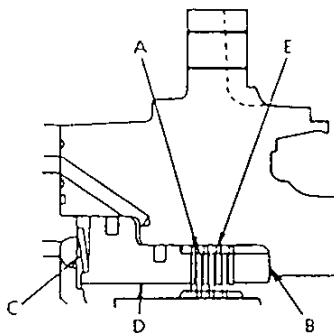
Unit : mm

	ND	LU	Remedy
A	74.0	64	Buildup and finishing
B	579.6	570	
PCD	PCD 644.6	-	
D	658.4	5648	
P	190.0	-	

ND : Nominal dimension
 LU : Limit of Use
 PCD : Pitch circle Diameter

UNDERCARRIAGE / Travel Device

EX200-2

«Parking Brake»

ND :Nominal Dimension

LU :Limit of Use

T107-0302-205

Unit: mm

	Parts Name	ND (Thickness)	LU (Thickness)	Remedy
A	Friction Plate	3.3	3.25	Replace
B	Spacer	8.5	-	Replace
C	Disk Spring	6.2	6.10	Replace
D	Piston	*41.5	-	Replace
E	Plate	1.8	1.75	Replace
Remark		The spacer and piston do not wear down. The new friction plate is made on the thick side of + 0.1 mm.		

NOTE: * The piston thickness describes the height from touching point spring (C) to touching point plate (E).

UNDER CARRIAGE / Center Joint

EX200-2

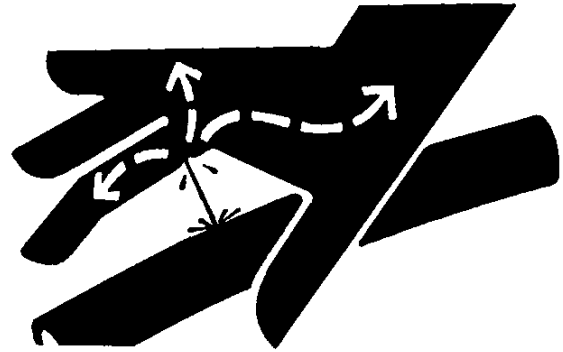
REMOVE AND INSTALL CENTER JOINT

1. Release air from the hydraulic oil tank by pushing down the button on the air breather cap.
2. Disconnect pipes (1), (2), and (4) to (7). Remove the adapters. Loosen bolts (3) and remove the lock plate.

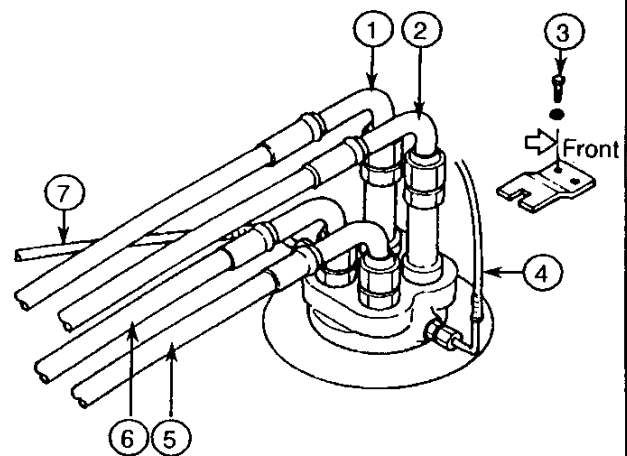
CAUTION: Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



SA-031



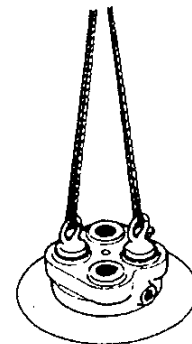
Upperstructure side

W105-03-03-001

3. Install a lifting tools to center joint and fold it. Lift center joint.

CAUTION: Weight of center joint : 26.5 kg (58.5 lb)

Lifting Sling: ST0014



W105-03-03-002

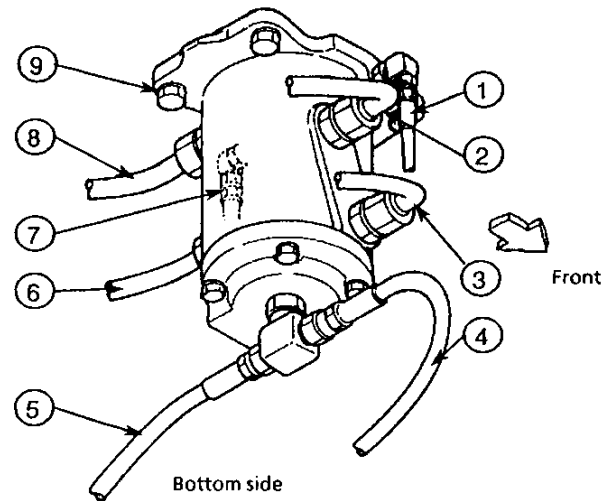
W03-03-01

UNDER CARRIAGE / Center Joint

EX200-2

4. Remove pipes (1) to (8).
Remove bolts (9).

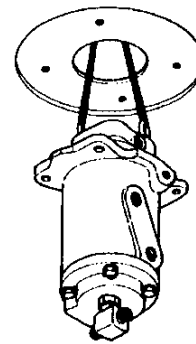
 : 19, 22, 27 mm



W105-03-03-003

5. Lower the crane to remove the center joint.

NOTE: When remove the center joint take care not to damage to rubber.



W105-03-03-004

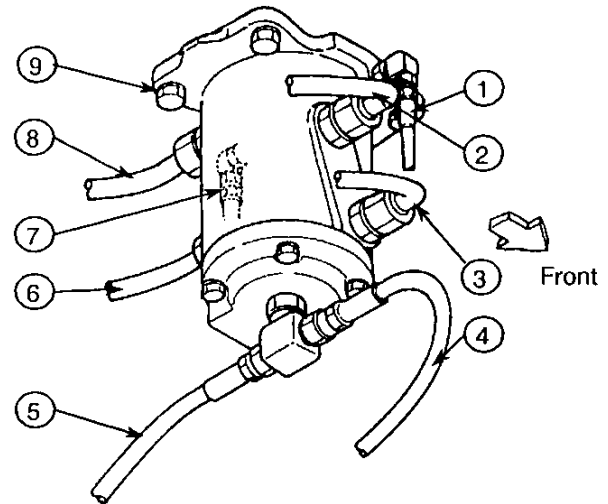
W03-03-02

UNDER CARRIAGE / Center Joint

EX200-2

« Center Joint Installation »

6. Using eyebolt to center joint and lift it, then install bolt (9). Install adapters and pipes (1) to (8).



W105-03-03-005

Pilot hose motor side

Tightening torque 5 kgf-m

Travel right reverse side when high pressure

Tightening torque 18 kgf-m

Travel right forward side when high pressure

Tightening torque 18 kgf-m

Traveling drain pipe left

Tightening torque 9.5 kgf-m

Traveling drain pipe right

Tightening torque 9.5 kgf-m

Travel left forward side when high pressure

Tightening torque 18 kgf-m

Pilot hose motor side

Tightening torque 5 kgf-m

Center joint bolts

Tightening torque 5 kgf-m

Travel left reverse side when high pressure

Tightening torque 18 kgf-m

1 – Pilot hose

To driving motor high-low switch port

2 – Travel right reverse side when high pressure

To the right driving motor

3 – Travel right forward side when high pressure

To the right driving motor

4 – Travel drain pipe right

To driving motor drain port

5 – Travel drain pipe left

To driving motor drain port

6 – Travel left forward side when high pressure

To driving motor left

7 – Pilot hose motor side

To travel motor high-low switch port

8 – Travel left reverse side when high pressure

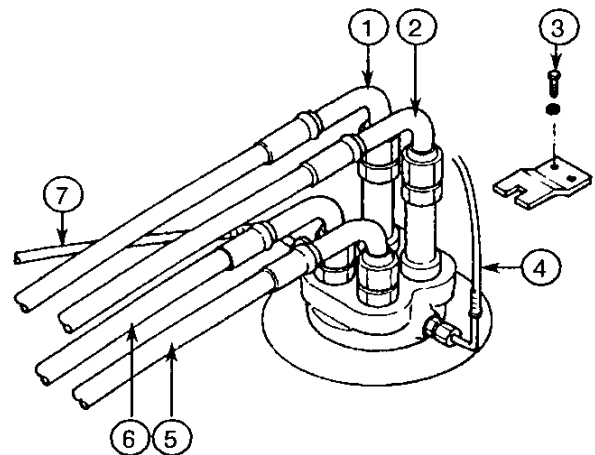
To travel motor left

9 – Center joint bolts

UNDER CARRIAGE / Center Joint

EX200-2

7. Remove eyebolt and secure the lock plate with bolts. Install adapters and hoses (1) to (7).



W105-03-03-006

Left forward control valve side when high pressure

Tightening torque 18 kgf-m

Right forward control valve side when high pressure

Tightening torque 18 kgf-m

Lock bolt

Tightening torque 6.5 kgf-m

Pilot hose control valve side

Tightening torque 7 kgf-m

Right reverse side when high pressure

Tightening torque 18 kgf-m

Left reverse control valve side when high pressure

Tightening torque 18 kgf-m

Drain hose reservoir side

Tightening torque 5 kgf-m

1 - Left forward when high pressure
To control valve

2 - Right forward when high pressure
To control valve

3 - Lock bolt

4 - Pilot hose
To control valve

5 - Right reverse when high pressure
To control valve

6 - Left reverse when high pressure
To control valve

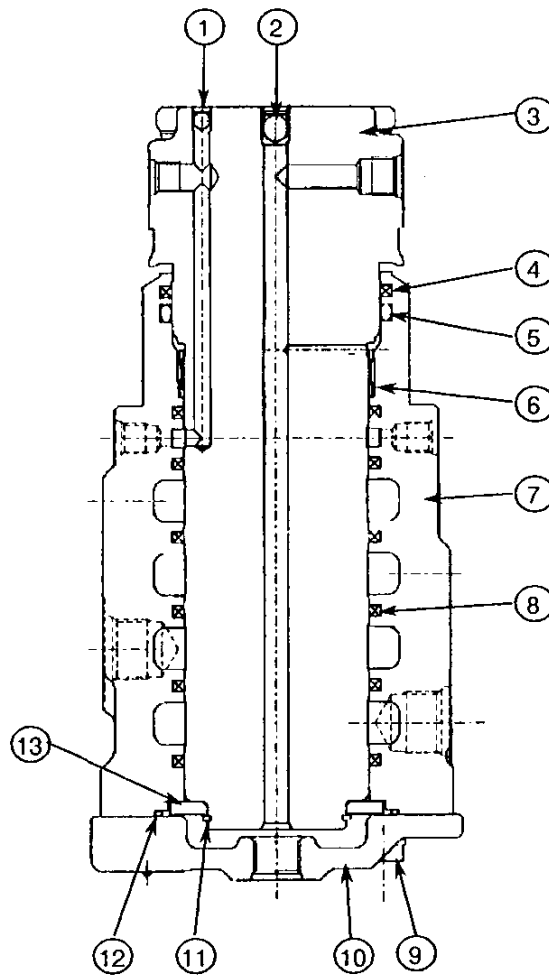
7 - Drain hose
To reservoir

W03-03-04

UNDER CARRIAGE / Center Joint

EX200-2

Drawing for disassembly



W105-03-03-007

1- Plug
2- Plug
3- Spindle
4- Seal Dust

5- O-ring
6- Bushing
7- Body
8- Oil Seal

9- Bolt
10- Cover
11- Retaining Ring
12- O-ring

13- Ring

W03-03-05

UNDER CARRIAGE / Center Joint

EX200-2

DISASSEMBLY

Before the disassembly, clean the center joint.

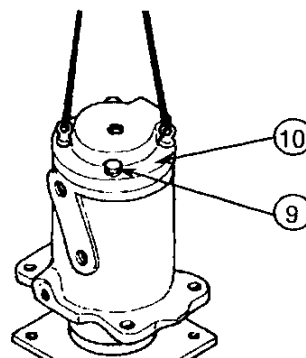
Note: thoroughly clean ports with plug.

1. Secure the center joint to workbench using two eyebolts as illustrated.

Workbench: ST5049

Eyebolt: M 10 mm

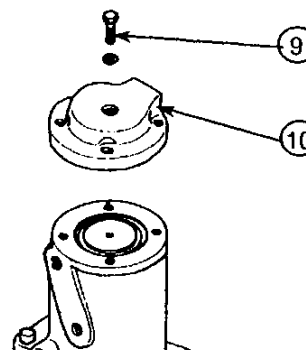
Lifting sling: ST0001



W105-03-03-008

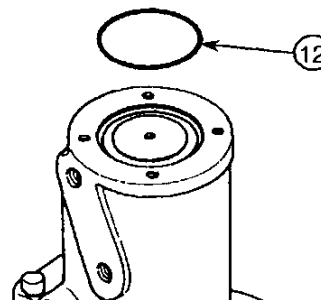
2. Remove the bolts to remove cover (10).

 : 17 mm



W105-03-03-009

3. Remove O-ring (12).



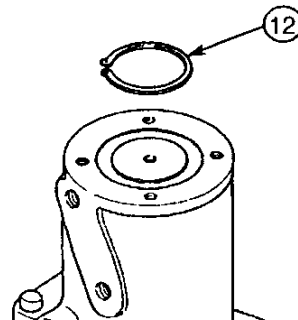
W105-03-03-010

W03-03-06

UNDER CARRIAGE / Center Joint

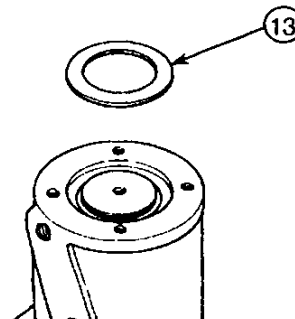
EX200-2

4. Remove retaining ring (12).



W105-03-03-011

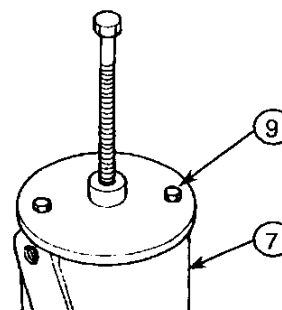
5. Remove the ring (13).



W105-03-03-012

6. Attach the center joint removing tool to body (7) with cover mounting bolts (9).

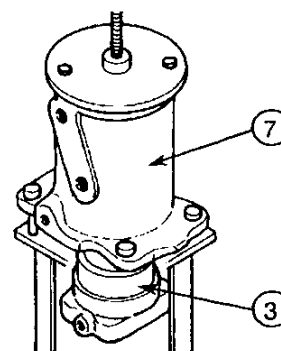
 : 17 mm
: ST1930



W105-03-03-013

7. Remove body (7) from spindle (3).

NOTE: Take care not to damage the spindle when remove body or rest it sideways.
Put a fitting mark on body (7) and spindle (3).

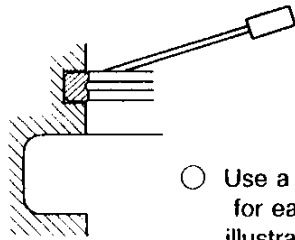


W105-03-03-014

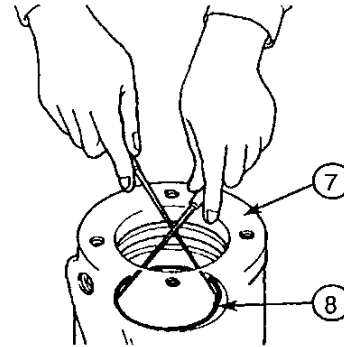
UNDER CARRIAGE / Center Joint

EX200-2

8. Remove six seals (8) from body (7).

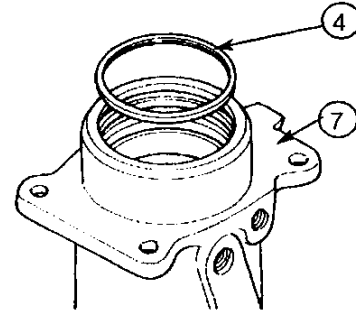


- Use a pick to pry out oil seals (8) , for easy removal, use two picks as illustrated.
- Take care not to damage the seal with pick.



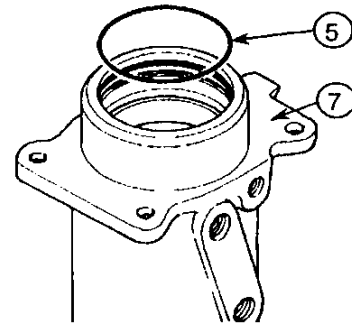
W105-03-03-015

9. Remove dust seal (4) from body (7).



W105-03-03-016

10. Remove O-ring (5) from body (7).

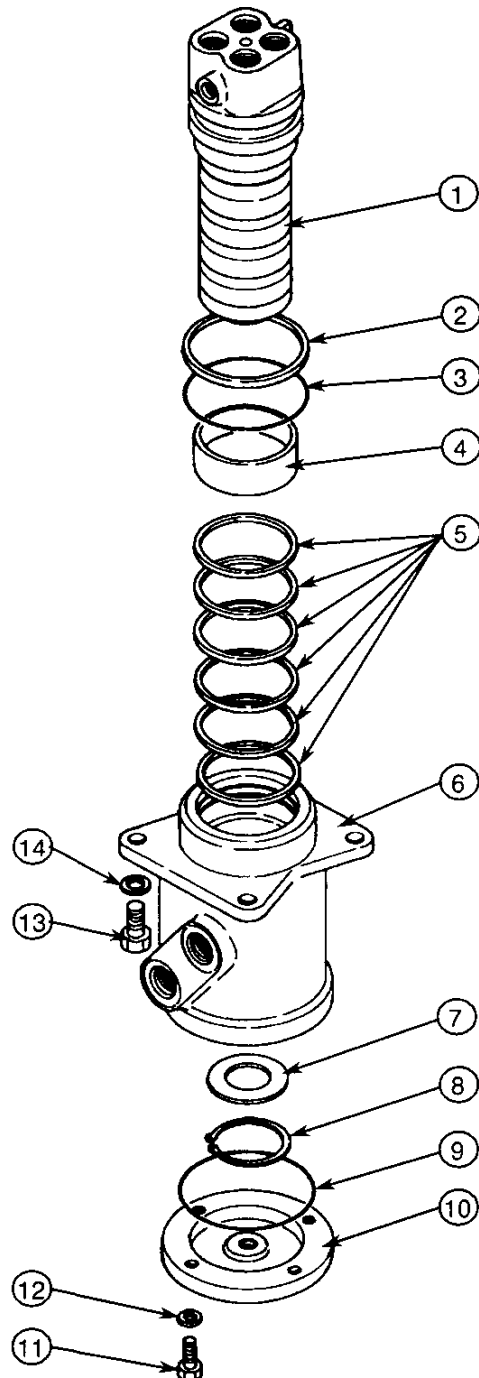


W105-03-03-017

UNDER CARRIAGE / Center Joint

EX200-2

CENTER JOINT DRAWING FOR ASSEMBLY



W105-03-03-018

- | | | | |
|-------------|-------------------|-------------------|-------------------|
| 1— Spindle | 5— Oil Seal | 9— O-ring | 13— Bolt |
| 2— Oil Seal | 6— Body | 10— Cover | 14— Spring Washer |
| 3— O-ring | 7— Ring | 11— Bolt | |
| 4— Bushing | 8— Retaining Ring | 12— Spring Washer | |

W03-03-09A

9503

404

UNDER CARRIAGE / Center Joint

EX200-2

ASSEMBLY OF CENTER JOINT

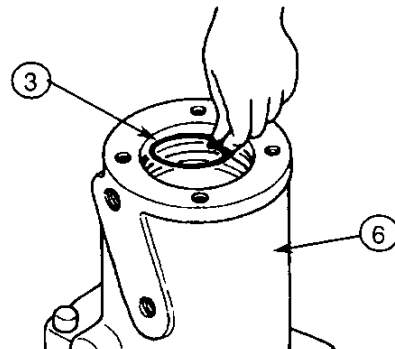
IMPORTANT:

- (1) Clean all parts.
- (2) Check for scratches or rough surfaces if found smooth with an oil stone.
- (3) As a general rule, replace oil seals.

NOTE: (1) Apply a film of grease on the rip of dust seal (2) before installing.
(2) Thoroughly clean grooves hole. Full step apply a film of hydraulic oil or grease to the oil seal (5) before installing.
(3) Be sure to install ring (7) with the chamfered side down.
(4) Perform leaking test after assembled.
(5) Check that retaining ring (8) is installed correctly.
(6) When before installing the spindle, apply a film of hydraulic oil to body (6) inside and spindle outside then press in spindle.

1. Install O-ring (3) into body (6).

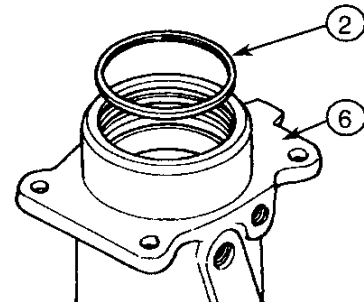
NOTE: For easy installation, bend the O-ring into a heart shape it.
After installing that the O-ring is seated correctly.



W105-03-03-019

2. Install dust seal (2) to body (6).

NOTE: If bushing is removed, be sure to reinstall bushing (4) before installing dust seal (2).



W105-03-03-016

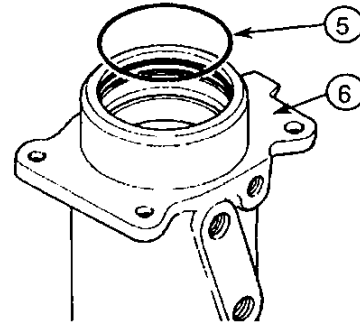
UNDER CARRIAGE / Center Joint

EX200-2

3. Install oil seal into body (6).

NOTE: Apply a film grease or hydraulic oil to seal.

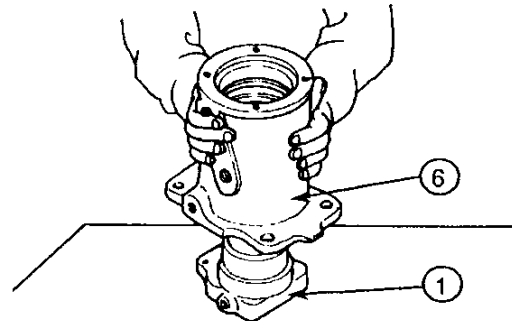
NOTE: After install O-ring (3), oil seal (5), and dust seal (2) supply a film grease to inside.



W105-03-03-021

4. Secure spindle (1) to work table.
Mount body (6) on spindle (1).

NOTE: Align with the matching mark which was made when at disassembly.

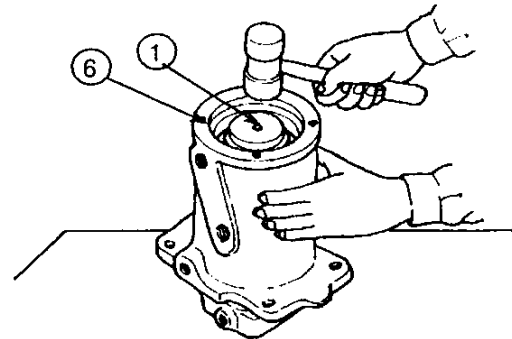


W105-03-03-022

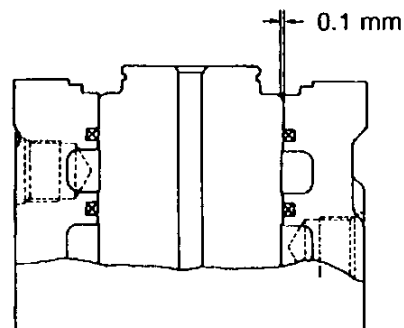
5. Tap body (6) with a soft hammer, put body (6) until it touches the edge of spindle (1).

NOTE: Put body upward, install spindle (1) in it slowly.

*NOTE: Install it slowly so that it does not cause damage to seal.
Gap between body (6) and spindle (1) is about 0.1 mm, so put body (6) straight by a spindle (1).*



W105-03-03-023

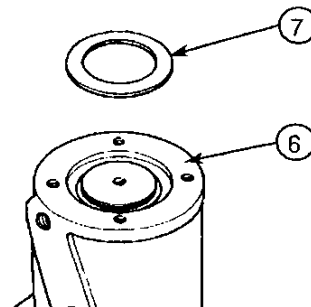


W105-03-03-024

UNDER CARRIAGE / Center Joint

EX200-2

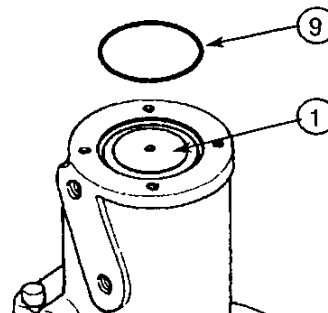
6. Install ring (7) to body (6).



W105-03-03-025

7. Install O-ring (3) to spindle (1).

*NOTE: Take care sides of O-ring (9),
Install rounded off to up side.*

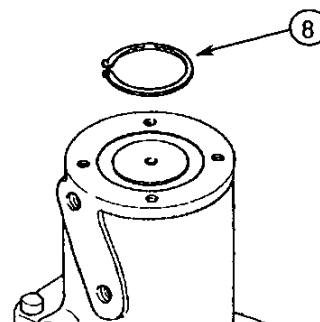


W105-03-03-026

8. Install retaining ring (8) to spindle.

*NOTE: Take care sides of retaining ring,
Install rounded off to up side.*

NOTE: Make sure that it installed completely.



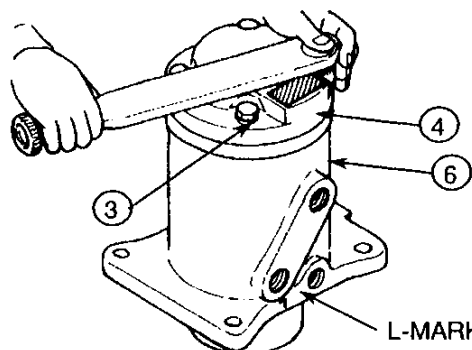
W105-03-03-027

9. Install cover (4) and tighten bolts (3).

 : 17mm

 : 5 kgf·m (49 N·m ,36 lbf·ft)

*NOTE: When install cover (4), a name plate facing
L-MARK.*



W105-03-03-028

UNDER CARRIAGE / Center Joint

EX200-2

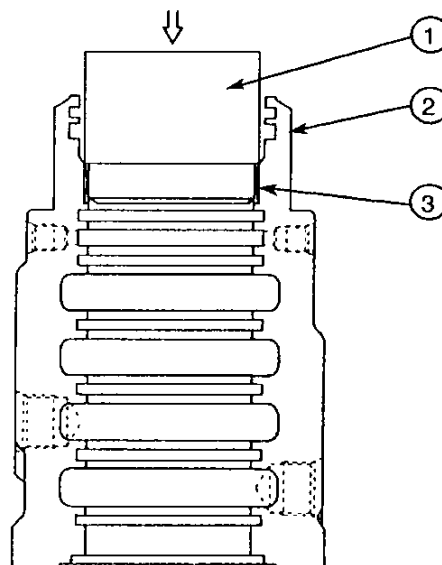
When changing the body or spindle, follow these procedures ;

« In case of Body (2) »

1. Clean body (2) and bushing (3).
2. Use pressing tool (ST 2558) to insert bushing (3) into body (2).

Pressure: 0.5 to 1.5 ton

Pressing tool: ST 2558



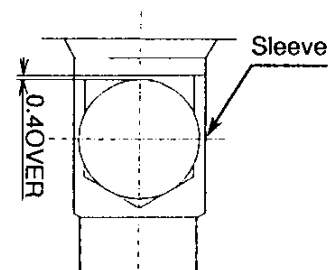
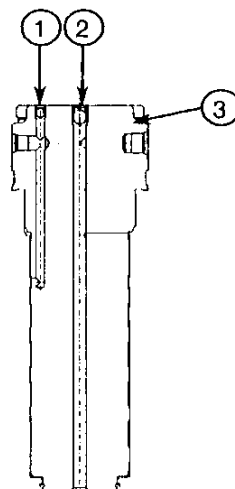
W105-03-03-029

« In case of spindle (3) »

1. Clean spindle (3).
2. Insert plug (1) and (2) into spindle (3) using pressing tools (ST 2559 and ST 2560).

Driving tool: ST2559

Driving tool: ST2560



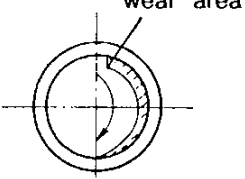
Detail D

W105-03-03-030

UNDER CARRIAGE / Center Joint

EX200-2

Maintenance Standard

Item		Minimum limit (basis of judgment)	Remedy
Bushing		1. Wear more than 0.2 mm.	Exchange
		2. Scored, abnormal wear.	Exchange
		3. Inclined wear less than 180°.	Exchange
			
Body, spindle	Sliding surface and sealed part	Scored or something hurt it.	Exchange
	Sliding surface except sealed part	1) Scored or something hurt it more than 0.1 mm. When at abnormal abrasion.	Exchange
		2) Something hurt it less than 0.1 mm depth.	Repair with oil stone
	Sliding surface with ring	1) Wear more than 0.5 mm depth. Abnormal wear.	Exchange
		2) Wear less than 0.5 mm depth.	Repair it flat
		3) Scored or something hurt it less than 0.5 mm depth and able to repair.	Repair it flat
Cover	Sliding surface with ring	1) Wear less than 0.5 mm.	Exchange
		2) Wear less than 0.5 mm.	Repair it flat
		3) Scored or something hurt it less than 0.5 mm and able to repair.	Repair it flat

UNDER CARRIAGE / Center Joint

EX200-2

Required tools for Disassembly or Assembly

1. Tightening tools

Unit:mm

Name	Size	Note
 Wrench	17, 19, 22, 27	
 Box wrench	17, 19	

W105-03-03-031

2. General tools

Name
 screw driver (-)
 Plastic hammer,  One-handed hammer,  snap ring plier

W105-03-03-032

3. Measure tools

Name
 Torque wrench

W105-03-03-033

UNDERCARRIAGE / Track Adjuster

EX200-2

REMOVE AND INSTALL TRACK ADJUST-ER

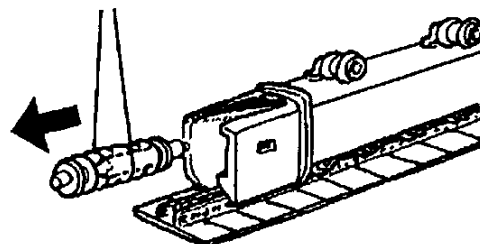
Remove Track Adjuster

1. Slide track adjuster forward using a pry bar.



CAUTION : The approximate weight of track adjuster is 98.2 kg (217 lb)

2. Attach track adjuster to hoist, remove from frame, and repair or replace.

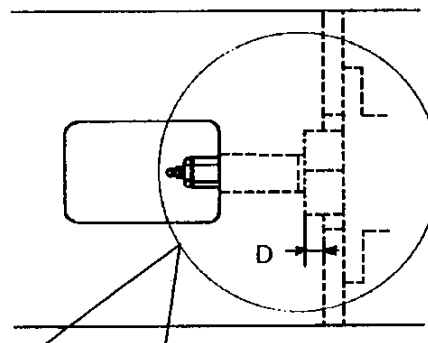


W105-03-04-001

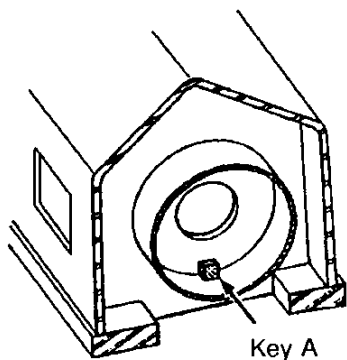
Install Track Adjuster

1. Align key (A) in frame with notch (B) and install track adjuster.

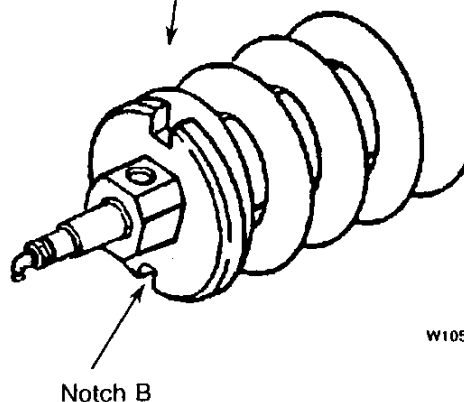
Length (D) is 13mm (0.51 in).



W105-03-04-002



W105-03-04-003

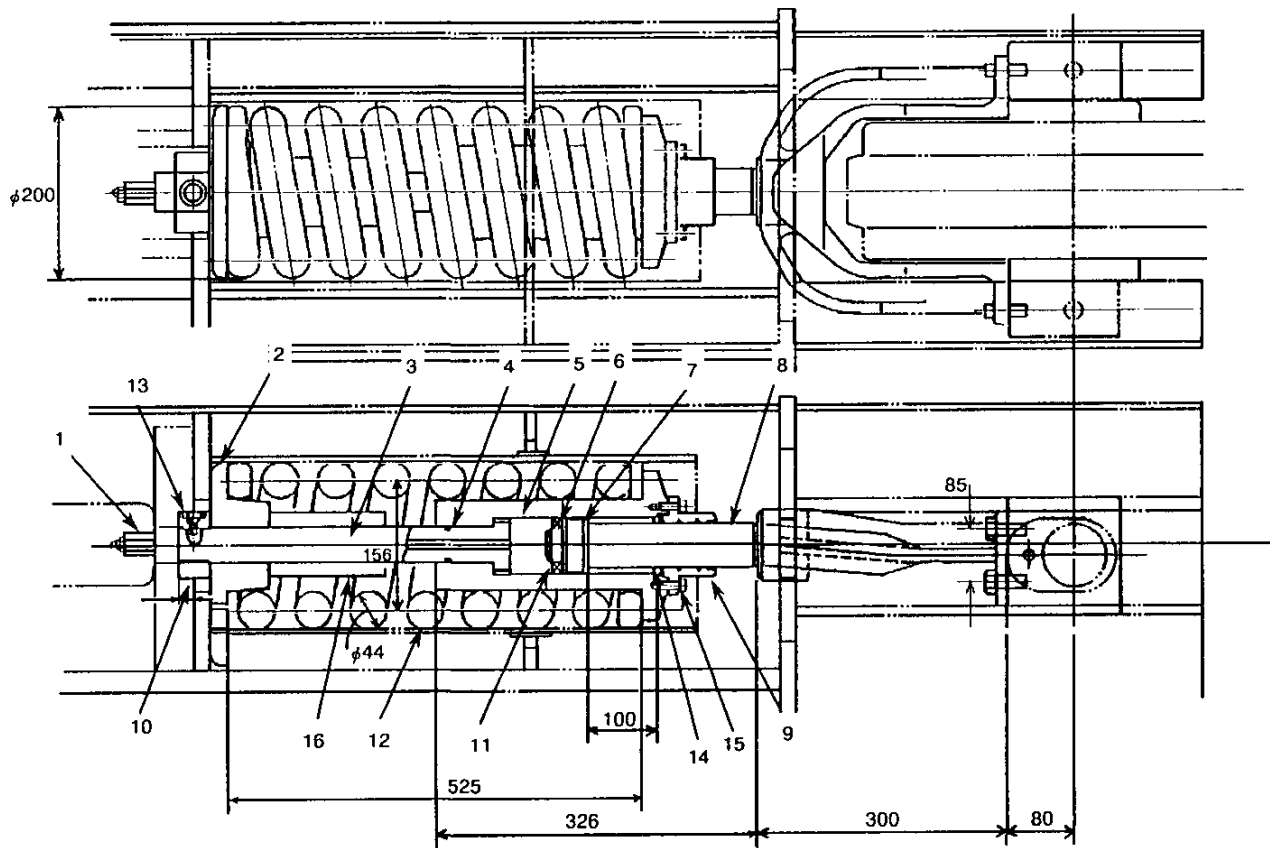


W105-03-04-004

UNDERCARRIAGE / Track Adjuster

EX200-2

TRACK ADJUSTER DRAWING FOR DISASSEMBLY



W105-03-04-005

- | | | | |
|-----------|---------------|------------|------------|
| 1- Valve | 5- Cylinder | 9- Flange | 13- Plug |
| 2- Washer | 6- U-ring | 10- Nut | 14- Spacer |
| 3- Rod | 7- Wear Ring | 11- O-ring | 15- Bolt |
| 4- O-ring | 8- Piston Rod | 12- Spring | 16- Spacer |

W03-04-02

UNDERCARRIAGE / Track Adjuster

EX200-2

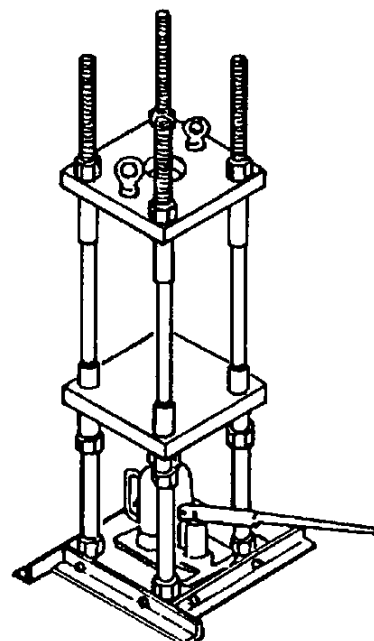


CAUTION : Spring or rod may break if dropped while handling, transportation or disassembling. Nicks or weld craters in spring and rod assembly can cause stress concentration resulting in a weak spot that may result in immediate or eventual spring failure creating a risk of personal injury. Put a heavy protective covering around spring assembly when handling track adjuster.

A compression tool must be used for disassembly and assembly because of the extreme preload on spring.

1. Place jack on bottom of track spring holder assembly .

Track Spring Holder Assembly : ST-4920

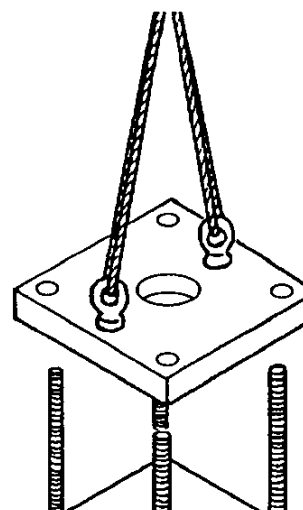


W105-03-04-006

2. Remove nuts and plate.



: 46 mm



W105-03-04-007

UNDERCARRIAGE / Track Adjuster

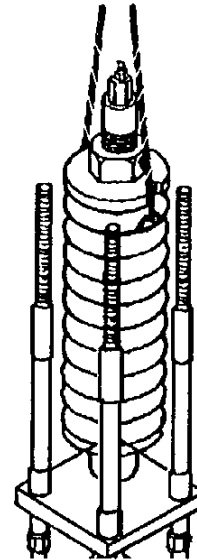
EX200-2

3. Connect track adjuster to a hoist using a lifting strap.



CAUTION :The approximate weight of track adjuster is 98.2 kg (217 lb).

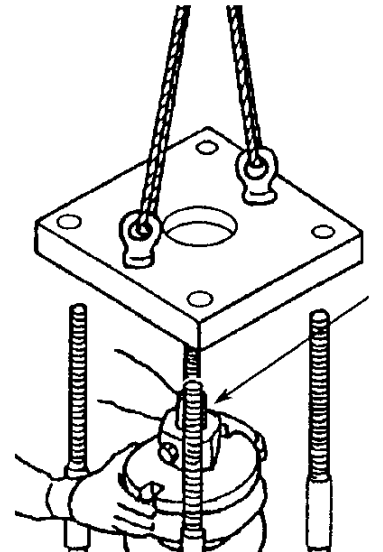
4. Put track adjuster in the track spring holder assembly (ST-4920).
5. Remove lifting strap.



W105-03-04-009

6. Install plate.
7. Remove valve (1) with fitting.

 : 24 mm



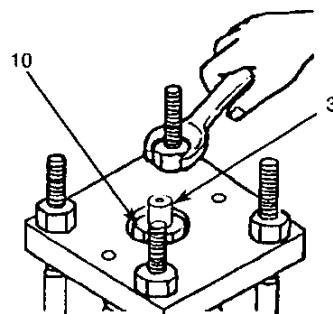
W105-03-04-011

UNDERCARRIAGE / Track Adjuster

EX200-2

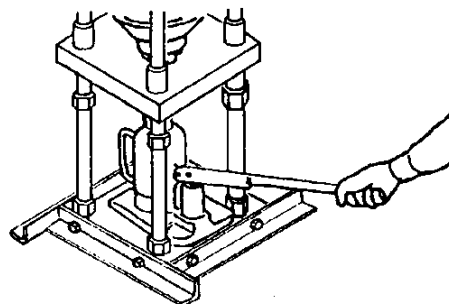
8. Tighten nuts to secure the track adjuster.

 : 46 mm



W105-03-04-012

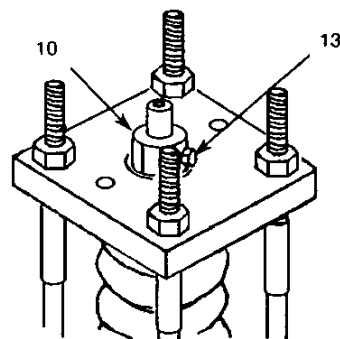
9. Operate jack to compress spring until nut (10) and end of rod (3) extend through hole in plate.



W105-03-04-013

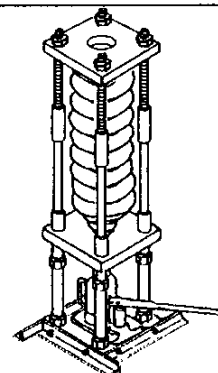
10. Remove plug (13) and nut (10).

 : 17 mm, 71 mm



W105-03-04-014

11. Lower jack to release spring force.



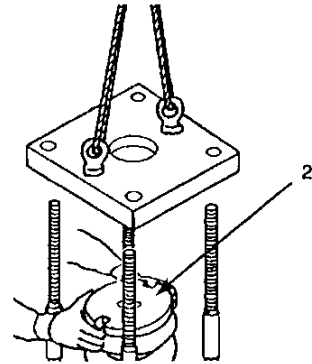
W105-03-04-015

UNDERCARRIAGE / Track Adjuster

EX200-2

12. Remove nuts and plate.

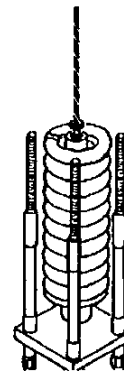
Remove washer (2) .



W105-03-04-016

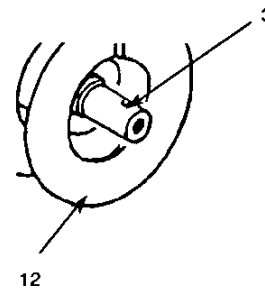
13. Remove track adjuster using eyebolt and a hoist.

14. Remove hoist and eyebolt



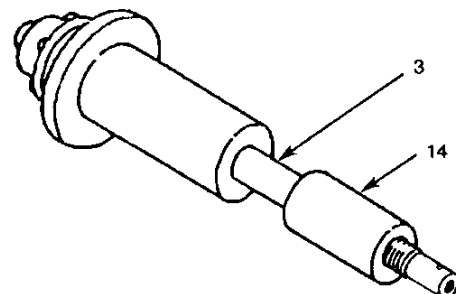
W105-03-04-017

15. Remove spring (12) from rod (3).



W105-03-04-018

16. Remove spacer (14) from rod (3).



W105-03-04-019

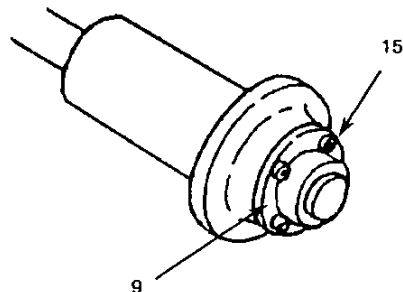
W03-04-06

UNDERCARRIAGE / Track Adjuster

EX200-2

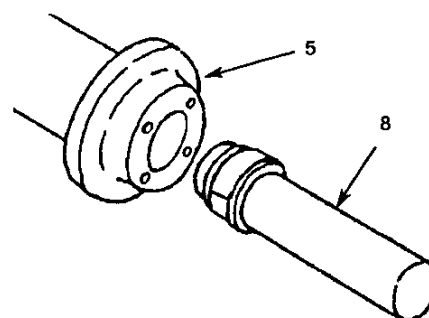
17. Remove socket bolts (15) and flange (9).

 : 6 mm



W105-03-04-020

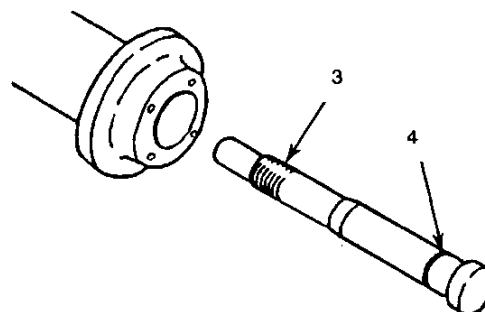
18. Pull out piston rod (8) from cylinder (5).



W105-03-04-021

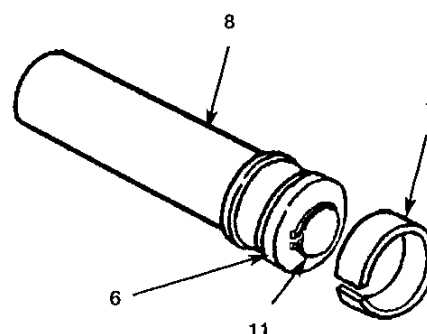
19. Remove rod (3) from the cylinder.

20. Remove O-ring (4) from the rod.



W105-03-04-022

21. Remove wear ring (7), retaining ring (11) and U-ring (6) from piston rod (8).

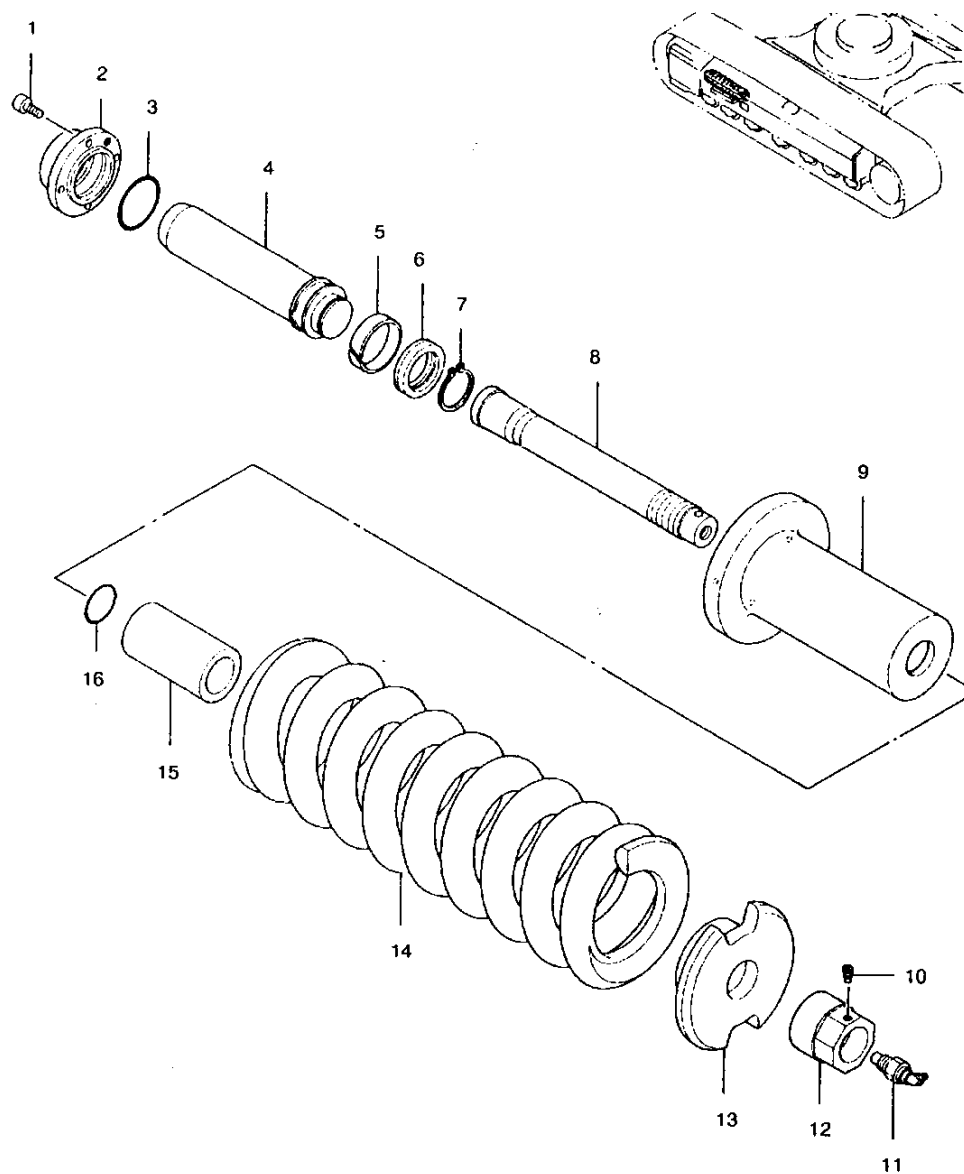


W105-03-04-023

UNDERCARRIAGE / Track Adjuster

EX200-2

TRACK ADJUSTER DRAWING FOR ASSEMBLY



W105-03-04-024

- | | | | |
|---------------|-------------------|-------------|------------|
| 1- Bolt | 5- Wear Ring | 9- Cylinder | 13- Washer |
| 2- Flange | 6- U-ring | 10- Plug | 14- Spring |
| 3- Spacer | 7- Retaining Ring | 11- Valve | 15- Spacer |
| 4- Piston Rod | 8- Rod | 12- Nut | 16- O-ring |

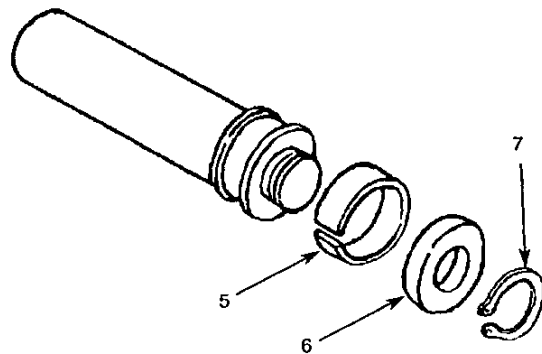
W03-04-09

UNDERCARRIAGE / Track Adjuster

EX200-2

1. Clean all parts.

Install U-ring (6), retaining ring (7) and wear ring (5) to the piston rod.

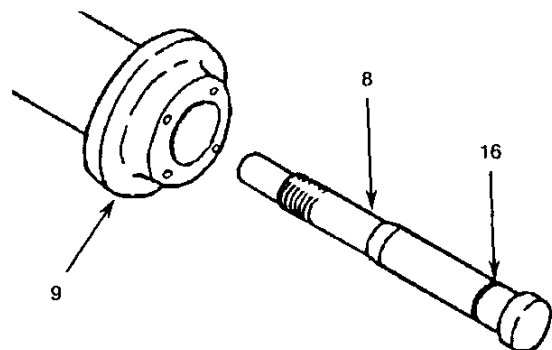


W105-03-04-025

2. Apply grease to O-ring (16) and install it on rod (8).

Install rod(8) into cylinder (9).

Note : Handle carefully not to damage O-ring.

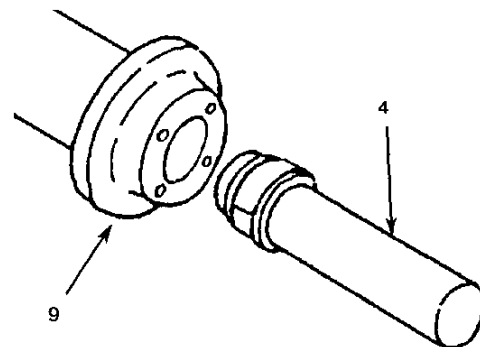


W105-03-04-022

3. Apply grease to U-ring (6) and wear ring (5).
Apply hydraulic oil to cylinder (9) and piston rod (4).

4. Install piston rod (4) into cylinder (9).

Note : When installing piston rod, apply grease (about 100 cm³) onto its head.

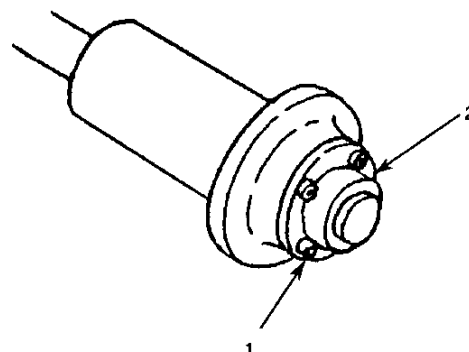


W105-03-04-021

5. Fill flange inside grooves with grease.
Install flange (2) into cylinder and tighten socket bolts (1).

 : 8 mm

Tightening Torque : 63.7 N·m (6.5 kgf·m, 47 lbf·ft)



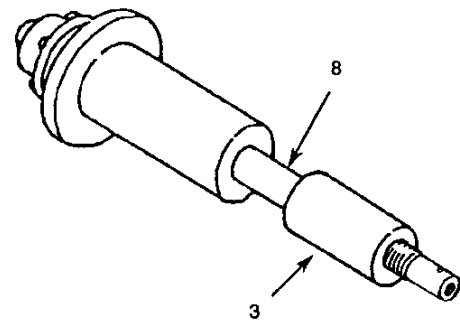
W105-03-04-020

W03-04-10

UNDERCARRIAGE / Track Adjuster

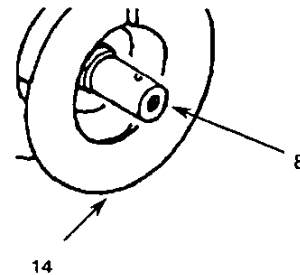
EX200-2

6. Install spacer (3) on rod (8).



W105-03-04-019

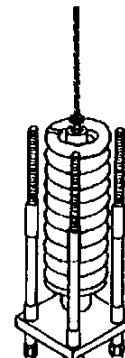
7. Install spring (14) on rod (8).



W105-03-04-018

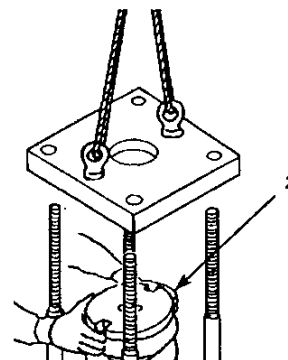
8. Put track adjuster in tool using lifting eyebolt and a hoist.

9. Remove hoist hoist and eyebolt.



W105-03-04-017

10. Install washer (2) on the rod.
Install plate.



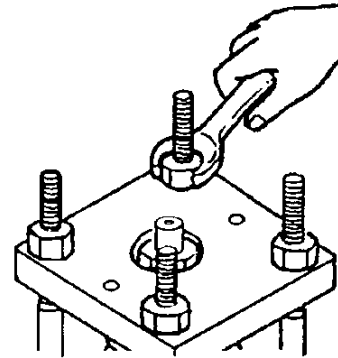
W105-03-04-016

UNDERCARRIAGE / Track Adjuster

EX200-2

11. Align jack and track adjuster with hole in plate.

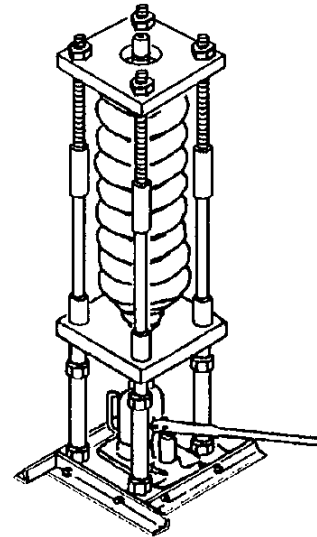
Install and tighten nuts to secure track adjuster.



W105-03-04-012

12. Operate jack to compress spring (14) to the compressed length.

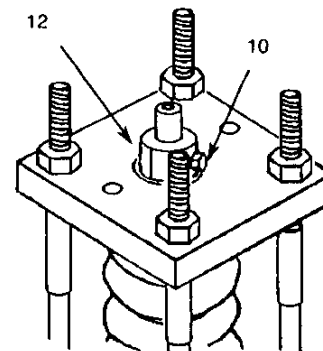
Compressed Length : 525 mm (20.7 in)



W105-03-04-026

13. Install nut (12) and plug (10).

 : 17 mm, 71 mm



W105-03-04-014

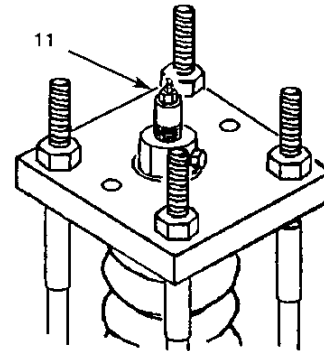
UNDERCARRIAGE / Track Adjuster

EX200-2

14. Install valve (11) with fitting.

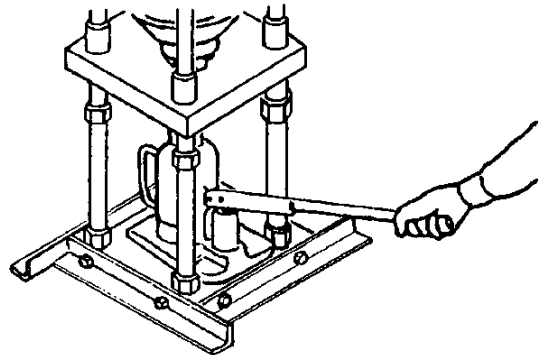
 : 24 mm

Tightening Torque : 147 N·m (15 kgf·m, 110 lbf·ft)



W105-03-04-010

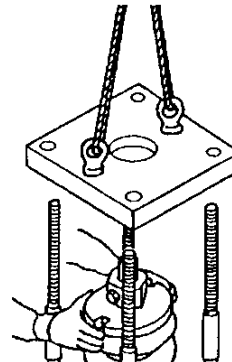
15. Lower jack.



W105-03-04-013

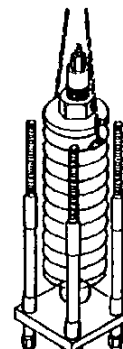
16. Remove nuts and plate.

 : 46 mm



W105-03-04-011

17. Remove track adjuster from tool using a lifting strap and a hoist.



W105-03-04-009

UNDERCARRIAGE / Front Idler

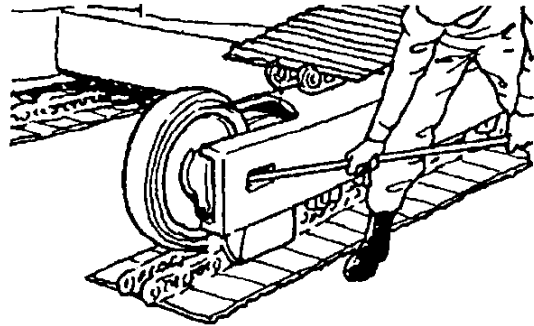
EX200-2

REMOVE AND INSTALL FRONT IDLER

«Remove front idler»

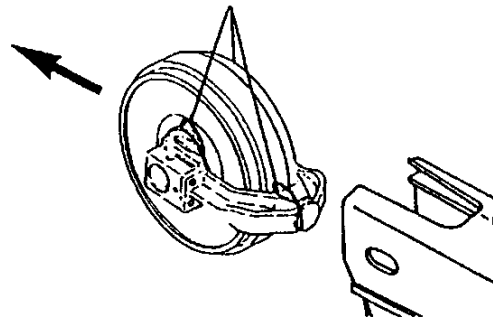
CAUTION: The approximate weight of front idler is 111 kg (244.7 lb)

1. Slide front idler forward using a pry bar.



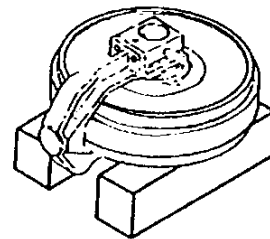
W105-03-05-001

2. Attach front idler to hoist , remove from frame.



W105-03-05-002

3. If keep it for a time, place it as shown.



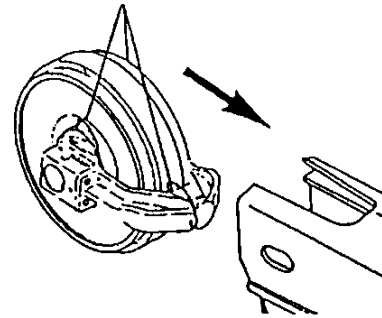
W105-03-05-003

UNDERCARRIAGE / Front Idler

EX200-2

«Install front idler»

4. Attach front idler to hoist, install to frame.
Apply a film of grease to sliding surface between the track frame and the yolk.

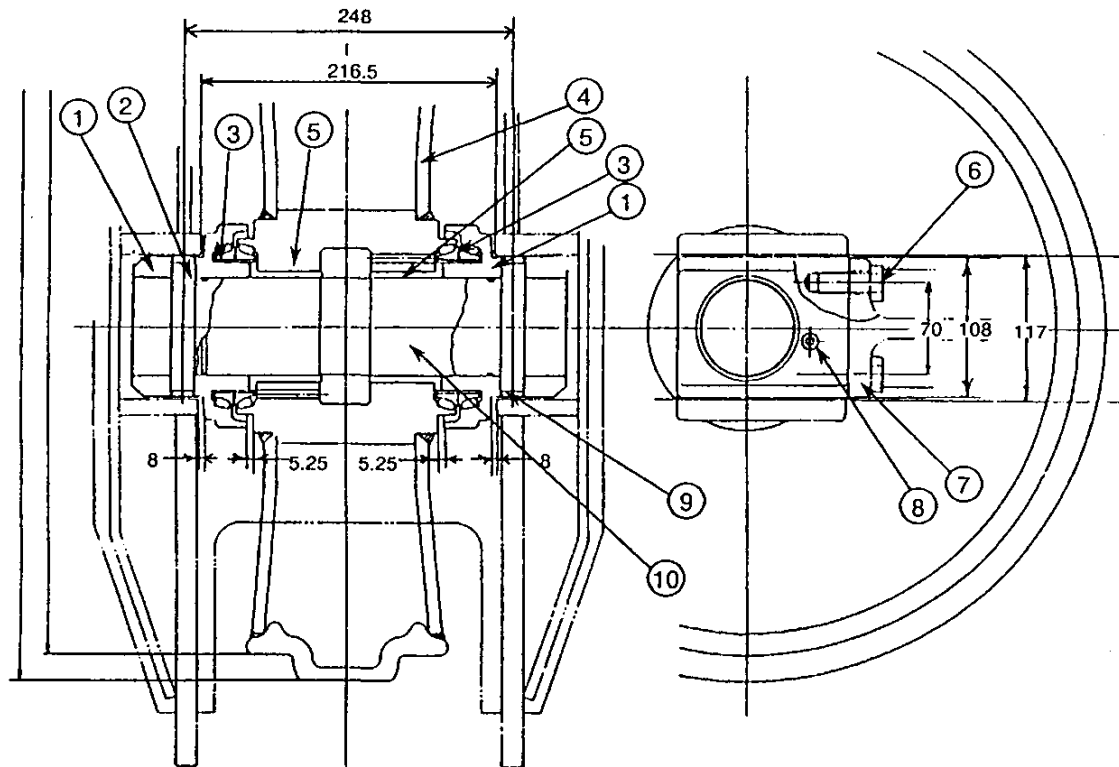


W105-03-05-004

UNDERCARRIAGE / Front Idler

EX200-2

FRONT IDLER DRAWING FOR DISASSEMBLY



W105-03-05-005

1- Bearing
2- Pin
3- Floating seal

4- Idler
5- Bushing
6- Bolt

7- York
8- Plug
9- O-ring

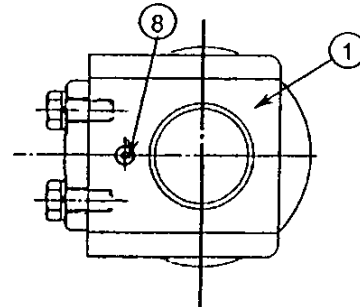
10- Axle

UNDERCARRIAGE / Front Idler

EX200-2

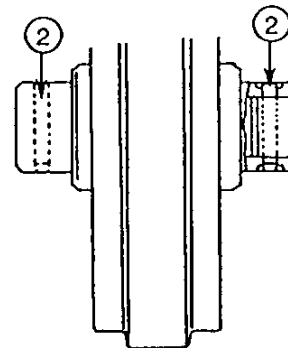
«Disassemble front idler»

1. Remove bolts to remove yoke.
2. Remove drain plug (8) to drain oil.



W105-03-05-006

3. Remove pins (2).

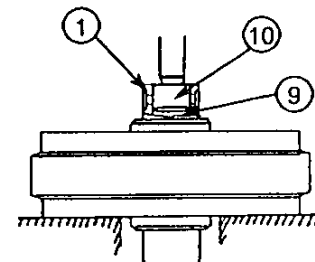


W105-03-05-007

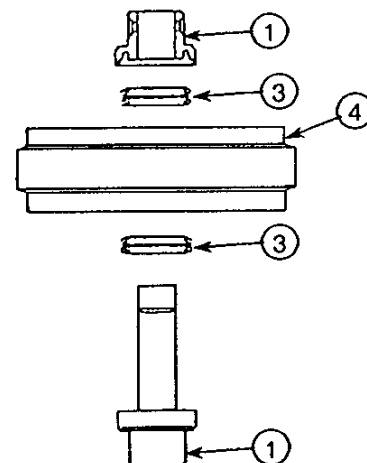
4. Press axle (10) and remove bearing (1).
5. Remove O-ring (9) from axle and push out axle with other side bearing.

IMPORTANT: Floating seal can be reused if they are not worn or damaged. A used seal must be kept together as a set because of wear patterns on seal ring face.

6. Remove floating seals (3) and keep seal rings together as a matched set with seal ring faces together to protect surface.



W105-03-05-008



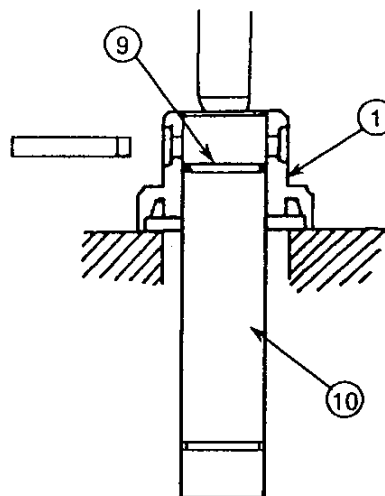
W105-03-05-009

W03-05-04

UNDERCARRIAGE / Front Idler

EX200-2

7. Press out axle (10) to remove bearing (1) and O-ring (9).

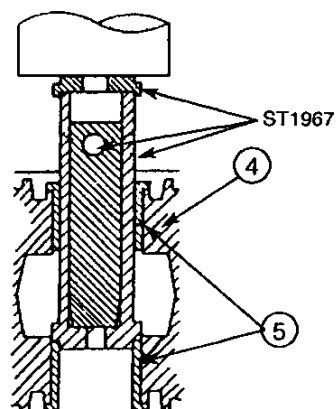


W105-03-05-010

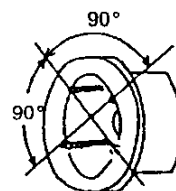
8. Remove bushings (5) using a special tool.

ST 1967

NOTE: Only remove bushings if replacement is necessary.



W105-03-05-011

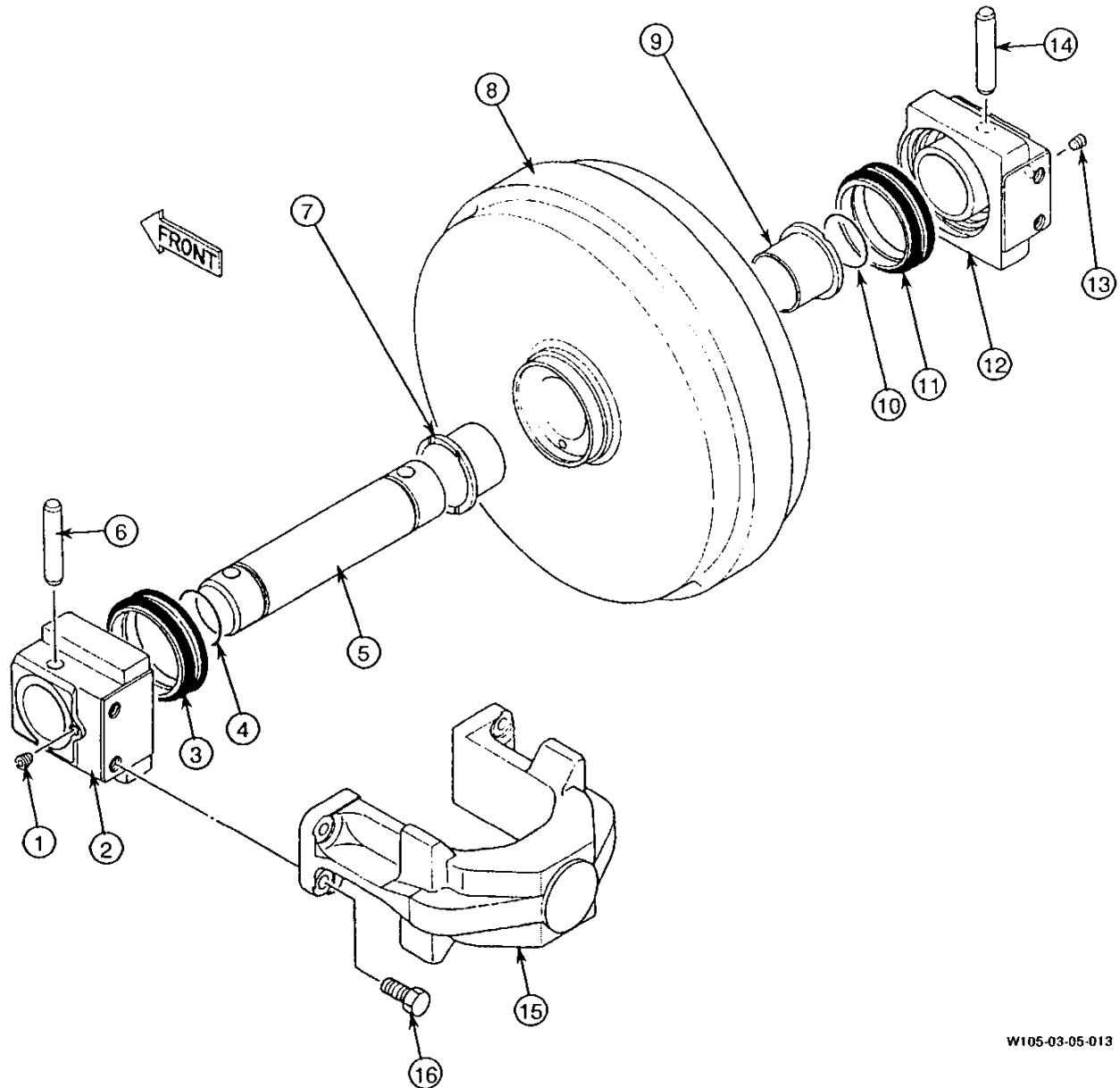


W105-03-05-012

UNDERCARRIAGE / Front Idler

EX200-2

FRONT IDLER DRAWING FOR ASSEMBLY



W105-03-05-013

- | | | |
|----------------------|-------------------|-----------|
| 1— Plug | 7— Bushing | 13— Plug |
| 2— Bearing | 8— Idler | 14— Pin |
| 3— Floating sea seal | 9— Bushing | 15— Yoke |
| 4— O-ring | 10— O-ring | 16— Bolts |
| 5— Axle | 11— Floating seal | |
| 6— Pin | 12— Bearing | |

W03-05-06

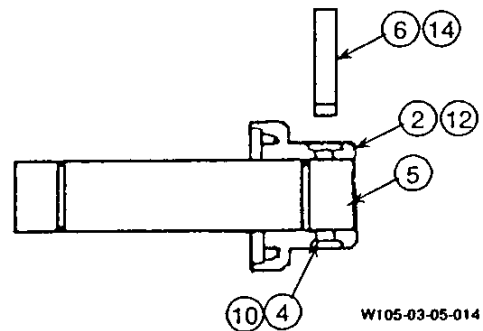
UNDERCARRIAGE / Front Idler

EX200-2

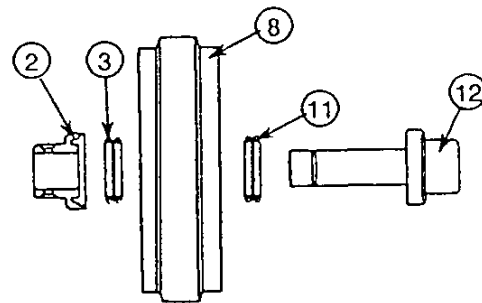
«Assemble front idler»

Before assembly, clean the parts.

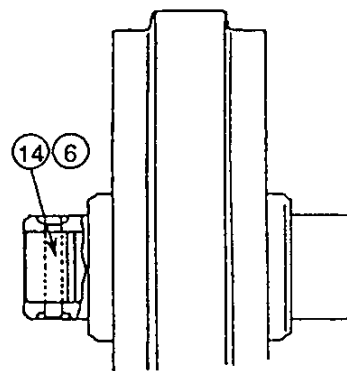
1. Apply a film of oil to bushings (7) and (9), I
n stall bushings into idler (8).
2. Apply a film of grease to O-ring (10), then Install
O-ring (10) on axle (5).
3. Install axle (5) into bearing (12).
4. Install pin (14).



5. Install floating in bearing (12) and idler (8).
6. Install axle (5) as an assembly into idler (8).
7. Install O-ring (4) on axle.
8. Install floating seal (3) in bearing (2) and idler
(8).

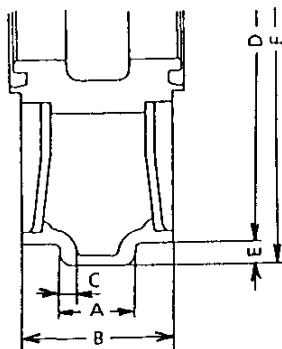


9. Install bearing (2).
10. Install pin (6).
11. Fill front idler with 0.265ℓ (0.07 USgalℓ/ 0.058
lmgal) of engine oil, (API CD CLASS equivalent
to SAE 30).
12. Apply on equivalent of LOCTITE 503 to thread
of drain plugs (1) and (13) and install.
13. Install yoke (15).
Tighten bolts (16)



UNDERCARRIAGE / Front Idler

EX200-2

MAINTENANCE STANDARD**«Front Idler»**

ND :Nominal Dimension
LU :Limit of Use

W104-03-05-017

Unit: mm

	ND	LU	Remedy
A	84	66	Buildup weld and finishing
B	159	-	
C	15	-	
D	500	482	
E	15	-	
F	538	-	

[Axle-Bushing]

Unit: mm

		ND	LU	Remedy
Axle	Outside Dia	75	74.2	Replace
	Inside Dia	75	76.0	
Bushing	Flange Thickness	6	5.2	

W03-05-08

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

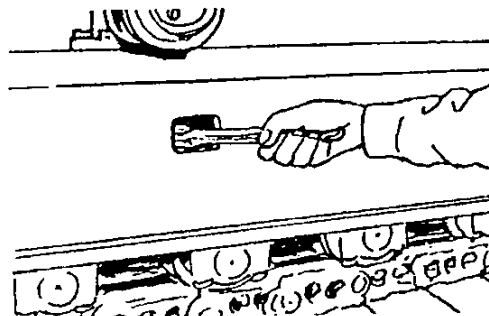
UPPER AND LOWER ROLLER

UPPER ROLLER

« Removal »

1. Loosen track adjuster valve to drain grease.

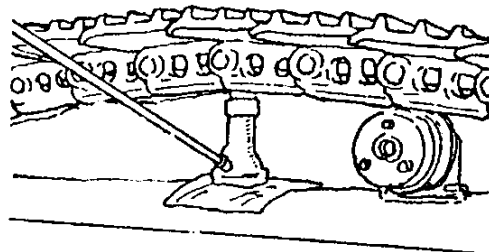
 : 24 mm



W105-03-06-001

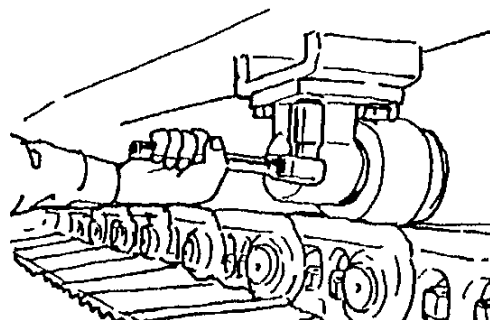
2. Jack up the track link height enough to permit upper roller removal.

CAUTION: Use a nonskid cloth between track link and oil jack to unslipe.



W105-03-06-002

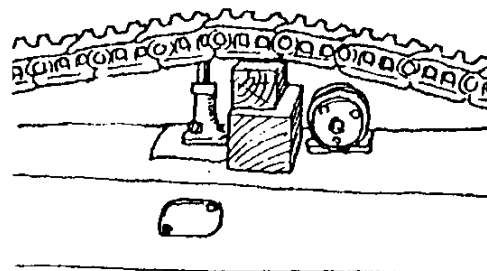
3. Insert a wooden block between the track link and the side frame.



W105-03-06-003

4. Remove bolts.

 : 19 mm



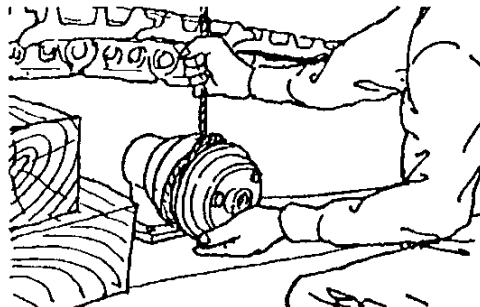
W105-03-06-004

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

5. Remove the upper roller from the track frame.

Weight: 14 kg (31 lb)



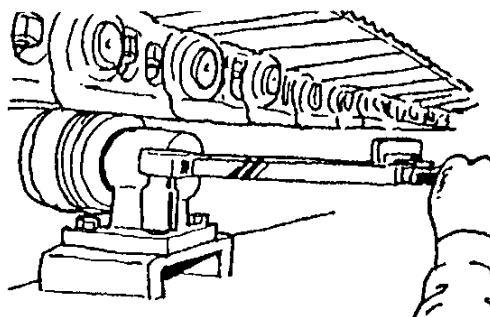
W105-03-06-005

« Installation »

6. Install the upper roller and bolts.

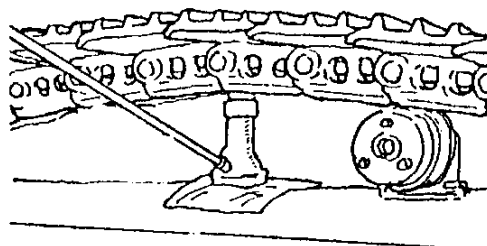
 : 19 mm

 : 11 kgf·m (108 N·m, 80 lbf·ft)



W105-03-06-006

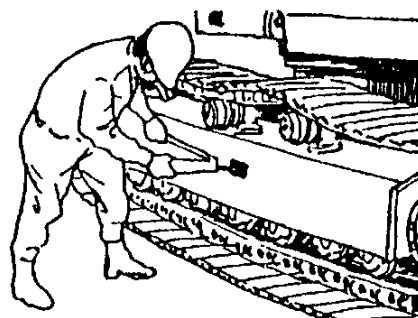
7. Remove wooden blocks and jack.



W105-03-06-002

8. Supply grease to the valve to adjust track link tension.

Track tension: 260 - 290 mm (10.2 - 11.4 in)



W105-03-06-007

W03-06-02

UNDERCARRIAGE / Upper And Lower Roller

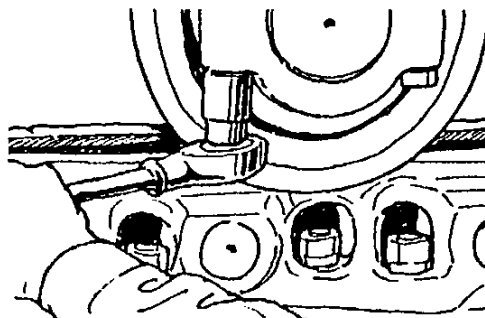
EX200-2

LOWER ROLLER

«Removal»

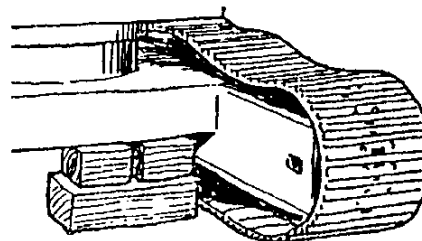
1. Remove the roller guard and loosen bolts.

 : 24 mm



W105-03-06-008

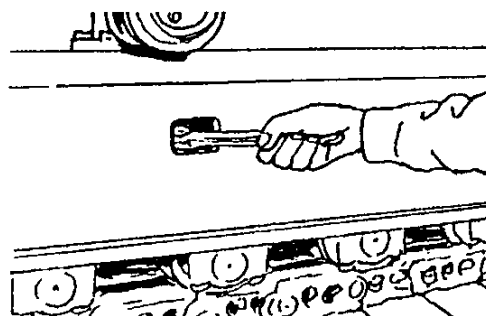
2. Lift the one side of the unit height enough to remove lower roller.
Insert wooden blocks under the unit.



W105-03-06-009

3. Open the valve to flow out grease till enough to permit the roller removal.

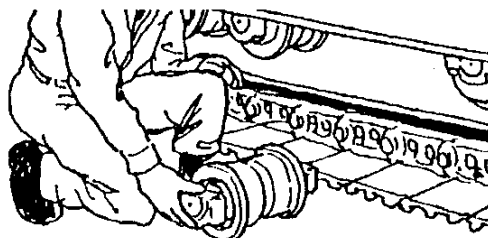
 : 24 mm



W105-03-06-001

4. Remove the lower roller.

Weight: 35 kg (78 lb)



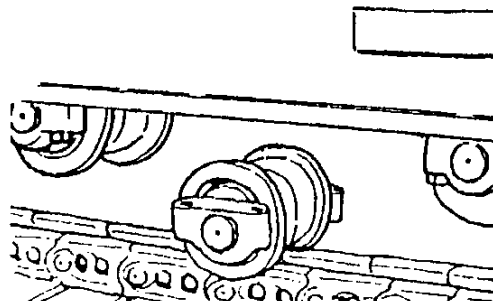
W105-03-06-010

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

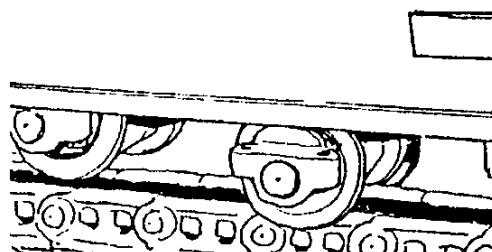
◀ Installation ▶

5. Put rollers on the track link as illustration.



W105-03-06-011

6. Lower the unit enough to allow bolts to be installed into track frame.



W105-03-06-012

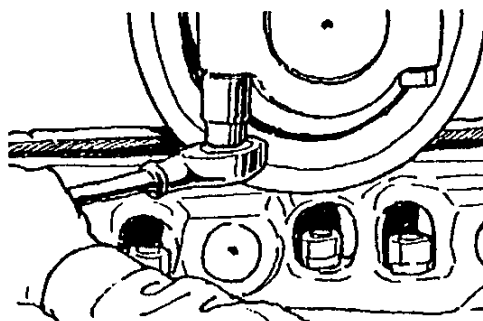
7. Align with tapped holes in track frame.
Tighten the bolt.



: 24 mm



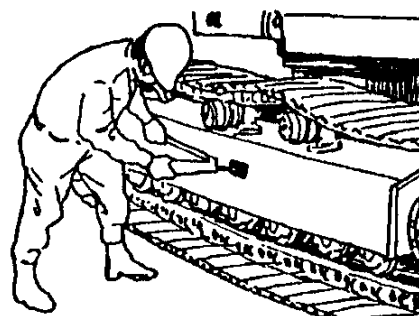
: 31 kgf·m (304 N·m, 224 lbf·ft)



W105-03-06-008

8. Supply grease to the valve to adjust track link tension.

Track tension: 260 - 290 mm
(10.2 - 11.4 in)



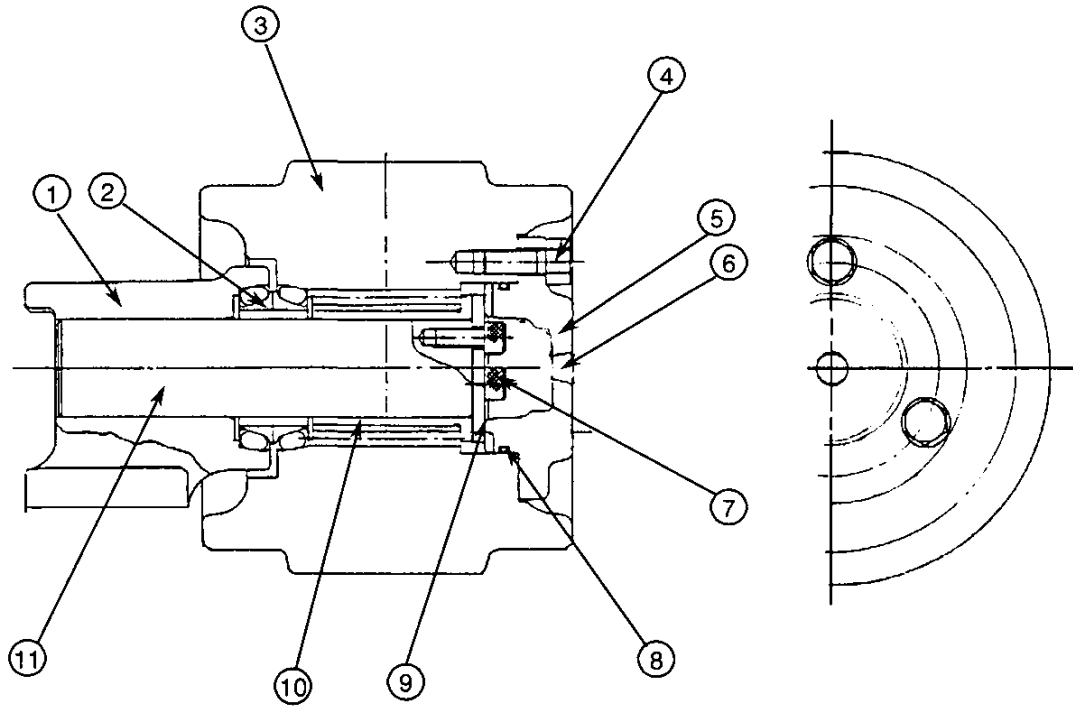
W105-03-06-007

W03-06-04

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

UPPER ROLLER DRAWING FOR DISASSEMBLY



W105-03-06-013

1— Bracket
2— Seal group
3— Roller

4— Bolt
5— Cover
6— Plug

7— Bolt
8— O-ring
9— Plate

10— Bushing
11— Axle

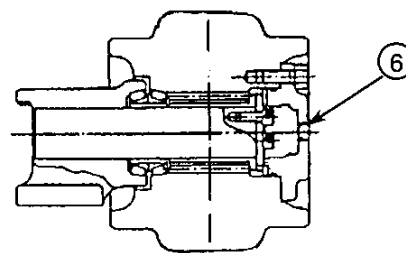
UNDERCARRIAGE / Upper And Lower Roller

EX200-2

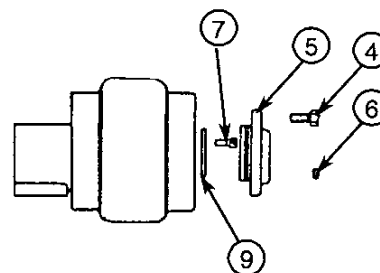
DISASSEMBLY OF UPPER ROLLER

9. Remove plug (6) and flow out the oil.
Remove roller ass'y from the track frame.
Remove three bolts (4) and cover (5).
Remove two bolts (7) and plate (9).

 : 6 mm
 : 13 mm

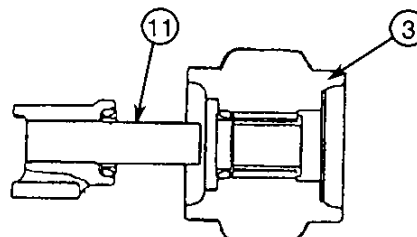


W105-03-06-014

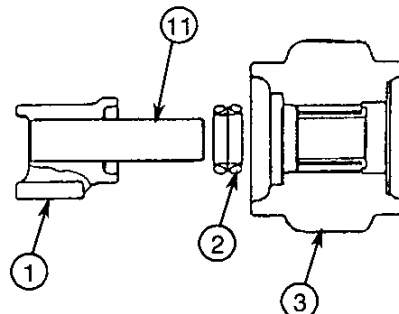


W105-03-06-015

10. Pull roller out (3) from axle (11).
Remove seal group (2) from bracket (1) and roller (3).



W105-03-06-016



W105-03-06-017

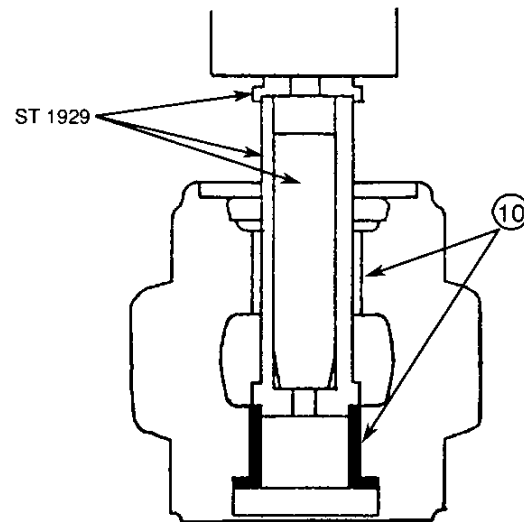
W03-06-06

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

11. In case of changing bushing (10), remove the bushing from the roller using a press and special tool ST 1929.

Bushing can also be removed by applying four weld beads on the inside of bushing at 90° intervals. Bushing will shrink enough to permit removal using a hammer.

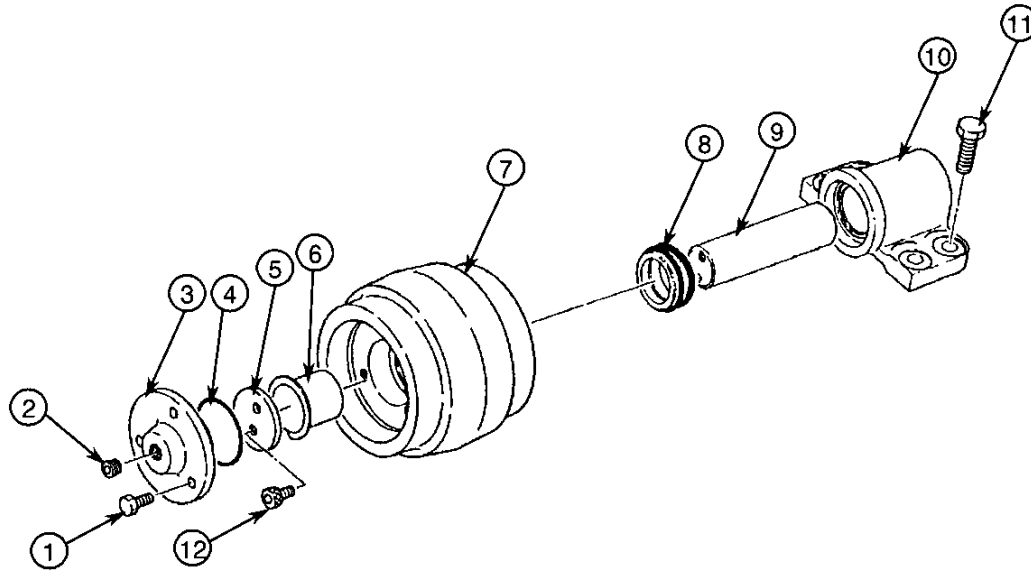


W105-03-06-018

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

UPPER ROLLER DRAWING FOR ASSEMBLY



W105-03-06-019

1— Bolt
2— Plug
3— Cover

4— O-ring
5— Plate
6— Bushing

7— Roller
8— Seal group
9— Axle

10— Bracket
11— Bolt
12— Bolt

W03-06-08

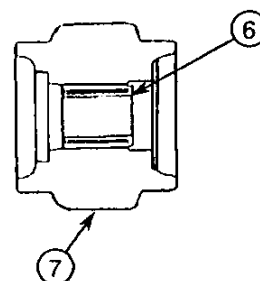
UNDERCARRIAGE / Upper And Lower Roller

EX200-2

ASSEMBLY OF UPPER ROLLER

- Clean all parts.
- Check for scratches or rough surfaces. If found smooth with an oil stone.
- As a general rule replace all seals.

12. Press bushing (6) into roller (7).

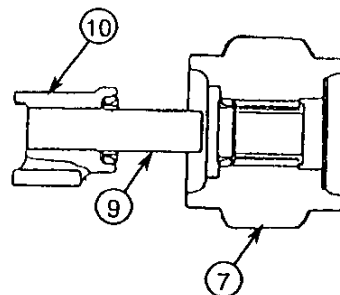


W105-03-06-020

13. Install seal group (8) to roller (7) and bucket (10).
Install roller (7) to axle (9).

NOTE:

- Apply grease to O-ring part of seal group.
- Make sure O-ring seated completely.
- Seal group has owned set use proper one.



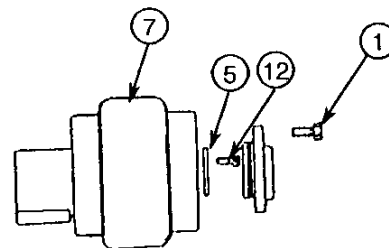
W105-03-06-016

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

14. Install plate (5) and two bolts (12).

 : 6 mm



W105-03-06-021

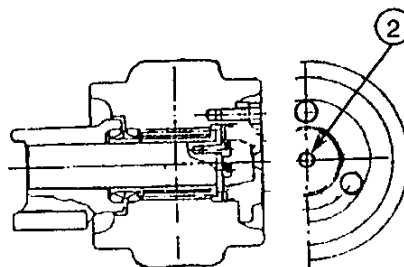
15. Apply a film of grease to O-ring and install it to cover (3).
Install cover (3) and bolts (1) to roller (7).

 : 13 mm

16. Supply engine oil to the roller through plug (2), apply LOCTITE 503 to plug (2).

NOTE: Recommended oil
Class: API-CD
SEA 30
Volume: 38 to 43 cc

 : 6 mm

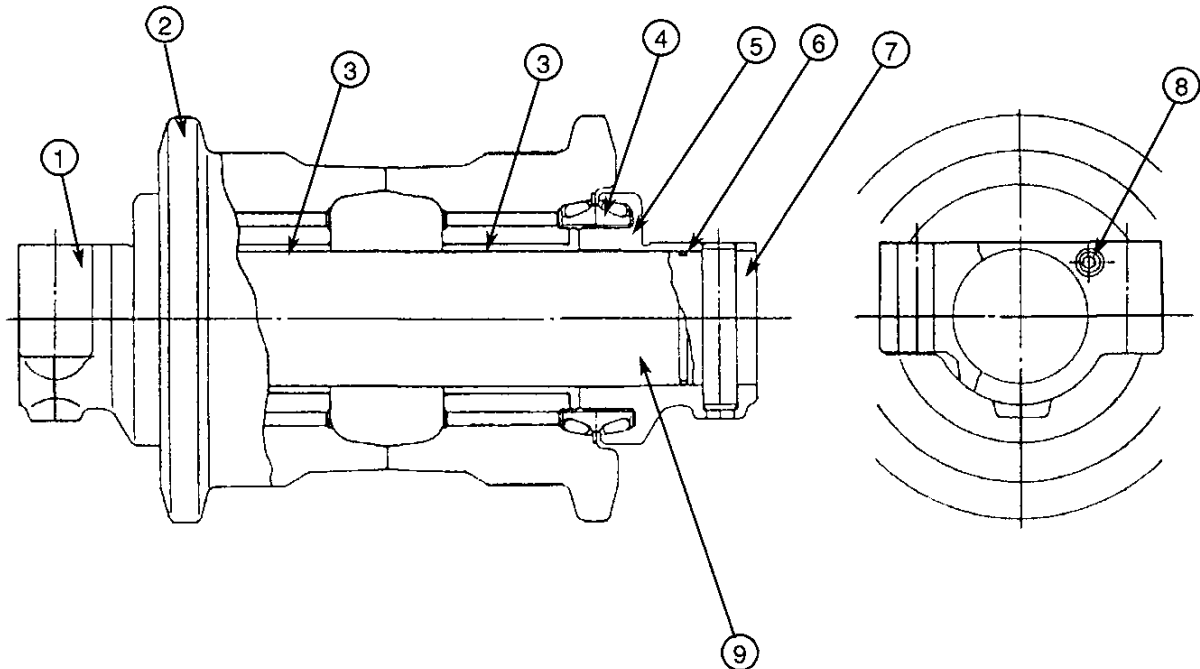


W105-03-06-022

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

LOWER ROLLER DRAWING FOR DISASSEMBLY



W105-03-06-023

1— Collar
2— Roller
3— bushing

4— Seal group
5— Collar
6— O-ring

7— Pin
8— Plug
9— Axle

W03-06-11A

9503

424

UNDERCARRIAGE / Upper And Lower Roller

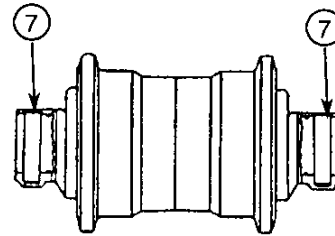
EX200-2

DISASSEMBLY OF LOWER ROLLER

- Clean the roller before disassembly.

17. Remove plug (8) from collar and flow out the oil.

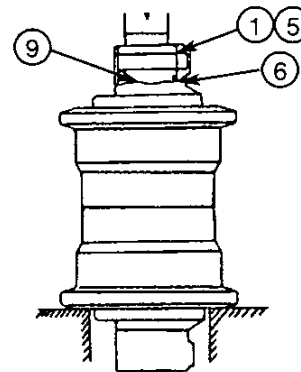
 : 6 mm



W105-03-06-024

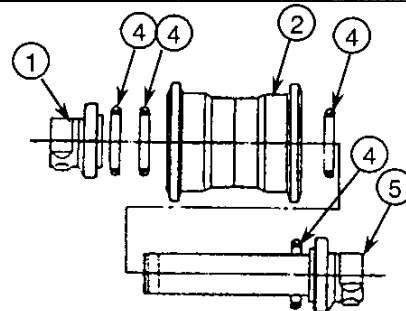
18. Remove pin (7).

Press down axle (9), then remove O-ring (6) and collars (1) (5) from the roller.



W105-03-06-025

19. Remove seal groups (4) from roller (2) and collars (1) (5).



W105-03-06-026

UNDERCARRIAGE / Upper And Lower Roller

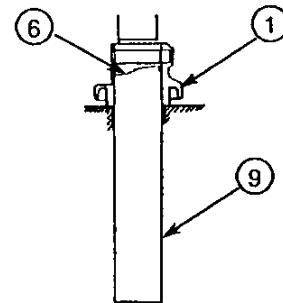
EX200-2

20. Press axle (9) and remove collars (5) and O-ring (6) from axle (9).

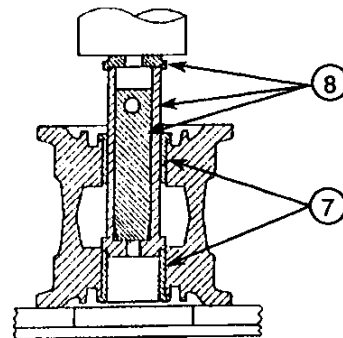
In case of changing bushings (7), remove the bushings using press and special tools (ST-1902).

Even if not available special tool can be done following procedures.

Weld inside of bushing slightly by mean for depressed of fitting forced.



W105-03-06-027

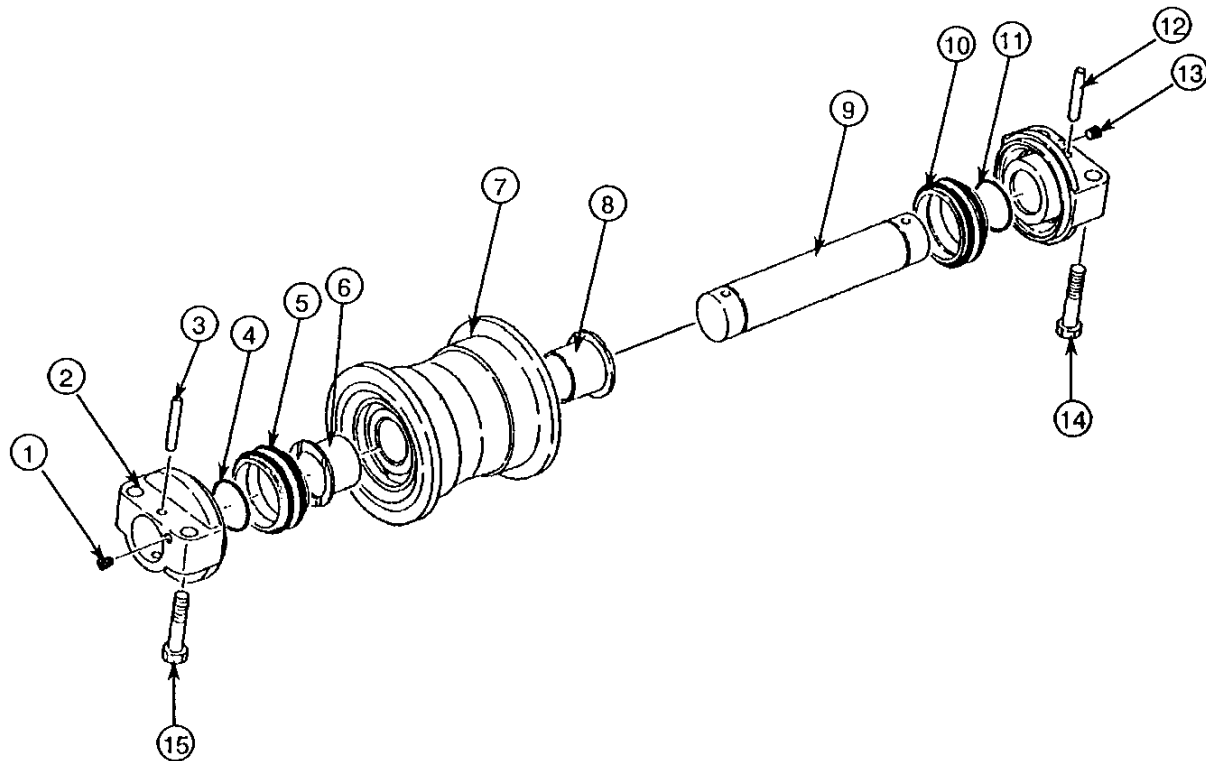


W105-03-06-028

UNDERCARRIAGE / Upper And Lower Roller

EX200-2

UPPER ROLLER DRAWING FOR ASSEMBLY



W105-03-06-029

- 1— Plug
- 2— Collar
- 3— Pin
- 4— O-ring
- 5— Seal group

- 6— Bushing
- 7— Roller
- 8— Bushing
- 9— Axle
- 10— Seal group

- 11— O-ring
- 12— Pin
- 13— Plug
- 14— Bolt
- 15— Bolt

W03-06-14

UNDERCARRIAGE / Upper And Lower Roller

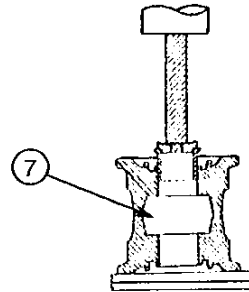
EX200-2

ASSEMBLY OF UPPER ROLLER

Before assembling,

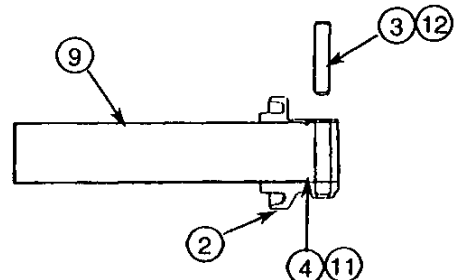
- Clean all parts.
- Check for scratches on rough surfaces. If found smooth with an oil stone.
- As a general rule, replace all seals.

21. Press bushings (6) (8) into roller (7).



W105-03-06-030

22. Apply a film of grease to O-rings (4) (11) and install it to axle (9).
Install collar (2) to axle (9) and fix it by pin (3).
Take care not to damage O-rings (4) (11).

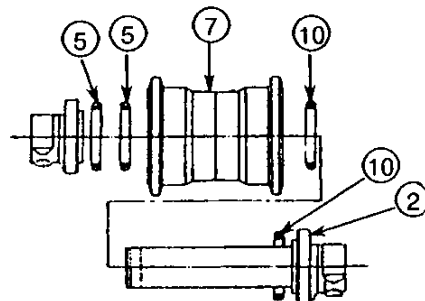


W105-03-06-031

23. Install seal groups (5) (6) into roller (7) and collar (2).

NOTE:

- Apply a film of grease to O-ring part of seal groups.
- Make sure O-ring seated completely.
- Seal group has owned set use proper one.



W105-03-06-026

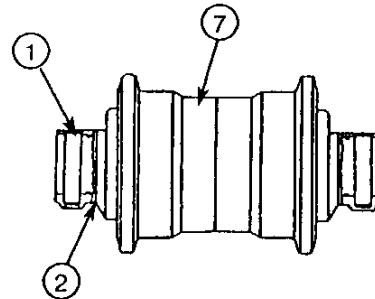
UNDERCARRIAGE / Upper And Lower Roller

EX200-2

24. Install axle (9) into roller (7).
Fix another collar (2) to the axle by pin (12).

Supply engine oil to the roller through plugs (1) (13)
apply LOCTITE (503) to plugs (1) (13).

NOTE: Recommended oil
Class: API-CD
SEA 30
Volume: 230 cc

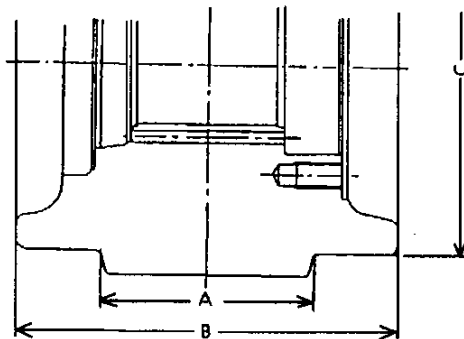


 : 6 mm

W105-03-06-024

UNDERCARRIAGE / Upper Roller and Lower Roller

EX200-2

MAINTENANCE STANDARD**«Upper Roller»**

ND: Nominal Dimension
LU: Limit of Use

W105-03-06-032

Unit: mm

	ND	LU	Remedy
A	84	-	Buildup and finishing
B	150	-	
C	120	110	

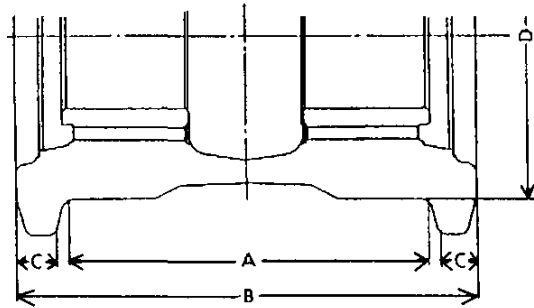
[Axle-Bushing]

Unit: mm

		ND	LU	Remedy
Axle	Outside Dia	40	39.2	Replace
	Inside Dia	40	41.0	
Bushing	Flange Thickness	2	1.2	

UNDERCARRIAGE / Upper Roller and Lower Roller

EX200-2

«Lower Roller»

ND: Nominal Dimension
LU: Limit of Use

W105-03-06-033

Unit: mm

	ND	LU	Remedy
A	172.0	187.25	Buildup weld and finishing
B	218.0	-	
C	18.5	9.25	
D	155.0	137.00	

[Axle-Bushing]

Unit: mm

		ND	LU	Remedy
Axle	Outside Dia	65	64.2	Replace
Bushing	Inside Dia	65	66.0	
	Flange Thickness	2	1.2	

UNDERCARRIAGE / Track Link

EX200-2

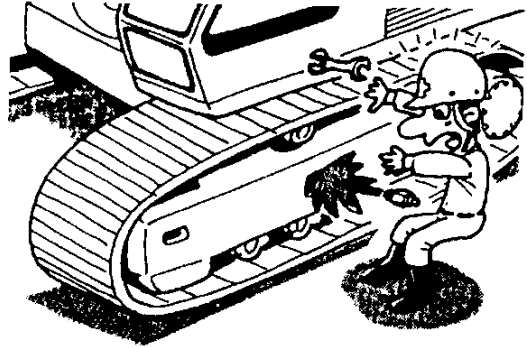
TRACK LINK

Following instructions are very important for removal and Installation of Track link.

- (1) Must be to understanding removal and installation procedure at first and must be have a knowledge to safety work.
- (2) Must be careful to disassemble the track adjuster, if improper operation to disassemble, it causes to serious personal injury.

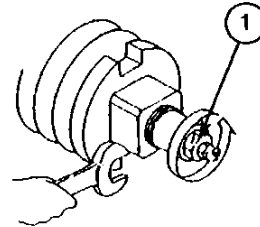


WARNING: Slowly loosen the valve to release grease, when decrease the track tension if the valve is loosened abruptly, the grease may be ejected.



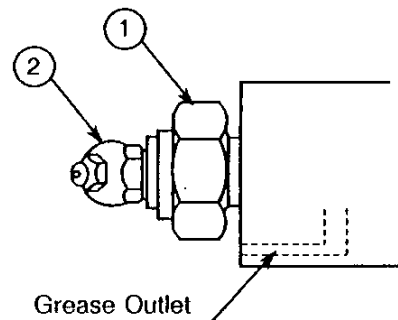
W105-03-07-001

- (1) To decrease the track tension just a turn valve (1) enough to release the grease, From cylinder.



W105-03-07-002

- (2) Loosen valve (1) or never loosen fitting (2).



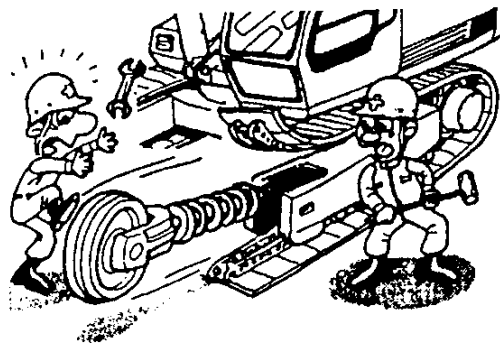
M104-07-074

W03-07-01

UNDERCARRIAGE / Track Link

EX200-2

- (3) Must be careful the front idler may eject unexpectedly when disconnected the track link because of the extreme preload on the track spring.

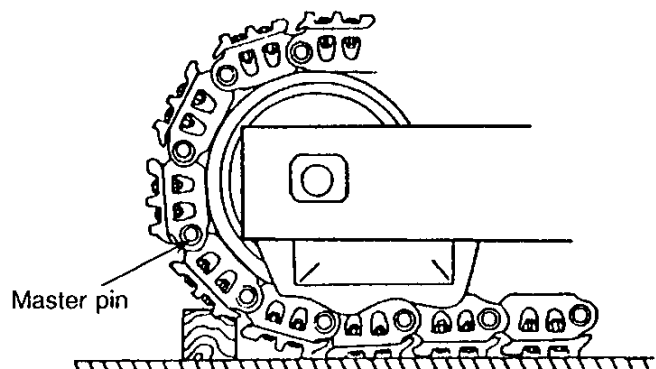


W105-03-04-005

REMOVAL & INSTALLATION

«Removal»

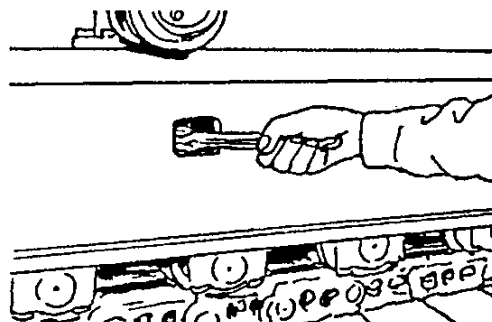
- (1) Move track link until master pin is over front idler in the position.
Put wooden block as shown.



W105-03-07-006

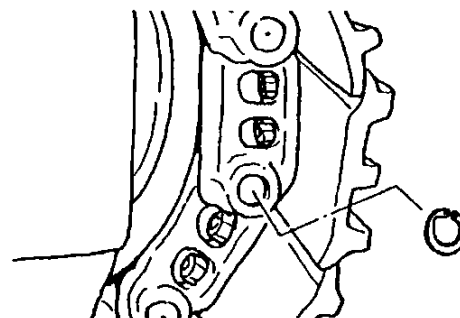
- (2) Loosen valve to flow out grease.

 : 24 mm



W105-03-07-007

- (3) Remove retaining ring.



W105-03-07-009

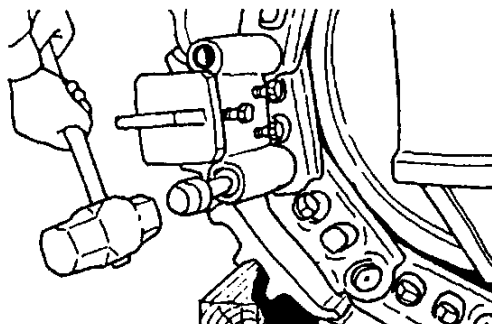
W03-07-02

UNDERCARRIAGE / Track Link

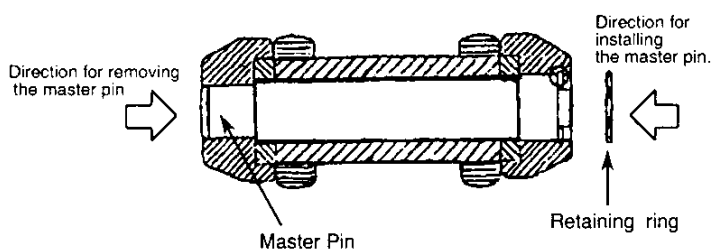
EX200-2

- (4) Push out master pin out by using a special tool (ST-1970)

NOTE: Make sure direction of master pin as follows.

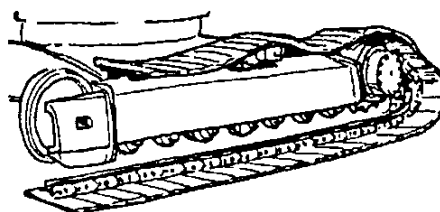


W105-03-07-008



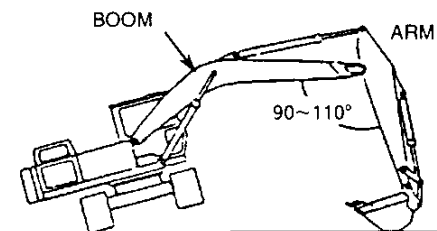
W105-03-07-010

- (5) Operate the machine to backward



W105-03-07-011

- (6) Juck up the machine as shown.
Put wooden blocks under the machine.
Pull out the track link.



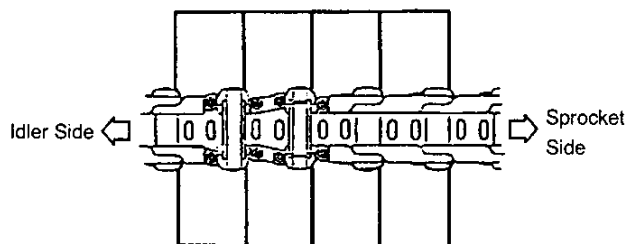
W105-03-07-012

UNDERCARRIAGE / Track Link

EX200-2

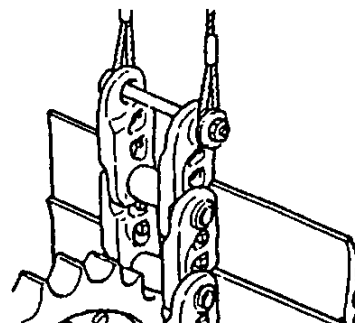
《Installation》

- (1) Jack up the machine and put the track link under the lower roller.
Make sure direction of the track link as shown.



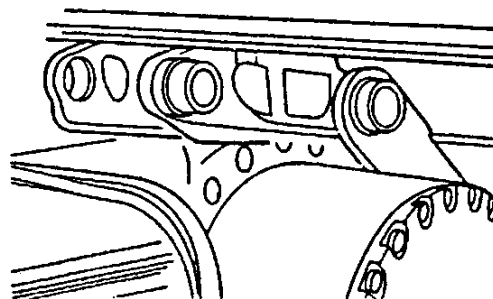
W105-03-07-013

- (2) Lift the track link and place it on the sprocket.



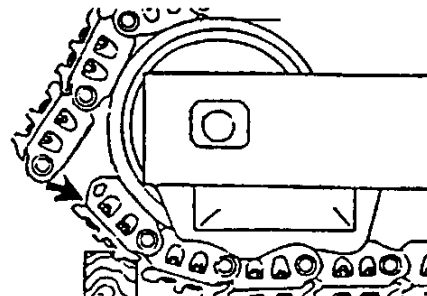
W105-03-07-014

- (3) Slowly operate the sprocket in forward direction.



W105-03-07-015

- (4) Keep on operating the sprocket until end of track link is over front idler.
Lower the machine.
Put wooden block as shown.



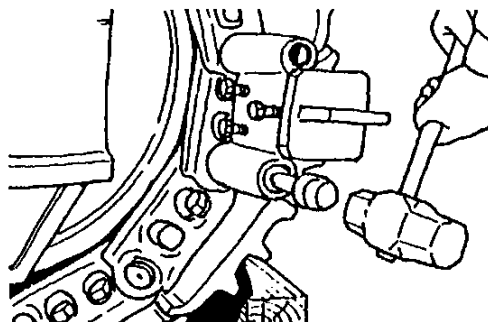
W105-03-07-016

UNDERCARRIAGE / Track Link

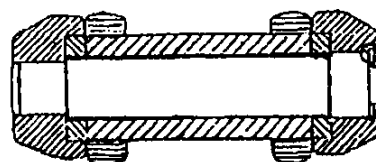
EX200-2

- (5) Install master pin using a special tool (ST-1970).

NOTE: Make sure direction of masterpin as shown.



W105-03-07-017

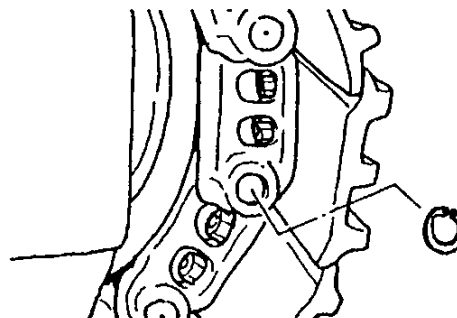


Direction for installing master pin

W105-03-07-010

- (6) Install retaining ring.

*NOTE: 1. Make sure installing the ring with round cut facing this side.
2. As a general rule replace the ring.*



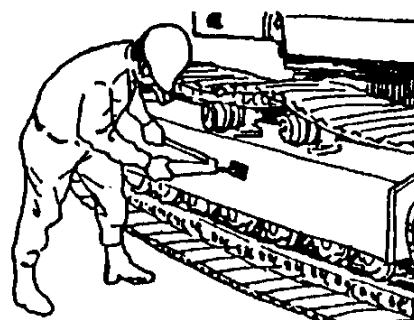
W105-03-07-009

- (7) Supply grease to the cylinder through the fitting to adjust the track link tension.

 : 24 mm

STANDARD TRACK

TENSION 315~350 mm (12.⁴ in ~ 13.⁸ in)



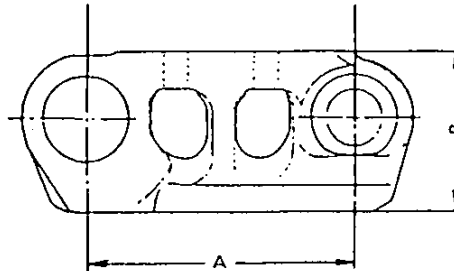
W105-03-07-018

UNDERCARRIAGE / Track Link

EX200-2

MAINTENANCE STANDARD

«Link»



ND: Nominal Dimension
LU: Limit of Use

W104-03-07-019

Unit: mm

	ND	LU	Remedy
A	190	196	Buildup weld and finishing or Replace
B	105	98	

«Link Pin»



W104-03-07-020

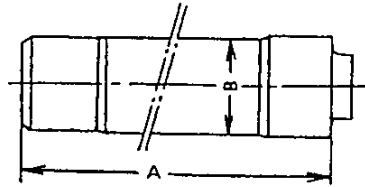
Unit: mm

	ND	LU	Remedy
A	212	-	Replace
B	38	35	

W03-07-06

UNDERCARRIAGE / Track Link

EX200-2

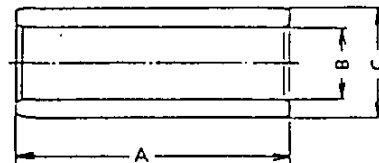
«Master Pin»

ND :Nominal Dimension
LU :Limit of Use

W104-03-07-021

Unit: mm

	ND	LU	Remedy
A	203.0	-	Replace
B	38.4	35.4	

«Track Bushing»

W104-03-07-022

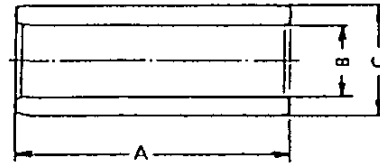
Unit: mm

	ND	LU	Remedy
A	145.5	-	Replace
B	38.7	40	
C	59.0	54	

UNDERCARRIAGE / Track Link

EX200-2

«Master Bushing»



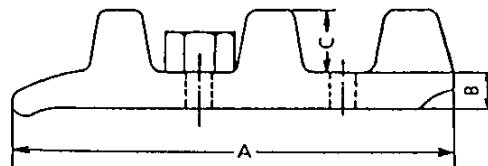
ND: Nominal Dimension
LU: Limit of Use

W104-03-07-023

Unit: mm

	ND	LU	Remedy
A	129.2	-	Replace
B	38.7	42	
C	59.0	54	

«Grouser Shoe»



W104-03-07-024

Unit: mm

	500 mm Grouser		
	ND	LU	Remedy
A	217.5	-	Replace
B	9.0	-	
C	26.0	18	

W03-07-08