

# **Shop Manual**

# **D31S-16**

# **D31Q-16**

## **CRAWLER DOZER**

**SERIAL NUMBERS 25001 and up**

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# SHOP MANUAL

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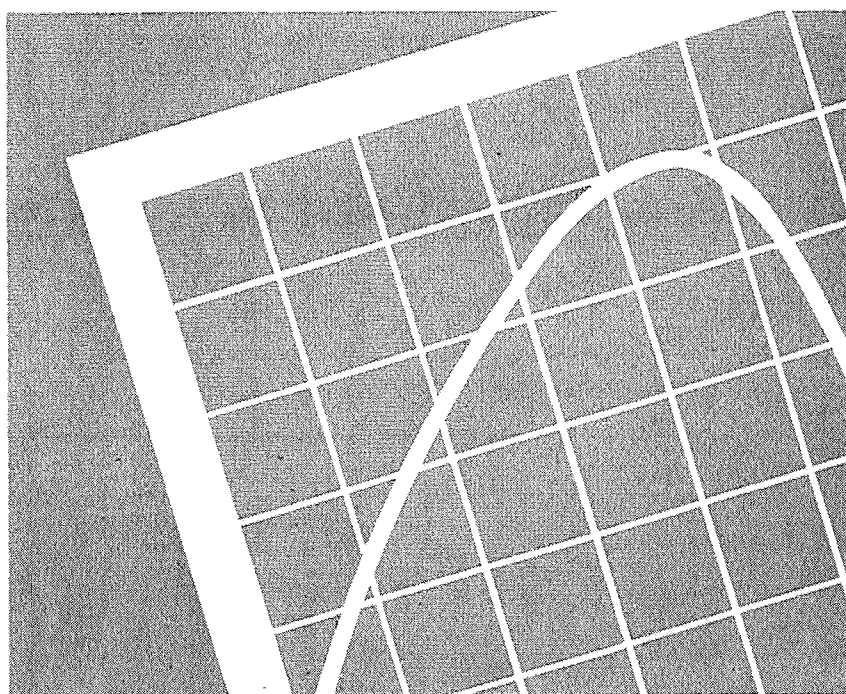
## D31-16

SERIAL      D31S-16 25001~  
NUMBERS    D31Q-16 25001~

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## 01 SPECIFICATIONS

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# SPECIFICATIONS

• BODY

Machine model		D31S-16	D31Q-16
Serial number		25001~	25001~
Weight	Operating weight (kg) (Prescribed quantity of fuel, lubricant and water)	6750	7100
	Overall length	—	—
Dimensions	Overall length of machine (mm)	4155	4050
	Overall length with bucket (mm)	4155	4050
	Overall width	1790	2250
	Overall width of machine (mm)	1790	2250
	Overall width with bucket (mm)	1905	2300
	Overall height	2590	2620
	Overall height to the top of exhaust pipe (mm)	2590	2620
	Overall height at the top of operator's seat (mm)	1955	1985
	Minimum ground clearance (mm)	315	385
	Undercarriage	Distance between center of tracks (mm)	1450
	Ground contacting length (mm)	1880	1880
	Ground contacting pressure (kg/cm <sup>2</sup> )	0.54	0.31
	Track width (standard) (mm)	330	600
Performance	Travelling speed	Forward 1st speed (km/h)	2.2
		Forward 2nd speed (km/h)	3.9
		Forward 3rd speed (km/h)	6.5
		Reverse 1st speed (km/h)	2.4
		Reverse 2nd speed (km/h)	4.3
		Reverse 3rd speed (km/h)	7.1
	Minimum turning radius (m)	2.2	2.4
	Gradeability (Degrees)	30	
	Fuel tank (ℓ)	115	
	Cooling water (ℓ)	22	
Engine lubricating oil (ℓ)	13		
Water • Oil capacity	Damper (ℓ)	1	
	Hydroshift transmission (ℓ)	13	
	Bevel gear shaft • Steering device (ℓ)	15	
	Final drive (each side) (ℓ)	8.5	11
	Idler (each) (cc)	150	
	Track roller (each) (cc)	150	
	Carrier roller (each) (cc)	115	
	Hydraulic equipment (ℓ)	52	

Machine model		D31S-16	D31Q-16	
Serial number		25001~	25001~	
Power transmission	Damper	Wet spring cushion type		
	Hydroshift transmission	Planetary gear, Hydraulic operation, Lubrication oil pressure pumping type		
	Bevel gear	Spiral bevel gear		
	Steering clutch	Dry multi-disk, spring compression type, foot operated hydraulic booster type		
	Steering brake	Dry band type Foot operated interconnected with steering clutch		
	Final drive	Spur gear single stage reduction		
	Undercarriage	Suspension	Rigid type	
		Carrier roller	One for each side	
		Track roller	Five for each side	
		Shoe	Assembly type semidouble	37 pieces for each side
Pitch 154mm Width 330mm				37 pieces for each side Pitch 154mm Width 600mm
Hydraulic system	Link type	Single type		
	Bucket	Full, with teeth 0.8m <sup>3</sup>		
	Maximum	175kg/cm <sup>2</sup>		
	Discharge	87 ℓ/min		
	Lift cylinder	Dump cylinder		
	Dump cylinder	Reciprocating piston		
	Hydraulic tank	External operation valve		

# SHOP MANUAL

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## D31-16

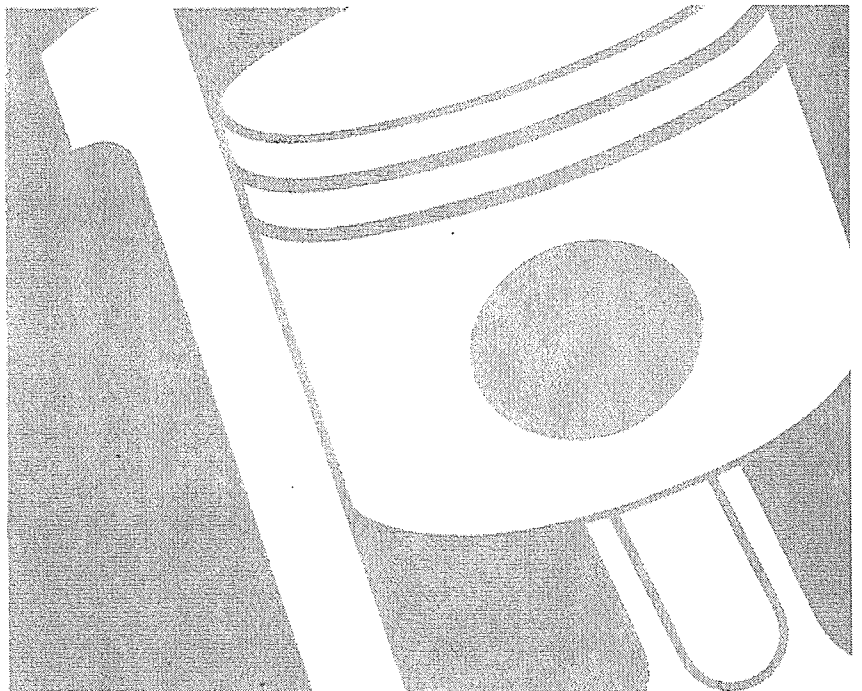
SERIAL        D31S-16 25001~  
NUMBERS     D31Q-16 25001~

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# 14 ENGINE

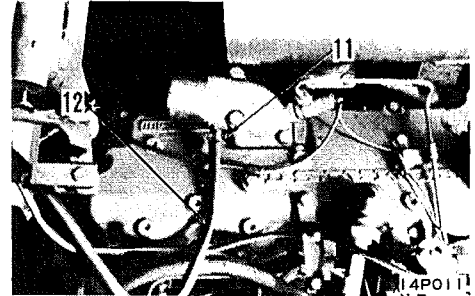
DISASSEMBLY AND ASSEMBLY

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**5. Dust indicator hose**

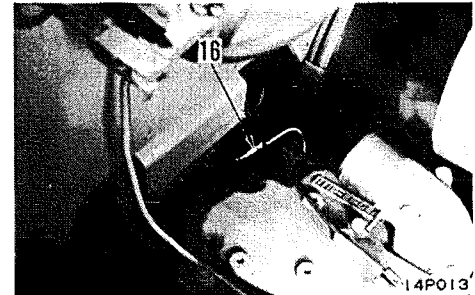
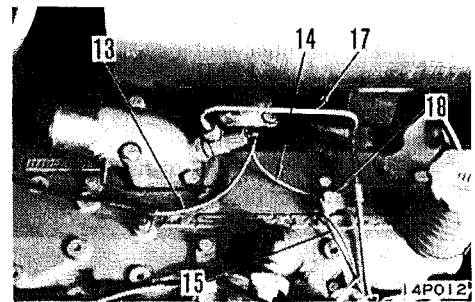
Loosen the dust indicator clamp (11) and disconnect the hose (12).

**6. Magnetic valve wiring**

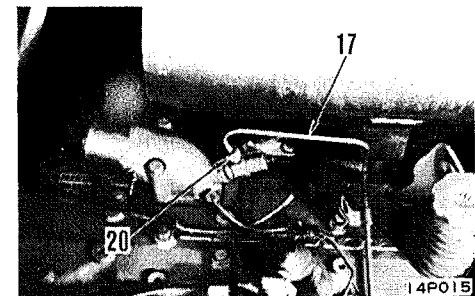
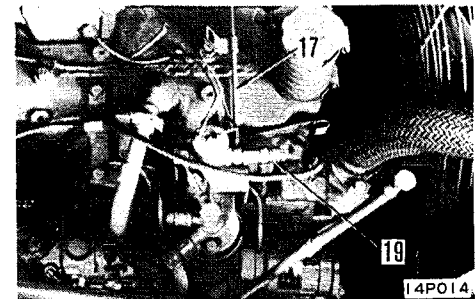
1) Disconnect the magnetic valve wiring (13), (14) and the grounding wire (15).

2) Disconnect the connector (16) of the resistor-air heater wiring.

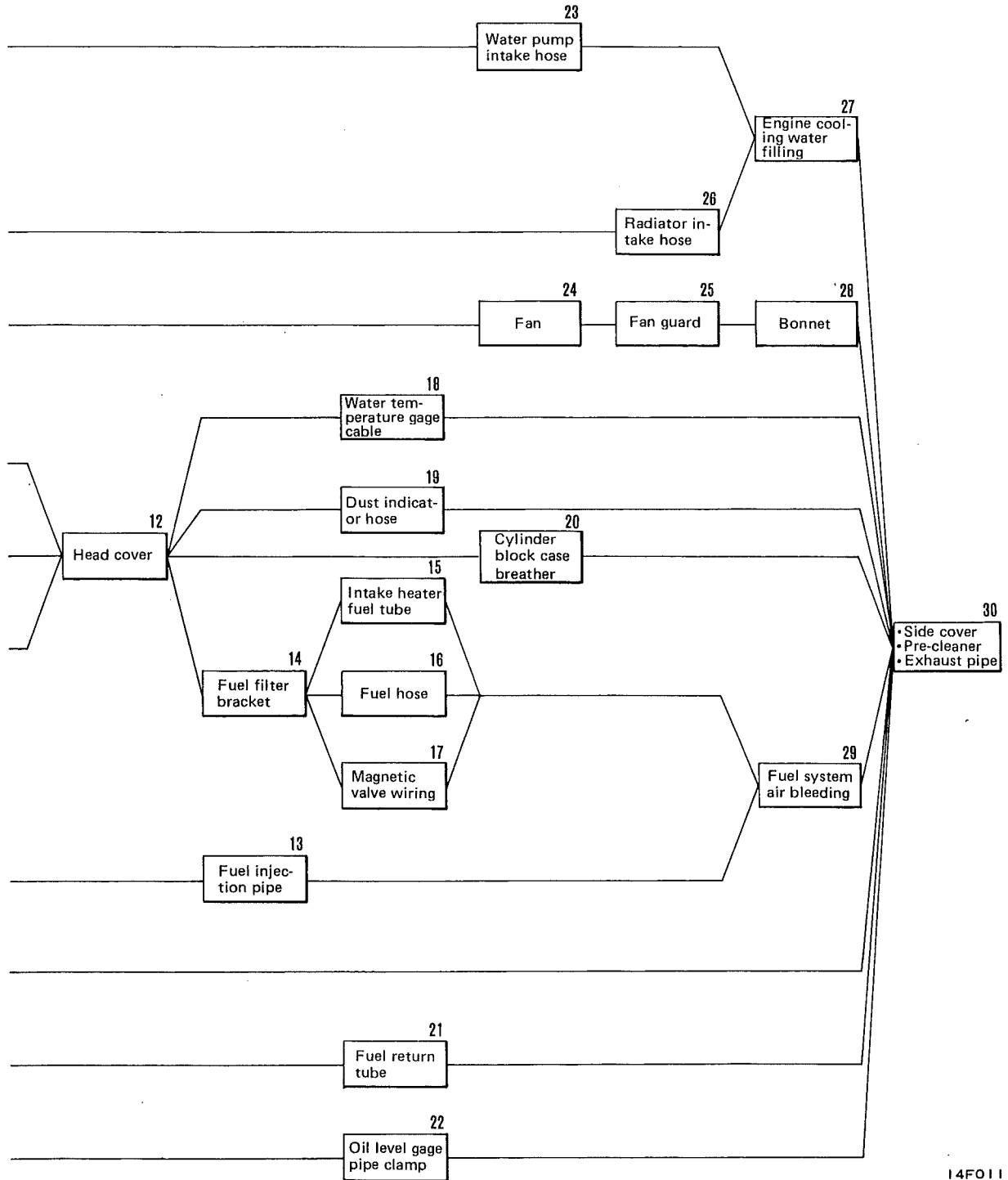
★ The grounding wire mounting bolt is used in common with the fuel tube (17) clamp bolt (18).

**7. Air heater fuel tube**

Loosen the magnetic valve side joint bolt (19), remove the air heater side of the cap nut (20) and disconnect the tube (17).



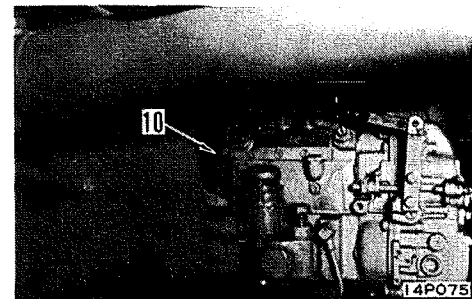
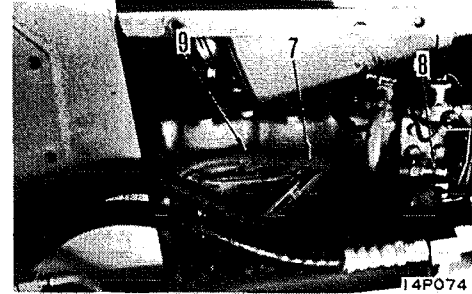




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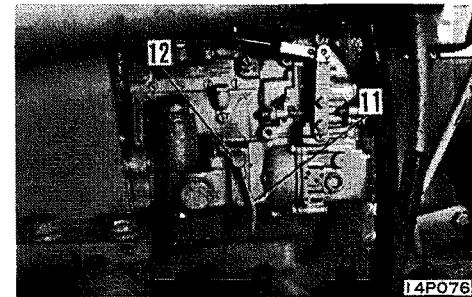
- 2) Disconnect the hose (7) between the fuel injection pump and the fuel filter from the filter by removing the fuel filter center joint bolt (8) and the hose clamp bolt (9).

★ This hose can be disconnected by removing the joint bolt (10) at the fuel injection pump side, but since it requires a difficult work, the disconnection is done as described above.



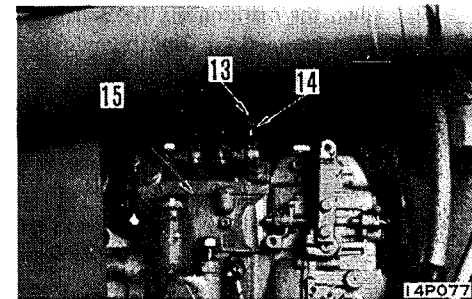
5. Oil feed pipe

Remove the joint bolt (12). Then disconnect the fuel injection pump lubricant feed pipe (11) from the fuel injection pump.



6. Fuel injection pipe

Remove the cap nut (14). Then disconnect the fuel injection pipe (13) from the injection pump (15).

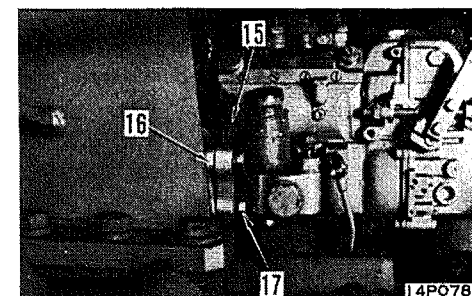


7. Fuel injection pump

Confirm the matching marks on the fuel injection pump (15) and coupling case (16) and remove the mounting nuts (17). Then, slowly remove the fuel injection pump.

★ The matching marks are stamped to obtain correct injection timing. Thus, the matching marks should be confirmed before removing the pump to prevent the injection timing from being off after the pump is reinstalled.

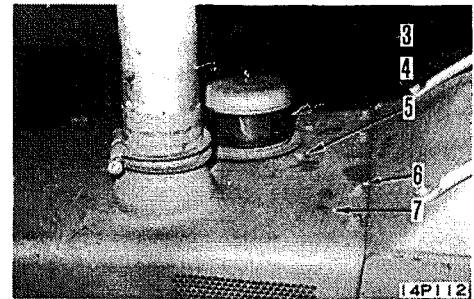
★ Close the fuel and oil ports in the removed pump with tape or the like to prevent the entry of dust and foreign matter.



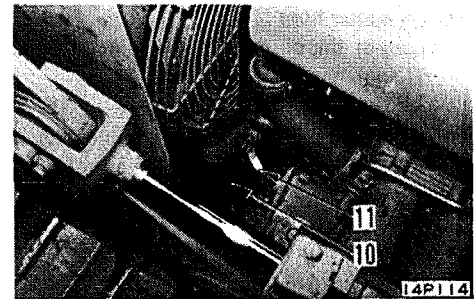
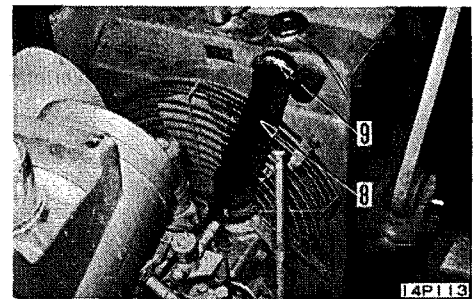


**3. Exhaust pipe****4. Pre-cleaner.****5. Air cleaner mounting bolt.****6. Bonnet.**

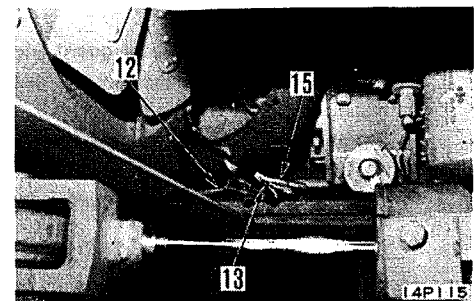
Remove the exhaust pipe (3) and the pre-cleaner (4). Remove the air cleaner mounting bolt (5) and the bonnet mounting bolt (6). Then, remove the bonnet (7) from the body.

**7. Upper and lower water piping**

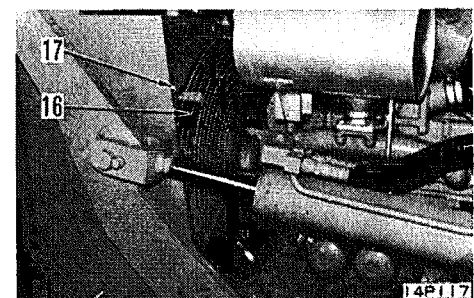
Disconnect the upper radiator inlet hose (8) by loosening the upper tank side clamp (9). In the same manner, disconnect the hose (10) between the lower tank and the water pump by loosening the water pump side clamp (11).

**8. Wiring**

Disconnect the head lamp (12) and the horn cord (13) at the connector section. Disconnect the alternator cord (15) at the terminal section by removing the alternator clamp (14).

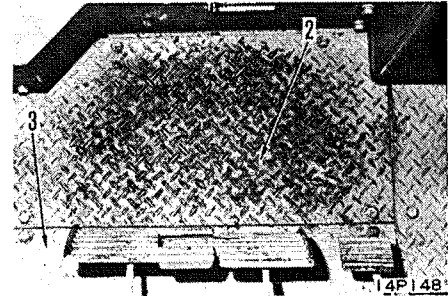
**9. Fan guard**

Remove the fan guard (16) mounting bolt (17). Then remove the fan guard.



**3. Floor plate**

Remove the floor plate mounting bolts (2) (3). Then, remove the plate.

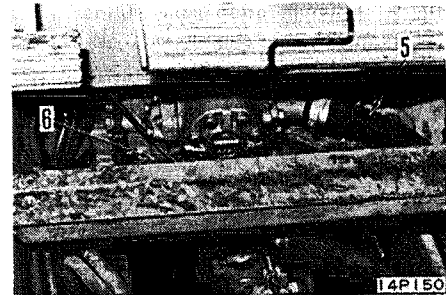
**4. Transmission inspection cover**

Remove the mounting bolt of the transmission inspection cover (4). Then remove the inspection cover.

**5. Hydraulic pump piping**

Remove the flange bolts of the suction tube (5) and outlet tube (6) of the hydraulic pump. Then, remove the tubes.

- ★ Width across flats of the suction flange mounting bolt : 17mm.
- Width across flats of the outlet flange mounting bolt: 13mm.

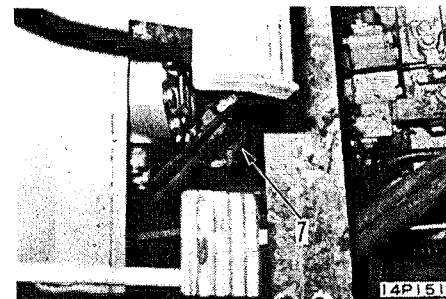
**6. Universal joint**

Remove the universal joint (7) mounting bolt. Then, remove the joint assembly.

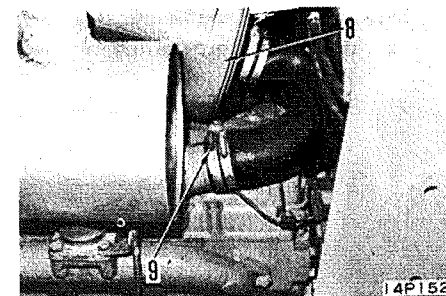
- ★ The universal joint should be sling with a wire cable to facilitate the removal of the bolts without letting them drop.



Weight of the universal joint assembly: 5kg.

**7. Air cleaner**

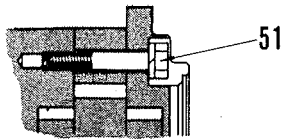
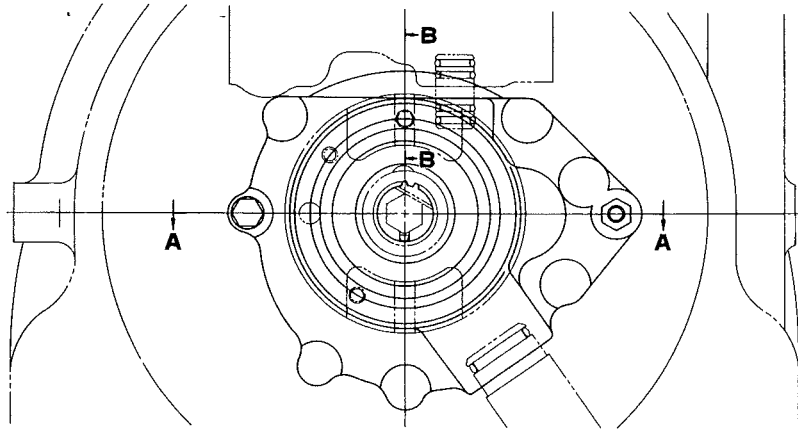
Loosen the connector band (9) of the air cleaner assembly (8). Then, remove the air cleaner.



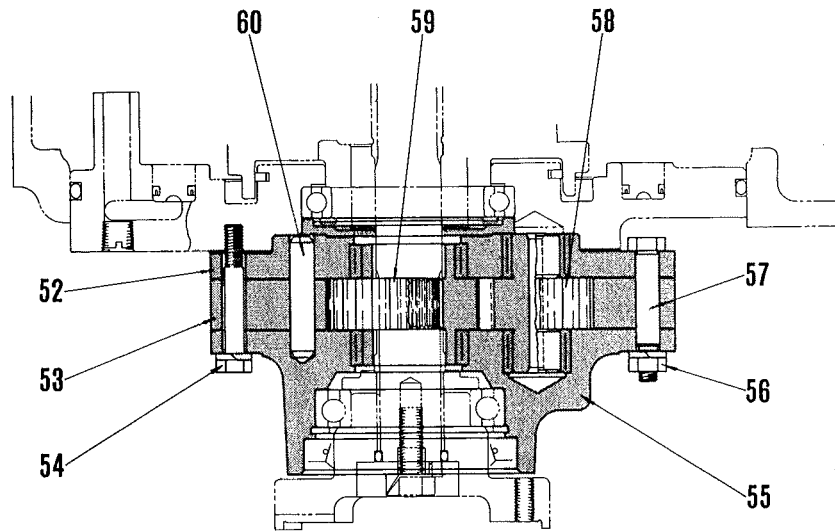
# STRUCTURE AND FUNCTION

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Hydroshift steering pump



Section B-B

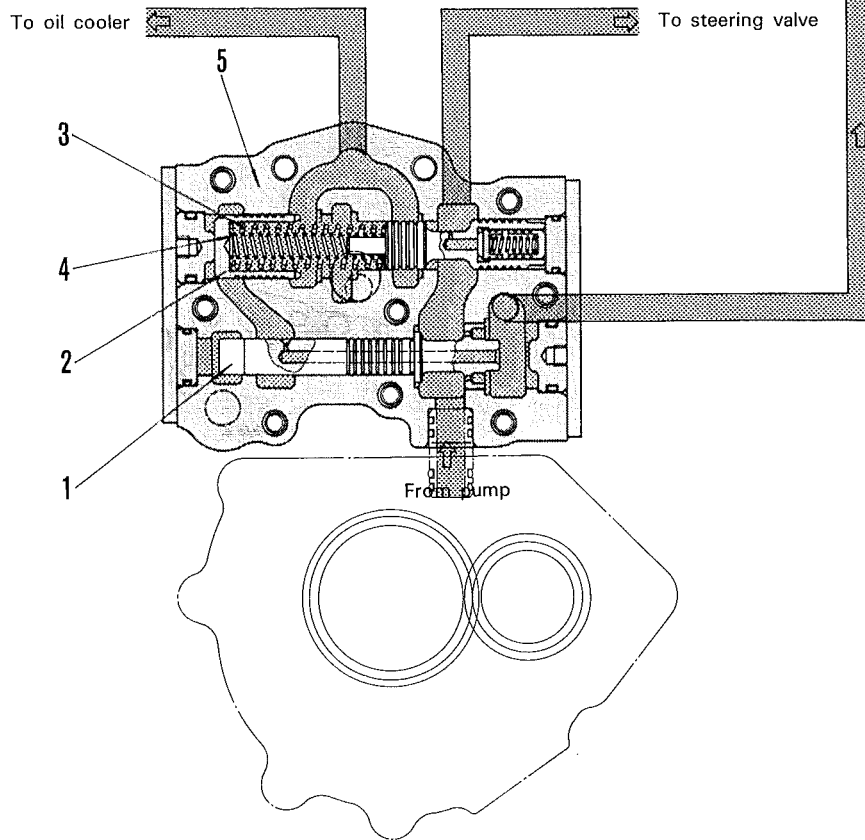
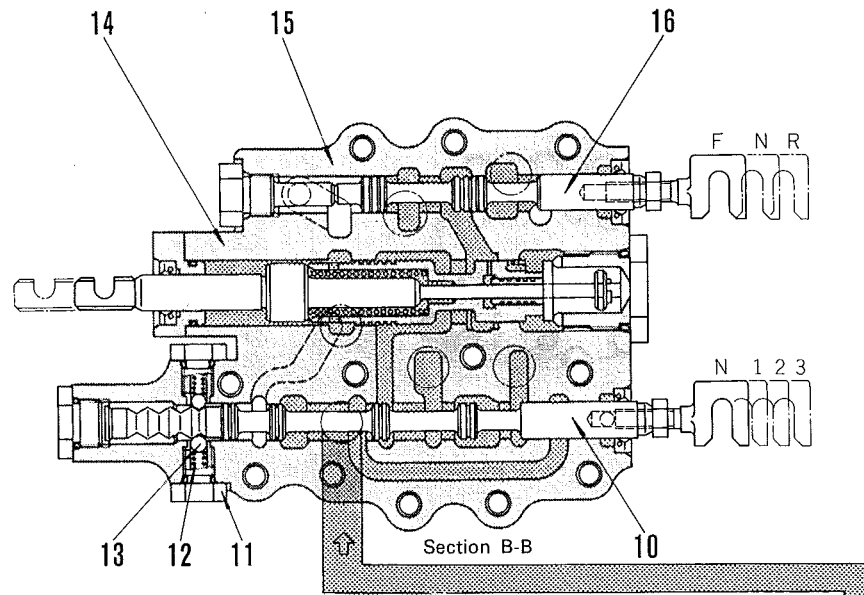


Section A-A

21F009

- |             |                 |
|-------------|-----------------|
| 3. Coupling | 56. Nut         |
| 51. Bolt    | 57. Stud        |
| 52. Bracket | 58. Driven gear |
| 53. Case    | 59. Drive gear  |
| 54. Bolt    | 60. Pin         |
| 55. Housing |                 |

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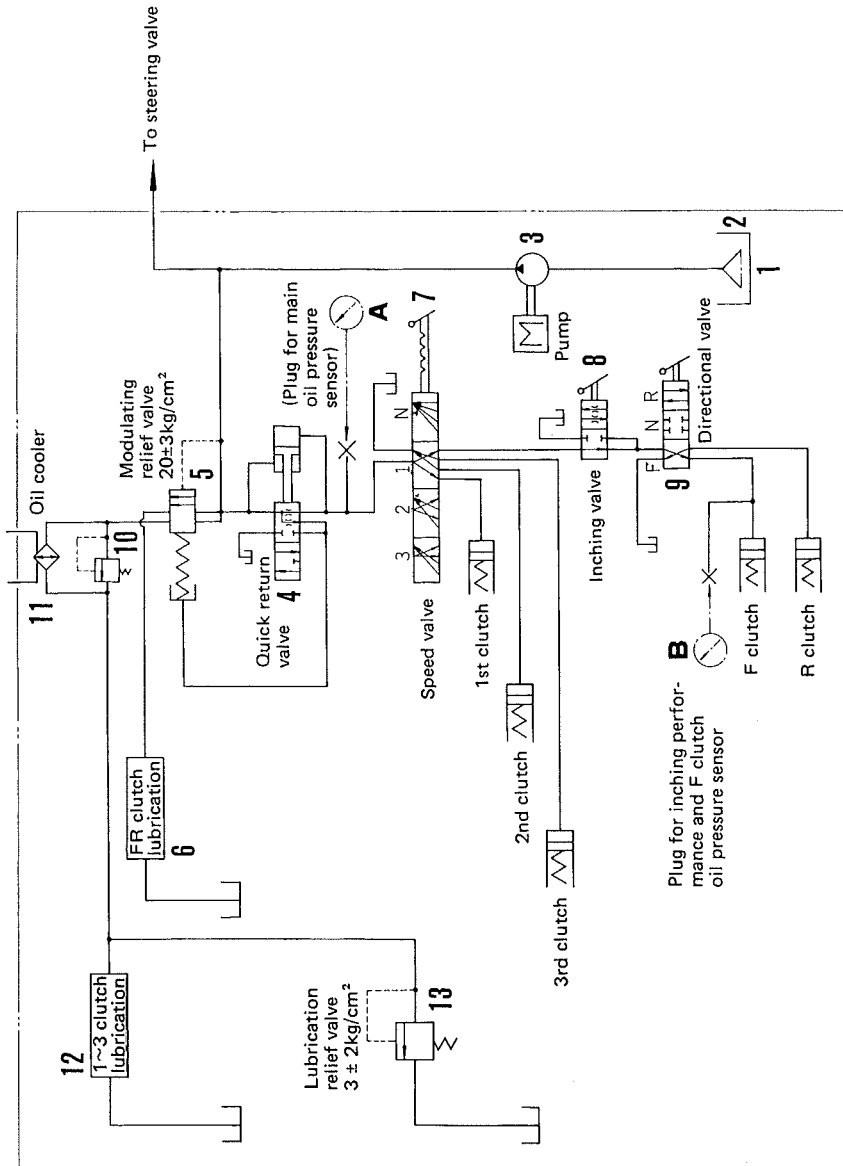


Section A-A

21F058

HYDROSHIFT TRANSMISSION HYDRAULIC DIAGRAM  
(Forward 1st speed)

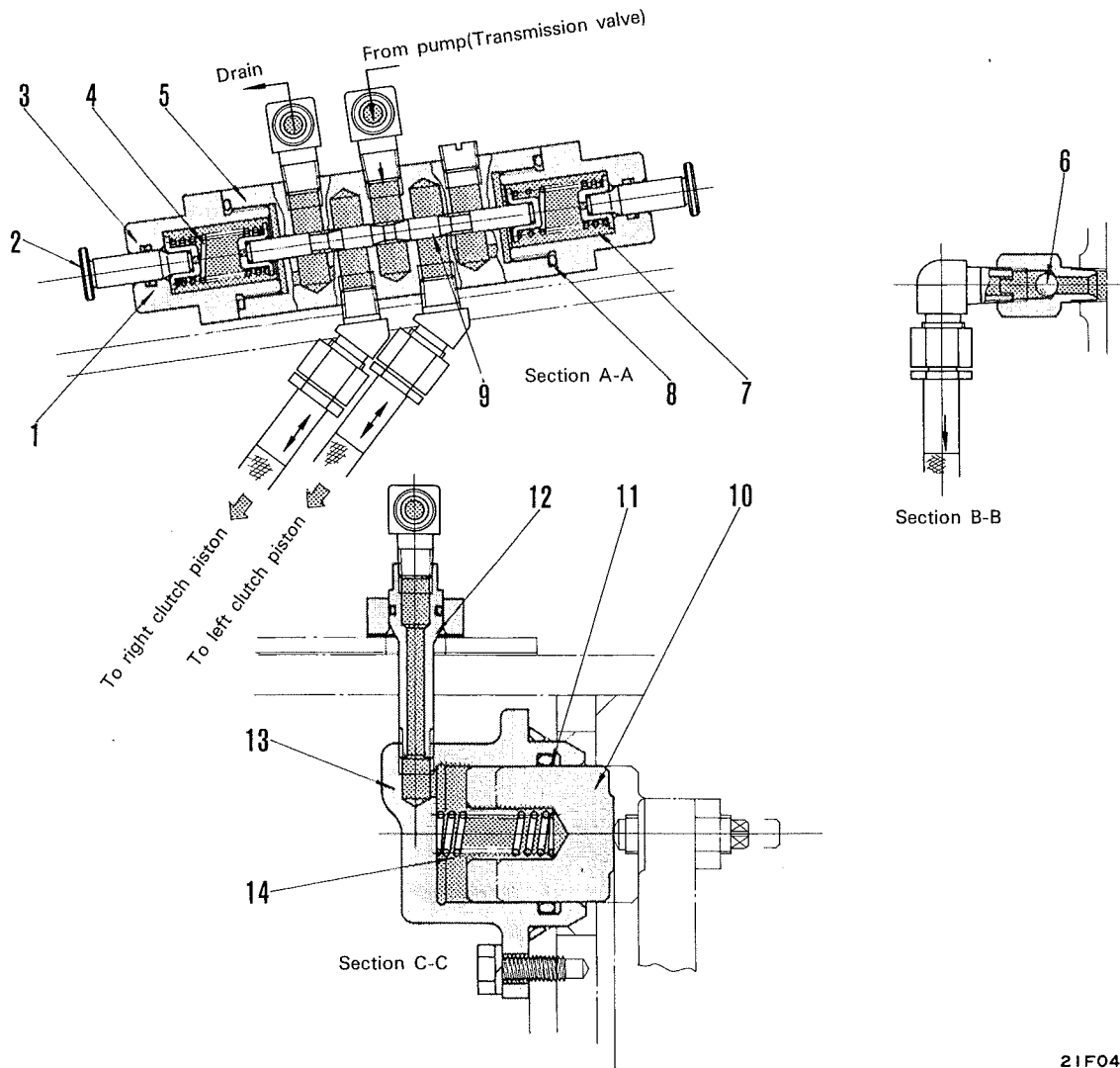
D31S·Q-16 25001 ~ 28000



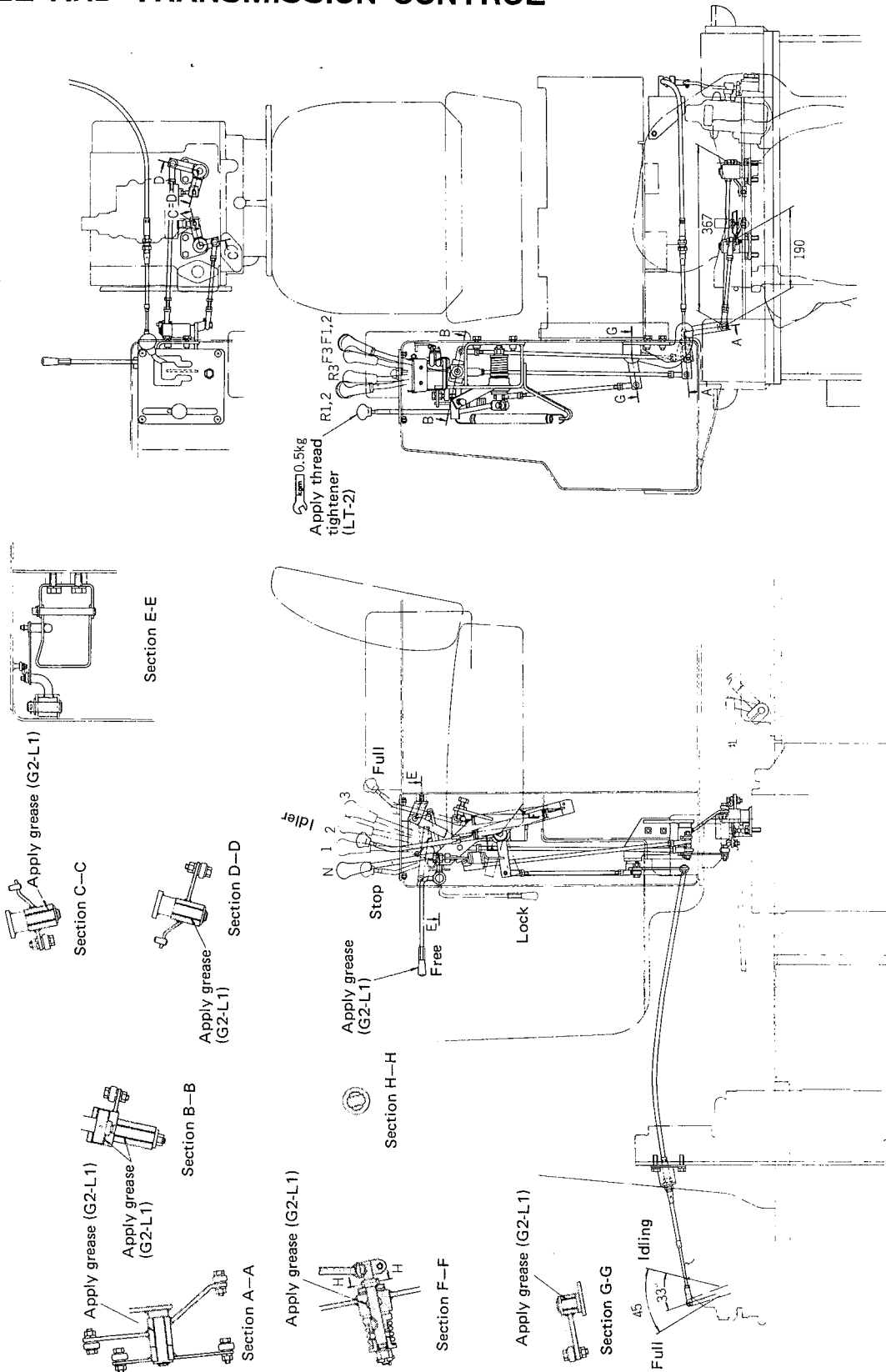
21F065

1. Hydroshift transmission case
2. Strainer
3. Hydroshift transmission steering pump
4. Quick return valve
5. Modulating relief valve
6. F.R. clutch lubrication
7. Speed spool
8. Inching spool
9. Directional valve
10. Oil cooler relief valve
11. Oil cooler
12. 1~3rd speed lubrication
13. Lubrication relief valve
- A. Clutch oil pressure check plug (PT1/8)
- B. F. clutch oil pressure check plug (PT1/8)  
Inching oil pressure check plug (PT1/8)
- C. R. clutch oil pressure check plug (PT1/8)  
Plug (installation for spare switch)

D31S·Q-16 25001 ~ 28000

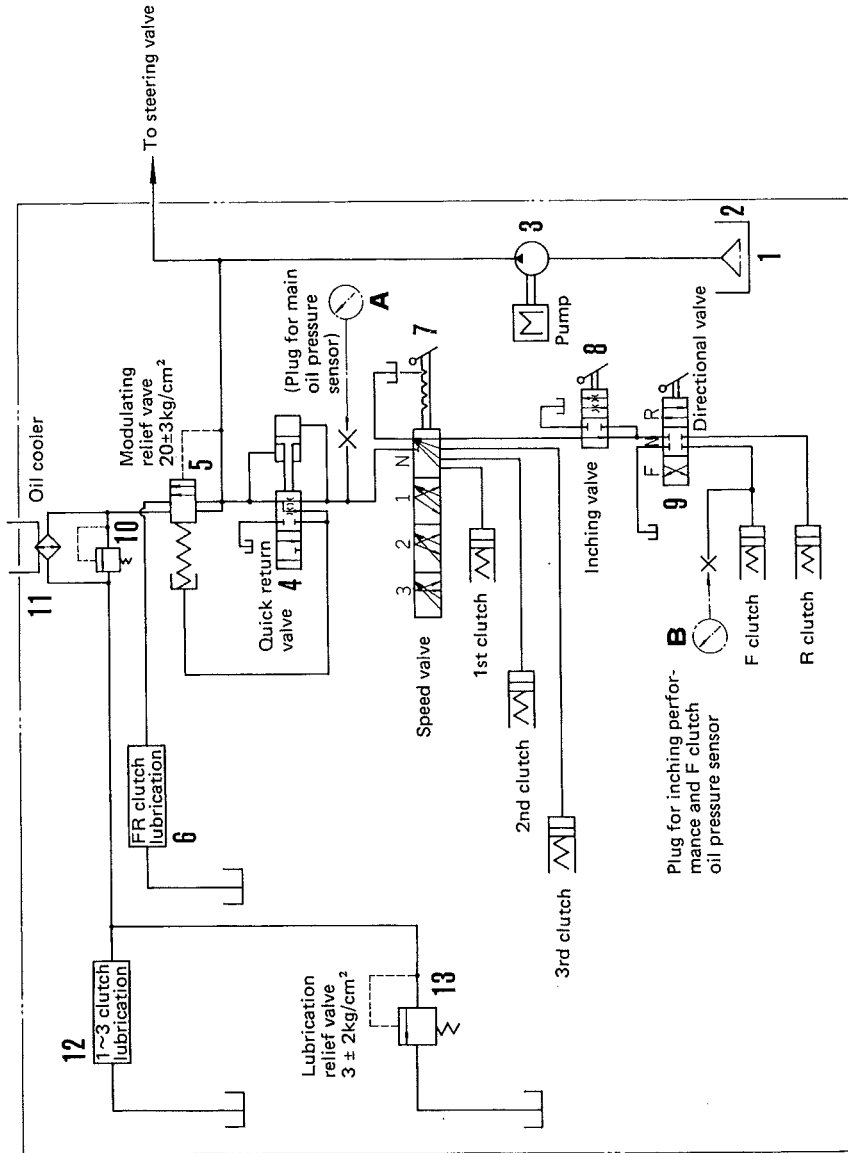


# FUEL AND TRANSMISSION CONTROL



HYDROSHIFT TRANSMISSION HYDRAULIC DIAGRAM (NEUTRAL)

D31S·Q-16 25001 ~ 28000



21F061

1. Hydroshift transmission case
  2. Strainer
  3. Hydroshift transmission steering pump
  4. Quick return valve
  5. Modulating relief valve
  6. F.R. clutch lubrication
  7. Speed spool
  8. Inching spool
  9. Directional spool
  10. Oil cooler relief valve
  11. Oil cooler
  12. 1~3rd speed lubrication
  13. Lubrication relief valve
  - A. Clutch oil pressure check plug (PT1/8)
  - B. F. clutch oil pressure check plug Inching oil pressure check plug (PT1/8)
  - C. R. clutch oil pressure check plug (PT1/8)
- Plug (installation for spare switch)

## CHECK AND ADJUSTMENT OF STROKE

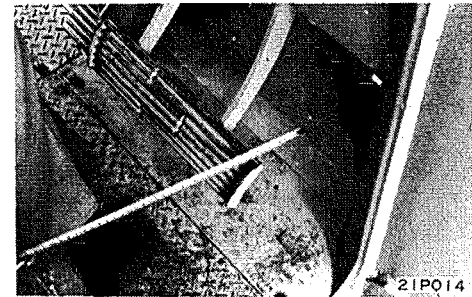
### 1. Measurement of stroke of steering (brake pedal)

- 1) After stopping engine, step on the pedal fully, and put scale on the pedal.



- 2) Leave scale as it is, and release foot off pedal.  
The returned amount of pedal corresponds to pedal stroke.

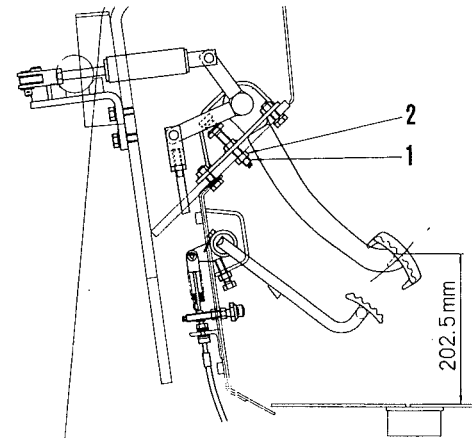
  - ★ Parking brake should be free while measuring.
  - ★ Standard stroke: 131 mm




### 2. Adjustment of brake

Adjust brake pedal (steering pedal) to stroke of 131 mm.

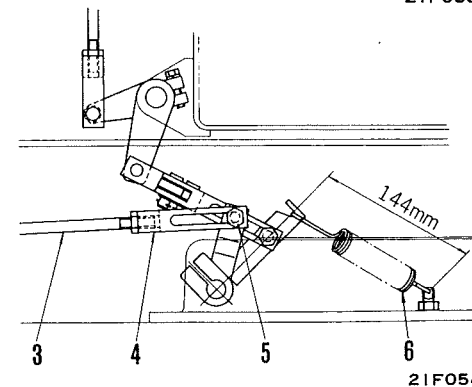
	Clearance between brake band drum (mm)	Brake pedal stroke (mm)	Step-on force (kg)	Parking brake lever stroke (mm)
Standard	1.0	130	One side 9.1 Both side 18.2	164
Clearance limit	1.3	180	One side 11.2 Both side 22.4	227
Possible maximum stroke	1.45	190	One side 11.5 Both side 23.0	239



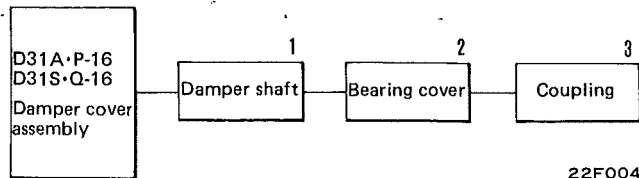
- 1) Using adjustment bolt (1), adjust brake pedal to 202.5 mm above floor top, and lock bolt with lock nut (2).

 Tightening torque for lock nut 1.5~2.0 kg.m

- 2) Make sure on rod (3) that pin (5) is closely contacted with rear end of hole of yoke (4), and adjust distance between pins.  
At the same time, make sure the return spring (6) in brake cover is properly set to installation length of 144 mm.



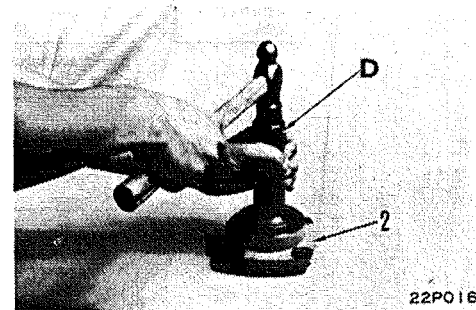
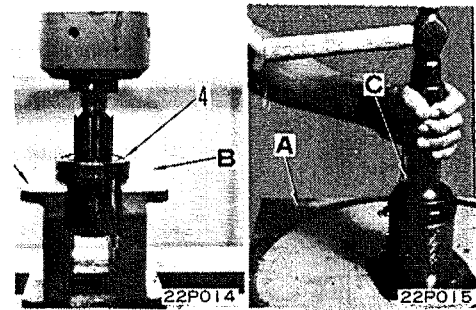
## ASSEMBLY OF DAMPER COVER ASSEMBLY



Necessary tools		A	B	C	D
	Block (H=100mm)	2			
	Block		2		
790-101-5421	Plate			1	
790-101-5221	Grip			1	1
01010-51218	Bolt			1	1
791-222-1310	Plate				1

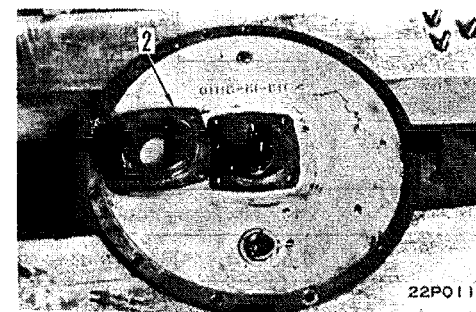
### 1. Damper shaft

- 1) Install snap ring for coupling side to damper shaft (3), and set both bearing (4) and shaft to block B. Thrust the shaft using a press from the damper side as far as the snap ring. Then, install another side snap ring.
- 2) Place damper cover with its inner side down on block A, and force-fit damper shaft into cover using tool C.



### 2. Bearing cover

- 1) Using tool D, force-fit oil seal to bearing cover (2).
- 2) Set O-ring on bearing cover (2), and after applying grease G2-L1 over oilseal lip, install bearing cover to damper cover.

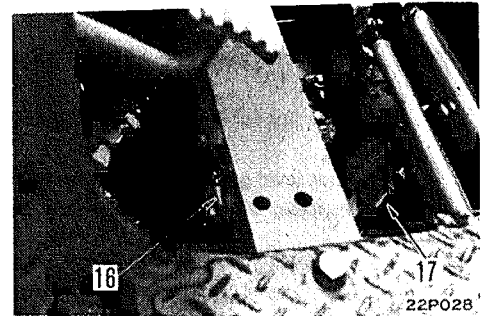


### 3. Coupling

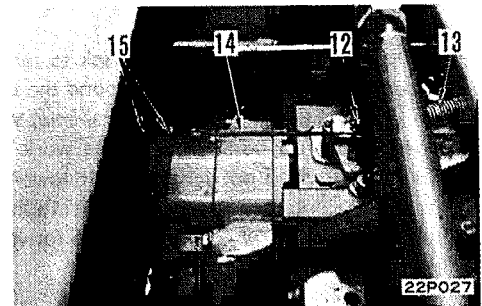
- 1) Apply grease G2-L1 into recess spline, and install coupling (1) to damper cover, taking care not to damage oil seal.

**8. Steering tube**

Install hose (16) connecting HYDROSHIFT transmission modulating valve to steering valve and return hose (17) leading from steering valve to top of HYDROSHIFT transmission case.

**9. Inching cable**

Set return spring (13) between yokes and connect inching cable (14). After inserting cotter pin (12), secure cable to bracket using double nut (15).

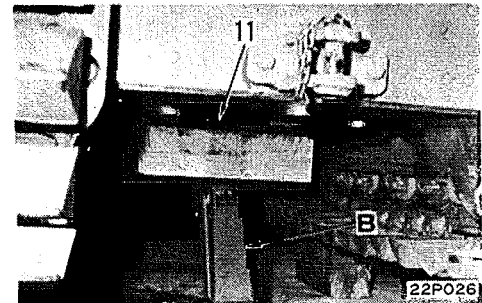
**10. Underguard**

Load underguard on a lifter and push it from rear of body to the position to be installed. Slowly lift up underguard as guide bar guides toward mounting bolt holes, and then install underguard (11) with mounting bolts.

★ Coat thread tightener LT-2 on these mounting bolts.



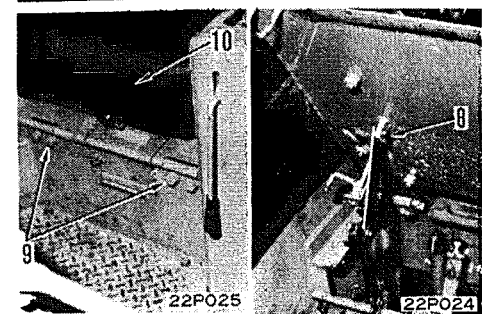
Weight of rear underguard: 40 Kg.

**11. Operator's seat**

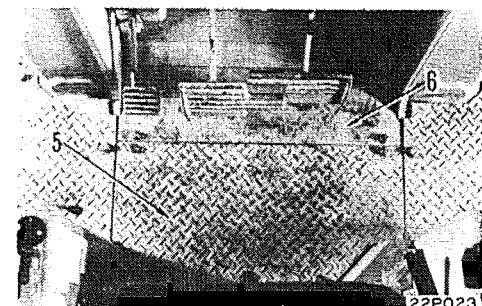
Lift up operator's seat (10) for positioning, install hinge plate with bolts (9), and insert pin (8) by moving seat forward and down by means of lock lever (7). Then, return operator's seat to original position.



Weight of operator's seat assembly: 25 Kg.

**12. Floor plate**

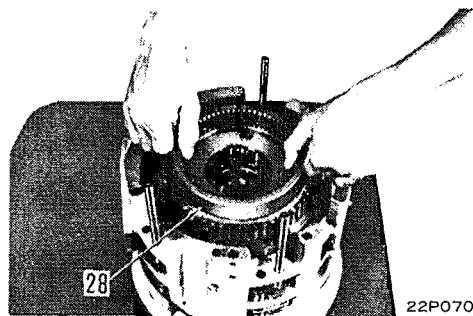
Install floor plates (5) and (6).



**15. Ring gear**

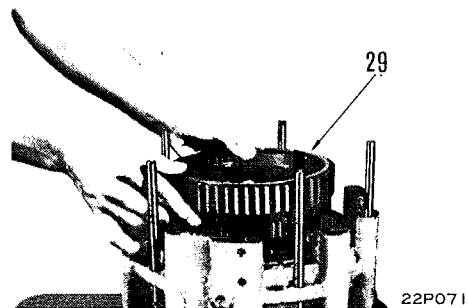
Remove ring gear (28).

- ★ Before removing ring gear confirm direction of insertion (Groove of snap ring gear comes to underside).

**16. NO.2 ring gear**

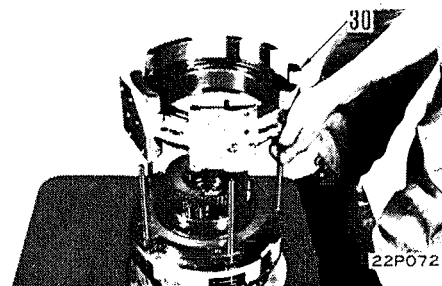
Remove ring gear (29) in NO.2 clutch.

- ★ Before removing ring gear confirm direction of insertion (Dented part of outer gear comes to underside).

**17. NO.2, 3 housing assembly**

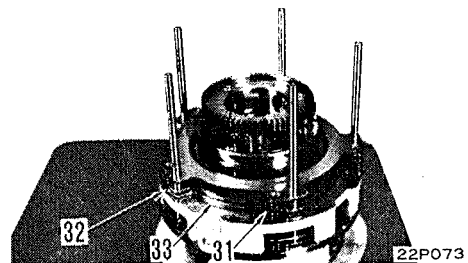
Lift up NO.2, 3 housing (30), holding pressure plate (31) of NO.3 clutch to prevent NO.3 clutch piston from falling.

- ★ Care must be exercised to prevent return spring in NO.3 clutch piston from jumping out.

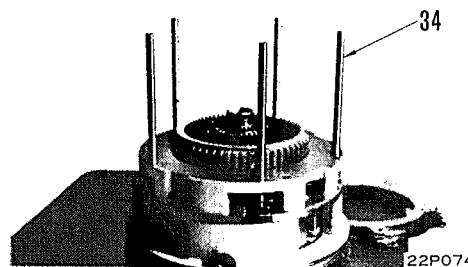
**18. Spring, Plate, Disc**

Remove Piston return spring (31), plate (32) and disc (33) in NO.3 clutch.

- ★ Plate and disc should be stored either horizontally or vertically to avoid occurrence of any warping.

**19. Pin**

Take out pin (34) used to prevent plate from turning.





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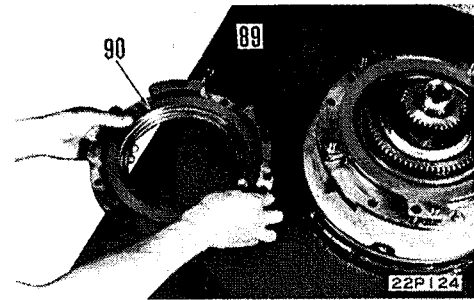
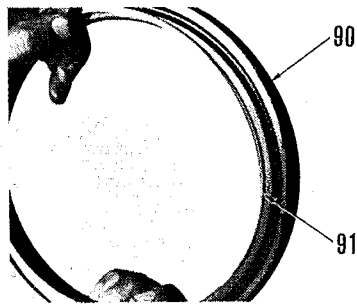
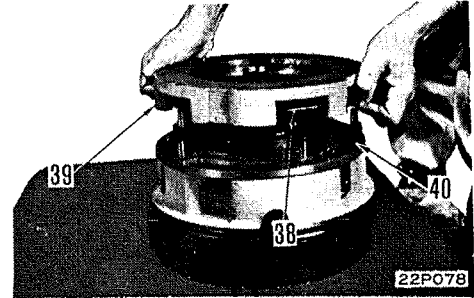
- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

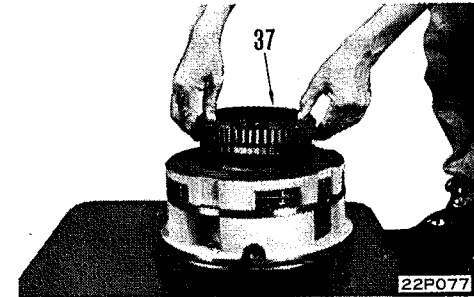
**9. NO.4 clutch housing assembly**

Aligning pin holes, install NO.4 clutch housing assembly (39), holding plate (38) to prevent piston from falling.

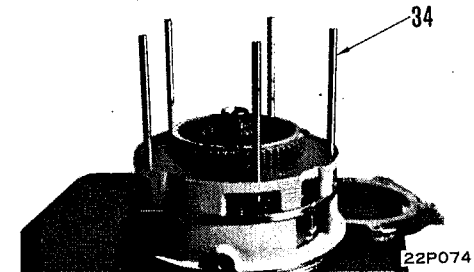
- ★ Using a wooden spatula or the like, attach the seal rings to each of clutch housing (89) and piston (90), being careful of interference with the pressure receiving sides (grooved side). Apply grease G2-LI around them and then install.

**10. NO.3 ring gear**

Install NO.3 ring gear (37) with wider dented part of outer teeth positioned at lower side.

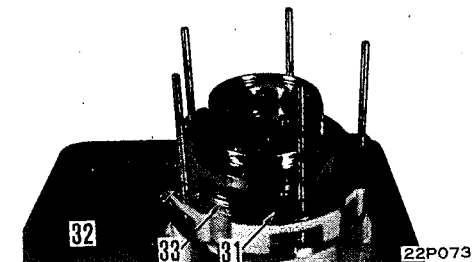
**11. Pin**

Install pins (34).

**12. Plate, Disc, Spring**

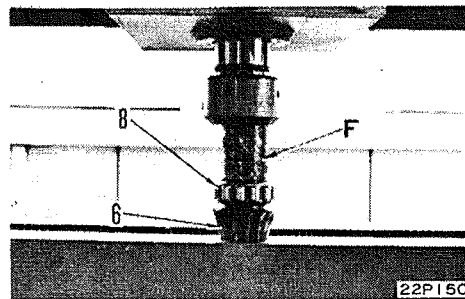
Install plate (32) and disc (33) of NO.3 clutch and NO.3 piston return spring (31), in that order.

- ★ Mating surfaces between plate and disc should be coated with engine oil Class CD, SAE30. Spring is installed to a position where there is tie bolt for plate.

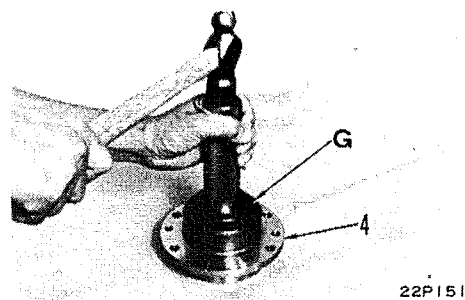


**4. Pinion shaft, Bearing cage**

- 1) Using special tool **F**, press-fit pinion shaft (6) into bearing (8).

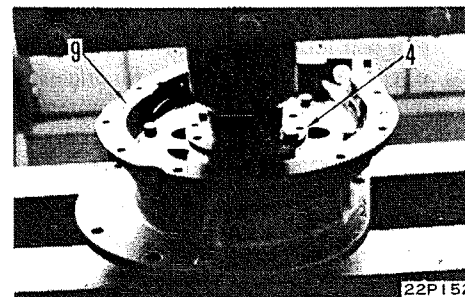


- 2) Using special tool **G**, press-fit bearing to bearing cage (4).



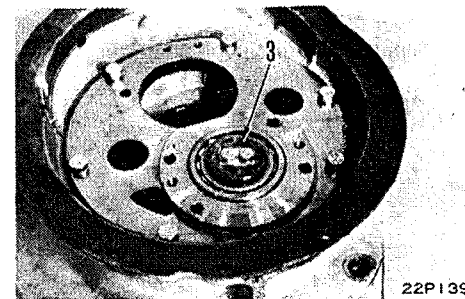
- 3) Set both pinion and bearing cage (4) to transfer case (9), then press-fit them.

- ★ Before installing pinion, insert guide bolt to bolt holes on bearing cage to align bolt holes.

**5. Pinion shaft holder**

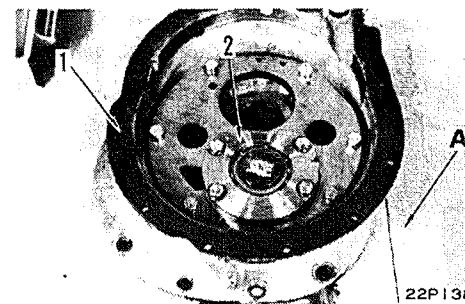
In order to tighten bolts, use a bar to prevent pinion shaft gear from turning. Then install holder (3), and lock the bolts.

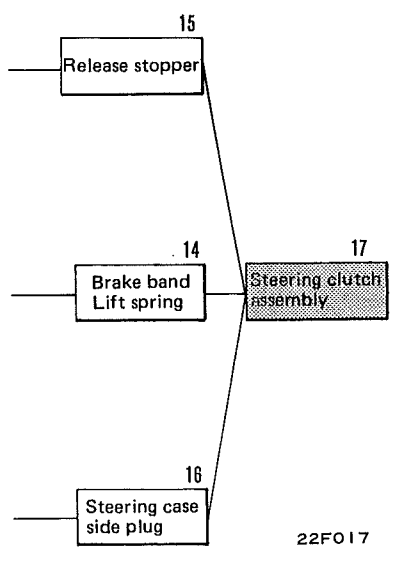
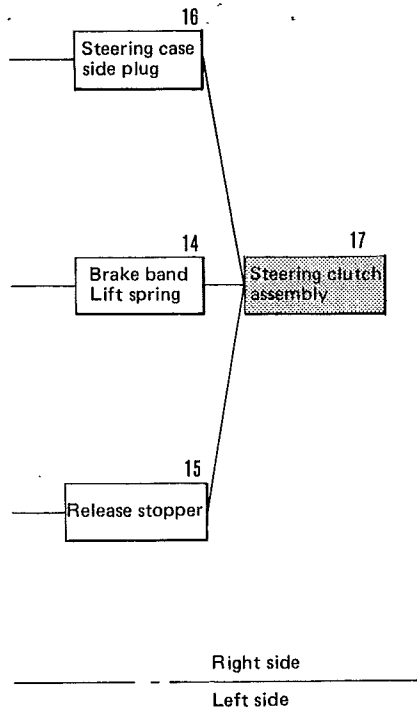
- ★ Be sure to use a bar made of soft material to prevent gear teeth from damage.

**6. Pinion shaft cover**

Insert shims (5) between bearing cage and pinion case cover, and install pinion shaft cover (2).

- ★ In case 2 shims are used, the thicker one is placed on top.
- ★ In case 3 shims are used, the thinner one is sandwiched.
- ★ In installing pinion shaft cover mounting bolts, first tighten them with your fingers as much as possible, then tighten with a tool. Because the pinion case cover is made of casting.

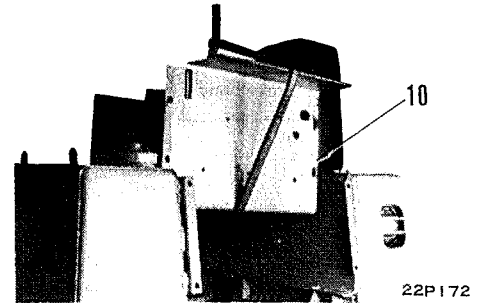




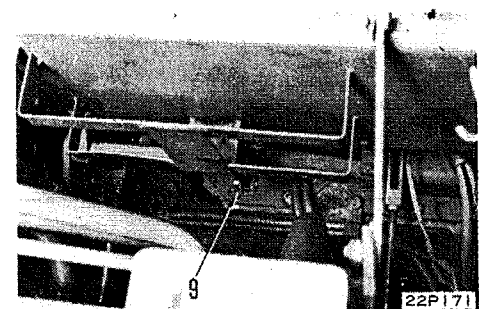
22F017

**13. Tool box**

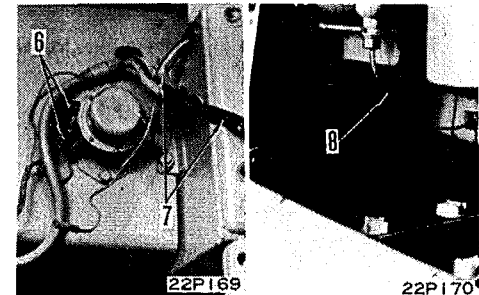
Install tool box (10).

**14. Parking linkage**

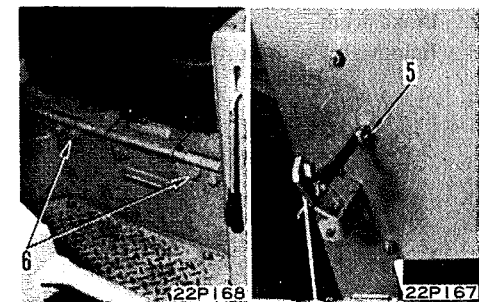
Connect parking lever linkage (9).

**15. Battery relay, Wiring**

Make connections on battery relay (6), battery electric wiring (7) and back lamp wiring (8).

**16. Operator's seat**

Using 4 mounting bolts, install operator's seat (4), and connect stopper ring (5).

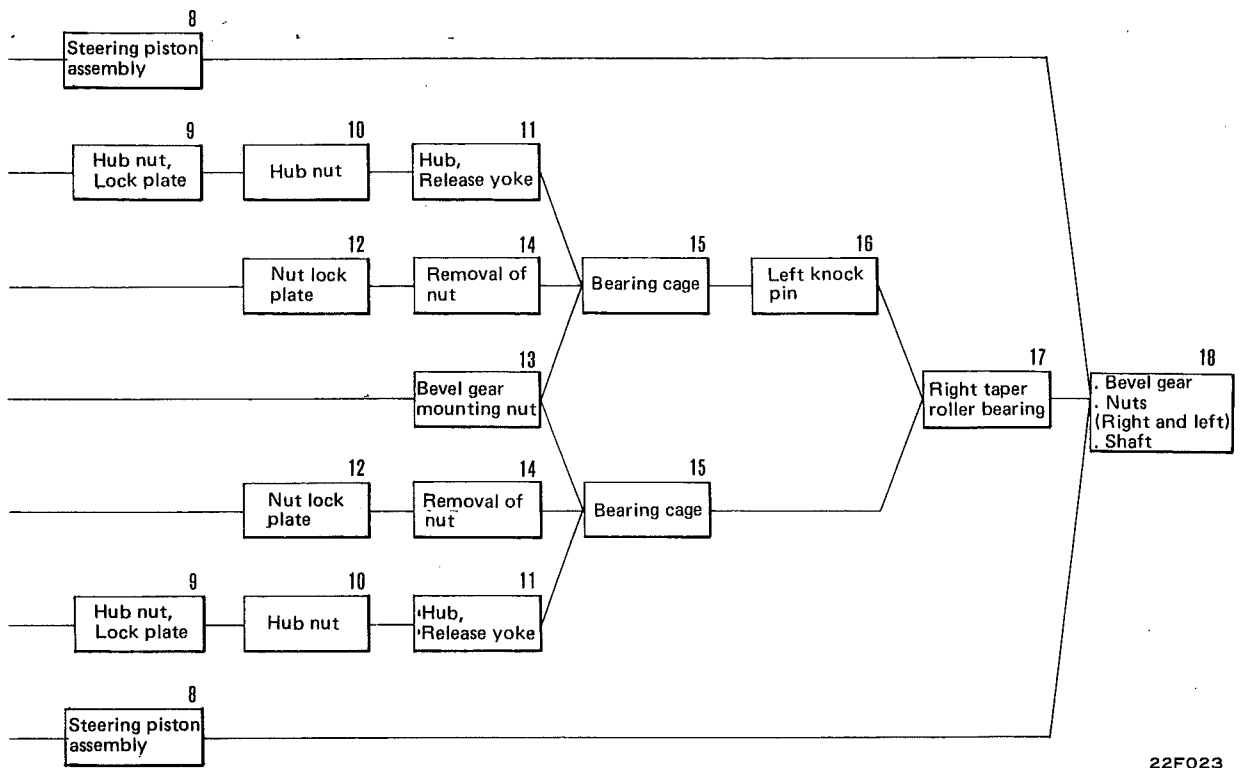
**17. Left armrest**

Install left armrest (3).

**18. Upper and lower rear covers**

Install both upper rear cover (1) and lower rear cover (2).

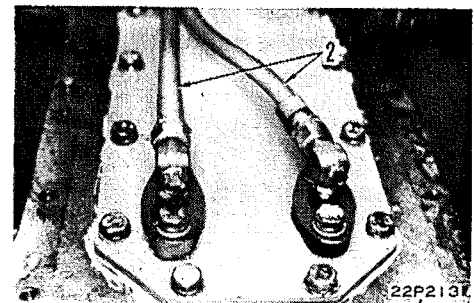




22F023

**3. Clutch piping hose**

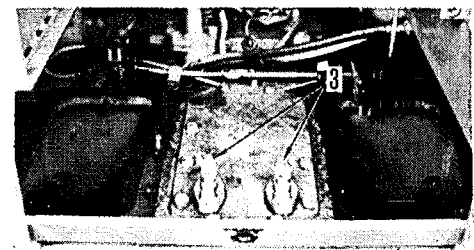
Separate clutch piping hoses (2) and plug up (with cork, etc.) to hose ends.



22P213

**4. Elbow**

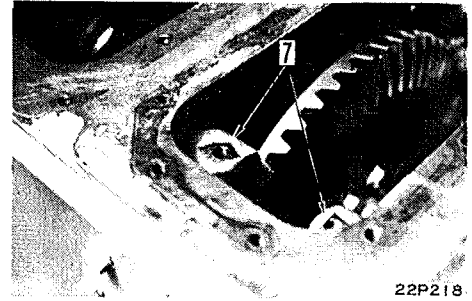
Remove elbows (3).



22P214

**12. Steering piston assembly**

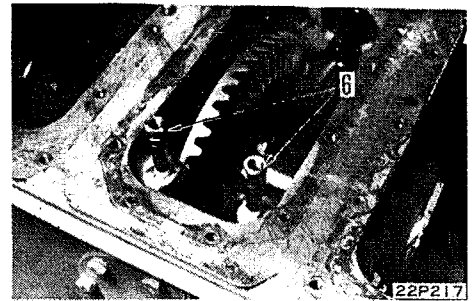
Install O-ring to steering piston (7), and apply thin coat of grease (G2-L1) over piston.



22P218

**13. Piston sleeve**

Install O-ring to piston sleeve (6), then wrap them with seal tape and install sleeve to cylinder.

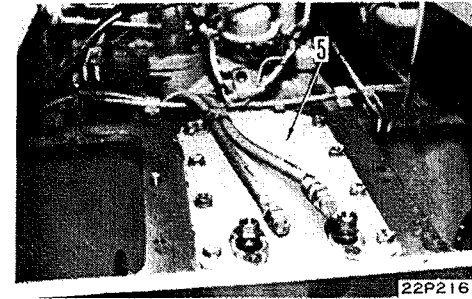


22P217

**14. Bevel gear case cover**

Apply gasket sealant (LG-1) to both sides of bevel gear case cover gasket, as well as mounting bolts, and install cover (5).

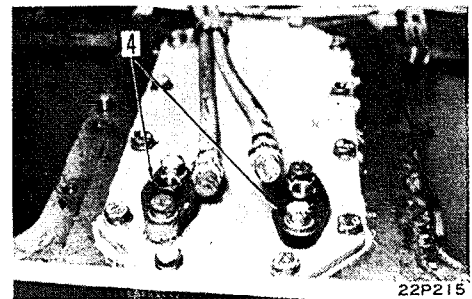
★ One of these bolts is tightened together with hose clamp.



22P216

**15. Flange**

Apply gasket sealant (LG-1) to both sides of flange gasket as well as to mounting bolts, and install flange (4).

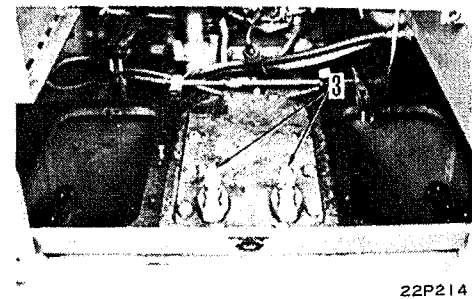


22P215

**16. Elbow**

After wrapping elbow (3) with seal tape, install it.

★ Direction of elbow (input port) should be toward front of machine after tightening.

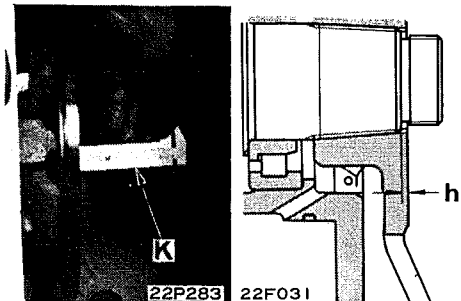
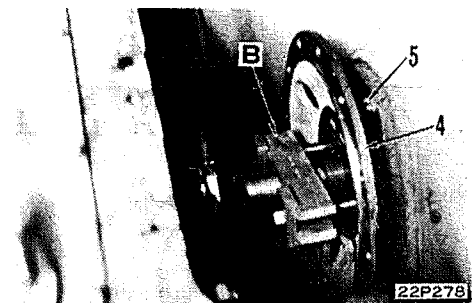


22P214

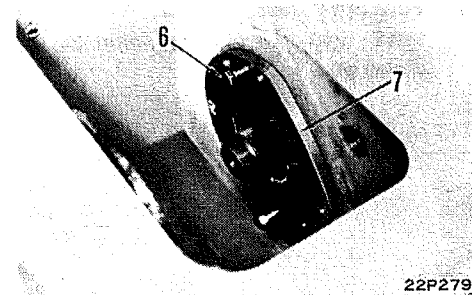
**4. Flange**

Using special tool B, pull out flange (4).

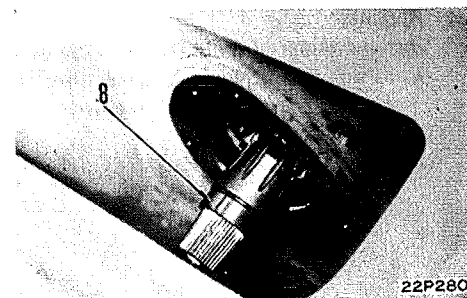
- ★ Before pulling out flange, record dimension (h) between flange and pinion shaft.

**5. Retainer**

Loosen retainer mounting bolts (5). Using two bolts (6) (10 mm, P = 1.25: used for installation of cage), take out retainer assembly (7).

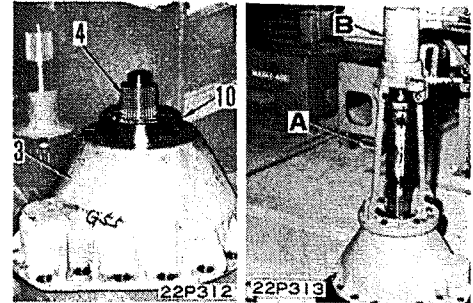
**6. Final drive primary pinion**

Take out final drive primary pinion (8) toward inside of bevel gear shaft case.

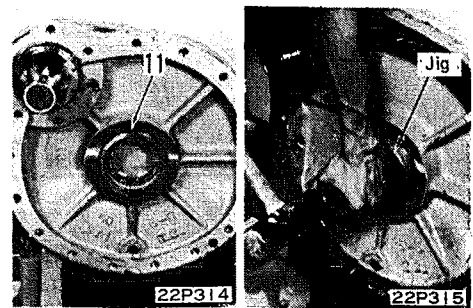


**4. Bearing**

Match sprocket shaft (4) with final drive case (3) so that they are ready for assembling. Press-fit bearing (10) to both shaft and case at same time using special tool A, B and C.

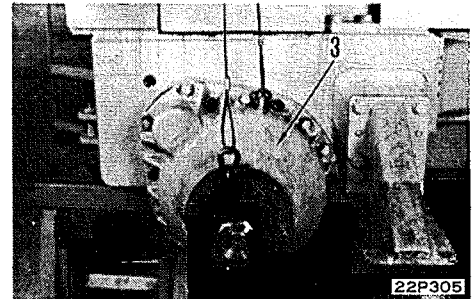
**5. Bearing**

Install bearing (11) for steering case side using jig.

**6. Final drive assembly**

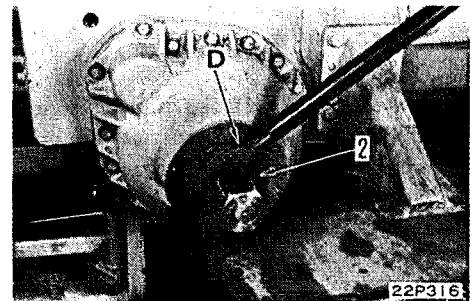
After fitting gasket to final drive case, sling assembly with wires. Install final drive assembly (3), paying attention to mutual engagement of pinion bearing, bearing for steering case side and pinion gear.

- ★ Threaded part of shaft must be protected by threading the nut on it.
- ★ Gasket should be applied with a gasket sealant (LG-1).

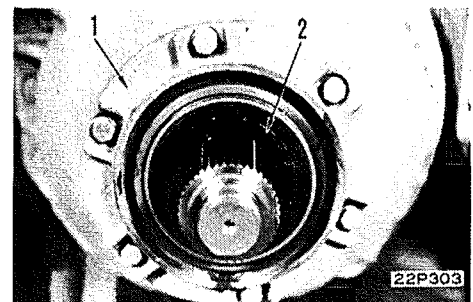
**7. Nut**

Tighten nuts (2) by use of special tool D.

- ★ Threaded part of nut should be coated with molybdenum disulfide ( $\text{MoS}_2$ ).

**8. Cover**

After attaching O-ring, install cover (1) with mounting bolts.



9. Install sprocket.

10. Install track frame assembly.

11. Install track shoe assembly.

12. Install work equipment assembly.

# SHOP MANUAL

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## D31-16

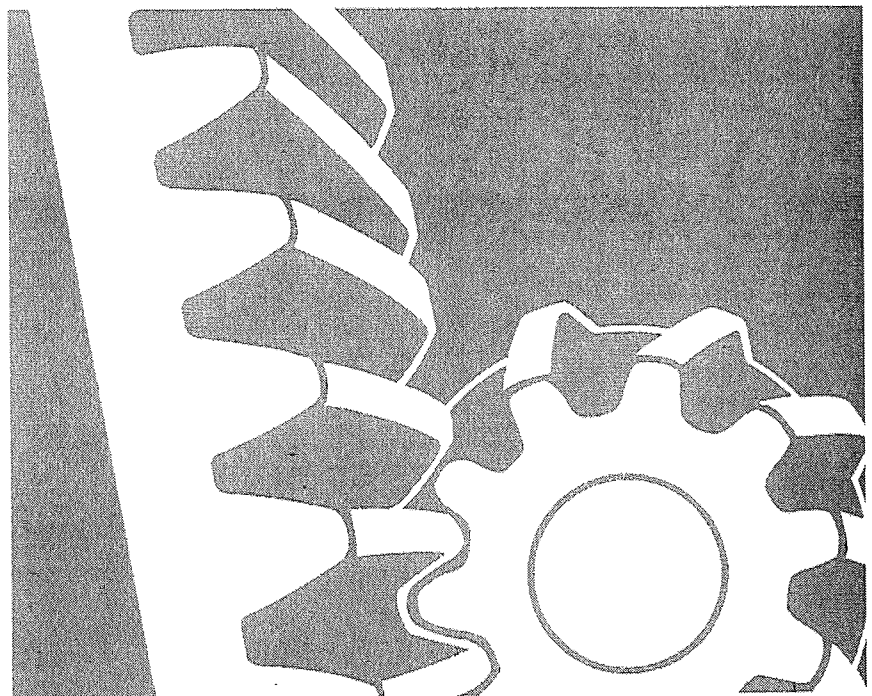
SERIAL      D31S-16 25001~  
NUMBERS    D31Q-16 25001~

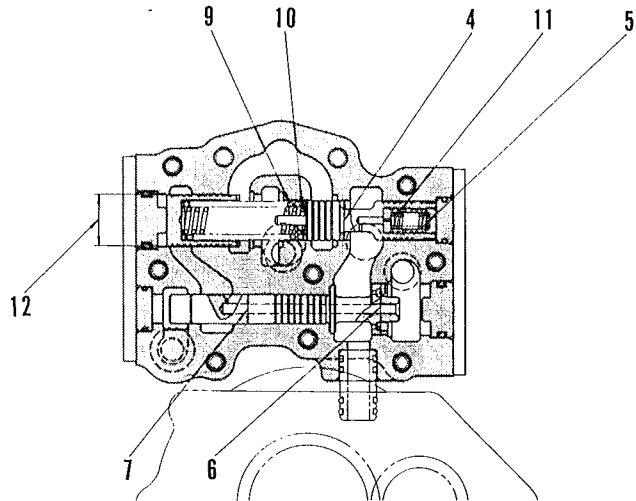
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## 23 POWER TRAIN

### MAINTENANCE STANDARD

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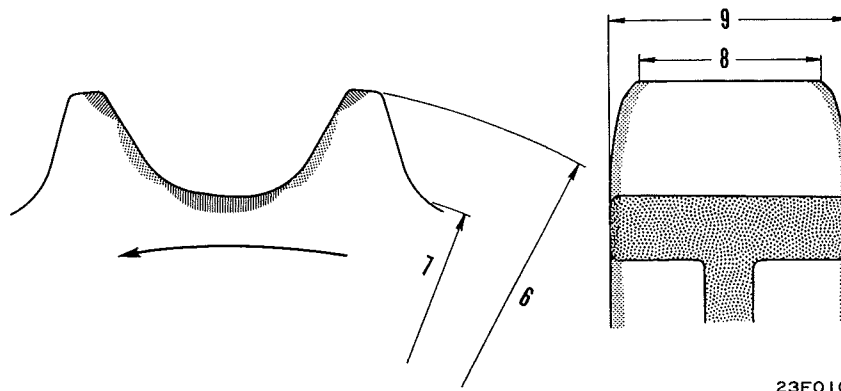




23F004

Unit: mm

No.	Check Item	Criteria						Remedy
		Serial No.	Basic size			Repair limit		
8	Speed valve detent spring			Free length X O.D.	Installation length	Installation load	Free length	Installation Load
		25001~	21X	14.3	6.0kg	20	5.1kg	
9	Modulating valve spring (Large)	25001~	61.6X	36.6	6.3 kg	61.6	6.30kg	
10	Modulating valve spring (Small)	25001~	60.6X	36.6	14.6 kg	60.6	14.81kg	
11	Modulating valve piston spring	25001~	26X	21	0.42kg	25.5	0.37kg	
12	Clearance between modulating valve sleeve and body	Serial No.	Basic size	Tolerance		Standard Clearance	Repair limit	
				Shaft	Hole			
		25001~	25	-0.035 -0.045	+0.013 0	0.035~ 0.058	0.08	
13	Speed spool	Serial No.	Item	Standard Value				
				25001~	Stroke	N - 1st: 7, 1 - 2nd: 8.5, 2 - 3rd: 8.5		
					Operating force	less than 9.5kg		
14	Inching spool	Serial No.	Item	Standard Value				
				25001~	Stroke	23.5		
					Operating force	less than 0.5kg		
15	Directional spool	Serial No.	Item	Standard Value				
				25001~	Stroke	F 0 ~ 6.5 R 18.5 ~ 25		
					Operating force	less than 0.5kg		

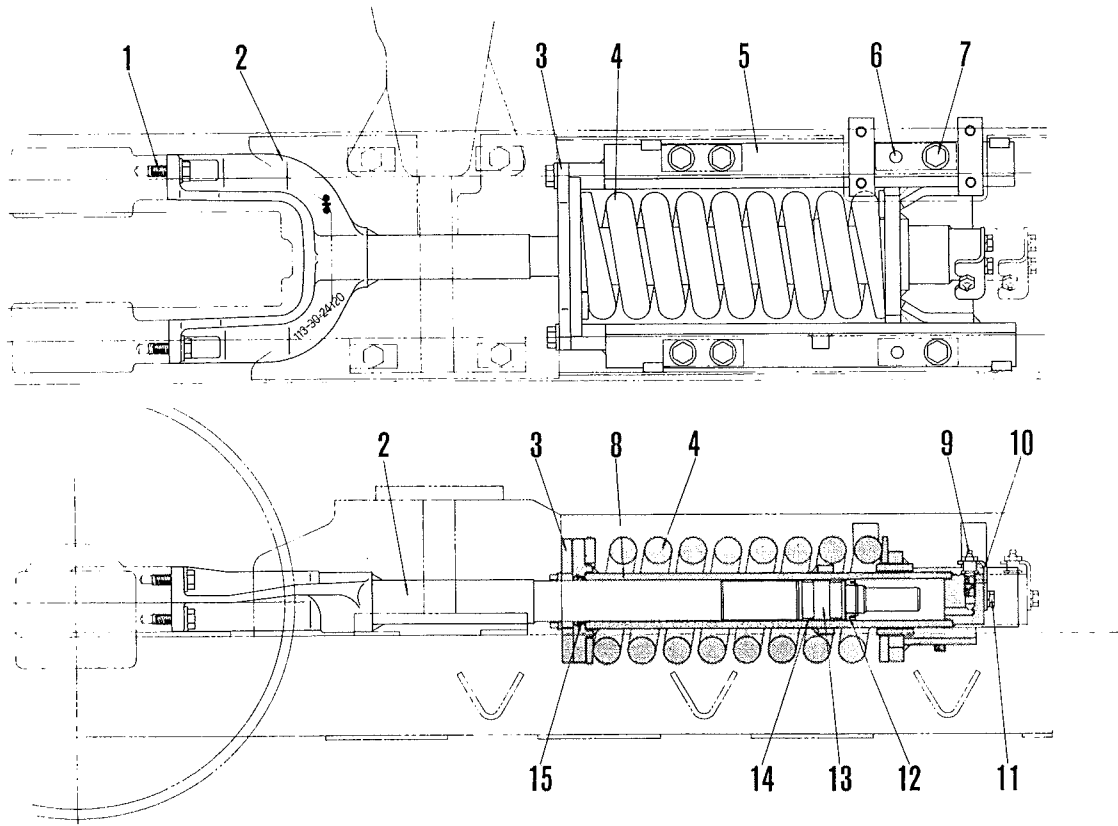


23F010

								Unit: mm
No.	Check Item	Criteria						Remedy
4	Tightening torque of sprocket nut	110 ~ 125kg.m						
5	Backlash between pinion gear and sprocket shaft shift gear	Serial No.	Pinion gear		Sprocket gear		Standard Clearance	Repair limit
			Number of teeth	Tooth width	Number of teeth	Tooth width		
		25001~	10	65	58	60	0.21 ~ 0.55	1.2
6	Wear on tips of sprocket teeth	Serial No.	Basic size		Tolerance		Repair limit	
		25001~	636.4		±2.0		630.5	
7	Wear on roots of sprocket teeth	25001~	573.9		±1.0 -2.0		568	
8	Wear on tooth tips width of sprocket	Serial No.	Basic size		Tolerance		Repair limit	
		25001~	38		-		32	
9	Wear on tooth root width of sprocket	25001~	48		-		42	

Rebuild or replace

RECOIL SPRING



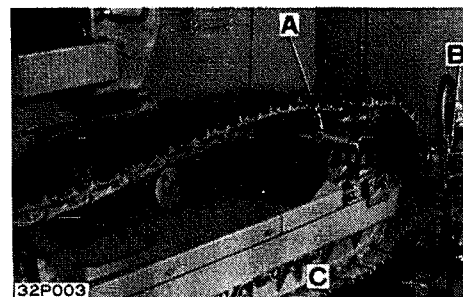
31 F004

- 1. Bolt
- 2. Yoke rod
- 3. Plate
- 4. Recoil spring
- 5. Bracket
- 6. Dowel pin
- 7. Bolt
- 8. Cylinder
- 9. Grease fitting
- 10. Stopper plate
- 11. Bolt
- 12. Packing
- 13. Piston
- 14. Piston ring
- 15. Dust seal

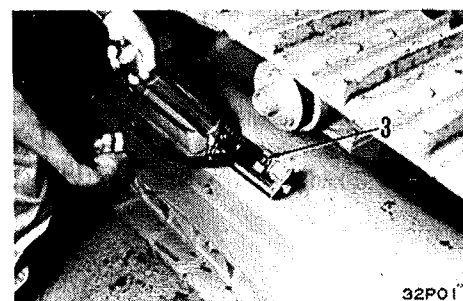
**4. Master pin**

Operate machine backward until temporary pin becomes positioned just in the middle between idler and carrier roller. After setting special tool A, press-fit master pin (1) utilizing cylinder B and pump C.

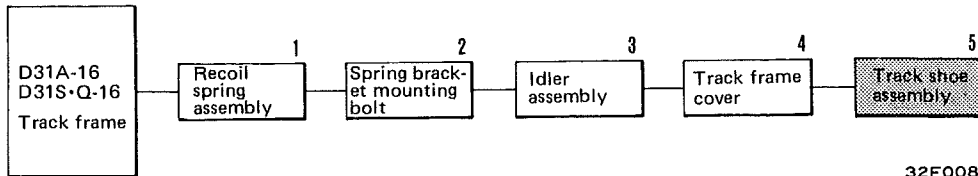
- ★ Before press-fitting, coat master pin on its circumferences with grease (G2-LI).

**5. Adjustment of tension**

Pour grease through lubricator, and adjust track to proper tension.



## INSTALLATION OF RECOIL SPRING ASSEMBLY

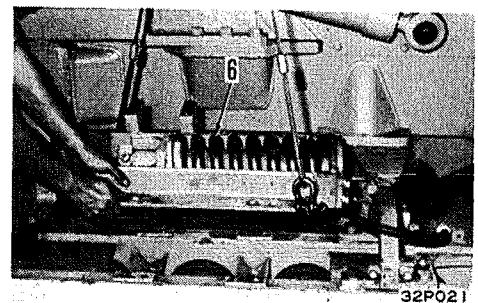


32F008

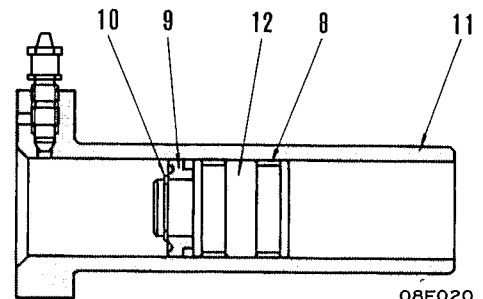
### 1. Recoil spring assembly

Suspend recoil spring assembly (6) by means of wires and install it to track frame in alignment with dowel (7). To the cylinder (11), install piston assembly in which piston (12), ring (8) and packing (9) are incorporated together. Packing (9) should be set that pressure receiving side (concaved) is directed to snap ring (10).

- ★ Apply grease (G2-L1) fully to inside of the cylinder.



32P021

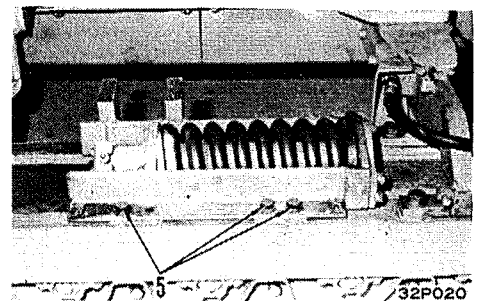


08F020

### 2. Mounting bolt

Tighten mounting bolts (5).

- ★ Apply thread tightener (LT-2) to all bolts.



32P020

### 3. Idler assembly

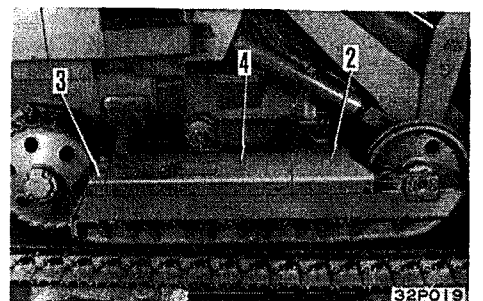
Hook wires in idler hole to lift up idler assembly (1). Slide the idler along track frame surface to thrust it in.

- ★ In inserting rod into cylinder, care that dust seal to avoid any scratches.

- ★ Be sure to apply grease (G2-L1) to the end of rod.



Weight of idler assembly 100 Kg.



32F019

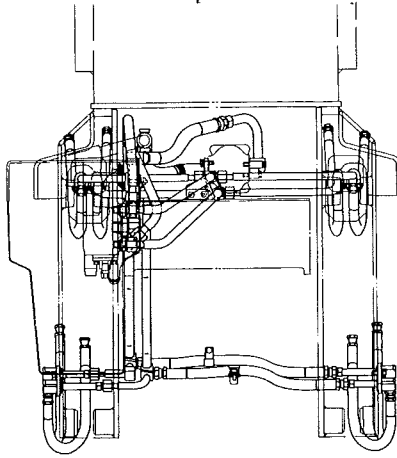
### 4. Cover

Install front cover (2), rear cover (3) and center cover (4) respectively with mounting bolts.

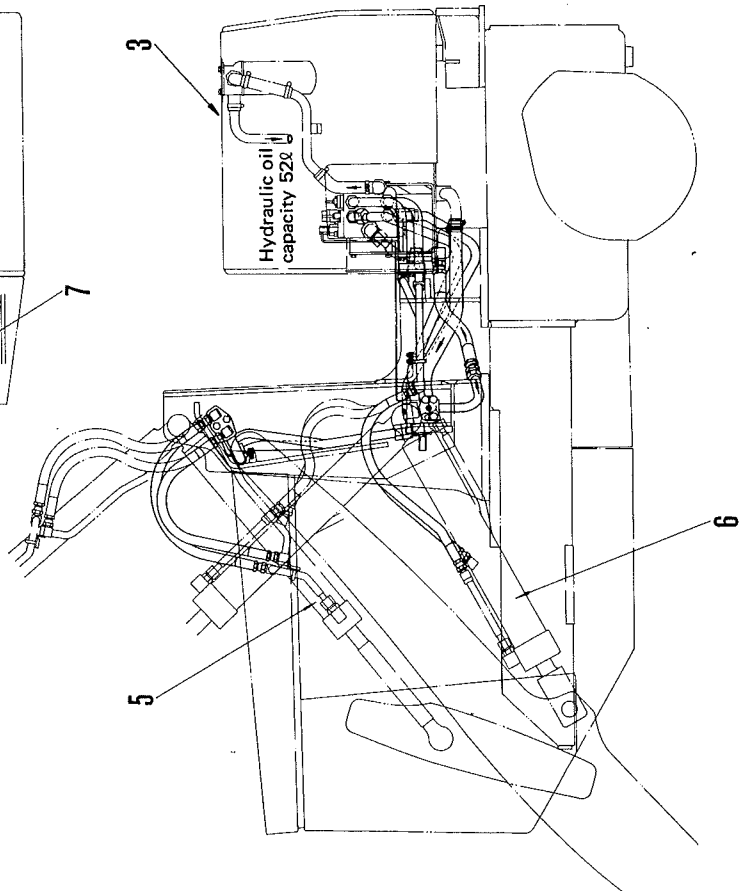
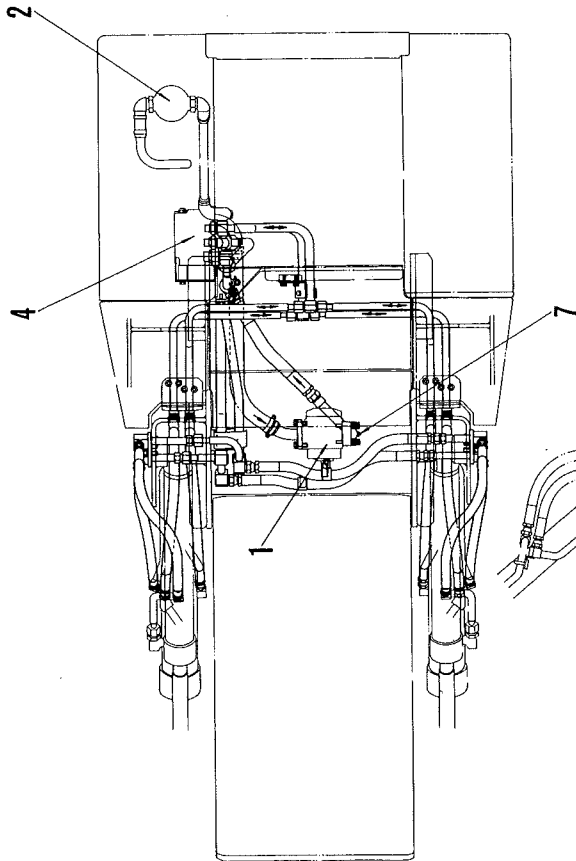
Unit: mm

No.	Check Item	Criteria					Remedy
		Serial No.	Basic size	Tolerance		Standard interference	
Shaft	Hole						
8	Interference between track roller and bushing	25001~	88	+0.072 +0.037	+0.035 0	0.072~ 0.002	—
9	Width of track roller shaft collar	Serial No.	Basic size	Repair limit			
		25001~	10	9			
10	End clearance between track roller and shaft	Serial No.	Standard clearance	Clearance limit			
		25001~	0.40~0.85	1.5			
11	Tightening torque for oil supply plug	16 ~ 26 kg.m (Supply quantity 150cc EO30R-CD)					
12	Tightening torque for bracket mounting bolt	25 ~ 31.5kg.m					

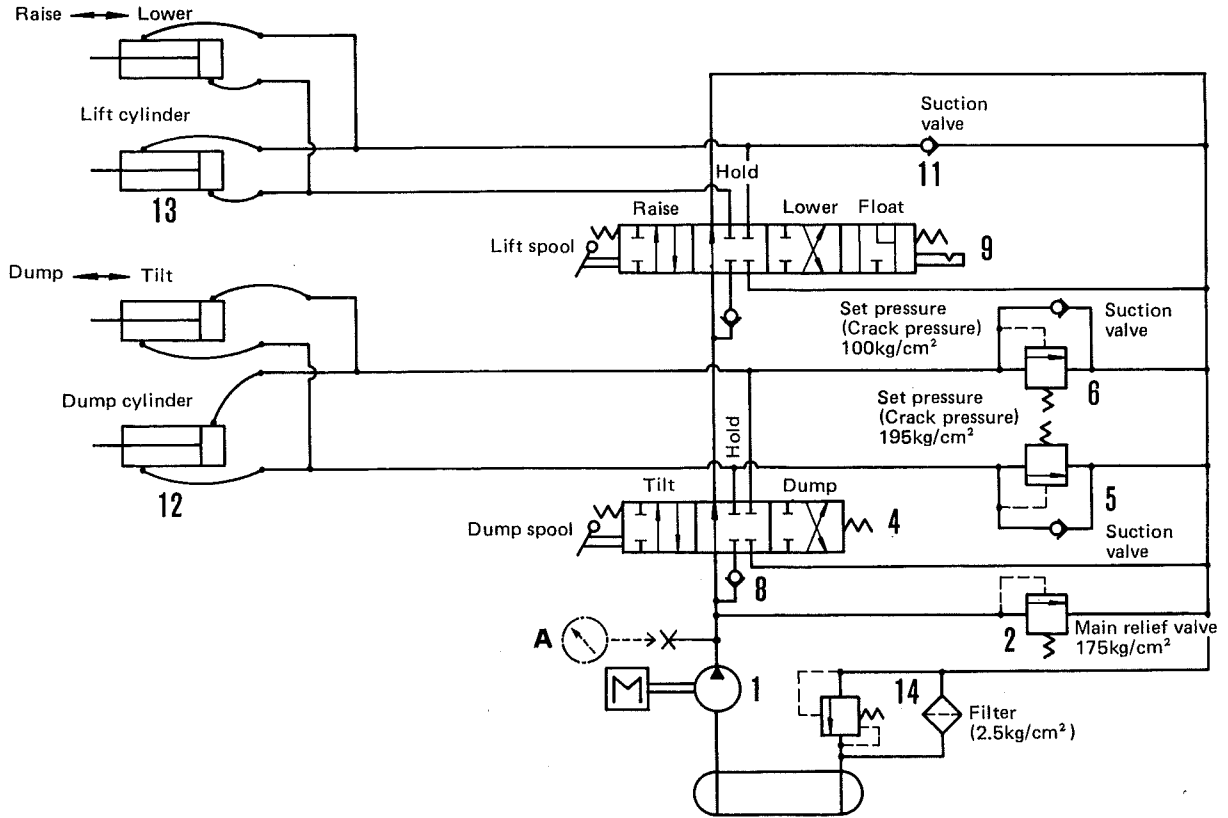
D31S·Q-16 25001 ~ 28000



- 1. Hydraulic pump
- 2. Hydraulic filter
- 3. Hydraulic tank
- 4. Hydraulic control valve
- 5. Dump cylinder
- 6. Lift cylinder
- 7. Hydraulic takeout plug (PT1/8)



61F003



61F017

- 1. Pump (KAR 040)
- 2. Body
- 3. Main relief valve
- 4. Tilt spool
- 5. Tilt side safety valve
- 6. Dump side safety valve
- 7. Body

- 8. Check valve
- 9. Lift spool
- 10. Detent case
- 11. Suction valve
- 12. Dump cylinder
- 13. Lift cylinder
- 14. Oil filter

A Main relief oil pressure takeout plug (PT1/8)



# SHOP MANUAL

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## D31-16

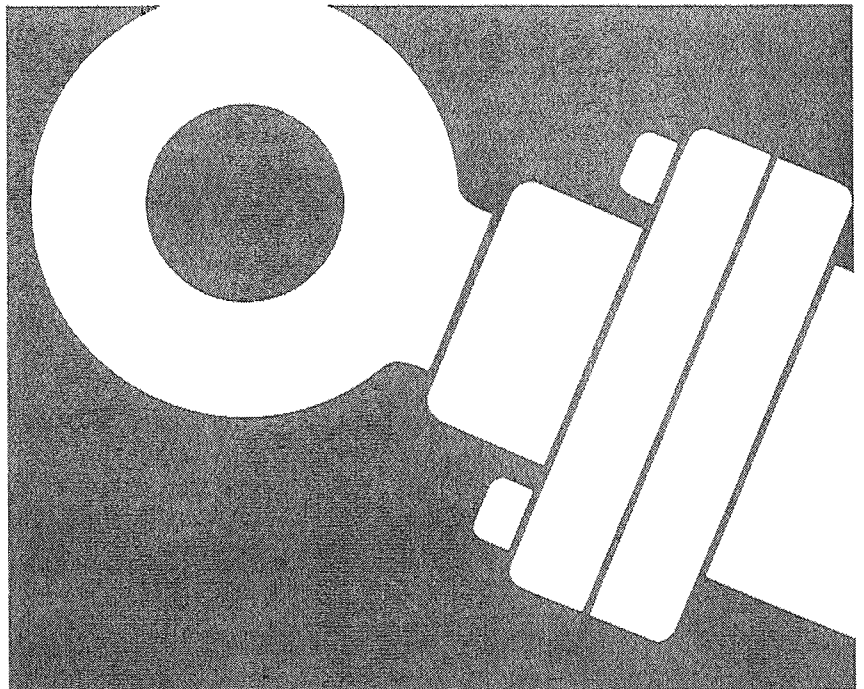
SERIAL        D31S-16 25001~  
NUMBERS     D31Q-16 25001~

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## 62 HYDRAULIC SYSTEM

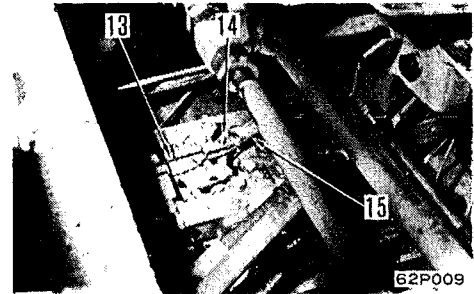
DISASSEMBLY AND ASSEMBLY

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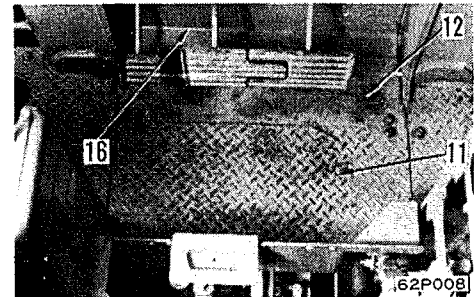


**4. Front floor plate**

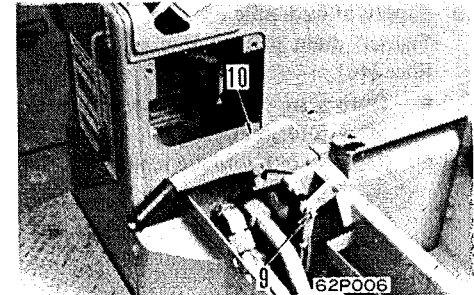
- 1) Install inching cable (13) with spring (15) to inching lever on transmission, and secure with nuts.
- 2) Install front floor plate (16).
  - ★ In case inching spool is moved off its specified position, make adjustment on it according to 'TESTING AND ADJUSTMENT'.

**5. Floor plate**

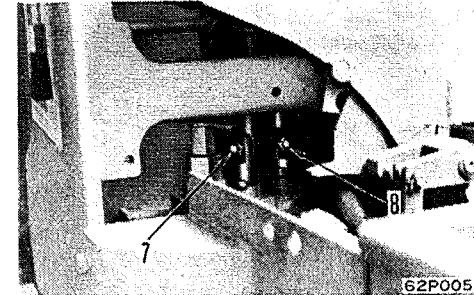
Install the floor plates (11) and (12).

**6. Parking brake rod**

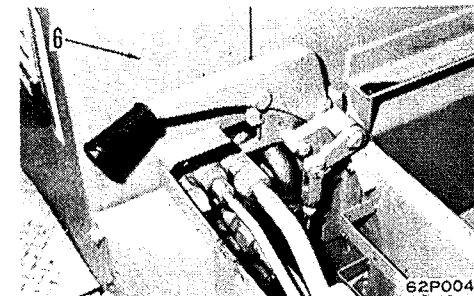
Tilt down brake lever (10), and install pin (9) into brake bracket and yoke.

**7. Control valve control rod**

Connect control rod and spool with connecting bolts (7) and (8).

**8. Cover**

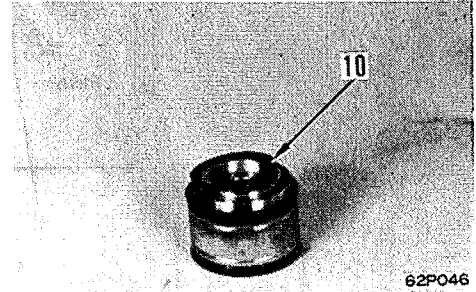
Install cover (6) with mounting screws.



## DISASSEMBLY OF PISTON ASSEMBLY

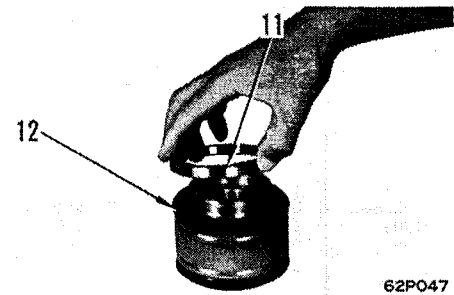
## 9. Snap ring

Remove snap ring (1).



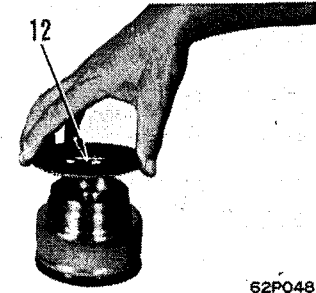
## 10. Retainer

Remove retainer (11).



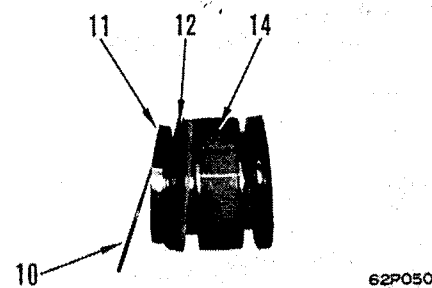
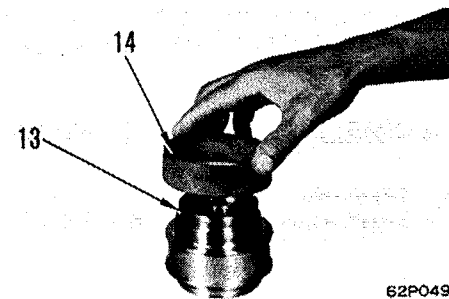
## 11. U-Packing

Remove both right and left U-packings (12).



## 12. Piston ring

Remove piston ring (14) from piston (13).



1. **Housing bolt**

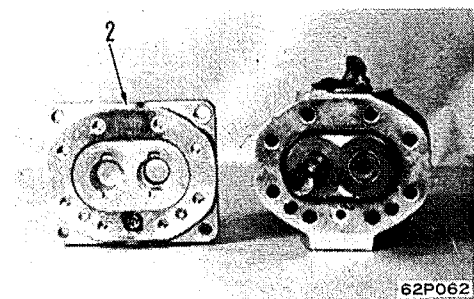
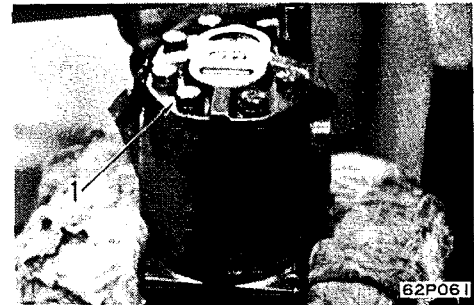
Remove bolt (1) by holding bracket of pump assembly with a vise.

2. **Bracket**

Release pump assembly from vise, and remove bracket (2).

★ In case oil seal for bracket is not replaced, wrap around input shaft spline with a tape to prevent any damage.

★ In case oil seal (10) is replaced, remove it after loosening snap ring (12).

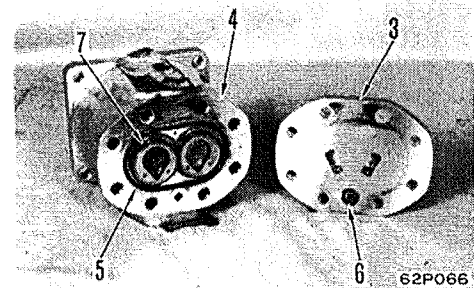


3. **Cover**

Place pump assembly sideways, and remove cover (3).

4. **Cover**

Attach O-ring (5) (6) and U-ring (7) to cover (3) and body (4), and install cover.

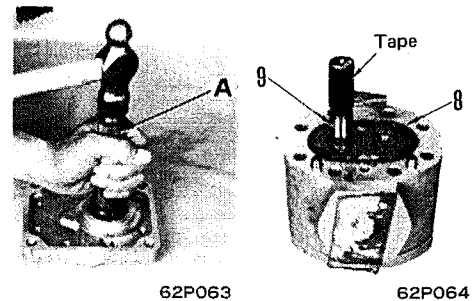


5. **Bracket**

1) Using press-fit tool A, press-fit oil seal (10) and plate (11) to bracket, and install snap ring (12).


2) Place pump body to bracket side upward, then attach O-ring (8) to body.

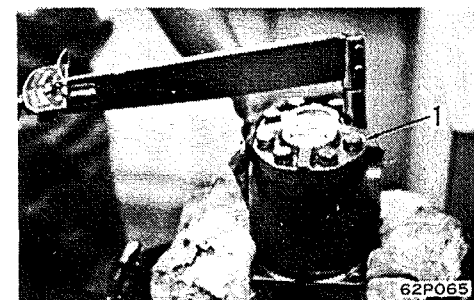
3) Before install bracket, to avoid any damage against oil seal lip, wrap with a tape around spline of input shaft (9), and then install bracket.



6. **Housing bolt**

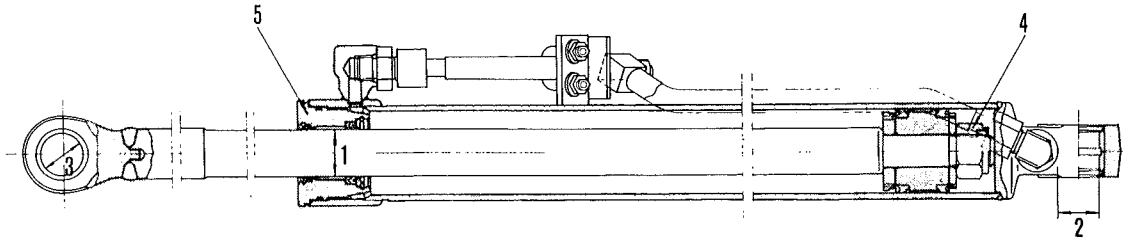
Temporarily tighten bolts (1), and while supporting bracket of pump assembly by means of a vise, tighten them securely.

 Tightening torque of bolt: 5.5~7.5 kg.m.



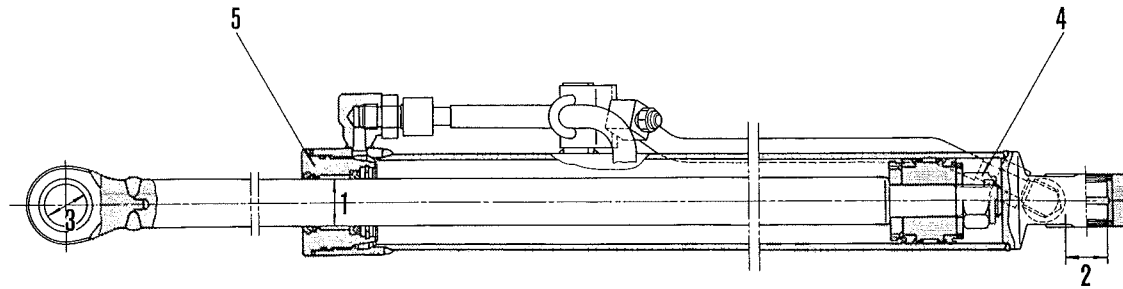
### DUMP CYLINDER

D31S·Q-16 25001 ~ 28000



63F006

D31S·Q-16 28001 ~



63F009

Unit: mm

No.	Check Item	Criteria					Remedy
		Serial No.	Basic size	Tolerance		Standard clearance	
Shaft	Hole						
1	Clearance between piston rod and bushing	S·Q25001~	45	-0.080 -0.142	+0.152 +0.007	0.087~ 0.294	0.594
2	Clearance between cylinder bottom bushing and pin	S·Q25001~	40	-0.025 -0.064	+0.142 +0.080	0.105~ 0.206	1.0
3	Clearance between piston rod bushing and pin	S·Q25001~	40	-0.025 -0.064	+0.142 +0.080	0.105~ 0.206	1.0
4	Piston nut tightening torque	80±8 kg.m (Across flats width: 46)					
5	Cylinder head tightening torque	60±6 kg.m					

# SHOP MANUAL

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## D31-16

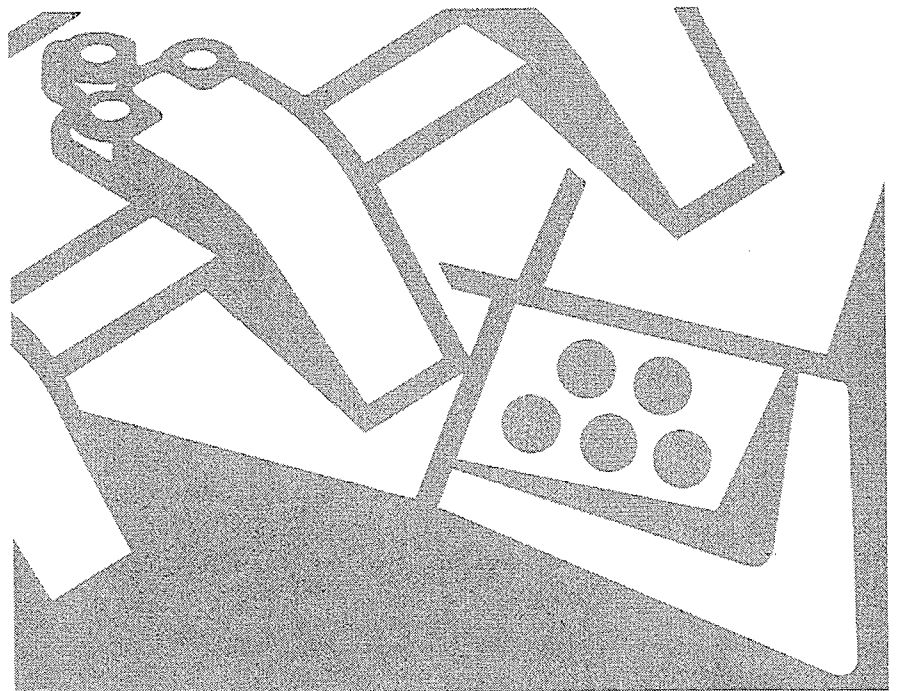
SERIAL      D31S-16 25001~  
NUMBERS    D31Q-16 25001~

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## 72 WORK EQUIPMENT

DISASSEMBLY AND ASSEMBLY

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