FLUIDS AND LUBRICANTS

Lubricants must have the correct properties for each application.

WARNING: The conditions of use for individual fluids and lubricants must be respected.

Hydraulic fluid

CASE/AKCELA hydraulic fluid is specially designed for high pressure applications and for the CASE hydraulic system. The type of fluid to be used depends on the ambient temperature.

Temperate climates: -20°C to +40°C (-4° to 104° F)

CASE/AKCELA: HYDRAULIC EXCAVATOR FLUID (MS 1230. ISO VG 46. DIN 51524 PART 2 HV)

Hot climates: 0°C to +50°C (32° to 122° F)

CASE/AKCELA: AW HYDRAULIC FLUID 68 HV (MS 1216. ISO VG 68. DIN 51524 PART 3 CATEGORY HVLP)

Cold climates: -25°C to +20°C (-13° to 68° F)

CASE/AKCELA: AW HYDRAULIC FLUID 32 (MS 1216. ISO VG 32. DIN 51524 PART 2)

Biodegradable fluid: -30°C to +40°C (-22° to 104° F)

This yellow-colored fluid is miscible with standard fluid. If used to change standard fluid, it is advised to drain the circuit completely before refilling with this fluid.

CASE/AKCELA: HYDRAULIC EXCAVATOR FLUID BIO (MS 1230. ISO VG 46. DIN 51524 PART 2 HV)

Transmission component oil

Extreme pressure oil used for enclosed transmission components.

CASE/AKCELA: GEAR 135H EP (SAE 80W-90. API GL 5. MIL-L-2105 D. MS 1316. ZF TE-ML 05A)

Grease

CASE/AKCELA: MOLY GREASE 251H EP-M (251H EP-M. NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap and molybdenum disulphide.

CASE/AKCELA: MULTIPURPOSE GREASE 251H EP (251H EP. NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap and calcium.

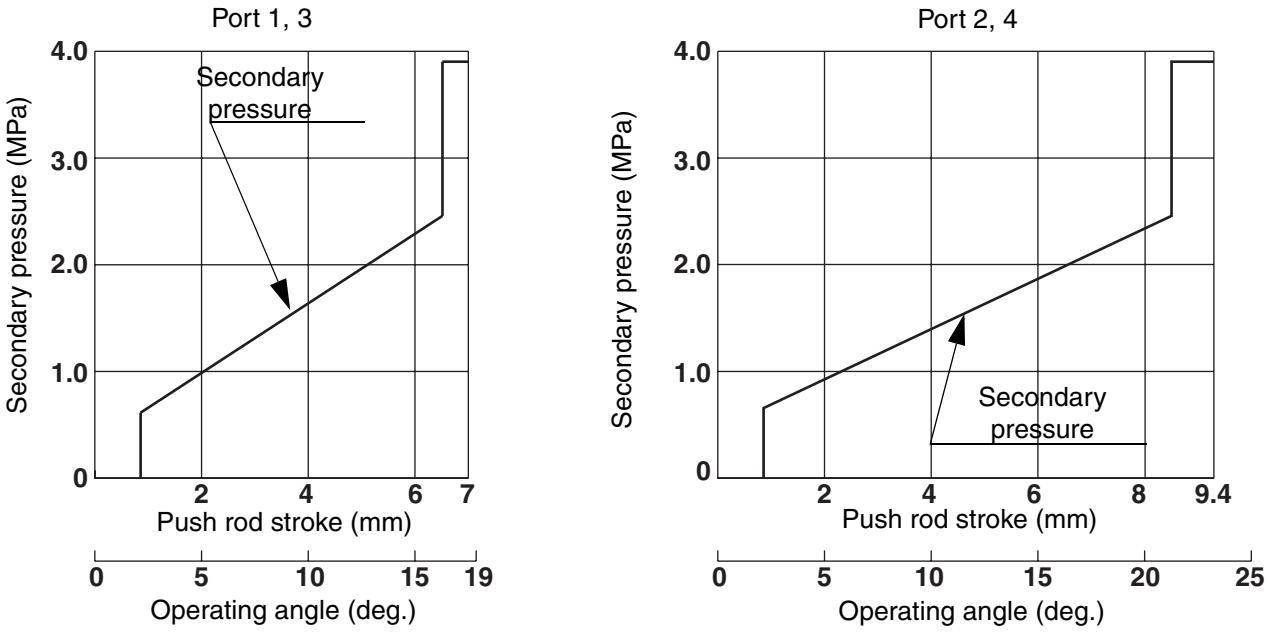
CASE/AKCELA: PREMIUM GREASE EP2 (NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap.

Hydraulic breakers

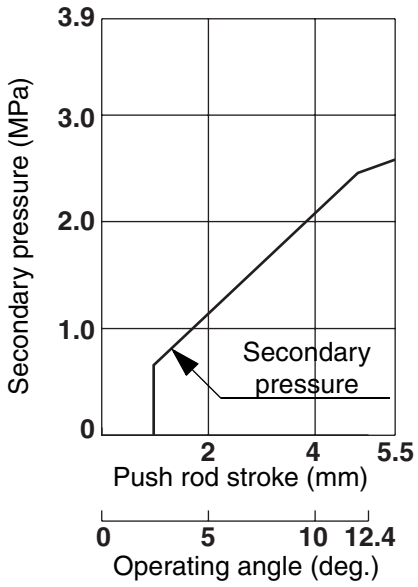
CASE/AKCELA: MULTIPURPOSE GREASE 251H EP (NLGI 2).

Hand control valve
- Manufacturer ..... Kawasaki
- Operating pressure ..... 3.92 MPa (569 psi)
- Secondary pressure, primary short type ..... 0.64 to 2.45 MPa (92.82 to 355.34 psi)
- Operating angle
  - Ports 1, 3 ..... 19°
  - Ports 2, 4 ..... 25°
- Operating torque
  - Ports 1 ..... 0.58 - 2.03 Nm (0.42 - 1.49 (lb-ft)
  - Ports 3 ..... 0.47 - 1.92 Nm (0.34 - 1.41 (lb-ft)
  - Ports 2, 4 ..... 0.71 - 2.30 Nm (0.52 - 1.69 (lb-ft)



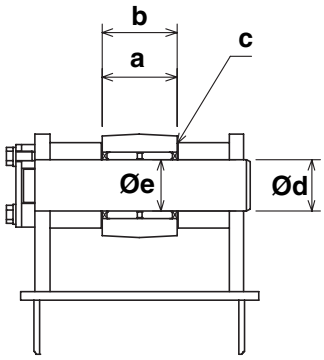
RST-03-01-001B

Foot control valve (for travel)
- Manufacturer ..... Nishina industrial
- Operating pressure ..... 3.92 MPa (569 psi)
- Secondary pressure, primary short type ..... 0.64 to 2.45 MPa (92.82 to 355.34 psi)
- Operating angle ..... 12.4°
- Operating torque
  - Valve ..... 2.62 - 8.58 Nm (1.93 - 6.33 lb-ft)
  - Damper ..... 6.87 Nm at 0.018 m/s (60.8 lb-ft)



RST-03-01-001D

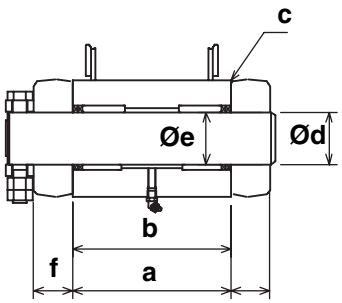
4. Dipper cylinder foot/Boom



AQ19002-009A

Mark		Dimension (mm)
a (boom)	Standard	81
	Limit	87
b (cylinder)	Standard	80
	Limit	78
c (a - b)	Standard	0.5 to 3.0
	Limit	Shims
Ø d (shaft)	Standard	55
	Limit	54
Ø d (bushing)	Standard	55
	Limit	56.5

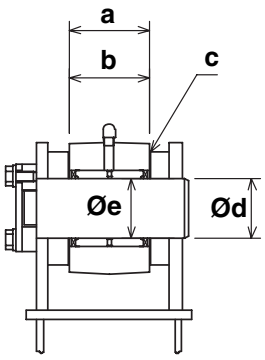
5. Boom/Dipper



AQ19002-010A

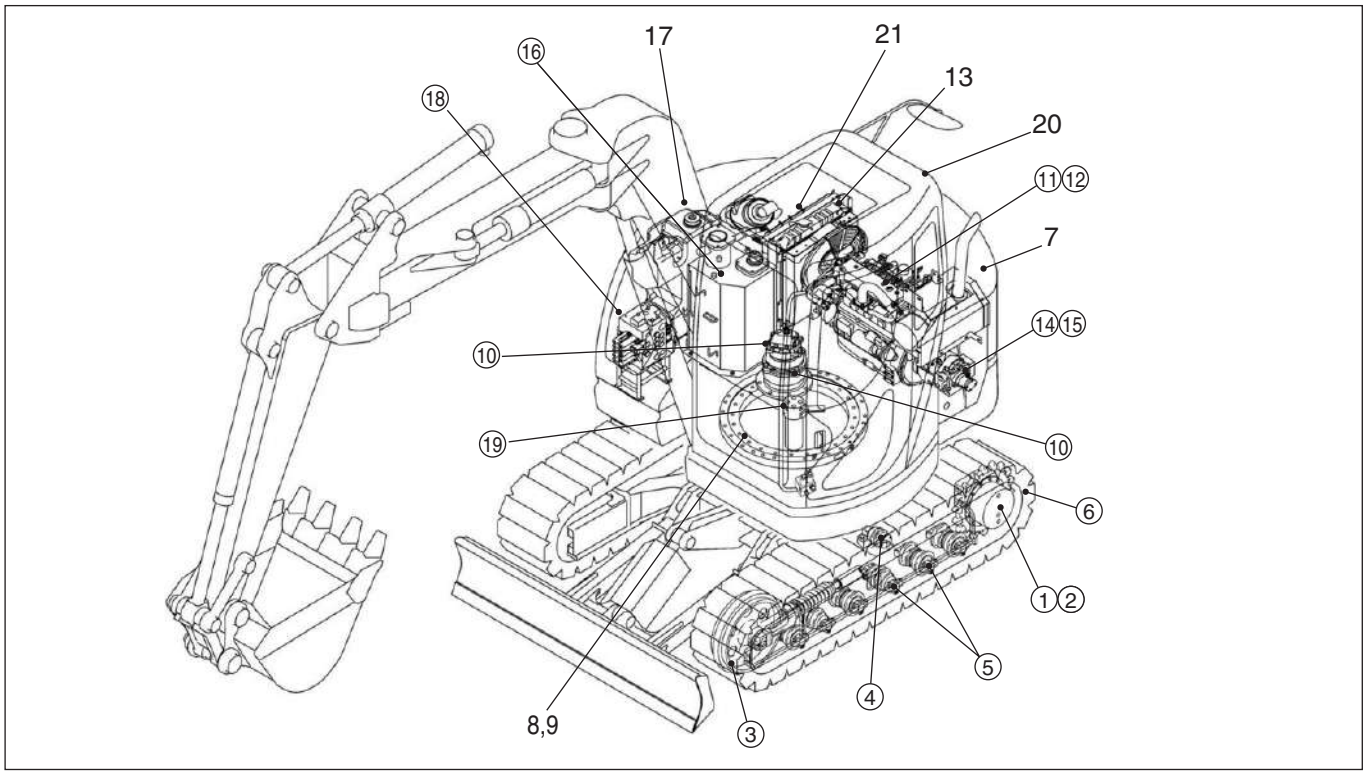
Mark		Dimension (mm)
a (boom)	Standard	184.5
	Limit	187.5
b (dipper)	Standard	184
	Limit	182
c (play)	Standard	0.5 to 1.1
	Limit	Shims
Ø d (shaft)	Standard	60
	Limit	59
Ø e (dipper)	Standard	60
	Limit	61.5
Ø f (boom)	Standard	45
	Limit	Refer a and b

6. Dipper cylinder head/Dipper



AQ19002-011A

Mark		Dimension (mm)
a (dipper)	Standard	81
	Limit	87
b (cylinder)	Standard	80
	Limit	78
c (a - b)	Standard	0.5 to 3.0
	Limit	Shims
Ø d (shaft)	Standard	60
	Limit	59
Ø e (bushing)	Standard	60
	Limit	61.5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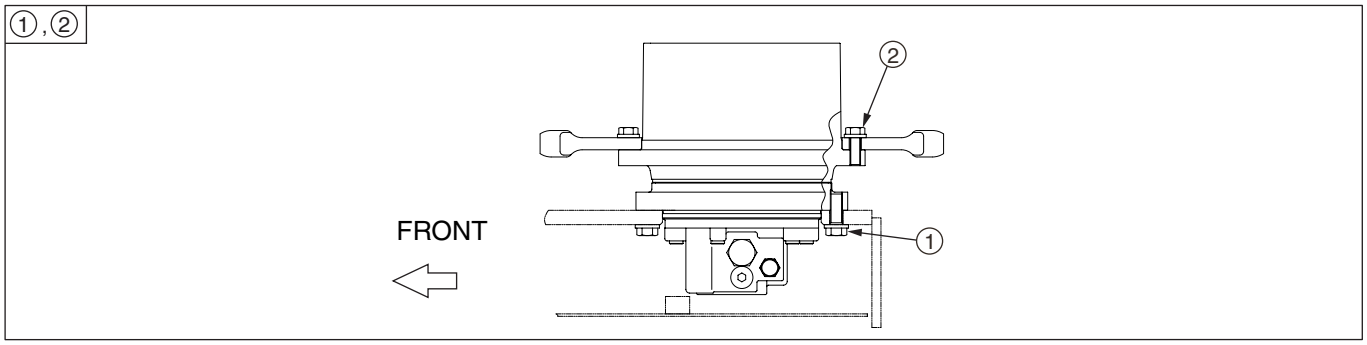
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FRONT
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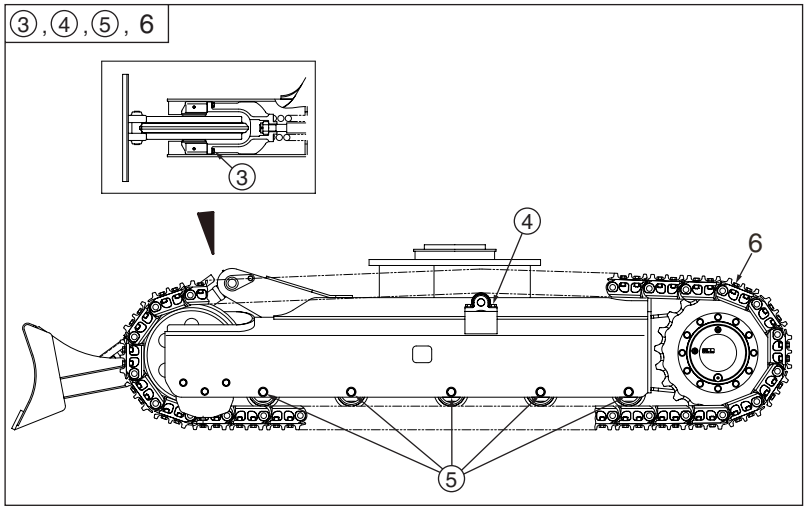
3 , 4 , 5 , 6
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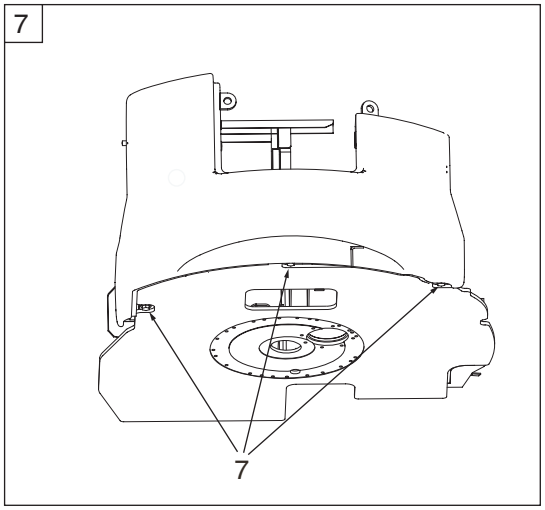

7
7

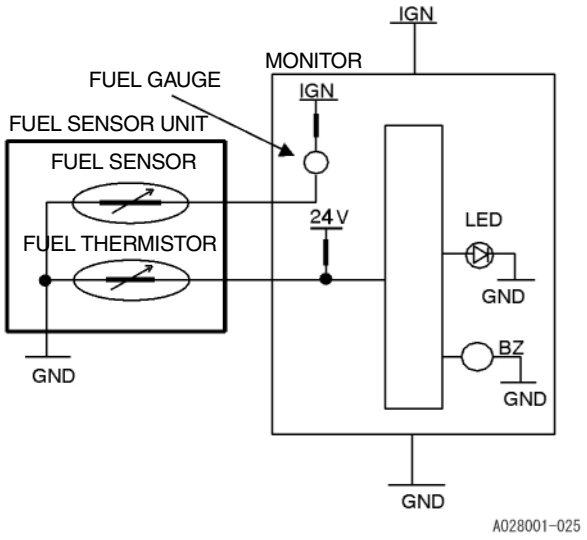
AQ09002-001

2. List of Functions

	Functions			Remarks
1	Engine Start-up Control			See page 6
2	Engine Start-up Circuit	2.1	Throttle control	See page 8
		2.2	One-touch idling	See page 10
		2.3	EGR cut control	See page 11
3	Monitor Output Control	3.1	2-speed travel	See page 13
		3.2	Swing brake	See page 14
		3.3	Travel alarm	See page 15
		3.4	Working light	See page 16
		3.5	Windshield wiper/washer	See page 17
		3.6	Power cut delay	See page 19
4	Monitor Display Control	4.1	Overheat warning	See page 20
		4.2	Engine oil pressure warning	See page 22
		4.3	Low fuel warning	See page 23
		4.4	Battery charging warning	See page 24
		4.5	Glow timer (auto)	See page 25
		4.6	Hour meter	
	Gate lock			
	Horn			
	Radio		AM/FM	
	Interior light			
4	Heater			
5	Air Conditioner (optional)			See Air Conditioner
6	Combined Line for Breaker and Crusher (optional)			See Hydraulic Circuit
7	Interference Prevention System			See Interference Prevention System

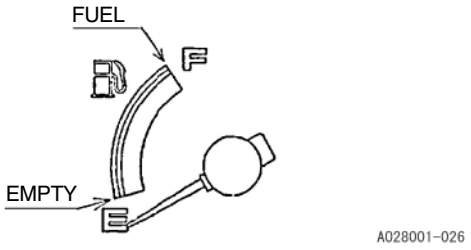
[3] Low fuel warning

1) Configuration

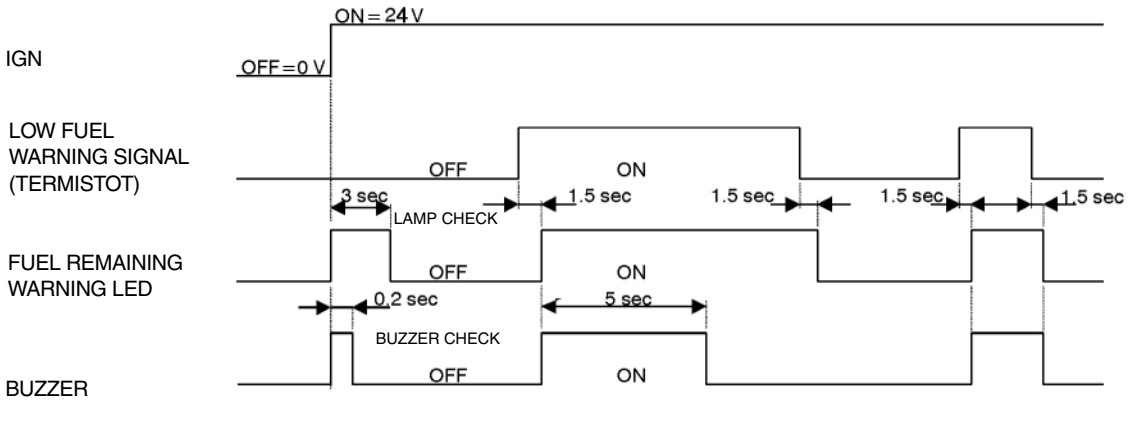


Fuel sensor specifications

Fuel remaining	Empty	1/2	Full
Sensor resistance (ohm)	90	38	10

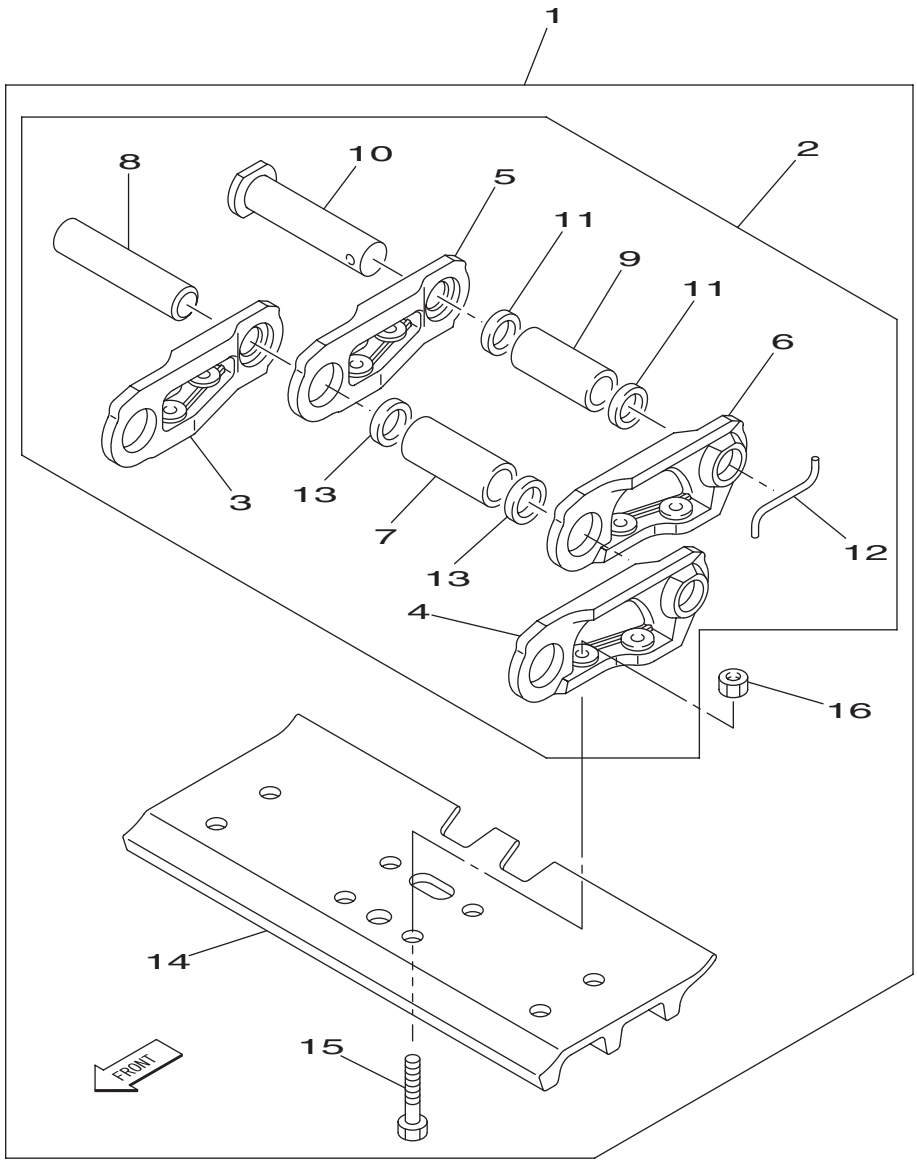


2) Operation



- When the thermistor resistance falls to 37 ohm or below, the monitor recognizes this as the signal being ON and turns on the LED.

TRACK SHOE

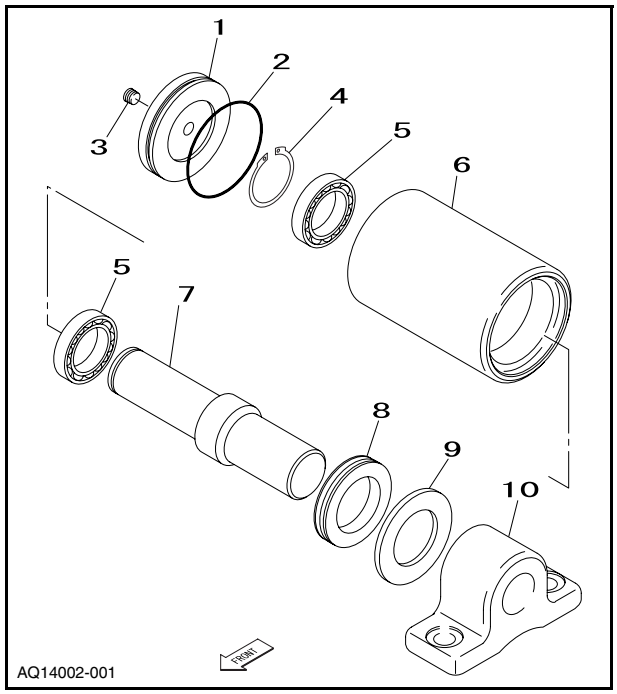


AQ10002-001

1. Grouser shoe
2. Track link assembly
3. Track link (right)
4. Track link (left)
5. Master link (right)
6. Master link (left)
7. Track bushing
8. Track pin
9. Master bushing
10. Master pin
11. Collar
12. Locking pin
13. Seal
14. Shoe plate
15. Shoe bolt
16. Shoe nut

3 Component diagram

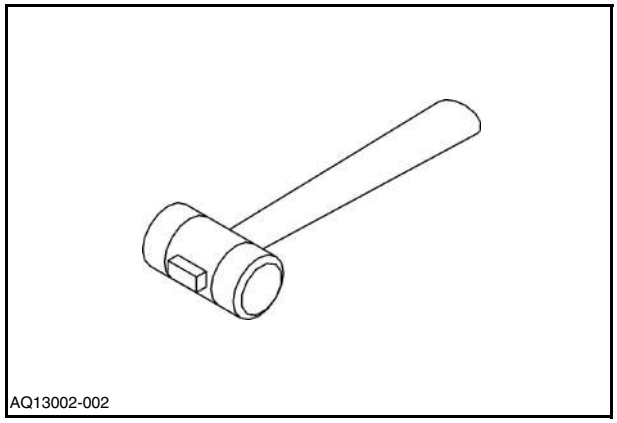
1. Cover
2. O-ring
3. Plug
4. Snap ring
5. Ball bearing
6. Roller
7. Shaft
8. Oil seal
9. Cover
10. Bracket



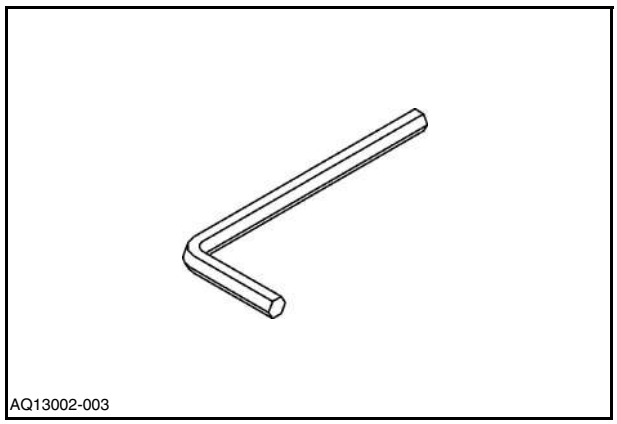
4 Tools and jigs

1. Tools

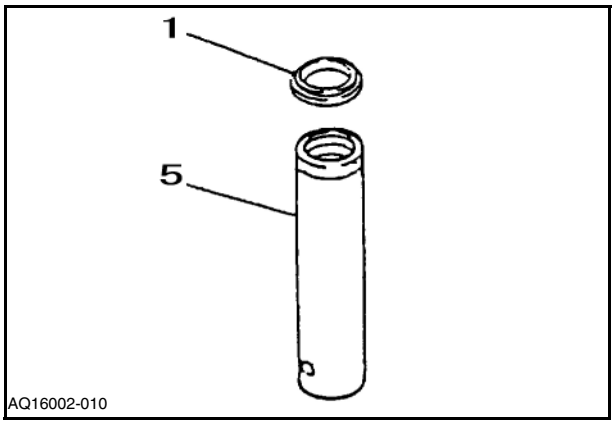
Hammer



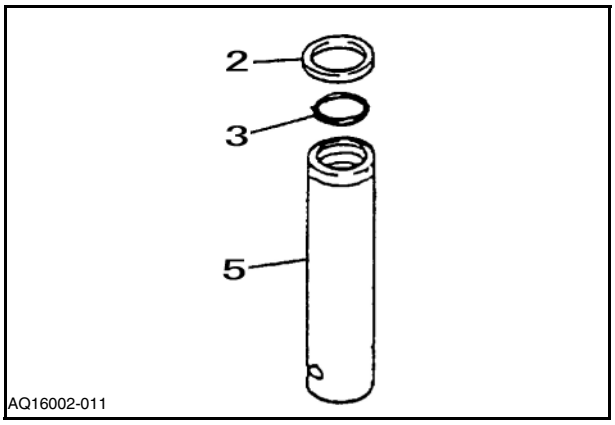
Hexagon bar wrench



3) Remove dust seal (1) from grease cylinder (5) using pulling jig.



4) Remove back-up ring (2) and O-ring (3) from grease cylinder (5).



4 Assembly instructions

[1] Prior to assembly

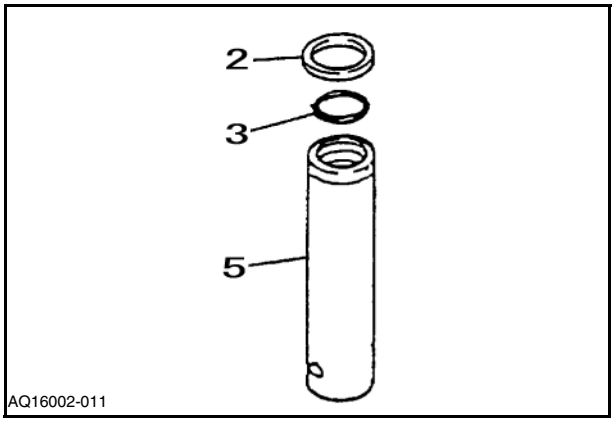
- Clean all the parts.
- Polish scratches, flashes or burrs using oil stone.
- Change sealing parts such as O-rings with new ones.

[2] Assembling instructions

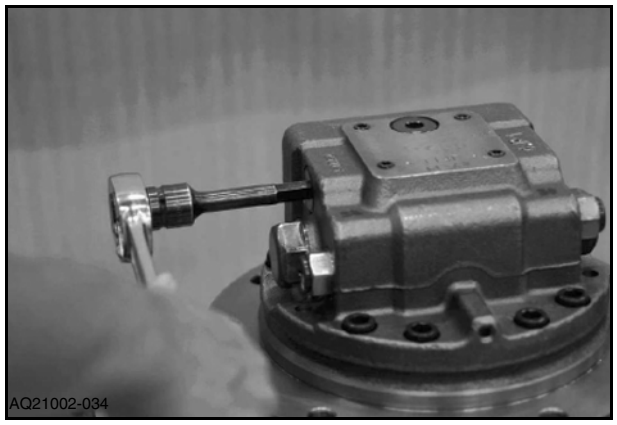
1)

1) Install grease-applied O-ring (3) to grease cylinder (5).
2) Install back-up ring (2).

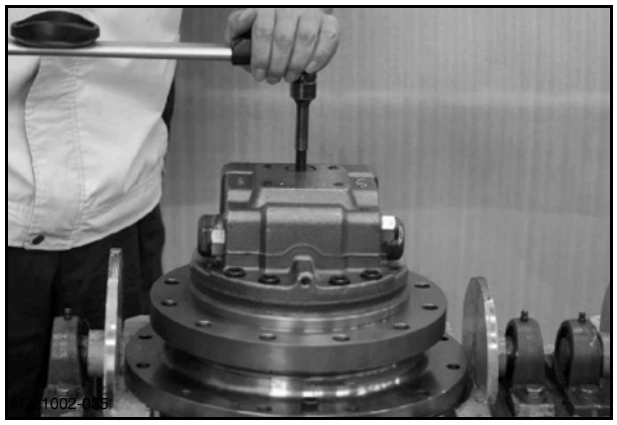
NOTE: *Do not reuse back-up ring (2) and O-ring (3).*



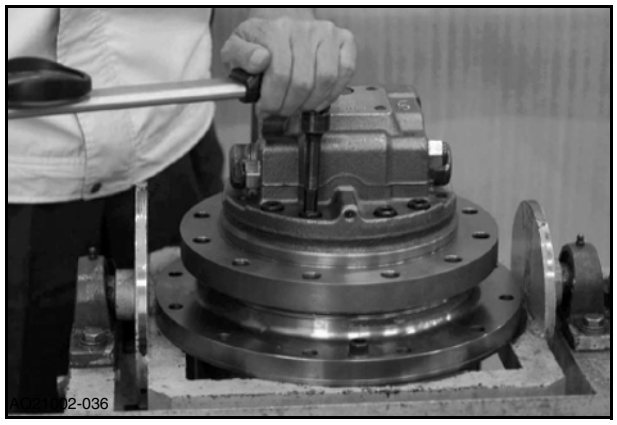
4) Temporarily loosen plug (382) (2 pcs).



5) Temporarily loosen plug (382).

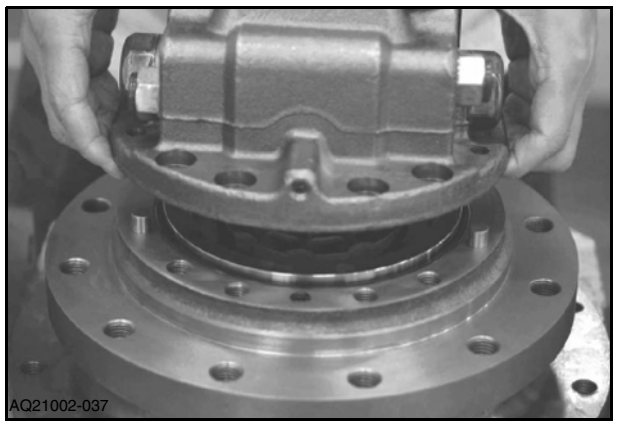


6) Loosen and remove hexagon socket head cap screw (345) (8 pcs) from rear flange (301).



7) Remove rear flange (301) from spindle (2).

NOTE: *Hold the rear flange by both hands, hold it up gently upright to remove it. Perform the work with care not to forcibly pry or strike the flange.*
Otherwise it may cause the timing plate (109) to drop and be damaged.



[8] Assembly of the brake valve parts in the rear flange

1) Fit O-ring (338) (2 pcs) to the plug (382) (2 pcs).

NOTE: *Apply grease to O-ring (338) (2 pcs).*

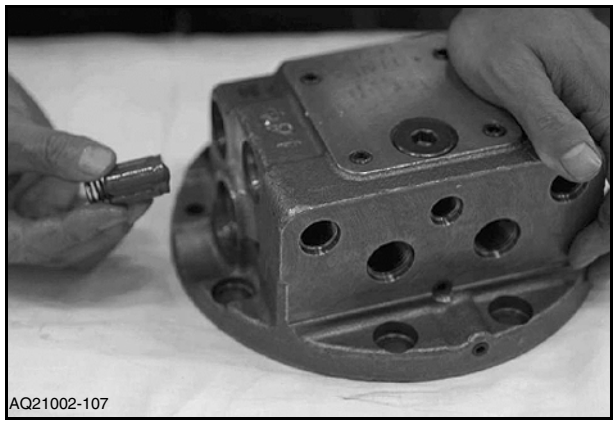
2) Install valve (327) (2 pcs), and spring (330) (2 pcs) on rear flange (301).
At this time, apply grease and on it to connect the valve (327), spring (330) and plug (382) by cohesion of the grease.


AQ21002-106

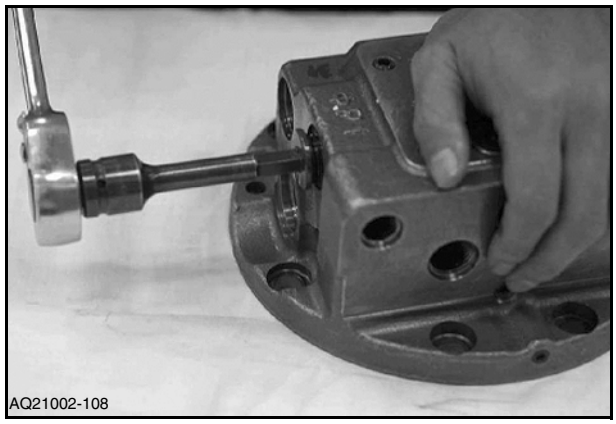
3) Insert the plug (382) (2 pcs) assembled in one piece in rear flange (301) and temporarily tighten.

NOTE: *For insertion of plug (382), place facing the tapped hole for plug mounting of rear flange (301) upward and align the center of tapped hole with the plug center. This is intended to prevent the O-ring from being damaged and spring (330) from coming out of valve (327) due to contact between the bore of the rear flange and the valve.*

NOTE: *If spring (330) separates from valve (327), valve (327) do not touch the sheet side of rear flange (301) correctly, and causes an leak of oil.*

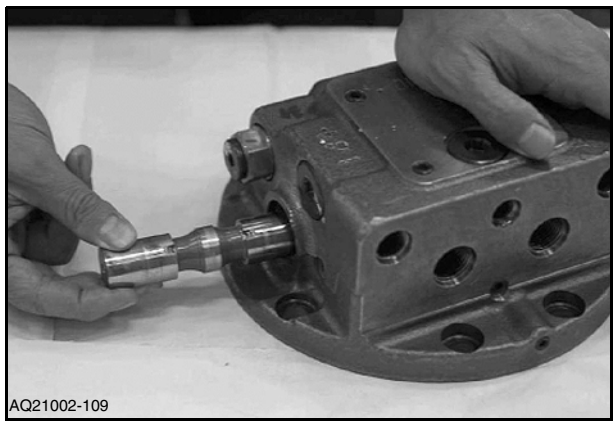

AQ21002-107

4) After inserting plug (382) (2 pcs), temporarily tighten into rear flange (301) by a hexagon wrench.


AQ21002-108

5) Insert spool (323) into rear flange (301).

NOTE: *Apply hydraulic fluid to the spool and insert the spool into the rear flange.*
To install the spool, align the hole of the rear flange with the spool shaft center so as to prevent the inner surface of the rear flange and the outer surface of the spool from being damaged due to interference.
Otherwise internal leaks will occur after reassembly, resulting in performance deterioration of the travel motor.

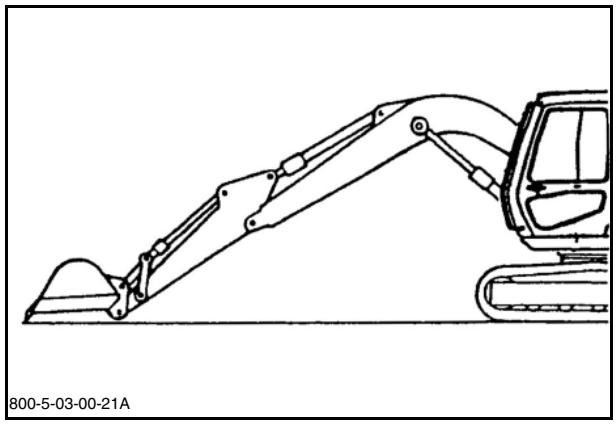

AQ21002-109

Port	Description	Port	Description
A1	Travel line (backward left)	pb1	Travel (forward left) Pilot Line
A2	Backup Line	pb2	Backup Pilot Line
A3	Swing-right Line	pb3	Swing-left Pilot Line
A5	Arm-out Line	pb4	Boom-down 2-speed Pilot Line
A6	Travel Line (backward right)	pb5	Arm-in Pilot Line
A7	Bucket-close Line	pb6	Travel (forward right) Pilot Line
A8	Boom-up Line	pb7	Bucket-open Pilot Line
B1	Travel-line (forward left)	pb8	Boom-down Pilot Line
B2	Backup Line	pb9	Arm-in 2-speed Pilot Line
B3	Swing-left Line	pc2	Load Holding at Boom
B5	Arm-in Line	T1, T2, T3, T4	Return Line
B6	Travel Line (forward right)	T5	Bypass Filter
B7	Bucket-open Line	dr2	Pilot drain
B8	Boom-down Line	pcc	Backup Confluence Pilot Line
DR1	Drain	AR2	Blade-up line
P1, P2, PR5, PP	Pressure Line	BR2	Blade-down line
P3, P4	Backup Confluence Line	pra2	Blade-up pilot line
PA	Attachment Signal Pressure Measurement	prb2	Blade-down pilot line
PT	Travel Signal Pressure Measurement		
pa1	Travel (backward left) Pilot Line		
pa2	Backup Pilot Line		
pa3	Swing-right Pilot Line		
pa4	Boom-up 2-speed Pilot Line		
pa5	Arm-out Pilot Line		
pa6	Travel (backward right) Pilot Line		
pa7	Bucket-close Pilot Line		
pa8	Boom-up Pilot Line		
pa9	Arm-out 2-speed Pilot Line		

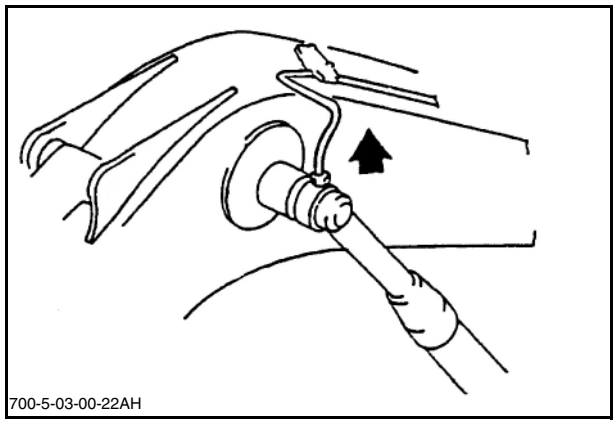
3 Boom cylinder

1 Removal

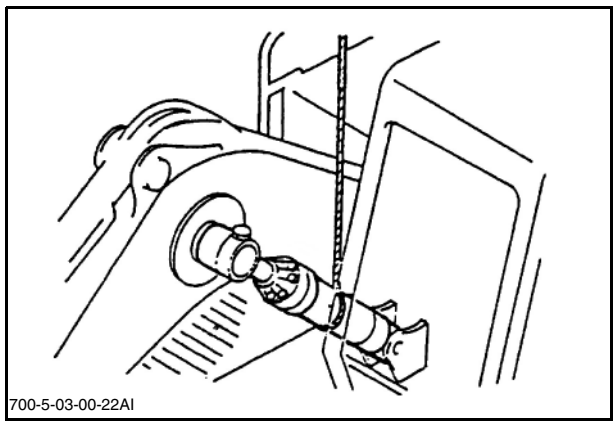
1) Lower the attachment to the ground.


800-5-03-00-21A

2) Remove the grease hose.

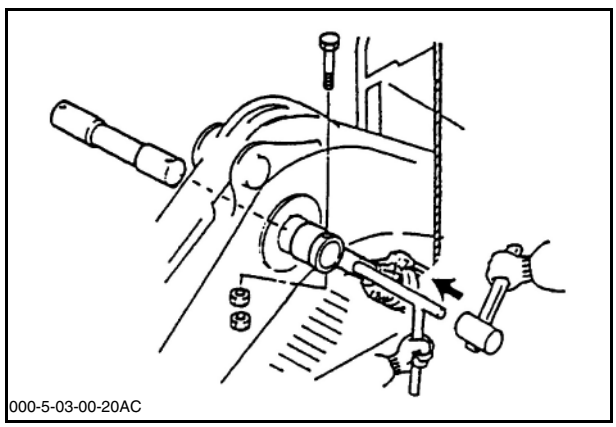

700-5-03-00-22AH

3) Attach a sling to the boom cylinder.

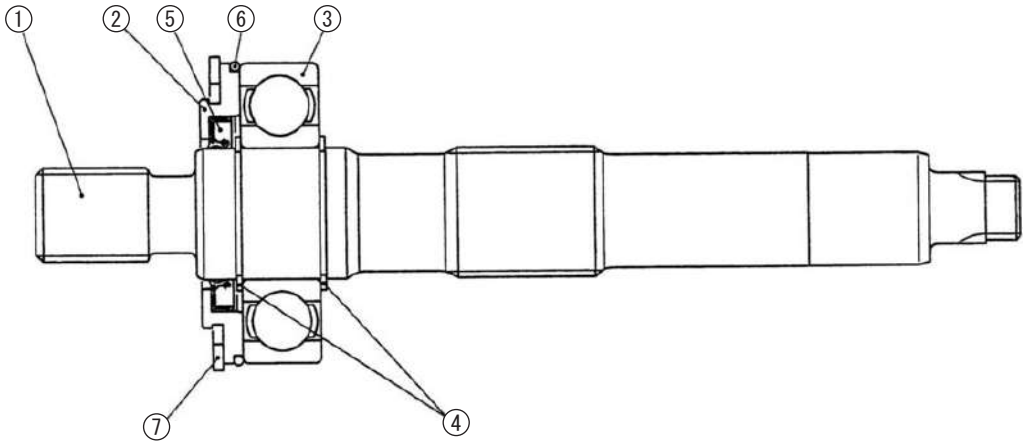

700-5-03-00-22AI

4) Remove the nuts and bolt to remove the collar.

5) Pull out the pin, using a steel bar and hammer.


000-5-03-00-20AC

1 No. 1 Shaft assembly

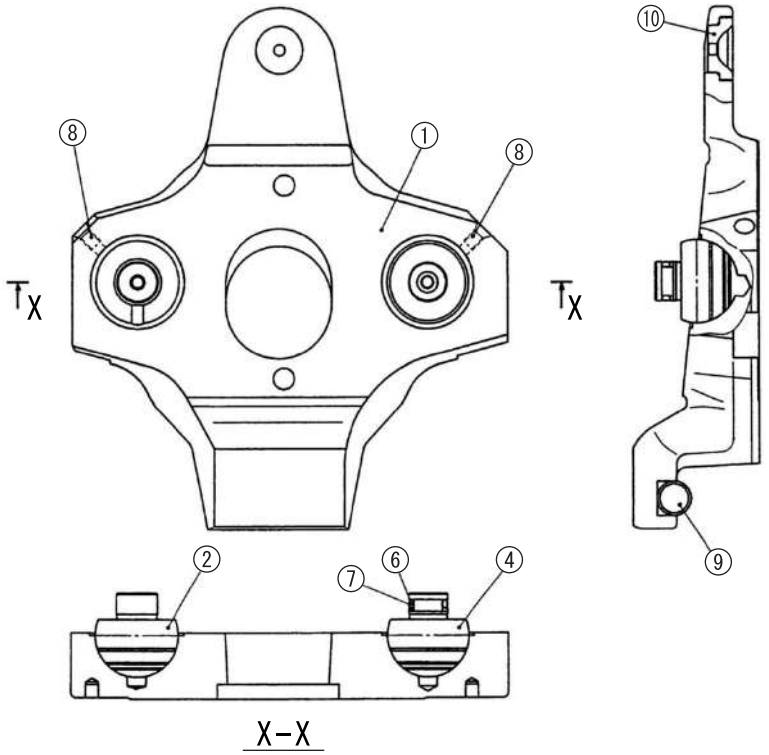


AQ20002-074

AQ20002-074

1. Shaft (1)
2. Seal case (1)
3. Bearing (1)
4. Retaining ring (C type) (2)
5. Oil seal (1)
6. O-ring (1)
7. Retaining ring (C type) (1)

2 No. 2 Swash plate assembly

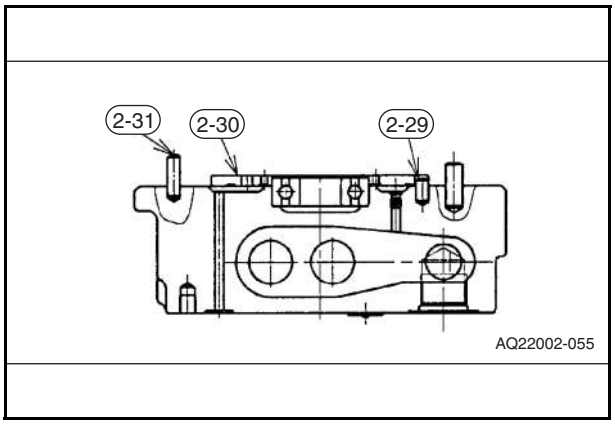


AQ20002-075

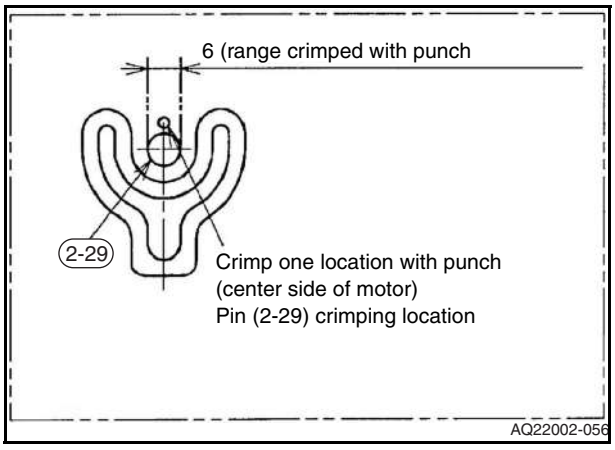
AQ20002-075

1. Swash plate (1)
2. Guide (1)
4. Guide (1)
6. O-ring (1)
7. Backup-ring (1)
8. Plug (1)
9. Parallel pin (1)
10. Bushing (1)

19 Install pin (2-29) and attach valve plate (2-30). Apply grease to back face to keep it from falling off.



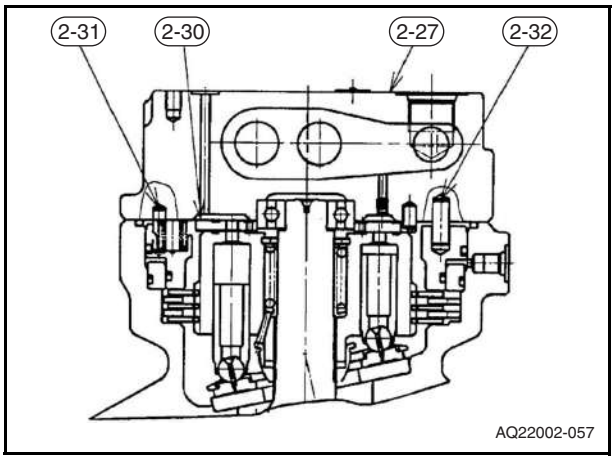
NOTE: *After installing pin (2-29), crimp the following locations using a punch:*



20 Install cover assembly (2-27) on case (2-1), keeping an eye on the locations of pins (2-31, 2-32).

NOTE: *Be careful not to drop the pin or the valve plate.*

NOTE: *Refer to notes in section 1-13: Installing Brake Piston for location of pin (2-32).*



21 Finger tighten socket head bolt (2-33), then tighten to specified torque.

Tightening torque: 177±10 Nm (Width across flats: 12)

NOTE: *Parts related to the pinion shaft should be replaced as a housing assembly (B6). Description below is for reference purposes only.*