WSM

WORKSHOP MANUAL
KUBOTA EXCAVATOR

U25S
U20-3α
U25-3α

Service Chapter

Kubota

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Code No.97899-61500

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(Note)
U25S is for KTC, KCL and KTA, what we call, PP-version in this manual.
U20-3α and U25-3α are for KE, KUK and KBM, what we call, EU-version in this manual.

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(4) Hose screw

Thread size (piping screw)	Tightening torque N·m kgf·m ft·lbf		Wrench size (reference)
	Union nut section	Taper thread section	
1/8”	7.8 ~ 11.8 N·m 0.8 ~ 1.2 kgf·m 5.8 ~ 8.7 ft·lbf	14.71 ~ 19.61 N·m 1.5 ~ 20 kgf·m 10.85 ~ 14.47 ft·lbf	17 mm 0.67 in
1/4”	24.5 ~ 29.4 2.5 ~ 3.0 18.1 ~ 21.7	36.3 ~ 44.1 3.7 ~ 4.5 26.8 ~ 32.5	19 mm 0.75 in
3/8”	49.0 ~ 53.9 5.0 ~ 5.5 36.2 ~ 39.8	49.0 ~ 68.6 5.0 ~ 7.0 36.2 ~ 50.6	22 mm 0.87 in
1/2”	58.8 ~ 63.7 6.0 ~ 6.5 43.4 ~ 47.0	83.4 ~ 88.3 8.5 ~ 9.0 61.5 ~ 65.1	27 mm 1.06 in
3/4”	117.7 ~ 127.5 12.0 ~ 13.0 86.8 ~ 94.0	127.5 ~ 147.1 13.0 ~ 15.0 94.0 ~ 108.5	36 mm 1.42 in
1”	137.3 ~ 147.1 14.0 ~ 15.0 101.3 ~ 108.5	147.1 ~ 166.7 15.0 ~ 17.0 108.5 ~ 123.0	41 mm 1.61 in

Metric Size Hose

Thread size (piping screw)	Torque N·m kgf·m ft·lbf
M12 × 1.5	20 ~ 30 2.0 ~ 3.1 14.75 ~ 22.13
M14 × 1.5	20 ~ 30 2.0 ~ 3.1 14.75 ~ 22.13
M16 × 1.5	30 ~ 50 3.1 ~ 5.1 22.13 ~ 36.9
M18 × 1.5	30 ~ 50 3.1 ~ 5.1 22.13 ~ 36.9
M22 × 1.5	40 ~ 60 4.1 ~ 6.1 29.5 ~ 44.25

(5) Joint bodies

Thread size (piping screw)	Tightening torque N·m kgf·m ft·lbf		Spanner size (reference)	Remarks Steel pipe (OD)	
	R (tapered thread)	G (straight thread)			
1/8”	19.6 ~ 29.4 N·m 2.0 ~ 3.0 kgf·m 14.5 ~ 21.7 ft·lbf	-	17 mm 0.67 in	When in steel pipe is in use.	8 mm 0.31 in
1/4”	36.3 ~ 44.1 3.7 ~ 4.5 26.8 ~ 32.5	W/O-ring *Joint Torque* 58.8 ~ 78.5 6 ~ 8 43.4 ~ 57.9	19 mm 0.75 in		12 mm 0.47 in
3/8”	39.2 ~ 49.0 4.0 ~ 5.0 28.9 ~ 36.2	W/O-ring *Joint Torque* 78.5 ~ 98.1 8 ~ 10 57.9 ~ 72.3	23 mm 0.91 in		15 mm 0.59 in
1/2”	49.0 ~ 68.6 5.0 ~ 7.0 36.2 ~ 50.6	W/O-ring *Joint Torque* 117.7 ~ 137.3 12 ~ 14 86.8 ~ 101.3	26 mm 1.02 in		16 mm 0.63 in

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F. Maintenance intervals

a. Maintenance intervals chart : EU-version

	General Maintenance	Elapsed Operating Hours																				
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	Interval
Operator Services	Check engine oil level																					daily
	Check hydraulic oil level																					daily
	Check fuel level																					daily
	Check coolant level																					daily
	Grease front attachments																					daily
	Check V-belt																					daily
	Check washer liquid																					daily
	Check water separator																					daily
	Grease swivel gear	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	50 h
	Check, clean air filter 1.)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	50 h
	Grease swivel gear bearing				○				○				○				○				○	200 h
	Check battery electrolyte level										○										○	500 h
	Drain water in fuel tank										○										○	500 h

IMPORTANT:

● ◉ First operation

1.) Clean the air filter more frequently if used under dusty conditions. By heavy soiling, replace the filter.
2.) When using a hydraulic breaker, change hydraulic oil and return filter according to the table on "Hydraulic Oil Change".
3.) Earlier if necessary.
4.) At least annually .
(including Exchange of the Suction Filter in the Hydraulic Tank) under "EVERY 1000 SERVICE HOURS" in "REGULAR CHECKS AND MAINTENANCE WORK".

	Service	Elapsed Operating Hours																				
		50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	Interval
Servicing by skilled personnel or KUBOTA dealer	Change engine oil and oil filter	◉				○					○					○					○	250 h
	Inspect coolant hoses and clamps					○					○					○					○	250 h
	Check/adjust V-belt tension					○					○					○					○	250 h
	Grease pilot valve linkage					○					○					○					○	250 h
	Change fuel filter cartridge 3.)																				○	500 h
	Drain of the water separator										○										○	500 h
	Change hydraulic return line filter element					◉					○										○	500 h
	Change drive unit oil 4.)		◉								○										○	500 h
	Change hydraulic oil and suction filter 2.)																				○	1000 h
	Renewing the pilot circuit filter																				○	1000 h
	Change air filter elements 1.)																				○	1000 h
	Change idler and track roller oil																					2000 h
	Check alternator and starter motor						Please contact your KUBOTA dealer.															2000 h
	Inspect electric cables and connections						Please contact your KUBOTA dealer.															annually
	Change coolant																					every 2 years
	Change hydraulic hoses						Please contact your KUBOTA dealer.															every 6 years
	Safety inspection																					annually

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c. Water and oil quantity

	Unit	U20-3α	U25-3α	U25S	Remarks
Radiator Canopy / Cab	L gal	3.0 0.79	←	←	Kubota LLC-N-50F 50%
Reserve tank	L gal	0.6 0.16	←	←	
Engine oil with filter	L gal	4.4 1.16	←	←	SAE10W30(CF-4)
Hydraulic oil Full	L gal	37.0 9.98	←	←	ISO 46
Hydraulic oil Tank gauge center	L gal	22.5 5.94	←	←	ISO 46
Wheel motor	L gal	0.33 0.09	0.35 0.09	←	SAE90 (API GL-4)
Track roller	cc gal	50 0.01	80 0.02	←	SAE30(CD)
Upper roller	cc gal	60 0.02	←	←	SAE30(CD)
Front idler	cc gal	35 0.01	75 0.02	←	SAE30(CD)
Fuel tank	L gal	27.5 7.27	←	←	

Grease	Supply grease to such amount that it oozes out of periphery of the rotating end.	Ultra -pressure grease : EP2, Beacon Q2
Control leaver and links Du-bushing	Assemble after applying grease	

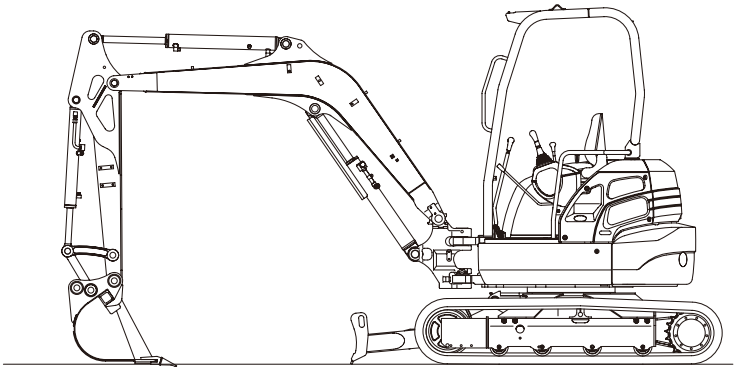
Inspection of hydraulic oil

When checking the hydraulic oil level, satisfy the following conditions and make sure the oil level is above the center the oil gauge.



The oil level is within the shaded area shown in the figure at left.

1) Oil temp. should be between 10 ~ 30 °C (50 ~ 86 °F)
2) Stance of front attachment :
   Swing : Straight forward
   Arm : Vertical to the ground
   Bucket : On the ground at its bottom
   Dozer blade : Down to the ground



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b. Machine specifications

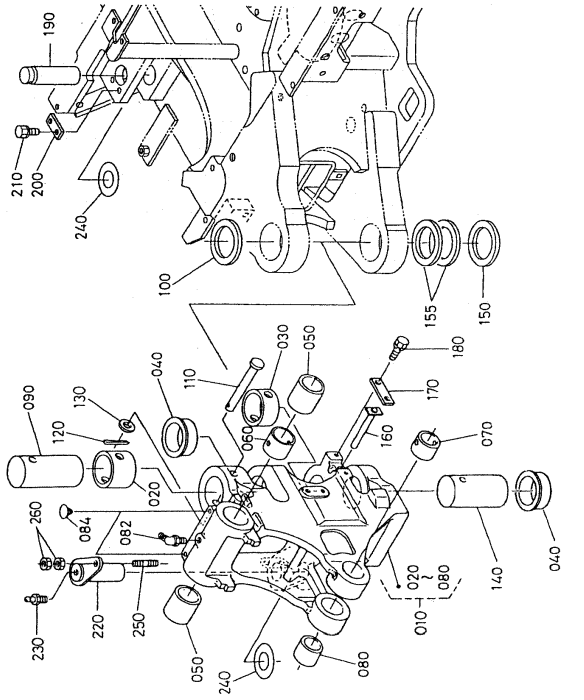
		Unit		U20-3α		U25-3α		U25S	
Engine									
Type				"Vertical, water-cooled 4 cycle, 3 cylinders diesel"					
Model				Kubota D1105-E2BH-12		Kubota D1105-E2BH-13		Kubota D1105-E2BH-14	
gross engine output (SAE J1349)		kW/rpm		14.0/2200		15.5/2400		15.5/2400	
		PS/rpm		19.0/2200		21.1/2400		21.1/2400	
Displacement		cc	in3	1123.0	68.5	1123.0	68.5	1123.0	68.5
Dimensions									
Overall length		mm	in	3848	151.5	4107	161.7	4107	161.7
Overall width	STD track	mm	in	1400	55.1	1500	59.1	1500	59.1
	Variable track	mm	in	1300 / 1500	51.2 / 59.1	-	-	-	-
Overall crawler width	STD track	mm	in	1400	55.1	1500	59.1	1500	59.1
	Variable track	mm	in	1300 / 1500	51.2 / 59.1	-	-	-	-
Overall height	Canopy	mm	in	2375	93.5	2420	95.3	2420	95.3
	Cabin	mm	in	2355	92.7	2400	94.5	-	-
Min. ground clearance		mm	in	265	10.4	300	11.8	300	11.8
Max. digging depth	Canopy	mm	in	2298	90.5	2526	99.2	2807	110.5
	Cabin	mm	in	2298	90.5	2526	99.2	-	-
Max. digging height	Canopy	mm	in	3879	152.7	4327	170.4	C:4532	178.4
	Cabin	mm	in	3655	143.9	4125	162.4	P:4167	164.1
Max. digging radius	Canopy	mm	in	4136	162.8	4501	177.2	4666	183.7
	Cabin	mm	in	4136	162.8	4501	177.2	-	-
Max. dumping height	Canopy	mm	in	2552	100.5	2972	117.0	3208	126.3
	Cabin	mm	in	2320	91.3	2775	109.3	-	-
Swing angle (left/right)		deg.		73/55		←		←	
Travel speed	Low speed	km/h	mph	2.2	1.4	2.5	1.6	2.5	1.6
	High speed	km/h	mph	4.2	2.6	4.5	2.8	4.5	2.8
Swivel speed		rpm		9.1		9.5		9.5	
Max. traction force	Low speed	kN	lbf	17.2	3.9	22.5	5.1	22.5	5.1
		kgf		1754.0		2294.0		2294.0	
	High speed	kN	lbf	9.0	2.0	10.8	2.4	10.8	2.4
		kgf		918.0		1101.0		1101.0	
Performance									
Tumbler distance		mm	in	1474	58.0	1561	61.5	1561	61.5
Tread		mm	in	1150	45.3	1200	47.2	1200	47.2
Crawler width x No. of shoe x pitch (Rubber crawler)		mm		250x47x84		300x53x80		300x53x80	
		in		9.8x1.9x3.3		11.8x2.1x3.2		11.8x2.1x3.2	
Bucket									
Heaped capacity		m3	yd3	0.066	0.086	0.08	0.105	0.08	0.105
Width		mm	in	450	17.7	500	19.7	500	19.7
Blade									
Width x height	STD track	mm	in	1400x292	55.1x11.5	1500x292	59.1x11.4	1500x292	59.1x11.4
	Variable track	mm	in	1500x292	59.1x11.5	-	-	-	-
Lift above GL / below GL	STD track	mm	in	318 / 440	12.5 / 17.3	354/315	13.9/12.4	354/315	13.9/12.4
	Variable track	mm	in	318 / 440	12.5 / 17.3	-	-	-	-

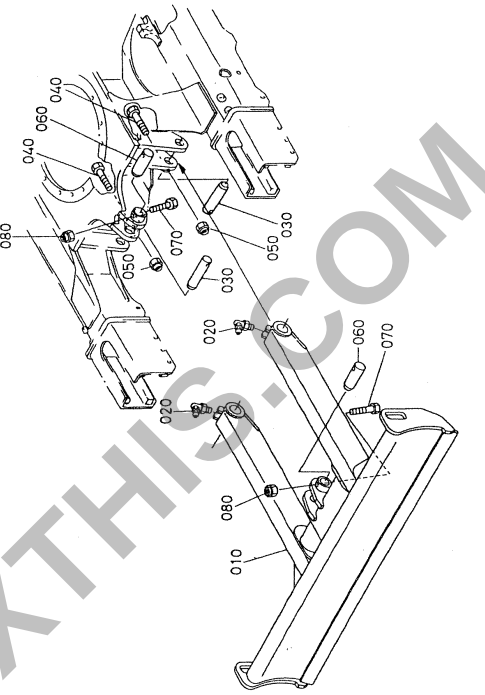
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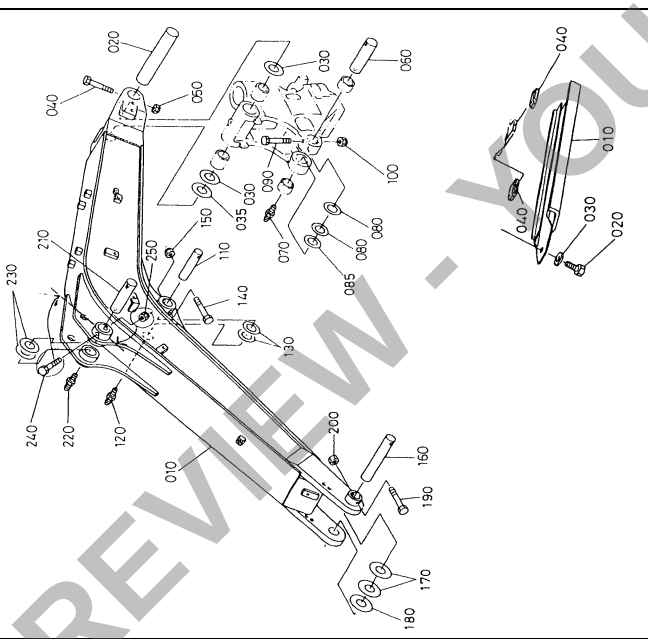
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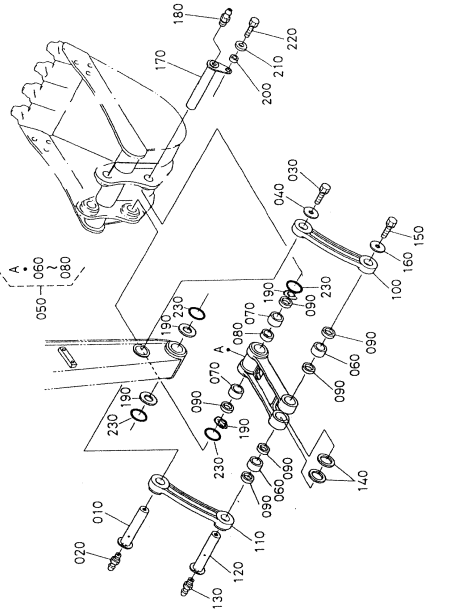
B. Front attachment

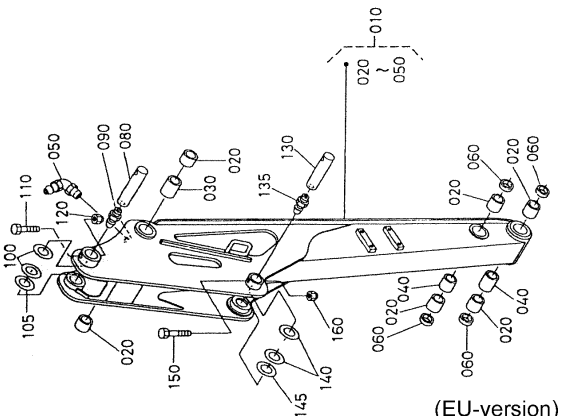
a. Parts designation











(EU-version)

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(1) Swing bracket

No.	PART NAME	No.	PART NAME	No.	PART NAME
010	Assy bracket, swing	090	Pin	180	Bolt
020	Bush	100	Collar, Thrust	190	Pin
030	Bush	110	Pin, Joint	200	Plate, Key
040	Bush	120	Pin, Sprit	210	Bolt
050	Bush	130	washer, Plain	220	Pin
060	Collar	140	Pin	230	Nipple, Grease
070	Bush	150	Collar, Thrust	240	Shim
080	Bush	155	Shim	250	Stud
082	Nipple, Grease	160	Pin	260	Nut
084	Plug	170	Plate, Retainer		

(2) Boom

No.	PART NAME	No.	PART NAME	No.	PART NAME
010	Boom	085	Shim	170	Shim
020	Pin	090	Bolt	180	Shim
030	Shim	100	Nut, Lock	190	Bolt
035	Shim	110	Pin	200	Nut, Lock
040	Bolt	120	Nipple, Grease	210	Pin
050	Pin	130	Shim	220	Nipple, Grease
060	Pin	140	Bolt	230	Shim
070	Nipple, Grease	150	Nut, lock	240	Bolt
080	Shim	160	Pin	250	Nut, Lock

(3) Boom Cylinder Cover

No.	PART NAME	No.	PART NAME
010	Cover, Cylinder	030	Washer, Plain
020	Bolt	040	Cap, Cylinder cover

(4) Arm

No.	PART NAME	No.	PART NAME	No.	PART NAME
010	Assy, Arm	080	Pin	130	Pin
020	Bush	090	Nipple, Grease	135	Nipple, Grease
030	Collar	100	Shim	140	Shim
040	Collar	105	Shim	145	Shim
050	Nipple, Grease	110	Bolt	150	Bolt
060	Seal, Dust	120	Nut, Lock	160	Nut, Lock
070	Blank				

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b. Exchange of bucket (Kubota Japan Bucket)

CAUTION

* When replacing the bucket, wear a hard helmet, goggles and other protective gears.
* When working in buddy system, fully understand signals from each other for added safety.

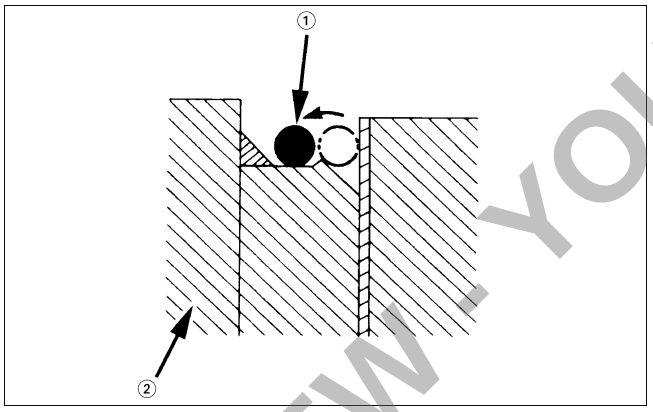
Take the following procedures to replace the bucket.

IMPORTANT

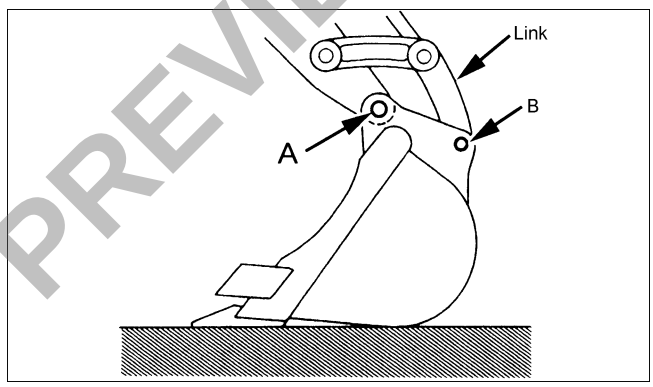
* Be careful to keep the drawn-out pins free of sand and mud.
* A dust seal is attached at each end of the bushing. In removing and fitting the pins, be careful not to damage the dust seals.

■ Removing the bucket

1.Place the bucket just on a flat, level ground.
2.Stop the engine and let out pressure from the hydraulic system.
3.Detach the O-ring from the groove and draw out the pins A and B.

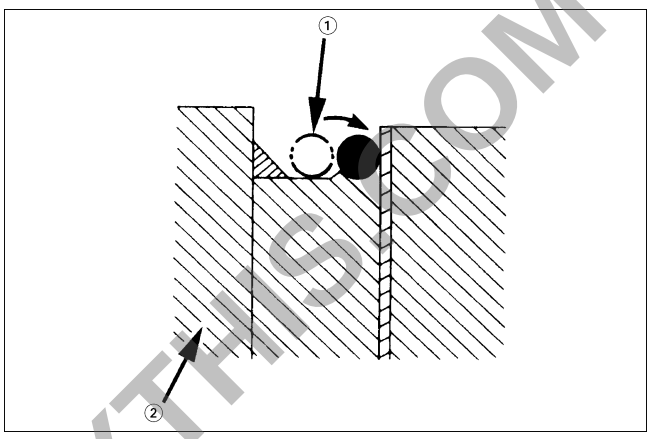


1 Move the O-ring 2 Bucket boss



■ Fitting the bucket

1.Place the O-ring on the boss of the bucket.
2.Align the arm with the hole A, put the shims at both ends of the arm, and couple them with the pins. Align the link with the hole B, put the shims at both ends of the link, and couple them with the pins.
3.Apply and tighten up the pin fixing bolts.
4.Fit the O-ring in the groove.



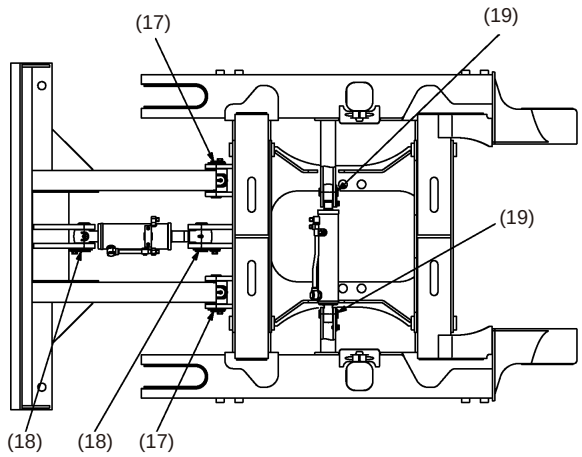
1 Move the O-ring 2 Bucket boss

5.Grease up the pins.

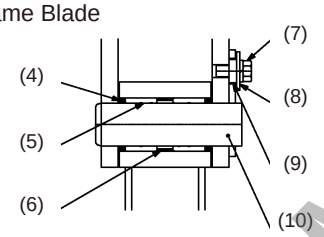
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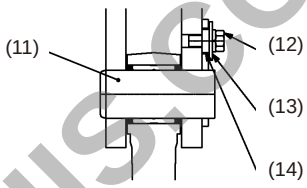
e. Track cylinder

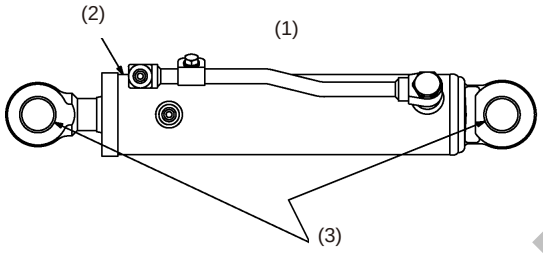


(17) Track frame Blade

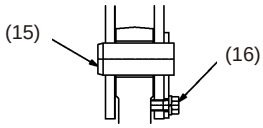


(18) Cylinder(blade)-Blade, track frame





(19) Cylinder (track)Track frame



(1) Cylinder, assembly(Track) RB411-2128Δ
(2) "M2D"markings
(3) RB401-7118Δ (Bushing)
(4) Dust seal (405042) RC411-6678Δ x4
(5) Bushing (405030) RB411-7455Δ x4
(6) Collar RC411-7445Δ x2
(7) Bolt 01133-61225 x2
(8) Plan washer 68741-66921 x2
(9) Spacer 68741-66921 x2
(10) Pin(40-125) RC411-7443Δ x4
(11) Pin (40-95) RB411-7442Δ x2
(12) Bolt 01133-61225x2
(13) Plan washer 04015-60120 x2
(14) Spacer 68741-66921 x2
(15) Pin (30-62) RB411- 2129Δ x2
(16) Bolt 01133-61020 x2

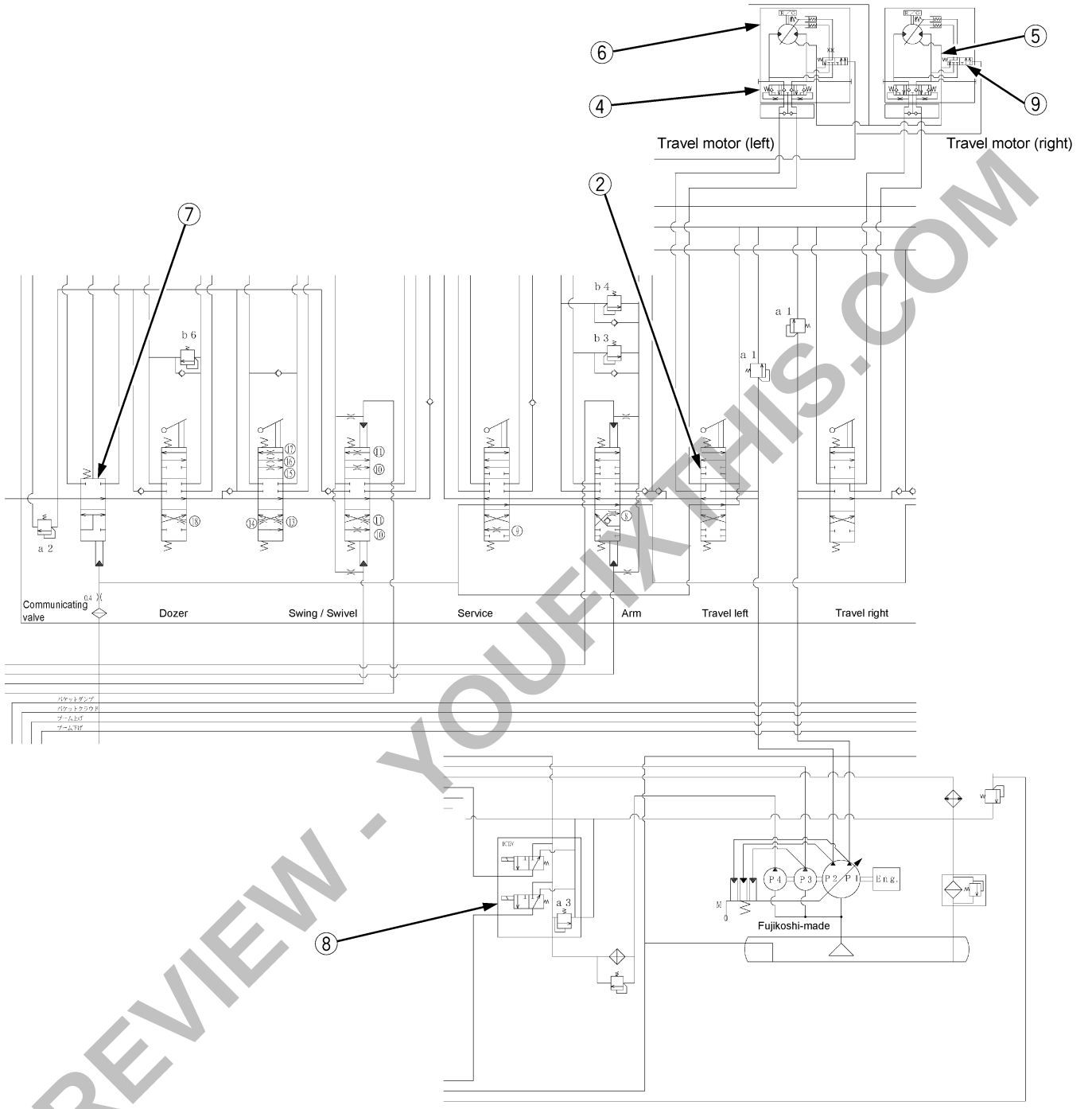
Cylinder identification

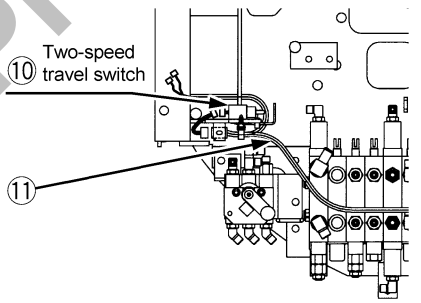
Identified by markings	
U20-3α	M2
U20-3α variable track	M2D

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1) Travel mechanism check points



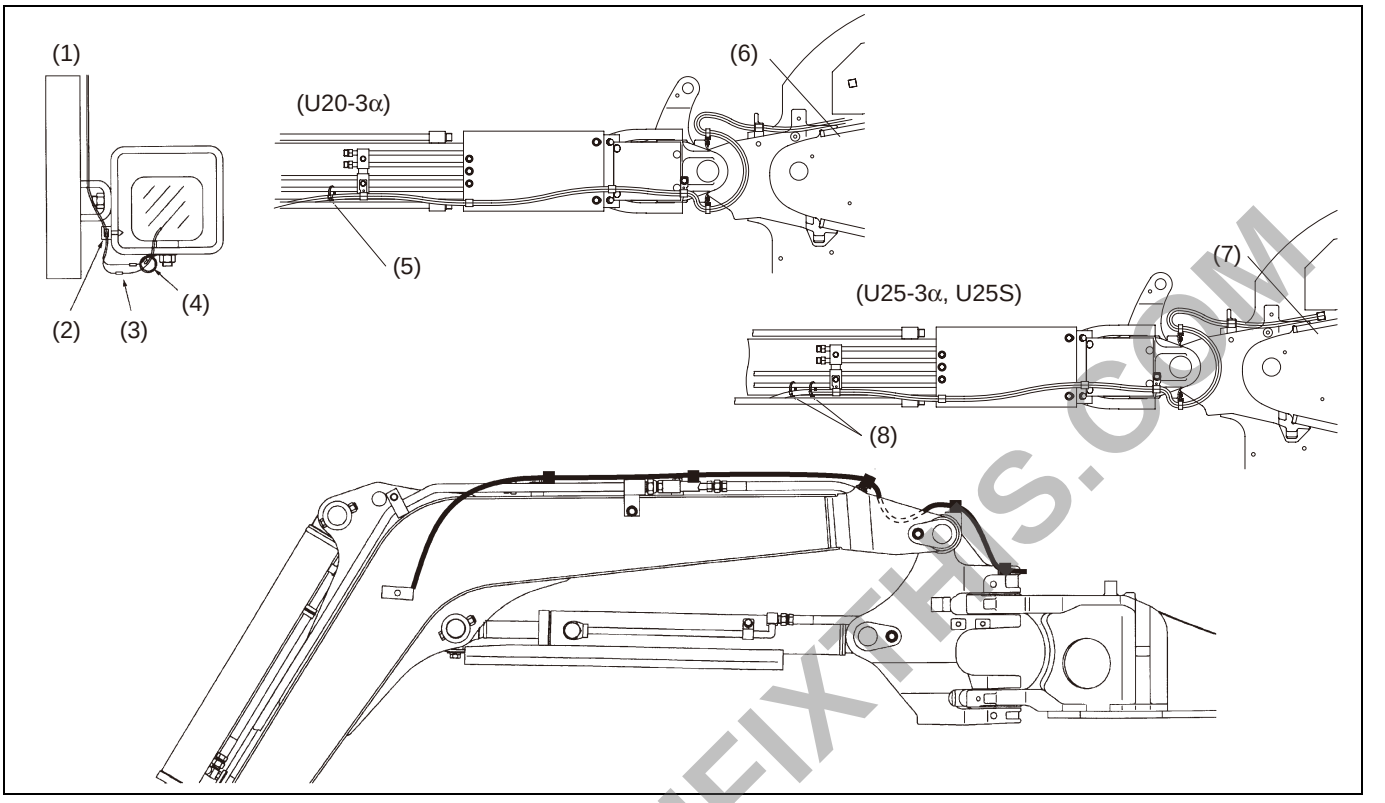


Left front of the machine

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a Front wireharness





(1) Harness clamp of light section
(2) Insert into the hole.
(3) After connecting the terminal,put it in the corrugate section.
(4) Cord clamp 37150-3446Δ
(5) Clamp the hose at blue-taped part.
(6) Insert this into the hole at the backside of the step.
(7) Insert this into the hole at the backside of the step.
(8) Clamp the hose at (2) white-taped parts.





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(5) Sound absorber & trim <Hood, right>

1 Applying the thermal insulator and sound absorber

Wipe oil and dust, if any, off the application surface.

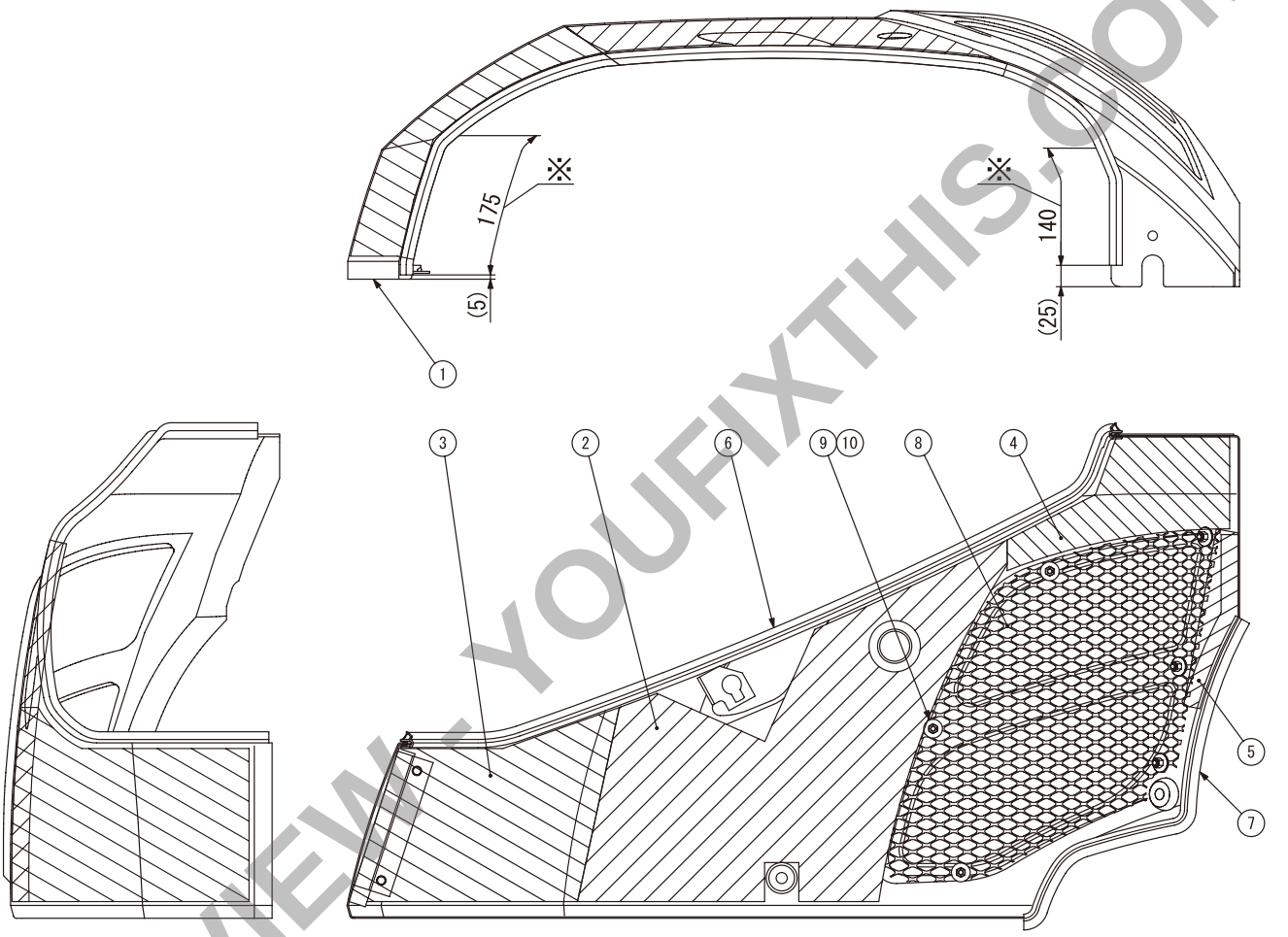
Press all over the applied insulator and absorber to fit them tight.

Poor application → Peel-off or drop-off

2 Adhesive-bonding the trim

* Apply instant adhesive on the two *-marked spots and bond the trim tightly.

Poor bonding → Drop-off

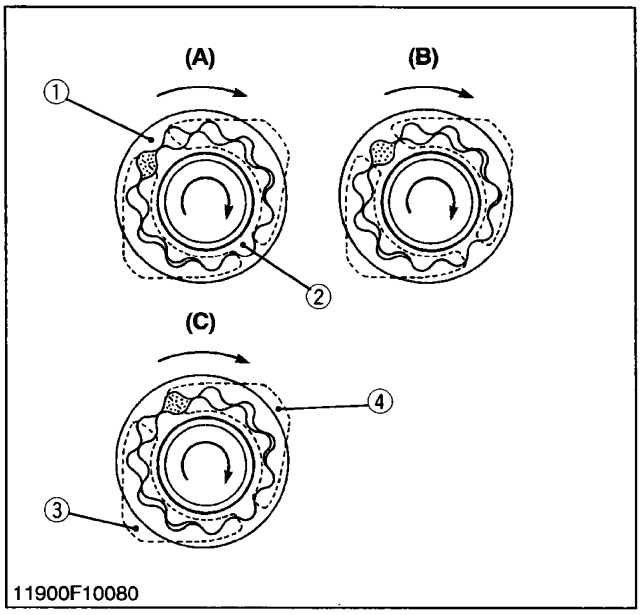


1	RB419−4331Δ	Hood (right)	1	Red No. 1
	RB411−4331Δ	Ditto in different color		
2	RB411−4347Δ	Sound absorber (1, hood, right)	1	
3	RB411−4348Δ	Sound absorber (2, hood, right)	1	
4	RB411−4345Δ	Sound absorber (3, hood, right)	1	
5	RB411−4352Δ	Sound absorber (4, hood, right)	1	
6	RB411−4374Δ	Trim (1, hood, right)	1	
7	RB411−4375Δ	Trim (2, hood, right)	1	
8	RB411−4334Δ	Cover (air intake)	1	
9	04015−50060	Plain washer	6	
10	02552−50060	Anti-rotation nut	6	

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[2] Oil pump



The oil pump in this engine is a trochoid pump.

Inside the pump body, the 10 lobe inner rotor (2) is eccentrically engaged with the 11 lobe outer rotor (1). The inner rotor is driven by the crankshaft, which in turn rotate the outer rotor.

When the inner rotor rotates, the outer rotor also rotates in the same direction. The two rotors have differences in lobe number and center, which generates space between lobes as shown in the figure.

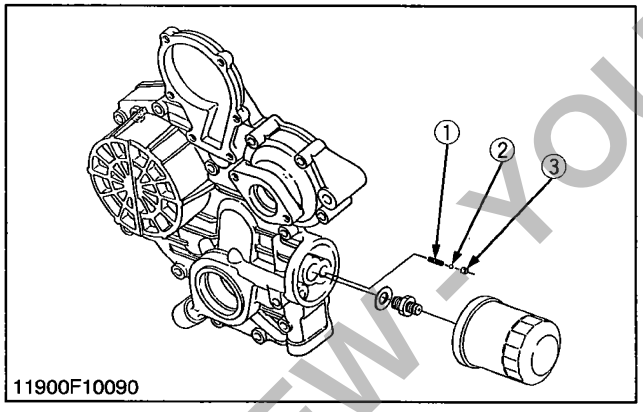
At position **(A)**, there is little space between lobes in the inlet port. As the rotor rotates towards position, the space between the lobes becomes larger, creating a negative pressure which sucks in oil.

Outside the inlet port, as shown in position **(B)**, the space between the lobes becomes gradually smaller, and oil pressure increases. At position **(C)**, oil is discharged from the outlet port.

(1) Outer Rotor
(2) Inner Rotor
(3) Inlet Port
(4) Outlet Port

11900M10101

[3] Relief valve



The relief valve prevents the damage of the lubricating system due to high oil pressure. This relief valve is a ball type direct acting relief valve, and is best suited for low pressures.

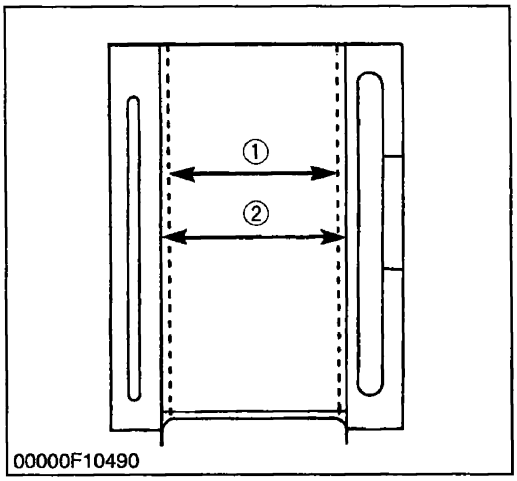
When oil pressure exceeds the upper limit, the ball (2) is pushed back by the pressure oil and the oil escapes.

(1) Spring
(2) Steel Ball
(3) Valve Seat

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Correcting Cylinder

1. When the cylinder is worn beyond the allowable limit, bore and hone it to the specified dimension.

Cylinder I.D.	Factory spec.	D905-B (E) V1205-B (E) V1205-T-B (E)	72.500 to 72.519 mm 2.8346 to 2.8551 in.
		D1005-B (E) V1305-B (E)	76.500 to 76.519mm 3.0118 to 3.0126 in.
		D1105-B (E) D1105-T-B (E) V1505-B (E) V1505-T-B (E)	78.500 to 78.519 mm 3.0906 to 3.0913 in.
Maximum wear	Allowable limit		0.15 mm 0.0059 in.
Finishing	Hone to 1.2 to 2.0 μR max. (0.00047 to 0.00079 in.R max.)		

2. Replace the piston and piston rings with oversize (0.5 mm) ones.

Part Name	Model	Code Number	Marking
Piston	D905-B (E), V1205-B (E)	16224-2191-0	05 OS
	V1205-T-B (E)	16295-2191-0	
	D1005-B (E), V1305-B (E)	16050-2191-0	
	D1105-B (E), V1505-B (E)	16060-2191-0	
	D1105-T-B (E) V1505-T-B (E)	16292-2191-0	
Piston ring assembly	D905-B (E), V1205-B (E)	15901-2109-0	05 OS
	V1205-T-B (E)	16269-2109-0	
	D1005-B (E), V1305-B (E)	16271-2109-0	
	D1105-B (E), V1505-B (E)	16261-2109-0	
	D1105-T-B (E) V1505-T-B (E)	16292-2109-0	

■ NOTE

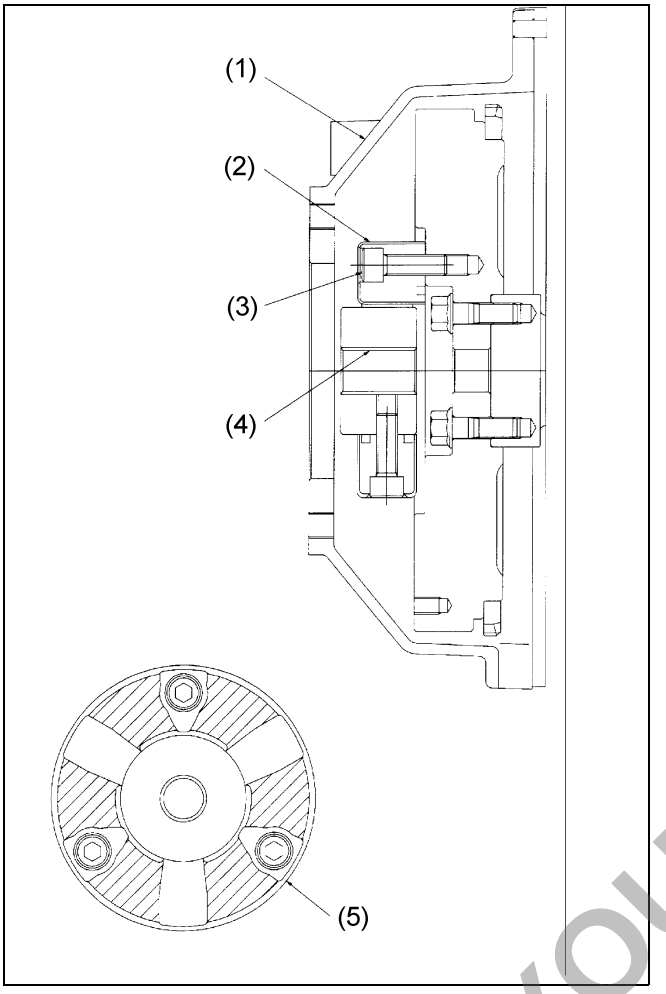
- **When the oversize cylinder is worn beyond the allowable limit, replace the cylinder block with a new one.**

(1) Cylinder I.D. (Before Correction) (2) Oversize Cylinder I.D.

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(1)Housing(pump) RB411-4261Δ
(2)Coupling RB411-4263Δ
(3)Coupling mounting bolt
(4)Apply grease to the spline
(5)Cut off the outer tape after mounting

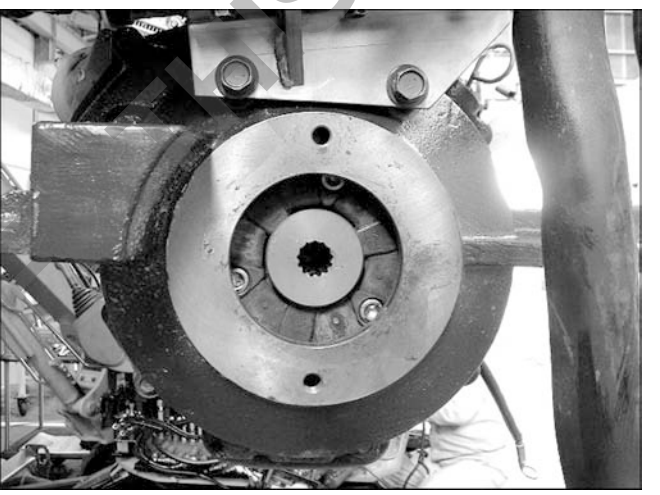
2) Reassembling procedure

1. Apply an appropriate amount of grease to the spline before mounting the pump.

CAUTION:
Do not allow grease onto the rubber parts. Rubber may be deteriorated.

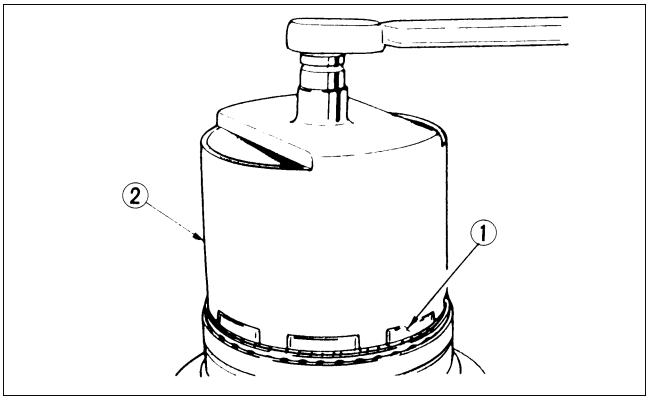
2. Tightening torque of coupling mounting bolt: 48.1-55.9N·m(4.9 ~ 5.7kgf·m) 35.4~41.2ft·lbs

CAUTION:
Do not apply screw LOCTITE. Rubber may be deteriorated.



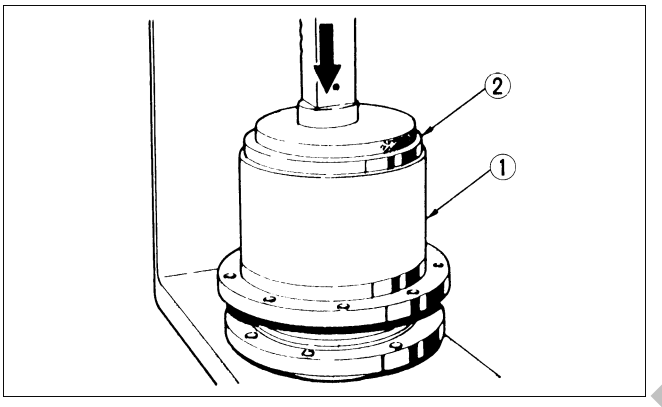
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4. Using the tightening jig, tighten the ring nut so as to leave no clearance between the ring nut and angular bearing.
   • For the tightening jig, refer to V17.

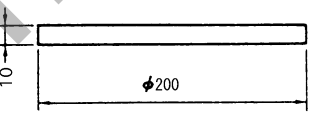
(1) Ring nut
(2) Tightening jig



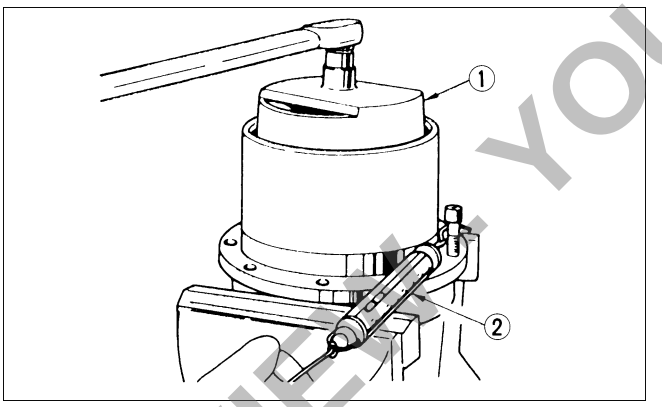
5. Using the press-fitting jig (see the figure below), press-fit the housing onto the angular bearing.

(1) Housing
(2) Press-fitting jig

Unit : mm

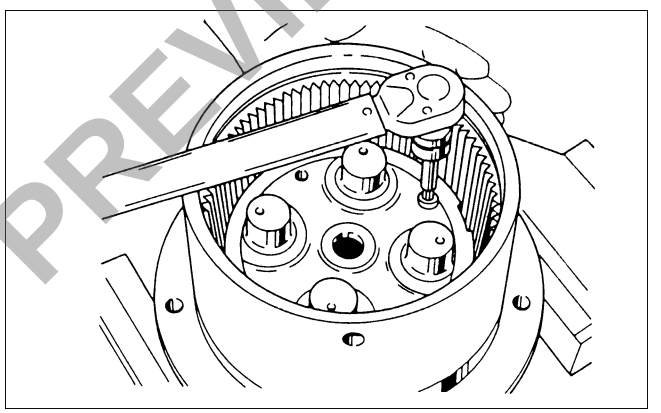


Material: Equivalent of S35C, C0.1



6. Tighten the ring nut using the tightening jig.
   • When the ring nut is tightened so as to leave no clearance between the ring nut and angular bearing, measure the load after turning the housing several turns. The load (starting load) measured at this time is assumed to be F kgf.
   • Tighten the ring nut so that the starting load becomes F + (1.7-2.5) kgf. (3.7~5.5 ft·lbs)

(1) Tightening jig
(2) Spring scale



7. Tighten the plug.
   • No seal tape is needed.

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