WSM

WORKSHOP MANUAL
KUBOTA WHEEL LOADER

R420S, 520S
R420α, 520α

Service Chapter

Kubota

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Code No.97899-60800

Service Chapter

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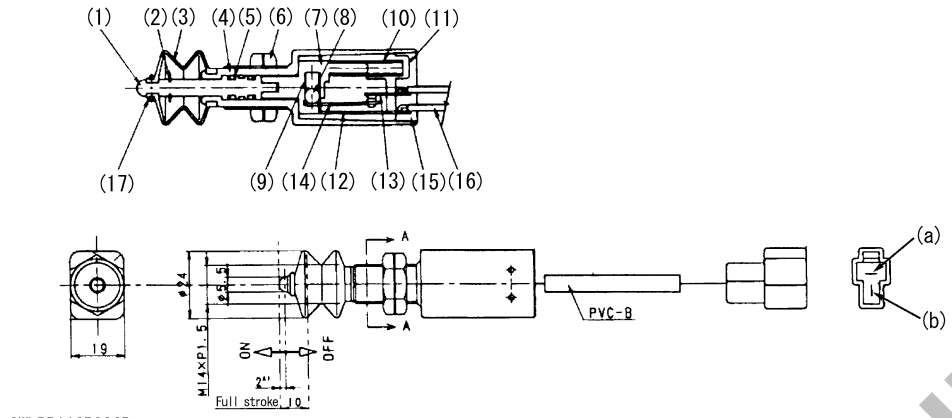
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[5] Specifications for electric components and service

(1) Stop switch



8WLRRAAGP026B

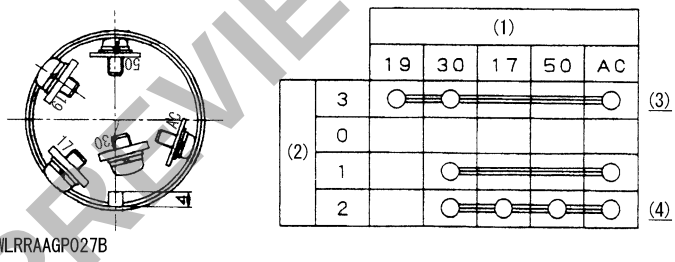
- Spesification
  Yushin Co., Ltd.
  Stroke: 10 mm
- Connection
  (a): Stop lamps L and R ((37) and (38)), coupler (57)
  (b): Fuse box (36), coupler (59)
- Stepping on the brake pedal forces the stop SW (1) circuit into conduction, energizing the stop lamps (37) and (38).



[Check]

- There shall be continuity between (a) and (b) when the brake pedal is stepped on.

(2) Starter switch



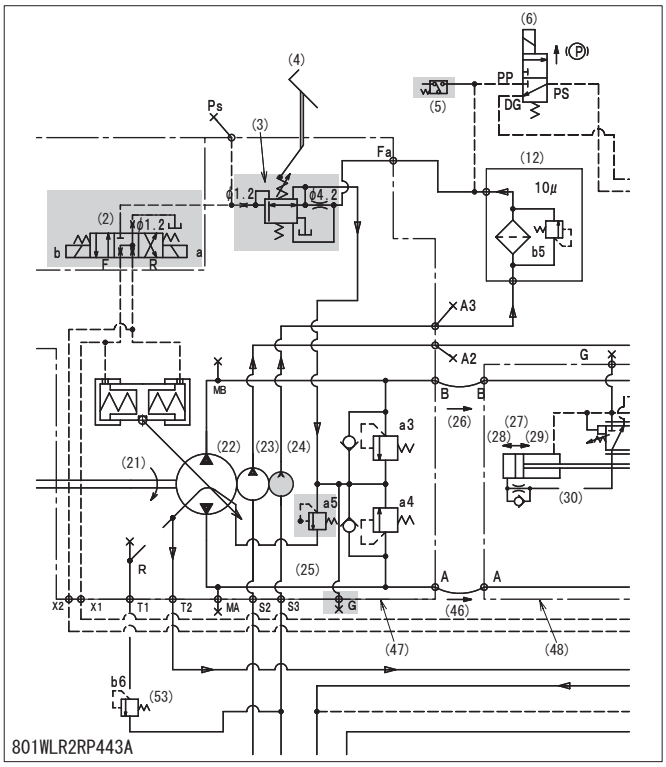
8WLRRAAGP027B

(1) Terminal symbol
(2) Switch position
(3) The position 3 returns to 0 automatically.
(4) The position 2 returns to 1 automatically.

- Yushin Co., Ltd.
  Rated current: 12V
- Connection
  30: Coupler (61), fusible links (35) and (34), battery
  17, 19: Lamp timer (3), indicator-2 (5), coupler (57), glow relay (54)
  50: Lamp timer (3), F-R SW (13), relay (starter) (15)
  AC: Coupler (60), fuse box (36)

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<Check points>

1. Check if the charge relief valve is sticking or any foreign matter is trapped in it.
2. Check if the inching cable is adjusted normally.
3. Check for any oil by passing the LST motor/pump seal plate. (Damaged seal plate or pistons.)
4. Check if the charge pump is worn.
5. Check if the speed relay valve is normal.

<Adjustment>

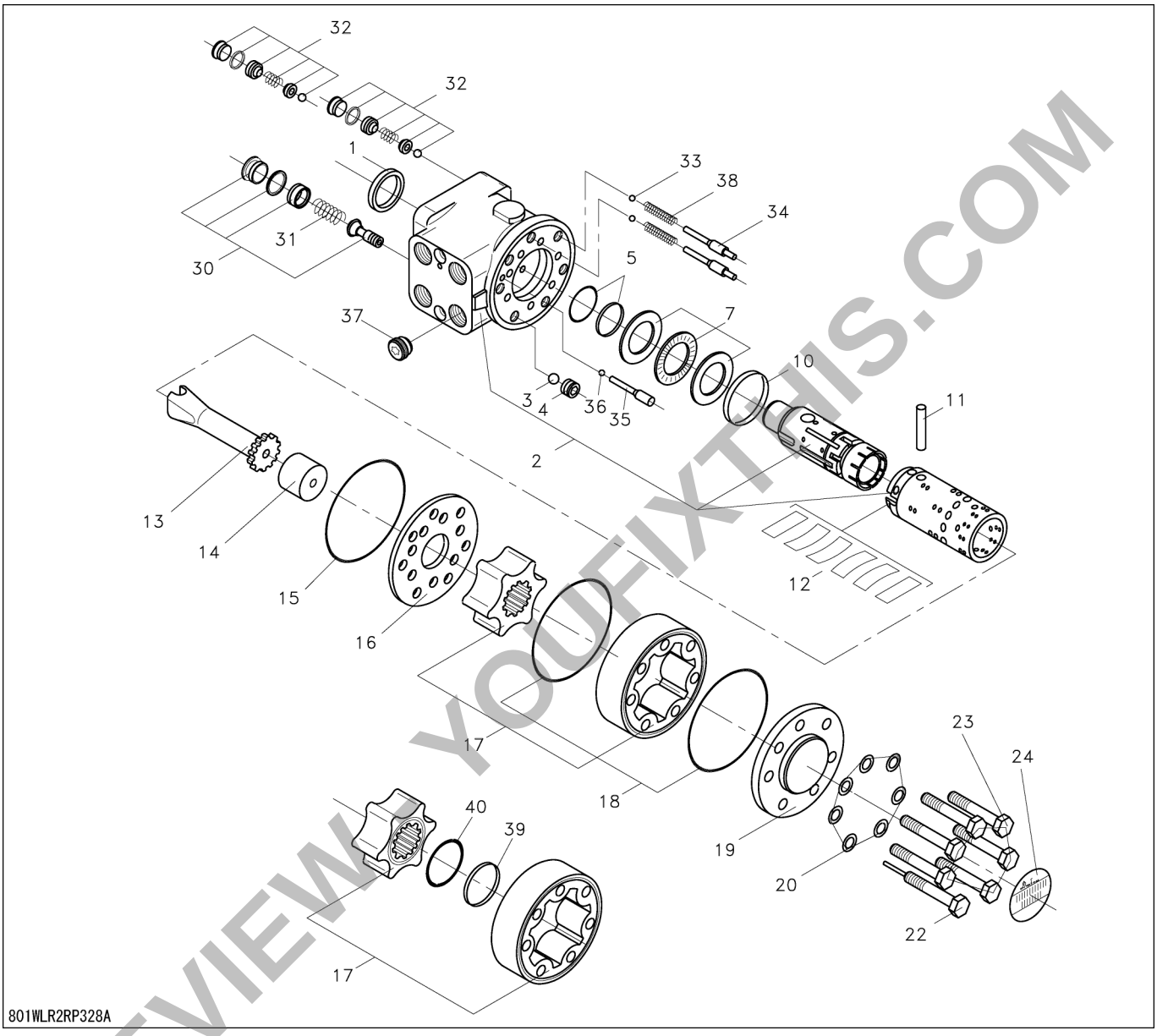
Refer to Starting Engine Speed

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[4] Hydrostatic Steering unit (OSPF) overhaul

Exploded view OSPF



(1) Dust seal ring
(2) Housing, spool and sleeve. Check valve and the seats for relief and shock valves are locktited.
(3) Ball 8.5 mm [0.33 in]
(4) Thread bushing
(5) O-ring used with kin-ring (item 6)
(6) Kin-ring
(7) Bearing assembly
(10) Ring
(11) Cross pin
(14) Spacer
(13) Cardan shaft
(12) Set of springs
(15) O-ring
(16) Distributor plate
(17) Gearwheel set
(18) O-ring
(19) End cover
(20) Washer
(22) Special screw
(23) Screw
(24) Name plate
(30) Complete relief valve
(31) Spring wire
(32) Complete shock valve
(33) Ball 3/16 in
(38) Spring
(34) Rolled pin
(36) Bushing
(35) Ball
(39) Kin ring
(40) O-ring

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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 ~ 3.0 18.1~21.7	49.0 ~ 68.6 5.0 ~ 7.0 36.2 ~ 50.6	22 mm 0.87 in
1/2"	49.0 ~ 53.9 5.0 ~ 5.5 36.2 ~ 39.8	83.4 ~ 88.3 8.5 ~ 9.0 61.5 ~ 65.1	27 mm 1.06 in
3/4"	58.8 ~ 63.7 6.0 ~ 6.5 43.4 ~ 47.0	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

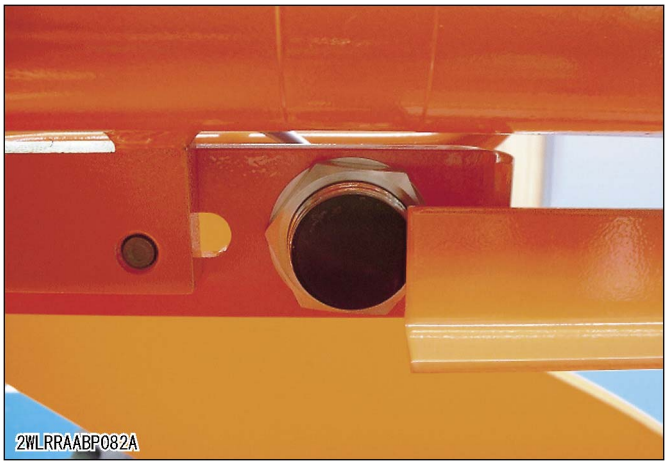
Metric Size Hose

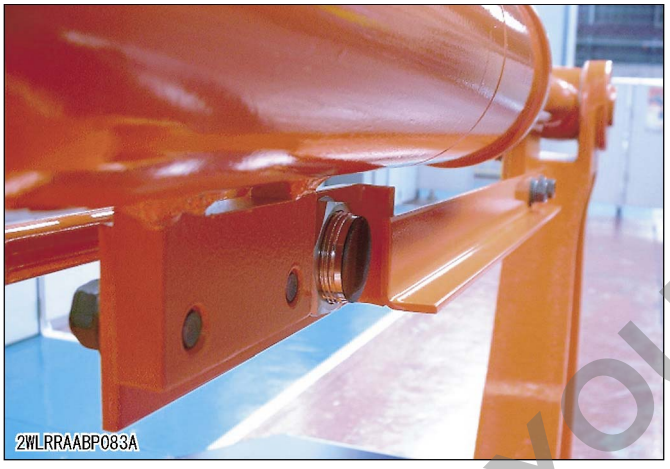
Thread size (piping screw)	Torque N-m kgf-m ft-lbf
M12 x 1.5	20 ~ 30 2.0 ~ 3.1 14.75 ~ 22.13
M14 x 1.5	20 ~ 30 2.0 ~ 3.1 14.75 ~ 22.13
M16 x 1.5	30 ~ 50 3.1 ~ 5.1 22.13 ~ 36.9
M18 x 1.5	30 ~ 50 3.1 ~ 5.1 22.13 ~ 36.9
M22 x 1.5	40 ~ 60 4.1 ~ 6.1 29.5 ~ 44.25

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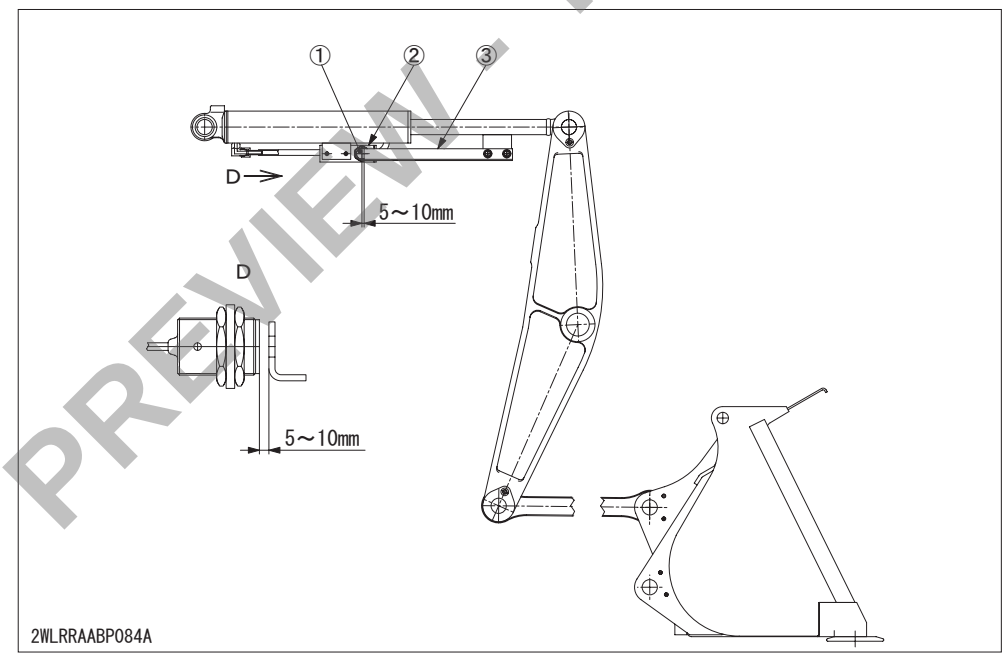
[2] Installing the frame-related parts (front)





Spanners 14, 17, 22, 27 and 37
Pin puller, Plastic hammer

1. Apply grease after installing each part.
2. Adjust each pin portion clearance with the shim to 1.0 mm or less.
3. The inclination of the bucket bottom should be 10mm or less when the bucket is in contact with the ground.
4. Adjusting the auto leveler.
   - Adjust the auto leveler so that there is a clearance of 5 to 10 mm between the bar and the sensor section when the bucket bottom is in contact with the ground horizontally.
   - The bucket should be horizontalize after the auto leveler works.
     Clearance: 5 ~ 10 mm (0.20 ~ 0.40 inch)

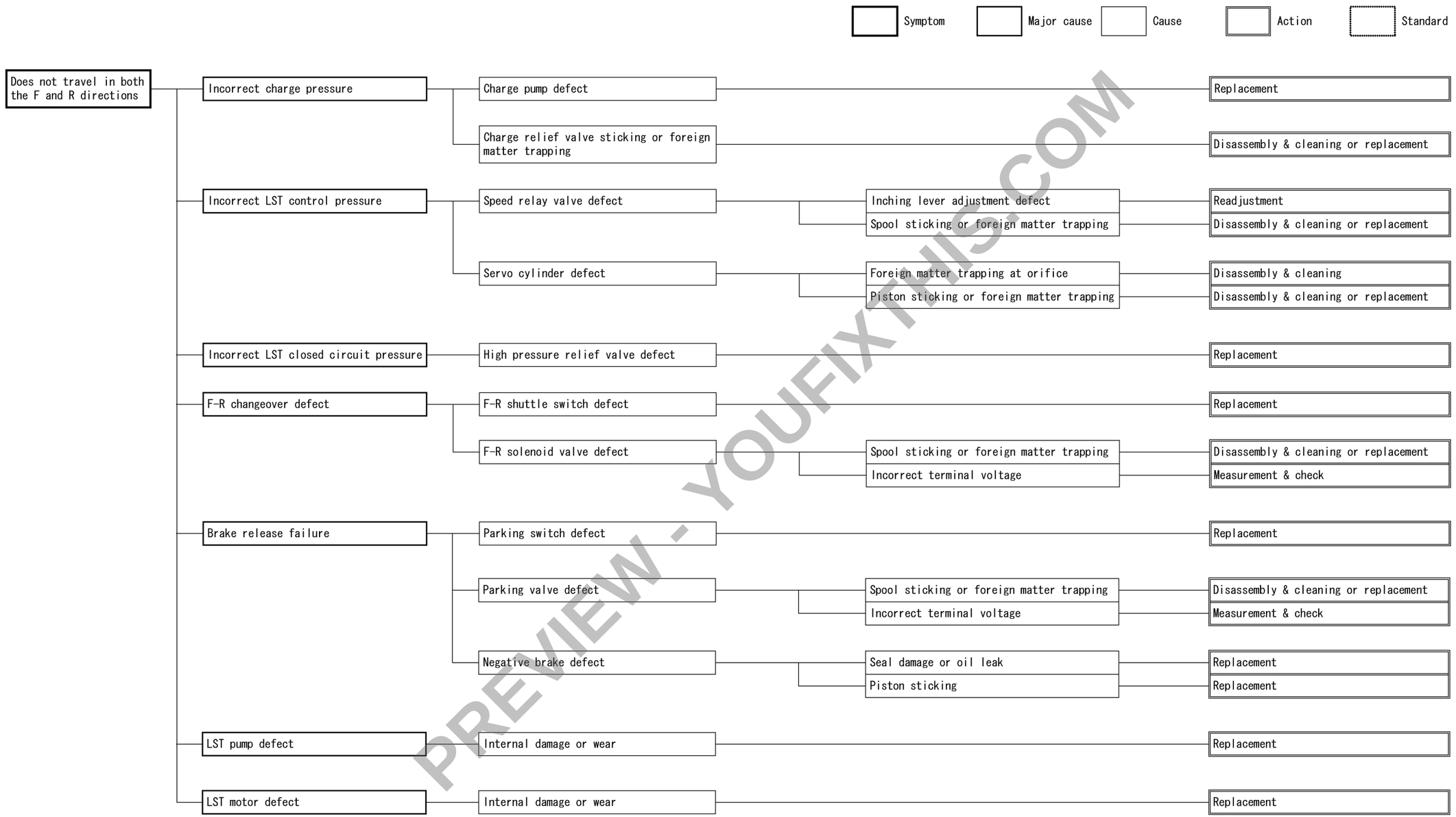


(1) Sensor (auto leveler)
(2) Bracket (auto leveler)
(3) Bar (sensor)

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(5) Does not travel in both the F and R directions



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2. Machine Body & Front Attachment

[1] Specifications

(1) Machine Specifications

SPECIFICATION TABLE: Front loader

With 1500 lbs Counter weight for R420S.

Model name				**R420S**	
Counter weight				1500 lbs	
Type				Canopy	CAB
Operating weight (with Rops/Fops Canopy, CAB)			kg (lbs.)	3380 (7450)	3600 (7935)
Bucket capacity			m^3 (cu.yds.)	0.4 (0.5)	
Tipping load Straight (SAE Rating)			kN (lbf)	20.4 (4585)	23.1 (5200)
Tipping load Full turn (SAE Rating)			kN (lbf)	17.1 (3850)	19.3 (4340)
Operating load			kN (lbf)	8.6 (1925)	
Engine	Manufacturer			KUBOTA	
	Model			Water cooled D1503-M-T-E2RP-1 diesel engine	
	Horsepower (SAE gross)		kW (HP)/rpm	32.1 (43) / 2600	
	Number of cylinders			3	
	Displacement		L (cu.in.)	1.499 (91.4)	
	Starter		V/kW	12 / 1.4	
	Battery		V/Ah	12 / 65	
Dimensions	Overall length		mm (in.)	4210 (165.8)	
	Overall width (without bucket)		mm (in.)	1520 (59.8)	
	Overall height		mm (in.)	2510 (98.8)	
	Min. ground clearance		mm (in.)	285 (11.3)	
	Wheel base		mm (in.)	1775 (69.9)	
	Tread		mm (in.)	1180 (46.5)	
	Angle of articulation		Deg	40 each	
	Angle of oscillation		Deg	8 each	
	Loader clearance circle (center of tire)		mm (in.)	6170 (242.9)	
Bucket	Hinge pin height		mm (in.)	2810 (110.7)	
	Dump height		mm (in.)	2245 (88.4)	
	Reach fully raised		mm (in.)	780 (30.8)	
	Lift capacity to max. height		kN (lbf)	14.2 (3190)	
	Breakout force		kN (lbf)	29.2 (6570)	
Traveling	Drive system			4WD	
	Tire			12.5 / 70-16-8PR	
	Traveling speed	Forward	km/h (MPH)	0 to 20 (0 to 12.5)	
		Reverse	km/h (MPH)	0 to 20 (0 to 12.5)	
	Traction force		kN (lbf)	23.5 (5290)	
Others	Fuel tank		L (U.S.gal.)	54 (14.3)	
	Hydraulic oil tank		L (U.S.gal.)	42 (11.1)	
	Hydraulic oil system		L (U.S.gal.)	60 (15.9)	

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(2) Lubricants

Select the Grade by Referring to the Table.

Replenish place		Kind of fuel oil and water	Capacity L(u.s. gal.) R420	Capacity L(u.s. gal.) R520	Viscosity No. classified by temperature; –20 –10 0 10 20 30 40(℃)
Fuel tank		Diesel	54 (14.3)		No.2-D / No.1-D
Engine oil pan		Engine oil	7.0 (1.8)	9.5 (2.5)	SAE 10W(CD) / SAE 30W(CD) / SAE 10W-30(CD)
Front and rear differential case		Gear oil	3.0 (0.8)		* SAE 80W
Hydraulic oil	Total system	Engine oil	60 (15.9)	60 (16.4)	SAE 5W-30 / SAE 10W-30 / SAE 15W-40
	Tank gauge center		42 (11.1)		
Brake fluid reservoir		Hydraulic oil	0.3 (0.08)		Hydraulic oil ISO VG32
Grease nipple		Grease	—		No.2 / No.1 / No.0
Radiator	Full	Coolant	6.5 (1.7)		Soft water / Anti-freeze
	Reserve tank		1.1 (0.3)		

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■ IMPORTANT

- In area where the temperature drops to -10℃ or lower, drain all oil in hydraulic oil tank and replace with all season type engine oil SAE 5W-30(CD) for the winter.
- Use engine oil API service classification CD, CE or CF.

■ NOTE

- It cannot be guaranteed against any problem caused by use of the fuel and lubricating oil and grease that are not specified.

★ Always use the specified gear oil, M80B or equivalent, which is permitted by KUBOTA.
When engine oil is used to the LSD specification differential, paki-paki sounds are generated from differential gears during turning (especially when the steering wheel is maintained at a turned position). (This occurs due to wrong combination of LSD clutch plate and oil, causing change in the friction characteristics, which has no adverse effects including durability)

Specified differential oil type				
M80B				
Shell Donax TD	Mobiland super Universal	Multipurpose Tcuban EP SAE 80W	Chevron Universal Gear Lubricant SAE 80W-90	Multi gear Lubricant EP SAE 80W-90

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[5] Service fundamentals

(1) Service intervals

Service Interval Chart (Do all previous checks in addition to New checks.)

	Maintenance hours (Hourmeter) / Item of Maintenance		First (hrs)			Maintenance (hrs)								One year from buying	Two years from buying	Ref. Page		
			50	100	500	every 50	every 200	every 250	every 500	every 1000	every 1500	every 2000	every 3000					
1	Check battery liquid level.					○												
2	Drain of the fuel tank					○												
3	Change engine oil			*□				□										
4	Replace engine oil filter cartridge			*□				□										
5	Check for fan belt tension and adjust as necessary.						○											
6	Clean and check air cleaner element, and change if necessary.	Outer element	*○				○			□							*1	@
		Inner element								□							*1	
7	Change, check and replenish oil in front/ rear axle differential case.				*□				○	□								
8	Change hydraulic oil.				*□					□								
9	Change LST oil filter cartridge								□									
10	Change return filter cartridge								□									
11	Change suction filter				*□					□								
12	Change fuel filter cartridge and discharging water from the sediment filter.								□									@
13	Check alternator, starteer motor.										○							

○: Check and replenish *□: Replace for the first time □: Replace *○: Check and clean for the first time
△: Consult your local KUBOTA Dealer for this service

■ IMPORTANT

*1 Clean and replace the air filter more frequently if used under dusty conditions. By heavy soiling, replace the filter.

*2 Replace only if necessary.

*3 Consult your local KUBOTA Dealer for this service.

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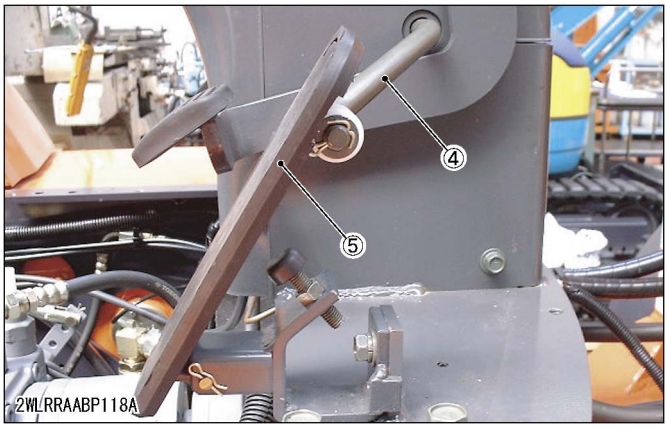
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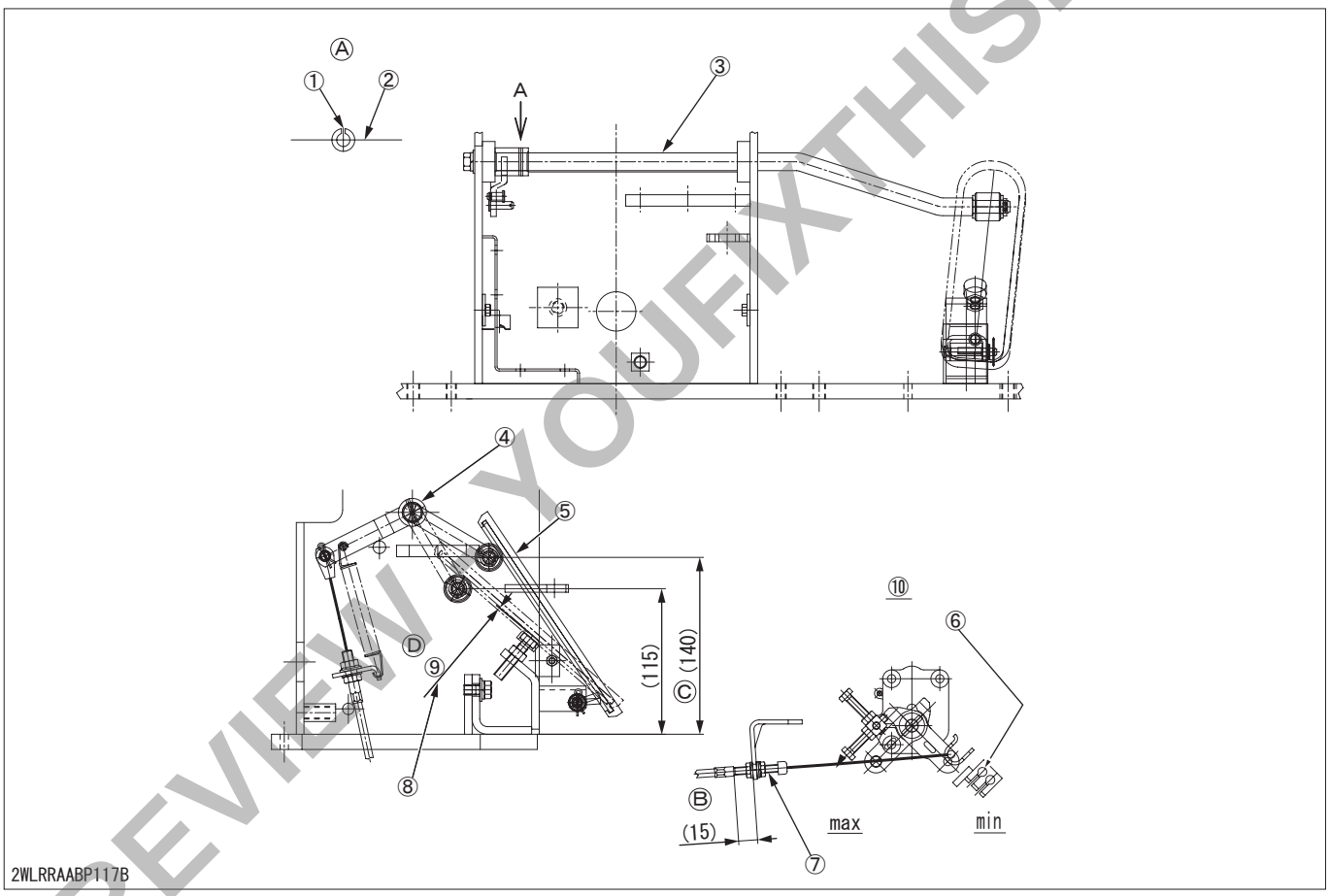
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[9] Installing the accelerator-related parts

Spanners 10, 12 and Long-nose pliers





(1) Split port
- The spring driving direction should be such that the splitting direction is perpendicular to the shaft. If the installing direction is wrong, the spring pin will come off.

(2) Shaft center
(3) Shaft (accelerator)
(4) Link (accelerator)
(5) Accelerator pedal
- Portion C At idling: 140 mm, At maximum no-load speed: 115 mm

(6) The upper part should be passed through. The lower part is for fixed acceleration.
(7) Cable (accelerator)
- Install the cable so that the dimension of portion C is 15 mm.
- Idling speed: 980 ~ 1050 rpm
  - No abnormal rattling noise should be caused.
  - Travelling should not be started.
- Rated speed: 2400 rpm
- Maximum no-load speed: 2600 rpm

(8) Accelerator pedal
- The pedal-side clearance (portion D) should be 0.5 mm or less when the engine-side governor lever is in contact with the stopper.

(9) 0.5 mm or less
(10) Engine side

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Lever Stroke and Operating Force

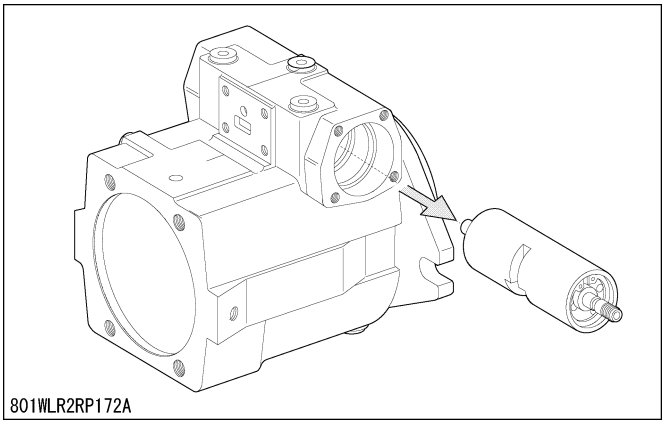
Item		Operating force (N) (kgf)		Stroke mm (in.)	
		R420S, α	**R520S, α**	**R420S, α**	**R520S, α**
Lift lever	Upper, Lower	17.6 ± 4.0 (1.8 ± 0.4)	←	65 ~ 80	←
	Float	44.1 ± 20 (4.5 ± 2.0)	←	110 ~ 130	←
Tilt lever		19.6 ± 4.0 (2.0 ± 0.4)	←	65 ~ 80	←
Service port		17.6 ± 4.0 (1.8 ± 0.4)	←	± (±)	←
Accelerator pedal		58.8 ± 20 (6 ± 2)	←	40 ± 10 (1.6 ± 0.4)	←
Brake pedal		686.0 ≥ (70.0 ≥)	←	15 ± 5 (0.6 ± 0.2) *1	←
Inching pedal		68.6 ± 3.0 (7.0 ± 3.0)	←	20 ± 5 (0.8 ± 0.2) *2	←
Steering wheel *3	Left	12.7 ± 2.0 (1.3 ± 0.2) *4	←	3.1 ± 0.5	3.7 ± 0.5
	Right	12.7 ± 2.0 (1.3 ± 0.2) *4	←	4.1 ± 0.5	4.8 ± 0.5

■**NOTE**
*1 Stroke from inching off
*2 Stroke until inching off
*3 Number of steering wheel revolutions to each of clockwise and counterclockwise stroke ends
*4 Engine speed: 1000 rpm

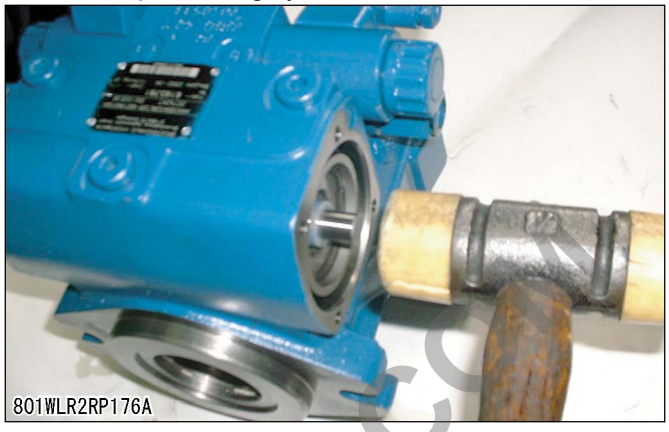
Type of cable	Screw size	R420S, α	R520S, α
Control cable mm (inch)	M16 x 1.5	1650 (65.0)	←
Accel. cable mm (inch)	M6 x 1.0 - M8 x 1.25	1372 (54.0)	←
Inching cable mm (inch)	M12 x 1.25	900 (35.4)	←

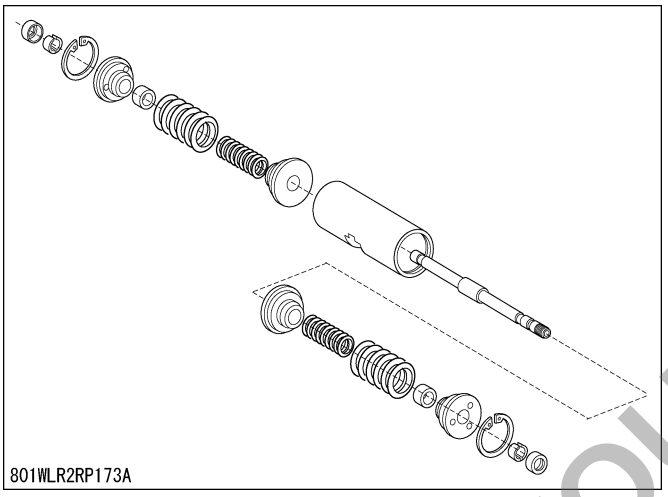
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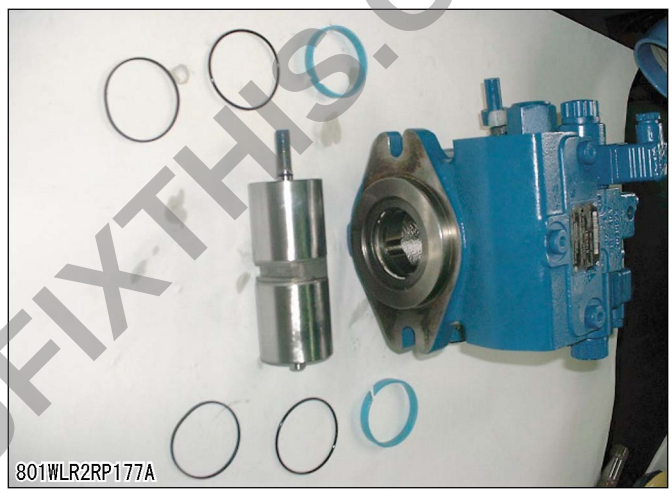
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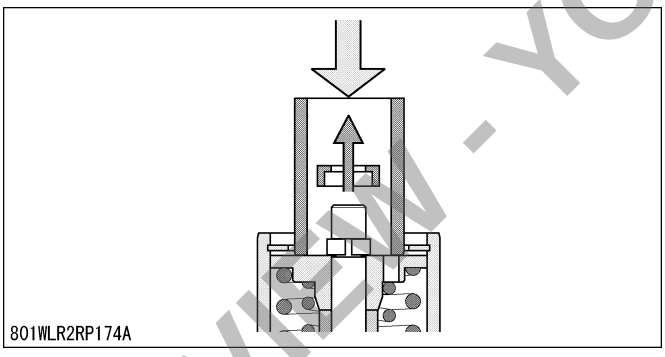
Remove positioning cylinder.


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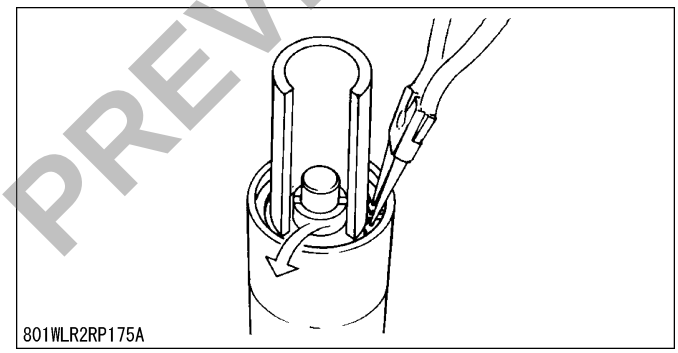

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Fit tool device and preload spring.
Remove safety cap.


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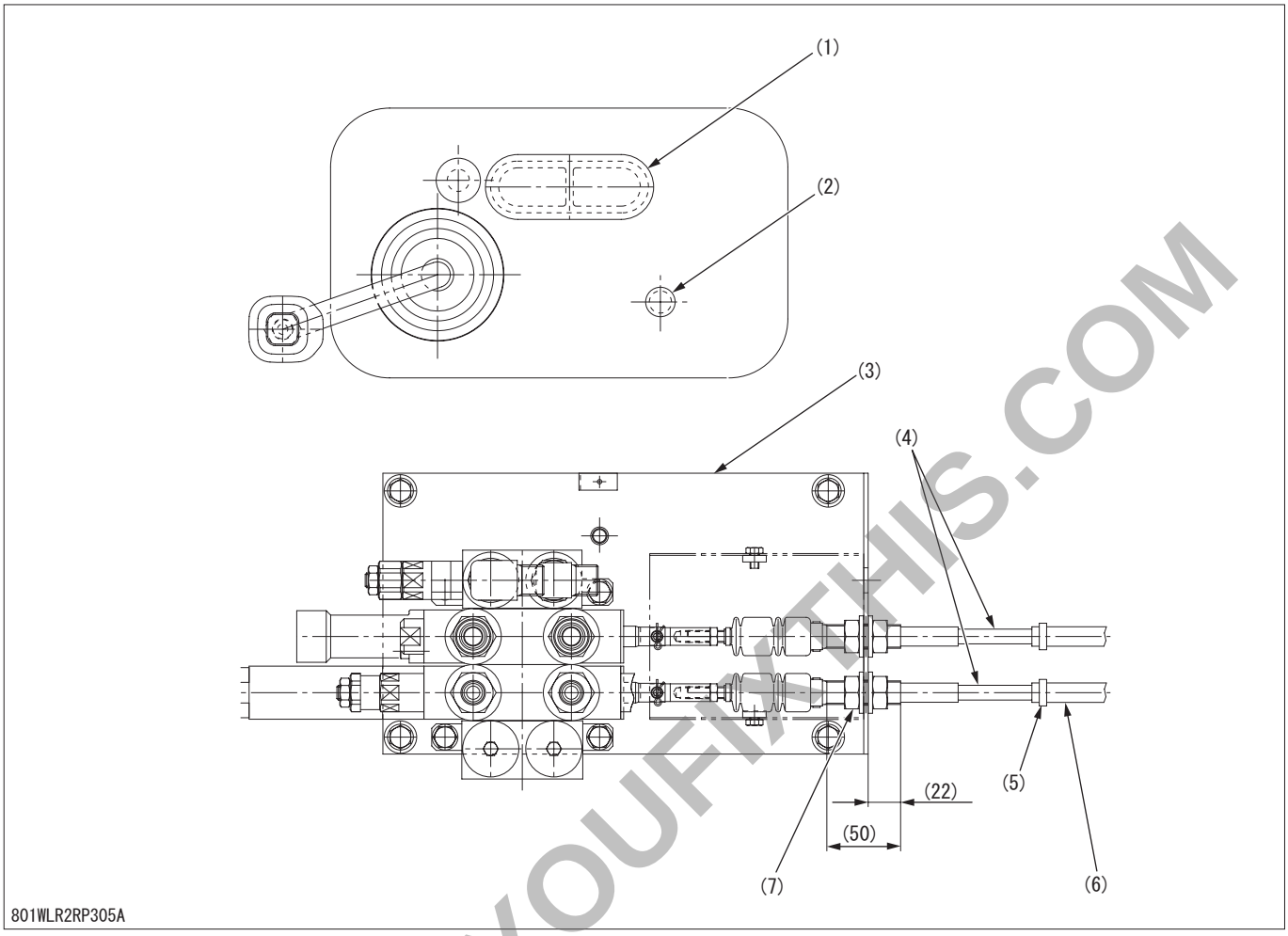
Remove rings.
Remove circlip.

CAUTION
- **Parts are under spring load.**


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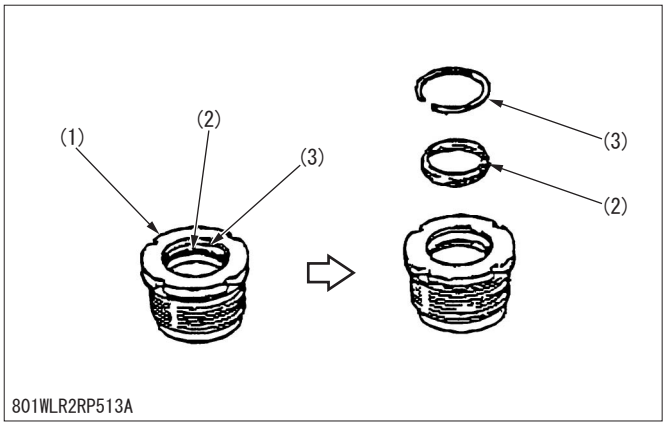
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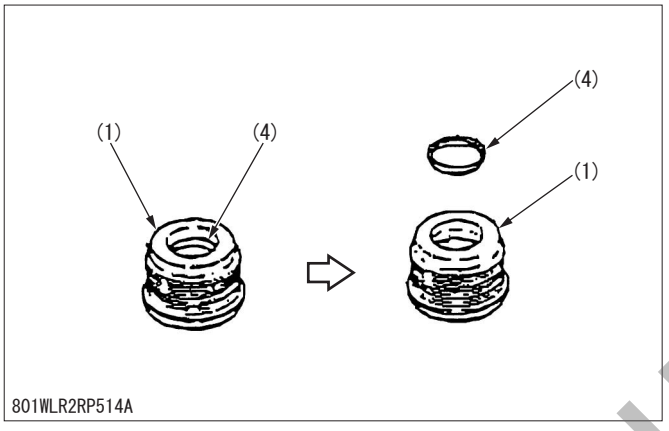
(1) Grommet
(2) Label
(3) Valve base
(4) Control cable
(5) Clinch part
(6) The protective tube should be installed so that the crimped portion is located on the control valve side.
(7) Adjustment of detent: Securely check the detent function.

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3. Disassembling the cylinder head assembly
- Do not remove the seals such as the slipper seal, backup ring, back ring and dust seal if they are not damaged.
- Because the removed seals cannot be reused, replace them with new ones.

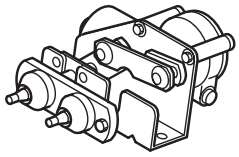
(1) Remove the snap ring and remove the dust seal from the cylinder head.

(2) Using a screwdriver, remove the U packing from the cylinder head.
- In doing so, take care not to damage any part other than the U packing.

(1) Cylinder head
(2) Dust seal
(3) Snap ring
(4) U packing

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Fig, Name	Machine Model	R420S, α	R520S, α
41. Wiper motor 	Code No.	R1411-4751-0	
42. Auto leveler sensor 	Code No.	R1401-53531	
	Rated approximaty distance	10 mm ± 10% A-type (No.)	
	Load capacity	4 ~ 100 mA	
43. Thermo sensor	Code No.	31351-3283-0	

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