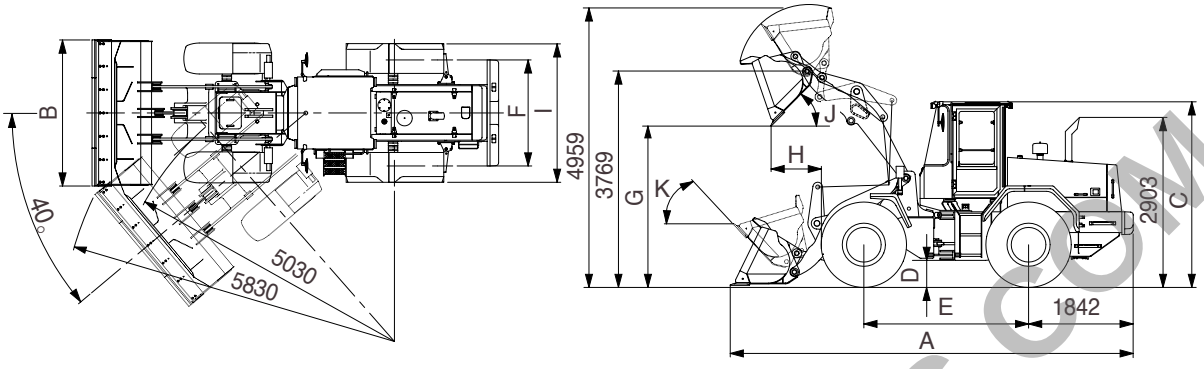
2) SPECIFICATIONS

(1) WITHOUT TOOTH AND CUTTING EDGE TYPE BUCKET(HL740-3)



Description		Unit	Specification
Operating weight		kg(lb)	10940(24119)
Bucket capacity	Struck	$m^3(yd^3)$	1.6(2.1)
	Heaped		1.9(2.5)
Overall length	A	mm(ft-in)	7025(23' 1")
Overall width	B		2550(8' 4")
Overall height	C		3237(10' 7")
Ground clearance	D		417(1' 4")
Wheelbase	E		2900(9' 6")
Tread	F		1900(6' 3")
Dump clearance at 45°	G		2871(9' 5")
Dump reach	H		850(2' 9")
Width over tires	I		2430(8' 0")
Dump angle	J	Degree (°)	48
Roll back angle(Carry position)	K		47
Cycle time	Lift(With load)	sec	5.4
	Dump(With load)		1.0
	Lower(Empty)		2.8
Maximum travel speed		km/hr(mph)	38.1(23.7)
Braking distance		m(ft-in)	14.5(47' 7")
Minimum turning radius(Center of outside tire)			5.03(16' 6")
Gradability		Degree (°)	30
Travel speed	Forward - First gear	km/hr(mph)	6.9(4.3)
	Forward - Second gear		12.6(7.9)
	Forward - Third gear		24.1(15.0)
	Forward - Fourth gear		38.1(23.7)
	Reverse - First gear		7.3(4.5)
	Reverse - Second gear		13.3(8.3)
	Reverse - Third gear		25.2(15.7)

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2. TROUBLESHOOTING

1) TRANSMISSION

※ **Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :** Step 1. Operational check out procedure(See group 3 in section 1.)
Step 2. Operational checks(In this group.)
Step 3. Troubleshooting
Step 4. Tests and/or adjustments(See group 3.)

Problem	Cause	Remedy
Transmission slippage	Low oil level.	Add oil.
	Wrong oil grade.	Change oil.
	Restricted transmission pump suction screen.	Remove and clean screen.
	Leak in transmission control valve or gasket.	Remove valve and inspect gaskets.
	Low transmission pump flow due to worn pump.	Do transmission pump flow test.
	Weak or broken pressure regulating valve spring.	Do transmission system pressure test.
Error code on display	Something wrong in transmission.	Go to transmission error code group at page 3-16~3-47.

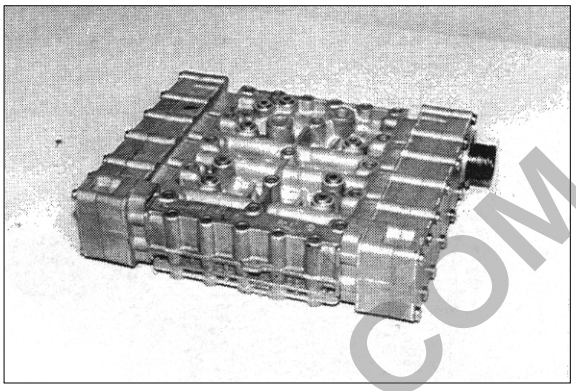
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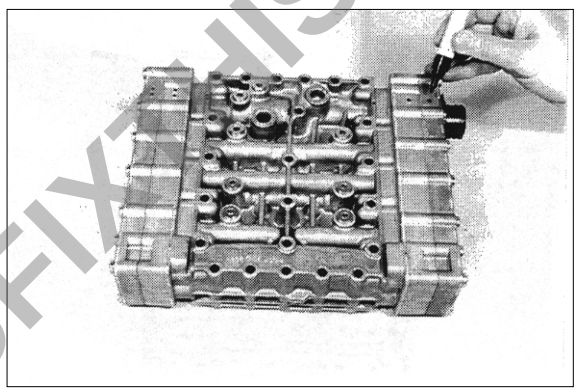
1. CONTROL VALVE

1) DISASSEMBLY

(1) Illustration on the right shows the complete control unit.

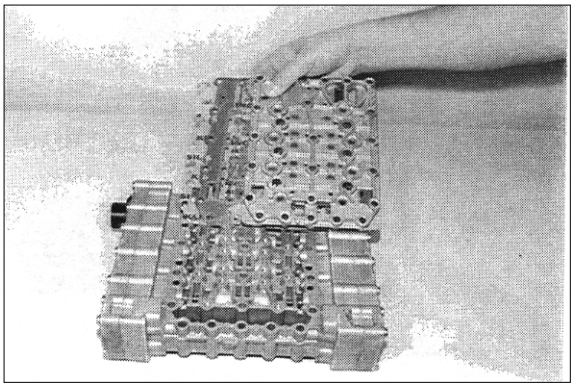


(2) Mark the installation position of the different covers, the housing and cable harness with the valve housing.

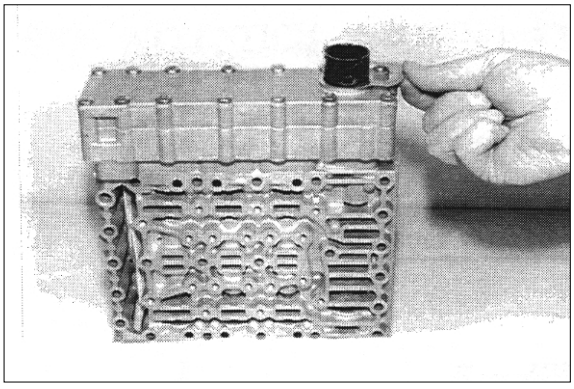


(3) Loosen socket head screws.
Separate duct plate, 1st gasket, intermediate plate and 2nd gasket from the valve housing.

※ Special tool
Box spanner 5873 042 002



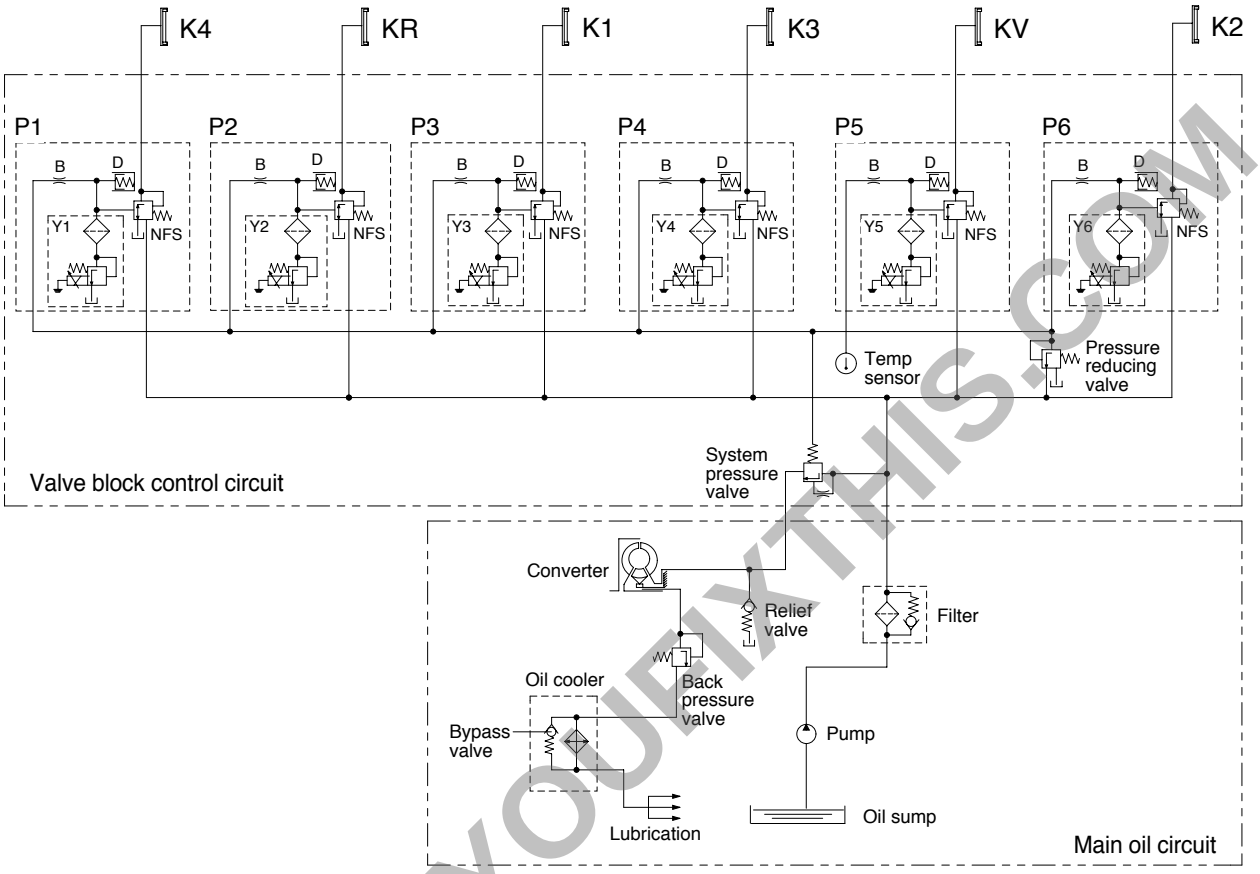
(4) Remove retaining clip.



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HYDRAULIC CIRCUIT



NFS	Follow-on slide	P3	Proportional valve clutch K1
D	Oscillation damper	P4	Proportional valve clutch K3
B	Orifice	P5	Proportional valve clutch KV
P1	Proportional valve clutch K4	P6	Proportional valve clutch K2
P2	Proportional valve clutch KR	Y1~Y6	Pressure regulator

Speed	Forward				Reverse			Neutral
	1	2	3	4	1	2	3	
Y1				X				
Y2					X	X	X	
Y3	X				X			
Y4			X	X			X	
Y5	X	X	X					
Y6		X				X		

X : Pressure regulator under voltage

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Fault code (Hex)	Int. code (Dec)	Meaning of the fault code possible reason for fault detection	Reaction of the TCU	Possible steps to repair	Remarks
71	22	**S.C. to battery voltage at clutch K1** The measured resistance value of the valve is out of limit, the voltage at K1 valve is too high • Cable/connector is defective and has contact to battery voltage • Cable/connector is defective and has contact to another regulator output of the TCU • Regulator has an internal defect	TCU shifts to neutral OP mode : Limp home If failure at another clutch is pending TCU shifts to neutral OP mode : TCU shutdown	• Check the cable from TCU to the gearbox • Check the connectors from TCU to the gearbox • Check the regulator resistance* • Check internal wire harness of the gearbox	* See Chapter (7)
72	10	**S.C. to ground at clutch K1** The measured resistance value of the valve is out of limit, the voltage at K1 valve is too low • Cable/connector is defective and has contact to vehicle ground • Regulator has an internal defect	TCU shifts to neutral OP mode : Limp home If failure at another clutch is pending TCU shifts to neutral OP mode : TCU shutdown	• Check the cable from TCU to the gearbox • Check the connectors from gearbox to TCU • Check the regulator resistance* • Check internal wire harness of the gearbox	* See Chapter (7)
73	16	**O.C. at clutch K1** The measured resistance value of the valve is out of limit • Cable/connector is defective and has no contact to TCU • Regulator has an internal defect	TCU shifts to neutral OP mode : Limp home If failure at another clutch is pending TCU shifts to neutral OP mode : TCU shutdown	• Check the cable from TCU to the gearbox • Check the connectors from gearbox to TCU • Check the regulator resistance* • Check internal wire harness of the gearbox	* See Chapter (7)
74	23	**S.C. to battery voltage at clutch K2** The measured resistance value of the valve is out of limit, the voltage at K2 valve is too high • Cable/connector is defective and has contact to battery voltage • Cable/connector is defective and has contact to another regulator output of the TCU • Regulator has an internal defect	TCU shifts to neutral OP mode : Limp home If failure at another clutch is pending TCU shifts to neutral OP mode : TCU shutdown	• Check the cable from TCU to the gearbox • Check the connectors from gearbox to TCU • Check the regulator resistance* • Check internal wire harness of the gearbox	* See Chapter (7)

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5. TIGHTENING TORQUE OF MAJOR COMPONENT

No.	Items		Size	kgf · m	lbf · ft
1	Engine	Engine mounting bolt, nut(4EA)	M20×2.5	57.9 ± 8.7	419± 63
2		Radiator mounting bolt, nut	M12×1.75	12.3 ± 2.5	89.0± 18
3	Hydraulic system	Main pump housing mounting bolt	M12×1.75	12.3 ± 2.5	89.0± 18
4		Main control valve mounting bolt, nut	M12×1.75	12.3 ± 2.5	89.0± 18
5		Steering unit mounting bolt	M10×1.5	6.9± 1.4	50.0± 10
6		Priority valve mounting bolt	M 8×1.25	2.5 ± 0.5	18.1± 3.6
7		Brake valve mounting bolt	M 8×1.25	2.5 ± 0.5	18.1± 3.6
8		Fuel tank mounting bolt	M16×2.0	27.9 ± 4.5	202± 33
9		Hydraulic oil tank mounting bolt	M12×1.75	12.3 ± 2.5	89.0± 18
10	Power train system	Transmission mounting bolt, nut	M20×2.5	57.9 ± 8.7	419± 63
11		Front axle mounting bolt, nut	M20×2.0	100± 15	723±108
12		Rear axle support mounting bolt, nut	M24×2.0	100± 15	723±108
13		Tire mounting nut(20.5-25 16PR, L3)	M22×1.5	70± 2.0	506± 15
14		Drive shaft joint mounting bolt, nut	3/8-24UNF	6 ± 0.8	43.4± 5.8
15	Others	Counterweight mounting bolt	M30×2.0	199 ± 29.9	1439±216
16		Operator's seat mounting bolt	M 8×1.25	3.4 ± 0.8	24.6± 5.8
17		ROPS Cab mounting bolt(4EA)	M24×3.0	28± 2.6	203± 19

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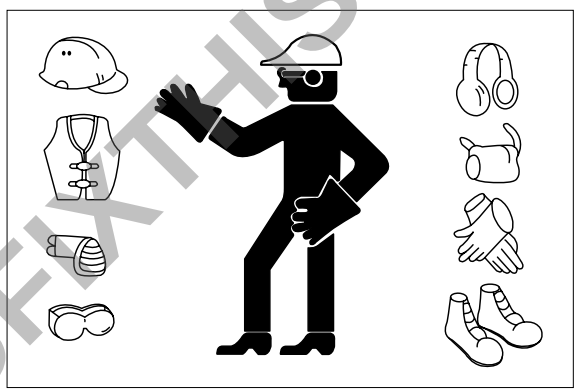
GROUP 1 SAFETY HINTS

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

WEAR PROTECTIVE CLOTHING

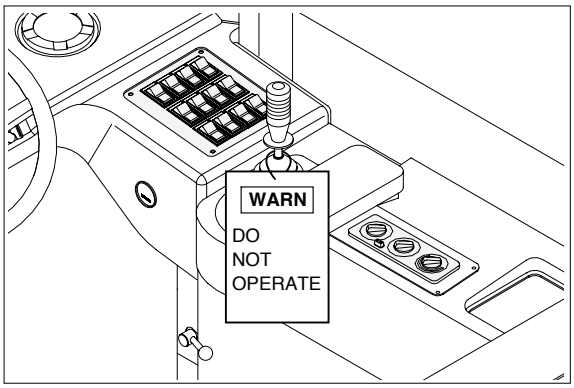
Wear close fitting clothing and safety equipment appropriate to the job.



WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.

Before performing any work on the wheel loader, attach a 「**Do Not Operate**」 tag on the right side controller lever.



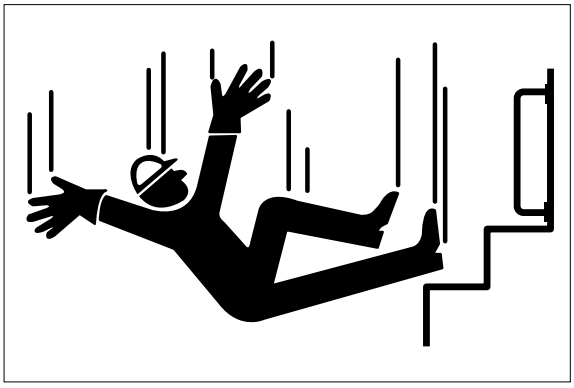
USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.

When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.

Never jump on or off the machine. Never mount or dismount a moving machine.

Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.



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Millimeters to Inches

1mm = 0.03937in

	0	1	2	3	4	5	6	7	8	9
0		0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

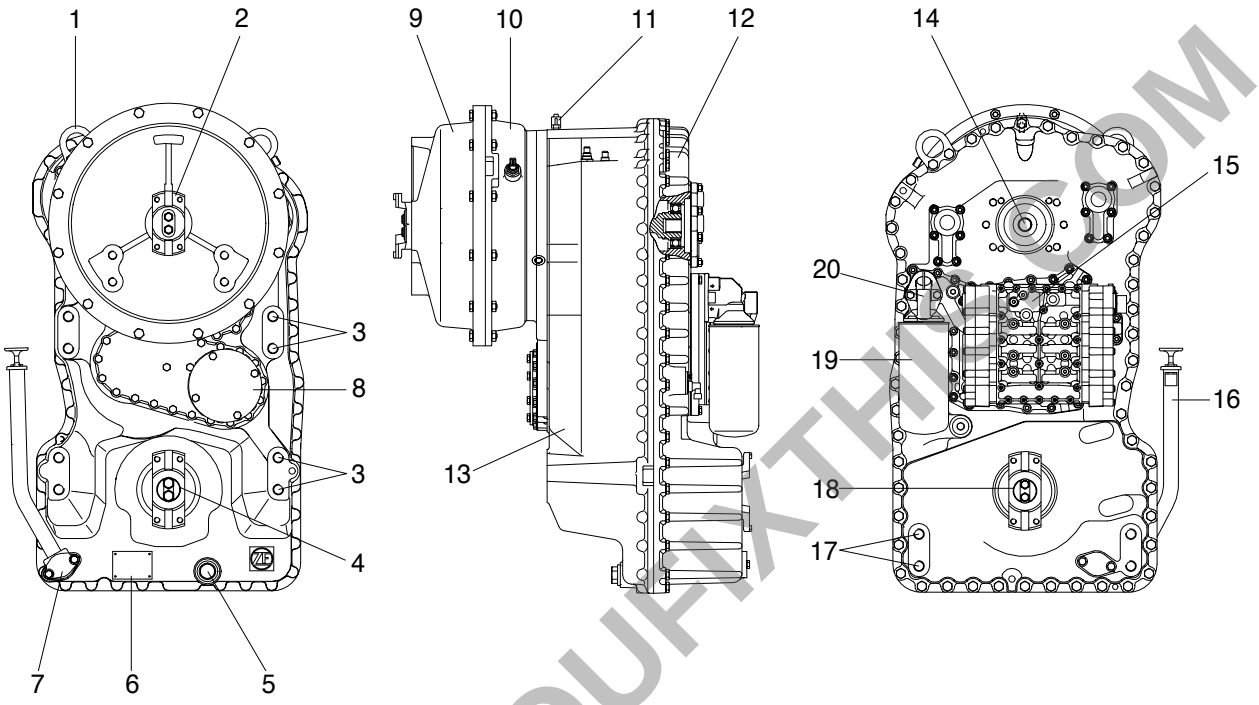
1kg = 2.2046lb

	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

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2) INSTALLATION VIEW



1 Lifting lugs
2 Input flange-input through universal shaft
3 Transmission suspension threads M20
4 Output flange-converter side
5 Oil drain plug with magnetic insert M38×1.5
6 Model identification plate
7 Attachment possibility for oil level tube with oil dipstick(Converter side)
8 Attachment possibility for emergency steering pump
9 Cover
10 Converter bell housing
11 Breather
12 Transmission-case cover
13 Transmission case
14 Power take-off; Coaxial; Engine-dependent
15 Electro-hydraulic control
16 Oil level tube with oil dipstick
17 Transmission suspension threads M20
18 Output flange-rear
19 Exchange filter(Fine filter)
20 Filter head with connection for filter restriction switch

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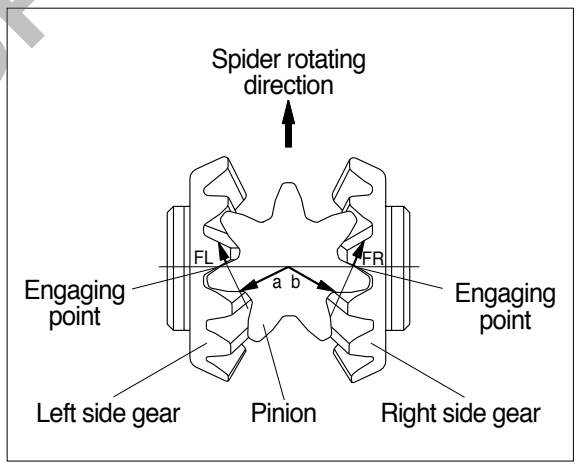
5) TORQUE PROPORTIONING DIFFERENTIAL

(1) Function

① Because of the nature of their work, 4-wheel-drive loaders have to work in places where the road surface is bad.
In such places, if the tires slip, the ability to work as a loader is reduced, and also the life of the tire is reduced.
The torque proportioning differential is installed to overcome this problem.
In structure it resembles the differential of an automobile, but the differential pinion gear has an odd number of teeth.
Because of the difference in the resistance from the road surface, the position of meshing of the pinion gear and side gear changes, and this changes the traction of the left and right tires.

(2) Operation

① **When traveling straight**(Equal resistance from road surface to left and right tires)
Under this condition, the distances involving the engaging points between right and left side gears and pinion-a and b-are equal and the pinion is balanced as FL×a=FR×b. Thus, FL=FR, and the right and left side gears are driven with the same force.



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Assemble KV and KR clutch

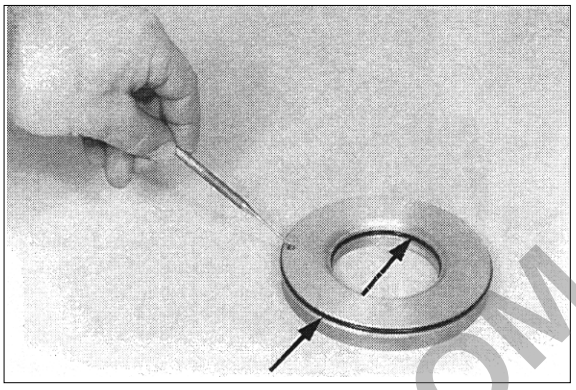
The following figures describe the assembly of the KV clutch.

Pre-assemble plate carrier(Figure ⑪~⑭)

⑪ Check function of the drain valve.

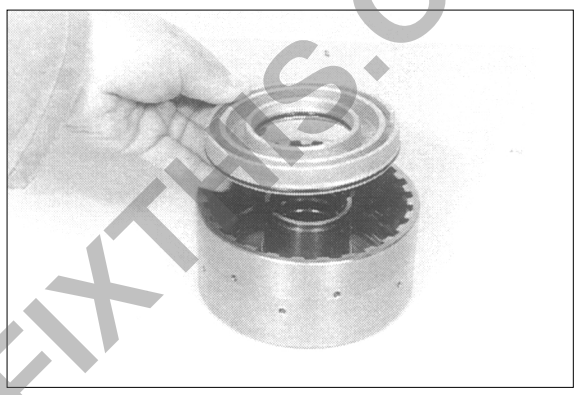
※ Ball may not seize, if necessary clean by means if compressed air.

Insert both O-rings(Arrows) scroll free into the recesses of the piston and oil them.

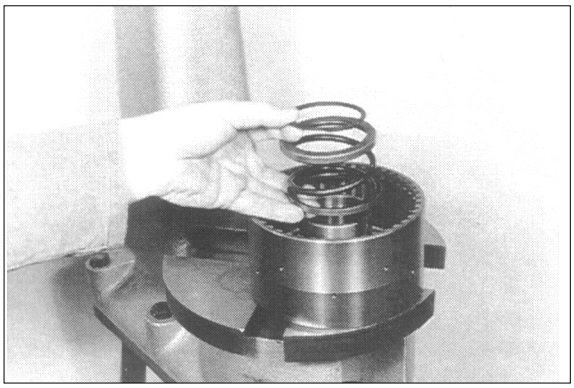


⑫ Assemble piston until contact is obtained.

※ Pay attention to the installation position, see on the right figure.



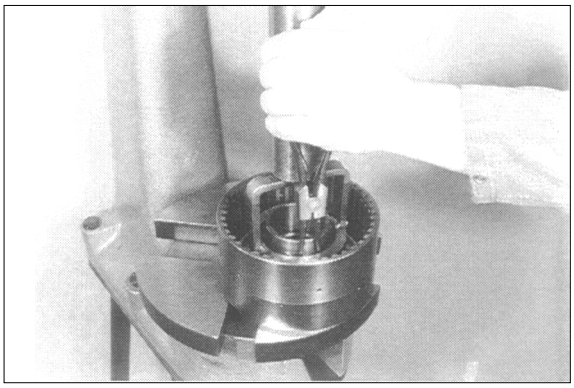
⑬ Introduce compression spring along with spring cup(2EA).



⑭ Preload compression spring and fix it by means of circlip.

※ Special tool

Assembly aid 5870 345 086

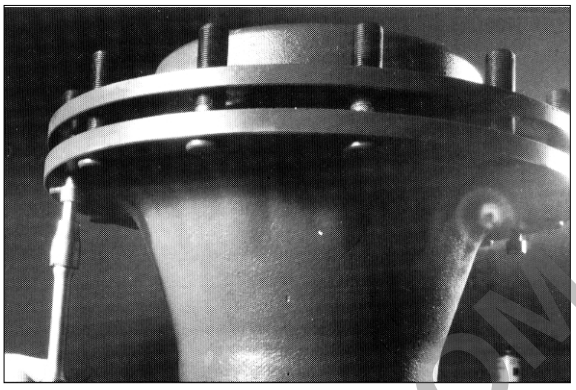


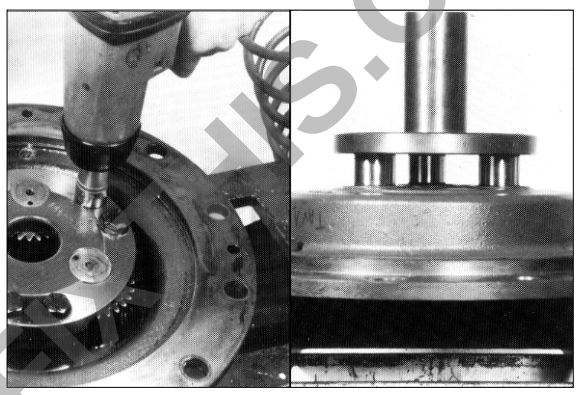
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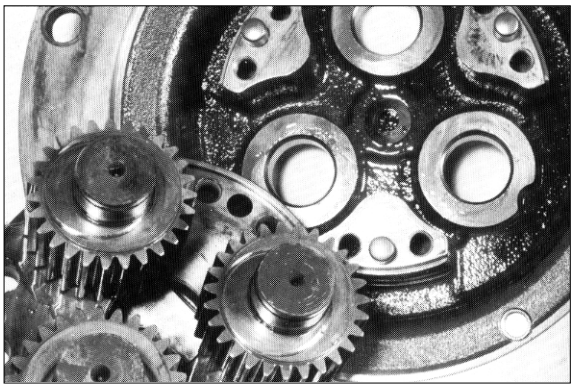
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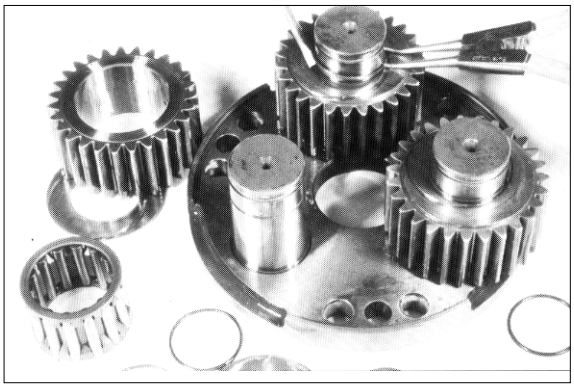
6) PLANETARY REDUCTION 6.23

(1) Disassembly



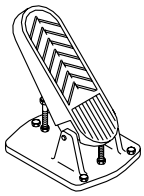
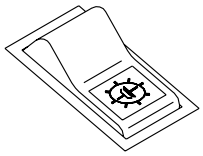
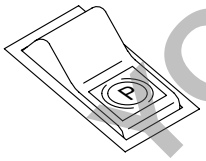






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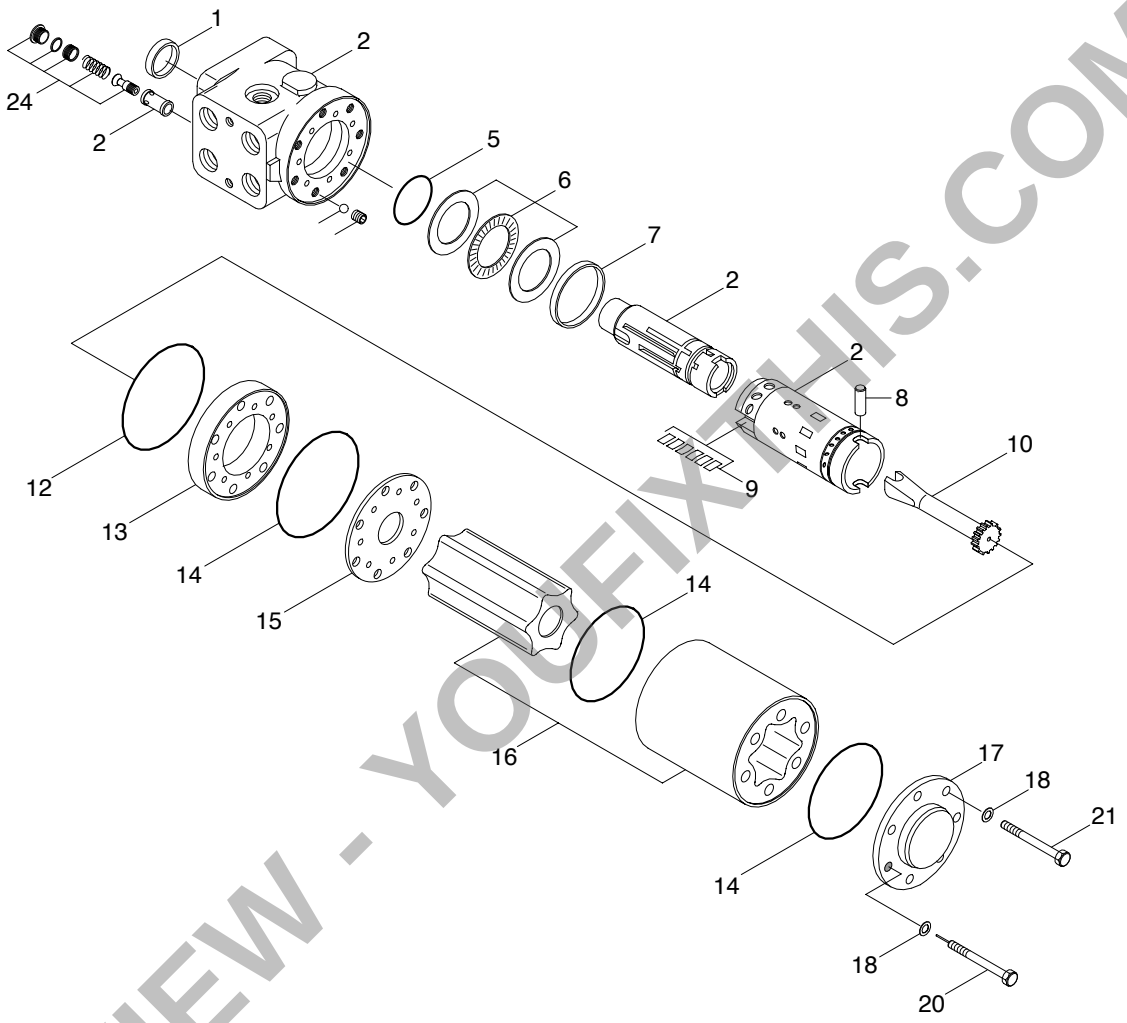
Item	Description	Service action
Service brake pump flow check ※ Hydraulic oil must be at operating temperature for the check. Engine OFF.	  Stop engine. Operate brake pedal approximately 20 times. Start engine and run at low idle. Record number of seconds required for low brake pressure indicator lamp to go out. **LOOK** : Indicator lamp must go out in less than 4 seconds from time engine starts. **NOTE** : Indicator will not come on approximately 1 second after starting engine.	**OK** Check completed. **NOT OK** Check for brake circuit leakage. Go to next page. **IF OK** Install a cap on line connected to inlet of pressure reducing valve and repeat pump flow check. If time does not decrease, check for worn brake pump. Go to brake pump flow test, in group 4.
Service brake capacity check Engine running.	  Turn clutch cut off switch OFF. Apply service brakes, release park brake and put transmission in 2nd forward. Increase engine speed to high idle. **LOOK** : Machine may not move or move at a very slow speed. Repeat check three times to ensure accurate results.	**OK** Check completed. **NOT OK** Check brake pressure in group 3. **IF OK** Inspect brake disk, see group 3.

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2. STEERING VALVE

1) STRUCTURE

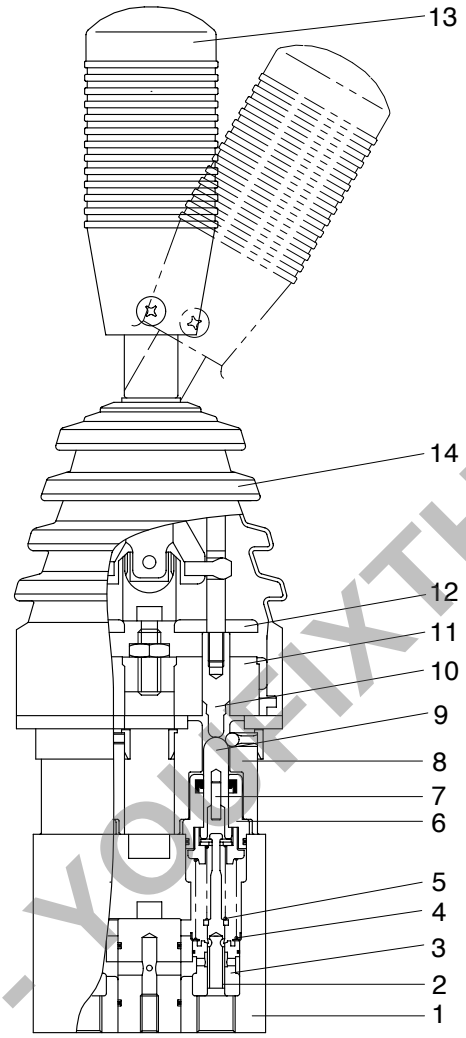


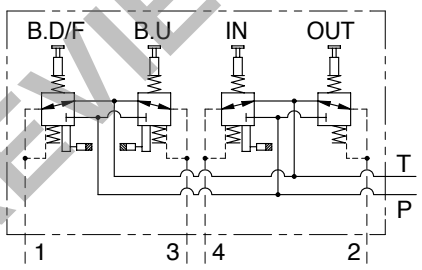
1	Dust seal	8	Cross pin	16	Gearwheel set
2	Housing assy	9	Spring set	17	End cover
3	Ball	10	Cardan shaft	18	Washer
4	Bushing	12	O-ring	20	Pin screw
5	O-ring	13	Intermediate plate	21	Screw
6	Bearing assy	14	O-ring	24	Pilot relief valve
7	Ring	15	Distributor plate		

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2) OPERATION





HYDRAULIC CIRCUIT

Port	Port name	Port size
1	Boom down	1/4 BSPP
2	Bucket dump	1/4 BSPP
3	Boom raise	1/4 BSPP
4	Bucket crowd	1/4 BSPP
P	Supply pressure	1/4 BSPP
T	Tank	1/4 BSPP

1	Aluminum body	6	Plunger guide	11	Hold coil
2	Pressure reducing spool	7	Roll pin	12	Armature plate
3	Pressure reducing body	8	Prefeel ball carrier	13	Control lever
4	Return spring	9	Plunger	14	Rubber boot
5	Metering spring	10	Prefeel spindle		

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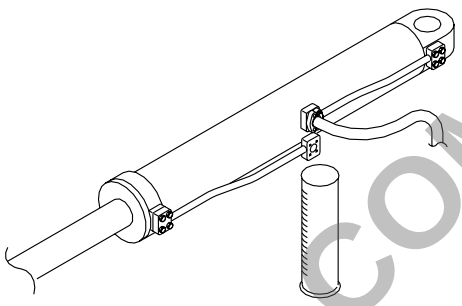
9. BOOM AND BUCKET CYLINDER LEAKAGE TEST

· **SPECIFICATION**

Oil temperature	45±5 ℃(113±9 ℉)
Engine speed	Low idle
Maximum leakage	12cc/10min

· **GAUGE AND TOOL**

Temperature reader
Stop watch
Measuring container



1) Fasten temperature sensor to head end port of cylinder to be tested. Cover sensor with a shop towel.

2) Heat hydraulic oil to specifications.(See hydraulic oil warm up procedure in this group.)

⚠ **Never work under raised equipment unless it is supported with a hoist or support stands.**

3) Full extend the cylinder to be tested. If testing the boom cylinders, restrain boom in the fully raised position using a hoist or a stand.

※ **Check cylinders for leakage in the fully extended position only. In the retracted position contacts the end of the cylinder and seals off piston seal leakage.**

4) Remove and plug cylinder rod end hose or line.

5) Run engine at low idle. Activate control lever to extend cylinder for 1 minute over relief while measuring leakage for open port.

If leakage is within specification, excessive cylinder drift is caused by leakage in the main control valve or circuit relief valve.

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8. WIPER AND WASHER CIRCUIT

1) OPERATING FLOW

Fuse box (No.11) → Wiper relay Hi [CR-4(30)隊(87a)] → Front wiper motor [CN-21(1)]
Wiper relay Hi [CR-4(30)隊(87a)] → Front relay Lo [CR-26(86), (87)]
Fuse box (No.11) → Multi function switch [CS-12(6)]
Fuse box (No.11) → Rear wiper & washer switch [CS-3(1)]
Fuse box (No.11) → Rear wiper motor [CN-102(1)]

(1) Front washer switch ON

① Washer switch ON [CS-12(6)隊(2)] → Washer tank [CN-22(2)] → Washer operating
Washer switch ON [CS-12(6)隊(2)] → Check unit [CN-58(21)隊(15)] → Wiper relay Lo [CR-26(87)隊(30)] → Front wiper motor [CN-21(5)] → Wiper motor operating(Low)

(2) Front wiper switch ON

① **INT position**

Wiper switch ON [CS-12(6)隊(1)] → Check unit [CN-58(10)隊(15)] → Wiper relay Lo [CR-26(87)隊(30)] → Front wiper motor [CN-21(5)] → Front wiper motor intermittently operating

② **Lo position**

Wiper switch ON [CS-12(6)隊(4)] → Wiper motor Lo [CR-26(87a)隊(30)] → Front wiper motor [CN-21(5)] → Front wiper motor operating (Low)

③ **Hi position**

Wiper switch ON [CS-12(6)隊(3)] → Wiper relay Hi [CR-4(30)隊(87)] → Front wiper motor [CN-21(4)] → Front wiper motor operating(High)

(3) Auto-parking(When switch OFF)

Switch OFF → Fuse box (No.11) → Wiper relay Hi [CR-4(30)隊(87a)] → Front wiper motor[CN-21(1)隊(2)] → Multi function switch [CS-12(5)隊(4)] → Wiper relay Lo [CR-26(87a)隊(30)] → Front wiper motor [CN-21(5)] → Wiper motor stop

(4) Rear wiper and washer switch

① **Wiper switch ON**(1st step)

Wiper switch ON [CS-3(1)隊(6)] → Wiper motor [CN-102(5)] → Wiper motor operating
Wiper switch ON [CS-3(1)隊(6)] → Rear wiper and washer switch indicator lamp ON

② **Washer switch ON**(2nd step)

Washer switch ON [CS-3(1)隊(3)] → Rear washer tank [CN-103(2)] → Washer operating

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