KH-00C-00

004

SERVICEMAN HANDBOOK

UH181

UH261

UH501

HITACHI

(3) **Working limit performance & Working limits**
Generally, when the machine performance deteriorates to this level the operator experiences inconveniences in routine work or it becomes difficult or impossible to make a repair and adjustments. A performance in such condition denotes the working limit performance (dimensions).
It can therefore be said to be desirable to take some appropriate actions before the machine deteriorates to the working limit performance (dimensions).

3-3 Conditions of performance check

When checking the performance and dimensions, the following items must be observed for securing the measurement accuracy and safety in work as well.

3-3-1 Location and facilities of performance check

(1) The check must be done on a flat, solid ground.
(2) A space must be secured which allows the machine to run 20 m straight for checking.
(3) A swing space must be secured which is suited to the types (size) of front end attachments.
(4) Various measuring apparatus and instruments must be prepared.
(5) Specific counterweights or equivalent must be prepared.
(6) The check location must be sectioned with ropes made of nylon or the like where necessary and an indication "Keep out " must be posted.

3-3-2 Cautions in performance check

(1) During check, always pay close attention to the ground, swing space high voltage power transmission line and other working environments for the human safety.
(2) Operate the machine carefully and make the co-workers quite clear about the signs for "Safety First".
(3) When disconnecting the hydraulic piping, be careful not to foul the ground and machine itself by oil and at the same time, dispose of waste oil and rags completely not to pollute the environment.

3-3-3 Securing measurement accuracy.

(1) To ensure the measurement accuracy, the measuring instruments calibrated correctly must be used.
(2) Repeat the same measurement a few times for confirmation and obtain the mean value as required.
(3) Try to improve the measurement accuracy.

3. OTHER STANDARD

3-1 BOLT TIGHTENING TORQUE

(1) BOLT TIGHTENING TORQUE (BASIC MACHINE BODY)

Bolts are classified into three kinds according to their materials.

T-BOLT

H-BOLT

M-BOLT

SOCKET BOLT

Kind \ Nominal dia (mm)	8	10	12	14	16	18	20	22	24	27	30	33	36
T-BOLT	29.4 (3.0)	63.7 (6.5)	107.8 (11)	176.4 (18)	264.6 (27)	392 (40)	539 (55)	735 (75)	931 (95)	1372 (140)	1911 (195)	2548 (260)	3136 (320)
H-BOLT	19.6 (2.0)	4.9 (5.0)	88.2 (9.0)	137.2 (14)	205.8 (21)	294 (30)	392 (40)	539 (55)	686 (70)	1029 (105)	1421 (145)	1911 (195)	2401 (245)
M-BOLT	9.8 (1.0)	19.6 (2.0)	34.3 (3.5)	53.9 (5.5)	78.4 (8.0)	117.6 (12)	166.6 (17)	215.6 (22)	274.4 (28)	392 (40)	539 (55)	735 (75)	931 (95)
SOCKET BOLT	29.4 (3.0)	63.7 (6.5)	107.8 (11)	176.4 (18)	264.6 (27)	392 (40)	539 (55)						

(Tolerance: ±10%)

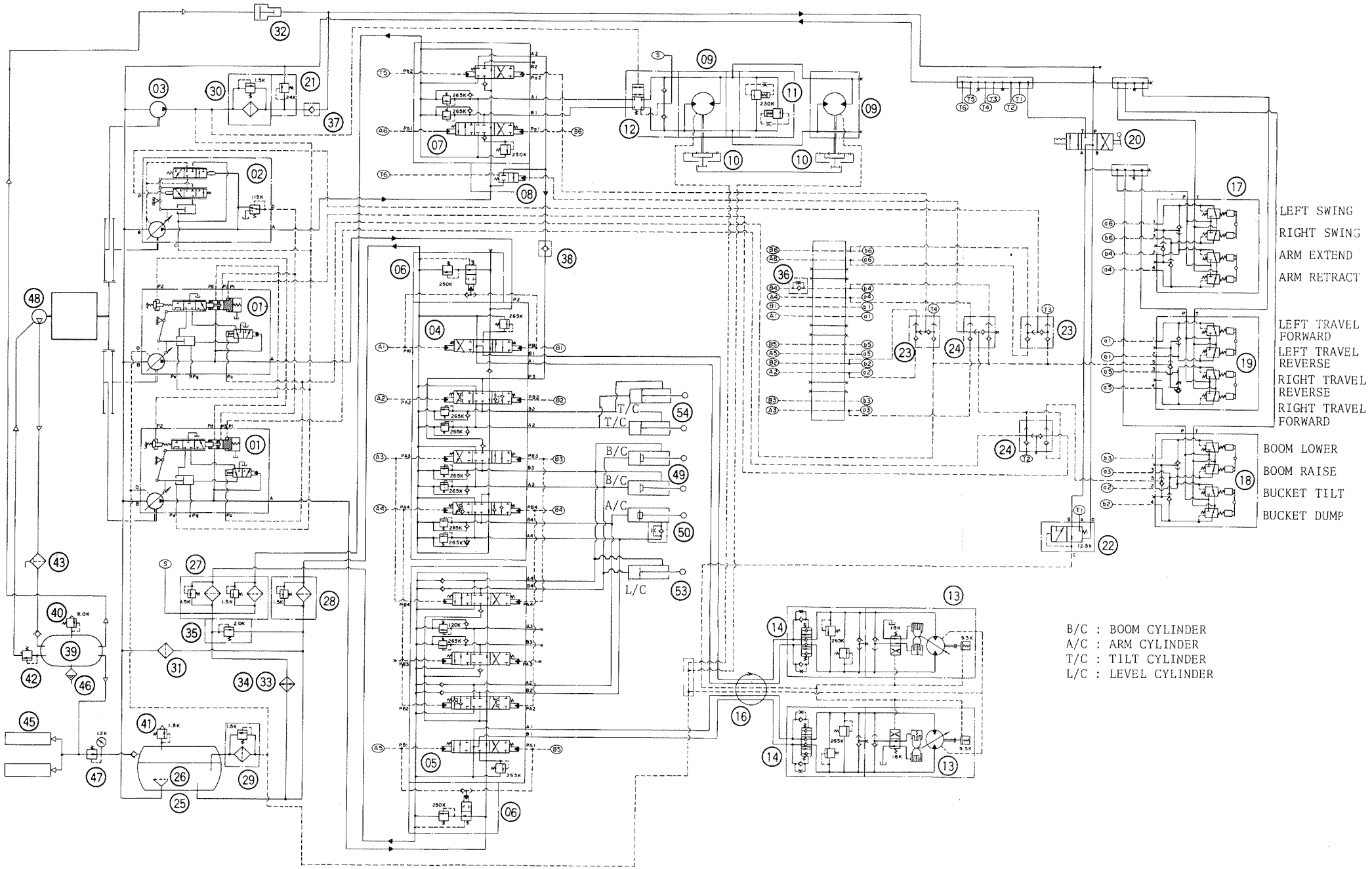
(2) BOLT TIGHTENING TORQUE (ENGINE)

(kg-m)

Bolt identification / Bolt diameter x pitch (mm)	 4 T (Low carbon steel)	 7 T (High carbon steel)	 9 T (Alloy steel)
6 x 1.0	0.4 — 0.8	0.5 — 1.0	—
8 x 1.25	0.8 — 1.8	1.2 — 2.3	1.7 — 3.1
10 x 1.25	2.1 — 3.5	2.8 — 4.7	3.8 — 6.4
*10 x 1.5	2.0 — 3.4	2.8 — 4.6	3.7 — 6.1
12 x 1.25	5.0 — 7.5	6.2 — 9.3	7.7 — 11.6
*12 x 1.75	4.6 — 7.0	5.8 — 8.6	7.3 — 10.9
14 x 1.5	7.8 — 11.7	9.5 — 14.2	11.6 — 17.4
*14 x 2.0	7.3 — 10.9	9.0 — 13.4	10.9 — 16.3
16 x 1.5	10.6 — 16.0	13.8 — 20.8	16.3 — 24.5
*16 x 2.0	10.2 — 15.2	13.2 — 19.8	15.6 — 23.4
18 x 1.5	15.4 — 23.0	19.9 — 29.9	23.4 — 35.2
20 x 1.5	21.0 — 31.6	27.5 — 41.3	32.3 — 48.5
22 x 1.5	25.6 — 42.2	37.0 — 55.5	43.3 — 64.9
24 x 2.0	36.6 — 55.0	43.9 — 72.5	56.5 — 84.7

The asterisk * indicates that the bolts are used for female-threaded parts that are made of soft materials such as casting, etc.

HYDRAULIC CIRCUIT (TILT-DUMPING TYPE LOADER)

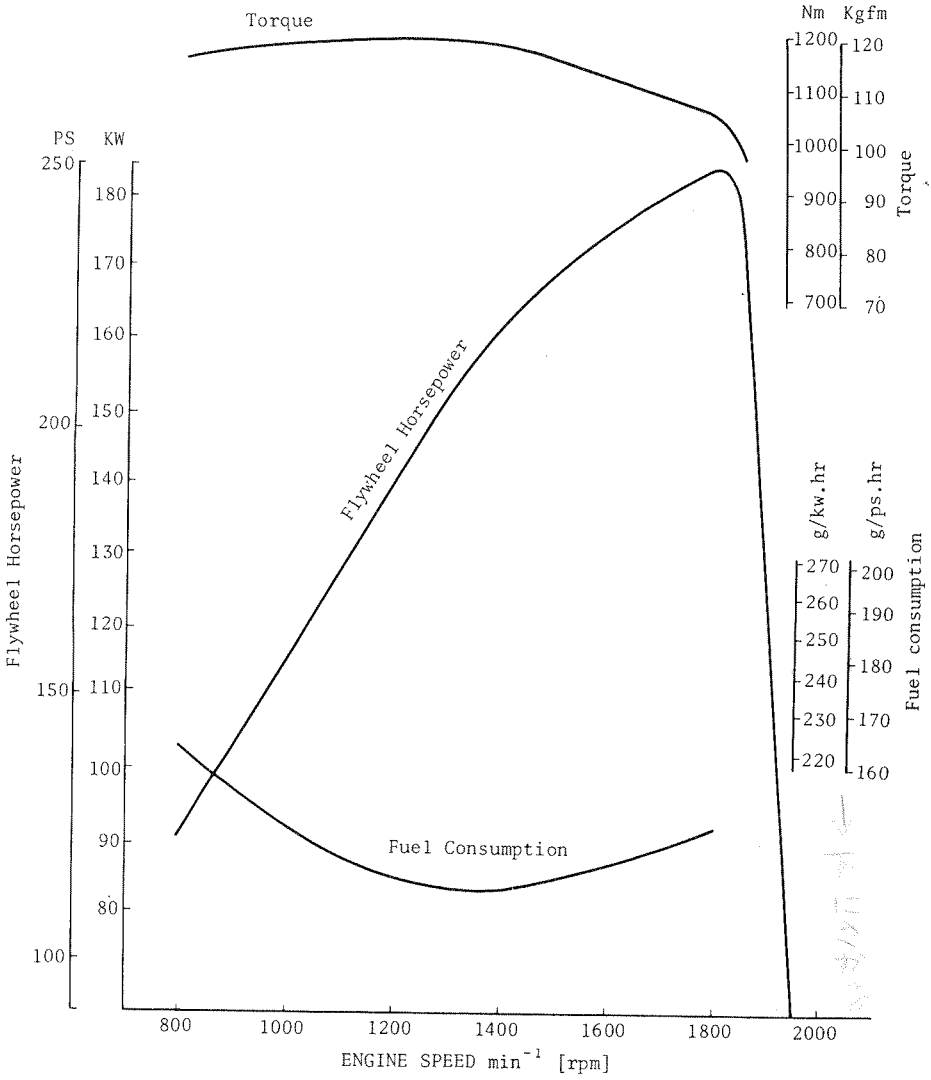


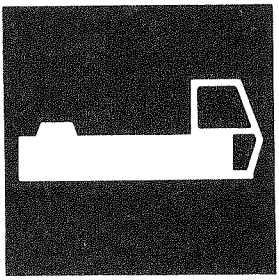
2. PERFORMANCE DATA

2-1 ENGINE PERFORMANCE CURVE

Test condition: Equipped with fuel system, water pump, lubrication pump, alternator and fan. Data shows performance observed at 1 bar (760 mmHg).

(1) Machine serial No. up to 0801





Section 4 SUPERSTRUCTURE

CONTENTS

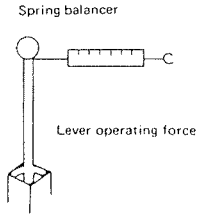
PERFORMANCE CHECK

1. LEVER OPERATING FORCE

Key points:

① Make sure of the play and working conditions of each control lever and at the same time, measure the operating force.
② For the control lever of front-end attachment, measure the maximum value in relief condition.
③ For each control lever, measure the force at a position beneath the grip.

Details	Remarks



(1) Preparation
Keep the hydraulic oil temperature at 50 ± 5°C.

(2) Measurement

(2)-1 Boom, arm, bucket & swing control levers
① Increase the engine speed to the maximum.
② In each operation, measure the maximum operating force of the levers in relief condition.

(2)-2 Travel control lever
① Increase the engine speed to the maximum.
② Jack up the track at the measuring side to make sure of the lever operating force.

(2)-3 Fuel lever
① Measure the maximum operating force required from minimum engine speed positon to maximum engine speed position.
② Measure the maximum operating force required from minimum engine speed position to stop position.

(2)-4 Bucket operating pedal
① Increase the engine speed to the maximum.
② Depress the bucket operating pedal from its neutral position and measure the maximum operating force in this case at the rear end of the pedal.

(3) Criteria

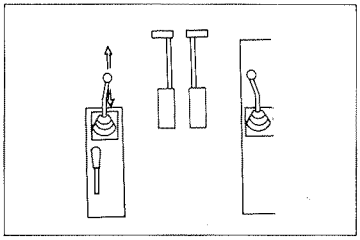
Unit: kg

Serial Nos		Boom lever	Arm lever	Bucket lever	Travel lever	Swing lever	Fuel lever	
							Speed-up	Stop
101 ~	A	≦3.2	≦2.2	≦2.2	≦2.2	≦2.9	≦15.0	
2-lever	B	3.5	2.5	2.5	2.5	3.5	17.0	
Type	C	4.0	3.0	3.0	3.0	4.0	18.0	

A: Standard performance
B: Service recommending performance
C: Working limit performance

PRESSURE MEASUREMENT

(1) Measurement
① Place the bucket on the ground.
② Apply swing lock lever.
③ Slowly pull the swing lever to full stroke and read the pressure gauge.
④ Slowly push the swing lever to full stroke and read the pressure gauge.
⑤ Hydraulic oil temperature: 50 ± 5°C.



(2) Judgement

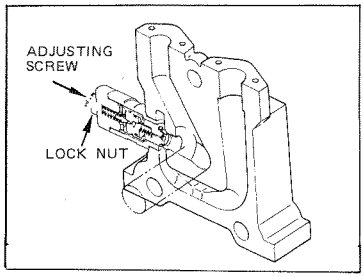
Unit: bar (kgf/cm^2)

Standard performance	Service recommending performance	Working limit performance
250 ± 5	Max. 255 Min. 220	Max. 255 Min. 209

(3) Adjustment
① Loosen the locknut and turn the adjusting screw.

Unit: bar (kgf/cm^2)

Turning screw rotation counterclockwise/clockwise	1 full turn	3/4	1/2	1/4
Variation of the pressure	180	135	90	45



② Make sure its relief set pressure again after adjusting.

Note: When the adjustment is completed, tighten the lock nut.

1.2 RIGHT SIDE MAIN PUMP

(1) Preparation

① Warm up the hydraulic oil temperature to 50 ± 5°C by operating the machine.
Lock the superstructure to the track frame by the sing lock.
Then slowly loosen the cock for air vent on the tank to release the air pressure.

② Install a vacuum pump on the hydraulic tank and operate the vacuum pump while the test-piping is set.

③ Disconnect Hose (4130760) from the left pump casing. (refer to left pump preparation 3)

④ Disconnect Hose (4514834) from the right pump regulator and plug the hose with a cap. (refer to left pump preparation 3)

⑤ Connect Male/Femal tees (female run) between hose (4130760) and the left pump regulator. (refer to left pump preparation 3)

⑥ Connect a hose (for test) between the tees and the right pump regulator. (refer to left pump preparation 3)

⑦ Loosen socket bolts (M341445) and remove split flange (4089703) from block (3028899).

⑧ Remove hose (4130879) from the block.

⑨ Connect flange (F-24) to the block with O-ring (ST-6372) and bolts (M341440).
Connect flange (F-23) to hose (4130879) by using split flange (4089703) with socket bolts (M341445).

⑩ Connect the test-hose (IN) to flange (F-24).
Connect the test-hose (OUT) to flange (F-23).

⑪ Disconnect the plug (right pump discharge pressure measuring port) from the right pump.

⑫ Connect a pressure gauge to the measuring port.

⑬ Install a sensor of tachometer onto the injection pump piping.

⑭ Stop the vacuum pump. Tighten the cock for air vent on the tank.

⑮ Open the loading valve of portable tester fully.

⑯ Run the engine keep idling until the air pressure is normal.

⑰ Run the engine at max. speed and check oil leakage.

(2) Measurement

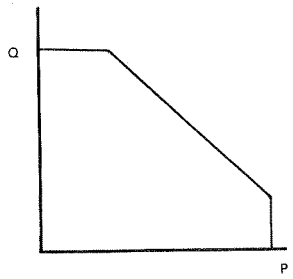
Note: Make sure the parking and speed changing lever is at "high speed" or low speed (either position is O.K).

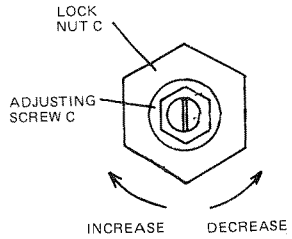
① Run the engine, keep max. speed.

② Close the portable tester loading valve slowly and record the discharge flow rate, engine speed and hydraulic oil temperature at the following each load pressure (read pressure gauge of measuring port).

- In measuring point; loading valve fully open 50, 220 240 bar (kgf/cm^2)
- Condition; Partner pump: minimum pressure, swing pump: minimum pressure

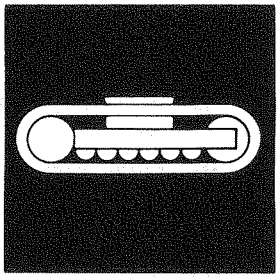
(7) Torque
Loosen the lock nut C and turn the adjusting screw©
After adjusting, tighten the lock nut securely.
After adjusting, tighten the lock nut securely.





ADJUSTING SCREW C

Turn	Flow rate variation
1/4	About 24.9



Section 5 UNDERCARRIAGE

CONTENTS

Continued on next page

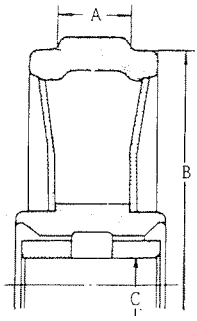
(5) FRONT IDLER

IDLER

UNIT: mm

MARK	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy
A	99	93	88	Buildup & Finish
B	665	659	650	
C	117	-	-	

WEIGHT: 170 kg



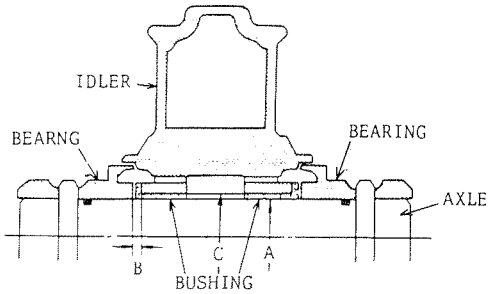
AXLE & BUSHING

UNIT: mm

		MARK	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy
AXLE	OUTSIDE DIA.	A	110	109.5	109.2	Replace
BUSHING	INSIDE DIA.	A	110	110.5	111.0	
	FLANGE THICKNES	B	7	6.5	6.2	
	OUTSIDE DIA.	C	117			

UNIT: mm

	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy	Note
Clearance between AXLE & BUSHING	0.37~ 0.49	1.0	1.8	Replace	
Gap between BUSHING & BEARING	0.2	1.0	1.5		Total dimension of both side

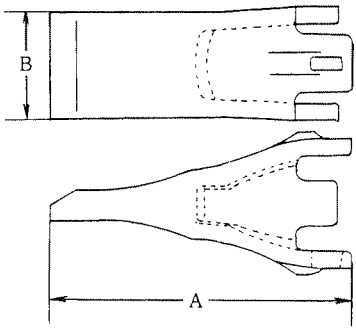


3-2 TOOTH POINT

(1) BACKHOE

Unit: mm

Standard dim.		Working limit dim.		Remedy
A	B	A	B	
250	120.7	160	-	Rebuild & Finish



(2) LOADER

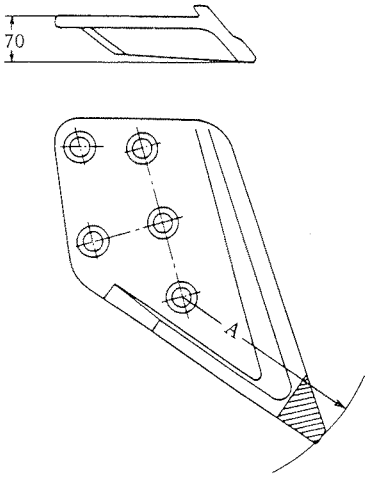
Unit: mm

Standard dim.		Working limit dim.		Remedy
A	B	A	B	
241	121	150	-	Rebuild & Finish

3-3 SIDE CUTTER

Unit: mm

	Standard dim.	Working limit dim.	Remedy
A	305	280	Rebuild & Finish



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(kg-m)

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14 x 1.5	7.8 — 11.7	9.5 — 14.2	11.6 — 17.4
*14 x 2.0	7.3 — 10.9	9.0 — 13.4	10.9 — 16.3
16 x 1.5	10.6 — 16.0	13.8 — 20.8	16.3 — 24.5
*16 x 2.0	10.2 — 15.2	13.2 — 19.8	15.6 — 23.4
18 x 1.5	15.4 — 23.0	19.9 — 29.9	23.4 — 35.2
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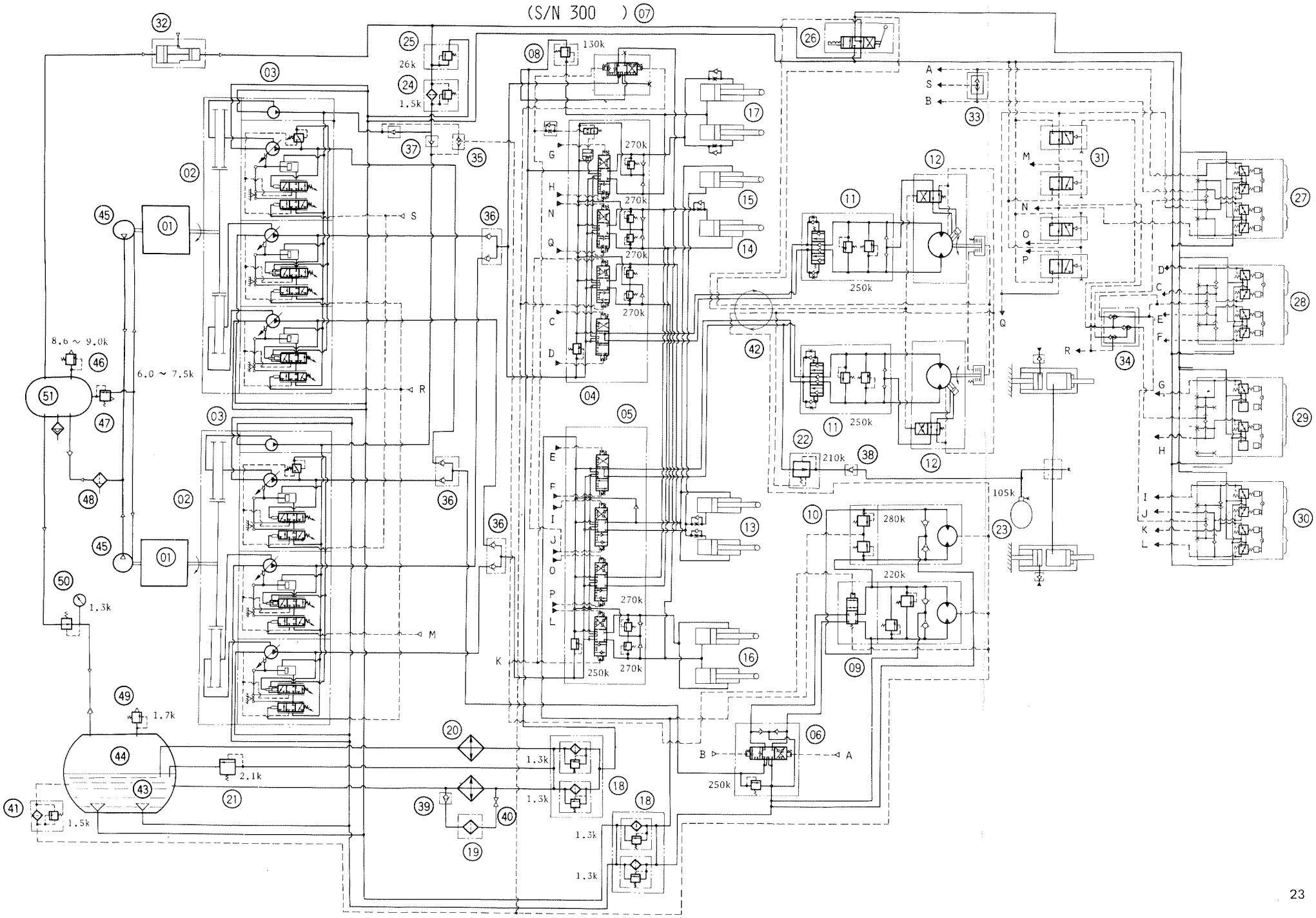
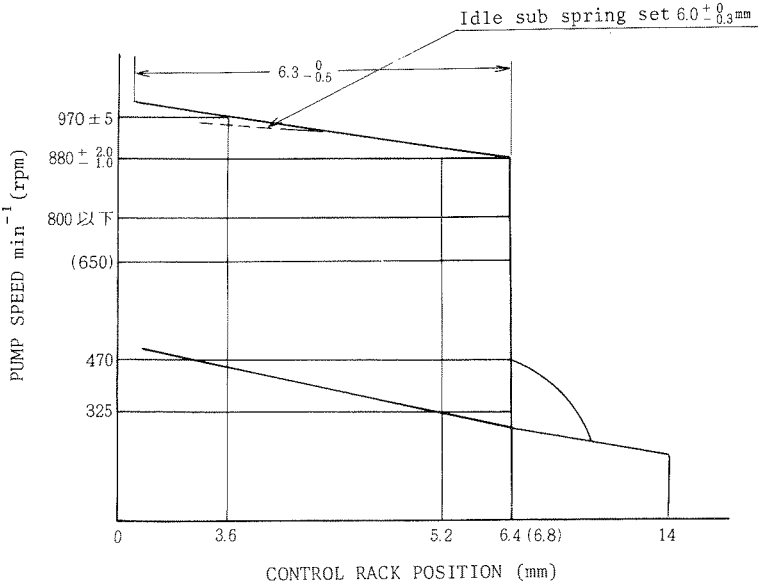
HYDRAULIC CIRCUIT LOADER



(4) Governor adjustment



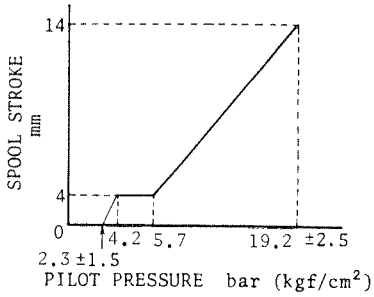
SPECIFICATIONS

3. PILOT PUMP

Maker	KAYABA
Model	KRP4-17AE
Type	Gear pump
Displacement	16.8 cm^3/rev
Rotating direction	Counter-clockwise viewed from shaft
Weight	3.1 kg

4. RIGHT CONTROL VALVE

Maker	TOSHIBA
Model	MVPH40BB$_4$M$_1$-33T.
Type	Pilot operated, 4-spool, parallel circuit with main relief valve, overload relief valves and make-up valves
. No.1 spool	Closed-center type with overload relief valves and make-up valves
. No.2 spool	Closed-center type
. No.3 spool	Closed-center type with make-up valve
. No.4 spool	Open-center type
Max. flow rate	
P port	488 liter/min
T port	1200 liter/min
Main relief set pressure	250 ±3 bar (kgf/cm^2) at 200 liter/min
Overload relief valve set pressure	270 ±5 bar (kgf/cm^2) at 150 liter/min
Weight	152 kg



PRESSURE MEASUREMENT

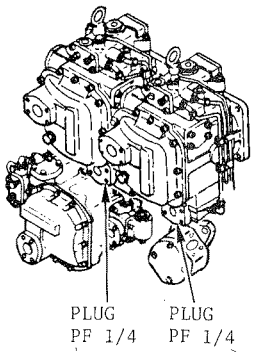
OVERLOAD RELIEF VALVE

(1) PREPARATION

① Loosen the air vent cock on the hydraulic tank, and release compressed air from the tank.
② Install a pressure gauge.
③ Run the engine at a low speed for five minutes.
④ Check oil leakage from the connection port of the gauge.
⑤ Hydraulic oil temperature. 50 ± 5°C.

(2) MEASUREMENT

① Accelerate the engine to maximum speed.
② Operate the control lever to the stroke end and hold in a while, even when the hydraulic cylinder rod is at stroke end.
③ Read the pressure gauge.



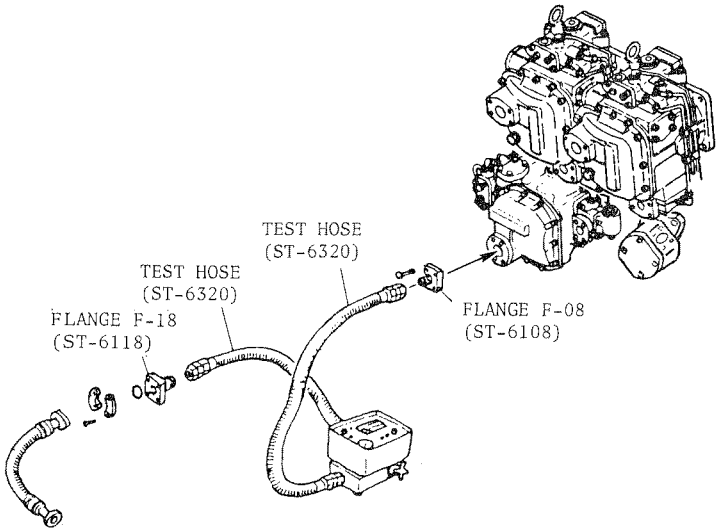
Judgement

Models & Machine Nos		UH261 · 300 –		
		Standard performance	Service re-commending performance	Working limit per-formance
Set pressure of main relief valve	kg/cm²	250^{+10}_{0}	Max 260 Min 220	Max 260 Min 210
Set pressure of boom overload relief valve	kg/cm²	270^{+5}_{-10}	275 235	275 220
Set pressure of arm overload relief valve	kg/cm²	270^{+5}_{-10}	275 235	275 220
Set pressure of bucket overload relief valve	kg/cm²	270^{+5}_{-10}	275 235	275 220
Set pressure of loader bucket (close) relief valve	kg/cm²	140^{+5}_{-10}	145 120	145 110

PUMP PERFORMANCE CHECK

2. SWING PUMP

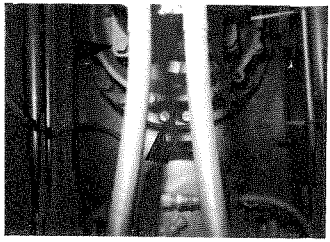
(1) Preparation



① Loosen the air vent cock on the hydraulic tank and release a compressed air from the tank.
② Remove the hose on the discharge side of the swing pump, and connect the flange F-08 (ST-6108) to the swing pump.
③ Connect the test hose IN (ST-6320) to the flange.
④ Install flange F-18 (ST-6118) to the test hose OUT (ST-6320)
⑤ Connect the test hose OUT to the hose.
⑥ Open the loading valve fully.
⑦ Remove the plug from the swing pump and install the pressure gauge assembly (ST-6933).
⑧ Close the air vent cock
⑨ Run the engine at low speed for five minutes.
⑩ Check oil leakage from the connection parts.
⑪ Hydraulic oil temperature: 50 ± 5°C.

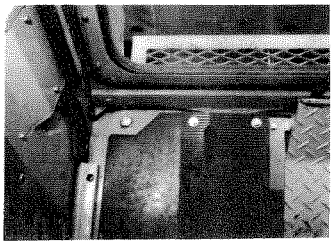
OTHER STANDARD

⑥ Retighten swing motor attaching bolts.
Tool : 30 mm
Torque: 392 NM (40 kgf-m)

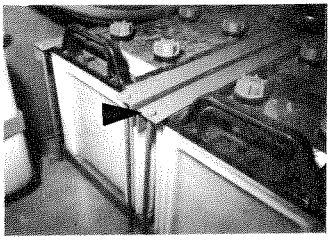


⑦ Swing drive mounting bolts.
Tool : 36 mm
Torque: 931 NM (95 kgf-m)

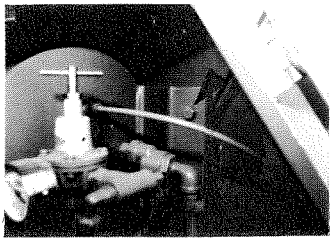
⑧ Retighten cab attaching bolts.
Tool : 24 mm
Torque: 206 NM (21 kgf-m)



⑨ Retighten battery attaching bolt.
Tool : 10 mm
Torque: 206 NM (1 kgf-m)

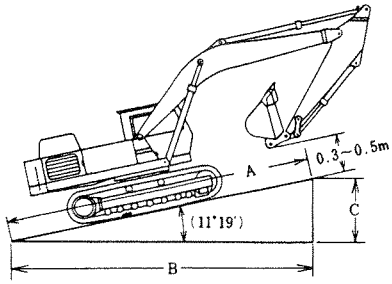


⑩ Retighten air tank attaching bolt.
Tool : 17 mm
Torque: 49 NM (5 kgf-m)



(4) TRAVEL MOTOR SLIPPAGE ON SLOPE

Measure on a slope with gradient of 1/5 as a rule.



A	B	C
1	0.98	0.20
1.02	1	0.20
5.09	4.99	1

Time lag

S/N	Standard performance	Service recommending performance	Working limit performance
300 and over	Less than 1/6 turn	—	Less than 1/6 turn

Less than 1/6 turn of the sprocket, when this is expressed by a length of straight line (L), becomes as

$$L = \frac{1}{6} \times 2\pi r \fallingdotseq r$$

Slippage Unit: mm/5 min

S/N	Standard performance	Service recommending performance	Working limit performance
300 and over	0		0

After 30 minutes have elapsed, the slippage must be zero.

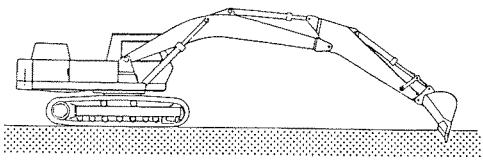
(5) TRAVEL RELIEF VALVE

Preparations

Set the front attachment as shown in the Figure, and grasp earth by the bucket securely.

Measurement

1) Operate either right or left travel control lever its full stroke slowly, and read relief pressure through the pressure gauge.
2) Apply this test to both travel motors, forward and reverse.



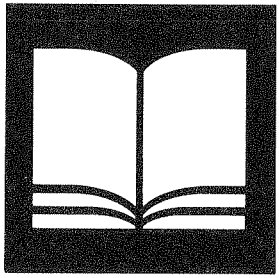
Unit: kgf/cm²

S/N	Standard performance	Service recommending performance	Working limit performance
300 and over	250^{+10}_{-5}	Max. 260 Min. 220	Max. 260 Min. 210

1. SPECIFICATIONS

1-1 BACKHOE ATTACHMENT

(1)	BOOM CYLINDER	
	Maker	KAYABA
	Cylinder bore	200 mm
	Rod diameter	130 mm
	Stroke	1855 mm
	Retracted length	2625 mm
	Piston nut tightening torque	25.1 to 36.5 KNm (2560 to 3720 kgf.m)
	Weight	702 kg
(2)	ARM CYLINDER	
	Maker	KAYABA
	Cylinder bore	225 mm
	Rod diameter	160 mm
	Stroke	2120 mm
	Retracted length	3075 mm
	Piston nut tightening torque	46.3 to 67.4 KNm (4720 to 6880 kgf.m)
	Weight	1088 kg
(3)	BUCKET CYLINDER	
	Maker	KAYABA
	Cylinder bore	200 mm
	Rod diameter	150 mm
	Stroke	1580 mm
	Retracted length	2445 mm
	Piston nut tightening torque	39.3 to 57.5 KNm (4010 to 5870 kgf.m)
	Weight	737 kg

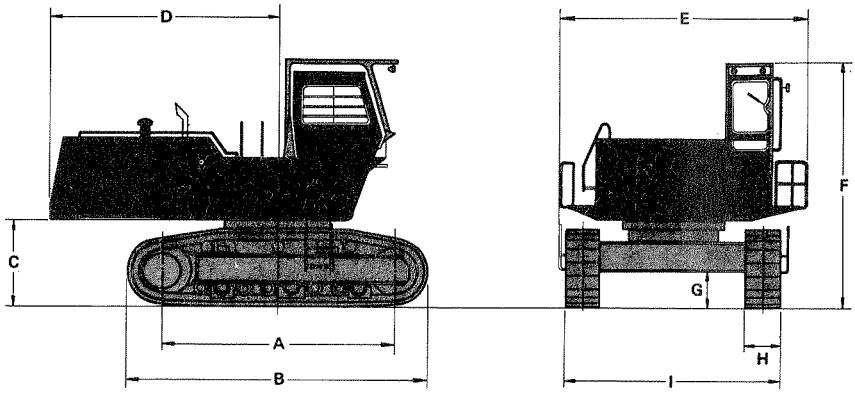


Section 1 FOREWORD

CONTENTS

GENERAL SPECIFICATIONS

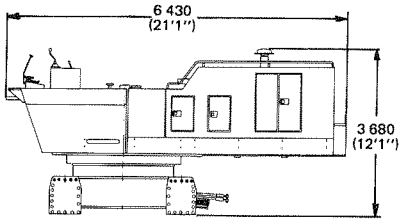
1. GENERAL SPECIFICATIONS
1-1 DIMENSIONS and WEIGHT



A	Distance between tumblers	4 670 mm (15'4")
B	Undercarriage length	6 080 mm (19'11")
C	Counterweight clearance	1 760 mm (5'9")
D	Rear-end swing radius	4 650 mm (15'4")
E	Overall width	5 010 mm (16'5")
F	Overall height of cab	5 030 mm (16'6")
G	Min. ground clearance	750 mm (29")
H	Track shoe width	700 mm (28"), 900 mm (35")
I	Undercarriage width	4 400 mm (14'5"), 4 600 mm (15'1")

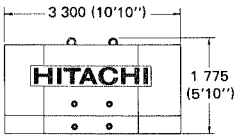
(1) SUPERSTRUCTURE

Basic machine: 28 500 kg (62 800 lb)



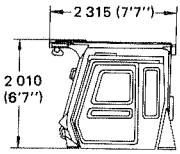
Width; 3 370 (11'1 ")

Counter weight: 14 050 kg (31 000 lb)



Width; 665 (2'2")

Cab: 645 kg (1 420 lb)



Width; 1 120 (3'8")

OTHER STANDARDS

2. AREA

(1) SQUARE INCHES TO SQUARE CENTIMETERS

in^2	0	1	2	3	4	5	6	7	8	9	in^2
	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	
—		6.452	12.903	19.355	25.806	32.258	38.710	45.161	51.613	58.064	—
10	64.516	70.968	77.419	83.871	90.322	96.774	103.226	109.677	116.129	122.580	10
20	129.032	135.484	141.935	148.387	154.838	161.290	167.742	174.193	180.645	187.096	20
30	193.548	200.000	206.451	212.903	219.354	225.806	232.258	238.709	245.161	251.612	30
40	258.064	264.516	270.967	277.419	283.870	290.322	296.774	303.225	309.677	316.128	40
50	322.580	329.032	335.483	341.935	348.386	354.838	361.290	367.741	374.193	380.644	50
60	387.096	393.548	399.999	406.451	412.902	419.354	425.806	432.257	438.709	445.160	60
70	451.612	458.064	464.515	470.967	477.418	483.870	490.322	496.773	503.225	509.676	70
80	516.128	522.580	529.031	535.483	541.934	548.386	554.838	561.289	567.741	574.192	80
90	580.644	587.096	593.547	599.999	606.450	612.902	619.354	625.805	632.257	638.708	90
100	645.160	651.612	658.063	664.515	670.966	677.418	683.870	690.321	696.773	703.224	100

(2) SQUARE CENTIMETERES TO SQUARE INCHES

cm^2	0	1	2	3	4	5	6	7	8	9	cm^2
	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	
—		0.155	0.310	0.465	0.620	0.775	0.930	1.085	1.240	1.395	—
10	1.550	1.705	1.860	2.015	2.170	2.325	2.480	2.635	2.790	2.945	10
20	3.100	3.255	3.410	3.565	3.720	3.875	4.030	4.185	4.340	4.495	20
30	4.650	4.805	4.960	5.115	5.270	5.425	5.580	5.735	5.890	6.045	30
40	6.200	6.355	6.510	6.665	6.820	6.975	7.130	7.285	7.440	7.595	40
50	7.750	7.905	8.060	8.215	8.370	8.525	8.680	8.835	8.990	9.145	50
60	9.300	9.455	9.610	9.765	9.920	10.075	10.230	10.385	10.540	10.695	60
70	10.850	11.005	11.160	11.315	11.470	11.625	11.780	11.935	12.090	12.245	70
80	12.400	12.555	12.710	12.865	13.020	13.175	13.330	13.485	13.640	13.795	80
90	13.950	14.105	14.260	14.415	14.570	14.725	14.880	15.035	15.190	15.345	90
100	15.500	15.655	15.810	15.965	16.120	16.275	16.430	16.385	16.740	16.895	100

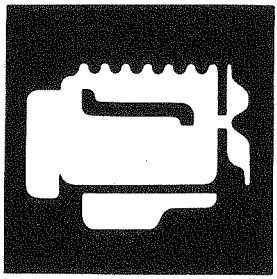
3. VOLUME

(1) CUBIC INCHES TO CUBIC CENTIMETERS

in^3	0	1	2	3	4	5	6	7	8	9	in^3
	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	cm^3(cc)	
—		16.387	32.774	49.161	65.548	81.935	98.332	114.709	131.097	147.484	—
10	163.871	180.258	196.645	213.032	229.419	245.806	262.193	278.580	294.967	311.354	10
20	327.741	344.128	360.515	376.902	393.290	209.677	426.064	442.451	458.838	475.225	20
30	491.612	507.999	524.386	540.773	557.160	573.547	589.934	606.321	622.708	639.095	30
40	655.483	671.870	688.257	704.644	721.031	737.418	753.805	770.192	786.579	802.966	40
50	819.353	835.740	852.127	868.514	884.901	901.289	917.676	934.063	950.450	966.837	50
60	983.224	999.611	1015.998	1032.385	1048.772	1065.159	1081.546	1097.933	1114.320	1130.707	60
70	1147.094	1163.482	1179.869	1196.256	1212.643	1229.030	1245.417	1261.804	1278.191	1294.578	70
80	1310.965	1327.352	1343.739	1360.126	1376.513	1392.200	1409.288	1425.675	1442.062	1458.449	80
90	1474.836	1491.223	1507.610	1523.997	1540.384	1556.771	1573.158	1589.545	1605.932	1622.319	90
100	1638.706	1655.093	1671.481	1687.868	1704.255	1720.642	1737.029	1753.416	1769.803	1786.190	100

(2) CUBIC CENTIMETERS TO CUBIC INCHES

cm^3(cc)	0	1	2	3	4	5	6	7	8	9	cm^3(cc)
	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	
—		0.0610	0.1220	0.1831	0.2441	0.3051	0.3661	0.4272	0.4882	0.5492	—
10	0.6102	0.6713	0.7323	0.7933	0.8543	0.9154	0.9764	1.0734	1.0984	1.1595	10
20	1.2205	1.2815	1.3425	1.4035	1.4646	1.5256	1.5866	1.6476	1.7087	1.7697	20
30	1.8307	1.8917	1.9528	2.0138	2.0748	2.1358	2.1969	2.2579	2.3189	2.3799	30
40	2.4409	2.5020	2.5630	2.6240	2.6850	2.7461	2.8071	2.8681	2.9291	2.9902	40
50	3.0512	3.1122	3.1732	3.2343	3.2953	3.3563	3.4173	3.4784	3.5394	3.6004	50
60	3.6614	3.7224	3.7835	3.8445	3.9055	3.9665	4.0276	4.0886	4.1495	4.2106	60
70	4.2717	4.3327	4.3937	4.4547	4.5158	4.5768	4.6378	4.6988	4.7599	4.8209	70
80	4.8819	4.9429	5.0039	5.0650	5.1260	5.1870	5.2480	5.3091	5.3701	5.4311	80
90	5.4921	5.5532	5.6142	5.6752	5.7362	5.7973	5.8583	5.9193	5.9803	6.0414	90
100	6.1024	6.1634	6.2244	6.2854	6.3465	6.4075	6.4685	6.5295	6.5906	6.6516	100



Section 3 ENGINE

CONTENTS

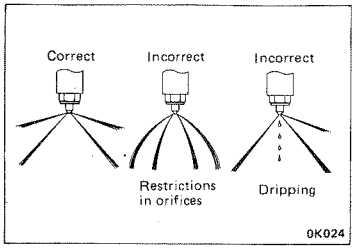
Continued on next page

(5) INJECTION PRESSURE

Injection nozzle

Inspection

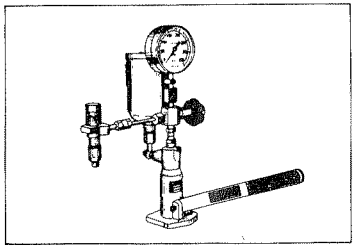
Check the spray condition and injection pressure.



Adjustment

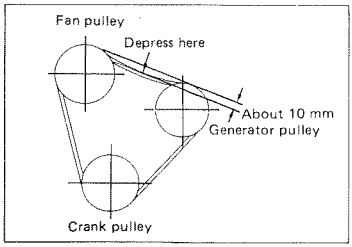
Adjust the injection starting pressure with the adjusting screw using a nozzle tester.

Standard injection pressure: 225 bar (kg/cm^2)



(6) FAN BELT

Belt deflection ..... 10 mm



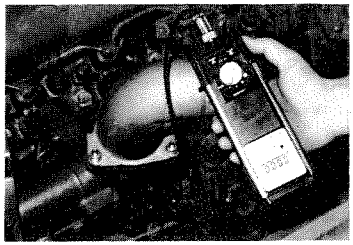
(7) ENGINE SPEED

Preparation

Fit the engine revolution tester to the fuel injection pipe.

Unit: min^{-1} (rpm)

Mark	Standard performance	Service recommending performance	Working limits
Maximum	1950 ± 50	Max. 2000 Min. 1710	Max. 2000 Min. 1610
Low idling	650 ± 50	-	510

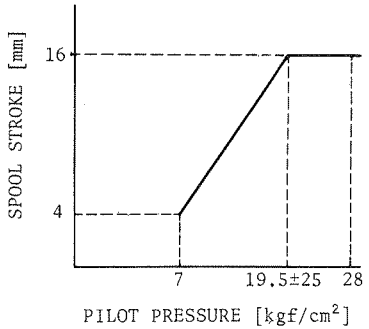


3. PILOT PUMP

Maker	KAYABA
Model	KRP4-19AE
Type	Fixed displacement gear pump
Delivery	19.2 cm^3/rev
Rotating direction	Counter-clockwise viewed from driven shaft side
Driven ratio	1.27 [at 2300 min^{-1} at engine speed 1800 min^{-1}]
Suction pressure	0.8 ~ 1.5 bar [kgf/cm^2]
Weight	3.2 kg

4. CONTROL VALVE [4-spool] (R)

Maker	TOSHIBA
Model	MVPH45DDBM-11T
Type	4-spool mono-block with main relief valve and overload relief valves
Main relief setting	
. Cracking pressure	Not less than 200 bar [kgf/cm^2]
. Set pressure	250 ±3 bar [kgf/cm^2] at 330 liter/min
Overload relief setting	
. Cracking pressure	Not less than 220 bar [kgf/cm^2]
. Set pressure	275^{+5}_{0} bar [kgf/cm^2] at 300 liter/min
Oil leakage	Less than 350 cm^3/min at tank and pump port by applying 100 bar [kgf/cm^2] at each cylinder port, oil temperature at 50±5°C.

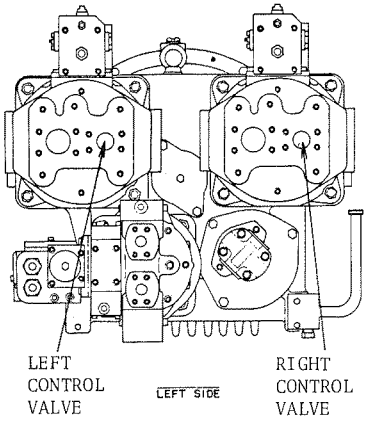


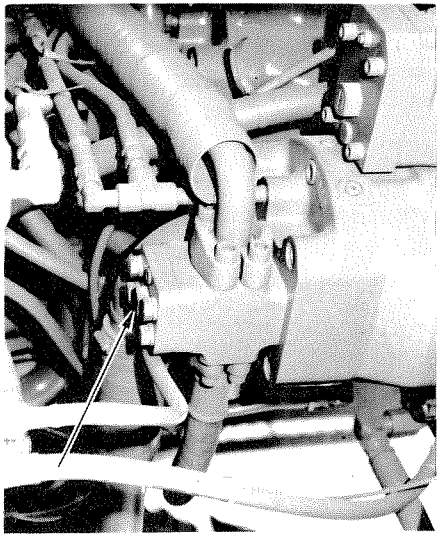
PRESSURE MEASUREMENT

1. SET PRESSURE OF MAIN RELIEF AND OVERLOAD RELIEF VALVE

MAIN RELIEF VALVE

(1) Preparation





① Loosen two plugs on the left and right hydraulic tanks, and release compressed air from the tanks.
② Remove the plug from the check valve and install the nipple (ST-6069) and seal washer (ST-6361).
③ Install the pressure gauge assembly (ST-6931) to the nipple.
- To measure the main relief valve of the right control valve, install the pressure gauge to the left pump at the left engine side.
- To measure the main relief valve of the left control valve, install the pressure gauge to the right pump at the left engine side.

④ Install two plugs on the left and right hydraulic tanks.
⑤ Run the engines at low speed for five minutes.
⑥ Check oil leakage from the connection parts of the gauge.
⑦ Hydraulic oil temperature: 50±5°C

PUMP PERFORMANCE CHECK

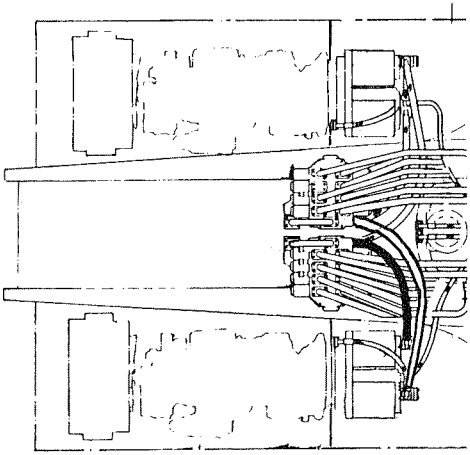
(1)-2 Measurement

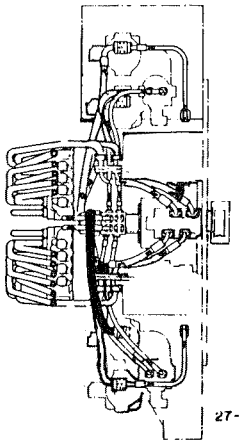
① Lock the superstructure to the track frame by the swing lock.
② Accelerate the right engine to the maximum speed.
③ Operate the bucket control lever slowly to the full stroke and hold it in the position.
④ Close the loading valve slowly to record the engine speed, oil temperature and discharge flow rate at 50 bar (kgf/cm^2), 140 bar (kgf/cm^2), 160 bar (kgf/cm^2) and 200 bar (kgf/cm^2).
⑤ After finishing the step 4 measurement, open the loading valve fully.
⑥ Operate the swing lever slowly to the full stroke and hold it.
⑦ Close the loading valve slowly to record the engine speed, oil temperature and discharge flow rate at 100 bar (kgf/cm^2), 140 bar (kgf/cm^2) and 200 bar (kgf/cm^2).

RIGHT ENGINE SIDE

(2) LEFT PUMP

(2)-1 Preparation





OTHER STANDARD

1. AMOUNT OF OIL IN TANK & OIL CHANGING INTERVALS

Fuel tank	liter	980	Swing reduction unit	liter	33 x 2
	Hr	—		Hr	1.000
All amount of Hydraulic oil	Liter	1.150		Brand	HE90
	Hr	2.000	Cooling water (radiator)	liter	84 x 2
	Brand	46 WR		Hr	600

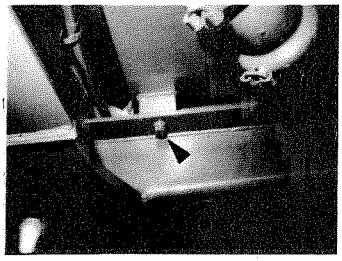
2. REPLACING INTERVALS OF FILTER ELEMENT

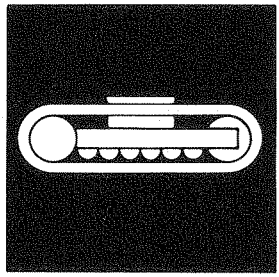
Full-flow filter element	Hr	250	
Suction filter element	Hr	2.000	Cleaning
Fuel tank strainer	Hr	1.000	Cleaning
Air cleaner element (intake)	Hr	250	Cleaning
	Hr	1.500	

3. TIGHTENDING TORQUE OF MOUNTING BOLTS

(1)

① **Retighten hydraulic oil tank fixing bolts.**
Tool: 24 mm
Torque: 206 NM (21 kgf-m)





Section 5 UNDERCARRIAGE

CONTENTS

Continued on next page

WEAR CHECK

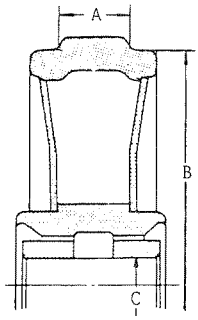
(5) FRONT IDEL

IDLER

UNIT: mm

MARK	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy
A	123	117	99	Buildup & Finish
B	892	886	868	
C		-	-	

WEIGHT: 400 kg



AXLE & BUSHING

UNIT: mm

		MARK	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy
AXLE	OUTSIDE DIA.	A	130	129.5	129.2	Replace
BUSHING	INSIDE DIA.	A	130	130.5	131.0	
	FLANGE THICKNES	B	11	10.5	10.2	
	OUTSIDE DIA.	C	144	-	-	

UNIT: mm

	Standard dim.	Service recommend-ing dim.	Working limit dim.	Remedy	Note
Clearance between AXLE & BUSHING	0.55~ 0.75	1.0	1.8	Replace	
Gap between BUSHING & BEARING	-	1.0	1.5		Total dimension of both side