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SERVICE MANUAL

HYDRAULIC EXCAVATOR

SK13SR

Applicable: SK013SR PE0100101~

S5PE0001E-01 03/04

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STANDARD MAINTENANCE TIME TABLE

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11. ENGINE SPECIFICATIONS

11.1 SPECIFICATIONS

Item \ Model		SK13SR	
Engine Model		3TNE68-YB	
Type		Vertical, 4-cycle water-cooled diesel engine	
No. of cylinders - Bore x Stroke		3 - 68mm (2.68 in) x 72 mm (2.83 in)	
Total displacement		0.784 liter (47.8 cu in)	
Compression ratio		23.5	
Rated output		12.1 PS (8.9 kW) at 2000 rpm	
Maximum torque		4.7 ~ 5.1 kgf·m (34.0 ~ 36.9 ft·lbs) at 1500 rpm	
Low idling		1300 ± 25 rpm	
High idling		2180 ± 25 rpm	
Fuel consumption rate		Less than 200 g / PS·h	
Allowable tilting angles		Back and forth, left and right 25° (momentary 30°)	
Rotating direction		Counterclockwise as seen from flywheel side	
Firing order		1-3-2-1	
Fuel injection timing (FID, b.T.D.C.)		12 ± 1°	
Fuel injection pressure		120$^{-5}_{+9}$ kgf / cm² (1710$^{-71}_{+128}$ psi)	
Valve action		Open	Close
	Intake valve	b.T.D.C. 10 ± 5°	a.B.D.C. 42 ± 5°
	Exhaust valve	b.T.D.C. 42 ± 5°	a.B.D.C. 10 ± 5°
Valve clearance	Intake valve	0.2 mm (0.008 in) in cold condition	
	Exhaust valve	0.2 mm (0.008 in) in cold condition	
Thermostat action		Start 71 ± 1.5°C (160 ± 3°F) / Full open 85°C(185°F)	
Compression pressure		33 ± 1 kgf / cm² (469 ± 14psi) at 250 rpm	
Lubrication oil pressure		2.5 ± 0.5 kgf / cm² (36 ± 7psi) at 2000 rpm	
Dimensions L x W x H		473 x 410 x 511 mm (18.6 x 16.1 x 20.1 in)	
Dry weight		81$^{+5}_{-6}$ kgf (179$^{+11}_{-13}$ lbs)	
Governor		Mechanical centrifugal governor (All speed type)	
Lubrication system		Forced lubrication with trochoid pump	
Cooling system		Liquid cooling / Radiator	
Starter capacity		12 V x 0.9 kW	
Generator capacity		12 V x 20 A	
Cooling water capacity : Max / Engine		2.5 / 0.9 liter (0.66 / 0.24 gal)	
Engine oil volume : Max / Effective		2.8 / 1.2 liter (0.74 / 0.32 gal)	

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5.3MAINTENANCE STANDARDS

5.3.1 Check Procedures and Remedy

Check Interval	Place Checked	Check Procedure	Remedy
2,000hrs.	Seals which prevent external leakage of hydraulic oil.	Check if oil is leaking out.	Replace the O-rings if there is leakage.
4,000hrs.	All seal parts.	—	Replace all the seal parts.
Disassemble and check whether there is leakage or not.	All sliding portion.	Check for abnormal wear, defects, corrosion, etc. due to seizing, foreign material being caught, etc.	Recondition in accordance with the use limit.
When disassembling due to trouble	All parts.	Check for abnormal wear, defects, corrosion, etc. due to seizing, foreign material being caught, etc.	Recondition in accordance with the use limit. Regarding the seal kit, replace it.

5.3.2 Parts Use Limit

(1) Body, Shaft

Portion	Judgment Criteria	Remedy
Seal Parts and Sliding Portion	• Wearing of surface treated with ultrasonic tempering, and coming off of surface due to seizing, foreign material getting caught, etc.	Replace.
Body and shaft sliding portion other than seals.	• Abnormal wear or defects by 0.1 mm (0.0039 in) deep or deeper due to seizing or foreign material getting caught, etc.	Replace.
	• Defects less than 0.1 mm (0.0039 in) deep.	Repair with an oil stone.
Portions which slide against the thrust ring.	• Wearing by 0.5 mm (0.020 in) or more, or abnormal wear.	Replace.
	• Wear less than 0.5 mm (0.020 in).	Repair so that is smooth.
	• Defects due to seizing or foreign material getting caught, etc. which are within the wear limit of 0.5 mm (0.020 in) and within repairing limit.	Repair so that is smooth.

(2) Flange and (3) Thrust Ring

Portion	Judgment Criteria	Remedy
• Portions of flange which slide against the shaft end.	• Wearing by 0.5 mm (0.020 in) or more, or abnormal wear.	Replace.
	• Wear less than 0.5 mm (0.020 in).	Repair so that is smooth.
• Thrust Ring	• Defects due to seizing or foreign material catching, etc. which are within the wear limit of 0.5 mm (0.020 in) and to within repairing limit.	Repair so that is smooth.

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3.9 DOZER AND ADJUSTABLE CRAWLER FRAME WIDTH OPERATING CIRCUIT

- The operation is conducted by the operating lever, which drives the cable.
- Dozer / Crawler width operations are selected with shifting selector valve.

3.9.1 Dozer Lowering Operating Circuit

(1) Dozer Operation

Put the shifting lever provided under the operator seat, to down side. Then shift the selector valve provided on the swivel joint (6), to dozer side.

When the operating lever is pushed forward, the dozer spool in control valve (1) is shifted by the pulling up motion of the cable. Since the pilot oil pressure is not utilized for it, as the same case as the swing, this is activated regardless to the safety lock lever.

(2) Main Circuit

1) Supply Circuit for Cylinder (11)

The oil discharged from P1 port on variable pump in pump assy (2) enters into P1 port on control valve (1), and is led to A5 port through dozer valve. The pressurized oil passed through swivel joint (6) is supplied to the head side of dozer cylinder (11) to activate dozer lowering motion.

2) Prevention of Dozer Lowering due to its own Weight

A check valve opening at 14 kg/cm² (200 psi) is provided in the return circuit of dozer valve on control valve (1). Therefore, if the dozer operating lever is operated while the engine is at a standstill, the dozer does not lower due to its own weight, because the oil pressure corresponding to the dozer weight is less than 14 kg/cm² (200 psi).

3.9.2 Adjustable Crawler Frame Width (Crawler width) Operating Circuit

Put the selector valve on swivel joint (6) to crawler width side (shifting lever is raised upper side). As same as dozer operating lever, when the operating lever is pushed forward, pressurized oil is supplied to the head side of adjusting cylinder (12) to expand the crawler width. The reverse operation of the lever results to the contraction of crawler width.

For the crawler width adjusting operation, the machine must be lifted up with the attachment and dozer to make the crawler shoes at free conditions.

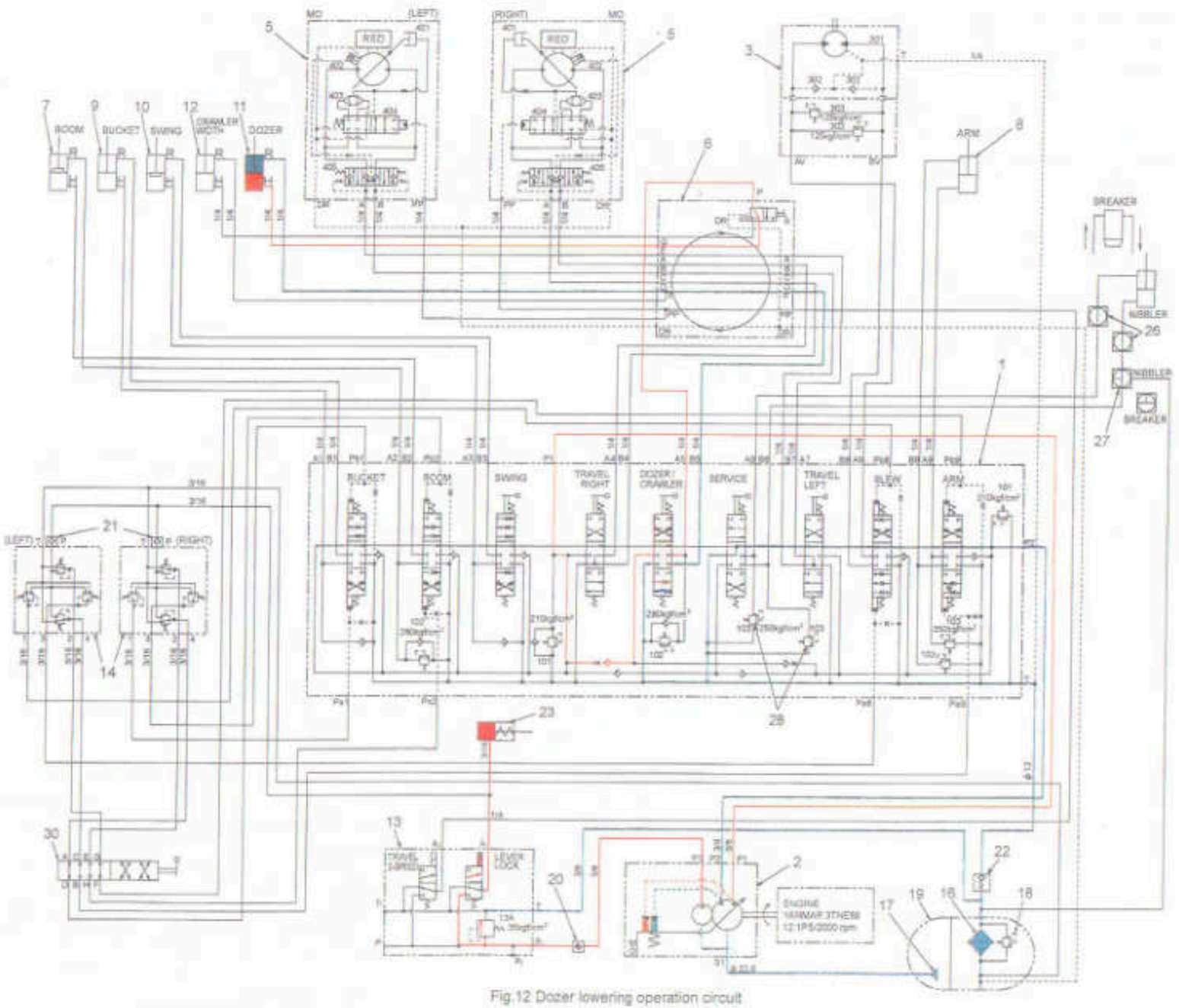


Fig.12 Dozer lowering operation circuit

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