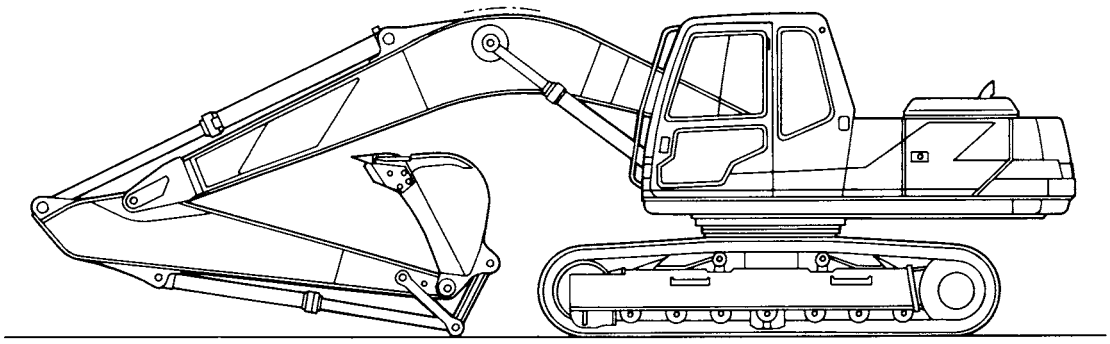
Book code NO.
S7L00008E Ⓐ

KOBELCO

Hydraulic Excavator

MARK Ⅲ SERIES

SERVICEMAN HANDBOOK



KOBE STEEL, LTD.

· PRINTED IN JAPAN
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APPLIED MACHINES

This serviceman's handbook provides essential information regarding the following models of excavator.

SK60	
SK100	
SK120	**SK120LC**
SK200	**SK200LC**
SK220	**SK220LC**

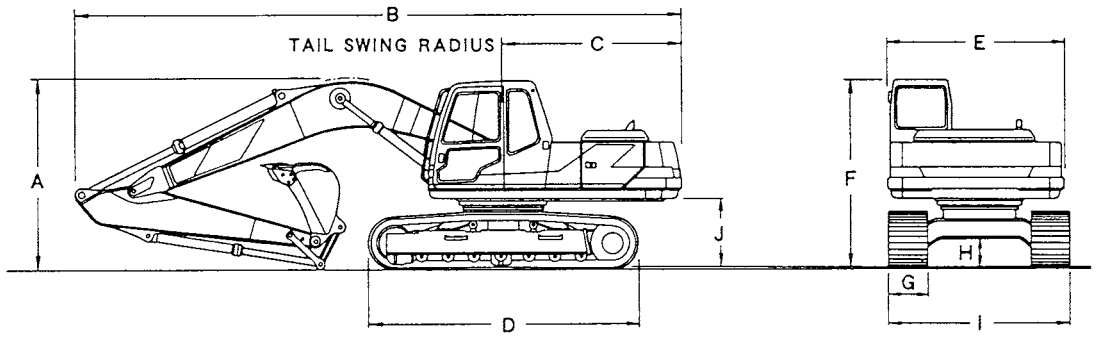
PREFACE

This serviceman's handbook for the KOBELCO hydraulic excavator provides maintenance and repair personnel with basic information concerning routine maintenance and repair of the KOBELCO machine.

This handbook is compiled for the user's convenience using extracts mainly from the Operators and Shop Manuals.

For inspection and maintenance of the machine in the field, use this handbook as a reference to improve your work efficiency.

DIMENSIONS



Unit: mm (ft-in)

MODEL	DIMENSIONS										
	A	B	C	D	E	F	G	H	I	J	ARM
SK60	2,950 (9′ 8.1″)	6,005 (19′ 8.4″)	(R1,700) (R5′ 6.9″)	2,770 (9′ 1.0″)	2,160 (7′ 1.0″)	2,595 (8′ 6.1″)	400 (15.7″)	380 (1′ 2.9″)	2,100 (6′ 10.6″)	770 (2′ 6.3″)	2,150 (7′ 11″)
	2,610 (8′ 6.7″)	6,020 (19′ 9.0″)					500 (19.6″)		2,200 (7′ 2.6″)		1,730 (5′ 8″)
	2,815 (9′ 2.8″)	6,020 (19′ 9.0″)					600 (23.6″)		2,300 (7′ 6.5″)		1,730 + 450 (5′ 8″ + 1′ 6″)
SK100	2,570 (8′ 5.2″)	7,240 (23′ 9.0″)	R2,130 (R7′ 0″)	3,320 (10′ 11.0″)	2,430 (7′ 12.0″)	2,725 (8′ 11.2″)	500 (19.6″)	455 (1′ 6.0″)	2,490 (8′ 2.0″)	900 (2′ 11.4″)	2,270 (7′ 5″)
	2,570 (8′ 5.2″)	7,290 (23′ 11.0″)					600 (23.6″)		2,590 (8′ 6.0″)		1,900 (6′ 3″)
	2,900 (9′ 6.1″)	7,180 (23′ 6.6″)					700 (27.6″)		2,690 (8′ 10.0″)		2,770 (9′ 1″)
	2,835 (9′ 3.6″)	7,195 (23′ 7.2″)					800 (31.5″)		2,790 (9′ 2.0″)		2,270 + 600 (7′ 5″ + 1′ 11″)
SK120 SK120LC	2,650 (8′ 8.3″)	7,595 (24′ 11.0″)	R2,150 (R7′ 0.6″)	3,490 (11′ 5.4″)	2,430 (7′ 11.6″)	2,725 (8′ 11.2″)	500 (19.6″)	455 (1′ 6.0″)	2,490 (8′ 2.0″)	900 (2′ 11.4″)	2,500 (8′ 2″)
	2,595 (8′ 6.1″)	7,585 (24′ 10.6″)					600 (23.6″)		2,590 (8′ 6.0″)		2,100 (6′ 11″)
	3,035 (6′ 8.1″)	7,550 (24′ 9.2″)		3,740 (12′ 3.2″) [LC-type]			700 (27.6″)		2,690 (8′ 10.0″)		3,000 (9′ 10″)
	3,065 (10′ 0.6″)	7,530 (24′ 8.4″)					800 (31.5″)		2,790 (9′ 2.0″)		2,500 + 1,000 (8′ 2″ + 3′ 3″)
SK200 SK200LC	3,060 (10′ 0.4″)	9,380 (30′ 9.3″)	R2,700 (R8′ 10.3″)	4,070 (13′ 4.2″)	2,720 (8′ 11.0″)	2,890 (9′ 5.7″)	600 (23.6″)	465 (1′ 6.3″)	2,800 (9′ 2.2″)	1,055 (3′ 5.5″)	2,400 (7′ 11″)
	2,910 (9′ 6.5″)	9,320 (30′ 7.0″)									2,940 (9′ 7″)
	2,860 (9′ 4.6″)	9,310 (30′ 6.5″)					800 (31.5″)		3,000 (9′ 10.1″)		3,300 (10′ 10″)
	3,730 (12′ 2.8″)	9,210 (30′ 2.6″)		4,450 (14′ 7.2″)							2,400 + 1,500 (7′ 11″ +4′ 11″)
	3,450 (11′ 3.8″)	9,310 (30′ 6.5″)					900 (35.4″)		3,190 (10′ 5.6″)		2,940 +1,500 (9′ 8″ + 4′ 11″)
SK220 SK220LC	3,210 (10′ 6.3″)	10,070 (33′ 0.4″)	R2,850 (R9′ 4.2″)	4,350 (14′ 3.2″)	2,830 (9′ 3.4″)	2,920 (9′ 7.0″)	600 (23.6″)	480 (1′ 6.7″)	2,990 (9′ 9.7″)	1,080 (3′ 6.5″)	2,500 (8′ 2″)
							700 (27.6″)		3,090 (10′ 1.6″)		
							800 (31.5″)		3,190 (10′ 5.6″)		
	3,070 (10′ 0.8″)	9,980 (32′ 9.0″)		4,650 (15′ 3.0″)			600 (23.6″)	465 (1′ 6.3″)	3,190 (10′ 5.6″)		2,980 (9′ 9″)
							700 (27.6″)		3,290 (10′ 9.5″)		
							800 (31.5″)		3,390 (11′ 1.4″)		3,660 (12′ 0″)

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MACHINE SPECIFICATIONS

Item			Model	SK60	
Std. bucket capacity			M^3 (cuyd)	0.25 (0.33)	
Range of bucket			M^3 (cuyd)	0.1~0.3 (0.13~0.39)	
Overall weight			ton (lbs)	6.4 (400 mm shoe) [14,110 (16″ shoe)]	
Performance	Swing speed		rpm	13	
	Travel speed		km/h(M/h)	3.7/5.5 (2.3/3.4)	
	Gradeability		%	70 (35°)	
	Digging Force	Bucket	ton (lbs)	4.8 (10,580)	
		Arm	ton (lbs)	3.7 (8,160)	
		Arm length	mm (in)	1,730 (5′ 8.1″)	
	Tractive force		ton (lbs)	5.2 (11,460)	
General dimensions	Arm length		mm (in)	1,730 (5′ 8.1″)	2,150 (7′ 0.6″)
	Overall length		mm (in)	6,020 (19′ 9.0″)	6,005 (19′ 8.4″)
	Overall width		mm (in)	2,180 (7′ 1.8″)	2,180 (7′ 1.8″)
	Overall height		mm (in)	2,610 (8′ 6.7″)	2,610 (8′ 6.7″)
	Ground clearance of undercarriage		mm (in)	380 (15″)	380 (15″)
Track	Overall length of crawler		mm (in)	2,770 (9′ 1.0″)	
	Center distance of tumblers		mm (in)	2,160 (7′ 1.0″)	
	Center distance of crawler		mm (in)	1,700 (5′ 6.9″)	
	Width of track shoe / Ground pressure		mm, kg/cm (in, psi)	Grouser (Equal height)	400/0.34 (16″ / 4.83)
					500/0.27 (20″ / 3.83)
					600/0.23 (24″ / 3.27)
				Flat	400/0.34 (16″ / 4.83)
				Triangle	600/0.23 (24″ / 3.27)
					700/0.20 (27.6″ / 2.84)
Engine	Maker/Model			ISUZU 4JB1	
	Type			Water-cooled 4-cycle, direct injection type	
	Rated output power		ps/rpm	75/2,200	
	Maximum torque		kgm/rpm	18/1,800	
	Number of cylinder – Bore × Stroke		mm (in)	4 – 93 × 102 (4 – 3.66″ × 4.02″)	
	Total displacement		cc (cuin)	2,771 (169)	
	Fuel consumption		g/psh	170	
	Dry weight		kg (lbs)	240 (530)	
	Fuel tank capacity		L (gal)	130 (24)	

SK100

Item			Model	SK100		
Std. bucket capacity			M^3 (cuyd)	0.4 (0.52)		
Range of bucket			M^3 (cuyd)	0.15~0.45 (0.20~0.59)		
Overall weight			ton (lbs)	10.5 (500 mm shoe) [23,150 (20″ shoe)]		
Performance	Swing speed		rpm	12.7		
	Travel speed		km/h(M/h)	1ST SPEED 4(2.4) 2ND SPEED 5.5(3.4)		
	Gradeability		%	70 (35°)		
	Digging Force	Bucket	ton (lbs)	7.3 (16,100)		
		Arm	ton (lbs)	6.2 (13,670)	5.4 (11,900)	4.7 (10,360)
		Arm length	mm (in)	1,900 (6′ 2.8″)	2,270 (7′ 5.3″)	2,770 (9′ 1.0″)
	Tractive force		ton (lbs)	6.1/8.9 (13,450/19,620)		
General dimensions	Arm length		mm (in)	1,900 (6′ 2.8″)	2,270 (7′ 5.3″)	2,770 (9′ 1.0″)
	Overall length		mm (in)	7,290 (23′ 11.0″)	7,240 (23′ 9.0″)	7,180 (23′ 6.6″)
	Overall width		mm (in)	2,490 (8′ 2.0″)	2,490 (8′ 2.0″)	2,490 (8′ 2.0″)
	Overall height		mm (in)	2,725 (8′ 11.2″)	2,725 (8′ 11.2″)	2,900 (9′ 6.1″)
	Ground clearance of undercarriage		mm (in)	455 (18)	455 (18″)	455 (18″)
Track	Overall length of crawler		mm (in)	3,320 (10′ 10.7″)		
	Center distance of tumblers		mm (in)	1,990 (6′ 6.3″)		
	Center distance of crawler		mm (in)	2,610 (8′ 6.7″)		
	Width of track shoe / Ground pressure		mm, kg/cm (in, psi)	Grouser (Equal height)	500 / 0.36 (20″ / 5.12)	
					600 / 0.30 (24″ / 4.27)	
					700 / 0.26 (27.6″ / 3.70)	
				Flat	500 / 0.36 (20″ /5.12)	
				Triangle	800 / 0.23 (32″ / 3.27)	
Engine	Maker/Model			ISUZU 4BD1		
	Type			4-cycle, water-cooled direct injection type diesel		
	Rated output power		ps/rpm	76/2,300		
	Maximum torque		kgm/rpm	24/1,600		
	Number of cylinder – Bore × Stroke		mm (in)	4 – 102 × 118 (4 – 4.0″ × 4.6″)		
	Total displacement		cc (cuin)	3,856 (235)		
	Fuel consumption		g/psh	173 ± 5		
	Dry weight		kg (lbs)	325 (715)		
	Fuel tank capacity		L (gal)	250 (66)		

Item			Model	SK120		SK120LC	
Std. bucket capacity			M^3 (cuyd)	0.45 (0.52)			
Range of bucket			M^3 (cuyd)	0.3~0.6 (0.39~0.78)			
Overall weight			ton (lbs)	11.5 (500 mm shoe) [25,350 (20" shoe)]		11.7 (500 mm shoe) [25,790 (20" shoe)]	
Performance	Swing speed		rpm	12.7			
	Travel speed		km/h(M/h)	1ST SPEED 4 (2.5) 2ND SPEED 7 (4.3)			
	Gradeability		%	70 (35°)			
	Digging Force	Bucket	ton (lbs)	7.7 (16,975)			
		Arm	ton (lbs)	6.8 (14,990)	6.1 (13,450)		5.4 (11,900)
		Arm length	mm (in)	2,100 (6' 10.6")	2,500 (8' 2.4")		3,100 (10' 2.0")
	Tractive force		ton (lbs)	4.9/9.3 (10,800/20,500)			
General dimensions	Arm length		mm (in)	2,100 (6' 10.6")	2,500 (8' 2.4")		3,100 (10' 2.0")
	Overall length		mm (in)	7,585 (24' 10.6")	7,595 (24' 11.0")		7,550 (24' 9.2")
	Overall width		mm (in)	2,490 (8' 2.0")	2,490 (8' 2.0")		2,490 (8' 2.0")
	Overall height		mm (in)	2,725 (8' 11.2")	2,725 (8' 11.2")		2,725 (8' 11.2")
	Ground clearance of undercarriage		mm (in)	455 (18")	455 (18")		455 (18")
Track	Overall length of crawler		mm (in)	3,490 (11' 5.3")		3,740 (12' 3.2")	
	Center distance of tumblers		mm (in)	1,990 (6' 6.3")		1,990 (6' 6.3")	
	Center distance of crawler		mm (in)	2,780 (9' 1.4")		3,035 (9' 11.4")	
	Width of track shoe / Ground pressure		mm, kg/cm (in, psi)	Grouser (Equal height)	500 / 0.38 (20" / 5.40)	Grouser (Equal height)	500 / 0.36 (20" / 5.12)
					600 / 0.32 (24" / 4.55)		600 / 0.30 (24" / 4.27)
					700 /0.28 (27.6" /3.98)		700 /0.26 (27.6" /3.70)
				Flat	500 / 0.38 (20" / 5.40)	Flat	500 / 0.36 (20" / 5.12)
				Triangle	800 / 0.24 (32" / 3.41)	Triangle	800 / 0.23 (32" / 3.27)
Engine	Maker/Model			ISUZU 4BD1T			
	Type			4-cycle, water-cooled direct injection type with turbo charger			
	Rated output power		ps/rpm	85/2,150			
	Maximum torque		kgm/rpm	30/1,600			
	Number of cylinder – Bore × Stroke		mm (in)	4 – 102 × 118 (4 – 4.0" × 4.64")			
	Total displacement		cc (cuin)	3,856 (235)			
	Fuel consumption		g/psh	165 ± 5			
	Dry weight		kg (lbs)	350 (770)			
	Fuel tank capacity		L (gal)	250 (66)			

Item			Model	SK200			SK200LC		
Std. bucket capacity			M^3 (cuyd)	0.7 (0.92)					
Range of bucket			M^3 (cuyd)	0.45~1.1 (0.59~1.44)					
Overall weight			ton (lbs)	18.7 (600 mm shoe) [41,220 (24″ shoe)]			19.5 (600 mm shoe) [42,990 (24″ shoe)]		
Performance	Swing speed		rpm	13					
	Travel speed		km/h(M/h)	1ST SPEED 4 (2.5) 2ND SPEED 5.5 (3.4)					
	Gradeability		%	70 (35°)					
	Digging Force	Bucket	ton (lbs)	11.0 (24,250)					
		Arm	ton (lbs)	10.4 (22,930)		8.9 (19,620)		8.2 (18,080)	
		Arm length	mm (in)	2,400 (7′ 10.4″)		2,940 (9′ 7.7″)		3,300 (10′ 9.9″)	
	Tractive force		ton (bls)	11.5/16.3 (25,350/35,930)					
General dimensions	Arm length		mm (in)	2,400 (7′ 10.4″)	2,940 (9′ 7.7″)	3,300 (10′ 9.9″)	2,400 (7′ 10.4″)	2,940 (9′ 7.7″)	3,300 (10′ 9.9″)
	Overall length		mm (in)	9,310 (30′ 6.5″)	9,320 (30′ 6.9″)	9,310 (30′ 6.5″)	9,380 (30′ 9.2″)	9,320 (30′ 6.9″)	9,310 (30′ 6.5″)
	Overall width		mm (in)	2,800 (9′ 2.2″)	2,800 (9′ 2.2″)	2,800 (9′ 2.2″)	2,990 (9′ 9.7″)	2,990 (9′ 9.7″)	2,990 (9′ 9.7″)
	Overall height		mm (in)	3,060 (10′ 0.4″)	2,910 (9′ 6.5″)	2,890 (9′ 5.7″)	2,890 (9′ 5.7″)	2,890 (9′ 5.7″)	2,890 (9′ 5.7″)
	Ground clearance of undercarriage		mm (in)	465 (18.3″)	465 (18.3″)	465 (18.3″)	465 (18.3″)	465 (18.3″)	465 (18.3″)
Track	Overall length of crawler		mm (in)	4,070 (13′ 4.2″)			4,450 (14′ 7.1″)		
	Center distance of tumblers		mm (in)	2,200 (7′ 2.6″)			2,390 (7′ 10.0″)		
	Center distance of crawler		mm (in)	3,280 (10′ 9.1″)			3,660 (12′ 0.1″)		
	Width of track shoe / Ground pressure		mm, kg/cm (in, psi)	Grouser (Equal height)	600 / 0.44 (24″ / 6.26)		Grouser (Equal height)	600 / 0.41 (24″ / 5.83)	
					800 / 0.34 (32″ / 4.83)			800 / 0.32 (32″ / 4.55)	
				Triangle	900 / 0.30 (36″ / 4.27)		Triangle	900 / 0.28 (36″ / 3.98)	
Engine	Maker/Model			MITSUBISHI 6D31T					
	Type			Water-cooled 4-cycle, direct injection type with exhaust turbo supercharger					
	Rated output power		ps/rpm	135/2,150					
	Maximum torque		kgm/rpm	47/1,700					
	Number of cylinder − Bore × Stroke		in (mm)	6 − 100 × 105 (6 − 3.9″ × 4.13″)					
	Total displacement		cc (cuin)	4,948 (767)					
	Fuel consumption		g/psh	165					
	Dry weight		kg (lbs)	440 (970)					
	Fuel tank capacity		L (gal)	300 (79)					

Item			Model	SK220			SK220LC		
Std. bucket capacity			M^3 (cuyd)	0.9 (1.18)					
Range of bucket			M^3 (cuyd)	0.92~1.57 (0.7~1.2)					
Overall weight			ton (lbs)	22.9 (600 mm shoe) [50,485 (24″ shoe)]			23.5 (600 mm shoe) [51,808 (24″ shoe)]		
Performance	Swing speed		rpm	12					
	Travel speed		km/h(M/h)	1ST SPEED 4 (2.5) 2ND SPEED 5.5 (3.4)					
	Gradeability		%	70 (35°)					
	Digging Force	Bucket	ton (lbs)	13.4 (29,540)					
		Arm	ton (lbs)	12.4 (27,340)		10.6 (23,370)		9.2 (20,280)	
		Arm length	mm (in)	2,500 (8′ 2.4″)		2,980 (9′ 9.3″)		3,660 (12′ 0.1″)	
	Tractive force		ton (lbs)	13.0/18.9 (28,660/41,670)					
General dimensions	Arm length		mm (in)	2,500 (8′ 2.4″)	2,980 (9′ 9.3″)	3,660 (12′ 0.1″)	2,500 (8′ 2.4″)	2,980 (9′ 9.3″)	3,660 (12′ 0.1″)
	Overall length		mm (in)	10,070 (33′ 0.4″)	9,980 (32′ 8.9″)	9,980 (32′ 8.9″)	10,070 (33′ 0.4″)	9,980 (32′ 8.9″)	10,000 (32′ 9.7″)
	Overall width		mm (in)	2,990 (9′ 9.7″)	2,990 (9′ 9.7″)	2,990 (9′ 9.7″)	3,190 (10′ 5.6″)	3,190 (10′ 5.6″)	3,190 (10′ 5.6″)
	Overall height		mm (in)	3,210 (10′ 6.3″)	3,070 (10′ 0.8″)	3,070 (10′ 0.8″)	3,210 (10′ 6.3″)	3,070 (10′ 0.8″)	3,190 (10′ 5.6″)
	Ground clearance of undercarriage		mm (in)	480 (18.9″)	480 (18.9″)	480 (18.9″)	465 (18.3″)	465 (18.3″)	465 (18.3″)
Track	Overall length of crawler		mm (in)	4,350 (14′ 3.2″)			4,650 (15′ 3.0″)		
	Center distance of tumblers		mm (in)	3,500 (11′ 5.8″)			3,800 (12′ 5.6″)		
	Center distance of crawler		mm (in)	2,390 (7′ 10.1″)			2,590 (8′ 5.9″)		
	Width of track shoe / Ground pressure		mm, kg/cm (in, psi)	Grouser (Equal height)	600 / 0.51 (24″ / 7.25)		Grouser (Equal height)	600 / 0.48 (24″ / 6.83)	
					700 /0.44 (27.6″ /6.26)			700 /0.41 (27.6″ /5.83)	
					800 / 0.39 (32″ / 5.55)			800 / 0.37 (32″ / 5.26)	
Engine	Maker/Model			MITSUBISHI 6D15−T					
	Type			Water-cooled 4- cycle, direct injection type with exhaust turbo supercharger					
	Rated output power		ps/rpm	165/2,150					
	Maximum torque		kgm/rpm	60/1,600					
	Number of cylinder − Bore × Stroke		in, psi	4 − 113 × 115 (6 − 4.45″ × 4.53″)					
	Total displacement		cc (cuin)	6,919 (1,073)					
	Fuel consumption		g/psh	165					
	Dry weight		kg (lbs)	590 (1,300)					
	Fuel tank capacity		L (gal)	310 (81)					

SK60 SK100 SK120 SK120LC SK200 SK200LC SK220 SK220LC

COMPONENTS SPECIFICATIONS

Item			Model	SK60	SK100	SK120 • SK120LC	SK200 • SK200LC	SK220 • SK220LC
Hydraulic Pump		Maker			KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY
		Model			K3V63DT-120R-9C0B-3	K3V63DT-120R-9C0B-2	K3V112DT-123R-9C09	K3V112DT-123R-9C29
		Type		Variable Piston Pump	Variable Piston Pump	Variable Piston Pump	Variable Piston Pump	Variable Piston Pump
		Displacement	cc/rev (cuin/rev)	37.3 × 2 (2.27 × 2)	51.5 × 2 (3.14 × 2)	55.1 × 2 (3.36 × 2)	97.2 × 2 (5.93 × 2)	112.1 × 2 (6.84 × 2)
		Max. flow	L/min (gal/min)	82 (21.6)	118 × 2 (31.2 × 2)	118 × 2 (31.2 × 2)	208 × 2 (54.9 × 2)	240 × 2 (63.4 × 2)
		Pressure	kg/cm² (psi)	210 (260 Travel boost pressure) [2985 (3700 Travel boost pressure)]	290 (350 Travel boost pressure) [4125 (4980 Travel boost pressure)]	290 (350 Travel boost pressure) [4125 (4980 Travel boost pressure)]	290 (350 Travel boost pressure) [4125 (4980 Travel boost pressure)]	290 (350 Travel boost pressure) [4125 (4980 Travel boost pressure)]
	Pilot	Type		Gear pump	Gear pump	Gear pump	Gear pump	Gear pump
		Displacement	cc/min (cuin/min)	8.9 (0.54)	9.08 (0.55)	9.08 (0.55)	9.08 (0.55)	9.08 (0.55)
		Max. flow	L/min (gal/min)	20 (5.3)	17.4 (4.6)	17.4 (4.6)	19.4 (5.1)	19.4 (5.1)
		Pressure	kg/cm² (psi)	35 (500)	50 (710)	50 (710)	50 (710)	50 (710)
		Weight	kg (lbs)	55 (120)	85 + 1.6 (190 + 3.5)	85 + 1.6 (190 + 3.5)	125 + 1.6 (275 + 3.5)	125 + 1.6 (275 + 3.5)
Control Valve		Maker			KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY
		Model			KMX13A/23014	KMX13A/23013	KMX15C/23015	KMX15D/23020
		Main relief valve pressure	kg/cm² (psi)	210 (2990)	290 (4125)	290 (4125)	290 (4125)	290 (4125)
		Operation system		Remote control	Remote control	Remote control	Remote control	Remote control
		No. Weight	kg (lbs)	67 (5 ream) [150 (5 ream)]	95 (5 ream) 18 (1 ream) [209 (5 ream) 39 (1 ream)]	95 (5 ream) 18 (1 ream) [209 (5 ream) 39 (1 ream)]	127 (5 ream) 19 (1 ream) [280 (5 ream) 42 (1 ream)]	127 (5 ream) 19 (1 ream) [280 (5 ream) 42 (1 ream)]
Swing Motor		Maker		KAWASAKI HEAVY	KAWASAKI HEAVY	TOSHIBA MACHINE	KAWASAKI HEAVY	KAWASAKI HEAVY
		Model		M2X55AOB-10A-06M	M2X63AOB-11A-02	MFB80-023	M2X150AOB-10A-02	M2X170AOB-12A-01
		Type		Axial Plunger	Axial Plunger	Axial Plunger	Axial Plunger	Axial Plunger
		Displacement	cc/rev (cuin/rev)	56.1 (3.4)	64 (3.9)	64 (3.9)	148.5 (9.0)	169.4 (10.3)
		Pressure	kg/cm² (psi)	250 (3555)	220 (3130)	250 (3555)	250 (3555)	260 (3700)
		Reduction ratio		15.429	18.827	18.827	13.287	16.812
		Lubricating	L (gal)	4 (1.05)	5.8 (1.53)	6.2 (1.63)	12 (3.17)	16 (4.22)
		Weight	kg (lbs)	100 (220)	120 (265)	130 (285)	225 (495)	3450 (750)

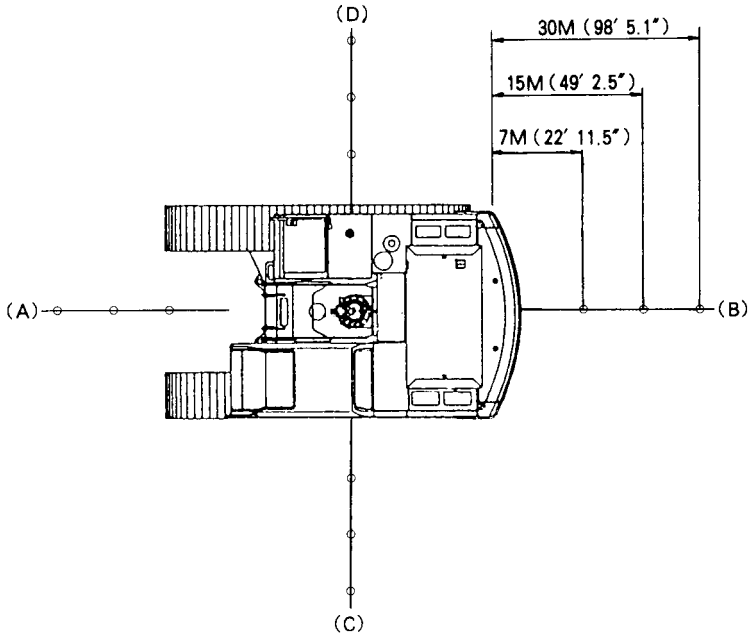
Item			Model	SK60	SK100	SK120・SK120LC	SK200・SK200LC	SK220・SK220LC
Travel Motor	Maker			TEIJIN	TEIJIN	TEIJIN	NIPPON AIR BRAKE	NIPPON AIR BRAKE
	Model			GM09VL	GM17V-B	GM17V-A	MV150/110Z	MV200/140Z
	Type			Axial Plunger	Axial Plunger	Axial Plunger	Axial Plunger	Axial Plunger
	Displacement		cc/rev (cuin/rev)	39.8 (2.4)	59.4/81.6 (9.2/12.6)	59.4/81.6 (9.2/12.6)	114.1/156.6 (6.96/9.56)	143.5/197.7 (8.76/12.1)
	Pressure of brake valve		kg/cm² (psi)	–	350 (4980)	350 (4980)	350 (4980)	350 (498)
	Reduction unit ratio			62.4	39	43.2	40.67	39.0
	Lubricatio oil		L (gal)	1.7 (0.45)	2.8 (0.74)	2.8 (0.74)	6 (1.58)	7.5 (1.98)
	Weight		kg (lbs)	90 (200)	165 (360)	165 (360)	290 (640)	385 (850)
Pilot Valve	Maker			KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY	KAWASAKI HEAVY
	Operating torque		kg/cm (ft/lbs)	6 (43) At Single Operate	6 (43) At Single Operate	6 (43) At Single Operate	6 (43) At Single Operate	6 (43) At Single Operate
	Angle of operate		0°	25 (Port 2.4) 19 (Port 1.3)	25 (Port 2.4) 19 (Port 1.3)	25 (Port 2.4) 19 (Port 1.3)	25 (Port 2.4) 19 (Port 1.3)	25 (Port 2.4) 19 (Port 1.3)
	Weight		kg (lbs)	4.8 (10.6)	6.4 (14.1)	6.4 (14.1)	6.4 (14.1)	6.4 (14.1)
Cylinder	Maker			NIPPON AIR BRAKE	NIPPON AIR BRAKE	NIPPON AIR BRAKE	NIPPON AIR BRAKE	NIPPON AIR BRAKE
	Boom	Bore×Rod×Stroke	mm (in)	φ125 × φ70 × 940 (φ4.9" × φ2.7" × 3' 1")	φ100 × φ70 × 975 (φ3.9" × φ2.7" × 3' 2")	φ105 × φ75 × 1097 (φ4.1" × φ2.9" × 3' 7")	φ125 × φ85 × 1290 (φ4.9" × φ3.3" × 4' 2")	φ140 × φ90 × 1334 (φ5.5" × φ3.5" × 4' 4")
		NO		1	2	2	2	2
		Weight	kg (lbs)	110 (240)	90 (200)	100 (220)	170 (370)	210 (460)
	Arm	Bore×Rod×Stroke	mm (in)	φ110 × φ65 × 900 (φ4.3" × φ2.5" × 35.4")	φ115 × φ75 × 1085 (φ4.5" × φ2.9" × 3' 6")	φ120 × φ80 × 1185 (φ4.7" × φ3.1" × 3' 10")	φ145 × φ100 × 1453 (φ5.7" × φ3.9" × 4' 9")	φ150 × φ105 × 1630 (φ5.9" × φ4.1" × 5' 4")
		NO		1	1	1	1	1
		Weight	kg (lbs)	87 (190)	120 (260)	150 (330)	250 (550)	320 (705)
	Bucket	Bore×Rod×Stroke	mm (in)	φ95 × φ60 × 725 (φ3.7" × φ2.3" × 28.5")	φ95 × φ65 × 985 (φ3.7" × φ2.6" × 3' 2")	φ100 × φ65 × 915 (φ3.9" × φ2.5" × 36.0")	φ120 × φ80 × 1110 (φ4.7" × φ3.3" × 3' 7")	φ130 × φ84 × 1170 (φ5.1" × φ3.3" × 3' 10")
		NO		1	1	1	1	1
		Weight	kg (lbs)	58 (130)	80 (175)	80 (175)	135 (300)	180 (395)
Hydraulic tank capacity			L (gal)	75 (19.8)	90 (23.7)	90 (23.7)	150 (39.6)	170 (45.0)

PERFORMANCE DATA

Item / Model	Fuel consumption ℓ/h (gal/h)		Production amount m³/h (cuyd/h)		Cycle time at 90° Swing (sec)		Remarks
	H	S	H	S	H	S	
SK60	8.1 (2.1)				15.6	[19.02]	1. Soil : Soft Swinging 90° for loading on dump truck (Digging is started from G.L.) 2. (These values are for reference.)
SK100	12.5 (3.3)	9.3 (2.4)	151 (197.8)	118 (154.5)	12.1	13.9	
SK120 SK120LC	13.0 (3.4)	10.1 (2.6)	180 (235.8)	157 (205.6)	13.1	13.5	
SK200 SK200LC	21.3 (5.6)	17.6 (4.6)	247 (323.5)	230 (301.3)	14.3	15.6	
SK220 SK220LC	21.3 (6.6)	20 (5.2)	337 (441.4)	311 (407.4)	15	16.1	

Values in [ ] show F.C.

NOISE LEVEL DATA



Test conditions (on standard specification machine in Japan)

Specification / Model	7M (27' 11.5")					15M (49' 2.5")				
	Direction				Average noise value	Direction				Average noise value
	Forward (A)	Backward (B)	Left (C)	Right (D)		Forward (A)	Backward (B)	Left (C)	Right (D)	
SK60	67	69	68	69	69	63	63	60	65	63
SK100	65	70	69	72	70	62	64	64	65	64
SK120 SK120LC	65	68	68	68	68	62	64	61	66	63
SK200 SK200LC	65	71	70	71	70	61	66	66	67	65
SK220 SK220LC	66	74	72	72	72	62	69	64	67	66

Specification / Model	30M (98' 5.1")					At the point near the operator's ears in cab			
	Direction				Average noise value	Door OPEN		Door CLOSE	
	Forward (A)	Backward (B)	Left (C)	Right (D)		Right	Left	Right	Left
SK60	58	58	55	59	58	78	78	70	70
SK100	58	58	58	60	59	78	78	70	70
SK120 SK120LC	57	57	56	60	58	75	76	70	70
SK200 SK200LC	56	60	61	62	60	77	76	70	70
SK220 SK220LC	58	62	59	62	61	77	77	70	70

WEIGHT OF COMPONENTS (DRY WEIGHT)

Unit : kg (lbs)

Item \ Model		SK60
Complete Machine [std Export 400mm (24˝) shoe]		6,400(14,100)
1. Upper Frame Assy (incl. 1.1~1.8)		3,170(7,000)
1.1 · Counter-weight		750(1,650)
1.2 · Cab		250(550)
1.3 · Boom cylinder	※	120(260)
1.4 · Engine, radiator	※	270(600)
1.5 · Pump assy		53(115)
1.6 · Control valve		67(150)
1.7 · Fuel and Hydraulic tank	※	145(320)
1.8 · Swing motor & reduction unit		110(240)
2. Lower frame assy (incl. 2.1~2.9)		2,190(4,800)
2.1 · Slwing ring		107(240)
2.2 · Travel motor & reduction unit		90 x 2(200 x 2)
2.3 · Idler assy		40 x 2(88 x 2)
2.4 · Lower roller assy		14 x 2(30 x 2)
2.5 · Upper roller assy		4.5 x 2(10 x 10)
2.6 · Track tension assy		26 x 2(57 x 2)
2.7 · Sprocket		28 x 2(62 x 2)
2.8 · Swivel joint		18(40)
2.9 · Track link with 400mm (16˝) shoe assy		760(1670)
· Track link with 500mm (20˝) shoe assy		880(1940)
· Track link with 600mm (24˝) shoe assy		1,040(2,290)
2.9.1 · Track link		150 x 2(330 x 2)
3. Attachment (incl. 3.1~3.3)		1,040(2,290)
3.1 · Bucket assy (0.25 m^3 (0.33cu yd) STD)		210(460)
3.2 · Arm assy (1.73m (5ft-8in) STD.) (incl. following)		280(620)
3.2.1 · · Arm		150(330)
3.2.2 · · Bucket cylinder	※	64(140)
3.2.3 · · Idler link		18(39)
3.2.4 · · Bucket link		18(39)
3.2.5 · · Pin (2 pcs for mounting the arm cylinder and the bucket)		11(24)
3.3 · Boom assy (includes the following :)		540(1,190)
3.3.1 · · Boom		440(970)
3.3.2 · · Arm cylinder	※	93(200)
3.3.3 · · Pin (mounting the arm)		8(18)
4. Oil, grease, water, etc. (incl. 4.1~4.3)		220(480)
4.1 · · Hydraulic oil, engine oil		104(230)
4.2 · · Fuel		107(240)
4.3 · · Water		10(22)

※ mark dry weight.

Unit : kg (lbs)

Item \ Model	SK100	SK120	SK120LC
Complete Machine (std Export 500mm (20″) shoe	10,500(23,100)	11,500(25,300)	11,700(25,800)
1. Upper Frame Assy (incl. 1.1~1.9)	4,680(10,300)	5,425(11,950)	←
1.1 · Counter-weight	1,300(2,870)	2,050(4,500)	←
1.2 · Cab	260(570)	←	←
1.3 · Boom cylinder	※ 90(200) × 2	※ 100(220) × 2	←
1.4 · Engine, radiator	※ 340(750)	※ 390(860)	←
1.5 · Pump assy	85(190)	←	←
1.6 · Control valve	105(230)	←	←
1.7 · Fuel tank	※ 75(160)	←	←
1.8 · Hydraulic tank	※ 105(230)	←	←
1.9 · Swing motor & reduction unit	※ 150(330)	※ 150(330)	←
2. Lower frame assy (incl. 2.1~2.9)	4,100(9,000)	4,150(9,100)	4,350(9,600)
2.1 · Slwing ring	150(330)	←	←
2.2 · Travel motor & reduction unit	※ 170(370)	←	←
2.3 · Idler assy	65(140) × 2	←	←
2.4 · Lower roller assy	26(57) × 12	←	26(57) × 14
2.5 · Upper roller assy	8(18) × 2	←	←
2.6 · Track tension assy	56(120) × 2	←	←
2.7 · Sprocket	37(82) × 2	←	←
2.8 · Swivel joint	30(66)	←	←
2.9 · Track link with 500mm (20″) shoe assy	1,360(3,000)	1,425(3,100)	1,510(3,330)
· Track link with 600mm (24″) shoe assy	1,640(3,600)	1,720(3,800)	1,830(4,300)
· Track link with 700mm (27″) shoe assy	1,770(3,900)	1,860(4,100)	1,990(4,390)
2.9.2 · Track link	270(600) × 2	285(630) × 2	290(640) × 2
3. Attachment (incl. 3.1~3.3)	1,720(3,792)	1,930(4,250)	←
3.1 · Bucket assy 0.4m³ (0.52cuyd)	350(772)	390(860)	←
3.2 · Arm assy { 2.27m (7ft-5in) STD. } (incl. following)	490(1,080)	565(1,200)	←
{ 2.5m (8ft-2in) STD. } (incl. following)			←
3.2.1 · · Arm	310(688)	380(840)	←
3.2.2 · · Bucket cylinder	※ 86(190)	←	←
3.2.3 · · Idler link	32(71)	34(75)	←
3.2.4 · · Bucket link	34(75)	48(110)	←
3.2.5 · · Pin (2 pcs for mounting the arm cylinder and the bucket)	19(42)	←	←
3.3 · Boom assy (includes the following :)	875(1,930)	970(2,100)	←
3.3.1 · · Boom	730(1,610)	800(1,780)	←
3.3.2 · · Arm cylinder	※ 130(280)	※ 155(340)	←
3.3.3 · · Pin (mounting the arm)	15(33)		←
4. Oil, grease, water, etc. (incl. 4.1~4.3)	360(790)	←	←
4.1 · · Hydraulic oil, engine oil	133(290)	←	←
4.2 · · Fuel	205(450)	←	←
4.3 · · Water	22(49)	←	←

※ mark dry weight.

Unit : kg (lbs)

Item \ Model	SK200	SK200LC
Complete Machine 〔 std Export 600mm (24") shoe 〕	18,700(41,200)	19,500(43,000)
1. Upper Frame Assy (incl. 1.1~1.9)	8,660(19,100)	←
1.1 · Counter-weight	3,850(8,490)	←
1.2 · Cab	260(570)	←
1.3 · Boom cylinder	※ 205(452) x 2	←
1.4 · Engine, radiator	※ 550(1,210)	←
1.5 · Pump assy	260(570)	←
1.6 · Control valve	130(290)	←
1.7 · Fuel tank	※ 95(210)	←
1.8 · Hydraulic tank	※ 170(370)	←
1.9 · Swing motor & reduction unit	※ 235(520)	←
2. Lower frame assy (incl. 2.1~2.9)	6,780(14,900)	7,580(16,700)
2.1 · Slwing ring	245(540)	←
2.2 · Travel motor & reduction unit	※ 305(670) x 2	←
2.3 · Idler assy	115(250) x 2	←
2.4 · Lower roller assy	34(75) x 14	34(75) x 16
2.5 · Upper roller assy	18(40) x 4	←
2.6 · Track tension assy	95(210) x 2	←
2.7 · Sprocket	115(250)	←
2.8 · Swivel joint	30(66)	←
2.9 · Track link with 600mm (24") shoe assy	1,275(2,810) x 2	1,420(3,130) x 2
· Track link with 800mm (32") shoe assy	1,570(3,460) x 2	1,700(3,750) x 2
2.9.1 · Track link	565(1,250) x 2	605(1,330) x 2
3. Attachment (incl. 3.1~3.3)	3,265(7,200)	←
3.1 · Bucket assy 〔 0.7 m³ (0.92cu yd) STD 〕	620(1,370)	←
3.2 · Arm assy 〔 2.94m (9ft-8in) STD. 〕 (incl. following)	1,000(2,200)	←
3.2.1 · · Arm	620(1,370)	←
3.2.2 · · Bucket cylinder	145(320)	←
3.2.3 · · Idler link	60(130)	←
3.2.4 · · Bucket link	90(200)	←
3.2.5 · · Pin (2 pcs for mounting the arm cylinder and the bucket)	50(110)	←
3.3 · Boom assy (includes the following :)	1,635(3,600)	←
3.3.1 · · Boom	1,330(2,930)	←
3.3.2 · · Arm cylinder	270(600)	←
3.3.3 · · Pin (mounting the arm)	20(44)	←
4. Oil, grease, water, etc. (incl. 4.1~4.3)	525(1,160)	←
4.1 · · Hydraulic oil, engine oil	255(560)	←
4.2 · · Fuel	250(550)	←
4.3 · · Water	20(44)	←

※ mark dry weight.

Unit : kg (lbs)

Item \ Model		SK220	SK220LC
	Complete machine (std Export 600mm (24") shoe)	22,900(50,500)	23,500(51,800)
1.	Upper frame assy (incl. 1.1~1.9)	9,980(22,000)	←
1.1	· Counter-weight	4,460(9,800)	←
1.2	· Cab	260(570)	←
1.3	· Boom cylinder	※ 220(490) x 2	←
1.4	· Engine, radiator	※ 660(1,460)	←
1.5	· Pump assy	260(570)	←
1.6	· Control valve	130(290)	←
1.7	· Fuel tank	※ 84(190)	←
1.8	· Hydraulic tank	※ 190(420)	←
1.9	· Swing motor & reduction unit	340(750)	←
2.	Lower frame assy (incl. 2.1~2.9)	8,860(19,500)	9,460(20,900)
2.1	· Slwing ring	355(780)	←
2.2	· Travel motor & reduction unit	810(1,790)	←
2.3	· Idler assy	130(280) x 2	←
2.4	· Lower roller assy	44(97) x 16	44(97) x 18
2.5	· Upper roller assy	19(42) x 4	←
2.6	· Track tension assy	155(340) x 2	←
2.7	· Sprocket	66(150) x 2	←
2.8	· Swivel joint	30(66)	←
2.9	· Track link with 600mm (24") shoe assy	3,200(7,050)	3,410(7,520)
	· Track link with 700mm (28") shoe assy (Option)	3,580(7,890)	3,820(8,400)
	· Track link with 800mm (32") shoe assy (Option)	4,040(8,910)	4,310(9,500)
2.9.2	· Track link	660(1,460) x 2	710(1,560) x 2
3.	Attachment (incl. 3.1~3.3)	4,070(8,970)	←
3.1	· Bucket assy (0.9 m^3 (1.18cuyd) STD)	825(1,820)	←
3.2	· Arm assy (2.98m (9ft-9in) STD.) (incl. following)	1,150(2,500)	←
3.2.1	· · Arm	750(1,600)	←
3.2.2	· · Bucket cylinder	※ 200(450)	←
3.2.3	· · Idler link	57(130)	←
3.2.4	· · Bucket link	110(240)	←
3.2.5	· · Pin (2 pcs for mounting the arm cylinder and the bucket)	41(90)	←
3.3	· Boom assy (includes the following :)	2,090(4,610)	←
3.3.1	· · Boom	1,720(3790)	←
3.3.2	· · Arm cylinder	※ 330(730)	←
3.3.3	· · Pin (mounting the arm)	29(64)	←
4.	Oil, grease, water, etc. (incl. 4.1~4.3)	580(1,280)	←
4.1	· · Hydraulic oil, engine oil	290(640)	←
4.2	· · Fuel	260(570)	←
4.3	· · Water	32(71)	←

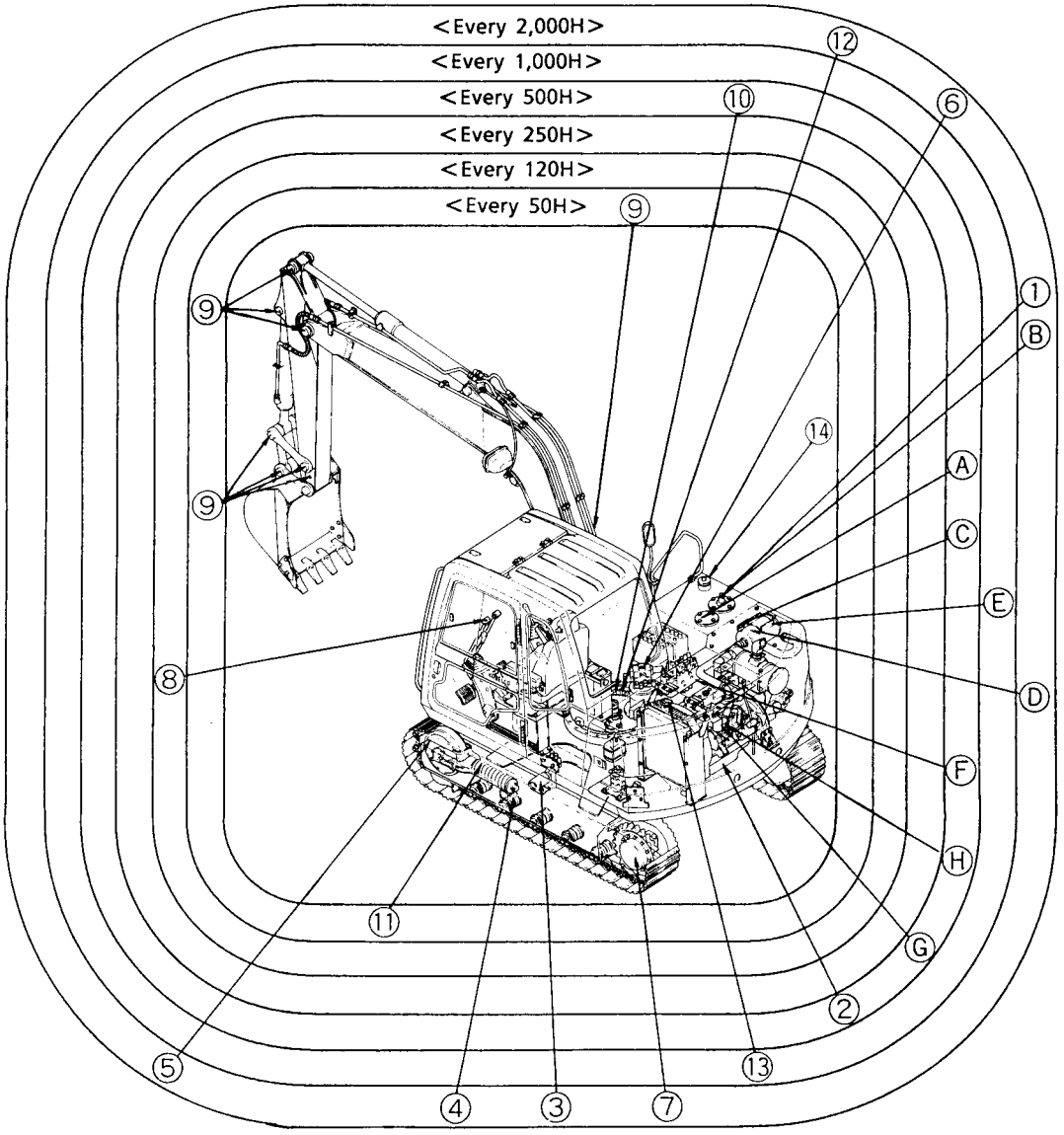
※ mark dry weight.

LUBRICATION VOLUME CHART

L (gal)

Item \ Model	SK60	SK100	SK120 SK120LC	SK200 SK200LC	SK220 SK220LC
Engine oil ( )oil pan	3(8) 〔 0.79(2.1) 〕	13 〔 3.43 〕	16 〔 4.22 〕	18 〔 4.75 〕	24 〔 6.34 〕
Hydraulic oil ( )Hydraulic oil tank	75(112) 〔 19.8(29.5) 〕	90(140) 〔 23.7(36.9) 〕	90(140) 〔 23.7(36.9) 〕	145(275) 〔 38.3(72.6) 〕	170(310) 〔 44.9(81.9) 〕
Travel reduction Unit	1.2 〔 0.31 〕	3.0×2 〔 0.79×2 〕	3.0×2 〔 0.79×2 〕	6.0×2 〔 1.58×2 〕 ·	7.5×2 〔 1.98×2 〕
Swing reduction Unit	4 〔 1.05 〕	5.8 〔 1.53 〕	5.8 〔 1.53 〕	12 〔 3.17 〕	16 〔 4.22 〕
Upper rollers	0.02×2 〔 0.005×2 〕	0.02×2 〔 0.005×2 〕	0.02×2 〔 0.005×2 〕	0.05×2 〔 0.013×2 〕	0.05×2 〔 0.013×2 〕
Lower rollers	0.09×10 〔 0.02×10 〕	0.15×12 〔 0.039×12 〕	0.15×12 0.15×14 〔 0.039×12 〕 〔 0.039×14 〕	0.3×14 0.3×16 〔 0.08×14 〕 〔 0.08×06 〕	0.3×16 0.3×18 〔 0.08×16 〕 〔 0.08×18 〕
Idlers	0.16×2 〔 0.04×2 〕	0.2×2 〔 0.05×2 〕	0.2×2 〔 0.05×2 〕	0.2×2 〔 0.05×2 〕	0.2×2 〔 0.05×2 〕
Cooling Water	10 〔 2.64 〕	22 〔 5.81 〕	22 〔 5.81 〕	27 〔 7.13 〕	28.5 〔 7.52 〕

LUBRICATION CHART



☞ ● Oils, greases, elements and other parts in the positions indicated by numbers / alphabets in the above figure are as listed below :

● The following oils are used for the below reduction units regardless of atmospheric temperature :

Reduction unit for swing unit (6) ····· A.P.I Classification "For service CD" SAE30

Reduction unit for travel unit (7) ····· A.P.I Classification "For service CD" SAE30

LIST OF OILS, GREASES, FILTERS AND ELEMENTS

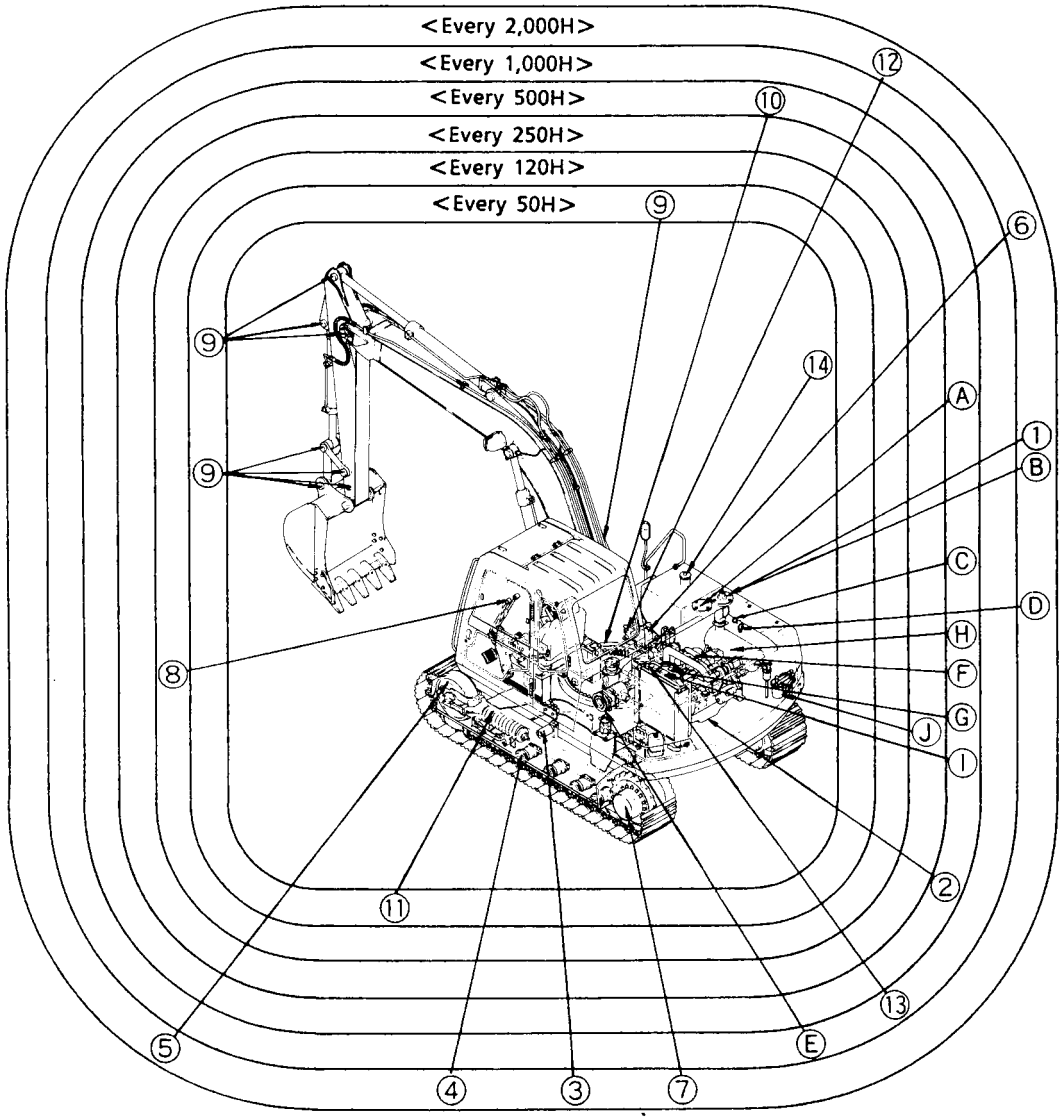
Note: Temperatures in the table indicate atmospheric

No.	Lubrication point	Type of oil and grease	Volume	Recommended oil/grease (genuine products)			Remark
1	Hydraulic tank	Hydraulic oil	75 ℓ (20gal) system 112 ℓ (30gal)	Hydraulic oil with anti-wear, anti oxidant an anti-harmful foaming.			
				Frigid zone −20° ~ 30℃ (−4° ~ 86°F) ISOVG32	Warm zone −5° ~ 40℃ (23° ~ 104°F) ISOVG46	Very hot zone 5° ~ 55℃ (41° ~ 131°F) ISOVG68	
2	Engine oil pan	Engine oil	8 ℓ (2.1gal) system 3 ℓ (0.79gal)	A.P.I. Classification for "servis CD"			
				SAE10W-30 Frigid zone −30° ~ 10℃ (−22° ~ 50°F)	SAE30 Warm zone −5 ~ 40℃ (23° ~ 104°F)	SAE40 Very hot zone 40℃ or over (104°F)	
3	Upper roller		0.02 ℓ (0.005gal) × 2	A.P.I. Classification for "servis CD" SAE30			
4	Lower roller		0.09 ℓ (0.02gal) × 10				
5	Idler		0.16 ℓ (0.04gal) × 2				
6	Reduction unit for swing unit		4 ℓ (1.1gal)				Initial replacement required
7	Reduction unit for travel unit		1.7 ℓ (0.45gal) × 2				Initial replacement required
8	Operating lever joint	Grease	Several grams	Extreme-pressure. Multipurpose grease. N.L.G.I No.2 lithium base grease EP type. Cartridge KSPG0420DI Pailcan KSPG1601D1			
9	Pins of attachments		15 places				
10	Slewing ring		2 places				
11	Track adjuster		2 places				
12	Swing gear		4kg(8.8 lbs)	H.L.G.I No.1 lithium base with MoS 2 grease			
13	Radiator	Water	3 ℓ (0.79gal) 10.5 ℓ (2.8gal) (Total volume of wate)	Anti-freeze (LLC)			
				30% −14.5℃ or over 5.9°F		50% −34℃ or over −29.2°F	
14	Fuel	Light oil	130 ℓ (34gal)	−5℃ or over (23°F)	−5℃ ~ −15℃ (23°F ~ 5°F)	−15℃ ~ −25℃ (5°F ~ −13°F)	
				JIS No.2 light oil	JIS No.3 light oil	JIS special No.3 light oil	

LIST OF FILTER ELEMENTS

Sym.	Location	Part to be replaced	Q'ty	Part No.	Remark
A	Return filter (hydraulic oil)	Element	1	24046Z15	Initial replacement required
B	Suction strainer	Strainer	1	2446R307S1	
C	Drain filter	Cartridge	1	2446U215S5	Initial replacement required
D	Pilot line filter	Element	1	R36P0019	
E	Air cleaner	Element	1	2446U271S2	
F	Engine oil filter	Cartridge	1	894428-9310	
G	Fuel filter	Cartridge	1	894143-4790	
H	Fuel feed pump gauze filter	Gauze filter	1	————	

LUBRICATION CHART



☞ ●Oils, greases, elements and other parts in the positions indicated by numbers / alphabets in the above figure are as listed below :

●The following oils are used for the below reduction units regardless of atmospheric temperature :

Reduction unit for swing unit (6) ····· A.P.I Classification "For service CD" SAE30

Reduction unit for travel unit (7) ····· A.P.I Classification "For service CD" SAE30

LIST OF OILS, GREASES, FILTERS AND ELEMENTS

Note: Temperatures in the table indicate atmospheric

No.	Lubrication point	Type of oil and grease	Volume	Recommended oil/grease (genuine products)			Remark
1	Hydraulic tank	Hydraulic oil	90 ℓ (24gal) system 140 ℓ (37gal)	Hydraulic oil with anti-wear, anti oxidant an anti-harmful foaming.			
				Frigid zone −20° ~ 30℃ (−4° ~ 86°F) 1S0VG32	Warm zone −5° ~ 40℃ (23° ~ 104°F) 1S0VG46	Very hot zone 5° ~ 55℃ (41° ~ 131°F) 1S0VG68	
2	Engine oil pan	Engine oil	13 ℓ (3.4gal) system 3 ℓ (0.79gal)	A.P.I. Classification for "servis CD"			
				SAE10W-30 Frigid zone −30° ~ 10℃ (−22° ~ 50°F)	SAE30 Warm zone −5 ~ 40℃ (23° ~ 104°F)	SAE40 Very hot zone 40℃ or over (104°F)	
3	Upper roller		0.02 ℓ (0.005gal) × 4	A.P.I. Classification for "servis CD" SAE30			
4	Lower roller		0.15 ℓ (0.04gal) × 12				
5	Idler		0.2 ℓ (0.05gal) × 2				
6	Reduction unit for swing unit		5.8 ℓ (1.5gal)				Initial replacement required
7	Reduction unit for travel unit		3 ℓ (0.8gal) × 2				Initial replacement required
8	Operating lever joint	Grease	Several grams	Extreme-pressure. Multipurpose grease. N.L.G.I No.2 lithium base grease EP type. Cartridge KSPG0420DI Pailcan KSPG1601D1			
9	Pins of attachments		15 places				
10	Slewing ring		2 places				
11	Track adjuster		2 places				
12	Swing gear		7.5kg (16.5 lbs)	H.L.G.I No.1 lithium base with MoS 2 grease			
13	Radiator	Water	5.3 ℓ (1.4gal) 22 ℓ (5.8gal) (Total volume of wate)	Anti-freeze (LLC)			
				30% −14.5℃ or over 5.9°F		50% −34℃ or over −29.2°F	
14	Fuel	Light oil	250 ℓ (66gal)	−5℃ or over (23°F)	−5℃ ~ −15℃ (23°F ~ 5°F)	−15℃ ~ −25℃ (5°F ~ −13°F)	
				JIS No.2 light oil	JIS No.3 light oil	JIS special No.3 light oil	

LIST OF FILTER ELEMENTS

Sym.	Location	Part to be replaced	Q'ty	Part No.	Remark
A	Return filter (hydraulic oil)	Element	1	24046Z15	Initial replacement required
B	Suction strainer	Strainer	1	2446R307S1	
C	Drain filter	Cartridge	1	2446U215S5	Initial replacement required
D	Pilot line filter	Element	1	R36P0019	
E	Air cleaner	Element	1	2446U264S2 (outer)	
			1	2446U249S1 (inner)	
F	Engine oil filter	Cartridge	1	894321-2190	
G	Fuel filter	Cartridge	1	894325-4630	
I	Fuel feed pump gauze filter	Gauze filter	1	————	
J	Pre fuel filter	Cartridge	2	2446U278S5	

LIST OF OILS, GREASES, FILTERS AND ELEMENTS

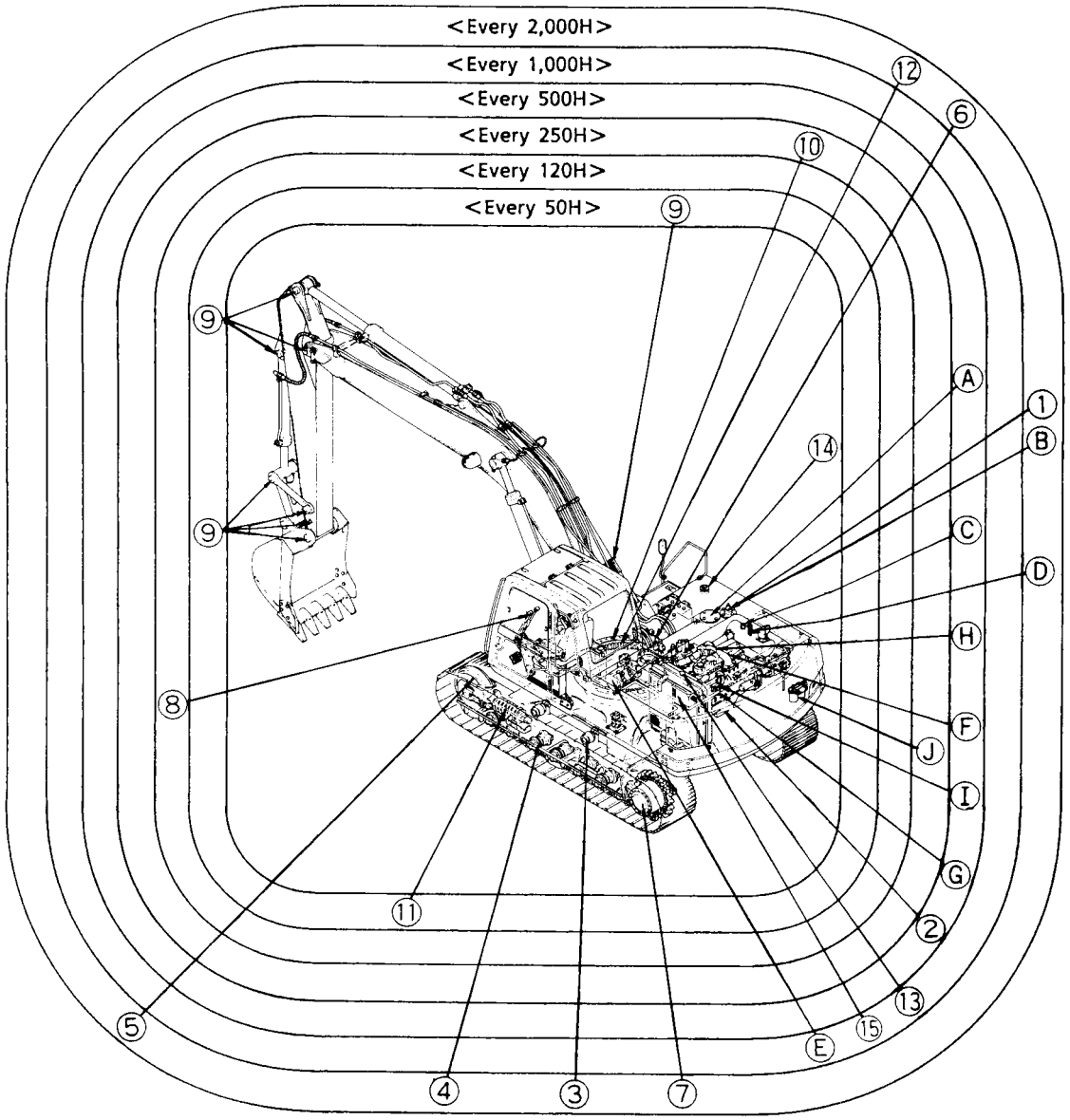
Note: Temperatures in the table indicate atmospheric

No.	Lubrication point	Type of oil and grease	Volume	Recommended oil/grease (genuine products)			Remark
1	Hydraulic tank	Hydraulic oil	90 ℓ (24gal) system 140 ℓ (37gal)	Hydraulic oil with anti-wear, anti oxidant an anti-harmful foaming.			
				Frigid zone −20° ~ 30℃ (−4° ~ 86°F) 1S0VG32	Warm zone −5° ~ 40℃ (23° ~ 104°F) 1S0VG46	Very hot zone 5° ~ 55℃ (41° ~ 131°F) 1S0VG68	
2	Engine oil pan	Engine oil	16 ℓ (4.2gal) system 3 ℓ (0.8gal)	A.P.I. Classification for "servis CD"			
				SAE10W-30 Frigid zone −30° ~ 10℃ (−22° ~ 50°F)	SAE30 Warm zone −5 ~ 40℃ (23° ~ 104°F)	SAE40 Very hot zone 40℃ or over (104°F)	
3	Upper roller		0.02 ℓ (0.005gal)×4	A.P.I. Classification for "servis CD" SAE30			
4	Lower roller		0.15 ℓ (0.04gal)×12				
5	Idler		0.2 ℓ (0.05gal)×2.				
6	Reduction unit for swing unit		6.2 ℓ (1.6gal)				Initial replacement required
7	Reduction unit for travel unit		3 ℓ (0.8gal)×2				Initial replacement required
8	Operating lever joint	Grease	Several grams	Extreme-pressure. Multipurpose grease. N.L.G.I No.2 lithium base grease EP type. Cartridge KSPG0420DI Pailcan KSPG1601D1			
9	Pins of attachments		15 places				
10	Slewing ring		2 places				
11	Track adjuster		2 places				
12	Swing gear		5.5kg(12.5 lbs)	H.L.G.I No.1 lithium base with MoS 2 grease			
13	Radiator	Water	6 ℓ (1.6gal) 22 ℓ (5.8gal) (Total volume of wate)	Anti-freeze (LLC)			
				30% −14.5℃ or over 5.9°F		50% −34℃ or over −29.2°F	
14	Fuel	Light oil	250 ℓ (66gal)	−5℃ or over (23°F)	−5℃ ~ −15℃ (23°F ~ 5°F)	−15℃ ~ −25℃ (5°F ~ −13°F)	
				JIS No.2 light oil	JIS No.3 light oil	JIS special No.3 light oil	

LIST OF FILTER ELEMENTS

Sym.	Location	Part to be replaced	Q'ty	Part No.	Remark
A	Return filter (hydraulic oil)	Element	1	24046Z15	Initial replacement required
B	Suction strainer	Strainer	1	2446R307S1	
C	Drain filter	Cartridge	1	2446U215S5	Initial replacement required
D	Pilot line filter	Element	1	R36P0019	
E	Air cleaner	Element	1	2446U242S2 (outer)	
			1	2446U162S2 (inner)	
F	Engine oil filter	Cartridge	1	894321-2190	
G	Fuel filter	Cartridge	1	894325-4630	
H	Engine bypass filter	Element	1	2446R339S1	
I	Fuel feed pump gauze filter	Gauze filter	1	————	
J	Pre fuel filter	Cartridge	2	2446U278S5	

LUBRICATION CHART



☞ ●Oils, greases, elements and other parts in the positions indicated by numbers / alphabets in the above figure are as listed below :

●The following oils are used for the below reduction units regardless of atmospheric temperature :

Reduction unit for swing unit (6) ····· A.P.I Classification "For service CD" SAE30

Reduction unit for travel unit (7) ····· A.P.I Classification "For service CD" SAE30

LIST OF OILS, GREASES, FILTERS AND ELEMENTS

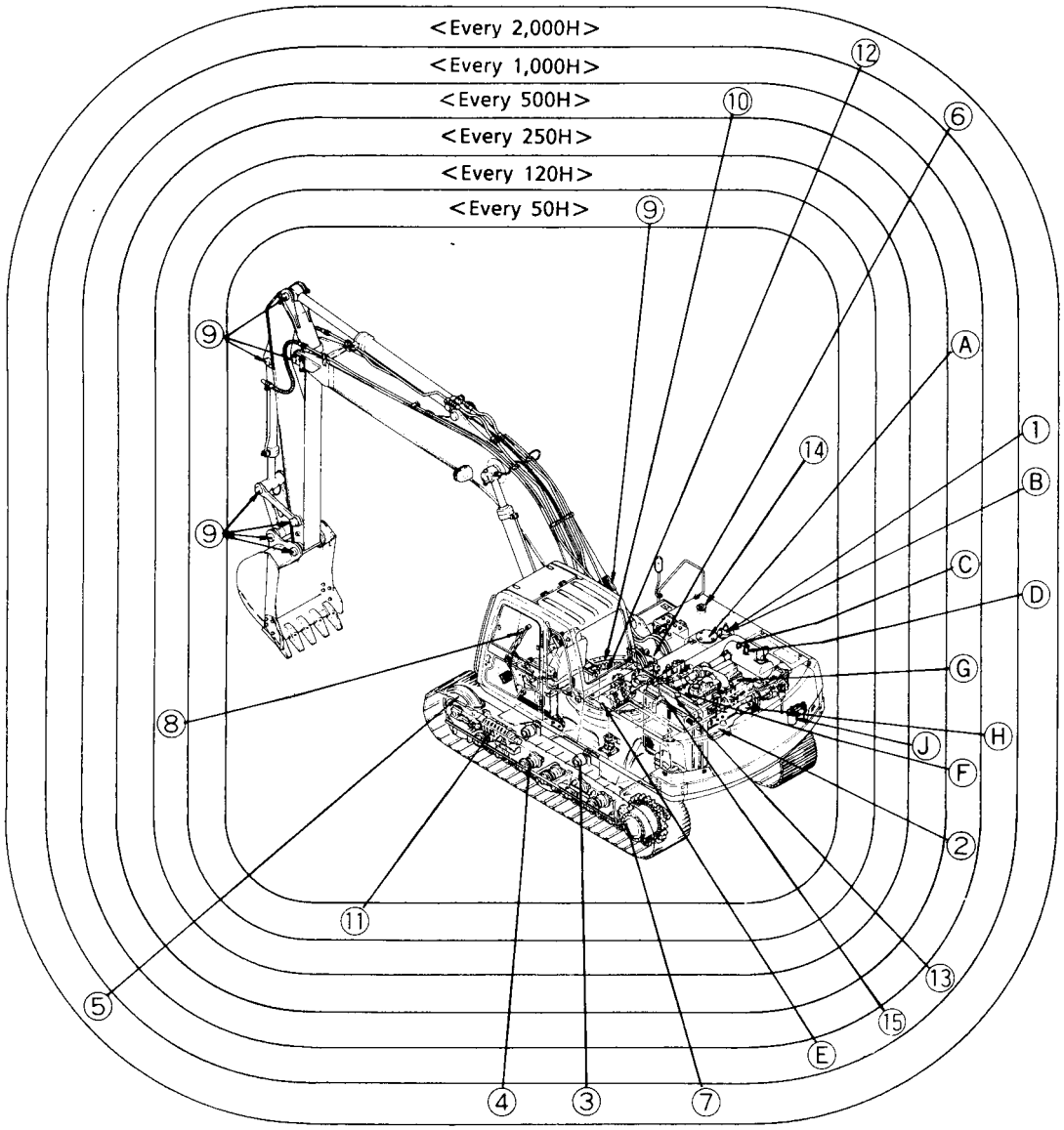
Note: Temperatures in the table indicate atmospheric

No.	Lubrication point	Type of oil and grease	Volume	Recommended oil/grease (genuine products)			Remark
1	Hydraulic tank	Hydraulic oil	145 ℓ (38.3gal) (system 275 ℓ (72.6gal))	Hydraulic oil with anti-wear, anti oxidant an anti-harmful foaming.			
				Frigid zone −20° ~ 30℃ (−4° ~ 86°F) ISOVG32	Warm zone −5° ~ 40℃ (23° ~ 104°F) ISOVG46	Very hot zone 5° ~ 55℃ (41° ~ 131°F) ISOVG68	
2	Engine oil pan	Engine oil	18 ℓ (4.8gal) (system 4 ℓ (1.1gal))	A.P.I. Classification for "servis CD"			
				SAE10W-30 Frigid zone −30° ~ 10℃ (−22° ~ 50°F)	SAE30 Warm zone −5 ~ 40℃ (23° ~ 104°F)	SAE40 Very hot zone 40℃ or over (104°F)	
3	Upper roller		0.05 ℓ (0.005gal) × 4	A.P.I. Classification for "servis CD" SAE30			
4	Lower roller		0.3 ℓ (0.08gal) × 14				
5	Idler		0.2 ℓ (0.05gal) × 2				
6	Reduction unit for swing unit		12 ℓ (3.2gal)				Initial replacement required
7	Reduction unit for travel unit		6 ℓ (1.6gal) × 2				Initial replacement required
8	Operating lever joint	Grease	Several grams	Extreme-pressure. Multipurpose grease. N.L.G.I No.2 lithium base grease EP type. Cartridge KSPG0420DI Pailcan KSPG1601D1			
9	Pins of attachments		15 places				
10	Slewing ring		2 places				
11	Track adjuster		2 places				
12	Swing gear		6.5kg (14.3 lbs)	H.L.G.I No.1 lithium base with MoS 2 grease			
13	Radiator	Water	8 ℓ (2.1gal) 27 ℓ (7.1gal) (Total volume of wate)	Anti-freeze (LLC)			
				30% −14.5℃ or over 5.9°F		50% −34℃ or over −29.2°F	
14	Fuel	Light oil	300 ℓ (79.3gal)	−5℃ or over (23°F)	−5℃ ~ −15℃ (23°F ~ 5°F)	−15℃ ~ −25℃ (5°F ~ −13°F)	
				JIS No.2 light oil	JIS No.3 light oil	JIS special No.3 light oil	

LIST OF FILTER ELEMENTS

Sym.	Location	Part to be replaced	Q'ty	Part No.	Remark
A	Return filter (hydraulic oil)	Element	1	24046Z15	Initial replacement required
B	Suction strainer	Strainer	1	2446R307S1	
C	Drain filter	Cartridge	1	2446U215S5	Initial replacement required
D	Pilot line filter	Element	1	R36P0019	
E	Air cleaner	Element	1	2446U242S2 (outer)	
			1	2446U248S2 (inner)	
F	Engine oil filter	Cartridge	1	ME088519	Initial replacement required
G	Fuel filter	Cartridge	1	ME035393	
H	Engine bypass filter	Element	1	ME014838	Initial replacement required
I	Fuel feed pump gauze filter	Gauze filter	1	———	
J	Pre fuel filter	Cartridge	2	2446U278S5	

LUBRICATION CHART



☞ ●Oils, greases, elements and other parts in the positions indicated by numbers / alphabets in the above figure are as listed below :

●The following oils are used for the below reduction units regardless of atmospheric temperature :

Reduction unit for swing unit (6) ····· A.P.I Classification "For service CD" SAE30

Reduction unit for travel unit (7) ····· A.P.I Classification "For service CD" SAE30

LIST OF OILS, GREASES, FILTERS AND ELEMENTS

Note: Temperatures in the table indicate atmospheric

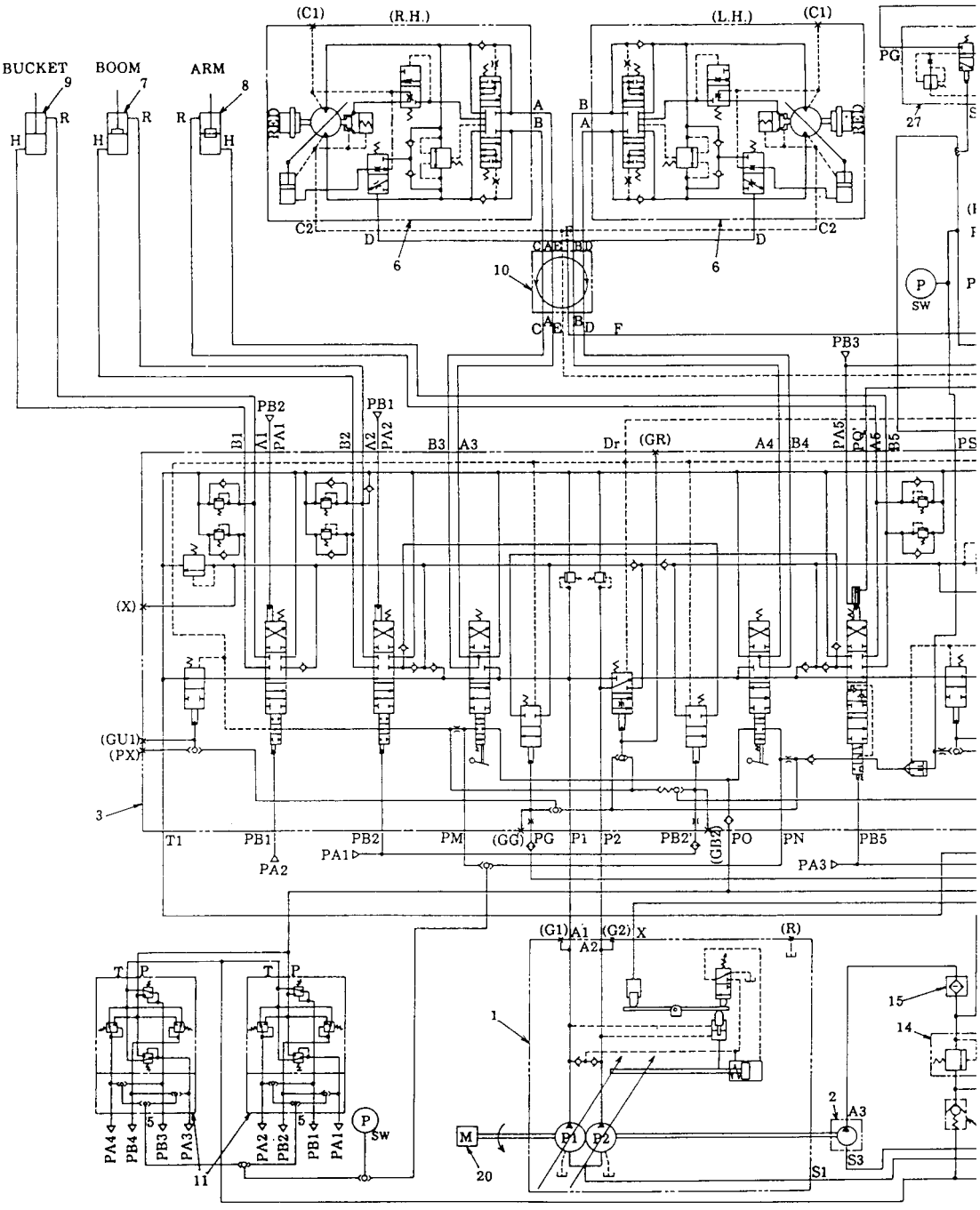
No.	Lubrication point	Type of oil and grease	Volume	Recommended oil/grease (genuine products)			Remark
1	Hydraulic tank	Hydraulic oil	170 ℓ (44.9gal) system 310 ℓ (81.8gal)	Hydraulic oil with anti-wear, anti oxidant an anti-harmful foaming.			
				Frigid zone −20° ~ 30℃ (−4° ~ 86°F) 1S0VG32	Warm zone −5° ~ 40℃ (23° ~ 104°F) 1S0VG46	Very hot zone 5° ~ 55℃ (41° ~ 131°F) 1S0VG68	
2	Engine oil pan	Engine oil	24 ℓ (6.3gal) system 4 ℓ (1.1gal)	A.P.I. Classification for "servis CD"			
				SAE10W-30 Frigid zone −30° ~ 10℃ (−22° ~ 50°F)	SAE30 Warm zone −5 ~ 40℃ (23° ~ 104°F)	SAE40 Very hot zone 40℃ or over. (104°F)	
3	Upper roller		0.05 ℓ (0.01gal) × 4	A.P.I. Classification for "servis CD" SAE30			
4	Lower roller		0.3 ℓ (0.08gal) × 14				
5	Idler		0.2 ℓ (0.05gal) × 2				
6	Reduction unit for swing unit		16 ℓ (4.2gal)				Initial replacement required
7	Reduction unit for travel unit		7.5 ℓ (2gal) × 2				Initial replacement required
8	Operating lever joint	Grease	Several grams	Extreme-pressure. Multipurpose grease. N.L.G.I No.2 lithium base grease EP type. Cartridge KSPG0420DI Pailcan KSPG1601D1			
9	Pins of attachments		15 places				
10	Slewing ring		2 places				
11	Track adjuster		2 places				
12	Swing gear		9.3kg (20.5 lbs)	H.L.G.I No.1 lithium base with MoS 2 grease			
13	Radiator	Water	8 ℓ (2.1gal) 28.5 ℓ (7.5gal) (Total volume of wate)	Anti-freeze (LLC)			
				30% −14.5℃ or over 5.9°F		50% −34℃ or over −29.2°F	
14	Fuel	Light oil	310 ℓ (71.9gal)	−5℃ or over (23°F)	−5℃ ~ −15℃ (23°F ~ 5°F)	−15℃ ~ −25℃ (5°F ~ −13°F)	
				JIS No.2 light oil	JIS No.3 light oil	JIS special No.3 light oil	

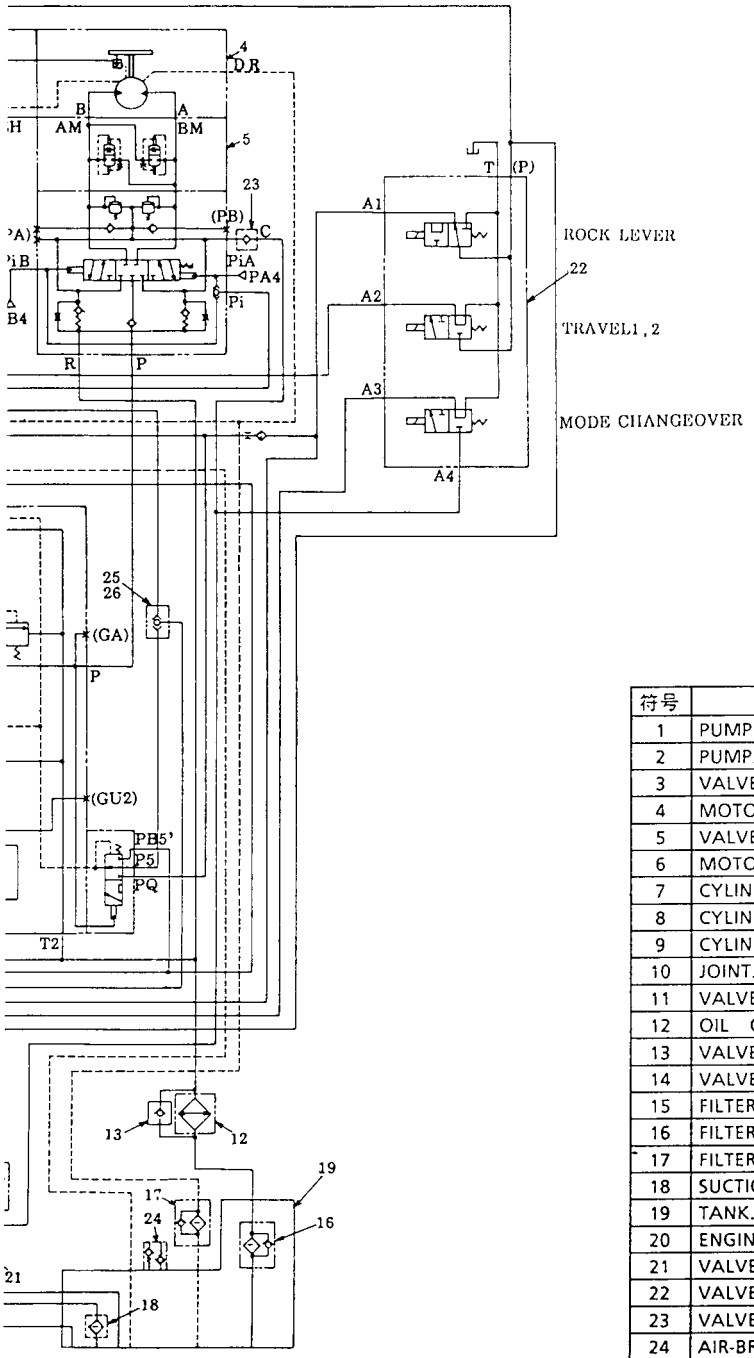
LIST OF FILTER ELEMENTS

Sym.	Location	Part to be replaced	Q'ty	Part No.	Remark
A	Return filter (hydraulic oil)	Element	1	24046Z15	Initial replacement required
B	Suction strainer	Strainer	1	2446R307S1	
C	Drain filter	Cartridge	1	2446U215S5	Initial replacement required
D	Pilot line filter	Element	1	R36P0019	
E	Air cleaner	Element	1	2446U242S2 (outer)	
			1	2446U249S1 (inner)	
F	Engine oil filter	Cartridge	1	ME088519	Initial replacement required
G	Fuel filter	Cartridge	1	ME035393	
H	Engine bypass filter	Element	1	ME014838	
I	Fuel feed pump gauze filter	Gauze filter	1	————	
J	Pre fuel filter	Cartridge	2	2446U278S5	

HYDRAULIC CIRCUITS AND COMPONENTS

(STD)

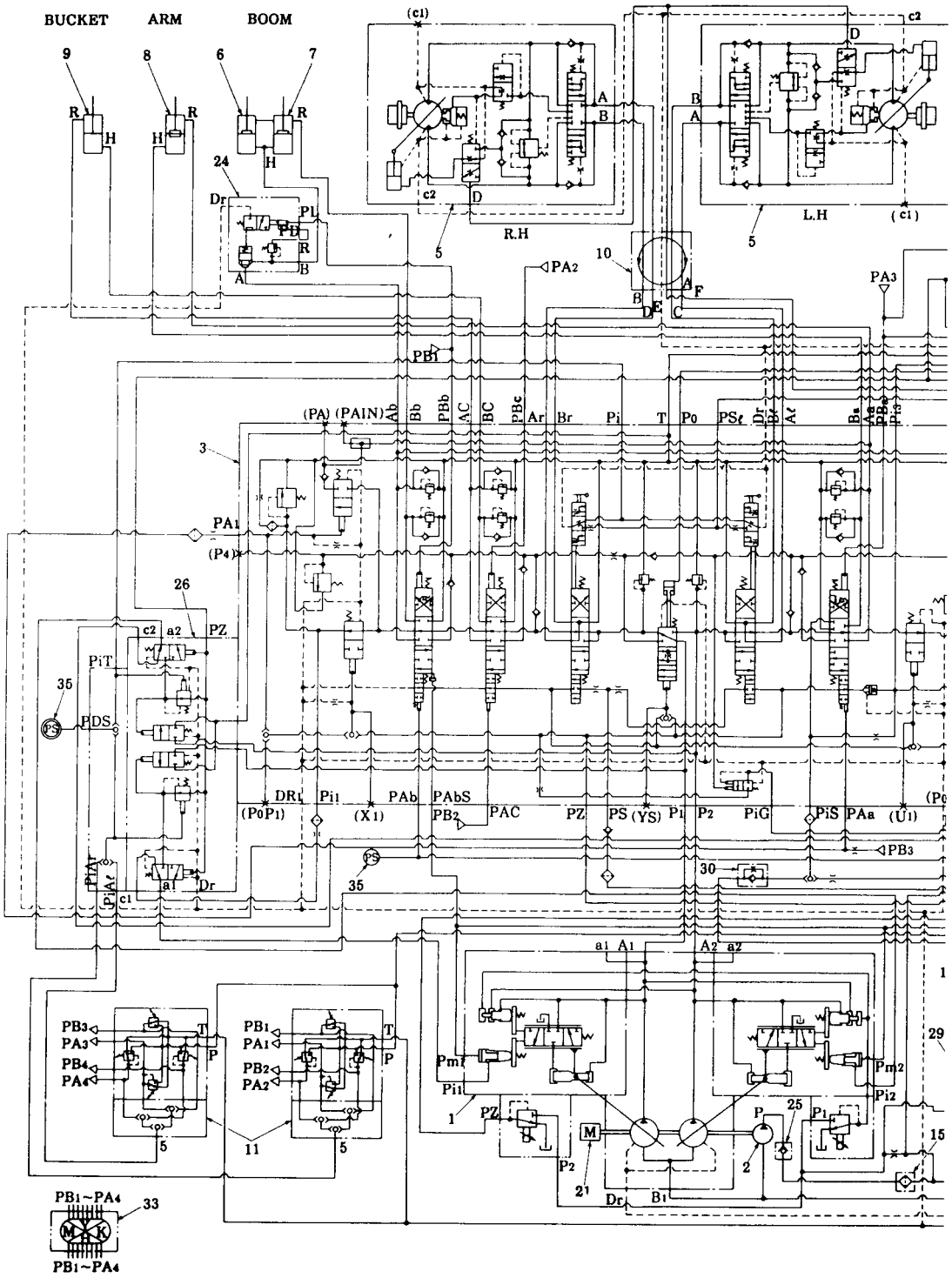


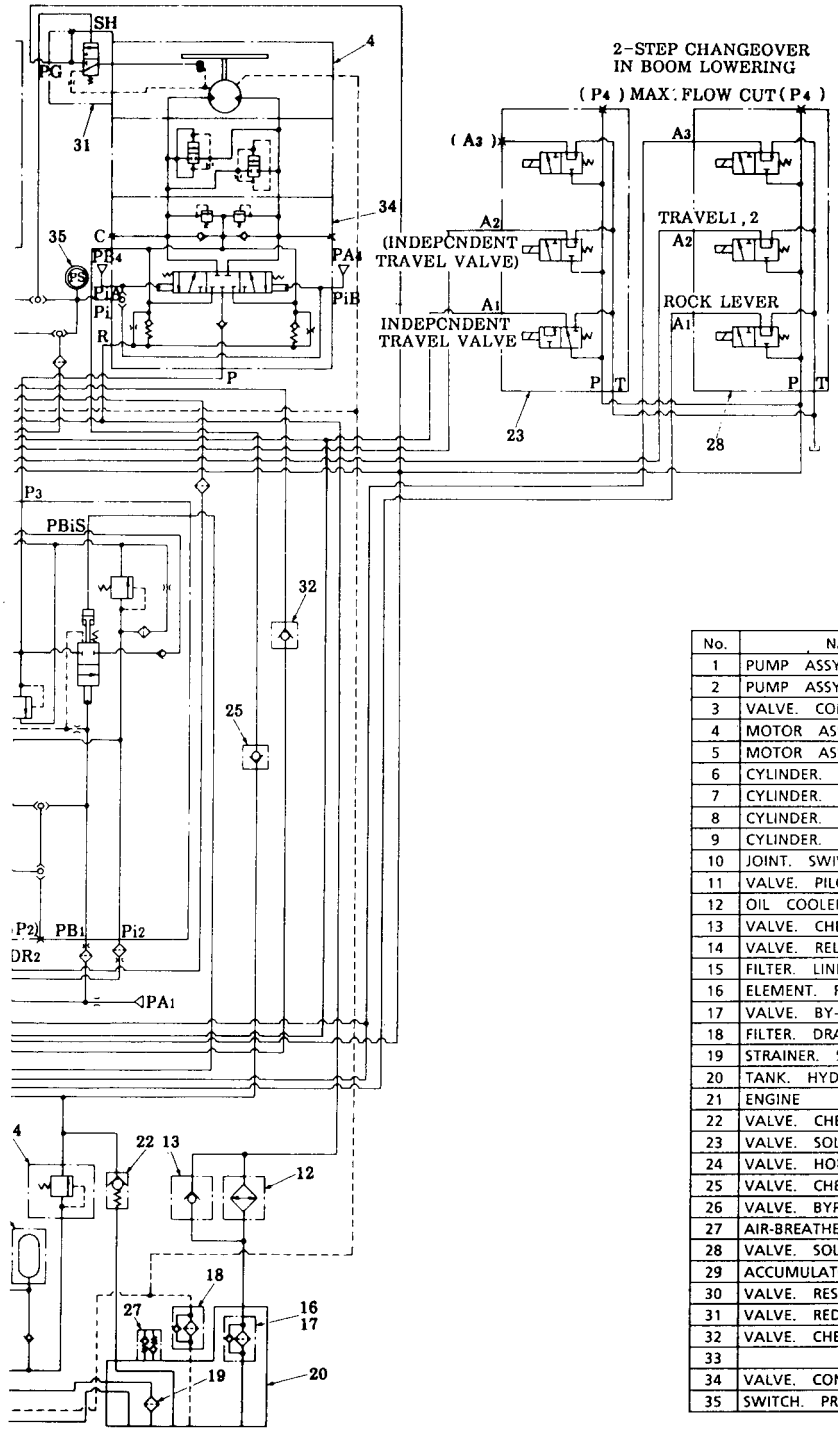


符号	NAME	TYPE
1	PUMP	A10VD43SR
2	PUMP. GEAR	G1-09R-10
3	VALVE. CONTROL	BCV-8A
4	MOTOR	M2X55
5	VALVE	KSC15R
6	MOTOR	GM09VL
7	CYLINDER(BOOM)	125-70-940
8	CYLINDER(ARM)	110-65-900
9	CYLINDER(BUCKET)	95-60-725
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	
16	FILTER RETURN	
17	FILTER. DRAIN	
18	SUCTION. STRAINER	
19	TANK. HYDR	
20	ENGINE	4JB1
21	VALVE. CHECK	
22	VALVE. SOLENOID	
23	VALVE. CHECK	
24	AIR-BREATHER	
25	TEE	
26	BALL	
27	VALVE. REDUCING	

SK100 SK120 SK120LC

(STD)

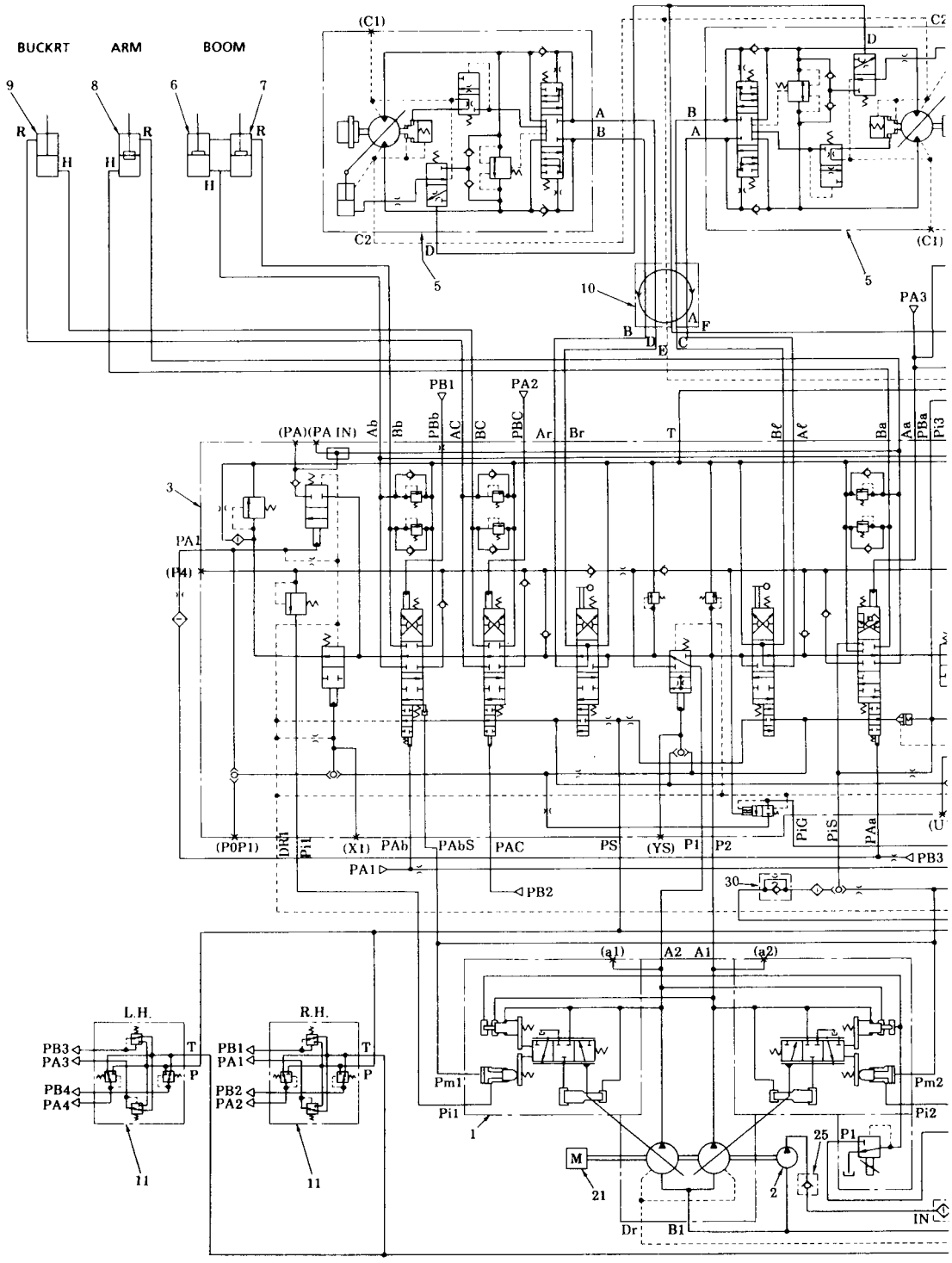


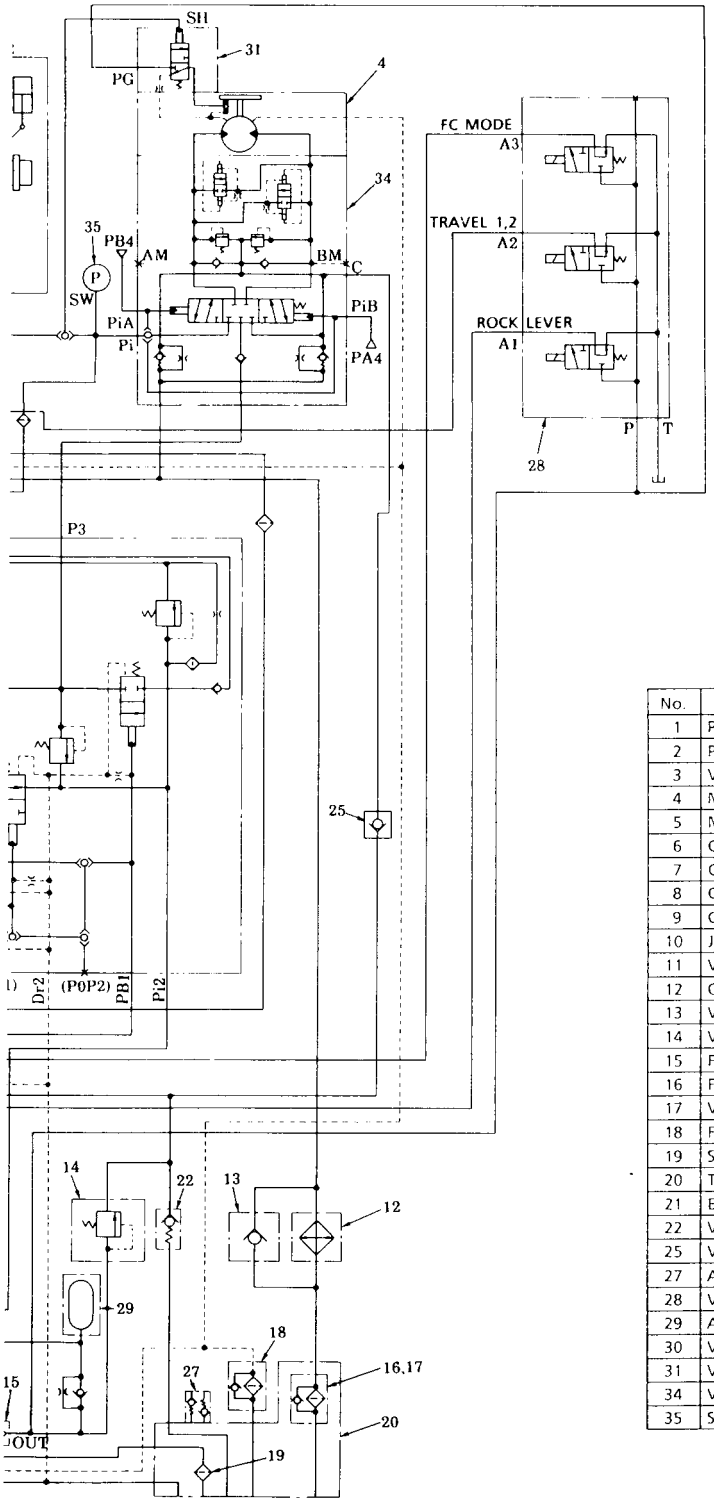


No.	NAME	TYPE
1	PUMP ASSY	K3V63DT
2	PUMP ASSY	KP1009
3	VALVE. CONTROL	KMX13
4	MOTOR ASSY	
5	MOTOR ASSY	GM17V
6	CYLINDER. BOOM(RH)	RBV24
7	CYLINDER. BOOM(LH)	
8	CYLINDER. ARM	
9	CYLINDER. BUCKET	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40
12	OIL COOLER	
13	VALVE. CHECK	
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	
16	ELEMENT. FILTER	
17	VALVE. BY-PASS	
18	FILTER. DRAIN	
19	STRAINER. SUCTION	
20	TANK. HYDR	
21	ENGINE	
22	VALVE. CHECK	
23	VALVE. SOLENOID	
24	VALVE. HOLDING	
25	VALVE. CHECK	
26	VALVE. BYPASS	
27	AIR-BREATHER	
28	VALVE. SOLENOID	
29	ACCUMULATOR	
30	VALVE. RESTRICTOR	
31	VALVE. REDUCING	
32	VALVE. CHECK	
33		
34	VALVE. CONTROL	KSC15R
35	SWITCH. PRESS	

SK100 SK120 SK120LC

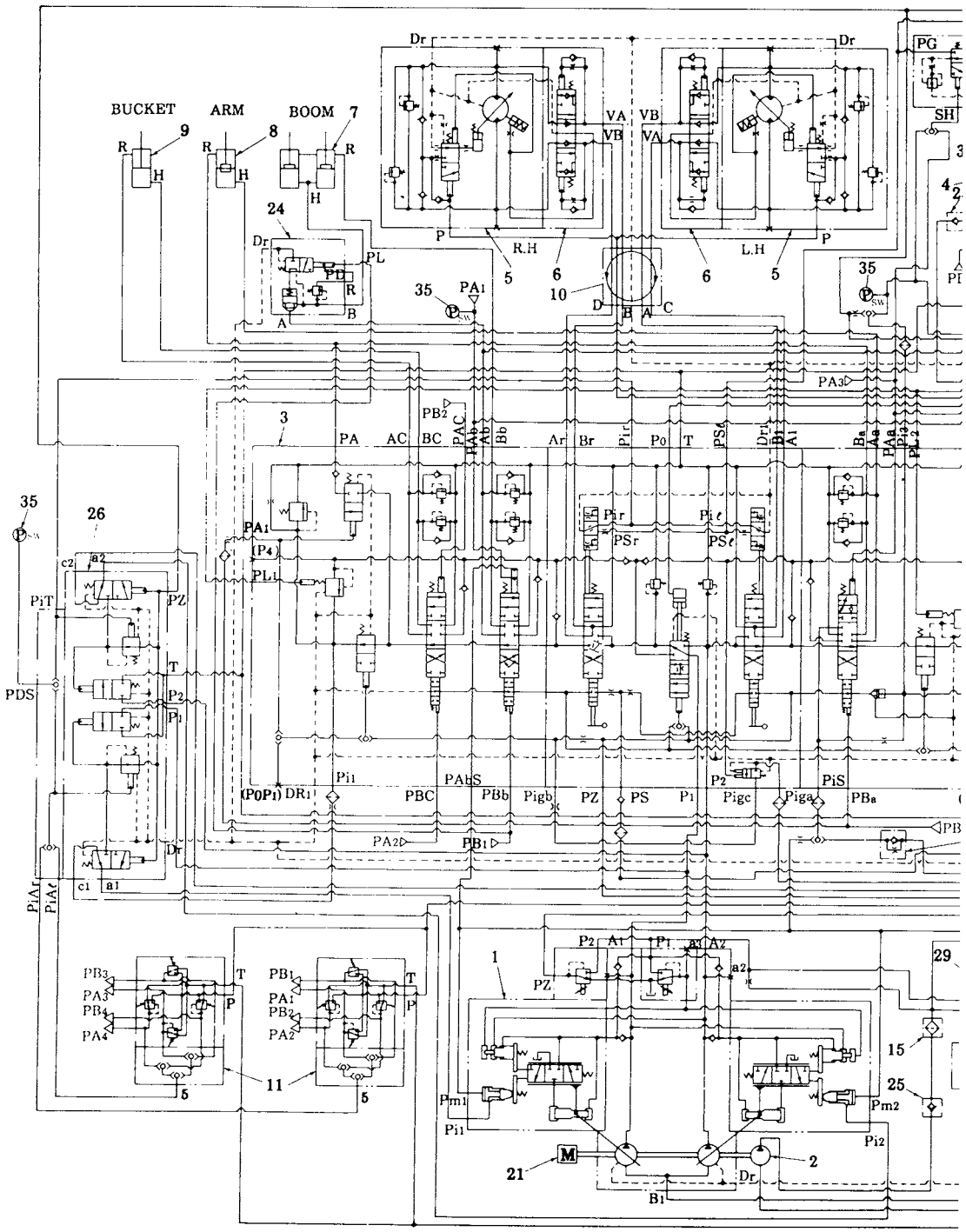
(ASIA)





No.	NAME	TYPE
1	PUMP ASSY	K3V63DT
2	PUMP ASSY	KP1009
3	VALVE. CONTROL	KM x 13
4	MOTOR ASSY	
5	MOTOR ASSY	GM17V
6	CYLINDER. BOOM(RH)	
7	CYLINDER. BOOM(LH)	
8	CYLINDER. ARM	
9	CYLINDER. BUCKET	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	
16	FILTER. RETURN	
17	VALVE. BY-PASS	
18	FILTER. DRAIN	
19	STRAINER. SUCTION	
20	TANK. HYDR	
21	ENGINE	
22	VALVE. CHECK	
25	VALVE. CHECK	
27	AIR BREATHER	
28	VALVE, SOLENOID	
29	ACCUMULATOR	
30	VALVE. RESTRICTOR	
31	VALVE. REDUCING	
34	VALVE, CONTROL	KSC15R
35	SWITCH. PRESS	

(STD)


BUCKET
ARM
BOOM
Dr
PG
SH
VA
VB
R.H
L.H
PA1
PA3
PB2
PA
AC
BC
PAC
Ar
Br
Po
T
PSr
PSℓ
PDS
PiT
PZ
P2
P1
PL
PBC
PBb
Pigb
PS
Pigc
Piga
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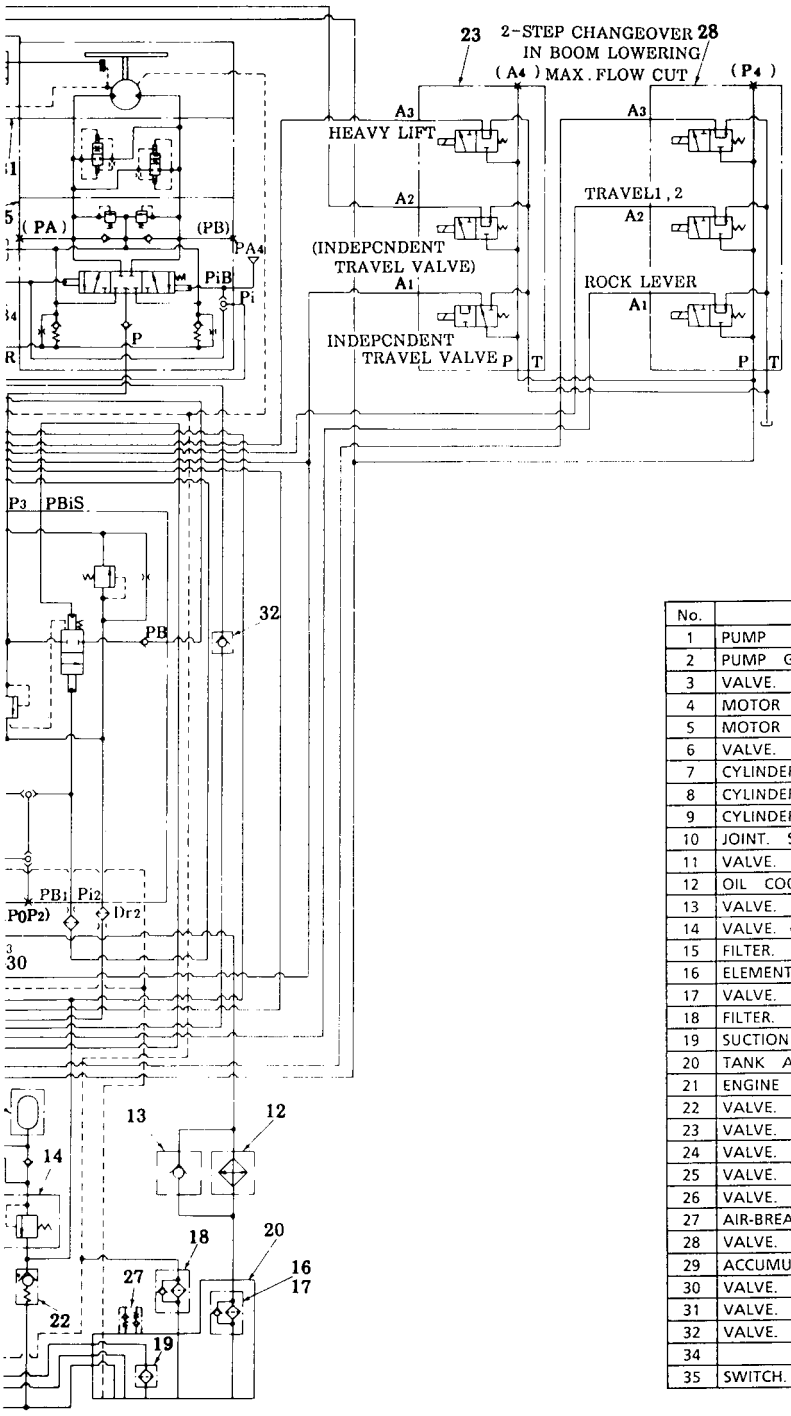
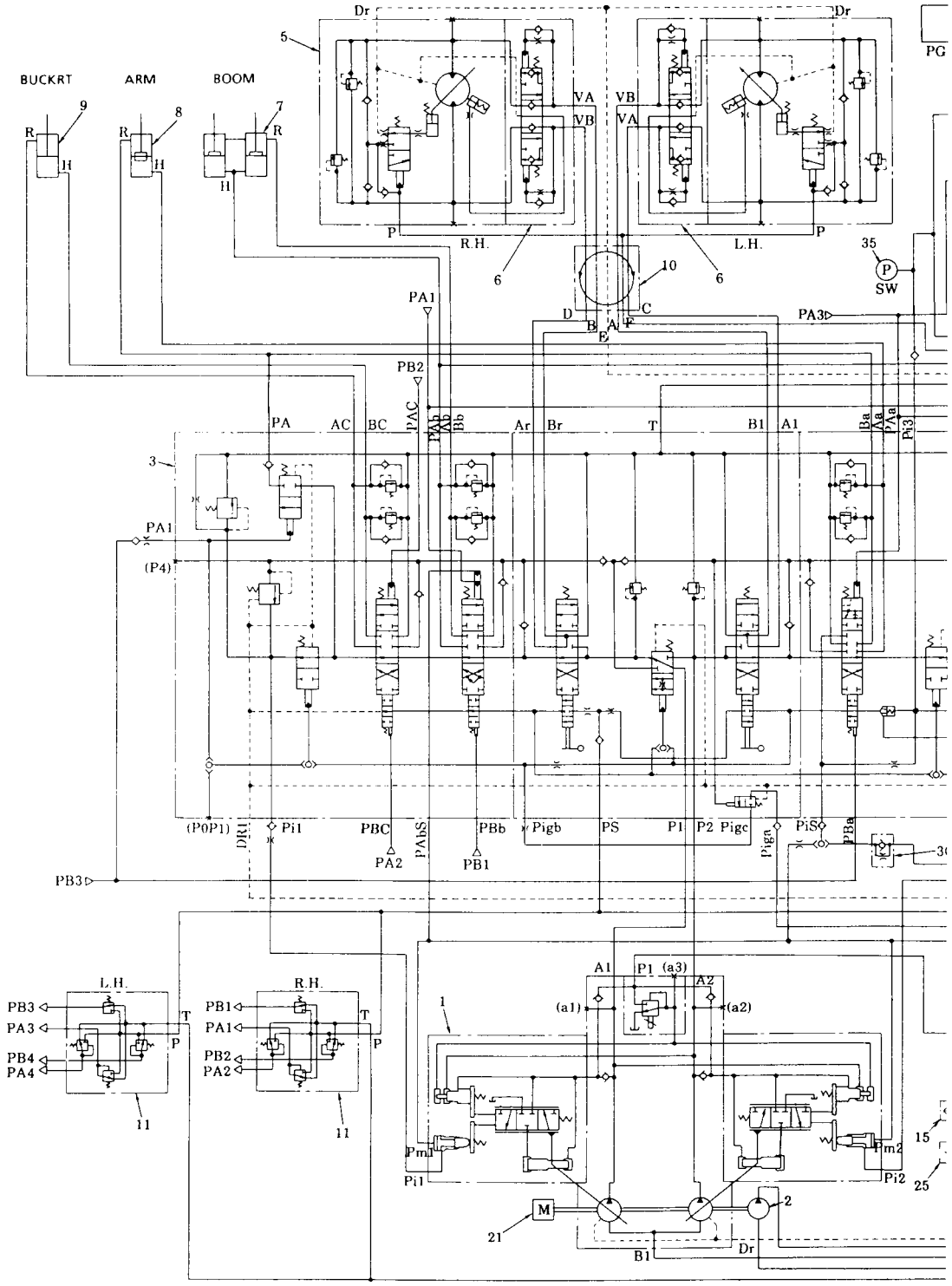
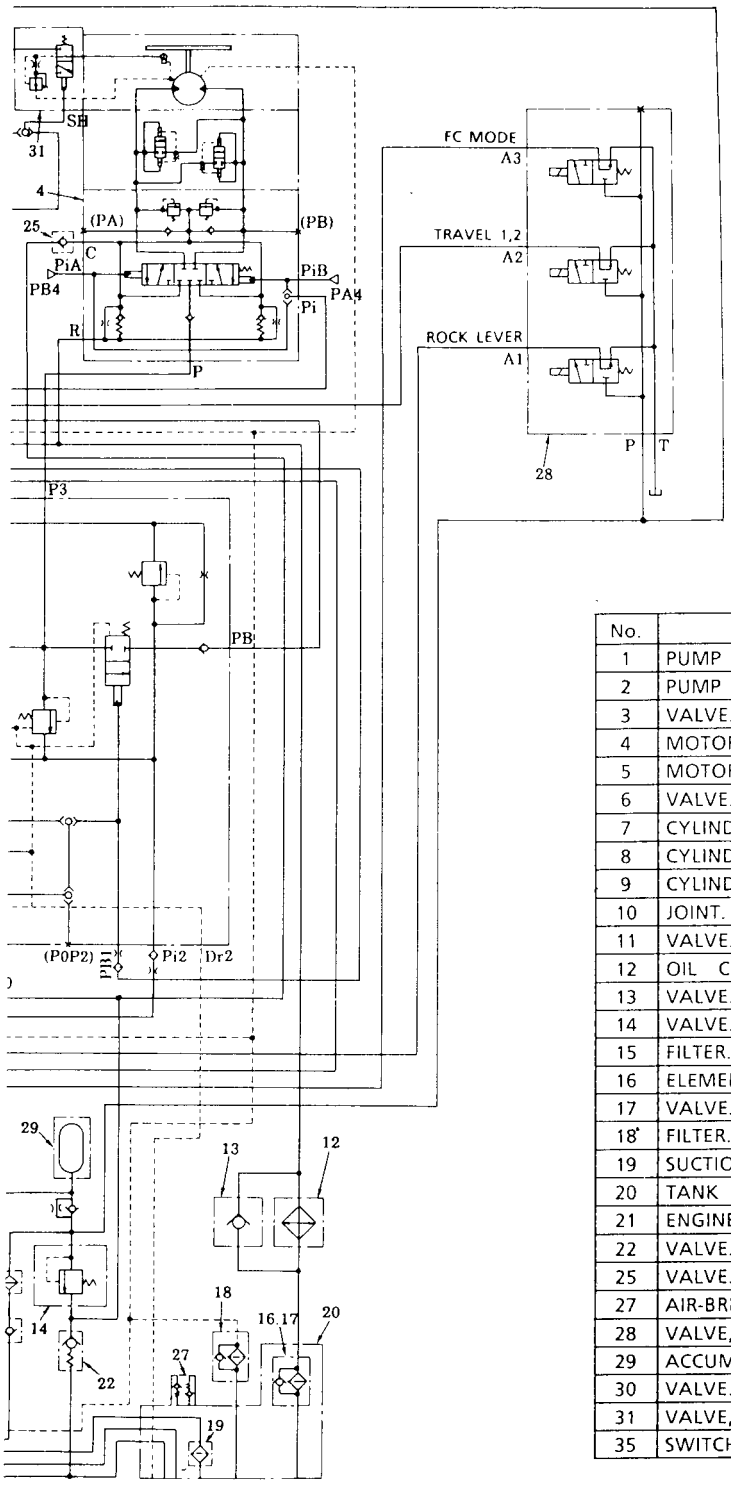


No.	NAME	TYPE
1	PUMP	K3Y112DT
2	PUMP GEAR	KP1009
3	VALVE. CONTROL	KMX15D
4	MOTOR ASSY	M2 x 150 + 15R
5	MOTOR	MV150/90
6	VALVE. BRAKE	RBV24
7	CYLINDER	
8	CYLINDER	
9	CYLINDER	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	Y-2395
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	Y-1795
16	ELEMENT. FILTER	Y-1635
17	VALVE. BYPASS	Y-1506
18	FILTER. DRAIN	SP04-10
19	SUCTION STRAINER	1877
20	TANK ASSY HYDR	
21	ENGINE ASSY	
22	VALVE. CHECK	
23	VALVE. SOLENOID	VBY-119
24	VALVE. HOLDING	KHV20EA10
25	VALVE. CHECK	
26	VALVE. BYPASS	VBY125
27	AIR-BREATHER	
28	VALVE. SOLENOID	VBY-121
29	ACCUMULATOR	ME70-500-30
30	VALVE. RESTRICTOR	
31	VALVE. REDUCING	
32	VALVE. CHECK	
34		
35	SWITCH. PRESS	

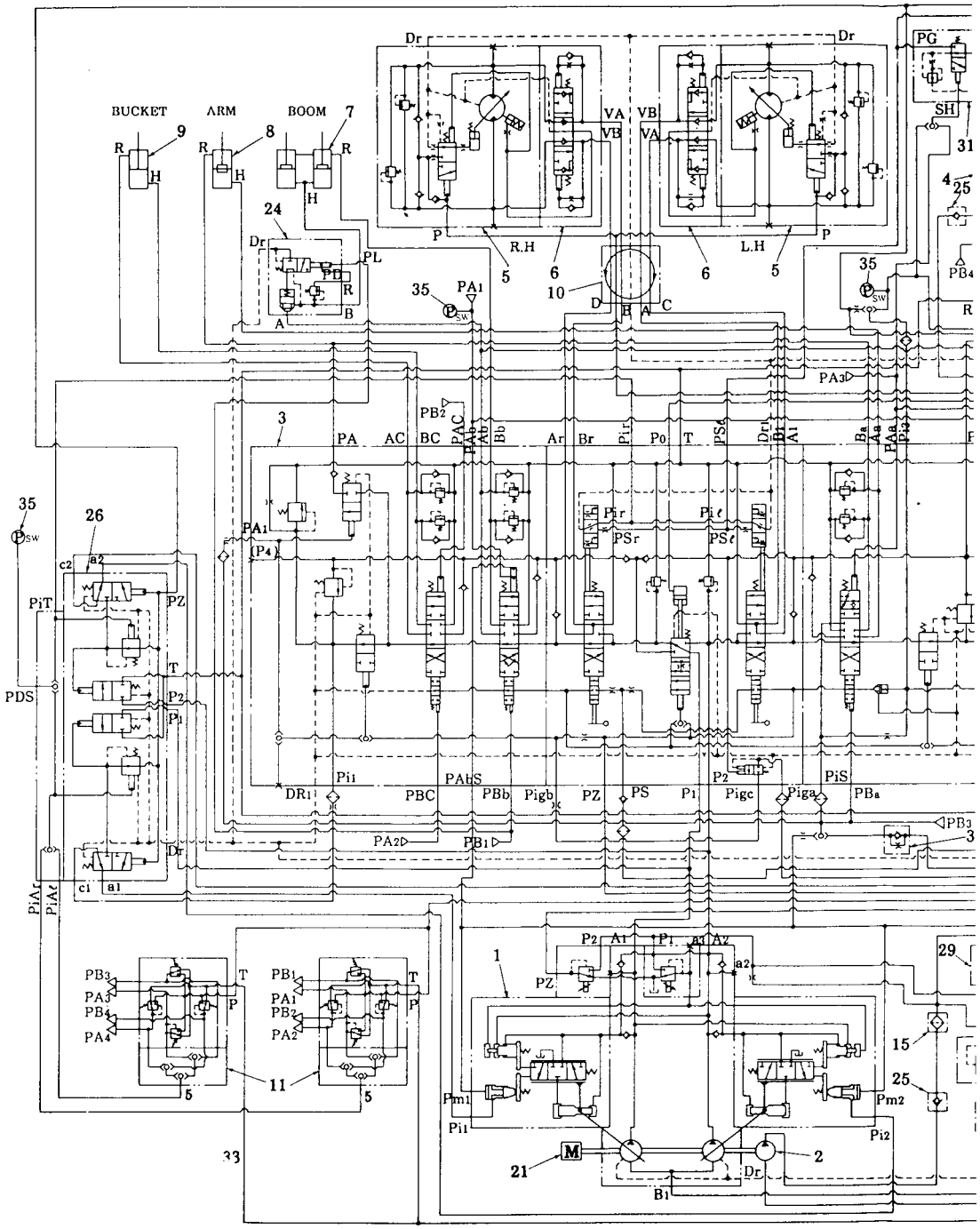
(ASIA)

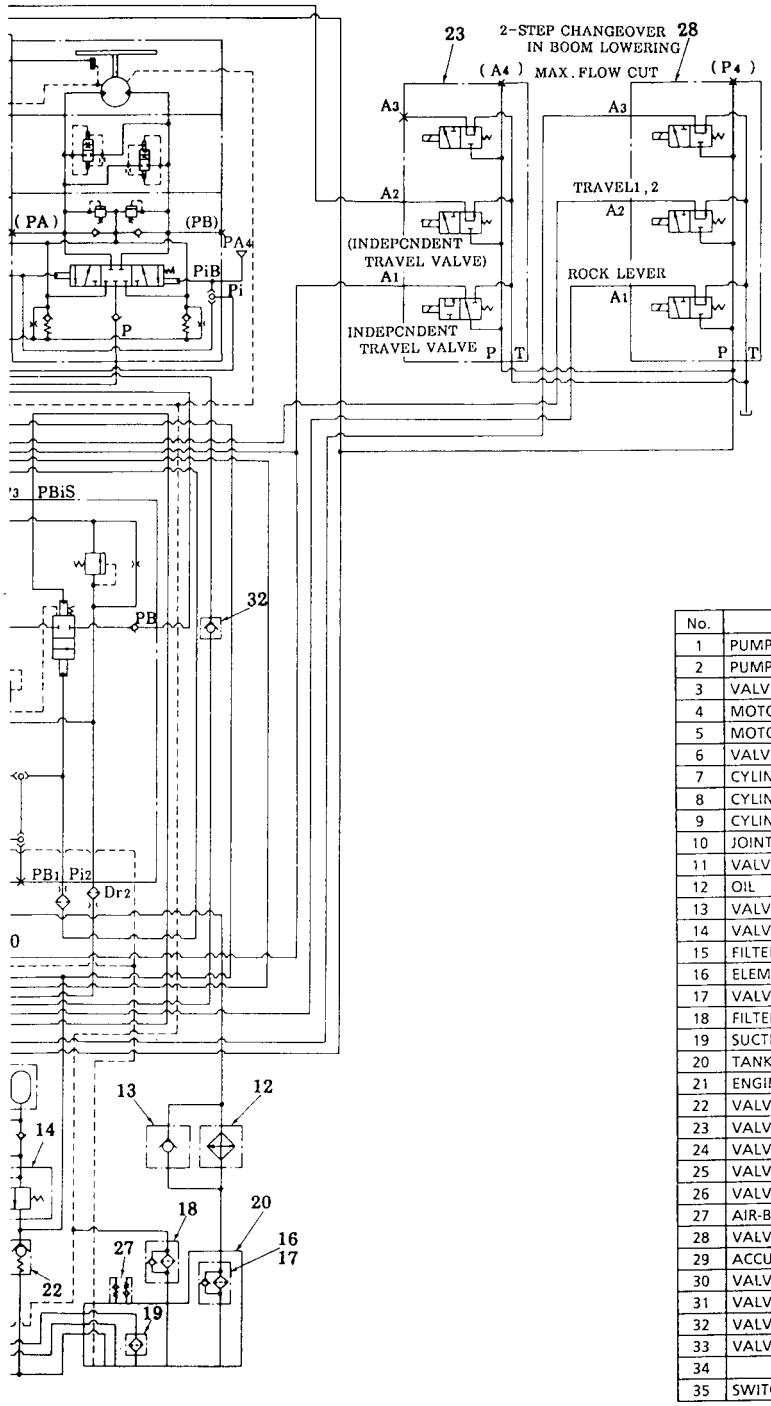

BUCKRT
ARM
BOOM
R.H.
L.H.
SW
PG
PA1
PA3
PB2
PA
AC
BC
PAC
Ar
Br
T
B1
A1
(P4)
(P0P1)
Pi1
PBC
PA2
PAbS
PBb
PB1
Pigb
PS
P1
P2
Pigc
PiS
PB3
PA3
PB4
PA4
PB1
PA1
PB2
PA2
A1
P1 (a3)
A2
(a1)
(a2)
Pm1
Pm2
Pi2
M
Dr



No.	NAME	TYPE
1	PUMP	K3Y112DT
2	PUMP GEAR	KP1009
3	VALVE. CONTROL	KM x 15C
4	MOTOR ASSY	M2 x 150 + 15R
5	MOTOR	MV150/114
6	VALVE. BRAKE	RBV24
7	CYLINDER	
8	CYLINDER	
9	CYLINDER	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	Y-2395
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	Y-1795
16	ELEMENT. FILTER	Y-1635
17	VALVE. BYPASS	Y-1506
18	FILTER. DRAIN	SP04-10
19	SUCTION STRAINER	F1877
20	TANK ASSY HYDR	
21	ENGINE ASSY	
22	VALVE. CHECK	
25	VALVE. CHECK	
27	AIR-BREATHER	
28	VALVE, SOLENOID	VBY-121
29	ACCUMULATOR	ME70-500-30
30	VALVE. RESTRICTOR	
31	VALVE, REDUCING	
35	SWITCH. PRESS	

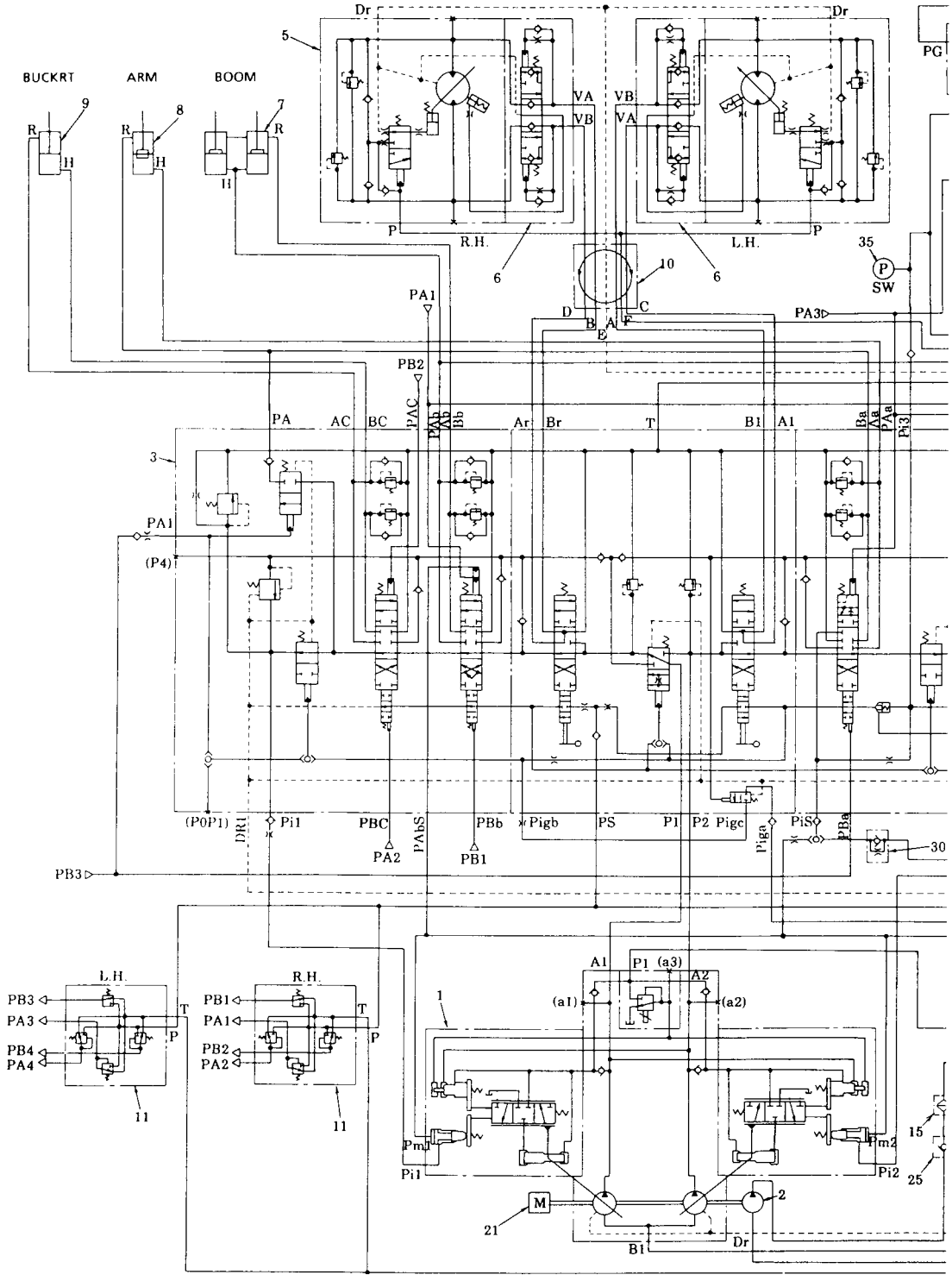
(STD)


BUCKET
ARM
BOOM
R.H
L.H
PG
SH
PA
AC
BC
PAC
Bb
Ar
Br
Po
T
PS
PZ
PDS
PiT
PA1
PA2
PA3
PB1
PB2
PB3
PB4
PL
PD
Pi1
Pi2
Pm1
Pm2
PAbS
PBC
PBb
Pigb
Pigc
Piga
PiS
PBa
DR1
Dr
R
H
P
A
B
C
D
M
SW



No.	NAME	TYPE
1	PUMP	K3Y112DT
2	PUMP GEAR	KP1009
3	VALVE. CONTROL	KMX15D
4	MOTOR ASSY	M2×170+15R
5	MOTOR	MV200/100
6	VALVE. BRAKE	RBV24
7	CYLINDER	
8	CYLINDER	
9	CYLINDER	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	Y-2395
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	Y-1795
16	ELEMENT. FILTER	Y-2954
17	VALVE. BYPASS	Y-1506
18	FILTER. DRAIN	SP04-10
19	SUCTION STRAINER	Y-3844
20	TANK ASSY HYDR	
21	ENGINE ASSY	
22	VALVE. CHECK	
23	VALVE. SOLENOID	VBY-119
24	VALVE. HOLDING	KHV20EA10
25	VALVE. CHECK	
26	VALVE. BYPASS	VBY125
27	AIR-BREATHER	
28	VALVE. SOLENOID	VBY-121
29	ACCUMULATOR	ME70-500-30
30	VALVE. RESTRICTOR	
31	VALVE. REDUCING	
32	VALVE. CHECK	
33	VALVE. CONTROL	
34		
35	SWITCH. PRESS	

(ASIA)


BUCKRT
ARM
BOOM
Dr
R.H.
L.H.
PG
SW
PA1
PB2
PA3
PA
AC
BC
Ar
Br
T
B1
A1
(P4)
(P0P1)
Pi1
PBC
PA2
PBb
PB1
Pigb
PS
P1
P2
Pigc
PiS
PB3
PA3
PB4
PA4
PB1
PA2
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Pi2
Pm2
M
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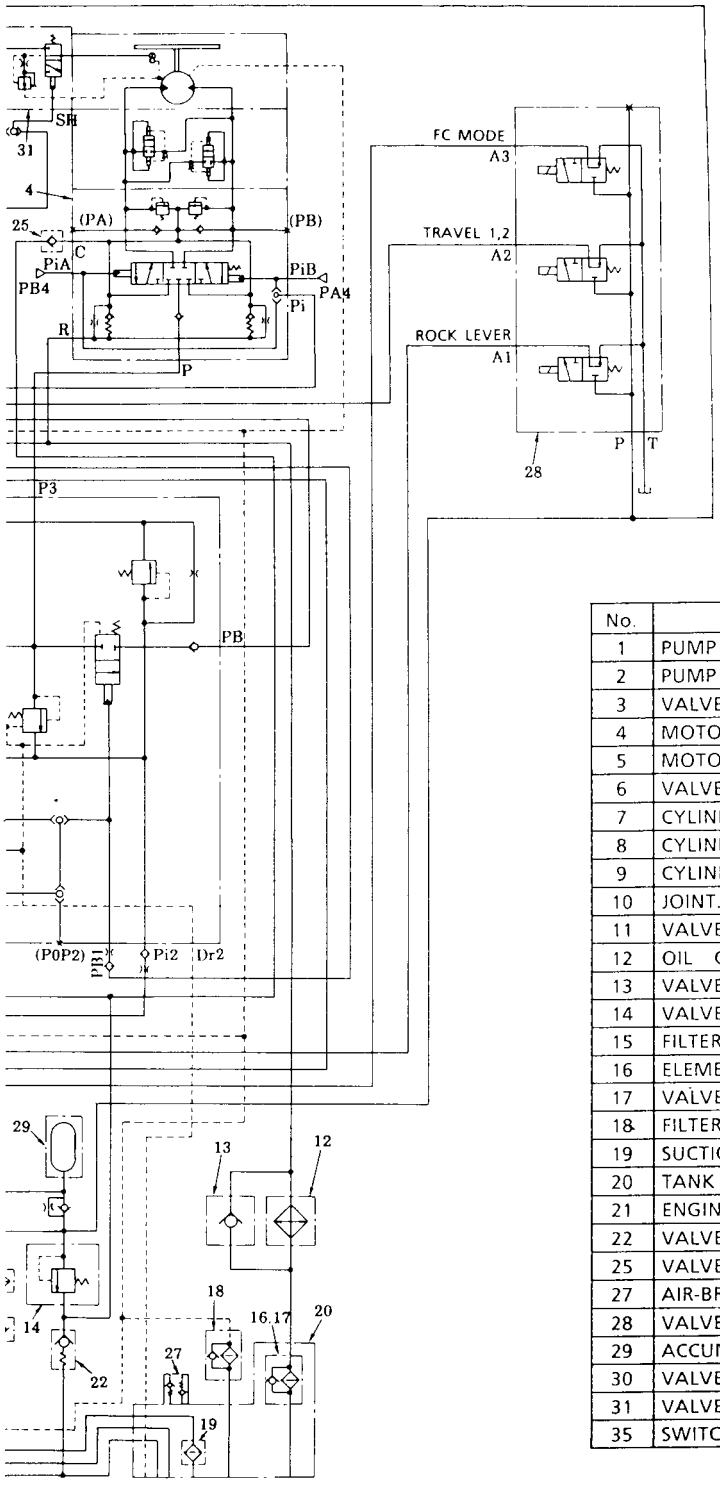
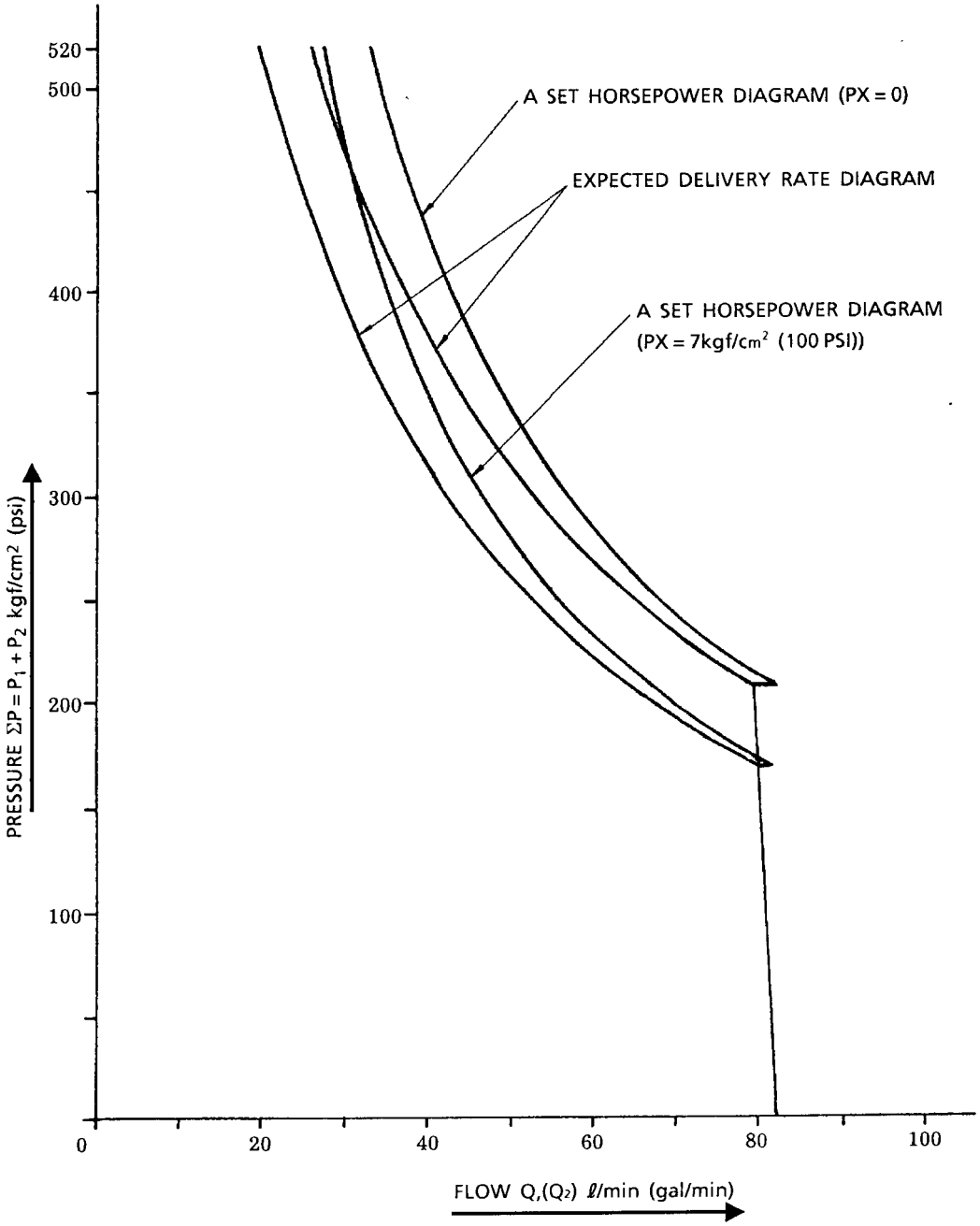
2
15
25
30
11



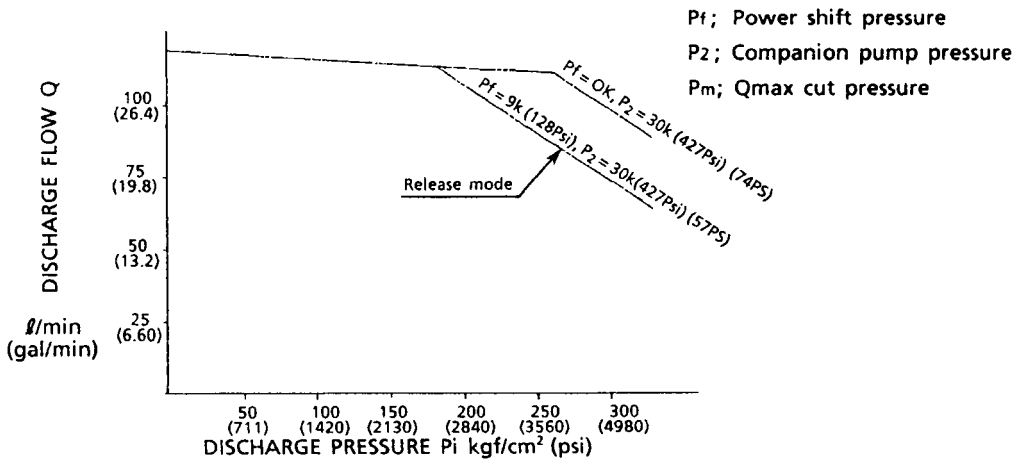
No.	NAME	TYPE
1	PUMP	K3Y112DT
2	PUMP GEAR	KP1009
3	VALVE. CONTROL	KM x 15C
4	MOTOR ASSY	M2 x 150 + 15R
5	MOTOR	MV150/114
6	VALVE. BRAKE	RBV24
7	CYLINDER	
8	CYLINDER	
9	CYLINDER	
10	JOINT. SWIVEL	
11	VALVE. PILOT	TH40K
12	OIL COOLER	
13	VALVE. CHECK	Y-2395
14	VALVE. RELIEF	VRD-03
15	FILTER. LINE	Y-1795
16	ELEMENT. FILTER	Y-1635
17	VALVE. BYPASS	Y-1506
18	FILTER. DRAIN	SP04-10
19	SUCTION STRAINER	F1877
20	TANK ASSY HYDR	
21	ENGINE ASSY	
22	VALVE. CHECK	
25	VALVE. CHECK	
27	AIR-BREATHER	
28	VALVE, SOLENOID	VBY-121
29	ACCUMULATOR	ME70-500-30
30	VALVE. RESTRICTOR	
31	VALVE, REDUCING	
35	SWITCH. PRESS	

PQ CURVE PUMP

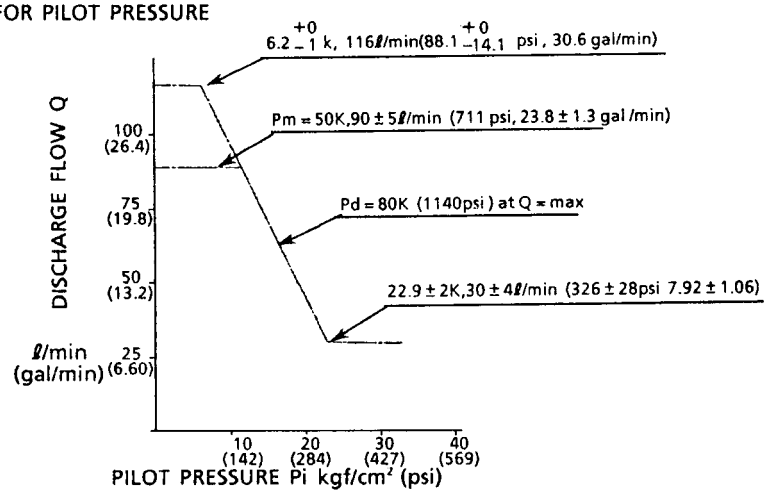
PUMP CONTROL CURVE



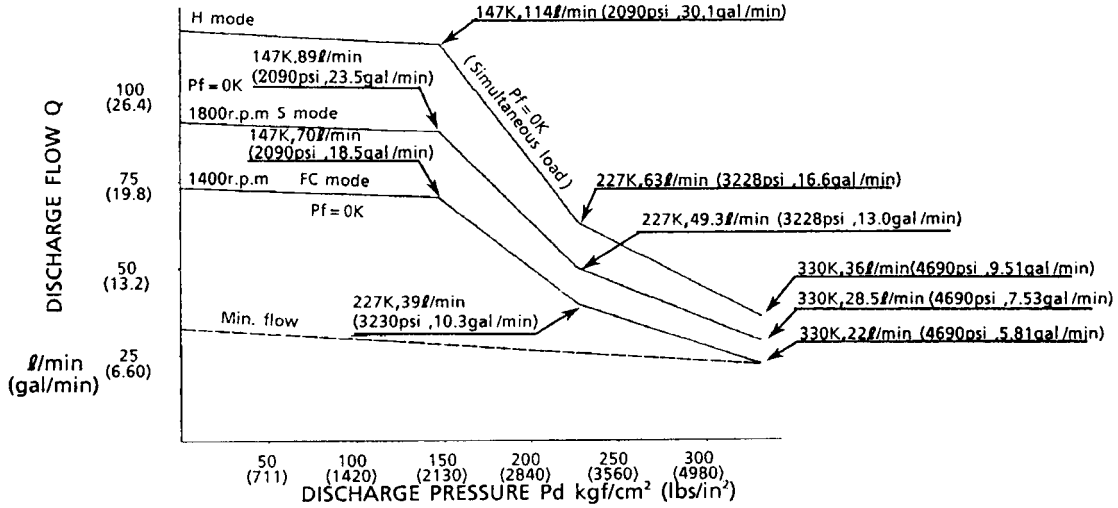
PQ CURVE OF PUMP (TWO PUMPS)



DISCHARGE RATE CURVE FOR PILOT PRESSURE

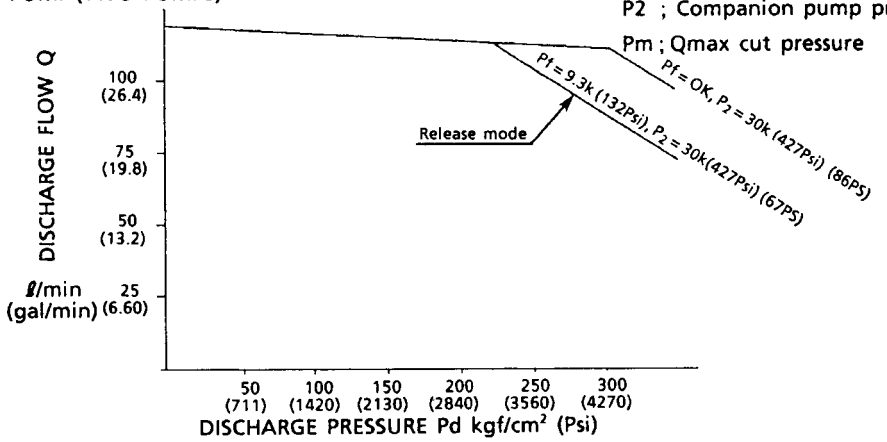


ONE PUMP HORSEPOWER CONTROL CURVE

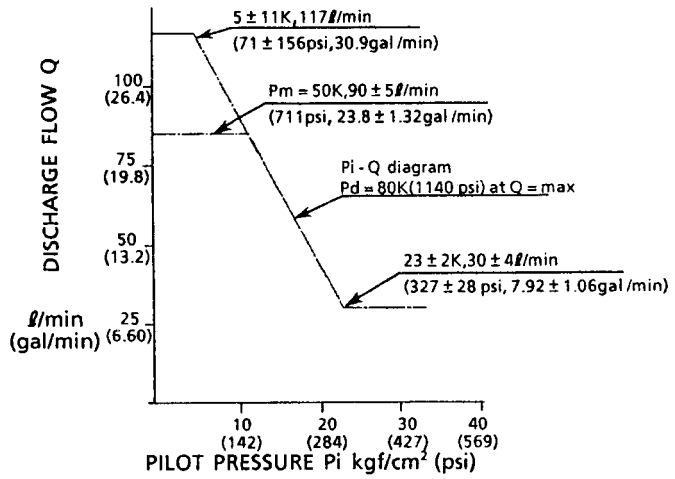


PQ CURVE OF PUMP (TWO PUMPS)

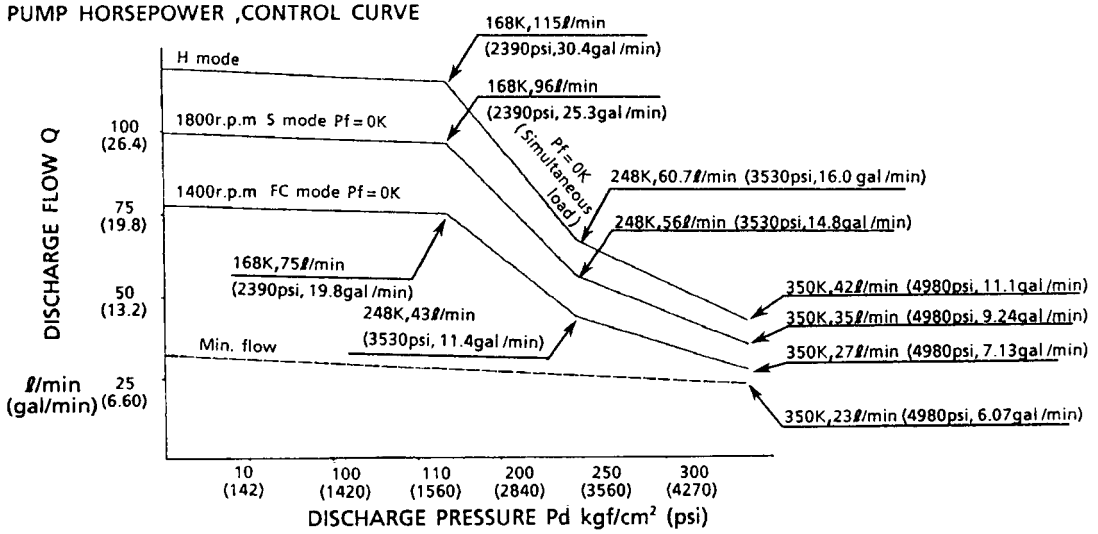
Pf ; Power shift pressure
P2 ; Companion pump pressure
Pm ; Qmax cut pressure



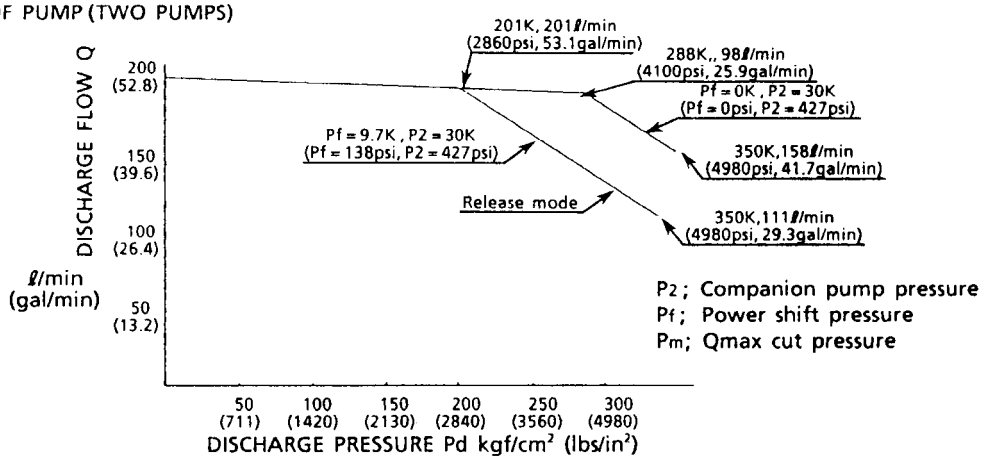
DISCHARGE RATE CURVE FOR PILOT PRESSURE



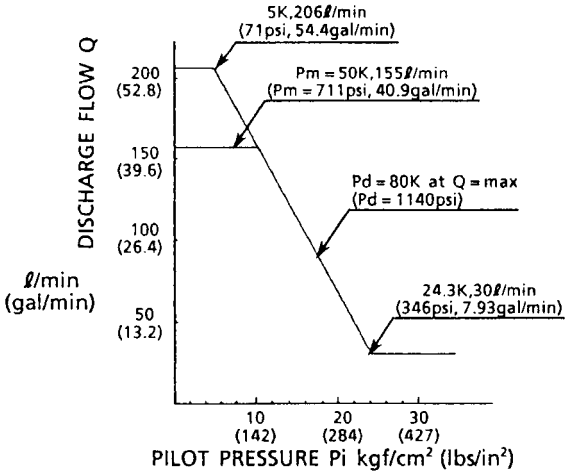
ONE PUMP HORSEPOWER ,CONTROL CURVE



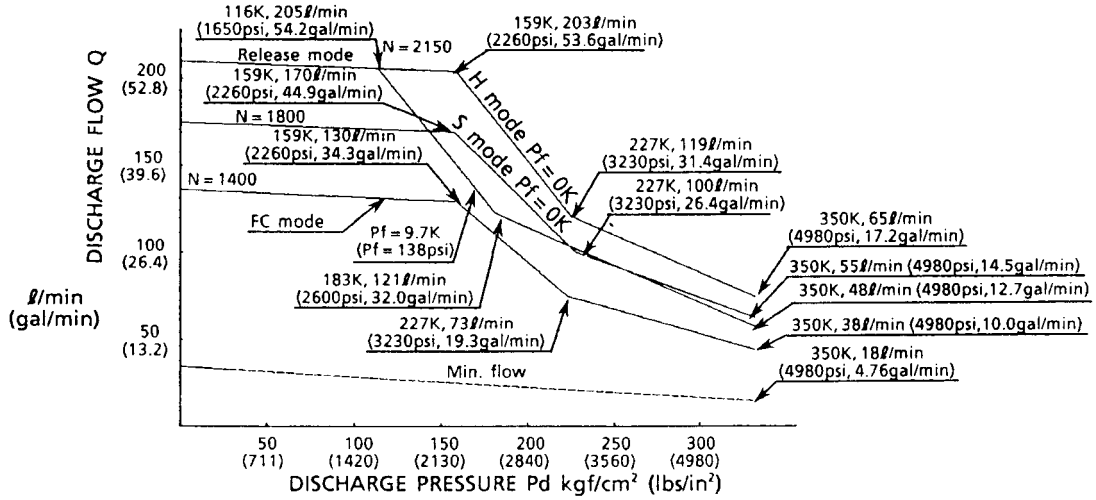
PQ CURVE OF PUMP (TWO PUMPS)



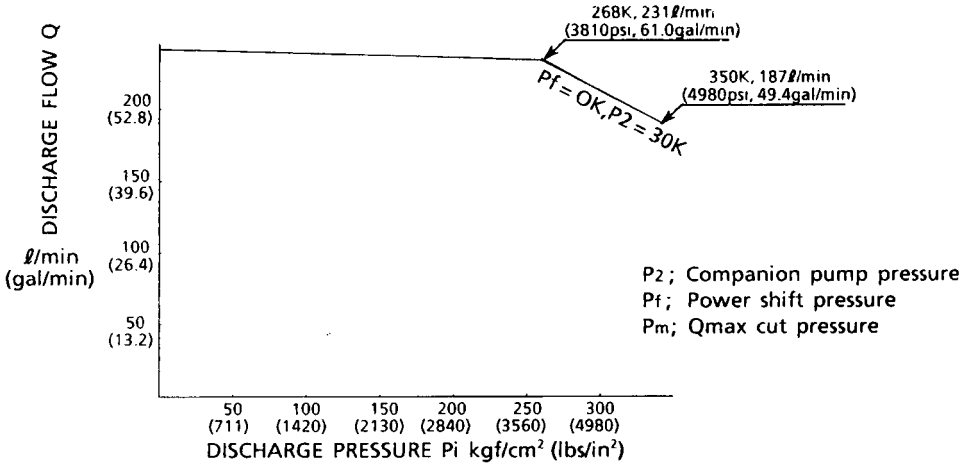
DISCHARGE RATE CURVE FOR PILOT PRESSURE



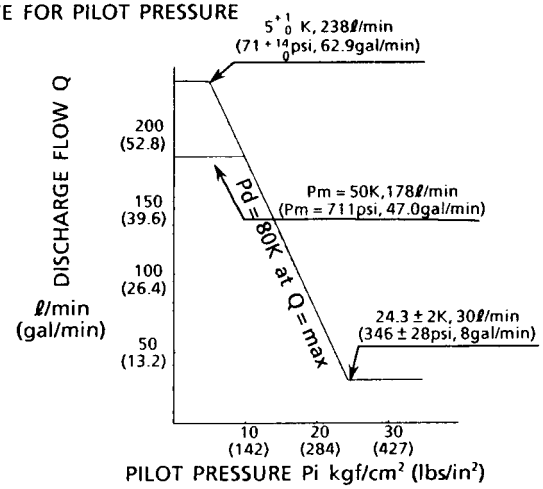
ONE PUMP HORSEPOWER CONTROL CURVE



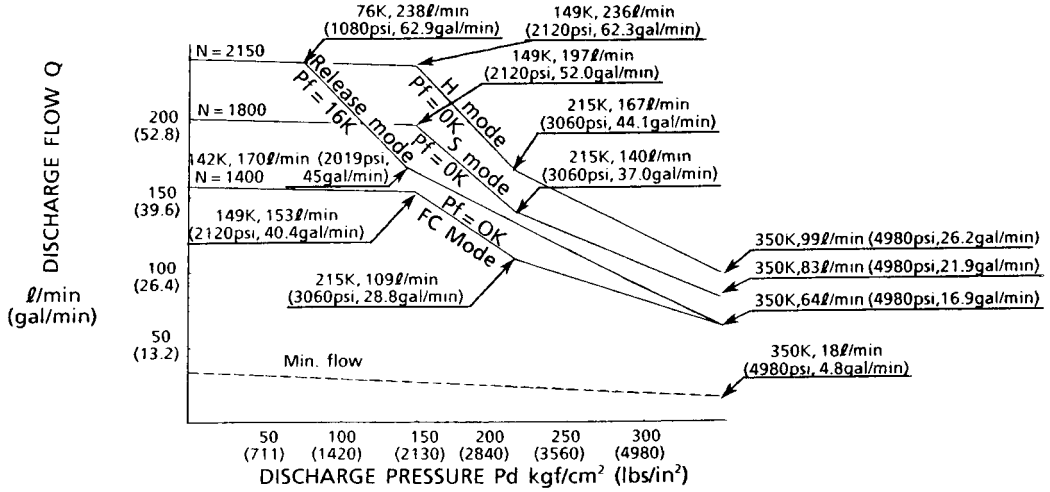
PQ CURVE OF PUMP (TWO PUMPS)



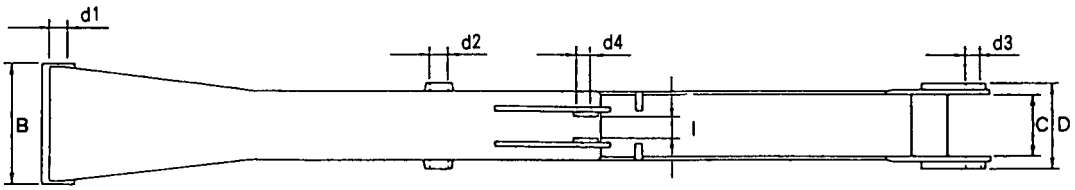
DISCHARGE RATE CURVE FOR PILOT PRESSURE

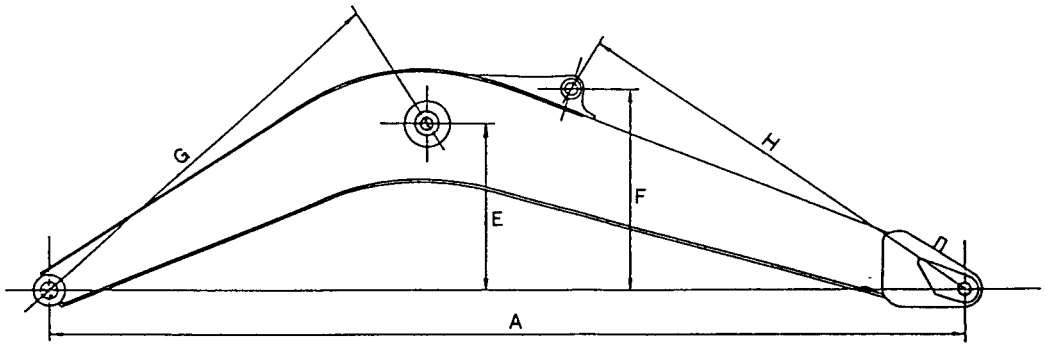


ONE PUMP HORSEPOWER CONTROL CURVE



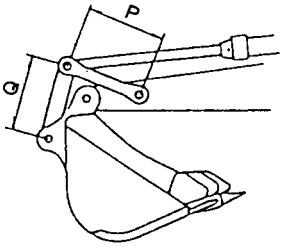
DIMENSIONS FOR ATTACHMENT

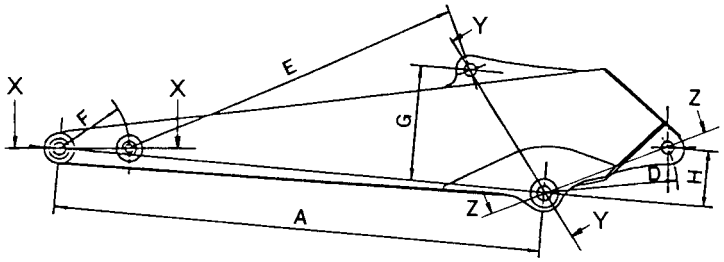


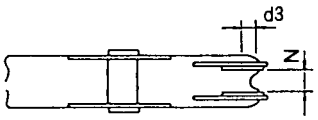


A : Boom dimensions
B : Boom foot width
C : Boom head inside width
D : Boom head outside width
E : Height of center pin
F : Height of arm hydraulic cylinder pin(Bottom side)
G : Distance between pins of boss
H : Distance between pins of bracket
I : Arm cylinder inside width (Bottom side)
d1 : Diameter of boon foot pin
d2 : Diameter of boom bydraulic cylinder pin (Rod side)
d3 : Diameter of boom head pin
d4 : Diameter of arm hydraulic cylin der pin (Bottom side)

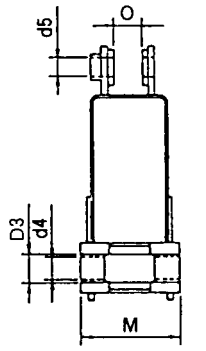
SK60 SK100 SK120 SK120LC
SK200 SK200LC SK220 SK220LC



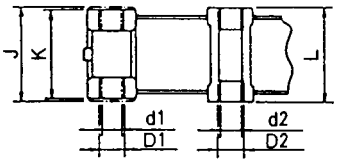




SECTION Z–Z

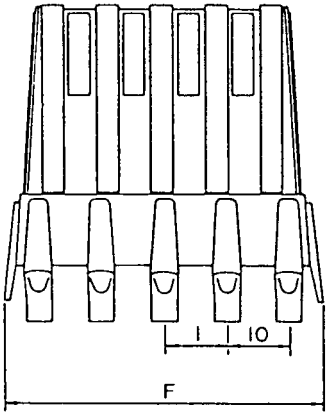


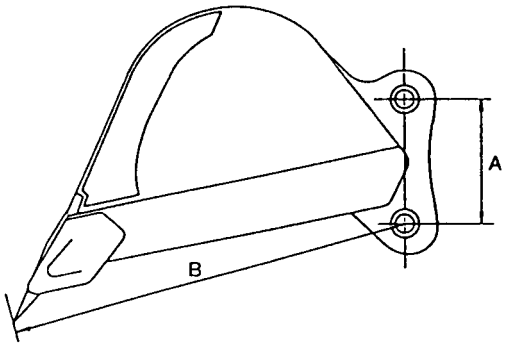
SECTION Y–Y

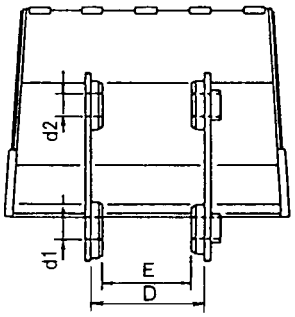


SECTION X–X

A : Arm dimensions
D : Distance between boss pin and bracket pin
D1 : Inside diameter of boss
D2 : Inside diameter of boss
D3 : Inside diameter of boss
E : Distance between boss pin and bracket pin
F : Distance between pins of boss
G : Height between boss pin and bracket pin
H : Height between boss pin and bracket pin
J : Arm head width (with bush)
K : Boss width
L : Arm head width
M : Boss width
N : Bracket inside width
O : Bracket inside wedth
P : Link dimension
Q : Rod dimension
d1 : Diameter of pin
d2 : Diameter of pin
d3 : Diameter of pin
d4 : Diameter of pin
d5 : Diameter of pin







A : Distance be tween pins of bracket
B : Distance from bucket pin to tooth head
D : Bracket outside width
E : Bracket inside width
F : Side cutter outside width
I : Pitch between teeth
IO : Pitch between teeth
d1 : Diameter of pin
d2 : Diameter of pin

Unit : mm(ft-in)

	Boom	Arm			Bucket						
	3.7M (12'1.6")	1.73M (5' 8.1")	2.15M (7' 0.6")			0.1M³ (0.13)	0.16M³ (0.20)	0.2M³ (0.26)	0.25M³ (0.33)	0.3M³ (0.39)	
A	3,700 (12'1.6")	1,730 (5' 8.1")	2,150 (7' 0.6")			290 (11.4")	290 (11.4")	290 (11.4")	290 (11.4")	290 (11.4")	
B	400 (1' 3.7")	–	–			R1040 (R3'4.9")	R1040 (R3'4.9")	R1040 (R3'4.9")	R1040 (R3'4.9")	R1040 (R3'4.9")	
C	216 (8.5")	–	–			–	–	–	–	–	
D	304 (11.9")	R515.5 (R1'8.3")	R509 (1' 8.0")			238 (9.3")	238 (9.3")	238 (9.3")	238 (9.3")	238 (9.3")	
D1	–	φ65 (φ2.5")	φ65 (φ2.5")			–	–	–	–	–	
D2	–	φ65 (φ2.5")	φ65 (φ2.5")			–	–	–	–	–	
D3	–	φ75 (φ2.9")	φ75 (φ2.9")			–	–	–	–	–	
E	858 (2' 9.7")	R1485(R4'10.4")	R1485(R4'10.4")			182 (7.1")	182 (7.1")	182 (7.1")	182 (7.1")	182 (7.1")	
F	1185 (3' 10.6")	R234 (R9.2")	R234 (R9.2")			400 (1' 3.7")	557 (1' 9.9")	652 (2'1.6")	770 (2' 6.3")	887 (2' 10.9")	
J	R1828 (R6'0.0")	420 (1' 4.5")	420 (1' 4.5")			–	–	–	–	–	
H	R1829 (R6'0.0")	290 (11.4")	275 (10.8")			–	–	–	–	–	
I	97 (3.8")	–	–		I	146 (5.7")	186.5 (7.3")	234 (9.2")	196 (7.7")	235 (9.2")	
J	–	180 (7.1")	180 (7.1")		IO	–	–	–	195 (7.6")	234 (9.2")	
K	–	162 (6.3")	162 (6.3")			–	–	–	–	–	
L	–	180 (7.1")	180 (7.1")			–	–	–	–	–	
M	–	214 (8.4")	214 (8.4")			–	–	–	–	–	
N	–	97 (3.8")	97 (3.8")			–	–	–	–	–	
O	–	87 (3.4")	87 (3.4")			–	–	–	–	–	
P	–	420 (1' 4.5")	420 (1' 4.5")			–	–	–	–	–	
Q	–	380 (1' 2.9")	380 (1' 2.9")			–	–	–	–	–	
d1	φ60 (φ2.3")	φ50 (φ1.9")	φ50 (φ1.9")			φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	
d2	φ55 (φ2.1")	φ50 (φ1.9")	φ50 (φ1.9")			φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	φ50 (φ1.9")	
d3	φ60 (φ2.3")	φ55 (φ2.1")	φ55 (φ2.1")			–	–	–	–	–	
d4	φ55 (φ2.1")	φ60 (φ2.3")	φ60 (φ2.3")			–	–	–	–	–	
d5	–	φ50 (φ1.9")	φ50 (φ1.9")			–	–	–	–	–	

Unit : mm(ft-in)

	Boom	Arm			Bucket						
						M^3 (Cuyd)					
	4.26M (13'11.7")	1.9M (6' 2.8")	2.27M (7' 5.3")	2.77M (9' 1.0")		0.15M^3 (0.20)	0.25M^3 (0.33)	0.3M^3 (0.39)	0.35M^3 (0.46)	0.4M^3 (0.52)	0.45M^3 (0.59)
A	4.26 (13'11.7")	1,900 (6' 2.8")	2,270 (7' 5.3")	2,770 (9' 1.0")		375 (1' 2.7")	375 (1' 2.7")	375 (1' 2.7")	375 (1' 2.7")	375 (1' 2.7")	375 (1' 2.7")
B	580 (1' 10.8")	–	–	–		R1200(R3'11.2")	R1210(R3'11.6")	R1210(R3'11.3")	R1210(R3'11.3")	R1210(R3'11.3")	R1210(R3'11.3")
C	232 (9.13")	–	–	–							
D	388 (1' 3.27")	R635 (R2'1.0")	R622 (R2'0.4")	R624 (R2'0.5")		274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")
D1	–	ϕ75 (ϕ2.9")	ϕ75 (ϕ2.9")	ϕ75 (ϕ2.9")							
D2	–	ϕ75 (ϕ2.9")	ϕ75 (ϕ2.9")	ϕ75 (ϕ2.9")							
D3	–	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")							
E	913 (2' 11.9")	R1960.5 (R6'5.1")	R1962.5 (R6'5.2")	R1962.5 (R6'5.2")		218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")
F	1034 (3' 4.7")	R350 (R1' 1.7")	R350 (R1'1.7")	R350 (R1'1.7")		450 (1' 5.7")	560 (1' 10.0")	750 (2' 5.5")	836 (2' 8.9")	921 (3' 0.2")	1005 (3' 3.5")
G	R1942 (R6'4.4")	515 (1' 8.2")	465.5 (1' 6.3")	502 (1' 7.7")		–	–	–	–	–	–
H	R2131(R6'11.8")	280 (11.0")	235 (9.2")	255.5 (10.0")		–	–	–	–	–	–
I	102 (4.0")	–	–	–	I	172.5 (6.8")	217 (8.5")	175 (6.9")	203 (8.0")	230 (9.0")	194 (7.6")
J	–	216 (8.5")	216 (8.5")	216 (8.5")	IO	172.5 (6.8")	217 (8.5")	173 (6.8")	202 (7.9")	229 (9.0")	194 (7.6")
K	–	198 (7.8")	198 (7.8")	198 (7.8")		–	–	–	–	–	–
L	–	216 (8.5")	216 (8.5")	216 (8.5")		–	–	–	–	–	–
M	–	232 (9.1")	232 (9.1")	232 (9.1")		--	–	–	–	–	–
N	–	102 (4.0")	102 (4.0")	102 (4.0")		–	–	–	–	–	–
O	–	92 (3.6")	92 (3.6")	92 (3.6")		–	–	–	–	–	–
P	–	565 (1' 10.2")	565 (1' 10.2")	565 (1' 10.2")		–	–	–	–	–	–
Q	–	545 (1' 9.4")	545 (1' 9.4")	545 (1' 9.4")		–	–	–	–	–	–
d1	ϕ70 (ϕ2.7")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")		ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")
d2	ϕ75 (ϕ2.9")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")		ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")
d3	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")		–	–	–	–	–	–
d4	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")		–	–	–	–	–	–
d5	–	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")	ϕ60 (ϕ2.3")		–	–	–	–	–	–

Unit : mm(ft-in)

	Boom	Arm			Bucket						
	4.6M (15'1.1")	2.1M (6' 10.6")	2.5M (8' 2.4")	3.0M (9' 10.11")		0.3M³ (0.39)	0.35M³ (0.46)	0.45M³ (0.59)	0.5M³ (0.65)	M³ (Cuyd)	
A	4,600 (15'1.1")	2,100 (6' 10.6")	2,500 (8' 2.4")	3,000 (9' 10.11")		370 (1' 2.5")	370 (1' 2.5")	370 (1' 2.5")	370 (1' 2.5")		
B	580 (1' 10.8")	–	–	–		R1241.3 (R4'0.8")	R1241.3 (R4'0.8")	R1241.3 (R4'0.8")	R1241.3 (R4'0.8")		
C	275 (10.8")	–	–	–		–	–	–	–		
D	386 (1' 3.2")	R670 (R2'2.3")	R667.5 (2' 2.2")	R681 (R2'2.8")		324 (12.7")	324 (12.7")	324 (12.7")	324 (12.7")		
D1	–	φ8.0 (φ3.1")	φ8.0 (φ3.1")	φ8.0 (φ3.1")		–	–	–	–		
D2	–	φ75 (φ2.9")	φ75 (φ2.9")	φ75 (φ2.9")		–	–	–	–		
D3	–	φ85 (φ3.3")	φ85 (φ3.3")	φ85 (φ3.3")		–	–	–	–		
E	1028 (3' 4.4")	R1876 (R6'1.8")	R1876 (R6'1.8")	R1876 (R6'1.8")		252 (9.9")	252 (9.9")	252 (9.9")	252 (9.9")		
F	1112 (3' 7.7")	R350 (R1'1.7")	R350 (R1'1.7")	R350 (R1'1.7")		735 (2' 4.9")	818 (2' 8.2")	983 (3' 2.7")	1064 (3' 5.8")		
G	R2111.5 (R6'11.1")	490 (1' 7.3")	460.5 (1' 6.1")	480 (1' 6.9")							
H	R2367 (R7'9.2")	267 (10.5")	248.5 (9.7")	280 (11.0")							
I	102 (4.0")	–	–	–	I	169 (6.6")	197 (7.7")	189 (7.4")	208 (8.1")		
J	–	250 (9.8")	250 (9.8")	250 (9.8")	IO	169 (6.6")	197 (7.7")	189 (7.4")	208 (8.1")		
K	–	232 (9.1")	232 (9.1")	232 (9.1")		–	–	–	–		
L	–	250 (9.8")	250 (9.8")	250 (9.8")		–	–	–	–		
M	–	274 (10.7")	274 (10.7")	274 (10.7")		–	–	–	–		
N	–	102 (4.0")	102 (4.0")	102 (4.0")		–	–	–	–		
O	–	92 (3.6")	92 (3.6")	92 (3.6")		–	–	–	–		
P	–	522 (1' 8.5")	522 (1' 8.5")	522 (1' 8.5")		–	–	–	–		
Q	–	500 (1' 7.6")	500 (1' 7.6")	500 (1' 7.6")		–	–	–	–		
d1	φ70 (φ2.7")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")		φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")		
d2	φ75 (φ2.9")	φ60 (φ2.3")	φ60 (φ2.3")	φ60 (φ2.3")		φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")		
d3	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")		–	–	–	–		
d4	φ70 (φ2.7")	φ60 (φ2.3")	φ60 (φ2.3")	φ60 (φ2.3")		–	–	–	–		
d5	–	φ60 (φ2.3")	φ60 (φ2.3")	φ60 (φ2.3")		–	–	–	–		

Unit : mm(ft-in)

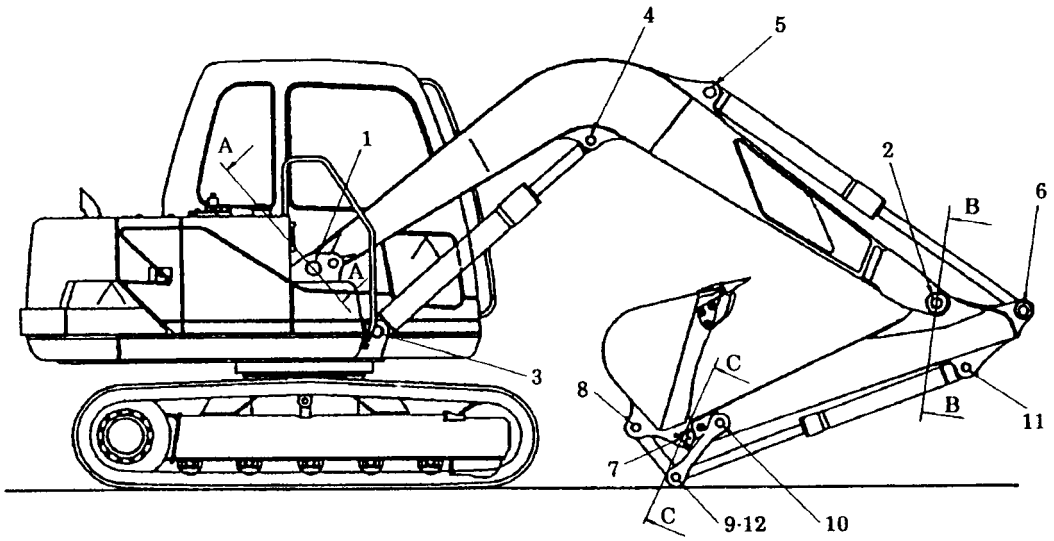
	Boom	Arm			Bucket						
						M^3 (Cuyd)					
	5.6M (18'4.7")	2.4M (7' 10.4")	2.94M (9' 7.7")	3.3M (10'9.9")		0.45M^3 (0.59)	0.6M^3 (0.78)	0.7M^3 (0.92)	0.8M^3 (1.05)	0.9M^3 (1.18)	1.1M^3 (1.44)
A	5,600 (18'4.7")	2,400 (7' 10.4")	2,940 (9' 7.7")	3,300 (10'9.9")		430 (1' 4.9")	430 (1' 4.9")	430 (1' 4.9")	430 (1' 4.9")	430 (1' 4.9")	430 (1' 4.9")
B	680 (2' 2.7")	–	–	–		R1450 (R4'9.0")	R1450 (R4'9.0")	R1450 (R4'9.0")	R1450 (R4'9.0")	R1450 (R4'9.0")	R1450 (R4'9.0")
C	353 (1' 1.9")	–	–	–		–	–	–	–	–	–
D	490 (1' 7.3")	R840 (R2'9.0")	R815 (R2'8.0")	R815 (R2'8.0")		399 (15.7")	399 (15.7")	399 (15.7")	399 (15.7")	399 (15.7")	399 (15.7")
D1	–	ϕ95 (ϕ3.7")	ϕ95 (ϕ3.7")	ϕ95 (ϕ3.7")		–	–	–	–	–	–
D2	–	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")		–	–	–	–	–	–
D3	–	ϕ95 (ϕ3.7")	ϕ95 (ϕ3.7")	ϕ95 (ϕ3.7")		–	–	–	–	–	–
E	1025 (3' 4.3")	R2208 (R7'2.9")	R2205.5 (R7'2.8")	R2205.5 (R7'2.8")		327 (128")	327 (128")	327 (128")	327 (128")	327 (128")	327 (128")
F	1165 (3' 9.8")	R420 (R1'4.5")	R420 (R1'4.5")	R420 (R1'4.5")		837 (2' 8.9")	1064 (3' 5.8")	1157 (3." 9.5")	1282 (4' 2.7")	1407 (4' 7.3")	1547 (5' 0.9")
G	R2466 (8'1.0")	681 (2' 2.8")	601 (1' 11.6")	600 (1' 11.6")		–	–	–	–	–	–
H	R2700 (R8'10.3")	352.3 (1' 1.8")	272 (10.7")	238.5 (9.4")		–	–	–	–	–	–
I	122 (4.8")	–	–	–	I	287 (11.3")	200 (7.8")	223 (8.7")	255 (10.0")	230 (9.0")	280 (11.0")
J	–	325 (12.8")	325 (12.8")	325 (12.8")	IO	287 (11.3")	200 (7.8")	223 (8.7")	254 (10.0")	237 (9.3")	280 (11.0")
K	–	305 (11.8")	305 (11.8")	305 (11.8")							
L	–	325 (12.8")	325 (12.8")	325 (12.8")							
M	–	352 (1' 1.8")	352 (1' 1.8")	352 (1' 1.8")							
N	–	122 (4.8")	122 (4.8")	122 (4.8")							
O	–	102 (4.0")	102 (4.0")	102 (4.0")							
P	–	646 (2' 1.4")	646 (2' 1.4")	666 (2' 2.2")							
Q	–	640 (2' 1.2")	640 (2' 1.2")	640 (2' 1.2")							
d1	ϕ70 (ϕ2.7")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")		ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")
d2	ϕ75 (ϕ2.9")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")	ϕ70 (ϕ2.7")		ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")
d3	ϕ70 (ϕ2.7")	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")	ϕ85 (ϕ3.3")		–	–	–	–	–	–
d4	ϕ70 (ϕ2.7")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")		–	–	–	–	–	–
d5	–	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")	ϕ80 (ϕ3.1")		–	–	–	–	–	–

Unit : mm(ft-in)

	Boom	Arm			Bucket					M³(Cuyd)	
	6.02M (19'9.0")	6.02M (8' 2.4")	2.98M (9' 9.3")	3.66M (12'0.1")		0.7M³ (0.92)	0.9M³ (1.18)	1.0M³ (1.31)	1.2M³ (1.57)		
A	6,020 (19'9.0")	6,020 (8' 2.4")	2,980 (9' 9.3")	3,660 (12'0.1")		500 (1' 7.6")	500 (1' 7.6")	500 (1' 7.6")	500 (1' 7.6")		
B	750 (2' 5.5")	–	–	–		R1515(R4'11.6")	R1515(R4'11.6")	R1515(R4'11.6")	R1515(R4'11.6")		
C	351 (1' 1.8")	–	–	–		–	–	–	–		
D	508 (1' 7.8")	R975 (R3'2.3")	R929.5 (R3'0.6")	R925 (R3'0.4")		399 (15.7")	399 (15.7")	399 (15.7")	399 (15.7")		
D1	–	φ105 (φ4.1")	φ105 (φ4.1")	φ105 (φ4.1")		–	–	–	–		
D2	–	φ85 (φ3.3")	φ85 (φ3.3")	φ85 (φ3.3")		–	–	–	–		
D3	–	φ105 (φ4.1")	φ105 (φ4.1")	φ105 (φ4.1")		–	–	–	–		
E	1143.5 (3' 9.0")	R2352 (R7'8.6")	2356.5 (R7'8.7")	2356.5 (R7'8.7")		327 (12.8")	327 (12.8")	327 (12.8")	327 (12.8")		
F	1329.5 (4' 4.3")	R450 (R1'5.7")	R450 (R1'5.7")	R450 (R1'5.7")		1060 (3' 5.7")	1279 (4' 2.3")	1388 (4' 6.6")	1506 (4' 11.3")		
G	R2608.5 (R8' 6.7")	750 (2' 5.5")	705.5 (2' 3.7")	705.5 (2' 3.7")		–	–	–	–		
H	R3080 (R10' 1.2")	373.5 (1' 2.7")	324 (1' 0.7")	295 (11.6")		–	–	–	–		
I	132 (5.2")	–	–	–	I	256 (10.0")	329 (12.9")	274 (10.7")	263 (10.3")		
J	–	325 (12.7")	325 (12.7")	325 (12.7")	IO	256 (10.0")	329 (12.9")	274 (10.7")	263 (10.3")		
K	–	303 (11.9")	303 (11.9")	303 (11.9")		–	–	–	–		
L	–	325 (12.7")	325 (12.7")	325 (12.7")		–	–	–	–		
M	–	350 (1' 1.7")	350 (1' 1.7")	350 (1' 1.7")		–	–	–	–		
N	–	132 (5.2")	132 (5.2")	132 (5.2")		–	–	–	–		
O	–	112 (4.4")	112 (4.4")	112 (4.4")		–	–	–	–		
P	–	666 (2' 2.2")	666 (2' 2.2")	666 (2' 2.2")		–	–	–	–		
Q	–	599.5 (1' 11.6")	599.5 (1' 11.6")	599.5 (1' 11.6")		–	–	–	–		
d1	φ100 (φ3.9")	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")		φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")		
d2	φ95 (φ3.7")	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")		φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")		
d3	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")		–	–	–	–		
d4	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")	φ90 (φ3.5")		–	–	–	–		
d5	–	φ80 (φ3.1")	φ80 (φ3.1")	φ80 (φ3.1")		–	–	–	–		

MAINTENANCE STANDARDS

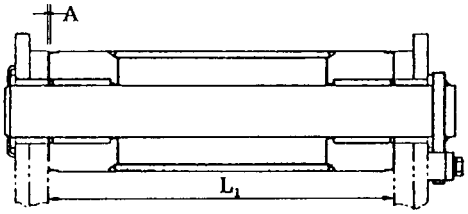
CLEARANCE BETWEEN PINS AND BUSHING



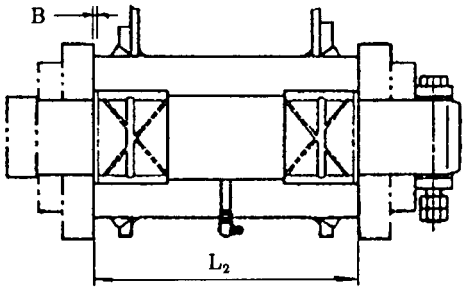
Unit : mm (ft-in)

No.	Item	Standard Value				Allowable Value	Remedy
		Pin Dia	Tolerance for pin O.D.	Tolerance for BushingI.D.	Clearance		
1	Boom foot	Ø60 (Ø2.3622˝)	−0.15 (0.0059˝) ∼ −0.21 (0.0083˝)	+0.177 (0.0070˝) ∼ +0.043 (0.0017˝)	+0.193 (0.0076˝) ∼ +0.387 (0.0152˝)	2.0 (0.08˝)	Replace bushing or pin.
2	Arm center						
3	Boom cylinder (Bottom side)			+0.25 (0.0098˝) ∼ +0.05 (0.0020˝)	+0.20 (0.0079˝) ∼ +0.20 (0.0181˝)		
4	Boom cylinder (Rod side)	Ø55 (Ø2.1654˝)					
5	Arm cylinder (Bottom side)						
6	Arm cylinder (Rod side)						
7	Arm point	Ø50 (Ø1.9685˝)		+0.189 (0.0074˝) ∼ +0.052 (0.0020˝)	+0.202 (0.0080˝) ∼ +0.399 (0.0157˝)		
8	Bucket link (Bucket connection)						
9	Bucket link						
10	Idler link (Arm connection)						
11	Bucket cylinder (Bottom side)			+0.25 (0.0098˝) ∼ +0.05 (0.0020˝)	+0.20 (0.0079˝) ∼ +0.46 (0.0181˝)		
12	Bucket cylinder (Rod side)						

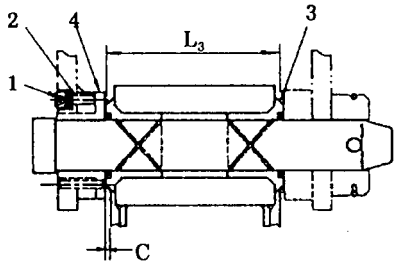
CLEARANCE IN THRUST DIRECTION OF BOOM, ARM AND BUCKET



BOOM FOOT SECTION



ARM CENTER SECTION



ARM POINT SECTION

1. SOCKET BOLT
2. SHIM
3. O RING
4. BUSHING

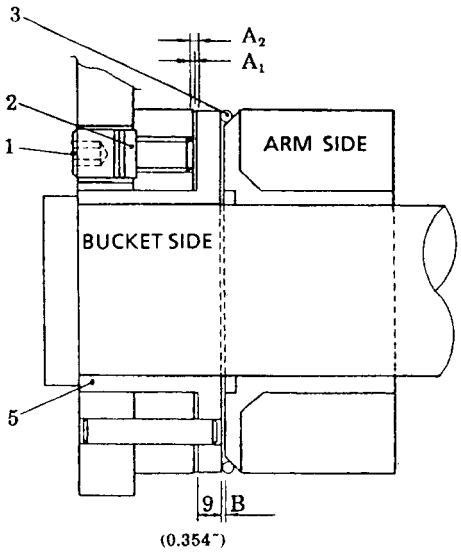
Unit : mm (in)

Item			Tolerance		Clearance	Adjust shims standerd value	Clearance allowable value
Boom foot section	Boom	L1	$400\ {}^{0}_{-0.2}$ (15.748″ $^{0}_{-0.008}$″)	A	2.0 (0.079″) ∫ 4.2 (0.165″)	2 or under	4 (0.158″)
	Upper frame		$402\ {}^{+2.0}_{0}$ (15.827″ $^{+0.079}_{0}$″)				
Arm center section	Arm side	L2	214±0.2 (8.425″±0.008″)	B	1.8 (0.071″) ∫ 4.2 (0.165″)	1 or under	2 (0.079″)
	Boom side		$216\ {}^{+2.0}_{0}$ (8.504″ $^{+0.079}_{0}$″)				
Arm point section	Arm side	L3	180±0.3 (7.087″±0.012″)	C	1.5 (0.059″) ∫ 2.5 (0.0.98″)	1 or under	2 (0.079″)
	Bucket side		182±0.2 (7.165″±0.008″)				

ADJUSTING CLEARANCE BETWEEN BUCKET AND ARM (SEE FIG.13)

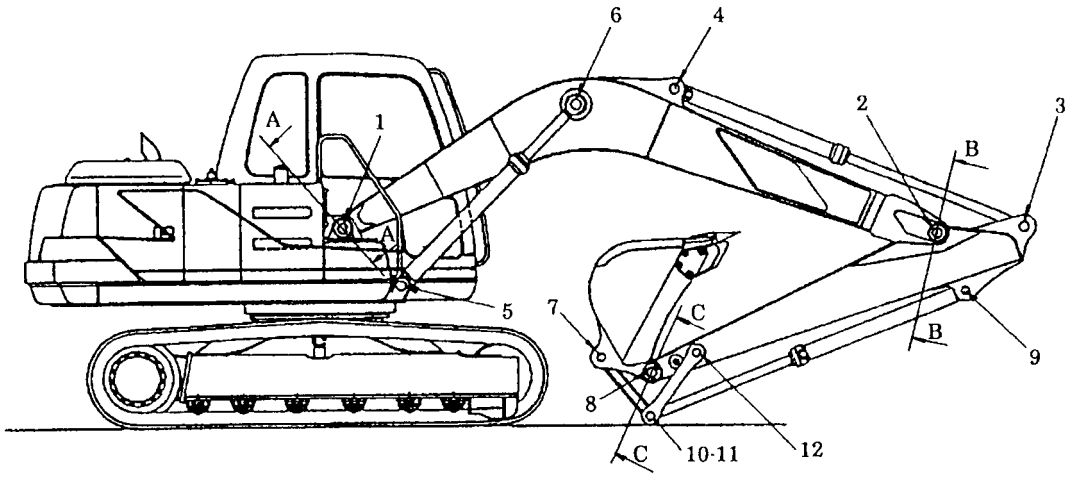
(1) Clearance adjusting procedure

1) Shift O ring (3) to the boss on the arm side, using a spatula or something.
2) Measure clearance (A1).
3) Loosen three socket screws (1), remove shims (2), tighten three socket screws (1) evenly, and press bushing (5) and tighten socket screws (1) till clearance (B) gets to 0.5 ~1.0mm (0.02~0.04in) (provided clearance (C) on the opposite side is in close contact).
4) Measure clearance (A2).
5) The thickness of a single shim (2) is 1mm (0.04in).
6) Clearance (A2) less the initaially measured clearance (A1) is the thickness of shims (2) to be taken off.
7) Confirm that clearance (B) falls within the standard value.
8) Fit O ring (3) to its original position.



☞
- Use care so as not to damage O ring (3) when shifting O ring (3) with a spatula.
- When removing shim (2) and extruding bushing (5) to the rights with three socket screws (1), do not tighten them too hard and take care so clearance (C) is not within the standard value.
- Inspect clearances every 120 hours in normal operation. In case of special operation perform inspection earlier than usual and adjust them as required.

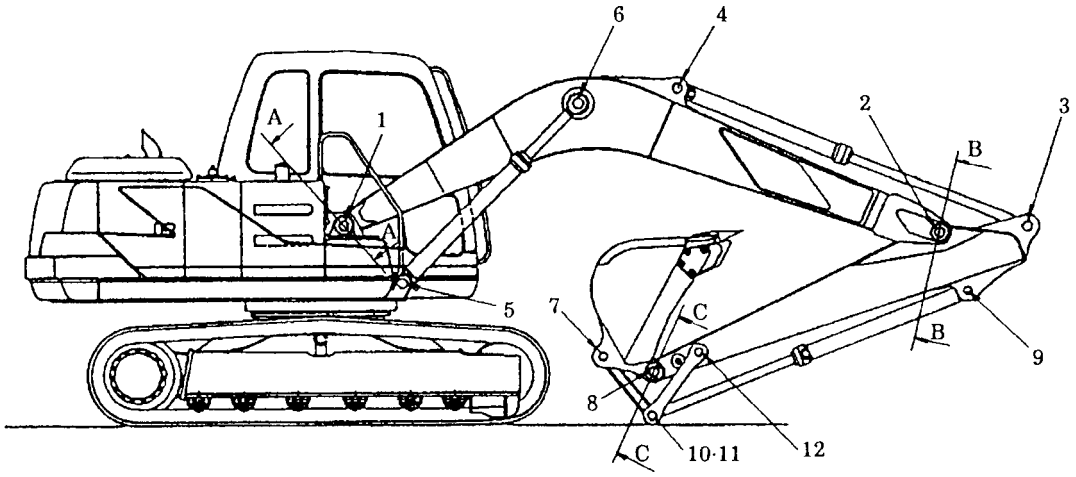
CLEARANCE BETWEEN PINS AND BUSHING



Unit : mm (ft-in)

No.	Item	Standard Value				Allowable Value	Remedy
		Pin Dia	Tolerance for pin O.D.	Tolerance for Bushing I.D.	Clearance		
1	Boom foot	Ø70 (Ø 2.7559″)	−0.153 (−0.0060″) −0.213 (−0.0084″)	+0.139 (+0.0055″) −0.003 (−0.0001″)	0.150 (0.0059″) ~ 0.352 (0.0139″)	2.0 (0.08″)	Replace bushing or pin.
2	Arm center						
3	Arm cylinder (Rod side)			+0.18 (+0.0071″) +0.10 (+0.0039″)	0.253 (0.0100″) ~ 0.393 (0.0155″)		
4	Arm cylinder (Bottom side)						
5	Boom cylinder (Bottom side)						
6	Boom cylinder (Rod side)	Ø75 (Ø 2.9528″)	−0.050 (−0.0020″) −0.110 (−0.0043″)	+0.18 (+0.0071″) (+0.10 (+0.0039″)	0.150 (0.0059″) ~ 0.290 (0.0114″)		
7	Bucket link (Bucket connection)	Ø60 (Ø 2.3622″)	−0.150 (−0.0059″) −0.210 (−0.0083″)	+0.152 (+0.0060″) +0.045 (+0.0018″)	0.195 (0.0077″) ~ 0.362 (0.0143″)		
8	Arm point						
9	Bucket cylinder (Bottom side)			+0.18 (+0.0071″) +0.10 (+0.0039″)	0.250 (0.0098″) ~ 0.390 (0.0154″)		
10	Bucket cylinder (Rod side)						
11	Bucket link (Cylinder connection)			+0.194 (+0.0076″) +0.054 (+0.0021″)	0.204 (0.0080″) ~ 0.404 (0.0159″)		
12	Arm~Idler link (Connection)						

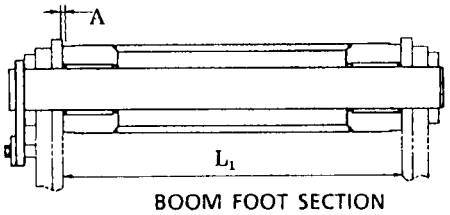
CLEARANCE BETWEEN PINS AND BUSHING



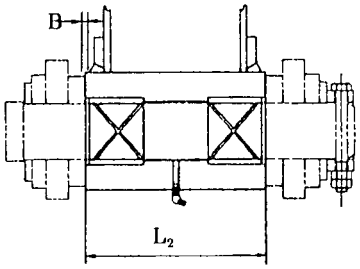
Unit : mm (ft-in)

No.	Item	Standard Value				Allowable Value	Remedy
		Pin Dia	Tolerance for pin O.D.	Tolerance for Bushing I.D.	Clearance		
1	Boom foot	Ø70 (Ø 2.7559″)	−0.153 (−0.0060″) −0.213 (−0.0084″)	+0.139 (+0.0055″) −0.003 (−0.0001″)	0.150 (0.0059″) ~ 0.352 (0.0139″)	2.0 (0.08″)	Replace bushing or pin.
2	Arm center						
3	Arm cylinder (Rod side)			+0.18 (+0.0071″) +0.10 (+0.0039″)	0.253 (0.0100″) ~ 0.393 (0.0155″)		
4	Arm cylinder (Bottom side)						
5	Boom cylinder (Bottom side)						
6	Boom cylinder (Rod side)	Ø75 (Ø 2.9528″)	−0.050 (−0.0020″) −0.110 (−0.0043″)	+0.18 (+0.0071″) +0.10 (+0.0039″)	0.150 (0.0059″) ~ 0.290 (0.0114″)		
7	Bucket link (Bucket connection)	Ø65 (Ø 2.5591″)	−0.150 (−0.0059″) −0.210 (−0.0083″)	+0.045 (+0.0018″) +0.152 (+0.0060″)	0.195 (0.0077″) ~ 0.362 (0.0143″)		
8	Arm point						
9	Bucket cylinder (Bottom side)	Ø60 (Ø 2.3622″)	−0.150 (−0.0059″) −0.210 (−0.0083″)	+0.18 (+0.0071″) +0.10 (+0.0039″)	0.250 (0.0098″) ~ 0.390 (0.0154″)		
10	Bucket cylinder (Rod side)						
11	Bucket link (Cylinder connection)			+0.054 (+0.0021″) +0.194 (+0.0076″)	0.204 (0.0080″) ~ 0.404 (0.0159″)		
12	Arm~Idler link (Connection)						

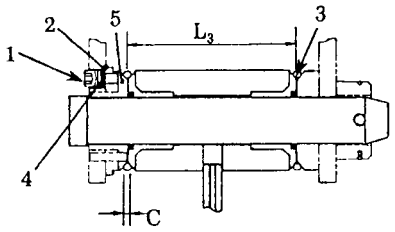
CLEARANCE IN THRUST DIRECTION OF BOOM, ARM AND BUCKET



BOOM FOOT SECTION



ARM CENTER SECTION



ARM POINT SECTION

1. SOCKET BOLT
2. SHIM
3. O RING
4. LOCKWASHER
5. BUSHING

SK100

Unit : mm (in)

Item			Tolerance		Clearance	Adjust shims standard value	Clearance allow able value
Boom foot section	Boom	L1	580 $^{0}_{-0.2}$ (22.835″ $^{0}_{-0.008}$″)	A	1.0 (0.039″) ∫ 3.2 (0.126″)	2 or under	4.0 (0.158″)
	Upper frame		581 $^{+2.0}_{0}$ (22.874″ $^{+0.079}_{0}$″)				
Arm center section	Arm side	L2	232 ±0.2 (9.133″ ±0.008″)	B	0.2 (0.008″) ∫ 1.0 (0.039″)	※ ——	2.0 (0.079″)
	Boom side		232 $^{+0.8}_{+0.4}$ (9.134″ $^{+0.031}_{+0.016}$″)				
Arm point section	Arm side	L3	216 ±0.3 (8.504″ ±0.012″)	C	0.5 (0.020″) ∫ 2.7 (0.106″)	1 or under	2.0 (0.079″)
	Bucket side		218 $^{+0.4}_{-0.2}$ (8.583″ $^{+0.016}_{-0.008}$″)				

SK120, SK120L

Item			Tolerance		Clearance	Adjust shims standard value	Clearance allow able value
Boom foot section	Boom	L1	580 $^{0}_{-0.2}$ (22.835″ $^{0}_{-0.008}$″)	A	1.0 (0.039″) ∫ 3.2 (0.126″)	2 or under	4.0 (0.158″)
	Upper frame		581 $^{+2.0}_{0}$ (22.874″ $^{+0.008}_{0}$″)				
Arm center section	Arm side	L2	274 ±0.2 (10.787″ ±0.008″)	B	0.5 (0.020″) ∫ 1.2 (0.047″)	※ ——	2.0 (0.079″)
	Boom side		275 $^{0}_{-0.3}$ (10.827″ $^{0}_{-0.012}$″)				
Arm point section	Arm side	L3	250 ±0.3 (9.843″ ±0.012″)	C	0.5 (0.020″) ∫ 2.7 (0.106″)	1 or under	2.0 (0.079″)
	Bucket side		252 $^{+0.4}_{-1.2}$ (9.921″ $^{+0.016}_{-0.047}$″)				

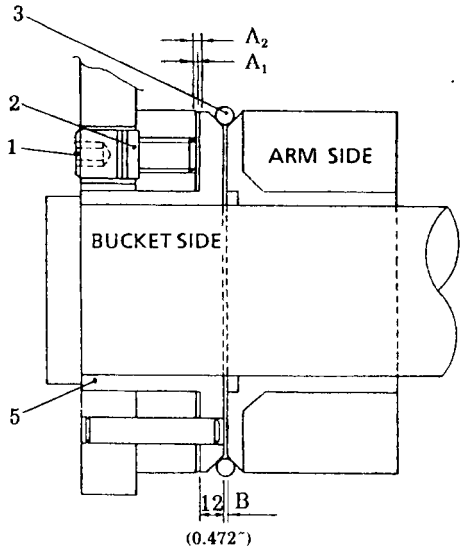
☞ ※ Shim adjustment not necessary

ADJUSTING CLEARANCE BETWEEN BUCKET AND ARM

(1) Clearance adjusting procedure

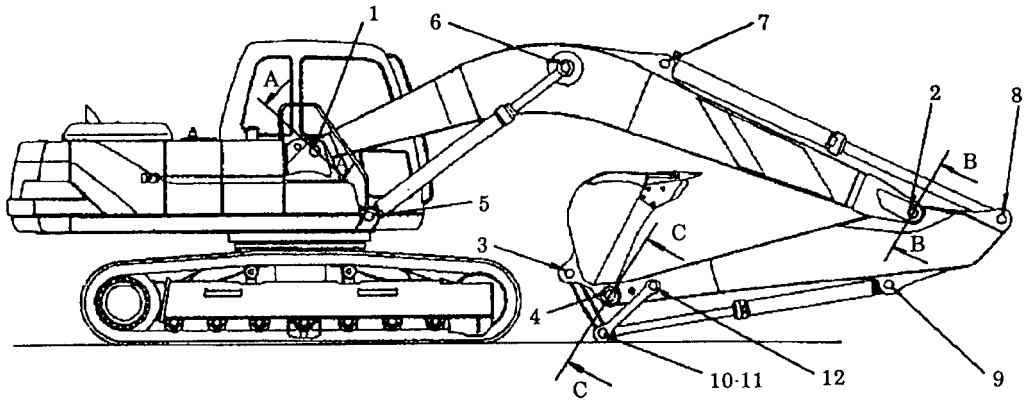
1) Shift O ring (3) to the boss on the arm side, using a spatula or something.
2) Measure clearance (A1).
3) Loosen three socket screws (1), remove shims (2), tighten three socket screws (1) evenly, and press bushing (5) and tighten socket screws (1) till clearance (B) gets to 0.5 ~1.0mm (0.02~0.04in) (provided clearance (C) on the opposite side is in close contact).
4) Measure clearance (A2).
5) The thickness of a single shim (2) is 1mm (0.04in).
6) Clearance (A2) less the initially measured clearance (A1) is the thickness of shims (2) to be taken off.
7) Confirm that clearance (B) falls within the standard value.
8) Fit O ring (3) to its original position.

☞ • Use care so as not to damage O ring (3) when shifting O ring (3) with a spatula.
• When removing shim (2) and extruding bushing (5) to the rights with three socket screws (1), do not tighten them too hard and take care so clearance (C) is not within the standard value.
• Inspect clearances every 120 hours in normal operation. In case of special operation perform inspection earlier than usual and adjust them as required.



How to adjust clearance B

CLEARANCE BETWEEN PINS AND BUSHING

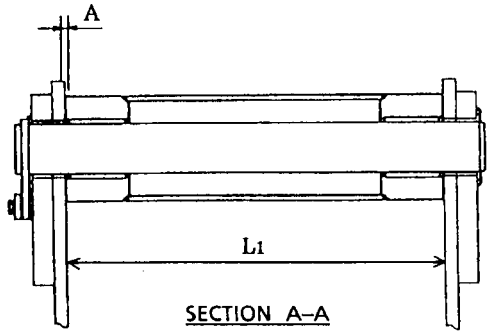


Unit : mm (ft-in)

No.	Item	Standard Value				Allowable Value	Remedy
		Pin Dia	Tolerance for pin O.D.	Tolerance for BushingI.D.	Clearance		
1	Boom foot	Ø90 (Ø 3.5433˝)	±0.02 (±0.0008˝)	+0.294 (+0.0116˝) +0.195 (+0.0077˝)	0.175 (0.0069˝) ~ 0.314 (0.0124˝)	3.0 (0.12˝)	Replace bushing or pin.
2	Arm center	Ø80 (Ø 3.1496˝)	±0.02 (±0.0008˝)	+0.281 (+0.0111˝) +0.208 (+0.0082˝)	0.188 (0.0074˝) ~ 0.301 (0.0119˝)		
3	Bucket link (Bucket connection)		−0.05 (−0.0020˝) −0.11 (−0.0043˝)		0.258 (0.0102˝) ~ 0.391 (0.0154˝)		
4	Arm point						
5	Boom cylinder (Bottom side)		±0.02 (±0.0008˝)	+0.230 (+0.0091˝) +0.150 (+0.0059˝)	0.130 (0.0051˝) ~ 0.250 (0.0098˝)		
6	Boom cylinder (Rod side)	Ø85 (Ø 3.3464˝)	±0.02 (±0.0008˝)				
7	Arm cylinder (Bottom side)	Ø85 (Ø 3.3464˝)	−0.030 (−0.0012˝) −0.090 (−0.0035˝)		0.180 (0.0071˝) ~ 0.320 (0.0126˝)		
8	Arm cylinder (Rod side)						
9	Bucket cylinder (Bottom side)	Ø80 (Ø 3.1496˝)	−0.050 (−0.0020˝) −0.110 (−0.0043˝)		0.200 (0.0079˝) ~ 0.340 (0.0134˝)		
10	Bucket cylinder (Rod side)						
11	Bucket link (Cylinder connection)			+0.283 (+0.0111˝) +0.211 (+0.0083˝)	0.261 (0.0103˝) ~ 0.393 (0.0155˝)		
12	Arm~Idler link (Connection)	Ø70 (Ø 2.7559˝)	−0.153 (−0.0060˝) −0.213 (−0.0084˝)	+0.283 (+0.0111˝) +0.213 (+0.00839˝)	0.366 (0.0144˝) ~ 0.496 (0.0195˝)		

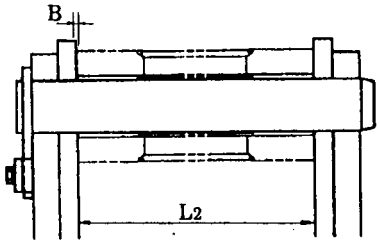
CLEARANCE IN THRUST DIRECTION OF BOOM, ARM AND BUCKET

BOOM FOOT SECTION



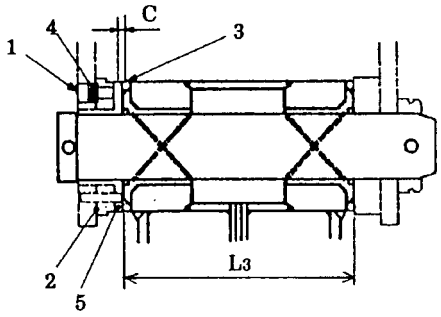
SECTION A–A

ARM CENTER SECTION



SECTION B–B

ARM POINT SECTION



SECTION C–C

1. SOCKET BOLT
2. SHIM
3. O RING
4. LOCKWASHER
5. BUSHING

Unit : mm (in)

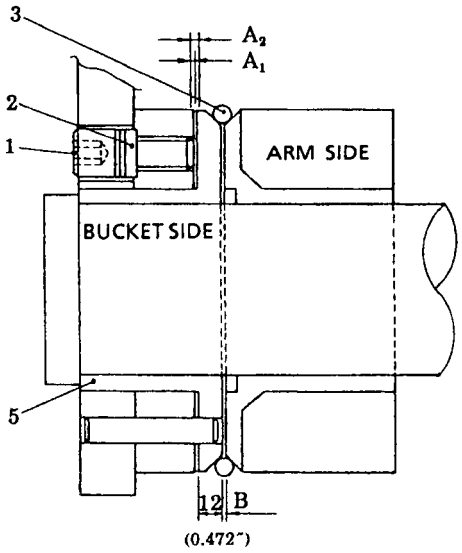
Item			Tolerance		Clearance	Adjust shims standerd value	Clearance allowable value
Boom foot section	Boom	L1	$680\ ^{0}_{-0.2}$ ($26.772''\ ^{0}_{-0.008''}$)	A	2.0 (0.079″) ≀ 4.2 (0.165″)	※ 1 or under	6.0 (0.236″)
	Upper frame		$682\ ^{+2.0}_{0}$ ($26.850''\ ^{+0.079''}_{0}$)				
Arm center section	Arm side	L2	352±0.2 (13.858″±0.008″)	B	0.3 (0.012″) ≀ 1.2 (0.047″)	※ —	5.0 (0.197″)
	Boom side		$353\ ^{0}_{-0.5}$ ($13.898''\ ^{0}_{-0.020''}$)				
Arm point section	Arm side	L3	325±0.3 (12.795″±0.012″)	C	0.7 (0.028″) ≀ 2.8 (0.110″)	1 or under	0.5~1.0 (0.020″) ~ (0.039″)
	Bucket side		$327\ ^{+0.5}_{-1.0}$ ($12.874''\ ^{+0.020''}_{-0.039''}$)				

☞ ※ Shim adjustment not necessary

ADJUSTING CLEARANCE BETWEEN BUCKET AND ARM

(1) Clearance adjusting procedure

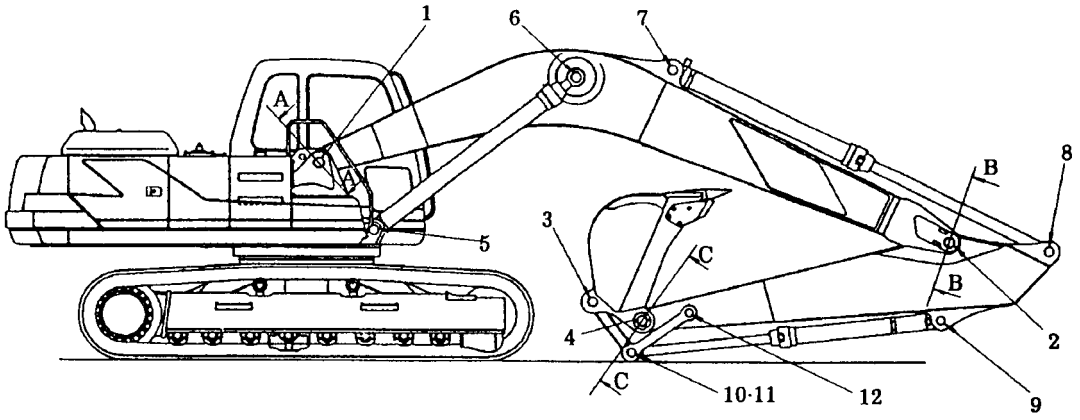
1) Shift O ring (3) to the boss on the arm side, using a spatula or something.
2) Measure clearance (A1).
3) Loosen three socket screws (1), remove shims (2), tighten three socket screws (1) evenly, and press bushing (5) and tighten socket screws (1) till clearance (B) gets to 0.5 ~1.0mm (0.02~0.04in) (provided clearance (C) on the opposite side is in close contact).
4) Measure clearance (A2).
5) The thickness of a single shim (2) is 1mm (0.04in).
6) Clearance (A2) less the initaially measured clearance (A1) is the thickness of shims (2) to be taken off.
7) Confirm that clearance (B) falls within the standard value.
8) Fit O ring (3) to its original position.



How to adjust clearance B

☞
- Use care so as not to damage O ring (3) when shifting O ring (3) with a spatula.
- When removing shim (2) and extruding bushing (5) to the rights with three socket screws (1), do not tighten them too hard and take care so clearance (C) is not within the standard value.
- Inspect clearances every 120 hours in normal operation. In case of special operation perform inspection earlier than usual and adjust them as required.

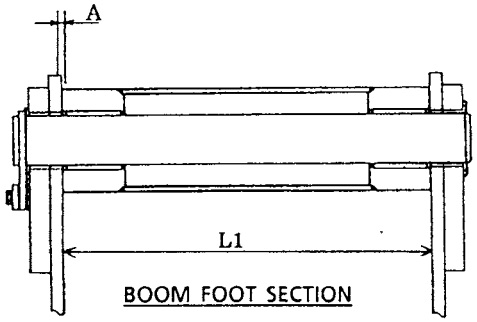
CLEARANCE BETWEEN PINS AND BUSHING



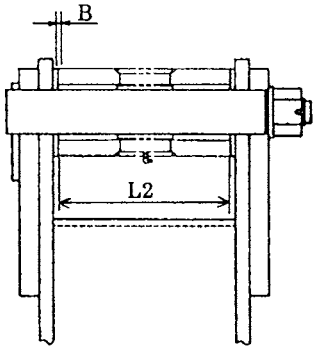
Unit : mm (in)

No.	Item	Standard Value				Allowable Value	Remedy
		Pin Dia	Tolerance for pin O.D.	Tolerance for BushingI.D.	Clearance		
1	Boom foot	Ø100 (Ø 3.9370)	±0.020 (±0.0008)	+0.295 (+0.0116) +0.200 (+0.0079)	+0.315 (+0.0124) +0.180 (+0.0071)	3.0 (0.12)	Replace bushing or pin.
2	Arm center	Ø90 (Ø 3.5433)		+0.273 (+0.0107) +0.176 (+0.0069)	+0.293 (+0.0115) +0.156 (+0.0061)		
3	Bucket link (Bucket connection)		−0.030 (−0.0012) −0.090 (−0.0035)	+0.280 (+0.0110) +0.207 (+0.0081)	+0.370 (+0.0146) +0.237 (+0.0093)		
4	Arm point						
5	Boom cylinder (Bottom side)		±0.020 (±0.0008)	+0.250 (+0.0098) +0.050 (+0.0020)	+0.270 (+0.0106) +0.030 (+0.0012)		
6	Boom cylinder (Rod side)	Ø95 (Ø 3.7402)					
7	Arm cylinder (Bottom side)	Ø90 (Ø 3.5433)	−0.030 (−0.0012) −0.090 (−0.0035)		+0.340 (+0.0134) +0.080 (+0.0031)		
8	Arm cylinder (Rod side)						
9	Bucket cylinder (Bottom side)	Ø80 (Ø 3.496)	−0.050 (−0.0020) −0.110 (−0.0043)		+0.360 (+0.0142) +0.100 (+0.0039)		
10	Bucket cylinder (Rod side)						
11	Bucket link (Cylinder connection)			+0.134 (+0.0053) +0.005 (+0.0002)	+0.244 (+0.0096) +0.045 (+0.0018)		
12	Arm~Idler link (Connection)	Ø70 (Ø 2.7559)	−0.153 (−0.0060) −0.213 (−0.0084)	+0.281 (+0.0111) +0.210 (+0.0083)	+0.494 (+0.0194) +0.363 (+0.0143)		

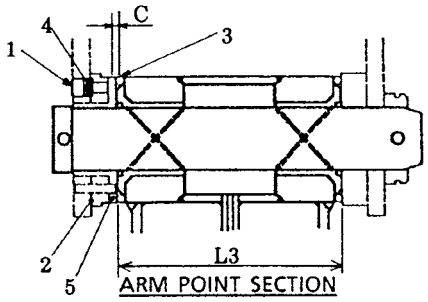
CLEARANCE IN THRUST DIRECTION OF BOOM, ARM AND BUCKET



BOOM FOOT SECTION



ARM CENTER SECTION



ARM POINT SECTION

1. SOCKET BOLT
2. SHIM
3. O RING
4. LOCKWASHER
5. BUSHING

Unit : mm (in)

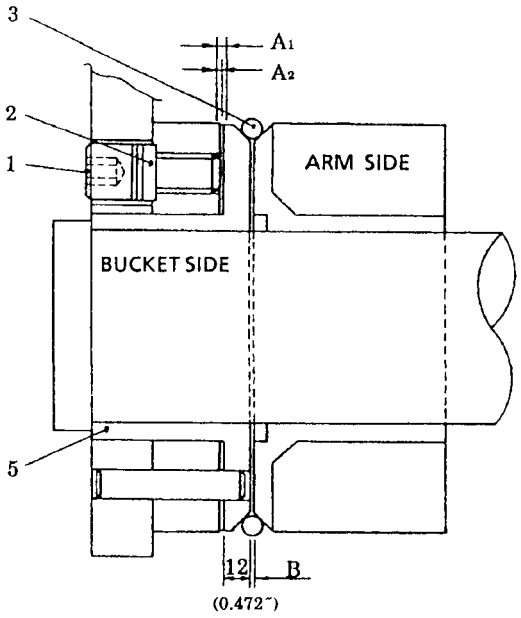
Item			Tolerance		Clearance	Adjust shims standerd value	Clearance allowable value
Boom foot section	Boom	L1	$750\ {}^{0}_{-0.2}$ ($29.528\ {}^{0}_{-0.008}$)	A	2.0 (0.079) ~ 4.2 (0.165)	1 or under	6.0 (0.236)
	Upper frame		$752\ {}^{+2.0}_{0}$ ($29.606\ {}^{+0.079}_{0}$)				
Arm center section	Arm side	L2	350 ± 0.2 (13.780 ± 0.008)	B	0.6 (0.024) ~ 1.2 (0.047)	※ —	5.0 (0.197)
	Boom side		$351\ {}^{0}_{-0.2}$ ($13.819\ {}^{0}_{-0.008}$)				
Arm point section	Arm side	L3	325 ± 0.3 (12.795 ± 0.012)	C	0.7 (0.028) ~ 2.8 (0.110)	1 or under	7.0 (0.276)
	Bucket side		$327\ {}^{+0.5}_{-1.0}$ ($12.874\ {}^{+0.020}_{-0.039}$)				

☞ ※ Shim adjustment not necessary

ADJUSTING CLEARANCE BETWEEN BUCKET AND ARM

(1) Clearance adjusting procedure

1) Shift O ring (3) to the boss on the arm side, using a spatula or something.
2) Measure clearance (A1).
3) Loosen three socket screws (1), remove shims (2), tighten three socket screws (1) evenly, and press bushing (5) and tighten socket screws (1) till clearance (B) gets to 0.5 ~1.0mm (0.02~0.04in) (provided clearance (C) on the opposite side is in close contact).
4) Measure clearance (A2).
5) The thickness of a single shim (2) is 1mm (0.04in).
6) Clearance (A2) less the initaially measured clearance (A1) is the thickness of shims (2) to be taken off.
7) Confirm that clearance (B) falls within the standard value.
8) Fit O ring (3) to its original position.



How to adjust clearance B

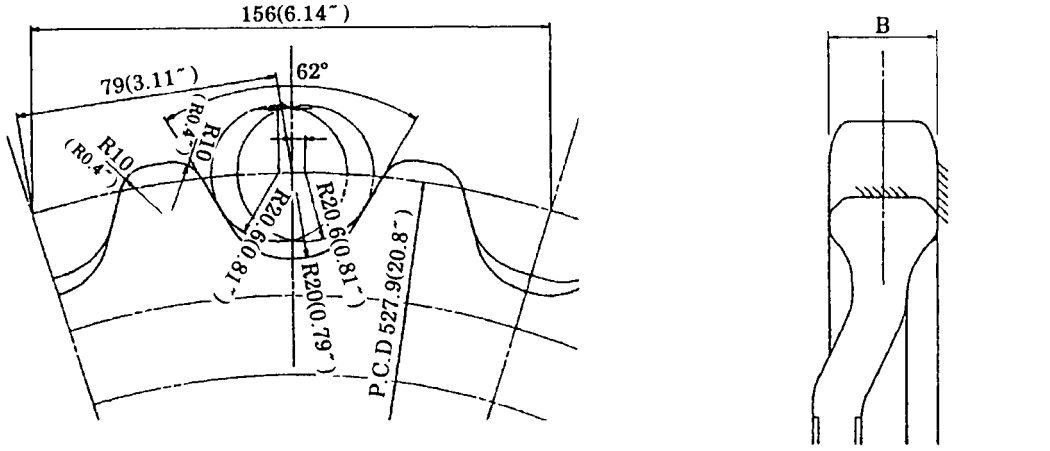
☞
- Use care so as not to damage O ring (3) when shifting O ring (3) with a spatula.
- When removing shim (2) and extruding bushing (5) to the rights with three socket screws (1), do not tighten them too hard and take care so clearance (C) is not within the standard value.
- Inspect clearances every 120 hours in normal operation. In case of special operation perform inspection earlier than usual and adjust them as required.

TRAVEL • MAINTENANCE STANDARDS

SPROCKET

mm (in)

Items				
	Pitch	78.7mm (3.1˝)	Tooth number	21
	Roller dia	Ø41 (1.61˝)		

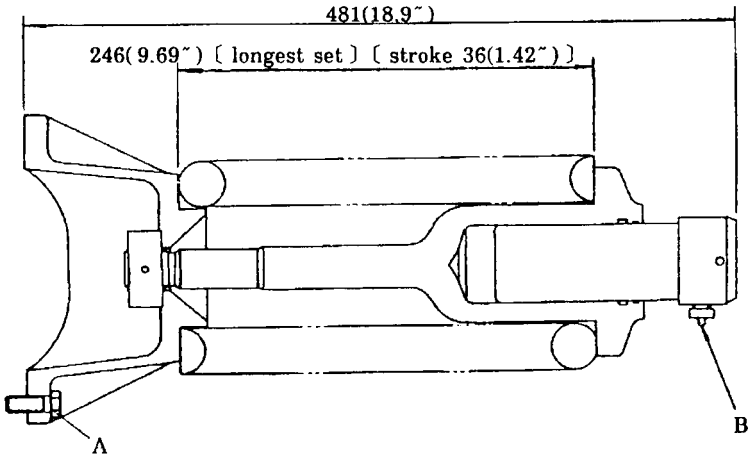


Unit : mm (ft · in)

Symbol	Item	Standard Value	Allowable Value	Remedy
A	Wear of sprocket tooth profile	———	4 (0.16˝)	Correct by reinforcement
B	Width of sprocket teeth	$38^{+0.5}_{-2.5}$ ($1.50^{+0.02˝}_{-0.10˝}$)	32 (1.26˝)	Replace

TRACK SPRING

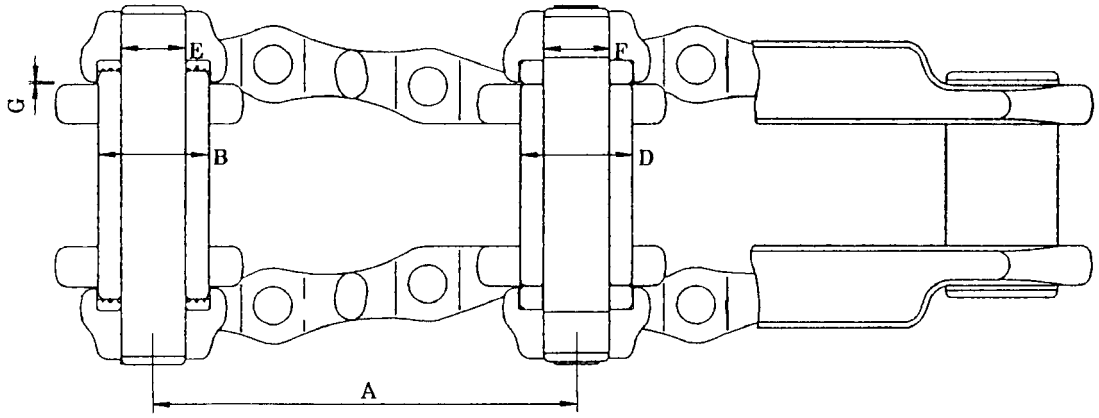
Set load : 4160±250kg (9170±550 lbs)

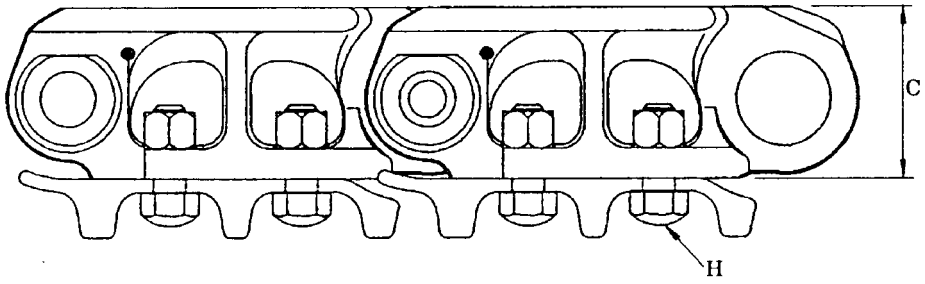


Unit : kgf · m (ft · lbs)

Symbol	Item	Standard Value	Remedy
A	Tightening torque of track spring mounting capscrews	11.7±1.2 (85±9)	Apply Three Bond 1305
B	Tightening torque of Grease nipple	6±1 (43±7)	———

TRACK LINK



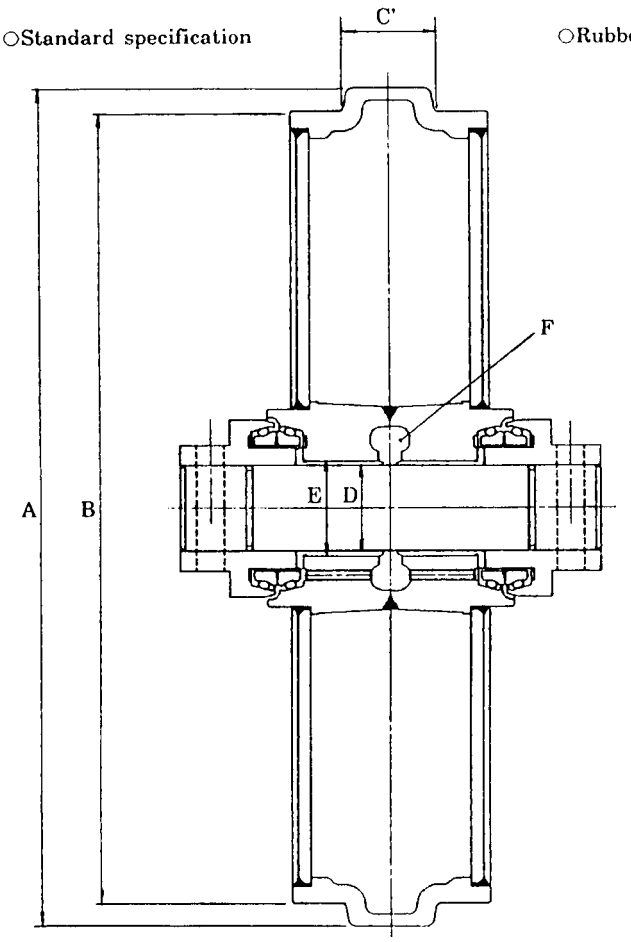


Unit : mm(ft · in)

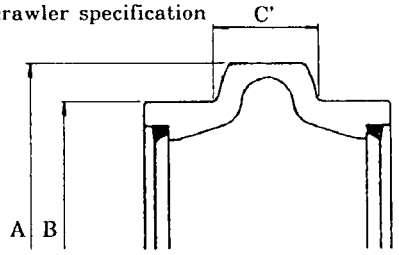
Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Ring pitch	155.6 (6.13″)				160(6.30″)	Replace.
B	Bush O.D.	$\varnothing 41^{+0.214}_{+0.174}$		($\varnothing$1.6142″ $^{+0.0084}_{+0.0069}$″)		$\varnothing$39(1.54″)	
C	Link height	75 (2.95″)				69(2.72″)	Replace.
D	Shrinkage-fit interference of bush and link	Basic dim	Tolerance		Standard interference	Allowable interference	Replace.
		$\varnothing$41 (1.6142″)	Shaft	+0.214 (0.0084″) +0.174 (0.0069″)	–	0.1 (0.004″)	
E	Shrinkage-fit interference of regular pin and link	$\varnothing$24 (0.9449″)	Shaft	±0.04 (0.0016″)	–	0.1 (0.004″)	
F	Shrinkage-fit interference of master pin and link	$\varnothing$24 (0.9449″)	Shaft	−0.05 (0.0020″) −0.08 (0.0031″)	–	0.05 (0.002″)	Replace with an oversize pin.
G	Link clearance	—				10(both sides)	Replace.
H	Tightening torque for shoe bolt	30 ± 3kgf · m (217 ± 22 ft · lbs)					Retighten

IDLER

○Standard specification



○Rubber crawler specification

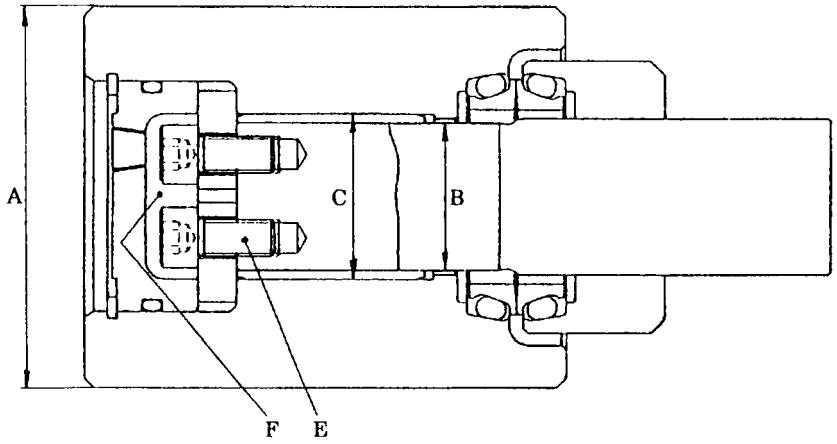


Unit : mm (ft · in)

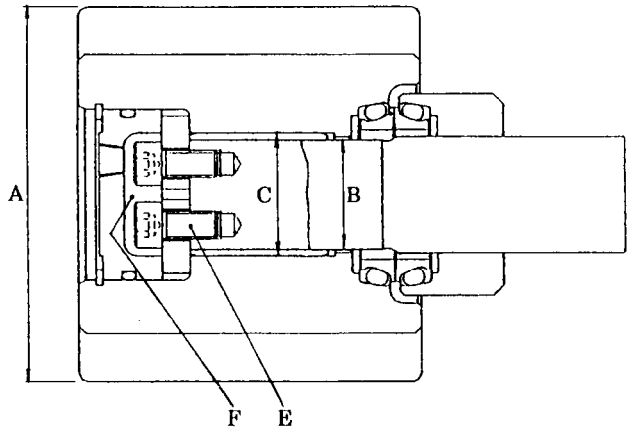
Symbol	Item	Standard Value				Allowable Value		Remedy
		Standard specification		Rubber crawler specification		Standard	Rubber	
A	Diameter of idler protruding portion	Ø432 (17.0″)		Ø453 (17.8″)		Ø426 (16.8″)	447 (17.6″)	Replace.
B	Diameter of track shoe contract surface	Ø400 (15.7″)		Ø400 (15.7″)		Ø394 (15.5″)	394 (15.5″)	
C	Flange width	42 (1.65″)		42 (1.65″)		C'=36 (1.42″)	C'=37 (1.46″)	
D	Clearance between shaft and bushing	Basic dim	Allowable interference		Standard	Allowable		Replace bushing
		Ø50 (1.9685″)	Shaft	−0.050 (−0.0020″)	Clearance	Clearance		
				−0.075 (−0.0030″)	−	2.0 (0.08″)		
E	Interference of roller and bushing	Ø57 (2.2441″)	Bore	+0.030 (0.0012″)	Interference	Interference		
				−0.020 (−0.0008″)	−	0		
F	Oil	Engine oil API, Class CD #30 160cc (9.76 cuin)						Refill

UPPER ROLLER

○Standard specification



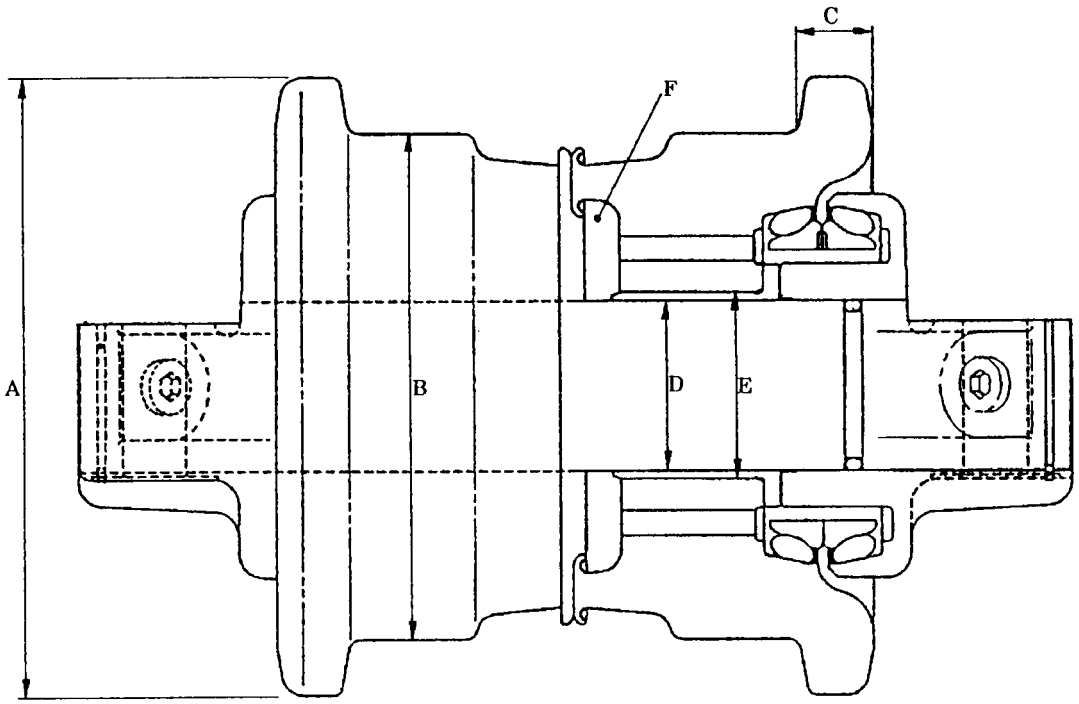
○Rubber crawler specification



Unit : mm(ft · in)

Symbol	Item	Standard Value				Allowable Value		Remedy
		Standard specification			Rubber crawler specification	Standard	Rubber	
A	Diameter of track shoe contract surface	Ø82 (3.23˝)			Ø110 (4.33˝)	Ø72 (2.83˝)	Ø87 (3.43˝)	Replace
B	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable		Replace bushing
		Ø32 (1.2598˝)	Shaft	−0.025 (−0.0010˝) / −0.050 (−0.0020˝)	Clearance −	Clearance 0.05 (0.002˝)		
C	Interference of roller and bushing	Ø36 (1.4173˝)	Bore	0 / +0.030 (0.0012˝)	Interference −	Interference 0		
E	Tightening torque of socket screw	3.4 ± 0.35kgf · m (25 ± 3 ft · lbs)						Loctite #242 or Three Bond 1360K
F	Oil	Engine oil API, Class CD #30 20 cc (1.22 cuin)						Refill

LOWER ROLLER



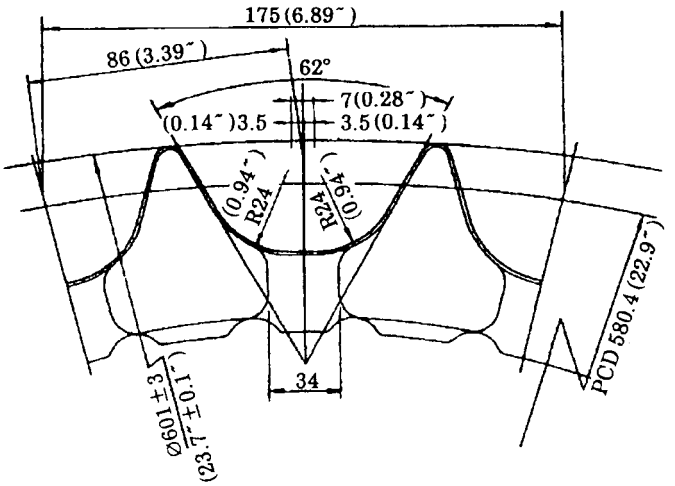
Unit : mm(ft · in)

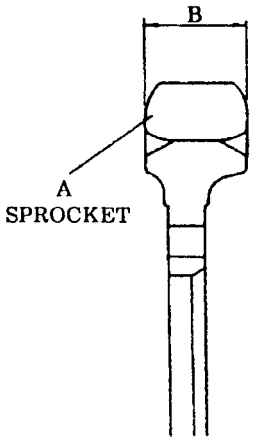
Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Flange O. D	Ø147 (5.79″)				Ø135 (5.31″)	Replace
B	Diameter of track shoe contract surface	Ø120 (4.72″)				Ø108 (4.25″)	
C	Flange width	17.5 (0.69″)				12 (0.47″)	
D	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		Ø40 (1.5748″)	Shaft	−0.050 (−0.0020″) −0.075 (−0.0030″)	Clearance −	Clearance 0.8 (0.031″)	
E	Interference of roller and bushing	Ø44 (1.7323″)	Bore	+0.025 (0.0010″) −0.020 (−0.0008″)	Interference −	Interference 0	Replace
F	Oil	Engine oil API, Class CD #30 90cc (5.49 cuin)					Refill

SPROCKET

mm (in)

Items				
	Pitch	86mm (3.39˝)	Tooth number	21
	Roller dia	Ø47 (1.85˝)		



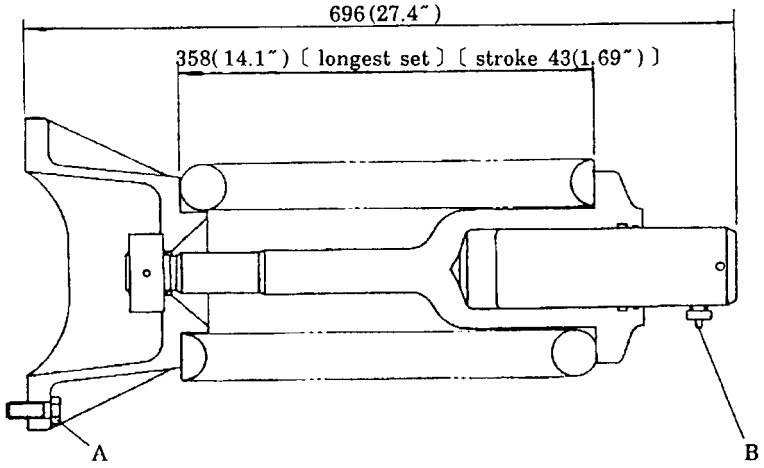


Unit : mm (ft · in)

Symbol	Item	Standard Value	Allowable Value	Remedy
A	Wear of sprocket tooth profile	———	4 (0.16˝)	Correct by reinforcement
B	Width of sprocket teeth	51^{+3}_{-0} ($2.01^{\prime\prime}{}^{+0.12}_{-0}$˝)	44 (1 .73˝)	Replace

TRACK SPRING

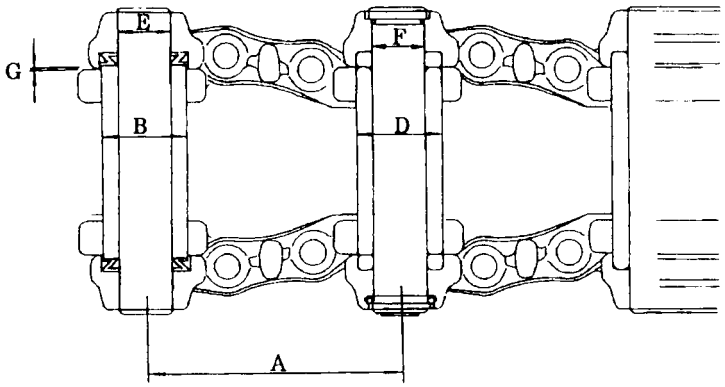
Set load : 8200 $^{+600}_{-500}$ kg (18080 $^{+1320}_{-1100}$ lbs)

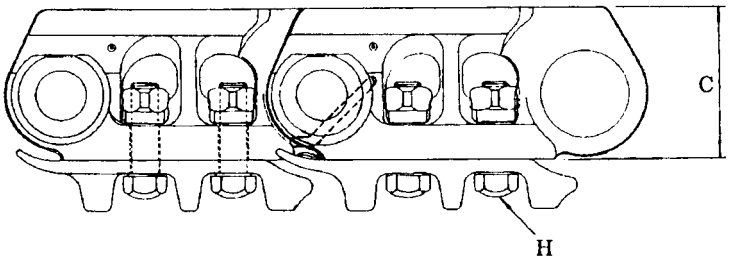


Unit : kgf · m (ft · lbs)

Symbol	Item	Standard Value	Remedy
A	Tightening torque of track spring mounting capscrews	11.7±1 (85±7)	Apply Three Bond 1305
B	Tightening torque of Grease nipple	6±1 (43±7)	———

TRACK LINK(STANDARD TRACK)

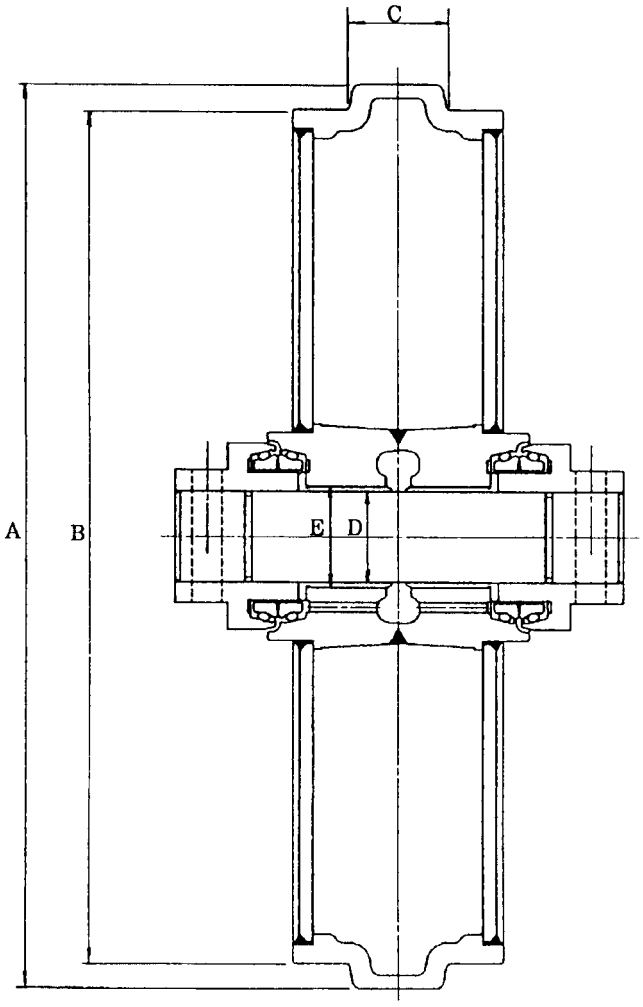




Unit : mm(ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Ring pitch	171.07±0.1 (6.735˝ ±0.004˝)				175.5 (6.91˝)	Replace.
B	Bush O.D.	Ø47 $^{+0.280}_{+0.220}$ (1.850˝ $^{+0.011˝}_{+0.009˝}$)				Ø45 (1.77˝)	
C	Link height	90 (3.54˝)				85 (3.35˝)	Replace.
D	Shrinkage-fit interference of bush and link	Basic dim	Tolerance		Standard interference	Allowable interference	Replace.
		Ø47 (1.850˝)	Shaft	+0.280 +0.220 (+0.011˝ +0.009˝)	–	0.1 (0.004˝)	
E	Shrinkage-fit interference of regular pin and link	Ø30 (1.181˝)	Shaft	+0.100 +0.070 (+0.004˝ +0.003˝)	–	0.1 (0.004˝)	
F	Shrinkage-fit interference of master pin and link	Ø30 (1.181˝)	Shaft	+0.010 +0.020 (+0.0004˝ +0.0008˝)	–	0.05 (0.002˝)	Replace with oversize pin
G	Link clearance					10(both sides)	Replace.
H	Tightening torque for shoe bolt	41±4 kgf · m (296 ±29 ft · lbs)					Retighten

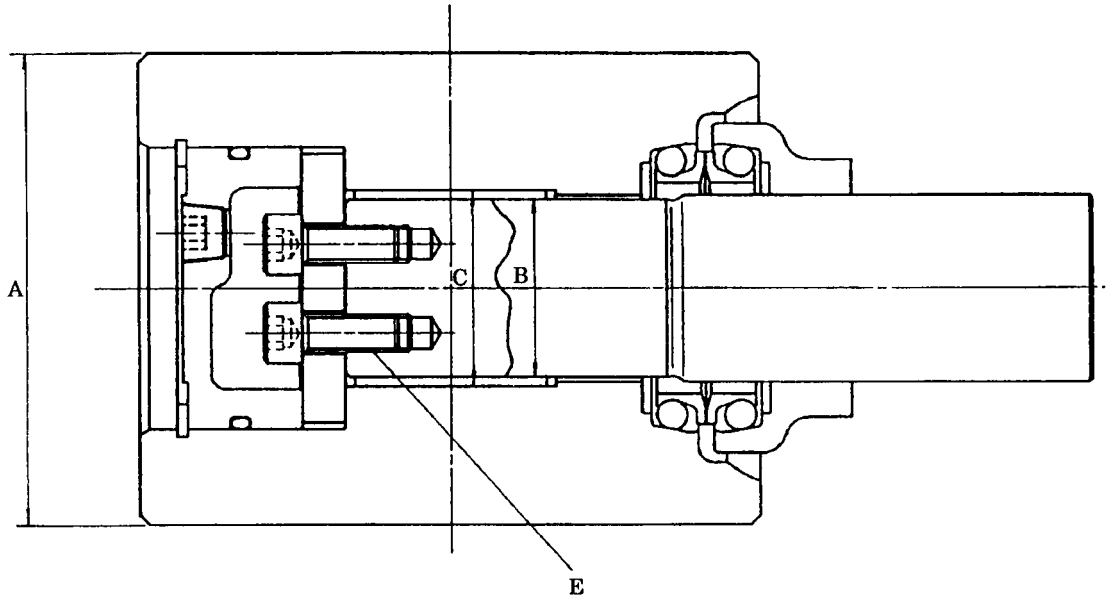
IDLER



Unit : mm (ft · in)

Symbol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of idler protruding portion	Ø486 (19.1˝)				Ø481 (18.9˝)	Repair by build-up Welding or replace.
B	Diameter of track shoe contract surface	Ø456 (18.0˝)				Ø450 (17.7˝)	
C	Flange width	58 (2.28˝)					
D	Clearance between shaft and bushing	Basic dim	Allowable interference		Standard	Allowable	Replace bushing
		Ø54 (2.13˝)	Shaft	−0.030 (0.0012˝) / −0.060 (0.0024˝)	Clearance –	Clearance 1.0 (0.040˝)	
E	Interference of roller and bushing	Ø60.604 (2.3860˝)	Shaft	±0.025 (0.0010˝)	Interference –	Interference 0	

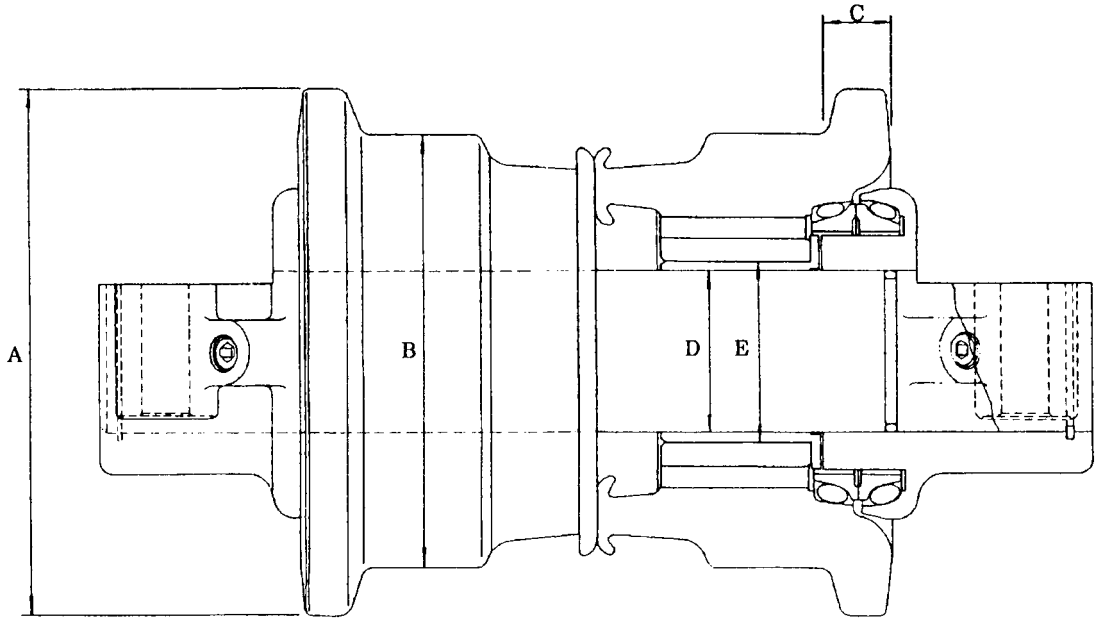
UPPER ROLLER



Unit : mm(ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of track shoe contract surface	Ø100 (3.94˝)				Ø94 (3.70˝)	Repair by build-up Welding or replace.
B	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		38 (1.4961˝)	Shaft	−0.025 (-0.0010˝) −0.050 (-0.0020˝)	Clearance −	Clearance 0.05 (0.0020˝)	
C	Interference of roller and bushing	42 (1.6535˝)	Bore	+0.11 (-0.0043˝) +0.08 (-0.0031˝)	Interference −	Interference 0	
E	Tightening torque of socket screw	3.4±0.35 kgf · m (25±3 ft · lbs)					Loctite #242 Three Bond 1360K

LOWER ROLLER



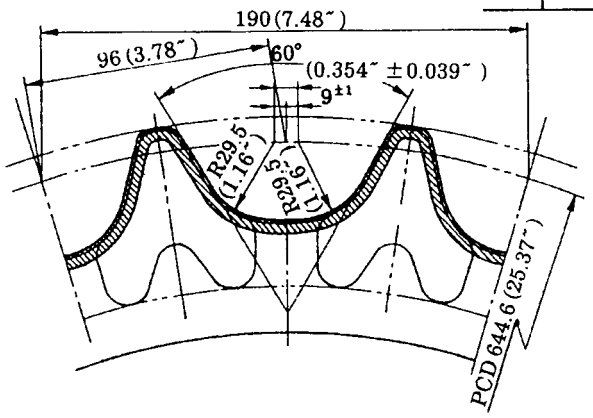
Unit : mm(ft · in)

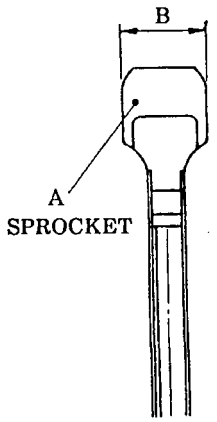
Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Flange O. D	Ø170 (6.69˝)				Ø160 (6.30˝)	Repair by build-up Welding or replace.
B	Diameter of track shoe contract surface	Ø140 (5.51˝)				Ø130 (5.12˝)	
C	Flange width	22 (0.87˝)				18 (0.71˝)	
D	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		50 (1.9685˝)	Shaft	−0.03 (0.0012˝) −0.06 (0.0024˝)	Clearance −	Clearance 0.8 (0.031˝)	
E	Interference of roller and bushing	57 (2.2441˝)	Shaft	+0.14 (0.0055˝) +0.09 (0.0035˝)	Interference −	Interference 0	Replace

SPROCKET

mm (in)

Items				
	Pitch	96mm (3.78˝)	Tooth number	21
	Roller dia	Ø58.72 (2.312˝)		



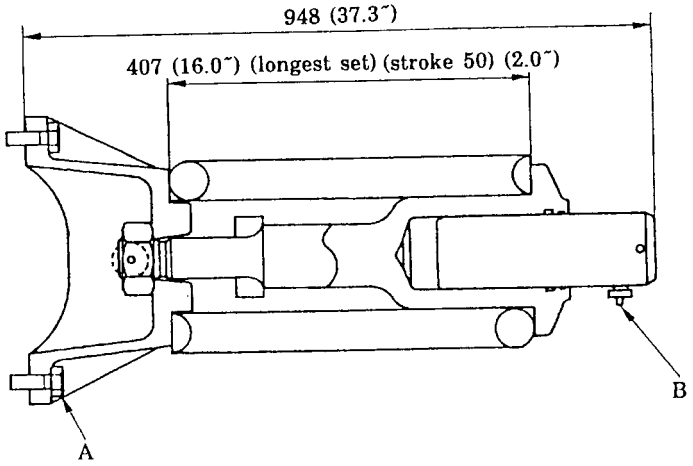


Unit : mm (ft · in)

Symbol	Item	Standard Value	Allowable Value	Remedy
A	Wear of sprocket tooth profile	———		Correct by reinforcement
B	Width of sprocket teeth	70 $^{0}_{-4}$ (2.76˝ $^{0}_{-0.16}$˝)	60 (2.36˝)	Replace

TRACK SPRING

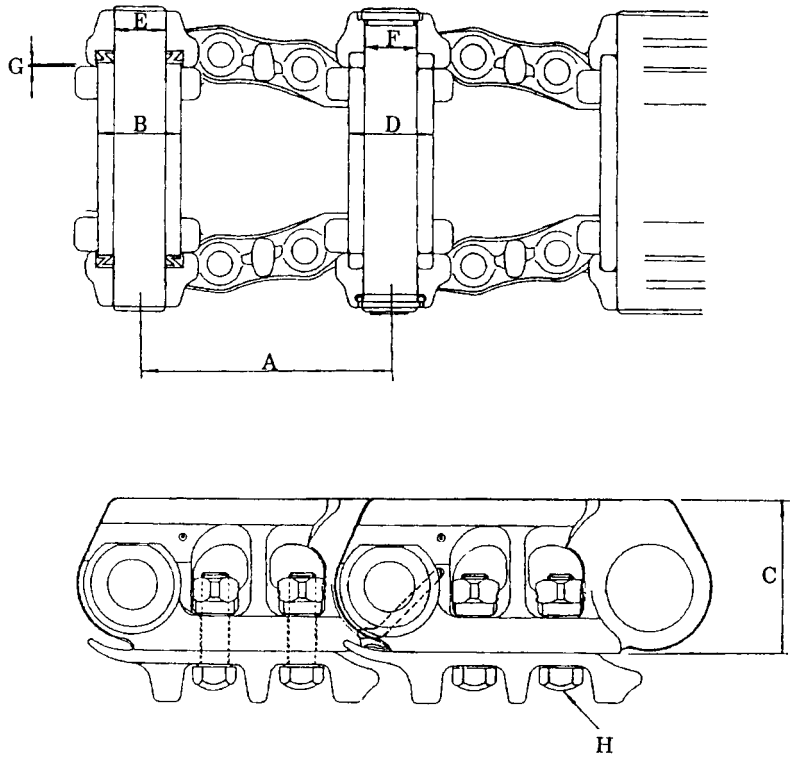
Set load : 20320±1000kg (44800±2200 lbs)



Unit : kgf · m (ft · lbs)

Symbol	Item	Standard Value	Remedy
A	Tightening torque of track spring mounting capscrews	28.5±3 (206±22)	Apply Three Bond 1305
B	Tightening torque of Grease nipple	6±1 (43±7)	———

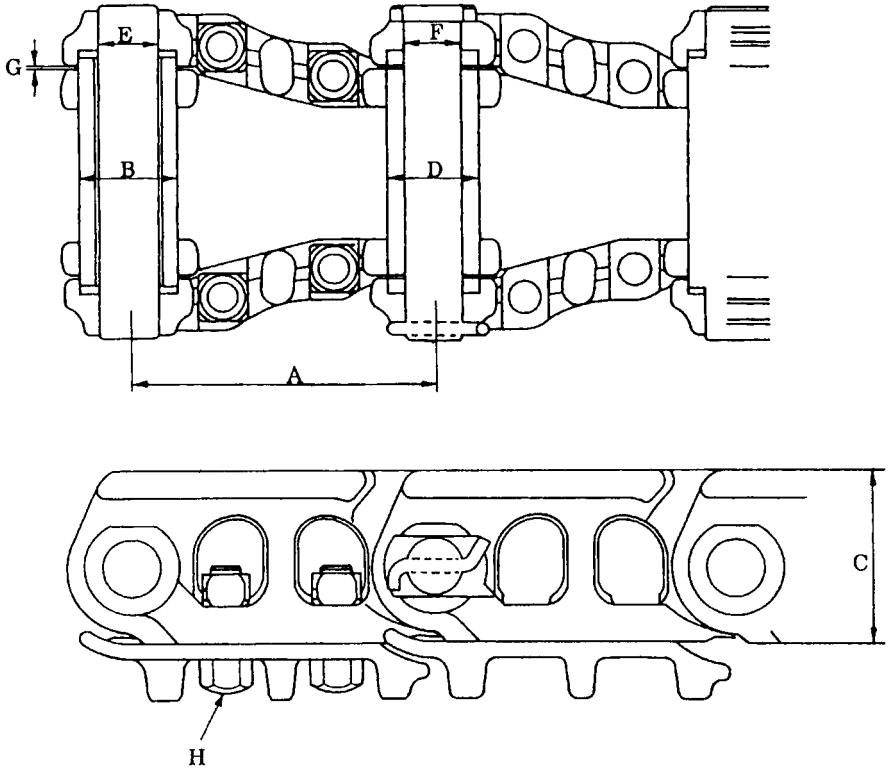
TRACK LINK(STANDARD TRACK)



Unit : mm(ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Ring pitch	190±0.1 (7.480˝ ±0.004˝)				194.5(7.66˝)	Replace.
B	Bush O.D.	ø58.78±0.05 (2.314˝±0.002˝)				ø55(2.17˝)	
C	Link height	106.0±0.3(4.173˝ ±0.012˝)				100.8(3.97˝)	Replace.
D	Shrinkage-fit interference of bush and link	Basic dim	Tolerance		Standard interference	Allowable interference	Replace.
		ø58.78 (2.314˝)	Shaft	±0.05 (0.002˝)	–	0.1 (0.004˝)	
E	Shrinkage-fit interference of regular pin and link	ø36.63 (1.442˝)	Shaft	±0.05 (0.002˝)	–	0.1 (0.004˝)	
F	Shrinkage-fit interference of master pin and link	ø36.28 (1.428˝)	Shaft	+0.08 (0.003˝) −0	–	−0.1 (−0.004˝)	Replace.
G	Link clearance	—				10(both sides)	Replace.
H	Tightening torque for shoe bolt	95±9.5kgf · m (686 ±69 ft · lbs)					Retighten

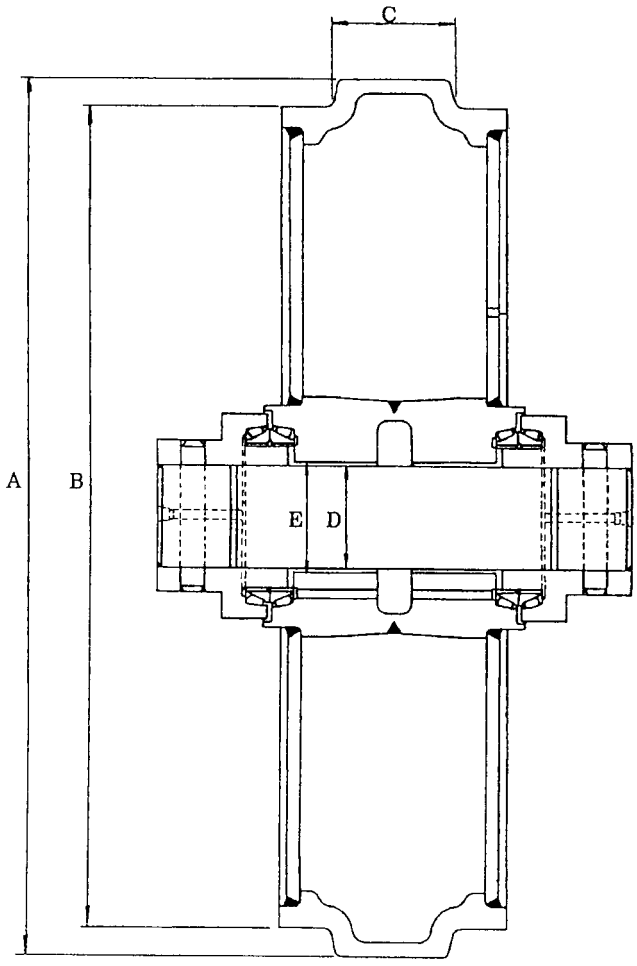
TRACK LINK (LC TRACK)



Unit : mm(ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Ring pitch	190±0.1 (7.480˝ ±0.004˝)				194.5(7.7˝)	Replace.
B	Bush O.D.	ø58.72±0.05(2.312˝±0.002˝)				ø55(2.2˝)	
C	Link height	106.0±0.25(4.173˝ ±0.010˝)				100.8(4.0˝)	Replace.
D	Shrinkage-fit interference of bush and link	Basic dim	Tolerance		Standard interference	Allowable interference	Replace.
		ø58.72 (2.312˝)	Shaft	±0.05 (0.002˝)	–	0.1 (0.004˝)	
E	Shrinkage-fit interference of regular pin and link	ø36.65 (1.443˝)	Shaft	±0.05 (0.002˝)	–	0.1 (0.004˝)	
F	Shrinkage-fit interference of master pin and link	ø36.34 (1.431˝)	Shaft	+0.04 (0.0016˝) −0	–	−0.1 (−0.004˝)	Replace with oversize pin
G	Link clearance	——				10(both sides)	Replace.
H	Tightening torque for shoe bolt	95±9.5kgf · m(686 ±69 ft · lbs)					Retighten

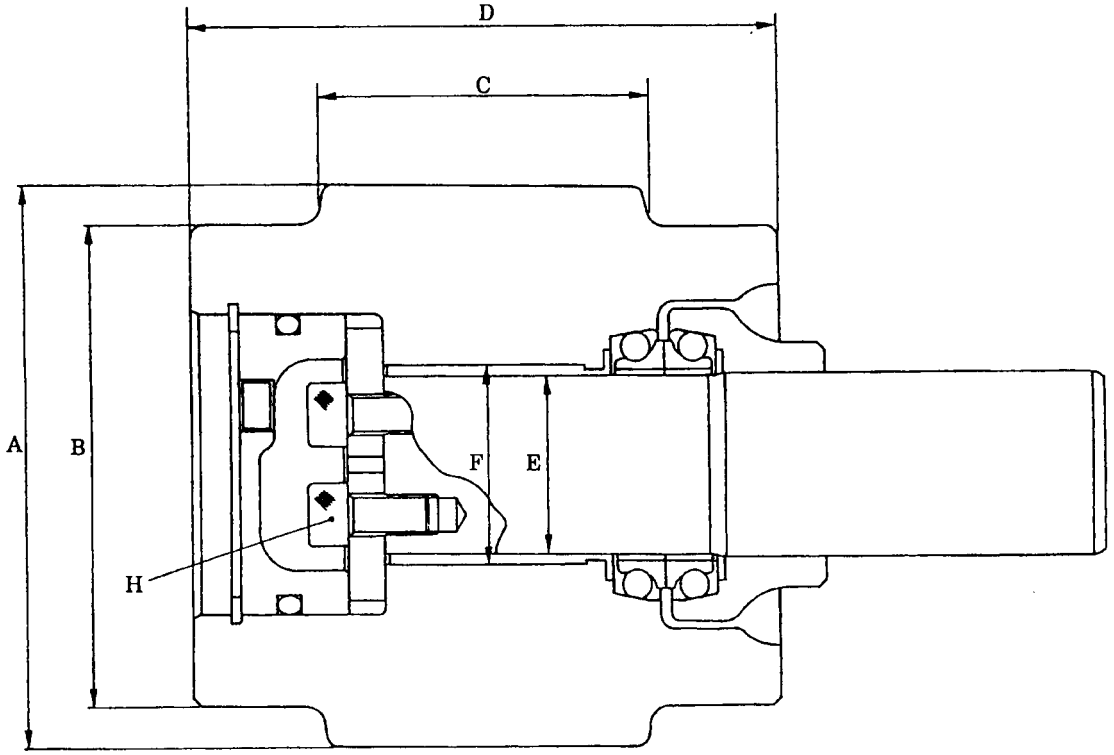
IDLER



Unit : mm (ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of idler protruding portion	Ø535(21.06˝)				Ø525(20.7˝)	Repair by build-up Welding or replace.
B	Diameter of track shoe contract surface	Ø497(19.57˝)				Ø487(19.2˝)	
C	Flange width	84±0.5 (3.31˝ ±0.02˝)				74(2.91˝)	
D	Clearance between shaft and bushing	Basic dim	Allowable interference		Standard	Allowable	Replace bushing
		Ø70 (2.7559˝)	Shaft	−0.030 (0.0012˝) −0.060 (0.0024˝)	Clearance −	Clearance 1.0(0.039˝)	
E	Interference of roller and bushing	Ø77 (3.0315˝)	Shaft	+0.140 (0.0055˝) +0.090 (0.0035˝)	Interference −	Interference 0	

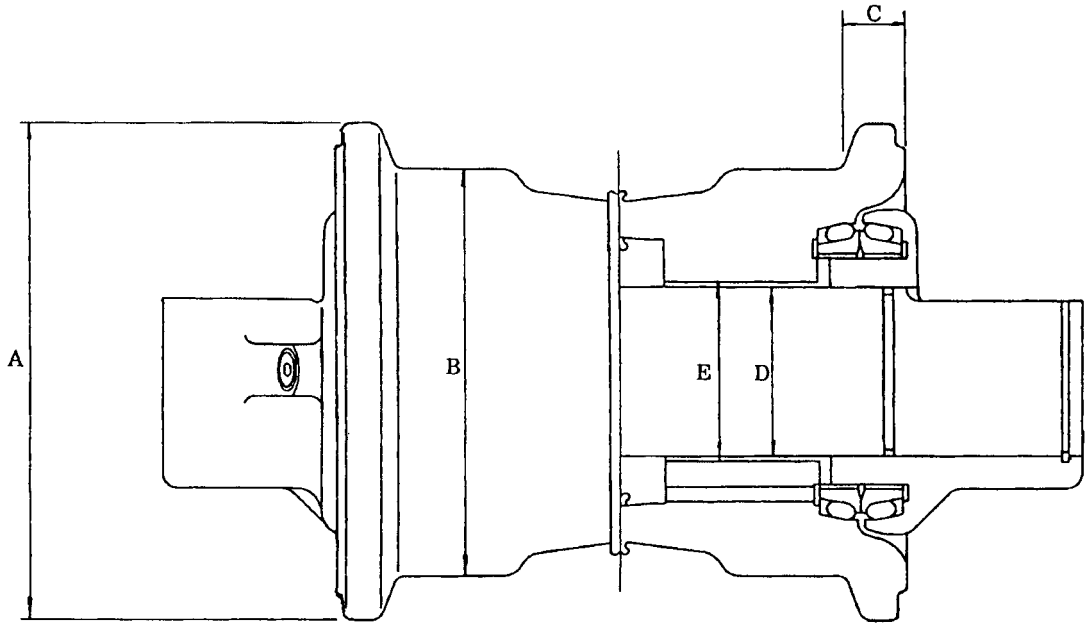
UPPER ROLLER



Unit : mm(ft · in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of roller protruding portion	Ø140 (5.51˝)				Ø130 (5.12˝)	Replace
B	Diameter of track shoe contract surface	Ø120 (4.72˝)				Ø110 (4.33˝)	
C	Protruding portion width	84 (3.31˝)				74 (2.91˝)	
D	Flange width	150 (5.91˝)				140 (5.51˝)	
E	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		45 (1.7717˝)	Shaft	−0.025 (0.0010˝) −0.040 (0.0016˝)	Clearance −	Clearance 0.8 (0.032˝)	
F	Interference of roller and bushing	50 (1.9685˝)	Bore	+0.03 (0.0012˝) 0	Interference −	Interference 0.8 (0.032˝)	
H	Tightening torque of socket screw	6.7±0.7kgf · m (48 ±5 ft · lbs)					Apply Loctite #242

LOWER ROLLER



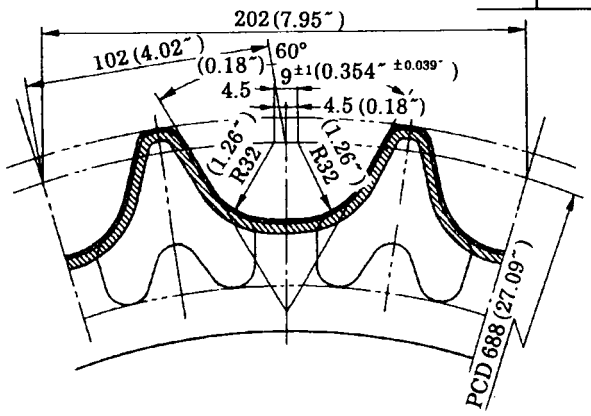
Unit : mm(ft · in)

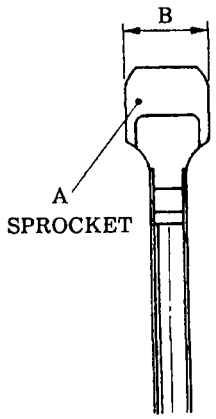
Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Flange O. D	ø185 (7.28˝)				ø175 (6.89˝)	Replace
B	Diameter of track shoe contract surface	ø150 (5.91˝)				ø140 (5.51˝)	
C	Flange width	23.5 (0.93˝)				17 (0.67˝)	
D	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		65 (2.5591˝)	Shaft	−0.06 (0.0024˝) −0.09 (0.0035˝)	Clearance −	Clearance 0.8 (0.032˝)	
E	Interference of roller and bushing	69 (2.7165˝)	Shaft	+0.35 (0.0138˝) +0.14 (0.0055˝)	Interference −	Interference 0	Replace

SPROCKET

mm (in)

Items				
	Pitch	102mm (4.0157)	Tooth number	21
	Roller dia	Ø64 (2.520)		

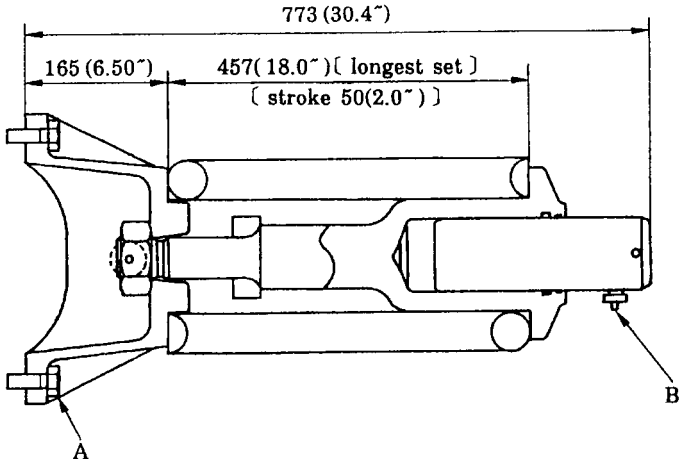




Symbol	Item	Standard Value	Allowable Value	Remedy
A	Wear of sprocket tooth profile	———		Correct by reinforcement
B	Width of sprocket teeth	80^{+4}_{0} ($3.15^{+0.16}_{0}$)	70 (2.76)	Replace

TRACK SPRING

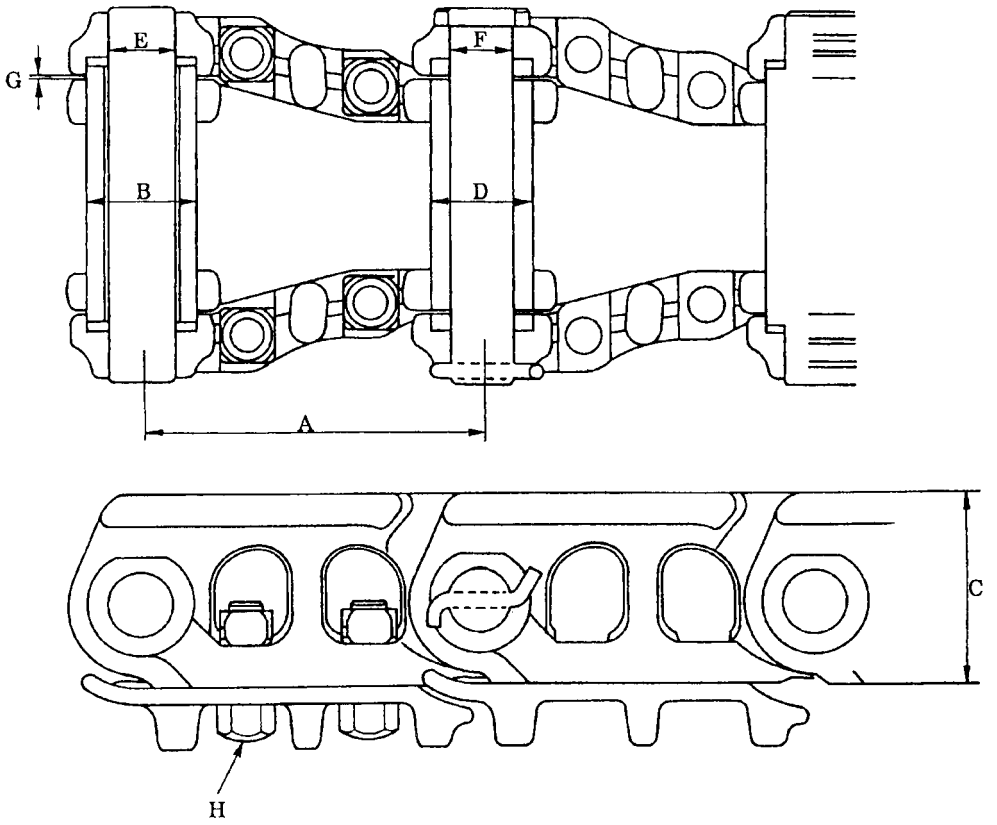
Set load : 15730±790kg (34700±1700 lbs)



Unit : kgf · m (ft · lbs)

Symbol	Item	Standard Value	Remedy
A	Tightening torque of track spring mounting capscrews	39±4 (281±29)	Apply Three Bond 1305
B	Tightening torque of Grease nipple	6±1 (43±7)	———

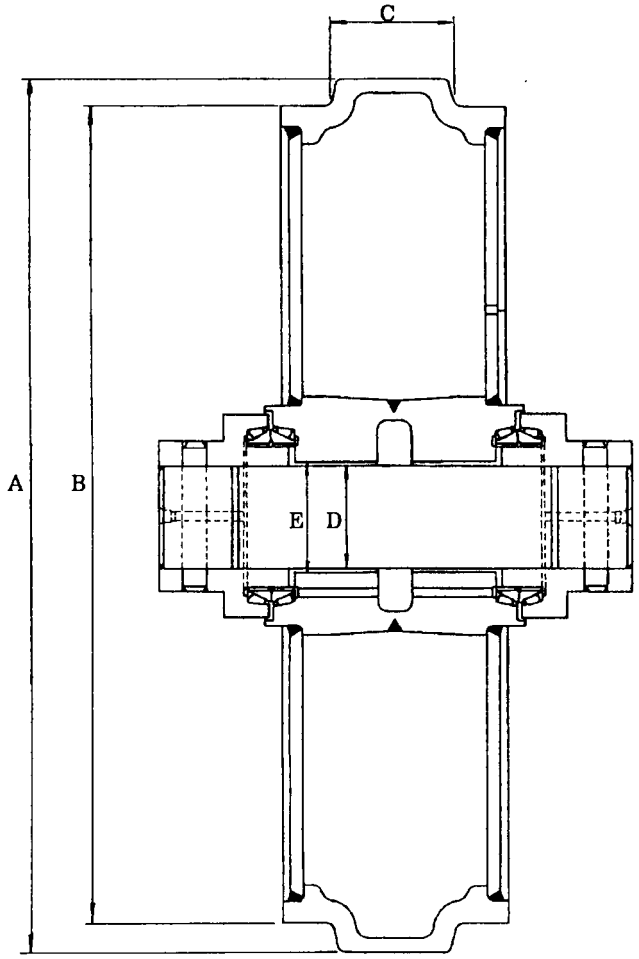
TRACK LINK(STANDARD TRACK)



Unit : mm(in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Ring pitch	202.8 (7.984)				207.5(8.169)	Replace.
B	Bush O.D.	$\varnothing 64^{+0.05}_{0}$ (2.5197 $^{+0.002}_{0}$)				ø59(2.32)	
C	Link height	115 (4.528)				109(4.29)	Replace.
D	Shrinkage-fit interference of bush and link	Basic dim	Tolerance		Standard interference	Allowable interference	Replace.
		ø64 (2.520)	Shaft	+0.05 0 ($^{+0.002}_{0}$)	–	0.1 (0.004")	
E	Shrinkage-fit interference of regular pin and link	ø42 (1.654)	Shaft	±0.05 (0.002)	–	0.1 (0.004")	
F	Shrinkage-fit interference of master pin and link	ø41.7 (1.642)	Shaft	0 −0.03 ($^{0}_{-0.0012}$)	–	−0.1 (−0.004")	Replace.
G	Link clearance	—				10(both sides)	Replace.
H	Tightening torque for shoe bolt	95±9.5kgf · m (686 ±69 ft · lbs)					Retighten

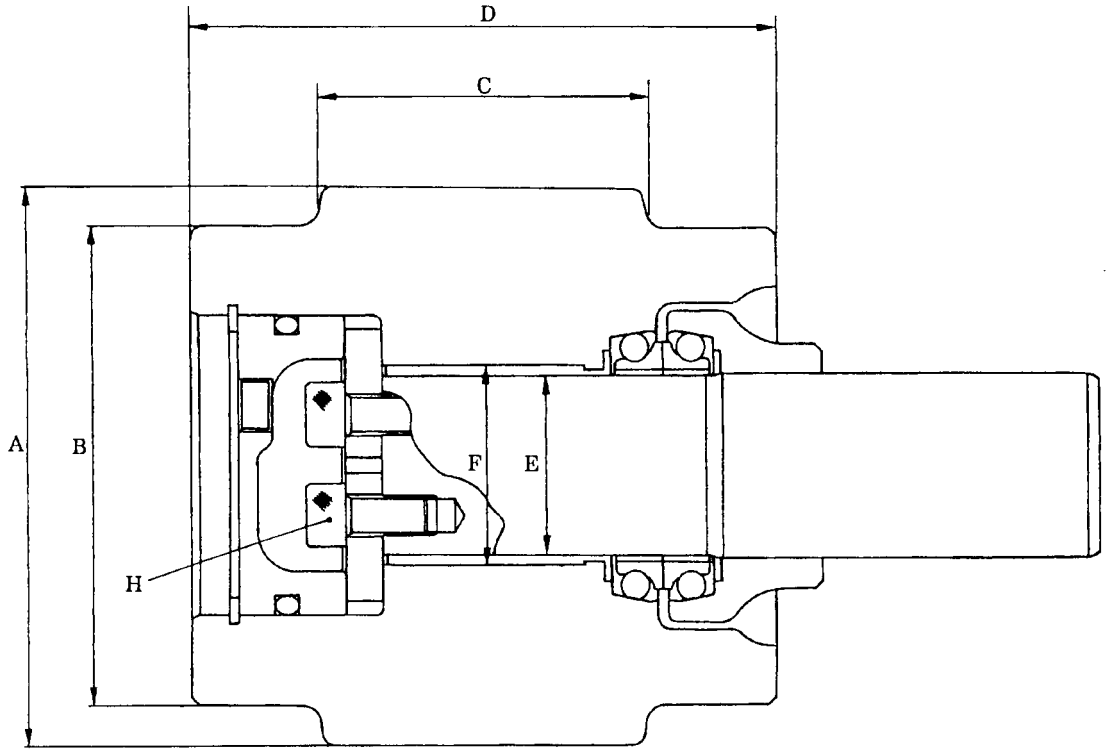
IDLER



Unit : mm (in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of idler protruding portion	Ø535(21.06)				Ø525(20.7)	Repair by build-up Welding or replace.
B	Diameter of track shoe contract surface	Ø497(19.57)				Ø487(19.2)	
C	Flange width	84±0.5 (3.31±0.02)				74(2.91)	
D	Clearance between shaft and bushing	Basic dim	Allowable interference		Standard	Allowable	Replace bushing
		Ø70 (2.7559)	Shaft	−0.030 (−0.0012) −0.060 (−0.0024)	Clearance −	Clearance 1.0(0.039)	
E	Interference of roller and bushing	Ø77 (3.0315)	Shaft	+0.140 (+0.0055) +0.090 (+0.0035)	Interference −	Interference 0 (0)	

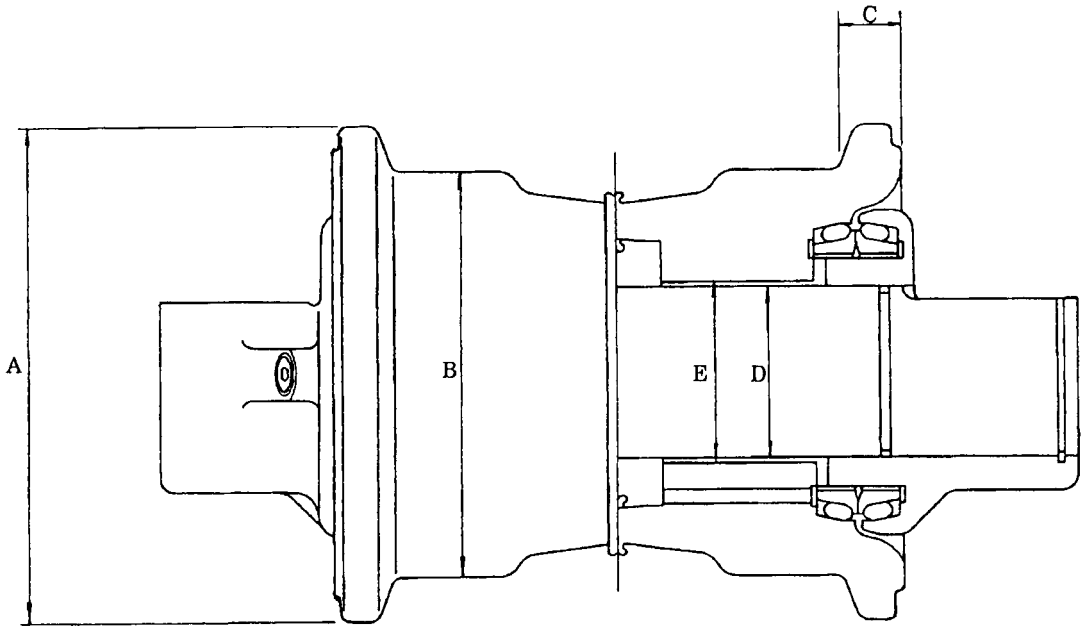
UPPER ROLLER



Unit : mm(in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Diameter of roller protruding portion	Ø140 (5.51)				Ø130 (5.12)	Replace
B	Diameter of track shoe contract surface	Ø120 (4.72)				Ø110 (4.33)	
C	Protruding portion width	84 (3.31)				74 (2.91)	
D	Flange width	150 (5.91)				140 (5.51)	
E	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		45 (1.7717)	Shaft	−0.025 (−0.0010) −0.040 (−0.0016)	Clearance —	Clearance 0.8 (0.032)	
F	Interference of roller and bushing	50 (1.9685)	Bore	+0.03 (+0.0012) 0 (0)	Interference —	Interference 0.8 (0.032)	
H	Tightening torque of socket screw	6.7 ± 0.7kgf · m (48 ± 5 ft · lbs)					Apply Loctite #242

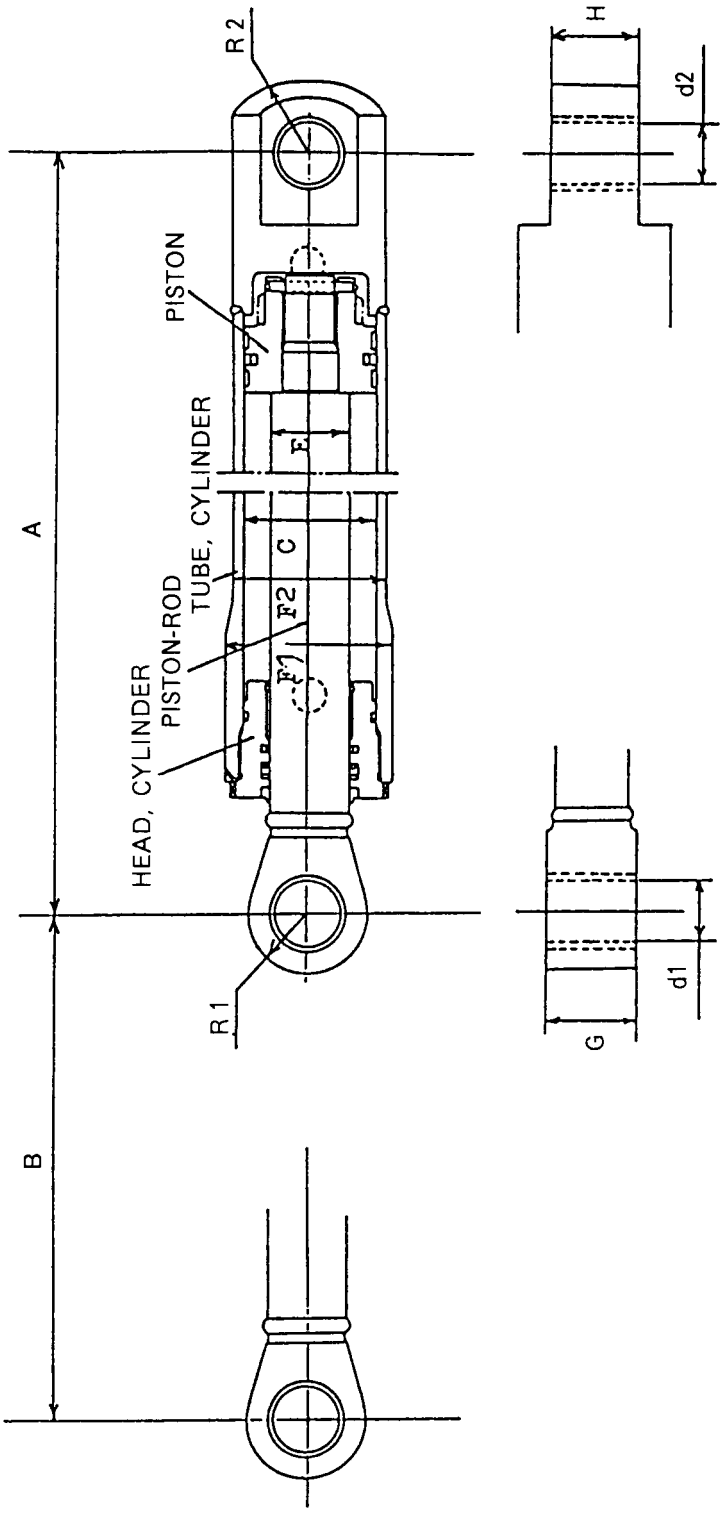
LOWER ROLLER



Unit : mm (in)

Sym-bol	Item	Standard Value				Allowable Value	Remedy
A	Flange O. D	ø200 (7.87)				ø188 (7.40)	Replace
B	Diameter of track shoe contract surface	ø165 (6.50)				ø153 (6.02)	
C	Flange width	24.5 (0.96)				18.5 (0.73)	
D	Clearance between shaft and bushing	Basic dim	Allowable tolerance		Standard	Allowable	Replace bushing
		65 (2.5591)	Shaft	−0.06 (−0.0024) −0.09 (−0.0035)	Clearance −	Clearance 0.8 (0.032)	
E	Interference of roller and bushing	69 (2.7165)	Shaft	+0.19 (+0.0138) +0.14 (+0.0075)	Interference −	Interference 0 (0)	Replace

HYDRAULIC CYLINDER



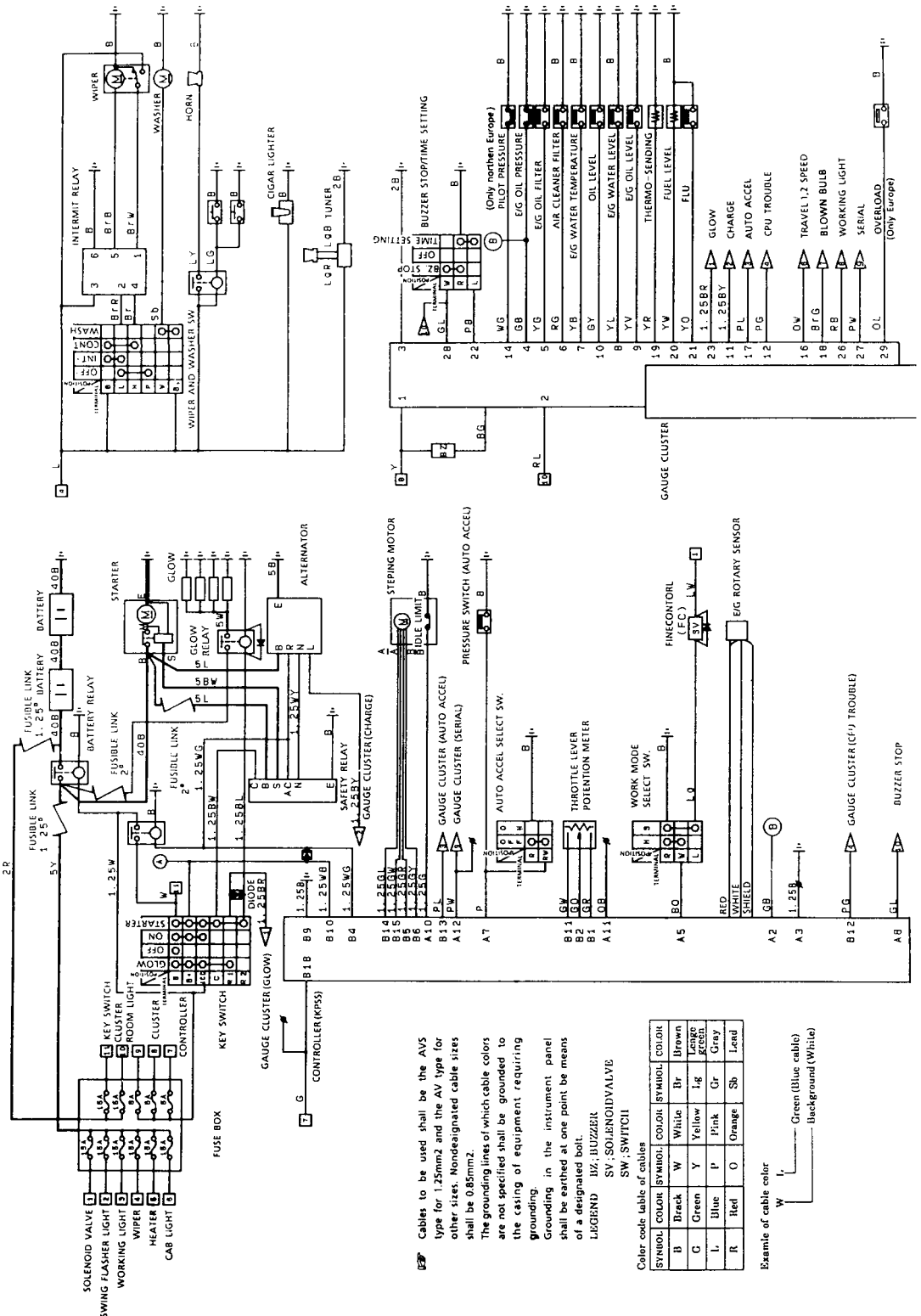
Unit: mm (ft-in)

Models	Spec	Applicable	Part,No.	A	B	φC	φE	φF1	φF2	G	H	R1	R2	φd1	φd2	Weight kg (lbs)	Cushion	
																	Rod side	Bottom side
SK60	Std • BH	Boom	2438U 1094F1	1360 (4′ 5.5″)	940 (3′ 1.0″)	125 (4.9″)	70 (2.7″)	155 (6.1″)	143 (5.6″)	95 (3.7″)	145 (5.7″)	55 (2.1″)	58 (2.2″)	55 (2.1″)	60 (2.3″)	110 (242)	no	yes
		Arm	2438U 1095F1	1345 (4′ 4.9″)	900 (2′ 11.4″)	110 (4.3″)	65 (2.5″)	136 (5.3″)	126 (4.9″)	95 (3.7″)	95 (3.7″)	55 (2.1″)	55 (2.1″)	55 (2.1″)	55 (2.11″)	88 (194)	no	yes
		Bucket	2438U 1096F1	1110 (3′ 7.7″)	725 (2′ 4.5″)	95 (3.7″)	60 (2.3″)	120 (4.7″)	110 (4.3″)	85 (3.3″)	85 (3.3″)	50 (1.9″)	50 (1.9″)	50 (1.9″)	50 (1.9″)	59 (130)	no	no
	Loader	Boom	2438U 1158F1	1185 (3′ 10.6″)	790 (2′ 7.1″)	125 (4.9″)	70 (2.7″)	155 (6.1″)	143 (5.6″)	95 (3.7″)	145 (5.7″)	55 (2.1″)	56 (2.2″)	55 (2.1″)	60 (2.3″)	110 (242)	no	yes
		Arm	2438U 1156F1	950 (3′ 1.4″)	580 (1′ 10.8″)	125 (4.9″)	70 (2.7″)	168 (6.6″)	140 (5.5″)	95 (3.7″)	95 (3.7″)	55 (2.1″)	55 (2.1″)	55 (2.1″)	55 (2.1″)	80 (176)	no	no
		Bucket	2438U 1155F1	1080 (3′ 6.5″)	695 (2′ 3.3″)	110 (4.3″)	60 (2.3″)	150 (5.9″)	125 (4.9″)	85 (3.3″)	85 (3.3″)	50 (1.9″)	50 (1.9″)	50 (1.9″)	50 (1.9″)	55 (120)	no	no
	Telescopic	Slide	2438U 1154F1	2200 (7′ 2.6″)	1860 (6′ 1.2″)	60 (2.3″)	40 (1.5″)	98 (3.8″)	69 (2.7″)	45 (1.7″)	80 (3.1″)	36 (1.4″)	35 (1.3″)	30 (1.1″)	30 (1.1″)	50 (110)	no	no
	Gutter	Offset	2438U 1152F1	750 (2′ 5.5″)	400 (1′ 3.7″)	110 (4.3″)	65 (2.5″)	150 (5.9″)	125 (4.9″)	95 (3.7″)	95 (3.7″)	55 (2.1″)	55 (2.1″)	55 (2.1″)	55 (2.1″)	60 (132)	no	no
	Dozer	Dozer	2438U 1153F1	600 (1′ 11.6″)	160 (6.3″)	80 (3.1″)	50 (1.9″)	114 (4.4″)	93 (3.6″)	60 (2.3″)	60 (2.3″)	45 (1.7″)	45 (1.7″)	40 (1.5″)	40 (1.5″)	26 (57)	no	no
SK100	Stb • BH	Boom	2438U 1123F1	1430 (4′ 8.3″)	975 (3′ 2.3″)	100 (3.9″)	70 (2.7″)	155 (6.1″)	116 (4.5″)	80 (3.1″)	90 (3.5″)	65 (2.5″)	60 (2.3″)	75 (2.9″)	70 (2.7″)	90 (198)	yes	no
		Arm	2438U 1125F1	1585 (5′ 2.4″)	1085 (3′ 6.7″)	115 (4.5″)	75 (2.9″)	170 (6.6″)	134 (5.2″)	100 (3.9″)	100 (3.9″)	65 (2.5″)	65 (2.5″)	70 (2.7″)	70 (2.7″)	120 (264)	yes	no
		Bucket	2438U 1097F2	1435 (4′ 8.5″)	985 (3′ 2.7″)	95 (3.7″)	65 (2.5″)	150 (5.9″)	109 (4.3″)	90 (3.5″)	90 (3.5″)	55 (2.1″)	55 (2.1″)	60 (2.3″)	60 (2.3″)	80 (176)	no	no

Unit: mm (ft-in)

Models	Spec	Applicable	Part,No.	A	B	φC	φE	φF1	φF2	G	H	R1	R2	φd1	φd2	Weight kg (lbs)	Cushion	
																	Rod side	Bottom side
SK120 SK120LC	Std.BH	Boom	2438U 1133F1	1565 (5′ 1.6″)	1097 (3′ 7.1″)	105 (4.1″)	70 (2.7″)	160 (6.3″)	122 (4.8″)	80 (3.1″)	90 (3.5″)	65 (2.5″)	60 (2.3″)	75 (2.9″)	70 (2.7″)	100 (220)	yes	no
		Arm	2438U 1132F1	1775 (5′ 9.8″)	1185 (3′ 10.6″)	120 (4.7″)	80 (3.1″)	175 (6.8″)	140 (5.5″)	100 (3.9″)	100 (3.9″)	65 (2.5″)	65 (2.5″)	70 (2.7″)	70 (2.7″)	150 (330)	yes	no
		Bucket	2438U 1131F1	1405 (4′ 7.3″)	915 (3′ 0.0″)	100 (3.9″)	65 (2.5″)	155 (6.1″)	114 (4.4″)	90 (3.5″)	90 (3.5″)	55 (2.1″)	55 (2.1″)	60 (2.3″)	60 (2.3″)	80 (176)	no	no
SK200 SK200LC	Std.BH	Boom	2438U 1106F1	1810 (5′ 11.2″)	1290 (4′ 2.7″)	125 (4.9″)	85 (3.3″)	180 (7.1″)	146 (5.7″)	100 (3.9″)	100 (3.9″)	75 (2.9″)	72.5 (2.8″)	85 (3.3″)	80 (3.1″)	170 (374)	yes	no
		Arm	2438U 1108F1	1990 (6′ 6.3″)	1453 (4′ 9.2″)	145 (5.7″)	100 (3.9″)	210 (8.2″)	170 (6.6″)	120 (4.7″)	120 (4.7″)	79 (3.1″)	70 (2.7″)	85 (3.3″)	85 (3.3″)	250 (550)	yes	no
		Bucket	2438U 1109F1	1610 (5′ 3.3″)	1110 (3′ 7.7″)	120 (4.7″)	80 (3.1″)	175 (6.8″)	139 (5.4″)	100 (3.9″)	100 (3.9″)	70 (2.7″)	70 (2.7″)	80 (3.1″)	80 (3.1″)	130 (286)	no	no
	Std.HB (Lc Tyep)	Boom	2438U 1102F1	1810 (5′ 11.2″)	1290 (4′ 2.7″)	125 (4.9″)	85 (3.3″)	191 (7.5″)	144 (5.6″)	100 (3.9″)	100 (3.9″)	70 (2.7″)	65 (2.5″)	85 (3.3″)	80 (3.1″)	160 (252)	yes	no
		Arm	2438U 1104F1	1990 (6′ 6.3″)	1453 (4′ 9.2″)	145 (5.7″)	100 (3.9″)	219 (8.6″)	170 (6.7″)	120 (4.7″)	120 (4.7″)	80 (3.1″)	80 (3.1″)	85 (3.3″)	85 (3.3″)	250 (550)	yes	no
		Bucket	2438U 1105F1	1610 (5′ 3.3″)	1110 (3′ 7.7″)	120 (4.7″)	80 (3.1″)	184 (7.2″)	140 (5.5″)	100 (3.9″)	100 (3.9″)	70 (2.7″)	65 (2.5″)	80 (3.1″)	80 (3.1″)	135 (297)	no	no
SK220 SK220LC	Std.HB	Boom	2438U 1135F1	1930 (6′ 3.9″)	1334 (4′ 4.5″)	140 (5.5″)	90 (3.5″)	219 (8.6″)	160 (6.3″)	110 (4.3″)	110 (4.3″)	90 (3.5″)	75 (2.9″)	95 (3.7″)	90 (3.5″)	210 (462)	yes	no
		Arm	2438U 1137F1	2300 (7′ 6.5″)	1630 (5′ 4.1″)	150 (5.9″)	105 (4.1″)	232 (9.1″)	176 (6.9″)	130 (5.1″)	130 (5.1″)	90 (3.5″)	85 (3.3″)	90 (3.5″)	90 (3.5″)	320 (705)	yes	no
		Bucket	2438U 1138F1	1750 (5′ 8.8″)	1170 (3′ 10.0″)	130 (5.1″)	85 (3.3″)	196 (7.7″)	152 (5.9″)	110 (4.3″)	110 (4.3″)	80 (3.1″)	70 (2.7″)	80 (3.1″)	80 (3.1″)	180 (296)	no	no

ELECTRIC SYSTEM DIAGRAM

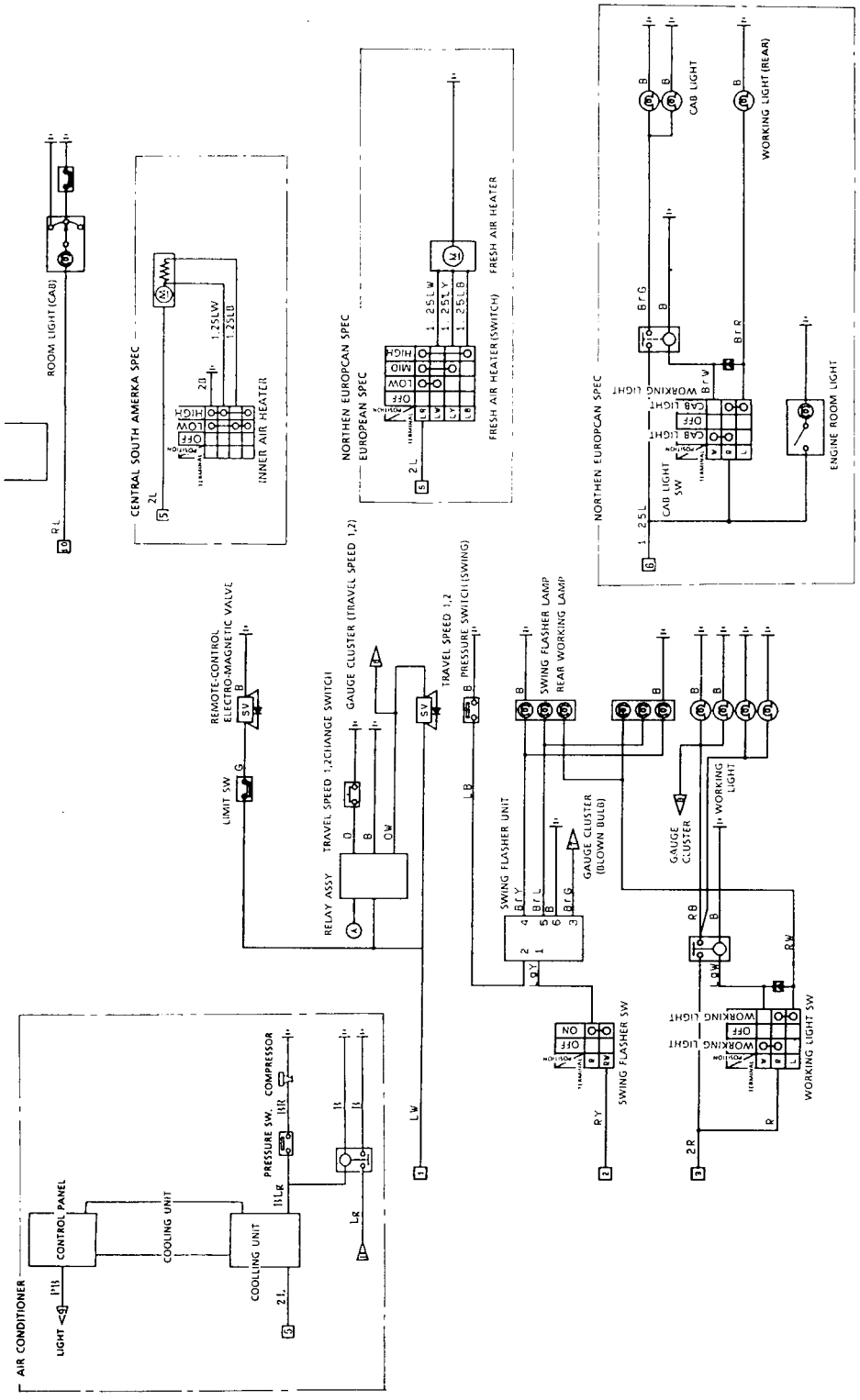


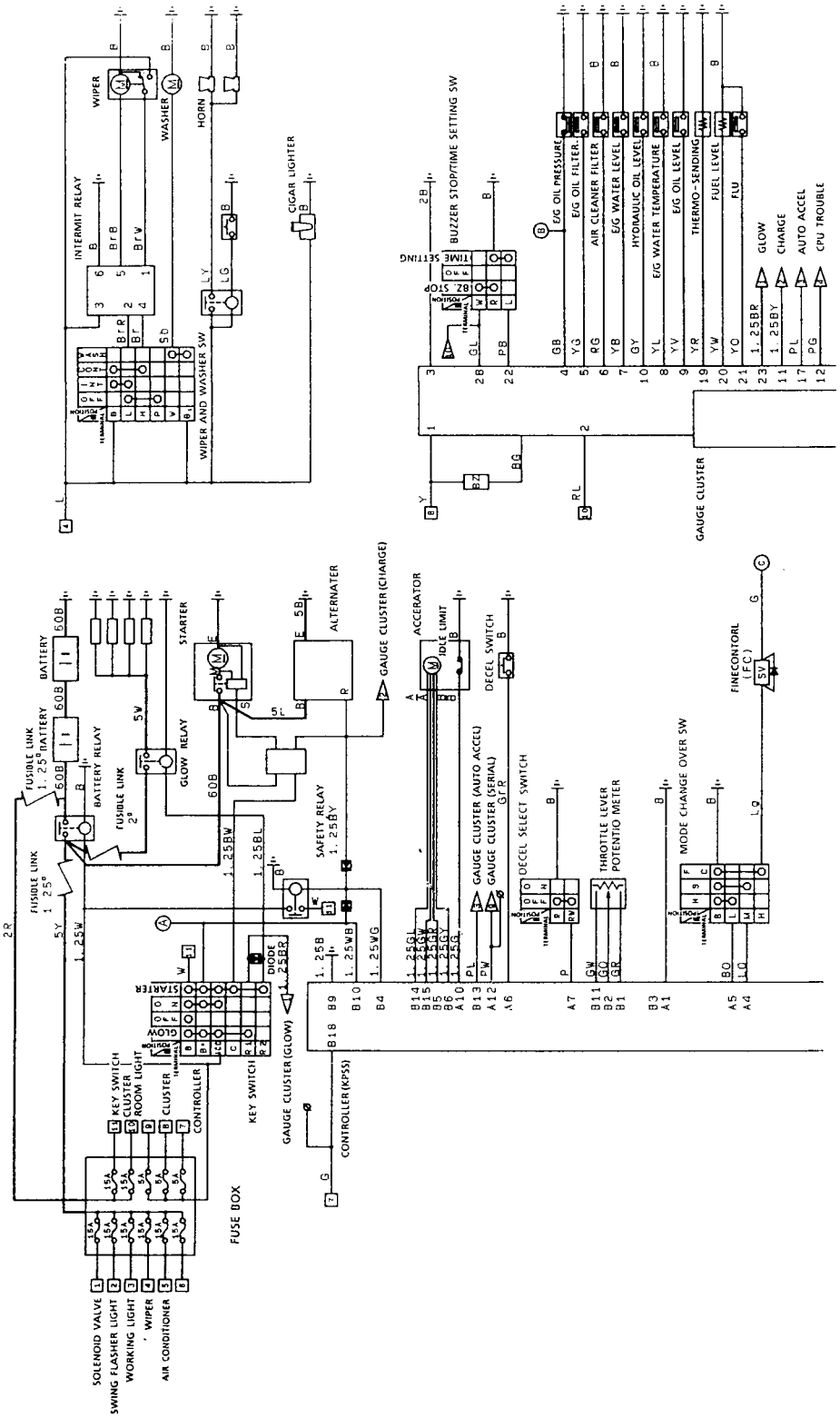
☞ Cables to be used shall be the AVS type for 1.25mm2 and the AV type for other sizes. Nondesignated cable sizes shall be 0.85mm2.
The grounding lines of which cable colors are not specified shall be grounded to the casing of equipment requiring grounding.
Grounding in the instrument panel shall be earthed at one point be means of a designated bolt.
LEGEND IG ; BUZZER
SV ; SOLENOIDVALVE
SW ; SWITCH

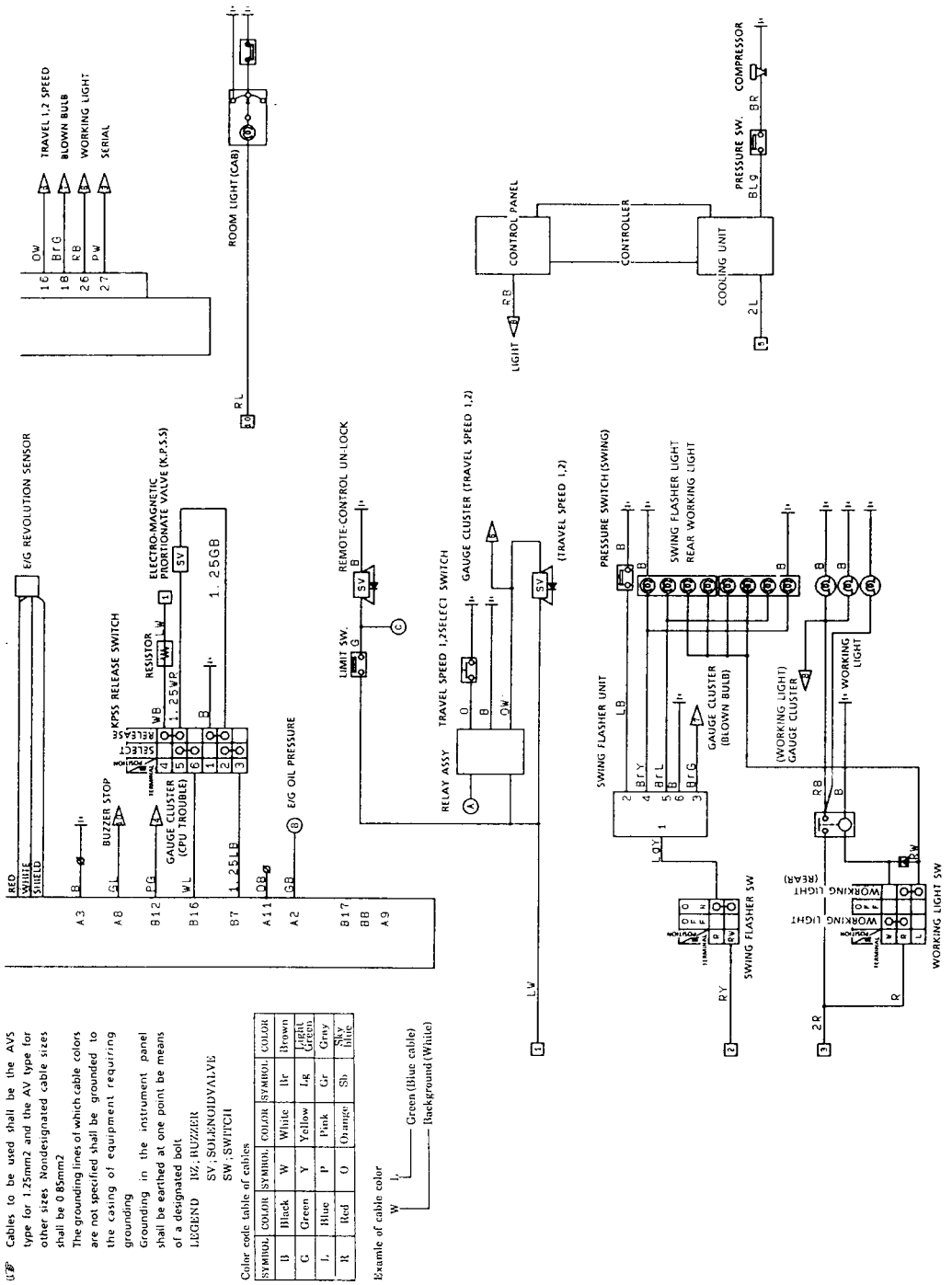
Color code table of cables

SYMBOL	COLOR	SYMBOL	COLOR	SYMBOL	COLOR
B	Black	W	White	Br	Brown
G	Green	Y	Yellow	Lg	Large green
L	Blue	P	Pink	Gr	Gray
R	Red	O	Orange	Sb	Lead

Example of cable color
W / L — Green (Blue cable)
Background (White)


ROOM LIGHT (CAB)
CENTRAL SOUTH AMERKA SPEC
INNER AIR HEATER
NORTHEN EUROPEAN SPEC
EUROPEAN SPEC
FRESH AIR HEATER (SWITCH)
FRESH AIR HEATER
NORTHEN EUROPEAN SPEC
CAB LIGHT
WORKING LIGHT (REAR)
ENGINE ROOM LIGHT
CAB LIGHT SW
WORKING LIGHT
REMOTE-CONTROL ELECTRO-MAGNETIC VALVE
LIMIT SW
TRAVEL SPEED 1,2CHANGE SWITCH
GAUGE CLUSTER (TRAVEL SPEED 1,2)
RELAY ASSY
TRAVEL SPEED 1,2 PRESSURE SWITCH(SWING)
SWING FLASHER LAMP
REAR WORKING LAMP
SWING FLASHER UNIT
GAUGE CLUSTER (BLOWN BULB)
GAUGE CLUSTER
WORKING LIGHT
SWING FLASHER SW
WORKING LIGHT SW
AIR CONDITIONER
CONTROL PANEL
COOLING UNIT
COOLING UNIT
PRESSURE SW.
COMPRESSOR
LIGHT


WIPER
WASHER
HORN
INTERMIT RELAY
WIPER AND WASHER SW
CIGAR LIGHTER
BUZZER STOP/TIME SETTING SW
E/G OIL PRESSURE
E/G OIL FILTER
AIR CLEANER FILTER
E/G WATER LEVEL
HYDRAULIC OIL LEVEL
E/G WATER TEMPERATURE
E/G OIL LEVEL
THERMO-SENDING
FUEL LEVEL
GLOW
CHARGE
AUTO ACCEL
CPU TROUBLE
GAUGE CLUSTER
BATTERY
FUSIBLE LINK
BATTERY RELAY
GLOW RELAY
STARTER
ALTERNATER
GAUGE CLUSTER (CHARGE)
SAFETY RELAY
DIODE
ACCERATOR
IDLE LIMIT
DECEL SWITCH
GAUGE CLUSTER (AUTO ACCEL)
GAUGE CLUSTER (SERIAL)
DECEL SELECT SWITCH
THROTTLE LEVER POTENTIO METER
MODE CHANGE OVER SW
FINECONTORL (FC)
KEY SWITCH
CLUSTER
ROOM LIGHT
CONTROLLER
GAUGE CLUSTER (GLOW)
CONTROLLER (KPSS)
FUSE BOX
SOLENOID VALVE
SWING FLASHER LIGHT
WORKING LIGHT
WIPER
AIR CONDITIONER



Cables to be used shall be the AVS type for 1.25mm2 and the AV type for other sizes Nondesignated cable sizes shall be 0.85mm2

The grounding lines of which cable colors are not specified shall be grounded to the casing of equipment requiring grounding

Grounding in the instrument panel shall be earthed at one point be means of a designated bolt

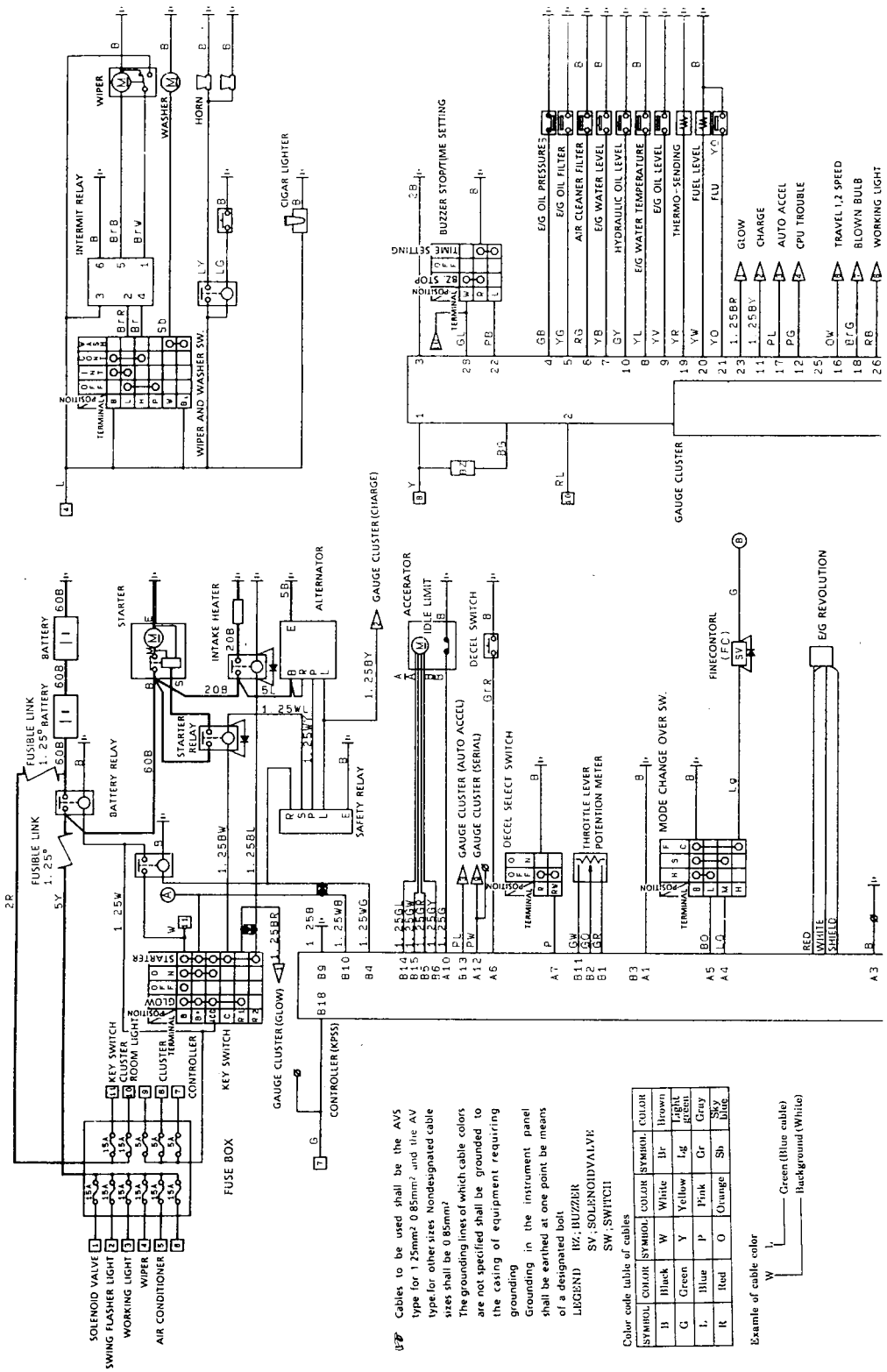
LEGEND BZ ; BUZZER
SV ; SOLENOID VALVE
SW ; SWITCH

Color code table of cables

SYMBOL	COLOR	SYMBOL	COLOR	SYMBOL	COLOR
B	Black	W	White	Br	Brown
G	Green	Y	Yellow	Lg	Light Green
L	Blue	P	Pink	Gr	Grey
R	Red	O	Orange	Sb	Sky blue

Example of cable color

W — L — Green (Blue cable) — Background (White)



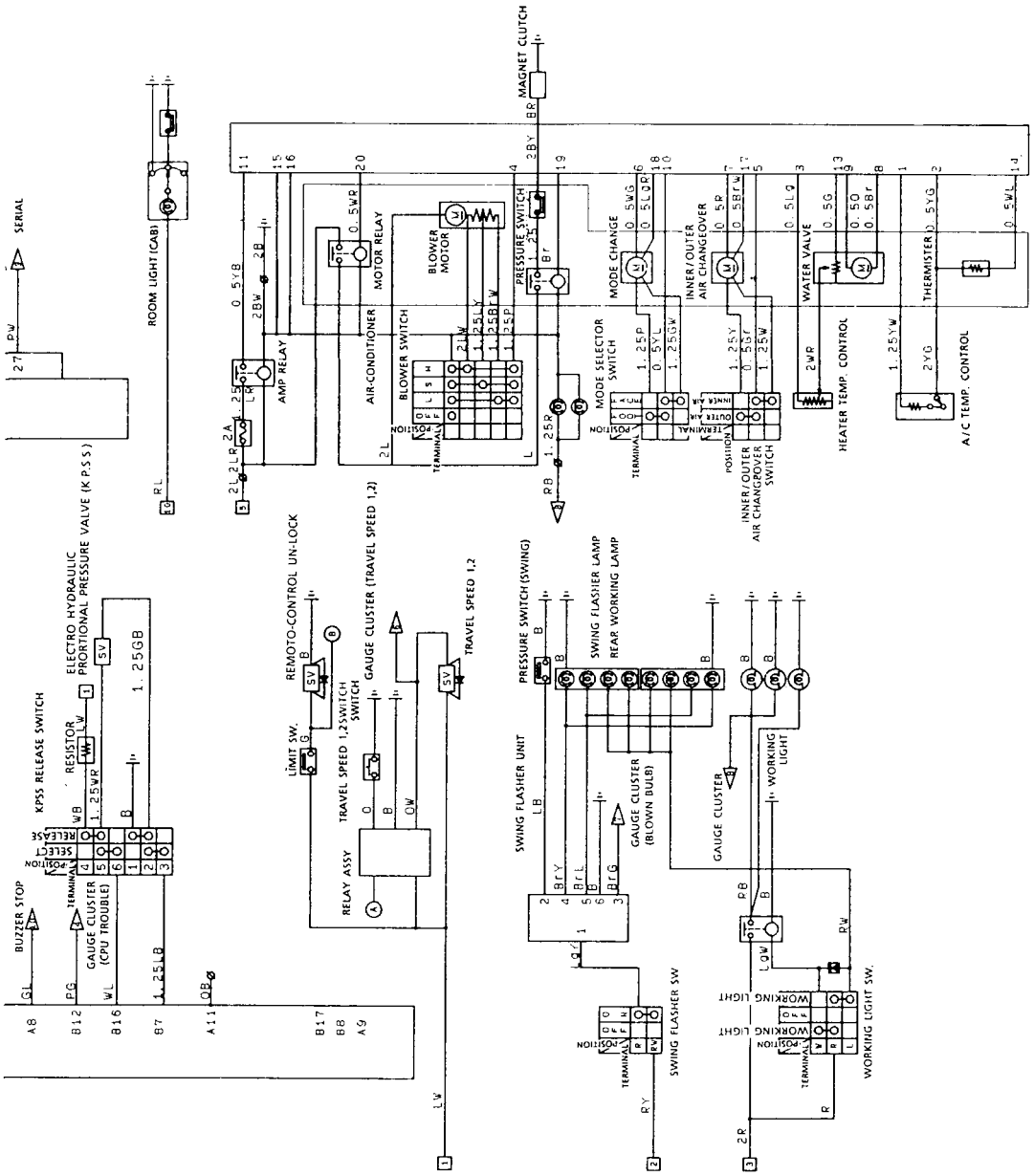
Cables to be used shall be the AVS type for 1.25mm² 0.85mm² and the AV type for other sizes. Nondesignated cable sizes shall be 0.85mm².
The grounding lines of which cable colors are not specified shall be grounded to the casing of equipment requiring grounding.
Grounding in the instrument panel shall be earthed at one point be means of a designated bolt.

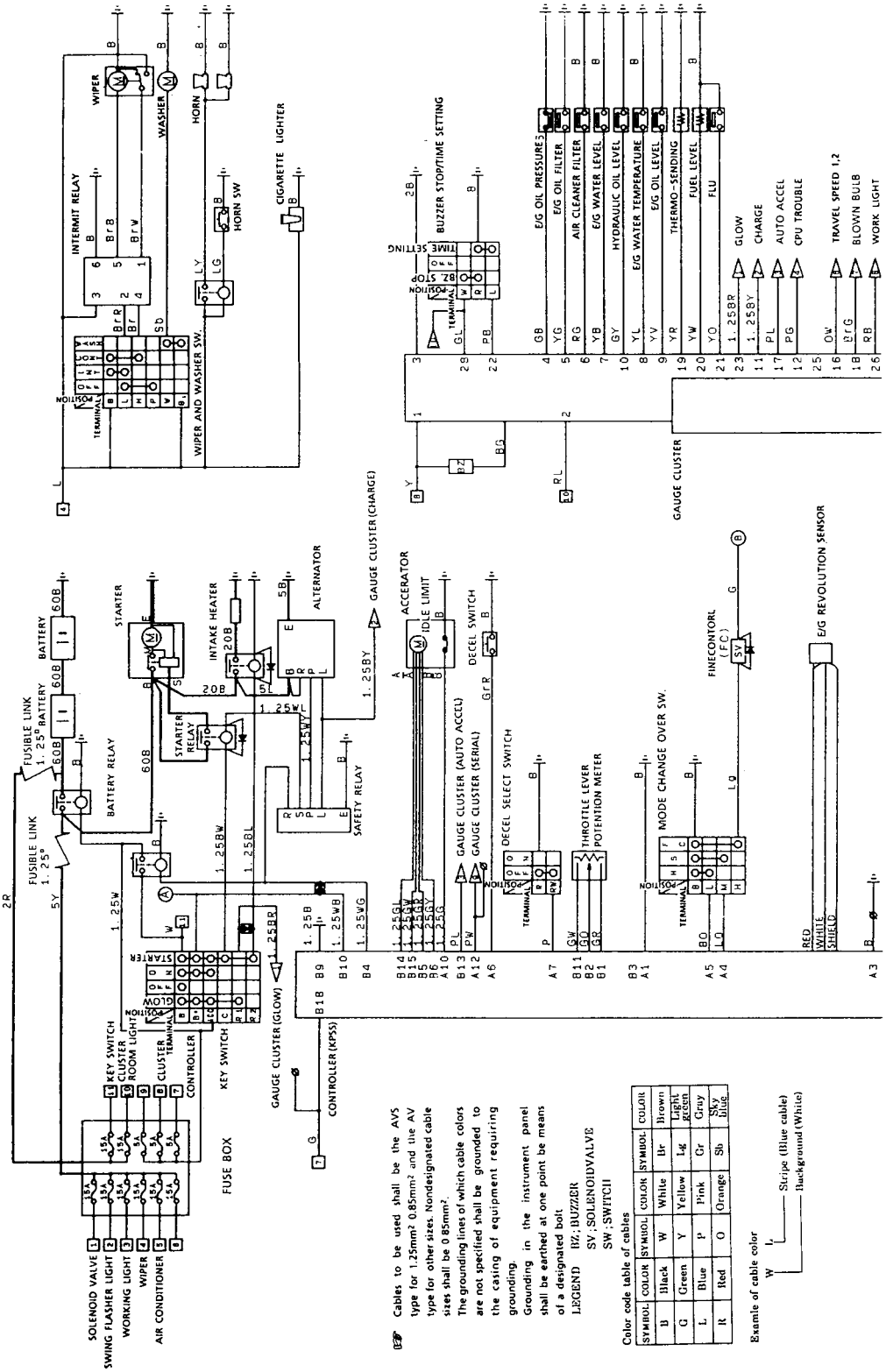
LEGEND IW: BUZZER
SV: SOLENOIDVALVE
SW: SWITCH

Color code table of cables

SYMBOL	COLOR	SYMBOL	COLOR	SYMBOL	COLOR
B	Black	W	White	Br	Brown
G	Green	Y	Yellow	Lg	Light green
L	Blue	P	Pink	Gr	Grey
R	Red	O	Orange	Sb	Sky blue

Example of cable color
W — White
L — Green (Blue cable)
B — Background (White)


SERIAL
ROOM LIGHT (CAB)
MAGNET CLUTCH
AMP RELAY
AIR-CONDITIONER
MOTOR RELAY
BLOWER MOTOR
BLOWER SWITCH
PRESSURE SWITCH
MODE CHANGE
MODE SELECTOR SWITCH
INNER/OUTER AIR CHANGEOVER
INNER/OUTER AIR CHANGROVER SWITCH
WATER VALVE
HEATER TEMP. CONTROL
THERMISTER
A/C TEMP. CONTROL
ELECTRO HYDRAULIC PRORTIONAL PRESSURE VALVE (KPSS)
KPSS RELEASE SWITCH
RESISTOR
BUZZER STOP
GAUGE CLUSTER (CPU TROUBLE)
REMOTO-CONTROL UN-LOCK
LIMIT SW.
TRAVEL SPEED 1,2SWITCH SWITCH
GAUGE CLUSTER (TRAVEL SPEED 1,2)
RELAY ASSY
TRAVEL SPEED 1,2
PRESSURE SWITCH (SWING)
SWING FLASHER LAMP
REAR WORKING LAMP
SWING FLASHER UNIT
GAUGE CLUSTER (BLOWN BULB)
GAUGE CLUSTER
WORKING LIGHT
SWING FLASHER SW
WORKING LIGHT SW.



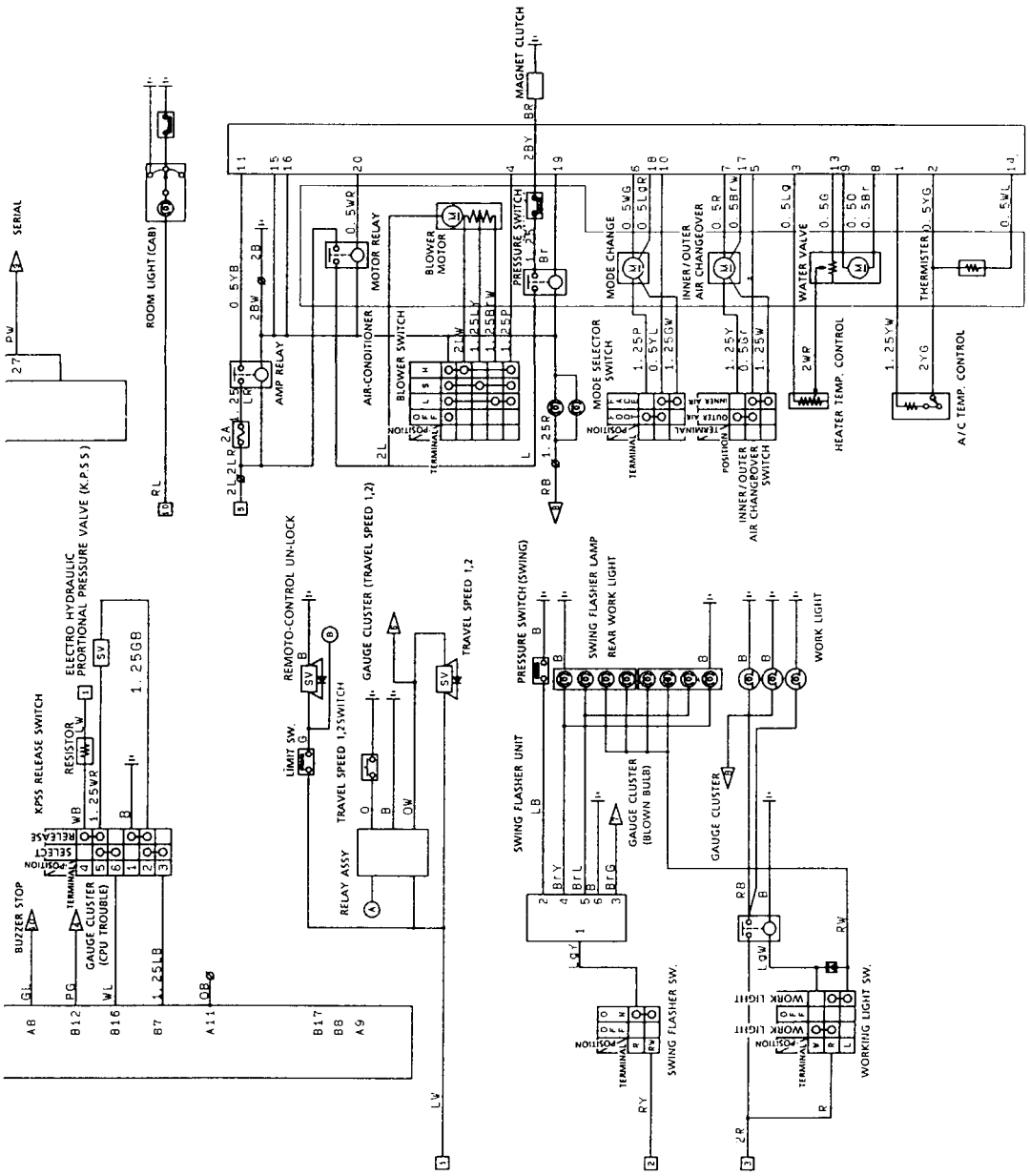
☞ Cables to be used shall be the AVS type for 1.25mm² 0.85mm² and the AV type for other sizes. Nondesignated cable sizes shall be 0.85mm².
The grounding lines of which cable colors are not specified shall be grounded to the casing of equipment requiring grounding.
Grounding in the instrument panel shall be earthed at one point be means of a designated bolt.

LEGEND BZ; BUZZER
SV; SOLENOIDVALVE
SW; SWITCH

Color code table of cables

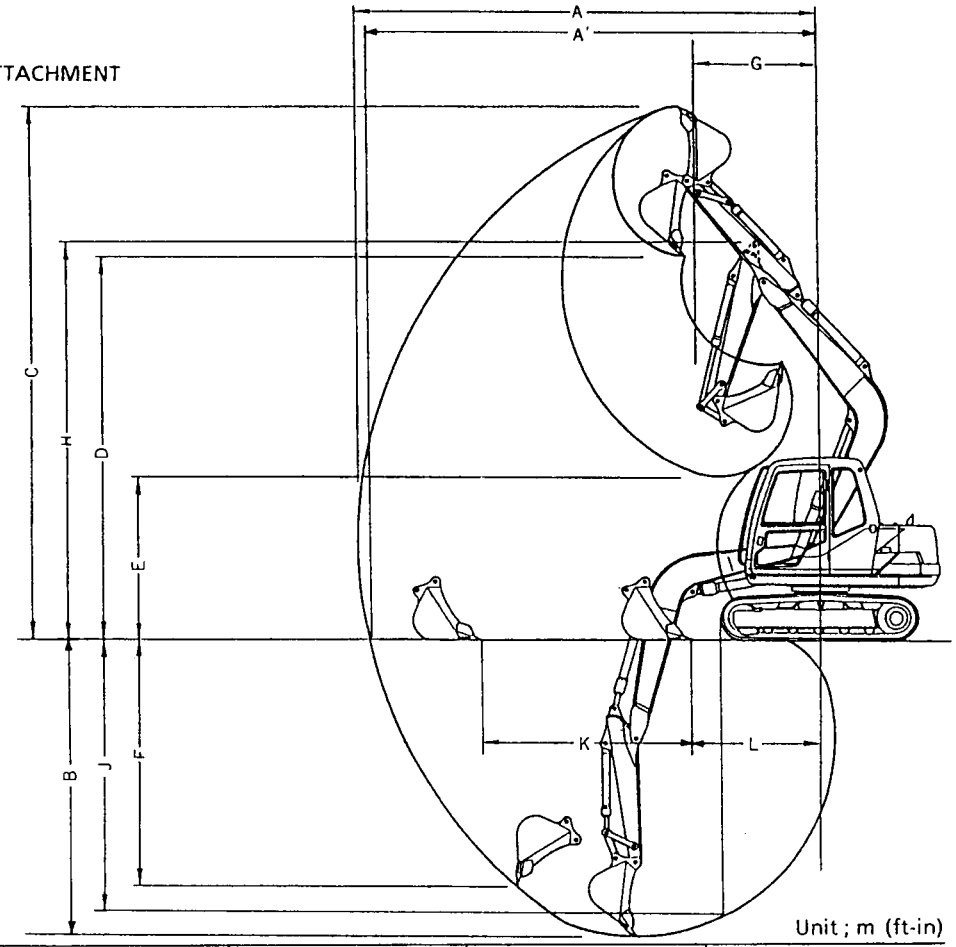
SYMBOL	COLOR	SYMBOL	COLOR	SYMBOL	COLOR
B	Black	W	White	Br	Brown
G	Green	Y	Yellow	Lg	Light green
L	Blue	P	Pink	Gr	Gray
R	Red	O	Orange	Sb	Sky blue

Examle of cable color
W — Stripe (Blue cable)
L — Background (White)


SERIAL
ROOM LIGHT (CAB)
MAGNET CLUTCH
AMP RELAY
AIR-CONDITIONER
MOTOR RELAY
BLOWER MOTOR
BLOWER SWITCH
PRESSURE SWITCH
MODE CHANGE
MODE SELECTOR SWITCH
INNER/OUTER AIR CHANGEOVER
INNER/OUTER AIR CHANGEOVER SWITCH
WATER VALVE
HEATER TEMP. CONTROL
THERMISTER
A/C TEMP. CONTROL
BUZZER STOP
KPSS RELEASE SWITCH
ELECTRO HYDRAULIC PROPORTIONAL PRESSURE VALVE (K.P.S.S.)
RESISTOR
GAUGE CLUSTER (CPU TROUBLE)
REMOTO-CONTROL UN-LOCK
LIMIT SW.
TRAVEL SPEED 1,2 SWITCH
RELAY ASSY
GAUGE CLUSTER (TRAVEL SPEED 1,2)
TRAVEL SPEED 1,2
PRESSURE SWITCH (SWING)
SWING FLASHER LAMP
REAR WORK LIGHT
SWING FLASHER UNIT
GAUGE CLUSTER (BLOWN BULB)
SWING FLASHER SW.
GAUGE CLUSTER
WORK LIGHT
WORKING LIGHT SW.

WORKING RANGE OF ATTACHMENTS

■BACKHOE ATTACHMENT

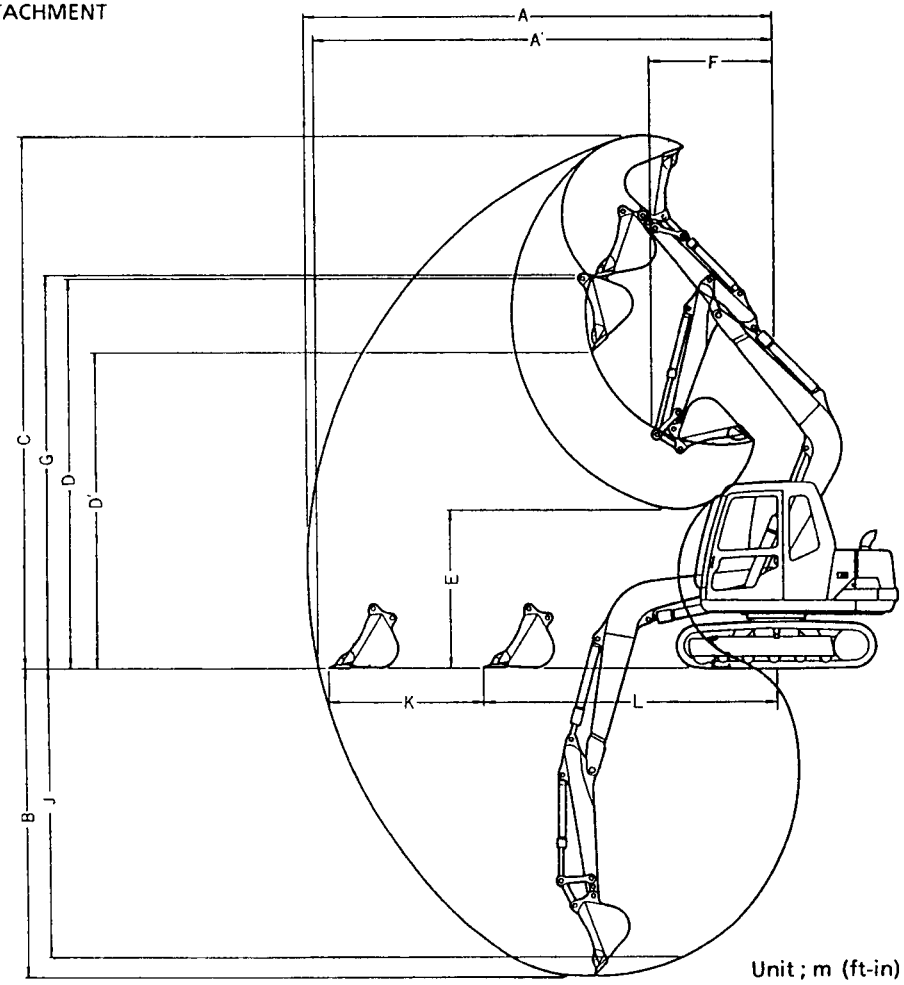


Unit ; m (ft-in)

Item / Range / Type of attachment		1.73m (5ft8in) arm with 0.25m³ (0.33cuyd) bucket	2.15m (7ft1in) arm with 0.2m³ (0.26cuyd) bucket	1.73m (5ft8in) arm + 0.45m (1ft6in) arm extension arm with 0.2m³ (0.26cuyd) bucket
A	Max digging reach	6.42(21′ 1″)	6.81(22′ 4″)	6.82(22′ 4″)
A′	Max. reach at ground level	6.28(20′ 7″)	6.68(21′11″)	6.70(22′)
B	Max. digging depth	4.20(13′ 9″)	4.60(15′ 1″)	4.63(15′ 2″)
C	Max. digging height	7.36(24′ 2″)	7.69(25′ 3″)	7.68(25′ 2″)
D	Max. dumping clearance	5.29(17′ 4″)	5.62(18′ 5″)	5.61(18′ 5″)
E	Min. dumping clearance	2.29(7′ 6″)	1.87(6′ 2″)	1.86(6′ 1″)
F	Max. vertical digging depth	3.47(11′ 5″)	3.85(12′ 8″)	3.78(12′ 5″)
G	Min swing radius	1.70(5′ 7″)	1.74(5′ 9″)	1.81(5′11″)
H	Height at min. swing radius	5.51(18′ 1″)	5.50(18′ 1″)	5.51(18′ 1″)
J	Digging depth at 8-flat floor	3.85(12′ 8″)	4.33(14′ 2″)	4.37(14′ 4″)
K	Horizontal digging distance — Stroke	2.92(9′ 7″)	3.63(11′11″)	3.61(11′10″)
L	Horizontal digging distance — At min.	1.79(5′10″)	1.48(4′10″)	1.52(5′)

☞ The figures in this table do not include the projection of shoes (20mm (0.78in)) .

■FACE SHOVEL ATTACHMENT



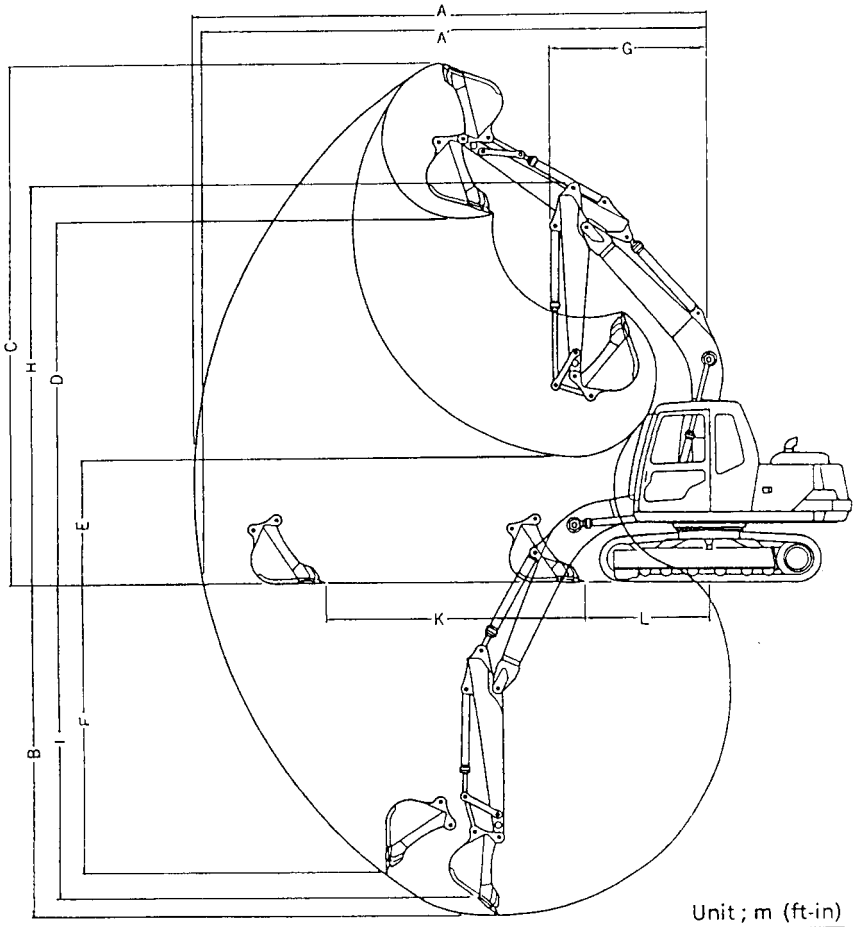
Unit ; m (ft-in)

Item / Range		Type of attachment: 1.73m (5ft8in) arm with 0.25m³ (0.33cuyd) bucket	2.15m (7ft1in) arm with 0.2m³ (0.26cuyd) bucket	1.73m (5ft8in) arm + 0.45m (1ft6in) arm extension arm with 0.2m³ (0.26cuyd) bucket
A	Max digging reach	6.51(21′ 4″)	6.91(22′ 8″)	6.92(22′ 8″)
A'	Max. reach at ground level	6.37(20′11″)	6.78(22′ 3″)	6.79(22′ 3″)
B	Max. digging depth	4.30(14′ 1″)	4.70(15′ 5″)	4.72(15′ 6″)
C	Max. digging height	7.46(24′ 6″)	7.80(25′ 7″)	7.79(25′ 7″)
D	Max. dumping clearance	5.46(17′11″)	5.79(19′)	5.79(19′)
D'	Max. dumping clearance (45°)	4.42(14′ 6″)	4.58(15′)	4.53(14′10″)
E	Min. dumping clearance	2.20(7′ 3″)	1.77(5′10″)	1.76(5′ 9″)
F	Min swing radius	1.70(5′ 7″)	1.74(5′ 9″)	1.81(5′11″)
G	Height at min. swing radius	5.51(18′ 1″)	5.50(18′)	5.51(18′ 1″)
J	Digging depth at 8-flat floor	3.98(13′ 1″)	4.43(14′ 6″)	4.47(14′ 8″)
K	Horizontal digging discance — Stroke	2.16(7′ 1″)	2.82(9′ 3″)	2.90(9′ 6″)
L	Horizontal digging discance — At min.	4.07(13′ 4″)	3.82(12′ 6″)	3.75(12′ 4″)

☞ The figures in this table do not include the projection of shoes (20mm (0.78in))

SK100

■BACKHOE ATTACHMENT

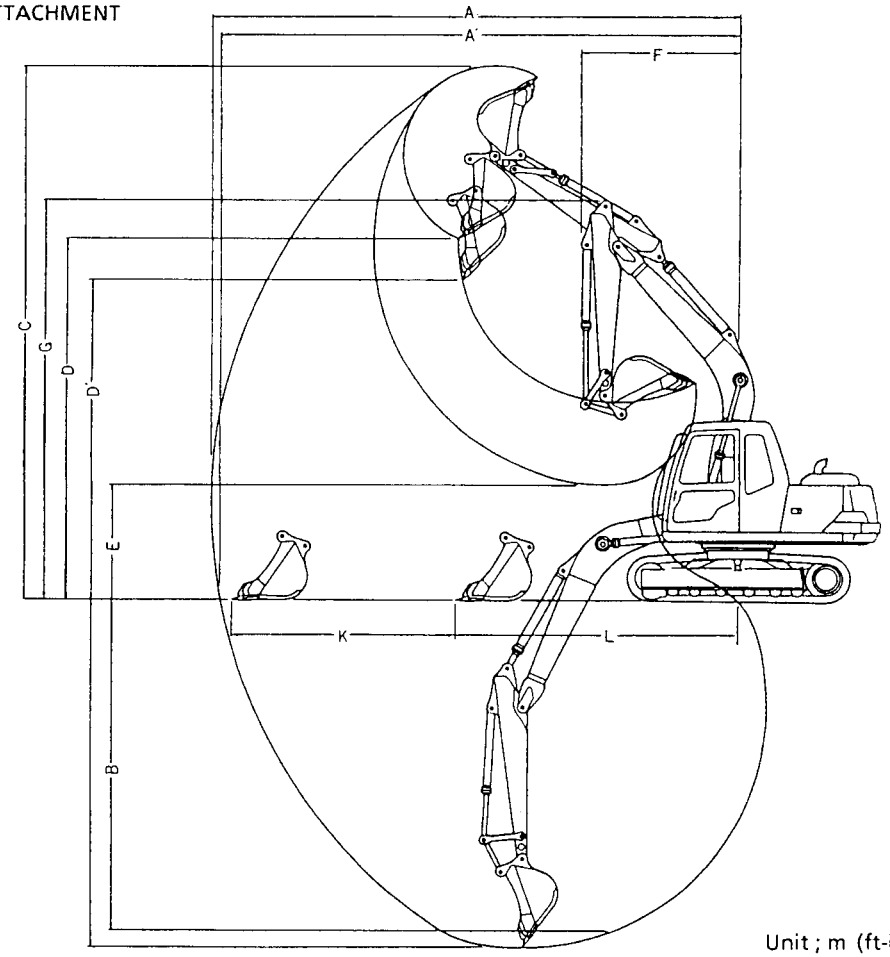


Unit ; m (ft-in)

Item / Type of attachment	Range		1.9m (6ft3in) arm with 0.45m³ (0.59cuyd) bucket	2.27m (7ft5in) arm with 0.4m³ (0.52cuyd) bucket	2.77m (9ft1in) arm with 0.35m³ (0.46cuyd) bucket	2.27m (7ft5in) arm + 0.6m (1ft11in) arm extension arm with 0.3m³ (0.39cuyd) bucket
A	Max digging reach		7.38(24'3")	7.70(25'3")	8.20(26'11")	8.26(27'1")
A'	Max. reach at ground level		7.24(23'9")	7.56(24'10")	8.07(26'6")	8.13(26'8")
B	Max. digging depth		4.71(15'5")	5.08(16'8")	5.58(18'4")	5.68(18'8")
C	Max. digging height		7.70(25'3")	7.86(25'9")	8.22(26'12")	8.18(26'10")
D	Max. dumping clearance		5.33(17'6")	5.49(18')	5.85(19'2")	5.83(19'2")
E	Min. dumping clearance		2.28(7'6")	1.88(6'2")	1.40(4'7")	1.28(4'2")
F	Vertical digging depth		4.07(13'4")	4.41(14'6")	4.90(16'1")	4.89(16'1")
G	Min. swing radius		2.53(8'4")	2.35(7'9")	2.49(8'2")	2.37(7'9")
H	Height at min. swing radius		6.06(19'11")	6.03(19'9")	6.04(19'10")	6.03(19'9")
J	Digging height at 8-flat floor		4.42(14'6")	4.81(15'9")	5.37(17'7")	5.46(17'11")
K	Horizontal digging distance	Stroke	3.14(10'4")	3.87(12'8")	4.55(14'11")	4.78(15'8")
L		At min.	2.27(7'5")	1.86(6'1")	1.68(5'6")	1.51(4'11")

☞ The figures in this table do not include the projection of shoes (20mm (0.78in)) .

■FACE SHOVEL ATTACHMENT

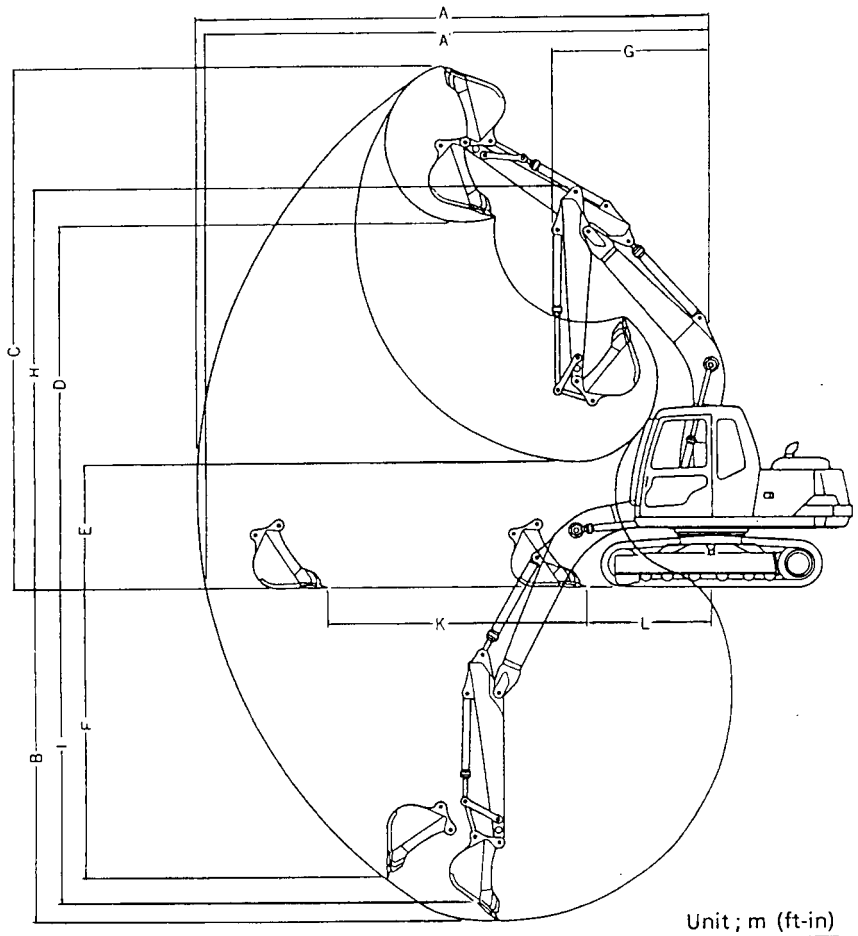


Unit ; m (ft-in)

Item / Range / Type of attachment			1.9m (6ft3in) arm with 0.45m³ (0.59cuyd) bucket	2.27m (7ft5in) arm with 0.4m³ (0.52cuyd) bucket	2.77m (9ft1in) arm with 0.35m³ (0.46cuyd) bucket	2.27m (7ft5in) arm + 0.6m (1ft11in) arm extension arm with 0.3m³ (0.39cuyd) bucket
A	Max digging reach		7.53(24'8")	7.85(25'9")	8.34(27'4")	8.40(27'7")
A'	Max. reach at ground level		7.39(24'3")	7.71(25'3")	8.22(27')	8.28(27'2")
B	Max. digging depth		4.86(15'11")	5.23(17'2")	5.73(18'10")	5.83(19'1")
C	Max. digging height		7.90(25'11")	8.06(26'5")	8.42(27'7")	8.39(27'6")
D	Max. dumping clearance		5.30(17'5")	5.46(17'11")	5.81(19'1")	5.77(18'11")
D'	Max. dumping clearance (45°)		4.75(15'7")	4.83(15'10")	5.14(16'10")	5.15(16'11")
E	Min. dumping clearance		2.13(6'12")	1.74(5'9")	1.25(4'1")	1.14(3'9")
F	Min. swing radius		2.53(8'4")	2.35(7'9")	2.49(8'2")	2.37(7'9")
G	Height at min. swing radius		6.06(19'11")	6.03(19'9")	6.04(19'10")	6.03(19'9")
J	Digging height at 8-flat floor		4.58(15')	4.97(16'4")	5.53(18'2")	5.62(18'5")
K	Horizontal digging distance	Stroke	2.71(8'11")	3.35(10'12")	4.22(13'10")	4.38(14'4")
L		At min.	4.52(14'10")	4.20(13'9")	3.82(12'6")	3.72(12'2")

☞ The figures in this table do not include the projection of shoes { 20mm (0.78in) } .

■BACKHOE ATTACHMENT

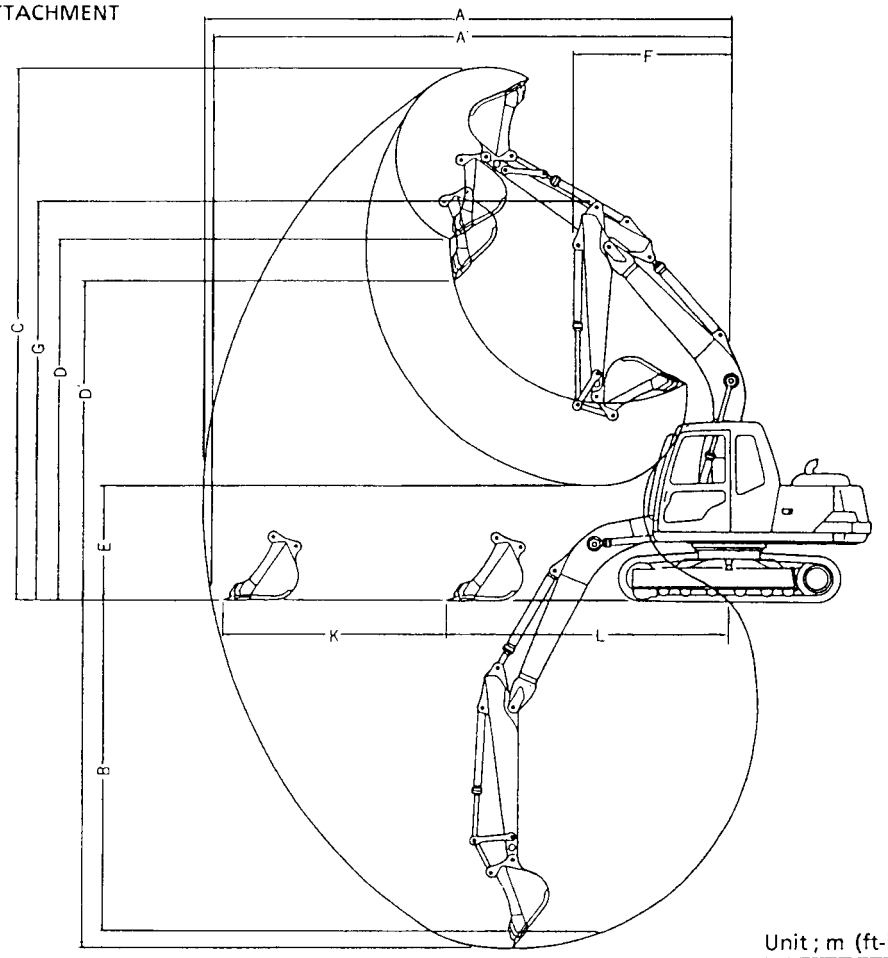


Unit ; m (ft-in)

Item / Range / Type of attachment			2.1m (6ft11in) arm with 0.5m³ (0.65cuyd) bucket	2.5m (8ft2in) arm with 0.45m³ (0.59cuyd) bucket	3.0m (9ft10in) arm with 0.35m³ (0.46cuyd) bucket	2.5m (8ft2in) arm + 1.0m (3ft3in) arm extension arm with 0.3m³ (0.39cuyd) bucket
A	Max digging reach		7.90(25'11")	8.25(27'1")	8.74(28'8")	9.19(30'2")
A'	Max. reach at ground level		7.75(25'5")	8.12(26'8")	8.61(28'3")	9.07(29'9")
B	Max. digging depth		5.17(16'12")	5.57(18'3")	6.07(19'11")	6.56(21'6")
C	Max. digging height		8.29(27'2")	8.50(27'11")	8.84(29')	9.08(29'9")
D	Max. dumping clearance		5.85(19'2")	6.06(19'11")	6.40(20'12")	6.64(21'9")
E	Min. dumping clearance		2.41(7'11")	2.00(6'7")	1.53(5')	1.00(3'3")
F	Vertical digging depth		4.48(14'8")	4.87(15'12")	5.33(17'6")	5.83(19'2")
G	Min. swing radius		2.39(7'10")	2.39(7'10")	2.53(8'4")	2.39(7'10")
H	Height at min. swing radius		6.46(21'2")	6.46(21'2")	6.50(21'4")	6.46(21'2")
J	Digging height at 8-flat floor		4.92(16'2")	5.35(17'7")	5.89(19'4")	6.40(21')
K	Horizontal digging distance	Stroke	3.66(12')	4.36(14'4")	4.92(16'2")	5.88(19'3")
L		At min.	2.23(7'4")	1.89(6'2")	1.81(5'11")	1.30(4'3")

☞ The figures in this table do not include the projection of shoes (20mm (0.78in)) .

■FACE SHOVEL ATTACHMENT

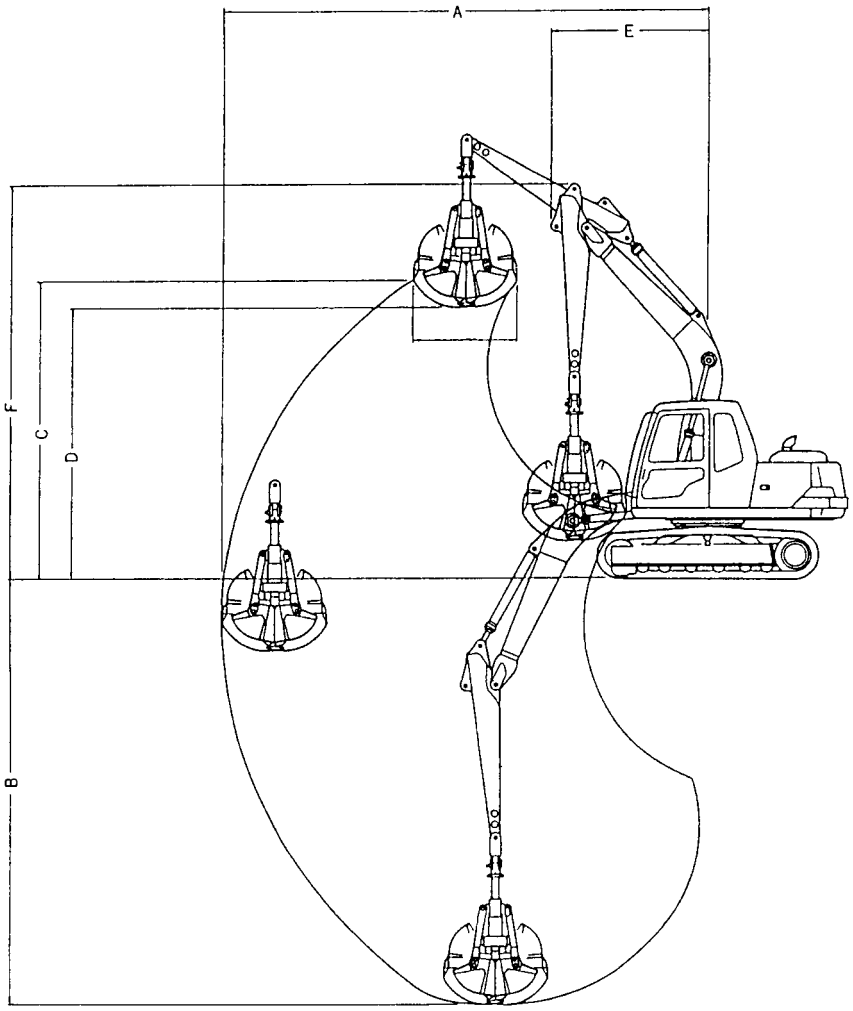


Unit ; m (ft-in)

Item	Range		Type of attachment: 2.1m (6ft11in) arm with 0.5m³ (0.65cuyd) bucket	2.5m (8ft2in) arm with 0.45m³ (0.59cuyd) bucket	3.0m (9ft10in) arm with 0.35m³ (0.46cuyd) bucket	2.5m (8ft2in) arm + 1.0m (3ft3in) arm extension arm with 0.3m³ (0.39cuyd) bucket
A	Max digging reach		8.02(26'4")	8.38(27'6")	8.87(29'1")	9.32(30'7")
A'	Max. reach at ground level		7.89(25'11")	8.25(27'1")	8.74(28'8")	9.20(30'2")
B	Max. digging depth		5.30(17'5")	5.70(18'8")	6.20(20'4")	6.69(21'11")
C	Max. digging height		8.46(27'9")	8.67(28'5")	9.01(29'7")	9.25(30'4")
D	Max. dumping clearance		5.79(19')	6.01(19'9")	6.34(20'10")	6.59(21'7")
D'	Max. dumping clearance (45°)		5.42(17'9")	5.51(18'1")	5.82(19'1")	5.94(19'6")
E	Min. dumping clearance		2.28(7'6")	1.87(6'2")	1.40(4'7")	0.87(2'10")
F	Min. swing radius		2.39(7'10")	2.39(7'10")	2.53(8'4")	2.39(7'10")
G	Height at min. swing radius		6.46(21'2")	6.46(21'2")	6.50(21'4")	6.46(21'2")
J	Digging height at 8-flat floor		5.07(16'8")	5.49(18')	6.02(19'9")	6.54(21'5")
K	Horizontal digging distance	Stroke	2.90(9'6")	3.58(11'9")	4.45(14'7")	5.43(17'10")
L		At min.	4.82(15'10")	4.50(14'9")	4.12(13'6")	3.59(11'9")

☞ The figures in this table do not include the projection of shoes { 20mm (0.78in) } .

■ CLAMSHELL ATTACHMENT

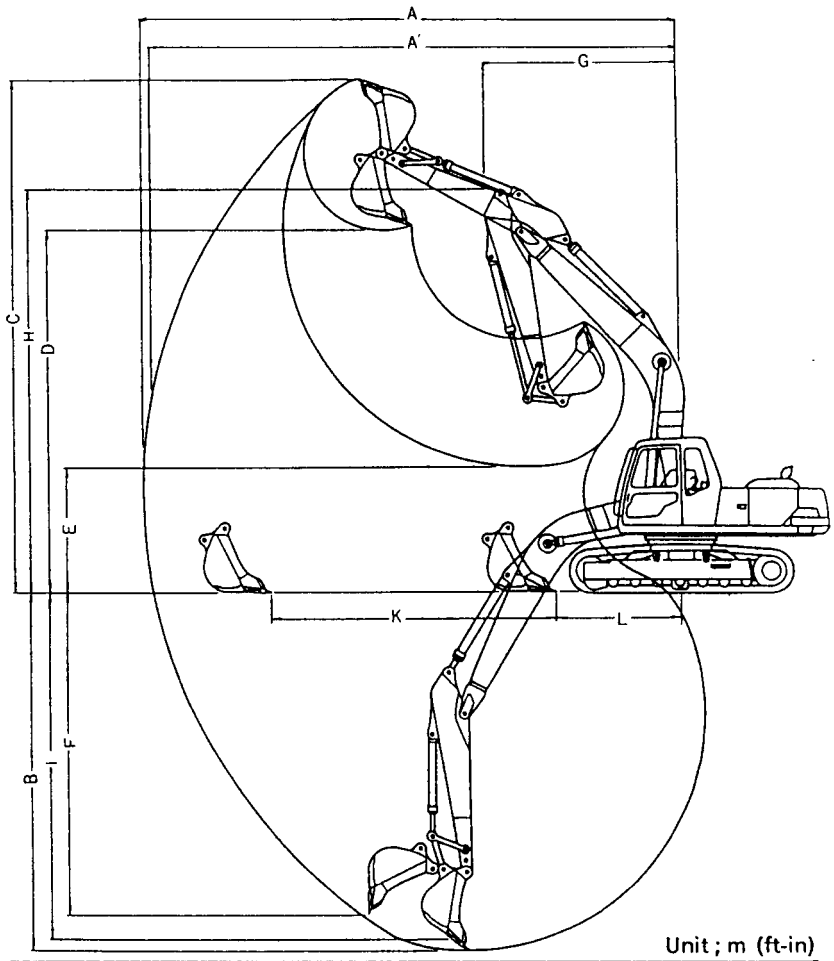


Unit ; m (ft-in)

Item / Range \ Type of attachment	SK100		SK120,SK120LC	
	1.9m (6ft3in) arm 0.4m³ (0.52cuyd) bucket	2.27m (7ft5in) arm 0.4m³ (0.52cuyd) bucket	2.1m (6ft11in) arm 0.4m³ (0.52cuyd) bucket	2.5m (8ft2in) arm 0.4m3 (0.52cuyd) bucket
A Max. digging reach	6.96(22′10″)	7.27(23′10″)	7.44(24′5″)	7.80(25′7″)
B Max. digging depth	6.02(19′9″)	6.39(21′)	6.45(21′2″)	6.85(22′6″)
C Max. digging height	4.43(14′6″)	4.59(15′1″)	4.98(16′4″)	5.19(17′)
D Max. dumping clearance	4.02(13′2″)	4.18(13′9″)	4.56(14′12″)	4.88(16′)
E Min. dumping clearance	2.33(7′8″)	2.35(7′9″)	2.39(7′10″)	2.39(7′10″)
F Height at min. swing radius	6.06(19′11″)	6.03(19′9″)	6.46(21′2″)	6.46(21′2″)

☞ The figures in this table do not include the projection of shoes (20mm (0.78in)) .

■BACKHOE ATTACHMENT

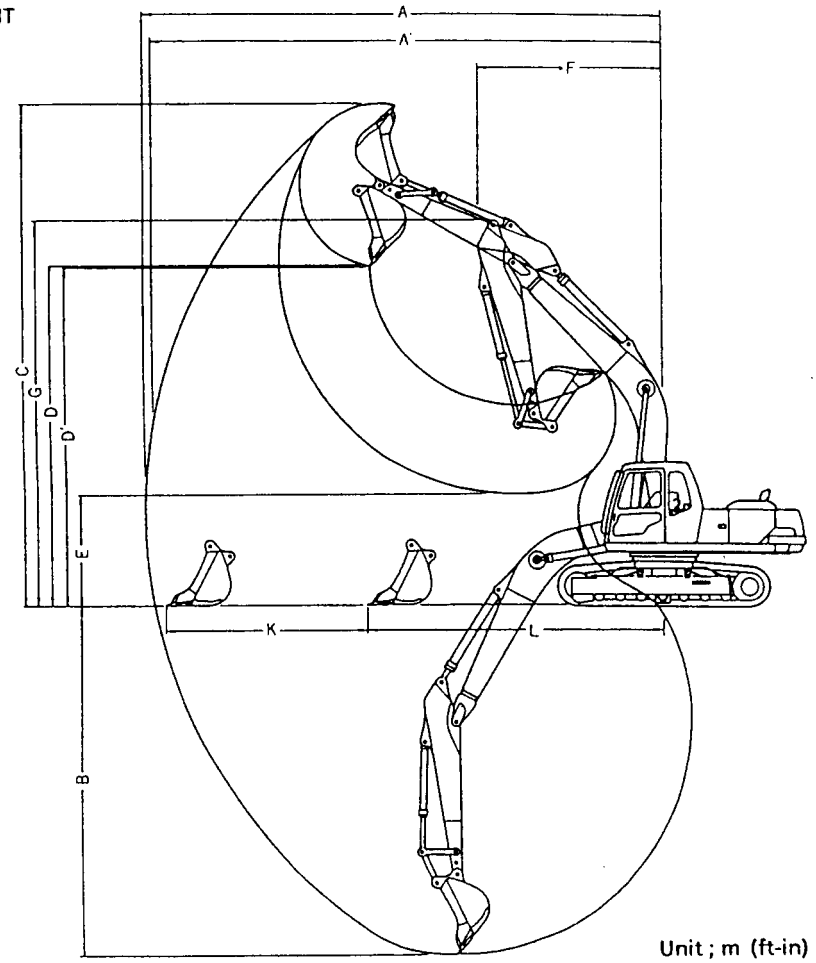


Unit ; m (ft-in)

Item / Range / Type of attachment		2.4m (7ft10in) arm (with 0.8m³ (1.05cuyd) bucket)	2.94m (9ft8in) arm (with 0.7m³ (0.92cuyd) bucket)	3.3m (10ft10in) arm (with 0.6m³ (0.78cuyd) bucket)	2.4m (7ft10in) arm + 1.5m (4ft11in) arm extension arm (with 0.45m³ (0.59cuyd) bucket)	2.94m (9ft8in) arm + 1.5m (4ft11in) arm extension arm (with 0.45m³ (0.59cuyd) bucket)
A Max digging reach		9.39(30'10")	9.85(32'4")	10.14(33'3")	10.79(35'5")	11.26(36'11")
A' Max. reach at ground level		9.21(30'3")	9.68(31'9")	9.98(32'9")	10.64(34'11")	11.11(36'5")
B Max. digging depth		6.12(20'1")	6.67(21'11")	7.02(23')	7.64(25'1")	8.18(26'10")
C Max. digging height		9.43(30'11")	9.59(31'6")	9.62(31'7")	10.14(33'3")	10.28(33'9")
D Max. dumping clearance		6.59(21'7")	6.76(22'2")	6.82(22'4")	7.30(23'11")	7.45(24'5")
E Min. dumping clearance		2.87(9'5")	2.33(7'8")	1.97(6'6")	1.35(4'5")	0.81(2'8")
F Vertical digging depth		5.46(17'11")	6.00(19'8")	6.19(20'4")	6.97(22'10")	7.48(24'6")
G Min swing radius		3.59(11'9")	3.48(11'5")	3.52(11'7")	3.35(11')	3.48(11'5")
H Height at min. swing radius		7.59(24'11")	7.54(24'9")	7.54(24'9")	7.59(24'11")	7.54(24'9")
I Digging height at 8-flat floor		5.90(19'4")	6.46(21'2")	6.82(22'4")	7.50(24'7")	8.05(26'5")
K Horizontal digging distance	Stroke	4.08(13'5")	5.24(17'2")	5.90(19'4")	6.37(20'11")	7.65(25'1")
L	At min.	2.98(9'9")	2.28(7'6")	1.91(6'3")	2.09(6'10")	1.29(4'3")

☞ The figures in this table do not include the projection of shoes (25mm (0.98in)) .

■FACE SHOVEL ATTACHMENT

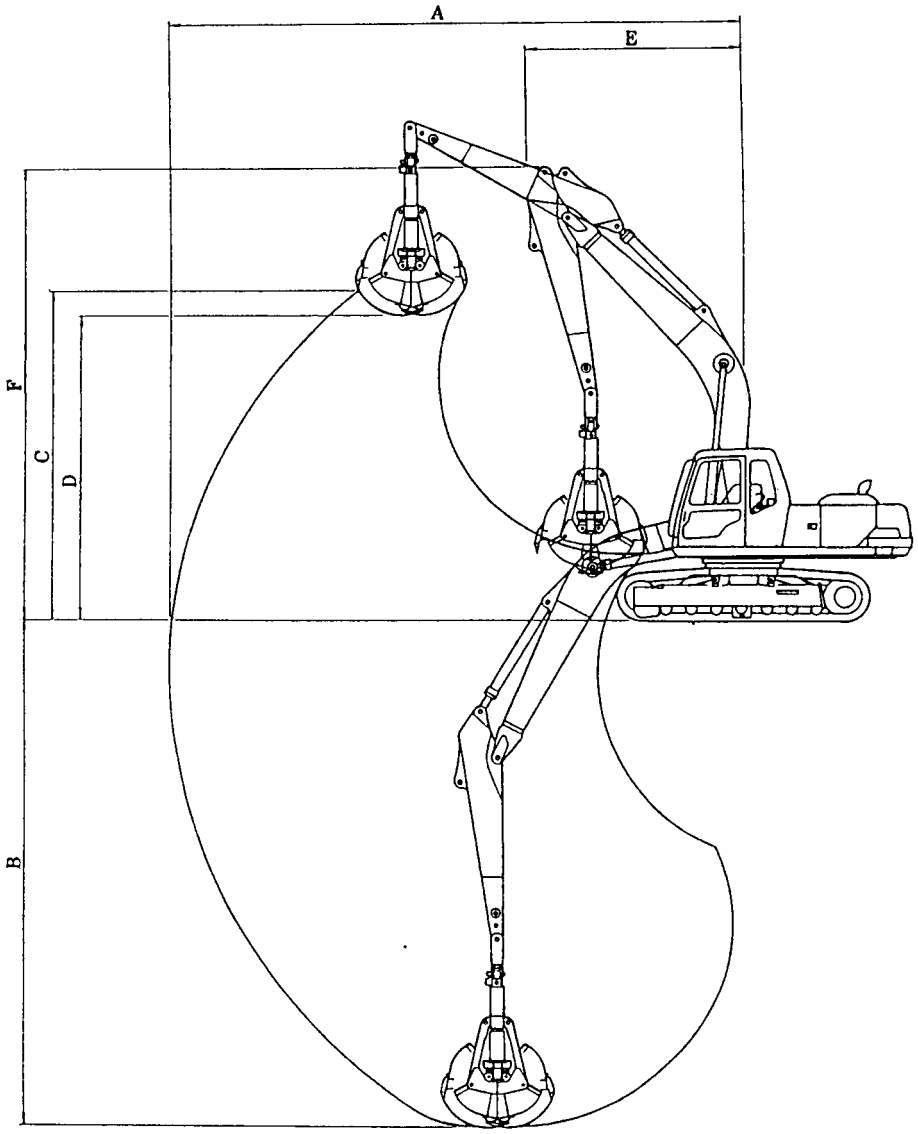


Unit ; m (ft-in)

Item / Range \ Type of attachment		2.4m (7ft10in) arm (with 0.8m³ (1.05cuyd) bucket)	2.94m (9ft8in) arm (with 0.7m³ (0.92cuyd) bucket)	3.3m (10ft10in) arm (with 0.6m³ (0.78cuyd) bucket)	2.4m (7ft10in) arm + 1.5m (4ft11in)arm extension arm (with 0.45m³ (0.59cuyd) bucket)	2.94m (9ft8in) arm + 1.5m (4ft11in)arm extension arm (with 0.45m³ (0.59cuyd) bucket)
A Max digging reach		9.50(31'2")	9.96(32'8")	10.25(33'8")	10.90(35'9")	11.37(37'4")
A' Max. reach at ground level		9.33(30'7")	9.79(32'1")	10.09(33'1")	10.75(35'3")	11.23(36'10")
B Max. digging depth		6.23(20'5")	6.77(22'3")	7.13(23'5")	7.75(25'5")	8.29(27'2")
C Max. digging height		9.60(31'6")	9.77(32'1")	9.83(32'3")	10.31(33'10")	10.46(34'4")
D Max. dumping clearance		6.51(21'4")	6.66(21'10")	6.71(22')	7.23(23'9")	7.36(24'2")
D' Max. dumping clearance (45°)		6.37(20'11")	6.63(21'9")	6.72(22'1")	6.88(22'7")	7.18(23'7")
E Min. dumping clearance		2.76(9'1")	2.22(7'3")	1.86(6'1")	1.24(4'1")	0.70(2'4")
F Min swing radius		3.59(11'9")	3.48(11'5")	3.52(11'7")	3.59(11'9")	3.48(11'5")
G Height at min. swing radius		7.59(24'11")	7.54(24'9")	7.54(24'9")	7.59(24'11")	7.54(24'9")
K Horizontal digging discance	Stroke	3.07(10'1")	3.91(12'10")	4.46(14'8")	5.65(18'6")	6.65(21'10")
L	At min.	6.05(19'10")	5.68(18'8")	5.42(17'9")	4.88(16')	4.35(14'3")

☞ The figures in this table do not include the projection of shoes { 25mm (0.98in) } .

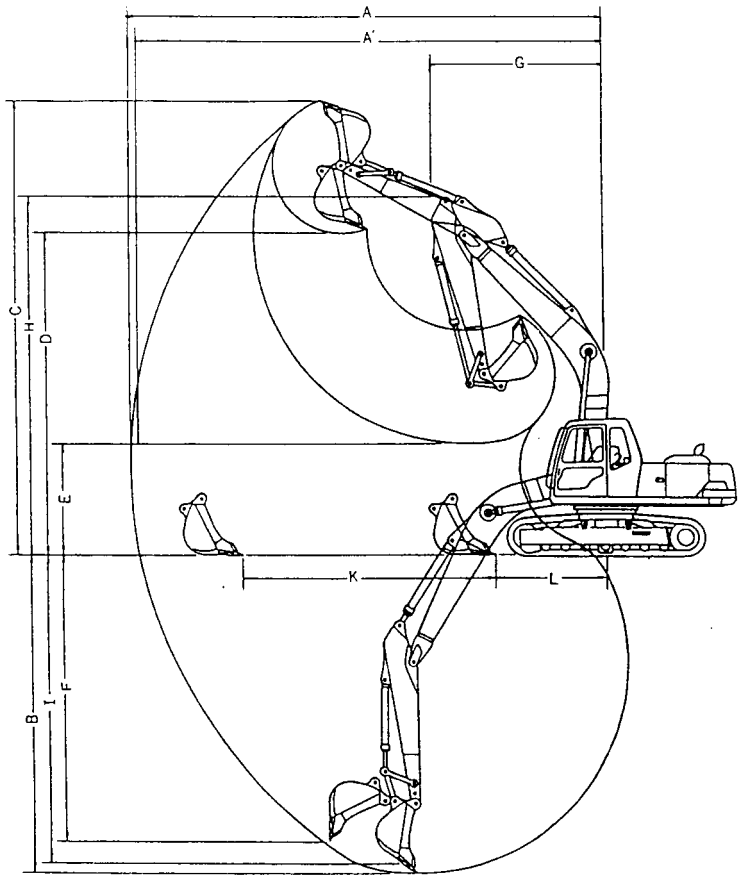
CLAMSHELL ATTACHMENT



Unit ; m (ft-in)

Item / Range / Type of attachment	2.4m (7ft10in) arm (with 0.5m3 (0.65cuyd) bucket)	2.94m (9ft8in) arm (with 0.5m3 (0.65cuyd) bucket)
A Max. digging reach	8.80 (28'10")	9.26 (30' 5")
B Max. digging depth	7.78 (25' 6")	8.32 (27' 4")
C Max. digging height	5.35 (17' 7")	5.52 (18' 1")
D Max. dumping clearance	4.94 (16' 2")	5.11 (16'9")
G Min. swing radius	3.39 (11'10")	3.48 (11' 5")
H Height at min. swing radius	7.59 (24' 11")	7.54 (24'9")

■ BACKHOE ATTACHMENT

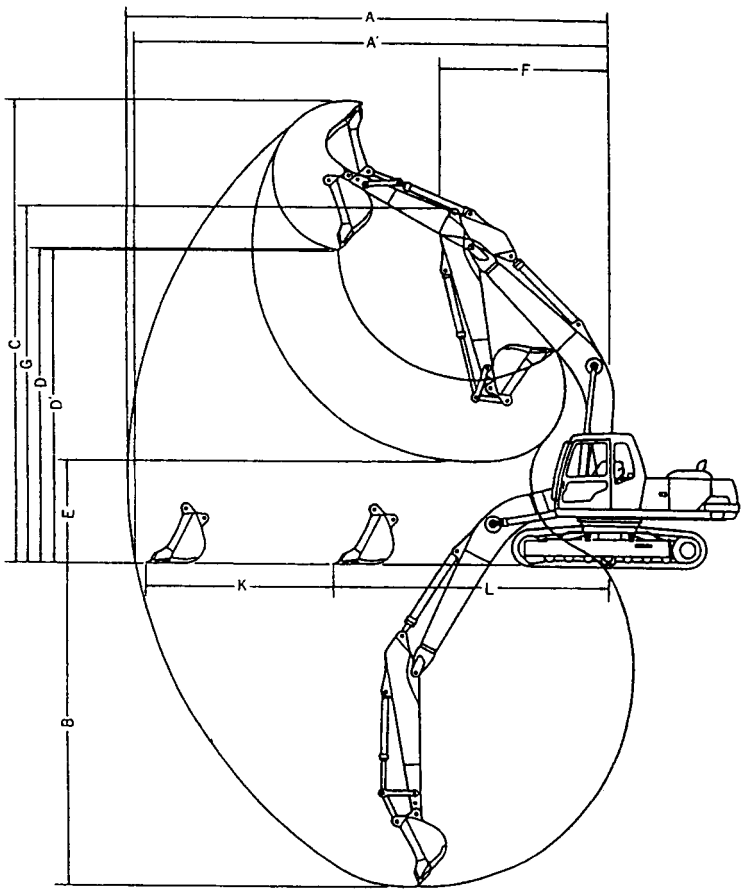


Unit ; m (ft-in)

Item / Type of attachment — Range			2.5m (8ft2in) arm with 1.0m³ (1.31cuyd) bucket	2.98m (9ft9in) arm with 0.9m³ (1.18cuyd) bucket	3.66m (12ft) arm with 0.7m³ (0.92cuyd) bucket
A	A max digging reach		9.85 (32'4")	10.31 (33'10")	10.91 (35'10")
A'	Max. reach at ground level		9.66 (31'8")	10.13 (33'3")	10.74 (35'3")
B	Max. digging depth		6.52 (21'5")	7.00 (22'12")	7.68 (25'2")
C	Max. digging height		9.44 (30'12")	9.72 (31'11")	9.92 (32'7")
D	Max. dumping clearance		6.58 (21'7")	6.83 (22'5")	7.05 (23'2")
E	Min. dumping clearance		3.03 (9'11")	2.55 (8'4")	1.87 (6'2")
F	Vertical digging depth		5.31 (17'5")	6.04 (19'10")	6.58 (21'7")
G	Min swing radius		4.06 (13'4")	4.00 (13'1")	4.01 (13'2")
H	Height at min. swing radius		8.04 (26'5")	7.95 (26'1")	7.94 (26'1")
I	Digging height at 8-flat floor		6.30 (20'8")	6.81 (22'4")	7.48 (24'6")
K	Horizontal	Stroke	4.17 (13'8")	5.27 (17'3")	6.48 (21'3")
L	digging distance	At min.	3.22 (10'7")	2.58 (8'6")	1.97 (6'6")

☞ The figures in this table do not include the projection of shoes (26mm (1.02in)) .

■ FACE SHOVEL ATTACHMENT



Unit ; m (ft-in)

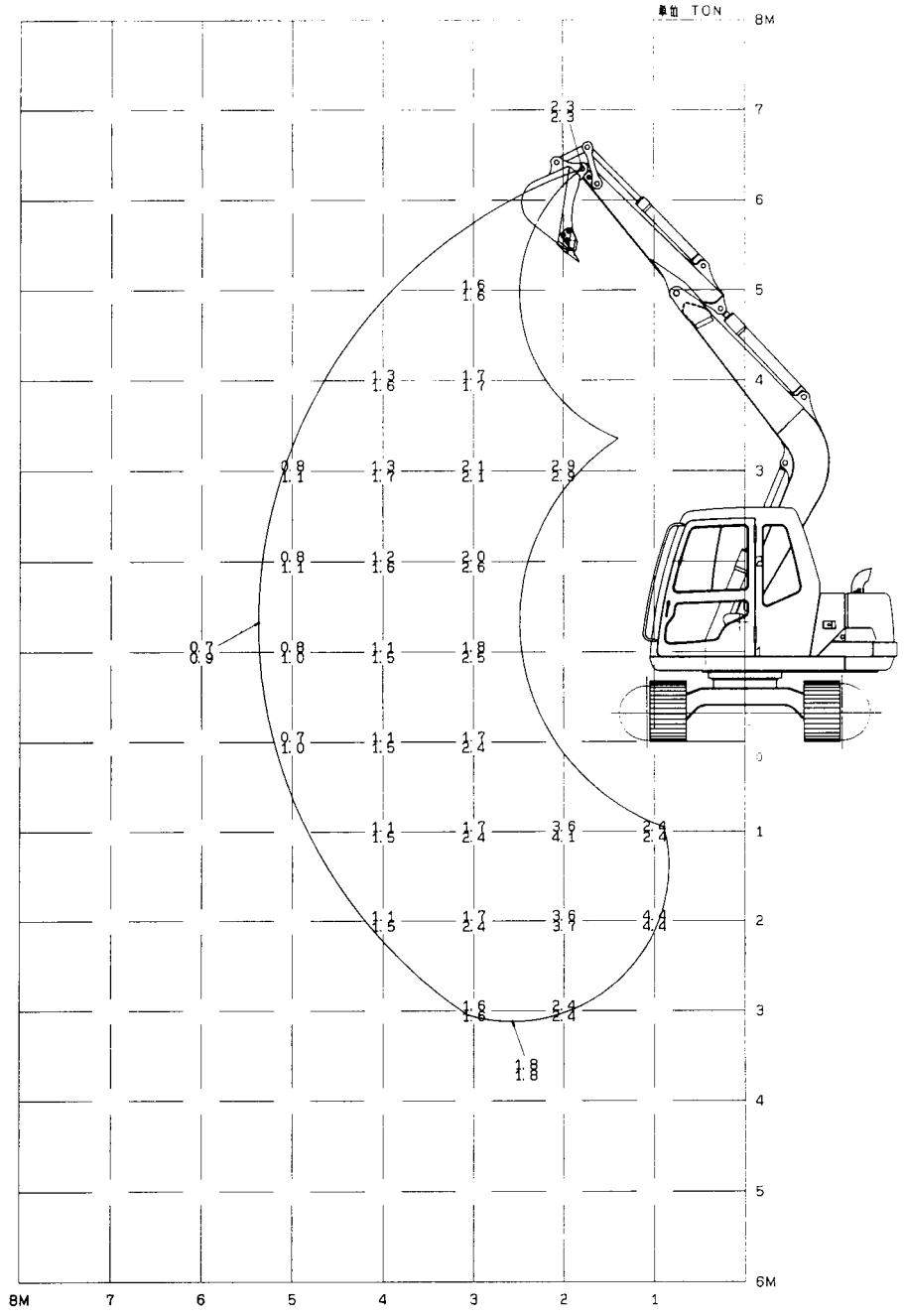
Item / Range / Type of attachment			2.5m (8ft2in) arm with 1.0m³ (1.31cuyd) bucket	2.98m (9ft9in) arm with 0.9m³ (1.18cuyd) bucket	3.66m (12ft) arm with 0.7m³ (0.92cuyd) bucket
A	A max digging reach		10.03 (32'11")	10.49 (34'5")	11.09 (36'5")
A'	Max. reach at ground level		9.85 (32'4")	10.32 (33'10")	10.93 (35'10")
B	Max. digging depth		6.70 (21'12")	7.18 (23'7")	7.86 (25'9")
C	Max. digging height		9.80 (32'2")	10.05 (32'12")	10.26 (33'8")
D	Max. dumping clearance		6.47 (21'3")	6.75 (22'2")	6.95 (22'10")
D'	Max. dumping clearance (45°)		6.13 (20'1")	6.13 (20'1")	6.30 (20'8")
E	Min. dumping clearance		2.84 (9'4")	2.36 (7'9")	1.68 (5'6")
F	Min swing radius		4.06 (13'4")	4.00 (13'1")	4.01 (13'2")
G	Height at min. swing radius		8.04 (26'5")	7.95 (26'1")	7.94 (26')
K	Horizontal digging discance	Stroke	3.39 (11'1")	4.26 (13'12")	5.40 (17'9")
L		At min.	6.26 (20'6")	5.86 (19'3")	5.32 (17'5")

☞ The figures in this table do not include the projection of shoes (26mm (1.02in))

LIFTING CAPACITY

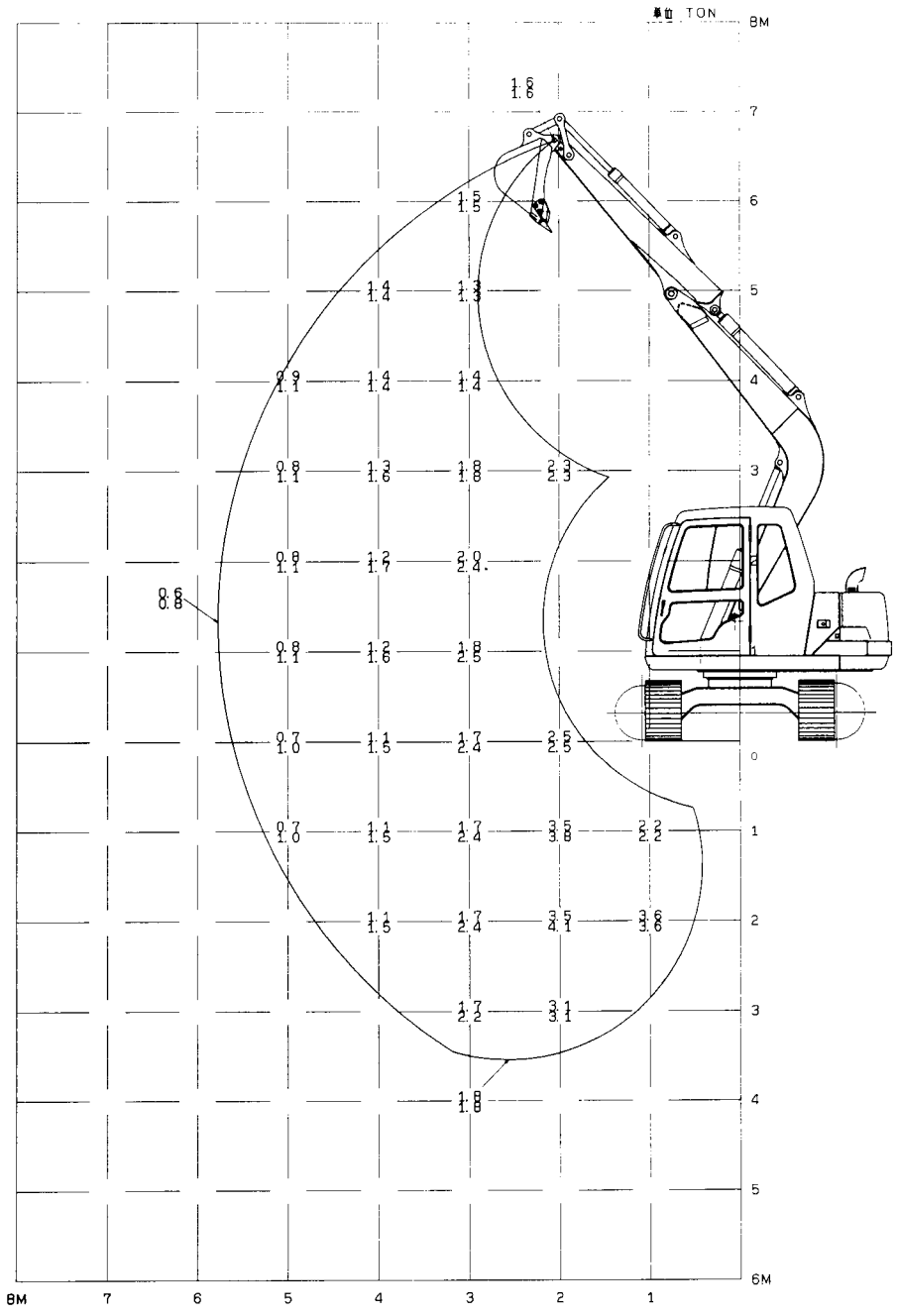
WITH 1.73 m (5 ft-8 in) ARM (STD) 400 mm (16 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.15 m (7 ft-1 in) ARM (LONG RANGE) 400 mm (16 in) SHOE
360° SWING (FRONT)

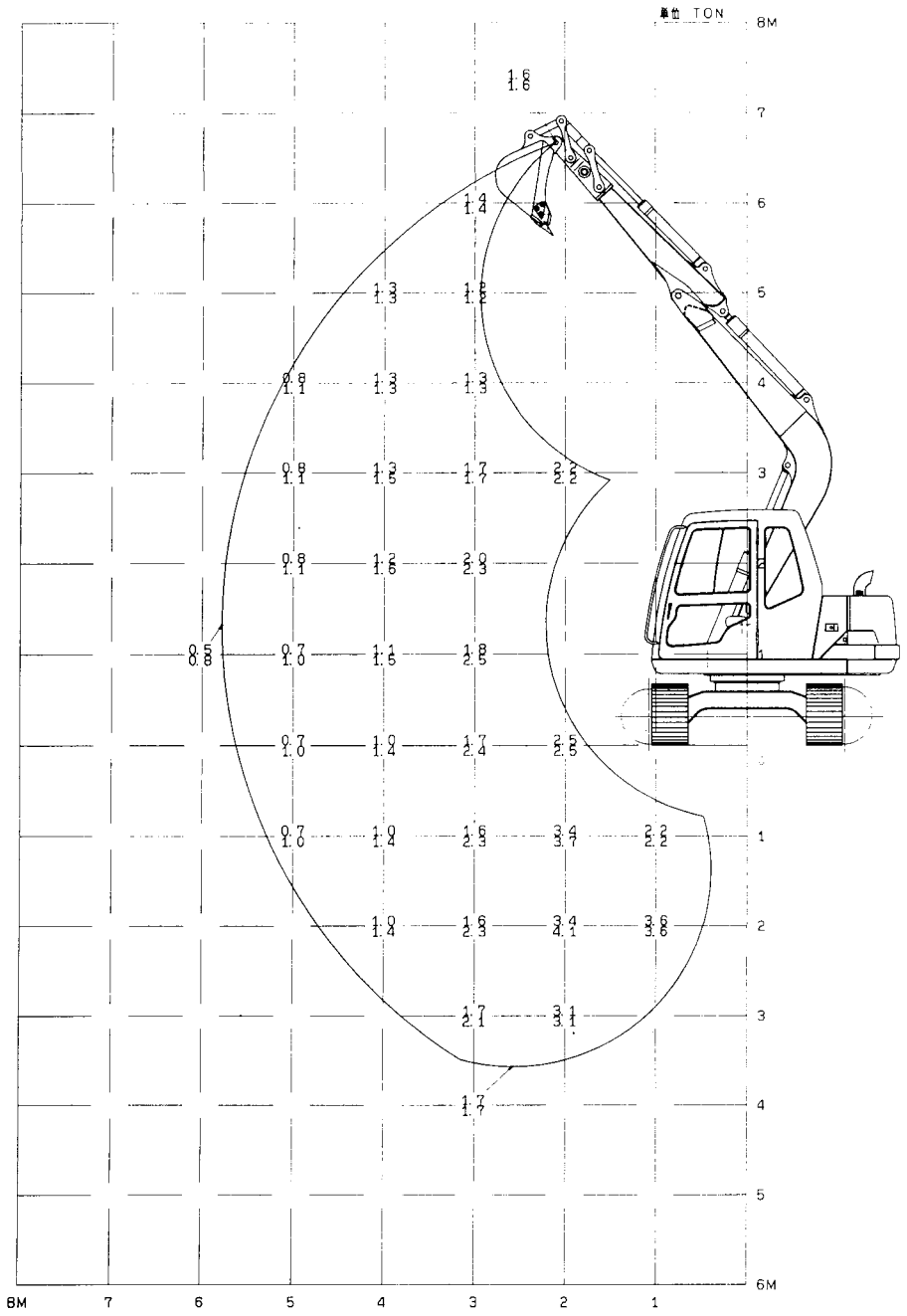
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK60

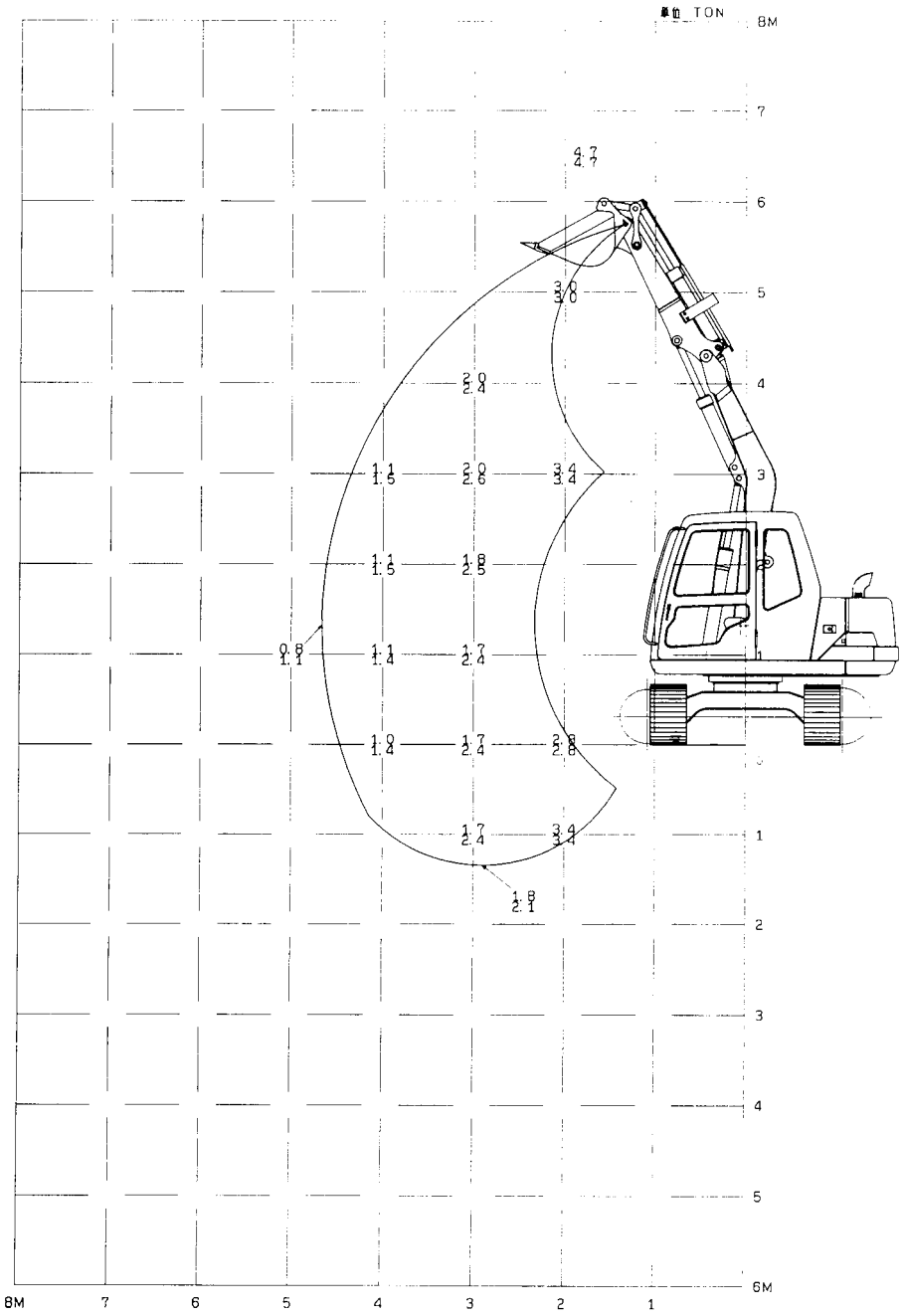
WITH 1.73 m (5 ft-8 in) ARM+0.45 m (1 ft-6 in) EXTENSION ARM 400 mm (16 in) SHOE 360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SHORT LOADER ARM+0.3M³ (0.39 cuyd) LOADER BUCKET 400 mm (16 in) SHOE 360° SWING (FRONT)

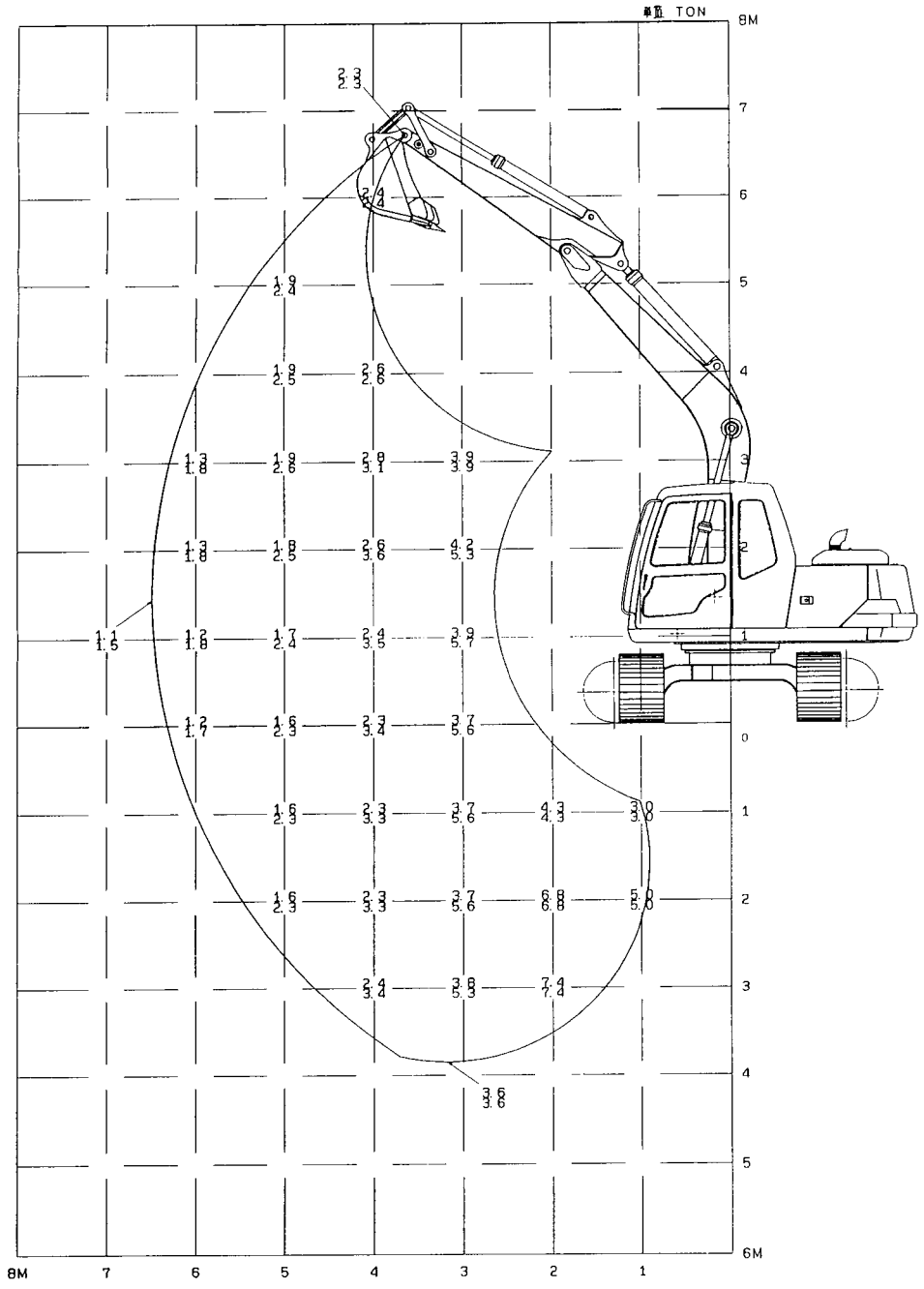
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK100

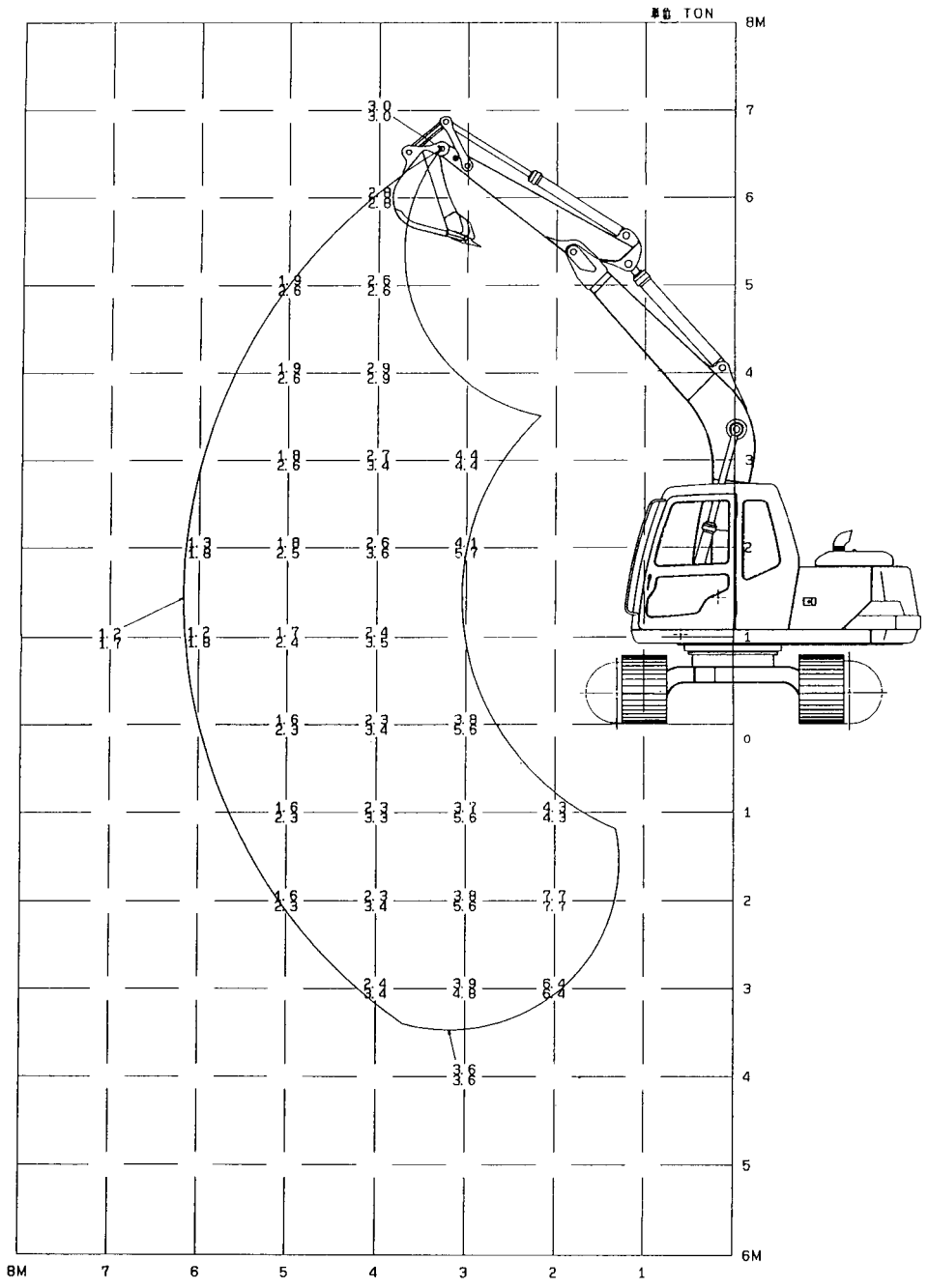
WITH 2.27 m (7 ft-5 in) ARM (STD) 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 1.9 m (6 ft-3 in) ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

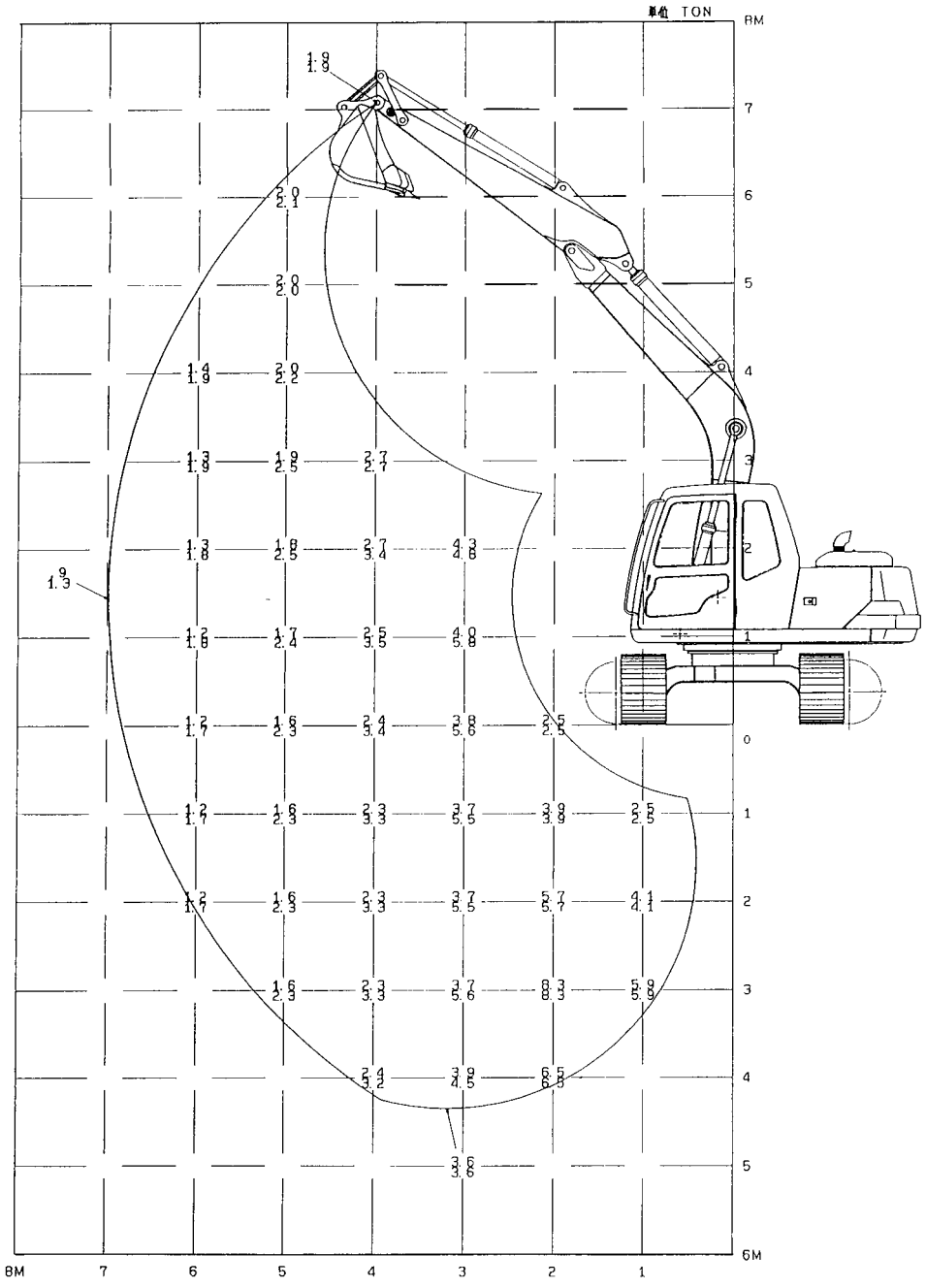
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK100

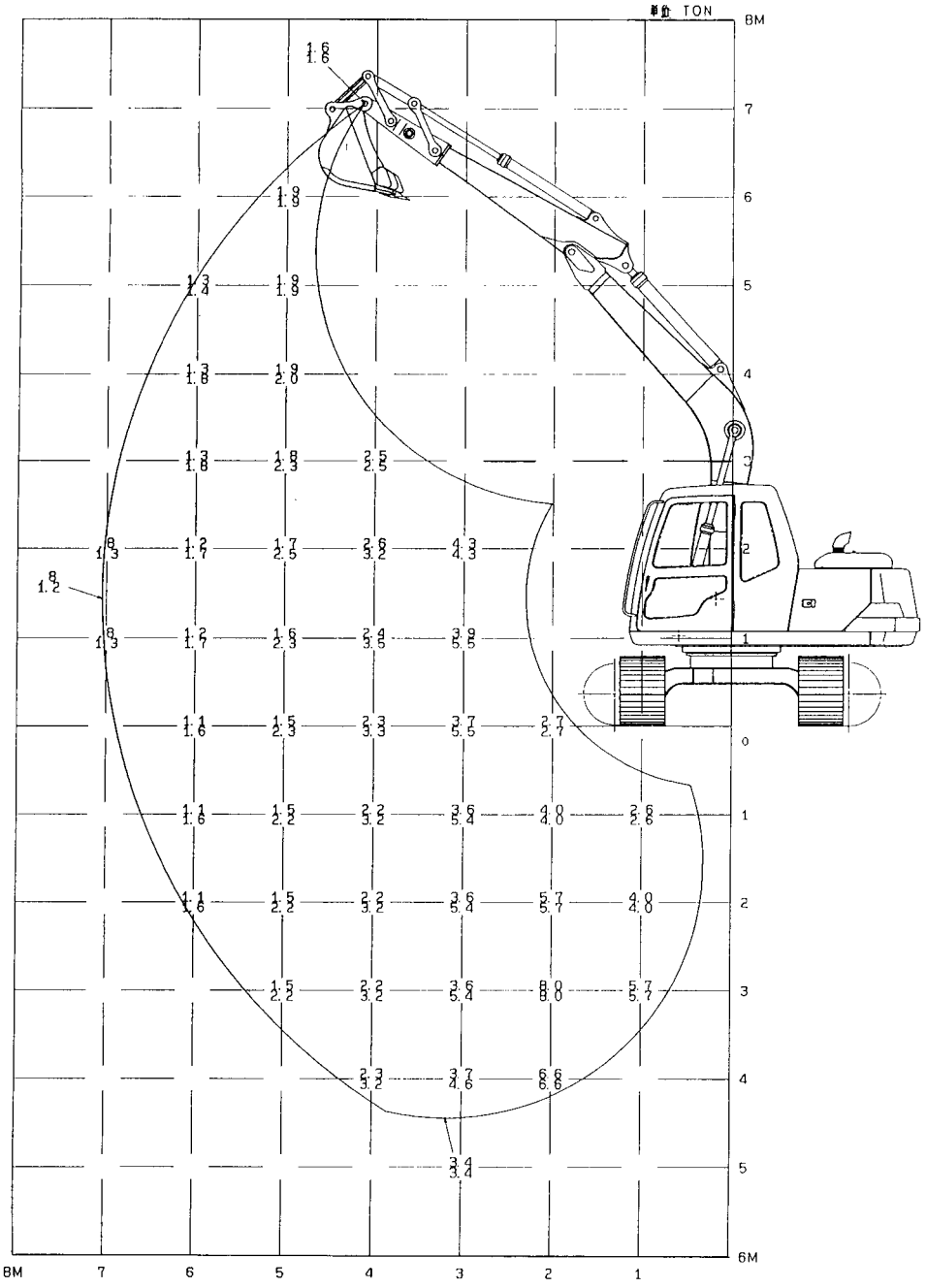
WITH 2.77 m (9 ft-1 in) LONG ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.27 m (7 ft-5 in) ARM+WITH 0.6 m (2 ft-0 in) EXTENSION ARM 500 mm (20 in) SHOE 360° SWING (FRONT)

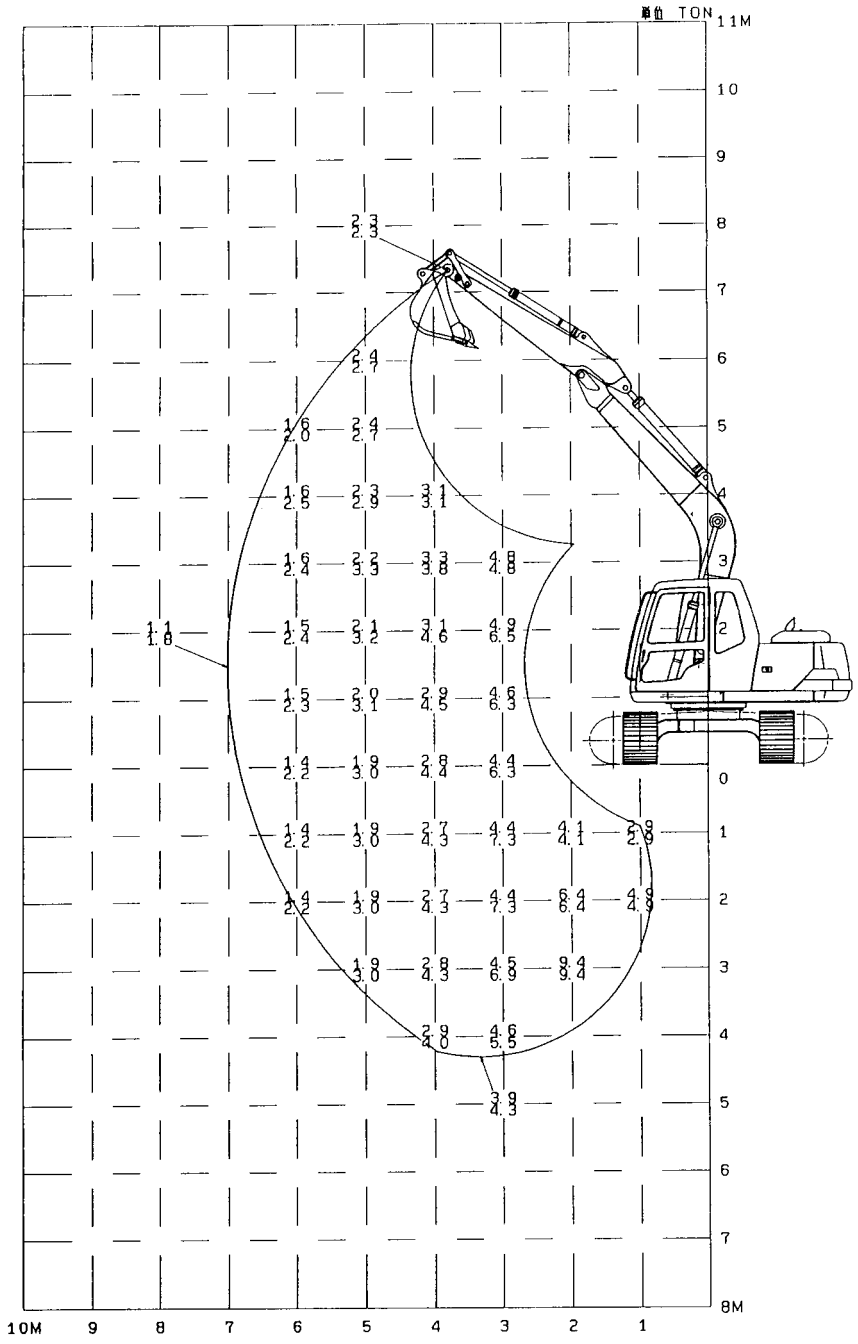
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK120

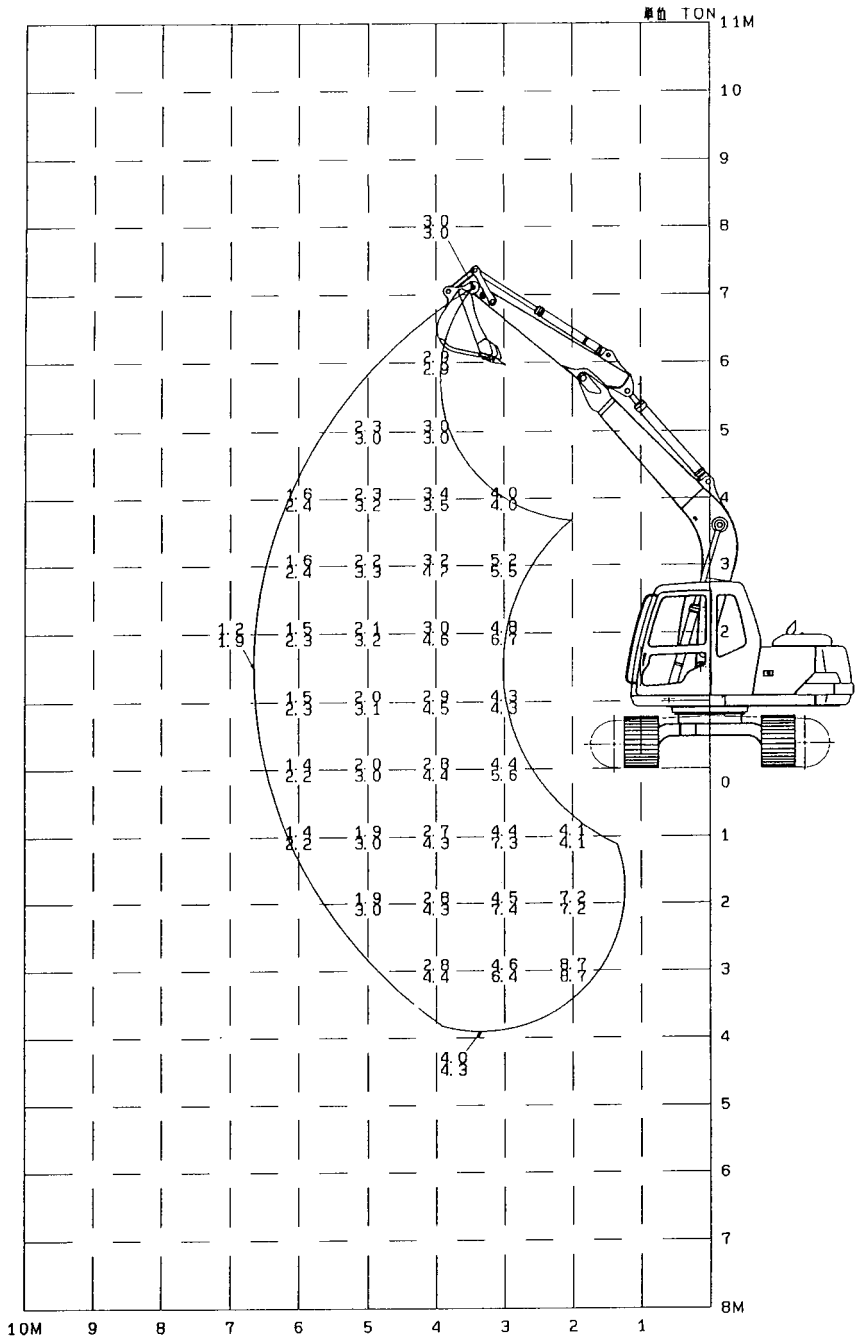
WITH 2.5 m (8 ft-2 in) ARM (STD) 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.1 m (6 ft-11 in) ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

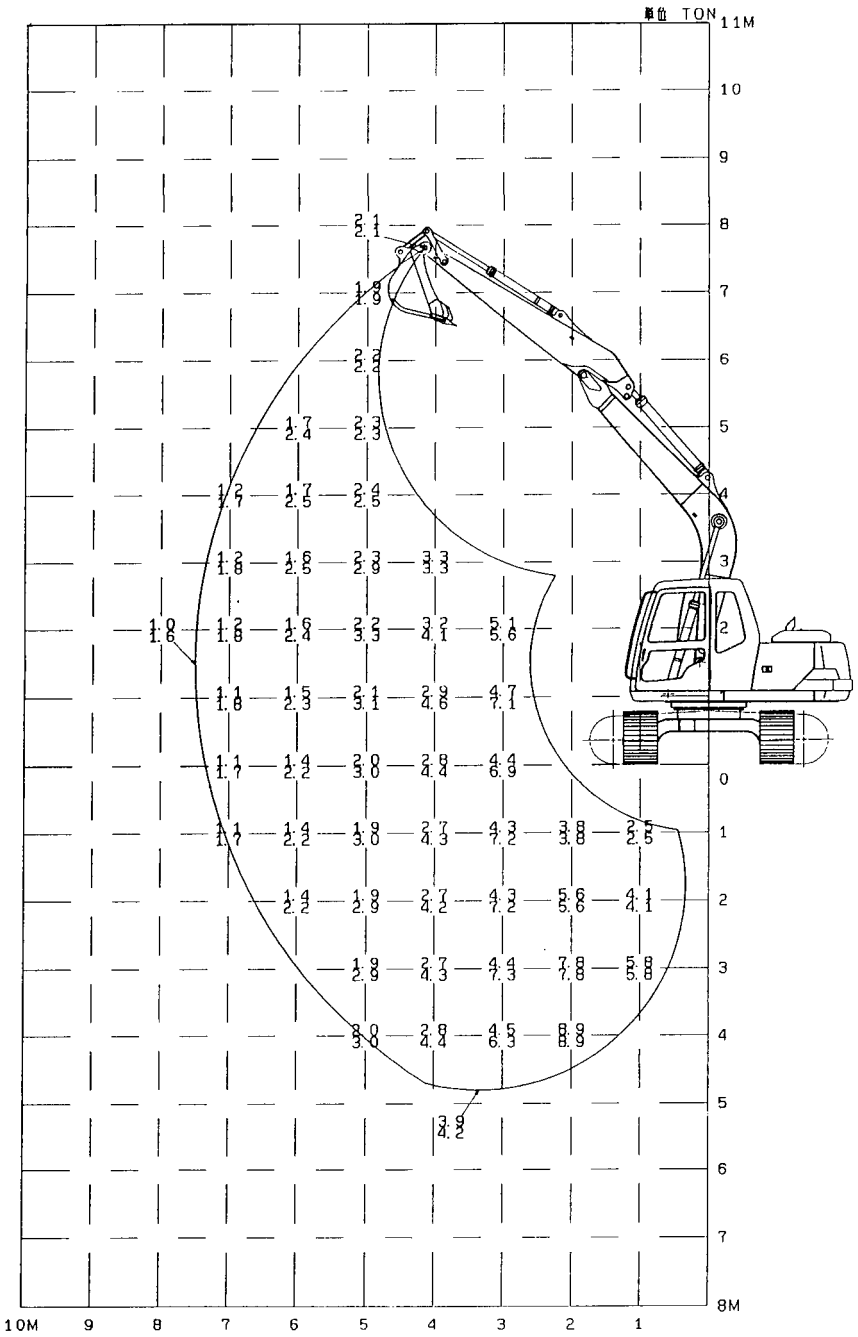
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK120

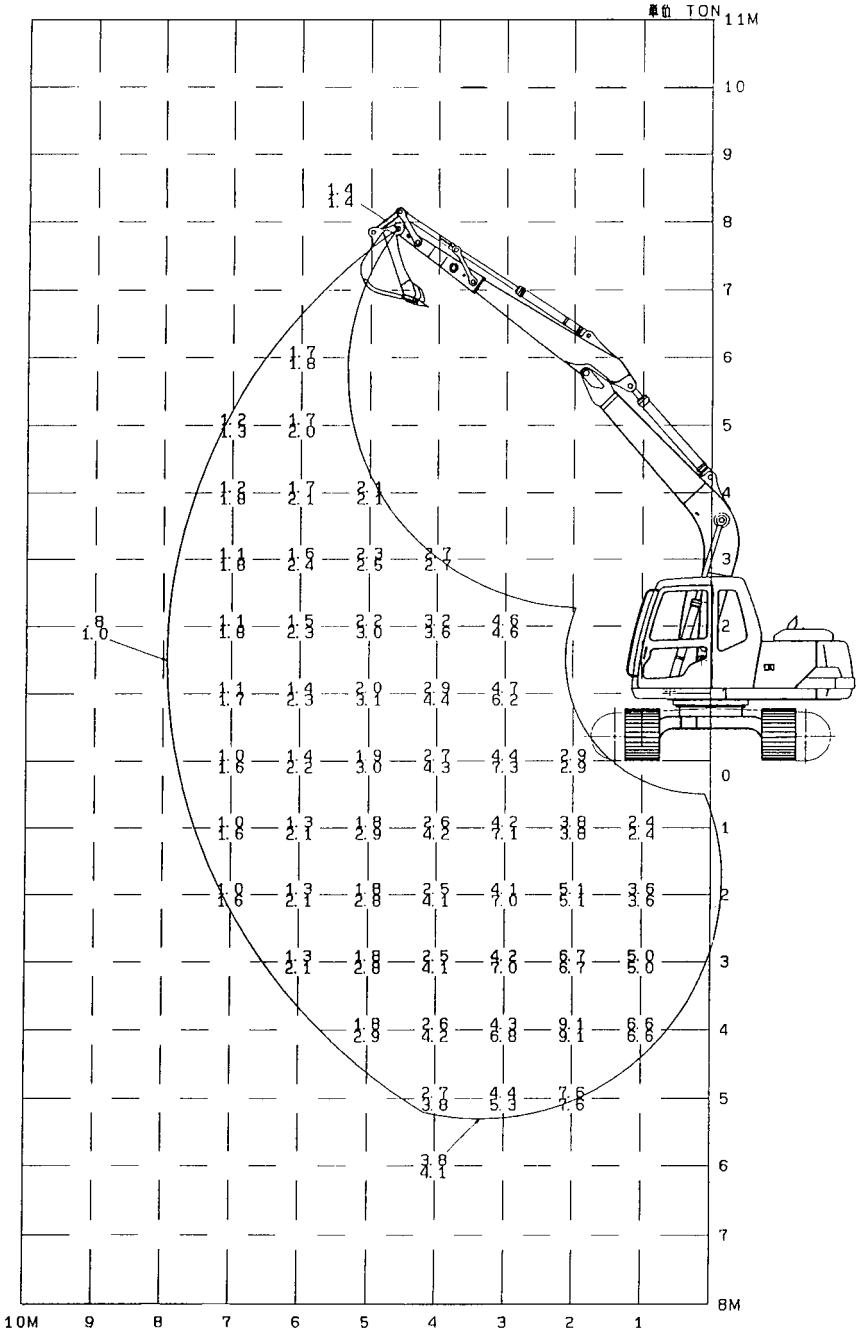
WITH 3.0 m (9 ft-10 in) LONG ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



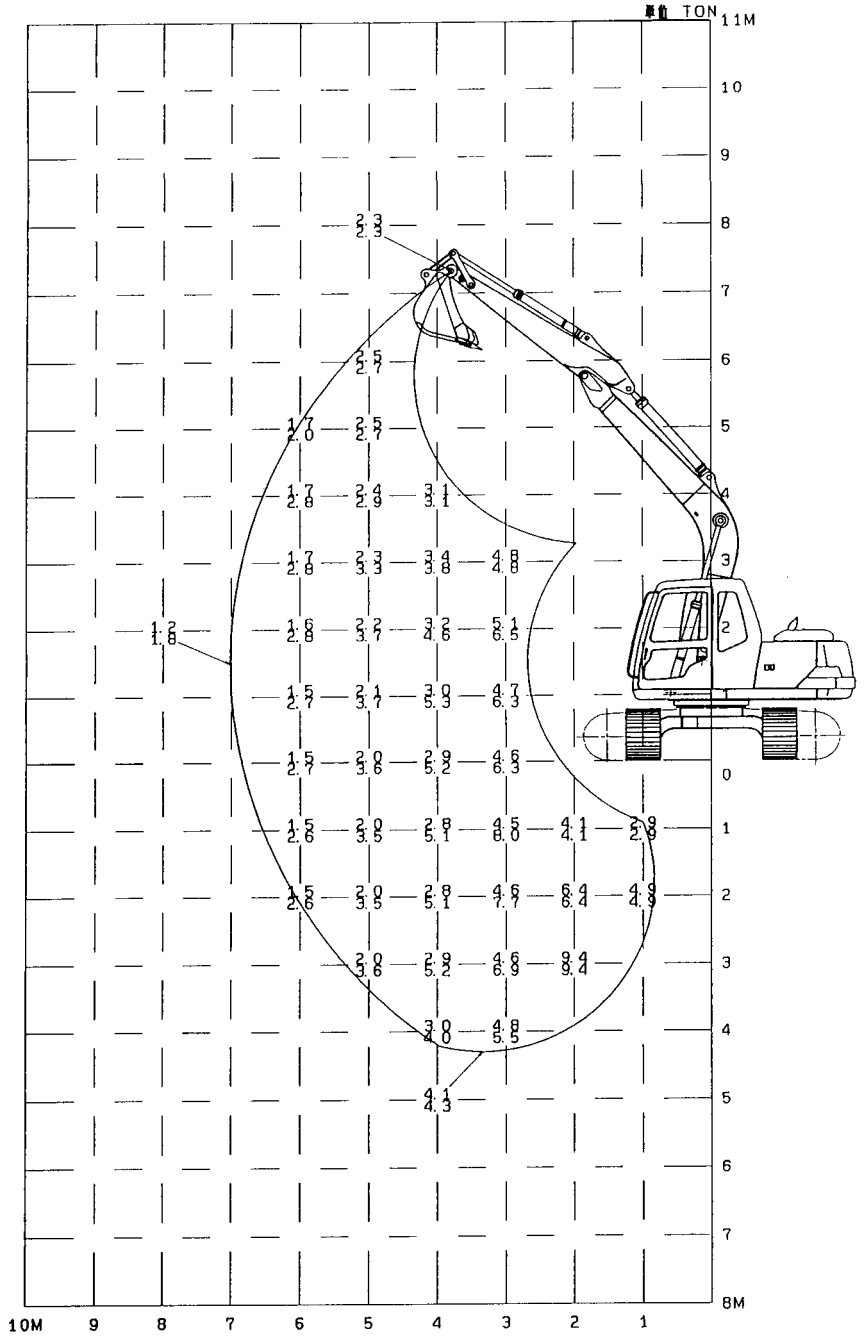
WITH 2.5 m (8 ft-2 in) ARM+1.0 m (3 ft-3 in) EXTENSION ARM 500 mm (20 in) SHOE 360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



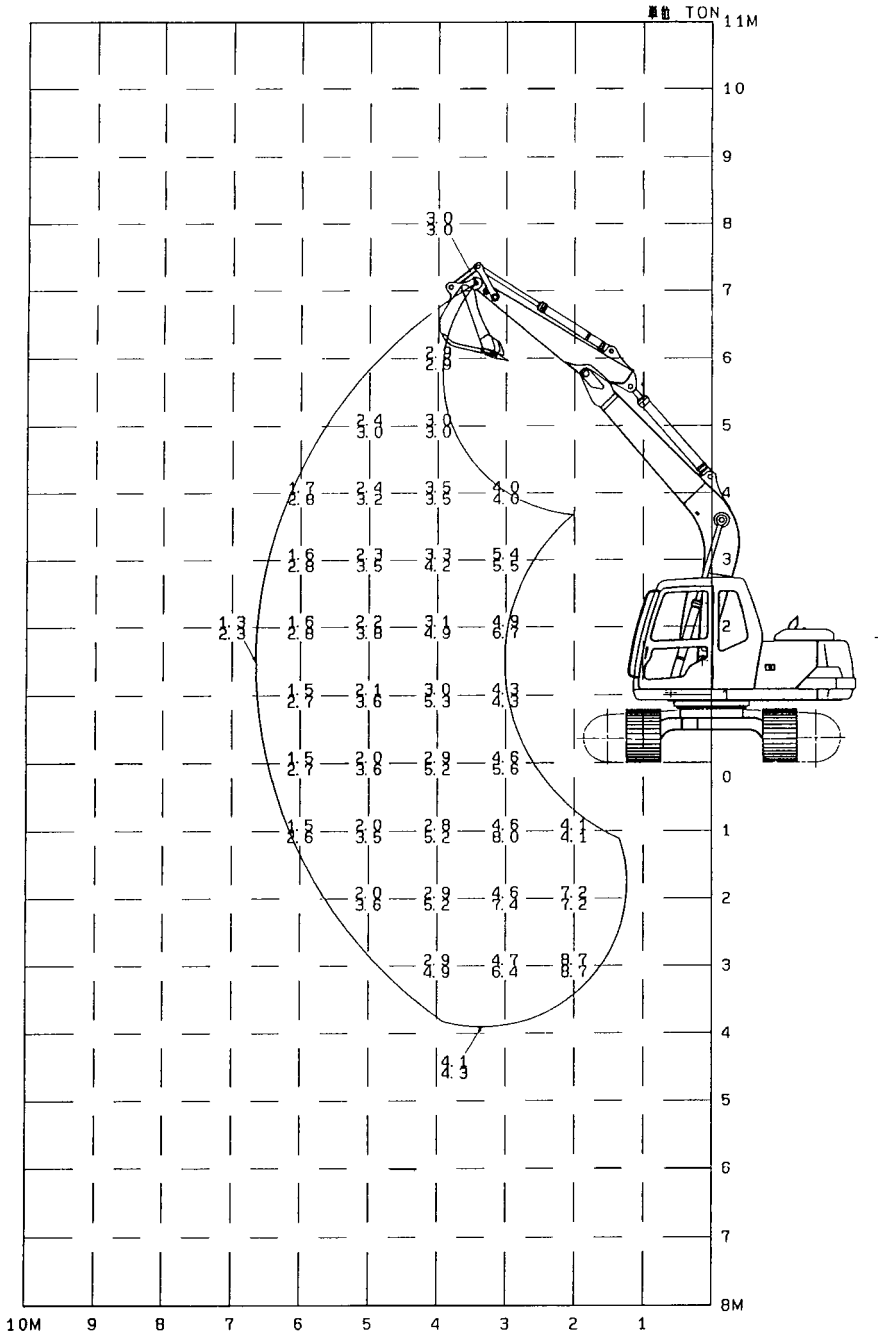
WITH 2.5 m (8 ft-2 in) ARM (STD) 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



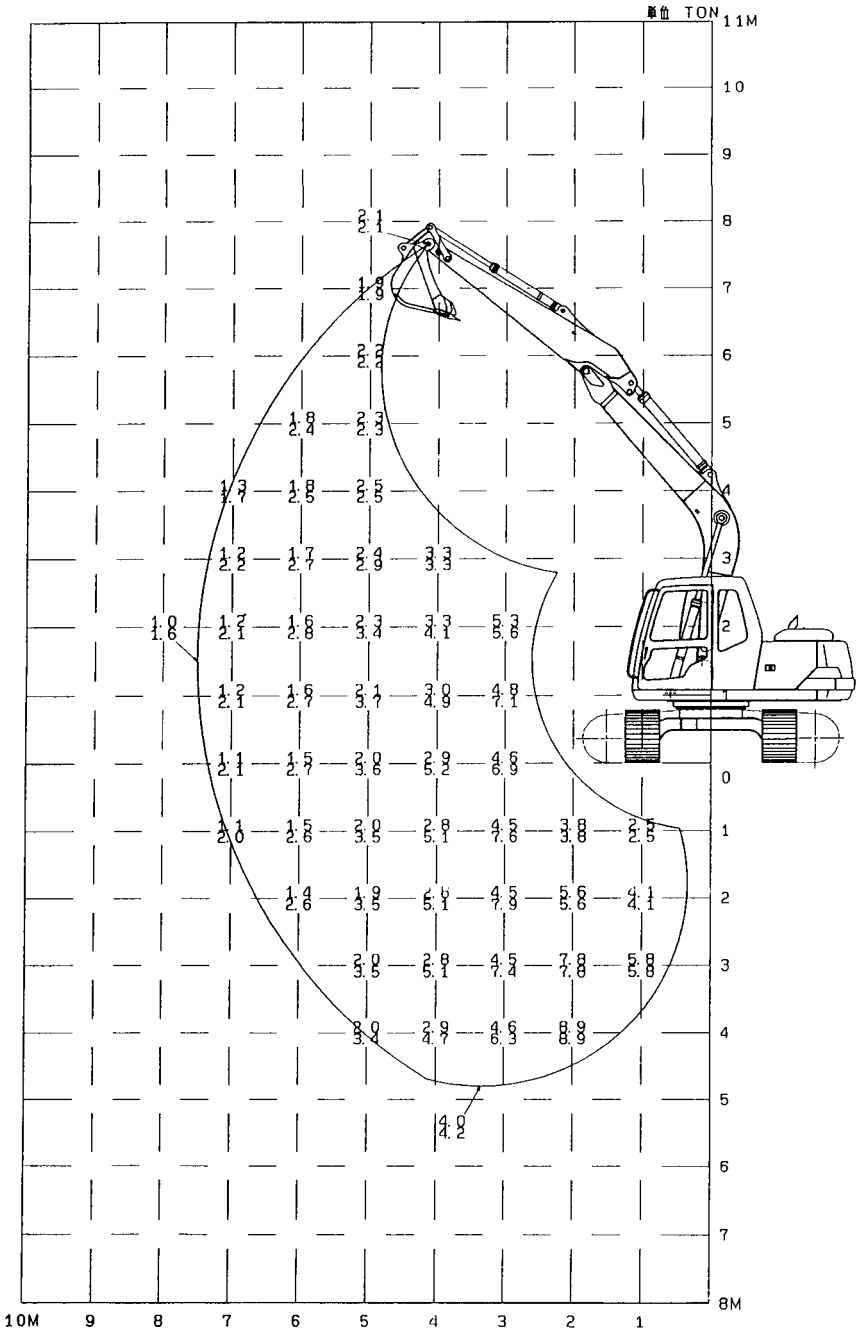
WITH 2.1 m (6 ft-11 in) ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



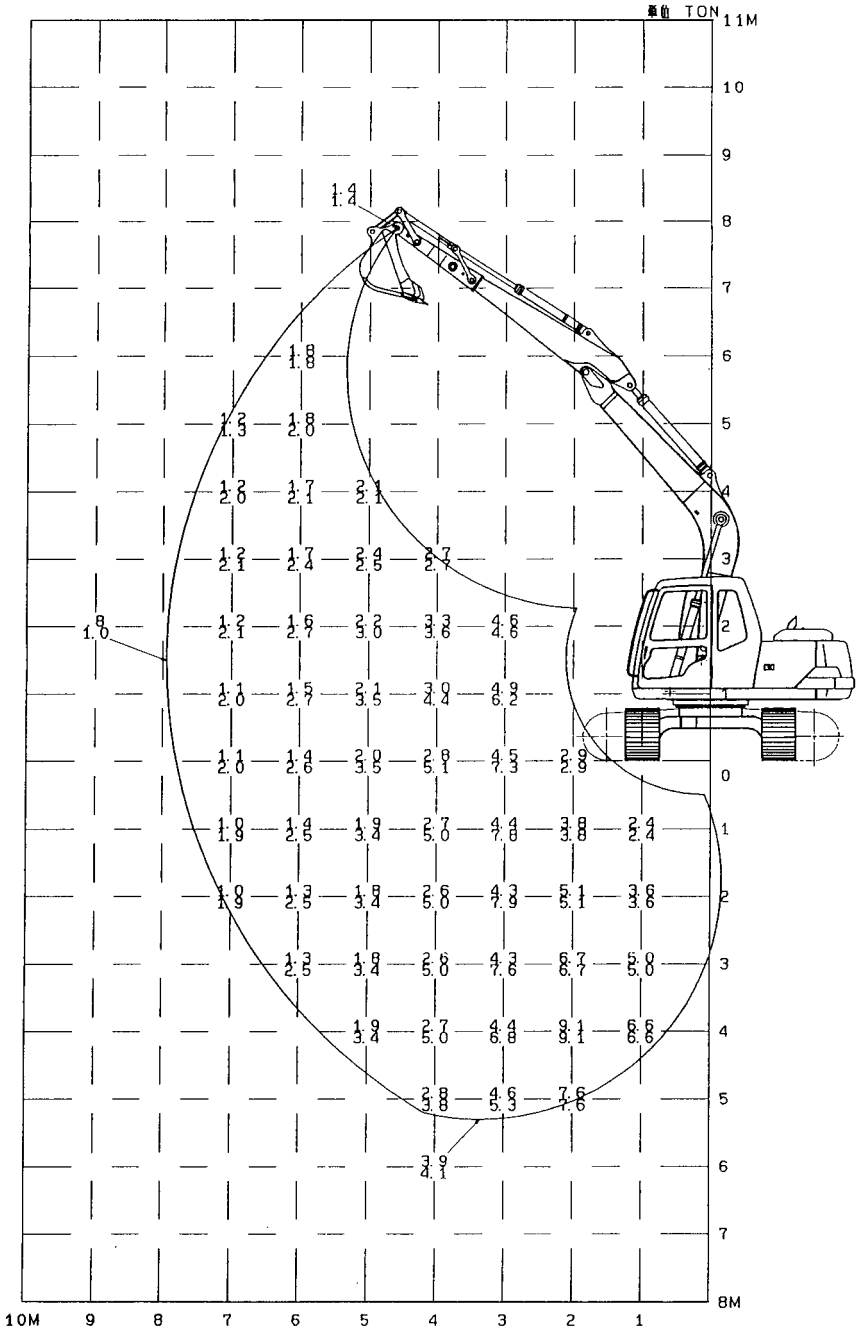
WITH 3.0 m (9 ft-10 in) LONG ARM 500 mm (20 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.5 m (8 ft-2 in) ARM+1.0 m (3 ft-3 in) EXTENSION ARM 500 mm (20 in) SHOE 360° SWING (FRONT)

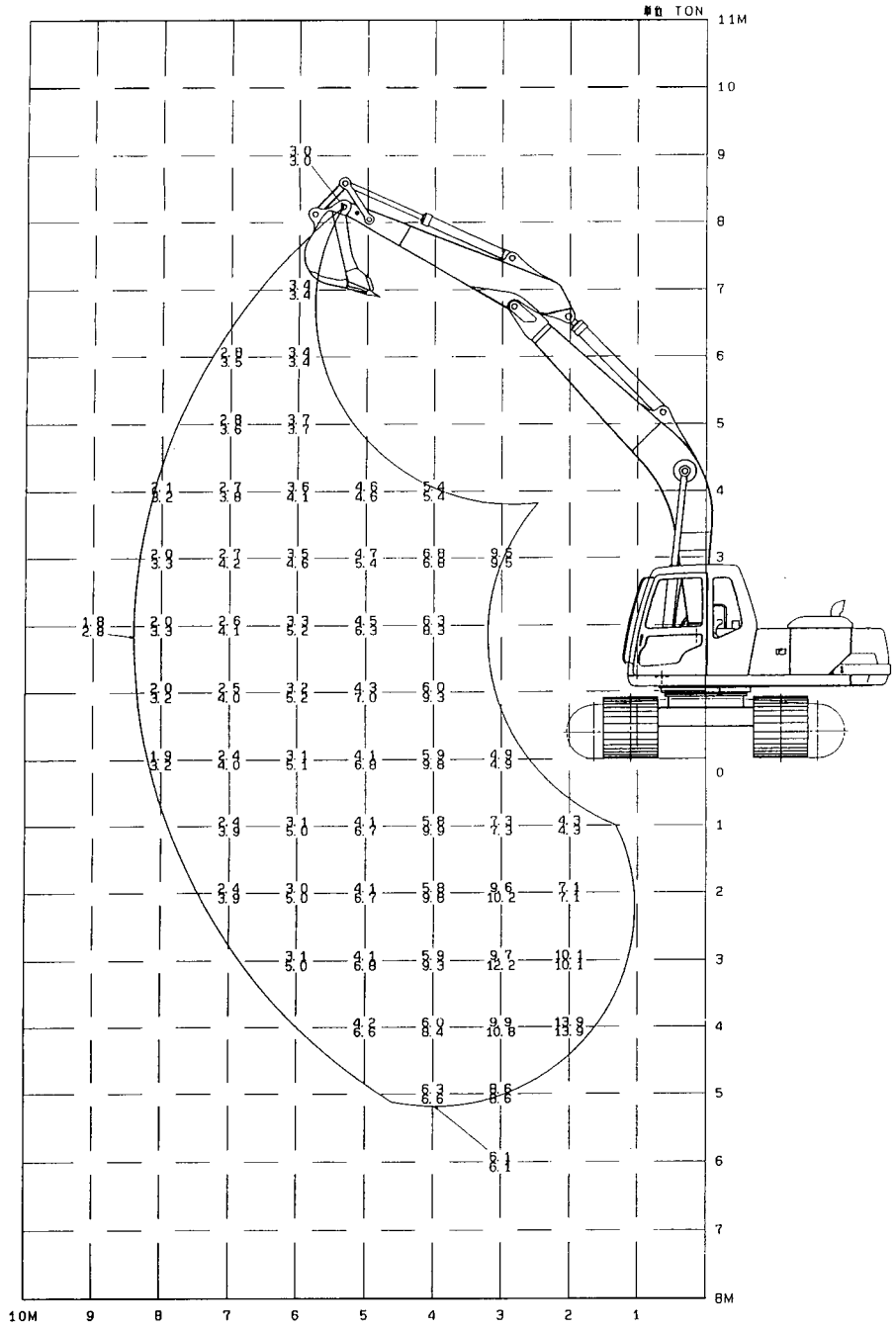
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK200

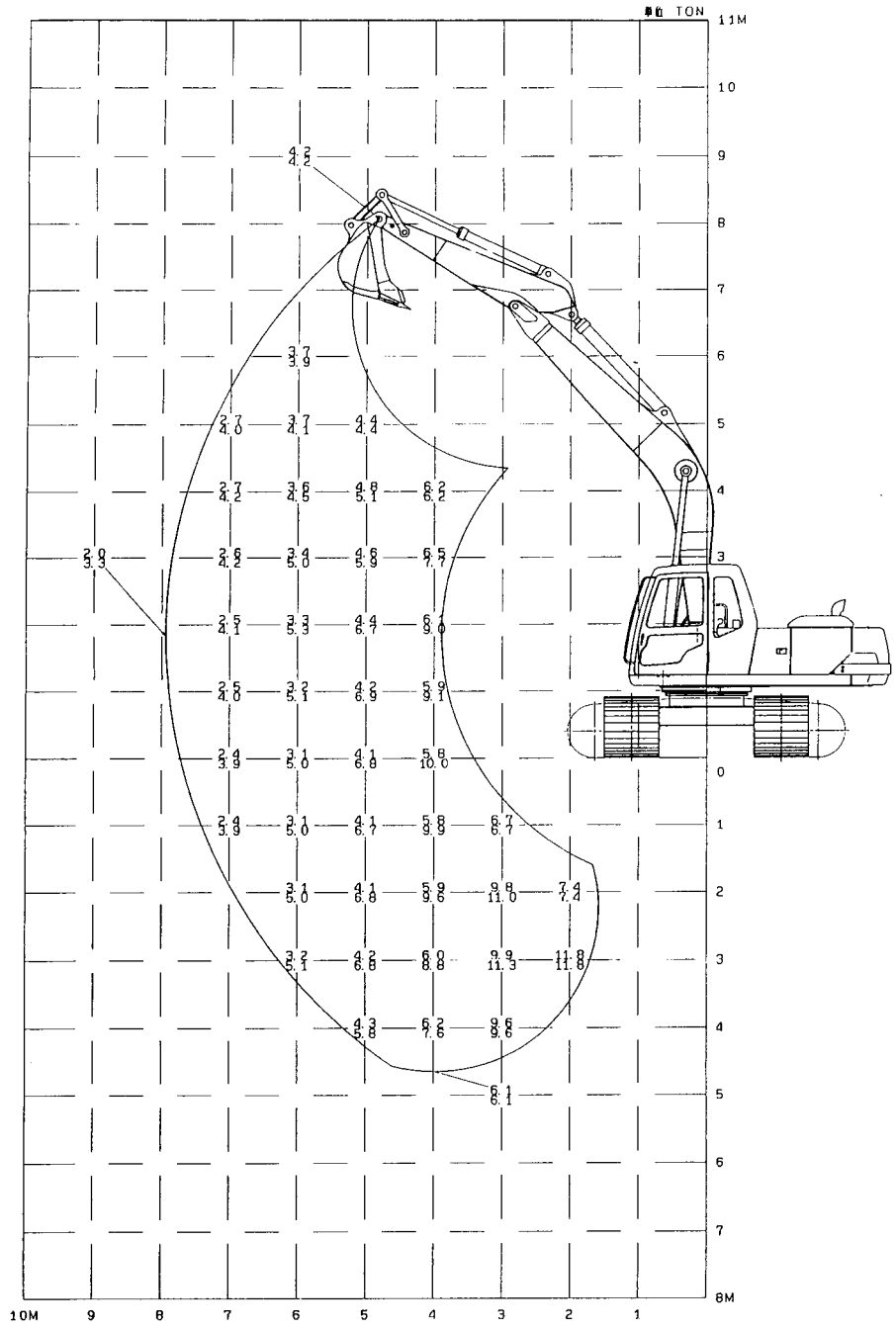
WITH 2.94 m (9 ft-8 in) ARM (STD) 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.4 m (7 ft-10 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

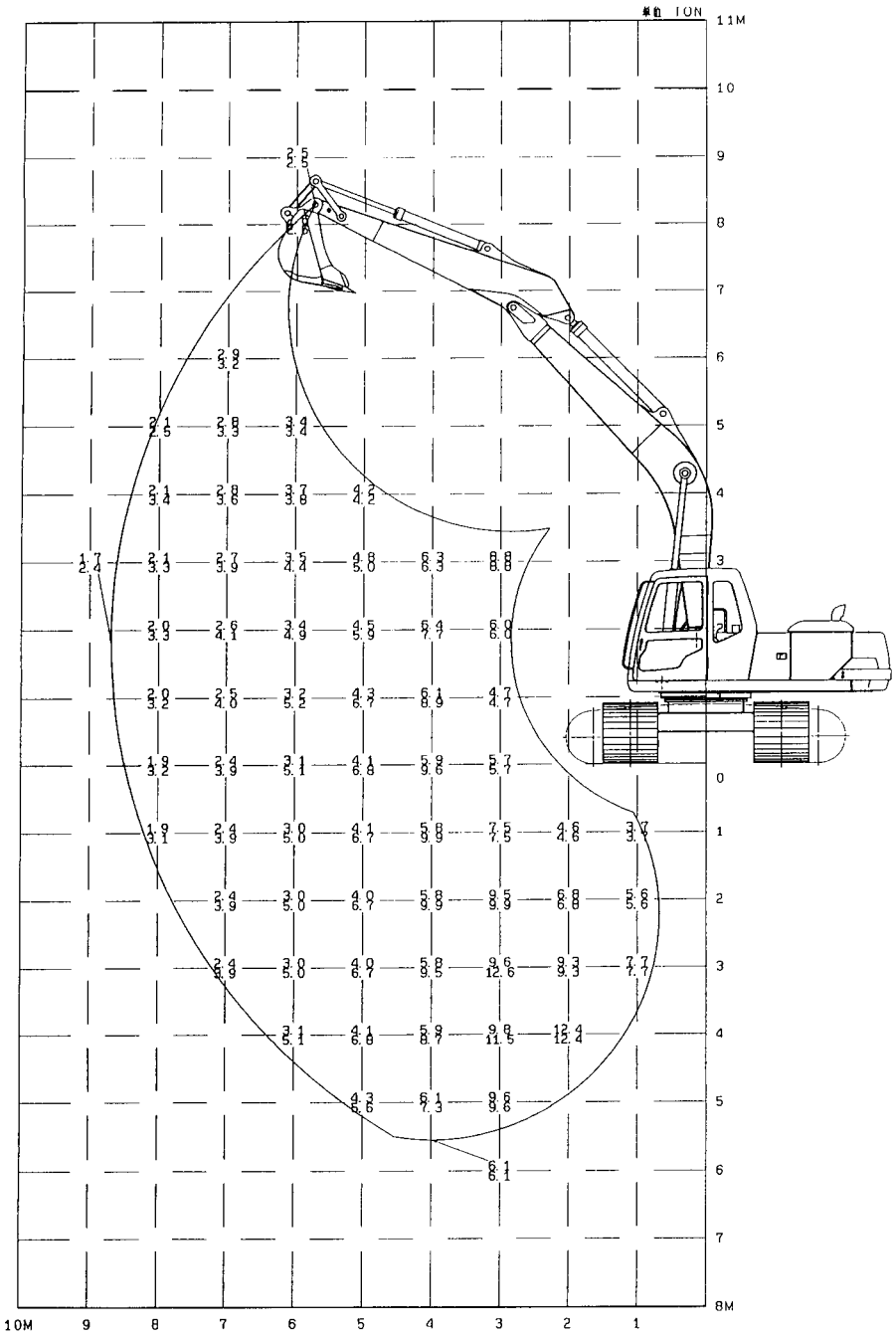
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK200

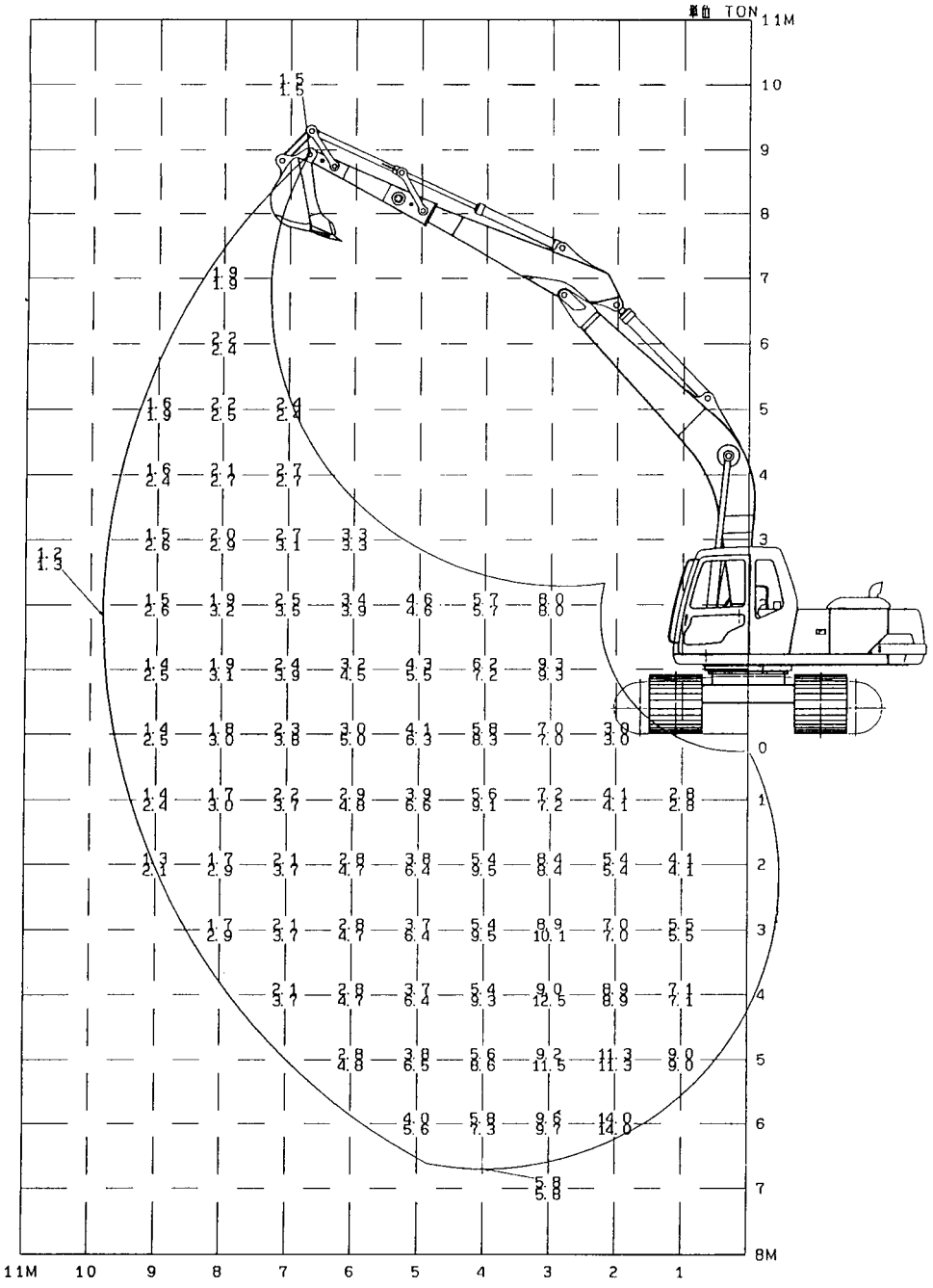
WITH 3.3 m (10 ft-10 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



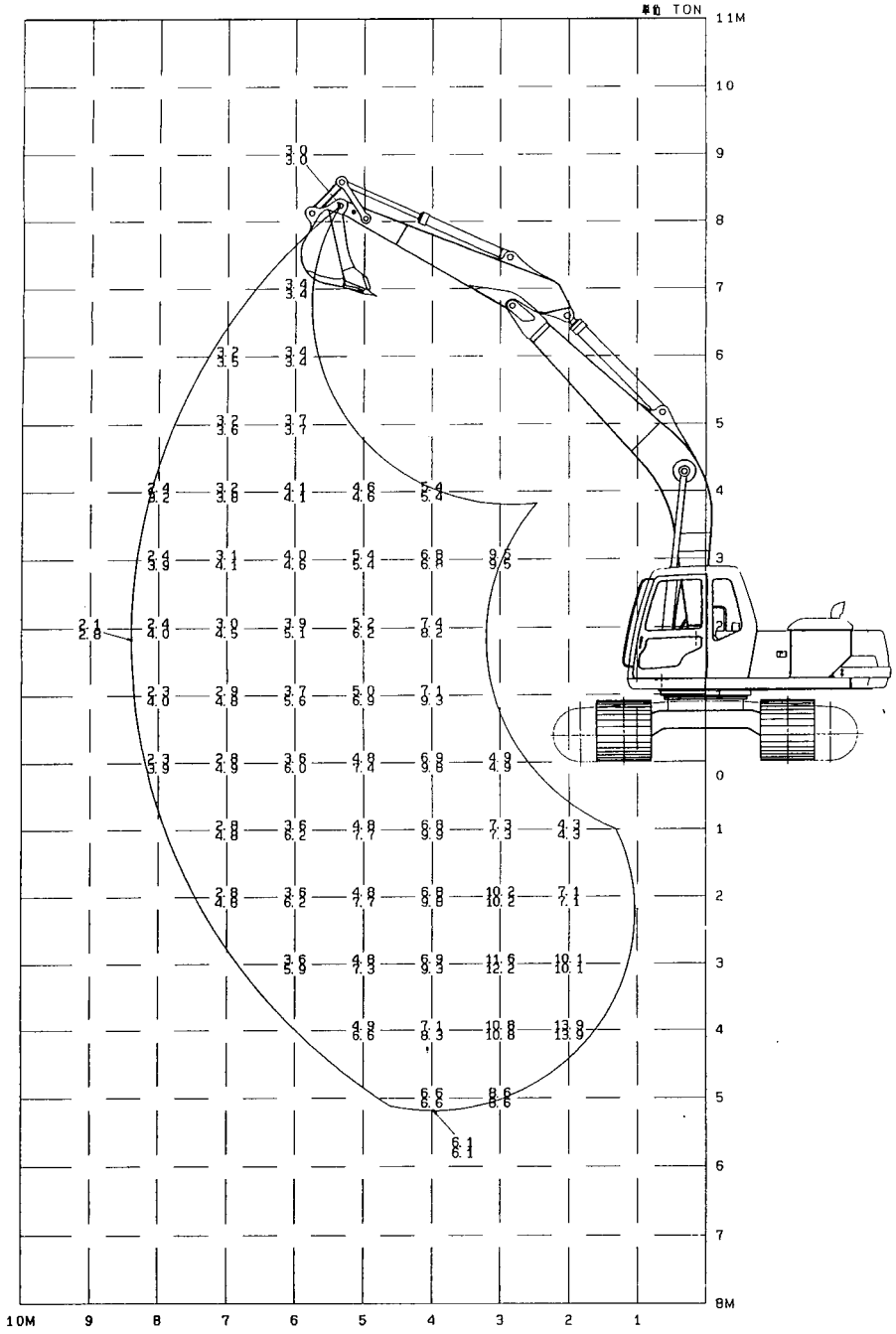
WITH 2.94 m (9 ft-8 in) ARM+1.5 m (4 ft-11 in) EXTENSION ARM 600 mm (24 in) SHOE 360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



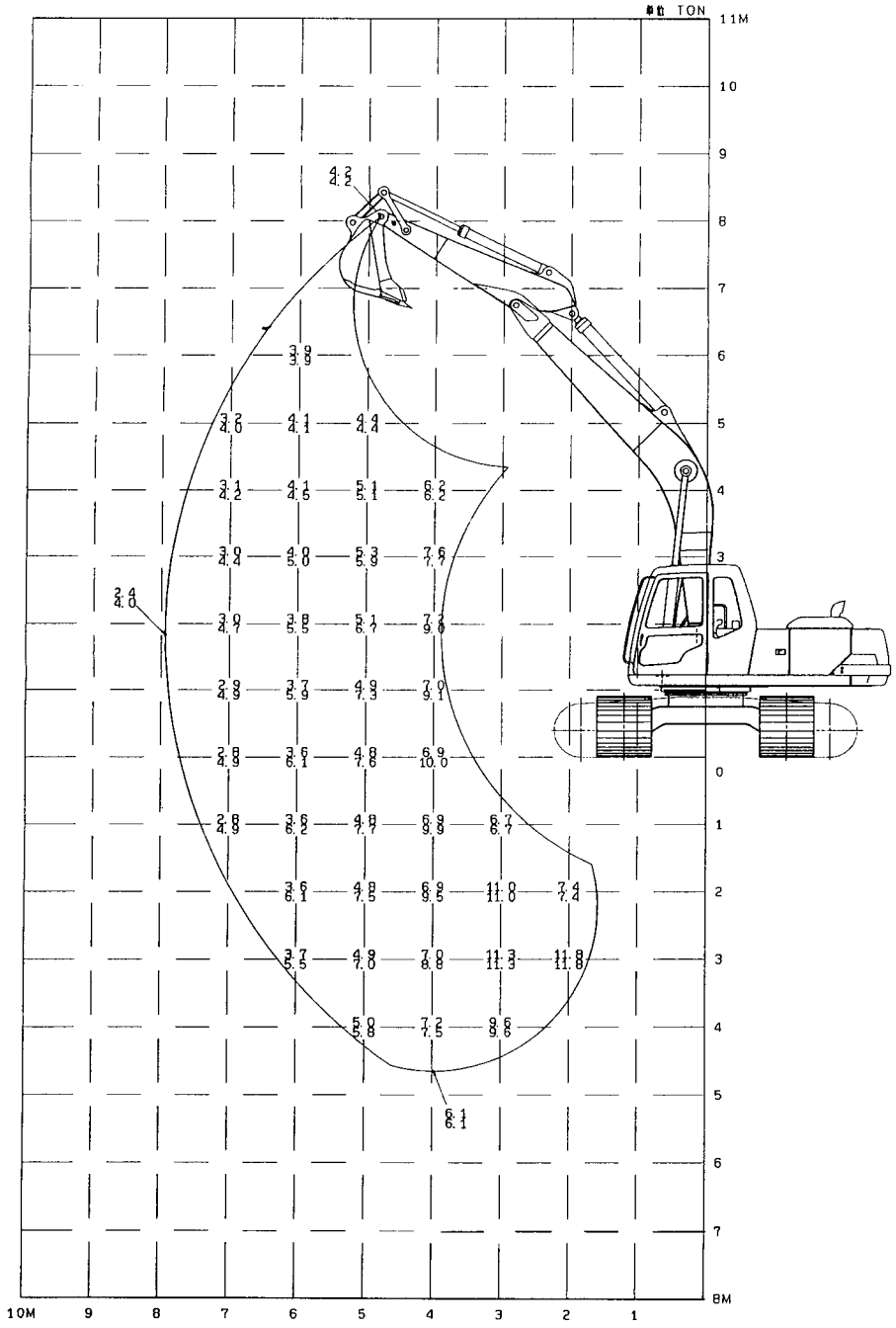
WITH 2.94 m (9 ft-8 in) ARM (STD) 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



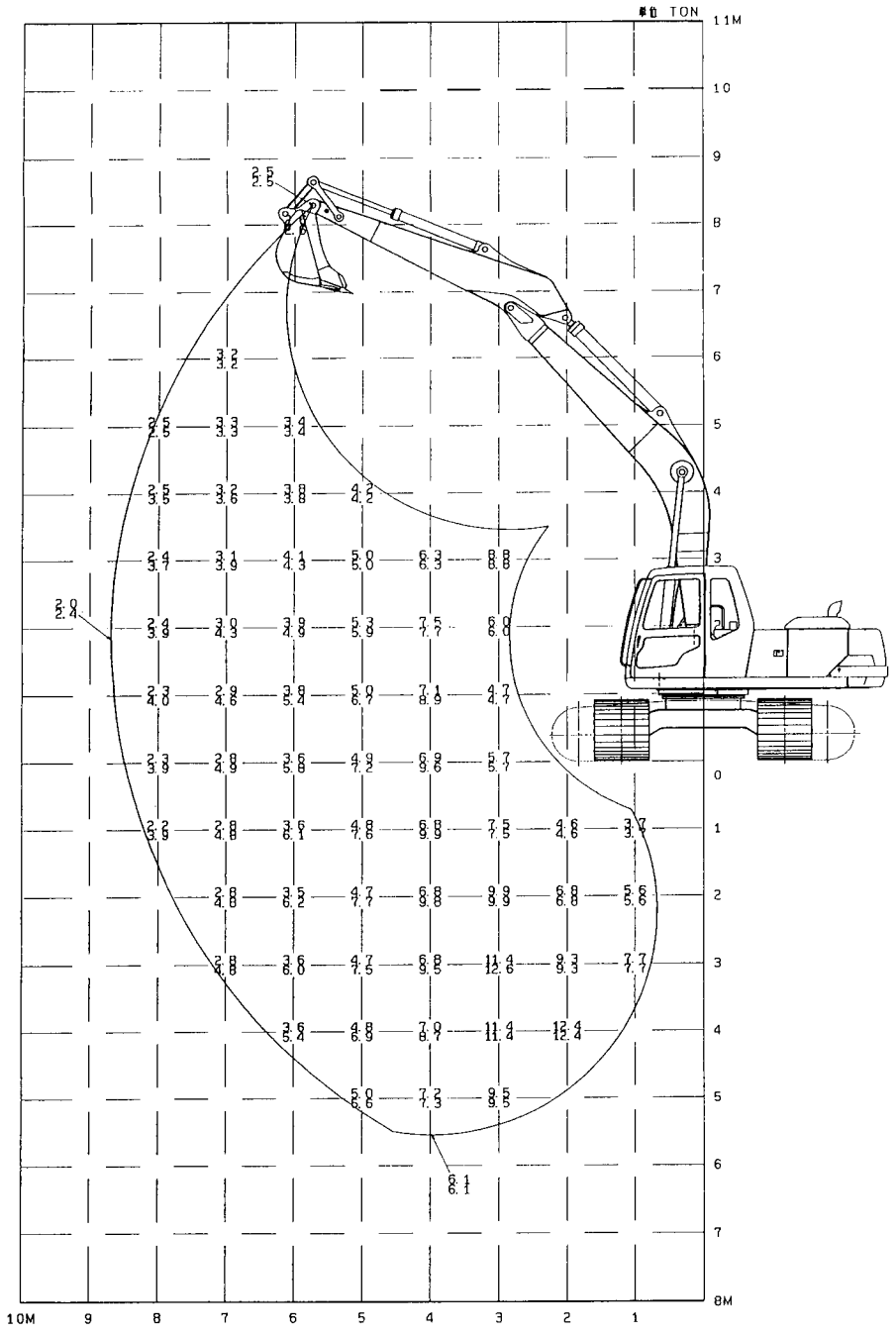
WITH 2.4 m (7 ft-10 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



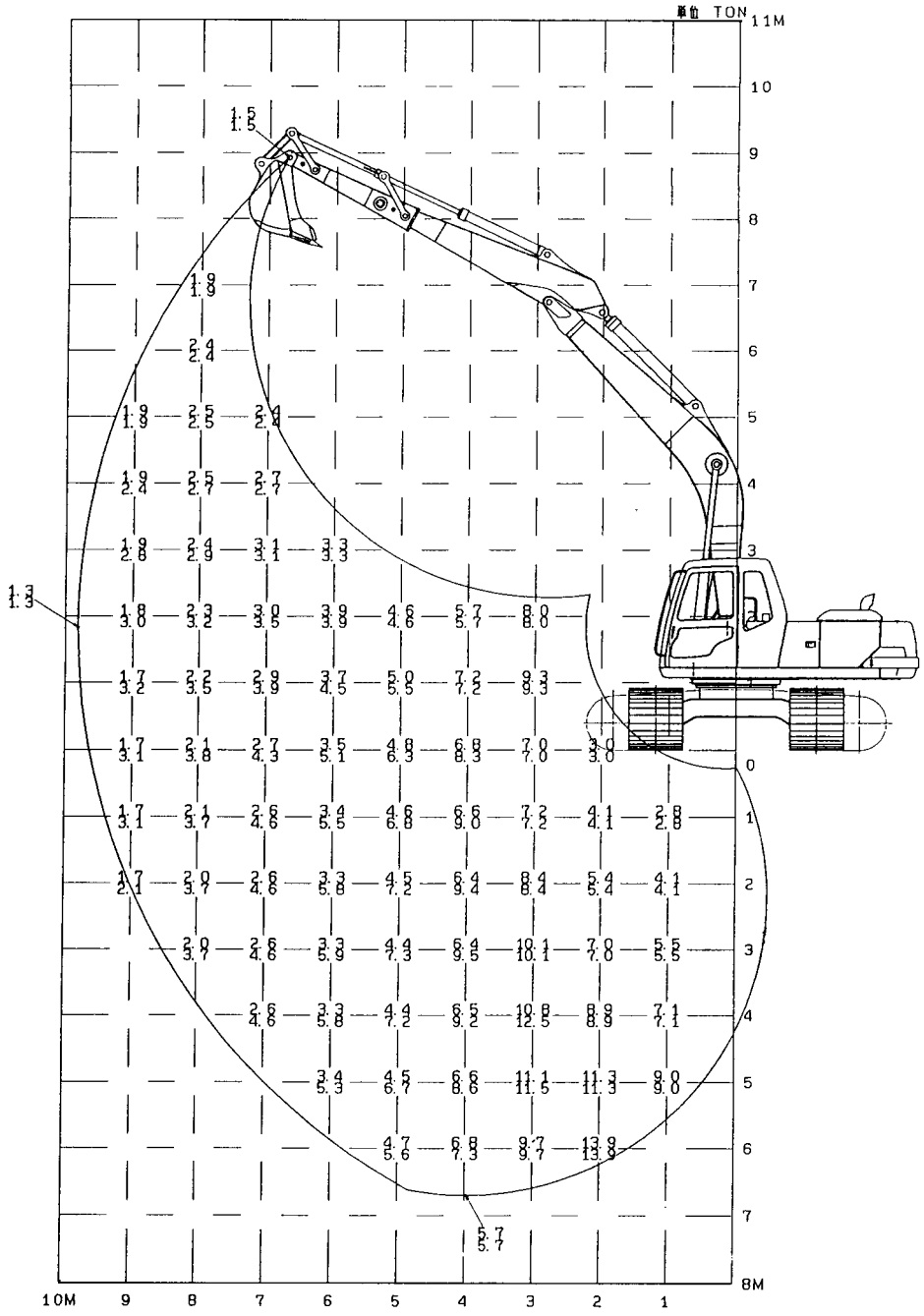
WITH 3.3 m (10 ft-10 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.94 m (9 ft-8 in) ARM+1.5 m (4 ft-11 in) EXTENSION ARM 600 mm (24 in) SHOE 360° SWING (FRONT)

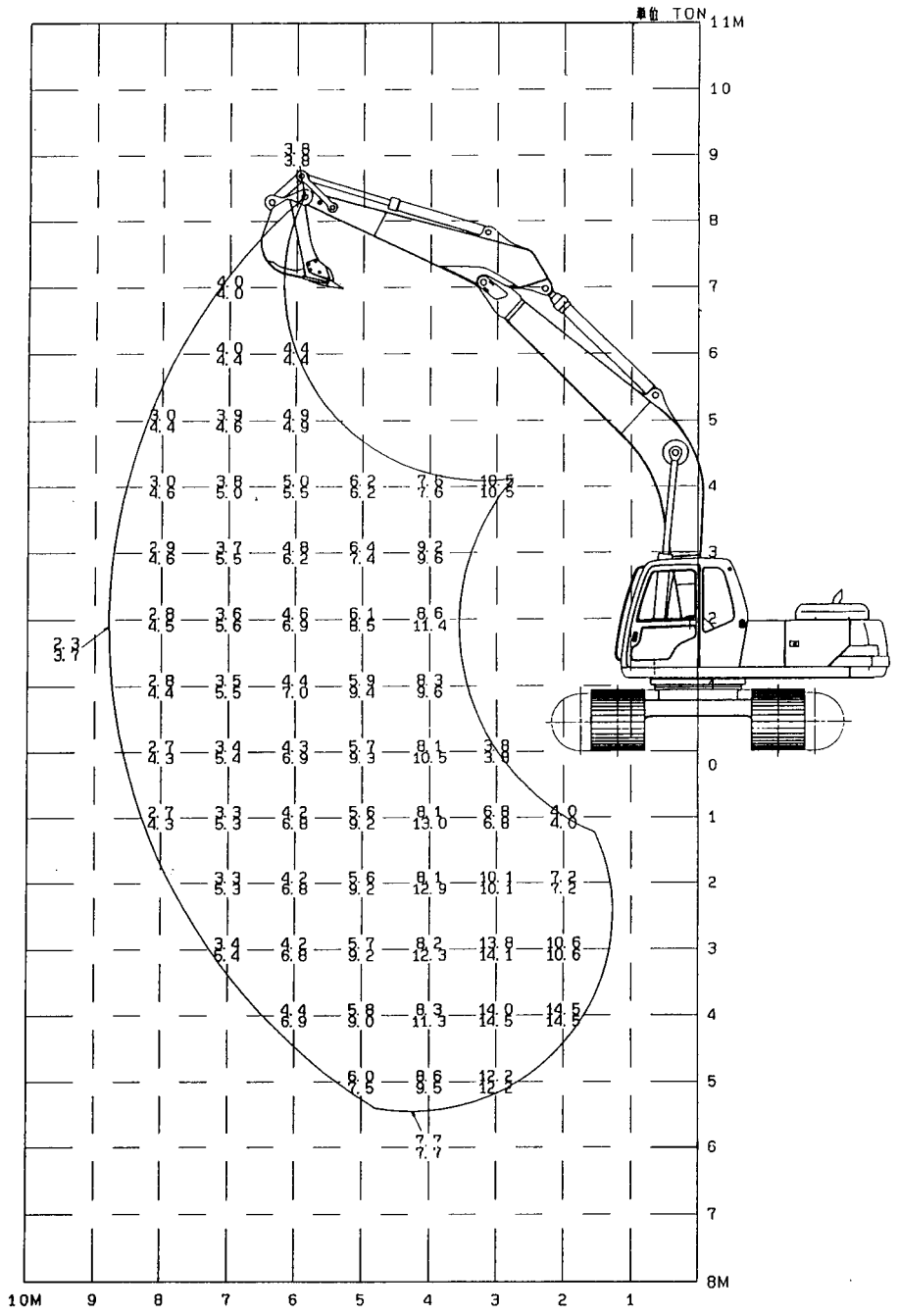
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK220

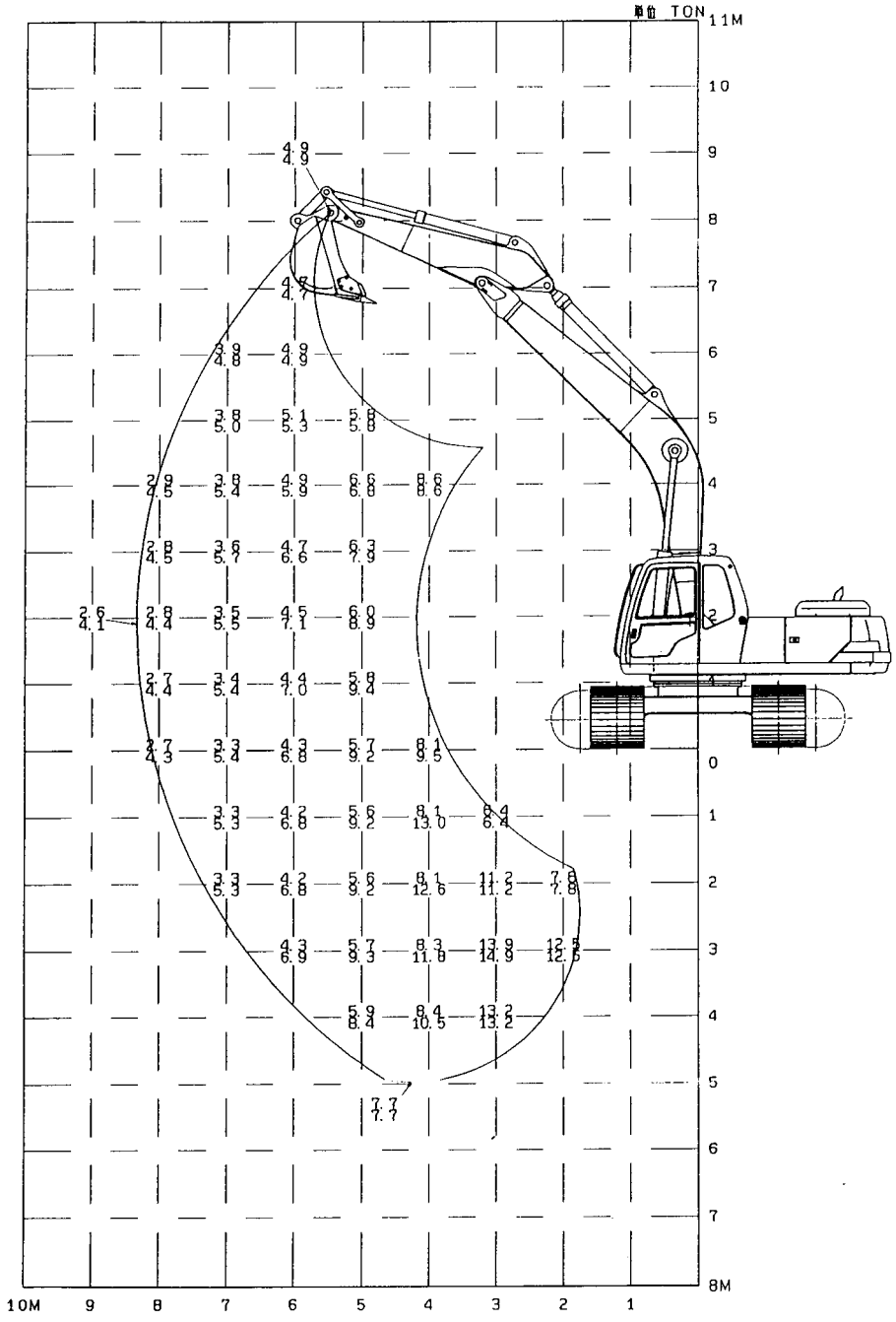
WITH 2.98 m (9 ft-7 in) ARM (STD) 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 2.5 m (8 ft-2 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

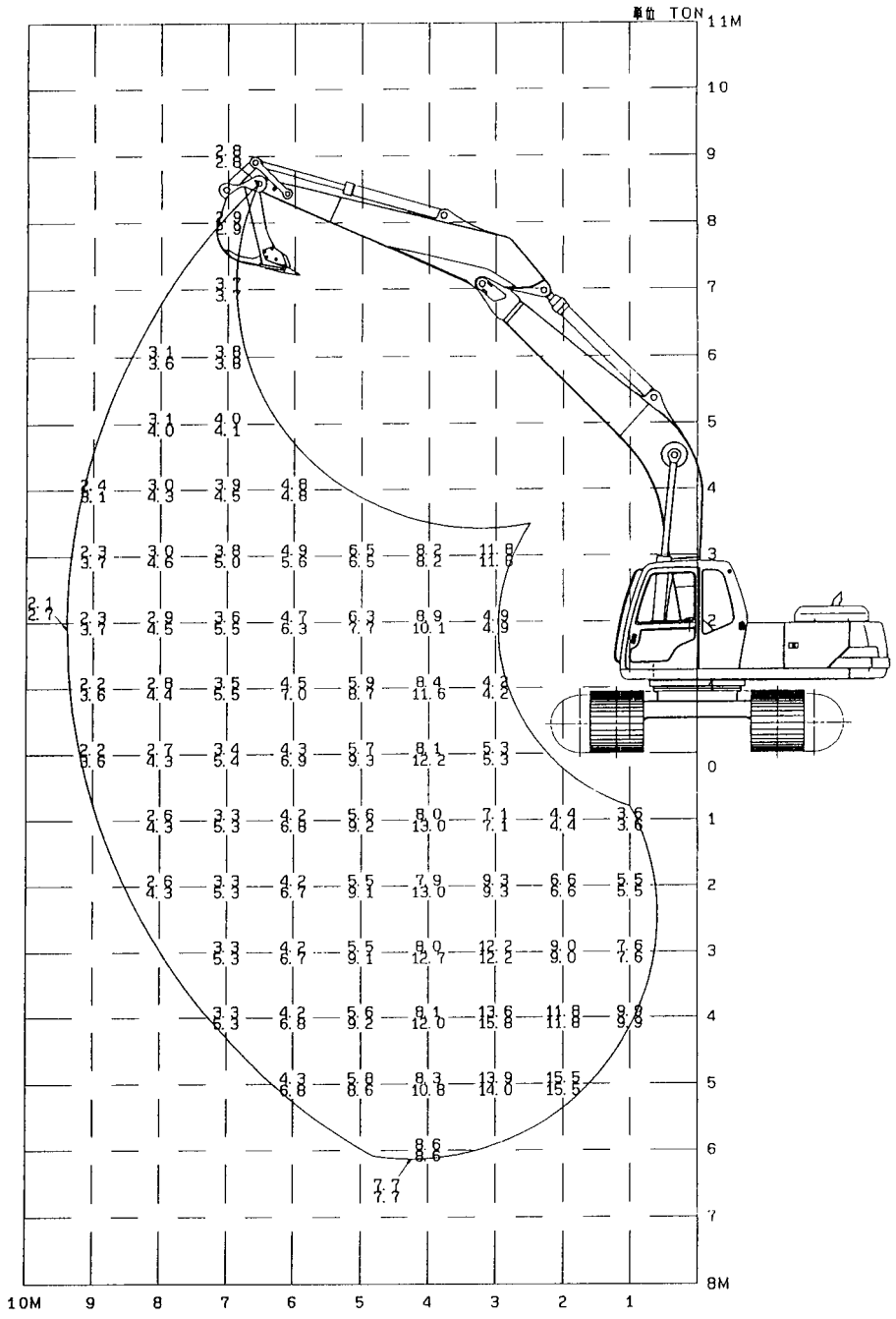
Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



SK220

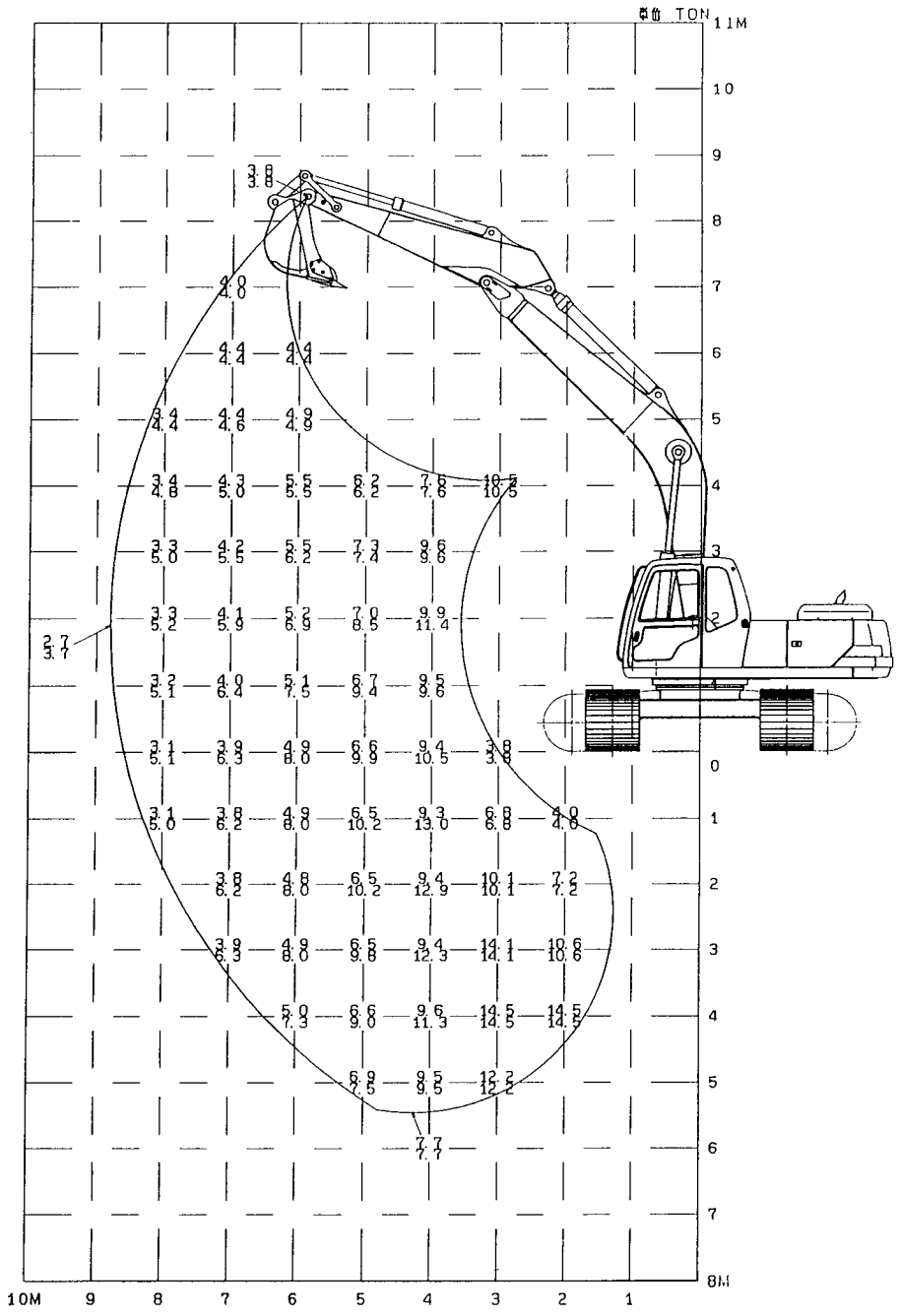
WITH 3.66 m (12 ft-0 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



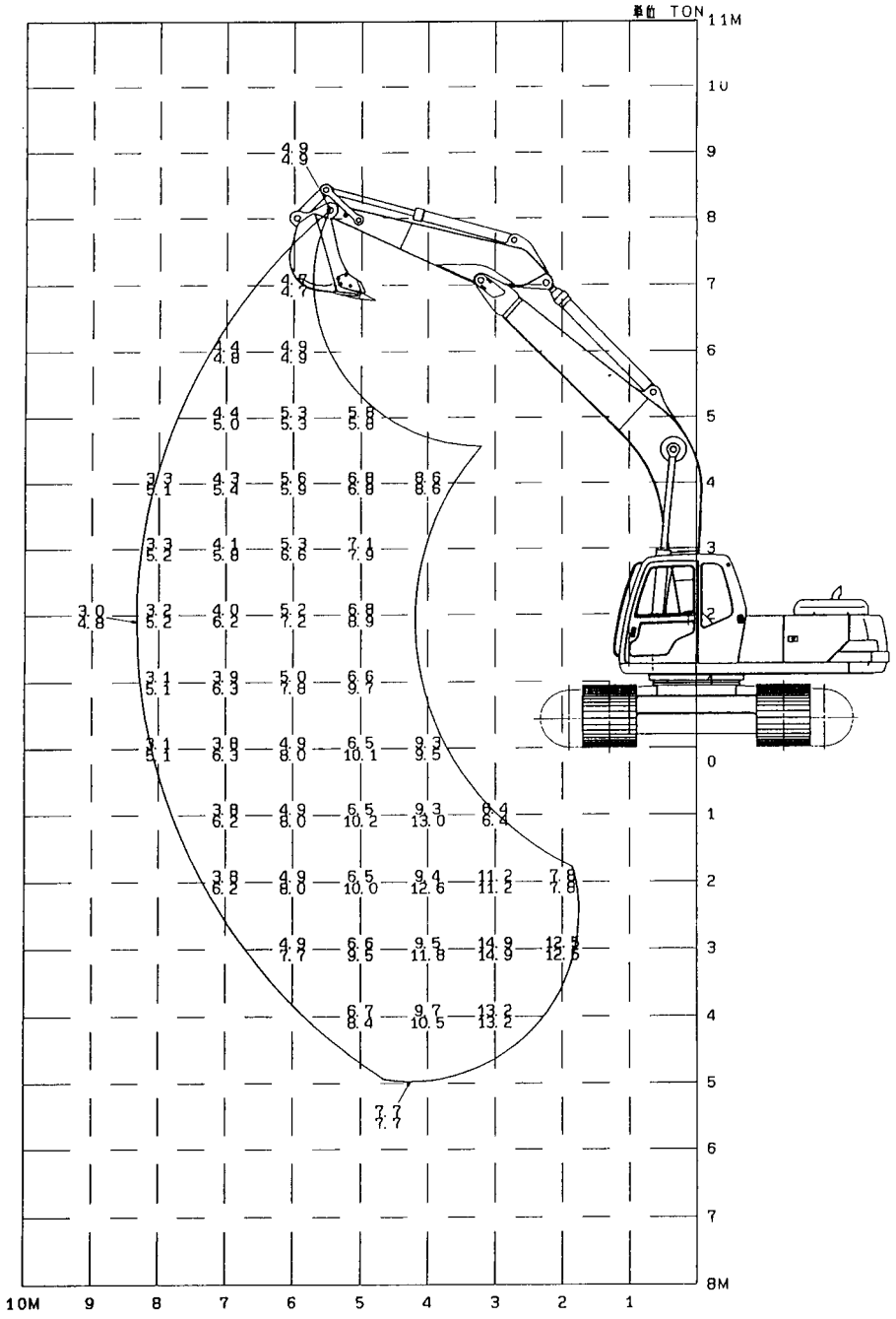
WITH 2.98 m (9 ft-7 in) ARM (STD) 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



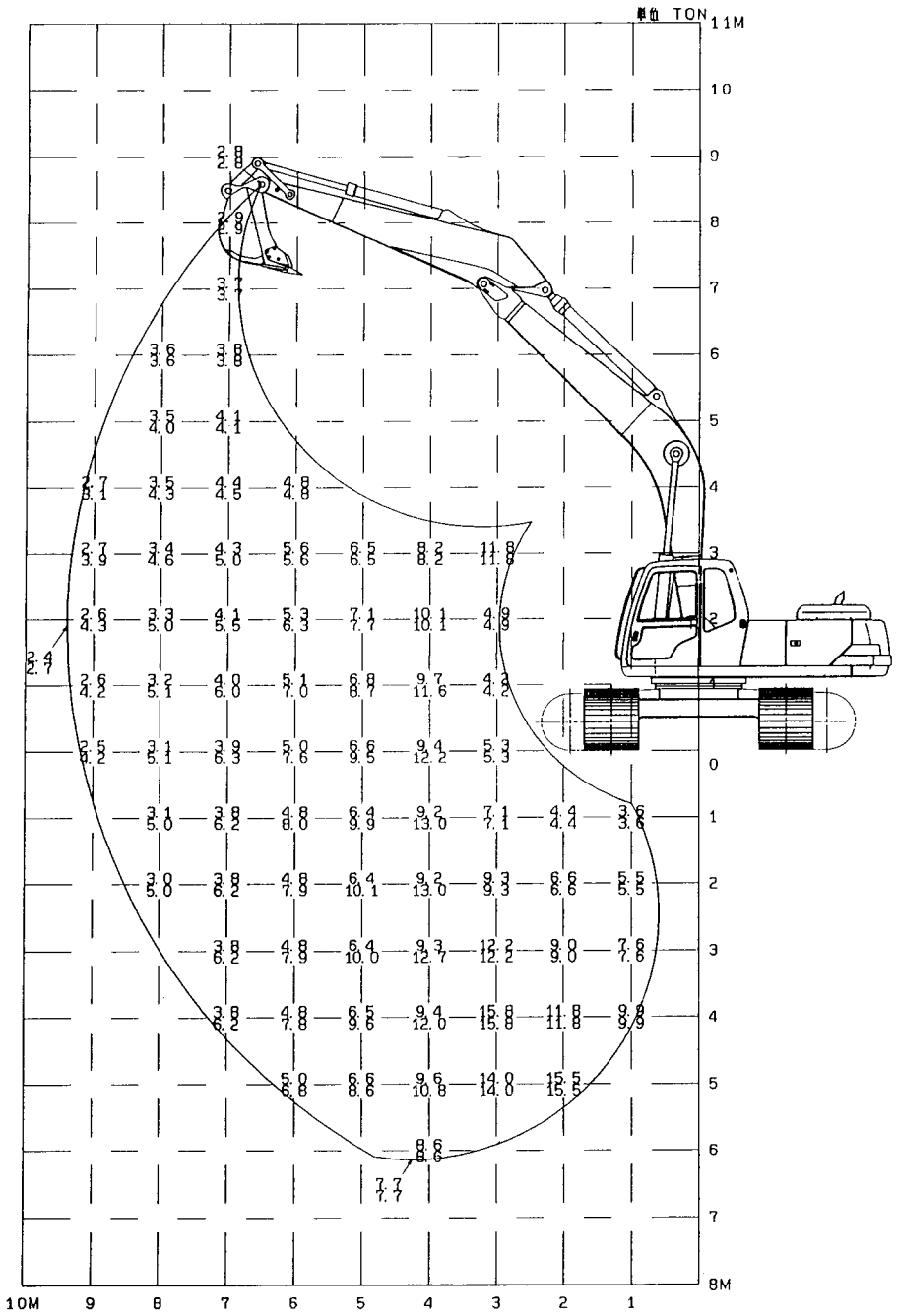
WITH 2.5 m (8 ft-2 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)



WITH 3.66 m (12 ft-0 in) ARM 600 mm (24 in) SHOE
360° SWING (FRONT)

Lifting capacity figures (foot-pound) are for 360° swing (and over the front) at 87% of main relief valve pressure for arm or boom cylinders and not exceeding 75% of static tipping load. (SAE J1097)

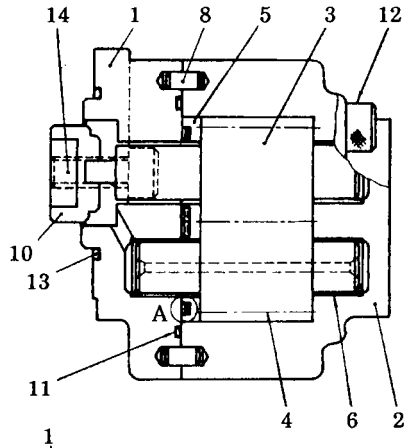


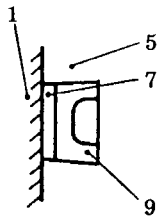
COMPONENTS

HYDRAULIC GEAR PUMP

CONSTRUCTION

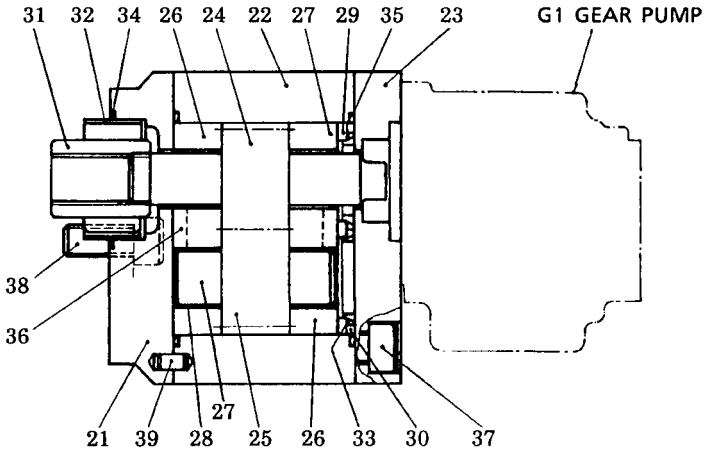
G1 GEAR PUMP (STANDARD)





DETAIL A

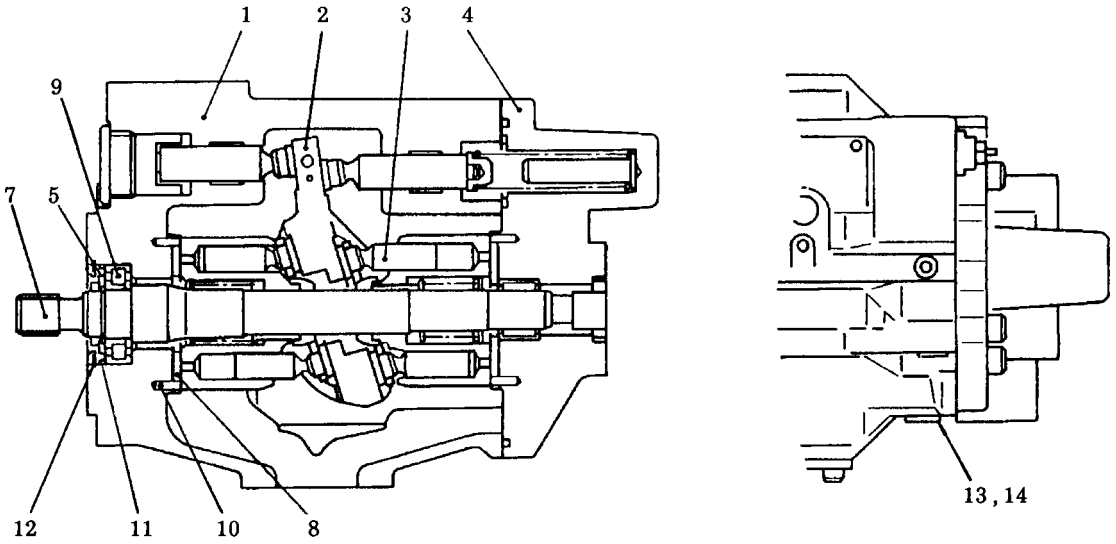
G2 + (G1) GEAR PUMP OPTION)



G1 gear pump			G2 gear pump		
No.	NAME	Q'ty	No.	NAME	Q'ty
1	FRAME	1	21	FRAME	1
2	HOUSING	1	22	CASING	1
3	GEAR (DRIVE)	1	23	FRAME	1
4	GEAR (IDLE)	1	24	GEAR (DRIVE)	1
5	SIDE	1	25	GEAR (IDLE)	1
6	METAL	4	26	SIDE PLATE	2
7	BACKUP RING	1	27	SIDE PLATE	2
8	PIN	2	28	METAL	4
9	SQUARE RING	1	29	PLATE	1
10	COUPLING	1	30	GUIDE	2
11	O RING	1	31	COUPLING	1
12	SOCKET BOLT	4	32	BUSHING	1
13	O RING	1	33	O RING	2
14	SOCKET BOLT	2	34	O RING	1
			35	SQUARE RING	2
			36	SQUARE RING	2
			37	SOCKET BOLT	4
			38	SOCKET BOLT	2
			39	PIN	4

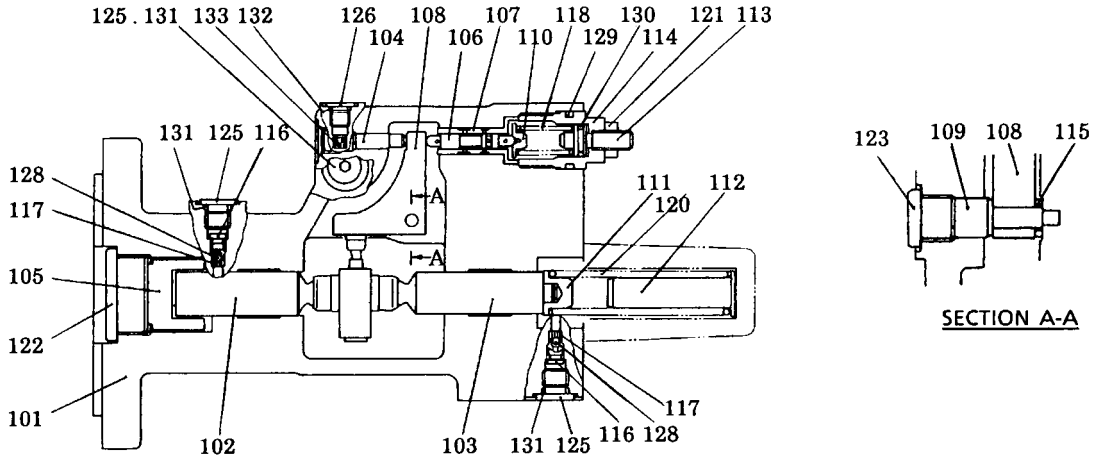
HYDRAULIC PUMP

CONSTRUCTION



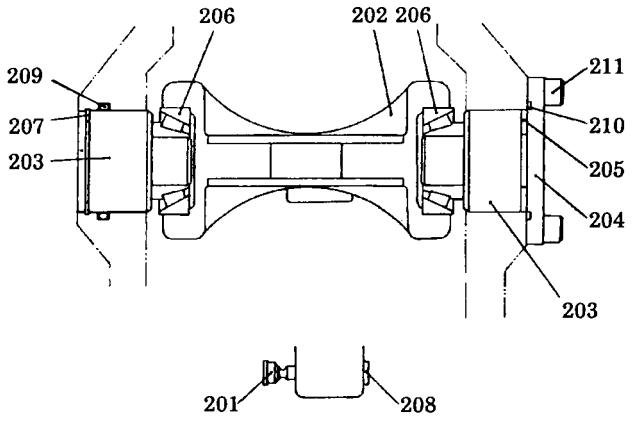
No.	NAME	Q'ty	No.	NAME	Q'ty
1	CONTROL BODY	1	8	CONTROL PLATE	1
2	HANGER	1	9	BEARING	1
3	ROTARY GROUP	2	10	PIN	2
4	COVER	1	11	SHIM	1
5	CASING	1	12	SNAP RING	1
6	–	–	13	PLUG	1
7	SHAFT	1	14	O RING	1

(1) Control body



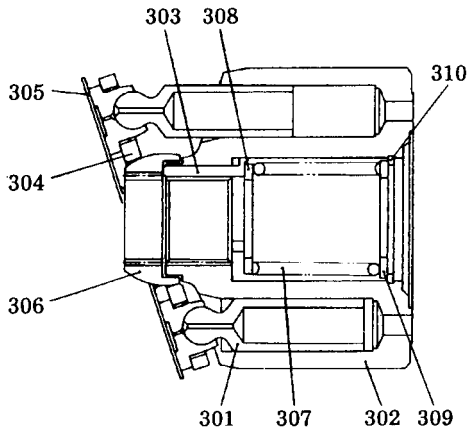
No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	HOUSING	1	111	SPRING SEAT B	1	122	PLUG	1
102	PISTON A	1	112	SPRING SEAT C	1	123	PLUG	1
103	PISTON B	1	113	ADJUST SCREW	1	125	PLUG	3
104	PISTON (FOR SHIFT)	1	114	GUIDE	1	126	PLUG	1
105	DISTANCE PIECE	1	115	SHIM	1	128	BALL	2
106	SPOOL	1	116	VALVE SEAT	2	129	O RING	1
107	BARREL	1	117	GUIDE	2	130	O RING	1
108	ARM	1	118	SPRING	1	131	O RING	3
109	SHAFT	1	120	SPRING (C)	1	132	O RING	1
110	SPRING SEAT A	1	121	NUT	1	133	ORIFICE	1

(2) Hanger



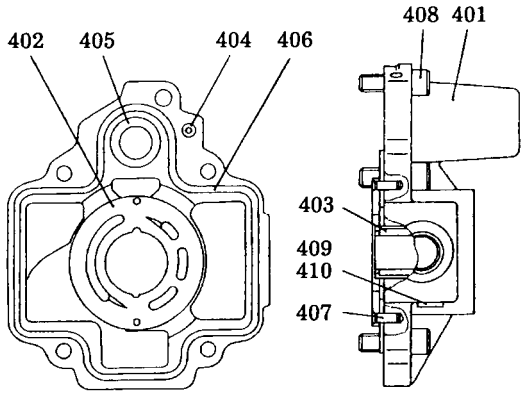
No.	NAME	Q'ty
201	PILOT PIN	1
202	HANGER	1
203	SHAFT	2
204	COVER	1
205	SHIM	1
206	BEARING	2
207	SNAP RING	1
208	PLUG	1
209	O RING	1
210	O RING	1
211	SOCKET BOLT	4

(3) Rotary group



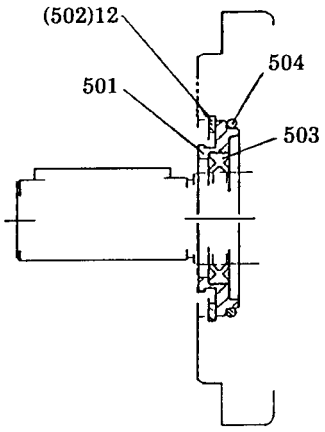
No.	NAME	Q'ty
301	PISTON	9
302	CYLINDER BLOCK	1
303	PIN	3
304	RETAINER	1
305	PLATE	1
306	GUIDE	1
307	SPRING	1
308	SPRING SEAT (A)	1
309	SPRING SEAT (B)	1
310	SNAP RING	1

(4) Cover



No.	NAME	Q'ty
401	COVER	1
402	CONTROL PLATE	1
403	BEARING	1
404	O RING	1
405	O RING	1
406	O RING	1
407	PIN	2
408	SOCKET BOLT	5
409	PLUG	1
410	O RING	1

(5) Case

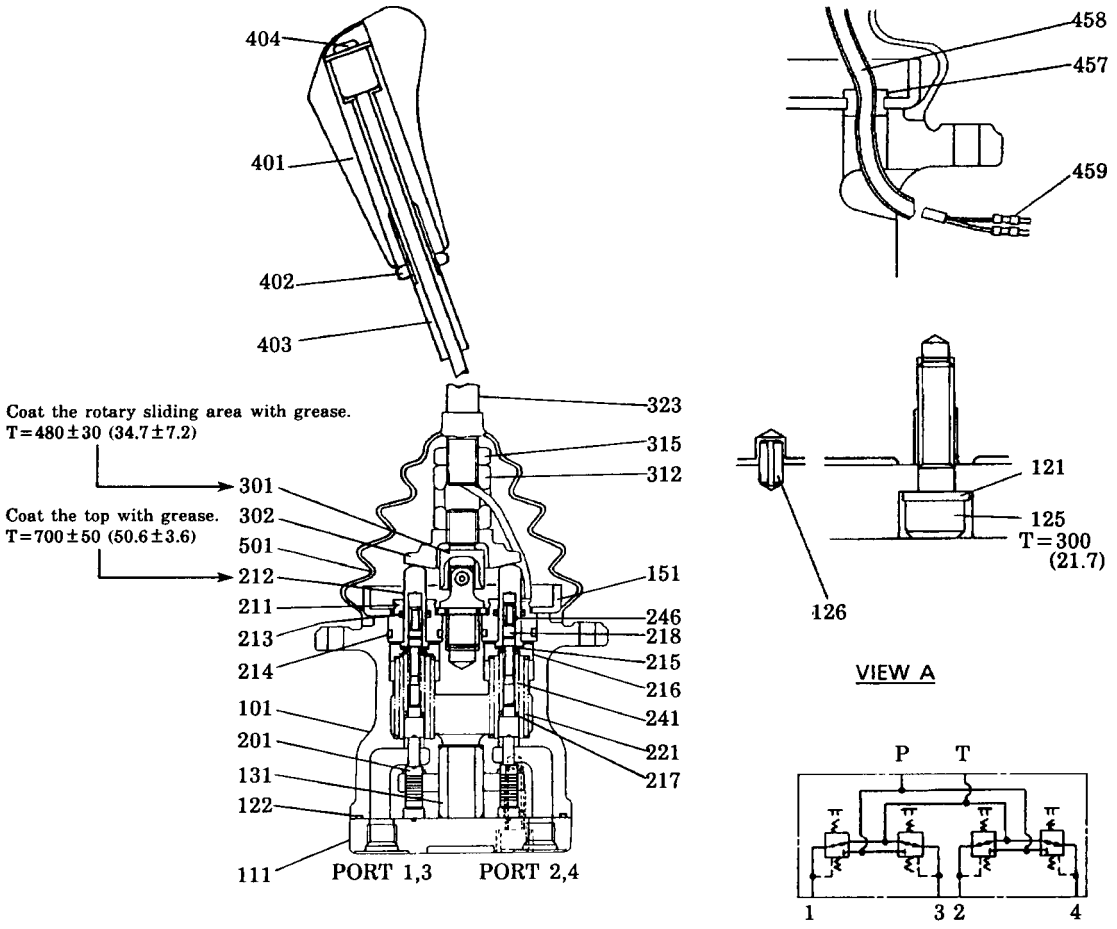


No.	NAME	Q'ty
501	CASE	1
(502)	SNAP RING	1
503	OIL SEAL	1
504	O RING	1

PILOT VALVE

CONSTRUCTION

☞ T=Tightening torques kgf·cm (ft·lbs)

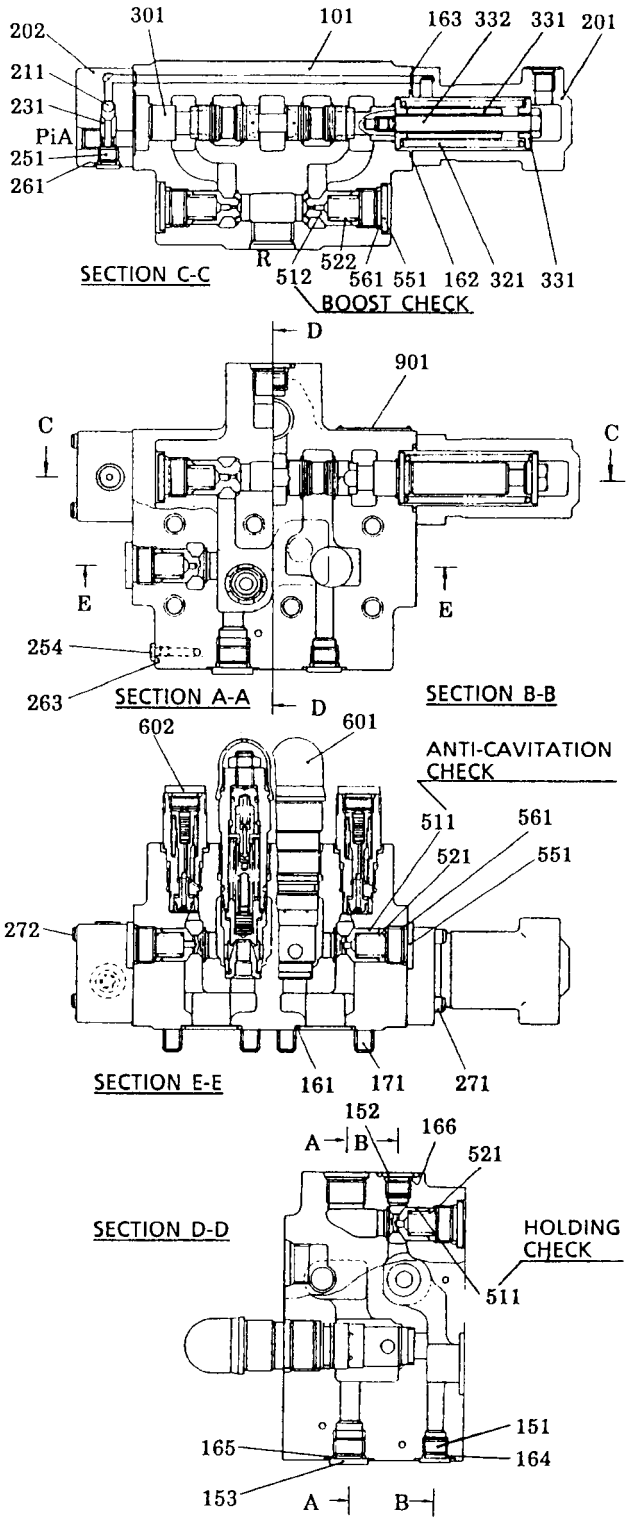


No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	CASING	1	213	SEAL	4	312	ADJUSTING NUT	1
111	POAT PLATE	1	214	O RING	4	315	LOCK NUT	1
121	SEAL WASHER	2	215	WASHER 1	8	323	HANDLE BAR	1
122	O RING	1	216	SPRING SEAT	2+2	401	GRIP	1
125	SOCKET BOLT	2	217	WASHER 2	4	402	NUT	1
126	SPRING PIN	1	218	SPRING SEAT	2+2	403	LEVER	1
131	BUSHING	1	221	SPRING	2+2	404	HORN SWITCH	1
151	PLATE	1	241	SPRING	2+2	457	BUSHING	1
201	SPOOL	2+2	246	SPRING	4	458	TUBE	1
211	PLUG	4	301	JOINT	1	459	TERMINAL	2
212	PUSH ROD	4	302	DISC	1	501	BOOT	1

CONTROL VALVE (SWING)

CONSTRUCTION

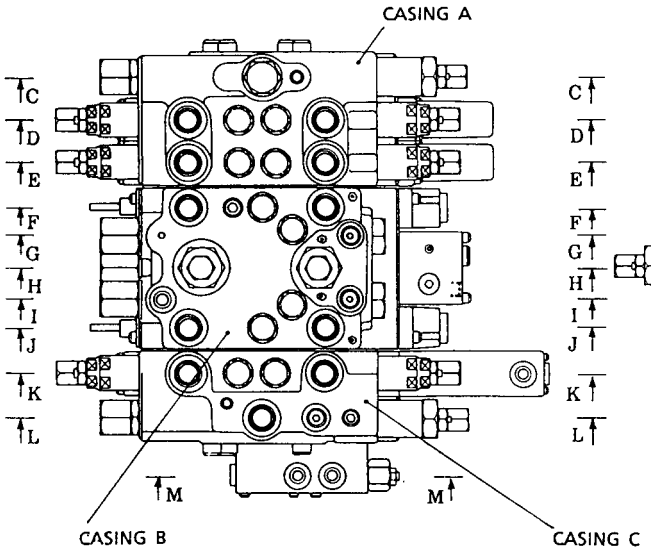
No.	NAME	Q'ty
101	CASING	1
151	PLUG	1
152	PLUG	1
153	PLUG	1
161	O RING	1
162	O RING	2
163	O RING	2
164	O RING	2
165	O RING	1
166	O RING	1
171	SOCKET BOLT	6
201	SPRING COVER	1
202	VALVE SHUTTLE COVER	1
211	BALL	1
231	SEAT	1
251	PLUG	1
254	PLUG	8
261	O RING	1
263	O RING	8
271	SOCKET BOLT	2
272	SOCKET BOLT	2
301	SPOOL	1
321	SPRING	1
331	SPRING SEAT	2
332	SPACER BOLT	1
333	STOPPER	1
511	POPPET1	3
512	POPPET2(BOOST)	2
521	SPRING1	3
522	SPRING2	2
551	PLUG	5
561	O RING	5
601	RELIEF VALVE	2
602	SWING-SHOCKLESS VALVE	2

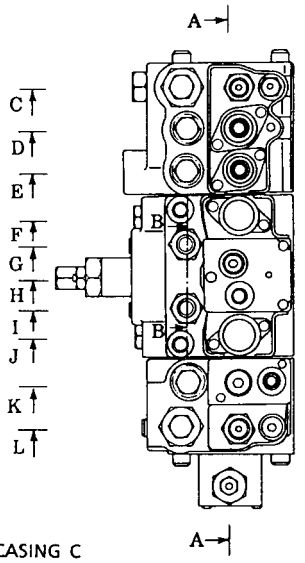


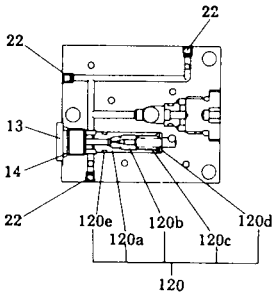
Cross-sectional view of control valve

CONTROL VALVE

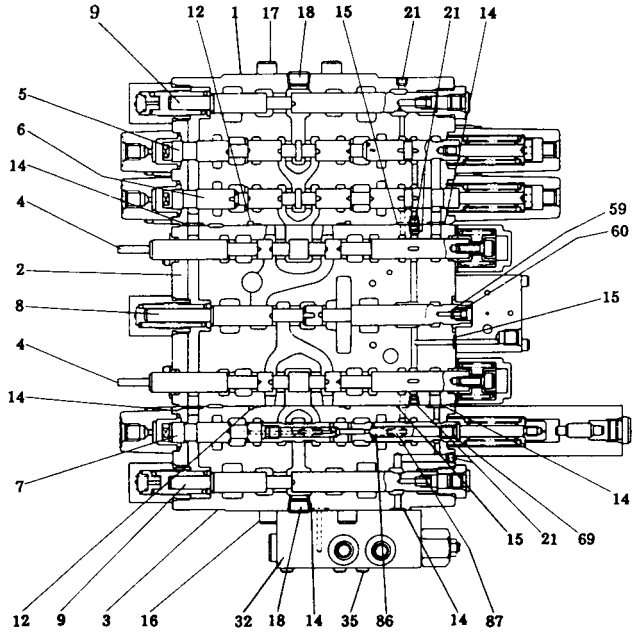
CONSTRUCTION



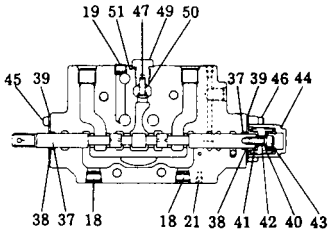




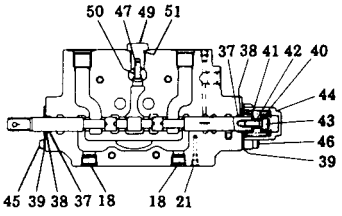
SECTION N – N



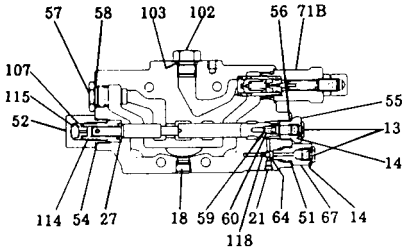
SECTION A – A



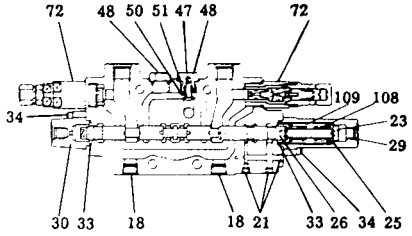
SECTION F – F



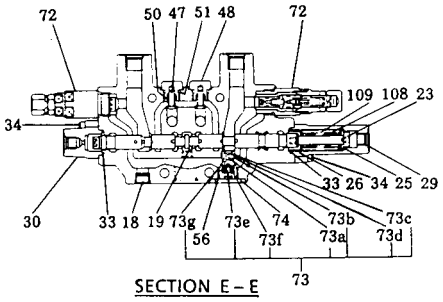
SECTION J – J



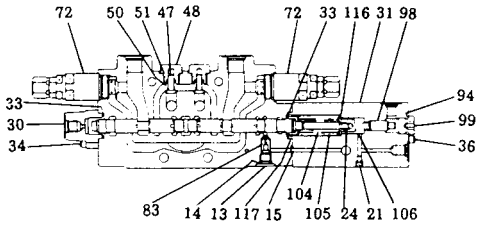
SECTION C – C



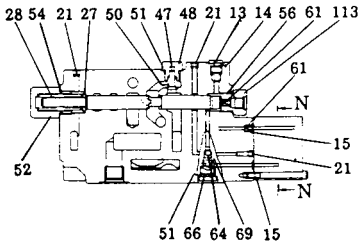
SECTION D – D



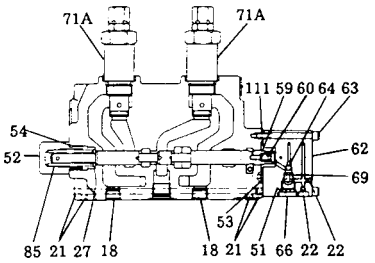
SECTION E – E



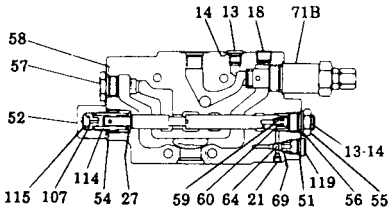
SECTION K – K



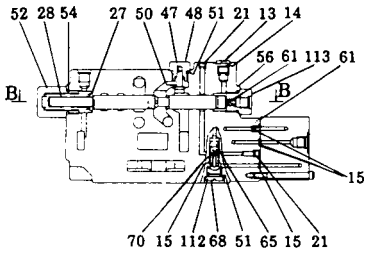
SECTION G – G



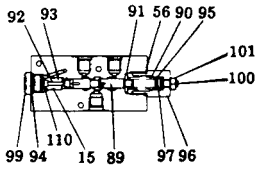
SECTION H – H



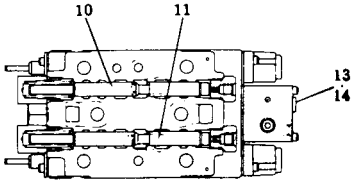
SECTION L – L



SECTION I – I



SECTION M – M



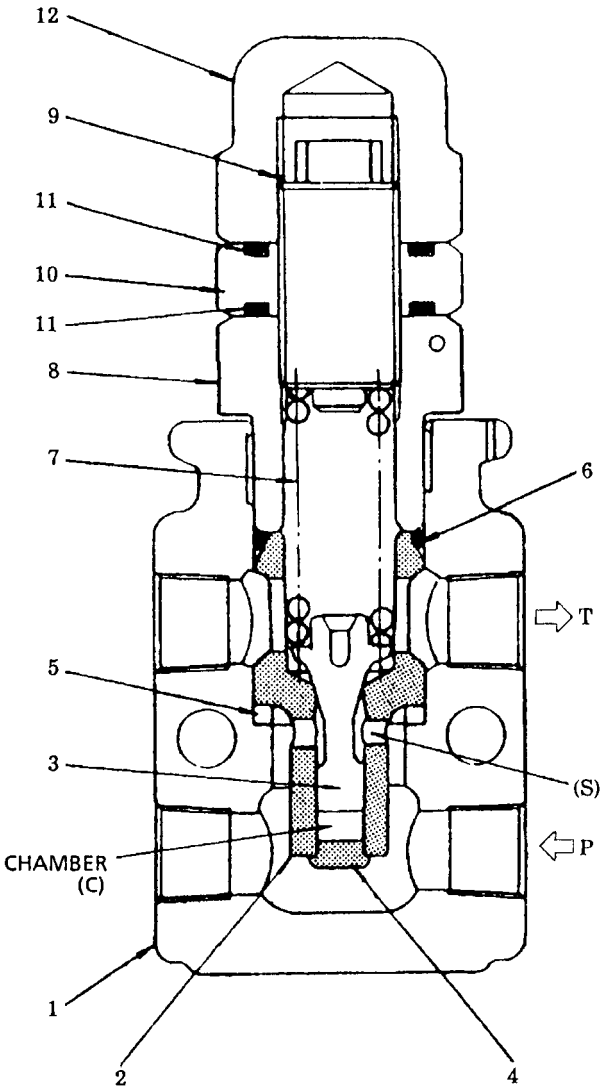
SECTION B – B

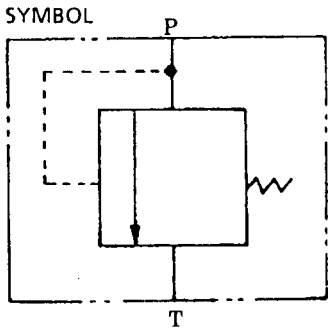
SK60

No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	CASING (A)	1	41	SPRING SEAT	4	91	SEQUENCE VALVE SEAT	1
2	CASING (B)	1	42	SPACER	2			
3	CASING (C)	1	43	SOCKET BOLT	2	92	PILOT PISTON	1
4	SPOOL (For travel)	2	44	COVER	2	93	PISTON GUIDE	1
5	SPOOL (For bucket)	1	45	SOCKET BOLT	4	94	O RING	3
6	SPOOL (For boom)	1	46	SOCKET BOLT	4	95	PISTON	1
7	SPOOL ASS'Y (For boom)	1	47	POPPET	9	96	PISTON CASE	1
			48	POPPET SEAT	8	97	O RING	1
7-a	ARM SPOOL (A)	1	49	POPPET SEAT	2	98	PISTON	1
7-b	ARM SPOOL (B)	1	50	SPRING	9	99	PLUG	2
7-c	VALVE	1	51	O RING	15	100	ADJUSTER SCREW	1
7-d	SPRING	1	52	CAP	5	101	HEXAGON NUT	1
7-e	O RING	1	53	O RING	1	102	PLUG	1
8	SPOOL (For straight travel)	1	54	O RING	5	103	O RING	1
9	SPOOL (For cat valve)	2	55	BUSHING	2	104	SPRING	1
10	SPOOL (For arm conflux valve)	1	56	O RING	6	105	SPRING	1
			57	PLUG	2	106	CAP	1
11	SPOOL (For boom conflux valve)	1	58	O RING	2	107	STOPPER	2
			59	FILTER	3	108	SPRING	2
12	O RING	2	60	RETAINER	3	109	SPRING	2
13	PLUG	9	61	ORIFICE	4	110	SPRING PIN	1
14	O RING	13	62	TRAVEL STRAIGHT VALVE CASING	1	111	O RING	1
15	O RING	13				112	BALL	1
16	SOCKET BOLT	4	63	SOCKET BOLT	3	113	BUSHING	2
17	SOCKET BOLT	4	64	BALL	4	114	SPRING	2
18	SOCKET BOLT	13	65	SHUTTLE VALVE	1	115	SPRING	2
19	SOCKET BOLT	3	66	SHUTTLE VALVE PLUG	2	116	SPRING SEAT	1
21	SCREW PLUG	35	67	SHUTTLE VALVE PLUG	1	117	SPRING SEAT	1
22	SCREW PLUG	8	68	SHUTTLE VALVE PLUG	1	118	SPRING	1
23	SPOOL END	2	69	O RING	5	119	SHUTTLE VALVE PLUG	1
24	SPOOL END	1	70	SPRING	1	120	POPPET ASS'Y	1set
25	SPRING SEAT	2	71-A	MAIN RELIEF VALVE ASS'Y (For travel)	2set			
26	SPRING SEAT	2						
27	SPRING SEAT	5	71-B	MAIN RELIEF VALVE ASS'Y(For attachment)	2set			
28	SPRING	2						
29	COVER	2	72	PORT RELIEF VALVE ASS'Y	6set			
30	COVER	3						
31	SPRING CASE	1	73	ANTI-CAVITATION VALVE ASS'Y	1set			
32	SEQUENCE VALVE	1						
33	O RING	6	74	CAP	1			
34	SOCKET BOLT	6	83	LOGIC VALVE	1			
35	SOCKET BOLT	3	85	SPRING	1			
36	SOCKET BOLT	2	86	POPPET	1			
37	O RING	4	87	SPRING	1			
38	DUST WIPER	4	89	SEQUENCE VALVE SPOOL	1			
39	OIL SEAL RETAINER	4	90					
40	SPRING	2		SPRING	1			

PILOT RELIEF VALVE

CONSTRUCTION





NO.	NAME	Q'TY
1.	BODY	1
2.	HOUSING	1
3.	POPPET	1
4.	PLUG	1
5.	SEAT	1
6.	O RING	1
7.	SPRING	1
8.	SET SCREW	1
9.	ADJUSTING SCREW	1
10.	LOCK NUT	1
11.	O RING	2
12.	CAP	1

Cross-sectional view of pilot relief valve

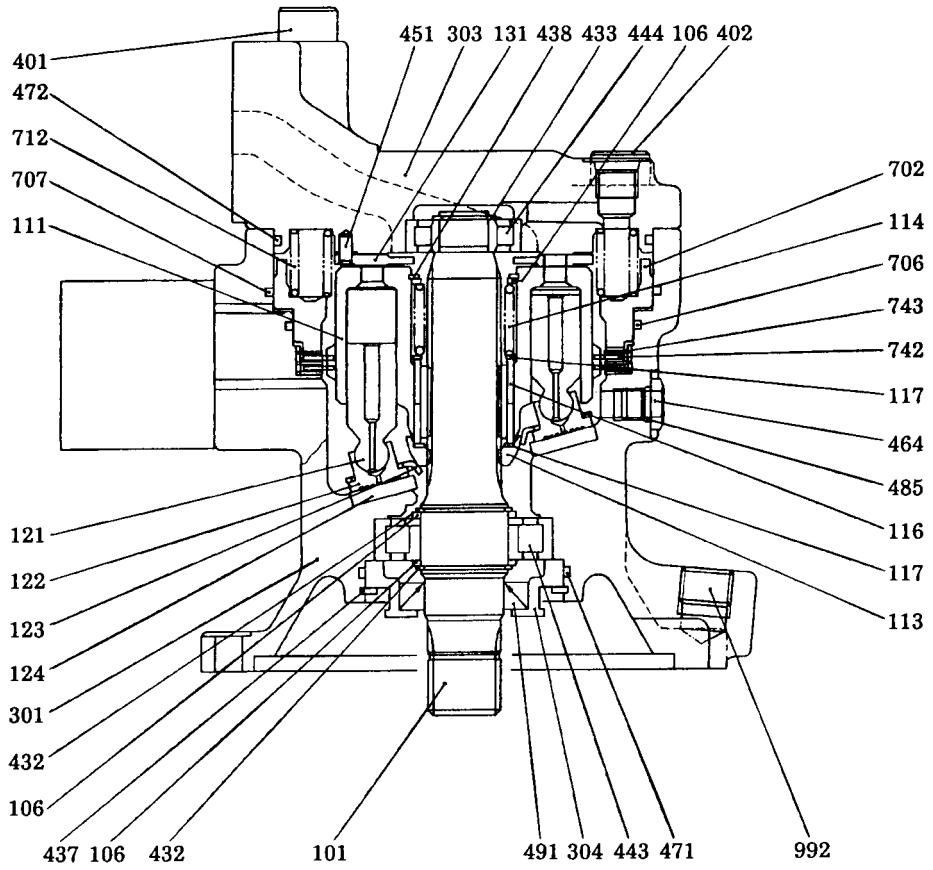
FUNCTION

Clearance is secured at the sliding surface between poppet (3) and housing (2) to allow free oil flow. Oil supplied from P port is conducted to chamber (C) through hole (S) of housing (2) and clearance at the sliding surface between the poppet and the housing. Spring force is strong enough that the poppet does not operate until the pressure in chamber (C) reaches at the relief valve set pressure. The moment the pressure in chamber (C) exceeds the cracking pressure, the hydraulic force becomes greater than the spring force, thereby detaching the poppet (3) from the seat of relief housing (2). Oil supplied from (P) port then flows from clearance between poppet and seat to tank port (T) through hole (S).

Displacement of poppet (3) is determined by flow rate and pressure. If the flow volume properly corresponds to the pressure, the pressure remains constant ; therefore the system pressure does not exceed the set pressure.

HYDRAULIC MOTOR (SWING)

CONSTRUCTION

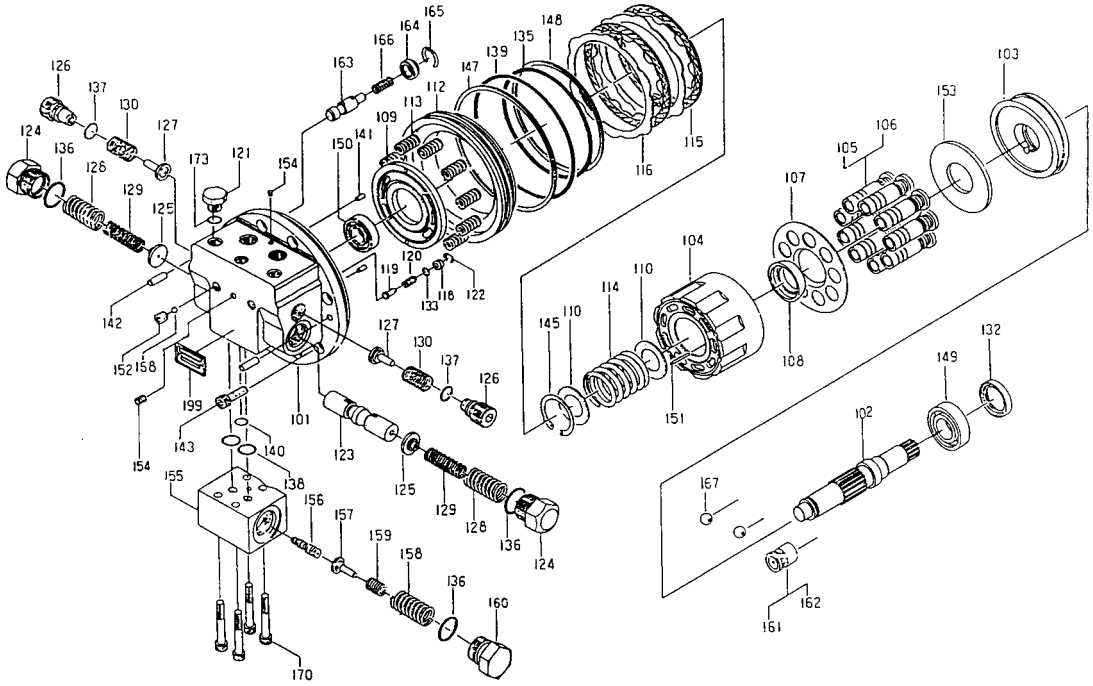


No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	DRIVE SHAFT	1	301	CASING	1	464	VP PLUG	1
106	BEARING SPACER	3	303	VALVE COVER	1	471	O RING	1
111	CYLINDER BLOCK	1	304	FRONT COVER	1	472	O RING	1
113	SPHERICAL BUSHING	1	401	SOCKET BOLT	2	485	O RING	1
114	CYLINDER SPRING	1	402	SOCKET BOLT	2	491	OIL SEAL	1
116	PUSH ROD	12	432	STOP RING	2	702	BRAKE PISTON	1
117	SPACER F	2	433	CIR CLIP (SNAP RING)	1	706	O RING	1
121	PISTON	9	437	LOCKING RING	1	707	O RING	1
122	SHOE	9	438	LOCKING RING	1	712	BRAKE SPRING	20
123	RETAINER PLATE	1	443	ROLLER BEARING	1	742	FRICTION PLATE	2
124	SHOE PLATE	1	444	ROLLER BEARING	1	743	SEPARATE PLATE	3
131	VALVE PLATE	1	451	PIN	2	992	PLUG	2

HYDRAULIC MOTOR (TRAVEL)

CONSTRUCTION

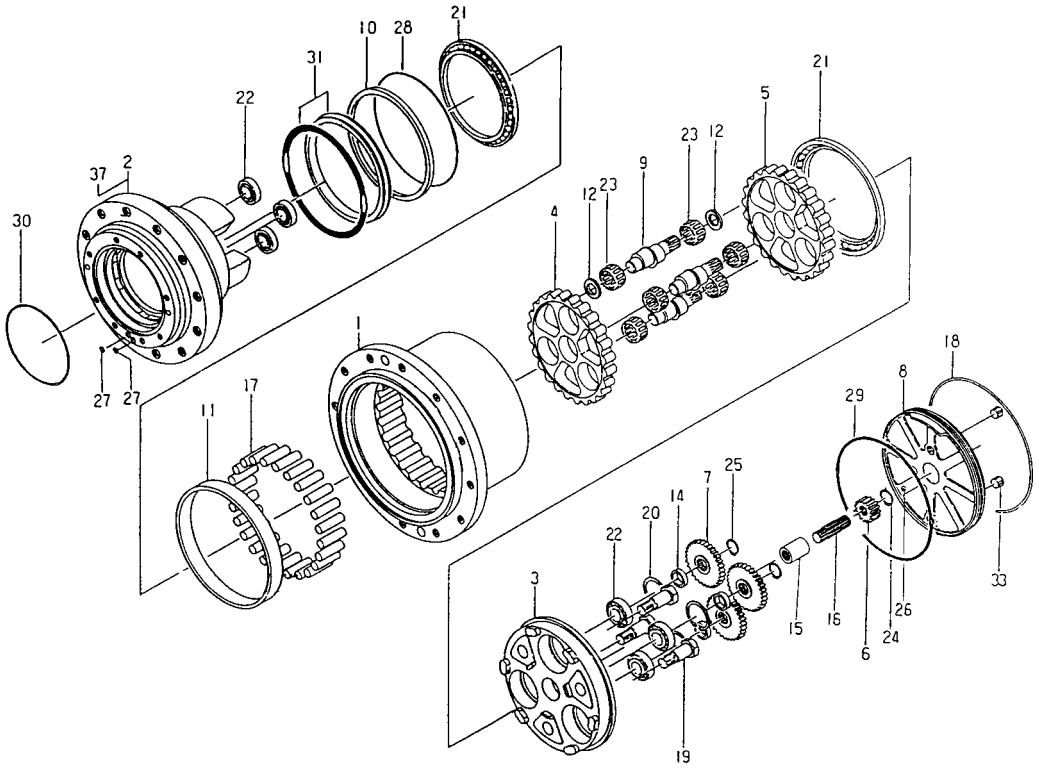
MOTOR



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	REAR FLANGE	1	125	SPRING RETAINER	2	151	NEEDLE ROLLER	3
102	DRIVE SHAFT	1	126	PLUG	2	152	PLUG	2
103	(SWASH) PLATE	1	127	ANTI-CAVITATION VALVE	2	153	THRUST PLATE	1
104	CYLINDER BLOCK	1	128	SPRING	2	154	EXPANDER	2
105	PISTON	1	129	SPRING	2	155	SURGE CUT VALVE	1
106	SHOE	1	130	SPRING	2	156	SPOOL	1
107	RETAINER PLATE	1	132	OIL SEAL	1	157	STOPPER	1
108	THRUST BALL	1	133	O-RING	1	158	SPRING	1
109	PLATE	1	135	O-RING	1	159	SPRING	1
110	WASHER	2	136	O-RING	3	160	PLUG	1
112	PISTON	1	137	O-RING	2	161	PISTON	1
113	SPRING	8	138	O-RING	2	162	SHOE	1
114	SPRING	1	139	O-RING	1	163	PILOT VALVE	1
115	PLATE (FRICTION PLATE)	2	140	O-RING	1	164	STOPPER	1
116	PLATE (COMPANION PLATE)	2	141	PARALLEL PIN	2	165	RING	1
118	VALVE SEAT	1	142	PARALLEL PIN	2	166	SPRING	1
119	VALVE	1	143	SOCKET BOLT	8	167	BALL	2
120	SPRING	1	145	SNAP RING	1	168	BALL	2
121	PLUG	1	147	BACKUP RING	1	170	SOCKET BOLT	4
122	RING	1	148	BACKUP RING	1	173	O-RING	1
123	BRAKE VALVE SPOOL	1	149	BEARING	1	199	NAME PLATE	1
124	PLUG	2	150	BEARING	1			

SK60

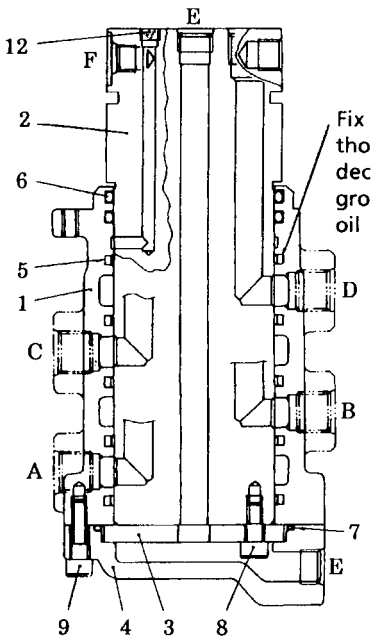
REDUCTION UNIT



No.	NAME	Q'ty	No.	NAME	Q'ty
1	HUB	1	18	RING	1
2	SPINDLE	1	19	REAMER BOLT	3
3	HOLD FLANGE	1	20	SNAP RING	3
4	RV GEAR A	1	21	BEARING	2
5	RV GEAR B	1	22	BEARING	6
6	INPUT GEAR	1	23	BEARING	6
7	SPAR GEAR	3	24	SNAP RING	1
8	COVER	1	25	SNAP RING	3
9	CRANK SHAFT	3	26	BALL	1
10	DISTANCE PIECE	1	27	O-RING	2
11	COLLAR	1	28	O-RING	1
12	SPACER	6	29	O-RING	1
14	DISTANCE PIECE	3	30	O-RING	1
15	COUPLING	1	31	FLOATING SEAL	1
16	SHAFT	1	33	PLUG	2
17	PIN	24	37	EXPANDER	1

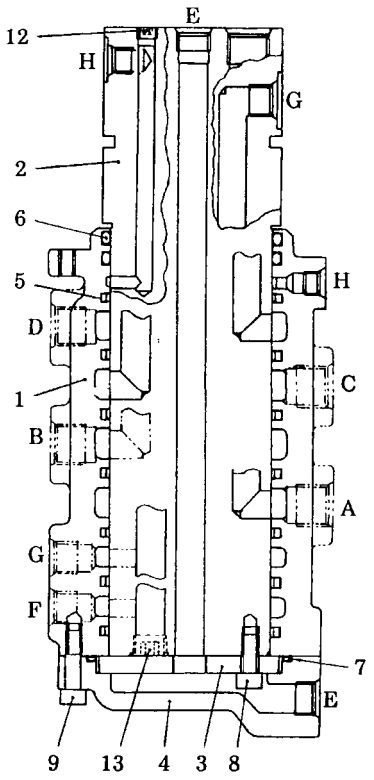
SWIVEL JOINT

• Spec. 1



☞ Tightening torque 3.1kgf·m (22 lbs) (8, 9)
Apply Locktite 290 to threads (the same Spec-2).

• Spec. 2



Cross-sectional view of swivel joint

No.	NAME	Q'ty Spec.1	Q'ty Spec.2	No.	NAME	Q'ty Spec.1	Q'ty Spec.2
1	BODY	1	1	7	O RING	1	1
2	STEM	1	1	8	SOCKET BOLT	2	2
3	THRUST PLATE	1	1	9	SOCKET BOLT	3	3
4	COVER	1	1	12	PLUG	1	1
5	SEAL ASS'Y	5	7	13	PLUG	—	2
6	O RING	2	2				

☞ Let us explain Spec. 1 (STD) hereinunder :

Main portion of the swivel joint consists of body (1) which rotates freely, swivel stem (2), thrust plate (3) which prevents disconnection of body and stem, cover (4) which closes one side of swivel body (1), slipper seal sets (5), which divide circuits, and Orings (6,7), which prevent external oil leakage.

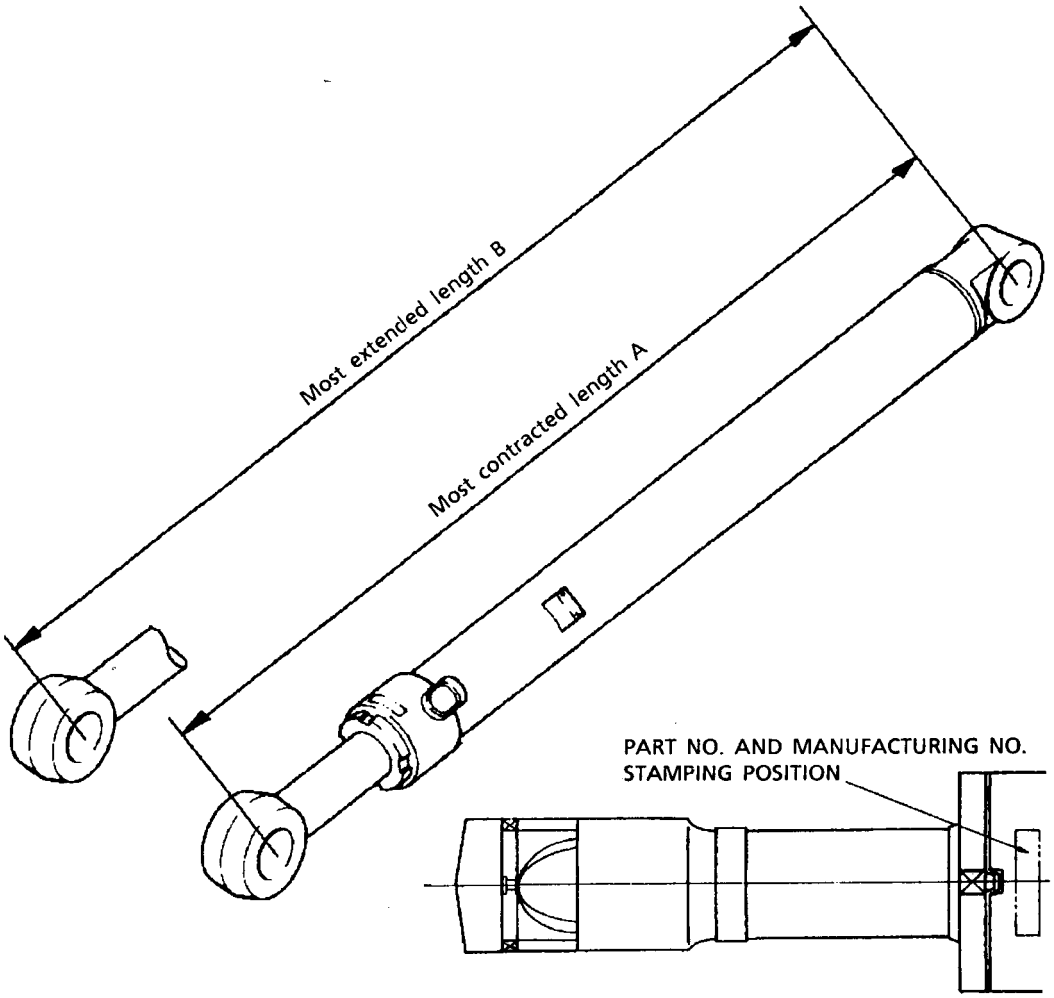
Four ports for the main circuits are provided on body (1) and stem (2), four oil passage grooves are machined on the inner face of the body (1), and seal sets (5) are provided at top and bottom of circumferential grooves.

Body (1) and stem (2) rotate freely. Oil from body (1) or stem (2) flows into stem (2) or body (1) through circumferential grooves between body (1) and stem (2) ; Oil flow is thus not obstructed by swiveling. Lubricating oil groove to drain port is also provided to prevent seizure of body (1) or stem (2) by swiveling.

With this construction, swivel joint assures circuit connection between the lower body and the revolving upper body.

HYDRAULIC CYLINDER

GENERAL VIEW



Outside view of cylinder

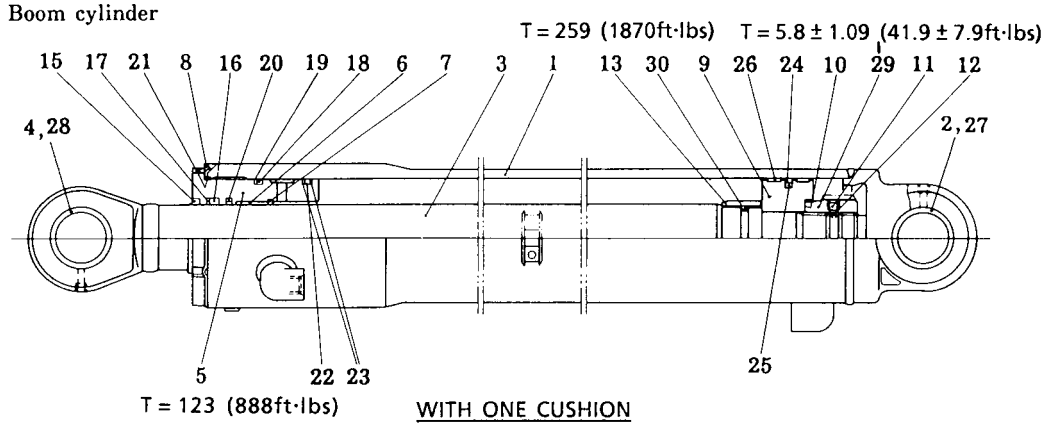
MAJOR SPECIFICATIONS

Unit : mm (ft-in)

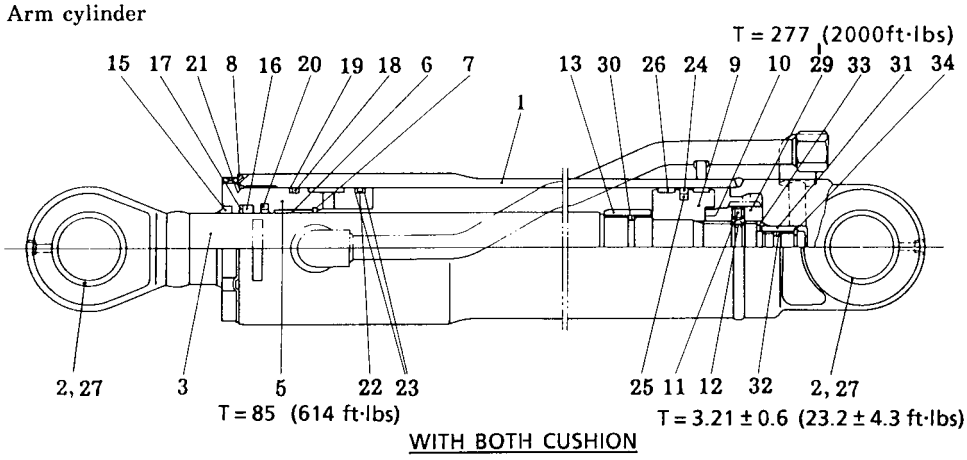
Cylinder	Cylinder bore / Rod Dia.	Stroke	Center-to-Center Distance of Pins Full extended B / Full contracted A	Cushion	Dry weight kg (lbs)
Boom	125 / 70 (4.92" / 2.76")	940 (37.0")	2305/ 1365 (7'6.7" / 4'5.7")	yes	110 (243)
Arm	110 / 65 (4.33" / 2.56")	900 (35.4")	2245 / 1345 (7'4.4" / 4'5")	yes	87 (192)
Bucket	95 / 60 (3.74" / 2.36")	725 (28.5")	1835 / 1110 (6'0.2" / 3'7.7")	No	58 (128)

CONSTRUCTION

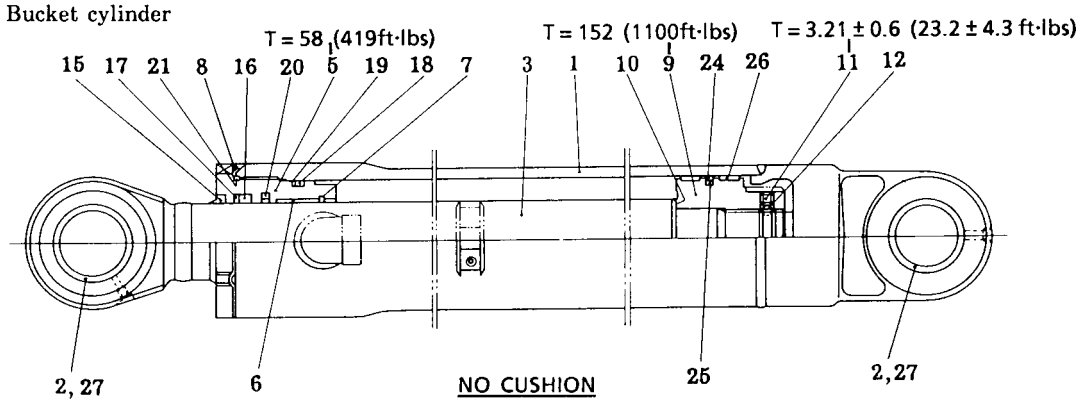
Boom cylinder



Arm cylinder



Bucket cylinder



Cross-sectional view of cylinder

☞ Coat the thread of the cylinder head with Three Bond 1901 (or equivalent).

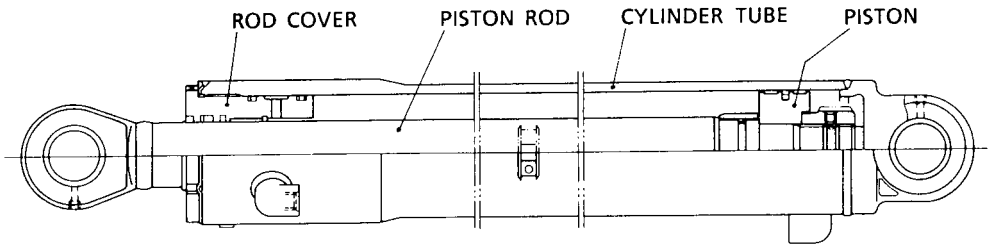
☞ Tightening torque T=kgf · m (Unit)

NO.	NAME	Quantity		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
1	CYLINDER TUBE	1	1	1
2	PIN BUSHING	2	2	2
3	PISTON ROD	1	1	1
4	PIN BUSHING	1	–	–
5	ROD COVER	1	1	1
6	BUSHING	1	1	1
7	SNAP RING	1	1	1
8	LOCK WASHER	1	1	1
9	PISTON	1	1	1
10	SHIM	1	1	1
11	SETSCREW	1	1	1
12	BALL	1	1	1
13	CUSHION BEARING	1	1	–
15	WIPER RING	1	1	1
16	U RING	1	1	1
17	BACKUP RING	1	1	1
18	O RING	1	1	1

NO.	NAME	Quantity		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
19	BACKUP RING	1	1	1
20	BUFFER RING	1	1	1
21	O RING	1	1	1
22	O RING	1	1	–
23	BACKUP RING	2	2	–
24	SEAL RING	1	1	1
25	O RING	1	1	1
26	SLIDE RING	2	2	2
27	WIPER RING	2	4	4
28	WIPER RING	2	–	–
29	NUT	1	1	–
30	CUSHION SEAL	1	1	–
31	CUSHION BEARING	–	1	–
32	CUSHION SEAL	–	1	–
33	SNAP RING	–	1	–
34	STOPPER	–	2	–

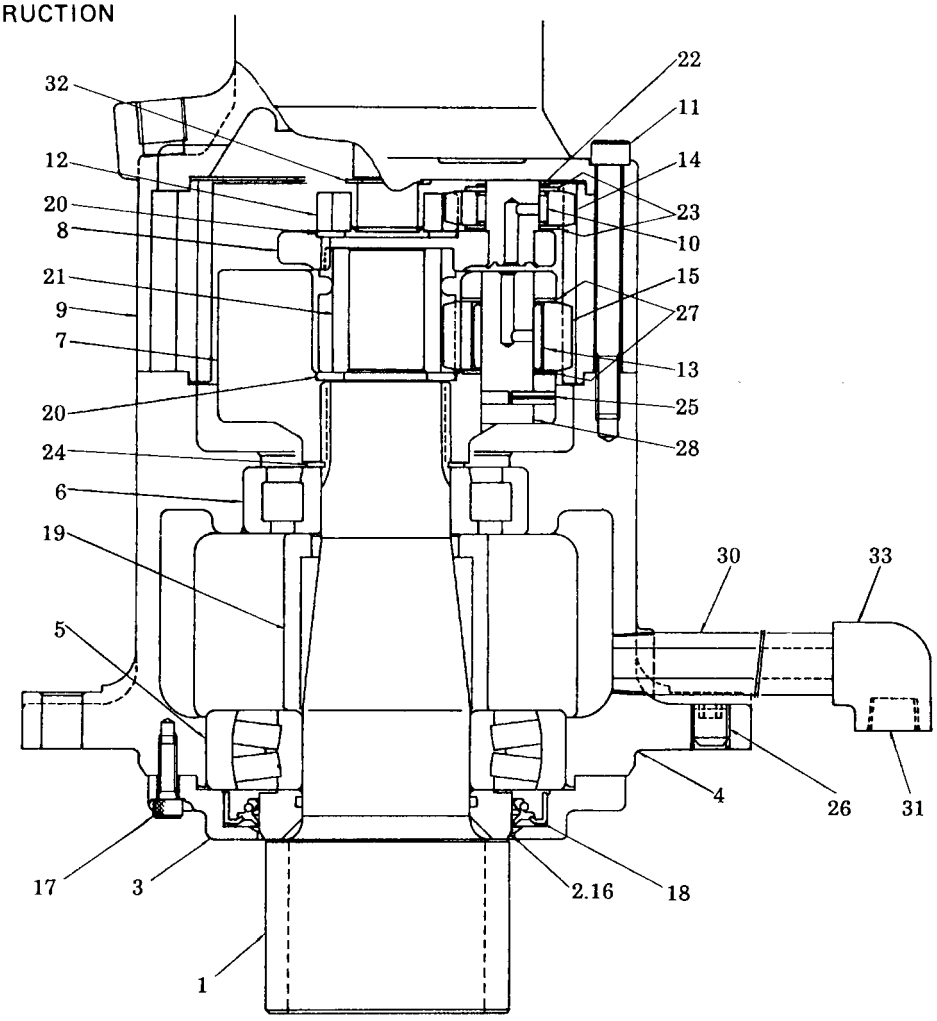
The hydraulic cylinder consists mainly of cylinder tube (1). piston (9) reciprocating in it, piston rod (3) taking cut the piston movement, and rod cover (5) acting as a lid and a guide. Cylinder tube (1) and piston rod (3) are provided with a pinmounting part (clevis), a trunnion or a flange for connection with other component.

Aside from these major parts, packings, seals or bushings are provided on the sliding areas between piston (9) and cylinder tube (1) piston rod (3) and rod cover (5) or cylinder tube (1) and rod cover (5).



REDUCTION UNIT (SWING)

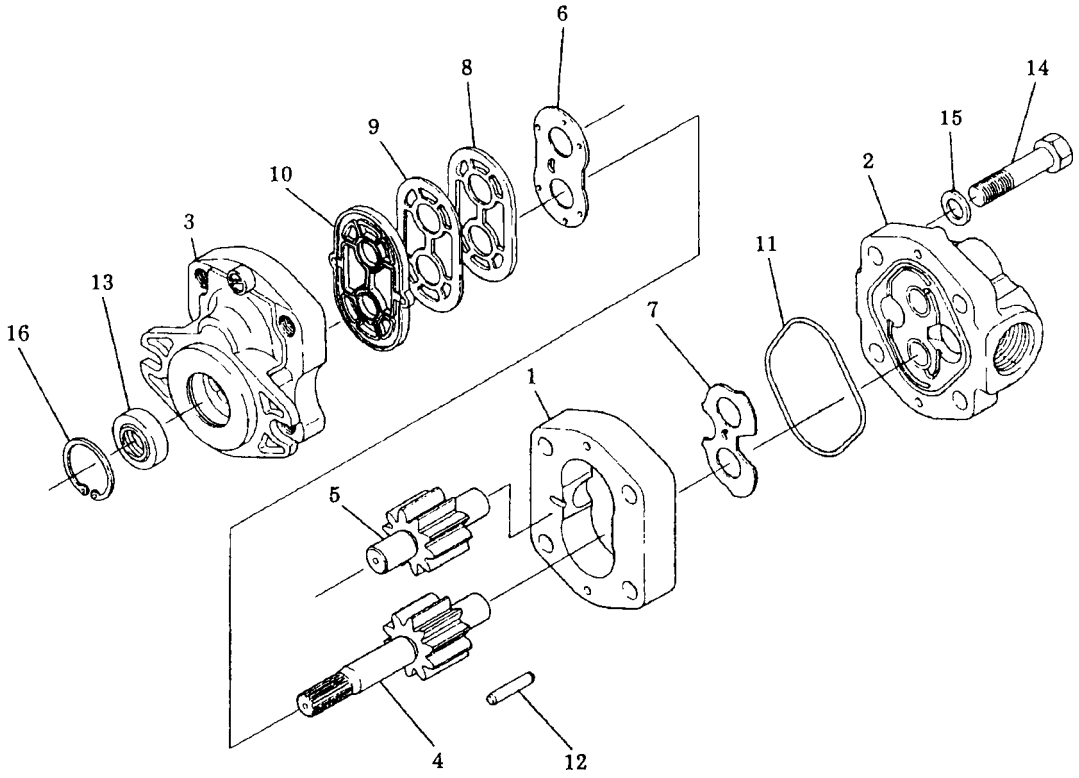
CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty
1	PINION SHAFT	1	17	CAPSCREW	8
2	SLEEVE	1	18	OIL SEAL	1
3	RETAINER	1	19	SPACER	1
4	HOUSING	1	20	SPACER	2
5	ROLLER BEARING	1	21	SUN GEAR	1
6	ROLLER BEARING	1	22	SNAP RING	3
7	SPIDER	1	23	THRUST WASHER	6
8	SPIDER ASS'Y	1	24	SNAP RING	1
9	INTERNAL GEAR	1	25	SPRING PIN	4
10	NEEDLE BEARING	3	26	SET SCREW	2
11	CAPSCREW	8	27	THRUST WASHER	8
12	SUN GEAR	1	28	SHAFT	4
13	NEEDLE BEARING	4	30	PIPE	1
14	PLANETARY PINION	3	31	PLUG	1
15	PLANETARY PINION	4	32	SNAP RING	1
16	O RING	1	33	ELBOW	1

HYDRAULIC GEAR PUMP

CONSTRUCTION



Right (Clockwise) Revolution Type

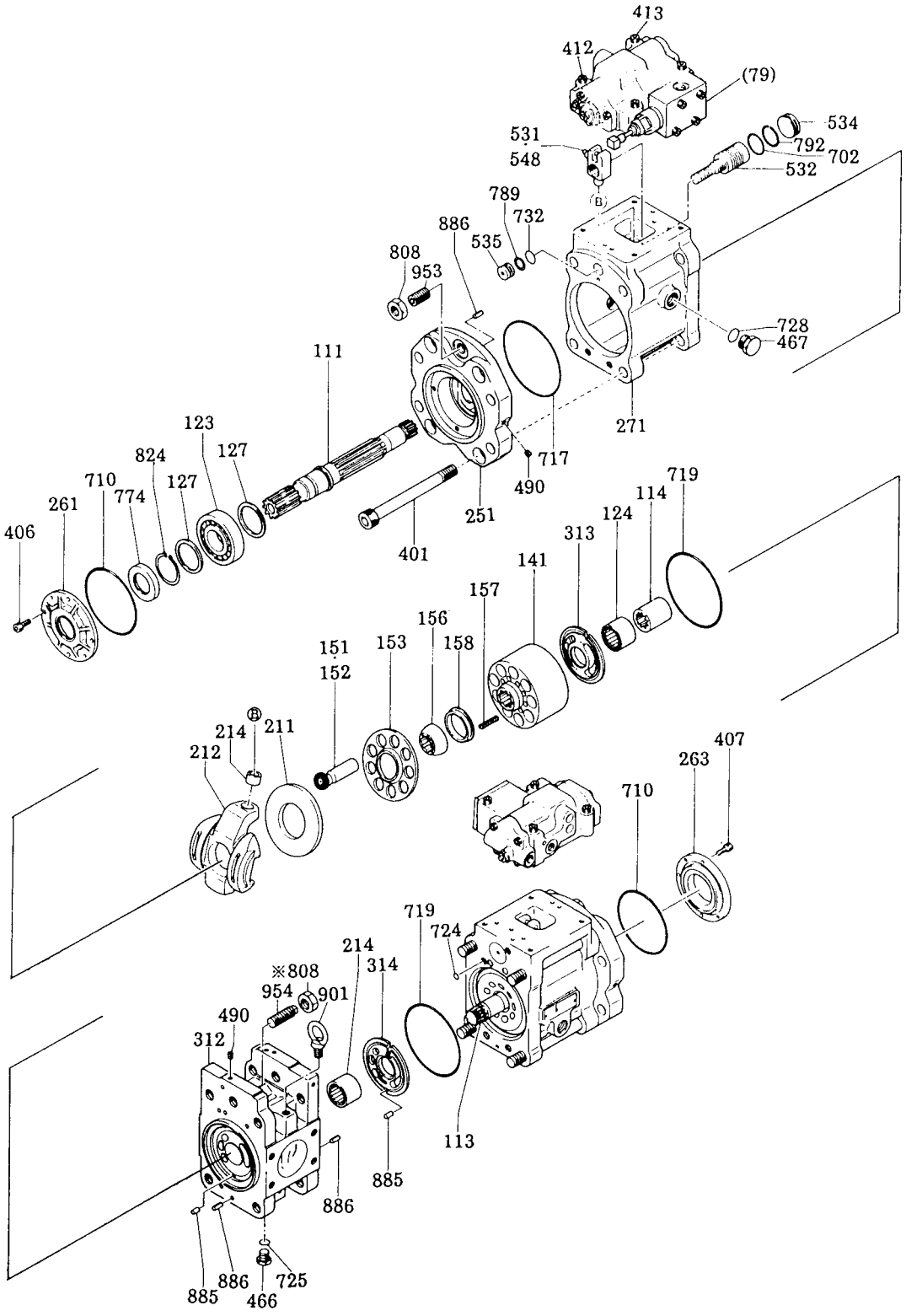
No.	Port name	Q'ty	No.	Port name	Q'ty
1	GEAR PLATE	1	9	GASKET B	1
2	COVER	1	10	BALANCE SEAL	1
3	MOUNTING FLANGE	1	11	O RING	1
4	DRIVE GEAR	1	12	DOWEL PIN	2
5	DRIVEN GEAR	1	13	OIL SEAL	1
6	SIDE PLATE A	1	14	BOLT	4
7	AIDE PLATE B	1	15	WASHER	1
8	GASKET A	1	16	SNAP RING	1

The casing consists of the gear plate (1), cover (2) ,and mounting flange (3). Incorporated in the casing are a pair of gears-drive gear (4) and driven gear(5)– and bushings supporting the gears. that are press fitted into the cover and the routing flange. On the side of the mounting flange are incorporated a pair of side plates-side plates A (6) and B (7)–that seal off the leakfrom the side face of the gears, balance seal (10),gasket A(8) and gasket B(9) that form pressure compensation chamber.

In order to prevent oil leakage outside,an O ring (11) is provided to the cover (2) while the oil seal (13) and the balance seal (10) are used in the mounting flange (3)

HYDRAULIC PUMP

CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
111	DRIVE SHAFT (F)	1	271	PUMP CASING	2	724	O RING	18
113	DRIVE SHAFT (R)	1	312	VALVE BLOCK	1	725	O RING	2
114	SPLINE COUPLING	1	313	VALVE PLATE (R)	1	728	O RING	3
123	ROLLER BEARING	2	314	VALVE PLATE (L)	1	732	O RING	2
124	NEEDLE BEARING	2	401	SOCKET BOLT	8	774	OIL SEAL	1
127	BEARING SPACER	4	406	SOCKET BOLT	4	789	BACK UP RING	2
141	CYLINDER BLOCK	2	407	SOCKET BOLT	4	792	BACK UP RING	2
151	PISTON	18	466	VP PLUG	2	808	NUT	4
152	SHOE	18	467	VP PLUG	3	824	STOP RING	2
153	RETAINER	2	490	PLUG	15	885	VALVE PLATE PIN	2
156	SPHERICAL BUSH	2	531	TILTING PIN	2	886	SPRING PIN	4
157	CYLINDER SPRING	18	532	SERVO PISTON	2	901	EYE BOLT	2
158	SPACER	2	534	STOPPER (L)	2	953	SOCKET BOLT	2
211	SHOE PLATE	2	535	STOPPER (S)	2	954	STOP SCREW	2
212	SWASH PLATE	2	548	FEED BACK PIN	2	(79)	ELECTROMAGNETIC PROPORTIONATE PRESSURE REDUCING VALVE	1set
214	TILTING BUSH	2	702	O RING	2			
251	SWASH PLATE SUPPORT	2	710	O RING	2	(412)	SOCKET BOLT	2
261	SEAL COVER (F)	1	717	O RING	2	(413)	SOCKET BOLT	2
263	REAR COVER	1	719	O RING	2			

□ The numbers in the triangles indicate adjust screws. Do not tamper with the adjust screwe as much as possible.

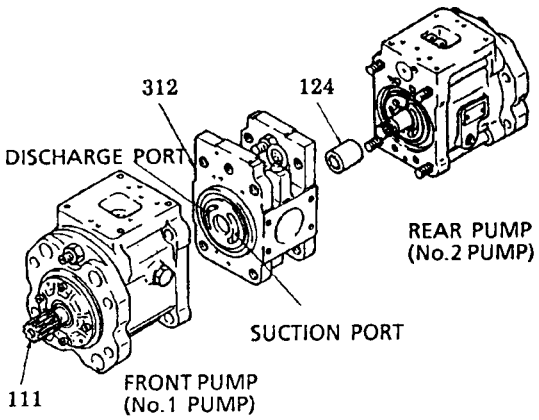
This pump assy consists of two pumps connected by spline joint (124).The two pumps can be driven concurrentlyas the rotation of the prime mover is transferred by the drive shaft (F) (111) on the front side The suction and discharge ports are integrated at the connecting part of the two pumps. i.e. in valve block(312). The section port serves for both the front pump and the rear pump.

FUNCTION

The pumps may be classified roughly into the rotary group performing a rotary motion and working as the major part of the whole pump function : the swash plate group that varies the delivery rates : and the valve cover group that changes over oil suction and discharge.

(1) Rotary Group

The rotary group consists of drive shaft(F)(111), cylinder block (141), piston shoes (151, 152), retainer (153), spherical bush (156), spacer (158) and cylinder spring (157). The drive shaft is supported by bearings (123, 124) at its both ends. The shoe is caulked to the piston to form

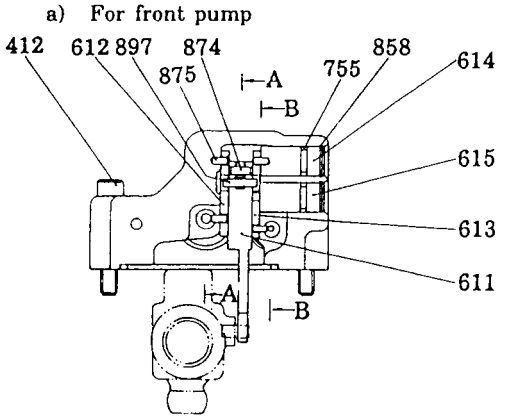


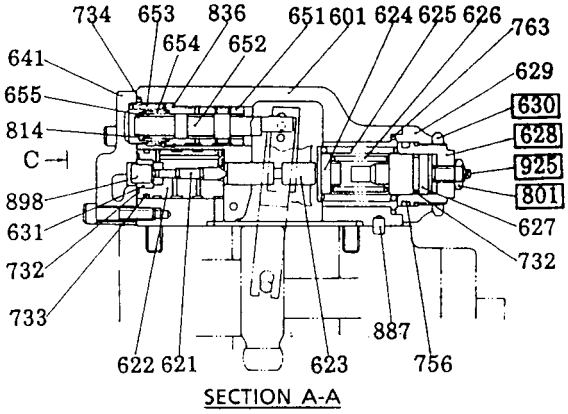
REGULATOR

CONSTRUCTION

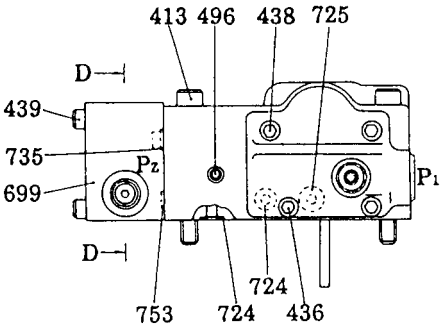
INNER CONSTRUCTION

a) For front pump

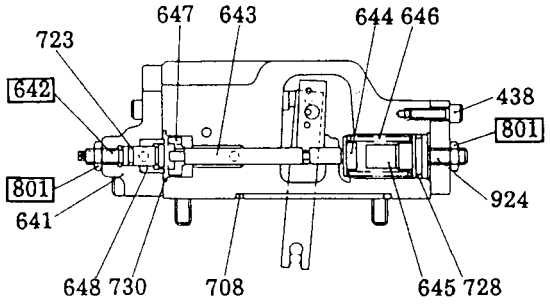




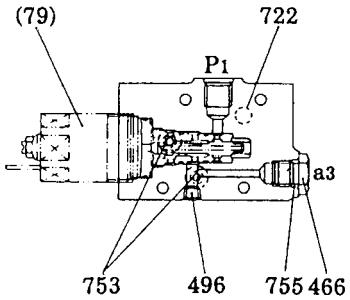
SECTION A-A



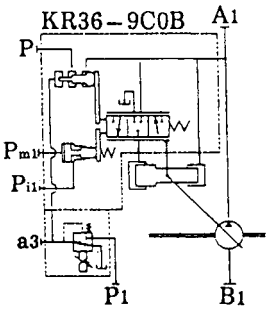
VIEW C



SECTION B-B



SECTION D-D



Cross section

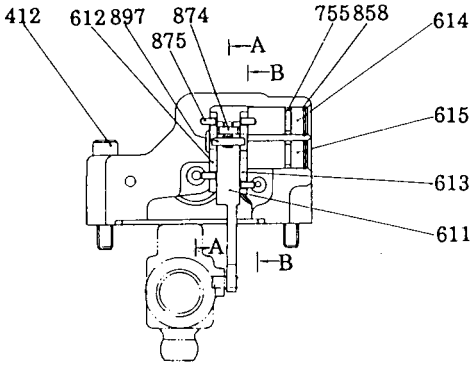
HYDRAULIC CIRCUIT DIAGRAM

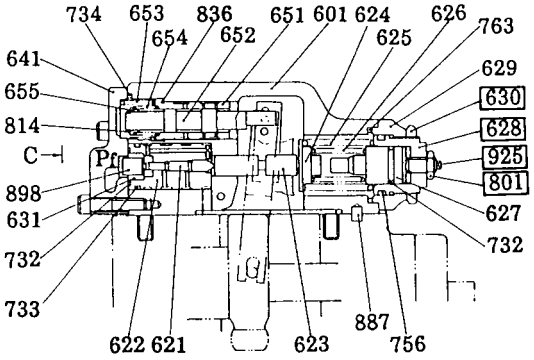
NO.	NAME	Q'ty	NO.	NAME	Q'ty	NO.	NAME	Q'ty
(79)	ELECTROMAGNETIC PROPORTIONATE PRESSURE REDUCING VALVE	1	601	CASING	1	623	COMPENSATING ROD	1
412	SOCKET BOLT	2	611	FEED BACK LEVER	1	624	SPRING SEAST (C)	1
413	SOCKET BOLT	2	612	LEVER (1)	1	625	OUTER SPRING	1
436	SOCKET BOLT	2	613	LEVER (2)	1	626	INNER SPRING	1
438	SOCKET BOLT	6	614	FULCRUM PLUG	1	627	ADJUST RING (C)	1
439	SOCKET BOLT	4	615	ADJUST PLUG	1	628	ADJUST SCREW (C)	1
466	VP PLUG	1	621	COMPENSATING PISTON	1	629	COVER (C)	1
496	INTER PLUG	6	622	PISTON CASE	1	630	LOCK NUT	1

NO.	NAME	Q'ty	NO.	NAME	Q'ty	NO.	NAME	Q'ty
631	PF SLEEVE	1	656	COVER	1	756	O RING	1
641	PILOT COVER	1	708	O RING	1	763	O RING	1
642	ADJUST SCREW (QMC)	1	722	O RING	1	801	HEXAGON NUT	3
643	PILOT PISTON	1	723	O RING	1	814	STOP RING	1
644	SPRING SEAT (Q)	1	724	O RING	9	836	CIRCLIP	1
645	ADJUST RING (Q)	1	725	O RING	1	858	LOCKING RING	2
646	PILOT SPRING	1	728	O RING	1	874	PIN	1
647	STOPPER	1	730	O RING	1	875	PIN	4
648	PISTON (QMC)	1	732	O RING	2	887	PIN	1
651	SLEEVE	1	733	O RING	1	897	PIN	1
652	SPOOL	1	734	O RING	1	898	PIN	1
653	SPRING SEAT	1	735	O RING	1	924	SOCKET BOLT	1
654	RETURN SPRING	1	753	O RING	2	925	ADJUST SCREW (QI)	1
655	SET SPRING	1	755	O RING	3			

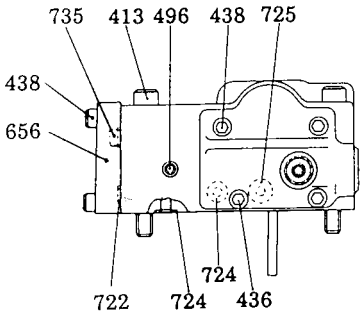
□ The numbers in the triangles indicate adjust screws. Do not tamper with the adjust screws as much as possible.

(b) For rear pump

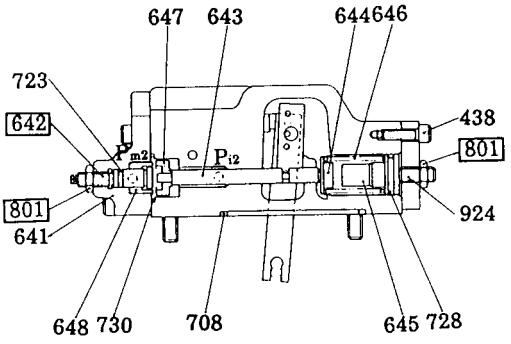




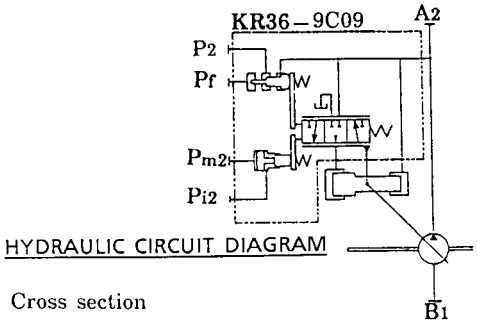
SECTION A-A



VIEW C



SECTION B-B



HYDRAULIC CIRCUIT DIAGRAM

Cross section

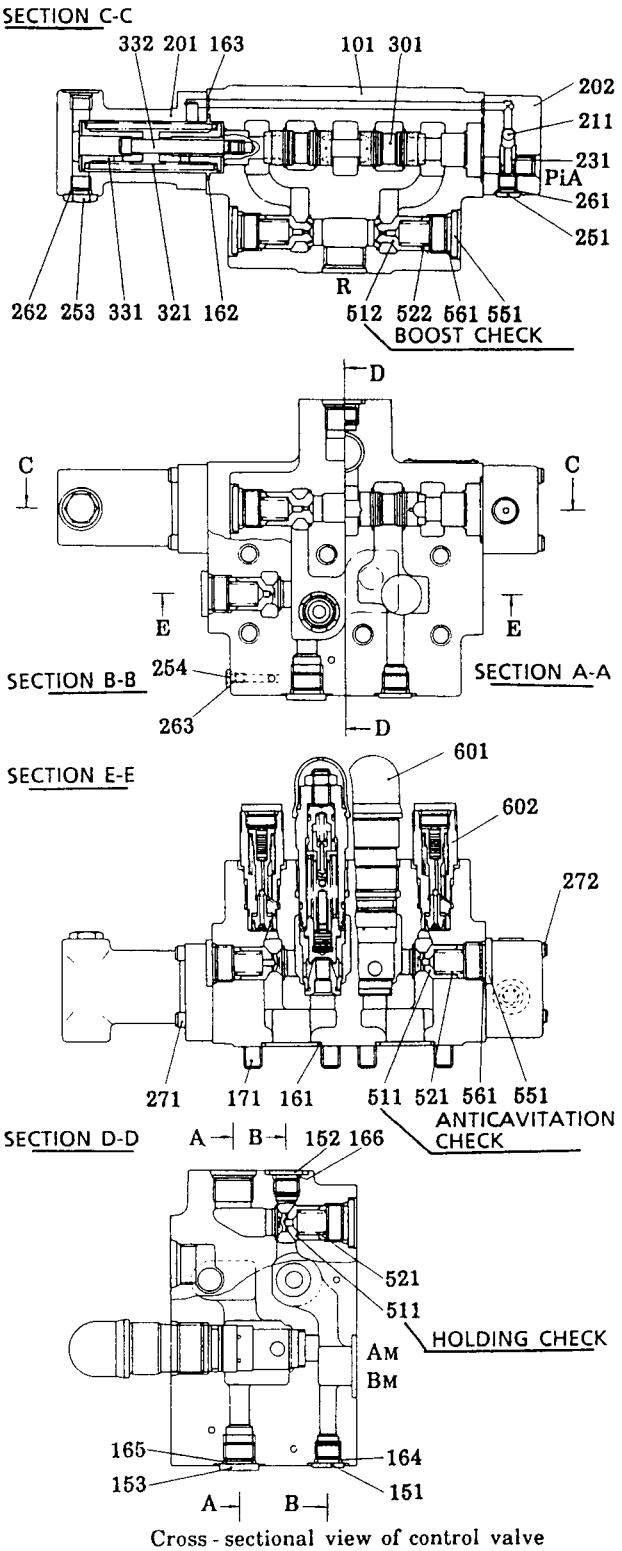
NO.	NAME	Q'ty	NO.	NAME	Q'ty	NO.	NAME	Q'ty
(79)	ELECTROMAGNETIC PROPORTIONATE PRESSURE REDUCING VALVE	1set	629	COVER (C)	1	730	O RING	1
			630	LOCK NUT	1	732	O RING	2
			631	Pf SLEEVE	1	733	O RING	1
412	SOCKET BOLT	2	641	PILOT COVER	1	734	O RING	1
413	SOCKET BOLT	2	642	ADJUST SCREW (QMC)	1	735	O RING	1
436	SOCKET BOLT	2	643	PILOT PISTON	1	753	O RING	2
438	SOCKET BOLT	6	644	SPRING SEAT (Q)	1	755	O RING	2
439	SOCKET BOLT	4	645	ADJUST RING (Q)	1	756	O RING	1
496	INTER PLUG	7	646	PILOT SPRING	1	763	O RING	1
601	CASING	1	647	STOPPER	1	801	HEXAGON NUT	3
611	FEED BACK LEVER	1	648	PISTON (QMC)	1	814	STOP RING	1
612	LEVER (1)	1	651	SLEEVE	1	836	CIRCLIP	1
613	LEVER (2)	1	652	SPOOL	1	858	LOCKING RING	2
614	FULCRUM PLUG	1	653	SPRING SEAT	1	874	PIN	1
615	ADJUST PLUG	1	654	RETURN SPRING	1	875	PIN	4
621	COMPENSATING PISTON	1	655	SET SPRING	1	887	PIN	1
622	PISTON CASE	1	699	VALVE CASING	1	897	PIN	1
623	COMPENSATING ROD	1	708	O RING	1	898	PIN	1
624	SPRING SEAT (C)	1	722	O RING	2	924	SOCKET HEAD CAPSCREW	1
625	OUTER SPRING	1	723	O RING	1			
626	INNER SPRING	1	724	O RING	9	925	ADJUST SCREW (QI)	1
627	ADJUST RING (C)	1	725	O RING	1			
628	ADJUST SCREW (C)	1	728	O RING	1			

△ The numbers in the triangles indicate adjust screws. Do not tamper with the adjust screws as much as possible.

CONTROL VALVE (SWING)

CONSTRUCTION

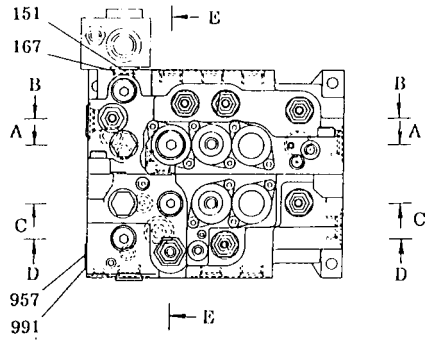
No.	NAME	Q'ty
101	CASING	1
151	PLUG	2
152	PLUG	1
153	PLUG	1
161	O RING	2
162	O RING	2
163	O RING	2
164	O RING	2
165	O RING	1
166	O RING	1
171	SOCKET BOLT	6
201	SPRING COVER	1
202	VALVE SHUTTLE COVER	1
211	BALL	1
231	SEAT	1
251	PLUG	1
253	PLUG	1
254	PLUG	8
261	O RING	1
262	O RING	1
263	O RING	8
271	SOCKET BOLT	4
272	SOCKET BOLT	4
301	SPOOL	1
321	SPRING	1
331	SPRING SEAT	2
332	SPACER BOLT	1
511	POPPET 1	3
512	POPPET 2 (BOOST)	2
521	SPRING 1	3
522	SPRING 2	2
551	PLUG	5
561	O RING	5
601	RELIEF VALVE	2
602	SWING-SHOCKLESS VALVE	2

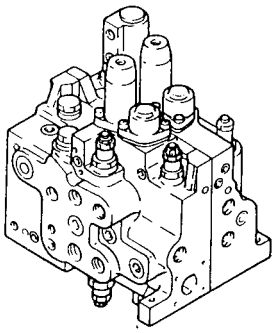


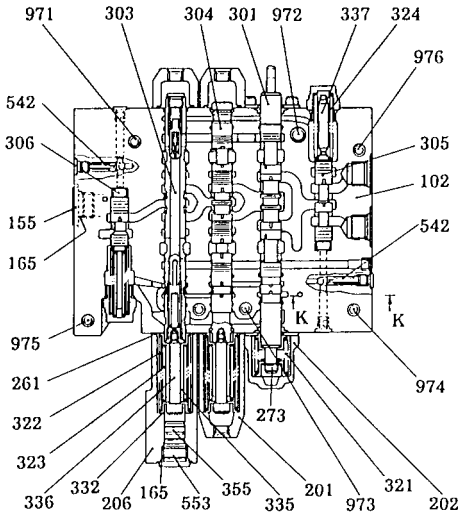
Cross - sectional view of control valve

CONTROL VALVE

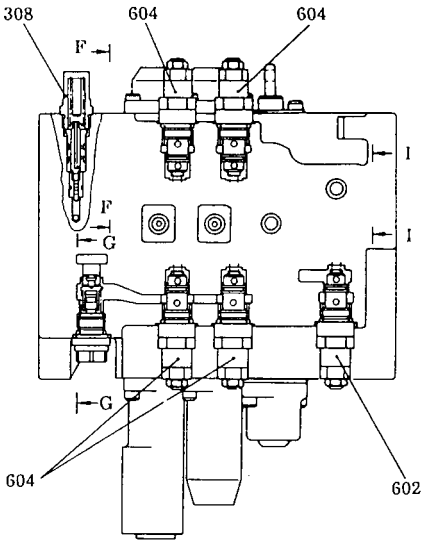
CONSTRUCTION



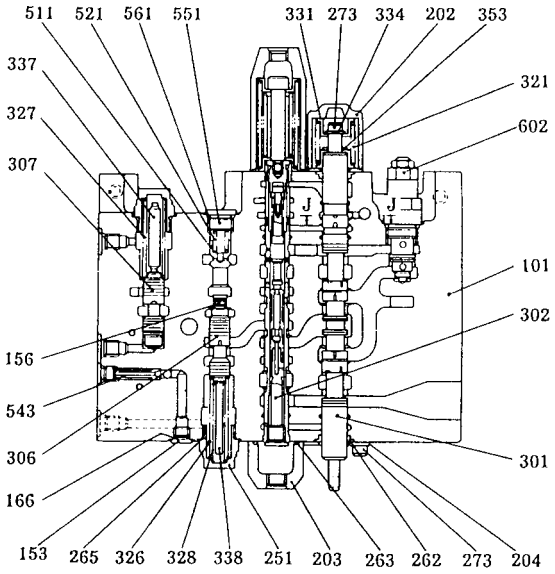




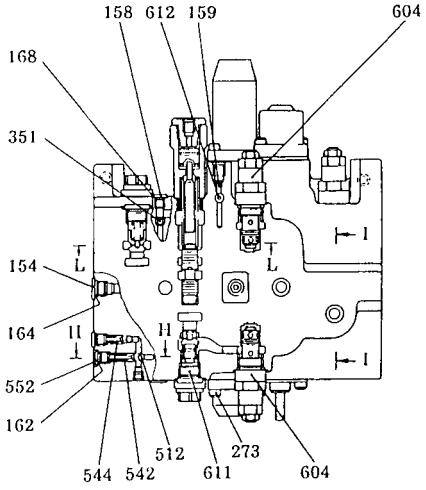
SECTION A-A



SECTION B-B

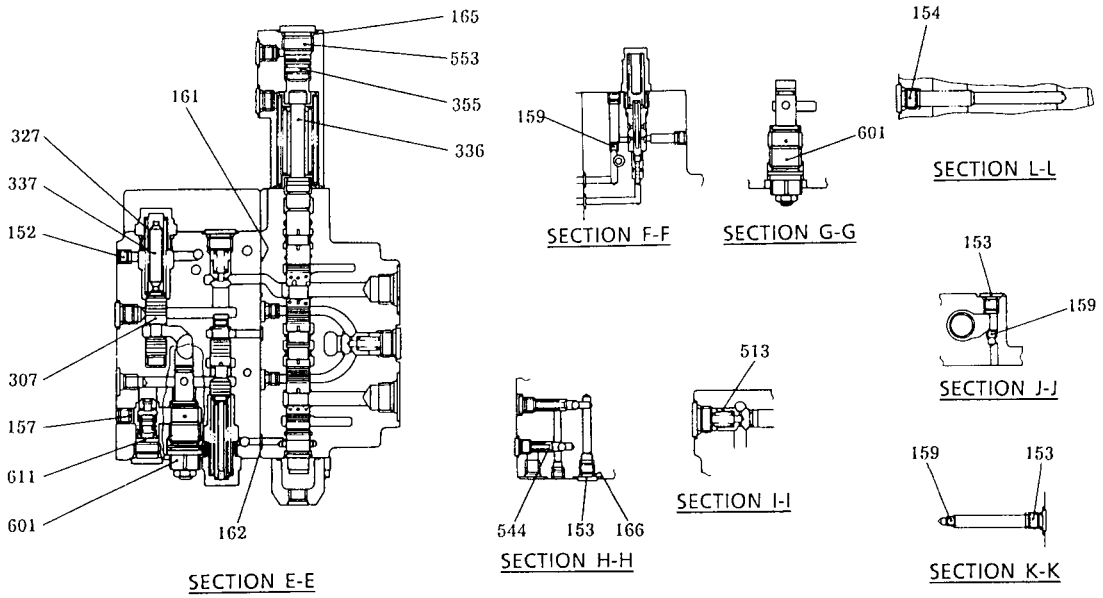


SECTION C-C



SECTION D-D

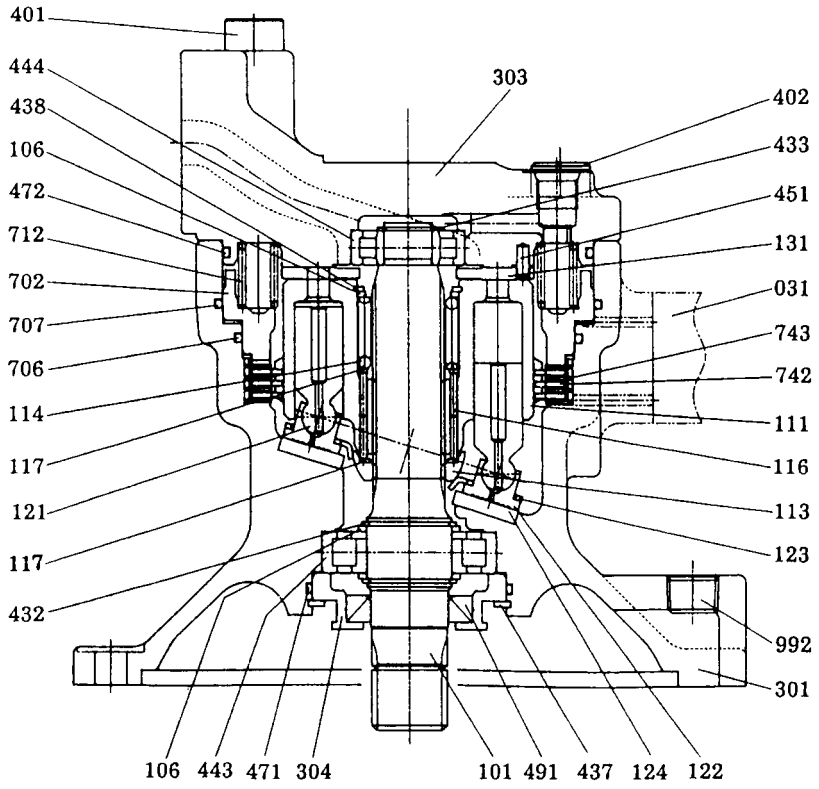
SK100 SK120 SK120LC



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	CASING A	1	273	SOCKET BOLT	22	355	PISTON	1
102	CASING B	1	301	SPOOL JM (TRAVEL)	2	511	POPPET	8
151	PLUG	1	302	SUB-SPOOL (ARM)	1	512	BALL	6
152	PLUG	22	303	SUB-SPOOL (BOOM)	1	513	POPPET	1
153	PLUG	8	304	BUCKET SPOOL	1	521	SPRING	9
154	PLUG	7	305	SPOOL (TRAVEL PREFERENTIAL)	1	542	SEAT	3
155	PLUG	2				543	SEAT	1
156	PLUG	1	306	SPOOL (BYPASS CUT)	2	544	SEAT	2
157	PLUG	2	307	SPOOL (BOOM & ARM CONFLUENT)	2	551	PLUG	11
158	PLUG	5				552	PLUG	13
159	ORIFICE	4	308	ARM CONFLUENT SEQUENCERIB	1	553	PLUG	1
161	O RING	7				561	O RING	11
162	O RING	27	321	SPRING	2	601	MAIN RELIEF VALVE	2
164	O RING	7	322	SPRING	3	602	TRAVEL RELIEF VALVE	2
165	O RING	3	323	SPRING	3	604	PORT RELIEF VALVE	6
166	O RING	8	324	SPRING	1	611	NEGATIVE CONTROL RELIEF VALVE	2
167	O RING	1	326	SPRING	2			
168	O RING	5	327	SPRING	2	612	POPPET	1
201	SPRING COVER	2	328	SPRING	2	957	SCREW	2
202	COVER (TRAVEL)	2	331	SPRING SEAT	4	971	SOCKET BOLT	1
203	SPOOL COVER	3	332	SPRING SEAT	6	972	SOCKET BOLT	1
204	PLATE	4	334	WASHER	2	973	SOCKET BOLT	2
206	COVER (BOOM)	1	335	STOPPER	3	974	SOCKET BOLT	1
251	PLUG	5	336	BOLT SPACER	3	975	SOCKET BOLT	1
261	O RING	3	337	ROD	3	976	SOCKET BOLT	1
262	PACKING	4	338	ROD	2	991	NAME PLATE	1
263	O RING	3	351	ORIFICE	1			
265	O RING	5	353	SHIM	2			

HYDRAULIC MOTOR (SWING)

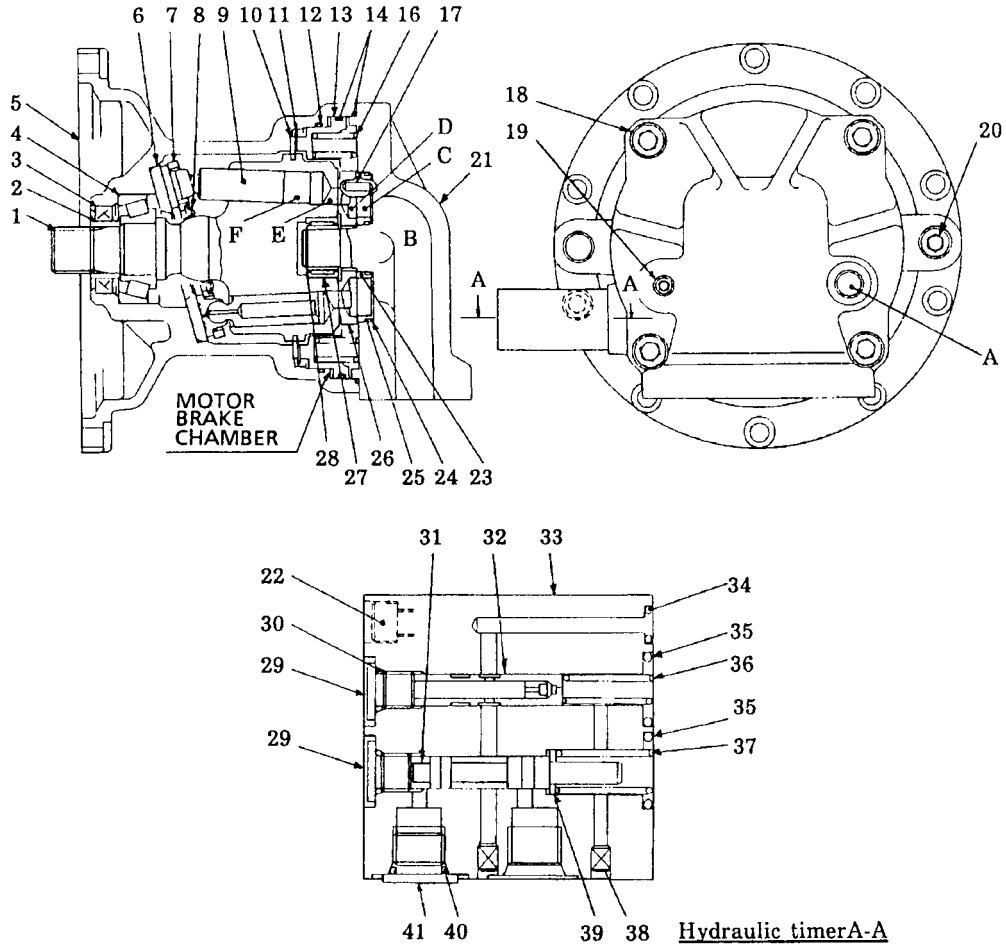
CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
101	DRIVE SHAFT	1	301	CASING	1	471	O RING	1
106	BEARING SPACER	3	303	VALVE COVER	1	472	O RING	1
111	CYLINDER BLOCK	1	304	FRONT COVER	1	491	OIL SEAL	1
113	SPHERICAL BUSHING	1	401	SOCKET BOLT	2	702	BRAKE PISTON	1
114	CYLINDER SPRING	1	402	SOCKET BOLT	2	706	O RING	1
116	PUSH ROD	12	432	STOP RING	2	707	O RING	1
117	SPACER F	2	433	SNAP RING	1	712	BRAKE SPRING	20
121	PISTON	9	437	LOCKING RING	1	742	FRICTION PLATE	3
122	SHOE	9	438	LOCKING RING	1	743	SEPARATE PLATE	4
123	RETAINER PLATE	1	443	ROLLER BEARING	1	992	PLUG	2
124	SHOE PLATE	1	444	ROLLER BEARING	1	031	BRAKE SELECTOR VALVE	1
131	VALVE PLATE	1	451	PIN	2			

HYDRAULIC MOTOR (SWING)

CONSTRUCTION

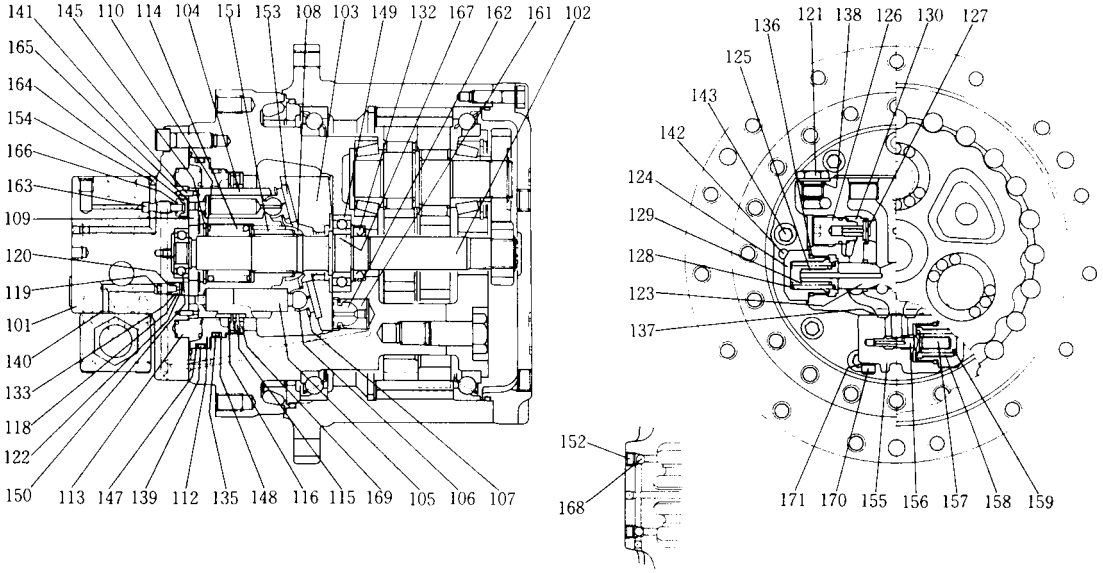


Cross-sectional view of swing motor

NO.	NAME	Q'TY	NO.	NAME	Q'TY	NO.	NAME	Q'TY
1	CYLINDER ASSY	1	16	SPRING	20	30	O RING	1
2	INNER RACE	1	17	PIN	2	31	SPOOL	1
3	OIL SEAL	1	18	SOCKET BOLT	4	32	POPPET ASSY	1
4	TAPER ROLLER BEARING	1	19	PLUG	1	33	MANIFOLD	1
5	HOUSING	1	20	PLUG	1	34	O RING	1
6	CAM PLATE	1	21	COVER	1	35	O RING	2
7	RETURN PLATE	1	22	SOCKET BOLT	3	36	SPRING	1
8	RECEIVER SPRING	1	23	BUSHING	4	37	SPRING	1
9	PISTON ASSY	9	24	FLAT SPRING	4	38	PLUG	2
10	FRICTION PLATE	1	25	TEFLON RING	4	39	STOPPER	1
11	COMPANION PLATE	1	26	BALANCE PLATE	1	40	O RING	1
12	O RING	1	27	NEEDLE BEARING	1	41	CAP	1
13	PISTON	1	28	SNAP RING	1			
14	O RING	2	29	CAP	2			

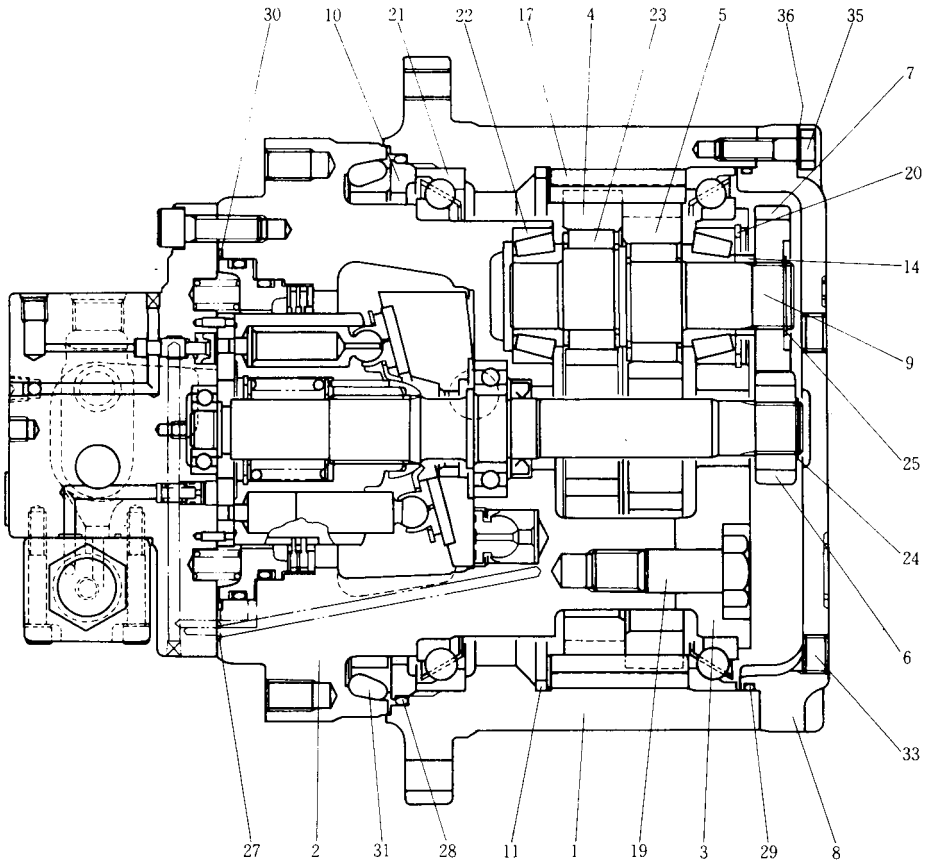
HYDRAULIC MOTOR (TRAVEL)

CONSTRUCTION
MOTOR



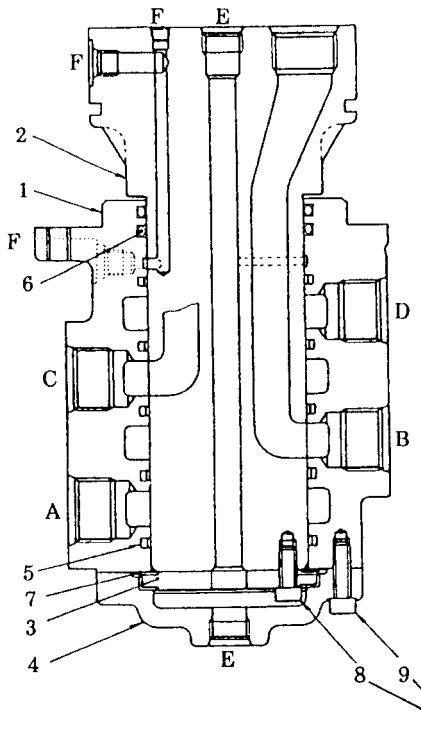
101.	FLANGE	126.	PLUG	152.	PLUG
102.	SHAFT	127.	VALVE	153.	THRUST PLATE
103.	SHOE PLATE	128.	SPRING	154.	EXPANDER
104.	CYLINDER BLOCK	129.	SPRING	155.	BODY
105.	PISTON	130.	SPRING	156.	SPOOL
106.	SHOE	132.	OIL SEAL	157.	STOPPER
107.	RETAINER PLATE	133.	O RING	158.	SPRING
108.	THRUST BALL	135.	O RING	159.	SPRING
109.	VALVE PLATE	136.	O RING	161.	PISTON
110.	WASHER	137.	O RING	162.	SHOE
112.	PISTON	138.	O RING	163.	VALVE
113.	SPRING	139.	O RING	164.	STOPPER
114.	SPRING	140.	O RING	165.	RING
115.	FRICTION PLATE	141.	PIN	166.	SPRING
116.	PLATE	142.	PIN	167.	BALL
118.	VALVE SEAL	143.	SOCKET BOLT	168.	BALL
119.	VALVE	145.	SNAP RING	169.	PLATE
120.	SPRING	147.	BACKUP RING	170.	SOCKET BOLT
121.	PLUG	148.	BACKUP RING	171.	LOCK WASHER
122.	RING	149.	RADIAL CONTACT ROLLER BEARING		
123.	SPOOL	150.	RADIAL CONTACT ROLLER BEARING		
124.	PLUG	151.	NEEDLE BEARING		
125.	STOPPER	151.	NEEDLE BEARING		

REDUCTION UNIT



1. INTERNAL GEAR
2. SPINDLE
3. FLANGE
4. PINION (A)
5. PINION (B)
6. INPUT GEAR
7. SUPER GEAR
8. COVER
9. CRANKSHAFT
10. DISTANCE PIECE
11. RING
14. DISTANCE PIECE
17. PIN
19. REAMER BOLT
20. SNAP RING
21. BALL BEARING
22. TAPER ROLLER BEARING
23. NEEDLE BEARING
24. SNAP RING
25. SNAP RING
27. O RING
28. O RING
29. O RING
30. O RING
31. FLOATING SEAL
33. PLUG
35. HEX. HEAD BOLT
36. LOCK WASHER

SWIVEL JOINT



Tightening torque 3.1kgf·m (22 lbs)
Use Three-bond 1360K.

NO.	NAME	Q'TY	NO.	NAME	Q'TY
1	BODY	1	6	O RING	2
2	STEM	1	7	O RING	1
3	THRUST PLATE	1	8	SOCKET BOLT	2
4	COVER	1	9	SOCKET BOLT	4
5	SEAL ASS'Y	5			

Cross-sectional view of swivel joint

Main portion of the swivel joint consists of body (1) which rotates freely, swivel stem (2), thrust plate (3) which prevents disconnection of body and stem, cover (4) which closes one side of swivel body (1), slipper seal sets (5), which divide circuits, and Orings (6,7), which prevent external oil leakage.

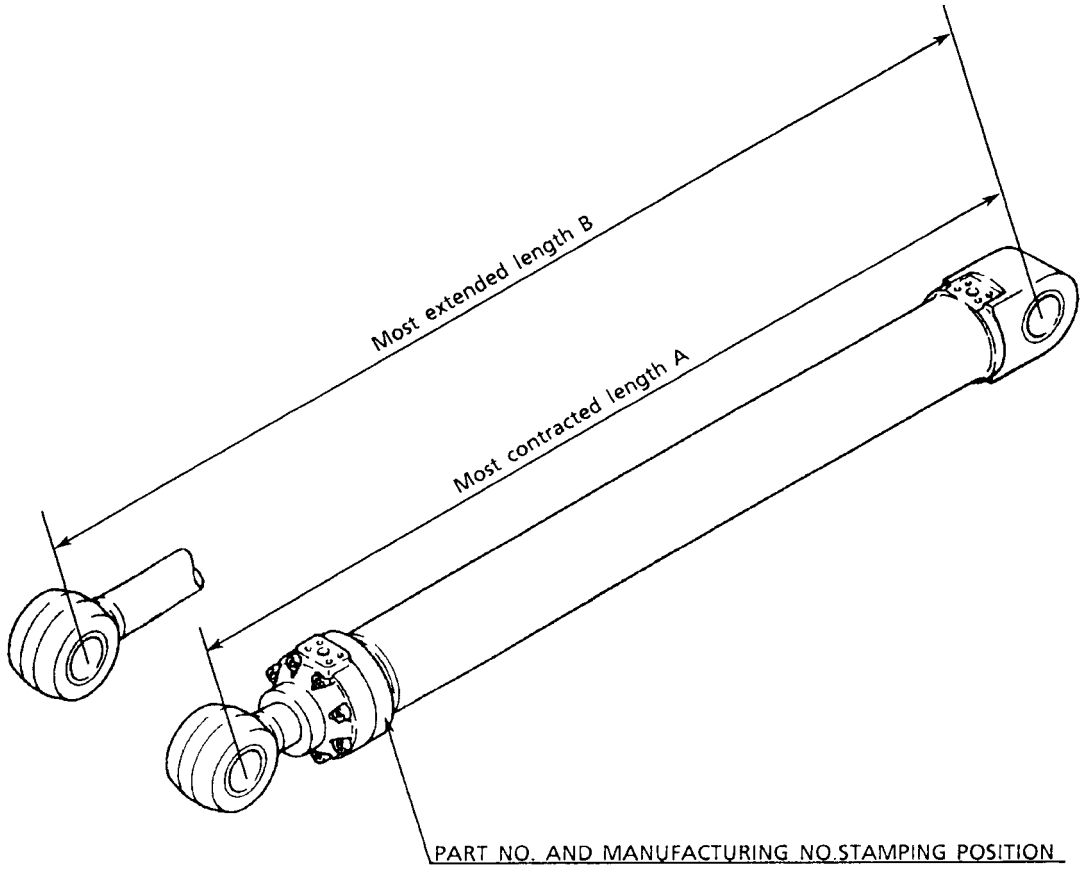
Four ports for the main circuits are provided on body (1) and stem (2), four oil passage grooves are machined on the inner face of the body (1), and seal sets (5) are provided at top and bottom of circumferential grooves.

Body (1) and stem (2) rotate freely. Oil from body (1) or stem (2) flows into stem (2) or body (1) through circumferential grooves between body (1) and stem (2) ; Oil flow is thus not obstructed by swiveling. Lubricating oil groove to drain port is also provided to prevent seizure of body (1) or stem (2) by swiveling.

With this construction, swivel joint assures circuit connection between the lower body and the revolving upper body.

HYDRAULIC CYLINDER

GENERAL VIEW



Outside view of cylinder

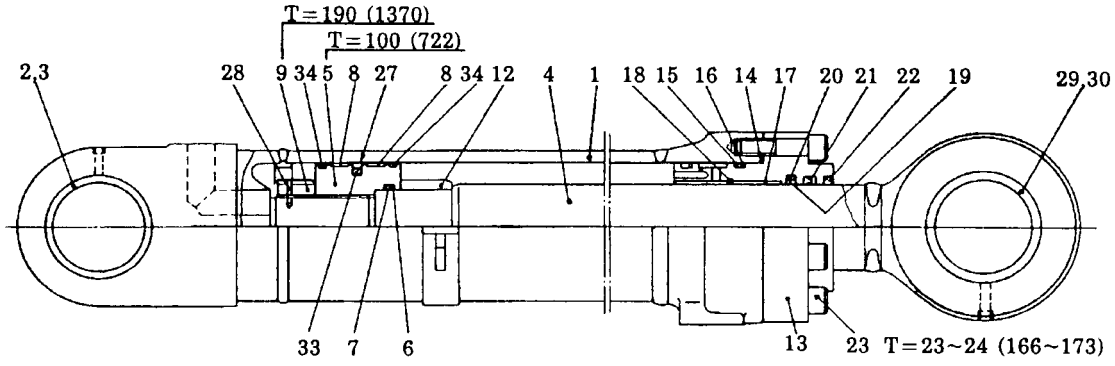
MAJOR SPECIFICATIONS

Unit : mm (ft-in)

Cylinder		Cylinder bore/Rod Dia.	Stroke	Center-to-Center Distance of Pins Full-extended/Full-retracted	Cushion	Weight (kg)
Boom	SK100	100/70 (3.94"/2.76")	975 (3'2.4")	2405/1430 (7'10.7"/4'8.3")	On rod side	90 (198 lbs)
	SK120	105/70 (4.13"/2.76")	1097 (3'7.2")	2662/1565 (8'8.8"/5'1.6")		101 (223 lbs)
Arm	SK100	115/75 (4.53"/2.95")	1085 (3'6.7")	2670/1585 (8'9.1"/5'2.4")	On both side	123 (271 lbs)
	SK120	120/80 (4.72"/3.15")	1185 (3'10.7")	2960/1775 (9'8.5"/5'9.9")		148 (326 lbs)
Bucket	SK100	95/65 (3.74"/2.56")	985 (3'2.8")	2420/1435 (7'11.3"/4'8.5")	No	80 (176 lbs)
	SK120	100/65 (3.94"/2.56")	915 (3'.0")	2320/1405 (7'7.3"/4'7.3")		79 (174 lbs)

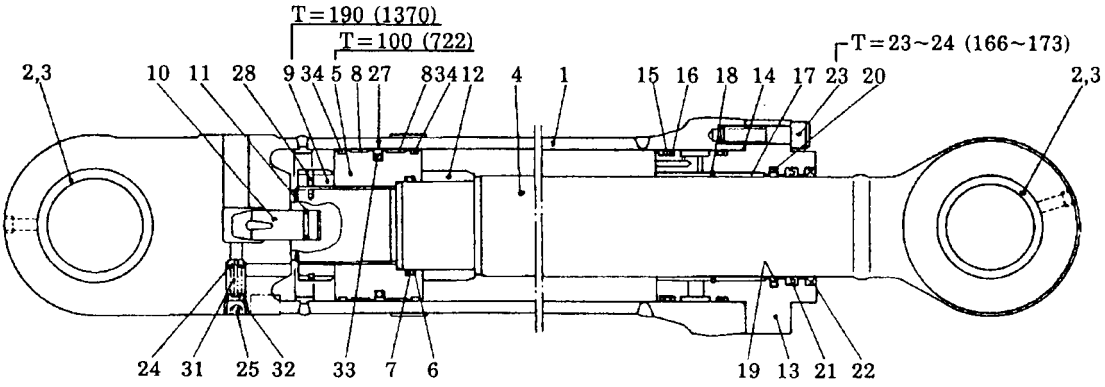
CONSTRUCTION

CYLINDER, BOOM



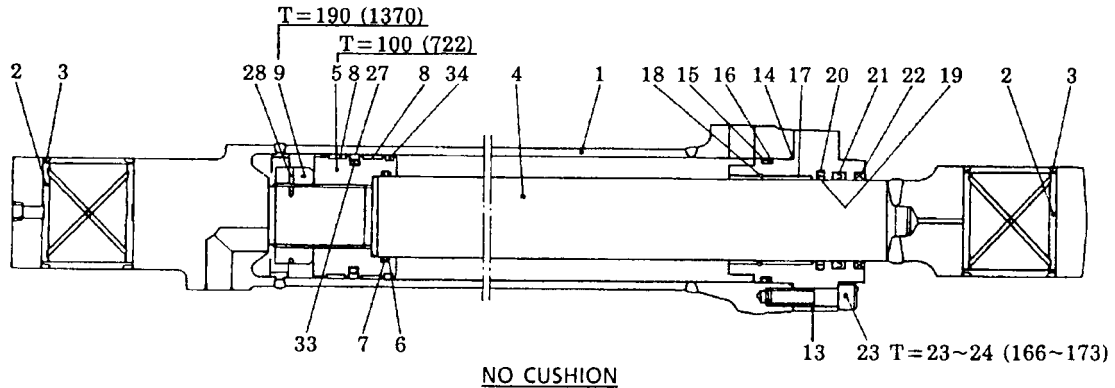
WITH ONE CUSHION

CYLINDER, ARM



WITH BOTH CUSHION

CYLINDER, BUCKET



NO CUSHION

☞ •Coat the screwed part of the cylinder head with Three Bond 1360K (or equivalent).
•Tightening Torque T=kgf·m(ft·lbs) (Unit)

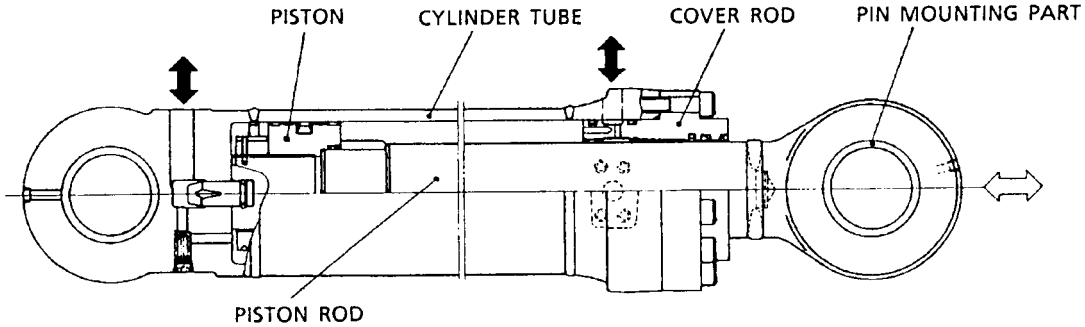
Cross-sectional view of cylinder

No.	PART NAME	Q'ty		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
1	CYLINDER TUBE	1	1	1
2	PIN BUSHING	1	2	2
3	DUST SEAL	2	4	4
4	PISTON ROD	1	1	1
5	PISTON	1	1	1
6	BACK-UP RING	2	2	2
7	O RING	1	1	1
8	WEAR RING	2	2	2
9	PISTON NUT	1	1	1
10	PLUNGER	-	1	-
11	STOPPER	-	1	-
12	CUSHION RING	1	1	-
13	ROD COVER	1	1	1
14	O RING	1	1	1
15	O RING	2	2	1
16	BACK-UP RING	2	2	1
17	ROD BUSHING	1	1	1

No.	PART NAME	Q'ty		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
18	CIRCLIP	1	1	1
19	STEP SEAL	1	1	1
20	O RING	1	1	1
21	ROD PACKING	1	1	1
22	DUST SEAL	1	1	1
23	SOCKET BOLT	8	12	8
24	CHECK VALVE	-	1	-
25	PLUG	-	1	-
27	SLIPPER SEAL	1	1	1
28	SNAP RING	1	1	1
29	PIN BUSHING	1	-	-
30	DUST SEAL	2	-	-
31	SPRING	-	1	-
32	SEAT	-	1	-
33	O RING	1	1	1
34	DUST RING	2	2	2

By construction the hydraulic cylinder consists largely of cylinder tube (1),piston (5) that reciprocates in it, piston rod (4) that takes the movement of the piston outward and rod cover (13) that serves as a lid/guide. The cylinder tube (1)and the piston rod (4) has a crevis, a trunnion or a flange to come in contact with other parts.

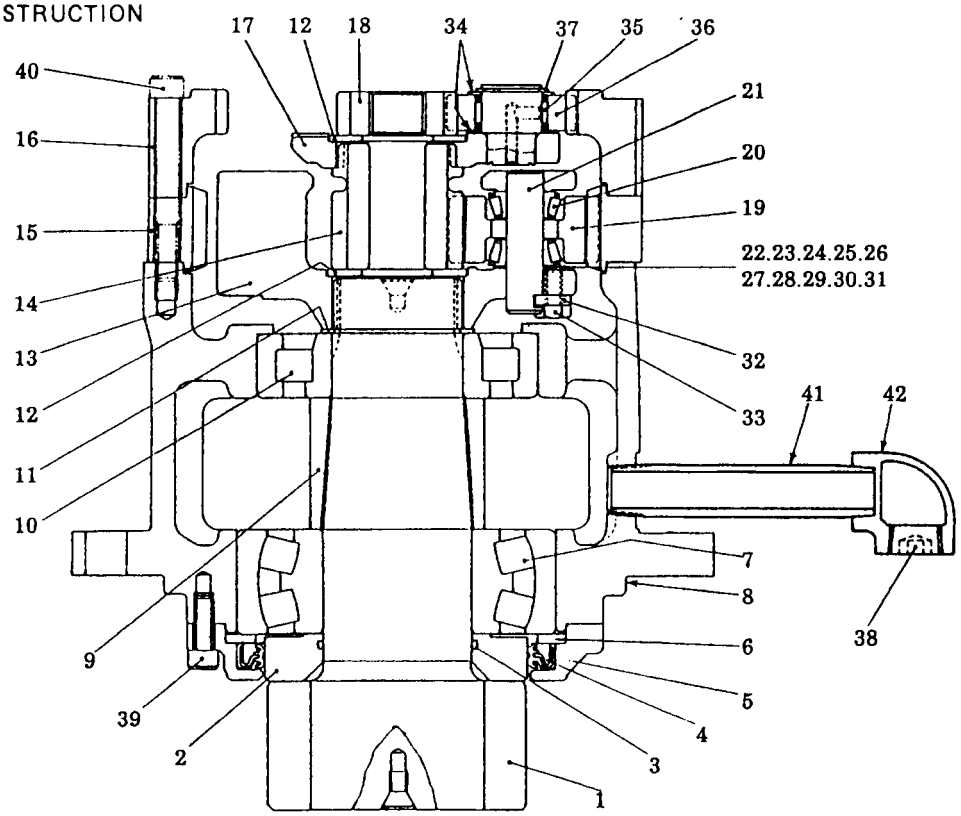
Packings, seals and bushes are used in the moving part or on the mounting part between piston (5) and cylinder tube (1), between piston rod (4) and rod cover (13) and between cylinder tube (1) and rod cover (13).



Construction of Hydraulic Cylinder

REDUCTION UNIT (SWING)

CONSTRUCTION

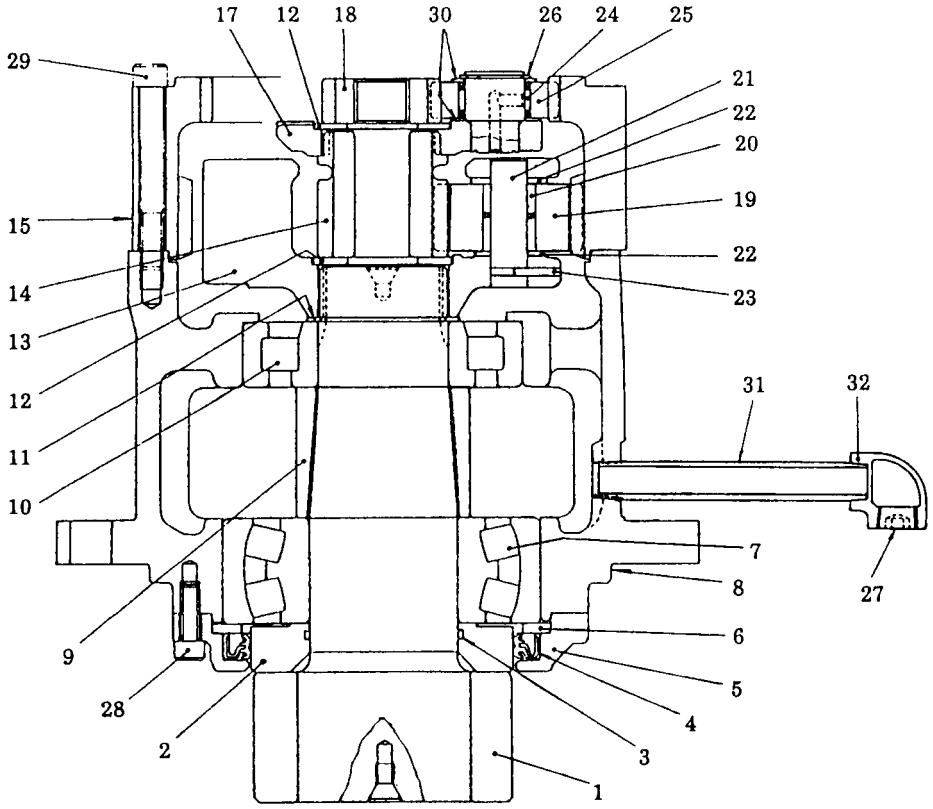


No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	PINION SHAFT	1	15	RING GEAR	1	29	SHIM t=1.7	1
2	SLEEVE	1	16	RING GEAR	1	30	SHIM t=1.8	1
3	O RING	1	17	SPIDER ASS'Y	1	31	SHIM t=1.9	1
4	OIL SEAL	1	18	SUN GEAR	1	32	LOCK PLATE	4
5	RETAINER	1	19	PINION	4	33	CAPSCREW	8
6	SPACER	1	20	BEARING	8	34	THRUST WASHER	6
7	BEARING	1	21	SHAFT	4	35	BEARING	3
8	HOUSING	1	22	SHIM t=1.0	1	36	PINION	3
9	SPACER	1	23	SHIM t=1.1	1	37	SNAP RING	3
10	BEARING	1	24	SHIM t=1.2	1	38	PLUG	1
11	SNAP RING	1	25	SHIM t=1.3	1	39	CAPSCREW	12
12	SPACER	2	26	SHIM t=1.4	1	40	CAPSCREW	4
13	SPIDER	1	27	SHIM t=1.5	1	41	PUMP	1
14	SUN GEAR	1	28	SHIM t=1.6	1	42	ELBOW	1

Choose one from No.22~No.31

REDUCTION UNIT (SWING)

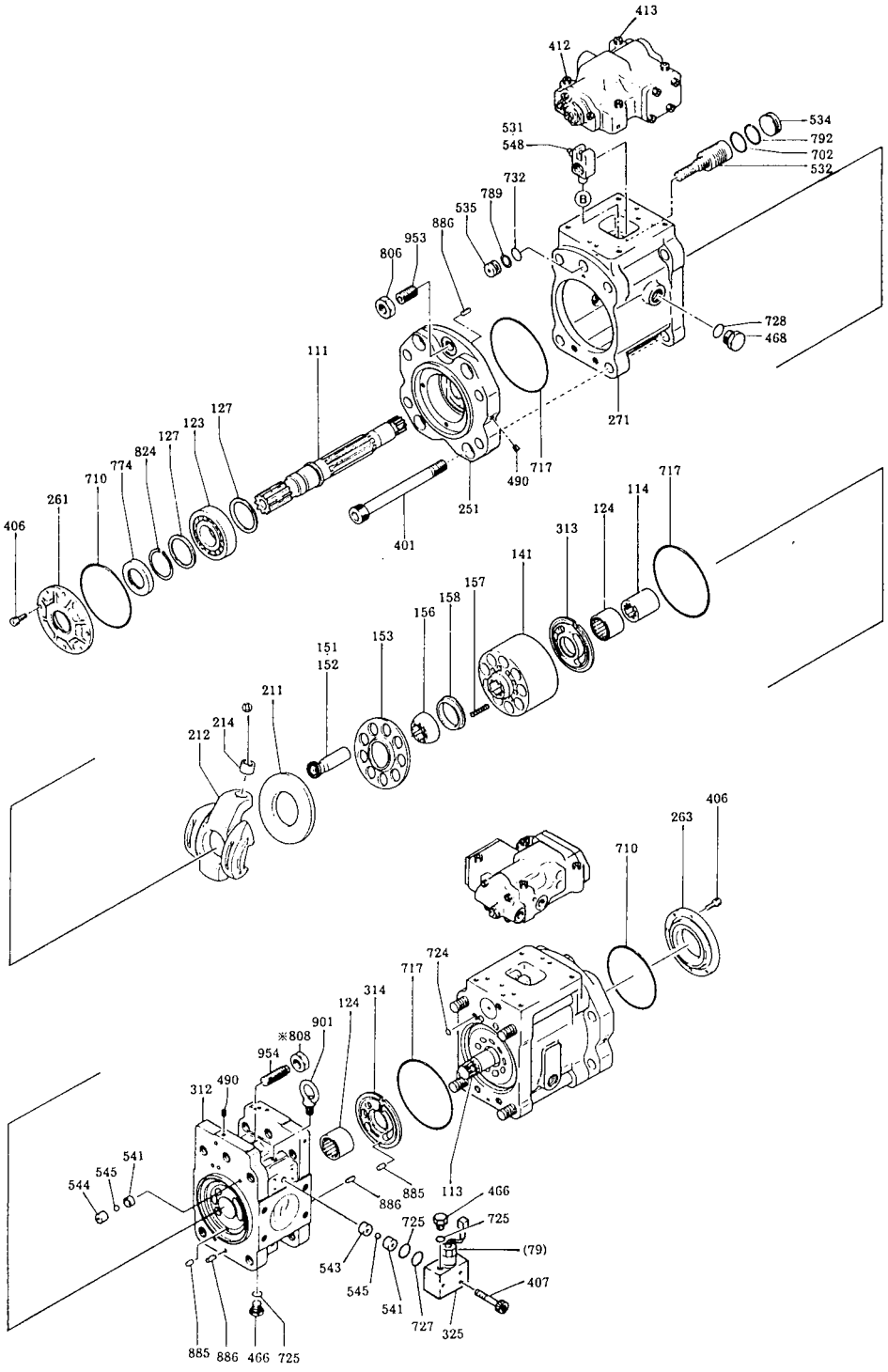
CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty
1	PINION SHAFT	1	18	SUN GEAR	1
2	SLEEVE	1	19	PINION	4
3	O RING	1	20	BEARING	8
4	OIL SEAL	1	21	SHAFT	4
5	RETAINER	1	22	THRUST WASHER	8
6	SPACER	1	23	SPRING PIN	4
7	BEARING	1	24	BEARING	4
8	HOUSING	1	25	PINION	4
9	SPACER	1	26	SNAP RING	4
10	BEARING	1	27	PLUG	1
11	SNAP RING	1	28	CAPSCREW	12
12	SPACER	2	29	CAPSCREW	4
13	SPIDER	1	30	THRUST WASHER	8
14	SUN GEAR	1	31	PIPE	1
15	INTERNAL GEAR	1	32	ELBOW	1
17	SPIDER ASSEMBLY	1			

HYDRAULIC PUMP

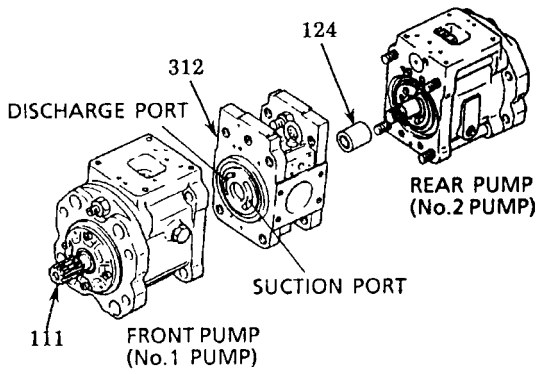
CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
111	DRIVE SHAFT (F)	1	312	VALVE BLOCK	1	717	O RING	4
113	DRIVE SHAFT (R)	1	313	VALVE PLATE (R)	1	724	O RING	16
114	SPLINE COUPLING	1	314	VALVE PLATE (L)	1	725	O RING	8
123	ROLLER BEARING	2	325	VALVE CASING	1	727	O RING	2
124	NEEDLE BEARING	2	401	SOCKET BOLT	8	728	O RING	3
127	BEARING SPACER	4	406	SOCKET BOLT	8	732	O RING	2
141	CYLINDER BLOCK	2	407	SOCKET BOLT	8	774	OIL SEAL	1
151	PISTON	18	466	VP PLUG	3	789	BACK UP RING	2
152	SHOE	18	468	VP PLUG	3	792	BACK UP RING	2
153	RETAINER	2	490	PLUG	24	806	NUT	2
156	SPHERICAL BUSNING	2	531	TILTING PIN	2	808	NUT	2
157	CYLINDER SPRING	18	532	THORBO PISTON	2	824	STOP RING	2
158	SPACER	2	534	STOPPER (L)	2	885	VALVE PLATE PIN	2
211	SHOE PLATE	2	535	STOPPER (S)	2	886	SPRING PIN	4
212	SWASH PLATE	2	541	SEAT	4	901	EYE BOLT	2
214	TILTING BUSH	2	543	STOPPER 1	2	953	SOCKET BOLT	2
251	SWASH PLATE SUPPORT	2	544	STOPPER 2	2	954	STOP SCREW	2
			545	BALL	4	(79)	ELECTROMAGNETIC PROPORTIONATE PRESSURE REDUCING VALVE	1set
261	SEAL COVER (F)	1	548	FEED BACK PIN	2			
263	REAR COVER	1	702	O RING	2	(412)	SOCKET BOLT	2
271	PUMP CASING	2	710	O RING	2	(413)	SOCKET BOLT	2

□ The numbers in the triangles indicate adjust screws. Do not tamper with the adjust screwe as much as possible.

This pump assy consists of two pumps connected by spline joint (124).The two pumps can be driven concurrentlyas the rotation of the prime mover is transferred by the drive shaft (F) (111) on the front side The suction and discharge ports are integrated at the connecting part of the two pumps. i.e. in valve block (312).The section port serves for both the front pump and the rear pump.



FUNCTION

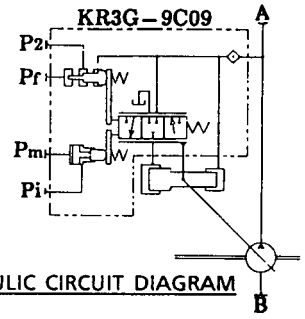
The pumps may be classified roughly into the rotary group performing a rotary motion and working as the major part of the whole pump function : the swash plate group that varies the delivery rates : and the valve cover group that changes over oil suction and discharge.

(1) Rotary Group

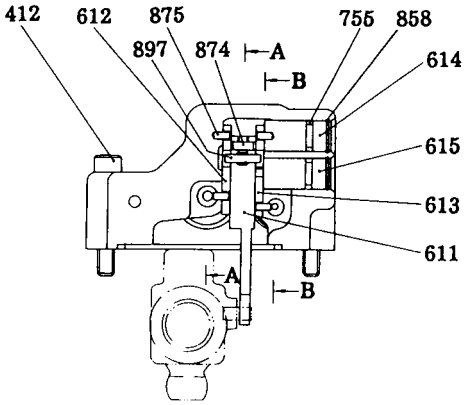
The rotary group consists of drive shaft(F)(111), cylinder block (141), piston shoes (151, 152),

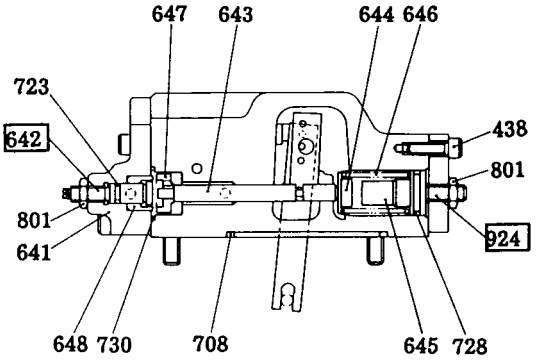
REGULATOR

CONSTRUCTION

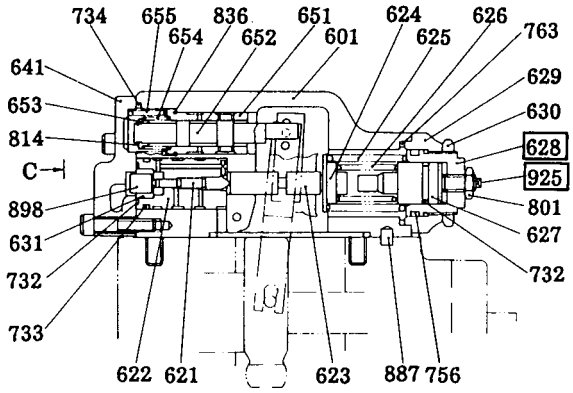


HYDRAULIC CIRCUIT DIAGRAM

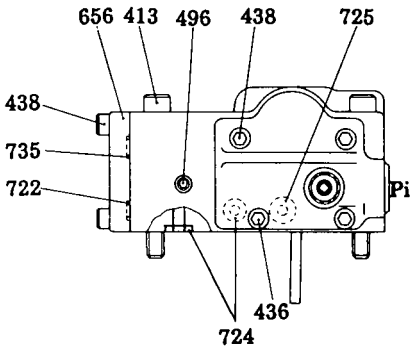




SECTION B-B



SECTION A-A



VIEW C

NO.	NAME	Q'ty	NO.	NAME	Q'ty	NO.	NAME	Q'ty
412	SOCKET BOLT	2	631	PF SLEEVE	1	730	O RING	1
413	SOCKET BOLT	2	641	PILOT COVER	1	732	O RING	2
436	SOCKET BOLT	2	▽642	ADJUST SCREW (QMC)	1	733	O RING	1
438	SOCKET BOLT	10	643	PILOT PISTON	1	734	O RING	1
496	INTER STOPPER	5	644	SPRING SEAT (Q)	1	735	O RING	1
601	CASING	1	645	ADJUST RING (Q)	1	755	O RING	2
611	FEED BACK LEVER	1	646	PILOT SPRING	1	756	O RING	1
612	LEVER (1)	1	647	STOPPER	1	763	O RING	1
613	LEVER (2)	1	648	PISTON (QMC)	1	801	HEXAGON NUT	3
614	FULCRUM PLUG	1	651	SLEEVE	1	814	STOP RING	1
615	ADJUST PLUG	1	652	SPOOL	1	836	CIRCLIP	1
621	COMPENSATING PISTON	1	653	SPRING SEAT	1	858	LOCKING RING	2
622	PISTON CASE	1	654	RETURN SPRING	1	874	PIN	1
623	COMPENSATING ROD	1	655	SET SPRING	1	875	PIN	4
624	SPRING SEAT (C)	1	656	BLIND COVER	1	887	PIN	1
625	OUTER SPRING	1	708	O RING	1	897	PIN	1
626	INNER SPRING	1	722	O RING	3	898	PIN	1
627	ADJUST RING (C)	1	723	O RING	1	▽924	SOCKET HEAD CAPSCREW	1
▽628	ADJUST SCREW (C)	1	724	O RING	8			
629	COVER (C)	1	725	O RING	1	▽925	ADJUST SCREW (QI)	1
630	LOCK NUT	1	728	O RING	1			

☞ ▽ The numbers in the triangles indicate adjust screws. Do not tamper with the adjust screws as much as possible.

CONTROL VALVE

CONSTRUCTION

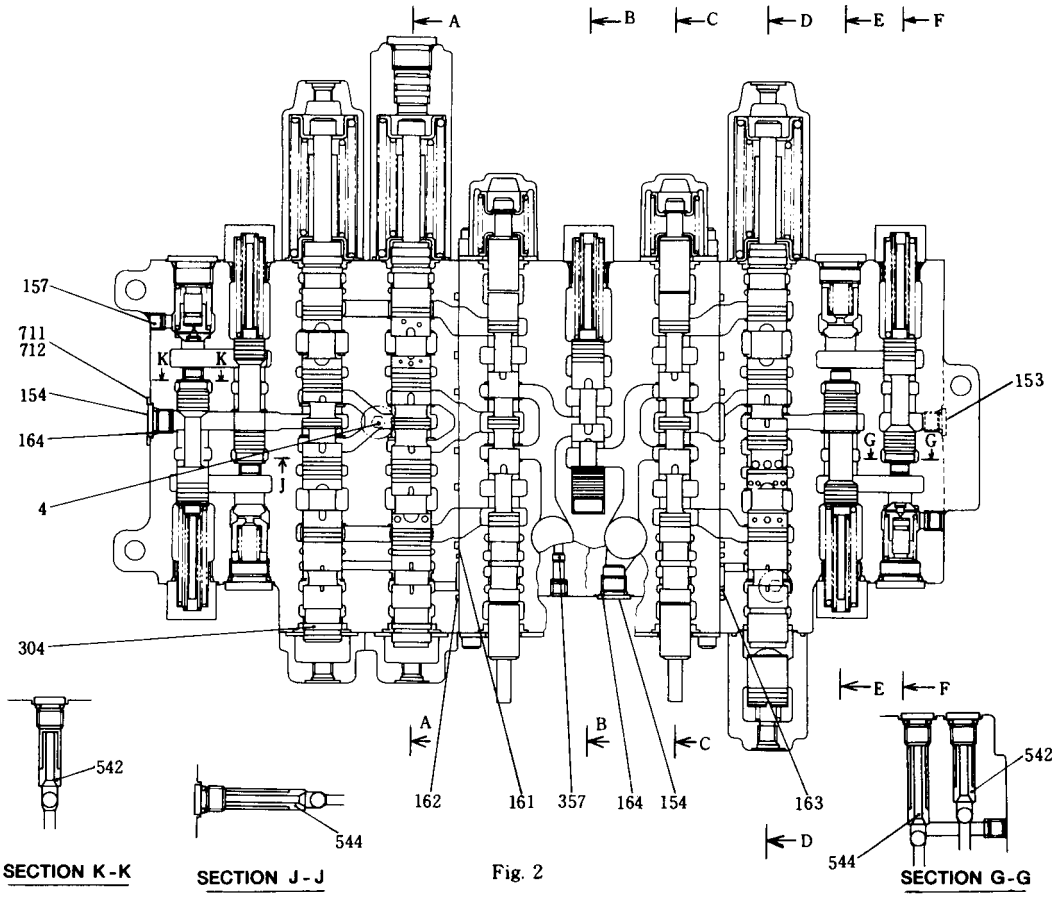
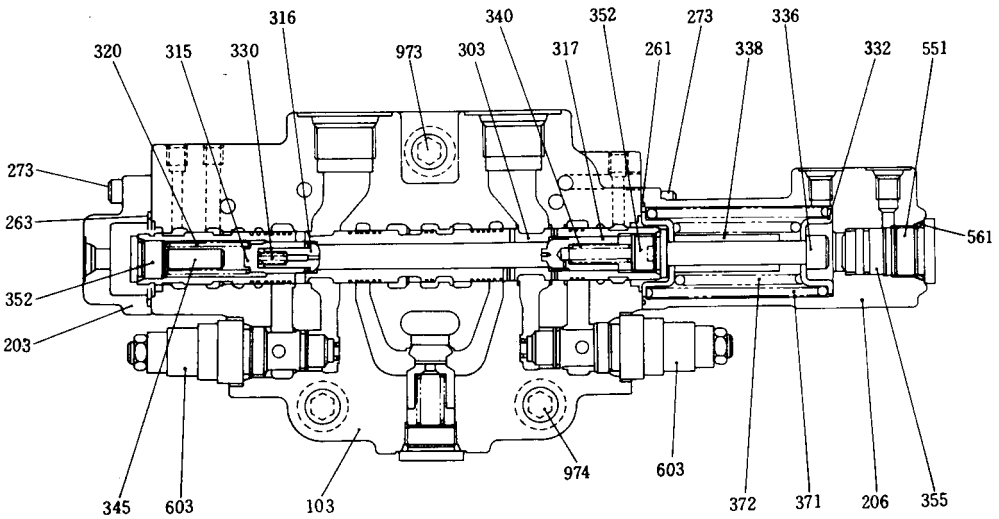


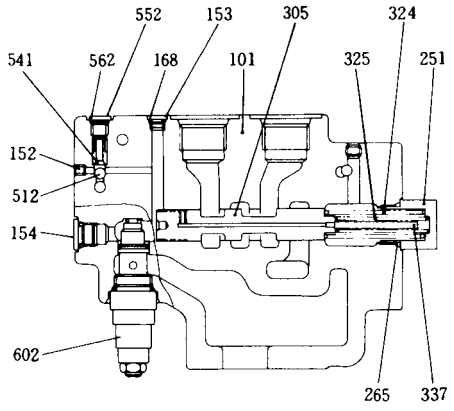
Fig. 2

101. TRAVEL BLOCK
102. CASING A
103. CASING B
152. PLUG
153. PLUG
154. PLUG
156. PLUG
157. PLUG
158. PLUG
161. O RING
162. O RING
163. O RING
164. O RING
166. O RING
168. O RING
201. SPRING COVER
202. END COVER
203. SPOOL COVER
204. PLATE
205. ARM COVER
206. BOOM STROKE LIMITTER
251. PLUG
261. O RING
262. PACKING
263. O RING
264. O RING
265. O RING
271. SOCKET BOLT
273. SOCKET BOLT
301. SPOOL (TRAVEL)
302. SPOOL (ARM)
303. SPOOL (BOOM)
304. SPOOL (BUCKET)
305. SPOOL (TRAVEL PREFERENTIAL)
306. SPOOL (BYPASS CUT)
307. SPOOL (CONFLUENT FLOW)
308. SPOOL
309. PISTON
312. SUB—SPOOL (ARM)
313. PISTON (ARM)
314. SLEEVE 2 (ARM)
315. PLUNGER 1 (BOOM)
316. PLUNGER 2 (BOOM)
317. PLUNGER 3 (BOOM)
318. SPRING
320. SPRING (BOOM LOWERING)
321. SPRING (TRAVEL)
322. OUTER SPRING (ARM EXTRUSION)
323. INNER SPRING (ARM EXTRUSION)
324. OUTER SPRING (TRAVEL PREFERENTIAL)
325. INNER SPRING (TRAVEL PREFERENTIAL)
326. OUTER SPRING (BYPASS CUT)
327. INNER SPRING (BYPASS CUT)
328. SPRING (ARM REGENERATION)
329. SPRING (ARM SUB—SPOOL)
330. SPRING (BOOM REGENERATION)
331. SPRING SEAT (TRAVEL)
332. SPRING SEAT (BOOM, ARM AND BUCKET)
333. SOCKET BOLT (TRAVEL SPOOL)

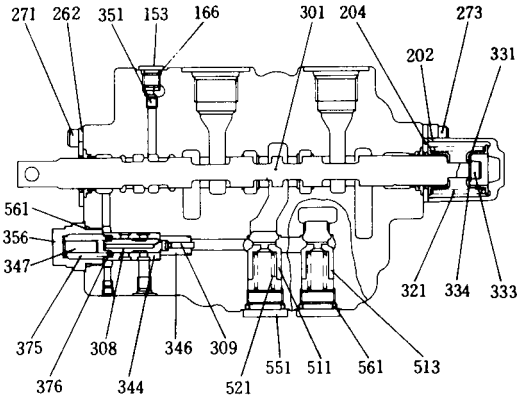
334. WASHER (TRAVEL SPOOL)
335. STOPPER (ARM AND BUCKET)
336. SPACER BOLT (BOOM, ARM AND BUCKET)
337. ROD
338. STOPPER (BOOM)
339. C RING (ARM)
340. SPRING (BOOM, ARM AND BUCKET)
341. BUSHING (ARM)
342. SLEEVE 1 (ARM)
343. SPACER BOLT (ARM SUB-SPOOL)
344. SLEEVE
345. ROD (BOOM SPOOL)
346. BUSHING
347. STOPPER
349. STOPPER
351. ORIFICE φ0.6 (φ0.02")
352. PLUG (BOOM SPOOL)
353. PISTON (ARM SPOOL)
354. SPRING (ARM COVER)
355. PISTON (BOOM SPOOL)
356. PLUG
357. ORIFICE φ0.8 (φ0.03")
358. SPRING SEAT (ARM SPOOL)
359. PLUG (ARM SPOOL)
371. OUTER SPRING (BOOM BUCKET)
372. INNER SPRING (BOOM BUCKET)
373. OUTER SPRING (CONFLUENT FLOW VALVE)
374. INNER SPRING (CONFLUENT FLOW VALVE)
375. SPRING
376. SPRING SEAT
511. POPPET (LOAD CHECK VALVE)
512. BALL (SHUTTLE VALVE)
513. POPPET (TRAVEL PREFERENTIAL)
521. SPRING (LOAD CHECK VALVE)
541. SEAT L=18.7 SHUTTLE VALVE
542. SEAT L=27.7 SHUTTLE VALVE
543. SEAT L=33.7 SHUTTLE VALVE
544. SEAT L=37.7 SHUTTLE VALVE
551. PLUG ROM 27X1.5
552. PLUG ROM 12X1.5
561. O RING
562. O RING
601. MAIN RELIEF VALVE
602. TRAVEL RELIEF VALVE
603. PORT RELIEF VALVE
604. NEGATIVE CONTROL RELIEF VALVE
611. NEGATIVE CONTROL RELIEF VALVE
612. POPPET
711. PLUG RO 3/4
712. O RING
971. SOCKET BOLT M18X1.5X170
972. SOCKET BOLT M18X1.5X85
973. SOCKET BOLT M18X1.5X235
974. SOCKET BOLT M18X1.5X145



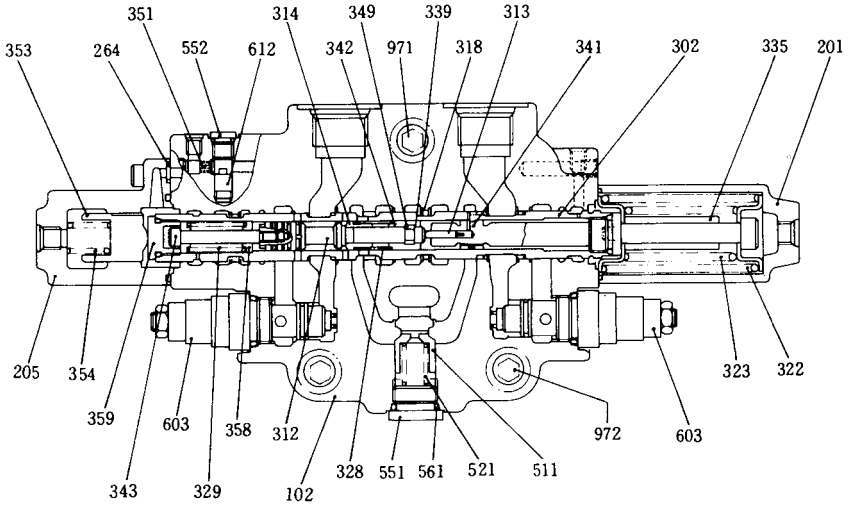
SECTION A-A (BOOM)



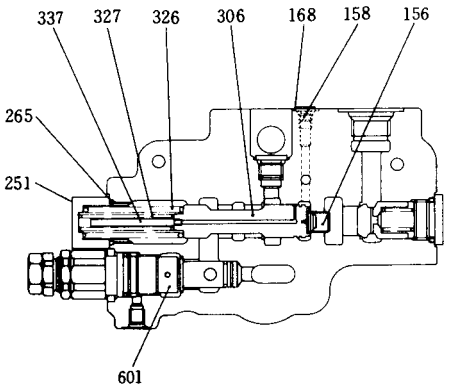
SECTION B-B (TRAVEL BLOCK)



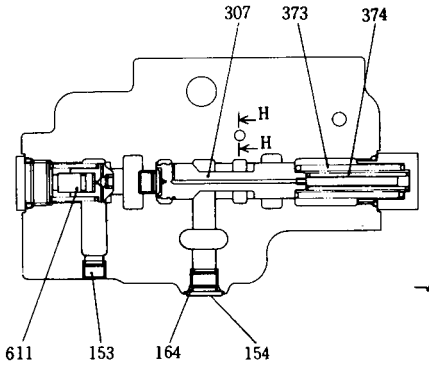
SECTION C-C (LH TRAVEL)



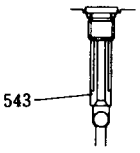
SECTION D-D (ARM)



SECTION E-E



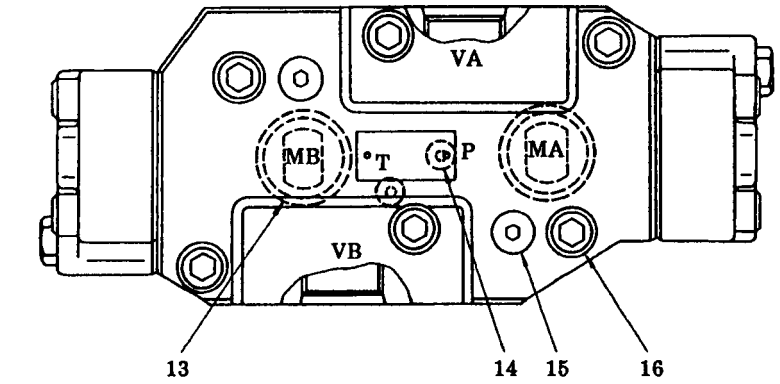
SECTION F-F

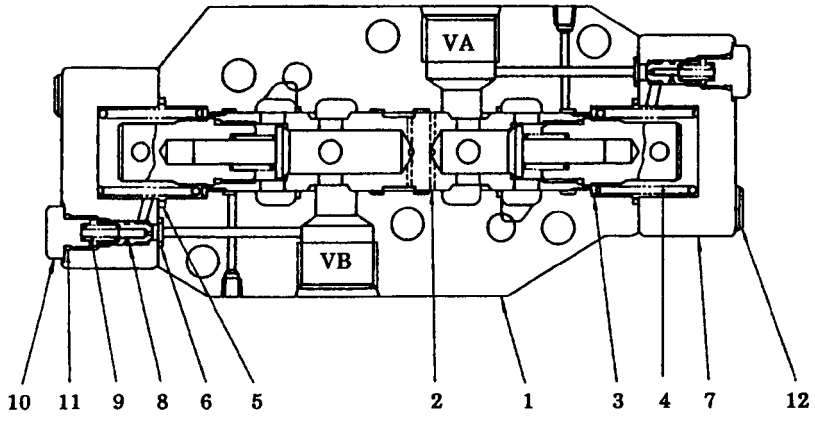


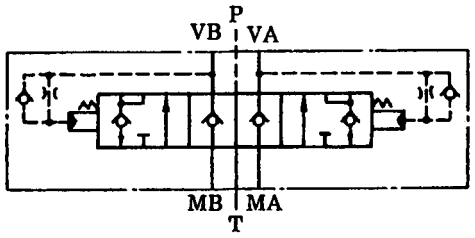
SECTION H-H

BRAKE VALVE (TRAVEL)

CONSTRUCTION





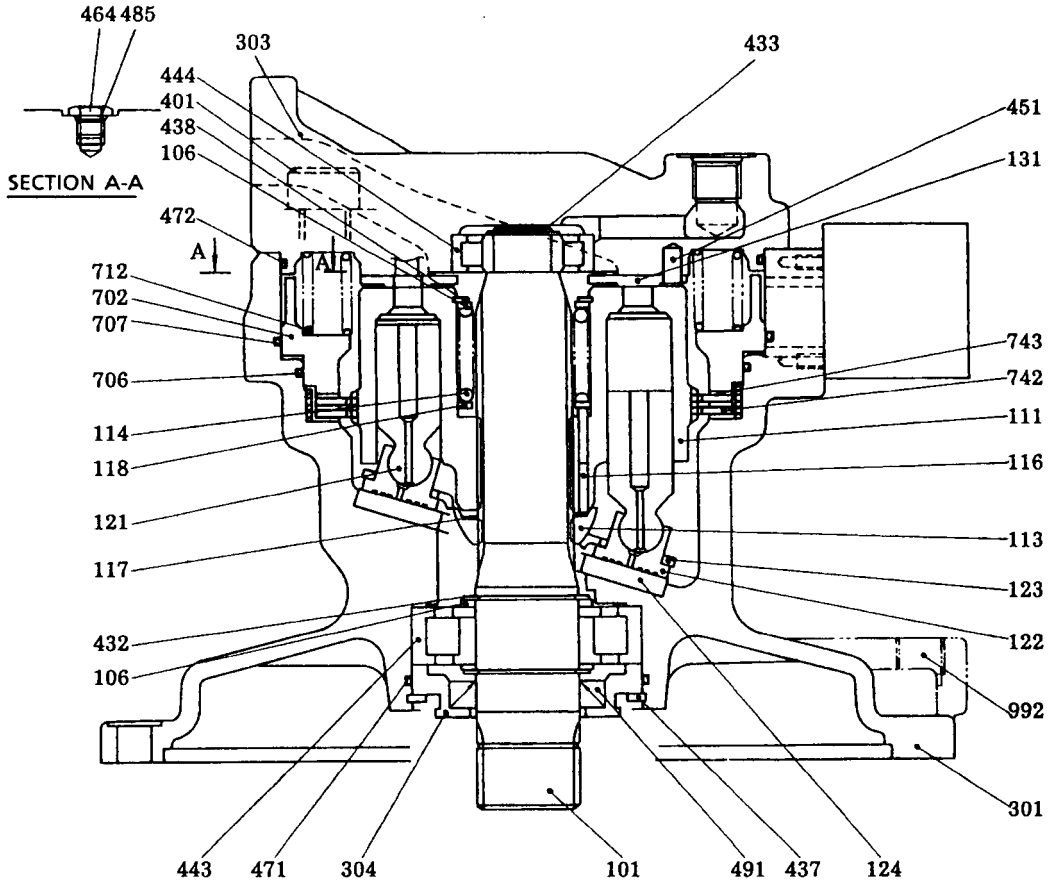


JIS SYMBOL

No.	NAME	Q'ty	No.	NAME	Q'ty
1	BODY	1	9	SPRING	2
2	SPOOL	1	10	PLUG	2
3	SPRING SEAT	2	11	O RING	4
4	SPRING	2	12	SOCKET BOLT	8
5	O RING	2	13	O RING	2
6	O RING	4	14	O RING	2
7	COVER	2	15	PLUG	2
8	RESTRICTOR	2	16	SOCKET BOLT	6

HYDRAULIC MOTOR (SWING)

CONSTRUCTION

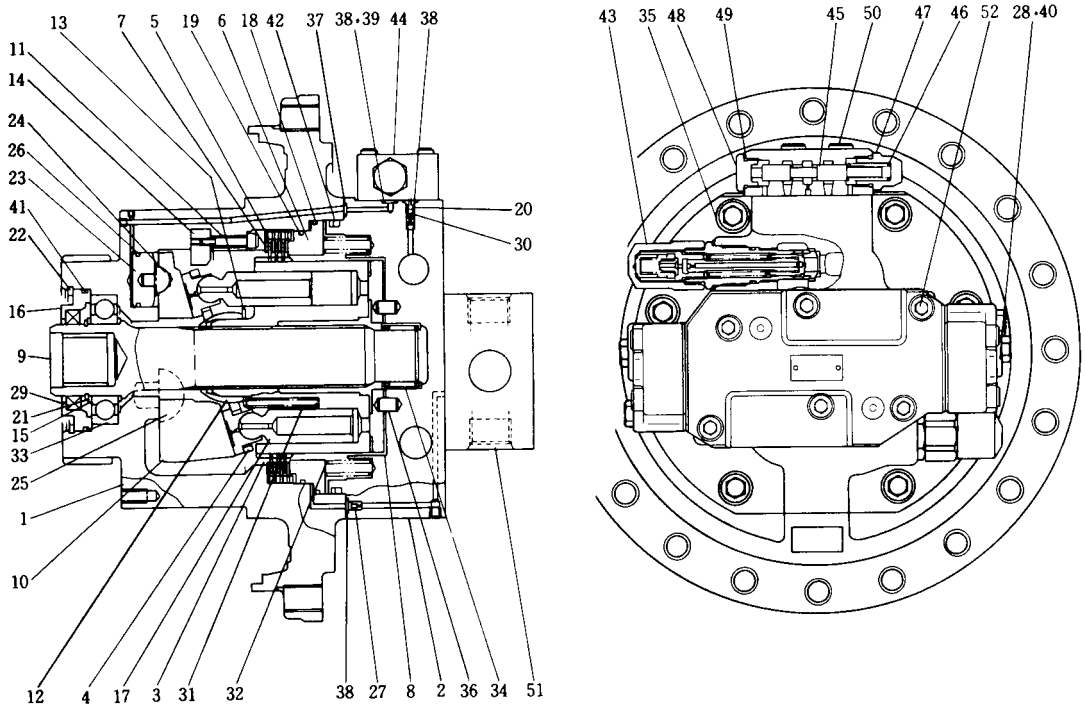


NO.	NAME	Q'TY	NO.	NAME	Q'TY	NO.	NAME	Q'TY
101	DRIVE SHAFT	1	131	VALVE PLATE	1	464	VP PLUG	1
106	BEARING SPACER	3	301	CASING	1	471	O RING	1
111	CYLINDER BLOCK	1	303	VALVE COVER	1	472	O RING	1
113	SPHERICAL BUSHING	1	304	FRONT COVER	1	485	O RING	1
114	CYLINDER SPRING	1	401	SOCKET BOLT	4	491	OIL SEAL	1
116	PUSH ROD	12	432	STOP RING	2	702	BRAKE PISTON	1
117	SPACER F	1	433	STOP RING	1	706	O RING	1
118	SPACER R	1	437	LOCKING RING	1	707	O RING	1
121	PISTON	9	438	LOCKING RING	1	712	BRAKE SPRING	18(20)
122	SHOE	9	443	ROLLER BEARING	1	742	FRICTION PLATE	2
123	RETAINER PLATE	1	444	ROLLER BEARING	1	743	SEPARATE PLATE	3
124	SHOE PLATE	1	451	PIN	2	992	PLUG	2

( ) is SK220

HYDRAULIC MOTOR (TRAVEL)

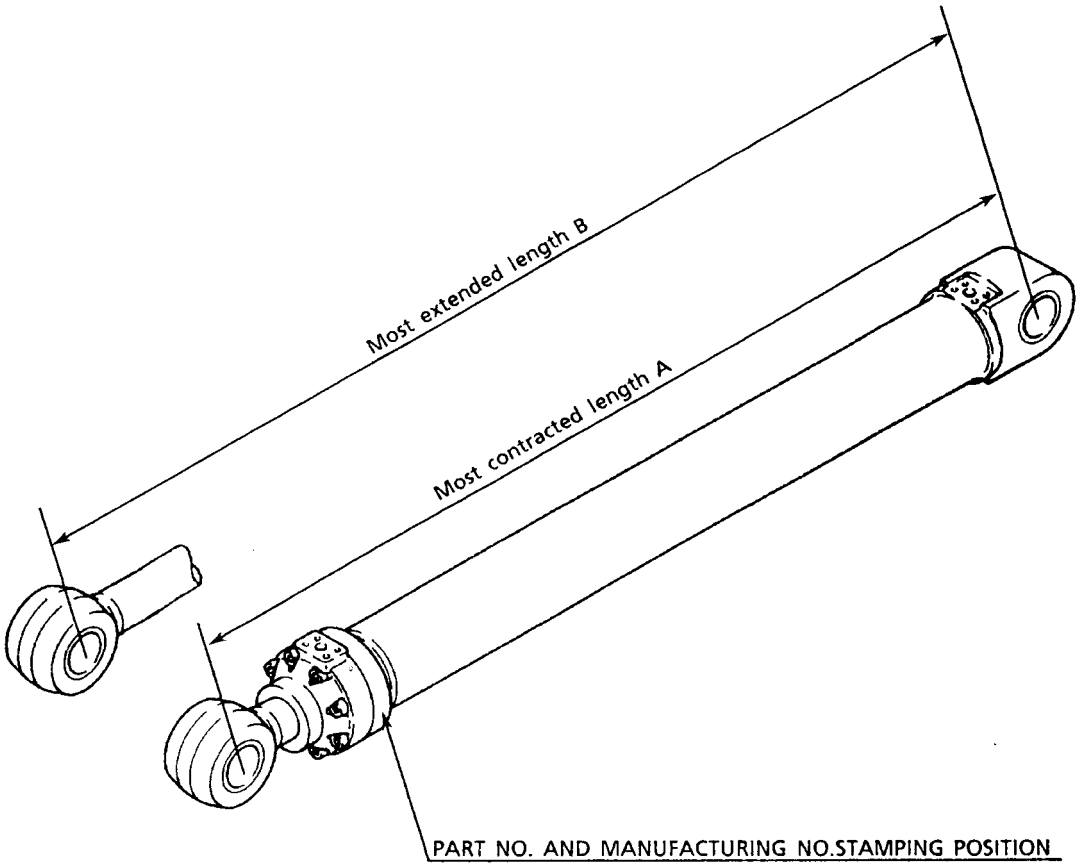
CONSTRUCTION



1. CASING
2. REAR COVER
3. CYLINDER BLOCK
4. SHOE RETAINER
5. FRICTION PLATE
6. BRAKE PISTON
7. SEPARATOR PLATE
8. VALVE PLATE
9. SHAFT
10. SHOE PLATE
11. SOCKET BOLT
12. BALL JOINT
13. SPRING SEAT
14. STOPPER
15. BEARING SPACER
16. SEAL BOX
17. PISTON ASSY
18. PISTON RING (LARGE)
19. PIST RING (MEDIUM)
20. CHECK VALVE
21. SNAPRING
22. SNAPRING
23. PISTON
24. HALF BALL
25. PIVOT
26. PIST RING (SMALL)
27. RESTRICTOR
28. PLUG
29. OIL SEAL
30. SPRING
31. CYLINDER SPRING
32. BRAKE SPRING
33. BEARING
34. NEEDLE BEARING
35. SOCKET BOLT
36. PIN
37. O RING
38. O RING
39. O RING
40. O RING
41. O RING
42. O RING
43. OVERLOAD VALVE
44. PILOT SELECT VALVE
45. SPOOL
46. SPRING
47. CAP
48. PLUG
49. O RING
50. SOCKET BOLT
51. COUNTER BALA VALVE
52. SOCKET VALVE

HYDRAULIC CYLINDER

GENERAL VIEW



Outside view of cylinder

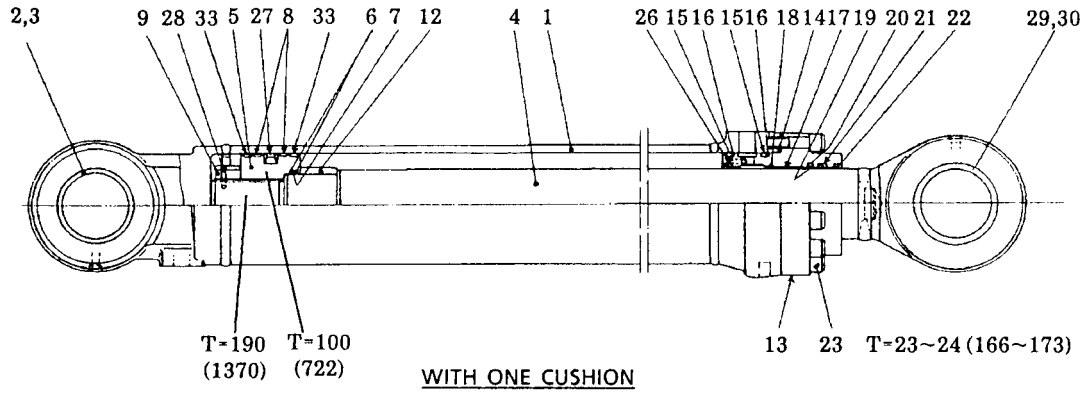
MAJOR SPECIFICATIONS

Unit : mm (ft-in)

Cylinder	Cylinder bore/Rod Dia.	Stroke	Center-to-Center Distance of Pins Full-extended/Full-retracted	Cushion	Weight (kg)
Boom	125/85 (4.92˝/3.34˝)	1290 (4´3˝)	3100/1810 (10´2˝/5´11˝)	On rod side	166 (366 lbs)
Arm	145/100 (5.70˝/3.93˝)	1453 (4´9˝)	3443/1990 (11´3˝/6´6˝)	On both side	251 (553 lbs)
Bucket	120/80 (4.72˝/3.15˝)	1110 (3´7˝)	2720/1610 (8´11˝/5´3˝)	No	134 (295 lbs)

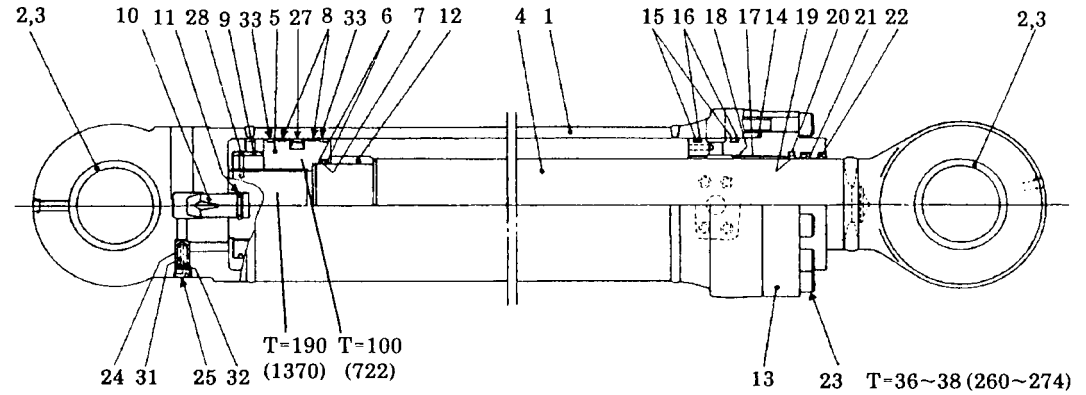
CONSTRUCTION

CYLINDER, BOOM



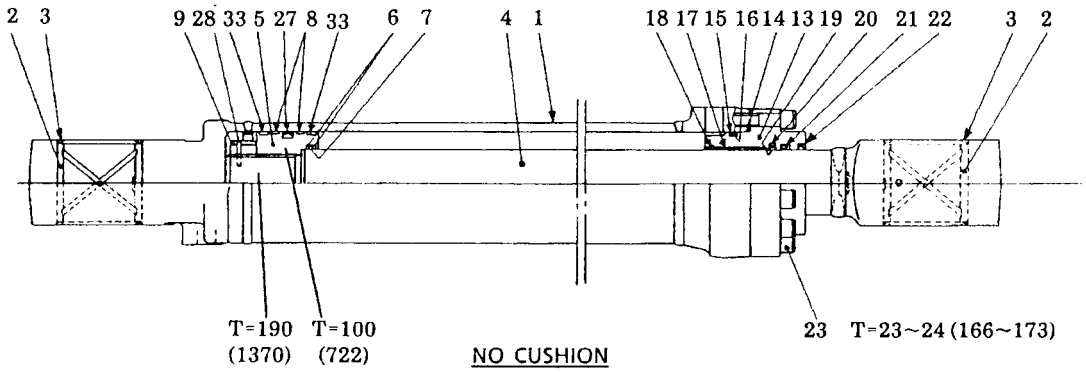
WITH ONE CUSHION

CYLINDER, ARM



WITH BOTH CUSHION

CYLINDER, BUCKET



NO CUSHION

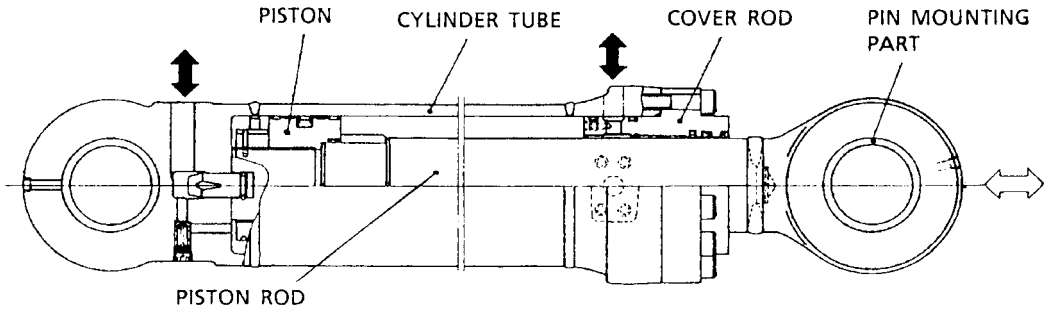
☞ Tightening Torque T=kgf·m (ft·lbs)

Cross-sectional view of cylinder

No.	PART NAME	Q'ty			No.	PART NAME	Q'ty		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.			Boom Cyl.	Arm Cyl.	Bucket Cyl.
1	CYLINDER TUBE	1	1	1	18	CIRCLIP	1	1	1
2	BUSHING	1	2	2	19	STEP SEAL	1	1	1
3	DUST SEAL	2	4	4	20	O RING	1	1	1
4	PISTON ROD	1	1	1	21	ROD PACKING	1	1	1
5	PISTON	1	1	1	22	DUST SEAL	1	1	1
6	BACK-UP RING	2	2	2	23	SOCKET BOLT	12	16	12
7	O RING	1	1	1	24	CHECK VALVE	-	1	-
8	WEAR RING	2	2	2	25	PLUG	-	1	-
9	PISTON NUT	1	1	1	26	ORIFICE	1	-	-
10	PLUNGER	-	1	-	27	SEAL, SLIPPER	1	1	1
11	RING STOPPER	-	1	-	28	SNAP RING	1	1	1
12	CUSHION RING	1	1	-	29	PIN BUSHING	1	-	-
13	COVER, ROD	1	1	1	30	DUST SEAL	2	-	-
14	O RING	1	1	1	31	SPRING	-	1	-
15	O RING	2	2	1	32	SEAT	-	1	-
16	BACK-UP RING	2	2	1	33	RING, WEAR	2	2	2
17	ROD BUSHING	1	1	1					

By construction, the hydraulic cylinder consists of cylinder tube (1), piston (5) that reciprocates in it, piston rod (4) that takes out the piston movement and rod cover (13) acting as a lid / guide. The cylinder tube (1) and the piston rod (4) has a pin (crevis) section as they contact other areas.

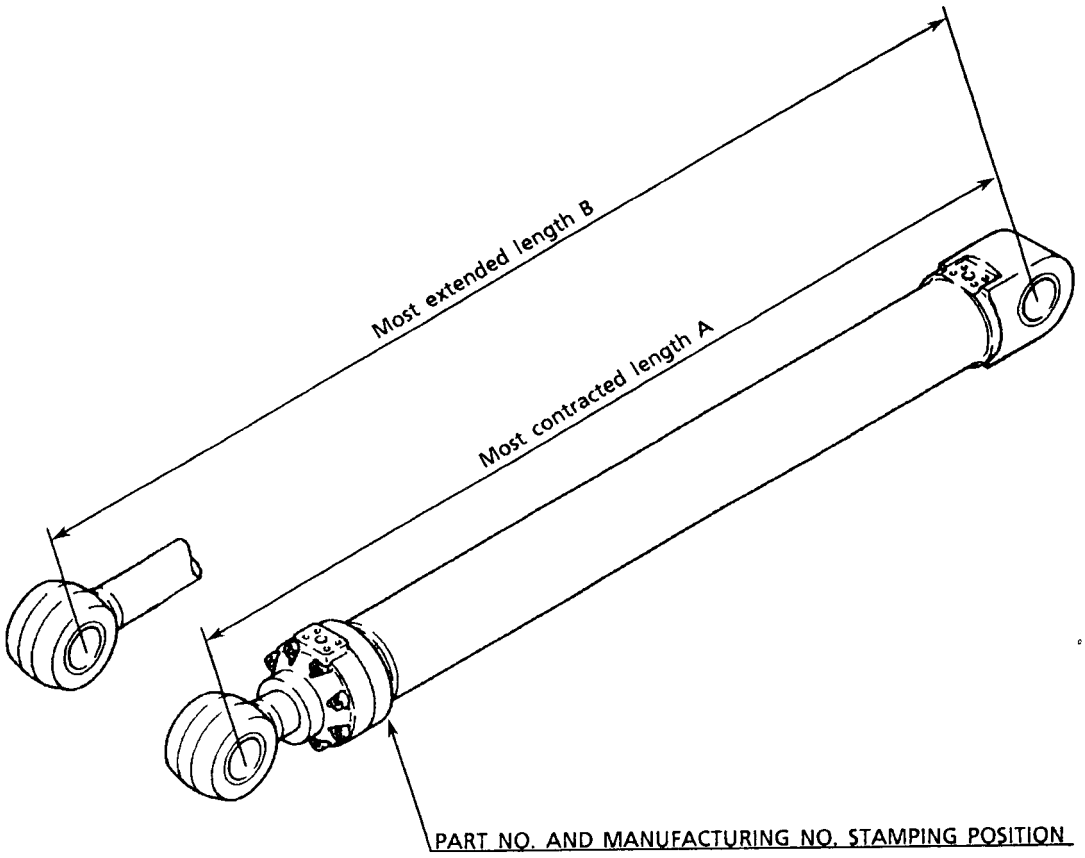
Aside from these major parts, packings, seals or bushings are provided on the sliding areas between piston (5) and cylinder tube (1), piston rod (4) and cover rod (13) or cylinder tube (1) and cover rod (13).



Construction of Hydraulic Cylinder

HYDRAULIC CYLINDER

GENERAL VIEW



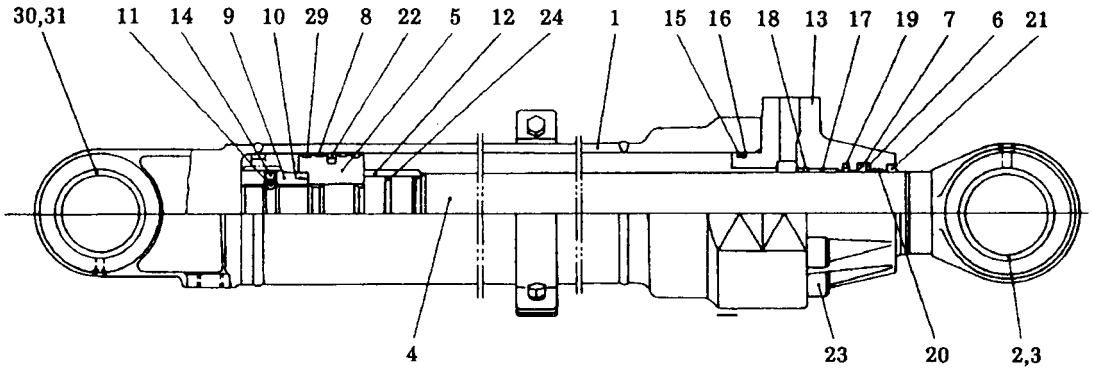
Outside view of cylinder

MAJOR SPECIFICATIONS

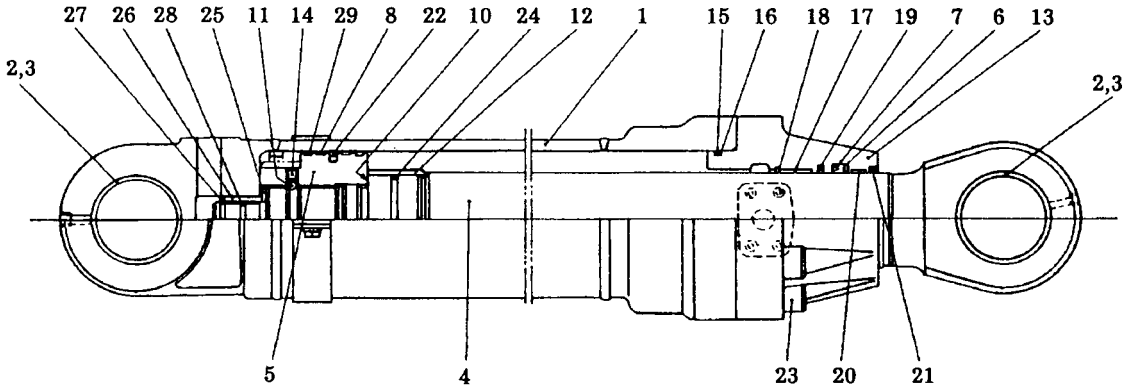
Unit : mm (ft-in)

Cylinder	Cylinder bore / Rod Dia.	Stroke	Center-to-Center Distance of Pins Full extended B / Full contracted A	Cushion	Weight kg (lbs)
Boom	125 / 85 (4.92" / 3.34")	1290 (4'3")	3100 / 1810 (10'2" / 5'11")	On rod side	160 (353)
Arm	145 / 100 (5.71" / 3.94")	1453 (4'9")	3443 / 1990 (11'3" / 6'6")	On both side	252 (556)
Bucket	120 / 80 (4.72" / 3.15")	1110 (3'7")	2720 / 1610 (8'11" / 5'3")	No	135 (298)

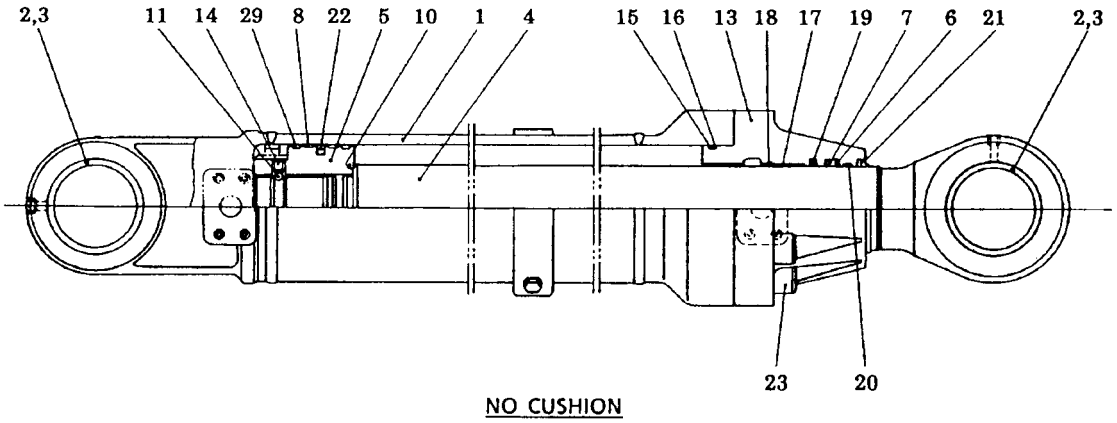
CONSTRUCTION



WITH ONE CUSHION



WITH BOTH CUSHION



NO CUSHION

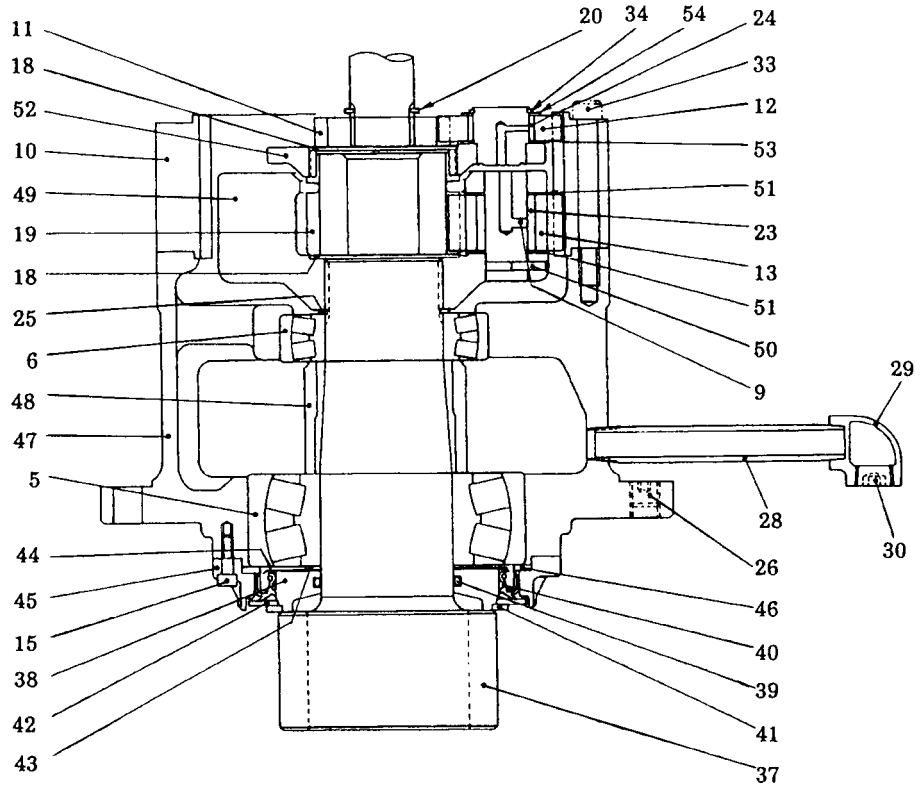
Cross-sectional view of cylinder

NO.	NAME	Quantity		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
1	CYLINDER TUBE	1	1	1
2	PIN BUSHING	1	2	2
3	WIPER RING	1	4	4
4	PISTON ROD	1	1	1
5	PISTON	1	1	1
6	BACKUP RING	1	1	1
7	U RING	1	1	1
8	SLIDE RING	2	2	2
9	PISTON NUT	1	1	1
10	SHIM	1	1	1
11	STEEL BALL	1	1	1
12	CUSHION RING	1	1	1
13	ROD COVER	1	1	1
14	SETSCREW	1	1	1
15	O RING	1	1	1
16	BACKUP RING	1	1	1

NO.	NAME	Quantity		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.
17	ROD BUSHING	1	1	1
18	CIRCLIP	1	1	1
19	BUFFER RING	1s	1s	1s
20	SLIDE RING	1	1	1
21	WIPER RING	1	1	1
22	SEAL RING	1s	1s	1s
23	SOCKET BOLT	8	8	8
24	CUSHION SEAL	1	1	–
25	SNAP RING	–	1	–
26	BEARING CUSHION	–	1	–
27	STOPPER	–	2	–
28	CUSHION SEAL	–	1	–
29	SLIDE RING	2	2	2
30	WIPER RING	1	–	–
31	PIN BUSHING	1	–	–

REDUCTION UNIT (SWING)

CONSTRUCTION

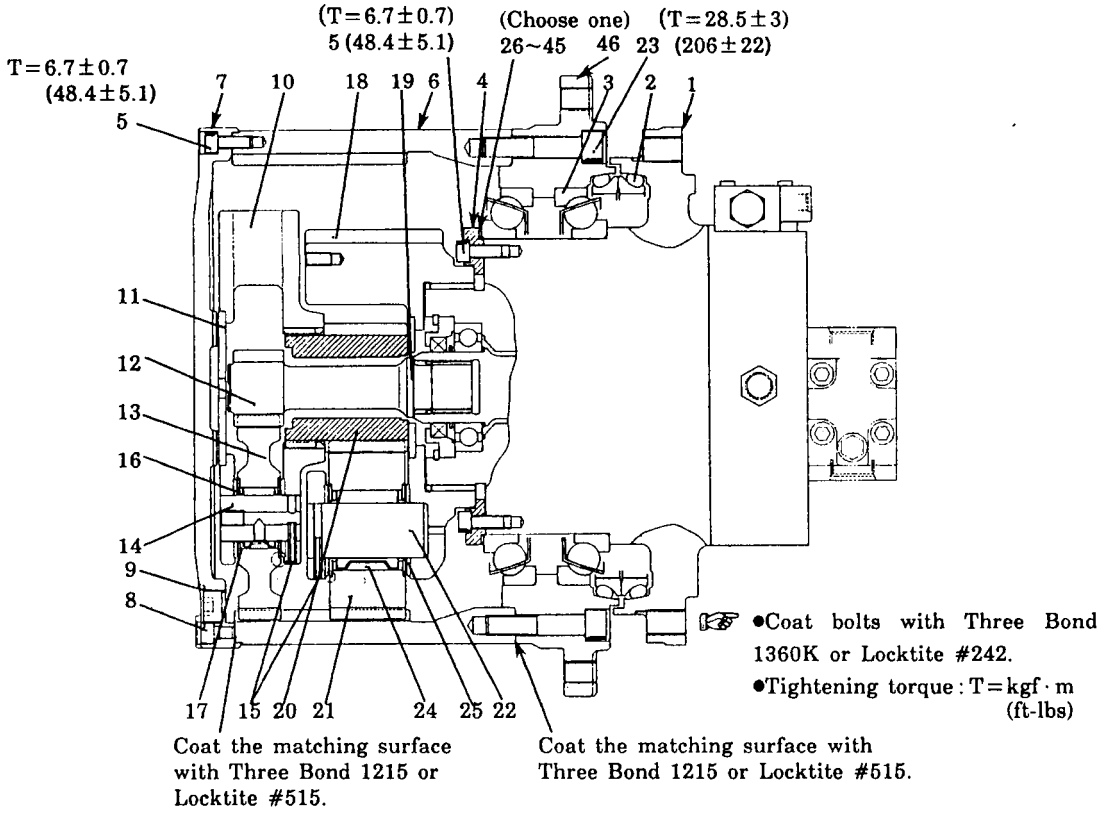


No.	NAME	Q'ty	No.	NAME	Q'ty
5	ROLLER BEARING	1	34	SNAP RING	1
6	ROLLER BEARING	1	37	PINION SHAFT	2
9	SHAFT	4	38	SLEEVE	1
10	INTERNAL GEAR	1	39	O RING	1
11	SUN GEAR	1	40	OIL SEAL	1
12	PLANETARY PINION	4	41	SNAP RING	1
13	PLANETARY PINION	4	42	PLATE	1
15	CAPSCREW	12	43	SPACER	1
18	SPACER	2	44	PLATE	1
19	SUN GEAR	1	45	RETAINER	1
20	SNAP RING	1	46	SPACER	1
23	ROLLER NEEDLE	76	47	HOUSING	1
24	ROLLER NEEDLE	140	48	SPACER	1
25	SNAP RING	1	49	SPIDER	1
26	SETSCREW	2	50	SPRING PIN	4
28	PIPE	1	51	THRUST WASHER	8
29	90° ELBOW	1	52	SPIDER ASSEMBLY	1
30	PLUG	1	53	THRUST WASHER	4
33	CAPSCREW	10	54	THRUST WASHER	4

REDUCTION UNIT (TRAVEL)

CONSTRUCTION

The reduction unit functions with a travel motor incorporated in its interior. Therefore, engine oil can not be filled in unless the travel motor is mounted.



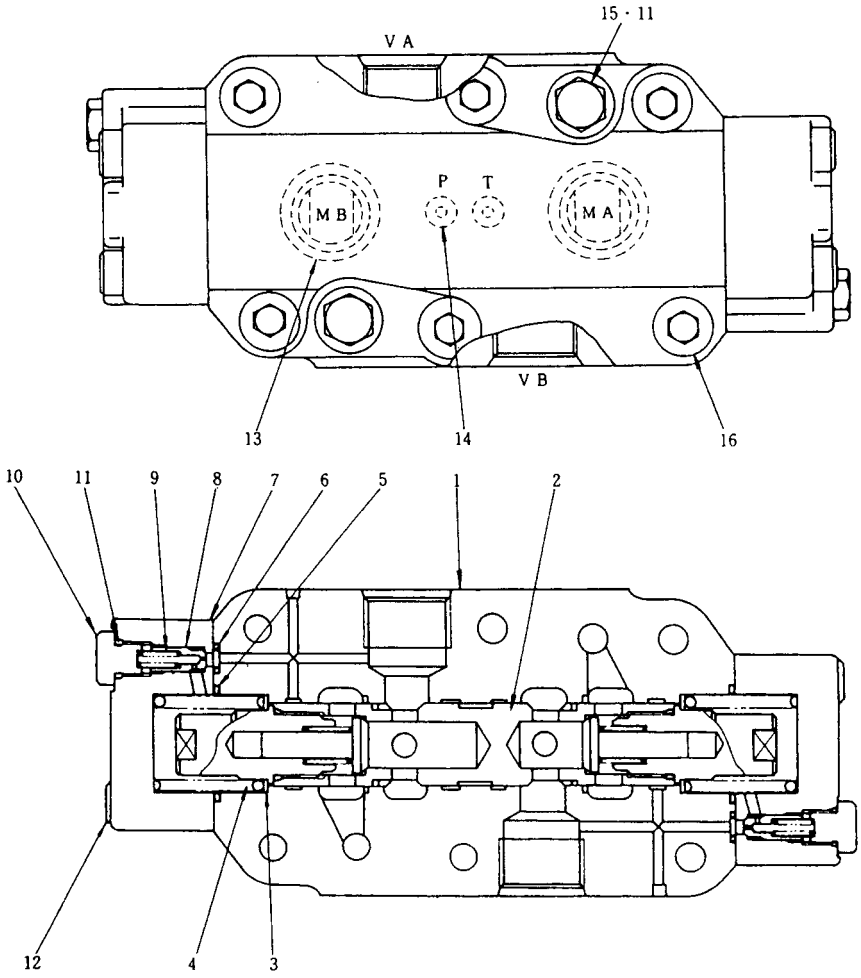
Cross-sectional view of reduction unit.

No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	MOTOR ASSEMBLY	1	17	THRUST WASHER	6	33	SHIM t=1.8mm (0.071in)	1
2	FLOATING SEAL	1	18	SPIDER	1	34	SHIM t=1.9mm (0.075in)	1
3	BEARING	2	19	SPACER	1	35	SHIM t=2.0mm (0.079in)	1
4	RETAINER	1	20	SUN GEAR	1	36	SHIM t=2.1mm (0.083in)	1
5	CAPSCREW	34	21	PLANETARY PINION	3	37	SHIM t=2.2mm (0.087in)	1
6	RING GEAR	1	22	SHAFT	3	38	SHIM t=2.3mm (0.091in)	1
7	COVER	1	23	CAPSCREW	18	39	SHIM t=2.4mm (0.094in)	1
8	CAPSCREW	2	24	NEEDLE BEARING	3	40	SHIM t=2.5mm (0.098in)	1
9	PLUG PT3/4	2	25	THRUST WASHER	6	41	SHIM t=2.6mm (0.102in)	1
10	SPIDER	1	26	SHIM t=1.1mm (0.043in)	1	42	SHIM t=2.7mm (0.106in)	1
11	SPACER	1	27	SHIM t=1.2mm (0.047in)	1	43	SHIM t=2.8mm (0.110in)	1
12	SUN GEAR	1	28	SHIM t=1.3mm (0.051in)	1	44	SHIM t=2.9mm (0.114in)	1
13	PINION PLANETARY	3	29	SHIM t=1.4mm (0.055in)	1	45	SHIM t=3.0mm (0.118in)	1
14	SHAFT	3	30	SHIM t=1.5mm (0.059in)	1	46	HUB	1
15	PIN SPRING	6	31	SHIM t=1.6mm (0.063in)	1			
16	NEEDLE BEARING	3	32	SHIM t=1.7mm (0.067in)	1			

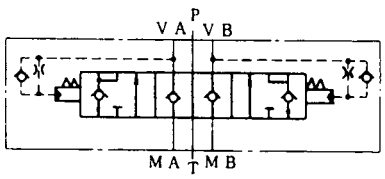
☞ Choose one from No.26~45

BRAKE VALVE (TRAVEL)

CONSTRUCTION



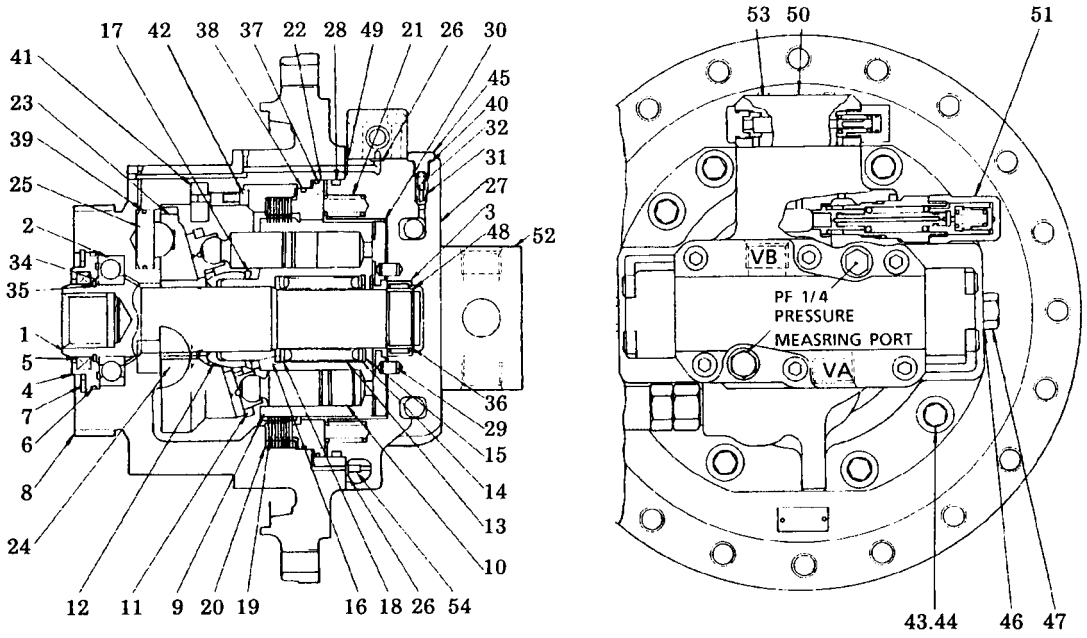
No.	NAME	Q'ty	No.	NAME	Q'ty
1	BODY	1	9	SPRING	2
2	SPOOL	1	10	PLUG	2
3	SPRING SEAT	2	11	O RING	4
4	SPRING	2	12	SOCKET BOLT	8
5	O RING	2	13	O RING	2
6	O RING	4	14	O RING	2
7	COVER	2	15	PLUG	2
8	RESTRICTOR	2	16	SOCKET BOLT	6



JIS SYMBOL

HYDRAULIC MOTOR (TRAVEL)

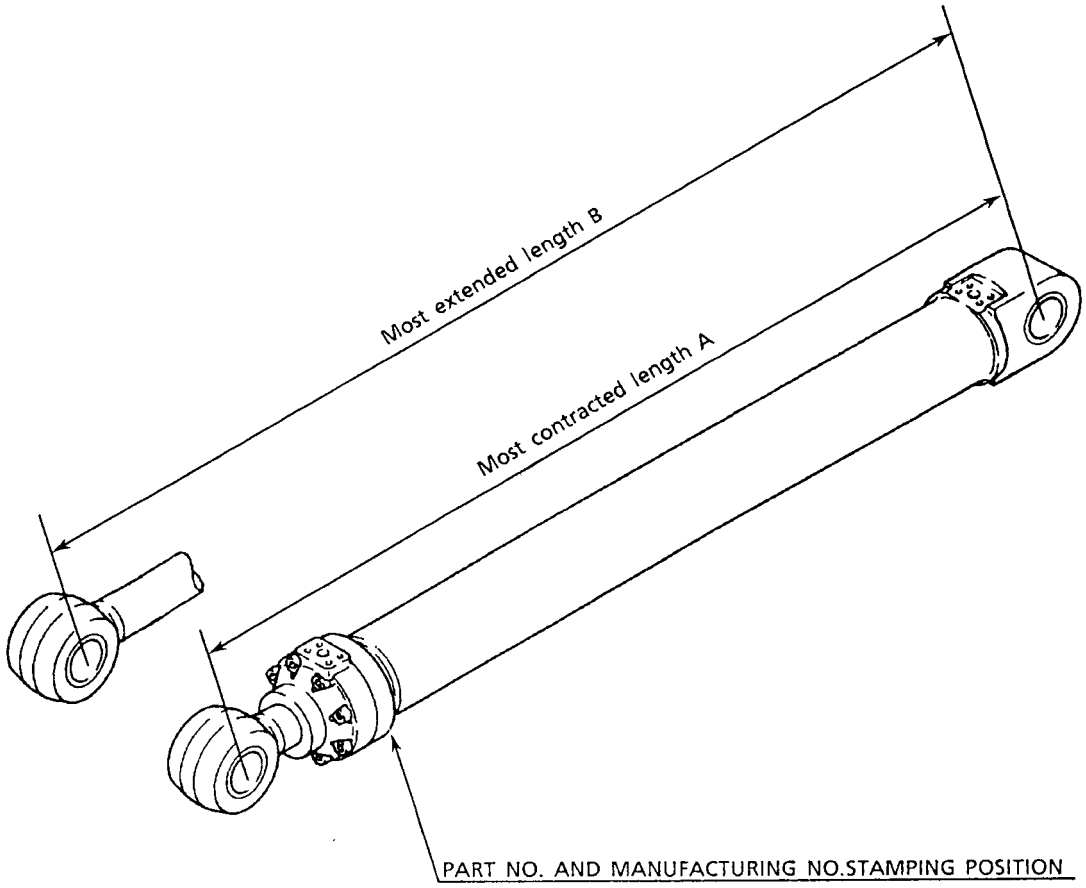
CONSTRUCTION



No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	SHAFT	1	19	FRICTION PLATE	4	38	PISTON RING (MEDIUM)	1
2	BEARING	1	20	SEPARATOR PLATE	5	39	PISTON (SMALL)	1
3	NEEDLE BEARING	1	21	BRAKE SPRING	14	40	O RING	3
4	SEAL BOX	1	22	BRAKE PISTON	1	41	TILTING STOPPER	1
5	OIL SEAL	1	23	SHOE PLATE	1	42	SOCKET BOLT	3
6	O RING	1	24	PIVOT	2	43	SOCKET BOLT	4
7	SNAP RING	1	25	TILTING PIN	1	44	SOCKET BOLT	6
8	CASING	1	26	O RING	6	45	PLUG	3
9	CYLINDER BLOCK	1	27	REAR COVER	1	46	O RING	2
10	PISTON ASSY	9	28	O RING	1	47	PLUG PF 1/2	2
11	SHOE RETAINER	1	29	STRAIGHT PIN	2	48	SNAP RING	1
12	BALL JOINT	1	30	VALVE PLATE	1	49	O RING	1
13	CYLINDER SPRING	1	31	CHECK VALVE	3	50	PILOT VALVE	1
14	SPRING SEAT	1	32	SPRING	3	51	OVERLOAD VALVE	2
15	SNAP RING	1	34	BEARING SPACER	1	52	COUNTER BALANCE VALVE	1
16	RETAINER PIN	3	35	SNAP RING	1	53	SOCKET BOLT	4
17	RETAINER PIN RECEIVER	1	36	INNER RACE	1	54	RESTRICTOR	1
18	SPRING SEAT	1	37	PISTON RING (LARGE)				

HYDRAULIC CYLINDER

GENERAL VIEW



Outside view of cylinder

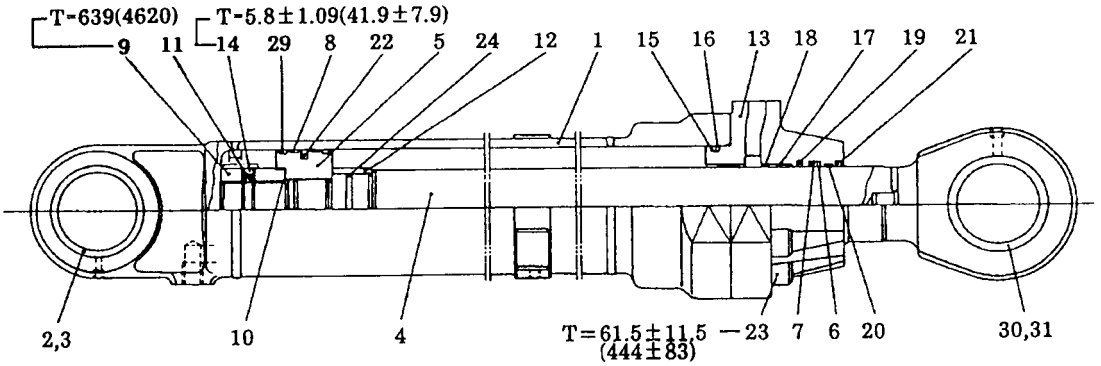
MAJOR SPECIFICATIONS

Unit : mm (ft-in)

Cylinder	Cylinder bore/Rod Dia.	Stroke	Center-to-Center Distance of Pins Full-extended/Full-retracted	Cushion	Weight (kg)
Boom	140/90 (5.51″/3.54″)	1334 (4′5″)	3264/1930 (10′9″/6′4″)	On rod side	209 (461 lbs)
Arm	150/105 (5.91″/4.13″)	1630 (5′4″)	3930/2300 (12′11″/7′6″)	On both side	320 (705 lbs)
Bucket	130/85 (5.12″/3.35″)	1170 (3′10″)	2920/1750 (9′7″/5′9″)	No	178 (392 lbs)

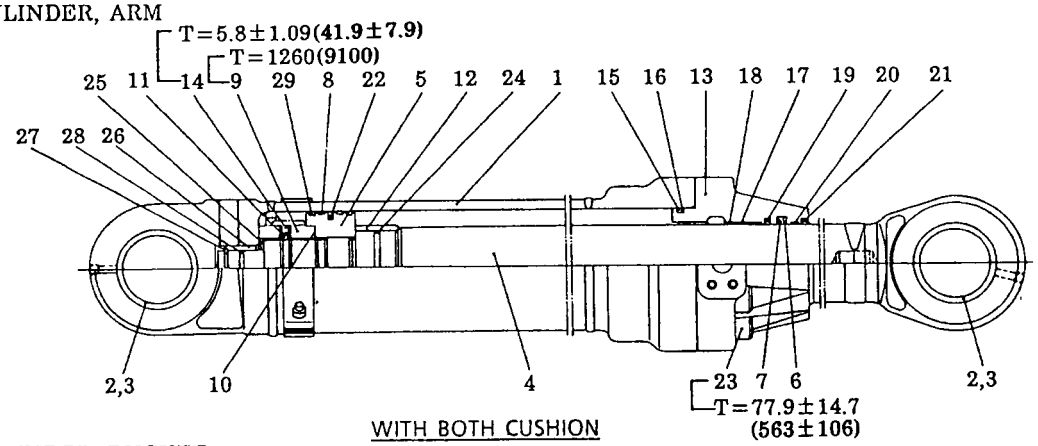
CONSTRUCTION

CYLINDER, BOOM



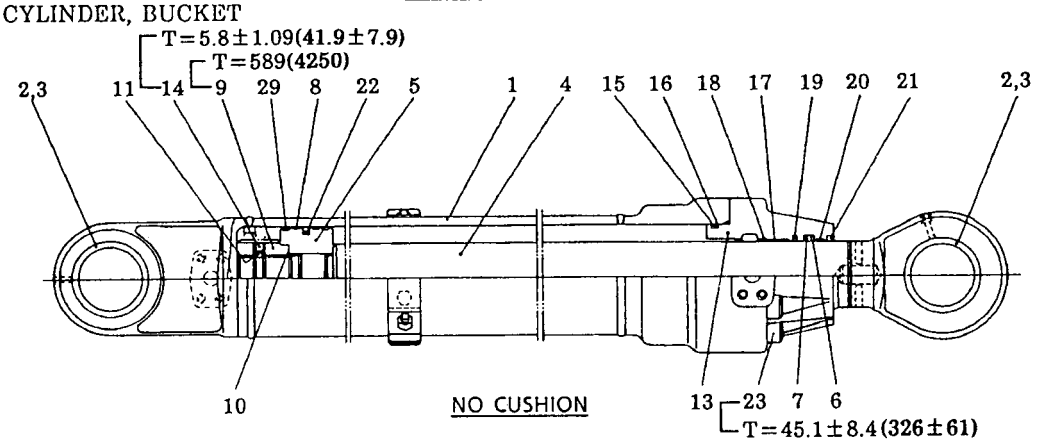
WITH ONE CUSHION

CYLINDER, ARM



WITH BOTH CUSHION

CYLINDER, BUCKET



NO CUSHION

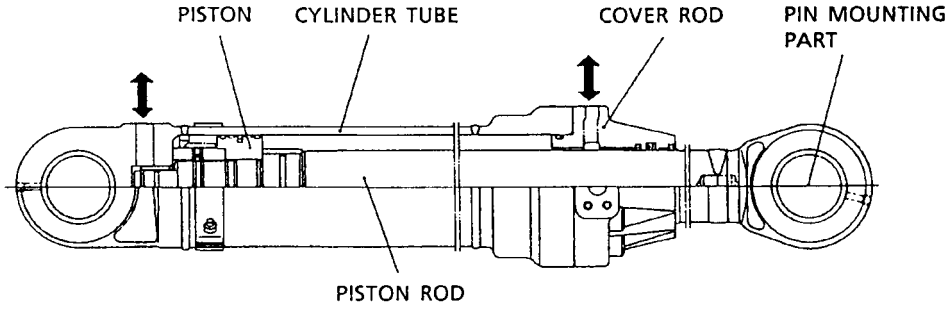
☞ Coat the screwed part of the cylinder head with ThreeBond 1360K (or equivalent).
Tightening Torque T=kgf·m (ft·lbs)

Cross-sectional view of cylinder

No.	PART NAME	Q'ty			No.	PART NAME	Q'ty		
		Boom Cyl.	Arm Cyl.	Bucket Cyl.			Boom Cyl.	Arm Cyl.	Bucket Cyl.
1	CYLINDER TUBE	1	1	1	17	ROD BUSHING	1	1	1
2	PIN BUSHING	1	2	2	18	CIRCLIP	1	1	1
3	WIPER RING	2	4	4	19	BUFFER RING	1	1	1
4	PISTON ROD	1	1	1	20	SLIDE RING	1	1	1
5	PISTON	1	1	1	21	WIPER RING	1	1	1
6	BACK-UP RING	1	1	1	22	SEAL RING	1	1	1
7	U RING	1	1	1	23	SOCKET BOLT	8	8	8
8	SLIDE RING	2	2	2	24	CUSHION SEAL	1	1	-
9	PISTON NUT	1	1	1	25	SNAP RING	-	1	-
10	SHIM	1	1	1	26	CUSHION RING	-	1	-
11	STEEL BALL	1	1	1	27	STOPPER	-	2	-
12	CUSHION RING	1	1	-	28	CUSHION SEAL	-	1	-
13	ROD COVER	1	1	1	29	SLIDE RING	2	2	2
14	SETSCREW	1	1	1	30	PIN BUSHING	1	-	-
15	O RING	1	1	1	31	WIPER RING	2	-	-
16	BACK-UP RING	1	1	1					

By construction the hydraulic cylinder consists largely of cylinder tube (1), piston (5) that reciprocates in it, piston rod (4) that takes the movement of the piston outward and rod cover (13) that serves as a lid/guide. The cylinder tube (1) and the piston rod (4) has a crevis, a trunnion or a flange to come in contact with other parts.

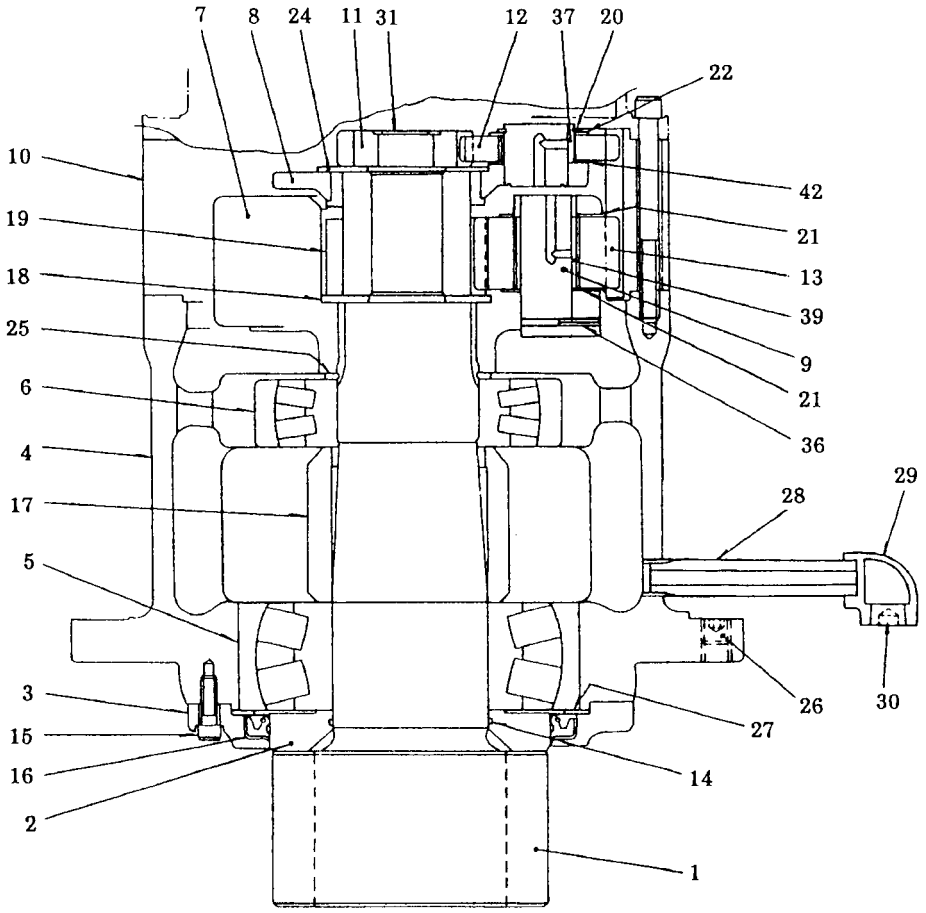
Packings, seals and bushes are used in the moving part or on the mounting part between piston (5) and cylinder tube (1), between piston rod (4) and rod cover (13) and between cylinder tube (1) and rod cover (13).



Construction of Hydraulic Cylinder

REDUCTION UNIT (SWING)

CONSTRUCTION



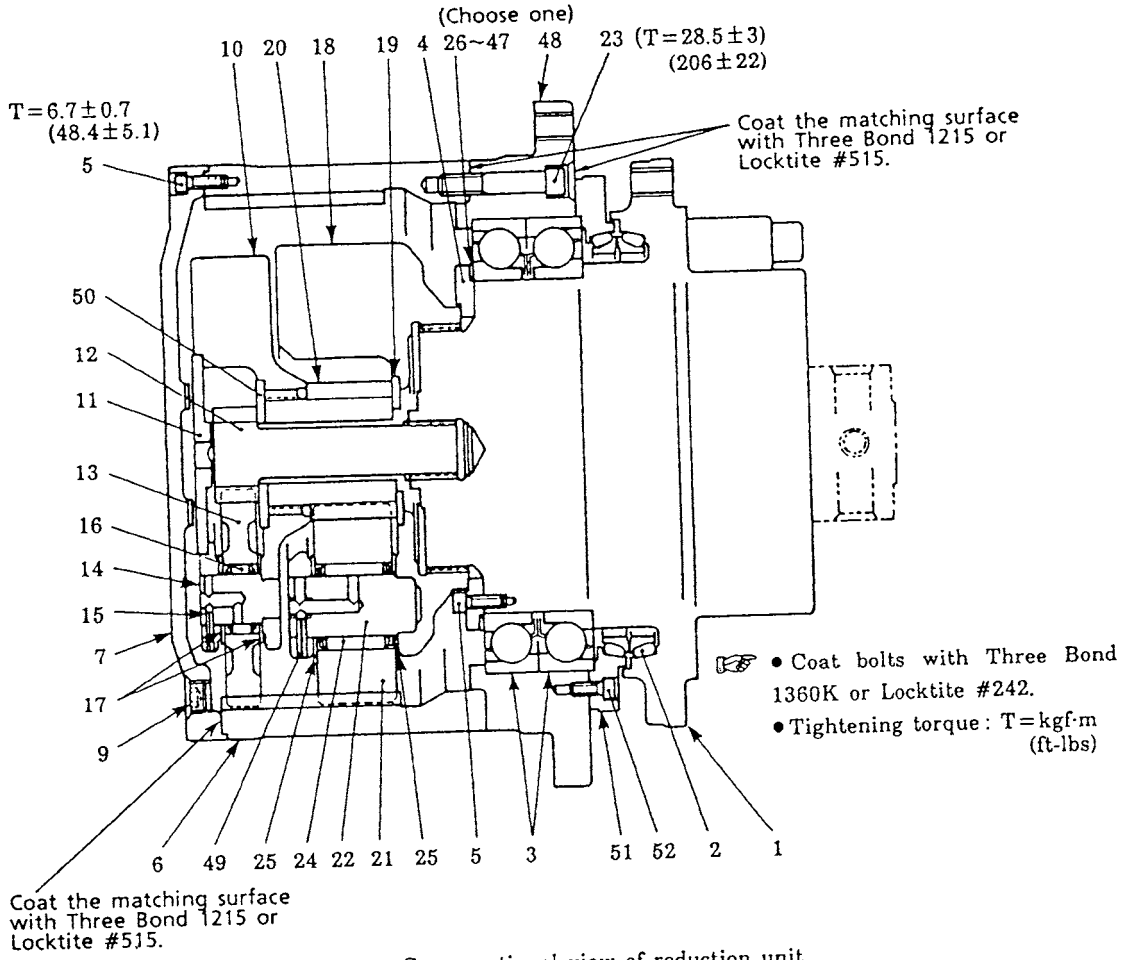
section of reduction unit

No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	PINION SHAFT	1	13	PINION	4	26	SETSCREW	2
2	SLEEVE	1	14	O RING	1	27	SPACER	1
3	RETAINER	1	15	SOCKET BOLT	12	28	PIPE	1
4	HOUSING	1	16	OIL SEAL	1	29	ELBOW	1
5	ROLLER BEARING	1	17	SPACER	1	30	PLUG	1
6	ROLLER BEARING	1	18	SPACER	1	31	SNAP RING	1
7	SPIDER	1	19	SUN GEAR	1	36	SPRING PIN	4
8	SPIDER ASSEMBLY	1	20	SNAP RING	4	37	BEARING	4
9	SHAFT	4	21	THRUST WASHER	8	39	BEARING	4
10	INTERNAL GEAR	1	22	THRUST WASHER	4	42	THRUST WASHER	4
11	SUN GEAR	1	24	SPACER	1			
12	PINION	4	25	SNAP RING	1			

REDUCTION UNIT (TRAVEL)

CONSTRUCTION

The reduction unit functions with a travel motor incorporated in its interior. Therefore, engine oil can not be filled in unless the travel motor is mounted.



Cross-sectional view of reduction unit.

Unit: mm (in)

No.	NAME	Q'ty	No.	NAME	Q'ty	No.	NAME	Q'ty
1	MOTOR ASSEMBLY	1	19	SPACER	1	36	SHIM t=2.1 (0.083)	1
2	FLOATING SEAL	1	20	SUN GEAR	1	37	SHIM t=2.2 (0.087)	1
3	BEARING	2	21	PLANETARY PINION	3	38	SHIM t=2.3 (0.091)	1
4	RETAINER	1	22	SHAFT	3	39	SHIM t=2.4 (0.094)	1
5	CAPSCREW	38	23	CAPSCREW	18	40	SHIM t=2.5 (0.098)	1
6	RING GEAR	1	24	NEEDLE BEARING	3	41	SHIM t=2.6 (0.102)	1
7	COVER	1	25	THRUST WASHER	6	42	SHIM t=2.7 (0.106)	1
9	PLUG PT3/4	2	26	SHIM t=1.1 (0.043)	1	43	SHIM t=2.8 (0.110)	1
10	SPIDER	1	27	SHIM t=1.2 (0.047)	1	44	SHIM t=2.9 (0.114)	1
11	SPACER	1	28	SHIM t=1.3 (0.051)	1	45	SHIM t=3.0 (0.118)	1
12	SUN GEAR	1	29	SHIM t=1.4 (0.055)	1	46	SHIM t=3.1 (0.122)	1
13	PINION PLANETARY	3	30	SHIM t=1.5 (0.059)	1	47	SHIM t=3.2 (0.126)	1
14	SHAFT	3	31	SHIM t=1.6 (0.063)	1	48	HUB	1
15	PIN SPRING Ø6 (0.24)	3	32	SHIM t=1.7 (0.067)	1	49	PIN SPRING Ø8 (0.31)	3
16	NEEDLE BEARING	3	33	SHIM t=1.8 (0.071)	1	50	SPACER	1
17	THRUST WASHER	6	34	SHIM t=1.9 (0.075)	1	51	RETAINER	1
18	SPIDER	1	35	SHIM t=2.0 (0.079)	1	52	CAPSCREW	18

☞ Choose one from No.26~47

PERFORMANCE INSPECTION STANDARD

GENERAL

1) The terms used in this Maintenance Standards shall have definitions as follows:
   Standard value:
   Standard values for adjustment or assembly of a new machine, provided the values are for standard specifications (machine with standard attachments and shoes) unless otherwise specified.
   Allowable value:
   A limit value that shall not be exceeded. If it is exceeded, remedy or replacement is required. Avoid using a machine, exceeding this value to maintain the performance or safety of the machine.
   Limit value of use:
   A value at which machine adjustment or parts replacement becomes unnecessary if it is exceeded. If the machine is still used beyond the limit value, the machine will be faced with failures leading to the out-of operation and will develop safety problems.
   Oil temperature:
   Temperature to be applied. The temperature of hydraulic oil refers to that in the hydraulic oil tank. Hydraulic oil must be circulated continuously so that the oil temperature in the circuits may be leveled off with that of the tank.
2) For items without allowable values, adjust and repair or replace them with reference to the standard values.
3) Rubber products such as hydraulic hoses, O rings and oil seals deteriorate with time. Replace them regularly or at overhaul.
4) It is advisable that important hoses for safety purpose be designated as very important parts (V.I.P.) and be replaced regularly.
5) In proceeding to maintenance, it is essential to get familiar with machine operating procedures, precautions to be observed and inspection / lubrication procedures. Read through the Operators Manual as well.

EQUIPMENT TO BE PREPARED

Pressure gauge	70kgf/cm² (1000 psi)	3 pcs
	500kgf/cm² (7000 psi)	2 pcs
Pressure measuring set		1 set
Surface thermometer (with magnet)		1 pcs
Hydraulic oil analyzing apparatus		1 set

STANDARD MEASURING CONDITION

Within standard measuring condition in Performance Inspection Standard Table

(1) Measuring Procedure and Method

1) Measuring the cleanliness of operating oil
Measure cleanliness with an analysis apparatus after taking sample oil from the operating oil tank. If the oil shows a cleanliness exceeding an allowable value, flush the oil or replace the filter.
2) Raising the temperature of the operating oil
Attach a thermometer in the surface of the operating oil tank and measure temperature. Wait till the temperature rises by raising the boom or by relieving the bucket relief valve.
3) Raising the water temperature
Attach a thermometer in the surface of the radiator and measure the temperature. Run the engine and wait till temperature rises.

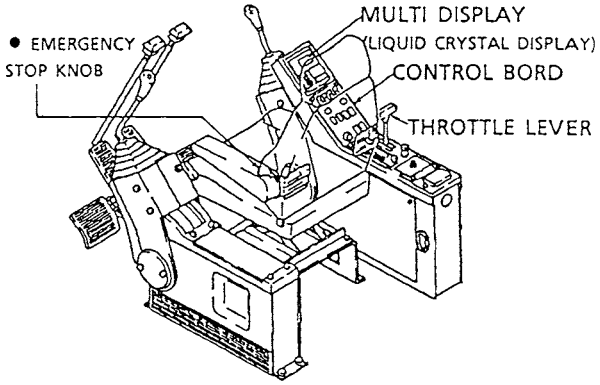
READING THE ENGINE REVOLUTION

Following is a procedure whereby the engine revolution is read on the multi-display:

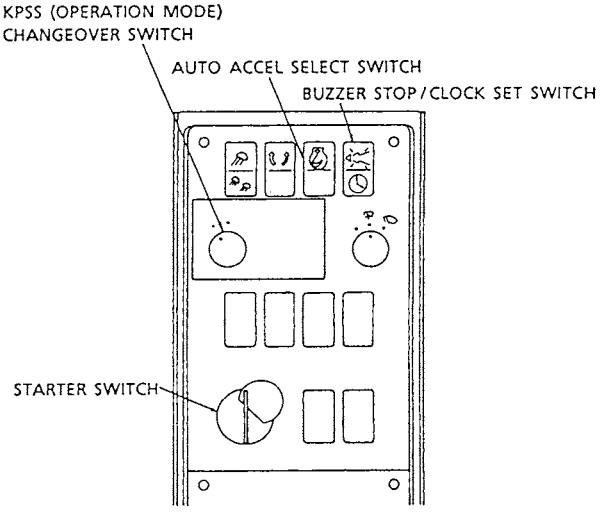
1) With the buzzer stop switch turned to "ON", turn the starter key switch to "ON". However, keep the engine stopped.
2) Depress the buzzer stop switch five times and get an engine rotation mark and a controller part number.
3) Depress the buzzer stop switch by turns. An engine revolution will be indicated at the 23rd out of 24 pressings.
4) If the engine is started here, the display will be as shown on the right, for instance.
5) Turn off the auto acceleration select switch
6) Set the throttle lever to the maximum revolution "HI".
7) Change over the operation mode (KPSS) switch to H,FC by turns and compare the revolution at no load with an existing revolution.
8) If the revolution falls within a tolerance, determine that the engine and the controller are normal, and measure and adjust the pressure of the hydraulic circuit.

Revolution at no load = present revolution $^{+50}_{-50}$

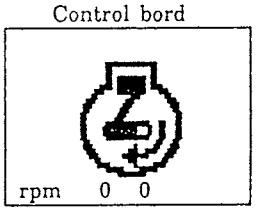
9) If the revolution runs out of a tolerance, adjust the revolution according to the procedure for the adjustment of the following mechatro controller.



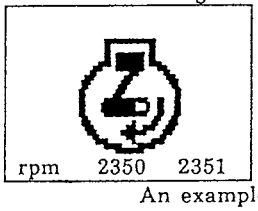
Operating controls



Control bord



Displaying the engine revolution when the engine is at rest



- 2351 ····· Present revolution
- 2350 ····· No-load revolution at mechatro adjustment (Hereinafter called no-load revolution)
- rpm ····· Revolution

An example of engine revolution display when running

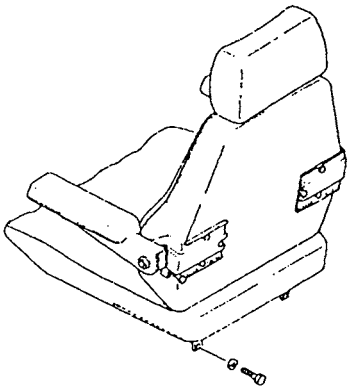
ADJUSTING THE ENGINE REVOLUTION BY MECHATRO CONTROLLER

The adjustment of the mechatro controller which will be mentioned hereinunder must be performed whenever the above engine revolution runs out of a target tolerance or whenever either the controller or the stepping motor is replaced. If you follow the adjusting procedure incorrectly, adjustment data may be broken. Always stick to the procedure and reminders.

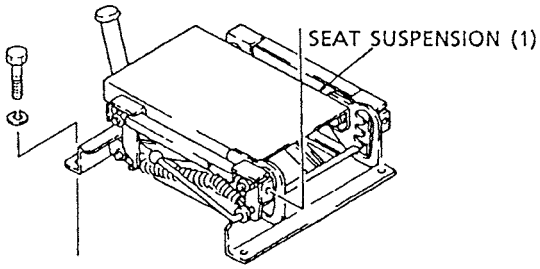
〔 Procedure for adjusting the engine revolution 〕

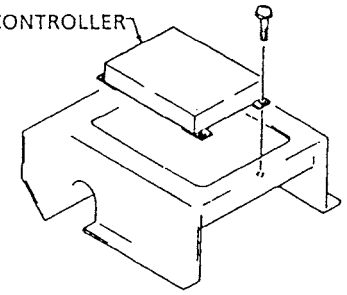
(1) Setting engine stop high positions
 1) Read and reset an adjust signal (TEST).
 2) Adjustment start condition
 3) Adjustment signal timing
 4) Setting the engine revolution stop position
 5) Setting engine revolution high speed position
 6) Fixing engine revolution high speed position
 7) Storing engine revolution high speed position

(2) Setting engine revolution
 1) Read and reset an adjust signal (TEST).
 2) Adjustment start condition
 3) Adjustment signal timing
 4) Storing the revolution and position of the stepping motor
 5) Closing the reading of adjust signals (RUN)



Removing the operator seat





Mounted position of mechatro controller

SETTING THE ENGINE STOP AND HIGH POSITIONS

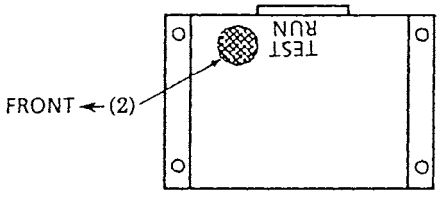
(1) Prepare to read and reset (TEST) an adjust signal.

1) Take off the operator seat and remove seat suspension (1) fixed to the seat stand.

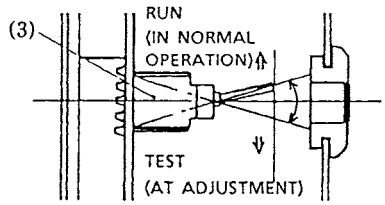
2) Remove cap (2) of the controller.

3) After confirming that the engine key is at "OFF".
 Push the adjust switch (3) in the controller in the TEST direction through the hole in the rubber cap, read and reset an adjust signal.

⚠ Adjustment data may be broken unless the switch (3) is pressed with the engine key in "OFF" position.



Removing controller cap (2)



Direction of pushing the adjust switch in the controller

(2) Adjustment start condition

1) Adjust switch in controller·····TEST

2) KPSS (operation mode)
changeover switch ·····H mode

3) Auto accel select switch·····ON

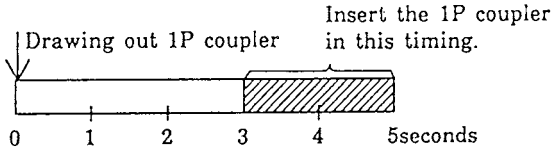
4) Throttle lever ·····Low idle

5) Starter key ····Engine at rest with the starter switch "ON"

(3) Adjust signal timing

1) Adjust signal
To receive an adjust signal that actuates the stepping motor, pull out and put in 1P coupler (4) at the inlet of the controller.

2) Adjust timing
There is a timing at which IN /OUT signals of the 1p coupler work effectively. The timing is limited to two seconds in the hatching of the below figure.



☞ If it is set within an adjust timing, "CPU" is indicated on the magnetic display, implying that it has entered adjustment. Then the stepping motor runs itself to the stop position.

3) When insertion of the 1P coupler runs out of the adjustment timing:
When a time display appears on the multi display even if the 1P coupler is inserted, draw out the 1P coupler above match the insertion timing.

(4) Adjust signal reset operation

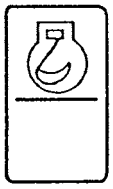
1) Pull out the 1P coupler for initial adjustment and put it in again within a few seconds.

2) Lighting the CPU display and transferring the motor stop position
A CPU indication appears on the multi display and the stepping motor runs to the engine stop position.

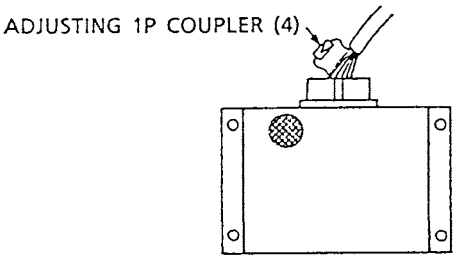
(5) Procedure for setting an engine stop position

1) Turn the stepping motor lever (8) clockwise to 22.5-360°/23 from the perpendicular line.

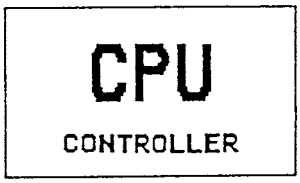
2) Connect the control cable to the fixing bracket and the lever (8) and arrange them as shown in the figure 13.



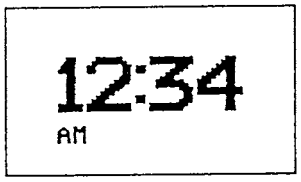
Auto accel select switch



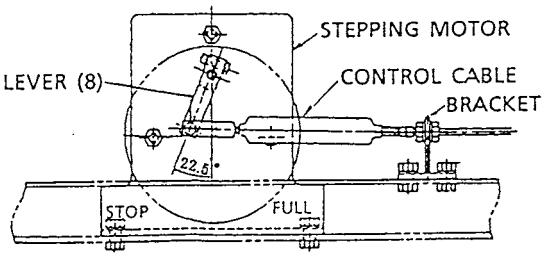
Position of the adjusting 1P coupler of the controller



CPU indication on multi display



An example of time display on the multi display



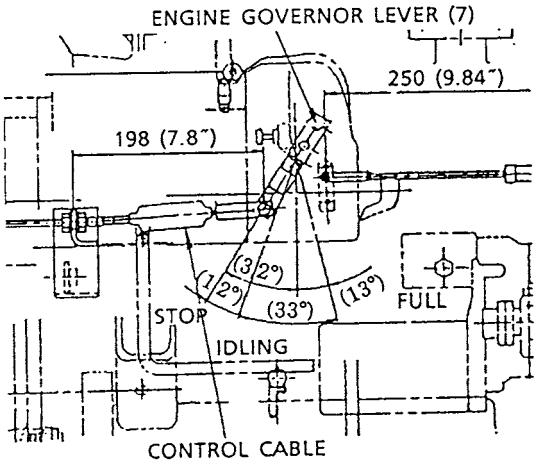
Stop position of stepping motor

3) On the engine side also, attach the control cable to the mounting bracket. Then put a 0.2mm (0.008in) thickness gauge between the engine governor lever (7) and the stop adjust bolt and press it till it hits the bottom.
   In that position, lock the control cable nut to the engine side bracket.
4) Re-confirm the 0.2mm (0.008in) clearance.

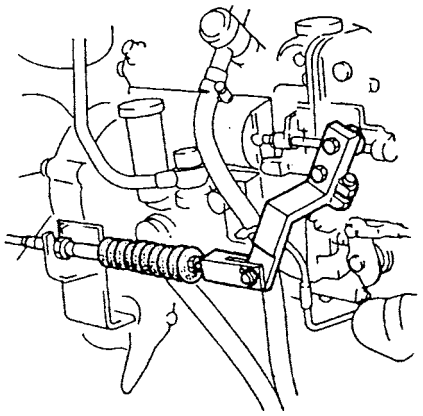
(6) Procedure for adjusting the high speed position on the engine side

1) Pull out the 1P coupler for second adjustment. Then, the power to the stepping motor is shut off.
2) The lever (8) of the stepping motor is freed and can be moved by hand. Then turn the lever counterclockwise (to FULL) to the full by hand.
3) Put a 0.2mm (0.008in) thickness gauge between the engine governor lever (7) and the stop adjust bolt on the high speed side (on your left), push it till it hits the bottom and hold it in that condition.
4) Insert the 1P coupler for second adjustment. Then the stepping motor is powered and locked at high position.
5) Make sure once again of the 0.2mm (0.008in) clearance.
6) Pull out the 1P coupler for 3rd adjustment and then put it in. Then the stepping motor runs itself and moves toward the stop side. This completes all adjustments, and the CPU display goes out.
7) Where you wish to perform fine adjustment of the 0.2mm (0.008in) clearance under 5).

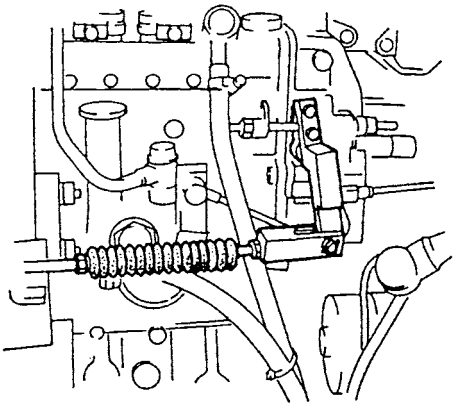
If the controller is 2480U310F2 and 2480U310F5, the stepping motor rotates about 0.04mm (0.0016in) in the high idle direction if the auto acceleration select switch is "ON" and in the low idle direction if the auto acceleration select switch is "OFF", each time the buzzer stop switch is turn "ON". Adjust the clearance using this function.



Mounting position of control cable



Setting the high speed position by clearance adjustment



Setting the high speed position by clearance adjustment

SETTING THE ENGINE REVOLUTION

(1) Read and reset an adjust signal (TEST).
Perform it the same way with the adjust switch (3) in the controller at TEST.

(2) Adjust reset condition.

1) Adjust switch in controller ····· TEST
2) KPSS (operation mode) select switch ··· H mode
3) Auto accel select switch ····· OFF
4) Throttle lever ····· LOW IDLE
5) Engine ····· RUNNING

Differences in setting the engine stop and high positions in para. 2.5 are those surrounded by a rectangle.

(3) Adjust signal timing

1) Draw out 1P coupler (4) and then insert 3~5 seconds later the same way as above.
2) Confirming that the CPU display is lit.
The same as above.

(4) Storing the rotating position of the stepping motor
The stepping motor runs itself from a position further below LOW IDLE (a little above ENGINE STOP) to HI IDLE to read and store engine revolutions.

☞ • If the controller is 2480U310F1 or 2480U310F2, the adjustment under (7) must be additionally required.
• If the engine key is turned "OFF" during adjustment, storage gets unstable. In that case, adjust it once again.

(5) Confirming that the CPU display is off
Confirm that CPU display is off on the multi display.

(6) Blocking reading adjust signals (RUN)
More than four seconds after the engine key is turned to OFF, turn the adjust switch (3) in the controller to "RUN".

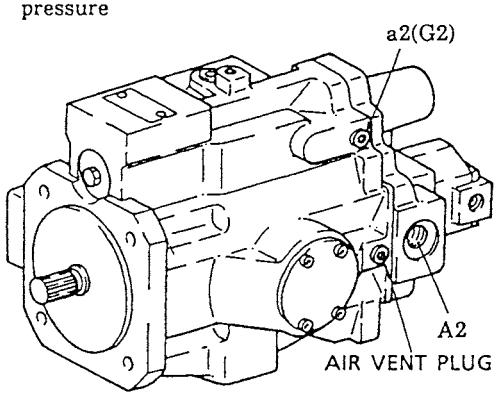
Four seconds after the engine key is turned "OFF", power supply is turned off. Adjustment data may be broken in some cases if adjust switch (3) is depressed when power supply is on.

(7) If the controller is 2480U310F1 or 2480U310F2 is under item (4), pull out the 1P coupler and put it in once again.Otherwise, self running, reading and storge do not begin.

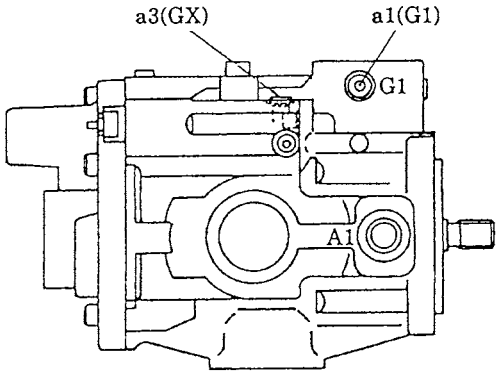
This manipulation is not neccssary on 2480U310F5.

PRESSURE MEASURING POSITIONS

(1) Ports (a1, a2) for tapping the main circuit pressure



a2 side / EY circuit pressure tapping port



a2 side / EY circuit pressure tapping port

MEASURING AND ADJUSTING THE CIRCUIT PRESSURE

(1) Procedure for measurement

1) Do not adjust pressure if measured values fall within the tolerances of Table 1. In case adjustment is necessary, the target shall be:

$$\text{Standard value} + \frac{\text{Tolerance (upper limit + lower limit)}}{2}$$

2) Measure port pressures by tightening the main relief valve after measuring the main relief pressure. (Marking on the adjusted points will promote restoration of pressure.)

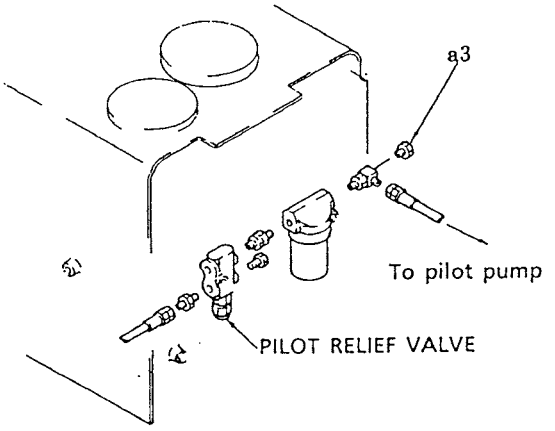
(2) Procedure for Measurement

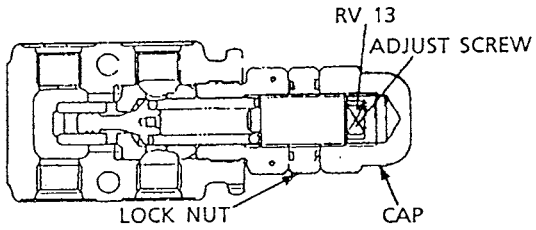
As mentioned above, attach a pressure gauge, adjust the water and oil temperature conditions within standard ranges, confirm the engine revolution and measure pressure according to the following procedure:

1) Measure the primary pilot pressure.
2) Measure the main relief pressure and tighten the adjust screw up.
3) Measure the port relief pressure.
4) Measure the swing port relief pressure.
5) Measure the travel relief valve pressure.
6) Bring the adjusted main relief valve pressure back to its original level.

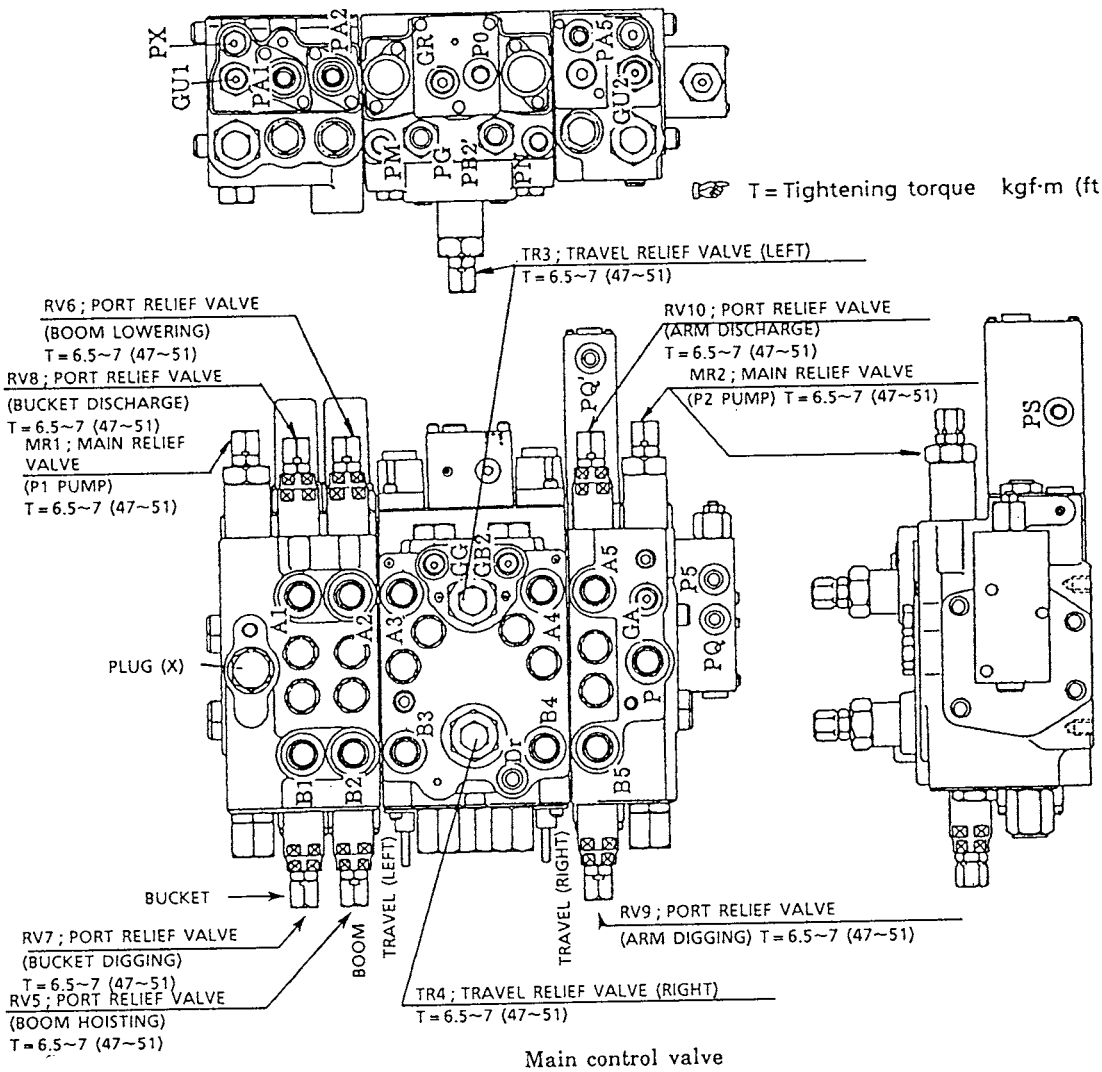
(3) Pressure adjustment

1) Measuring the primary pilot pressure
   Location ····· Port a3 that taps the pilot circuit pressure in
   Method ····· When all operating levers are neutral
   Adjustment ····· By means of the adjust screw (RV13) of the pilot relief valve
2) Measuring and tightening the main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Bucket digging (a1 side)
   Boom hoisting (a2 side)
   Adjustment ····· Main relief MR1 and MR2
   Tighten the adjust screws 180 deg. to measure the pressure of ports. (because it is lower than the port pressure.)
3) Measuring the port relief pressure
   Location ····· Port a1 or a2 that taps the main circuit pressure
   Method ····· Refer to "Measurement" in Table 1.
   Adjustment ····· Port relief valves (RV9-RV12)
4) Measuring the swing port relief pressure
   Location ····· Ports PA and PB of the swing control valve
   Method ····· Lock the bucket with the shoe plate.
   Adjustment ····· Swing relief valves RV11 and RV12
5) Measuring the travel main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Operate both the RH and LH sides (front and back) at the same time at 2-speed and in the H mode. (Lock both sprockets.)
   Adjustment ····· Travel relief valves (TR1 and TR2)
6) Returning the adjusted main relief valve pressure
   Lastly, return the adjust screw of the main relief valve 180 deg. or to the matching mark point so it falls within a standard tolerance.
7) Pilot circuit pressure tapping port

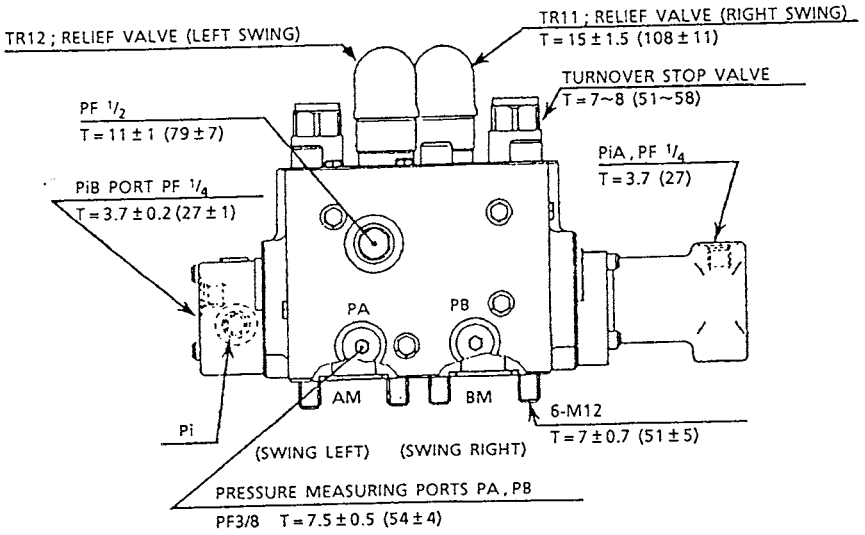




Pilot circuit pressure tapping port a3 and relief valve adjust screw



Main control valve



Outside view of swing control valve (As seen from blow)

(NOTE ; Take measurement in the S mode, unless otherwise specified.
The standard tolerance shall be an allowable range in field measurements.)

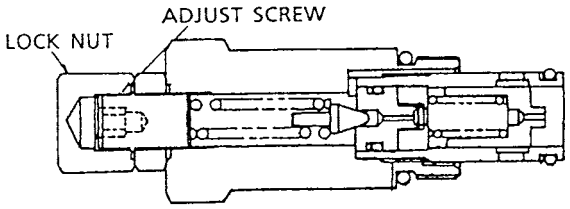
	Inspection item			Pressure measurement: Position	Port	Size	Bench test value	※ Tolerance		Unit	Control	Measurement: Condition, function
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil in tank			8	+1	−1	Class	−	Takeout of sample
	Temperature of hydraulic oil			Tank surface			50 (122)	+5 (+9)	−5 (−9)	°C	−	Air temperature 50°~−10°C (122~14)
	Water temperature			Radiator surface			75 (167)	+15 (+27)	−15 (−27)	(°F)	−	Air temperature 50°~−10°C (122~14)
	Engine revolution	Low idle		Multi display			875	+25	−25	rpm	Adjustment not neccessary	FULL throttle
		Hi idle					2350	+50	−50			
		S										
		FC					1900	+50	−50			
		Decel					1050	+50	−50			
Main circuit	Main relief pressure	Attach	RH	Pump	a1	PF1/4	210 (2990)	+5 (+71)	0 (0)	kgf/cm² (psi)	MR1	Bucket digging
			LH		a2						MR2	Boom hoisting
		−					−	−	−		−	
											−	
		Travel	RH		a1		260 (3700)	+5 (+71)	0 (0)		TR1	Simultaneous RH/LF operation in H mode and at 2-speed
			LH		a2						TR2	
	Port relief pressure	Boom	R		a1		240 (3410)				RV6	Mode H Main relief pressure range 190~215K (2700~3060)
			H				240 (3410)				RV5	
		Arm	R		a2		240 (3410)				RV10	Mode H Main relief pressure range 210~215K (2990~3060)
			H								RV9	
		Bucket	R		a1		240 (3410)				RV8	
			H				240 (3410)				RV7	
		Swing	RH		a2		175 (2490)	+40 (+569)	0 (0)		RV11	
			LH								RV12	
Pilot circuit	Primary pressure	Discharge pressure		G pump	P	PF1/4	35 (498)	+2 (+28)	−1 (−14)		−	Mode H
	KPSS Soleniod proportional valve for secondary pressure	H		Pump	a3	PF1/4	0 (0)	+1 (+14)	0 (0)		−	
											−	
		FC					7 (100)	+2 (+28)	−1 (−14)		−	
											−	
		Release									−	
		Boost pressure										

※ Tolerance ;
The upper and lower limits, when added or subtracted to the bench test value, provide an acceptable range when measuring pressures on a actual machine.

PROCEDURE FOR ADJUSTING THE PRESSURE OF INDEPENDENT RELIEF VALVES

1) Procedure for Adjusting the Main Relief Valve
Turning the adjust screw clockwise increases the pressure, while turning it counterclockwise decreases the pressure. References for pressure variations are as follows:

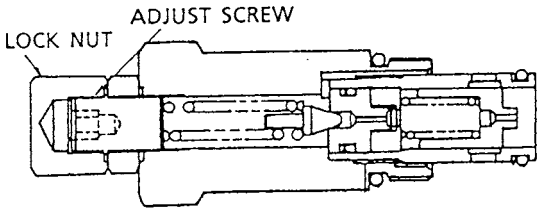
Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 54 (768)
1/4 turn	about 27 (384)



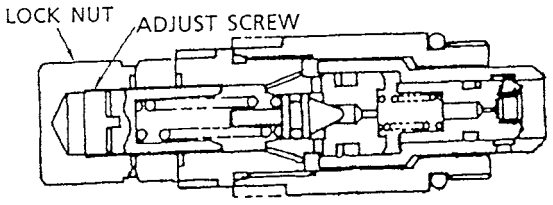
Main relief valve (71B)

2) Adjustment procedures for travel relief valve and port relief valve
Turning the adjust it counterclockwise decreases the pressure. Given below are the pressure changes for reference:

Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 62 (882)
1/4 turn	about 31 (441)



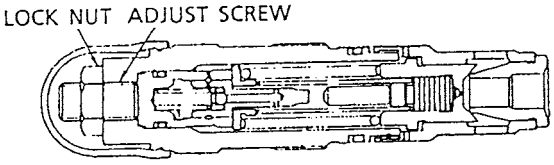
Travel relief valve (71A)



Port relief valve (72)

3) Procedure for adjusting swing relief valve
Turning the adjust screw clockwise increases the pressure and turning the adjust screw counter-clockwise decreases the pressure. Given below are guidelines of pressure variation.

Turn of adjust screw	Pressure change kgf/cm² (psi)
1 turn	about 52 (739)
1/4 turn	about 26 (370)



Swing relief valve

EQUIPMENT TO BE PREPARED

Pressure gauge	70kgf/cm2 (1000 psi)	3 pcs
	500kgf/cm2 (7000 psi)	2 pcs
Pressure measuring set		1 set
Surface thermometer (with magnet)		1 pcs
Hydraulic oil analyzing apparatus		1 set

STANDARD MEASURING CONDITION

Within standard measuring condition in Performance Inspection Standard Table (Table 1)

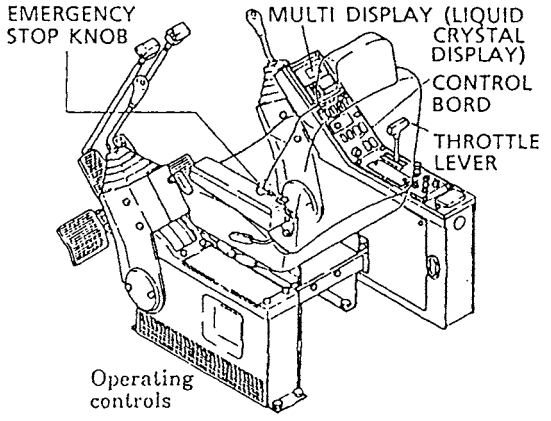
(1) Measuring Procedure and Method

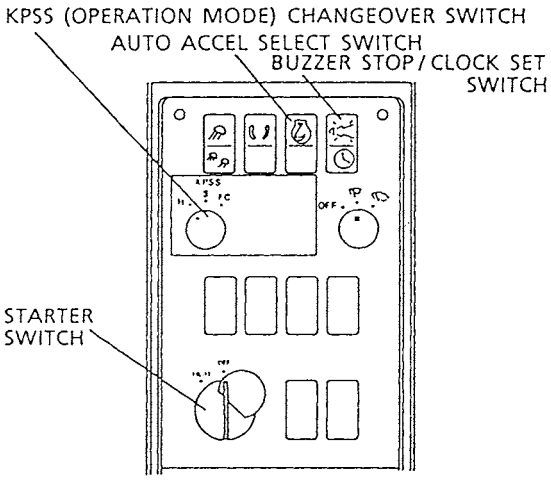
1) Measuring the cleanliness of operating oil
Measure cleanliness with an analysis apparatus after taking sample oil from the operating oiltank. If the oil shows a cleanliness exceeding an allowable value, flush the oil or replace the filter.
2) Raising the temperature of the operating oil
Attach a thermometer in the surface of the operating oil tank and measure temperature. Wait till the temperature rises by raising the boom or by relieving the bucket relief valve.
3) Raising the water temperature
Attach a thermometer in the surface of the radiator and measure the temperature. Run the engine and wait till temperature rises.

READING THE ENGINE REVOLUTION

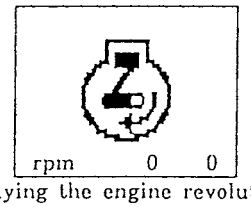
Following is a procedure whereby the engine revolution is read on the multi-display:

1) With the buzzer stop switch turned to "ON", turn the starter key switch to "ON". However, keep the engine stopped.
2) Depress the buzzer stop switch five times and get an engine rotation mark and a controller part number.
3) Depress the buzzer stop switch by turns. An engine revolution will be indicated at the 23rd out of 24 pressings.
4) If the engine is started here, the display will be as shown on the right, for instance.
5) Set the throttle lever to the maximum revolution "HI".
6) Change over the operation mode (KPSS) switch to H,S,FC by turns and compare the revolu-tion at no load with an existing revolution.
7) If the revolution falls within a tolerance, determine that the engine and the controller are normal, and measure and adjust the pressure of the hydraulic circuit.
Revolution at no load = present revolution $^{+5}_{-25}$
8) If the revolution runs out of a tolerance, adjust the revolution according to the procedure for the adjustment of the following mechatro controller.

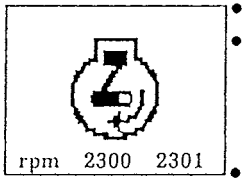




Control bord



Displaying the engine revolution when the engine is at rest



- 2301 ·····Present revolution
- 2300 ·····No-load revolution at mechatro adjustment (Hereinafter called no-load revolution)
- rpm ·····Revolution

An example of engine revolution display when running

ADJUSTING THE ENGINE REVOLUTION BY MECHATRO CONTROLLER

The adjustment of the mechatro controller which will be mentioned hereinunder must be performed whenever the above engine revolution runs out of a target tolerance or whenever either the controller or the stepping motor is replaced. If you follow the adjusting procedure incorrectly, adjustment data may be broken. Always stick to the procedure and reminders.

〔 Procedure for adjusting the engine revolution 〕

(1) Setting engine stop high positions
1) Starting reading adjust signals (adjustable)
2) Adjustment start condition
3) Adjustment signal timing
4) Setting the engine revolution stop position
5) Setting engine revolution and high speed position
6) Fixing engine revolution and high speed position
7) Storing engine revolution and high speed position

(2) Setting engine revolution
1) Starting reading adjustment signals (adjustable)
2) Adjustment start condition
3) Adjustment signal timing
4) Storing the revolution and position of the stepping motor
5) Closing the reading of adjust signals (adjust prohibit)

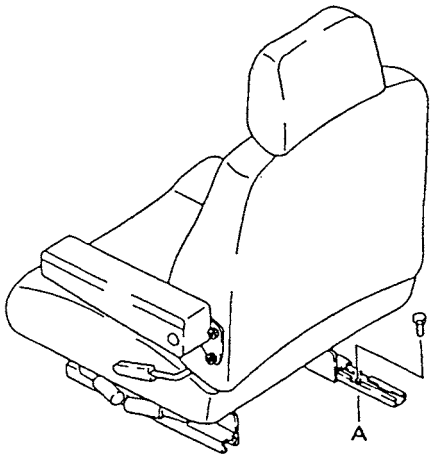
SETTING THE ENGINE STOP AND HIGH POSITIONS

(1) Starting reading adjustment signals (adjustable)
1) Take off the operator seat and remove controller cover (1) fixed to the seat stand.

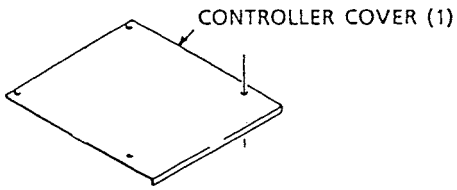
2) Remove cap (2) of the controller.

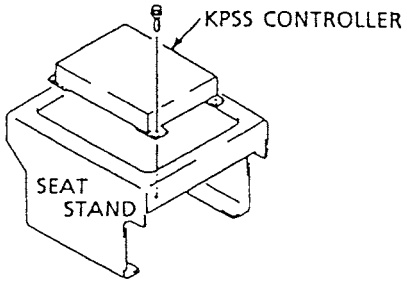
3) After confirming that the engine key is "OFF", put your finger into the hole in the rubber cap, push the adjust switch (3) in the controller toward ADJUSTABLE and start reading adjustment signals.

⚠ Adjustment data may be broken unless the switch (3) is pressed with the engine key in "OFF" position.

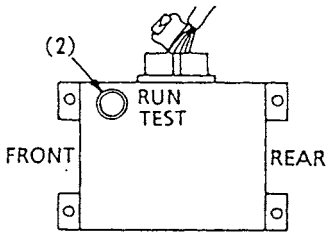


Removing the operator seat

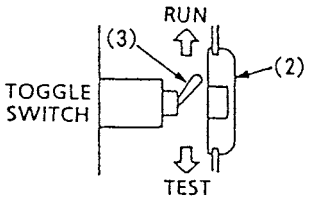




Mounted position of mechatro controller



Removing controller cap (2)



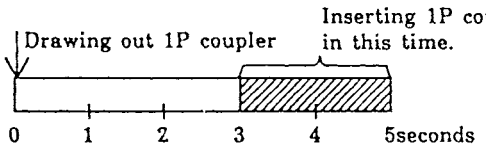
Direction of pushing the adjust switch in the controller

(2) Adjustment start condition

1) Adjust switch in controller·····Adjust permit
2) KPSS (operation mode)
changeover switch ·····H mode
3) Auto accel select switch·····ON
4) Throttle lever·····Low idle
5) Starter key·····Engine at rest with the starter switch "ON"

(3) Adjust signal timing

1) Adjust signal
To receive an adjust signal that actuates the stepping motor, pull out and put in 1P coupler (4) at the inlet of the controller.
2) Adjust timing
There is a timing at which the pulling out and inserting signals of the 1P coupler work effective-ly. It is limited to seconds in the hatching of the figure below.

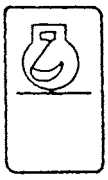


☞ If the 1P coupler is inserted within the adjusting timing, "CPU" is indicated on the multi display, indicating that adjustment is under way.

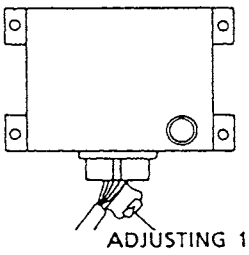
3) When insertion of the 1P coupler runs out of the adjustment timing:
When a time display appears on the multi display even if the 1P coupler is inserted, draw out the 1P coupler above match the insertion timing.

(4) Procedure of positioning the engine rotation stop

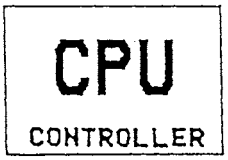
1) Manipulation of adjust signals
Within 3~5 seconds after the 1P coupler is drawn out, insert it again.
2) Lighting the CPU display and transferring the motor stop position
CPU display comes out on the multi display and then the stepping motor returns to the engine stop position.
3) Adjusting the length of governor lever adjust rod (9)
Insert a 0.1mm leaf of the thickness gauge between engine stop set bolt (13) and governor lever (7), adjust the length of adjust rod (9) and lock the nuts on both ends.



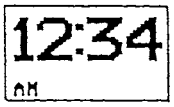
Auto accel select switch



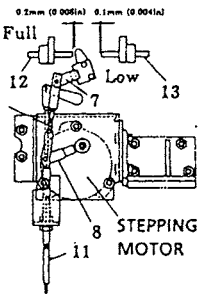
Position of the adjusting 1P coupler of the controller



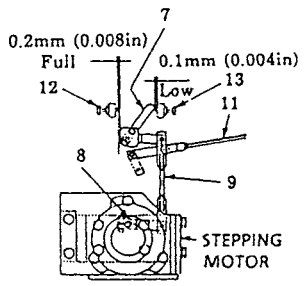
CPU indication on multi display



An example of time display on the multi display



(SK100, SK120, SK120LC)



(SK200, SK200LC, SK220, SK220LC)

7 Governor lever
8 Stepping motor lever
9 Adjust rod
11 Emergency stop cable
12 High idle set screw
13 Engine stop set screw

Governor lever adjusting clearance

(5) Procedure for setting the engine rotation and high speed positions

1) Manipulation of adjust signals
Draw out the adjusting 1P coupler and insert it again.
The CPU lamp lights and the power supply to the stepping motor is cut off. This frees the stepping motor and now you can turn it by hand.

2) Setting the high speed position of the stepping motor
Lift up the stepping motor lever (8) by hand and press governor lever (7) against high idle set screw (12) of the engine governor.
With the governor lever kept pressed, perform item (6) below:

(6) Procedure for fixing the engine rotation and high speed positions

1) Manipulation of adjust signals
Draw out the 1P coupler and insert it. Then the stepping motor is powered and now it can not be turned by hand. Measure the clearance between the high idle adjust screw and the governor, using a thickness gauge.

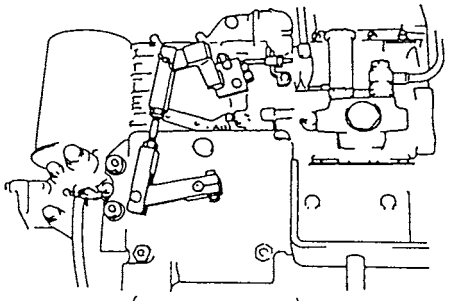
2) When the clearance is less than 0.2mm (0.008in);
If the clearance is less than 0.2mm (0.008in), turn on and off the key switch and repeat steps from item (2).

(7) Procedure for storing the engine rotation and high speed positions

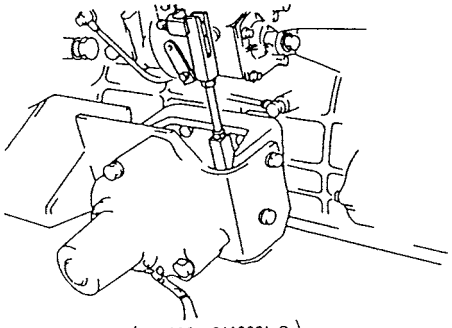
1) Manipulation of adjust signals
Insert the 1P coupler the same way as above.

2) Racing of the stepping motor
The position of the high speed side set screw is stored as the stepping motor races.

3) Turning the CPU display off
This completes adjustment, whereupon the CPU display goes out and returns to time display.

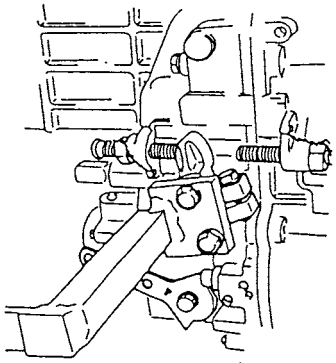


(SK100
SK120, SK120LC)

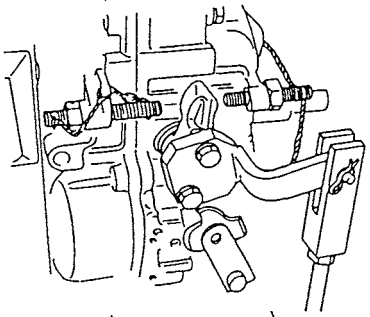


(SK200, SK200LC
SK220, SK220LC)

Setting the engine stop position by adjust rod stroke



(SK100
SK120, SK120LC)



(SK200, SK200LC
SK220, SK220LC)

Setting the high speed position by clearance adjustment

SETTING THE ENGINE REVOLUTION

(1) Starting reading adjust signals (adjustable)
Read with the adjust switch (3) in the controller set to ADJUST PERMIT in the same way as above.

(2) Adjust start condition
1) Adjust switch in controller···ADJUST PERMIT
2) KPSS (operation mode) select switch···H mode
3) Auto accel select switch·····OFF
4) Throttle lever·····LOW IDLE
5) Engine·····RUNNING
Differences in setting the engine stop and high positions in para. 2.5 are those surrounded by a rectangle.

(3) Adjust signal timing
1) Draw out 1P coupler (4) and then insert 3~5 seconds later the same way as above.
2) Confirming that the CPU display is lit.
The same as above.

(4) Storing the rotating position of the stepping motor
The stepping motor runs itself from a position further below LOW IDLE (a little above ENGINE STOP) to HI IDLE to read and store engine revolutions.

☞ If the engine key is turned "OFF" during adjustment, storage gets unstable. In that case, adjust it once again.

(5) Confirming that the CPU display is off
Confirm that CPU display is off on the multi display.

(6) Blocking reading adjust signals (ADJUST PROHIBIT)
More than four seconds after the engine key is turned "OFF", push adjust switch (3) in the controller to ADJUST PROHIBIT.

⚠ Four seconds after the engine key is turned "OFF", power supply is turned off. Adjustment data may be broken in some cases if adjust switch (3) is depressed when power supply is on.

PROCEDURE FOR ADJUSTING THE VARIABLE LOADING MODE

(1) Starting Adjustment Reading (Adjust Permit)
The internal adjust switch (3) is in the ADJUST PERMIT position the same way as above.

(2) Adjustment start condition
1) Internal switch of controller···ADJUST PERMIT
2) KPSS (operation mode) select switch···S mode
3) Auto accel select switch·····OFF
4) Throttle lever·····HI IDLE
5) Engine·····Running

(3) Adjust signal timing
Adjustment proceeds 3~5 seconds after the 1P coupler is inserted the same way as above.

(4) Procedure for Setting the Lower limit valve
1) Measure the P2 pump pressure (a2 port pressure) by turning the variable loading mode switch counterclockwise (0 notch) and performing boom hoisting operation.
2) Look for a notch that gives a pressure 25±5kgf/cm² (356±71psi) above the pressure in "0 notch", by turning the variable loading mode switch clockwise to "1 notch" and per-forming boom hoisting operation. For instance, the 1.3 notch can be the intermediate point.
3) Draw out and insert the 1P coupler, matching the adjust signal timing.

(5) Procedure for setting the upper limit value
1) Look for a notch that gives a P2 pump pressure of 300kgf/cm² (4270psi) by turning the loading mode switch clockwise (for instance, 6 notch) and performing boom hoisting operation.
2) Advance the switch by two notches including the measurement notch (e. g. 6+2=8 notches) and store the upper limit value by drawing out and inserting the 1P coupler according to the adjustment signal timing, the same way as for the lower limit value. For instance, 6+2=8th notch is stored cven when the intermediate point of the 6.2 notch reaches 300kgf/cm² (4270psi).
3) Storage of the upper limit value completes the moment the CPU display goes out.

MEASURING AND ADJUSTING THE CIRCUIT PRESSURE

(1) Procedure for measurement

1) Do not adjust pressure if measured values fall within the tolerances of Table 1. In case adjustment is necessary, the target shall be:

$$\text{Standard value} + \frac{\text{Tolerance (upper limit + lower limit)}}{2}$$

2) Measure port pressures by tightening the main relief valve after measuring the main relief pressure. (Marking on the adjusted points will promote restoration of pressure.)

(2) Procedure for Measurement

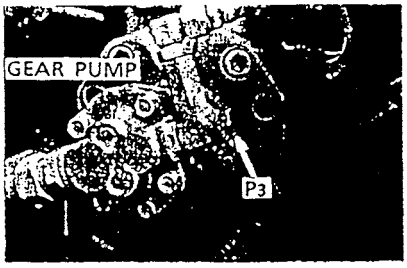
As mentioned above, attach a pressure gauge, adjust the water and oil temperature conditions within standard ranges, confirm the engine revolution and measure pressure according to the following procedure:

1) Measure the primary pilot pressure.
2) Measure the main relief pressure and tighten the adjust screw up.
3) Measure the port relief pressure.
4) Measure the swing port relief pressure.
5) Measure the travel relief valve pressure.
6) Bring the adjusted main relief valve pressure back to its original level.

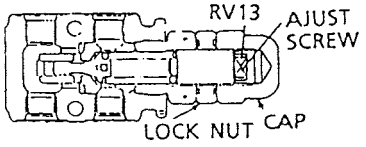
(3) Pressure adjustment

1) Measuring the primary pilot pressure
   Location ····· Port a3 that taps the pilot circuit pressure
   Method ····· When all operating levers are neutral
   Adjustment ····· By means of the adjust screw (RV13) of the pilot relief valve
2) Measuring and tightening the main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Bucket digging (a1 side)
   Boom hoisting (a2 side)
   Adjustment ····· Main relief MR1 and MR2
   Tighten the adjust screws 180 deg. to measure the pressure of ports. (because it is lower than the port pressure.)
3) Measuring the port relief pressure
   Location ····· Port a1 or a2 that taps the main circuit pressure
   Method ····· Refer to "Measurement" in Table 1.
   Adjustment ····· Port relief valves (RV9-RV12)
4) Measuring the swing port relief pressure
   Location ····· Ports PA and PB (See Fig. 20.) of the swing control valve
   Method ····· Lock the bucket with the shoe plate.
   Adjustment ····· Swing relief valves RV11 and RV12
5) Measuring the travel main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Operate both the RH and LH sides (front and back) at the same time at 2-speed and in the H mode. (Lock both sprockets.)
   Adjustment ····· Travel relief valves (TR1 and TR2)
6) Returning the adjusted main relief valve pressure

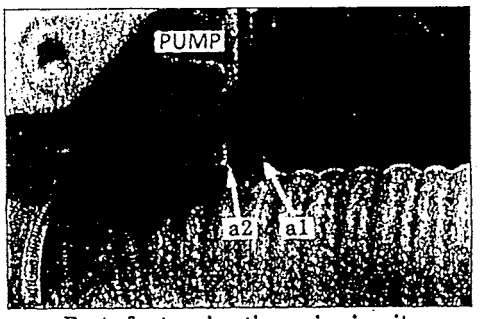
Lastly, return the adjust screw of the main relief valve 180 deg. or to the matching mark point so it falls within a standard tolerance.



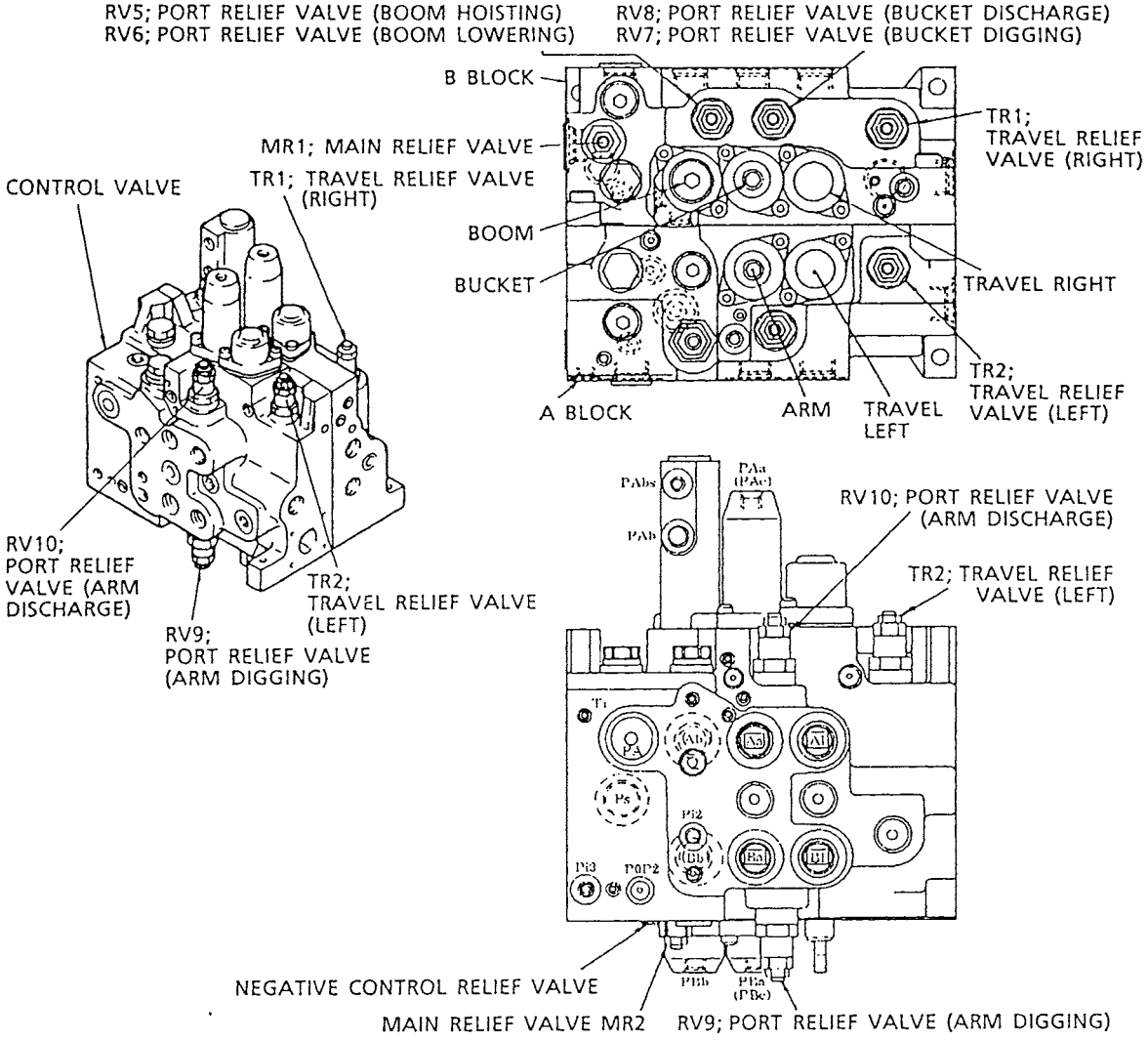
Pilot pressure measuring port



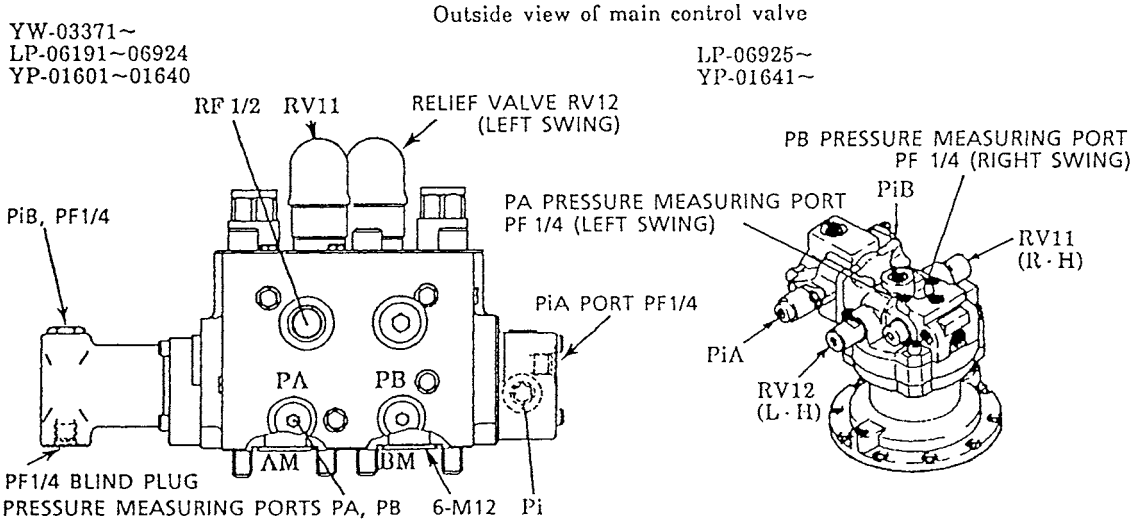
The pilot relief valve for adjustment



Ports for tapping the main circuit pressure



Outside view of main control valve



Outside view of swing control valve

PERFORMANCE INSPECTION STANDARD

(NOTE ; Take measurement in the S mode, unless otherwise specified.
The standard tolerance shall be an allowable range in field measurements.)

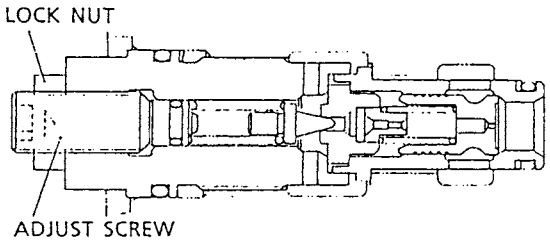
Inspection item				Pressure measurement: Position	Port	Size	Basic Value	Tolerance: Upper limit	Tolerance: Lower limit	Unit	Control	Measurement: Condition, function
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil in tank			8	+1	−1	Class	−	Takeout of sample
	Temperature of hydraulic oil			Tank surface			50 (122.0)	+5 (+9)	−5 (−9)	°C (°F)	−	Air temperature 50°~−10°C (122~14°F)
	Water temperature			Radiator surface			75 (167.0)	+15 (+27)	−15 (−27)		−	Air temperature 50°~−10°C (122~14°F)
	Engine revolution	Low idle		Multi display			875	+25	−25	rpm	Adjustment not neccessary	FULL throttle
		Hi idle					2490	+50	−50			
		S					2000	+50	−50			
		FC					1600	+50	−50			
		Decel					1050	+50	−50			
Main circuit	Main relief pressure	Attach	RH	Pump	a1	PF1/4	290 (4120)	+5 (+70)	0 (0)	※1	MR1	Bucket digging
			LH		a2						MR2	Boom hoisting
		Boost pressure	RH		a1		—	—	—		−	
			LH		a2						−	
		Travel	RH		a1		330 (4690)	+5 (+70)	0 (0)		TR1	Simultaneous RH/LF operation in H mode and at 2-speed
			LH		a2						TR2	
	Port relief pressure	Boom	R	Pump	a1	PF1/4	335 (4760)	+5 (+70)	−15 (−210)		RV6	Boom lowering
			H				335 (4760)	+5 (+70)	−5 (−70)		RV5	Boom hoisting
		Arm	R		a2		335 (4760)	+5 (+70)	−5 (−70)		RV10	Arm discharge
			H								RV9	Arm digging
		Bucket	R		a1		335 (4760)	+5 (+70)	−5 (−70)		RV8	Bucket discharge
			H				335 (4760)	+5 (+70)	−5 (−70)		RV7	Bucket digging
		Swing	RH		a2		220 (3130)	+40 (+570)	+10 (+140)		RV11 RV12	Bucket lock
			LH									
	Lower relief	Independent travel OFF	RH		a1		28 (398)	+13 (+185)	0 (0)		−	H mode pump pressure when all operating levers are in neutral
			LH		a2		28 (398)	+13 (+185)	0 (0)		−	
Pilot circuit	Primary pressure	Discharge pressure		Pump G	P3	PF1/4	50 (711)	+3 (+43)	−3 (−43)	Kgf/cm² (psi)	−	Mode H
	KPSS Solenoid proportional valve for secondary pressure	H		Pump	a3	PF1/4	0 (0)	+3 (+43)	0 (0)		−	
		S					0 (0)	+3 (+43)	0 (0)		−	
		FC					0 (0)	+3 (+43)	0 (0)		−	
		Release					12 (171)	+5 (+71)	−3 (−43)		−	
		Boost pressure										

☞ ※1 Adjustment is not required if the ATT. main relief pressure in the H mode lies within 290~295 kgf/cm² (4120~4190 psi).

PROCEDURE FOR ADJUSTING THE PRESSURE OF INDEPENDENT RELIEF VALVES

1) Procedure for Adjusting the Main Relief Valve
Turning the adjust screw clockwise increases the pressure, while turning it counterclockwise decreases the pressure. References for pressure variations are as follows:

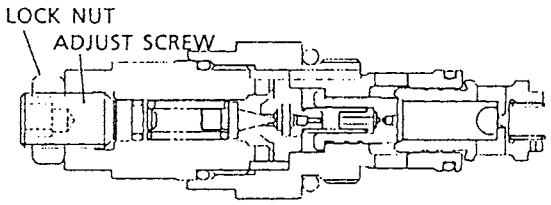
Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 115 (1,640)
1/4 turn	about 58 (825)



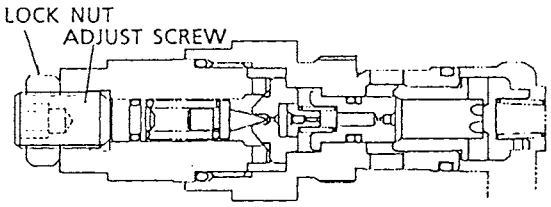
Main relief valve (601)

2) Adjustment procedures for travel relief valve and port relief valve
Turning the adjust it counterclockwise decreases the pressure. Given below are the pressure changes for reference:

Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 115 (1,640)
1/4 turn	about 58 (825)



Travel relief valve (602)

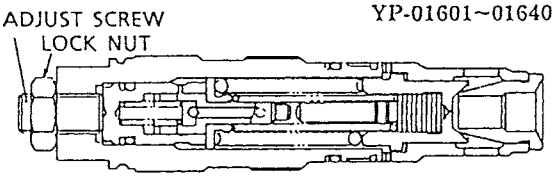


Port relief valve (604)

3) Procedure for adjusting swing relief valve
Turning the adjust screw clockwise increases the pressure and turning the adjust screw counter-clockwise decreases the pressure. Given below are guidelines of pressure variation.

Turn of adjust screw	Pressure change kgf/cm² (psi)
1 turn	about 100 (1,420)
1/4 turn	about 25 (356)

YW-03371~
LP-05201~06924
YP-01601~01640

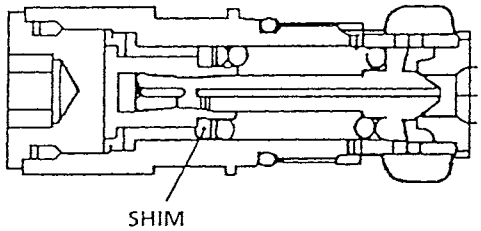


Swing relief valve

The Fig. 23-2 swing relief valve can not be pressure adjusted from outside, as shown in the figure on the right. The pressure is adjusted with shims, and pressure variations are given below for reference:

O.D.,bore dia and thickness of shim	Pressure change kgf/cm² (psi)
Ø19×Ø11.5×1mm	about 45 (640)
Ø19×Ø11.5×0.5mm	about 22.5 (320)

LP-06925~
YP-01641~



Swing relief valve

MEASURING AND ADJUSTING THE CIRCUIT PRESSURE

(1) Procedure for measurement

1) Do not adjust pressure if measured values fall within the tolerances of Table 1. In case adjustment is necessary, the target shall be:

$$\text{Standard value} + \frac{\text{Tolerance (upper limit + lower limit)}}{2}$$

2) Measure port pressures by tightening the main relief valve after measuring the main relief pressure. (Marking on the adjusted points will promote restoration of pressure.)

3) For adjustment of the 2nd step relief pressure, start from the bottom pressure (high pressure).

(2) Procedure for Measurement

As mentioned above, attach a pressure gauge, adjust the water and oil temperature conditions within standard ranges, confirm the engine revolution and measure pressure according to the following procedure:

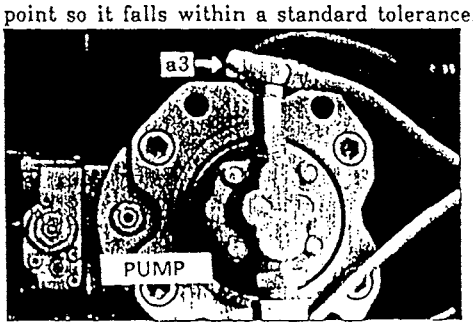
1) Measure the primary pilot pressure.
2) Measure the main relief pressure in the boosted pressure attachment operation.
3) Measure the main relief pressure and tighten the adjust screw up.
4) Measure the port relief pressure.
5) Measure the swing port relief pressure.
6) Measure the travel relief valve pressure.
7) Bring the adjusted main relief valve pressure back to its original level.

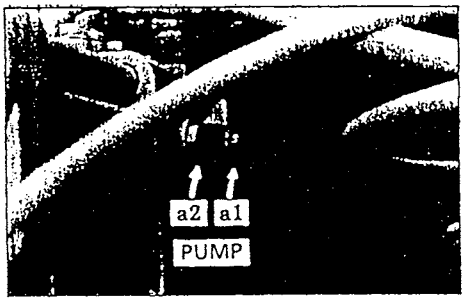
(3) Pressure adjustment

1) Measuring the primary pilot pressure
   Location ····· Port a3 that taps the pilot circuit pressure
   Method ····· When all operating levers are neutral
   Adjustment ····· By means of the adjust screw (RV13) of the pilot relief valve
2) Measuring the main relief pressure in boosted pressure attachment operation
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· When the attachment boost pressure button is "ON" and "OFF"
   Adjustment ····· Measure the boosted pressure of the main relief valve
3) Measuring and tightening the main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Bucket digging (a1 side)
   Boom hoisting (a2 side)
   Adjustment ····· Main relief MR1 and MR2
   Tighten the adjust screws 180 deg. to measure the pressure of ports. (because it is lower than the port pressure.)
4) Measuring the port relief pressure
   Location ····· Port a1 or a2 that taps the main circuit pressure
   Method ····· Refer to "Measurement" in Table 1.
   Adjustment ····· Port relief valves (RV9-RV12)
5) Measuring the swing port relief pressure
   Location ····· Ports PA and PB (See Fig. 20.) of the swing control valve
   Method ····· Lock the bucket with the shoe plate.
   Adjustment ····· Swing relief valves RV11 and RV12
6) Measuring the travel main relief pressure
   Location ····· Ports a1 and a2 that tap the main circuit pressure
   Method ····· Operate both the RH and LH sides (front and back) at the same time at 2-speed and in the H mode. (Lock both sprockets.)
   Adjustment ····· Travel relief valves (TR1 and TR2)

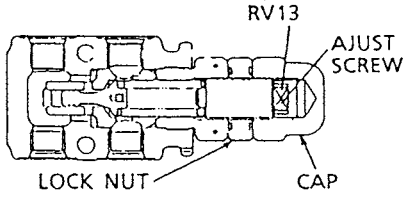
7) Returning the adjusted main relief valve pressure

Lastly, return the adjust screw of the main relief valve 180 deg. or to the matching mark point so it falls within a standard tolerance.

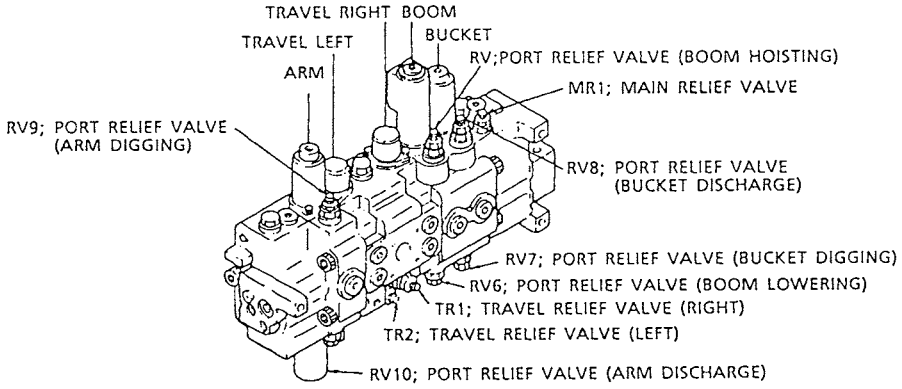


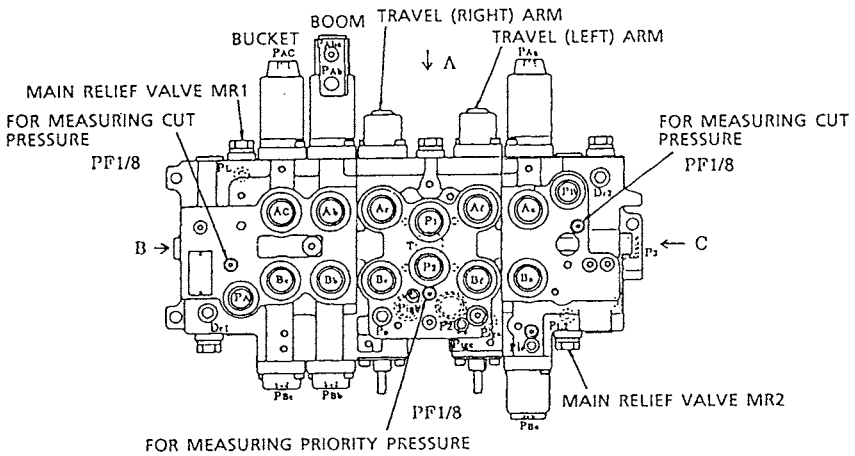


Ports for tapping the main circuit pressure

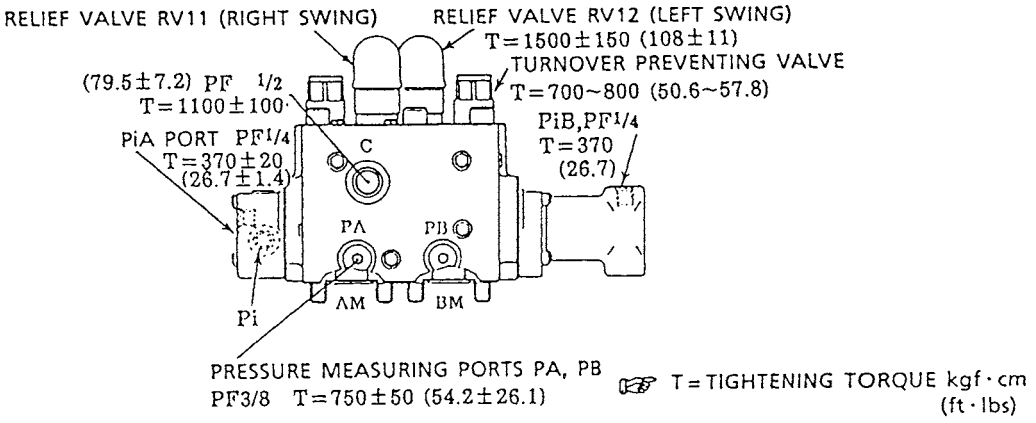


Pilot pressure measuring port and the pilot relief valve for adjustment





Outside view of main control valve



Outside view of swing control valve

PERFORMANCE INSPECTION STANDARD

NOTE; Take measurement in the S mode, unless otherwise specified.

※ Tolerance: The upper and lower limits, when added or substracted to the bench test value, provide an acceptable range when measuring pressures on an actual machine.

	Inspection item		Pressure measurement			Bench test value	※Tolerance		Unit	Control	Measurement
			Position	Port	Size		Upper limit	Lower limit			Condition, function
Standard measuring condition	Cleanliness of hydraulic oil		Hydraulic oil in tank			8	+1	−1	Class	−	Takeout of sample
	Temperature of hydraulic oil		Tank surface			50 (122)	+5 (+9)	−5 (−9)	°C	−	Air temperature 50°~−10°C (122~14)
	Water temperature		Radiator surface			75 (167)	+1 (+1.8)	−15 (−27)	(°F)	−	Air temperature 50°~−10°C (122~14)
	Engine revolution	Low idle	Multi display			875	+25	−25	rpm	Adjustment not neccessary	FULL throttle
		Hi idle				2320	+50	−50			
		S				2000	+50	−50			
		FC				1600	+50	−50			
		Decel				1050	+50	−50			

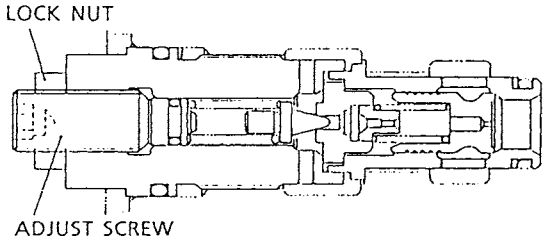
Main circuit	Main relief pressure	Attach	RH	Pump	a1	PF1/4	290 (4120)	+5 (+70)	0 (0)	※1	MR1	Bucket digging
			LH		a2						MR2	Boom hoisting
		Travel	RH		a1		350 (4980)	+5 (+70)	0 (0)		TR1	Simultaneous RH/LF operation in H mode and at 2-speed
			LH		a2						TR2	
	Port relief pressure	Boom	R	Pump	a1	PF1/4	335 (4760)	+5 (+70)	−5 (−70)		RV6	Boom lowering
			H				335 (4760)	+5 (+70)	−5 (−70)		RV5	Boom hoisting
		Arm	R		a2		335 (4760)	+5 (+70)	−5 (−70)		RV10	Arm discharge
			H								RV9	Arm digging
		Bucket	R		a1		335 (4760)	+5 (+70)	−5 (−70)		RV8	Bucket discharge
			H				335 (4760)	+5 (+70)	−5 (−70)		RV7	Bucket digging
		Swing	RH		a2		250 (3560)	+55 (+780)	+25 (+360)		RV11 RV12	Bucket lock
			LH									
	Lower relief		RH		a1		29 (412)	+15 (+213)	+5 (+71)	Kgf/cm² (psi)	−	H mode
			LH		a2		29 (412)	+15 (+213)	+5 (+71)		−	
Pilot circuit	Primary pressure	Discharge pressure		Pump G	P3	PF1/4	50 (711)	+3 (+43)	−3 (−43)		RV13	Mode H
	KPSS Solenoid proportional valve for secondary pressure	H		Pump	a3	PF1/4	0 (0)	+3 (+43)	0 (0)		−	
		S					0 (0)	+3 (+43)	0 (0)		−	
		FC					0 (0)	+3 (+43)	0 (0)		−	
		Release					12 (171)	+5 (+71)	−3 (−43)		−	

☞ ※1 Adjustment is not required if the ATT. main relief pressure in the H mode lies within 290~295 kgf/cm² (4120~4190 psi).

PROCEDURE FOR ADJUSTING THE PRESSURE OF INDEPENDENT RELIEF VALVES

1) Procedure for Adjusting the Main Relief Valve
Turning the adjust screw clockwise increases the pressure, while turning it counterclockwise decreases the pressure. References for pressure variations are as follows:

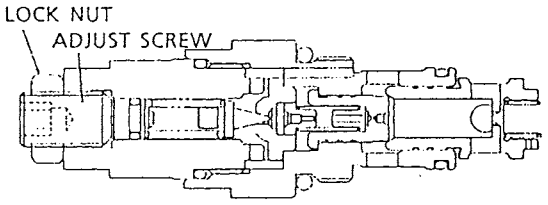
Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 115 (1,640)
1/4 turn	about 58 (825)



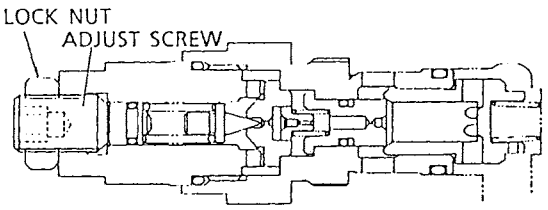
Main relief valve (601)

2) Adjustment procedures for travel relief valve and port relief valve
Turning the adjust it counterclockwise decreases the pressure. Given below are the pressure changes for reference:

Turn of adjust screw	Pressure change kgf/cm² (psi)
1/2 turn	about 115 (1,640)
1/4 turn	about 58 (825)



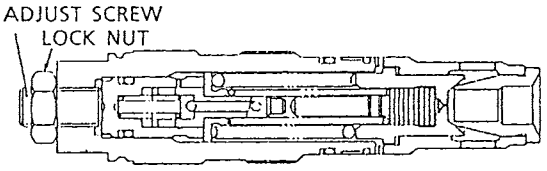
Travel relief valve (602)



Port relief valve (603)

3) Procedure for adjusting swing relief valve
Turning the adjust screw clockwise increases the pressure and turning the adjust screw counterclockwise decreases the pressure. Given below are guidelines of pressure variation.

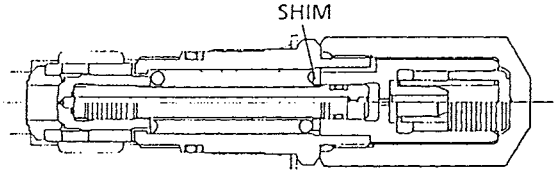
Turn of adjust screw	Pressure change kgf/cm² (psi)
1 turn	about 100 (1,420)
1/4 turn	about 25 (356)



Swing relief valve

4) Procedure for adjusting travel motor's relief valve
The travel brake valve can not be pressure adjusted from outside, as shown in the figure on the right. The pressure is adjusted with shims, and pressure variations are given below for reference:

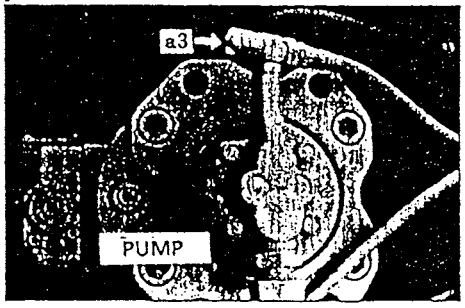
O.D., bore dia and thickness of shim	Pressure change kgf/cm² (psi)
Ø17×Ø10× 1mm	about 50 (711)
Ø17×Ø10×0.5mm	about 25 (356)

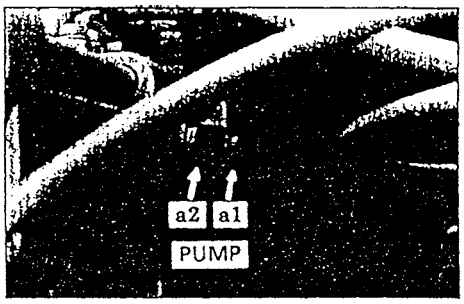


Travel motor port relief valve

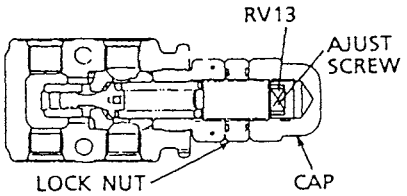
7) Returning the adjusted main relief valve pressure

Lastly, return the adjust screw of the main relief valve 180 deg. or to the matching mark point so it falls within a standard tolerance.

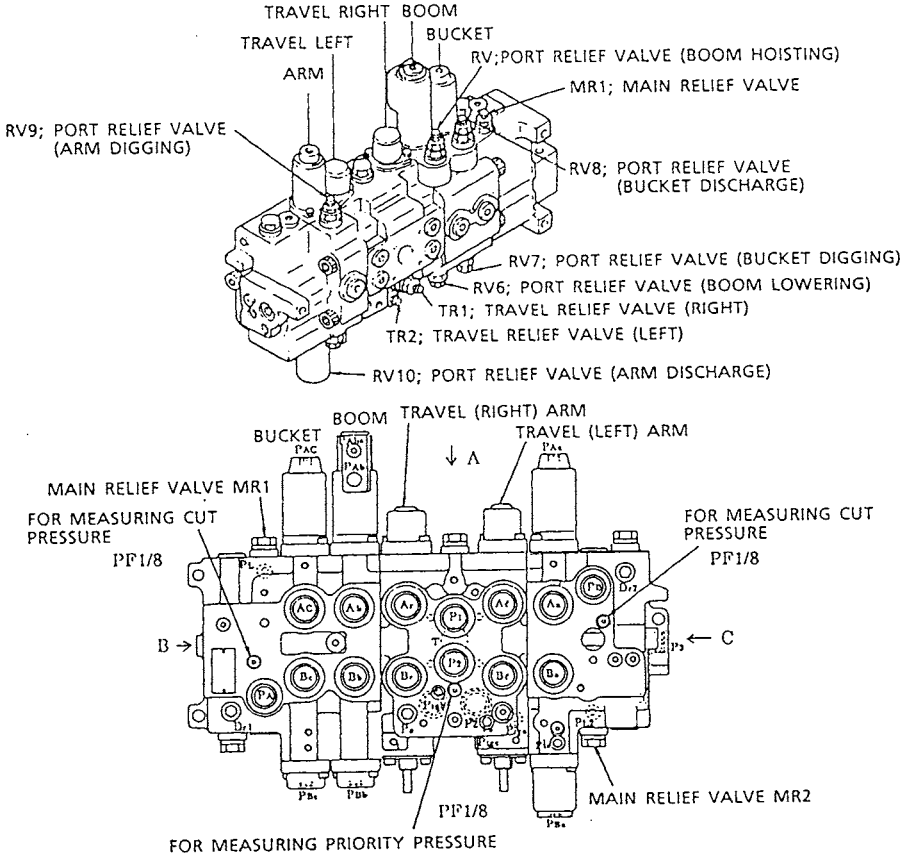




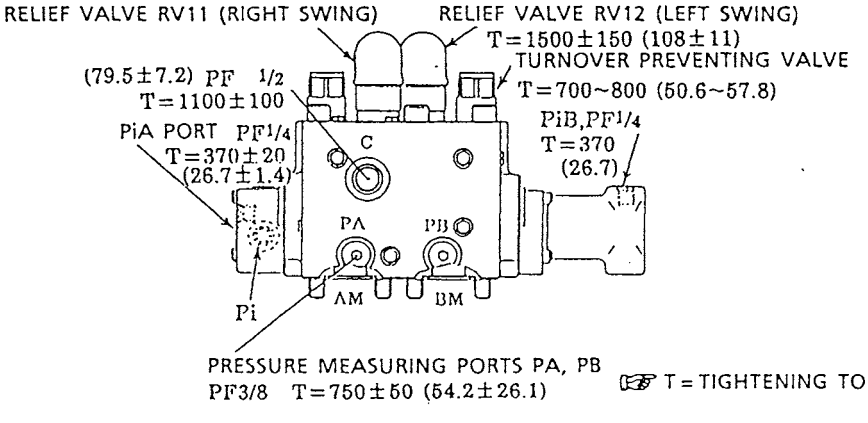
Ports for tapping the main circuit pressure



Pilot pressure measuring port and the pilot relief valve for adjustment



Outside view of main control valve



Outside view of swing control valve

PERFORMANCE INSPECTION STANDARD

NOTE; Take measurement in the S mode, unless otherwise specified.

※ Tolerance: The upper and lower limits, when added or substracted to the bench test value, provide an acceptable range when measuring pressures on an actual machine.

	Inspection item		Pressure measurement: Position	Port	Size	Bench test value	※Tolerance: Upper limit	Lower limit	Unit	Control	Measurement: Condition, function
Standard measuring condition	Cleanliness of hydraulic oil		Hydraulic oil in tank			8	+1	−1	Class	−	Takeout of sample
	Temperature of hydraulic oil		Tank surface			50 (122)	+5 (+9)	−5 (−9)	°C	−	Air temperature 50°~−10°C (122~14)
	Water temperature		Radiator surface			75 (167)	+1 (+1.8)	−15 (−27)	(°F)	−	Air temperature 50°~−10°C (122~14)
	Engine revolution	Low idle	Multi display			875	+25	−25	rpm	Adjustment not neccessary	FULL throttle
		Hi idle				2320	+20	−50			
		S				2000	+50	−50			
		FC				1600	+50	−50			
		Decel				1050	+50	−50			

Main circuit	Main relief pressure	Attach	RII	Pump	a1	PF1/4	290 (4120)	+5 (+70)	0 (0)	※1 Kgf/cm² (psi)	MR1	Bucket digging
			LII		a2						MR2	Boom hoisting
		Travel	RII		a1		350 (4980)	+5 (+70)	0 (0)		TR1	Simultaneous RII/LF operation in II mode and at 2-speed
			LII		a2						TR2	
	Port relief pressure	Boom	R		a1		335 (4760)	+5 (+70)	−5 (−70)		RV6	Boom lowering
			II				335 (4760)	+5 (+70)	−5 (−70)		RV5	Boom hoisting
		Arm	R		a2		335 (4760)	+5 (+70)	−5 (−70)		RV10	Arm discharge
			II								RV9	Arm digging
		Bucket	R		a1		335 (4760)	+5 (+70)	−5 (−70)		RV8	Bucket discharge
			II	Pump		PF1/4	335 (4760)	+5 (+70)	−5 (−70)		RV7	Bucket digging
		Swing	RII		a2		260 (3700)	+50 (+710)	+20 (+280)		RV11 RV12	Bucket lock
			LII									
	Lower relief		RII		a1		29 (412)	+20 (+284)	+6 (+85)		–	II mode
			LII		a2		29 (412)	+20 (+284)	+6 (+85)		–	
Pilot circuit	Primary pressure	Discharge pressure		Pump G	P3	PF1/4	50 (711)	+3 (+43)	−3 (−43)		RV13	Mode II
	KPSS Solenoid proportional valve for secondary pressure	II		Pump	a3	PF1/4	0 (0)	+3 (+43)	0 (0)		–	
		S					0 (0)	+3 (+43)	0 (0)		–	
		FC					0 (0)	+3 (+43)	0 (0)		–	
		Release					16 (228)	+5 (+71)	−3 (−43)		–	

☞ ※1 Adjustment is not required if the ATT. main relief pressure in the II mode lies within 290~295 kgf/cm² (4120~4190 psi).

PROCEDURE FOR ADJUSTING THE PRESSURE OF INDEPENDENT RELIEF VALVES

1) Adjustment procedure for main relief valve
Pressure rises if the adjust screw is turned clock wise and it falls turned counterclockwise. Adjust pressure referring to the following.

Turn of adjust screw	Pressure change kgf/cm² (psi)
½ turn	about 115 (1,635)
¼ turn	about 58 (825)

2) Adjustment procedures for travel relief valve and port relief valve
Turning the adjust counterclockwise decreases the pressure. Given below are the pressure changes for reference:

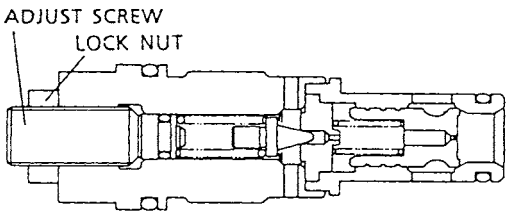
Turn of adjust screw	Pressure change kgf/cm² (psi)
½ turn	about 115 (1,635)
¼ turn	about 58 (825)

3) Procedure for adjusting swing relief valve
Turning the adjust screw clockwise increases the pressure and turning the adjust screw counterclockwise decreases the pressure. Given below are guidelines of pressure variation.

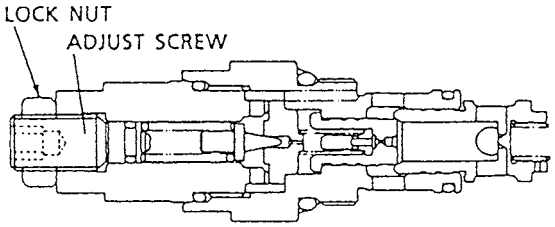
Turn of adjust screw	Pressure change kgf/cm² (psi)
1 turn	about 100 (1,422)
¼ turn	about 25 (355)

4) Procedure for adjusting travel motor's relief valve
The travel brake valve can not be pressure adjusted from outside, as shown in the figure on the right. The pressure is adjusted with shims, and pressure variations are given below for reference:

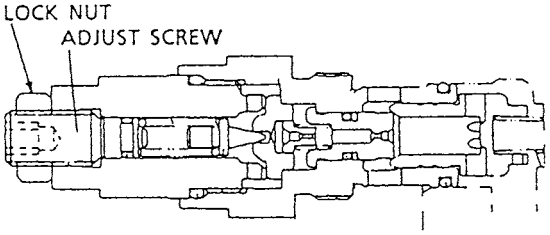
O.D., bore dia and thickness of shim	Pressure change kgf/cm² (psi)
φ17×φ10×1 mm	about 50 (711)
φ17×φ10×0.5 mm	about 25 (355)



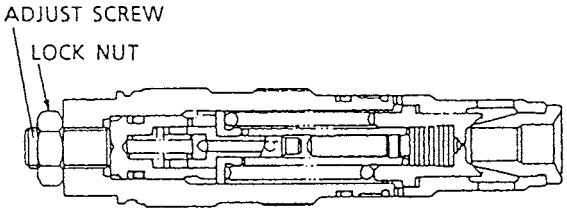
Main relief valve



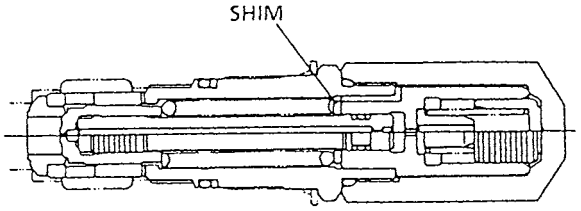
Travel relief valve



Port relief valve



Swing relief valve

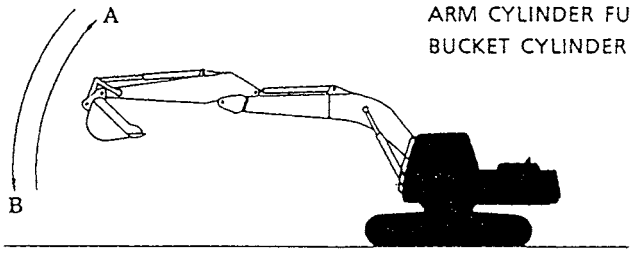


Travel motor port relief valve

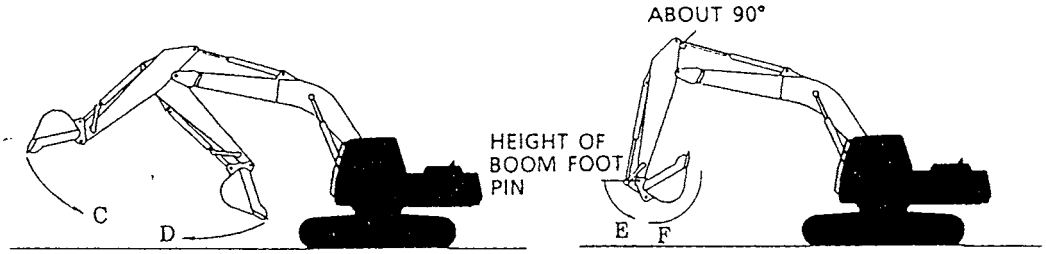
CYLINDER SPEED

Test condition:
Engine at high idling, oil temperature of 50 ± 5℃ (122 ± 9℉).
Procedure:
Measure the time from the most retracted (extended) condition to the most extended (retracted) condition of cylinders at lever full stroke with a stop watch, except that for the boom cylinder the time shall be from the ground level to the highest position. Make three measurements and record the average value.

CONDITION A, B :
ARM CYLINDER FULLY RETRACTED.
BUCKET CYLINDER FULLY EXTENDED.



CONDITION C, D :
BOOM CYLINDER FULLY EXTENDED.
BUCKET CYLINDER FULLY RETRACTED.
CONDITION E, F :
SET THE ARM TIP POINT TO THE BOOM FOOT HEIGHT, AND SET THE ARM ABOUT 90° TO ARM CYLINDER.



SK60 Unit : sec.

Symbol	Item	Standard value 1.73m (5'8") ARM	
		MODE H	MODE FC
A	Boom cylinder extension	2.8~3.4	3.4~4.0
B	Boom cylinder retraction	2.9~3.5	-
C	Arm cylinder extension	3.5~4.1	3.8~4.4
D	Arm cylinder retraction	2.8~3.4	-
E	Bucket cylinder extension	3.6~4.2	-
F	Bucket cylinder retraction	2.5~3.1	-

SK100

Unit: sec.

Symbol	Item	H Mode Standard value		
		2.27M(7′ 5.3″)STD Arm	1.9M(6′ 2.8″)Short Arm	2.77M(9′ 1.0″)Long Arm
A	Boom cylinder extension	2.2 ~ 2.9	←	←
B	Boom cylinder retraction	1.9 ~ 2.6	←	←
C	Arm cylinder extension	3.3 ~ 4.0	←	←
D	Arm cylinder retraction	2.2 ~ 2.9	←	←
E	Bucket cylinder extension	3.6 ~ 4.2	←	←
F	Bucket cylinder retraction	2.1 ~ 2.9	←	←

SK120 (LC)

Unit: sec.

Symbol	Item	H Mode Standard value		
		2.5M(8′ 2.4″)STD Arm	2.1M(6′ 10.6″)Short Arm	3.0M(9′ 10.1″)Long Arm
A	Boom cylinder extension	2.5 ~ 3.2	←	←
B	Boom cylinder retraction	2.2 ~ 2.8	←	←
C	Arm cylinder extension	3.6 ~ 4.2	←	←
D	Arm cylinder retraction	2.5 ~ 3.1	←	←
E	Bucket cylinder extension	3.5 ~ 4.1	←	←
F	Bucket cylinder retraction	2.4 ~ 3.0	←	←

SK200 (LC)

Unit: sec.

Symbol	Item	H Mode Standard value		
		2.94M(9′ 7.7″)STD Arm	2.4M(7′ 10.5″)Short Arm	3.3M(10′ 10.0″)Long Arm
A	Boom cylinder extension	2.9 ~ 3.5	←	←
B	Boom cylinder retraction	2.6 ~ 3.2	←	←
C	Arm cylinder extension	4.1 ~ 4.7	←	←
D	Arm cylinder retraction	3.0 ~ 3.6	←	←
E	Bucket cylinder extension	3.8 ~ 4.4	←	←
F	Bucket cylinder retraction	2.5 ~ 3.1	←	←

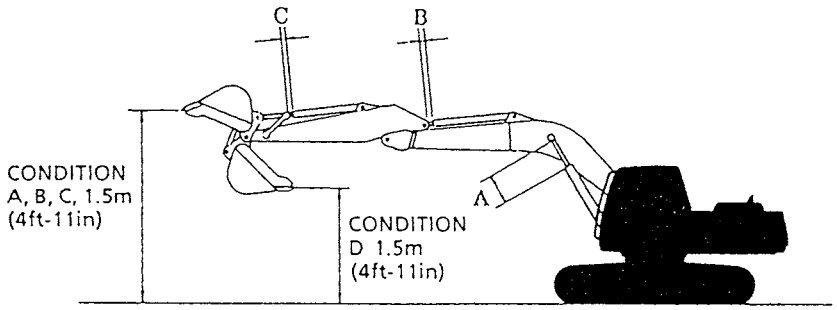
SK220 (LC)

Unit: sec.

Symbol	Item	H Mode Standard value		
		2.98M(9′ 9.3″)STD Arm	2.5M(8′ 2.4″)Short Arm	3.66M(12′ 0.1″)Long Arm
A	Boom cylinder extension	2.7 ~ 3.4	←	←
B	Boom cylinder retraction	2.6 ~ 3.2	←	←
C	Arm cylinder extension	4.1 ~ 4.8	←	←
D	Arm cylinder retraction	3.2 ~ 3.9	←	←
E	Bucket cylinder extension	3.7 ~ 4.4	←	←
F	Bucket cylinder retraction	2.7 ~ 3.3	←	←

CYLINDER OIL-TIGHTNESS

Test condition:
Engine stopped, oil temperature of 50 ± 5℃ (122±9°F), fully retract the arm cylinder and hold the bucket (empty) at 1.5 m (4 ft - 11 in) above ground.
Procedure:
After keeping the machine for three minutes under the above condition, measure the movement of the cylinders and the fall of the bucket top end in ten minutes.



SK60

Unit : mm (in)

Symbol	Item	Standard value	Remarks
A	Boom cylinder (Retraction of rod)	Max. 25 (1.0")	
B	Arm cylinder (Extension of rod)	[Max. 20 (0.8")]	
C	Bucket cylinder (Extension of rod)	[Max. 10 (0.4")]	
D	Fall of bucket top end	230mm (9.1in) / 10min	

[ ] The figures in parentheses are for reference.

SK100

Unit: mm (in)

Symbol	Item	Standard value		
		2.27M(7' 5.3")STD. Arm	1.9M(6' 2.8")Short Arm	2.77M(9' 1.0")Long Arm
A	Boom cylinder (Retraction of rod)	Max. 10 (0.4")	←	←
B	Arm cylinder (Extension of rod)	Max. 40 (1.6")	←	←
C	Bucket cylinder (Extension of rod)	Max. 15 (0.6")	←	←
D	Fall of bucket top end	300 mm(12 in)/10 min	←	←

SK120 (LC)

Unit: mm (in)

Symbol	Item	Standard value		
		2.5M(8′ 2.4″)STD. Arm	2.1M(6′ 10.6″)Short Arm	3.0M(9′ 10.1″)Long Arm
A	Boom cylinder (Retraction of rod)	10 (0.4″)	←	←
B	Arm cylinder (Extension of rod)	Max. 40 (1.6″)	←	←
C	Bucket cylinder (Extension of rod)	Max. 15 (0.6″)	←	←
D	Fall of bucket top end	300 mm(12 in)/10 min	←	←

SK200 (LC)

Unit: mm (in)

Symbol	Item	Standard value		
		2.94M(9′ 7.7″)STD. Arm	2.4M(7′ 10.5″)Short Arm	3.3M(10′ 10.0″)Long Arm
A	Boom cylinder (Retraction of rod)	Max. 10 (0.4″)	←	←
B	Arm cylinder (Extension of rod)	Max. 40 (1.6″)	←	←
C	Bucket cylinder (Extension of rod)	Max. 20 (0.8″)	←	←
D	Fall of bucket top end	Max. 320 mm(13″)/10 min	←	←

SK220 (LC)

Unit: mm (in)

Symbol	Item	Standard value		
		2.98M(9′ 9.3″)STD. Arm	2.5M(8′ 2.4″)Short Arm	3.66M(12′ 0.1″)Long Arm
A	Boom cylinder (Retraction of rod)	Max. 15 (0.6″)	←	←
B	Arm cylinder (Extension of rod)	Max. 50 (2.0″)	←	←
C	Bucket cylinder (Extension of rod)	Max. 20 (0.8″)	←	←
D	Fall of bucket top end	Max. 360 mm(14″)/10 min	←	←

SWING PERFORMANCE

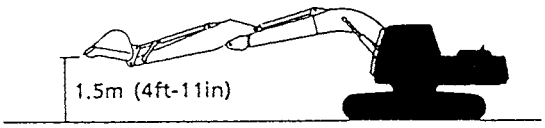
A. Swing performance

Test condition:

Engine at high idling, oil temperature of 50±5°C (122±9°F), fully retract the bucket cylinder and arm cylinder, and hold the bucket (empty) at 1.5m (4ft-11in) above ground.

Procedure:

Measure the time required to make two turns after one turn of start-up with a stop watch and give the time required to make one turn. Repeat it three times and give an average value.



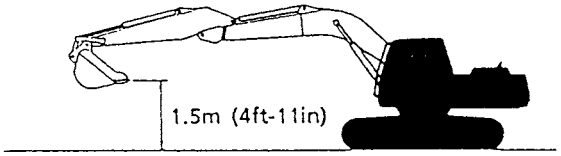
B. Swing brake

Test condition:

Engine at high idling, oil temperature of 50±5°C (122±9°F), fully extend the bucket cylinder and fully retract the arm cylinder, and hold the bucket (empty) at 1.5m (4ft-11in) above ground.

Procedure:

Measure the braking distance at the top end of the bucket, actuating swing relief valve after one turn of start-up. Repeat it three times on clockwise and counterclockwise direction respectively and give an average value for each direction.



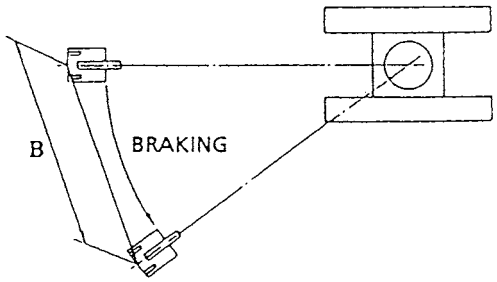
C. Swing maintain performance

Test condition:

Engine stopped, oil temperature of 50±5°C (122±9°F), fully retract the bucket cylinder and the arm cylinder, and set the machine on a 10 deg. Slope, holding the bucket at 1.5m (4ft-11in) above ground.

Procedure:

Direst the attachment perpendicular to the slope and measure the swing (overrun) at the bucket top end for 20 seconds. Measure it in both the clockwise and counterclockwise directions.



SK60

Symbol	Item	Standard value	Remarks
A	Swing speed	4.6~5.0sec/rev	
B	Swing brake performance	30°~60°	
C	Swing maintain performance	0mm/20sec (0 in/20 sec)	

SK100

Symbol	Item	Standard value	Remarks
A	Swing speed	4.6 ~ 5.1 sec/rev	
B	Swing brake performance	60° ~ 90°	
C	Swing maintain performance	0 mm/20 sec (0 in/20 sec)	

SK120 (LC)

Symbol	Item	Standard value	Remarks
A	Swing speed	4.7 ~ 5.1 sec/rev	
B	Swing brake performance	70° ~ 100°	
C	Swing maintain performance	0 mm/20 sec (0 in/20 sec)	

SK200 (LC)

Symbol	Item	Standard value	Remarks
A	Swing speed	4.7 ~ 5.1 sec/rev	
B	Swing brake performance	90° ~ 120°	
C	Swing maintain performance	0 mm/20 sec (0 in/20 sec)	

SK220 (LC)

Symbol	Item	Standard value	Remarks
A	Swing speed	4.9 ~ 5.5 sec/rev	
B	Swing brake performance	85° ~ 115°	
C	Swing maintain performance	0 mm/20 sec (0 in/20 sec)	

TRAVEL PERFORMANCE

A. Travel deflection

Test condition:

Engine at high idling, oil temperature of 50±5°C (122±9°F), on level solid soil, approach run more than 2m (6ft-7in).

Procedure:

Draw a target line parallel to the crawler and measure deflection in 20m (65ft-7in) of running. Repeat it three times and give an average value.

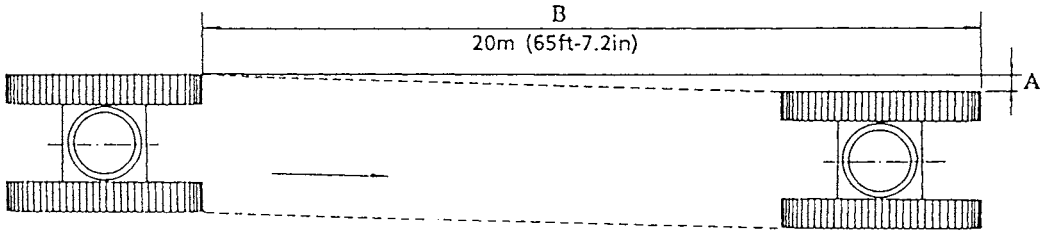
B. Travel speed

Test condition:

Engine HI IDLE, oil temp. 50±5°C (122±9°F). 31.0F).

Procedure:

Measure the revolution of the sprocket for one minute, using a stop watch. Repeat it three times and take a mean value.



Unit:rpm

Symbol	Item					Standard value				
						SK60	SK100	SK120(LC)	SK200(LC)	SK220(LC)
A	Travel deflection					0~1200mm	←	←	←	←
B	Revolution of sprocket rpm	Right	Advance	H	1	30.2~37.2	32.0~39.4	32.0~38.4	27.4~33.6	27.0~33.2
					2	45.1~55.3	44.0~54.1	←	37.6~46.2	36.7~45.2
			Retreat	FC	2	39.5~48.5	21.3~26.3	23.0~28.4	18.8~23.1	←
		Left	Advance	H	1	30.2~37.2	32.0~39.4	32.0~38.4	27.4~33.6	27.0~33.2
					2	45.1~55.3	44.0~54.1	←	37.6~46.2	36.7~45.2
			Retreat	FC	2	39.5~48.5	21.3~26.3	23.0~28.4	18.8~23.1	←

Differential between LH and RH movement:
Less than 5 rpm

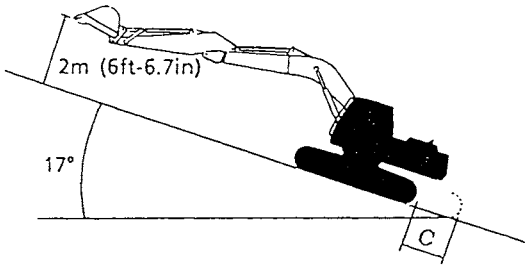
C. Parking brake

Test condition:

Engine stopped, oil temperature of 50±5°C (122±9°F), a slope of 17 degrees.

Procedure:

Leave the machine for one minute with its bucket and arm cylinders fully retracted and with its bucket held at 2m (6ft-7in) above ground, and measure the distance in which the machine moves back in ten minutes.



Unit:mm (in)

Symbol	Item	Standard value				
		SK60	SK100	SK120(LC)	SK200(LC)	SK220(LC)
C	Parking brake	0 (0")	0 (0")	0 (0")	0 (0")	0 (0")

OIL DRAIN FROM MOTORS

A. Swing motor

Test condition:

Engine at high idling, oil temperature of 50±5°C (122±9°F).

Procedure:

With the swing locked, measure the drain for one minute, with the hydraulic system in relief state.

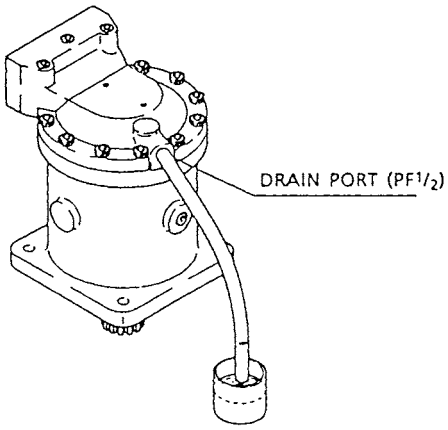
B. Travel Motor

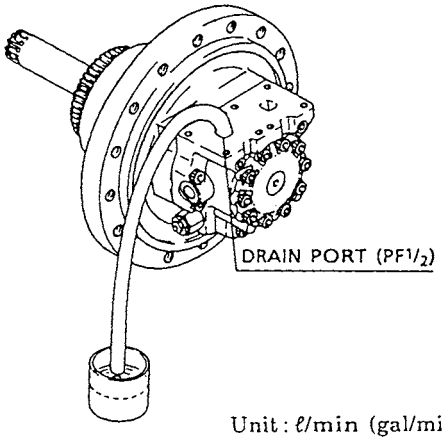
Test condition:

Engine at high idling, oil temperature of 50±5°C (122±9°F).

Procedure:

With the travel motor locked, measure the drain for one minute, with the hydraulic system in relief state.





SK60

Unit: ℓ/min (gal/min)

Symbol	Item	Standard value	Allowable value	Remedy
A	Drain of swing motor	Max. 3 (0.8)	Max. 10 (2.6)	Overhaul
B	Drain of travel motor	Max. 4 (1.1)	Max, 8 (2.1)	Overhaul

SK100

Unit: ℓ/min (gal/min)

Symbol	Item	Standard value	Allowable value	Remedy
A	Drain of swing motor	Max. 5 (1.3)	Max. 15 (4.0)	Overhaul
B	Drain of travel motor	Max. 6 (1.6)	Max. 15 (4.0)	Overhaul

SK120(LC)

Unit: ℓ/min (gal/min)

Symbol	Item	Standard value	Allowable value	Remedy
A	Drain of swing motor	Max. 7 (1.8)	Max. 20 (5.3)	Overhaul
B	Drain of travel motor	Max. 6 (1.6)	Max. 15 (4.0)	Overhaul

SK200(LC)

Unit: ℓ/min (gal/min)

Symbol	Item	Standard value	Allowable value	Remedy
A	Drain of swing motor	Max. 11 (2.9)	Max. 30 (7.9)	Overhaul
B	Drain of travel motor	Max. 8 (2.1)	Max. 20 (5.3)	Overhaul

SK220(LC)

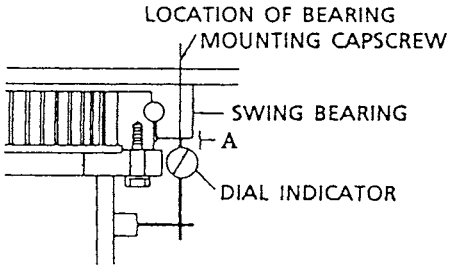
Unit: ℓ/min (gal/min)

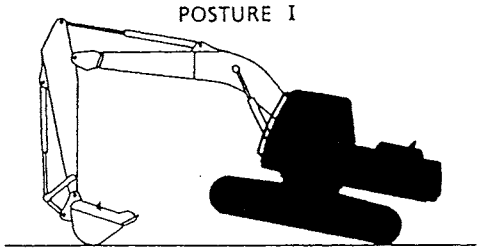
Symbol	Item	Standard value	Allowable value	Remedy
A	Drain of swing motor	Max. 11 (2.9)	Max. 30 (7.9)	Overhaul
B	Drain of travel motor	Max. 8 (2.1)	Max. 20 (5.3)	Overhaul

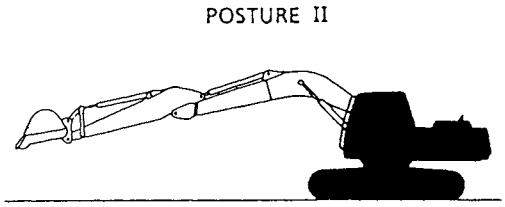
PLAY OF SWING BEARING

Test condition:

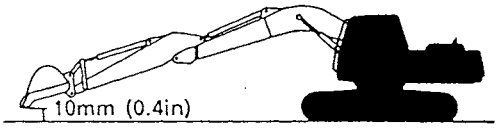
A. Axial play of swing bearing
After bringing the arm to an upright position, press the attachment against the ground till the front of the crawler takes off the ground [posture (I)], and fully contract the bucket cylinder and the arm cylinder till the bucket takes off the ground posture (II). Measure the axial displacement of the bearing outer race at the location of the bearing mounting capscrew, using a dial indicator.







B. Play between upper and lower bodies on the periphery of swing bearing
Fully contract the arm cylinder and the bucket cylinder and allow the bucket to take off the ground about 10mm (0.4in). Swing the top of the bucket horizontally and measure the travel at the top end of the bucket.



SK60 Unit : mm (ft-in)

Symbol	Item	Standard value	Allowable value	Remedy
A	Axial play of swing bearing	0.5~1.5 (0.02~0.06)	2.0 (0.08)	Replace.
B	Horizontal travel at top end of bucket	18~47 (0.7~1.9)	95 (3.7)	

SK100

Unit: mm (ft-in)

Symbol	Item	Standard value	Allowable value	Remedy
A	Axial play of swing bearing	0.5～1.5 (0.02～0.06)	2.0 (0.08)	Replace.
B	Horizontal travel at top end of bucket	18～42 (0.7～1.7)	85 (3.4)	

SK120(LC)

Unit: mm (ft-in)

Symbol	Item	Standard value	Allowable value	Remedy
A	Axial play of swing bearing	0.5～1.5 (0.02～0.06)	2.0 (0.08)	Replace.
B	Horizontal travel at top end of bucket	20～44 (0.8～1.7)	90 (3.5)	

SK200(LC)

Unit: mm (ft-in)

Symbol	Item	Standard value	Allowable value	Remedy
A	Axial play of swing bearing	0.8～1.5 (0.03～0.06)	2.0 (0.08)	Replace.
B	Horizontal travel at top end of bucket	20～45 (0.8～1.8)	95 (3.8)	

SK220(LC)

Unit: mm (ft-in)

Symbol	Item	Standard value	Allowable value	Remedy
A	Axial play of swing bearing	0.8～1.5 (0.03～0.06)	2.0 (0.08)	Replace.
B	Horizontal travel at top end of bucket	20～52 (0.8～2.0)	105 (4.1)	