

KOBELCO

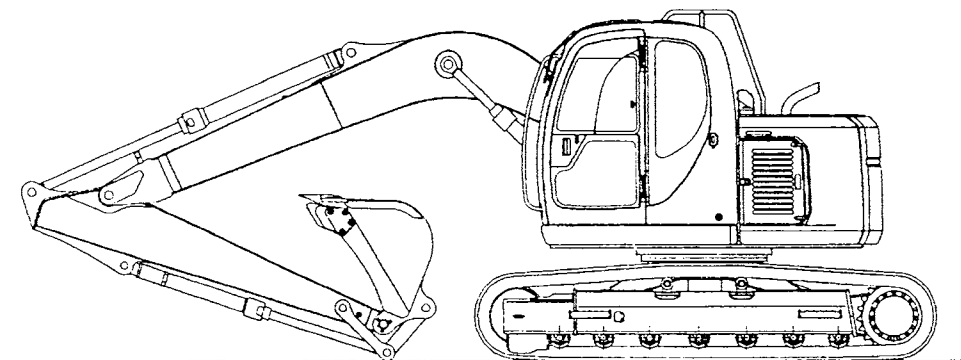
Hydraulic Excavator

Grand Beetle

— SR SERIES —

SERVICEMAN HANDBOOK

SK70SR	YT00101~
SK115SR	YV00101~
SK135SR	YY00101~
SK115SRDZ(KAI)	YY00101~
SK135SRLC	YH00101~
SK135SRLC(KAI)	YH00101~
SK235SR	YF00101~



KOBELCO CONSTRUCTION MACHINERY CO., LTD.

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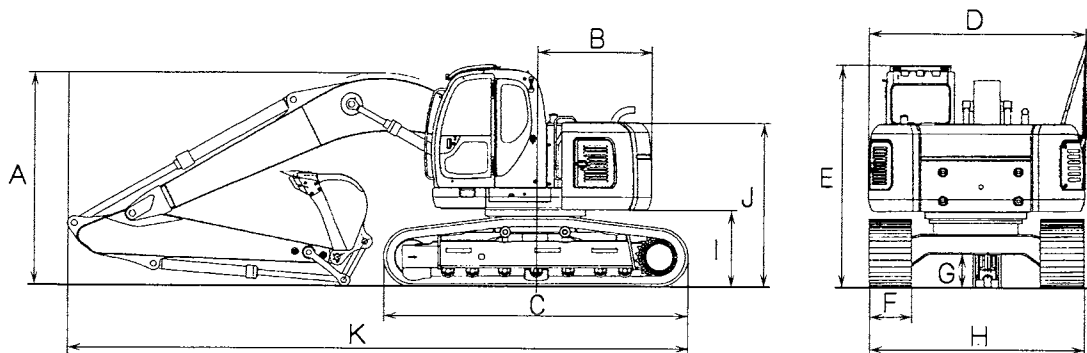
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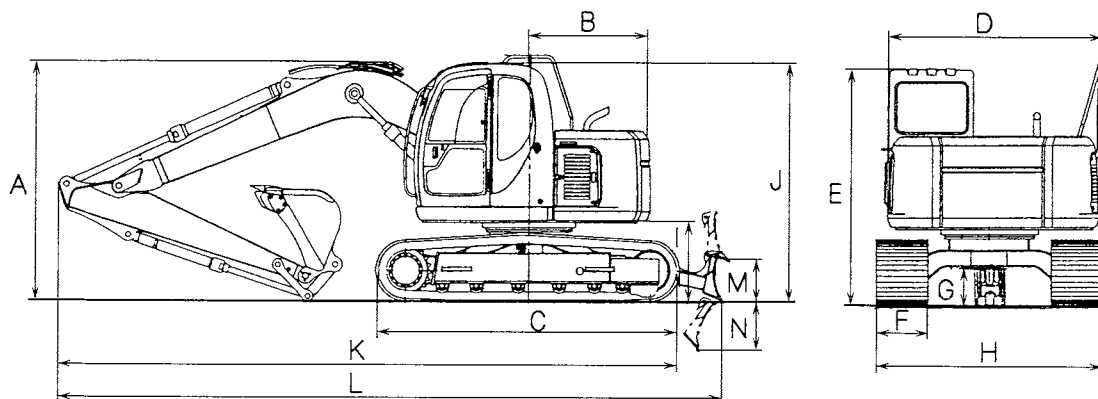
SK70SR SK135SR(LC) SK115SR SK235SR

1. GENERAL DIMENSIONS



Model	Outside Dimension											Unit : mm (ft-in)
	Arm length	A	B	C	D	E	F	G	H	I	J	
SK70SR	2,070 (6'9") (STD)	2,600 (8'6")	R1,160 (3'10")	2,860 (9'5")	2,170 (7'2")	2,600 (8'6")	600 (24")	400 (1'4")	2,470 (8'1")	750 (2'6")	1,780 (5'10")	5,790 (19")
	1,650 (5'5") (Short)	2,600 (8'6")					450 (18")					5,780 (18'12")
SK115SR	2,200 (7'3") (STD)	2,690 (8'10")	R1,385 (4'7")	3,320 (10'11")	2,410 (7'11")	2,740 (9')	600 (24")	455 (1'6")	2,590 (8'6")	910 (2'12")	1,960 (6'5")	6,880 (22'6")
	1,900 (6'3") (Short)	2,680 (8'9")					500 (20")					6,890 (22'7")
	2,700 (8'10") (Long)	2,780 (9'1")					700 (28")					6,890 (22'7")
SK135SR SK135SRLC	2,450 (8') (STD)	2,730 (8'11")	R1,425 (4'8")	STD 3,570 (11'9") LC 3,740 (12'3")	2,410 (7'11")	2,740 (9')	500 (20")	455 (1'6")	2,490 (8'2")	910 (2'12")	1,960 (6'5")	STD 7,360 (24'2") LC 7,440 (24'5")
	2,100 (6'11") (Short)	2,720 (8'11")					600 (24")					STD 7,360 (24'2") LC 7,440 (24'5")
	2,950 (9'8") (Long)	2,750 (9'1")					700 (28")					STD 7,390 (24'3") LC 7,470 (24'6")
SK235SR	2,940 (9'7") (STD)	2,950 (9'8")	R1,620 (5'4")	4,260 (13'12")	3,000 (9'10")	3,070 (10'1")	600 (24")	450 (1'5")	2,990 (9'9")	1,040 (3'5")	2,280 (7'6")	8,710 (28'7")
	2,400 (7'10") (Short)	3,100 (10'2")					700 (28")					8,810 (28'11")
	3,300 (10'10") (Long)	2,950 (9'8")					800 (32")					8,750 (28'8")

NOTE : Dimensions marked ※ do not include the height of the shoe lug.



Model	Outside Dimension											Unit : mm (ft-in)				
	Arm length	A	B	C	D	E	F	G	H	I(※)	J	K	L	M	N	
SK115SRDZ (KAI)	2,450 (8'0") (STD)	2,730 (8'11")	R1,425 (4'8")	3,570 (11'9")	2,410 (7'11")	2,740 (9')	600 (24")	455 (1'6")	2,590 (8'6")	910 (2'12")	1,960 (6'5")	7,360 (24'2")	7,880 (25'10")	490 (1'11")	540 (1'9")	
	2,100 (6'11") (Short)	2,720 (8'11")					7,360 (24'2")		7,880 (25'10")			490 (1'11")	540 (1'9")			
	2,950 (9'8") (Long)	2,750 (9'1")					7,390 (24'3")		7,910 (25'11")			490 (1'11")	540 (1'9")			
SK135SRLC (KAI)	2,950 (9'8") (STD)	2,780 (9'1")	R1,425 (4'8")	3,740 (12'3")	2,410 (7'11")	2,740 (9')	600 (24")	455 (1'6")	2,590 (8'6")	910 (2'12")	1,960 (6'5")	7,470 (4'6")	—	—	—	
	2,100 (6'11") (Short)	2,750 (9'1")					7,440 (24'5")		—			—	—			
	2,450 (8'0")	2,760 (9'1")					7,440 (24'5")		—			—	—			

NOTE : Dimensions marked ※ do not include the height of the shoe lug.

SK115SRDZ Dozer : Standard

2. MACHINE SPECIFICATION TABLE**PERFORMANCE**

ITEM		MODEL	SK70SR		SK115SR		
STD bucket capacity		m ³ {cu·yd}	0.22 (0.29)		0.45 (0.59)		
Bucket capacity range		m ³ {cu·yd}	0.11 (0.14)~0.35 (0.46)		0.17 (0.22)~0.50 (0.65)		
Travel speed		km/h	Iron shoe 3.4/5.3 Rubber shoe 3.5/5.3		Iron shoe 3.5/6.0 Rubber shoe 3.8/6.3		
Swing speed		min ⁻¹ rpm	12.5 {12.5}		11.4 {11.4}		
Gradeability		% (deg)	70 (35)		70 (35)		
Drawbar pulling force		kN {ton}	52.0 {5.3}		95.1 {9.7}		
Digging force	Bucket	kN {kgf}	52.9 {5,400}	52.9 {5,400}	85.5 {8,720}	85.5 {8,720}	85.5 {8,720}
	Arm	kN {kgf}	34.7 {3,540}	39.2 {4,000}	66.9 {6,820}	58.8 {6,000}	51.9 {5,300}
	Arm length	mm	2,070	1,650	1,900	2,200	2,700

DIMENSIONS AND WEIGHT

Operating weight (Shoe width)			ton	7.1 (600mm)		11.8 (500mm) · 11.9 (600mm)		
Dimensions for Transportation		Arm length	mm	2,070	1,650	1,900	2,200	2,700
		Overall length	mm	5,790	5,780	6,890	6,880	6,890
		Overall width	mm	2,470		2,490		2,590
		Overall height	mm	2,600	2,600	2,740	2,740	2,740
Upper	Cab height from G.L.	mm	2,600		2,740			
	Tail height from G.L.	mm	750		910			
	Tail swing radius	mm	1,160		1,385			
	Min. front swing radius	mm	1,750		2,330			
Lower	Overall length of crawler	mm	2,860		3,320			
	Crawler wheel centers	mm	2,240		2,610			
	Track gauge	mm	1,870		1,990			
	Overall width of crawler	mm	2,470		2,490		2,590	
	Width of shoes	mm/kPa	Grouser	450 / 31 {0.32}		Grouser	500 / 40 {0.41}	
	Ground pressure	{kgf/cm²}		600 / 25 {0.25}			600 / 34 {0.35}	
Ground clearance		mm	400		455			

ENGINE

Model	ISUZU A-4JB1		ISUZU A-4BG1	
Rated power output	kW/min ⁻¹ {PS/rpm}	40.4 / 2,100 {55 / 2,100}	58.8 / 2,100 {80 / 2,100}	
Max. torque	N·m/min ⁻¹ {kgf·m/rpm}	19.2 / 1,600 {188 / 1,600}	293 / 1,500 {29.9 / 1,500}	
Displacement	ℓ	2,771	4,329	
Capacity of fuel tank	ℓ	85	160	

HYDRAULIC SYSTEM

Type of pumps	Variable displacement axial piston + gear pump		
Set pressure of system	MPa {kgf/cm ² }	29.4 {300}	32.4 {330}
Swing motor	Axial piston motor		Axial piston motor
Travel motor	2-speed axial piston motor		2-speed axial piston motor
Control valves	6-spool Multiple control valve		6-spool Multiple control valve
Capacity of Hyd. oil tank (Proper level)	ℓ	78 (55)	140 (94)

WORKING RANGES

Arm length	mm	STD	Short	Short	STD	Long
		2,070	1,650	1,900	2,200	2,700
Bucket capacity	m ³ (cu·yd)	0.22 (0.29)	0.28 (0.37)	0.50 (0.65)	0.45 (0.59)	0.37 (0.48)
Max. digging reach	mm	6,710	6,310	7,430	7,710	8,180
Max. digging depth	mm	4,520	4,100	4,760	5,060	5,560
Max. vertical wall digging depth	mm	3,970	3,540	3,960	4,500	4,860
Max. digging height	mm	7,500	7,180	7,960	8,160	8,490
Max. dumping clearance	mm	5,430	5,120	5,570	5,780	6,100

PERFORMANCE

ITEM	MODEL	SK135SR			SK135SR (LC)		
STD bucket capacity	m ³ {cu·yd}	0.50 (0.65)			0.50 (0.65)		
Bucket capacity range	m ³ {cu·yd}	0.24 (0.31) ~ 0.57 (0.75)			0.24 (0.31) ~ 0.57 (0.75)		
Travel speed	km/h	Iron shoe 3.5/6.0 Rubber shoe 3.8/6.4			Iron shoe 3.5/6.0 Rubber shoe 3.8/6.4		
Swing speed	min ⁻¹ rpm	11.7 {11.7}			11.7 {11.7}		
Gradeability	% (deg)	70 (35)			70 (35)		
Drawbar pulling force	kN {ton}	100.0 {10.2}			100.0 {10.2}		
Digging force	Bucket	kN {kgf}	88.2 {8,990}	88.2 {8,990}	88.2 {8,990}	88.2 {8,990}	88.2 {8,990}
	Arm	kN {kgf}	71.7 {7,310}	63.6 {6,490}	58.0 {2,920}	71.7 {7,310}	63.6 {6,490}
	Arm length	mm	2,100	2,450	2,950	2,100	2,450

DIMENSIONS AND WEIGHT

Operating weight (Shoe width)		ton	13.4 (500mm) • 13.7 (600mm) • 13.9 (700mm)			13.9 (600mm)		
Dimensions for Transportation	Arm length	mm	2,100	2,450	2,950	2,100	2,450	2,950
	Overall length	mm	7,360	7,360	7,390	7,440	7,440	7,470
	Overall width	mm	2,490 (500mm) • 2,590 (600mm) • 2,690 (700mm)			2,590		
	Overall height	mm	2,740	2,810	2,740	2,810	2,810	2,810
Upper	Cab height from G.L.	mm	2,740			2,740		
	Tail height from G.L.	mm	910			910		
	Tail swing radius	mm	1,425			1,425		
	Min. front swing radius	mm	2,380			2,380		
Lower	Overall length of crawler	mm	3,570			3,740		
	Crawler wheel centers	mm	2,865			3,035		
	Track gauge	mm	1990			1,990		
	Overall width of crawler	mm	2,490 (500mm)	2,590 (600mm)	2,690 (700mm)	2,590		
	Width of shoes	mm/kPa	Grouser	500 / 42 {0.43}		Grouser	600 / 35 {0.35}	
	Ground pressure	{kgf/cm ² }		600 / 36 {0.37}				
		700 / 31 {0.32}						
Ground clearance		mm	455			455		

ENGINE

Model	ISUZU A-4BG1T		ISUZU A-4BG1T	
Rated power output kW/min ⁻¹ {PS/rpm}	62.5 / 2,050 {85 / 2,050}		62.5 / 2,050 {85 / 2,050}	
Max. torque N·m/min ⁻¹ {kgf·m/rpm}	318 / 1,600 {32.4 / 1,600}		318 / 1,600 {32.4 / 1,600}	
Displacement	ℓ		4,329	
Capacity of fuel tank	ℓ		160	

HYDRAULIC SYSTEM

Type of pumps	Variable displacement axial piston + gear pump	
Set pressure of system	MPa {kgf/cm ² }	34.3 {350}
Swing motor	Axial piston motor	
Travel motor	2-speed axial piston motor	
Control valves	6-spool Multiple control valve	
Capacity of Hyd. oil tank (Proper level)	ℓ	140 (94)

WORKING RANGES

Arm length	mm	Short	STD	Long	Short	STD	Long
		2,100	2,450	2,950	2,100	2,450	2,950
Bucket capacity	m ³ (cu·yd)	0.57 (0.75)	0.50 (0.65)	0.38 (0.50)	0.57 (0.75)	0.50 (0.65)	0.38 (0.50)
Max. digging reach	mm	8,030	8,340	8,770	8,030	8,340	8,770
Max. digging depth	mm	5,160	5,520	6,010	5,160	5,520	6,010
Max. vertical wall digging depth	mm	4,580	4,960	5,250	4,580	4,960	5,250
Max. digging height	mm	8,460	8,630	8,860	8,460	8,630	8,860
Max. dumping clearance	mm	6,020	6,200	6,440	6,020	6,200	6,440

PERFORMANCE

ITEM	MODEL	SK115SRDZ			SK135SRLC		
STD bucket capacity	m ³ {cu·yd}	0.24 (0.31) ~ 0.57 (0.75)			0.24 (0.31) ~ 0.57 (0.75)		
Bucket capacity range	m ³ {cu·yd}	0.50 (0.65)			0.38 (0.50)		
Travel speed	km/h	Iron shoe 3.5/6.0 Rubber shoe 3.8/6.4			Iron shoe 3.5/6.0 Rubber shoe 3.8/6.4		
Swing speed	min ⁻¹ rpm	11.7 {11.7}			11.7 {11.7}		
Gradeability	% (deg)	70 (35)			70 (35)		
Drawbar pulling force	kN {ton}	100.0 {10.2}			100.0 {10.2}		
Digging force	Bucket	kN {kgf}	88.2 {8,990}	88.2 {8,990}	88.2 {8,990}	95.0 {9,690}	
	Arm	kN {kgf}	71.7 {7,310}	63.6 {6,490}	58.0 {2,920}	58.1 {5,920}	
	Arm length	mm	2,100	2,450	2,950	2,100	2,950 2,450

DIMENSIONS AND WEIGHT

Operating weight (Shoe width)			ton	14.4 (600mm)			14 (600mm)		
Dimensions for Transportation	Arm length		mm	2,100	2,450	2,950	2,100	2,950	2,450
	Overall length		mm	7,360	7,360	7,390	7,440	7,470	7,440
	Overall width		mm	2,590			2,590		
	Overall height		mm	2,810	2,810	2,810	2,810	2,810	2,810
Upper	Cab height from G.L.		mm	2,740			2,740		
	Tail height from G.L.		mm	910			910		
	Tail swing radius		mm	1,425			1,425		
	Min. front swing radius		mm	2,380			2,380		
Lower	Overall length of crawler		mm	3,570			3,740		
	Crawler wheel centers		mm	2,865			3,035		
	Track gauge		mm	1,990			1,990		
	Overall width of crawler		mm	2,590			2,590		
	Width of shoes		mm/kPa	Grouser	600 / 38 {0.39}		Grouser	600 / 35 {0.36}	
Ground pressure		{kgf/cm²}							
Ground clearance			mm	455			455		

ENGINE

Model	ISUZU A-4BG1T		ISUZU A-4BG1T	
Rated power output	kW/min ⁻¹ {PS/rpm}	62.7 / 2,050 {85.2 / 2,050}		70.1 / 2,200 {95.3 / 2,200}
Max. torque	N·m/min ⁻¹ {kgf·m/rpm}	318 / 1,600 {32.4 / 1,600}		318 / 1,600 {32.4 / 1,600}
Displacement	ℓ	4,329		4,329
Capacity of fuel tank	ℓ	160		160

HYDRAULIC SYSTEM

Type of pumps	Variable displacement axial piston + gear pump	
Set pressure of system	MPa {kgf/cm ² }	34.3 {350}
Swing motor	Axial piston motor	
Travel motor	2-speed axial piston motor	
Control valves	6-spool Multiple control valve	
Capacity of Hyd. oil tank (Proper level)	ℓ	140 (94)

WORKING RANGES

Arm length	mm	Short	STD	Long	Short	STD	---
		2,100	2,450	2,950	2,100	2,950	2,450
Bucket capacity	m ³ {cu·yd}	0.57 (0.75)	0.50 (0.65)	0.38 (0.50)	0.57 (0.75)	0.38 (0.50)	0.50 (0.65)
Max. digging reach	mm	8,030	8,340	8,770	8,030	8,770	8,340
Max. digging depth	mm	5,160	5,520	6,010	5,160	6,010	5,520
Max. vertical wall digging depth	mm	4,580	4,960	5,250	4,580	5,250	4,960
Max. digging height	mm	8,460	8,630	8,860	8,460	8,860	8,630
Max. dumping clearance	mm	6,020	6,200	6,440	6,020	6,440	6,200

PERFORMANCE

ITEM		MODEL	SK235SR		
STD bucket capacity		m ³ {cu·yd}	0.80 (1.05)		
Bucket capacity range		m ³ {cu·yd}	0.51 (0.67)~0.93 (1.22)		
Travel speed		km/h	Iron shoe 3.3/5.3		
Swing speed		min ⁻¹ rpm	13.0 {13.0}		
Gradeability		% (deg)	70 {35}		
Drawbar pulling force		kN {ton}	185.3 {18.9}		
Digging force	Bucket	kN {kgf}	135 {13,800} at boost 149 {15,200}	135 {13,800} at boost 149 {15,200}	135 {13,800} at boost 149 {15,200}
	Arm	kN {kgf}	115 {11,700} at boost 126 {12,900}	97 {9,900} at boost 107 {10,900}	92.2 {9,400} at boost 10 {10,300}
	Arm length	mm	2,400	2,940	3,300

DIMENSIONS AND WEIGHT

Operating weight (Shoe width)			ton	23.2 (600mm)		
Dimensions for Transportation	Arm length	mm	2,400	2,940	3,300	
	Overall length	mm	8,810	8,710	8,750	
	Overall width	mm	2,990			
	Overall height	mm	3,070	3,070	3,070	
Upper	Cab height from G.L.	mm	3,070			
	Tail height from G.L.	mm	1,040			
	Tail swing radius	mm	1,620			
	Min. front swing radius	mm	1,900			
Lower	Overall length of crawler	mm	4,260			
	Crawler wheel centers	mm	3,470			
	Track gauge	mm	2,390			
	Overall width of crawler	mm	2,990			
	Width of shoes	mm/kPa	Grouser	600 / 50 {0.51}		
Ground pressure	{kgf/cm ² }	700 / 43 {0.44}				
		800 / 38 {0.39}				
Ground clearance			mm	450		

ENGINE

Model		MITSUBISHI 6D34-TE1
Rated power output		kW/min ⁻¹ {PS/rpm}
Max. torque		N·m/min ⁻¹ {kgf·m/rpm}
Displacement		ℓ
Capacity of fuel tank		ℓ
		290

HYDRAULIC SYSTEM

Type of pumps		Variable displacement axial piston + gear pump
Set pressure of system		MPa {kgf/cm ² }
Swing motor		Axial piston motor
Travel motor		2-speed axial piston motor
Control valves		6-spool Multiple control valve
Capacity of Hyd. oil tank (Proper level)		ℓ
		195 (125)

WORKING RANGES

Arm length	mm	Short	STD	Long
		2,400	2,940	3,300
Bucket capacity	m ³ (cu·yd)	0.93 (1.22)	0.80 (1.05)	0.68 (0.89)
Max. digging reach	mm	9,370	9,850	10,210
Max. digging depth	mm	6,160	6,700	7,100
Max. vertical wall digging depth	mm	5,520	6,060	6,480
Max. digging height	mm	10,890	11,290	11,590
Max. dumping clearance	mm	8,030	8,420	8,690

3. MAJOR SPECIFICATIONS**SK70SR****3-1 ● ENGINE SPECIFICATIONS****Principal items**

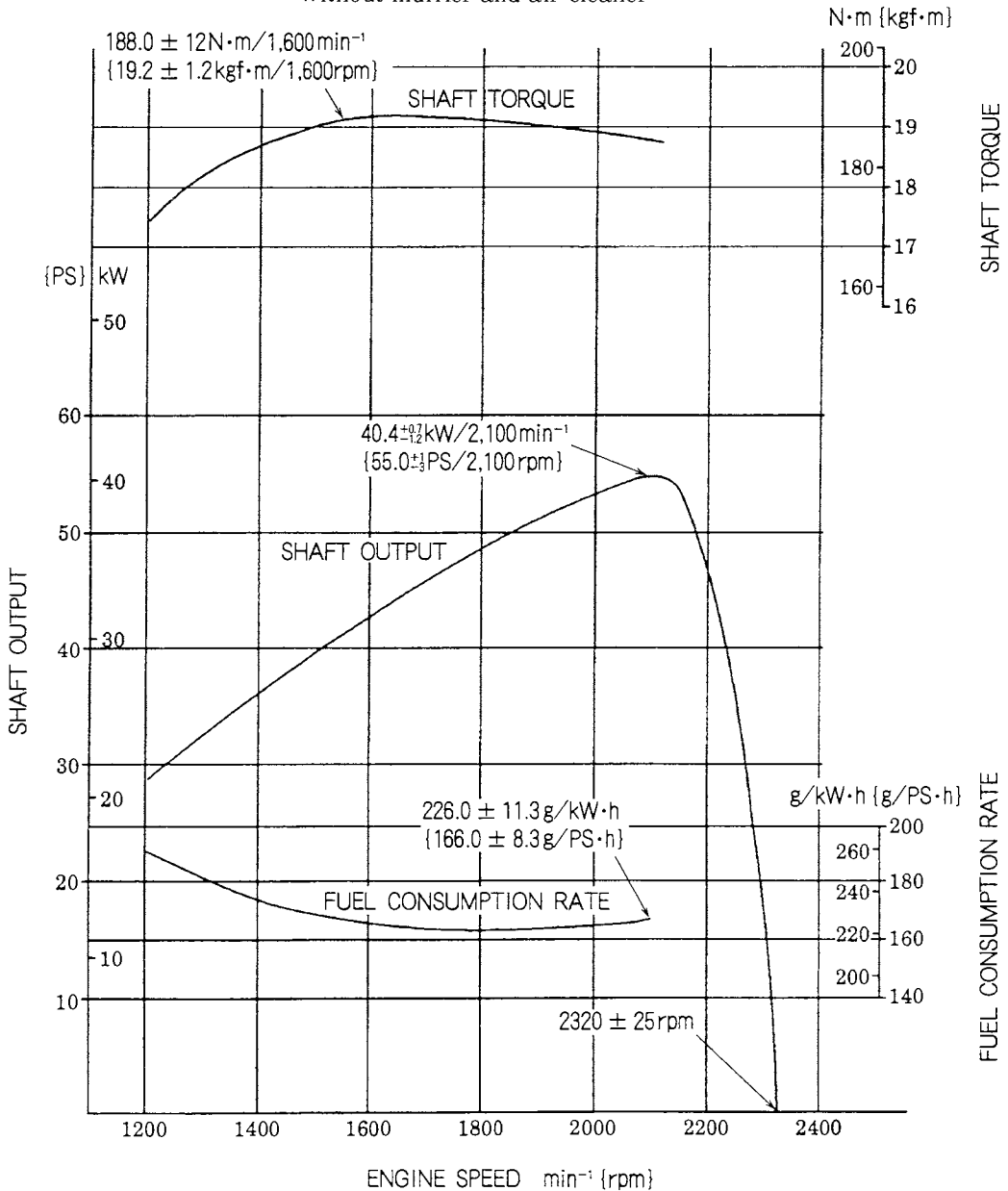
Model		SK70SR		
Engine model		ISUZU A-4JB1		
Type		4-cycle water-cooled, in-line, Direct injection		
Number of cylinder — Bore × Stroke		4 — 93mm (3.66in) × 102mm (4.02in)		
Total displacement		2.771 cc (169cu-in)		
Compression ratio		18.2		
Rated out put		40.4kW / 2,100min ⁻¹ {55PS / 2,100rpm}		
Maximum torque		19.2kgf·m / 1,600min ⁻¹ (139ft·lbs / 1,600rpm)		
High idling		2,320±25 min ⁻¹ {2,320±25rpm}		
Low idling		1,000±20 min ⁻¹ {1,000±20rpm}		
Injection valve opening pressure		185kgf/cm ² (2,632psi)		
Thermostat action		Opening 82°C (180°F) / Full open 95°C (203°F)		
Ignition order		1 - 3 - 4 - 2		
Compression pressure		30 kgf/cm ² (427psi) at 200rpm		
Lubrication oil pressure		—————		
Fuel injection timing		° (degree) 17±1° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4mm (0.016") in cold condition	24.5° before the top dead point	55.5° after the bottom dead point
	Exhaust valve	0.4mm (0.016") in cold condition	54° before the bottom dead point	26° after the top dead point
Starter capacity		3.2kW × 24V		
Generator capacity (Alternator)		24V × 30A		
Cooling fan drive method		φ 450 (φ 17.7in) suction type seven fans V-belt drive, Pulley ratio Crank / Fan : 1.12		
Engine oil quantity		Full level 8 ℓ (2.11gal) Low level sensor actuation oil filter, etc.		
Dry weight		240kg (529lbs)		
Fuel consumption ratio		226g/kW·h {166g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		760 × 620 × 710 (29.9 × 24.4 × 28)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK70SR

● ENGINE CHARACTERISTIC CURVE (ISUZU 4JB1)

Condition to be measured : With fan and generator

Without muffler and air cleaner



$$\text{Fuel consumption volume} = \frac{\text{Fuel consumption rate}}{0.835 \times 1000} \times \text{PS} \times \text{Load factor } (\alpha)$$

$$= \frac{166 \text{ g/PS·h}}{0.835 \times 1000} \times 55 \text{ PS} \times \alpha$$

$$= 10.9 \alpha \cdot \ell / \text{h} \quad (2.8 \alpha \cdot \text{gal/h})$$

α : Standard load factor (0.60~0.70)

Fuel consumption in regular operation
(load factor : 0.60~0.70)
 $6.5 \sim 7.6 \ell / \text{h} \quad (1.7 \sim 2.0 \text{ gal/h})$

SK115SR**● ENGINE SPECIFICATIONS****Principal items**

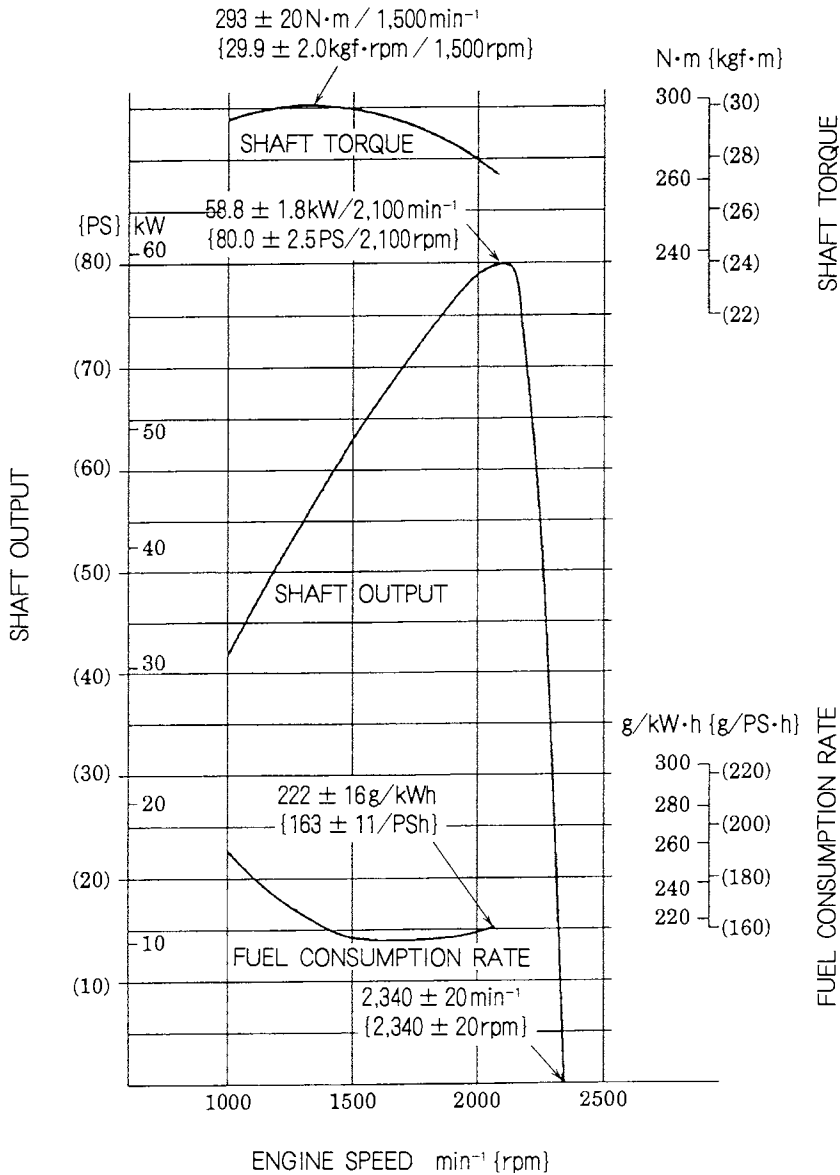
Model		SK115SR		
Engine model		ISUZU A-4BG1		
Type		4-cycle water-cooled, in-line, Direct injection		
Number of cylinder — Bore × Stroke		4 — 105mm (4.13 in) × 125 mm (4.92 in)		
Total displacement		4,329cc (264cu-in)		
Compression ratio		17		
Rated out put		58.8±1.8kW / 2,100min ⁻¹ {80±2.5PS / 2,100rpm}		
Maximum torque		29.9±2kgf·m / 1,500min ⁻¹ (216ft·lbs / 1,500rpm)		
High idling		2,340±20min ⁻¹ {2,340±20rpm}		
Low idling		850±20min ⁻¹ {850±20rpm}		
Injection valve opening pressure		150kgf/cm ² (2,134psi)		
Thermostat action		Opening 82°C (180°F) / Full open 95°C (203°F)		
Ignition order		1 — 3 — 4 — 2		
Compression pressure		31 kgf/cm ² (441 psi) at 200rpm		
Lubrication oil pressure		—————		
Fuel injection timing		14° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4mm (0.016") in cold condition	19° before the top dead point	47° after the bottom dead point
	Exhaust valve	0.4mm (0.016") in cold condition	57° before the bottom dead point	15° after the top dead point
Starter capacity		4.5kW × 24V		
Generator capacity (Alternator)		24V × 30A		
Cooling fan drive method		φ 550 (φ 22 in) suction type sixth fans V-belt drive, Pulley ratio Crank / Fan : 1.09		
Engine oil quantity		Engine body 13 ℓ (Full) (3.44 gal) 11 ℓ (Low) (2.9 gal)		
Dry weight		353kg (778lbs)		
Fuel consumption ratio		222±16g/kW·h {163±11 g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		860 × 670 × 850 (33.8 × 26.3 × 33.4)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK115SR

● ENGINE CHARACTERISTIC CURVE (ISUZU A-4BG1)

Condition to be measured : With fan and generator

Without muffler and air cleaner



$$\text{Fuel consumption volume} = \frac{\text{Fuel consumption rate}}{0.835 \times 1000} \times \text{PS} \times \text{Load factor } (\alpha)$$

$$= \frac{163 \text{ g/PS} \cdot \text{h}}{0.835 \times 1000} \times 80 \text{ PS} \times \alpha$$

$$= 15.6 \alpha \cdot \ell / \text{h} \quad (4.1 \alpha \cdot \text{gal/h})$$

α : Standard load factor (0.70~0.80)

Fuel consumption in regular operation
(load factor : 0.70~0.80)

10.9 ~ 12.5 ℓ / h (2.8 ~ 3.3 gal/h)

SK115SRDZ**● ENGINE SPECIFICATIONS****Principal items**

Model		SK115SRDZ (KAI)		
Engine model		ISUZU A-4BG1T		
Type		4-cycle water-cooled, in-line, Direct injection Turbo charging type		
Number of cylinder — Bore × Stroke		4 — 105 mm (4.13 in) × 125 mm (4.92 in)		
Total displacement		4,329 cc (264 cu-in)		
Compression ratio		17		
Rated out put		60.9 kW / 2,050 min ⁻¹ {82.8 PS / 2,050 rpm}		
Maximum torque		32.4 kgf·m / 1,600 min ⁻¹ (234 ft·lbs / 1,600 rpm)		
High idling		2,350 ± 20 min ⁻¹ {2,350 ± 20 rpm}		
Low idling		850 ± 20 min ⁻¹ {850 ± 20 rpm}		
Injection valve opening pressure		185 kgf/cm ² (2,631 psi)		
Thermostat action		Opening 82°C (180°F) / Full open 95°C (203°F)		
Ignition order		1 — 3 — 4 — 2		
Compression pressure		31 kgf/cm ² (441 psi) at 200 rpm		
Lubrication oil pressure		—————		
Fuel injection timing		° (degree) 12° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4 mm (0.016") in cold condition	19° before the top dead point	47° after the bottom dead point
	Exhaust valve	0.4 mm (0.016") in cold condition	57° before the bottom dead point	15° after the top dead point
Starter capacity		4.5 kW × 24V		
Generator capacity (Alternator)		24V × 40A		
Cooling fan drive method		φ 550 (φ 22 in) suction type eight fans V-belt drive, Pulley ratio Crank / Fan : 1.125		
Engine oil quantity		Engine body 13 ℓ (Full) (3.44 gal) 11 ℓ (Low) (2.9 gal)		
Dry weight		368 kg (812 lbs)		
Fuel consumption ratio		234 ± 16 g/kW·h {172 ± 12 g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		900 × 690 × 865 (35.5 × 27.2 × 34.1)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK135SR (LC)
● ENGINE SPECIFICATIONS
Principal items

Model		SK135SR (LC)		
Engine model		ISUZU A-4BG1T		
Type		4-cycle water-cooled, in-line, Direct injection Turbo charging type		
Number of cylinder — Bore × Stroke		4 — 105mm (4.13in) × 125mm (4.92in)		
Total displacement		4,329cc (264cu-in)		
Compression ratio		17		
Rated out put		62.5kW / 2,050min ⁻¹ {85PS / 2,050rpm}		
Maximum torque		32.4kgf·m / 1,600min ⁻¹ (234ft·lbs / 1,600rpm)		
High idling		2,350±20min ⁻¹ {2,350±20rpm}		
Low idling		850±20min ⁻¹ {850±20rpm}		
Injection valve opening pressure		185kgf/cm ² (2,631psi)		
Thermostat action		Opening 82°C (180°F) / Full open 95°C (203°F)		
Ignition order		1 — 3 — 4 — 2		
Compression pressure		31kgf/cm ² (441psi) at 200rpm		
Lubrication oil pressure		—		
Fuel injection timing		12° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4mm (0.016") in cold condition	19° before the top dead point	47° after the bottom dead point
	Exhaust valve	0.4mm (0.016") in cold condition	57° before the bottom dead point	15° after the top dead point
Starter capacity		4.5kW × 24V		
Generator capacity (Alternator)		24V × 40A		
Cooling fan drive method		φ 550 (φ 22in) suction type eight fans V-belt drive, Pulley ratio Crank / Fan : 1.125		
Engine oil quantity		Engine body 13ℓ (Full) (3.44gal) 11ℓ (Low) (2.9gal)		
Dry weight		368kg (812lbs)		
Fuel consumption ratio		234±16g/kW·h {172±12g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		900 × 690 × 865 (35.5 × 27.2 × 34.1)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK135SRLC (KAI)**● ENGINE SPECIFICATIONS****Principal items**

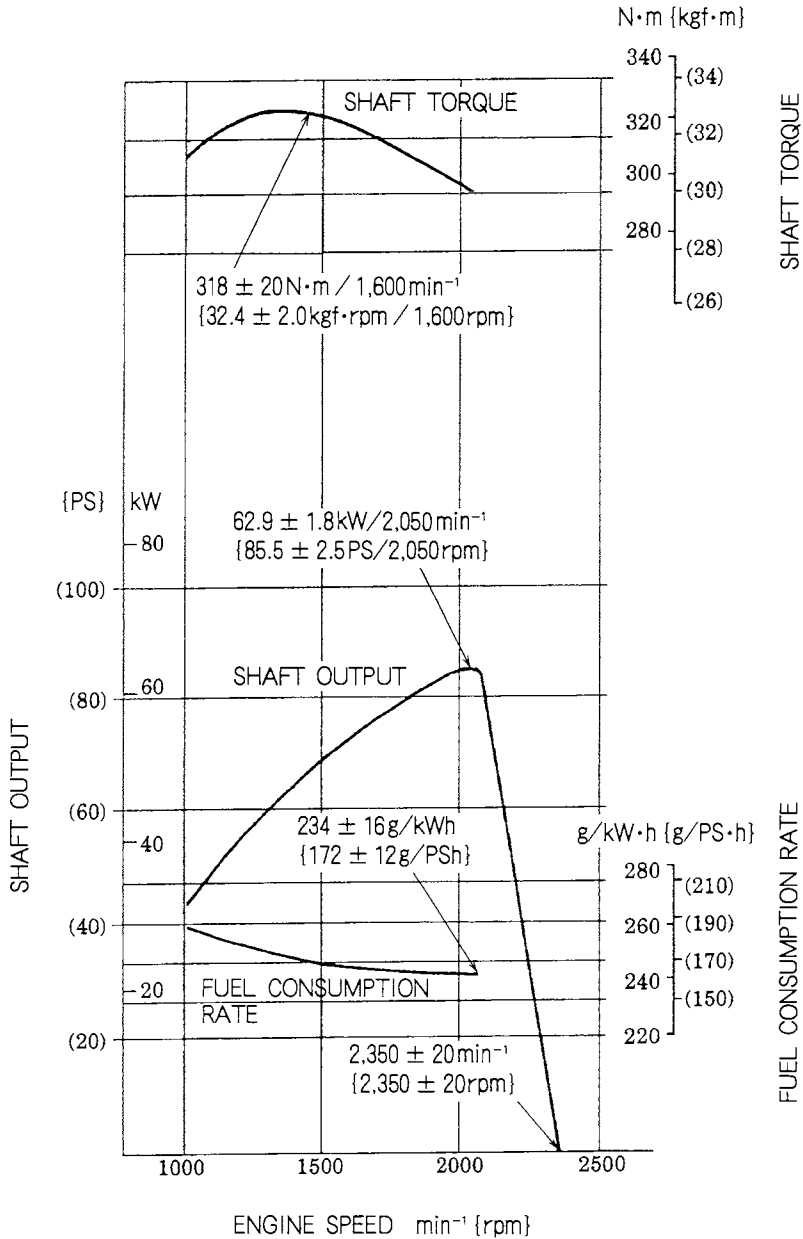
Model		SK135SRLC (KAI)		
Engine model		ISUZU A-4BG1T		
Type		4-cycle water-cooled, in-line, Direct injection Turbo charging type		
Number of cylinder — Bore × Stroke		4 — 105 mm (4.13 in) × 125 mm (4.92 in)		
Total displacement		4,329 cc (264 cu-in)		
Compression ratio		17		
Rated out put		68.2 kW / 2,200 min ⁻¹ {92.7 PS / 2,200 rpm}		
Maximum torque		32.4 kgf·m / 1,600 min ⁻¹ (234 ft·lbs / 1,600 rpm)		
High idling		2,350 ± 20 min ⁻¹ {2,350 ± 20 rpm}		
Low idling		850 ± 20 min ⁻¹ {850 ± 20 rpm}		
Injection valve opening pressure		185 kgf/cm ² (2,631 psi)		
Thermostat action		Opening 82°C (180°F) / Full open 95°C (203°F)		
Ignition order		1 — 3 — 4 — 2		
Compression pressure		31 kgf/cm ² (441 psi) at 200 rpm		
Lubrication oil pressure		—————		
Fuel injection timing		12° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4 mm (0.016") in cold condition	19° before the top dead point	47° after the bottom dead point
	Exhaust valve	0.4 mm (0.016") in cold condition	57° before the bottom dead point	15° after the top dead point
Starter capacity		4.5 kW × 24V		
Generator capacity (Alternator)		24V × 40A		
Cooling fan drive method		φ 550 (φ 22 in) suction type eight fans V-belt drive, Pulley ratio Crank / Fan : 1.125		
Engine oil quantity		Engine body 13 ℓ (Full) (3.44 gal) 11 ℓ (Low) (2.9 gal)		
Dry weight		368 kg (812 lbs)		
Fuel consumption ratio		234 ± 16 g/kW·h {172 ± 12 g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		900 × 690 × 865 (35.5 × 27.2 × 34.1)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK115SRdz • SK135SR (LC)

● ENGINE CHARACTERISTIC CURVE (ISUZU A-4BG1T)

Condition to be measured : With fan and generator

Without muffler and air cleaner



$$\text{Fuel consumption volume} = \frac{\text{Fuel consumption rate}}{0.835 \times 1000} \times \text{PS} \times \text{Load factor } (\alpha)$$

$$= \frac{172 \text{ g/PS}\cdot\text{h}}{0.835 \times 1000} \times 85.5 \text{ PS} \times \alpha$$

$$= 17.6 \alpha \cdot \ell / \text{h} \quad (4.6 \alpha \cdot \text{gal/h})$$

α : Standard load factor (0.70~0.80)

Fuel consumption in regular operation
(load factor : 0.70~0.80)

12.3 ~ 14.1 ℓ / h (3.2 ~ 3.7 gal/h)

SK70SR • **SK115SR** • **SK115SRdz** • **SK135SR (LC)**

● **EPA ENGINE**

Heavy Duty Non-Road Engine (50 – 750hp)
Emission Control System Warranty Statement

EMISSION RELATED SYSTEM DEFECT WARRANTY

American Isuzu Motors Inc. warrants to the initial owner and subsequent owner of a certified non-road diesel engine (powering non-road machines and equipment), that such engine is:

1. Designed, built, and equipped so as to conform, at the time of sale, with all applicable regulations adopted by the United States Environmental Protection Agency (EPA) and the California Air Resource Board.
2. Free from defects in materials and workmanship in specific emission related parts for a period of five (5) years or 3,000 hours of operation whichever occurs first, after date of delivery to the initial owner.

If an emission related part fails during the warranty period, it will be repaired or replaced. Any such part repaired or replaced under warranty is warranted for the remainder of the warranty period.

During the term of this warranty, American Isuzu Motors Inc. will provide, through a ISUZU Engine dealer or other establishment authorized by American Isuzu Motors Inc., repair or replacement of any warranted part at no charge to the non-road engine owner.

In an emergency, repairs may be performed at any service establishment, or by the owner, using any replacement part.

American Isuzu Motors Inc. will reimburse the owner for their expenses, including diagnostic charges for such emergency repair. These expenses shall not exceed American Isuzu Motors Inc. suggested retail price for all warranted parts replaced, and labor charges based on American Isuzu Motors Inc. recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate.

A part not being available within 30 days or a repair not being complete within 30 days constitutes an emergency.

As a condition of reimbursement, replaced parts and receipted invoices must be presented at a place of business of an authorized ISUZU Engine Dealer or other establishment authorized by American Isuzu Motors Inc.

This warranty covers the following emission related parts and components.

- Charge Air Cooling System (If Equipped)
- Fuel Injection System
- Intake Manifold
- Exhaust Manifold
- Turbocharger System
- Miscellaneous hoses, clamps, connectors and sealing devices used in the above systems.

If failure of one of these components results in failure of another part, both will be covered by this warranty.

Any Replacement part may be used for maintenance or repairs. The owner should ensure that such parts are equivalent in design and durability to genuine ISUZU parts.

Use of non-genuine ISUZU parts does not invalidate the warranty.

However, American Isuzu Motors Inc. is not liable for parts which are not genuine ISUZU parts.

LIMITATIONS AND RESPONSIBILITIES

These warranties are subject to the following:

AMERICAN ISUZU MOTORS INC. RESPONSIBILITIES

During the emission warranty period, if a defect in material or workmanship of a warranted part or component is found, American Isuzu Motors Inc. will provide:

- New, Remanufactured, or repaired parts and / or components required to correct the defect.

Note : Items replaced under this warranty become the property of American Isuzu Motors Inc.

- Labor, during normal working hours, required to make the warranty repair.

This includes diagnosis and labor to remove and install the engine, if necessary.

OWNER RESPONSIBILITIES

During the emission warranty period, the owner is responsible for:

- The performance of all required maintenance. A warranty claim will not be denied because the scheduled maintenance was not performed. However, if the lack of required maintenance was the reason for the repair, then the claim will be denied.
- Premium of overtime labor costs.
- Costs to investigate complaints which are not caused by a defect in American Isuzu Motors Inc. material or workmanship.
- Providing timely notice of a warrantable failure and promptly making the product available for repair.

LIMITATIONS

American Isuzu Motors Inc. is not responsible for resultant damages to an emission related part or component resulting from:

- Any application or installation American Isuzu Motors Inc. deems improper as explained in the Instruction Manual.
- Attachments, accessory items, or parts not authorized for use by American Isuzu Motors Inc.
- Improper off-road engine maintenance, repair, or abuse.
- Owner's unreasonable delay in making the product available after being notified of a potential product problem.

This warranty is in addition to American Isuzu Motors Inc. standard warranty, applicable to the off-road engine product involved.

Remedies under this warranty are limited to the provision of material and services as specified herein. American Isuzu Motors Inc. is not responsible for incidental or consequential damages such as downtime or loss-use of engine powered equipment.

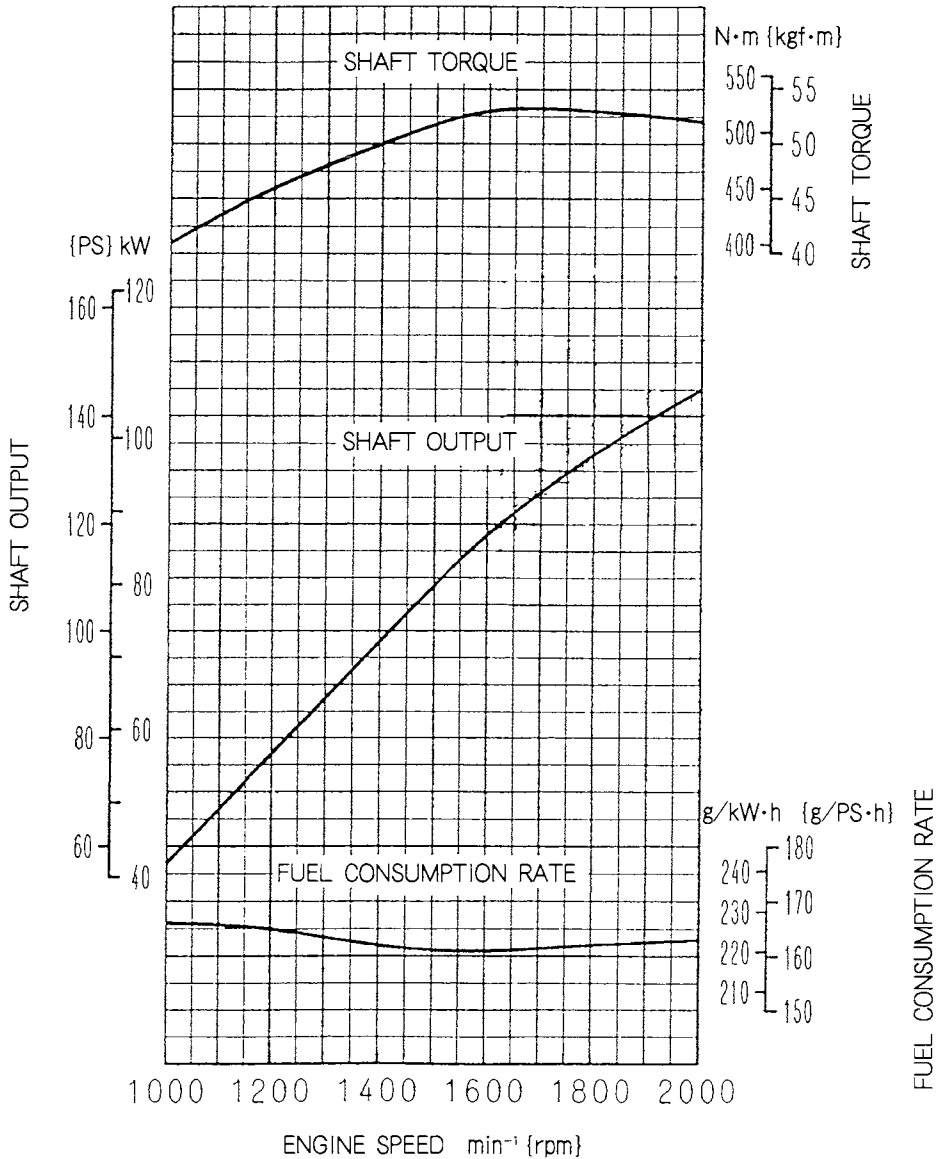
SK235SR**● ENGINE SPECIFICATIONS****Principal items**

Model		SK235SR		
Engine model		Mitsubishi Diesel engine { 6D34-TE1 6D34-TUB — EU 6D34-TEC — KAI		
Type		4-cycle water-cooled, in-line, Direct injection Turbo charging type		
Number of cylinder — Bore × Stroke		6 — 104mm (4.09in) × 115 mm (4.53in)		
Total displacement		5,861cc (358cu-in)		
Compression ratio		16.5		
Rated out put		107kW / 2,000min ⁻¹ {145PS / 2,000rpm} 110kW / 2,000min ⁻¹ {150PS / 1,600rpm} — EU 148hp / 2,000min ⁻¹ — KAI		
Maximum torque		53kgf·m / 1,600min ⁻¹ (383 ft·lbs / 1,600rpm) 54kgf·m / 1,600min ⁻¹ (390 ft·lbs / 1,600rpm) — EU 390 lbf·ft / 1,600min ⁻¹ — KAI		
High idling		2,220±20min ⁻¹ {2,220±20rpm}		
Low idling		950±20min ⁻¹ {950±20rpm}		
Injection valve opening pressure		220kgf/cm ² (3,129psi)		
Thermostat action		Opening 76.5°C (169.7°F) / Full open 90°C (194°F)		
Ignition order		1 - 5 - 3 - 6 - 2 - 4		
Compression pressure		26kgf/cm ² (370psi) at 200rpm		
Lubrication oil pressure		1.5 ~ 5kgf/cm ² (21 ~ 71psi) at 850rpm		
Fuel injection timing		° (degree) 15° before top dead point		
Valve clearance, valve action timing		Valve clearance	Open	Close
	Intake valve	0.4mm (0.016") in cold condition	19° before the top dead point	53° after the bottom dead point
	Exhaust valve	0.4mm (0.016") in cold condition	60° before the bottom dead point	16° after the top dead point
Starter capacity		5.0kW × 24V		
Generator capacity (Alternator)		24V × 35A		
Cooling fan drive method		φ 620 (φ 24in) suction type nine fans V-belt drive, Pulley ratio Crank / Fan : 0.85		
Engine oil quantity		Engine body 18 ℓ (Full) (4.76 gal) 15.5 ℓ (Low) (4.1 gal)		
Dry weight		470kg (1,036lbs)		
Fuel consumption ratio		222g/kW·h {163g/PS·h}		
Allowable inclination		Back and forth, Right and left : 35°		
Engine dimension L × W × H mm (in)		1,189 × 725 × 901 (46.8 × 28.5 × 35.4)		
Rotating direction		Counterclockwise seeing from flywheel side		

SK235SR

● ENGINE CHARACTERISTIC CURVE (MITSUBISHI 6D34-TE1)

Condition to be measured : With fan and air cleaner, alternator
Without muffler



$$\text{Fuel consumption volume} = \frac{\text{Fuel consumption rate}}{0.835 \times 1000} \times \text{PS} \times \text{Load factor } (\alpha)$$

$$= \frac{163 \text{ g/PS} \cdot \text{h}}{0.835 \times 1000} \times 145 \text{ PS} \times \alpha$$

$$= 28.3 \alpha \text{ } \ell / \text{h} \text{ (} 7.4 \alpha \text{ gal/h)}$$

α : Standard load factor (0.60~0.70)

Fuel consumption in regular operation
(load factor : 0.60~0.70)

17.0 ~ 19.8 ℓ / h (4.4 ~ 5.2 gal/h)

SK235SR**[KAI MODEL]****SUBJECT****CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT****PAGE
1/2****YOUR WARRANTY RIGHT AND OBLIGATIONS**

The California Air Resources Board and Mitsubishi Motors Corporation (hereinafter referred to as ARB and MMC) is pleased to explain the emission control system warranty on your 1996 and later heavy-duty off-road engines. In California, new heavy-duty off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. MMC must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be houses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, MMC will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE :

- The 1996 and later heavy-duty off-road engines are warranted for a period of five years or 3,000 hours of operation, whichever occurs first. In the absence of a device to measure hours of use, the engine shall be warranted for a period of five years.

If any emission-related part on your engine is defective, the part will be repaired or replaced by MMC.

OWNER'S WARRANTY RESPONSIBILITIES :

- As the heavy-duty off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. MMC recommends that you retain all receipts covering maintenance on your heavy-duty off-road engine, but MMC cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

SUBJECT

PAGE
1/2

- As the heavy-duty off-road engine owner, you should however be aware that MMC may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your engine is designed to operate on commercially available diesel fuel only.
- You are responsible for initiating the warranty process. The ARB suggests that you present your heavy-duty off-road engine to a MMC dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should contact at the office as shown below.

Mitsubishi Engine North America, Inc.
1250 Greenbriar Drive, Suite E Addison,
Illinois 60101-1065 U.S.A.

Tel. No. : 708 - 268 - 0750

Fax. No. : 708 - 268 - 9293

or

California Air Resource Board
9528 Telstar Avenue, El Monte,
CA 91731

Tel. No. : 818 - 575 - 6800

Fax. No. : 818 - 575 - 6685

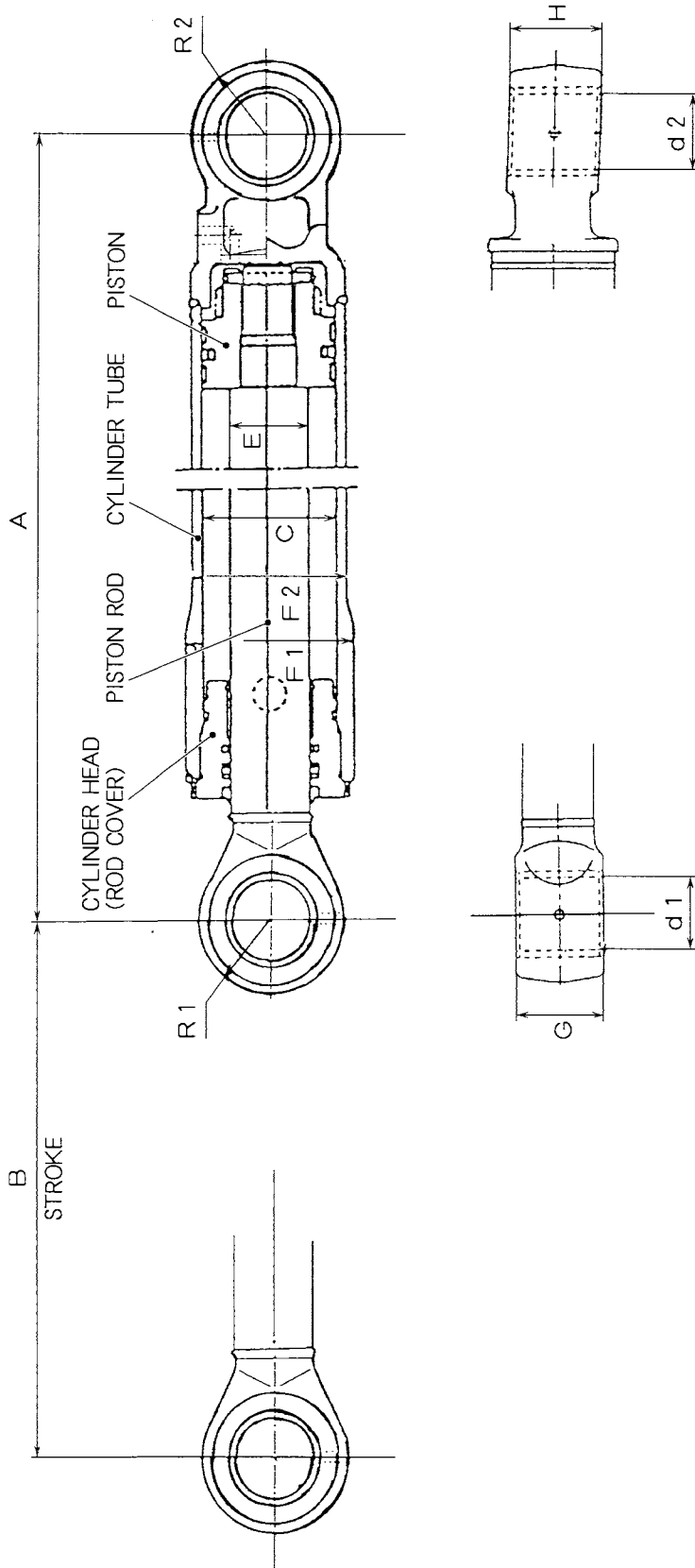
SK70SR • SK115SR**3-2 ● HYDRAULIC COMPONENTS SPECIFICATIONS & PERFORMANCE****Principal items**

Item				Model	SK70SR	SK115SR
Hydraulic pump	1st & 2nd	Type			Axial piston variable displacement pump	Axial piston variable displacement pump
		Displacement	cc/rev (cuin/rev)		31.4 × 2 (1.92 × 2)	50 × 2 (3.05 × 2) (Travel : 56.2 (3.43))
		Delivery	L/min (gal/min)		66 × 2 (17.4 × 2)	105 × 2 (27.7 × 2) (Travel : 118 (31.18))
		Working pressure	kgf/cm ² (psi)		300 (4,267)	330 (4,694)
	Pilot	Type			Gear pump	Gear pump
		Displacement	cc/rev (cuin/rev)		9.5 (0.58)	10 (0.61)
		Delivery	L/min (gal/min)		20 (5.3)	21 (5.6)
		Working pressure	kgf/cm ² (psi)		35 (498)	50 ⁺ / ₃ (711 ⁺ / ₃)
	Weight		kg (lbs)		41 (91)	89.5 (197)
	Control valve					
Swing motor	Main relief valve pressure		kgf/cm ² (psi) L/min (gal/min)		300 (4,267) at 28 (7.4)	330 ± 5 (4,694 ± 71) at 60 (15.9)
	Operating system				Hydraulic remote control	Hydraulic remote control
	Weight and Number of valves		kg (lbs) • (spool)		42 (93) • (6 spool)	114 (251) • (6 spool)
	Travel motor	Model			SG025E-096	M2X63CHB-13A-07/265-60
		Type			Axial piston motor	Axial piston motor
		Displacement	cc/rev (cuin/rev)		45.5 (2.78)	60 (3.66)
		Working pressure	kgf/cm ² (psi)		250 (3,555)	265 (3,769)
		Reduction gear ratio			1 : 15.54	1 : 19.2
		Lube oil for reduction gear	L (gal)		1.5 (0.37)	1.7 (0.45)
		Weight (Unit)	kg (lbs)		67 (148)	109 (240)
Pilot valve	Operation	Model			GM09VL2-A-23/27	GM18VL2-K-33/56-10
		Type			2-speed axial piston motor	2-speed axial piston motor
		Displacement	cc/rev (cuin/rev)		23/37.2 (1.4/2.27)	32.7/55.8 (2.0/3.4)
		Brake valve pressure	kgf/cm ² (psi)		300 (4,267)	350 (4,978)
		Reduction gear ratio			1 : 52.8	1 : 66
		Lube oil for reduction gear	L (gal)		1.7 (0.45)	2.5 (0.66)
		Weight (Unit)	kg (lbs)		95 (210)	144 (318)
	Traveling	Operation torque	kgf·cm [lb·ft]		Port 1, 3 25.7 [1.86] Port 2, 4 27.9 [2.02]	Port 1, 3 25.7 [1.86] Port 2, 4 27.9 [2.02]
		Operation angle	° (degree)		25 (Port 2, 4) 19 (Port 1, 3)	25 (Port 2, 4) 19 (Port 1, 3)
		Weight	kg (lbs)		1.9 (4.2)	1.9 (4.2)
		Operation torque	kgf·cm [lb·ft]		132.9 [9.6]	130 [9.4]
		Operation angle	° (degree)		12.4	12.4
		Weight	kg (lbs)		7.8 (17.2)	11 (24.3)

Principal items

Item				Model	SK115SR dz・SK135SR (LC)	SK235SR
Hydraulic pump	1st & 2nd	Type			Axial piston variable displacement pump	Axial piston variable displacement pump
		Displacement	cc/rev (cuin/rev)		50 × 2 (3.05 × 2) (Travel : 57.6 (3.51))	100 × 2 (6.1 × 2)
		Delivery	L/min (gal/min)		105 × 2 (27.7 × 2) (Travel : 118 (31.18))	200 × 2 (52.84 × 2)
		Working pressure	kgf/cm ² (psi)		350 (4,978)	350(4,978) at boost 385(5,476)
	Pilot	Type			Gear pump	Gear pump
		Displacement	cc/rev (cuin/rev)		10 (0.61)	10 (0.61)
		Delivery	L/min (gal/min)		20.5 (5.42)	20 (5.29)
		Working pressure	kgf/cm ² (psi)		50 ⁺ / ₃ (711 ⁺ / ₃)	50 ⁺ / ₃ (711 ⁺ / ₃)
	Weight		kg (lbs)		89.5 (197)	167 (368)
Control valve	Main relief valve pressure		kgf/cm ² (psi) L/min (gal/min)		350 ± 5 (4,978 ± 71) at 60 (15.9)	350±5(4,978±71) at 120 (31.7) at boost 385±5 (5,476±71) at 100 (26.4)
	Operating system				Hydraulic remote control	Hydraulic remote control
	Weight and Number of valves		kg (lbs)・(spool)		114 (251)・(6 spool)	175 (386)・(⁶ / ₁ spool, spool, OPT)
Swing motor	Model				M2X63CHB-13A-07/265-60	M2X120B-CHB-10A-29/285
	Type				Axial piston motor	Axial piston motor
	Displacement		cc/rev (cuin/rev)		60 (3.66)	121.6 (7.42)
	Working pressure		kgf/cm ² (psi)		265 (3,769)	285 (4,054)
	Reduction gear ratio				1 : 19.2	1 : 15.38
	Lube oil for reduction gear		L (gal)		1.7 (0.45)	7.5 (2.0)
	Weight (Unit)		kg (lbs)		109 (240)	217 (479)
Travel motor	Model				GM18VL2-K-33/56-10	MAG-170VP-3600E-2
	Type				2-speed axial piston motor	2-speed axial piston motor
	Displacement		cc/rev (cuin/rev)		32.7/55.8 (2.0/3.4)	109.9/170 (6.7/10.4)
	Brake valve pressure		kgf/cm ² (psi)		350 (4,978)	355 (5,049)
	Reduction gear ratio				1 : 66	1 : 43.246
	Lube oil for reduction gear		L (gal)		2.5 (0.66)	4.7 (1.24)
	Weight (Unit)		kg (lbs)		144 (318)	250 (551)
Pilot valve	Operation	Operation torque	kgf・cm [lb・ft]		Port 1, 3 25.7 [1.86] Port 2, 4 27.9 [2.02]	Port 1, 3 25.7 [1.86] Port 2, 4 27.9 [2.02]
		Operation angle	° (degree)		25 (Port 2, 4) 19 (Port 1, 3)	25 (Port 2, 4) 19 (Port 1, 3)
		Weight	kg (lbs)		1.9 (4.2)	1.9 (4.2)
	Traveling	Operation torque	kgf・cm [lb・ft]		130 [9.4]	130 [9.4]
		Operation angle	° (degree)		12.4	12.4
		Weight	kg (lbs)		11 (24.3)	11 (24.3)

3-3 ● HYDRAULIC CYLINDER LIST



Unit : mm (ft-in)

Model	Spec	Use	Part No.	A	B	φ C	φ E	φ F1	φ F2	G	H	R1	R2	φ d1	φ d2	Weight kg (lbs)	Cushion mechanism		Remarks
																	Rod side	Head side	
SK70SR	STD.BH	Boom	YT01V00001F1	1,375 (46.1")	916 (30.1")	110 (4.3")	70 (2.8")	136 (5.4")	126 (5")	95 (3.8")	95 (3.8")	62 (2.5")	65 (2.6")	70 (2.8")	75 (3")	92 (203)	W	W/O	
		Arm	YT01V00002F1	1,300 (43.2")	813 (28")	95 (3.8")	66 (2.6")	120 (4.7")	110 (4.3")	95 (3.8")	95 (3.8")	57 (2.3")	55 (2.2")	60 (2.4")	60 (2.4")	72 (159)	W	W	
		Bucket	YT01V00003F1	1,120 (38.1")	735 (24.9")	80 (3.2")	55 (2.2")	102 (4")	93 (3.7")	85 (3.4")	85 (3.4")	50 (2")	43 (1.7")	50 (2")	50 (2")	44 (97)	W/O	W/O	
SK115SR	STD.BH	Dozer	YR01V00015F1	690 (23.2")	150 (5.9")	120 (4.7")	70 (2.8")	—	144 (5.6")	80 (3.2")	80 (3.2")	62 (2.5")	65 (2.6")	70 (2.8")	70 (2.8")	55 (121)	W/O	W/O	
		Boom (R.H.)	YV01V00002F1	1,460 (49.1")	985 (33.2")	95 (3.8")	65 (2.6")	145 (5.7")	110 (4.3")	80 (3.2")	90 (3.6")	65 (2.6")	60 (2.4")	75 (3")	70 (2.8")	84 (186)	W	W/O	
		Boom (L.H.)	YV01V00001F1	1,450 (49.1")	995 (33.2")	95 (3.8")	65 (2.6")	145 (5.7")	110 (4.3")	80 (3.2")	90 (3.6")	65 (2.6")	60 (2.4")	75 (3")	70 (2.8")	84 (186)	W	W/O	
		Arm	YV01V00003F1	1,580 (52.2")	1,075 (36.3")	110 (4.3")	75 (3")	170 (6.7")	128 (5")	100 (3.9")	100 (3.9")	65 (2.6")	65 (2.6")	70 (2.8")	70 (2.8")	110 (243)	W	W	
		Bucket	YX01V00005F2	1,365 (45.8")	885 (270.9")	95 (3.8")	65 (2.6")	145 (5.7")	111 (4.4")	90 (3.6")	90 (3.6")	55 (2.2")	55 (2.2")	60 (2.4")	60 (2.4")	81 (179)	W	W/O	
SK115SRDZ SK135SR SK135SRLC	STD.BH	Boom (R.H.)	YY01V00002F1	1,488 (470.6")	1,038 (34.9")	100 (3.9")	70 (2.8")	150 (5.9")	117 (4.8")	80 (3.2")	90 (3.6")	70 (2.8")	60 (2.4")	80 (3.2")	70 (2.8")	94 (207)	W	W/O	
		Boom (L.H.)	YY01V00001F1	1,488 (470.6")	1,038 (34.9")	100 (3.9")	70 (2.8")	150 (5.9")	117 (4.8")	80 (3.2")	90 (3.6")	70 (2.8")	60 (2.4")	80 (3.2")	70 (2.8")	94 (207)	W	W/O	
		Arm	YY01V00003F1	1,730 (58.1")	1,135 (38.7")	115 (4.5")	80 (3.2")	175 (6.9")	135 (5.3")	100 (3.9")	100 (3.9")	65 (2.6")	65 (2.6")	70 (2.8")	70 (2.8")	136 (300)	W	W	
		Bucket	YX01V00005F2	1,365 (45.8")	885 (270.9")	95 (3.8")	65 (2.6")	145 (5.7")	111 (4.4")	90 (3.6")	90 (3.6")	55 (2.2")	55 (2.2")	60 (2.4")	60 (2.4")	81 (179)	W	W/O	
	(SK115SRDZ - STD)	Dozer	YX01V00006F1 YX01V00007F1	660 (62.8")	220 (67")	110 (4.3")	65 (2.6")	152.4 (5")	126 (5")	90 (3.6")	90 (3.6")	60 (2.4")	60 (2.4")	60 (2.4")	60 (2.4")	57 (126)	W/O	W/O	
SK235SR	STD.BH	Boom (R.H.)	YN01V00052F1	1,900 (62.8")	1,320 (44")	125 (4.9")	85 (3.4")	185 (7.3")	146 (5.8")	105 (4.1")	110 (4.3")	79 (3.1")	80 (3.2")	85 (3.4")	90 (3.6")	191 (421)	W	W/O	
		Boom (L.H.)	YN01V00053F1	1,900 (62.8")	1,320 (44")	125 (4.9")	85 (3.4")	185 (7.3")	146 (5.8")	105 (4.1")	110 (4.3")	79 (3.1")	80 (3.2")	85 (3.4")	90 (3.6")	191 (421)	W	W/O	
		Arm	YN01V00039F1	2,030 (67.9")	1,490 (470.7")	135 (5.3")	95 (3.8")	210 (6.3")	158 (6.2")	120 (4.7")	120 (4.7")	79 (3.1")	79 (3.1")	85 (3.1")	85 (3.4")	233 (514)	W	W	
		Bucket	YN01V00068F1	1,600 (53")	1,080 (36.5")	115 (4.5")	80 (3.2")	175 (6.9")	134 (5.3")	100 (3.9")	100 (3.9")	70 (2.8")	70 (2.8")	80 (3.2")	80 (3.2")	135 (298)	W	W/O	

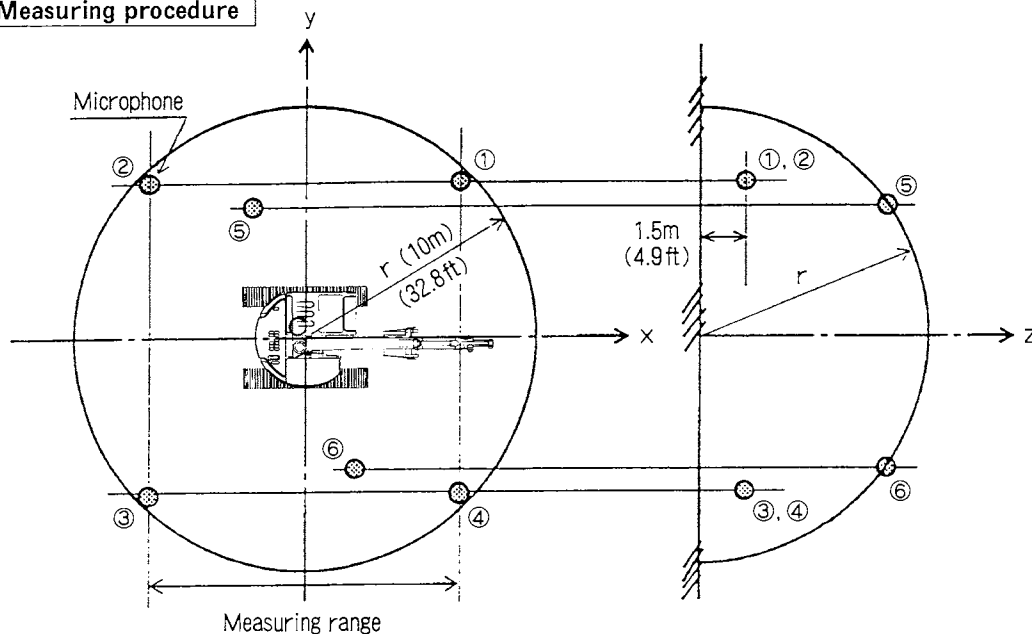
Note) W : With
W/O : Without

4. PERFORMANCE TABLE

Ground : Soft ground
 Load onto dump car swinging in 90°
 (Start digging from ground level.)

MODEL \ ITEM	Swing speed min ⁻¹ (rpm)	Travel speed km/h	Draw bar pulling force kN {ton}	Grade ability % (deg)	Attachment digging force kN {kgf}		Fuel consumption ℓ/h (gal/h)		Workload m ³ /h (cuyd/H)		Cycle time 90° swing sec	
					Arm (Arm length)	Bucket	S	H	S	H	S	H
SK70SR	12.5 (12.5)	5.3/3.4	52.0 {5.3}	70 (35°)	39.2 {4,000} (1.65m) 34.7 {3,540} (2.07m)	52.9 {5,400}	—	7.2 (1.9)	—	59 (77.2)	—	17.0
SK115SR	11.4 (11.4)	6.0/3.5	95.1 {9.7}	70 (35°)	66.9 {6,820} (1.9m) 58.8 {6,000} (2.2m) 51.9 {5,300} (2.7m)	85.5 {8,720}	—	12.5 (3.3)	—	151 (197.5)	—	12.1
SK115SRdz SK135SR (LC)	11.4 {11.4}	6.0/3.5	100.0 {10.2}	70 (35°)	71.7 {7,310} (2.1m) 63.6 {6,490} (2.45m) 58.0 {5,920} (2.95m)	88.2 {8,990}	—	13.0 (3.43)	—	180 (235.4)	—	13.1
SK235SR	13.0 (13.0)	5.3/3.3	185.3 {18.9}	70 (35°)	115 {11,700} (2.4m) 97 {9,900} (2.94m) ※126 {12,900} (2.4m) ※107 {10,900} (2.94m) 92.2 {9,400} (3.3m) ※101 {10,300} (3.3m)	135 {13,800} ※149 {15,200}	19.0 (5.02)	21.0 (5.55)	235 (307.4)	252 (329.6)	18.7	18.0

Measuring procedure



Measuring position (Position of microphone)

NOISE LEVEL

Unit : dB

Model	Circumference noise value (Dynamic)		Close to operator's ear in the cab (At no load Hi)	
	Average noise value	Sound power level	Close cab door	
			Left	Right
SK70SR	69	97	72	71
SK115SR	72	100	72	72
SK115SR dz · SK135SR (LC)	71	99	72	72
SK235SR	75	103	73	73

5. WEIGHT OF COMPONENTS

SK70SR

Unit : kg (lbs)

● WEIGHT OF COMPONENTS

Item	Spec.	2.07M (6ft-9in) arm + 600mm (24in) shoe	1.65M (5ft-5in) Arm + 450mm (18in) shoe
Machine complete		7,180 (15,830)	6,700 (14,800)
● Upper frame assy (including the following :)		3,250 (7,170)	←
●● Counterweight		820 (1,810)	←
Counterweight (Add-on)		400 (882)	←
●● Cab		210 (463)	←
●● Engine	※	240 (529)	←
●● Hydraulic oil tank	※	64 (141)	←
●● Fuel tank	※	46 (101)	←
●● Slewing motor (including reduction unit)		67 (148)	←
●● Control valve		62 (137)	←
●● Boom cylinder	※	92 (203)	←
●● Pin (2pcs. for mounting boom)		14 (31)	←
●● Pump		48 (106)	←
●● Radiator		44 (97)	←
● Lower frame assy (including the following :)		2,820 (6,220)	2,370 (5,230)
●● Slewing bearing		115 (254)	←
●● Travel motor (including reduction unit)		90 (198) × 2	←
●● Upper roller		4 (9) × 2	←
●● Lower roller		15 (33) × 10	←
●● Front idler		44 (97) × 2	←
●● Track tension adjuster		28 (62) × 2	←
●● Sprocket		27 (60) × 2	←
●● Swivel joint		21 (46)	←
●● Dozer blade		280 (620)	←
●●● Dozer cylinders	※	55 (120)	←
●● Track link with 450mm (18in) shoes assy		420 (926) × 2	←
Track link with 600mm (24in) shoes assy		530 (1,170) × 2	←
Track link with 600mm (24in) triangle shoes assy		440 (970) × 2	←
●●● Track link assy		160 (353) × 2	←
● Attachment		1,120 (2,470)	—
[3.72m (12ft-2in) Boom + 2.07m (6ft-9in) Arm + 0.22m³ (0.29cu·yd) Bucket]		—	1,080 (2,380)
[3.72m (12ft-2in) Boom + 1.65m (5ft-5in) Arm + 0.28m³ (0.37cu·yd) Bucket]		—	—
●● Bucket assy		190 (419)	200 (441)
●● Arm assy (including the following :)		300 (660)	250 (551)
●●● Arm		180 (297)	130 (287)
●●● Bucket cylinder	※	44 (97)	←
●●● Idler link		6 (13) × 2	←
●●● Bucket link		8 (18) × 2	←
●●● Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket)		17 (37)	←
●● Boom assy (Including the following :)		630 (1,390)	←
●●● Boom		390 (860)	←
●●● Arm cylinder	※	72 (159)	←
●●● Pin (Mounting arm · Mounting arm cylinder)		16 (35)	←
● Lubricant and water (including the following :)		125 (276)	←
●● Hydraulic oil		47 (104)	←
●● Engine oil		3 (7)	←
●● Fuel		70 (154)	←
●● Water		5 (11)	←

NOTE : Numerical values marked ※ indicate the dry weight.

SK115SR**● WEIGHT OF COMPONENTS**

Unit : kg (lbs)

Item	Spec.	SK115SR 2.2M (7ft-3in) Arm + 600 (24in) shoe
Machine complete		11,900 (26,230)
● Upper frame assy (including the following :)		6,080 (13,400)
●● Counterweight		2,340 (5,160)
●● Counterweight (Add-on)		600 (1,323)
●● Cab		210 (460)
●● Engine	※	353 (780)
●● Hydraulic oil tank	※	91 (200)
●● Fuel tank	※	53 (116)
●● Slewing motor (including reduction unit)		110 (240)
●● Control valve		114 (251)
●● Boom cylinder	※	84 (235) × 2
●● Pin (2pcs. for mounting boom)		37 (82)
●● Pump		95 (210)
●● Radiator	※	65 (143)
● Lower frame assy (including the following :)		4,140 (9,130)
●● Slewing bearing		149 (330)
●● Travel motor (including reduction unit)		144 (320) × 2
●● Upper roller		8 (18) × 2
●● Lower roller		27 (60) × 12
●● Front idler		70 (150) × 2
●● Track tension adjuster		57 (125) × 2
●● Sprocket		36 (79) × 2
●● Swivel joint		30 (66)
●● Dozer blade (OPT)		470 (1,040)
●●● Dozer cylinders (OPT)		57 (125) × 2
●● Track link with 600mm (24in) shoes assy		760 (1,670) × 2
●●● Track link assy		270 (595) × 2
● Attachment [4.26m (13ft-12in) Boom + 2.2m (7ft-3in) Arm + 0.45m ³ (0.59cu-yd) Bucket]		1,680 (3,705)
●● Bucket assy		340 (750)
●● Arm assy (including the following :)		490 (1,080)
●●● Arm		300 (662)
●●● Bucket cylinder	※	87 (192)
●●● Idler link		12 (26) × 2
●●● Bucket link		35 (77)
●●● Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket)		24 (53)
●● Boom assy (including the following :)		850 (1,874)
●●● Boom		680 (1,500)
●●● Arm cylinder	※	128 (282)
●●● Pin (Mounting arm - Mounting arm cylinder)		27 (60)
● Lubricant and water (including the following :)		300 (660)
●● Hydraulic oil		138 (304)
●● Engine oil		11 (24)
●● Fuel		133 (293)
●● Water		18 (40)

NOTE : Numerical values marked ※ indicate the dry weight.

● WEIGHT OF COMPONENTS

Unit : kg (lbs)

Item	Spec.	SK115SRdz (KAI) 2.45M (8ft) Arm + 600mm (24in) shoe	SK135SR (EU) 2.45M (8ft) Arm + 600mm (24in) shoe
Machine complete		14,400 (31,750)	13,700 (30,200)
● Upper frame assy (including the following :)		7,270 (16,030)	7,300 (16,160)
●● Counterweight		3,490 (7,690)	←
●● Counterweight (Add-on)		600 (1,323)	←
●● Cab		210 (460)	←
●● Engine	※	368 (810)	←
●● Hydraulic oil tank	※	91 (200)	←
●● Fuel tank	※	53 (116)	←
●● Slewing motor (including reduction unit)		110 (240)	←
●● Control valve		122 (270)	←
●● Boom cylinder	※	107 (235) × 2	←
●● Pin (2pcs. for mounting boom)		37 (82)	←
●● Pump		95 (210)	←
●● Radiator	※	77 (170)	←
● Lower frame assy (including the following :)		5,210 (11,490)	4,450 (9,810)
●● Slewing bearing		149 (330)	←
●● Travel motor (including reduction unit)		144 (320) × 2	←
●● Upper roller		8 (18) × 2	←
●● Lower roller		27 (60) × 12	←
●● Front idler		70 (154) × 2	←
●● Track tension adjuster		57 (125) × 2	←
●● Sprocket		36 (79) × 2	←
●● Swivel joint		63 (140)	30 (66)
●● Dozer blade		470 (1,040)	← (OPT)
●●● Dozer cylinders		57 (125) × 2	← (OPT)
●● Track link with 600mm (24in) shoes assy		870 (1,920) × 2	←
●●● Track link assy		290 (640) × 2	←
● Attachment [4.6m (15ft-1in) Boom + 2.45m (8ft) Arm + 0.50m ³ (0.65cu·yd) Bucket]		1,920 (4,230)	←
●● Bucket assy		370 (815)	←
●● Arm assy (including the following :)		580 (1,280)	←
●●● Arm		374 (820)	←
●●● Bucket cylinder	※	90 (198)	←
●●● Idler link		12 (26) × 2	←
●●● Bucket link		43 (95)	←
●●● Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket)		36 (79)	←
●● Boom assy (Including the following :)		940 (2,070)	←
●●● Boom		740 (1,630)	←
●●● Arm cylinder	※	149 (330)	←
●●● Pin (Mounting arm · Mounting arm cylinder)		29 (64)	←
● Lubricant and water (including the following :)		300 (660)	←
●● Hydraulic oil		138 (304)	←
●● Engine oil		11 (24)	←
●● Fuel		133 (293)	←
●● Water		18 (40)	←

NOTE : Numerical values marked ※ indicate the dry weight.

SK135SRLC**● WEIGHT OF COMPONENTS**

Unit : kg (lbs)

Item	Spec.	SK135SRLC (KAI) 2.95M (9ft-8in) Arm + 600mm (24in) shoe	SK135SRLC (EU) 2.45M (8ft) Arm + 600mm (24in) shoe
Machine complete		14,000 (30,860)	13,900 (30,640)
● Upper frame assy (including the following :)		7,270 (16,030)	7,330 (16,160)
●● Counterweight		3,490 (7,690)	←
●● Cab			
●● Engine		210 (460)	←
●● Hydraulic oil tank	※	368 (810)	←
●● Fuel tank	※	91 (200)	←
●● Slewing motor (including reduction unit)	※	53 (116)	←
●● Control valve		110 (240)	←
●● Boom cylinder		122 (270)	←
●● Pin (2pcs. for mounting boom)	※	107 (235) × 2	←
●● Pump		37 (82)	←
●● Radiator		95 (210)	←
● Lower frame assy (including the following :)		4,660 (10,270)	4,650 (10,250)
●● Slewing bearing		149 (330)	←
●● Travel motor (including reduction unit)		144 (320) × 2	←
●● Upper roller		8 (18) × 4	←
●● Lower roller		27 (60) × 14	←
●● Front idler		70 (150) × 2	←
●● Track tension adjuster		57 (125) × 2	←
●● Sprocket		36 (79) × 2	←
●● Swivel joint		30 (66)	←
●● Dozer blade (OPT)		470 (1,040)	←
●●● Dozer cylinders (OPT)		57 (125) × 2	←
●● Track link with 600mm (24in) shoes assy		915 (2,020) × 2	←
●●● Track link assy		305 (670) × 2	←
● Attachment			
[4.6m (15ft-1in) Boom + 2.95m (9ft-8in) Arm + 0.38m³ (0.50cu-yd) Bucket]		2,070 (4,560)	←
[4.6m (15ft-1in) Boom + 2.45m (8ft) Arm + 0.5m³ (0.65cu-yd) Bucket]		←	1,920 (4,230)
●● Bucket assy		320 (705)	370 (815)
●● Arm assy (including the following :)		700 (1,540)	580 (1,280)
●●● Arm		455 (1,000)	374 (820)
●●● Bucket cylinder	※	90 (198)	←
●●● Idler link		12 (26) × 2	←
●●● Bucket link		43 (95)	←
●●● Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket)		36 (79)	←
●● Boom assy (Including the following :)		940 (2,070)	←
●●● Boom		740 (1,630)	←
●●● Arm cylinder	※	149 (330)	←
●●● Pin (Mounting arm - Mounting arm cylinder)		29 (64)	←
● Lubricant and water (including the following :)		300 (660)	←
●● Hydraulic oil		138 (304)	←
●● Engine oil		11 (24)	←
●● Fuel		133 (293)	←
●● Water		18 (40)	←

NOTE : Numerical values marked ※ indicate the dry weight.

SK235SR

● WEIGHT OF COMPONENTS

Unit : kg (lbs)

Item	Spec.	SK235SR 2.94M (9ft-7in) Arm + 600 (24in) shoe
Machine complete		23,200 (51,156)
● Upper frame assy (including the following :) ●● Counterweight - Counterweight (Add-on) ●● Cab ●● Engine ●● Hydraulic oil tank ●● Fuel tank ●● Slewing motor (including reduction unit) ●● Control valve ●● Boom cylinder ●● Pin (2pcs. for mounting boom) ●● Pump ●● Radiator		11,700 (25,799) 6,000 (13,230) 7,500 (16,538) 220 (485) ※ 470 (1,036) ※ 130 (287) ※ 115 (254) 220 (485) 170 (375) ※ 190 (419) × 2 45 (99) 178 (393) 70 (154)
● Lower frame assy (including the following :) ●● Slewing bearing ●● Travel motor (including reduction unit) ●● Upper roller ●● Lower roller ●● Front idler ●● Track tension adjuster ●● Sprocket ●● Swivel joint ●● Track link with 600mm (24in) shoes assy - Track link with 700mm (28in) shoes assy - Track link with 800mm (32in) triangle shoes assy ●●● Track link assy		8,200 (18,081) 440 (970) 300 (660) × 2 22 (49) × 4 35 (77) × 14 106 (234) × 2 150 (331) × 2 54 (119) × 2 30 (66) 1,300 (2,867) × 2 1,500 (3,308) × 2 1,600 (3,528) × 2 520 (1,147) × 2
● Attachment [5.65m (18ft-7in) Boom + 2.94m (9ft-7in) Arm + 0.80m³ (1.06cu·yd) Bucket] ●● Bucket assy ●● Arm assy (including the following :) ●●● Arm ●●● Bucket cylinder ●●● Idler link ●●● Bucket link ●●● Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket) ●● Boom assy (including the following :) ●●● Boom ●●● Arm cylinder ●●● Pin (Mounting arm · Mounting arm cylinder)		3,300 (7,277) 630 (1,389) 940 (2,073) 610 (1,345) ※ 135 (298) 21 (46) × 2 80 (177) 70 (154) 1,700 (3,749) 1,400 (3,087) ※ 230 (507) 50 (110)
● Lubricant and water (including the following :) ●● Hydraulic oil ●● Engine oil ●● Fuel ●● Water		490 (1,080) 195 (430) 20 (44) 250 (551) 25 (55)

NOTE : Numerical values marked ※ indicate the dry weight.

6. CAPACITY TABLE OF LUBRICATION OIL AND COOLANT

Unit : L

System \ Model		SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR
Engine oil	Oil pan	8 (2.1GAL)	13 (3.4GAL)	13 (3.4GAL)	18 (4.7GAL)
	Total volume oil	10 (2.6GAL)	14 (3.7GAL)	17 (4.5GAL)	22 (5.8GAL)
Hydraulic oil	Hydraulic system	92 (24.3GAL)	140 (37GAL)	140 (37GAL)	195 (52GAL)
	Hydraulic tank	55 (14.5GAL)	94 (25GAL)	94 (25GAL)	125 (33GAL)
Travel motor reduction unit		1.7 × 2 (0.45GAL × 2)	2.5 × 2 (0.7GAL × 2)	2.5 × 2 (0.7GAL × 2)	4.7 × 2 (1.2GAL × 2)
Swing motor reduction unit		1.5 (0.4GAL)	1.7 (0.4GAL)	1.7 (0.4GAL)	7.5 (2GAL)
Upper roller		20cc × 2 (1.2cu·in × 2)	20cc × 2 (1.2cu·in × 2)	20cc × 2 (1.2cu·in × 2) LC 20cc × 4 (1.2cu·in × 4)	50cc × 4 (3cu·in × 4)
Lower roller		90cc × 10 (0.02GAL × 10)	150cc × 12 (0.3GAL × 12)	150cc × 12 (0.3GAL × 12) LC 150cc × 14 (0.3GAL × 14)	160cc × 14 (0.4GAL × 14)
Idler		160cc × 2 (0.4GAL × 2)	200cc × 2 (0.5GAL × 2)	200cc × 2 (0.5GAL × 2)	200cc × 2 (0.5GAL × 2)
Radiator (Receiver) Coolant	Radiator	3.9 (1.0GAL)	6 (1.6GAL)	8.5 (2.2GAL)	11 (2.9GAL)
	Cooling system total volume	12 (3.2GAL)	17 (4.5GAL)	18 (4.8GAL)	20 (5.3GAL)
Engine coolant Antifreeze (LLC)	−14.5°C (+5.9°F) 30%	3.6	5.1	5.4	6.0
	−34°C (−29.2°F) 50%	6.0	8.5	9.0	10

7. LIST OF FILTER AND ELEMENT

Location	Part to be replaced	Q'ty	Parts No.			
			SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR
Return filter (Hydraulic oil)	Element (O-ring)	1	YR50V00004P1 (ZD11G15500)	YR50V00004P1 (STD) YV50V00001P1 (Breaker) (ZD11G15500)	YR50V00004P1 (STD) YV50V00001P1 (Breaker) (ZD11G15500)	YN50V00001P1 (STD) YN50V00009P1 (Breaker) (ZD11G20000)
Breather filter (Hydraulic tank)	Element	1	YN57V00002S002	YN57V00002S002	YN57V00002S002	YN57V00002S002
Suction strainer	Strainer (O-ring)	1	YT50V00001F1 (ZD11G15500)	YW50V00004F5 (ZD11G20000)	YW50V00004F5 (ZD11G20000)	YW50V00004F4 (ZD11G20000)
Pilot line filter (Manifold block)	Filter	1	—	—	—	YN50V01001S005
Air cleaner	Element	1	LE11P00002S002	LP11P01013P1 (Inner) LP11P00004S002 (Outer)	LP11P01013P1 (Inner) LP11P00004S002 (Outer)	YN11P00001S002
Engine oil filter	Cartridge	1	897049—7081	894321—2191	897026—1342 (Bypass) 894160—9641 (Full flow)	ME088532
Fuel filter	Cartridge	1	894414—7963	894414—7963	894414—7963	ME015254
Air conditioner element	Element	1	YT50V01002P1 (Outer) YT20M00004S050 (Inner)	YT50V01002P1 (Outer) YT20M00004S050 (Inner)	YT50V01002P1 (Outer) YT20M00004S050 (Inner)	YT50V01002P1 (Outer) YT20M00004S050 (Inner)

8. SPECIFIED OIL AND GREASE, AND FILTER ELEMENT LIST

SK70SR

■ RECOMMENDED OIL VISCOSITY AND ITS CAPACITY

• Fuel and oil

Regardless of the ambient temperature, the types of oil used for the reduction units are given below:

Travel reduction units Engine Oil Classification API Service CD SAE30

Unit Name	Type of oil and grease	Capacity (When changed)	Use (depending on the temperature)								Specified lubricant	
			-22° -30°	-4° -20°	14° -10°	32° 0°	50° 10°	68° 20°	86° 30°	104°F 40°C		
Hydraulic oil tank	Hydraulic oil	55 L (14.5gal.)							ISO VG68		KW68	KOBELCO genuine parts
		System							ISO VG46		KW46	
		92 L (24.3gal.)							ISO VG32S		KW32S	
Engine oil pan	Engine oil	H Level 8 L (2.1gal.)							SAE10W-30			A. P. I classification for "service CD"
		L Level 6 L (1.6gal.)							SAE 30			
									SAE 40			
Fuel tank	Diesel fuel	85 L (22.5gal.)							ASTM D-975 No. 2			ASTM D-975 Grade 2-D
									ASTM D-975 No. 1			ASTM D-975 Grade 1-D
Radiator (reserve tank)	Coolant (LLC)	3.9 L (1.0gal.) Total water volume 12 L (3.2gal.)							30% LLC mixture			KOBELCO antifreeze (If commercial coolant is used, the mixing rate of the LLC should conform with the specified.
									50% LLC mixture			
Slewing reduction unit		1.5 L (0.4gal.)										
Travel reduction unit	Engine oil	1.7 L (0.45gal.) × 2							SAE 30			A. P. I classification for "service CD"
Upper rollers	Gear oil	0.02 L × 2							EXTREME GEAR OIL #90			A. P. I classification for "service GL-4"
Lower rollers		0.09 L × 10							EXTREME GEAR OIL #90			
Front idlers		0.16 L × 2							EXTREME GEAR OIL #90			
Attachment and dozer blade pin	Grease	13 places										Extreme pressure Multipurpose No.2 grease EP type
Swing cylinder pin		1 place 90° × 4										Cartridge KSPG0420D1 Pail can
Slewing ring												
Track adjuster	Grease	2 places										
Slewing gear	Grease	5 kg (11.0 lbs)										N.L.G.I No.2 Lithium base with MOS, grease

NOTE: Use of Bio-degradable Oils

When you use Bio-degradable Oil (BIO OIL), refer to the following information.

1. There are two types of BIO OIL available; vegetable-based and synthetic-based. You are recommended to use the synthetic-based type, because the vegetable-based oil has a maximum usage temperature of 80°C (176°F). Because of this, the degradation of vegetable-based oil occurs more rapidly, and causes reduced service life.
2. Do not mix either type of BIO OIL with the original factory-filled mineral oil. In the case that you do use BIO OIL, it is required to flush the hydraulic system that was filled with mineral oil two times.
3. If you use BIO OIL, swing and propel parking brake performance will be reduced, because of the lower friction factor of BIO OIL compared to that of mineral oil.
4. For further information about recommended Bio-degradable oil, please contact local dealer.

SK70SR**■ PARTS TO BE PERIODICALLY REPLACED****● Filters and elements**

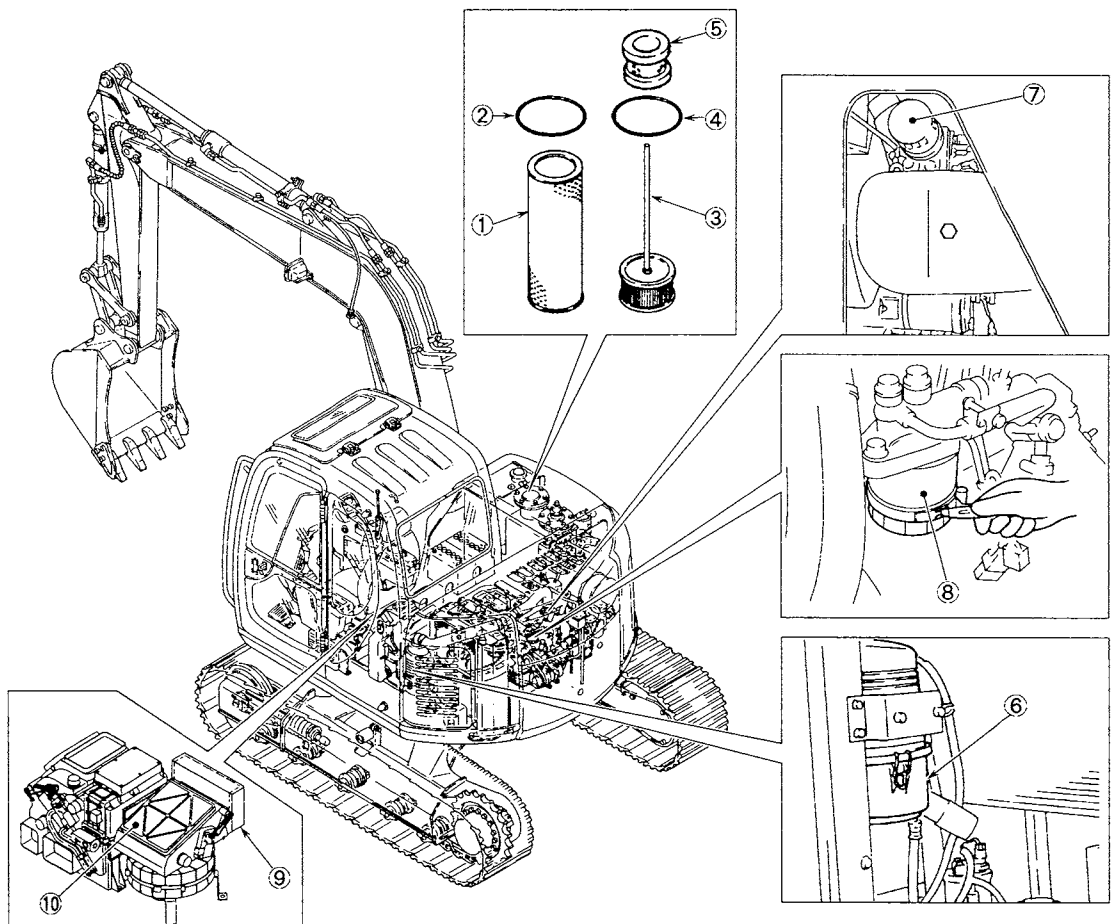
The wear parts such as filter, element, etc. should be replaced at the periodical inspection or when the wear has exceeded the limit.

Make sure to replace the wear parts to use machine economically.

Make sure of the Part No. shown in the Parts Manual before placing an order of spare parts.

Note : Parts in () shows ones to simultaneously-replaced.

Mark	Item	Part No.	Part name	Q'ty	Intervals for replacement
①	Hydraulic oil filter	YR50V00004P1	Return filter	1	50 hours for 1st replacement Every 500 hours after
②		(ZD11G15500)	(O-ring)	1	
③	Hydraulic oil filter	YT50V00001F1	Suction strainer	1	Clean every 2000 hours
④		(ZD11G15500)	(O-ring)	1	
⑤	Hydraulic oil filter	YN57V00002S002	Element Breather Assy	1	Every 2000 hours
⑥	Air cleaner	LE11P00002S002	Element	1	After 6 times of cleaning or every year
⑦	Engine oil filter	897049-7081	Cartridge	1	50 hours for 1st replacement Every 500 hours after
⑧	Fuel filter	894414-7963	Cartridge	1	Every 500 hours
⑨	Air conditioner	YT50V01002P1	External air filter	1	Approx. 10 times of cleaning
⑩		YT20M00004S050	Internal air filter	1	When frequently clogged



SK70SR

■ Lubrication and maintenance intervals

The table below indicates recommended lubrication, replacement, inspection and maintenance intervals of each device according to the calendar time and operation time shown by the hour meter.

Perform inspection and maintenance according to the calendar time or operation time, whichever comes first.

● Symbols and their meanings :

-  Necessary regular inspection item.
- * On first inspection is performed.
- Inspection and/or maintenance is needed.

Device	Interval		When re- quired	Daily 8H	Every week 50H	Every month 100H	Every 3 months 250H	Every 6 months 500H	Every 12 months 1,000H	Every 2,000H	Oil & Grease (Replacing part)
ENGINE	Engine oil	Checking the level		○							Engine oil
		Replacing			* (First)			○			
	Engine oil filter (Full-flow-Bypass)	Replacing			* (First)			○			Element
		Replacing						○			
	Fuel filter	Replacing						○			Cartridge
	Pre-fuel filter	Replacing						○			Cartridge
	Air cleaner element	Checking/ Cleaning	○								Element
		Replacing						○ (After 6 times of cleaning)			
	Radiator coolant	Checking the level		○							Tap water (LLC)
		Replacing								○	
	Fan belt	Checking		○							
		Adjusting					○				
	Radiator fin and condenser	Cleaning	○								
	Radiator cap	Cleaning	○								
	Radiator hose	Checking					○				
	Checking the color of exhaust gas			○							
	Valve clearance	Checking/ Adjusting							○		
	Compression pressure	Checking/ Adjusting							○		
	Injection timing	Checking/ Adjusting							○		
	Injection nozzle	Checking						○			

Device	Interval Item		When re- quired	Daily 8H	Every week 50H	Every month 100H	Every 3 months 250H	Every 6 months 500H	Every 12 months 1,000H	2,000H	Oil & Grease (Replacing) part
ENGINE	Starter and alternator		Checking/ Adjusting						○		
	Fan drive and tension pulley		Greasing					○			
FUEL SYSTEM	Fuel tank	Fuel	Checking the level	○							
		Draining water and deposits			○						
		Cap & strainer	Cleaner					○			
	Water separator		Draining water		○						
HYDRAULIC SYSTEM	Hydraulic tank	Hydraulic oil	Checking the level	○							Hydraulic oil
			Replacing							○	
		Suction strainer	Cleaning/ Replacing							○	
		Return filter	Replacing		*	(First)		○			Element
	Checking oil leakage and damage of pipings and hoses			○							
	Checking oil leakage and damage of cylinders			○							
UPPER STRUCTURE	Swing reduction lubricant	Checking the level				○	(120H)			○	Gear oil
		Replacing						*	(First)	○	
	Swing bearing		Greasing					○			Grease
	Swing gear tooth		Checking					○			
	Grease in the grease bath		Replacing							○	Grease
	Swing brake operation		Checking	○							
	Universal joint of the control lever		Greasing			○	(120H)				Grease
UNDER CARRIAGE	Swing bearing		Checking the capscrew						○		
	Travel reduction lubricant	Checking the level				○	(120H)				Gear oil
		Replacing						*	(First)	○	

Device	Interval		When re-quired	Daily	Every week	Every month	Every 3 months	Every 6 months	Every 12 months	Oil & Grease (Replacing part)
	Item			8H	50H	100H	250H	500H	1,000H	
UNDER CARRIAGE	Checking oil leakage of the travel reduction unit			○						
	Checking wear and damage of the track links and shoes			○						
	Checking oil leakage and damage of the rollers			○						
	Checking oil leakage and damage of the idlers			○						
	Checking wear of the sprockets			○						
	Track tension	Adjusting			○					
ATTACHMENT	Attachment pins	Greasing				○				Grease
	Bucket	Replacing	○							
		Adjusting the mount gap	○							
	Checking wear and damage of the tooth and side cutters		○							
	Checking the capscrew preventing pin loosening			○						
ELECTRICAL EQUIPMENT	Battery	Checking the fluid level			○					
		Measuring the specific gravity			○					
	Checking damage of the electrical wirings			○						
	Checking the function of the gauges, switches and lamps			○						
	Checking the function of the gauge cluster			○						
ACCESSORY / OTHERS	Cooler	Refrigerant	Checking the volume					○		
		Belt	Checking		○					
			Adjusting				○			
		Condenser	Checking/ Cleaning	○						
		Filter	Checking/ Cleaning				○ (Approx. 10 times of cleaning)			
	Window washer fluid	Checking the level	○							
	Checking abnormal deformation and damage of the machine exterior			○						
	Checking looseness and missing of the capscrews and nuts			○						

SK115SR**■ RECOMMENDED OIL VISCOSITY AND ITS CAPACITY**

• Fuel and oil

Regardless of the ambient temperature, the types of oil used for the reduction units are given below:

Travel reduction units Engine Oil Classification API Service CD SAE30

Unit Name	Type of oil and grease	Capacity (When changed)	Use (depending on the temperature)								Specified lubricant	
			-22° -30°	-4° -20°	14° -10°	32° 0°	50° 10°	68° 20°	86° 30°	104°F 40°C		
Hydraulic oil tank	Hydraulic oil	94 L (24.8gal.)							ISO VG68		KW68	KOBELCO genuine parts
		System							ISO VG46		KW46	
		140 L (37.0gal.)							ISO VG32S		KW32S	
Engine oil pan	Engine oil	H Level 13 L (3.4gal.)							SAE10W-30		A. P. I classification for "service CD"	
		L Level 11 L (2.9gal.)							SAE 30			
									SAE 40			
Fuel tank	Diesel fuel	160 L (42.3gal.)							ASTM D-975 No. 2		ASTM D-975 Grade 2-D	
									ASTM D-975 No. 1		ASTM D-975 Grade 1-D	
Radiator (reserve tank)	Coolant (LLC)	6 L (1.6gal.) Total water volume 17 L (4.5gal.)							30% LLC mixture		KOBELCO antifreeze (If commercial coolant is used, the mixing rate of the LLC should conform with the specified.	
									50% LLC mixture			
Slewing reduction unit		1.7 L (0.5gal.)										
Travel reduction unit	Engine oil	2.5 L (0.7gal.) × 2										
Upper rollers	Gear oil	0.02 L × 2							EXTREME GEAR OIL #90		A. P. I classification for "service GL-4"	
Lower rollers		0.15 L × 12							EXTREME GEAR OIL #90			
Front idlers		0.2 L × 2							EXTREME GEAR OIL #90			
Attachment and dozer blade pin	Grease	12 places									Extreme pressure Multipurpose No.2 grease EP type	
Swing cylinder pin		1 place 90° × 4										
Slewing ring											Cartridge KSPG0420D1	
Track adjuster	Grease	2 places									Pail can	
Slewing gear	Grease	6.4 kg (14.1 lbs)									N.L.G.I No.2 Lithium base with MOS, grease	

NOTE: Use of Bio-degradable Oils

When you use Bio-degradable Oil (BIO OIL), refer to the following information.

1. There are two types of BIO OIL available; vegetable-based and synthetic-based. You are recommended to use the synthetic-based type, because the vegetable-based oil has a maximum usage temperature of 80°C (176°F). Because of this, the degradation of vegetable-based oil occurs more rapidly, and causes reduced service life.
2. Do not mix either type of BIO OIL with the original factory-filled mineral oil. In the case that you do use BIO OIL, it is required to flush the hydraulic system that was filled with mineral oil two times.
3. If you use BIO OIL, swing and propel parking brake performance will be reduced, because of the lower friction factor of BIO OIL compared to that of mineral oil.
4. For further information about recommended Bio-degradable oil, please contact local dealer.

SK115SR

■ PARTS TO BE PERIODICALLY REPLACED

● Filters and elements

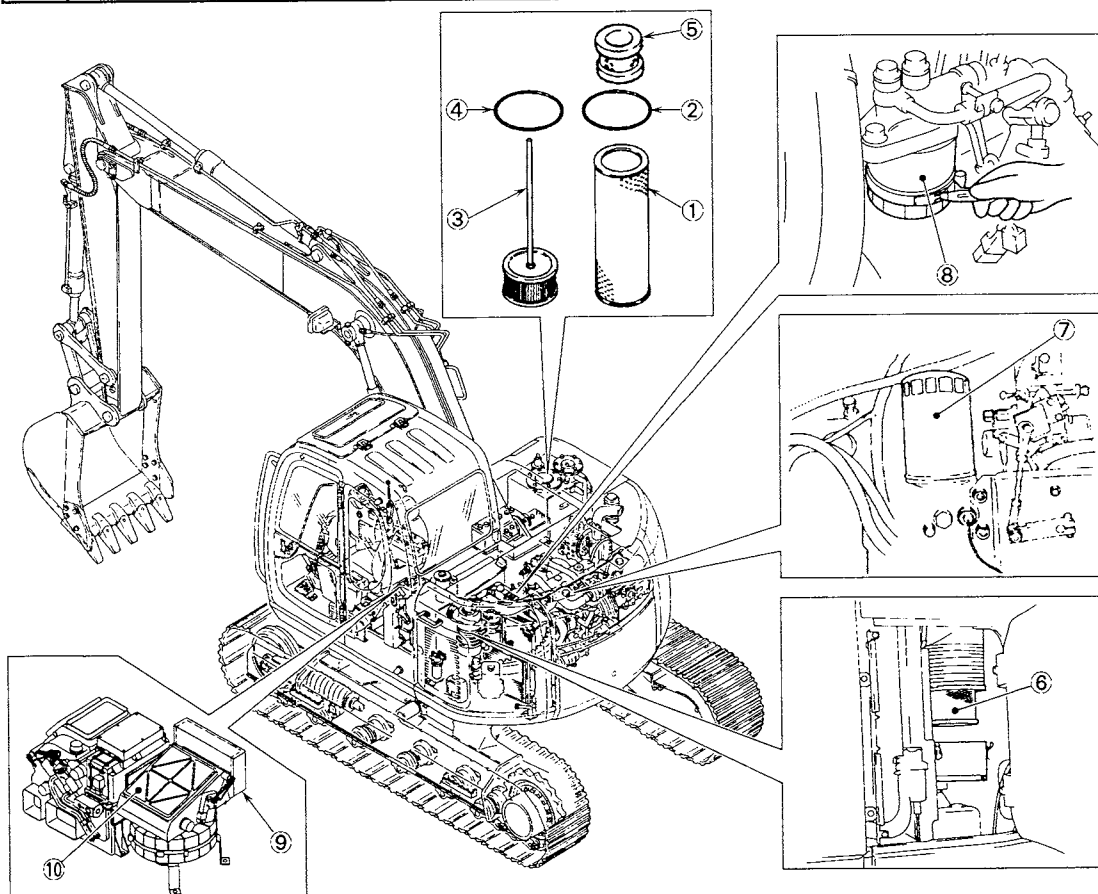
The wear parts such as filter, element, etc. should be replaced at the periodical inspection or when the wear has exceeded the limit.

Make sure to replace the wear parts to use machine economically.

Make sure of the Part No. shown in the Parts Manual before placing an order of spare parts.

Note : Parts in () shows ones to simultaneously-replaced.

Mark	Item	Part No.	Part name	Q'ty	Intervals for replacement
①	Hydraulic oil filter	YR50V00004P1	Return filter (STD)	1	50 hours for 1st replacement Every 500 hours after (Every 250 hours for breaker specification)
		YV50V00001P1	Return filter (Breaker)	1	
②		(ZD11G15500)	(O-ring)	1	
③	Hydraulic oil filter	YW50V00004F5	Suction strainer	1	Clean every 2000 hours
④		(ZD11G20000)	(O-ring)	1	
⑤	Hydraulic oil filter	YN57V00002S002	Element Breather Assy	1	Every 2000 hours
⑥	Air cleaner	LP11P00004S002	Element	1	After 6 times of cleaning or every year (or when it is very dirty)
⑦	Engine oil filter	894321-2191	Cartridge	1	50 hours for 1st replacement Every 500 hours after
⑧	Fuel filter	894414-7963	Cartridge	1	Every 500 hours
⑨	Air conditioner	YT50V01002P1	External air filter	1	Approx. 10 times of cleaning. When frequently clogged.
⑩		YT20M00004S050	Internal air filter	1	



SK115SRdz • SK135SR (LC)

■ RECOMMENDED OIL VISCOSITY AND ITS CAPACITY

• Fuel and oil

Regardless of the ambient temperature, the types of oil used for the reduction units are given below:

Travel reduction units Engine Oil Classification API Service CD SAE30

Unit Name	Type of oil and grease	Capacity (When changed)	Use (depending on the temperature)								Specified lubricant	
			-22° -30°	-4° -20°	14° -10°	32° 0°	50° 10°	68° 20°	86° 30°	104° 40°		
Hydraulic oil tank	Hydraulic oil	94 L (24.8gal.)						ISO VG68			KW68	KOBELCO genuine parts
		System						ISO VG46			KW46	
		140 L (37.0gal.)						ISO VG32S			KW32S	
Engine oil pan	Engine oil	H Level 13 L (3.4gal.)						SAE10W-30				A. P. I classification for "service CD"
		L Level 11 L (2.9gal.)						SAE 30				
								SAE 40				
Fuel tank	Diesel fuel	160 L (42.3gal.)						ASTM D-975 No. 2				ASTM D-975 Grade 2-D
								ASTM D-975 No. 1				ASTM D-975 Grade 1-D
Radiator (reserve tank)	Coolant (LLC)	8.5 L (2.3gal.)						30% LLC mixture				KOBELCO antifreeze (if commercial coolant is used, the mixing rate of the LLC should conform with the specified.
		Total water volume 18 L (4.8gal.)						50% LLC mixture				
Slewing reduction unit		1.7 L (0.5gal.)										
Travel reduction unit	Engine oil	2.5 L (0.7gal.) × 2										
Upper rollers	Gear oil	0.02 L × 2						EXTREME GEAR OIL #90				A. P. I classification for "service GL-4"
Lower rollers		0.15 L × 12						EXTREME GEAR OIL #90				
Front idlers		0.2 L × 2						EXTREME GEAR OIL #90				
Attachment and dozer blade pin	Grease	12 places										Extreme pressure Multipurpose No.2 grease EP type
Swing cylinder pin		1 place										Cartridge KSPG0420D1
Slewing ring		90° × 4										Pail can
Track adjuster	Grease	2 places										N.L.G.I No.2 Lithium base with MOS, grease
Slewing gear	Grease	6.4 kg (14.1 lbs)										

NOTE: Use of Bio-degradable Oils

When you use Bio-degradable Oil (BIO OIL), refer to the following information.

1. There are two types of BIO OIL available; vegetable-based and synthetic-based. You are recommended to use the synthetic-based type, because the vegetable-based oil has a maximum usage temperature of 80°C (176°F). Because of this, the degradation of vegetable-based oil occurs more rapidly, and causes reduced service life.
2. Do not mix either type of BIO OIL with the original factory-filled mineral oil. In the case that you do use BIO OIL, it is required to flush the hydraulic system that was filled with mineral oil two times.
3. If you use BIO OIL, swing and propel parking brake performance will be reduced, because of the lower friction factor of BIO OIL compared to that of mineral oil.
4. For further information about recommended Bio-degradable oil, please contact local dealer.

SK115SRdz SK135SR(LC)

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SK115SRdz • SK135SR (LC)

■ PARTS TO BE PERIODICALLY REPLACED

● Filters and elements

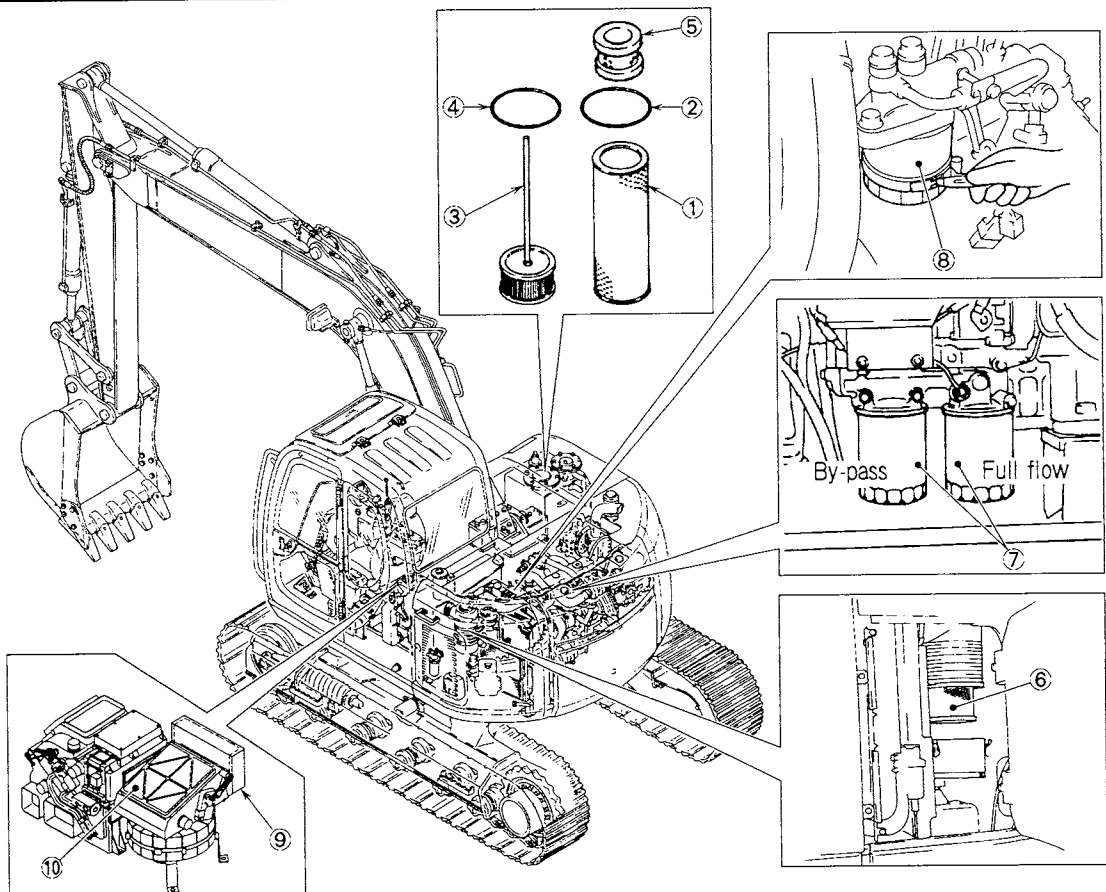
The wear parts such as filter, element, etc. should be replaced at the periodical inspection or when the wear has exceeded the limit.

Make sure to replace the wear parts to use machine economically.

Make sure of the Part No. shown in the Parts Manual before placing an order of spare parts.

Note : Parts in () shows ones to simultaneously-replaced.

Mark	Item	Part No.	Part name	Q'ty	Intervals for replacement
①	Hydraulic oil filter	YR50V00004P1	Return filter (STD)	1	50 hours for 1st replacement Every 500 hours after (Every 250 hours for breaker specification)
		YV50V00001P1	Return filter (Breaker)	1	
②		(ZD11G15500)	(O-ring)	1	
③	Hydraulic oil filter	YW50V00004F5	Suction strainer	1	Clean every 2000 hours
④		(ZD11G20000)	(O-ring)	1	
⑤	Hydraulic oil filter	YN57V00002S002	Element Breather Assy	1	Every 2000 hours
⑥	Air cleaner	LP11P00004S002	Element	1	After 6 times of cleaning or every year (or when it is very dirty)
⑦	Engine oil filter	897026-1342	Cartridge (By pass)	1	50 hours for 1st replacement Every 500 hours after
		894160-9641	Cartridge (Full flow)		
⑧	Fuel filter	894414-7963	Cartridge	1	Every 500 hours
⑨	Air conditioner	YT50V01002P1	External air filter	1	Approx. 10 times of cleaning. When frequently clogged.
⑩		YT20M00004S050	Internal air filter	1	



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■ Lubrication and maintenance intervals

The table below indicates recommended lubrication, replacement, inspection and maintenance intervals of each device according to the calendar time and operation time shown by the hour meter.

Perform inspection and maintenance according to the calendar time or operation time, whichever comes first.

● Symbols and their meanings :

- Necessary regular inspection item.
- * On first inspection is performed.
- Inspection and/or maintenance is needed.

Device	Interval		When re-quired	Daily 8H	Every week 50H	Every month 100H	Every 3 months 250H	Every 6 months 500H	Every 12 months 1,000H	2,000H	Oil & Grease (Replacing part)
ENGINE	Engine oil	Checking the level		○							Engine oil
		Replacing			* (First)			○			
	Engine oil filter (Full-flow-Bypass)	Replacing			* (First)			○			Element
		Replacing						○			
	Fuel filter	Replacing						○			Cartridge
		Replacing						○			
	Pre-fuel filter	Replacing						○			Cartridge
		Replacing						○			
	Air cleaner element	Checking/ Cleaning	○								Element
		Replacing						○ (After 6 times of cleaning)			
	Radiator coolant	Checking the level		○							Tap water (LLC)
		Replacing							○		
	Fan belt	Checking		○							
		Adjusting					○				
	Radiator fin and condenser	Cleaning	○								
		Cleaning	○								
	Radiator cap	Checking					○				
		Checking					○				
	Radiator hose	Checking the color of exhaust gas		○							
		Valve clearance							○		
	Compression pressure	Checking/ Adjusting							○		
		Checking/ Adjusting							○		
	Injection timing	Checking/ Adjusting							○		
		Checking						○			
	Injection nozzle	Checking						○			
		Checking						○			

Device	Interval		When re- quired	Daily 8H	Every week 50H	Every month 100H	Every 3 months 250H	Every 6 months 500H	Every 12 months 1,000H	Every 2,000H	Oil & Grease [Replacing part]
ENGINE	Item										
	Starter and alternator		Checking/ Adjusting						○		
FUEL SYSTEM	Fuel tank	Fuel	Checking the level		○						
		Draining water and deposits			○						
		Cap & strainer	Cleaner					○			
	Water separator		Draining water		○						
HYDRAULIC SYSTEM	Hydraulic tank	Hydraulic oil	Checking the level		○						Hydraulic oil
			Replacing							○	
		Suction strainer	Cleaning/ Replacing							○	Strainer
		Return filter	Replacing			* (First)	○ (Breaker)	○			Element
	Checking oil leakage and damage of pipings and hoses			○							
	Checking oil leakage and damage of cylinders			○							
UPPER STRUCTURE	Swing reduction lubricant	Checking the level				○ (120H)				○	Gear oil
		Replacing						* (First)		○	
	Swing bearing		Greasing					○			Grease
	Swing gear tooth		Checking					○			
	Grease in the grease bath		Replacing							○	Grease
	Swing brake operation		Checking		○						
UNDER CARRIAGE	Universal joint of the control lever		Greasing			○ (120H)					Grease
	Swing bearing		Checking the capscrew						○		
	Travel reduction lubricant	Checking the level				○ (120H)					Gear oil
		Replacing						* (First)		○	

Device	Interval		When re- quired	Daily	Every week	Every month	Every 3 months	Every 6 months	Every 12 months	Oil & Grease (Replacing part)
	Item			8H	50H	100H	250H	500H	1,000H	
UNDER CARRIAGE	Checking oil leakage of the travel reduction unit			○						
	Checking wear and damage of the track links and shoes			○						
	Checking oil leakage and damage of the rollers			○						
	Checking oil leakage and damage of the idlers			○						
	Checking wear of the sprockets			○						
	Track tension	Adjusting			○					
ATTACHMENT	Attachment pins	Greasing				○				Grease
	Bucket	Replacing	○							
		Adjusting the mount gap	○							
	Checking wear and damage of the tooth and side cutters		○							
	Checking the capscrew preventing pin loosening			○						
ELECTRICAL EQUIPMENT	Battery	Checking the fluid level			○					
		Measuring the specific gravity			○					
	Checking damage of the electrical wirings			○						
	Checking the function of the gauges, switches and lamps			○						
	Checking the function of the gauge cluster			○						
ACCESSORY / OTHERS	Cooler	Refrigerant	Checking the volume					○		
		Belt	Checking	○						
			Adjusting				○			
		Condenser	Checking/ Cleaning	○						
		Filter	Checking/ Cleaning				○ (Approx. 10 times of cleaning)			
	Window washer fluid	Checking the level	○							
	Checking abnormal deformation and damage of the machine exterior			○						
	Checking looseness and missing of the capscrews and nuts			○						

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■ RECOMMENDED OIL VISCOSITY AND ITS CAPACITY

● Fuel and oil

Regardless of the ambient temperature, the types of oil used for the reduction units are given below:

Travel reduction units Engine Oil Classification API Service CD SAE30

Unit Name	Type of oil and grease	Capacity (When changed)	Use (depending on the temperature)								Specified lubricant	
			-22° -30°	-4° -20°	14° -10°	32° 0°	50° 10°	68° 20°	86° 30°	104° 40°		
Hydraulic oil tank	Hydraulic oil	125 L (33.0 gal.)							ISO VG68		KW68	KOBELCO genuine parts
		System 95 L (51.5 gal.)							ISO VG46		KW46	
									ISO VG32S		KW32S	
Engine oil pan	Engine oil	H Level 18 L (4.8 gal.)							SAE10W-30			A. P. I classification for "service CD"
		L Level 15.5 L (4.1 gal.)							SAE 30			
									SAE 40			
Fuel tank	Diesel fuel	290 L (76.6 gal.)							ASTM D-975 No. 2			ASTM D-975 Grade 2-D
									ASTM D-975 No. 1			ASTM D-975 Grade 1-D
Radiator (reserve tank)	Coolant (LLC)	11 L (2.9 gal.) Total water volume 20 L (5.3 gal.)							30% LLC mixture			KOBELCO antifreeze (If commercial coolant is used, the mixing rate of the LLC should conform with the specified.
									50% LLC mixture			
Slewing reduction unit		7.5 L (2.0 gal.)										
Travel reduction unit	Engine oil	4.7 L (1.3 gal.) × 2										
Upper rollers	Gear oil	0.05 L × 4							EXTREME GEAR OIL #90			A. P. I classification for "service GL-4"
Lower rollers		0.16 L × 14							EXTREME GEAR OIL #90			
Front idlers		0.2 L × 2							EXTREME GEAR OIL #90			
Attachment and dozer blade pin	Grease	16 places										Extreme pressure Multipurpose No.2 grease EP type
Swing cylinder pin												
Slewing ring		1 place										Cartridge KSPG0420D1 Pail can
Track adjuster	Grease	2 places										
Slewing gear	Grease	19.1 kg (42.1 lbs)										N.L.G.I No.2 Lithium base with MOS ₂ grease

NOTE: Use of Bio-degradable Oils

When you use Bio-degradable Oil (BIO OIL), refer to the following information.

1. There are two types of BIO OIL available; vegetable-based and synthetic-based. You are recommended to use the synthetic-based type, because the vegetable-based oil has a maximum usage temperature of 80°C (176°F). Because of this, the degradation of vegetable-based oil occurs more rapidly, and causes reduced service life.
2. Do not mix either type of BIO OIL with the original factory-filled mineral oil. In the case that you do use BIO OIL, it is required to flush the hydraulic system that was filled with mineral oil two times.
3. If you use BIO OIL, swing and propel parking brake performance will be reduced, because of the lower friction factor of BIO OIL compared to that of mineral oil.
4. For further information about recommended Bio-degradable oil, please contact local dealer.

SK235SR**■ PARTS TO BE PERIODICALLY REPLACED****● Filters and elements**

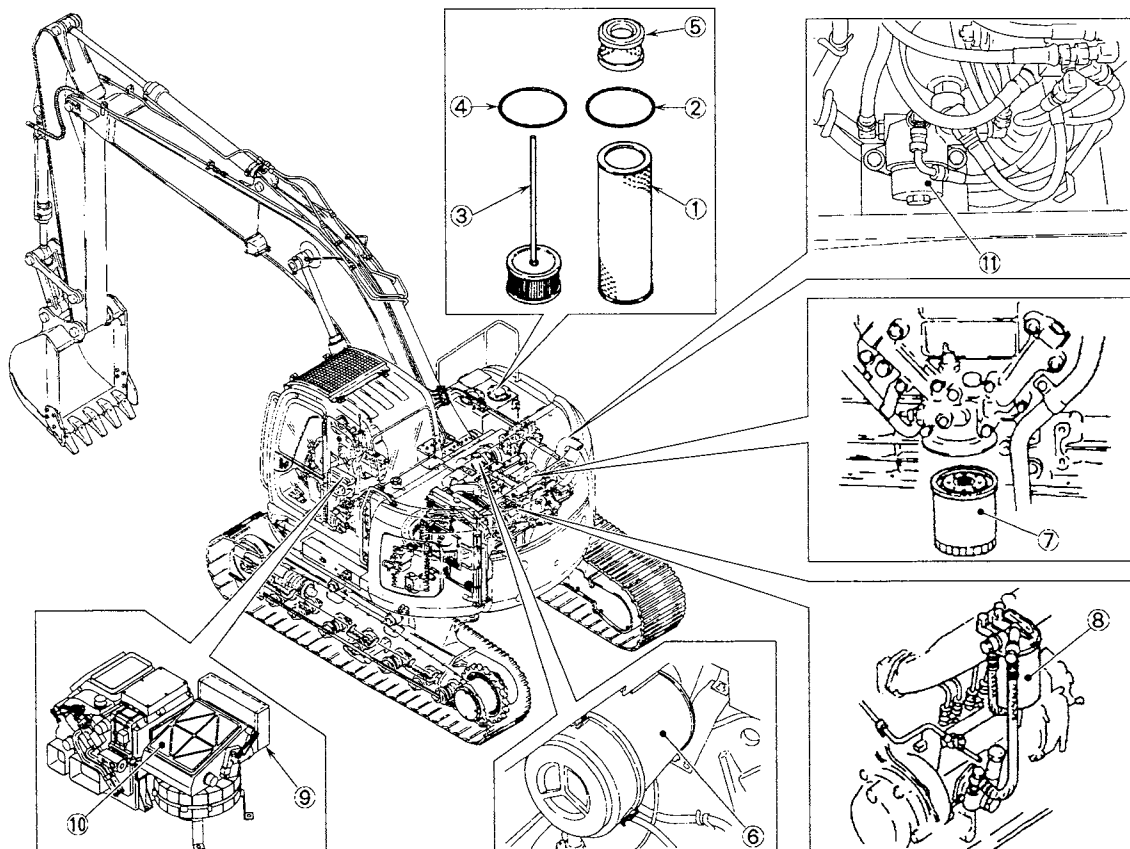
The wear parts such as filter, element, etc. should be replaced at the periodical inspection or when the wear has exceeded the limit.

Make sure to replace the wear parts to use machine economically.

Make sure of the Part No. shown in the Parts Manual before placing an order of spare parts.

Note : Parts in () shows ones to simultaneously-replaced.

Mark	Item	Part No.	Part name	Q'ty	Intervals for replacement
①	Hydraulic oil filter	YN50V00001P1	Return filter (STD)	1	50 hours for 1st replacement Every 500 hours after (Every 250 hours for breaker specification)
		YN50V00009P1	Return filter (Breaker)	1	
②		(ZD11G20000)	(O-ring)	1	
③	Hydraulic oil filter	YW50V00004F4	Suction strainer	1	Clean every 2000 hours
④		(ZD11G20000)	(O-ring)	1	
⑤	Hydraulic oil filter	YN57V00002S002	Element Breather Assy	1	Every 2000 hours
⑥	Air cleaner	YN11P00001S002	Element	1	After 6 times of cleaning or every year (or when it is very dirty)
⑦	Engine oil filter	ME088532	Cartridge	1	50 hours for 1st replacement Every 500 hours after
⑧	Fuel filter	ME015254	Cartridge	1	Every 500 hours
⑨	Air conditioner	YT50V01002P1	External air filter	1	Approx. 10 times of cleaning. When frequently clogged.
⑩		YT20M00004S050	Internal air filter	1	
⑪	Pilot line filter	YN50V01001S005	Filter	1	Clean every 2000 hours



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■ Lubrication and maintenance intervals

The table below indicates recommended lubrication, replacement, inspection and maintenance intervals of each device according to the calendar time and operation time shown by the hour meter.

Perform inspection and maintenance according to the calendar time or operation time, whichever comes first.

● Symbols and their meanings :

-  Necessary regular inspection item.
- * On first inspection is performed.
- Inspection and/or maintenance is needed.

Device	Interval		When re-quired	Daily	Every week	Every month	Every 3 months	Every 6 months	Every 12 months	Oil & Grease 〔Replacing part〕
	Item			8H	50H	100H	250H	500H	1,000H	
ENGINE	Engine oil	Checking the level		○						Engine oil
		Replacing			* (First)			○		
	Engine oil filter (Full-flow-Bypass)	Replacing			* (First)			○		Element
	Fuel filter	Replacing						○		Cartridge
	Pre-fuel filter	Replacing						○		Cartridge
	Air cleaner element	Checking/ Cleaning	○							Element
		Replacing						○ (After 6 times of cleaning)		
	Radiator coolant	Checking the level		○						Tap water (LLC)
		Replacing							○	
	Fan belt	Checking		○						
		Adjusting					○			
	Radiator fin and condenser	Cleaning	○							
	Radiator cap	Cleaning	○							
	Radiator hose	Checking					○			
	Checking the color of exhaust gas			○						
	Valve clearance	Checking/ Adjusting							○	
	Compression pressure	Checking/ Adjusting							○	
Injection timing	Checking/ Adjusting							○		
Injection nozzle	Checking							○		

Device	Interval		When re- quired	Daily 8H	Every week 50H	Every month 120H	Every 3 months 250H	Every 6 months 500H	Every 12 months 1,000H	2,000H	Oil & Grease (Replacing part)
ENGINE	Starter and alternator		Checking/ Adjusting						○		
	Fan drive and tension pulley		Greasing					○			
FUEL SYSTEM	Fuel tank	Fuel	Checking the level	○							
		Draining water and deposits			○						
		Cap & strainer	Cleaner					○			
	Water separator		Draining water		○						
HYDRAULIC SYSTEM	Hydraulic tank	Hydraulic oil	Checking the level	○							Hydraulic oil
			Replacing							○	
		Suction strainer	Cleaning/ Replacing							○	
		Return filter	Replacing			* (First)	○ (Breaker)	○			Element
	Checking oil leakage and damage of pipings and hoses			○							
	Checking oil leakage and damage of cylinders			○							
	Pilot line filter		Cleaning							○	
UPPER STRUCTURE	Swing reduction lubricant	Checking the level				○					Gear oil
		Replacing						* (First)		○	
	Swing bearing	Greasing						○			Grease
	Swing gear tooth	Checking						○			
	Grease in the grease bath	Replacing								○	Grease
	Swing brake operation	Checking		○							
	Universal joint of the control lever	Greasing				○					Grease
UNDER CARRIAGE	Swing bearing	Checking the capscrew							○		
	Travel reduction lubricant	Checking the level				○					Gear oil
		Replacing						* (First)		○	

Device	Interval		When re- quired	Daily	Every week	Every month	Every 3 months	Every 6 months	Every 12 months	Oil & Grease (Replacing part)
	Item	8H		50H	100H	250H	500H	1,000H	2,000H	
UNDER CARRIAGE	Checking oil leakage of the travel reduction unit			○						
	Checking wear and damage of the track links and shoes			○						
	Checking oil leakage and damage of the rollers			○						
	Checking oil leakage and damage of the idlers			○						
	Checking wear of the sprockets			○						
	Track tension	Adjusting			○					
ATTACHMENT	Attachment pins	Greasing				○				Grease
	Bucket	Replacing	○							
		Adjusting the mount gap	○							
	Checking wear and damage of the tooth and side cutters		○							
	Checking the capscrew preventing pin loosening			○						
ELECTRICAL EQUIPMENT	Battery	Checking the fluid level			○					
		Measuring the specific gravity			○					
	Checking damage of the electrical wirings			○						
	Checking the function of the gauges, switches and lamps			○						
	Checking the function of the gauge cluster			○						
ACCESSORY / OTHERS	Cooler	Refrigerant	Checking the volume					○		
		Belt	Checking		○					
			Adjusting					○		
		Condenser	Checking/ Cleaning	○						
		Filter	Checking/ Cleaning					○ (Approx. 10 times of cleaning)		
	Window washer fluid	Checking the level	○							
	Checking abnormal deformation and damage of the machine exterior			○						
	Checking looseness and missing of the capscrews and nuts			○						

9. PERFORMANCE INSPECTION STANDARD**SK70SR****● PERFORMANCE INSPECTION STANDARD**

Note : When power is supplied, S mode is provided. Unless otherwise specified, the measurement is performed in H mode.

Inspection item			Pressure measurement			Standard	Tolerance		Unit	Adjusting Point	Measuring condition	
			Position	Size	Port		Upper	Lower				
Standard measuring condition	Engine speed	Cleanliness of hydraulic oil	Hydraulic oil tank			8	+ 1	- 1	°C	Class	—	Sampling
		Temperature of hydraulic oil	Tank surface			50	+ 5	- 5		—	Ambient temperature	
		Coolant temperature	Radiator surface			75	+ 15	- 15		—	-10°C~50°C	
	Engine speed	Lo idling	Injection pipe			1020	+ 30	- 30	rpm	Adjustment is not required	Low throttle	
		Hi idling				2250	+ 30	- 30			FULL throttle (Hi idling)	
		Deceleration				1050	+ 30	- 30			All measurements must be performed under the condition where air-con is off	
		S mode				2100	+ 30	- 30				
		FC mode				1800	+ 30	- 30				
High pressure circuit	Pilot primary pressure		Gear Pump	PF1/4	a4	35	+ 2	- 1	kgf/cm ²	PR1	Hi idling	
	Main relief pressure	Travel	P1		a1	300	+ 5	0		MR1	R.H/L.H operate simultaneously	
			P2		a2	300	+ 5	- 0		MR1	Boom Up	
		ATT	P1		a1	300	+ 5	- 0		MR2	Boom Up	
			P2		a2	300	+ 5	- 0		MR3	Dozer Up	
		Dozer	P3		a3	200	+ 5	- 0		OR3	Boom Up	
		Port relief pressure	Boom		H	a1	335	+ 5		- 0	OR4	Boom Down
	R				a2	335	+ 5	- 0		OR7	Arm In	
	Arm		H		a1	335	+ 5	- 0		OR8	Arm Out	
			R		a2	335	+ 5	- 0		OR1	Bucket In	
	Bucket		H		a1	335	+ 5	- 0		OR2	Bucket Out	
			R		a2	250	+ 40	- 10		OR5	Bucket lock	
	Swing		L.H		a2	250	+ 40	- 10		OR6		
			R.H									
	Travel		R.H		Forward	a1	—	—		—		Travel right and left simultaneously operation
			Reverse		a2	—	—	—				
	Dozer		L.H		Forward							
			Reverse									
	Pilot circuit		Proportional valve block		P2 by-pass cut valve	B	No. 28	10		+ 1.5	- 0	Indicated current (mA) 400
Travel straight valve		C		No. 30								
P1 by-pass cut valve		D		No. 26								
P2 by-pass cut valve		B		No. 28								
Travel straight valve		C		No. 30								
P1 by-pass cut valve		D		No. 26								
Proportional valve block		P2 by-pass cut valve	B	No. 28	16	+ 2	- 1.5	700	E/G Hi Lever full stroke			
		Travel straight valve	C	No. 30								
		P1 by-pass cut valve	D	No. 26								
		P2 by-pass cut valve	B	No. 28								
		Travel straight valve	C	No. 30								
		P1 by-pass cut valve	D	No. 26								

Inspection item		Standard	Unit	
Operating speed	No. of sprocket rotation (R.H & L.H)	H mode 1st. speed	31.8 ~ 35.2	rpm
		H mode 2nd. speed	50.7 ~ 56.3	
		S mode 2nd. speed	47.4 ~ 52.4	
		FC mode 2nd. speed	40.8 ~ 44.9	
	Cylinder operating time	Boom Up	2.4 ~ 3.0	sec
		Boom Down	3.3 ~ 3.9	
		Arm In	2.4 ~ 3.0	
		Arm Out	2.0 ~ 2.6	
		Bucket In	3.2 ~ 3.8	
		Bucket Out	1.6 ~ 2.2	
		Dozer Down	1.1 ~ 1.7	
		Dozer Up	0.8 ~ 1.4	
	Swing speed	R.H & L.H	4.7 ~ 5.2	sec/rev.
	Travel speed	1st. speed Rubber	20.1 ~ 22.1	sec/20m
		1st. speed Iron	2.01 ~ 22.7	
		2nd. speed Rubber	13.1 ~ 11.5	
		2nd. speed Iron	13.4 ~ 14.8	
Performance	Amount of travel deviation	2nd. speed	0 ~ 1.0	m/20m
	Parking brake drift	12° slope gradient	0	mm/5 min
	Swing inertia braking drift	Neutral position after 180° full speed swing		degree
	Performance of swing Parking brake	12° slope gradient	0	mm
	Drop amount of attachment	Tip of bucket tooth	85	mm/5 min (no load)
		Boom cylinder	5	
		Arm cylinder	5	
		Dozer cylinder	5	
	Amount of horizontal play at the tip of bucket tooth		30 ~ 45	mm

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● PERFORMANCE INSPECTION STANDARD

[Note : When power is supplied, S mode is provided. Unless otherwise specified, the measurement is performed in H mode.]

Inspection item				Pressure measurement			Standard	Tolerance		Unit	Adjusting Point	Measuring condition		
				Position	Size	Port		Upper	Lower					
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil tank			8	+ 1	- 1	Class	—	Sampling		
	Temperature of hydraulic oil			Tank surface			50	+ 5	- 5		—	Ambient temperature - 10°C~50°C		
	Coolant temperature			Radiator surface			75	+ 15	- 15		—	- 10°C~50°C		
	Engine speed	Lo idling			Display change switch on Gauge cluster			935	+ 25	- 25	rpm	Adjustment is not required	Low throttle	
		Hi idling						2320	+ 30	- 30			FULL throttle (Hi idling)	
		Deceleration						2050	+ 30	- 30			All measurements must be performed under the condition where air-con is "OFF".	
		S mode						1800	+ 30	- 30				
		FC mode						1050	+ 30	- 30				
Pilot primary pressure			Gear Pump			a4	50	+ 5	0	PR1	Hi idling			
High pressure circuit	Main relief pressure	Travel		P1	PF1/4	a1	330	+	5	0	kgf/cm ²	MR1	R.H./L.H operate simultaneously	
				P2		a2						MR1		
		ATT		P1		a1	330	+	5	-		0	MR1	Boom Up
				P2		a2	330	+	5	-		0	MR2	Boom Up
	Dozer		P3	—		—	—	—	—	—		—	—	
	Port relief pressure	Boom		H		a1	365	0	-	35		OR3	Boom Up	
				R		365	0	-	35	OR4		Boom Down		
		Arm		H		a2	365	0	-	35		OR7	Arm In	
				R		365	0	-	35	OR8		Arm Out		
		Bucket		H		a1	365	0	-	35		OR1	Bucket In	
				R		365	0	-	35	OR2		Bucket Out		
		Swing		L.H		a2	265	+	35	+		5	OR5	Swing Left
				R.H		265	+	35	+	5		OR6	Swing Right	
		Travel		R.H		a1	—	—	—	—		—	—	Travel right and left simultaneously operation
				L.H		a2	—	—	—	—		—	—	
		Dozer		H		—	—	—	—	—		—	—	—
R				—	—	—	—	—	—	—	—			
Pilot circuit	Proportional valve block	P2 by-pass cut valve		B	Multi display on C2 Gauge cluster	Display No. of service diagnosis	No. 21	6	+ 1.5	- 0.5	Indicated current (mA) Approx. 349	Calculate the pressure in proportion to the measured value on display No. The indicated current in the left table is the same meaning as the standard pressure. E/G Hi, lever in neutral position		
		Travel straight valve		C			No. 22							
		P1 by-pass cut valve		D			No. 20							
		Arm variable recirculation		A			No. 23							
		P2 by-pass cut valve		B			No. 21	27	+	2	- 1.5			
		Travel straight valve		C										
		P1 by-pass cut valve		D										
		Arm variable recirculation		A										
	P1 pump proportional valve		P2 pump proportional valve	No. 24			6	+ 1.5	- 0.5	Indicated current (mA) 350	E/G Hi Lever neutral position			
	P2 pump proportional valve			No. 25										
P1 pump proportional valve		P2 pump proportional valve	No. 24	30	+	2	- 1.5	750	E/G Hi Max. value					
P2 pump proportional valve			No. 25											

		Inspection item		Standard	Unit	
Operating speed	No. of sprocket rotation (R.H & L.H)	H mode	1st. speed	32.1 ~ 35.5	rpm	
			2nd. speed	53.3 ~ 58.9		
		S mode	2nd. speed	48.2 ~ 53.2		
		FC mode	2nd. speed	42.4 ~ 46.8		
	Cylinder operating time	Boom	Up	2.6 ~ 3.2	sec	
			Down	2.8 ~ 3.4		
		Arm	In	2.6 ~ 3.2		
			Out	2.2 ~ 2.8		
		Bucket	In	3.3 ~ 3.9		
			Out	2.0 ~ 2.6		
	Dozer	Down	————			
		Up	————			
	Swing speed	R.H & L.H	Variable speed	————	sec/rev.	
			STD speed	5.2 ~ 5.8		
Travel speed	1st. speed	Iron	20.1 ~ 22.1	sec/20 m		
		Rubber	————			
		Iron	11.8 ~ 13.2			
		Rubber	————			
Performance	Amount of travel deviation	2nd. speed	0 ~ 1.0	m/20 m		
	Parking brake drift	15° slope gradient	0	mm/5 min		
	Swing inertia braking drift	Neutral position after 180° full speed swing	65	degree		
	Performance of swing Parking brake	15° slope gradient	0	mm		
	Drop amount of attachment	Tip of bucket tooth	90	mm/5 min	(no load)	
		Boom cylinder	3			
		Arm cylinder	4			
		Dozer cylinder	————			
Amount of horizontal play at the tip of bucket tooth		30 ~ 50	mm			

SK115SRdz • SK135SR (LC)

● PERFORMANCE INSPECTION STANDARD

[Note : When power is supplied, S mode is provided. Unless otherwise specified, the measurement is performed in H mode.]

Inspection item				Pressure measurement			Tolerance		Unit	Adjusting Point	Measuring condition				
				Position	Size	Port	Standard	Upper				Lower			
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil tank			8	+ 1	- 1	Class	—	Sampling			
	Temperature of hydraulic oil			Tank surface			50	+ 5	- 5		—	Ambient temperature - 10°C ~ 50°C			
	Coolant temperature			Radiator surface			75	+ 15	- 15		—	—			
	Engine speed	Lo idling			Display change switch on Gauge cluster			1000	+ 25	- 25	rpm	Adjustment is not required	Low throttle		
		Hi idling						2310	+ 30	- 30			FULL throttle (Hi idling)		
		Deceleration						2200	+ 30	- 30			All measurements must be performed under the condition where air-con is "OFF".		
		S mode						1700	+ 30	- 30					
FC mode			1050	+ 30	- 30										
Pilot primary pressure				Gear Pump			a4	50	+ 5	0	PR1	Hi idling			
High pressure circuit	Main relief pressure	Travel	P1	Main Pump	PF1/4	a1	350	+ 5	0	kgf/cm²	MR1	R.H / L.H operate simultaneously			
			P2			a2					MR1		Boom Up		
		ATT	P1			a1	350	+ 5	- 0		—	—			
			P2			a2					—	—			
	Port relief pressure	Dozer	P3			—	—	—	—		—	—	—	—	
			Boom			H	a1	385	0		- 35	OR3	Boom Up		
		Arm	R			a2	385	0	- 35		OR4	Boom Down			
			H			385	0	- 35	OR7		Arm In				
		Bucket	R			385	0	- 35	OR8		Arm Out				
			H			a1	385	0	- 35		OR1	Bucket In			
		Swing	R			a2	385	0	- 35		OR2	Bucket Out			
			L.H			285	+ 35	+ 5	OR5		Swing Left				
		Travel	R.H			Foward	a1	—	—		—	—	—	—	Travel right and left simultaneously operation
			L.H			Reverse	a2	—	—		—	—	—	—	
		Dozer	H			—	—	—	—		—	—	—	—	—
			R			—	—	—	—		—	—	—	—	—
Pilot circuit	Proportional valve block	P2 by-pass cut valve	B	Multi display on C2 Gauge cluster	Display No. of service diagnosis	No. 21	6	+ 1.5	- 0.5	Indicated current (mA) Approx. 349	670	Calculate the pressure in proportion to the measured value on display No. The indicated current in the left table is the same meaning as the standard pressure. E/G Hi lever in neutral position			
		Travel straight valve	C			No. 22									
		P1 by-pass cut valve	D			No. 20									
		Arm variable recirculation	A			No. 23									
		P2 by-pass cut valve	B			No. 21	27	+ 2	- 1.5	707	321	This value indicate max. value because E/G Hi and lever full stroke show various value due to operating conditions.			
		Travel straight valve	C			No. 22									
		P1 by-pass cut valve	D			No. 20									
		Arm variable recirculation	A			No. 23									
	P1 pump proportional valve P2 pump proportional valve		No. 24 No. 25			6	+ 1.5	- 0.5	Indicated current (mA) 350	E/G Hi Lever neutral position					
		P1 pump proportional valve P2 pump proportional valve				No. 24 No. 25	30	+ 2			- 1.5	750	E/G Hi Max. value		

Inspection item				Standard		Unit	
No. of sprocket rotation (R.H & L.H)	H mode S mode FC mode	2nd. speed		32.1 ~ 35.5 53.3 ~ 58.9 53.2 ~ 58.2 41.0 ~ 45.4			
		Cylinder operating time	Boom	Up	2.7 ~ 3.3	sec	
				Down	2.8 ~ 3.4		
			Arm	In	3.1 ~ 3.7		
Out	2.4 ~ 3.0						
Bucket	In		3.4 ~ 4.0				
	Out		2.0 ~ 2.6				
Dozer	Down	—	sec/rev.				
	Up	—					
Swing speed	R.H & L.H	Variable speed	—	sec/20m			
Travel speed	1st. speed	Iron	20.1 ~ 22.1				
		Rubber	—				
		2nd. speed	Iron	11.8 ~ 13.2			
			Rubber	—			
Amount of travel deviation	2nd. speed	0 ~ 1.0		m/20 m			
Parking brake drift	15° slope gradient	0		mm/5 min			
Swing inertia braking drift	Neutral position after 180° full speed swing	75		degree			
Performance of swing Parking brake	15° slope gradient	0		mm			
Drop amount of attachment	Tip of bucket tooth	90		mm/5 min	(no load)		
	Boom cylinder	3					
	Arm cylinder	4					
	Dozer cylinder	—					
Amount of horizontal play at the tip of bucket tooth				30 ~ 55	mm		

SK235SR

● PERFORMANCE INSPECTION STANDARD

[Note : When power is supplied, S mode is provided. Unless otherwise specified, the measurement is performed in H mode.]

Inspection item				Pressure measurement			Standard	Tolerance		Unit	Adjusting Point	Measuring condition						
				Position	Size	Port		Upper	Lower									
Standard measuring condition	Cleanliness of hydraulic oil			Hydraulic oil tank			8	+ 1	- 1	Class	—	Sampling						
	Temperature of hydraulic oil			Tank surface			50	+ 5	- 5		—	Ambient temperature -10°C~50°C						
	Coolant temperature			Radiator surface			75	+ 15	- 15		—							
	Engine speed	Lo idling		Display change switch on Gauge cluster	950			+ 25	- 25	rpm	Adjustment is not required	Low throttle						
		Hi idling			2200			+ 20	- 30			FULL throttle (Hi idling)						
		S mode			2100			+ 30	- 30			All measurements must be performed under the condition where air-con is "OFF".						
		FC mode			1700			+ 30	- 30									
		Deceleration			1050			+ 25	- 25									
	Pilot primary pressure				Gear Pump		a4	50	+ 3	- 3	PR1	Hi idling						
	High pressure circuit	Main relief pressure	Travel		P1	Main Pump	a1	350	+ 5	- 0	kgf/cm ²	MR1	Boom Up					
a2							385	+ 10	- 5	MR1		Boom Up						
a1																		
a2																		
Dozer			P3															
Port relief pressure		Boom		H	Main Pump		PF1/4	a1	405	0		- 55	OR3	Boom Up				
				R					385	0		- 35	OR4	Boom Down				
		Arm		H				a2	385	0		- 35	OR7	Arm In				
				R				405	0	- 55		OR8	Arm Out					
		Bucket		H				a1	405	0		- 55	OR1	Bucket In				
				R		385		0	- 35	OR2	Bucket Out							
		Swing		L.H		a2		285	+ 55	+ 10	OR5	Swing Left						
				R.H		285		+ 55	+ 10	OR6	Swing Right							
		Travel		R.H		Forward		a1	350	+ 15	0		Travel right and left simultaneously operation					
						Reverse												
				L.H		Forward								a2		+ 15	0	
						Reverse												
		Dozer		H														
R																		
Low press.		Negative control press. or low press. relief pressure		P11				Pn1'	24	+ 3	+ 3							
				P12				Pn2'										
Pilot circuit		Proportional valve block	Swing speed adjust valve	B		Multi display on C2 Gauge cluster		Display No. of service diagnosis	No. 21	6	+ 1.5	- 0.5	Indicated current (mA)	Calculate the pressure in proportion to the measured value on display No. The indicated current in the left table is the same meaning as the standard pressure. E/G Hi lever in neutral position				
			Arm variable recirculation	A					No. 23	27.6				700				
	Swing speed adjust valve		B	No. 21	27.6		+ 2		- 1.5	700	This value indicate max. value because E/G Hi and lever full stroke show various value due to operating conditions.							
	Arm variable recirculation		A	No. 23	10					395								
	Pump proportional valve			No. 24	8		+ 1.5		- 0.5	Indicated current (mA) 370	E/G Hi Lever neutral position							
	Pump proportional valve			No. 24	32.4		+ 2		- 1.5	770	E/G Hi Max. value							

Inspection item				Standard	Unit	
Operating speed	No. of sprocket rotation (R.H & L.H)	H mode	1st. speed	27.9 ~ 30.3	rpm	
			2nd. speed	42.5 ~ 46.5		
		S mode	2nd. speed	40.5 ~ 44.5		
		FC mode	2nd. speed	32.8 ~ 36.2		
	Cylinder operating time	Boom	Up	3.4 ~ 4.0	sec	
			Down	3.7 ~ 4.3		
		Arm	In	3.5 ~ 4.1		
			Out	2.6 ~ 3.2		
		Bucket	In	3.0 ~ 3.6		
			Out	1.8 ~ 2.4		
		Dozer	Down	———		
			Up	———		
	Swing speed	R.H & L.H	Variable speed	———	sec/rev.	
			STD speed	4.2 ~ 4.8		
	Travel speed	1st. speed	Iron	21.3 ~ 23.3	sec/20 m	
			Rubber	———		
			Iron	13.9 ~ 15.3		
			Rubber	———		
Performance	Amount of travel deviation	2nd. speed	0 ~ 1.0	m/20 m		
	Parking brake drift	15° slope gradient	0	mm/5 min		
	Swing inertia braking drift	Neutral position after 180° full speed swing	90	degree		
	Performance of swing Parking brake	15° slope gradient	0	mm		
	Drop amount of attachment	Tip of bucket tooth	90	mm/5 min	(no load)	
		Boom cylinder	6			
		Arm cylinder	4			
		Dozer cylinder	———			
	Amount of horizontal play at the tip of bucket tooth		30 ~ 55	mm		

10. HYDRAULIC OIL PUMP CONTROL CURVE

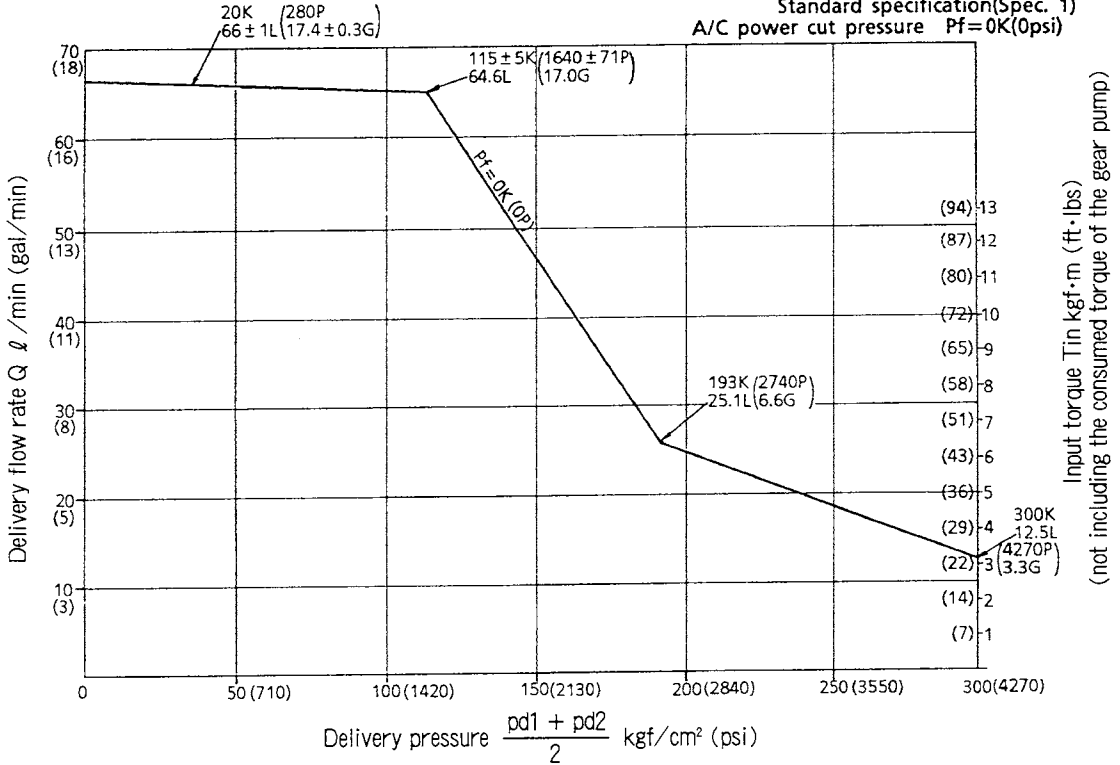
SK70SR

● CONTROL CHART OF PUMP

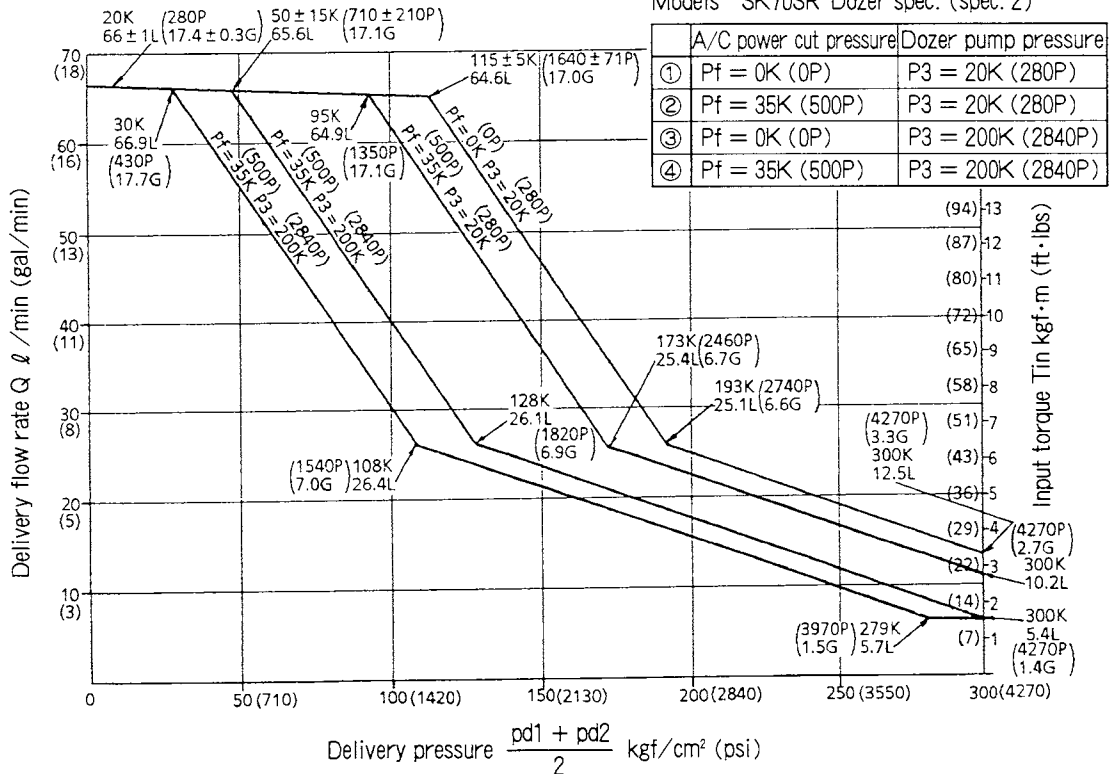
Models SK70SR

Standard specification (Spec. 1)

A/C power cut pressure Pf=0K(0psi)



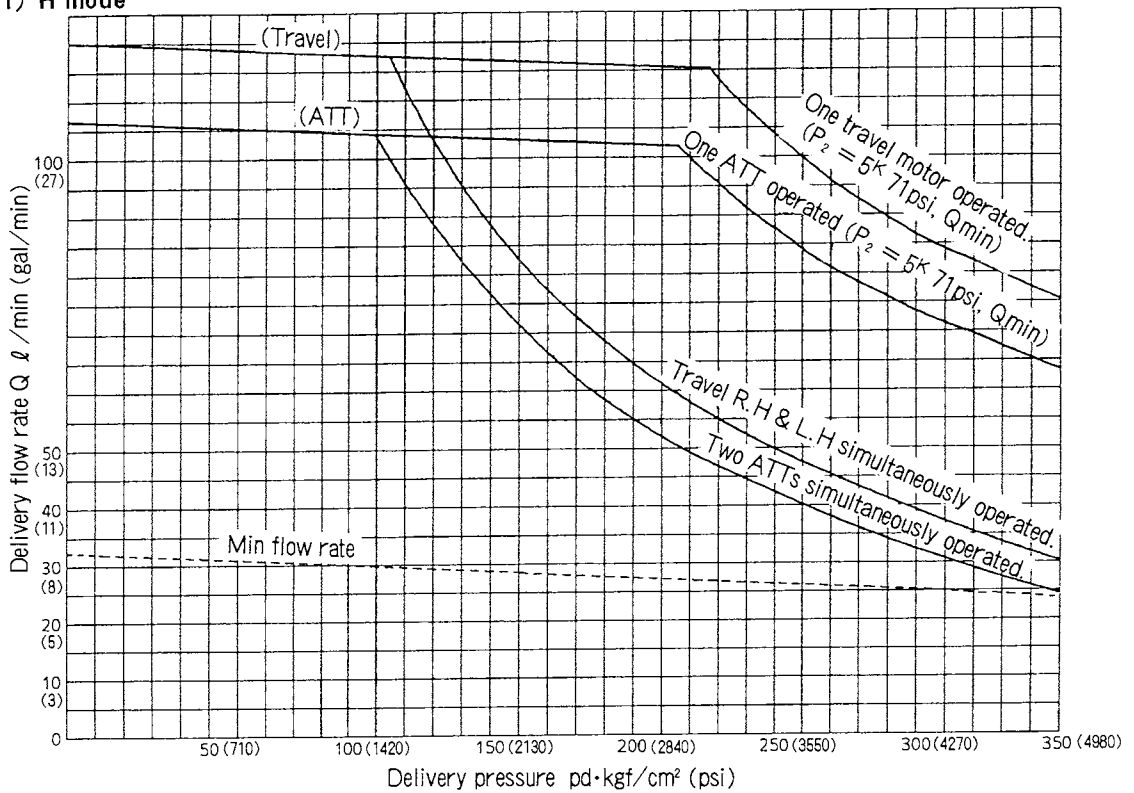
Models SK70SR Dozer spec. (spec. 2)



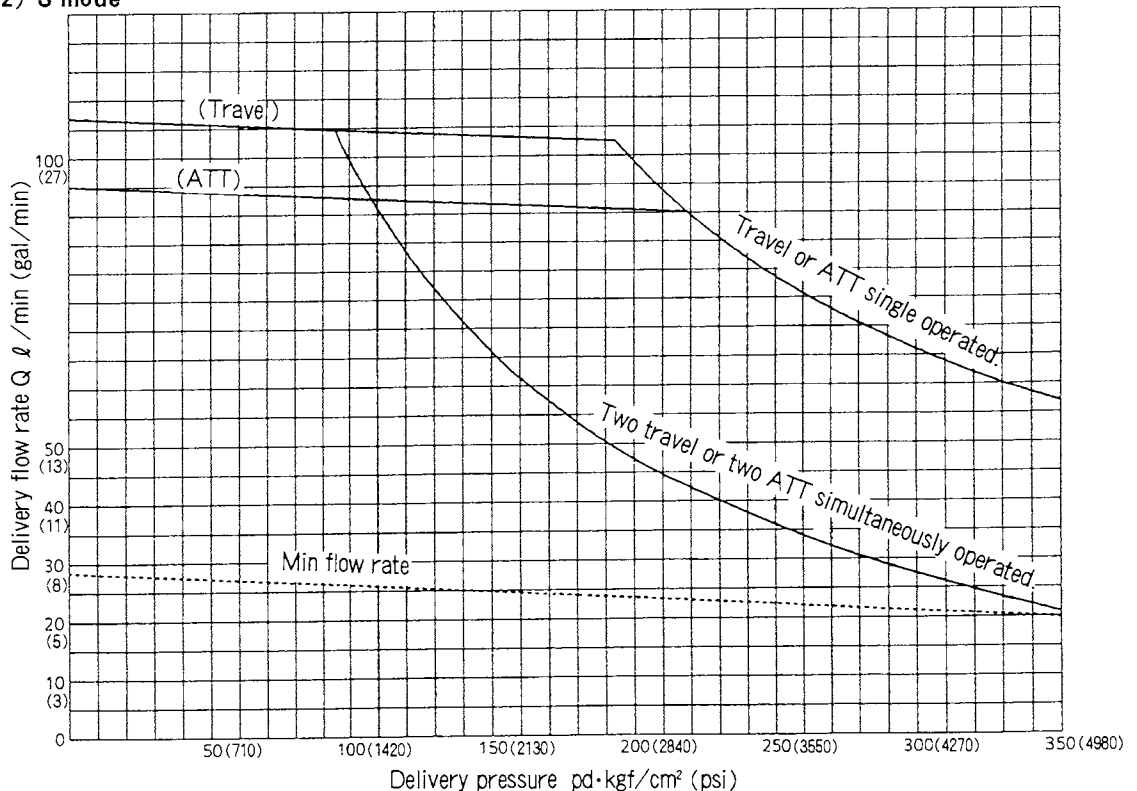
SK115SR

● CONTROL CHART OF PUMP

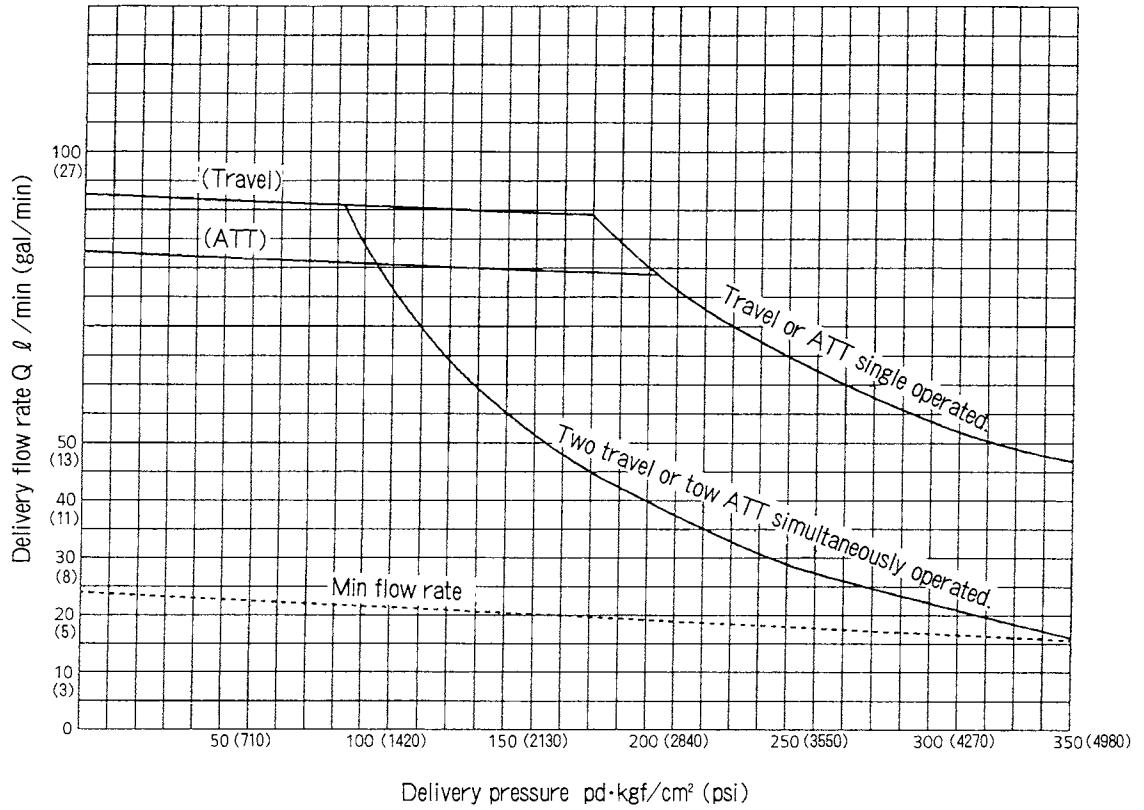
(1) H mode



(2) S mode



(3) FC mode



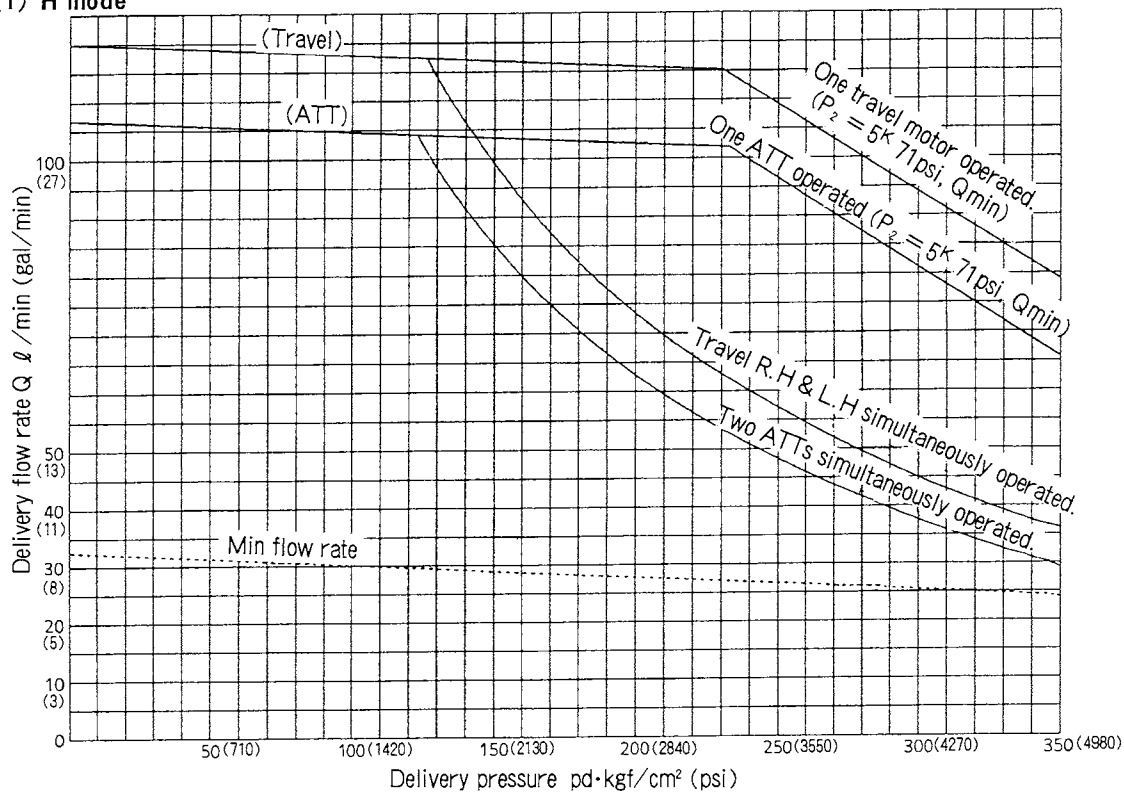
SK115SRDZ SK135SR(LC)

<https://truckmanualshub.com/>

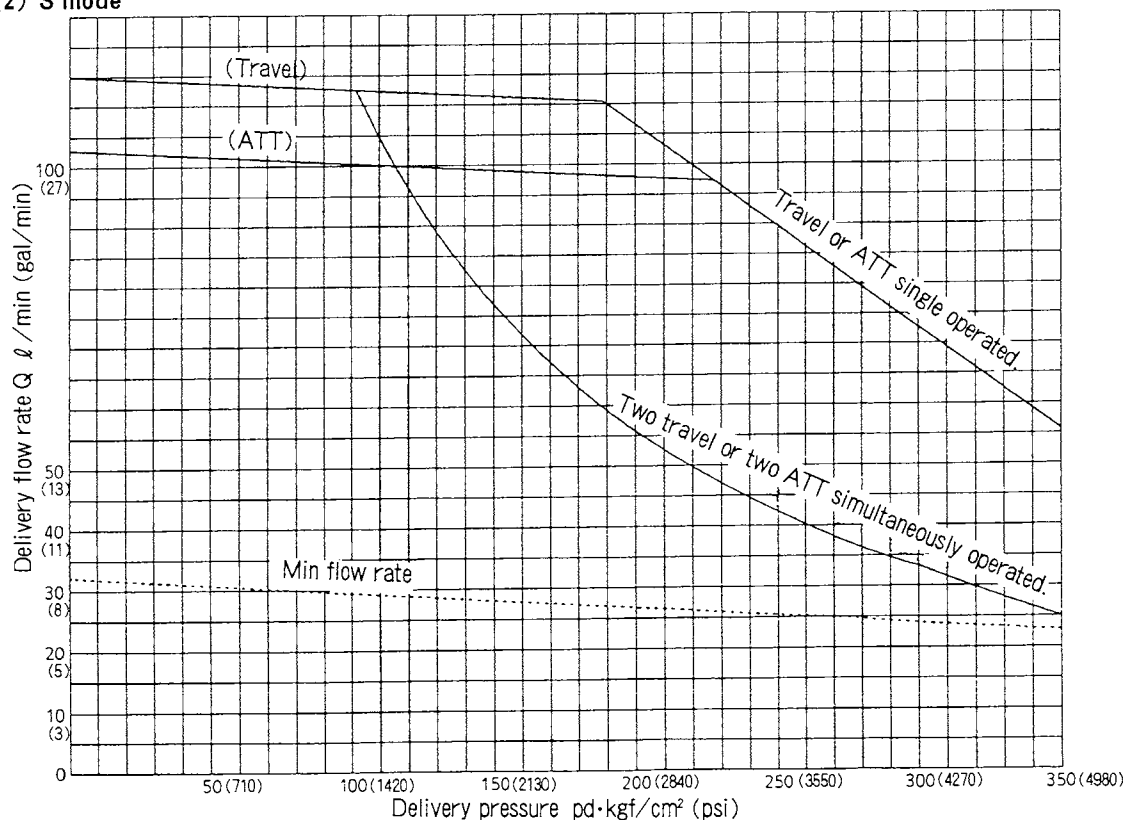
SK115SRDZ • SK135SR(LC)

● CONTROL CHART OF PUMP

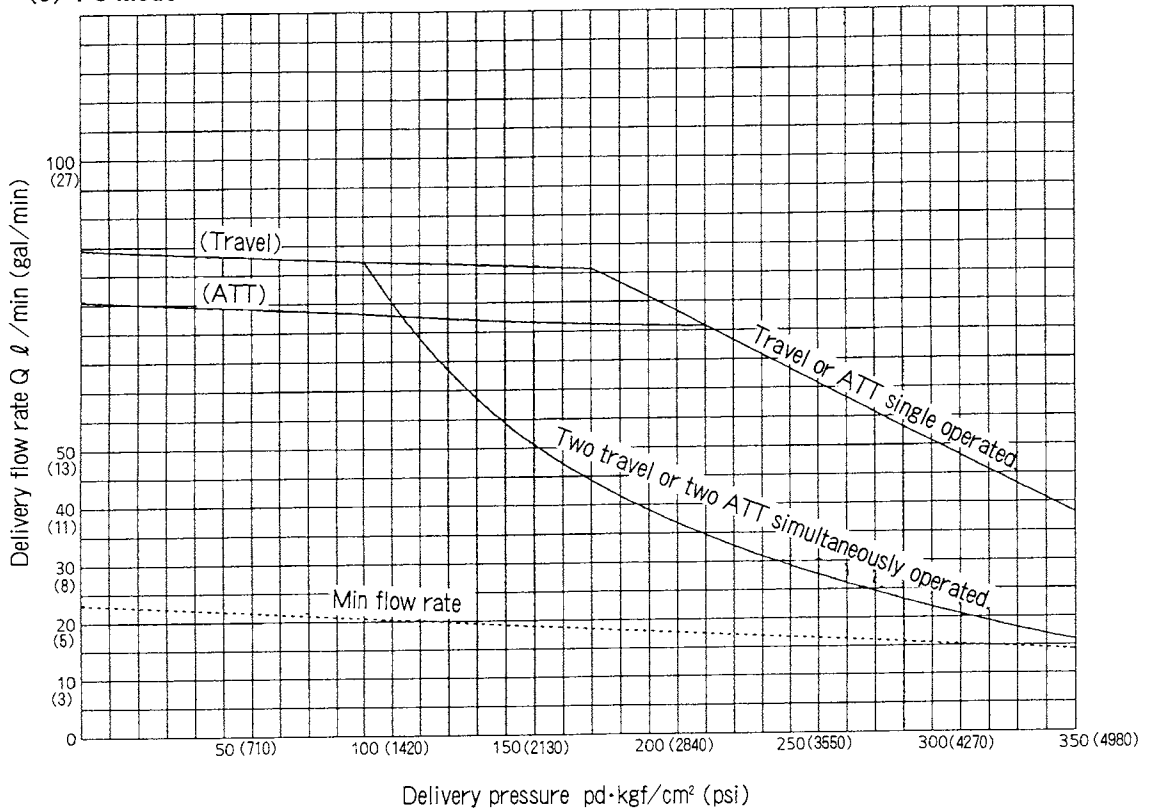
(1) H mode



(2) S mode



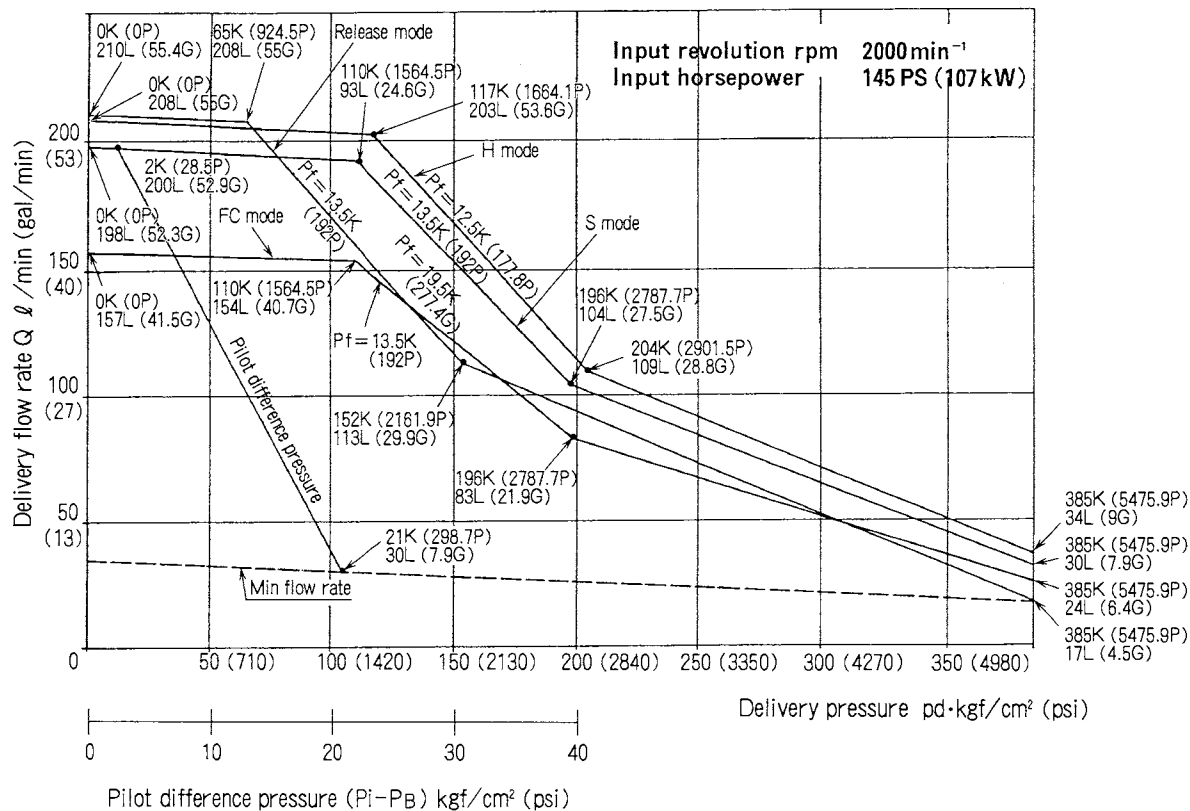
(3) FC mode



SK235SR

● CONTROL CHART OF PUMP

Models SK235SR Standard specification
A/C power cut pressure $P_f = 0K (0 \text{ psi})$



11. MEASUREMENT OF HYDRAULIC PRESSURE**SK70SR****● PREPARING TO MEASURE HYDRAULIC PRESSURE**

- (1) Hydraulic equipment
 70kgf/cm² (1000psi) pressure gauge 1 unit
 500kgf/cm² (7100psi) pressure gauge ... 2 unit
 (3pcs in dozer specification)
 Pressure measuring equipment and
 instrument for analysis 1 set

(2) Measuring cleanliness of hydraulic oil

- ▲** After releasing air in the hydraulic oil tank, open the cover and sample oil in the hydraulic tank, and measure with the instrument for analysis. If the measured value is higher than the reference value, replace the return filter or change the hydraulic oil.

● PLACE TO INSTALL PRESSURE GAUGE**(1) Main circuit**

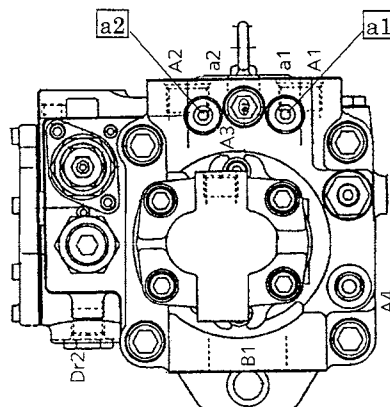
Replace plugs PF 1/4 of main pump gauge ports **a1**, **a2** with plugs for pressure measurement, and attach pressure gauge 500kgf/cm² (7100psi).

(2) Dozer circuit

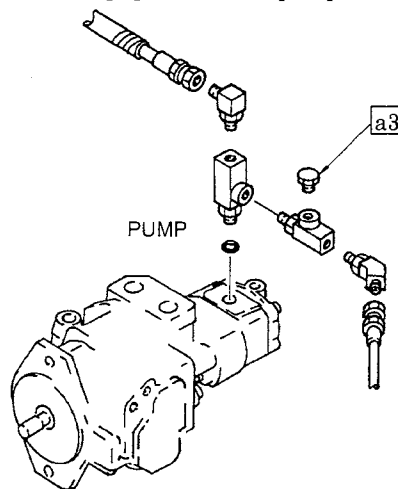
Replace dozer pump gauge plug PF1/4 **a3** with plug for pressure measurement, and attach pressure gauge 500kgf/cm² (7100psi).

(3) Pilot circuit

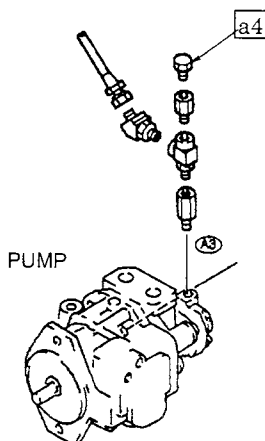
Replace pilot gauge plug **a4** with plug PF1/4 for pressure measurement, and attach pressure gauge 70kgf/cm² (1000psi).



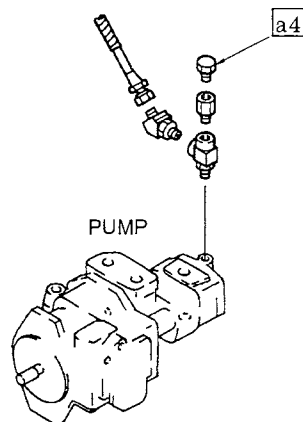
Gauge port on main pump



Gauge plug on dozer pump



Plug for STD pilot pressure measurement

Plug for pilot pressure measurement
in dozer specification

SK115SR • SK115SRDZ • SK135SR • SK135SRLC

● PREPARING TO MEASURE HYDRAULIC PRESSURE

(1) Hydraulic equipment

70kgf/cm² (1000psi) pressure gauge 1 unit

400~500kgf/cm² (5690~7100psi)

pressure gauge 3 unit

Pressure measuring equipment and

instrument for analysis 1 set

(2) Measuring cleanliness of hydraulic oil



After releasing air in the hydraulic oil tank, open the cover and sample oil in the hydraulic tank, and measure with the instrument for analysis. If the measured value is higher than the reference value, replace the return filter or change the hydraulic oil.

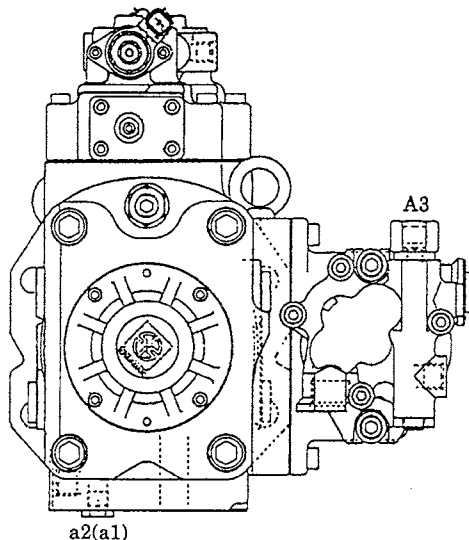
● PLACE TO INSTALL PRESSURE GAUGE

(1) Main circuit

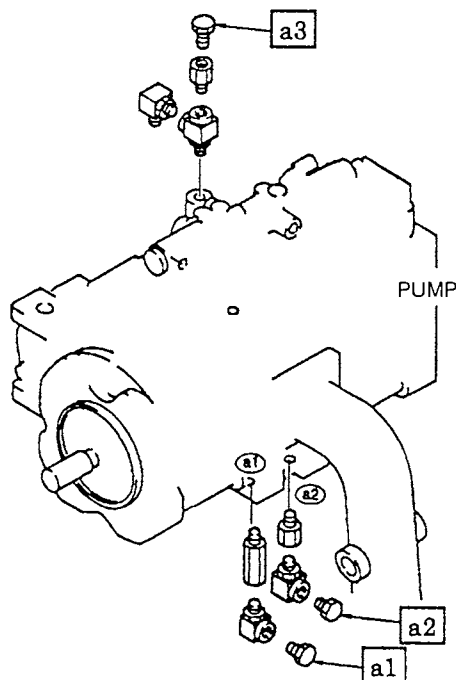
Replace plugs PF 1/4 of main pump gauge ports **a1**, **a2** with plugs for pressure measurement, and attach pressure gauge 500kgf/cm² (7100psi).

(2) Pilot circuit

Replace pilot gauge plug **a3** with plug PF1/4 for pressure measurement, and attach pressure gauge 70kgf/cm² (1000psi).



Gauge port on main pump



Plug for pressure measurement

SK235SR**● PREPARING TO MEASURE HYDRAULIC PRESSURE****(1) Hydraulic equipment**70kgf/cm² (1000psi) pressure gauge 1 unit400~500kgf/cm² (5690~7100psi)

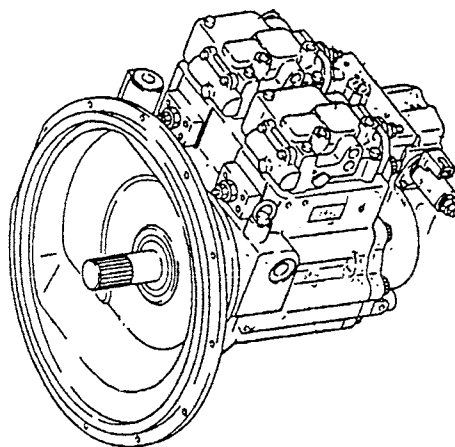
pressure gauge 2 unit

Pressure measuring equipment and

instrument for analysis 1 set

(2) Measuring cleanliness of hydraulic oil

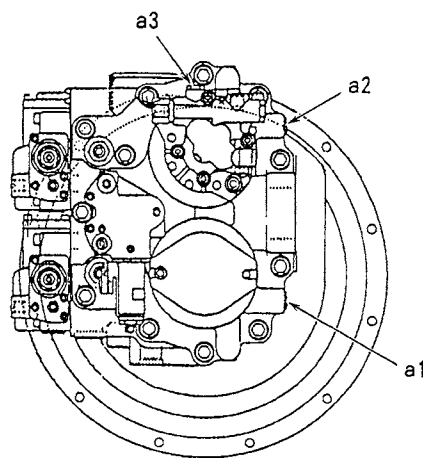
After releasing air in the hydraulic oil tank, open the cover and sample oil in the hydraulic tank, and measure with the instrument for analysis. If the measured value is higher than the reference value, replace the return filter or change the hydraulic oil.

**● PLACE TO INSTALL PRESSURE GAUGE****(1) Main circuit**

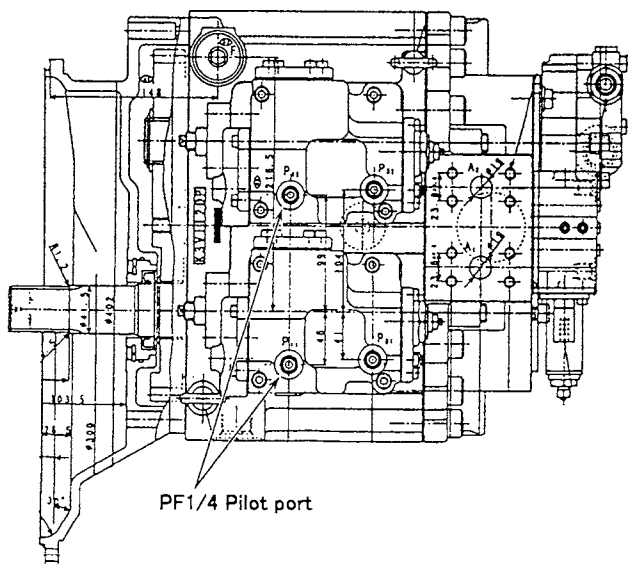
Replace plugs PF 1/4 of main pump gauge ports **a1**, **a2** with plugs for pressure measurement, and attach pressure gauge 500kgf/cm² (7100psi).

(2) Pilot circuit

Replace pilot gauge plug **a3** with plug PF1/4 for pressure measurement, and attach pressure gauge 70kgf/cm² (1000psi).



Gauge port on main pump



PF1/4 Pilot port

12. MEASUREMENT OF ENGINE SPEED

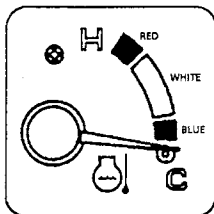
SK70SR

● MEASUREMENT OF ENGINE SPEED

(1) Warming up of engine

Start engine to raise the coolant temperature of engine to 40° to 80°C. (104° to 176°F)

Engine water temperature gauge



The E/G coolant temperature gauge is used to measure. The range in white color shows the temperature of approx. 40° to 100°C (104° to 212°F), so confirm that the measured value indicates the temperature within the range of white color.

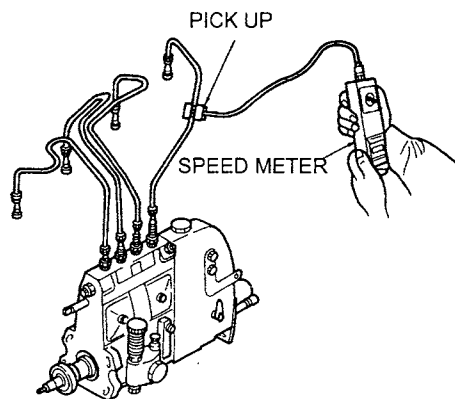


Fig. 1 Measurement of E/G speed

(2) Measuring with diesel engine speed meter

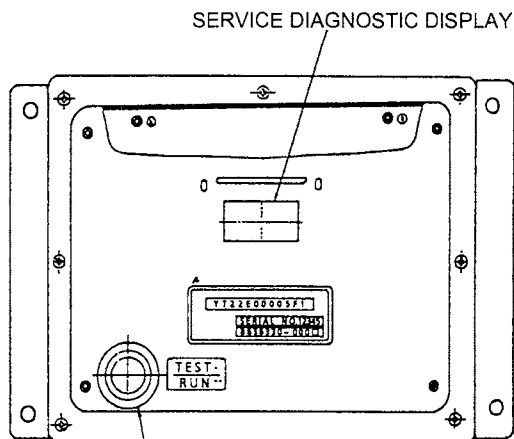
1) Install diesel engine speed meter pickup on and of injection pipes on which the pickup can be easily installed. (See Fig. 1.)

2) Check E/G speed shown in Table 1 in idling speed.

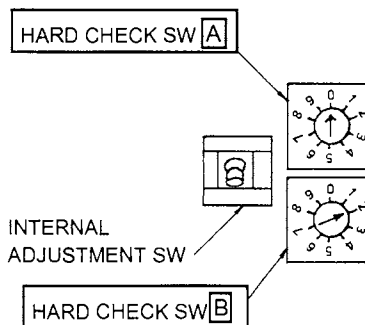
(3) Engine speed measured value through service diagnosis

Insert precision driver (—) into convex place indicated by arrow of hard check SW **A**, **B** in C-1 controller., then direct the arrow to **A**=0, **B**=2, and 3 digits in unit of 10rpm are displayed on service diagnostic display of controller.

Example: 2100rpm → 210 in display



Remove grommet, and you can find the following switch.



E/G speed measuring hard check SW

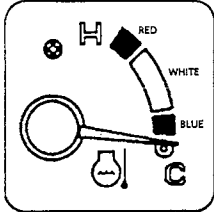
SK115SR • SK115SRDZ • SK135SR • SK135SRLC

● MEASUREMENT OF ENGINE SPEED

(1) Warming up of engine

Start engine to raise the coolant temperature of engine to 40° to 80°C. (104° to 176°F)

Engine water temperature gauge



The E/G coolant temperature gauge is used to measure. The range in white color shows the temperature of approx. 40° to 100°C (104° to 212°F), so confirm that the measured value indicates the temperature within the range of white color.

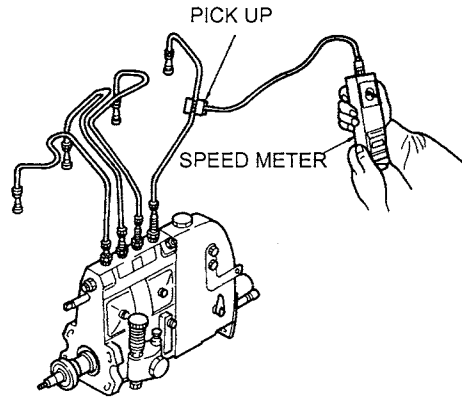


Fig. 1 Measurement of E/G speed

(2) Measuring with diesel engine speed meter

1) Install diesel engine speed meter pickup on and of injection pipes on which the pickup can be easily installed. (See Fig. 1.)

2) Check E/G speed shown in Table 1 in idling speed.

(3) Engine speed measured value through service diagnosis

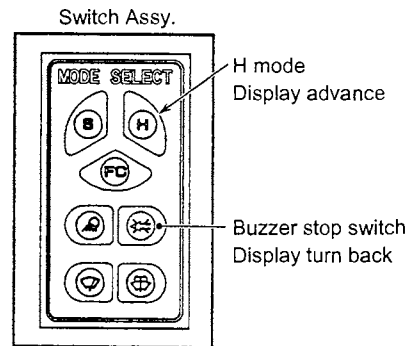
1) Turn the starter key switch [ON] keeping the buzzer stop switch depressed, and place the attachment to the travel position while operating in the low idling in the low idling condition after the engine starts.

2) The mechatro controller P/NO and the program version in the 1st item are displayed.

3) By pressing "H" mode of the work mode switch, goes to No.2, No.3 in order.

4) By pressing the buzzer stop switch, returns from No.40, No.39 in order.

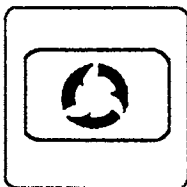
5) Turn thee starter switch off, and the display also goes off.



No.2	E/G SET	SK115SR 935 SK135SR 904	Upper SK115SR Lower SK135SR
2	MEAS	SK115SR 1000 SK135SR 1005	No load set rpm Actual rpm
	E/G PRS.	LIVE	LIVE/DEAD indication
	KPSS SW	H	H/S/FC indication.

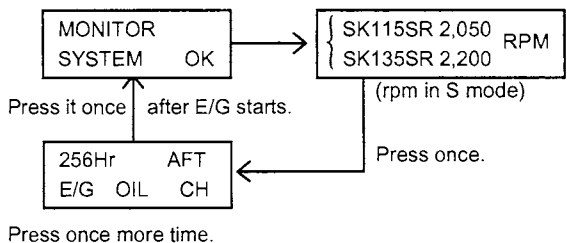
Engine speed measured value through service diagnosis

(4) Engine speed measured value through screen change switch.



After the engine starts, the following displays appear in order for every pressing of the screen change switch.

- E/G speed (rpm)
- E/G oil supply cumulative time



Screen change.

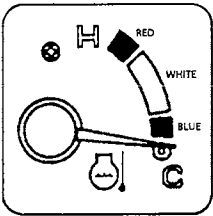
SK235SR

MEASUREMENT OF ENGINE SPEED

(1) Warming up of engine

Start engine to raise the coolant temperature of engine to 40° to 80°C. (104° to 176°F)

Engine water temperature gauge



The E/G coolant temperature gauge is used to measure. The range in white color shows the temperature of approx. 40° to 100°C (104° to 212°F), so confirm that the measured value indicates the temperature within the range of white color.

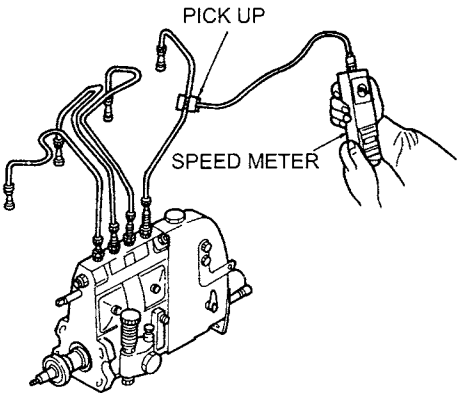


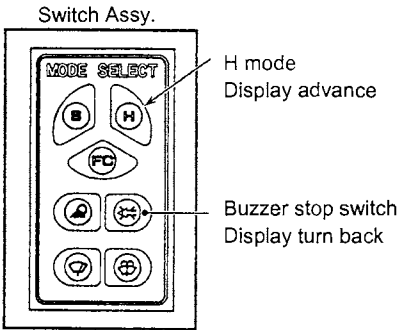
Fig. 1 Measurement of E/G speed

(2) Measuring with diesel engine speed meter

- 1) Install diesel engine speed meter pickup on and of injection pipes on which the pickup can be easily installed. (See Fig. 1.)
- 2) Check E/G speed shown in Table 1 in idling speed.

(3) Engine speed measured value through service diagnosis

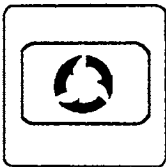
- 1) Turn the starter key switch [ON] keeping the buzzer stop switch depressed, and place the attachment to the travel position while operating in the low idling in the low idling condition after the engine starts.
- 2) The mechatro controller P/NO and the program version in the 1st item are displayed.
- 3) By pressing "H" mode of the work mode switch, goes to No.2, No.3 in order.
- 4) By pressing the buzzer stop switch, returns from No.13, No.12 in order.
- 5) Turn thee starter switch off, and the display also goes off.



No.2	E/G SET	950	[Upper SK115SR Lower SK135SR] No load set rpm Actual rpm LIVE/DEAD indication H/S/FC indication.
2	MEAS	970	
	E/G PRS.	LIVE	
	KPSS SW	H	

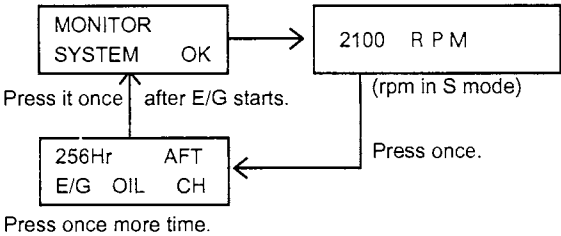
Engine speed measured value through service diagnosis

(4) Engine speed measured value through screen change switch.



After the engine starts, the following displays appear in order for every pressing of the screen change switch.

- E/G speed (rpm)
- E/G oil supply cumulative time



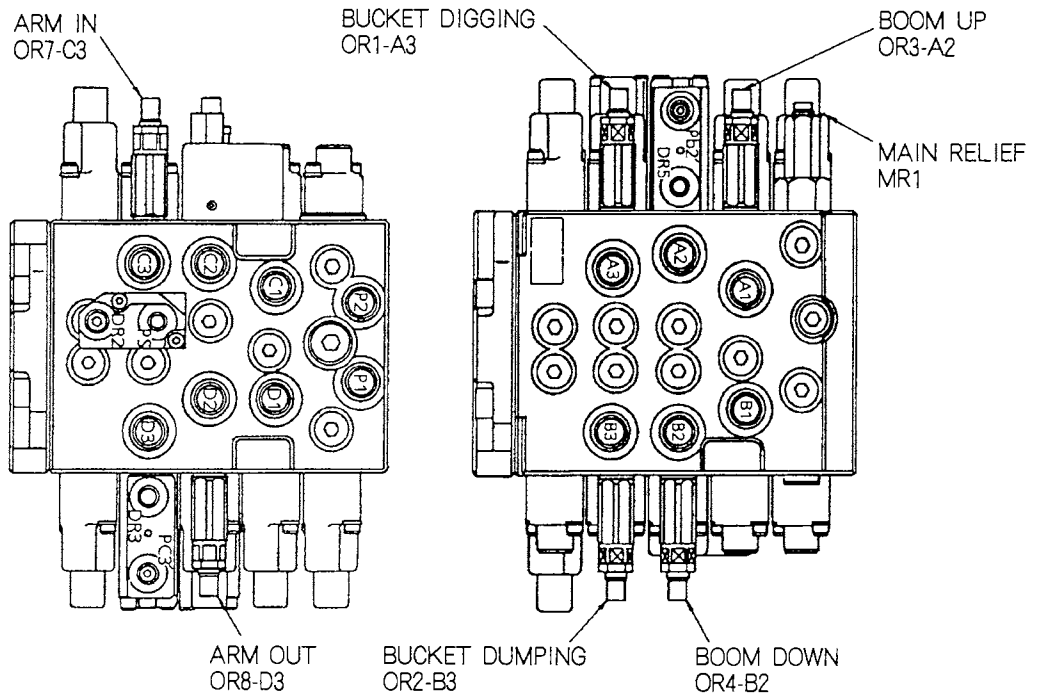
Screen change.

13. PRESSURE ADJUSTMENT POSITION

SK70SR

● PRESSURE ADJUSTMENT POSITION

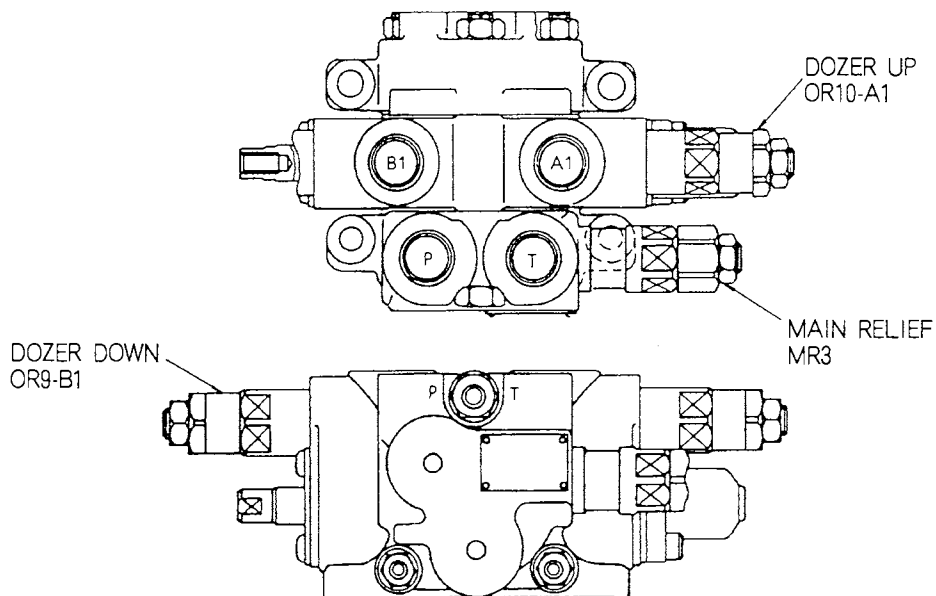
(1) Main control valve



View from rear side of machine

View from front side of machine

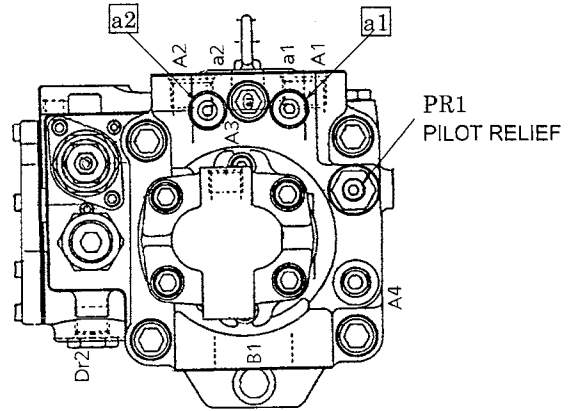
(2) Control valve for dozer (dozer specification only)



Control valve for dozer (OPT)

(3) Pilot relief valve

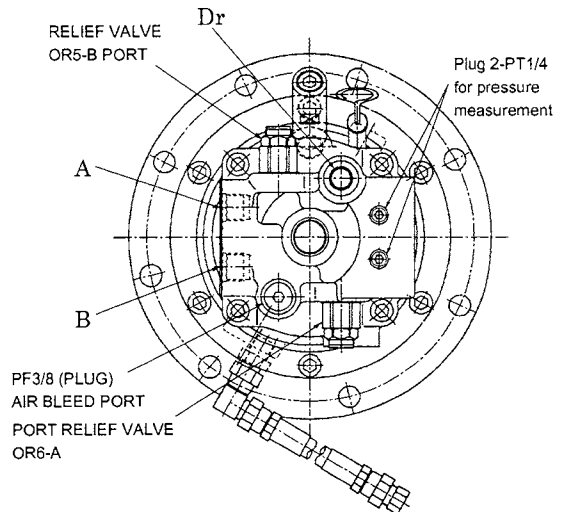
Pilot relief valve PR1 is built in main pump.



Pilot relief valve position

(4) Swing port relief

The swing motor is equipped with plugs for pressure measurement, but the measurement is carried out using gauge ports **a1** and **a2**. (See right illustration of pilot relief valve position.)

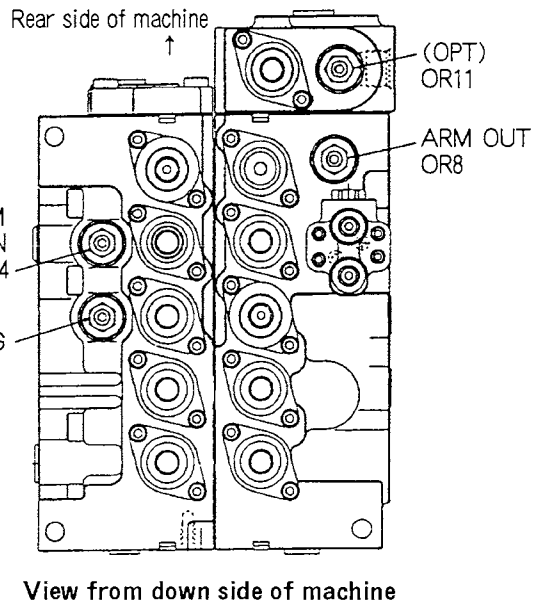
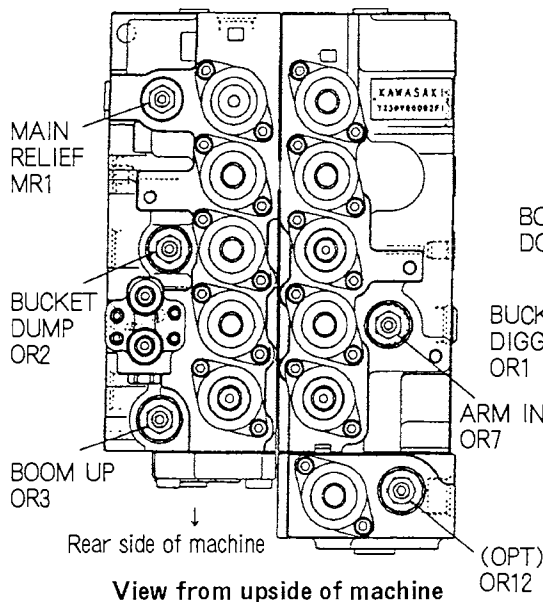


Swing port relief valve position

SK115SR • SK115SRdz • SK135SR(LC)

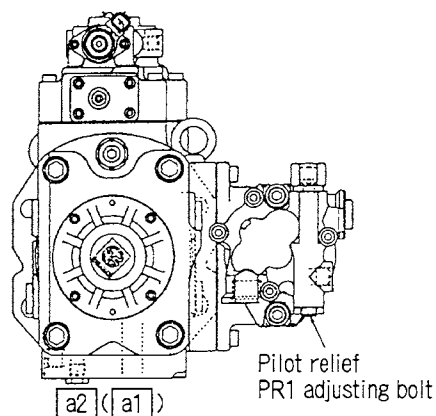
● **PRESSURE ADJUSTMENT POSITION**

(1) **Main control valve**



(2) **Pilot relief valve**

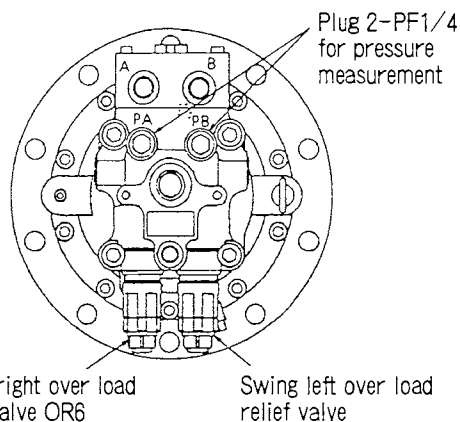
Pilot relief valve PR1 is built in main pump.



Pilot relief valve position

(3) **Swing port relief**

The swing motor is equipped with plugs for pressure measurement, but the measurement is carried out using ports **a1** and **a2**. (Plug for pressure measurement position and pilot relief valve position)

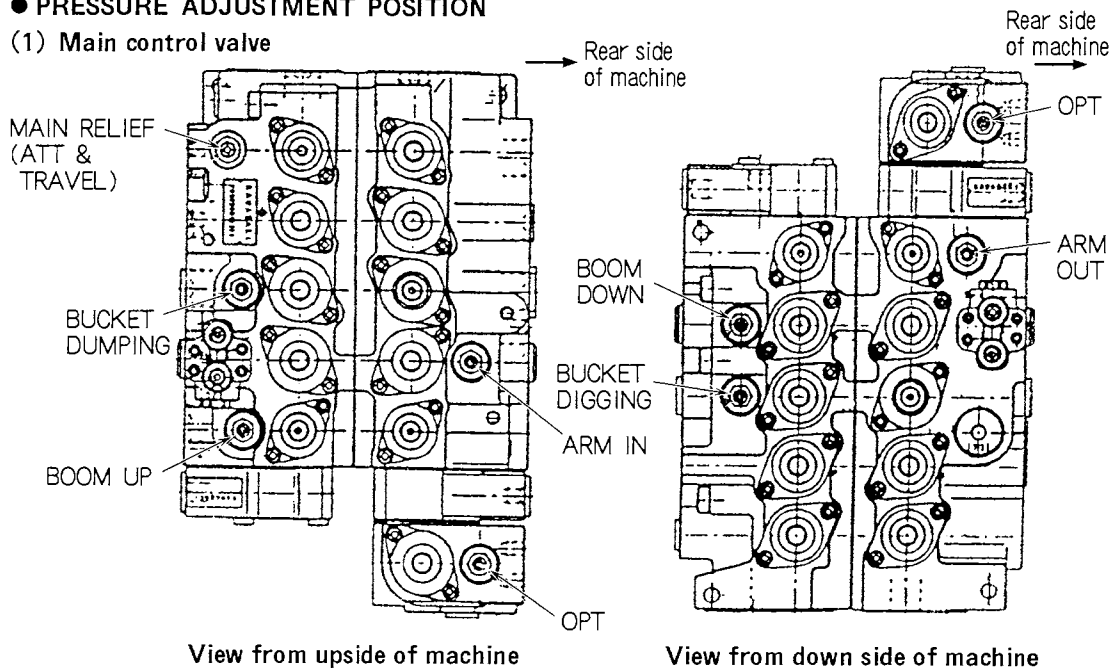


Swing port relief valve position

SK235SR

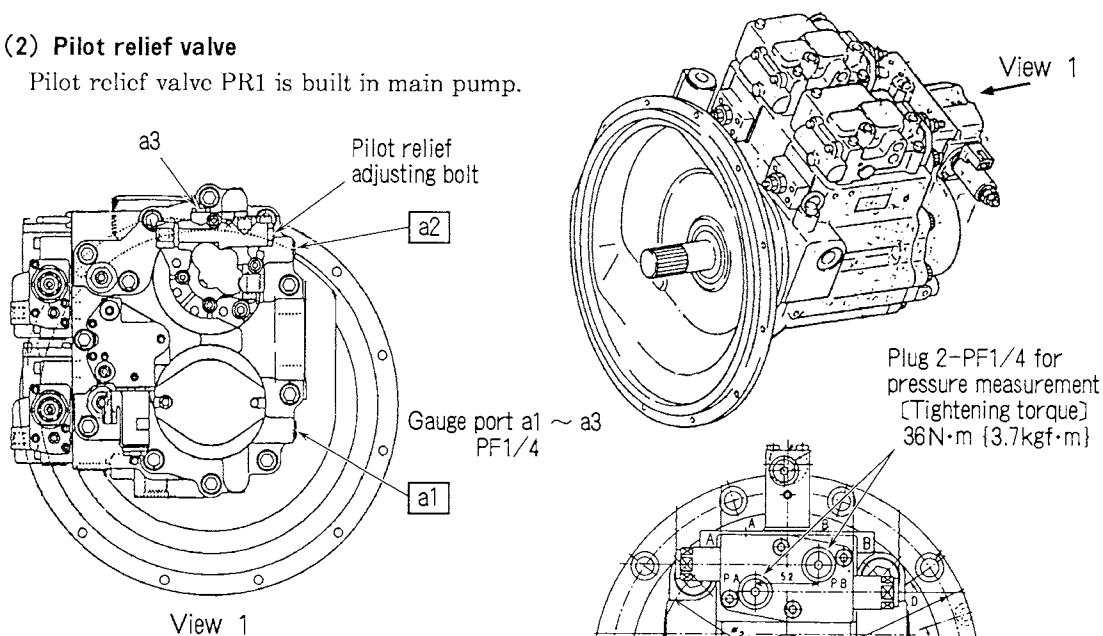
● PRESSURE ADJUSTMENT POSITION

(1) Main control valve



(2) Pilot relief valve

Pilot relief valve PR1 is built in main pump.

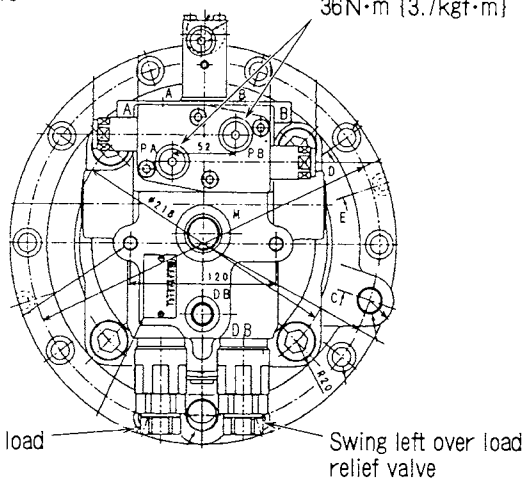


(3) Swing port relief

The swing motor is equipped with plugs for pressure measurement, but the measurement is carried out using ports **a1** and **a2**.

(See upper illustration)

Swing right over load relief valve
[Tightening torque]
177N·m {18kgf·m}



Swing port relief valve position

SK70SR

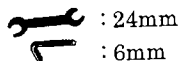
14. PROCEDURE FOR ADJUSTING RELIEF VALVE

SK70SR

● PROCEDURE FOR ADJUSTING RELIEF VALVE

(1) Pilot relief valve

Loosen nut (661) and adjust it with adjust screw (660).



: 24mm

: 6mm

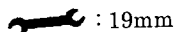
Table 2

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1/2 turn	Approx. 62 (880)

(2) Main relief valve

(Travel section, ATT common section)

Loosen lock nut (7) and adjust it with adjust screw (6).



: 19mm

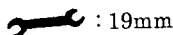
: 4mm

Table 3

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1/2 turn	Approx. 62 (880)

(3) Port relief valve (Boom, bucket, arm sections)

Loosen lock nut (8) and adjust it with adjust screw (7).



: 19mm

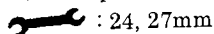
: 4mm

Table 4

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1/2 turn	Approx. 62 (880)

(4) Swing port relief valve

When the adjusted pressure is 10kgf/cm² (142psi) or less, loosen nut (71) and adjust it with cap (90).



: 24, 27mm

: 5mm

When the pressure adjusted value is over 10kgf/cm² (142psi), replace the relief valve assy.

(5) Travel surge cut valve

The valve cannot be pressure adjusted externally.

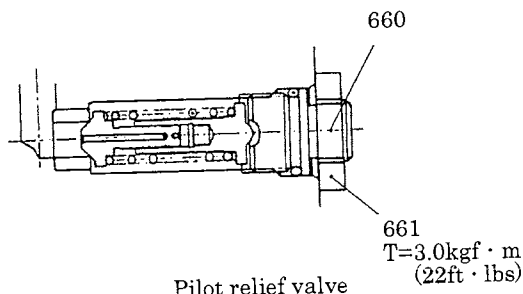
Loosen cap (5) and adjust it with shim (8). Increasing the shim thickness increases the pressure.



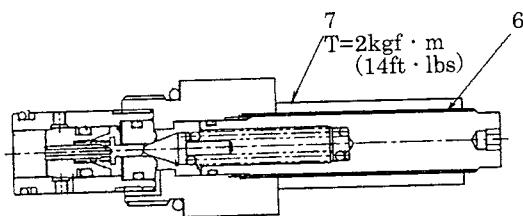
: 36mm

Table 5

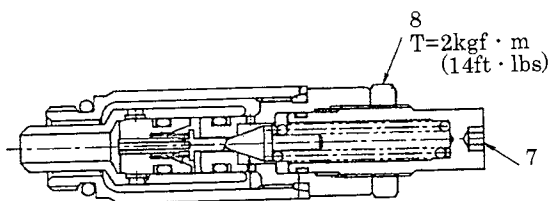
O.D. and thickness of shims mm (in)	Pressure change kgf/cm ² (psi)
Ø10(0.394)×0.1 (0.00394)	Approx. 14 (200)



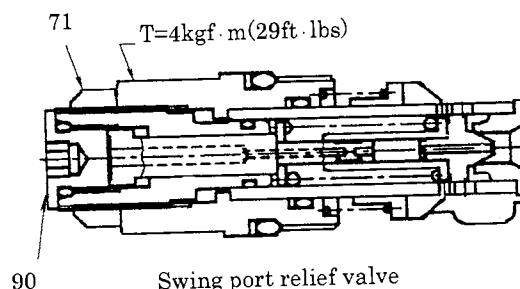
Pilot relief valve



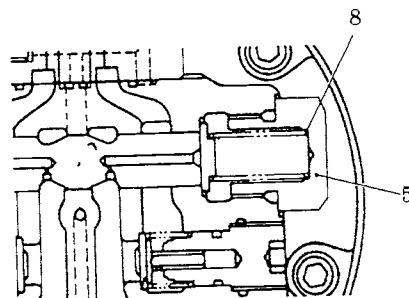
Main relief valve
(Travel section, ATT common section)



Port relief valve
(Boom, bucket, arm sections)



Swing port relief valve



Travel surge cut valve

SK115SR SK135SR SK115SRDZ SK135SRLC

SK115SR · SK115SRDZ · SK135SR · SK135SRLC

● PROCEDURE FOR ADJUSTING RELIEF VALVE

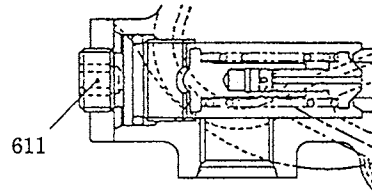
(1) Pilot relief valve

Loosen nut and adjust it with adjust screw (611).

 : 6mm

Table 3

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 21 (299)



Pilot relief valve

(2) Main relief valve

(Travel section, ATT common section)

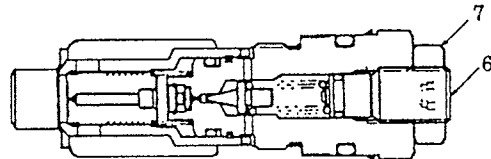
Loosen lock nut (7) and adjust it with adjust screw (6).

 : 19mm

 : 4mm

Table 4

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 180 (2,560)



Main relief valve

(Travel section, ATT common section)

(3) Port relief valve (Boom, bucket, arm sections)

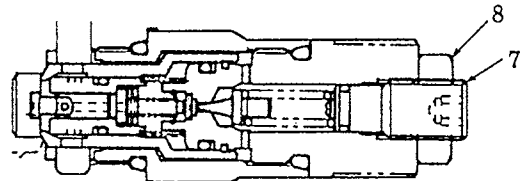
Loosen lock nut (8) and adjust it with adjust screw (7).

 : 19mm

 : 4mm

Table 5

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 180 (2,560)



Port relief valve

(Boom, bucket, arm sections)

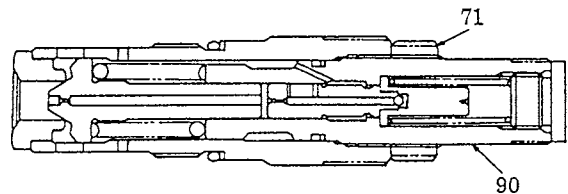
(4) Swing port relief valve

When the adjusted pressure is 10kgf/cm² (142psi) or less, loosen nut (71) and adjust it with cap (90).

 : 41mm

 : 22mm

When the pressure adjusted value is over 10kgf/cm² (142psi), replace the relief valve assy.



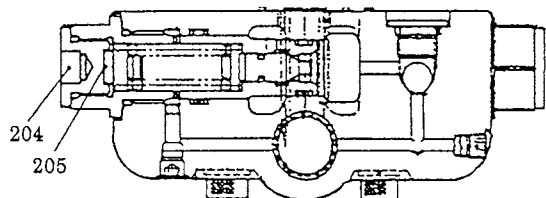
Swing port relief valve

(5) Travel surge cut valve

The valve cannot be pressure adjusted externally.

Loosen cap (204) and adjust it with shim (205). Increasing the shim thickness increases the pressure.

 : 10mm



Travel surge cut valve

SK235SR**● PROCEDURE FOR ADJUSTING RELIEF VALVE****(1) Pilot relief valve**

Adjust it with adjusting bolt (311)

 ; 24mm,

Tightening torque : 3.0kgf•m {22ft•lbs}

 ; 6mm**Table 2**

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 21 (299)

(2) 2nd stage main relief valve adjusting procedure. (Travel section, ATT common section)

For the adjustment of the 2nd stage relief valve, begin with the boost pressure side.

Loosen lock nut (1), adjust the valve with adjust screw (2) and turn up nut (1).

Next, loosen nut (3) and adjust the standard side of adjust screw (4). And turn up nut (3).

 ; 32mm,

Tightening torque : 2.8~3.2kgf•m {20~23ft•lbs}

 ; 22mm,

Tightening torque : 2.8~3.2kgf•m {20~23ft•lbs}

 ; 19mm Adjusting bolt ; 6mm**Table 3**

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
At boost 1 turn	Approx. 180 (2,560)
Standard 1 turn	Approx. 180 (2,560)

(3) Over load relief valve (Boom, bucket, arm section)

Loosen lock nut (1) and adjust it with adjust screw (2).

 ; 22mm,

Tightening torque : 2.8~3.2kgf•m {20~23ft•lbs}

 ; 6mm**Table 4**

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 180 (2,560)

(4) Swing over load relief valveWhen the adjusted pressure is 10kgf/cm² (142 psi) or less, loosen nut (1) and adjust it with cap (2). ; 30, 38mm,

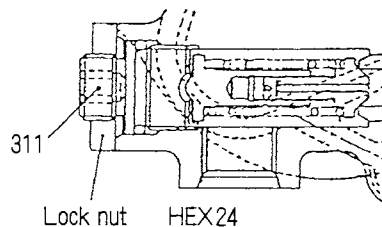
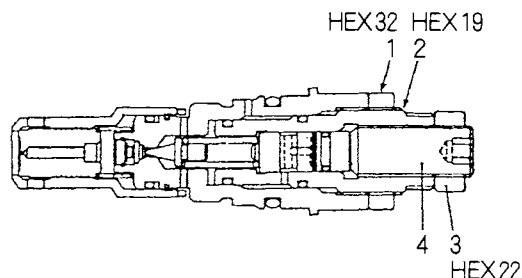
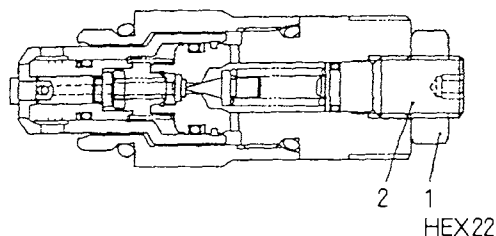
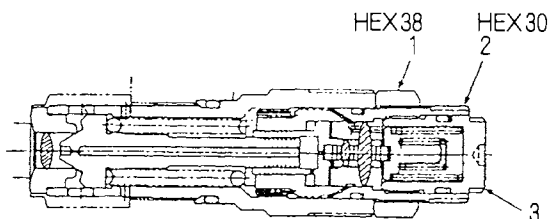
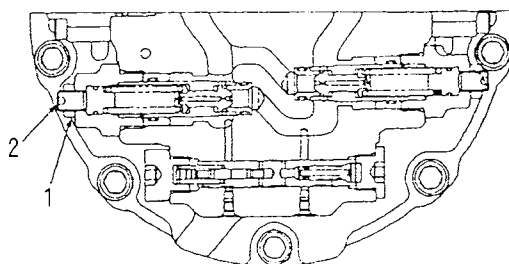
Tightening torque : 12kgf•m {87ft•lbs}

 ; 12mm**Table 5**

No. of turns of adjust screw	Pressure change kgf/cm ² (psi)
1 turn	Approx. 102 (1,450)

When the pressure adjusted valve is over 10kgf/cm² (142psi), replace the relief valve assy.**(5) Travel over load relief valve**

The valve cannot be pressure adjusted externally. Loosen lock nut (1) and adjust it with adjust screw (2).

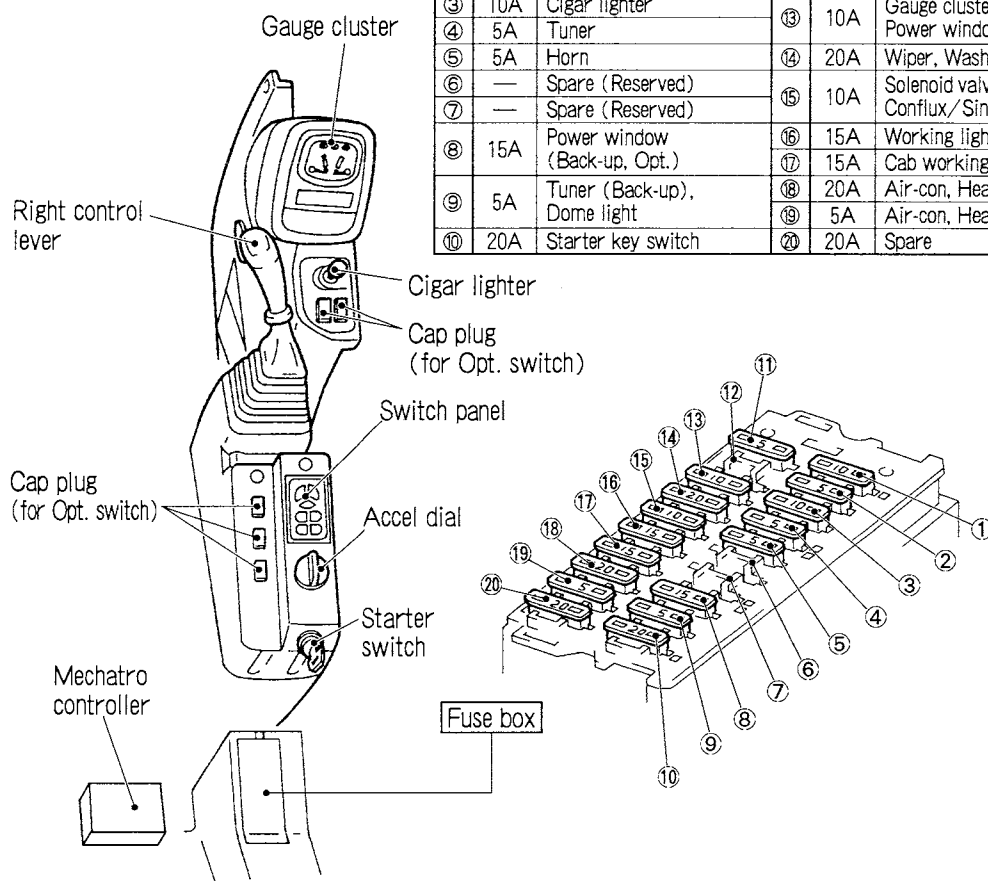
 ; 19mm ; 6mm**Pilot relief valve****Main relief valve
(Travel section, ATT common section)****Over load relief valve
(Boom, bucket, arm section)****Swing over load relief valve****Travel over load relief valve**

15. GAUGE CLUSTER AND SWITCH PANEL

SK70SR

Fuse capacity and circuits

No.	Capacity	Circuits	No.	Capacity	Circuits
①	10A	Mechatro controller	⑪	5A	Fuel pump (Opt.)
②	5A	Wiper, Washer relay	⑫	—	Spare (Reserved)
③	10A	Cigar lighter	⑬	10A	Gauge cluster, Power window (Opt.)
④	5A	Tuner	⑭	20A	Wiper, Washer
⑤	5A	Horn	⑮	10A	Solenoid valve (Lever lock, Conflux/Single select)
⑥	—	Spare (Reserved)	⑯	15A	Working light
⑦	—	Spare (Reserved)	⑰	15A	Cab working light (Opt.)
⑧	15A	Power window (Back-up, Opt.)	⑱	20A	Air-con, Heater (Opt.)
⑨	5A	Tuner (Back-up), Dome light	⑲	5A	Air-con, Heater (Back-up)
⑩	20A	Starter key switch	⑳	20A	Spare

**Work mode selector switch**

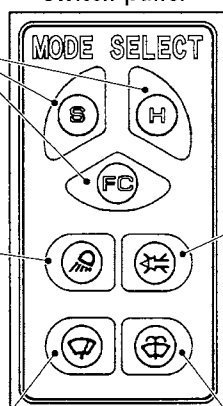
Start engine, and S mode is displayed.

Working light switch

Press this switch once, and working lights attached on boom and the front right side go on.
Press it again, and working lights on boom and front side go out.

Wiper switch

Press this switch once, and wiper moves intermittently.
In addition, press it again, and it moves continuously.
Press it one more time, and it stops operating.

Switch panel**Buzzer stop switch**

If mechatro controller and various sensors, etc. fail (trouble-shooting), warning buzzer sounds intermittently. To stop sounding, press buzzer stop switch.

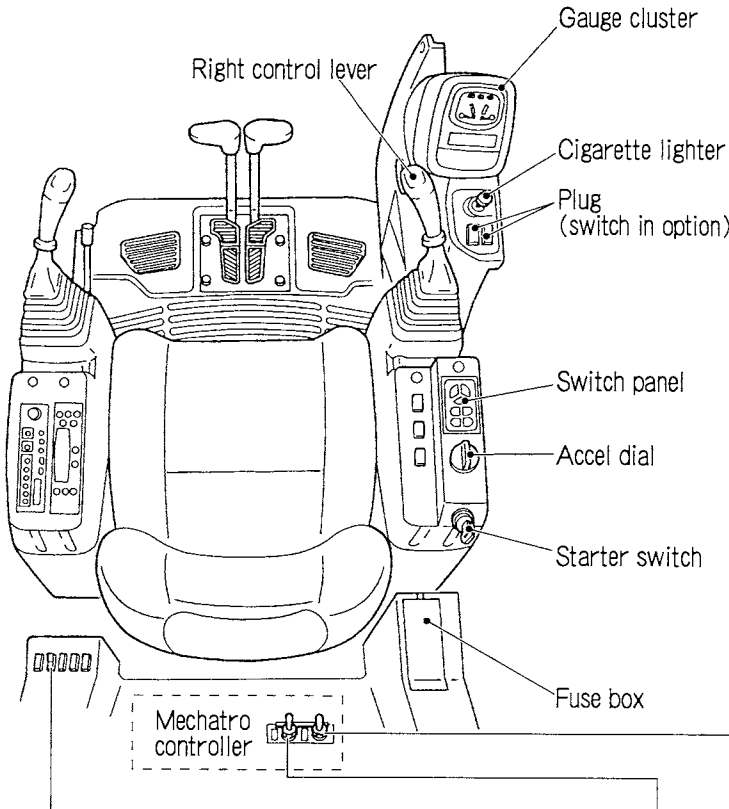
Note :

The buzzer sounding because of engine oil pressure drop and coolant temperature rise can not be stopped.

Washer switch

Press this switch, and wash liquid is sprayed while it is pressed.

SK115SR • SK115SRDZ • SK135SR (LC)



Slewing parking brake release switch

- The switch is set to the normal operation position.
- With the slewing arm-in operation, the brake is released.
- If it is impossible to release due to the failure of electric system, turn the toggle switch in the controller box on the rear side of the operator seat to the "RELEASE LOCK" side, and buzzer sounds intermittently and stops sounding in 5 seconds, enabling to release the braking.
- Place the machine on the safe area immediately, contact KOBELCO distributor.
- To turn the toggle switch to "RELEASE LOCK" side, switch it toward the machine rear side.
- Usually turn the toggle switch to "NORMAL" side, that is, toward the machine front side.

Pressure release switch

- Press the switch with symbol mark for 5 seconds or more, and the E/G speed reduces to the low idle rpm or lower, and the message "DRAINING HYD. PRESS" is displayed on the multidisplay and buzzer sounds intermittently.
- Operate the ATT and travel control levers used to release the pressure, and the pressure in the hydraulic system is released.
- Turn the starter switch off, and the pressure release mode is released and buzzer stops sounding.
- Then, after bleeding air in the hydraulic tank, carry out the inspection and repair.
- **Supplementary Explanation**
 - When it has failed to release the pressure, the message "FAIL DRAIN HYD. PRESS" is displayed on the multidisplay, buzzer sounds continuously, but it is impossible to stop the buzzer sounding.
 - Turn the starter switch off, the buzzer stops sounding.
 - Carry out the pressure releasing again.

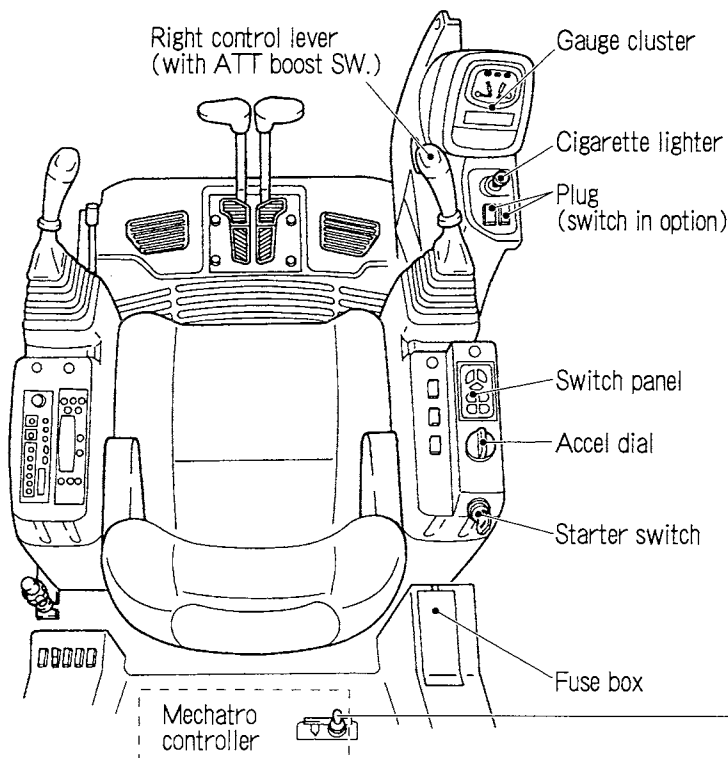
KPSS work mode release switch

- The switch is set to the normal work mode position.
- If the message "MECHATRO CONT FAIL" is displayed on the multi-display, turn the toggle switch in the controller box on the rear side of the operator seat to "RELEASE" side, and the buzzer sounds and stops sounding in 5 seconds. It is operable in this condition, but contact KOBELCO distributor immediately.
- To turn the toggle switch to "RELEASE" side, switch it toward the machine rear side.
- Usually turn the toggle switch to "KPSS" side, that is, toward the machine front side.

Note :

1. The mechatro controller, etc. are located in the control box on the rear side of the operator seat.
2. How to take out the mechatro controller, etc.
 - ① Fully pull it out in the front of the mechatro controller, and bring the back seat down frontward.
 - ② Remove five screws for the resin cover on the rear side with (+) driver.
 - ③ After removal of the resin cover, you can find the mechatro controller, etc.

SK235SR



KPSS work mode release switch

- The switch is set to the normal work mode position.
- If the message "MECHATRO CONT FAIL" is displayed on the multi-display, turn the toggle switch in the controller box on the rear side of the operator seat to "RELEASE" side, and the buzzer sounds and stops sounding in 5 seconds. It is operable in this condition, but contact KOBELCO distributor immediately.
- To turn the toggle switch to "RELEASE" side, switch it toward the machine rear side.
- Usually turn the toggle switch to "KPSS" side, that is, toward the machine front side.

Fuse capacities and names of circuits

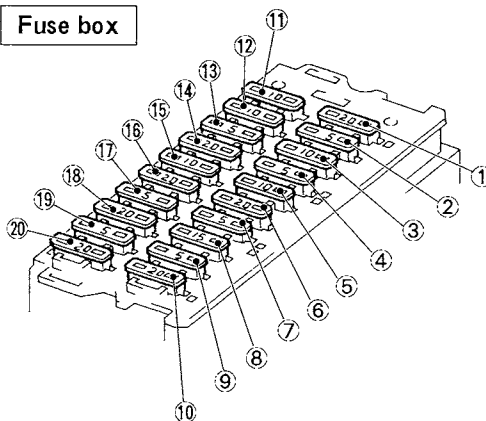
No.	Capacity	Circuit name
①	20A	Mechatro controller
②	5A	Wiper relay, Washer relay
③	10A	Cigarette lighter
④	5A	Tuner
⑤	10A	Horn
⑥	20A	Spare (24V)
⑦	5A	Mechatro controller (Back-up)
⑧	15A	Power window (Back-up·Opt.)
⑨	5A	Tuner (Back-up), Room lamp
⑩	20A	Key switch
⑪	10A	Auto greaseter (Opt.)
⑫	10A	Swing flasher (Opt.) Travel alarm (Opt.)
⑬	5A	Gauge cluster Power window (Opt.)
⑭	20A	Wiper, Washer
⑮	10A	Solenoid valve (Lever lock)
⑯	20A	Working light (Front)
⑰	5A	Resistor
⑱	20A	Air conditioner
⑲	5A	Air conditioner (Back-up)
⑳	20A	Opt. working light

Note :

When replacing fuse, be sure to turn the starter switch to OFF.

And replace fuses with equivalent amperage rating.

Fuse box



Supplementary explanation :

Spare fuses are attached to rearside of fuse box cover.

Note :

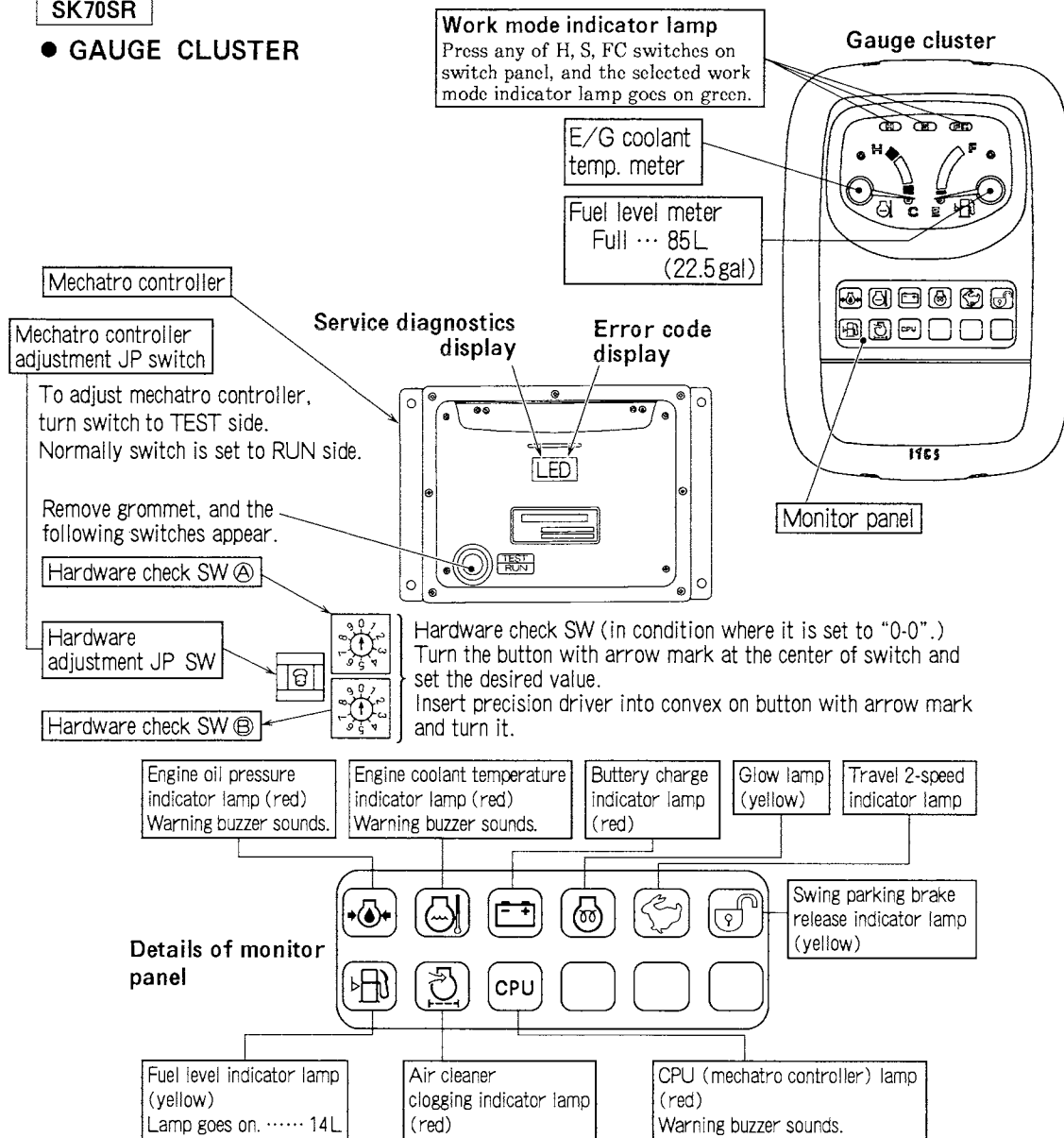
1. The mechatro controller, etc. are located in the control box on the rear side of the operator seat.

2. How to take out the mechatro controller, etc.

① Fully pull it out in the front of the mechatro controller, and bring the back seat down frontward.

② Remove five screws for the resin cover on the rear side with (+) driver.

③ After removal of the resin cover, you can find the mechatro controller, etc.

SK70SR**● GAUGE CLUSTER****Service diagnostics**

1. To perform service diagnostics, insert precision driver (—) into convex with arrow mark at the center of hardware check SWs A and B and turn A and B switches, and 36 items are displayed on service diagnostics display.
2. If error code is indicated on service diagnostics display, check each equipment and harness for possible damage.

Note : Since hardware check SWs A and B are set to "0-0" in the factory, error code for troubleshooting is indicated on the display.

Troubleshooting

1. If trouble of each equipment and harness is indicated on error code display of mechatro controller, 22 items are displayed on error code display.
2. At the same time, CPU lamp of gauge cluster flickers and buzzer sounds.
3. Press buzzer stop switch on switch panel, and the buzzer stops sounding.
4. In case error is displayed on error code display, check each equipment and harness for possible damage.

Note : When CPU lamp of gauge cluster goes on continuously, and buzzer sounds continuously, the display of abnormality of mechatro controller appears.

SK115SR

SK115SRDZ

SK135SR(LC)

SK235SR

GAUGE CLUSTER

Work mode display lamp

- Press any of H, S and FC modes on the switch panel, the selected work mode display lamp goes on in green.

Engine water temperature

- Indicates the temperature of the engine coolant.
- If the pointer is in the range of white zone while operating, it is normal.
- If the pointer is in the range of the red zone, reduce the E/G speed to the idle rpm, and wait until the pointer is in the range of the white zone.

Fuel level gauge

- Indicates the fuel level.
- If the remaining fuel quantity is reduced, the pointer moves close to E point.
- Make up shortage of fuel.

	SK115SR SK115SRDZ SK135SR(LC)	SK235SR
Full	180L (42.3gal)	290L (76.6gal)
E point	28L (7.4gal)	50L (13.2gal)
Lamp goes on	24L (6.3gal)	50L (13.2gal)

Multidisplay LCD (Liquid crystal display)

Work mode selector switch

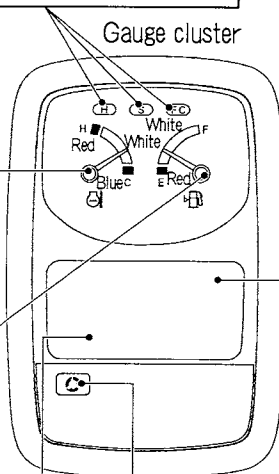
- After the engine starts, the work mode is set to the S mode.
- Select the most effective suitable work mode according to the working condition and working object from three work modes.

Working light switch

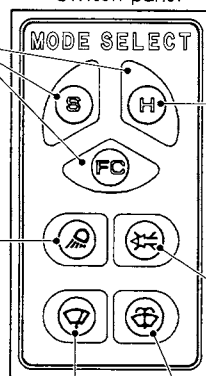
- Press the switch, and the working lights on the left side of the boom and on the right side of the front go on.
- Press it once more, and the working lights on the boom and on the right side of the front go out.
- When the working light switch is turned on, the symbol  is displayed on the lower section of the multidisplay.

Wiper switch

- Press the switch, and the wiper moves intermittently.
- Press it once more, and it moves continuously.
- Press once more again, the wiper stops moving.
- When wiper is moving, the symbol  is displayed for intermittent movement, and  for continuous movement on the lower section of the multidisplay.



Switch panel



The functions displayed on the multidisplay are classified roughly into the following 6 types.

*1. CPU error display

Displays the error of the mechatro controller, etc. (32 items)

*2. Self-diagnosis display

Displays the failure of the I/O system of the mechatro controller such as the low and high pressure sensors, governor motor, proportional valve, solenoid valve, etc.

*3. Service diagnosis display

Displays the information output by the mechatro controller such as the pressure sensor detection, proportional valve, solenoid valve, etc. (22 items)

4. Trouble history display

Stores and displays the contents of the troubles detected through the mechatro self diagnosis.

5. Mechatro A adjustment display

Displays it by procedure during the mechatro A adjustment.

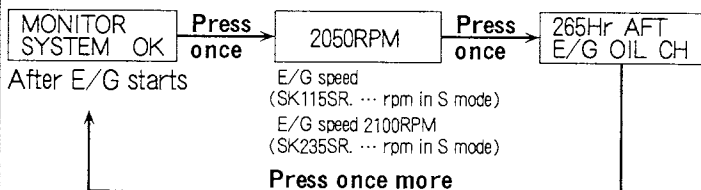
6. E/G oil supply cumulative (integrated) time

Displays the E/G oil supply cumulative time and E/G speed (rpm) list.

The information with mark * is displayed for every occurrence of the failure.

Screen change switch

After the engine starts, the following displays appear in order for every pressing of the screen change switch.



The work mode selector switch "H" contains the following functions.

- Work mode select "H Mode"
- Display item roll forwarded in service diagnosis operation
- Display item roll forwarded in trouble history operation
- Time display roll forwarded when correcting E/G oil supply cumulative time

Buzzer stop switch contains the following functions.

- Stops the warning sounding
- Display item rollbacked in service diagnosis operation
- Display item rollbacked in trouble history operation
- Time display rollbacked when correcting E/G oil supply cumulative time

Washer switch

Press the switch, and washer liquid is sprayed through the nozzle while the switch is pressed.

16. TROUBLESHOOTING SUMMARIZED MECHATRO CONTROL**SK70SR****16-1. ● TROUBLE SHOOTING SUMMARIZED**

No.	Trouble	Operating condition	Electric or hydraulic cause		Hydraulic or electric	Normal criterion		
			Cause	Check point		1	2	3
1-1	No operation works.	Safety lock lever down at full stroke.	Safety lock lever solenoid (SV-4) does not change over and there is no hydraulic source for pilot valve.	SOI (SV-4) connector	Electric	24V at SV-4 connector.	24V at SW-11.	24V at fuse box connector (CN-14M) white & black
1-2	Moves freely	Lever at neutral	P1 bypass cut proportionate valve moves freely and the P1 circuit pressure rises.	P1 bypass cut proportionate valve (PSV-D) connector	Electric	Current for P1 bypass cut proportionate valve: 315mA.	Arm in sensor and arm out sensor values: less than 1.3V.	—
		Lever at neutral	P2 bypass cut proportionate valve moves freely and the P2 circuit pressure rises.	P2 bypass cut proportionate valve (PSV-B) connector	Hydraulic	Secondary pilot pressure for P1 bypass cut valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure: 6kgf/cm ² (85psi)	—
		Lever at neutral	P2 bypass cut proportionate valve moves freely and the P2 circuit pressure rises.	P2 bypass cut proportionate valve (PSV-B) connector	Electric	Current for P2 bypass cut proportionate valve: 315mA.	Boom raise sensor and swing right/left sensor values: less than 1.3V.	—
		Lever at neutral	P2 bypass cut proportionate valve moves freely and the P2 circuit pressure rises.	P2 bypass cut proportionate valve (PSV-B) connector	Hydraulic	Secondary pilot pressure for P2 bypass cut proportionate valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure: 6kgf/cm ² (85psi).	—
2-2	Only bucket is slow.	Bucket lever and other levers at full stroke.	P2 bypass cut proportionate valve moves freely, P2 circuit pressure rises, and P1 circuit flow decreases.	P2 bypass cut proportionate valve (PSV-B) connector	Electric	Current for P2 bypass cut proportionate valve: 315mA.	Boom raise sensor and swing right/left sensor values: less than 1.3V.	—
					Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 5.5kgf/cm ² (78psi)	Lever at neutral Secondary pilot pressure with lever neutral: 6kgf/cm ² (85psi)	Secondary pilot pressure for bucket: 35kgf/cm ² (500psi)
2-3	Only boom raise speed is low.	Boom lever at full stroke.	P2 bypass cut proportionate valve does not move and the boom conflux flow is not created.	P2 bypass cut proportionate valve (PSV-B) feedback current	Electric	Feedback current for P2 bypass cut proportionate valve: 700mA	Command current for P2 bypass cut proportionate valve: 700mA	Boom raise sensor: more than 4.0V
		Travel lever at neutral	Travel straight valve moves freely and is actuated by P1 pump flow.	Travel straight proportionate valve (PSV-C) command current	Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 26kgf/cm ² (370psi)	←	Secondary pilot pressure for travel: 21kgf/cm ² (310psi)
					Electric	Command current for P2 bypass cut proportionate valve: 315mA	Travel right and left sensor values: less than 1.3V.	—
		Travel lever at neutral	Travel straight valve moves freely and P2 pump flow to tank.	Travel straight proportionate valve (PSV-C) command current	Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure for travel: 6kgf/cm ² (85psi).	—
					Electric	Command current for travel straight proportionate valve: 315mA	Travel right and left sensor values: less than 1.3V.	—
					Hydraulic	Secondary pilot pressure for P2 port travel straight valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure for travel: 6kgf/cm ² (85psi)	—
2-4	Only arm in speed is low.	Arm lever at full stroke	Arm conflux flow is not created.	P1 bypass cut proportionate valve (PSV-D) command current	Electric	Command current for P1 bypass cut proportionate valve: 700mA	—	Arm in sensor: more than 4.0V
					Hydraulic	Secondary pilot pressure for P1 bypass cut: 26kgf/cm ² (370psi)	—	Secondary pilot pressure for arm in: 35kgf/cm ² (500psi)
2-5	Only arm out speed is low.	Arm lever at full stroke	Arm conflux flow is not created.	P1 bypass cut proportionate valve (PSV-D) command current	Electric	Command current for P1 bypass cut proportionate valve: 700mA	Arm out sensor: more than 4.0V	—
					Hydraulic	Secondary pilot pressure for P1 bypass cut valve: 26kgf/cm ² (370psi)	—	Secondary pilot pressure for arm out: 35kgf/cm ² (500psi)
4-1	Fine bucket close and open operations can not be done.	Fine bucket operation	P1 bypass cut proportionate valve moves freely and the P1 circuit pressure rises.	P1 bypass cut proportionate valve (PSV-D) connector	Electric	Command current for P1 bypass cut proportionate valve: 315mA	Arm in and arm out sensor values: less than 1.3V.	—
					Hydraulic	Secondary pilot pressure for P1 bypass cut valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure for arm in and out: 6kgf/cm ² (85psi)	Unload pressure for P1 pump: approx. 20kgf/cm ² (280psi)
4-2	Fine boom raise and lower operations can not be done.	Fine boom raise and lower operations	P1 bypass cut proportionate valve moves freely and the P1 circuit pressure rises.	P1 bypass cut proportionate valve (PSV-D) connector	Electric	Command current for P2 bypass cut proportionate valve: 315mA	Arm in and arm out sensor values: more than 1.3V.	—
					Hydraulic	Secondary pilot pressure for P1 bypass cut valve: 5.5kgf/cm ² (78psi)	Secondary pilot pressure for arm in and out: 6kgf/cm ² (85psi)	Unload pressure for P1 pump: approx. 20kgf/cm ² (280psi)
4-3	Fine swing right and left operations can not be done.	Fine swing right and left operations	P2 bypass cut proportionate valve moves freely and the P2 circuit pressure rises.	P2 bypass cut proportionate valve (PSV-D) connector	Electric	Command current for P2 bypass cut proportionate valve: 315mA	Swing right and left sensor and boom raise sensor values: less than 1.3V.	—
					Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 5.5kgf/cm ² (78psi)	Unload pressure for P2 pump: approx. 20kgf/cm ² (280psi) or less	Secondary pressure for swing right/left and boom raise: 6kgf/cm ² (85psi)

Note : The below table shows items to be highlighted in the electrical and hydraulic troubleshooting.
 "Normal criterion" is a list of figures which come up in the electrical and hydraulic troubleshooting. Regarding the inspecting procedures, refer to each troubleshooting.

No.	Trouble	Operating condition	Electric or hydraulic cause		Hydraulic or electric	Normal criterion		
			Cause	Check point		1	2	3
4-3	Fine swing right and left operations impossible.	Swing left or right lever to full stroke	Swing parking solenoid is not deenergized	Swing parking solenoid (SV-1) connector	Electric	Command voltage for swing parking solenoid:0V	Swing right/left sensor values:more than 4.0V	—
					Hydraulic	Secondary pilot pressure for swing parking solenoid :35kgf/cm ² (500psi)	—	Secondary pilot pressure for swing right/left:35kgf/cm ² (500psi)
4-4	Fine arm in and out motions impossible.	Fine arm in or out operation	P2 bypass cut proportionate valve moves freely and the P2 circuit pressure rises.	Connector of P2 bypass cut proportionate valve (PSV-B)	Electric	Command current for P2 bypass cut proportionate valve:315mA	Swing right/left sensor and boom raise sensor values:less than 1.3V	—
					Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 5.5kgf/cm ² (78psi)	Secondary pressure for swing right, left and boom raise action: 6kgf/cm ² (85psi)	Unload pressure for P2 pump:approx. 20kgf/cm ² (280psi)
5	Travel 1-2 speed change impossible.	Travel 1-2 speed select switch is on.	Travel 1-2 speed solenoid (SV-3) does not change over.	Connector for travel 1-2 speed solenoid	Electric	24V across power supply for travel 1-2 speed solenoid and earth.	100th is indicated as 1 in controller service diagnosis 23.	—
					Hydraulic	—	—	Secondary pilot pressure for command travel 1-2 speed select: 35kgf/cm ² (500psi)
6	Travel speed is low. (single operation)	Travel lever at full stroke. (Other levers in neutral)	Travel straight valve moves freely and the machine travels only by the delivery rate of P1 pump.	Command current of travel straight proportionate valve (PSV-C)	Electric	Command current of travel straight proportionate valve: 315mA	8 sensor values for bucket, boom, swing and arm:less than 1.3V	—
					Hydraulic	Secondary pilot pressure of P0 port travel straight valve:5.5kgf/cm ² (78psi)	8 sensor values for bucket, boom, swing and arm:6kgf/cm ² (85psi)	Secondary pilot pressure for travel: 21kgf/cm ² (310psi)
8	Machine can not travel straight.	Levers at full stroke in composite swing/ travel or arm/travel actions.	Travel straight valve does not change over and the travel action is affected by the delivery rate of P1 pump.	Command current of travel straight proportionate valve (PSV-C)	Electric	Command current for travel straight proportionate valve: 315mA	—	Swing right/left sensor and arm in/out sensor: more than 4.0V
					Hydraulic	Secondary pilot pressure for P0 port travel straight valve:26kgf/cm ² (370psi)	—	Secondary pilot pressure for swing right/left and arm in/out:35kgf/cm ² (500psi)
		Levers at full stroke in composite operations of boom/ travel or bucket/ travel.	Travel straight valve does not change over and the travel action is affected by the delivery rate of P1 pump.	Command current of travel straight proportionate valve (PSV-C)	Electric	Command current for travel straight proportionate valve: 315mA	—	Boom raise lower sensor and bucket close open sensor:more than 1.0V
					Hydraulic	Secondary pilot pressure for P0 port travel straight valve:26kgf/cm ² (370psi)	—	Secondary pilot pressure for boom raise lower and bucket close open: 35kgf/cm ² (500psi)
10	Swing power is not available.	Swing lever at full stroke	Swing parking solenoid does not demagnetize.	Connector for swing parking solenoid (SV-1)	Electric	0V across power supply of swing parking solenoid and ground.	—	Swing right/left sensor:more than 4.0V
					Hydraulic	Secondary pilot pressure for swing parking solenoid :35kgf/cm ² (500psi)	—	Secondary pilot pressure for swing right/left:35kgf/cm ² (500psi)
11	Swing speed is low.	Swing lever at full stroke	P2 bypass cut proportionate valve does not change over and part of the delivery of P2 pump flows to tank.	Feedback current of P2 bypass cut proportionate valve (PSV-B)	Electric	Feedback current for P2 bypass cut proportionate valve:700mA	Command current for P2 bypass cut proportionate valve:700mA	Swing right/left sensor :more than 1.0V
					Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 26kgf/cm ² (370psi)	—	Secondary pilot pressure for swing right/left:35kgf/cm ² (500psi)
12	Swing power is poor.	Swing lever at full stroke	P2 bypass cut proportionate valve does not change over and the P2 circuit pressure does not rise.	Feedback current of P2 bypass cut proportionate valve (PSV-B)	Electric	Command current for P2 bypass cut proportionate valve:700mA	Command current for P2 bypass cut proportionate valve:700mA	Swing right/left sensor :more than 1.0V
					Hydraulic	Secondary pilot pressure for P2 bypass cut valve: 26kgf/cm ² (370psi)	—	Secondary pilot pressure for swing right/left:35kgf/cm ² (500psi)
13	Swing motion can not be held on a slope.	Swing lever at neutral.	Swing parking brake is released.	Connector for Swing parking solenoid	Electric	24V across power supply of swing parking solenoid and ground.	Swing right/left sensor and arm in sensor values :more than 1.3V	—
					Hydraulic	Secondary pilot pressure of swing parking solenoid: 35kgf/cm ² (500psi)	Secondary pressure for swing right/left and arm in:6kgf/cm ² (85psi)	—

SK115SR • SK115SRDZ • SK135SR(LC)

● TROUBLESHOOT SUMMARY <MECHATRO SYSTEM>

Operation	Lever position	Pilot secondary pressure		Pressure sensor		Pump proportional valve		Proportional valve
		ATT	Travel	High pressure (Pump)	Low pressure (Pilot)	P1	P2	
ATT Bucket digging Bucket dump Boom up Boom down Swing LH Swing RH Arm digging Arm dump	Full lever operation	MAX About 35 kgf/cm ² (498 psi) or over	MAX About 24 kgf/cm ² (341 psi) or over	2.9V or over	3.7V or over	MAX 730 mA	MAX 730 mA	Arm variable recirculation proportional valve At neutral ; 670 mA MIN ; 321 mA P2 bypass cut proportional valve At neutral ; About 349 mA MAX ; 667 mA
Travel Forward Reverse straight	Lever neutral	MAX About 6.0 kgf/cm ² (85 psi) less than	MAX About 6.0 kgf/cm ² (85 psi) less than	0.5V less than	0.5V less than	Neutral (At Hi idle) 350 mA	Neutral (At Hi idle) 350 mA	Travel straight proportional valve At neutral ; About 349 mA MAX ; 707 mA P1 bypass cut proportional valve At neutral ; About 349 mA MAX ; 667 mA

SK70SR

16-2 ● SERVICE DIAGNOSTICS

1. Remove grommet on the left lower part of mechatro controller, and you can find hardware check switches A, B.
2. To execute service diagnostics, insert precision screwdriver (—) in the concave part indicated by arrow at the center of hardware check switches A, B, and turn switches A, B, and the following items for each service diagnostics are indicated on the service diagnostic display.
3. Display the items for service diagnostics, and when troubles are displayed, check each equipment and harness for possible failures.

Note : Since hardware check switches A, B of machines for shipment are set to "00", service diagnostics is not displayed, but the error code for trouble diagnostics is.

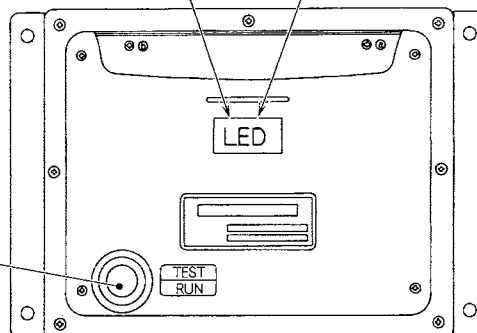
Remove grommet,
you can find switches.

Hardware check SW "A"

Internal adjustment
JP SW

Hardware check SW "B"

Service diagnostics display Error code display



Hardware check SW
(The left shows the condition where it is set to "00".)
Turn the part indicated by arrow at the center of switch, and set the value.
Insert precision screwdriver (—) into the concave part indicated by arrow, and turn it.

Hardware check SW		Service diagnostics items	Display	Normal value
A	B			
0	0	Normal (without service diagnostics)	Trouble diagnostics (error code)	—
0	1	Engine speed set value	3 figures display per 10 rpm. "225" for 2250rpm.	102 ~ 225
0	2	Engine speed actual value	3 figures display per 10 rpm. "225" for 2250rpm.	102 ~ 225
0	3	Key switch input/battery relay output	Key switch in column 10 (ON → "1"/OFF → "0"). Battery relay in column 1 (ON → "0"/OFF → "1")	—
0	4	Mode SW input signal/auto accel SW input signal	Mode SW in column 10 (H, S, FC) Option SW in column 1 (ON → "0"/OFF → "1")	—
0	5	Wiper SW/Washer SW/Working light SW	Wiper SW in column 100 (Push → "1"/release → "0"). Washer SW in column 10 (Push → "1"/release → "0"). Working light SW in column 1 (Push → "1"/release → "0")	—
0	6	Accel potentiometer voltage	Indicates 1 integer and 2 decimals. "234" for 2.34V.	004 ~ 460
0	7	Accel potentiometer position	Indicates governor motor position converted by accel potentiometer voltage in percentage.	0 ~ 100
0	8	Governor motor step number	Indicates present governor motor step number in 3 integral number. "256"	0 ~ 630
0	9	Governor motor position	Indicates position the present step number is located between low idling "0.00" and high idling "1.00" in percentage.	0 ~ 100
1	0	Governor motor A phase current	Outputs current of motor coil A. (Ampere converted value) "150" for 1.5A.	150
1	1	Governor motor B phase current	Outputs current of motor coil B. (Ampere converted value) "150" for 1.5A.	150
1	2	Governor motor limit SW	Governor motor limit SW in column 1 (ON → "1"/OFF → "0")	—
1	3	Boom raise pressure sensor	Value converted the input (A/D value) received from each pressure sensor to voltage Indicates 1 integer and 2 decimal number. "324" for 3.24V.	004 ~ 500
1	4	Boom lower pressure sensor		
1	5	Arm out pressure sensor		
1	6	Arm in pressure sensor		
1	7	Bucket digging pressure sensor		
1	8	Bucket dump pressure sensor		
1	9	Swing right pressure sensor		
2	0	Swing left pressure sensor		
2	1	Travel right pressure sensor	Travel 1.2 speed SW in column 100 (Push → "1"/release → "0"). Output command in column 10 (ON → "1"/OFF → "0"). Feed back in column 1 (ON → "1"/OFF → "0")	280 ~ 760
2	2	Travel left pressure sensor		
2	3	Travel 1.2 speed SW/selector valve output command/feed back		
2	4	Swing parking selector valve output command/feed back		
2	5	Battery relay output command/feed back		
2	6	P1 by-pass cut valve command current		
2	7	P1 by-pass cut valve feed back current		
2	8	P2 by-pass cut valve command current		
2	9	P2 by-pass cut valve feed back current		
3	0	Travel straight proportional valve command current	Value converted each proportional valve command value to current value (mA). "600"	280 ~ 760
3	1	Travel straight proportional valve feed back current	Feed back current value of each proportional valve. "600"	
3	2	Wiper motor rise up LS/reverse LS	Wiper motor rise up LS in column 10 (ON → "1"/OFF → "0"). Wiper motor reverse rotation in column 1 LS (ON → "1"/OFF → "0")	
3	3	Wiper motor arc protective relay/positive rotation relay/reverse rotation relay command	Wiper motor arc protective relay command in column 100 (ON → "1"/OFF → "0"). Positive relay command in column 10 (ON → "1"/OFF → "0"). Reverse rotation relay command in column 1 (ON → "1"/OFF → "0")	
3	4	Washer motor relay/working light relay/CPU error lamp command	Washer motor relay command in column 100 (ON → "1"/OFF → "0"). Working light relay command in column 10 (ON → "1"/OFF → "0"). CPU error lamp command in column 1 (ON → "1"/OFF → "0")	
3	5	Wiper operation command/power window operation input	Wiper operation command in column 10 (ON → "1"/OFF → "0"). Power window operation input command in column 1 (ON → "1"/OFF → "0")	
3	6	Internal adjustment JP SW	Controller internal adjustment JP SW (TEST → "1"/RUN → "0")	

SK115SR SK115SRDZ

SK135SR(LC)

SK115SR • SK115SRDZ • SK135SR (LC)

● SERVICE DIAGNOSIS

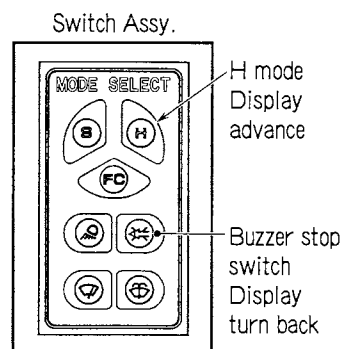
The result of the service diagnosis at the present time is displayed in 22 categories depending on the data output by the mechatro controller.

How to display

- Turn the starter key switch on, keeping the buzzer stop switch depressed, and place the attachment to the travel position while operating in the low idling condition after the engine starts.
- The mechatro controller P/NO and the Program version in the 1st item are displayed.

SK115SR	
No. 1	
MAIN CONT. P/NO.	
YV22E00001F5	
PROGRAM VERSION	
VER 6.00	

SK115SRDZ•SK135SR (LC)	
No. 1	
MAIN CONT. P/NO.	
YY22E00001F5	
PROGRAM VERSION	
VER 5.02	



- By pressing "H" mode of the work mode switch, goes to No.2, No.3 in order.
- By pressing the buzzer stop switch, returns from No.40, No.39 in order.
- Turn the starter switch off, and the display also goes off.

Service diagnosis display

No.	DISPLAY	REMARKS	No.	DISPLAY	REMARKS
1	No. 1 (Screen No.) MAIN CONT. P/No. YV22E00001F5 YY22E00001F5 PROGRAM VERSION VER 6.00 5.02	P/No. indication (Upper SK115SR) (Lower SK135SR) Version indication	5	No. 5 SOL. VALVE F-2 SWING-BRAKE COMP. ON MEAS. ON RELEASE SW. OFF	ON/OFF indication ON/OFF indication ON/OFF indication
2	No. 2 E/G SET 935 904 MEAS 1000 1005 E/G PRS. LIVE KPSS SW H	(Upper SK115SR) (Lower SK135SR) No load set rpm Actual rpm LIVE/DEAD indication H/S/FC indication	6	No. 6 SOL. VALVE F-3 1/2-SPEED TRAVEL COMP. OFF MEAS. OFF SWITCH OFF	ON/OFF indication ON/OFF indication ON/OFF indication
3	No. 3 H-1 ACCEL VOLT. 0.3V POS. 0% MOTOR STEP 253 POS. 0%	Potential voltage Voltage position No of motor steps Step position	8	No. 8 RELAY I-2 BAT. RELAY COMP. ON MEAS. ON KEY SWITCH ON	ON/OFF indication ON/OFF indication ON/OFF indication
4	No. 4 STEP. MOTOR G-1 COIL A 1.0A G-1 COIL B 1.0A G-2 LIMIT OFF	A phase current B phase current ON/OFF indication	9	No. 9 PRESS. SENSOR B-1 BOOM RAISE 0.5V 0K B-2 BOOM LOWER 0.5V 0K	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value

No.	DISPLAY	REMARKS	No.	DISPLAY	REMARKS
10	No. 10 PRESS. SENSOR B-3 ARM OUT <u>0.5V</u> <u>0K</u> B-4 ARM IN <u>0.5V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	21	No. 21 PROPO-VALVE D-2 P2 BY-PASS COMP. <u>349mA</u> <u>6K</u> MEAS. <u>341mA</u> <u>5K</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value
11	No. 11 PRESS. SENSOR B-5 BUCKET DIG <u>0.5V</u> <u>0K</u> B-6 BUCKET DUMP <u>0.5V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	22	No. 22 PROPO-VALVE D-3 S TRAVEL COMP. <u>349mA</u> <u>6K</u> MEAS. <u>341mA</u> <u>5K</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value
12	No. 12 PRESS. SENSOR B-7 SWING (R) <u>0.5V</u> <u>0K</u> B-8 SWING (L) <u>0.5V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	23	No. 23 PROPO-VALVE D-6 A-RECIRCULAT COMP. <u>670mA</u> <u>25K</u> MEAS. <u>668mA</u> <u>25K</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value
13	No. 13 PRESS. SENSOR B-9 TRAVEL (R) <u>0.5V</u> <u>0K</u> B-10 TRAVEL (L) <u>0.5V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	24	No. 24 PROPO-VALVE E-1 P1 PUMP COMP. <u>438mA</u> <u>11K</u> MEAS. <u>429mA</u> <u>11K</u> POWER SHIFT <u>0mA</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value
14	No. 14 PRESS. SENSOR C-1 PUMP P1 <u>0.5V</u> <u>6K</u> C-2 PUMP P2 <u>0.5V</u> <u>6K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	25	No. 25 PROPO-VALVE E-2 P2 PUMP COMP. <u>438mA</u> <u>11K</u> MEAS. <u>429mA</u> <u>11K</u> POWER SHIFT <u>0mA</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value
15	No. 15 PRESS. SENSOR B-16 P1 OPT. <u>0V</u> <u>0K</u> B-17 P2 OPT. <u>0V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value	39	No. 39 MECHATRO ADJT. CONT. SW <u>RUN</u> CONT. VOL <u>50 %</u> PROG. SW <u>OFF</u>	RUN/TEST indication Inner trimmer ON/OFF indication
20	No. 20 PROPO-VALVE D-1 P1 BY-PASS COMP. <u>349mA</u> <u>6K</u> MEAS. <u>341mA</u> <u>5K</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value	40	No. 40 RELEASE SW KPSS <u>OFF</u> SWING BRAKE <u>OFF</u>	ON/OFF indication ON/OFF indication

SK235SR**● SERVICE DIAGNOSIS**

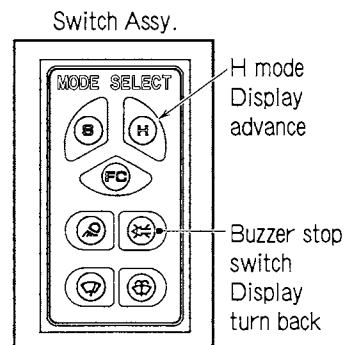
The result of the service diagnosis at the present time is displayed in 13 categories depending on the data output by the mechatro controller.

How to display

- ① Turn the starter key switch on, keeping the buzzer stop switch depressed, and place the attachment to the travel position while operating in the low idling condition after the engine starts.
- ② The mechatro controller P/NO and the Program version in the 1st item are displayed.

No. 1
MAIN CONT. P/NO.
YN22E00040F3
PROGRAM VERSION
VER 2.00

- ③ By pressing “H” mode of the work mode switch, goes to No.2, No.3 in order.
- ④ By pressing the buzzer stop switch, returns from No.13, No.12 in order.
- ⑤ Turn the starter switch off, and the display also goes off.

**Service diagnosis display**

No.	DISPLAY	REMARKS	No.	DISPLAY	REMARKS
1	No. 1 (Screen No.) MAIN CONT. P/No. YN22E00040F3 PROGRAM VERSION VER 2.00	P/No. indication Version indication	5	No. 6 SOL. VALVE F-3 1/2-SPEED TRAVEL COMP. OFF MEAS. OFF SWITCH OFF	ON/OFF indication ON/OFF indication ON/OFF indication
2	No. 2 E/G SET 950 MEAS 970 E/G PRS. LIVE KPSS SW H	No load set rpm Actual rpm LIVE/DEAD indication H/S/FC indication	6	No. 7 SOL. VALVE F-1 POWER BOOST COMP. OFF MEAS. OFF SWITCH OFF	ON/OFF indication ON/OFF indication ON/OFF indication
3	No. 3 H-1 ACCEL VOLT. 0.3V POS. 0% MOTOR STEP 253 POS. 0%	Potential voltage Voltage position No of motor steps Step position	7	No. 8 RELAY I-2 BAT. RELAY COMP. ON MEAS. ON KEY SWITCH ON	ON/OFF indication ON/OFF indication ON/OFF indication
4	No. 4 STEP. MOTOR G-1 COIL A 1.0A G-1 COIL B 1.0A G-2 LIMIT OFF	A phase current B phase current ON/OFF indication	※1 8	No. 21 PROPO-VALVE D-2 P2 BY-PASS COMP. 350mA 6K MEAS. 346mA 6K	Command current/ Pressure converted value Feedback current/ Pressure converted value

Note : ※ 1 . The P2 BY-PASS PROPO-VALV is displayed on the screen No. 21 of multidisplay, but in fact it indicates the slewing speed adjustment proportional valve.

No.	DISPLAY	REMARKS	No.	DISPLAY	REMARKS
9	No. 23 PROPO-VALVE D-6 A-RECIRCULAT COMP. <u>700mA</u> <u>27K</u> MEAS. <u>687mA</u> <u>26K</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value	12	No. 40 RELEASE SW KPSS <u>OFF</u> SWING BRAKE <u>OFF</u>	ON/OFF indication ON/OFF indication
※2 10	No. 24 PROPO-VALVE E-1 P1 PUMP COMP. <u>620mA</u> <u>22K</u> MEAS. <u>619mA</u> <u>22K</u> POWER SHIFT <u>249mA</u>	Command current/ Pressure converted value Feedback current/ Pressure converted value	13	No. 41 PRESS. SENSOR B-18 TRAVEL <u>0.5V</u> <u>0K</u> B-19 ATT <u>0.5V</u> <u>0K</u>	Sensor voltage/ Pressure converted value Sensor voltage/ Pressure converted value
11	No. 39 MECHATRO ADJT. CONT. SW <u>RUN</u> CONT. VOL <u>50 %</u> PROG. SW <u>OFF</u>	RUN/TEST indication inner trimmer ON/OFF indication			

Note : ※2. The PUMP P1
PROPO-VALV is displayed on the screen No. 24 of multidisplay, but in fact it indicates the pump proportional valve.

SK70SR**16-3 ● ERROR DIAGNOSTICS**

1. When error occurs on the following equipment and harness, error code is indicated on error code display of mechatro controller. CPU lamp on gauge cluster flickers, and buzzer sounds intermittently.
2. When error code is displayed, check each equipment and harness for possible failures.

Note : Since the machines for shipment are set hardware check SW A, B to "00", when trouble is detected, error code is displayed in error code display.

And, if CPU lamp on gauge cluster flickers, and buzzer sounds continuously, it means that the mechatro controller is in error.

Trouble shooting

Error code	Error diagnostic items	Corrective action
E 0 1	EEPROM data error	Adjust engine speed, or replace mechatro controller.
E 0 2	Maladjustment of mechatro controller	
E 0 3	Boom raise pressure sensor error	Replace sensor, or check harness between sensor and controller for possible damage.
E 0 4	Boom lower pressure sensor error	
E 0 5	Arm in pressure sensor error	
E 0 6	Arm out pressure sensor error	
E 0 7	Bucket digging pressure sensor error	
E 0 8	Bucket dump pressure sensor error	
E 0 9	Swing right pressure sensor error	
E 1 0	Swing left pressure sensor error	
E 1 1	Travel right pressure sensor error	
E 1 2	Travel left pressure sensor error	
E 1 3	Accel potentiometer error	Replace solenoid valve, or check harness between solenoid valve and controller for possible damage.
E 1 4	Travel 1,2 speed selector valve coil error	
E 1 5	Swing parking selector valve coil error	Replace battery relay, or check harness between battery relay and controller for possible damage.
E 1 6	Battery relay error	
E 1 7	P1 by-pass cut valve coil error	Replace proportional valve, or check harness between proportional valve and controller for possible damage.
E 1 8	P2 by-pass cut valve coil error	
E 1 9	Travel straight proportional valve coil error	Replace governor motor, or check harness between governor motor and controller for possible damage.
E 2 0	Governor motor current error	
E 2 1	Governor motor start point error	Replace engine oil pressure switch, or check harness between engine oil pressure switch and controller for possible damage.
E 2 2	Engine inverse rotation	

● TROUBLE HISTORY DIAGNOSIS

The error item detected by the self-diagnosis is stored in the mechatro controller as a history and is displayed on the multidisplay.

1. How to display

- ① Turn the starter switch 「ON」.
- ② Press the buzzer stop switch 5 times in sequence for 10 seconds.

(Example)

No errors	NO ERROR [SK115SR • SK135SR (LC) SK115SRDZ]	NO ERROR [SK235SR]
Error detected in the past	0 0 0 2 5 H B-1 BOOM RAISE D-1 P1 BY-PASS F-3 TWO SPEED	0 0 0 2 5 H B-18 TRAVEL SENSOR D-2 P2 BY-PASS PROPO-VALV F-3 TWO SPEED SOLENOID

Note :

Display D-2 is indicated  but it means actually swing speed adjust propo. valve failure.

- ③ Transmits the error data (one or many) and hour meter to the gauge cluster.
 - Hour meter and 3 error data are displayed on the screen.
 - If three error data or more exist, display the data three by three in order for every 5 seconds.
- ④ To scroll the page, use the work mode “H” and the buzzer stop switch.
 - Press the work mode “H” switch, page up.
 - Press the buzzer stop switch, page down.

Note : All the error items are stored by hourmeter, when the hourmeter is differed, press the work mode “H” and the buzzer stop switch, and displays all items and make sure that they are right.

- ⑤ Turn the starter switch 「OFF」, and the display is disappeared.

2. How to cancel the contents of the trouble history

- ① Display the trouble history mode.
- ② Press the work mode “H” switch and the buzzer stop switch for 10 seconds or more concurrently.
- ③ When the deletion is completed, the “NO ERROR” is displayed.
- ④ Turn the starter switch 「OFF」.

Note : All the stored items are erased. It is impossible to erase data partially.

16-4 • CONTENTS OF THE TROUBLE HISTORY
(SK115SR • SK115SRdz • SK135SR (LC))

Symbol	Display		Symbol	Display	
A	Controller relation	A-1 ROM DATA FAILURE A-2 MECHATRO SET ERROR	E	Proportional valve (Hydraulic pump)	E-1 PUMP P1 PROPO-VALV E-2 PUMP P2 PROPO-VALV
B	Low pressure sensor	B-1 BOOM RAISE SENSOR B-2 BOOM LOWER SENSOR B-3 ARM OUT SENSOR B-4 ARM IN SENSOR B-5 BUCKET DIG SENSOR B-6 BUCKET DUMP SENSOR B-7 SWING (R) SENSOR B-8 SWING (L) SENSOR B-9 TRAVEL (R) SENSOR B-10 TRAVEL (L) SENSOR	F	Solenoid valve	F-2 SWINGBRAKE SOLENOID F-3 TWO-SPEED SOLENOID
			G	E/G Accessory	G-1 STEP MOTOR CURRENT-NG G-2 STEP MOTOR S/PT.ERROR G-3 E/G REV. SENSOR
			H	Potential relation	H-1 ACCELERATR POTENTIO
			I		I-1 BAT. RELAY I-2 RECEIVE ERROR
					MONITOR SYSTEM OK
C	High pressure sensor (Hydraulic pump)	C-1 PUMP P1 SENSOR C-2 PUMP P2 SENSOR			
D	Proportional valve (Control valve)	D-1 P1 BY-PASS PROPO-VALV D-2 P2 BY-PASS PROPO-VALV D-3 TRAVEL PROPO-VALV D-6 RECIRCULAT PROPO-VALV			

(SK235SR)

Symbol	Display	
A	Controller relation	A-1 ROM DATA FAILURE A-2 MECHATRO SET ERROR
B	Low pressure sensor	B-18 TRAVEL SENSOR B-19 ATTACHMENT SENSOR
D	Proportional valve (Control valve)	D-2 P2 BY-PASS PROPO-VALV D-6 RECIRCULAT PROPO-VALV
E	Proportional valve (Hydraulic pump)	E-1 PUMP P1 PROPO-VALV
F	Solenoid valve	F-1 TWO-SPEED SOLENOID F-2 POWERBOOST SOLENOID
G	E/G Accessory	G-1 STEP MOTOR CURRENT-NG G-2 STEP MOTOR S/PT.ERROR G-3 E/G REV. SENSOR
H	Potential relation	H-1 ACCELERATR POTENTIO
I		I-1 BAT. RELAY I-2 RECEIVE ERROR
		MONITOR SYSTEM OK

Note :
Display D-2 is indicated P2 BY-PASS PROPO-VALV but it means actually swing speed adjust propo. valve failure.

16-5 • MULTI DISPLAY SELF DIAGNOSIS

The error of the control I/O signal of the pressure sensor and the proportional valve, etc. is detected, and the detected error item is displayed on the multidisplay of the gauge cluster.

Indication item

No.	Contents	Display of monitor	Connector No. - Pin No.	Wire No.	Wire color
1	ROM data	A-1 CPU ROM DATA FAILURE			
2	Mechatro set error	A-2 CPU MECHATRO SET ERROR			
10	Gauge cluster → Mechatro controller communication failure	I-1  RECEIVE ERROR	CN1 4-2 6	6 0 1	W
11	Hyd. press. release operation prepared	32  DRAINING HYD. PRESS	CN1 7-8	5 5 5	LB
12	Hyd. press. release failure	33  FAIL DRAIN HYD. PRESS			
15	Boom raise pressure sensor fail	B-1  BOOM RAISE SENSOR	CN11-2 CN11-1	5 0 2 9 5 2	LgY BR
16	Boom lower pressure sensor fail	B-2  BOOM LOWER SENSOR	CN11-5 CN11-6	5 0 3 9 5 3	LO BrW
17	Arm out pressure sensor fail	B-3  ARM OUT SENSOR	CN11-8 CN11-7	5 0 4 9 5 4	PG BrY
18	Arm in pressure sensor fail	B-4  ARM IN SENSOR	CN11-11 CN11-12	5 0 5 9 5 5	PL Gr
19	Bucket dig pressure sensor fail	B-5  BUCKET DIG SENSOR	CN11-14 CN11-13	5 0 0 9 5 0	LgR BrR
20	Bucket dump pressure sensor fail	B-6  BUCKET DUMP SENSOR	CN11-17 CN11-18	5 0 1 9 5 1	LgW BL
21	Swing (R.H) pressure sensor fail	B-7  SWING (R) SENSOR	CN11-20 CN11-19	5 0 6 9 5 6	V GrL
22	Swing (L.H) pressure sensor fail	B-8  SWING (L) SENSOR	CN11-23 CN11-24	5 0 7 9 5 7	VG Br
23	Travel (R.H) pressure sensor fail	B-9  TRAVEL (R) SENSOR	CN11-26 CN11-25	5 0 8 9 5 8	VY BY
24	Travel (L.H) pressure sensor fail	B-10  TRAVEL (L) SENSOR	CN11-29 CN11-30	5 0 9 9 5 9	Sb BG

No.	Contents	Display of monitor	Connector No. - Pin No.	Wire No.	Wire color
27	Pump P1 pressure sensor fail	C-1  PUMP P1 SENSOR	CN12-1 CN12-2 CN12-3	964 514 914	BrB VY YL
28	Pump P2 pressure sensor fail	C-2  PUMP P2 SENSOR	CN12-4 CN12-5 CN12-6	915 515 915	YR Sb BrL
29	P1 side option Press. sensor fail	B-16  OPT P1 SENSOR	CN12-7 CN12-8 CN12-9	962 512 912	BO LgR RB
30	P2 side option Press. sensor fail	B-17  OPT P2 SENSOR	CN12-10 CN12-11 CN12-12	913 513 963	YG VG Br
38	P1 By-pass cut propo-valve fail	D-1  P1 BY-PASS PROPO-VALV	CN15-4 CN15-5	755 756	BP PW
39	P2 By-pass cut propo-valve fail	D-2  P2 BY-PASS PROPO-VALV	CN15-6 CN15-7	751 752	BO GrR
40	Travel straight propo-valve fail	D-3  TRAVEL PROPO-VALV	CN15-8 CN15-9	753 754	BG BrB
41	Arm variable recirculation propo-valve fail	D-6  RECIRCURAT PROPO-VALV	CN15-10 CN15-11	757 758	BrG YV
42	Pump P1 propo-valve fail	E-1  PUMP P1 PROPO-VALV	CN15-17 CN15-18	760 759	VR GrG
43	Pump P2 propo-valve fail	E-2  PUMP P2 PROPO-VALV	CN15-19 CN15-20	764 763	VW GY
50	Travel two-speed solenoid valve fail	F-3  TWO-SPEED SOLENOID	CN15-21	702	LgB
51	Swing parking brake solenoid valve fail	F-2  SWING BRAKE SOLENOID	CN15-22	700	V
53	Governor motor current fail	G-1  STEP MOTOR CURRENT-NG	CN15-1 CN15-2 CN15-15 CN15-16	851 852 853 854	G B R W
54	Governor motor starting point indexing fail	G-2  STEP MOTOR S/PT. ERROR	CN11-34	560	V

No.	Contents	Display of monitor	Connector No. - Pin No.	Wire No.	Wire color
56	Accel potentio metor fail	H-1  ACCELERATR POTENTIO	CN11-33 CN11-32 CN11-31	930 530 970	WR P BW
59	Battery relay fail	I-2  BAT RELAY	CN15-24	857	WG
64	Engine speed sensor fail	G-3  E/G REV. SENSOR	CN12-20 CN12-21	534 535	B W

SK235SR**● MULTI DISPLAY SELF DIAGNOSIS**

The error of the control I/O signal of the pressure sensor and the proportional valve, etc. is detected, and the detected error item is displayed on the multidisplay of the gauge cluster.

Indication item

No.	Contents	Display of monitor	Connector No. - Pin No.	Wire No.	Wire color
1	ROM data	A-1 CPU ROM DATA FAILURE			
2	Mechatro set error	A-2 CPU MECHATRO SET ERROR			
10	Gauge cluster → Mechatro controller communication failure	I-1  RECEIVE ERROR	CN14-25 CN14-26	600 601	R W
13	Travel press. sensor	B-18  TRAVEL SENSOR	CN11-2 CN11-3	502 902	LgY W
14	Attachment press. sensor	B-19  ATTACHMENT SENSOR	CN11-4 CN11-5	903 503	OB LO
*39	P2 By-pass cut propo-valve fail	D-2  P2 BY-PASS PROPO-VALV	CN15-6 CN15-7	784 785	PG LgW
41	Arm variable recirculation propo-valve fail	D-6  RECIRCURAT PROPO-VALV	CN15-10 CN15-11	751 750	BrW O
42	Pump P1 propo-valve fail	E-1  PUMP P1 PROPO-VALV	CN15-17 CN15-18	760 759	VR GrG
50	Travel two-speed solenoid valve fail	F-3  TWO-SPEED SOLENOID	CN15-21	702	LgB
52	Attachment boost solenoid valve fail	F-1  POWERBOOST SOLENOID	CN15-23	703	YG
53	Governor motor current fail	G-1  STEP MOTOR CURRENT-NG	CN15-1 CN15-2 CN15-15 CN15-16	851 852 853 854	G B R W
54	Governor motor starting point indexing fail	G-2  STEP MOTOR S/PT. ERROR	CN11-34	560	V

Note :

Display No. 39 (marked ※) is indicated  but it means actually swing speed adjust propo. valve failure.

No.	Contents	Display of monitor	Connector No. – Pin No.	Wire No.	Wire color
56	Accel potentio meter fail	H-1  ACCELERATR POTENTIO	CN11-31 CN11-32 CN11-33	970 530 930	BW P WR
59	Battery relay fail	I-2  BAT. RELAY	CN15-24	657	WG
64	Engine revolution sensor fail	G-3  E/G REV. SENSOR	CN12-20 CN12-21	534 535	R W

SK115SR • **SK115SRdz** • **SK135SR (LC)**

16-6 • PRIORITY OF MULTIDISPLAY WARNING DISPLAY AND SELF DIAGNOSIS DISPLAY

Priority of the display (In case two inputs or more exist,)

- ① Only the message in higher priority according to the following priority order is displayed.
- ② When the priority order is the same, the display is changed for every 5 seconds.

Priority	Display contents		
1	Service diagnosis		
2	²  SWINGBRAKE DISENGAGED	³  KPSS DISENGAGED	
3	⁴  E/G PREHEAT	⁵  FINISH PREHEAT	
4	FAILURE HISTORY	MECHATRO ADJUSTMENT	HIGH REACH ADJUSTMENT (OPT)
	³³  FAIL DRAIN HYD. PRESS		
5	⁶  LOW E/G OIL PRESS	⁷  HIGH E/G COOL TEMP	⁹  REST'D AIR CLEANER
6	Initial check [Turn the multidisplay on (black screen), and check that there is no error.]		
7	³²  DRAINING HYD. PRESS	²⁶  100% LOAD HIGH REACH CRANE (OPT)	¹¹  CHARGING PROBLEM
	¹²  LOW FUEL LEVEL		
8	²⁹  CHANGE E/G OIL		

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● PRIORITY OF MULTIDISPLAY WARNING DISPLAY AND SELF DIAGNOSIS DISPLAY

Priority of the display (In case two inputs or more exist,)

- ① Only the message in higher priority according to the following priority order is displayed.
- ② When the priority order is the same, the display is changed for every 5 seconds.

Priority	Display contents		
1	Service diagnosis		
2	3  KPSS DISENGAGED		
3	4  E/G PREHEAT	5  FINISH PREHEAT	
4	FAILURE HISTORY	MECHATRO ADJUSTMENT	HIGH REACH ADJUSTMENT (OPT)
5	6  LOW E/G OIL PRESS	7  HIGH E/G COOL TEMP	8  REST'D E/G OIL FILTER
	9  REST'D AIR CLEANER		
6	Initial check [Turn the multidisplay on (black screen), and check that there is no error.]		
7	11  CHARGING PROBLEM	12  LOW FUEL LEVEL	13  CHARGING PROBLEM
	14  CHARGING PROBLEM	15  LOW FUEL LEVEL	18  CHARGING PROBLEM
	26 LOAD 100% LOAD HIGH REACH CRANE (OPT)		
8	29  CHANGE E/G OIL		

SK115SR • SK115SRdz • SK135SR(LC) • SK235SR

16-7 • HOW TO CORRECT THE E/G OIL SUPPLY CUMULATIVE TIME

Procedure	Operating procedure	Display on multidisplay
A	Turn the starter switch [ON].	(Normal) MONITOR SYSTEM OK is displayed.
B	Press the gauge cluster screen change switch once, and the E/G speed (rpm) is displayed.	MONITOR SYSTEM OK → Press once → E/G speed is displayed
C	Press once more, and the engine oil supply cumulative time screen is displayed.	E/G speed is displayed → Press once more → 100Hr AFT E/G OIL CH
D	Press the screen change switch for 5 to 10 seconds and release the hand, it returns to the correction mode. Note) The hourmeter does not flicker.	100Hr AFT E/G OIL CH → MONITOR SYSTEM OK → 100Hr AFT E/G OIL CH
E	Press the work mode selector switch "H", and the cumulative time increases. (once 1Hr)	100Hr AFT E/G OIL CH → Cumulative time increases → 100Hr AFT E/G OIL CH
F	Press the buzzer stop switch, the cumulative time decreases. (once 1Hr)	100Hr AFT E/G OIL CH → The cumulative time decreases → 99Hr AFT E/G OIL CH
G	Press the gauge cluster screen change switch once the correcting time is stored, and exits from the correction mode and OK symbol is displayed to complete the correction.	99Hr AFT E/G OIL CH → Complete the correction → (Normal) MONITOR SYSTEM OK

- Note :** 1. Press the screen change switch once after the procedure D, and the condition is stored and the correction is completed.
2. Even reaching procedure D, the hourmeter does not flicker, and even reaching procedure G, it still does not go on.

SK70SR

16-8 • ADJUSTMENT OF MECHATRO CONTROLLER

(1) When adjustment of mechatro controller is required

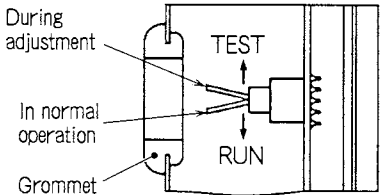
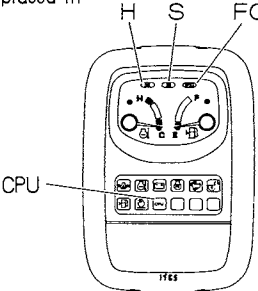
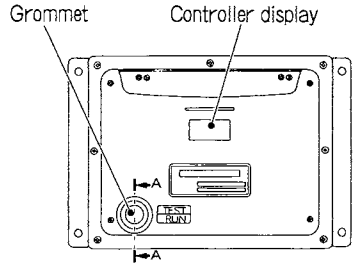
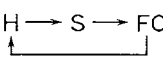
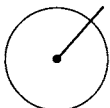
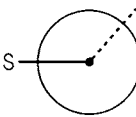
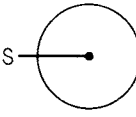
- ① When mechatro controller is replaced
- ② When governor motor is replaced
- ③ When link between governor and governor lever is loosened

(2) Preparation

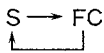
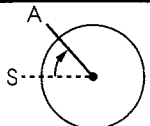
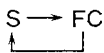
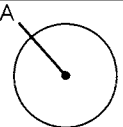
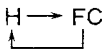
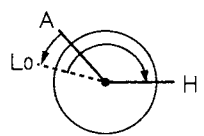
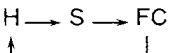
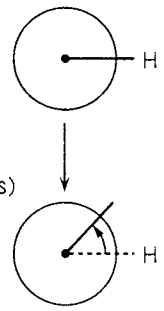
- ① Warm up engine.
- ② Turn air-con switch **OFF**.
- ③ Turn starter switch **OFF** and stop engine.
- ④ Pull operator seat forward fully and incline seat back forward.
- ⑤ Remove resin cover on the rear side, then mechatro controller appears..
(Remove 5 attaching screws from resin cover with driver ⊕).

Note : Check to be sure the engine emergency stop lever knob is fully pressed down. If mechatro controller is adjusted in the condition where the knob is pulled out, the engine speed can not be set rightly.

(3) Adjustment

Procedure	Gauge cluster work mode display	Function of governor motor
① Remove grommet on upper surface of mechatro controller, and switch internal adjustment JP switch placed in controller from RUN to TEST side.  During adjustment In normal operation Grommet Section AA (Internal adjustment JP switch)	 CPU	 Grommet Controller display
② Turn starter switch ON .	 Indication lamp lights on in order.	 Stop at the position set by accel dial.
③ Keep pressing buzzer stop switch for approx. 5 ~ 10 seconds and release. Check that mode display on cluster gauge is as in the given figure on the right. CPU flicker - Refer to the contents described in Notes.		 Self-travel to engine stop (S) position.
④ After verification of this mode display, adjust the length of rod so that the clearance "A" between governor motor and engine stop set bolt installed in engine room is 0.1mm. And, when governor motor is replaced, insert link rod after display of the following mode. Basic length of rod 204mm		 Stop of S position [Tools] • Spanner 13mm × 2 • Spanner 6mm • Thickness gauge

Note : During the procedure(3), when new mechatro controller is installed, CPU flickers. But this is not an error.

Procedure	Gauge cluster work mode display	Function of governor motor
⑤ Turn buzzer stop switch once, and wait until the mode is switched to the right figure.		 Automatically travel to position (A) available to start engine.
⑥ After verification of the right figure mode, start engine. Then, any position of accel dial is allowable.		 Stop at A position.
⑦ Turn buzzer switch on, and the mode is switched to the right figure, and controller lowers from A position of governor motor to low idling position and starts reading the engine speed to high idling automatically. Note : Governor motor is set to the position of approx. 1700 ~ 1900rpm. According to the command of mechatro controller, the lever lowers to low idling position after engine starts, then starts self-travelling.		 Lowers from A position to Lo position, and self-travels from Lo position to high idling (H) position.
⑧ After completion of read-out, wait until the mode display on gauge cluster switches to the right figure. After the display switches, the engine speed is returned automatically to the position set through accel dial. At this time, if CPU lamp goes out, the adjustment is completed, but if it is flickering, the adjustment has failed. So Try again to adjust it.		 (Approx. 5 seconds)

Note : When hardware check switch indicates "00", the mechatro controller displays error code.

(4) After completion of adjustment

- ① Turn starter switch **OFF** to stop engine.
- ② Switch internal adjustment JP switch from **TEST** to **RUN** position, and set hardware check switch B to 2.
- ③ Change service connector used to release auto accel, and after starting engine the speed rises to the high idling position, then check the engine speed at the time of H,S, and FC positions indicated on the display of mechatro controller.
- ④ By switching work mode through switch panel, the mode display on gauge cluster is also switched. Then, check that the engine speed changes.
- ⑤ Set accel dial to low idling position, and replace service connector after engine stops. And starts engine after switching to auto accel.
- ⑥ Set accel dial to high idling position, and check engine speed when running in auto accel condition.
- ⑦ After verification of engine speed, set hardware check switch B on mechatro controller to "0", and attach grommet.
- ⑧ Attach resin cover as it was, and slide operator seat backward to move the seatback backward.
Then, check connection of speaker for disconnection.

(5) When adjustment of mechatro controller can not be performed

1. After execution of procedure ⑦, **H→S→FC** is displayed, CPU lamp flickers, and adjustment cannot be executed.
(“E01” is indicated on controller display.)
 - Ⓐ (Display condition)
 - While reading engine speed, the engine speed after stepping of governor motor is lower than that before stepping in the condition of engine speed 850rpm or higher.
 - (Cause)
 - The read-out of engine speed sensor is wrong.
 - (Corrective action)
 - After measurement and adjustment of speed sensor voltage, carry out A adjustment.
High idling 3V or high (AC)(Voltage available for controller to read)
[When adjusting in factory, the voltage is set to 4V (AC) or high at high idling.]
 - Ⓑ (Display condition)
 - When abnormal rotation (step-out) occurs on high idling side.
 - (Cause)
 - Wrong connection of link rod of governor motor
 - (Corrective action)
 - After verification of link rod, perform A adjustment (Link rod length: 204mm)
 - ※ **When step-out occurs after adjustment, press buzzer stop switch once before stepping out as a temporary repair, and it is switched to high idling temporarily.**
2. The error code “E02” is indicated on the display of mechatro controller, and the adjustment cannot be executed.
 - (Display condition)
 - Engine speed is 300rpm or lower, or 3000rpm or higher.
 - (Cause)
 - The read-out of engine speed sensor is wrong.
 - (Corrective action)
 - After measurement and adjustment of speed sensor voltage, carry out A adjustment.
High idling 3V or high (AC)
3. When buzzer stop switch is pressed once to proceed from procedure ⑥ to ⑦, it does not proceed to procedure ⑦, but procedure ⑧ directly, and CPU lamp flickers and error code “E01” is indicated on the display on mechatro controller.
 - (Display condition)
 - Engine speed is 420rpm or low.
 - (Cause)
 - Buzzer stop switch is pressed before starting engine.
 - The read-out of engine speed sensor is wrong. (or disconnection)
 - (Corrective action)
 - Adjust mechatro controller again as the procedure.
 - After measurement and adjustment of speed sensor voltage, perform A adjustment.
High idling 3V or high (AC)
4. When buzzer stop switch is pressed once to proceed from procedure ④ to ⑤, but it does not proceed to procedure ⑤.
 - (Display condition)
 - Limit switch signal (grounding) is not input from governor motor to controller.
 - (Cause)
 - Failure of limit switch in governor motor
 - Disconnection of connection on governor motor
 - (Corrective action)
 - Check that limit switch of governor motor is switched ON and OFF.
 - Check connector and harness for possible damage, and adjust it.
5. Others
Error code “E02” is indicated on the display of controller, and engine stops.
Engine oil pressure switch and harness are short-circuited.

(6) CPU lamp on gauge cluster flickers, and error code “E01” is indicated on display of controller.

When mechatro controller is replaced, and the adjustment of controller has failed, this display appears.

When the adjustment is completed normally, CPU lamp goes off, and error code “E01” also disappears.

To perform the adjustment of mechatro controller again, press starter switch once to turn the power OFF, and turn starter switch ON and perform the adjustment again.

SK115SR • SK115SRdz • SK135SR(LC) • SK235SR

● MECHATRO CONTROLLER ADJUSTMENT

1. When the mechatro controller requires adjustment,

After replacement of the following parts, if the following display appears on the multidisplay, the "A" adjustment of the mechatro controller is performed.

When the mechatro controller is required to adjust,

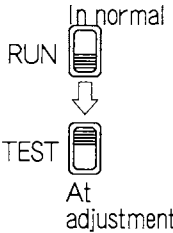
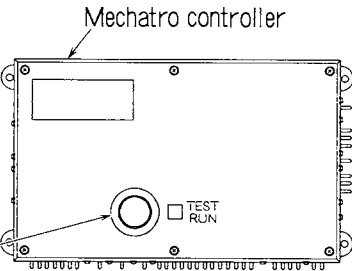
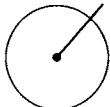
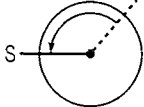
- ① When the mechatro controller is replaced,
- ② When the governor motor is replaced,
- ③ When the **ROM DATA FAILURE** is displayed on the multidisplay,
- ④ When the **ROM DATA FAILURE** and **MECHATRO SET ERROR** are displayed alternately on the multidisplay,

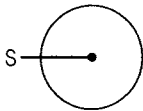
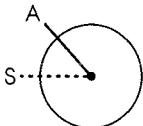
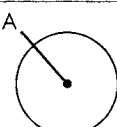
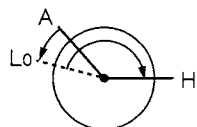
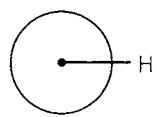
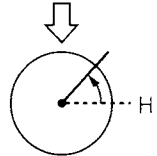
2. Preparation

- ① Warm up the engine.
- ② Turn the air-con switch **OFF**.
- ③ Turn the starter switch **OFF** to stop the engine.
- ④ Push the operator's seat forward fully, and bring the back seat down to the front side.
- ⑤ Remove 5 screws installing the resin cover on the rear side of the operator's seat with (+) screwdriver.
- ⑥ Remove the resin cover.
- ⑦ The mechatro controller is found enabling the adjustment.

Note : Make sure that the knob for the engine emergency stop is pushed in. If the adjustment is done while the knob is pulled out, the engine speed can not be set correctly.

3. Adjustment

Procedure	Multidisplay	Movement of governor motor
① Remove the grommet on the upper face of the mechatronics controller, and the internal switch on the inside of controller from RUN to TEST .	In normal  At adjustment  Grommet	
② Turn the starter key switch ON . Turn the accel dial to free choice position.		 Governor motor stops at position according to accel dial movement.
③ Press the buzzer stop switch for about 5 to 10 seconds, and release the hand after the STEP 1 is displayed, and wait until the following symbol STEP 2 is displayed.	CPU STEP 1 START CPU step 1 start  CPU STEP 2 GAP (STOP)	 Self-travels to the engine stop position.

Procedure	Multidisplay	Movement of governor motor
④ After verification of the CPU STEP 2 GAP (STOP) display, moves it to the engine room and adjust the rod Assy standard length to 204mm in order to have the clearance "A 0.1mm" between the governor lever and the engine stop set bolt.	CPU STEP 2 GAP (STOP)	 Stop at the stop position. [Tools] ● Spanner 13mm × 2 ● Spanner 6mm ● Thickness gauge
⑤ Press the buzzer stop switch once, and wait until the CPU STEP 3 START E/G is displayed.		 Self-travels to A position (about 1000 ~ 1200rpm).
⑥ After verification of CPU STEP 3 START E/G display, starts the engine. Then, it is unaffected by the accel dial position.	CPU STEP 3 START E/G	 Stop at A position.
⑦ Press the buzzer stop switch once, and the CPU STEP 4 MEMORY is displayed and the controller returns from the A position of governor to the low idling position once, and then reads the engine rpm to the high idling automatically. (Required time : about 3 minutes)	CPU STEP 4 MEMORY	 Return from A position, and self travel to the high position.
⑧ After completion of the read out, wait until the "CPU FINISH RPM" is displayed on the multidisplay. After the "CPU FINISH RPM" is displayed, the controller returns to the accel dial initial optional position automatically. Note : If the "CPU FINISH RPM" is not displayed, the adjustment has failed. Turn the starter switch OFF, and perform the adjustment again.	CPU FINISH (SK115SR) 2050RPM CPU FINISH (SK115SRdz) (SK135SR(LC)) 2200RPM CPU FINISH (SK235SR) 2100RPM	 

4. After completion of the adjustment,

- ① Turn the starter switch OFF to stop the engine.
- ② Return the inside adjustment switch from the TEST to the RUN position, install grommet, and press the screen change switch on the gauge cluster once to display the engine speed.
- ③ Change the service connector for the auto accel release, start the engine, and raise the engine speed to the high idle rpm.
- ④ With turning the work mode on the switch panel, the mode display on the gauge cluster switches to make sure that the engine speed changes on the multidisplay.
- ⑤ Return the accel dial to the low idling position, and change the service connector after the engine stops, and then start the engine again in the auto accel function condition.
- ⑥ Turn the accel dial to the high idling position, and check the engine speed in the auto accel condition.
- ⑦ Press the screen change switch on the gauge cluster two times, and "OK" is displayed.
- ⑧ Install the resin cover, and move the seat and operator's seat rearward.

5. When the mechatro controller can not be adjusted,

- ① The **CPU STEP 4 MEMORY** to **CPU CONDITION ERROR** is displayed, making the adjustment impossible.

- A. (Display condition) ● While reading the engine speed, in the condition of the engine revolution, 850rpm or higher, for the engine rpm before and after the steps of the governor, the revolution at rear step is 10rpm higher than that before step.

(Cause) ● The engine speed sensor has failed to read the engine speed.

(Corrective action) ● After measurement and adjustment of the voltage of speed sensor, carry out the "A" adjustment. (Disconnect the sensor connector and measure the voltage.)

3V (AC) or more at high idling condition
(Voltage available for controller to read)
[4V (AC) or more at high idling condition
set in the factory]

Specified value	
Voltage	1.4 to 6V (AC)
Resistance	$2.3 \pm 0.2 \Omega$

- B. (Display condition) ● Where the abnormal rotation (step out) in high idling condition.

(Cause) ● Governor motor link rod connection error. (Corrective action)

(Corrective action) ● After verification of connection of the link rod, carry out "A" adjustment. (Link rod length : 204mm)

***If it is stepped out even after the adjustment, press the buzzer stop once just before the stepping out as an emergency measure, and the speed changes to the high idling position temporarily and the CPU FINISH ○○○○ RPM is displayed.**

- ② The **CPU CONDITION ERROR**, **CPU MECHATRO CONT FAIL** and **CPU ROM DATA** are displayed by turn, making the adjustment impossible.

(Display condition) ● When the engine speed is 300rpm or lower, or 3,000rpm or higher, ... The **CPU MECHATRO CONT FAIL** is displayed.

● When the engine speed is 0rpm, ... The **CPU ROM DATA** is displayed.

(Cause) ● The engine sensor has failed to read the engine speed.

● The harness of the engine speed sensor is broken.

(Corrective action) ● After measurement and adjustment of the voltage of speed sensor, carry out "A" adjustment.

3V (AC) or more in high idling condition.

- ③ The **CPU ROM DATA FAILURE** is displayed.

- A. (Display condition) ● When the mechatro controller fails,

(Cause) ● There is the danger of breakage inside of the mechatro controller.

(Corrective action) ● If the failure is not recovered after the adjustment, replace the mechatro controller with new one.

- B. (Display condition) ● After the mechatro controller is replaced,

(Cause) ● The mechatro controller is not adjusted yet.

(Corrective action) ● Adjust the mechatro controller.

- ④ The display does not go from the **STEP 1 CPU START** to **STEP 2 CPU GAP (STOP)**.

(Display condition) ● The limit switch signal (grounding) in the governor motor is not input to the mechatro controller.

(Cause) ● Failure of the limit switch in the governor motor

● Insufficient contact of connector on the governor motor or breakage of the harness

(Corrective action) ● Check that the limit switch of the governor motor goes ON or OFF.

● Check connector and harness for possible damage, and adjust it if necessary.

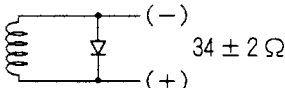
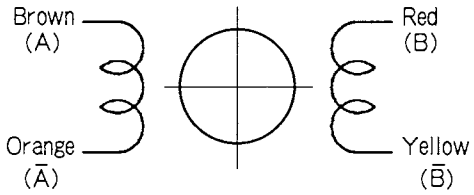
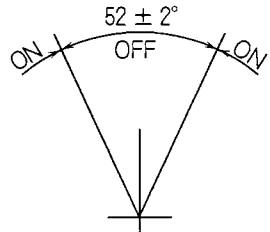
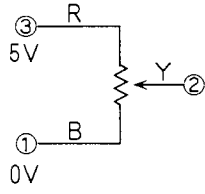
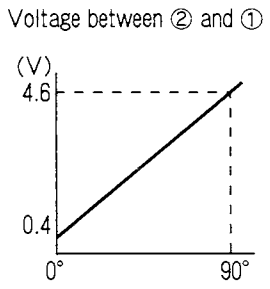
- ⑤ Others

The engine oil pressure is displayed on the gauge cluster, and the engine stops. It may be caused by the failure of the engine oil pressure switch and short-circuit of the harness.

SK70SR SK115SRdz SK235SR SK115SR SK135SR(LC)

16-9 • ACCEPTANCE CRITERION FOR ELECTRICAL FITTING IN CONTROL SYSTEM

APPARATUS	CHARACTERISTICS																													
Low press sensor	SK70SR • SK115SR • SK115SRdz • SK135SR (LC) <table> <tr><td>Press range</td><td>0 ~ 2.94MPa {0 ~ 30kgf/cm² • 0 ~ 430psi}</td></tr> <tr><td>Type</td><td>Three wire formula</td></tr> <tr><td>Operating source voltage</td><td>5.0 ± 0.5VDC</td></tr> <tr><td>Max. source voltage</td><td>6.0VDC</td></tr> <tr><td>Output</td><td>1/10 ~ 9/20Vcc</td></tr> <tr><td>Load resistance</td><td>10kΩ min.</td></tr> <tr><td>Resistance voltage</td><td>150V AC (1mm)</td></tr> <tr><td>Tightening torque</td><td>36.3N·m {3.7kgf·m} max.</td></tr> </table>	Press range	0 ~ 2.94MPa {0 ~ 30kgf/cm ² • 0 ~ 430psi}	Type	Three wire formula	Operating source voltage	5.0 ± 0.5VDC	Max. source voltage	6.0VDC	Output	1/10 ~ 9/20Vcc	Load resistance	10kΩ min.	Resistance voltage	150V AC (1mm)	Tightening torque	36.3N·m {3.7kgf·m} max.	OUTPUT VOLTAGE (V) PILOT PRESS MPa {30-427} {50-711} {kgf/cm²·psi}												
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High press sensor	SK115SR • SK135SR (LC) • SK235SR <table> <tr><td>Press range</td><td>0 ~ 49.0MPa {0 ~ 500kgf/cm²}</td></tr> <tr><td>Type</td><td>Three wire formula</td></tr> <tr><td>Operating source voltage</td><td>5.0 ± 0.5VDC</td></tr> <tr><td>Max. source voltage</td><td>6.0VDC</td></tr> <tr><td>Output</td><td>1/10 ~ 9/10Vcc</td></tr> <tr><td>Insulation resistance</td><td>100kΩ 以上</td></tr> <tr><td>Resistance voltage</td><td>150V AC (1mm)</td></tr> <tr><td>Tightening torque</td><td>73.5N·m {7.5kgf·m} max.</td></tr> </table>	Press range	0 ~ 49.0MPa {0 ~ 500kgf/cm ² }	Type	Three wire formula	Operating source voltage	5.0 ± 0.5VDC	Max. source voltage	6.0VDC	Output	1/10 ~ 9/10Vcc	Insulation resistance	100kΩ 以上	Resistance voltage	150V AC (1mm)	Tightening torque	73.5N·m {7.5kgf·m} max.	OUTPUT VOLTAGE (V) PUMP PRESS MPa {350-4978} {500-7112} {kgf/cm²·psi}												
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Proportional valve for pump	SK115SR • SK115SRdz • SK135SR (LC) • SK235SR RESISTANCE 17 ~ 25 Ω (at 20°C) <table> <tr><td colspan="2">Test condition</td></tr> <tr><td>• Press :</td><td>50kgf/cm² (711psi)</td></tr> <tr><td>• Flow rate at port :</td><td>0.8 / min</td></tr> <tr><td colspan="2">Dither condition at actual machine</td></tr> <tr><td>Frequency :</td><td>100Hz</td></tr> <tr><td>Amplitude (I = AT 300mA) :</td><td>300mA</td></tr> </table> Secondary Pressure P_2 (kgf/cm²) Input Current I (mA) At power boost (Press setting) AT 400mA 9.4 ± 0.5 kgf/cm² (133.7 ± 7.1 psi) with Hysteresis 9.4 ± 0.5 kgf/cm² (133.7 ± 7.1 psi) Upper limit Lower limit Range of hysteresis $P_2 = 5 \text{ kgf/cm}^2$ (71.1 psi) or more 1 kgf/cm² (14.2 psi) or less	Test condition		• Press :	50kgf/cm ² (711psi)	• Flow rate at port :	0.8 / min	Dither condition at actual machine		Frequency :	100Hz	Amplitude (I = AT 300mA) :	300mA	SECONDARY PRESSURE MPa (kgf/cm ² ·psi) INPUT CURRENT (mA) Place a proportional valve with top up By attaching the top-up spec. propo. valve in horizontal position, the press lowers 0.6kgf/cm² (8.5psi). By attaching in bottom-up position, the press lowers 1.2kgf/cm² (17.1psi) Input current - Secondary press characteristics (Place a proportional valve with Bottom up.) (An cut ward trip)																
Test condition																														
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Proportional valve for C/V	SK70SR <table> <tr><td rowspan="3">Proportional valve</td><td>Dither current</td><td>Frequency 100Hz. Amplitude 250 mA P-P (Triangle wave)</td></tr> <tr><td>Coil resistance</td><td>17.5 ± 1Ω (At 20°C)</td></tr> <tr><td>Current - Press profile</td><td>See Fig. A</td></tr> </table> SK115SR • SK115SRdz • SK135SR (LC) <table> <tr><td rowspan="4">Proportional valve</td><td>Rated current</td><td>700 mA</td></tr> <tr><td>Dither current</td><td>Frequency 100Hz. Amplitude 300 mA P-P (Triangle wave)</td></tr> <tr><td>Coil resistance</td><td>17.5 ± 1Ω (At 20°C)</td></tr> <tr><td>Current - Press profile</td><td>See Fig. A</td></tr> </table> SECONDARY PRESS MPa (kgf/cm²·psi) INPUT CURRENT (mA) Fig.A Input current - Secondary press characteristics (Place a proportional valve with Bottom up.) (An cut ward trip) Electrical circuit (Directional value) (-) 17.5 ± 1Ω (+)	Proportional valve	Dither current	Frequency 100Hz. Amplitude 250 mA P-P (Triangle wave)	Coil resistance	17.5 ± 1Ω (At 20°C)	Current - Press profile	See Fig. A	Proportional valve	Rated current	700 mA	Dither current	Frequency 100Hz. Amplitude 300 mA P-P (Triangle wave)	Coil resistance	17.5 ± 1Ω (At 20°C)	Current - Press profile	See Fig. A	SK235SR RESISTANCE 17 ~ 25 Ω (at 20°C) <table> <tr><td colspan="2">Test condition</td></tr> <tr><td>• Press :</td><td>50kgf/cm² (711psi)</td></tr> <tr><td>• Flow rate at port :</td><td>0.8 / min</td></tr> <tr><td colspan="2">Dither condition at actual machine</td></tr> <tr><td>Frequency :</td><td>100Hz</td></tr> <tr><td>Amplitude (I = AT 300mA) :</td><td>300mA</td></tr> </table> Secondary Pressure P_2 (kgf/cm²) Input Current I (mA) At power boost (Press setting) AT 400mA 9.4 ± 0.5 kgf/cm² (133.7 ± 7.1 psi) with Hysteresis 9.4 ± 0.5 kgf/cm² (133.7 ± 7.1 psi) Upper limit Lower limit Range of hysteresis $P_2 = 5 \text{ kgf/cm}^2$ (71.1 psi) or more 1 kgf/cm² (14.2 psi) or less	Test condition		• Press :	50kgf/cm ² (711psi)	• Flow rate at port :	0.8 / min	Dither condition at actual machine		Frequency :	100Hz	Amplitude (I = AT 300mA) :	300mA
Proportional valve	Dither current		Frequency 100Hz. Amplitude 250 mA P-P (Triangle wave)																											
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Frequency :	100Hz																													
Amplitude (I = AT 300mA) :	300mA																													

APPARATUS		CHARACTERISTICS				
Solenoid valve	MODEL	SK70SR	SK115SR・SK115SRdz ・SK135SR	SK235SR		
	Working press. (P port)	3.4 MPa {35 kgf/cm ² ・498 psi}	4.9 MPa {50 kgf/cm ² ・711 psi}	4.9 MPa {50 kgf/cm ² ・711 psi}		
	Rated voltage	DC24V	DC24V	DC24V		
	Coil resitance	34 ± 2Ω (At 20°C)	34 ± 2Ω (At 20°C)	34 ± 2Ω (At 20°C)		
	Surge absorber	HITACHI made VD3E	HITACHI made UO5E	HITACHI made UO5E		
						
CONNECTION PROCEDURE FOR SOLENOID VALVE						
Governor motor	Rated voltage	8.5 V (DC)				
	Rated current	1.5 A/phase				
	Number of phases	2 phases				
	Excitation method	2 Excitation				
	Step angle	1.8°				
	Rating	Continuous				
	Reduction rate	1/20.3				
	Coil winding resistance	5.7 Ω ± 10 % (At 25°C)				
	Drive voltage	DC 24V				
	Limit switch	11SM0090-JK				
CONNECTOR DIAGRAM						
						
						
LIMIT SWITCH OPERATING RANGE						
Speed sensor	Resistance value : 2.3kΩ ± 0.2Ω (at 25°C)					
	Output voltage : If the voltage at high idling is 3V (The machines for shipment are set to approx. 4V or more.)					
● By tightening lock nut, the voltage rises. ● By loosening lock nut, the voltage lowers.						
Throttle potentiometer	Total resistance	2kΩ				
	Effective electric angle	90°				
	Number of notches	10				
	Source voltage	5V				
						
Voltage between ② and ①						
						

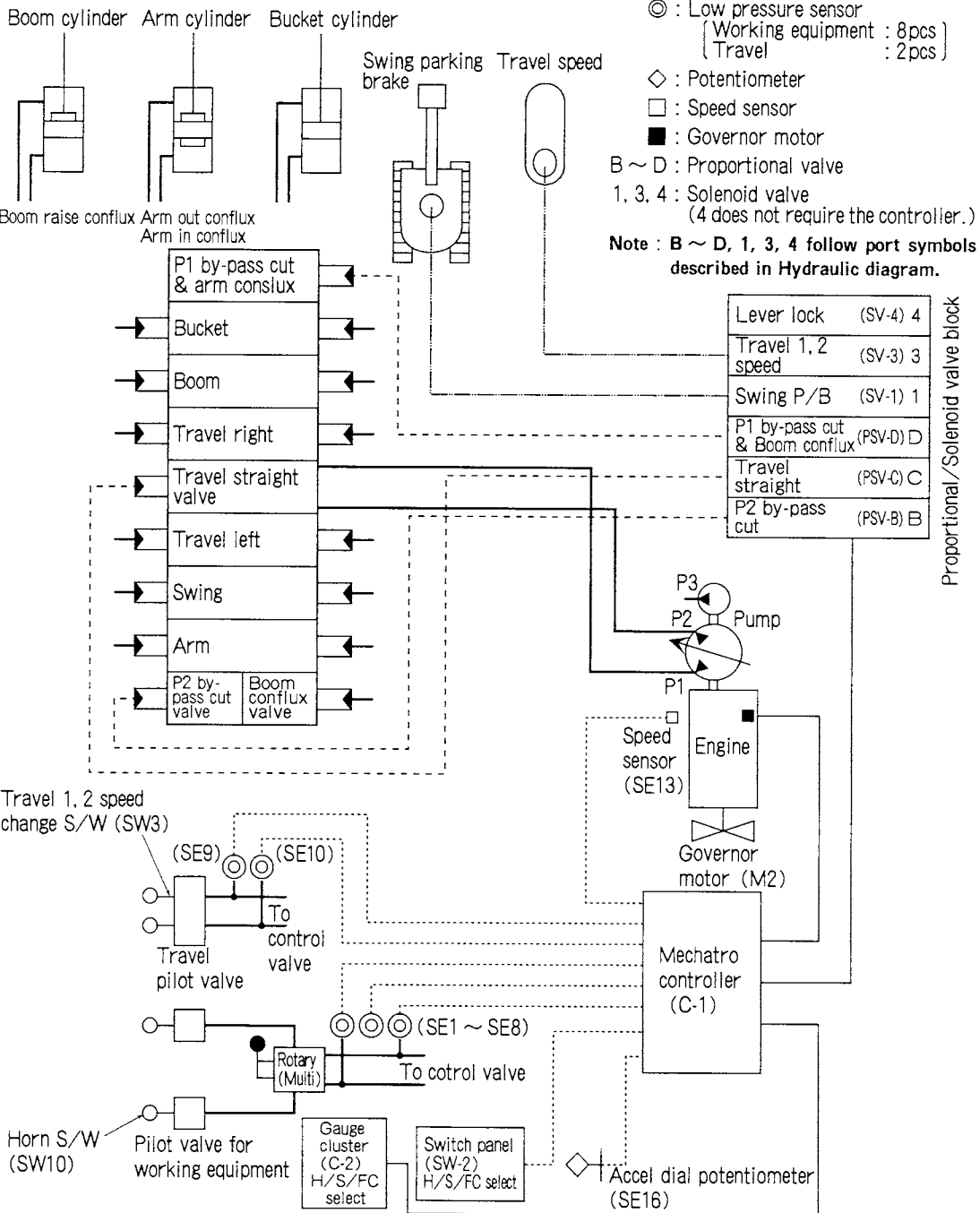
MECHATRO SYSTEM

SK70SR

16-10 Outline of Mechatro system

- Electric input signal
- Electric output signal
- - - - - Mechatro signal
- - - - - Mechatro signal
- Hydraulic control signal

Outline of system	Feature	Purpose
Control a part of control valve with proportional valve. Control main spool with hydraulic pressure.	1 Control travel straight valve with proportional valve.	• Smooth change
	2 Control by-pass cut valve with proportional valve.	• Smooth change
	3 Control swing motion with by-pass cut valve (proportional valve).	• Smooth operability
	4 Control swing P/B open/close with solenoid valve.	



SK115SR SK115SRdz SK135SR(LC)

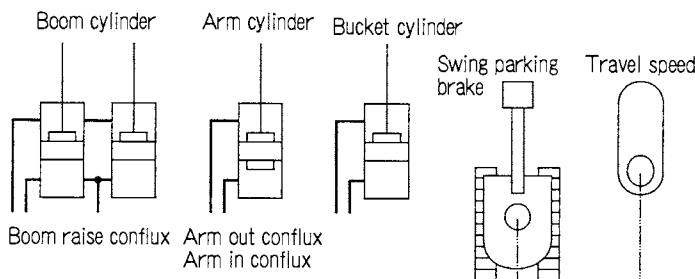
SK115SR • SK115SRdz

SK135SR • SK135SRLC

Outline of Mechatro system

- Electric input signal
- Electric output signal
- Mechatro signal
- Mechatro signal
- Hydraulic control signal

Outline of system	Feature	Purpose
Control a part of control valve with proportional valve. Control main spool with hydraulic pressure.	1 To control P1 pump with proportional valve.	Ⓐ To be power curve as an ideal curve.
	2 To control P2 pump with proportional valve.	Ⓑ To supply flow rate appropriate to every operation.
	3 Control travel straight valve with proportional valve.	To switch softly
	4 Control cut valve with proportional valve.	To switch softly
	5 Control arm variable recirculation valve with proportional valve.	Control arm speed as required
	6 Control arm with cut valve. (P2 cut solenoid valve)	To have soft operability
	7 Control slewing P/B open/close with solenoid valve.	



◇ : High pressure sensor (for P1 and P2 : 2pcs)

⊙ : Low pressure sensor (ATT : 8pcs, Travel : 2pcs)

◇ : Potentiometer

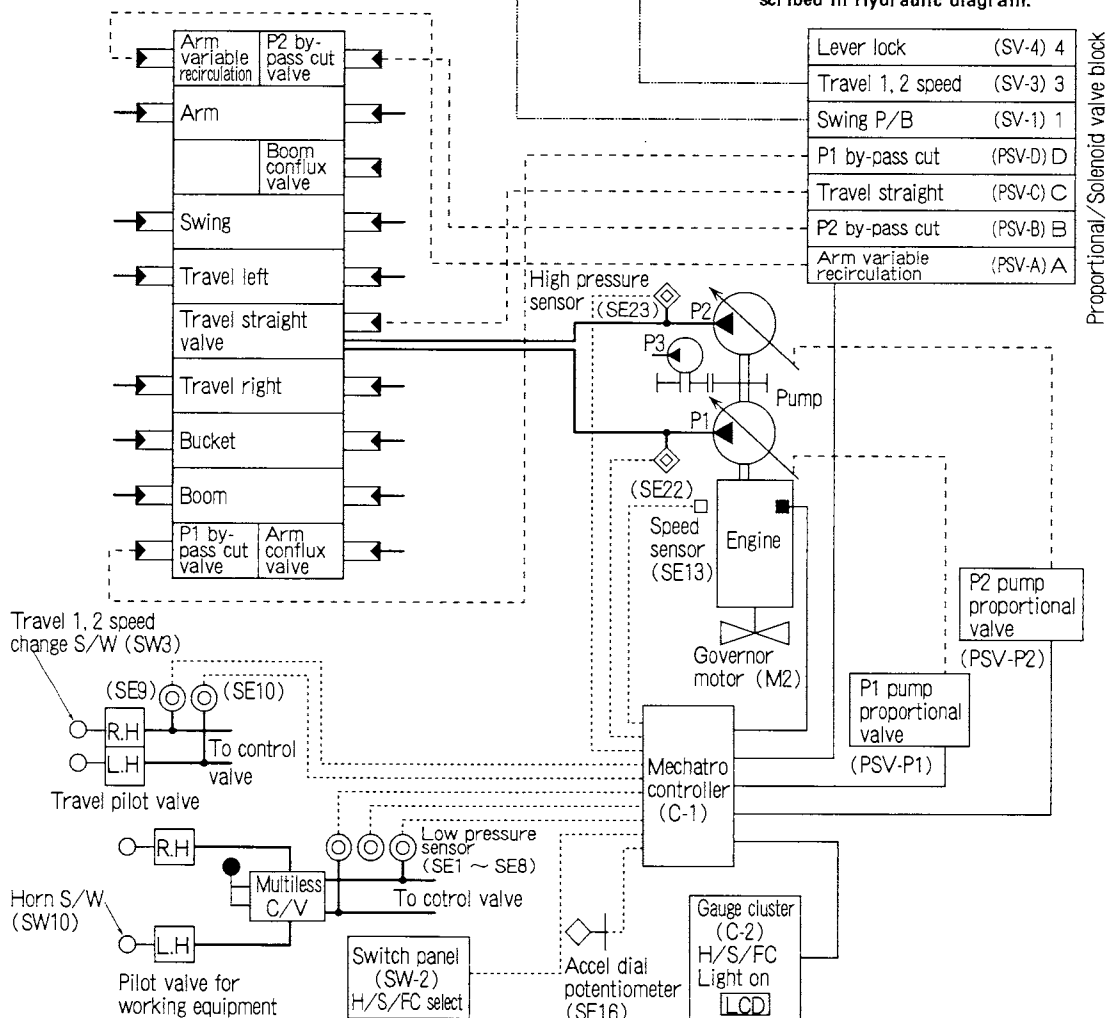
□ : E/G speed sensor

■ : Governor motor

A ~ D : Proportional valve (for control valve)

1, 3, 4 : Solenoid valve (4 does not require the controller.)

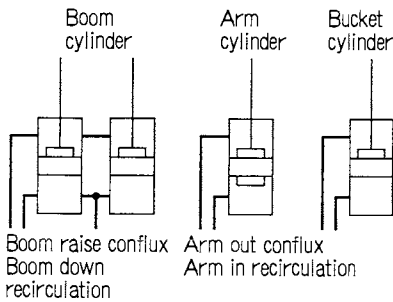
Note : A ~ D, 1, 3, 4 follow port symbols described in Hydraulic diagram.



SK235SR

Outline of Mechatro system

Outline of system : Hydraulic pump is controlled with negative control.
Control a part of control valve with proportional valve.
Control main spool with hydraulic pressure.



Feature	Purpose
1 To control P2 pump with proportional valve.	Most preferable control of delivery flow to repective ATT operation by negative control of main pump. Most effective control of main pump power and prevention of Engine-down.
2 Arm variable recirculation valve is controled with proportional valve.	Most effective control of Arm-in speed and prevention of cavitation.
3 Operate swing adjusting valve with proportional valve.	Bypass a part of delivery oil to tank circuit at swing start and it prevents from abrupt swing but all delivery oil flows at regular swing.
4 A part of control valve is controlled by proportional valve and sol-valve, and others are controlled by hydraulic pressure.	Easy maintenance.

◎ : Low pressure sensor
[ATT : 1 pcs
Travel : 1 pcs]

◇ : Potentiometer

□ : E/G speed sensor

■ : Governor motor

SV-1, SV-2, SV-3 : Solenoid valve
SV-1 does not require the controller
(For control valve)

PSV-A, PSV-G : Proportional valve
(For control valve)

PSV-P : Proportional valve (For pump)

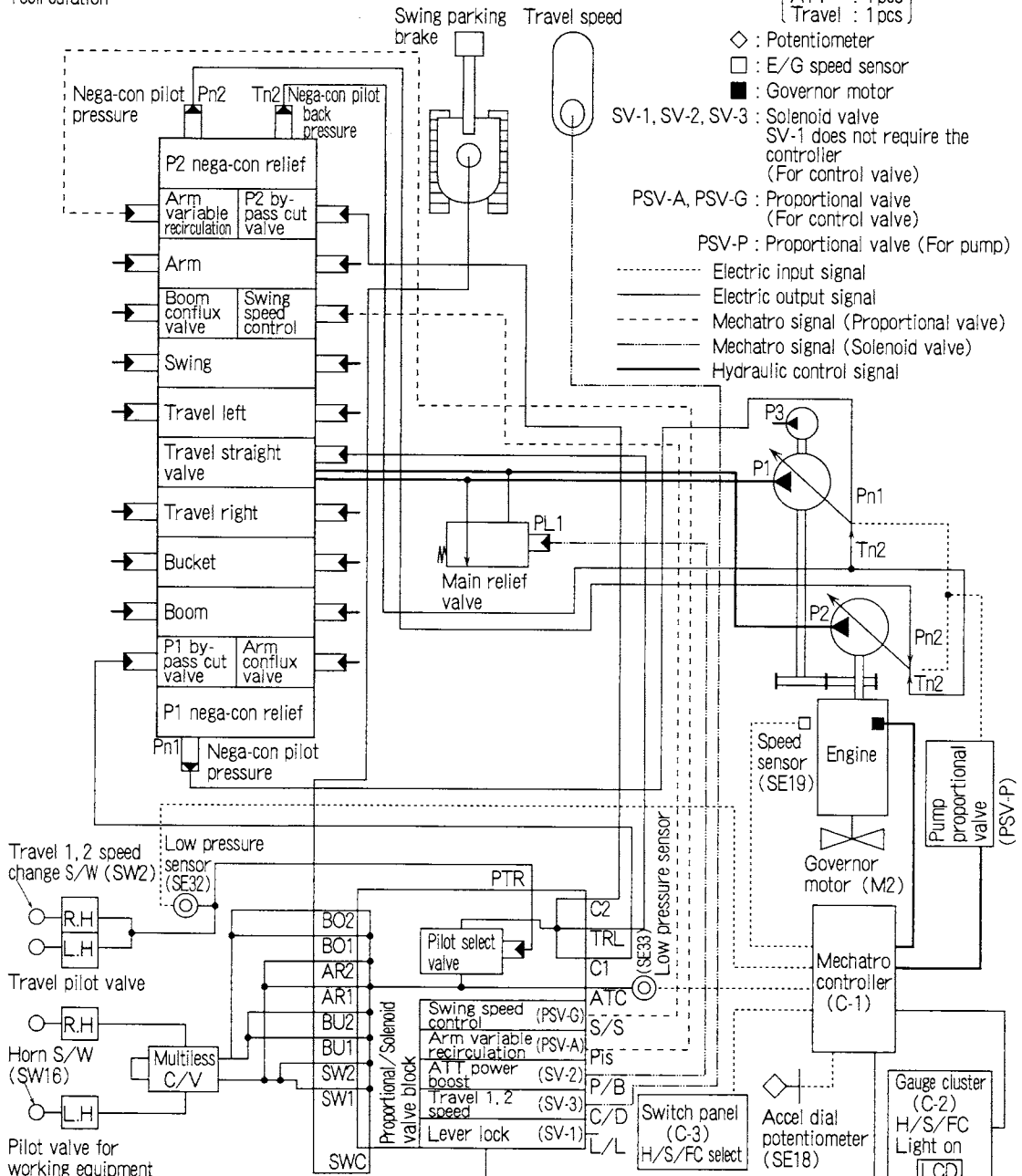
Electric input signal

Electric output signal

Mechatro signal (Proportional valve)

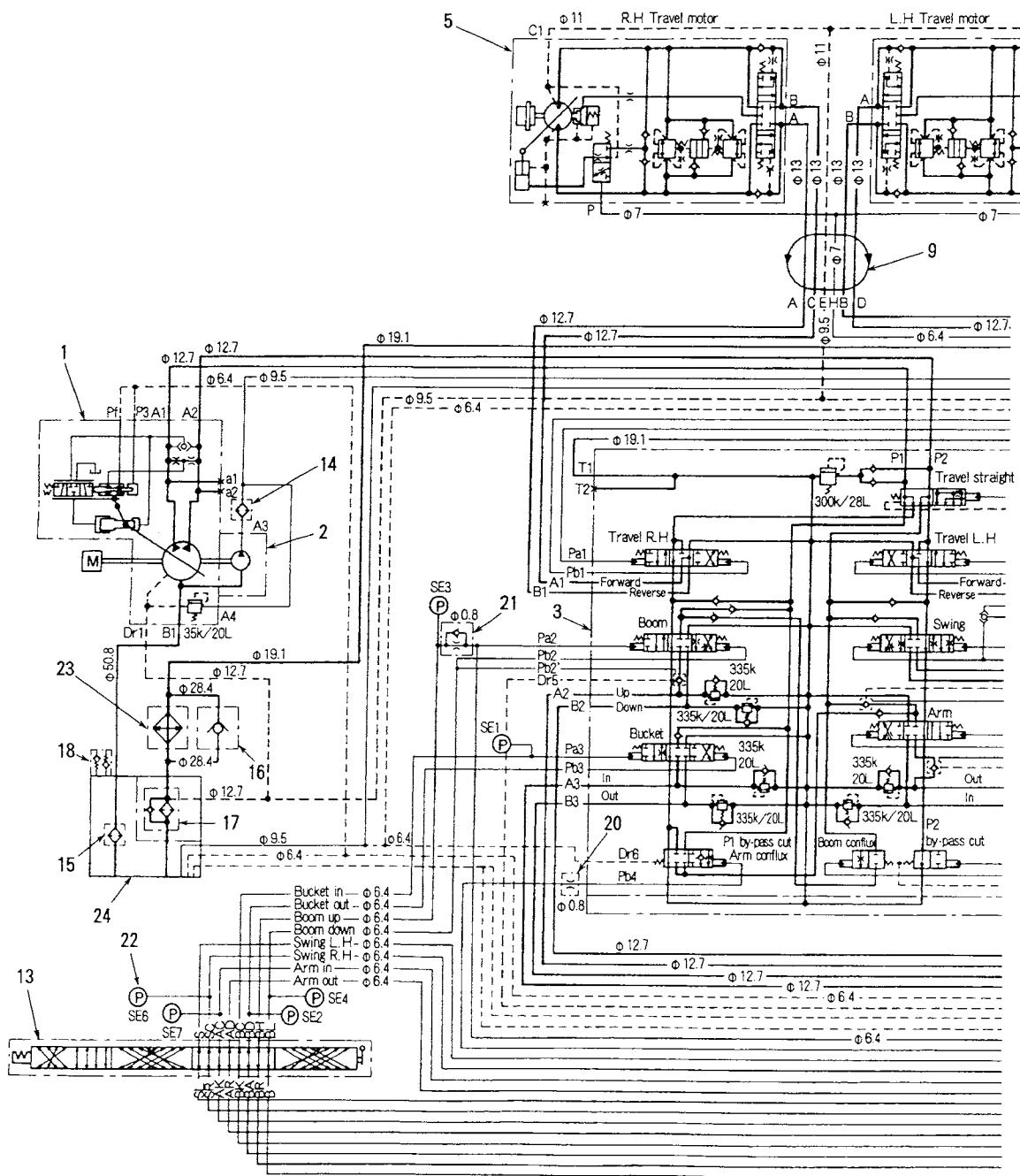
Mechatro signal (Solenoid valve)

Hydraulic control signal



SK70SR

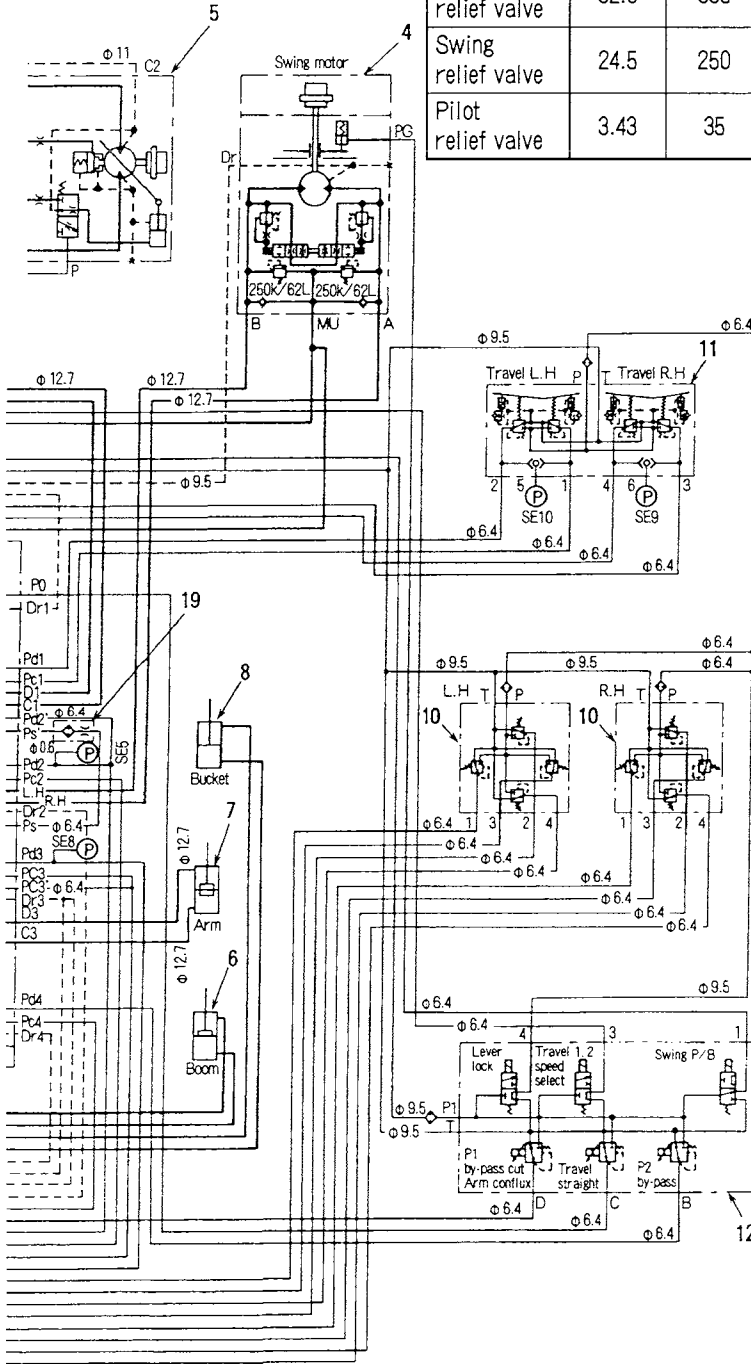
For Japan only



Set pressure of relief valve

Position	Unit	Pressure SI MPa	Pressure JIS kgf/cm ²	Flow rate L/min
Main relief valve		29.4	300	28
Port relief valve		32.9	335	20
Swing relief valve		24.5	250	62
Pilot relief valve		3.43	35	20

Code	Component
1	Main Pump
2	Gear Pump (for pilot)
3	Main control valve
4	Swing motor
5	Travel motor
6	Boom cylinder
7	Arm cylinder
8	Bucket cylinder
9	Swivel joint
10	Pilot valve (for ATT)
11	Pilot valve (for Travel)
12	Prop. solenoid valve block
13	Multi control valve
14	Inline filter
15	Suction strainer
16	Check valve
17	Return filter
18	Breather
19	Connector (with filter)
20	Connector
21	Slow return valve
22	Low pressure sensor
23	Oil cooler
24	Hydraulic tank

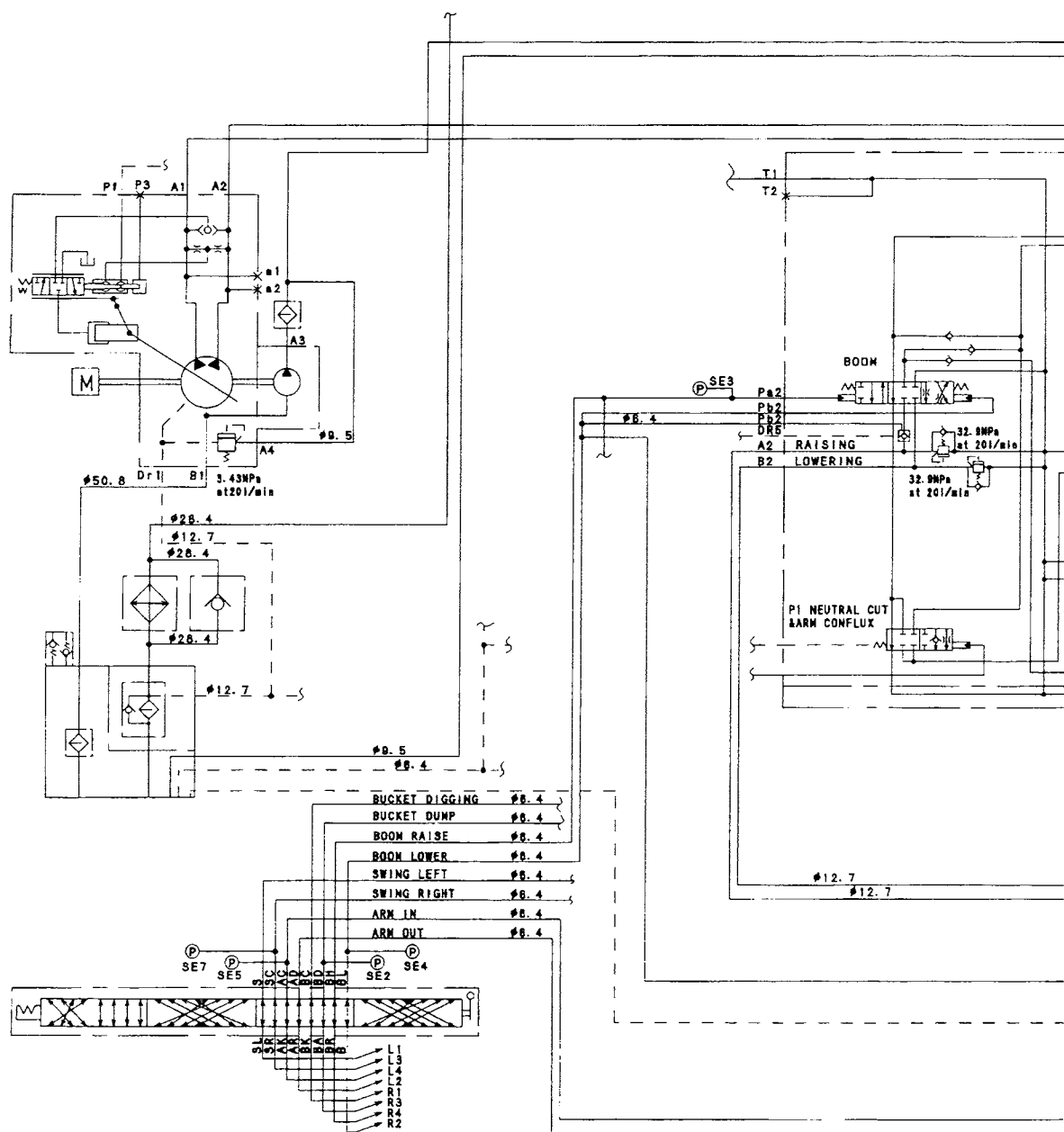

Condition of proportional valve action

Prop. Valve	D P1 by-pass cut Arm conflux	C Travel straight	B P1 by-pass cut
Operation			
Boom raise (conflux)	—	—	○
Arm out · in (conflux)	○	—	—
Swing	—	—	○
Travel right Boom, Bucket	—	○	○
Travel left Arm	○	○	—
Travel left Swing	○	○	○
Travel left & right Boom, Bucket Swing, Arm	○	○	○

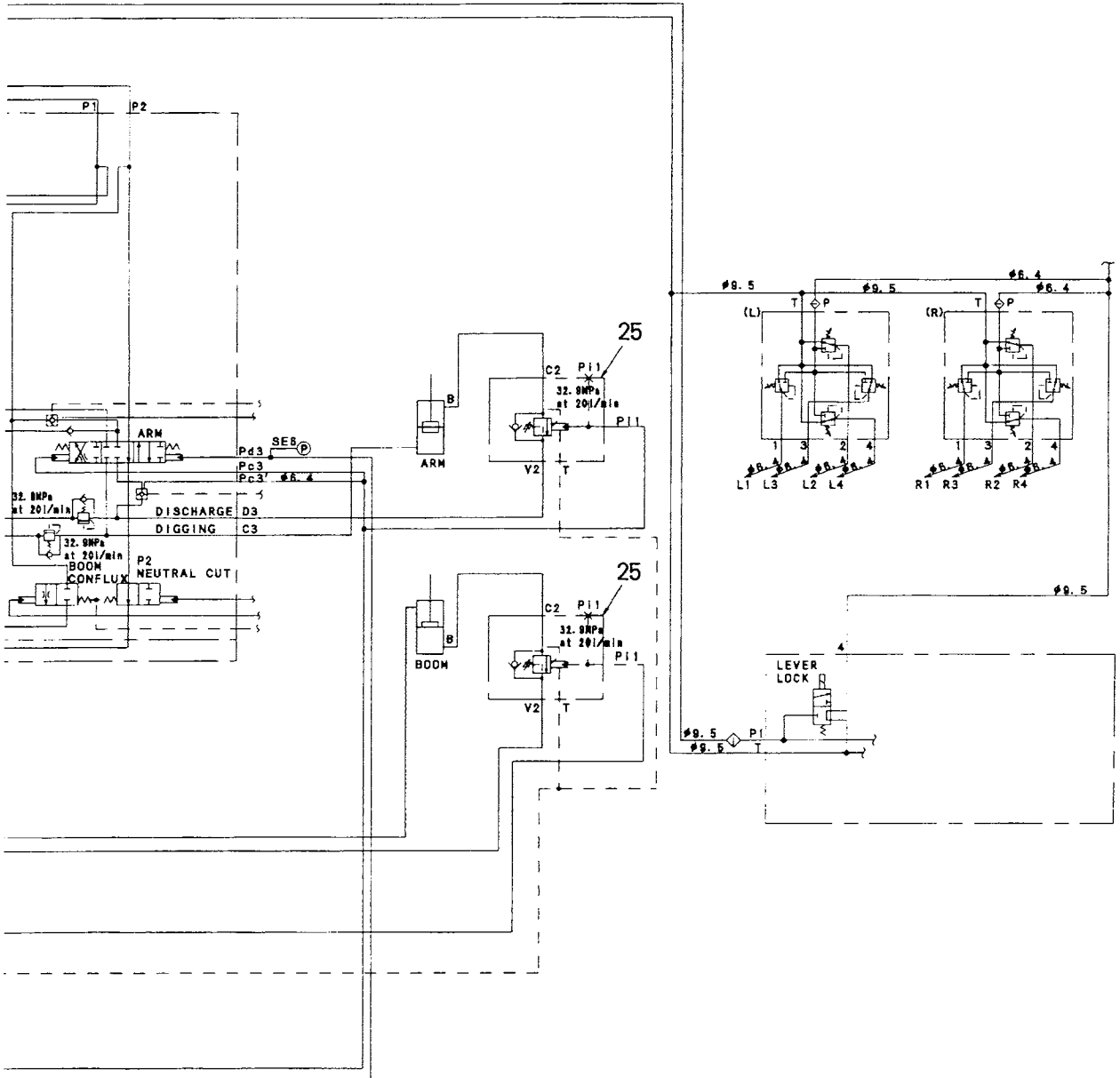
SK70SR

● HYDRAULIC DIAGRAM

Additional circuit for E.U.



Code	Component
25	Valve, holding



SK70SR

● HYDRAULIC DIAGRAM

N & B

Notes

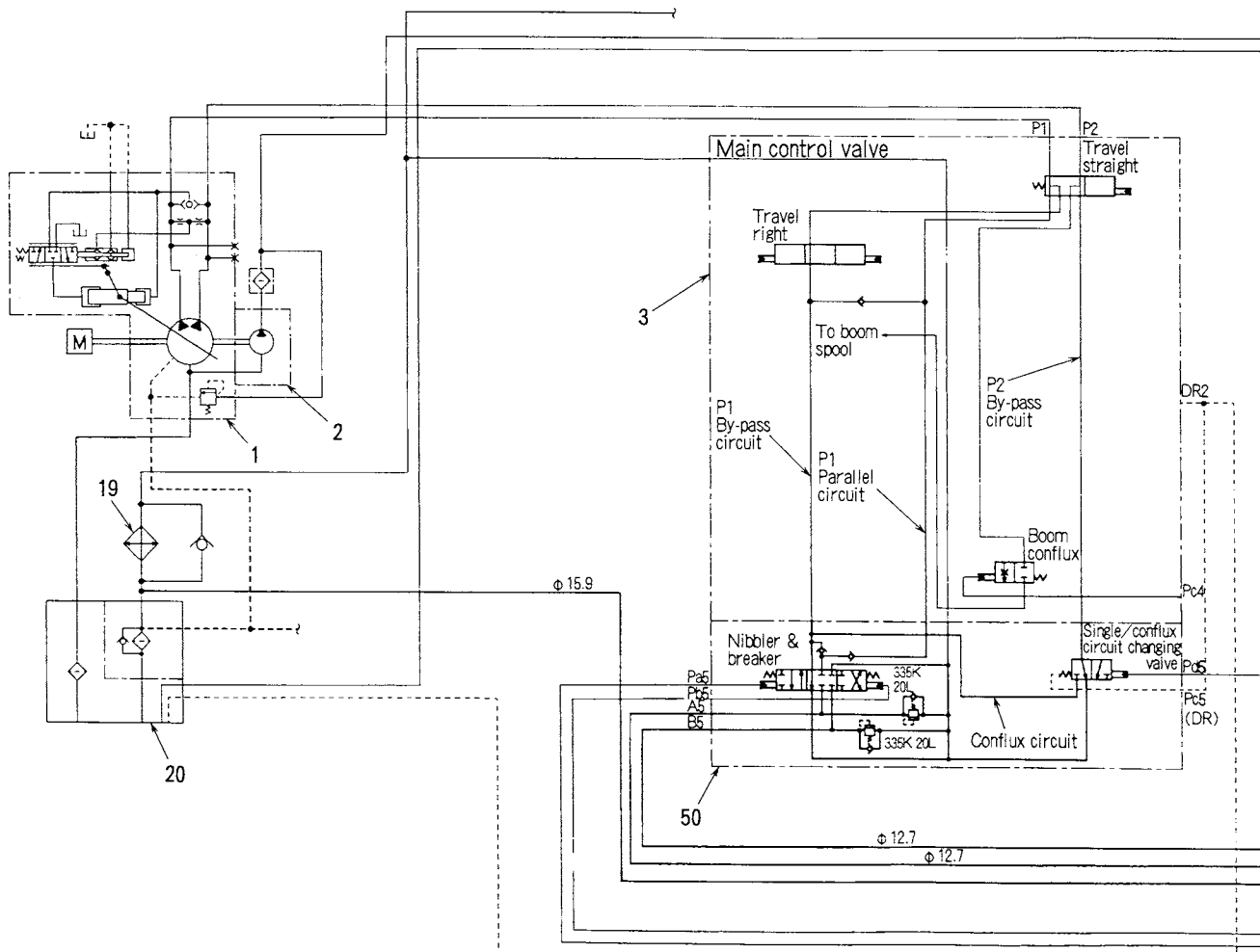
1. Remove end cover of STD control valve and install add-on valve for nibbler and breaker.
2. Switch selector valve so that the return oil flows into hydraulic oil tank directly when attaching breaker.
3. Switch solenoid valve to single pass or conflux through additional switch installed on instrument panel according to contents of specification corresponding to the attaching nibbler.
4. Adjust pressure of port relief valve of control valve according to specification corresponding to attaching nibbler and breaker.
5. When operating boom raise motion and nibbler at the same time, if the boom is not raised due to parallel circuit, place orifice in main circuit.

Explanation

Breaker circuit

1. Pilot circuit

- ① Oil delivered by pilot pump reaches to P port of solenoid proportional valve block (12).
- ② And lever lock acts on it, and the delivered oil flows into pilot valve (54) (for N&B) through four (4) ports and pilot valve for ATT.
- ③ Operate pilot valve (54) (for N&B), and oil acts on control valve (50) (for N&B) and moves spool.
- ④ For simultaneous operation of boom raise and breaker, oil delivered by P2 pump acts on boom raise motion allowing it to be operated.



2. Main circuit

- ① Oil delivered by P1 pump passes through travel straight valve from P1 port of main control valve (3), and flows into P1 by-pass circuit and P1 parallel circuit.
- ② Since P1 by-pass circuit is cut because of the movement of breaker section spool, the oil opens check valve on downstream of travel section, and flows into P1 parallel circuit.
- ③ Then, it flows into circuit valve (50) (for N&B) from P1 parallel circuit, and is fed into breaker circuit.
- ④ The return oil from breaker returns into hydraulic oil tank through selector valve (51) directly.

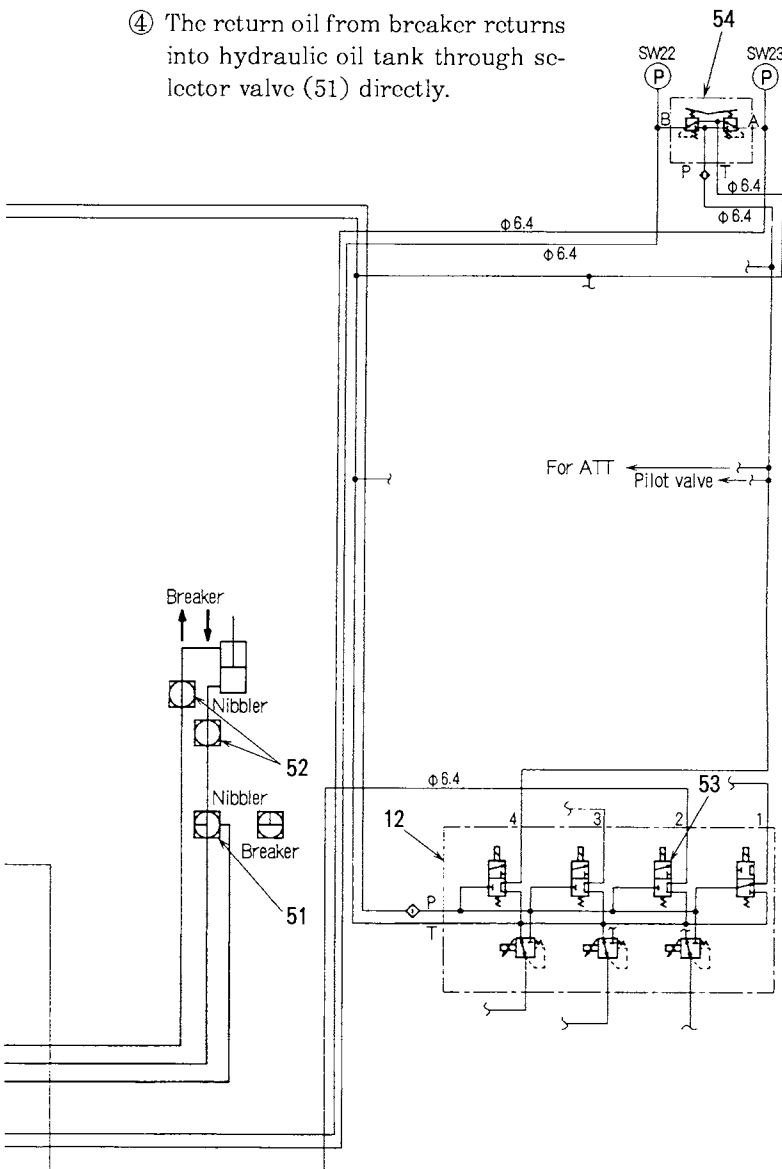
Nibbler circuit**1. Pilot circuit**

- ① Functions of breaker circuits ① to ③ are the same.
- ② In addition, press confluent/single flow circuit changing switch, and solenoid proportional valve block (12) and solenoid valve (53) are excited.
- ③ The excitation of solenoid valve (53) moves confluent/single flow circuit changing spool for control valve (50) (for N&B) from 2 ports.

2. Main circuit

- ① Functions of breaker circuits ① and ② are the same.

- ② Oil delivered by P1 pump flows into control valve (50) (for N & B) from P1 parallel circuit.
- ③ Oil delivered by P2 pump passes through travel straight valve from P2 port of main control valve (3), and flows into P2 by-pass circuit.
- ④ And, it flows into P1 by-pass circuit through confluent circuit because confluent/single flow circuit changing spool is moved from P2 by-pass circuit.
- ⑤ Oil delivered by P1 and P2 pumps is confluent in control valve (50) (for N & B), and fed into nibbler cylinder.
- ⑥ The return oil from nibbler cylinder flows into hydraulic oil tank through oil cooler by way of selector valve (51), control valve (50) (for N & B) and main control valve (3).

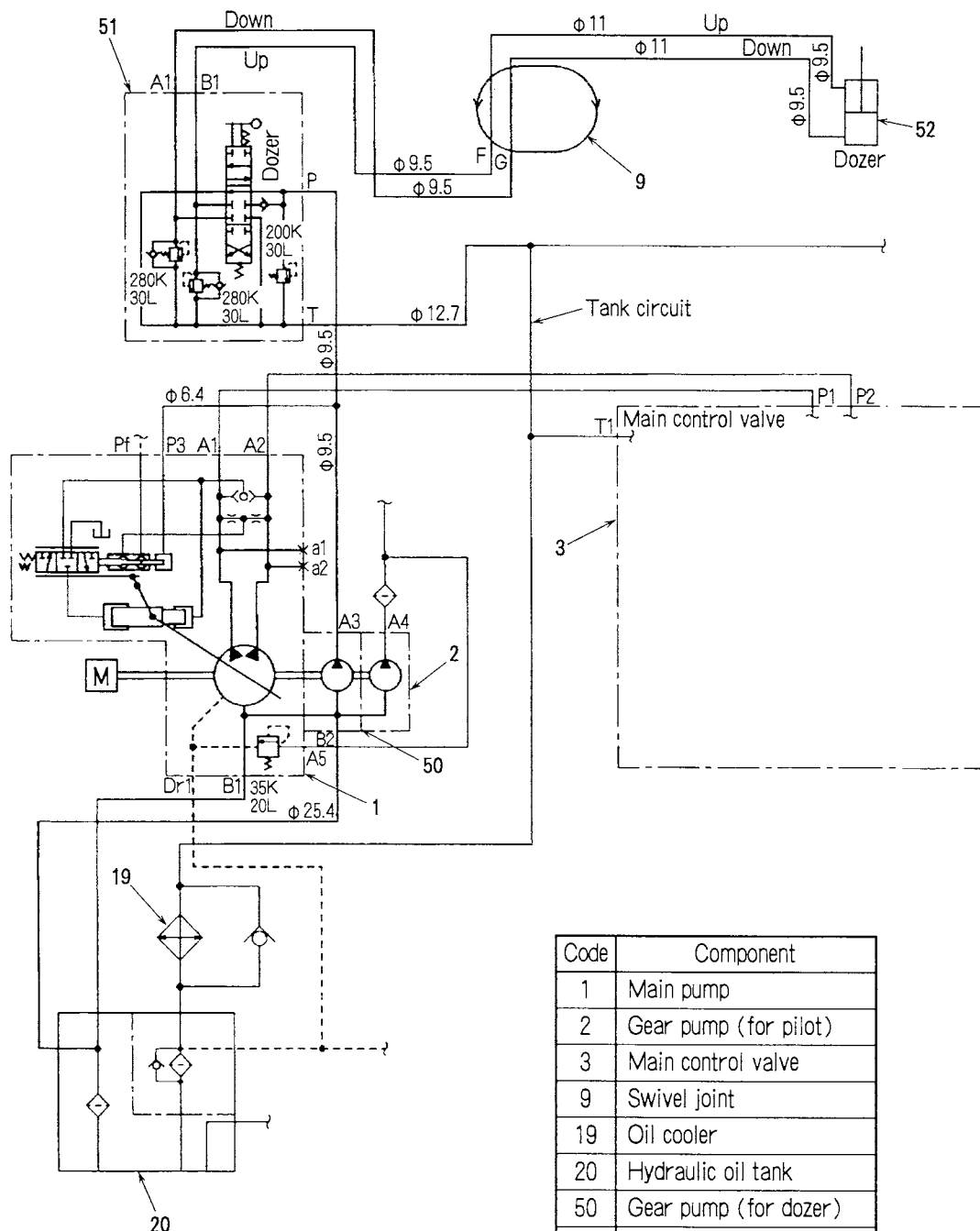


Code	Component
1	Main pump
2	Gear pump (for pilot)
3	Main control valve
12	Solenoid proportional valve block
19	Oil cooler
20	Hydraulic oil tank
50	Control valve (for N & B)
51	Selector valve
52	Stop valve
53	Solenoid valve (for single/confluent circuit changing)
54	Pilot valve (for N&B)

SK70SR

• OPTIONAL HYDRAULIC DIAGRAM

Dozer blade



Notes

1. After raising dozer blade and stopping engine, even if the safety lock lever is set to "Lock" side, the blade may be lowered by shifting dozer lever to "Lower" side incurring danger of injury.

The spool of dozer control valve (51) moves directly by shifting dozer lever to "Lower" side, and the oil in dozer cylinder head side returns into hydraulic oil tank through outside of spool due to its own weight, and the oil made up into dozer cylinder rod side is delivered from hydraulic oil tank and opens check valve of port relief valve and is fed in, then consequently the dozer blade lowers.

2. Auto accel function can not be released by shifting dozer lever independently. And, since the dozer is operated simultaneously with travel operation, the auto accel operation is released through travel operation.
3. To attach dozer blade in local area, adjust main port relief valve of dozer control valve (51) to the specified pressure without fail.

Explanation**1. Control circuit**

Operate dozer lever on operator's seat, and spool of dozer control valve (51) is moved because machine is in manual operation type.

2. Main circuit

- ① Oil delivered by gear pump (50) for dozer reaches to P port of dozer control valve (51).
- ② And it opens load check valve through tandem circuit because spool is moved from P port, passes through the outside of spool, and is fed into dozer cylinder (52) through swivel joint (9).
- ③ The return oil from dozer cylinder passes through swivel joint and dozer control valve (51), and flows into hydraulic oil tank (20) through oil cooler (19) from tank circuit.

Travel straight and dozer blade simultaneous operation

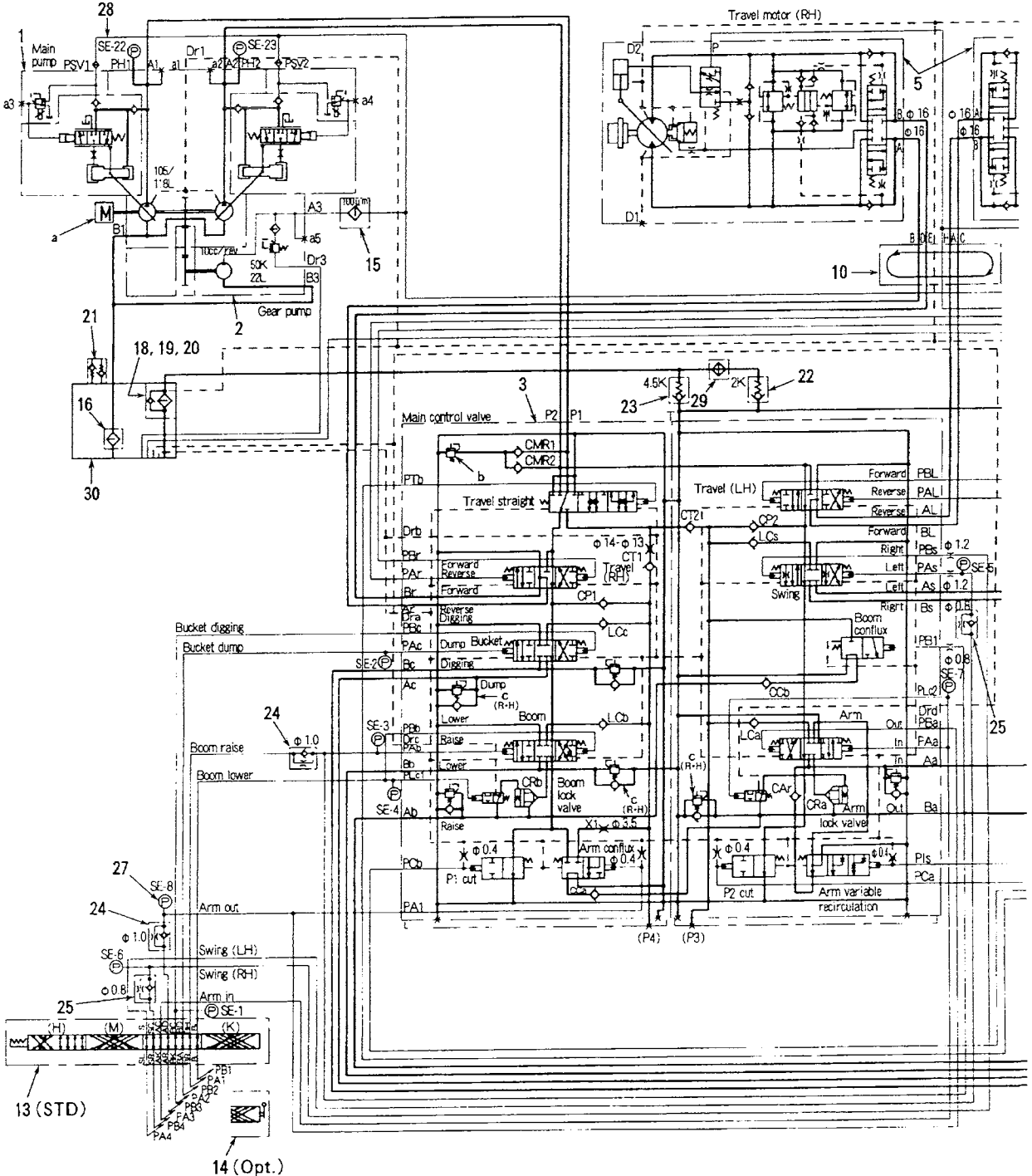
1. Since the travel straight operation is controlled by circuit from main pump (1) and dozer operation is controlled by circuit from gear pump (50) separately, the travel speed is not changed.
2. Auto accel function is released by shifting travel lever, and at the same time the dozer blade can be operated.

SK115SR SK135SR(LC)

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SK115SR • SK135SR • SK135SRLC

● HYDRAULIC DIAGRAM (STD)



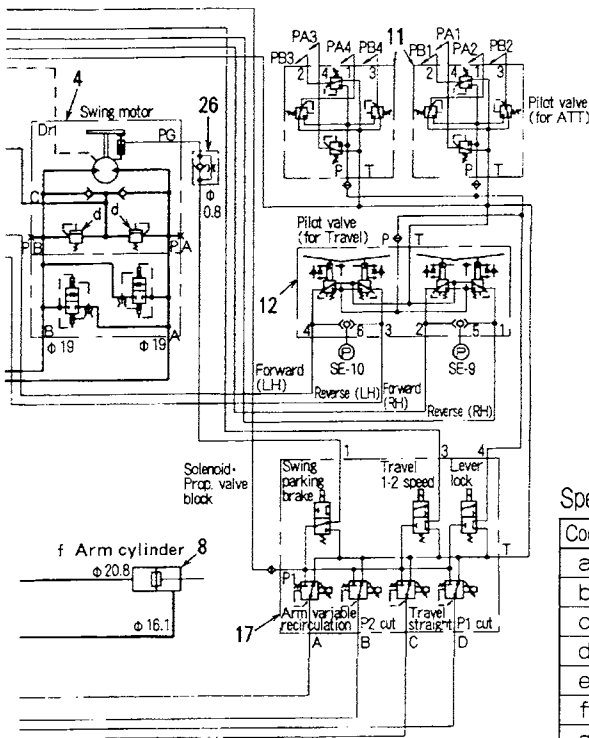
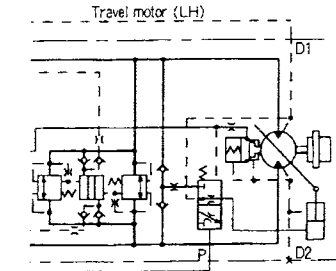
Note : Marks → PA1 and PA1 ← show the connection of line.

SK115SR SK135SR(LC)

Conversion table

MPa	kgf/cm ²
32.4	330
34.3	350
35.8	365
37.7	385
29.4	300
26.0	265
4.9	50

Code	Component
1	Main pump
2	Gear pump (for pilot)
3	Main control valve
4	Swing motor
5	Travel motor
6	Boom cylinder (LH)
7	Boom cylinder (RH)
8	Arm cylinder
9	Bucket cylinder
10	Swivel joint
11	Pilot valve (for ATT)
12	Pilot valve (for Travel)
13	STD Multiless valve (ISO fixed)
14	Multi valve (Opt.)
15	Inline filter
16	Suction strainer
17	Solenoid-Prop. valve block
18	By-pass valve
19	Spring
20	Return filter
21	Breather
22	Boost check valve
23	By-pass check valve
24	Slow return check valve
25	Slow return check valve
26	Slow return check valve
27	Low press. sensor
28	High press. sensor
29	Oil cooler
30	Hydraulic tank



Spec. by model

Code	Component	SK115SR	SK135SR
a	Engine	80PS/2100rpm	85PS/2050rpm
b	Main relief valve	330k/60L	350k/60L
c	Port relief valve	365k/30L	385k/30L
d	Swing port relief valve	265k/105L	300k/105L
e	Boom cylinder	φ 95 × φ 65/995	φ 100 × φ 70/1038
f	Arm cylinder	φ 110 × φ 75/1075	φ 115 × φ 80/1135
g	Bucket cylinder	φ 95 × φ 65/885	←

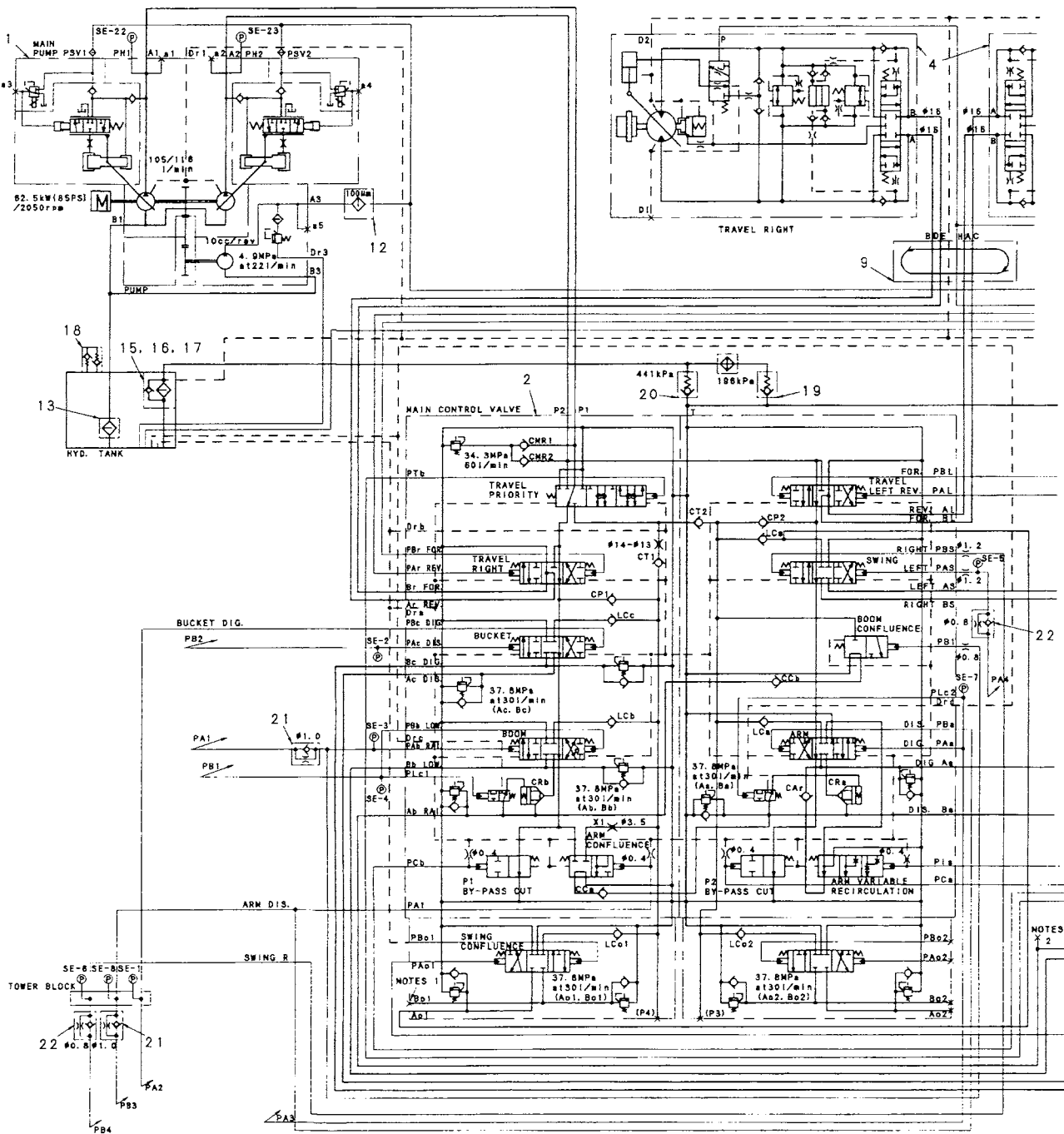
Condition of prop. valve action (solenoid/prop. valve block)

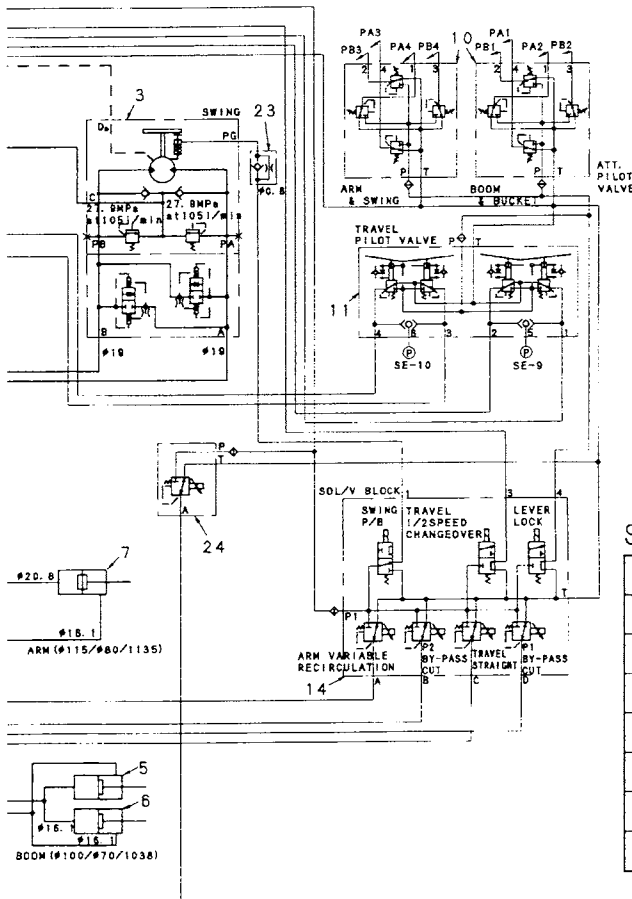
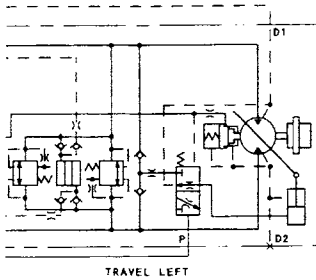
Prop. valve	A Arm variable recirculation	B P2 by-pass cut	C Travel straight	D P1 by-pass cut
Operation				
Boom raise confluent	—	○	—	—
Arm in variable recirculation	○	—	—	—
Arm in sequence confluent	—	—	○	○
Arm out confluent	—	—	—	○
Travel right, Boom, Bucket	—	○	○	—
Travel left, Arm, Swing	—	—	○	○
Travel left & right, Boom, Bucket, Arm, Swing	—	○	○	○

SK135SR • SK135SRLC

● HYDRAULIC DIAGRAM

E.U. spec





Code	Component
1	Main pump
2	Main control valve
3	Swing motor
4	Travel motor
5	Boom cylinder (LH)
6	Boom cylinder (RH)
7	Arm cylinder
8	Bucket cylinder
9	Swivel joint
10	Pilot valve (for ATT)
11	Pilot valve (for travel)
12	Multi valve
13	Suction strainer
14	Solenoid propo. valve block
15	By-pass valve
16	Spring
17	Return filter
18	Breather
19	Boost check valve
20	By-pass check valve
21	Slow return check valve
22	Slow return check valve
23	Slow return check valve
24	Solenoid valve

Spec. by model

Code	Component	SK135SR(LC)
a	Engine	85PS/2050rpm
b	Main relief valve	350k/60L
c	Port relief valve	385k/30L
d	Swing port relief valve	300k/105L
e	Boom cylinder	$\phi 100 \times \phi 70 / 1038$
f	Arm cylinder	$\phi 115 \times \phi 80 / 1135$
g	Bucket cylinder	$\phi 95 \times \phi 65 / 885$

Spec.	Code	SE1 ~ SE10	SE22, 23
Part No.		LC52S00001P1	LC52S00002P1
Pressure range	MPa	0 ~ 2.9	0 ~ 4.9
Power supply	V	0.5 ~ 4.5 DC	0.5 ~ 4.5 DC

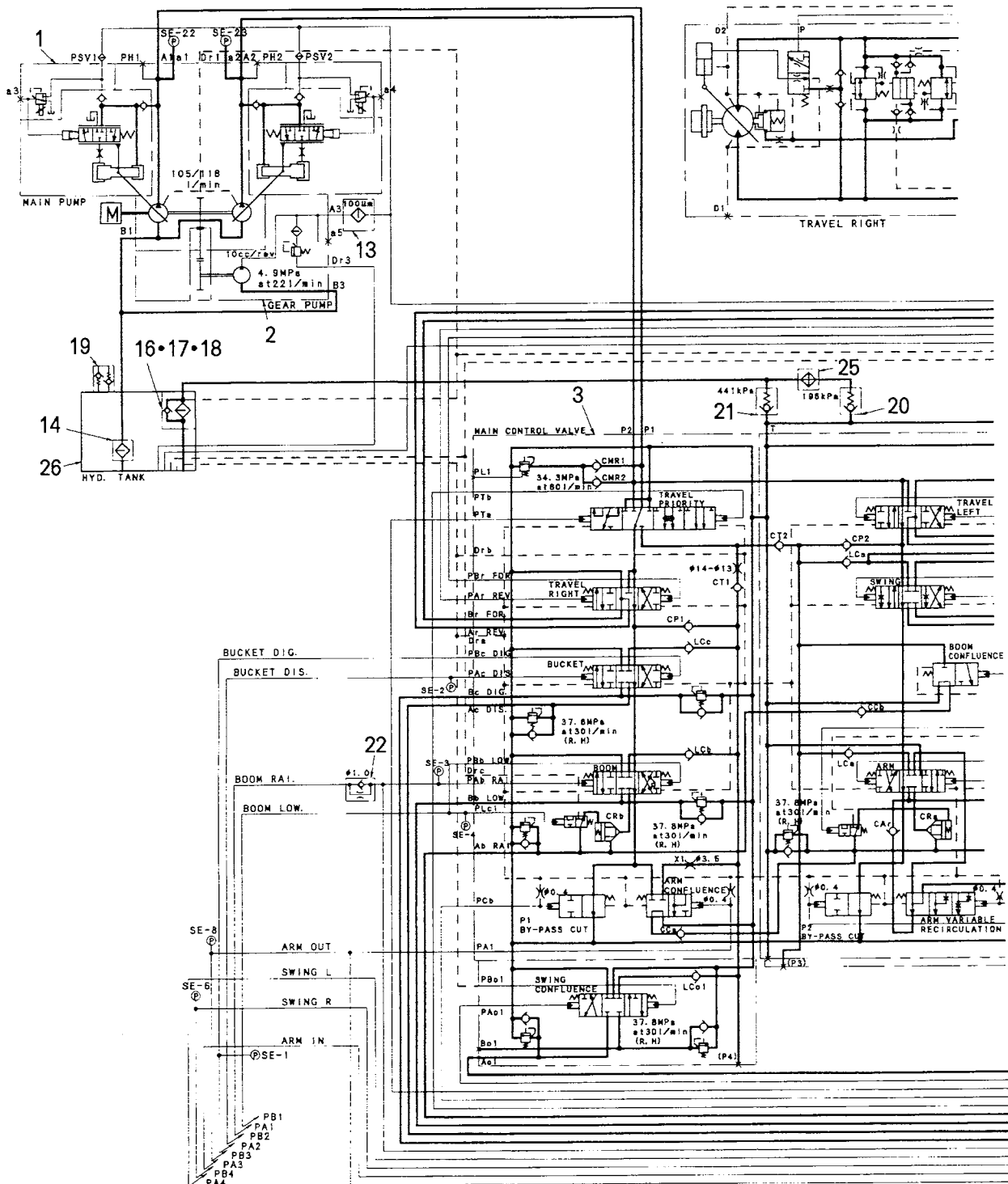
SK115SRdz SK135SRLC

<https://truckmanualshub.com/>

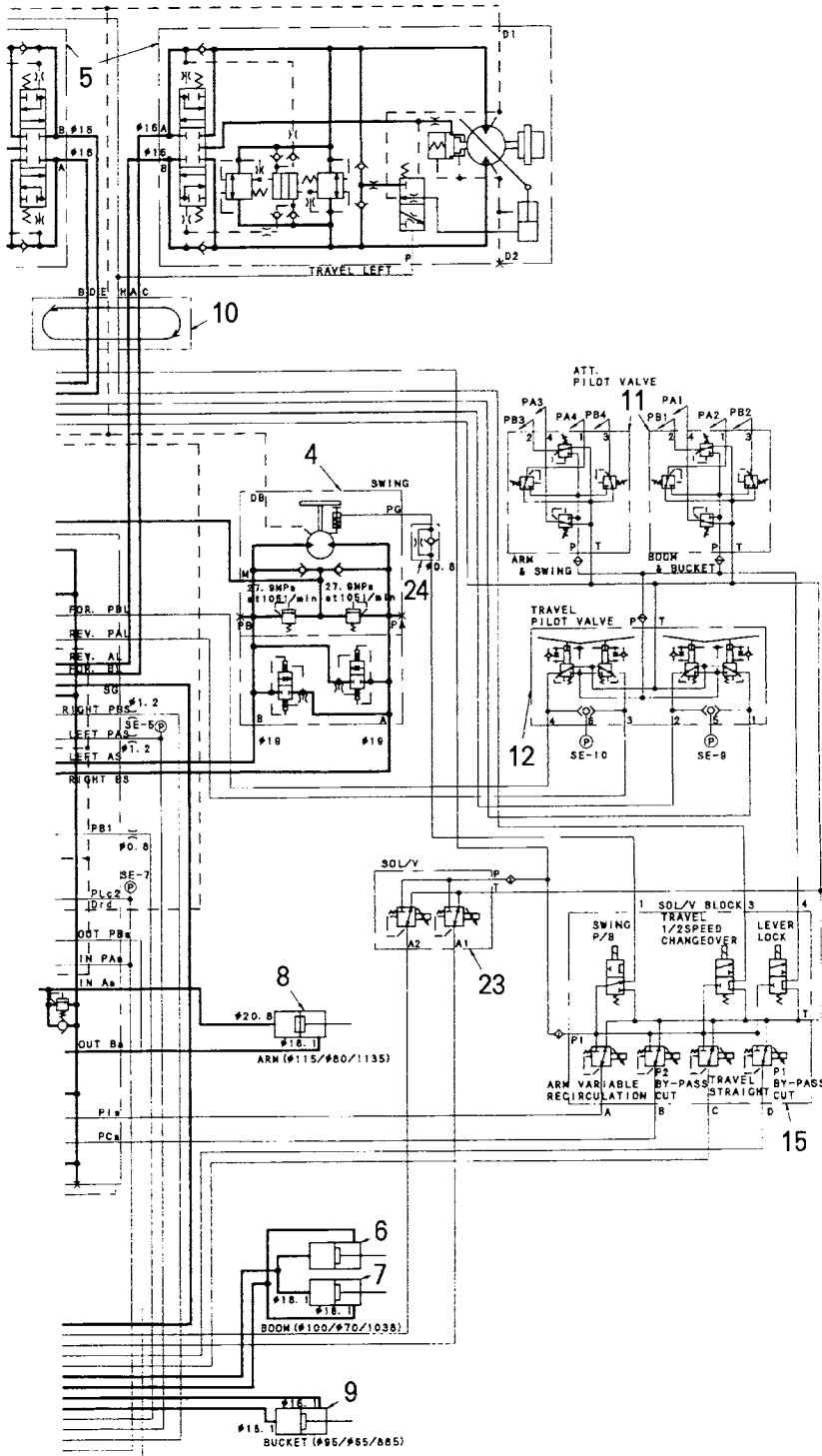
SK115SRdz • SK135SRLC

• HYDRAULIC DIAGRAM

KAI spec.



Note : Marks $\rightarrow$ PA1 and $\leftarrow$ PA1 show the connection of line.

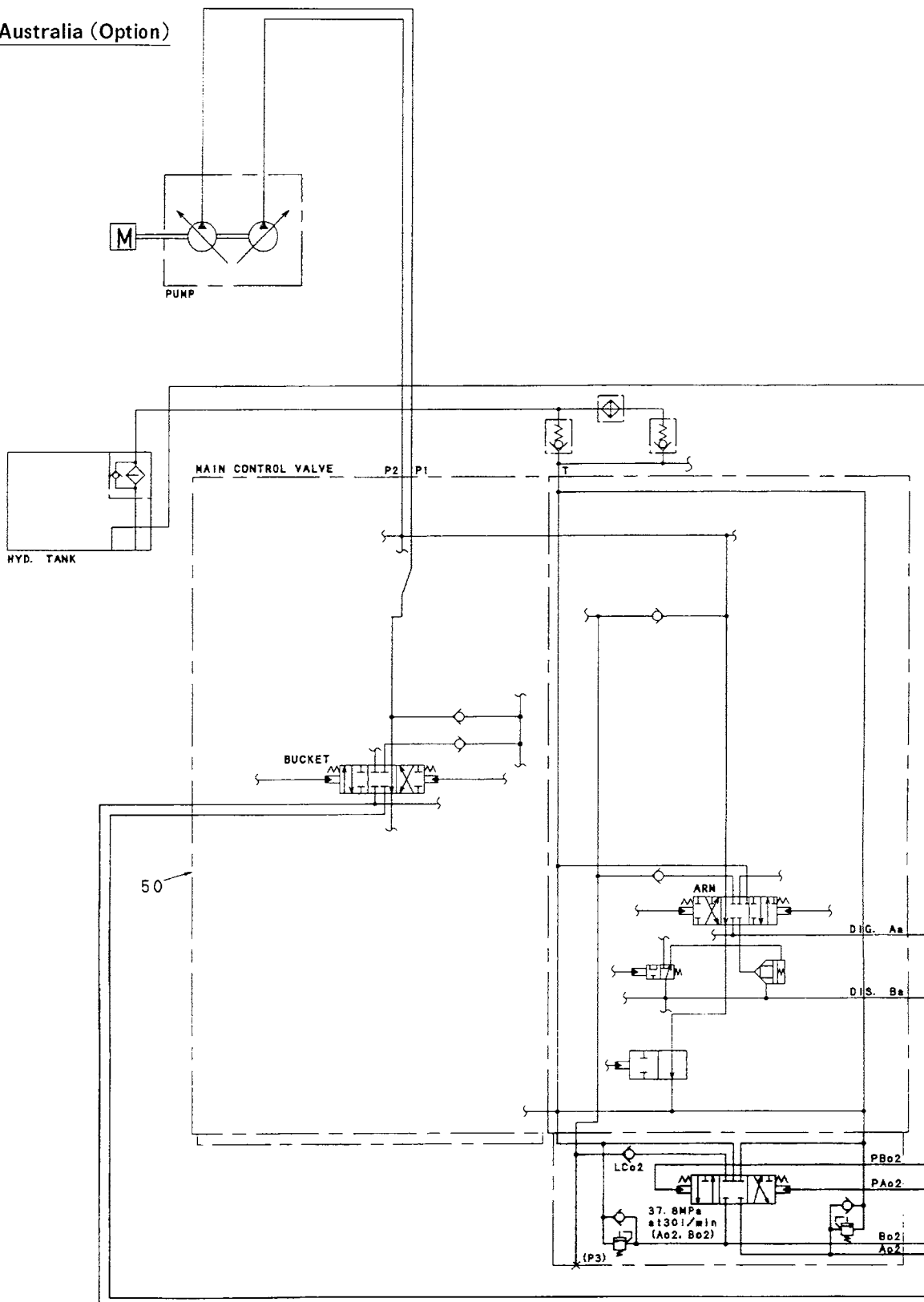


Code	Component
1	Main pump
2	Gear pump
3	Main control valve
4	Swing motor
5	Travel motor
6	Boom cylinder (R.H)
7	Boom cylinder (L.H)
8	Arm cylinder
9	Bucket cylinder
10	Swivel joint
11	Pilot valve (for ATT)
12	Pilot valve (for Travel)
13	Inline filter
14	Suction strainer
15	Solenoid valve block
16	By-pass valve
17	Spring
18	Return filter
19	Breather
20	Boost check valve
21	By-pass check valve
22	Slow return check valve
23	Solenoid valve
24	Slow return check valve
25	Oil cooler
26	Hydraulic tank

SK135SR

● OFF SET HYDRAULIC DIAGRAM

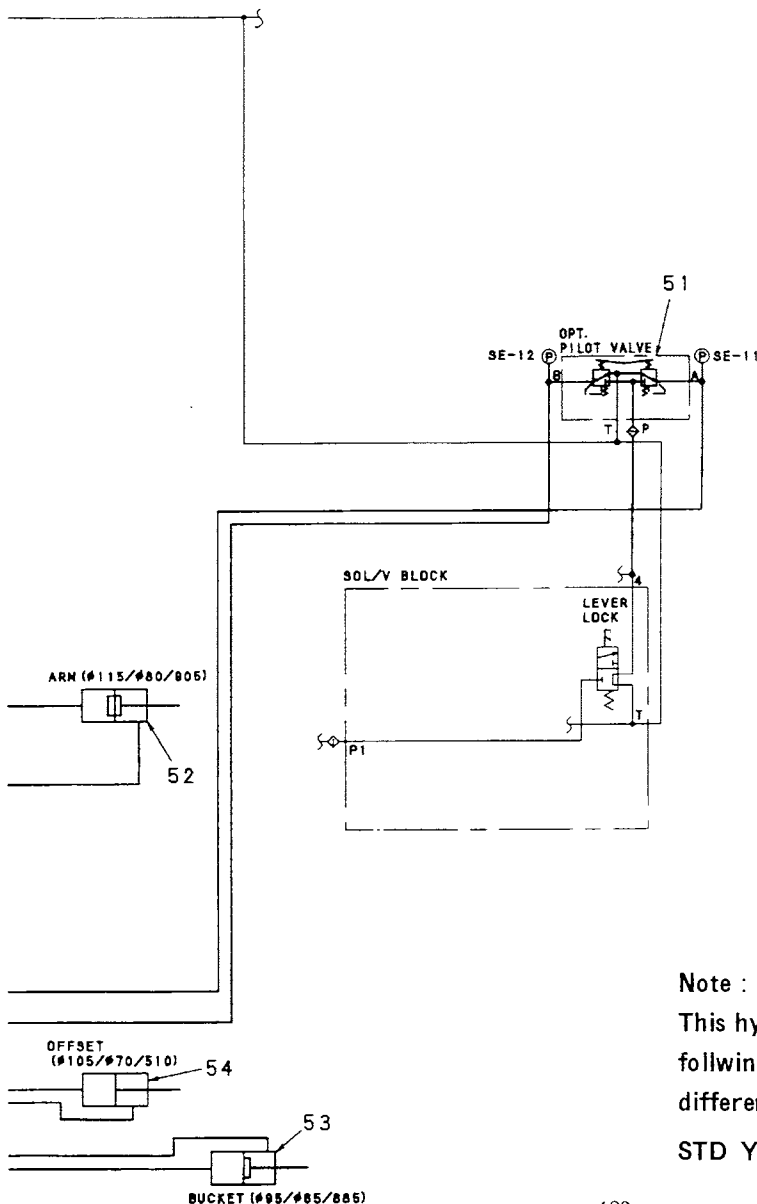
Australia (Option)



Pressure sensor specification

Spec.	Code	SE11, 12
Part No.		LC52S00001P1
Pressure range	MPa	0 ~ 2.9
Power supply	V	0.5 ~ 4.5V DC

Code	Component
50	Control valve
51	Pilot valve
52	Arm cylinder
53	Bucket cylinder
54	Offset cylinder

**Note :**

This hydraulic circuit is used by adding following circuit. Code 50 for main C/V is different from STD machine.

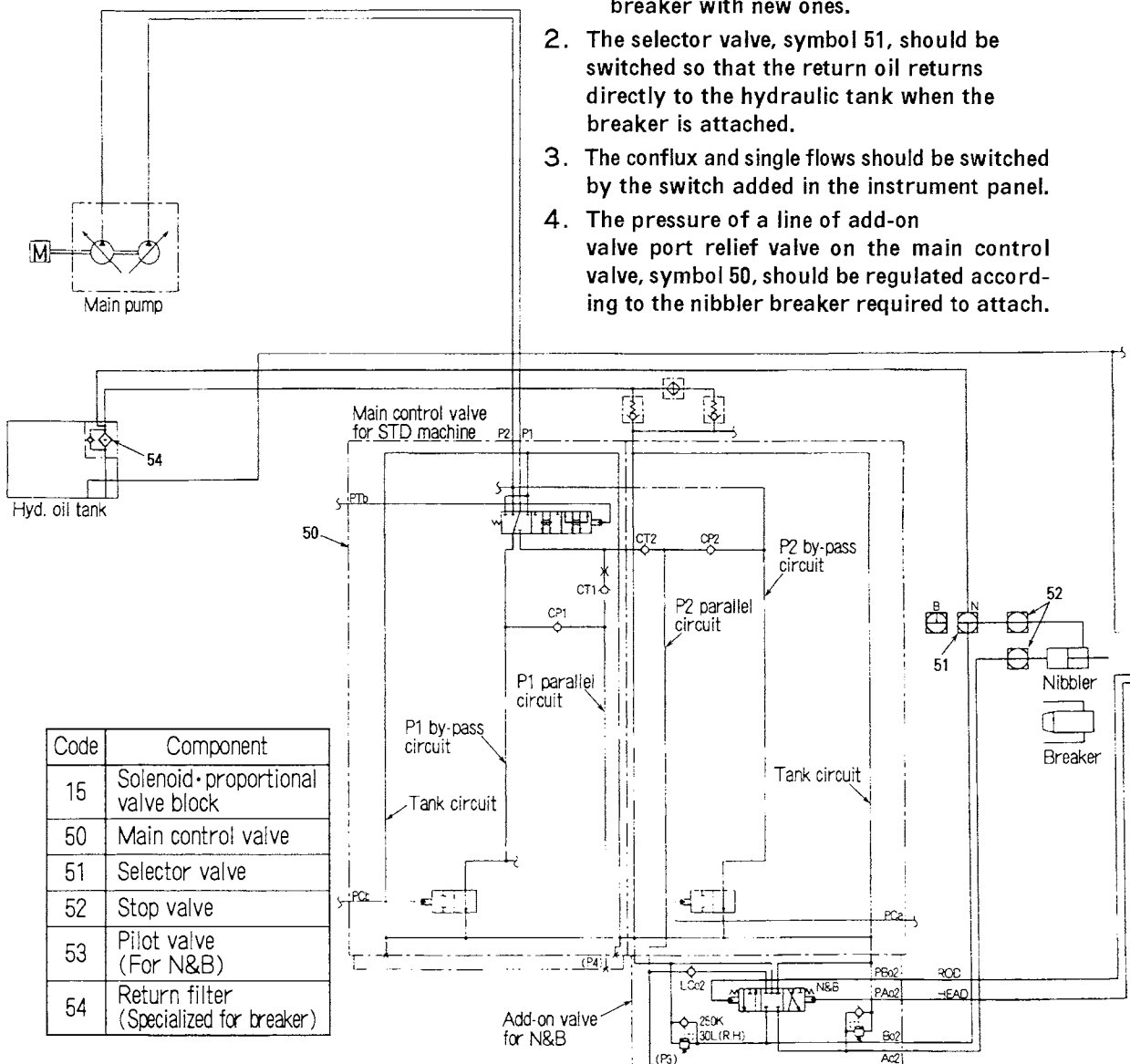
STD YY01Z00001P1

● HYDRAULIC DIAGRAM

N & B (Option)

Note :

1. Item 50 for main C/V and item 54 for return filter are different from those of STD machine.
 - Add the add-on valve to the standard main control valve.
 - Replace the return filter and filter for the breaker with new ones.
2. The selector valve, symbol 51, should be switched so that the return oil returns directly to the hydraulic tank when the breaker is attached.
3. The conflux and single flows should be switched by the switch added in the instrument panel.
4. The pressure of a line of add-on valve port relief valve on the main control valve, symbol 50, should be regulated according to the nibbler breaker required to attach.



Select condition and Proportional valve command

	Select condition		Proportional valve command (ON : ○, OFF : —)				
	Single/conflux select SW	Selector valve (51) SW	P1 pump	P2 pump	Travel straight	P1 by-pass cut	P2 by-pass cut
Nibbler conflux	Conflux ON	N	○	○	○	○	○
Nibbler single	Conflux OFF	N	—	○	—	—	○
Breaker	Conflux OFF	B	—	○	—	—	○

Operation

A. Breaker circuit

1. Pilot circuit

- ① The pilot pump delivery oil flows to P1 port of the solenoid proportional valve block (15).
- ② With the lever lock operation, the delivery oil flows to pilot valve (53) (for N&B) and pilot valve for ATTs through port 4.
- ③ With the operation of pilot valve (53), the pressure oil acts on control valve (50) for N&B and switches the spool.
- ④ Concurrently, the low pressure sensors SE-11, SE-12 outputs the signal to the mechatro controller, and acts on the hydraulic pump proportional valve, and increases the flow rate and switches the P2 cut spool.
- ⑤ With simultaneous boom raise and breaker operation, P1 pump acts on the boom raise operation, enabling the boom to be raised.

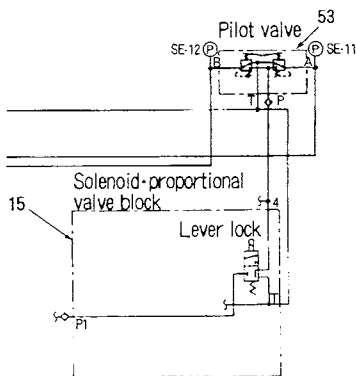
2. Main circuit

- ① P2 pump delivery oil passes through P2 port of main control valve (50) and flows to P2 by-pass circuit from the upper side of the travel straight section.
- ② The P2 by-pass circuit is closed because the P2 cut spool is moved, and delivery oil opens the load check valve CP2 and flows to P2 parallel circuit.
- ③ And opens the load check valve LCo2 of add-on valve through P2 parallel circuit, and passes on the outside of the spool and stop valve (52) and fed into the breaker.
- ④ The return oil from the breaker passes through stop valve (52) and selector valve (51) B, and directly returns to the specialized return filter (54) for the breaker of the hydraulic tank.

B. Nibbler circuit

1. Pilot circuit

- ① The operation of pilot circuit is the same as Articles (1) to (3) of the breaker circuit.
- ② Concurrently, the low pressure sensors SE-11, SE-12 output the signal to the mechatro controller, and the flow rates delivered by P1 and P2 pumps are increased.
- ③ In addition, press the single/conflux selector switch, and the mechatro controller outputs the command current to respective travel straight, P1 cut and P2 cut proportional valve, and moves the spool to the conflux circuit position.
- ④ With simultaneous boom raise and nibbler operation, P1 pump acts on the boom raise operation, enabling the boom to be raised.

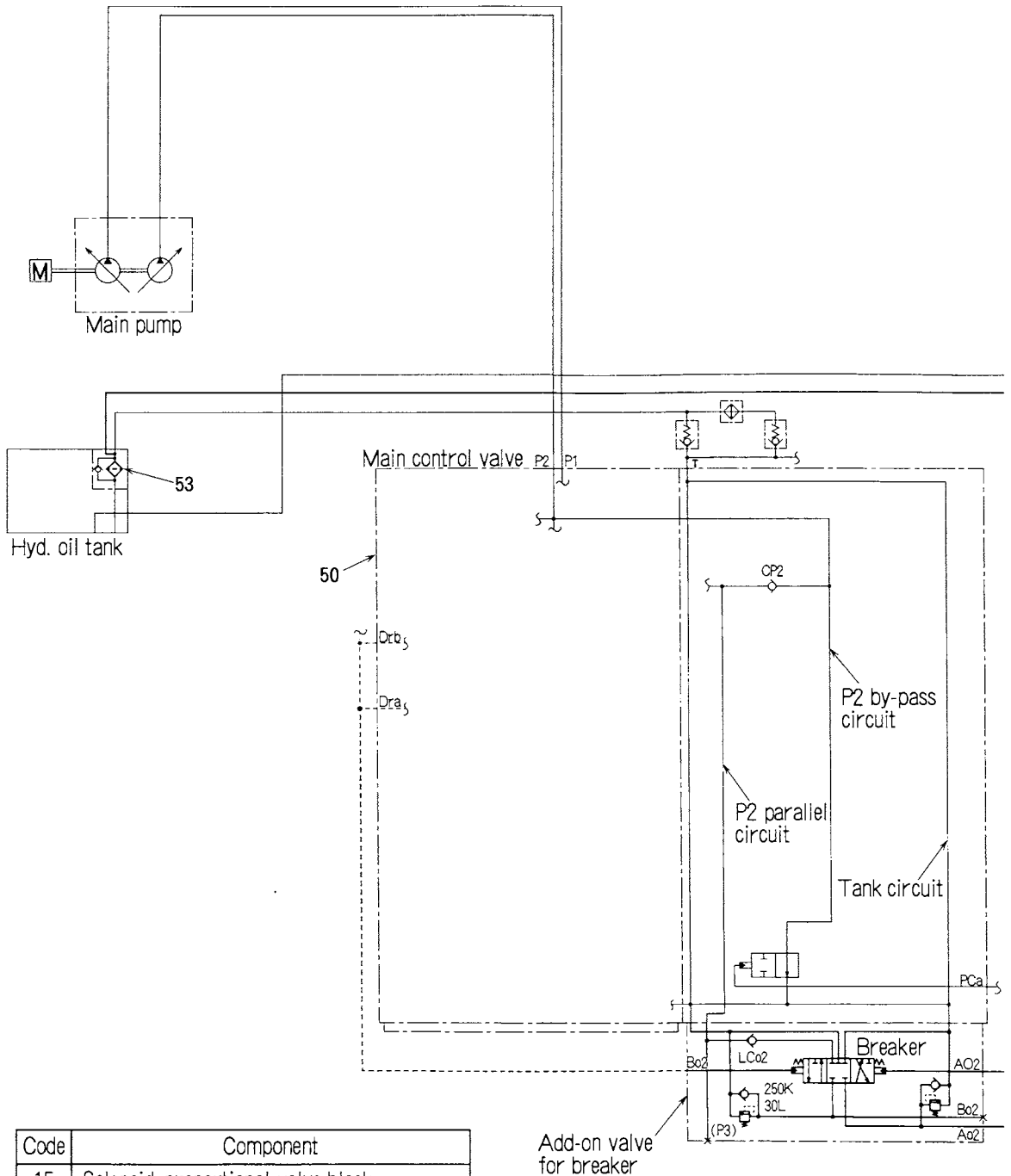


2. Main circuit

- ① P1 pump delivery oil flows to the travel straight section through P1 port of main control valve (50), but flows to P1 by-pass circuit and P1 parallel circuit because the spool is moved.
- ② The P1 by-pass circuit is closed because the P1 cut spool is moved, and the P1 parallel circuit is also closed.
- ③ And the delivery oil opens the load check valve CT2 and flows to the P2 parallel circuit.
- ④ The P2 pump delivery oil flows to the travel straight section through the P2 of the main control valve (50), but flows in the same way as shown in Articles (2) and (3).
- ⑤ Concurrently the delivery oil flows from the upstream of the travel straight section to the P2 by-pass circuit, but the opens the load check valve CP2, flows to the P2 parallel circuit, and conflues the oil delivered by P1 pump and P2 pump, because the P2 cut spool is closed.
- ⑥ And the oil opens the load check valve LCa2 of the add-on valve through P2 parallel circuit, and is fed into the nibbler cylinder because the spool is closed.
- ⑦ The return oil from the nibbler cylinder passes through selector valve (51) N and add-on valve and main control valve (50) and returns to the hydraulic tank through the oil cooler.

● HYDRAULIC DIAGRAM

Breaker (Option)

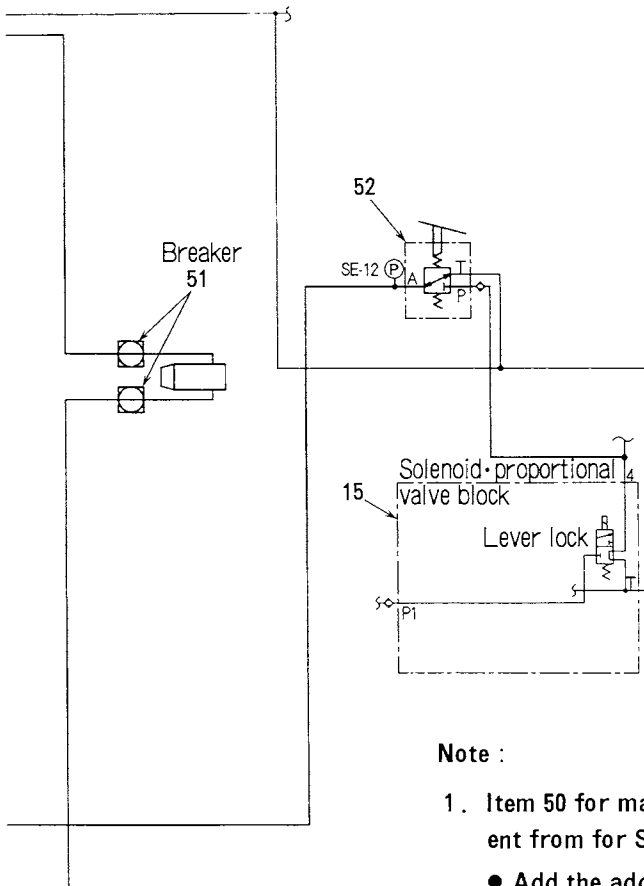


Code	Component
15	Solenoid-proportional valve block
50	Main control valve
51	Stop valve
52	Pilot valve (Specialized filter for breaker)
53	Return filter (Specialized filter for breaker)

Operation

1. Pilot circuit

- ① The pilot gear pump delivery oil flows to P1 port of the solenoid proportional valve block (15).
- ② With the lever lock operation, the delivery oil flows to pilot valve (52) (for breaker) and pilot valve for ATTs through port 4.
- ③ With the operation of pilot valve (52), the pressure oil acts on control valve (50) for breaker and switches the spool.
- ④ Concurrently, the low pressure sensor SE-12 outputs the signal to the mechatro controller, and acts on the hydraulic pump proportional valve (for P2), and increases the flow rate and switches the P2 cut spool.
- ⑤ With simultaneous boom raise and breaker operation, P1 pump acts on the boom raise operation, enabling the boom to be raised.



2. Main circuit

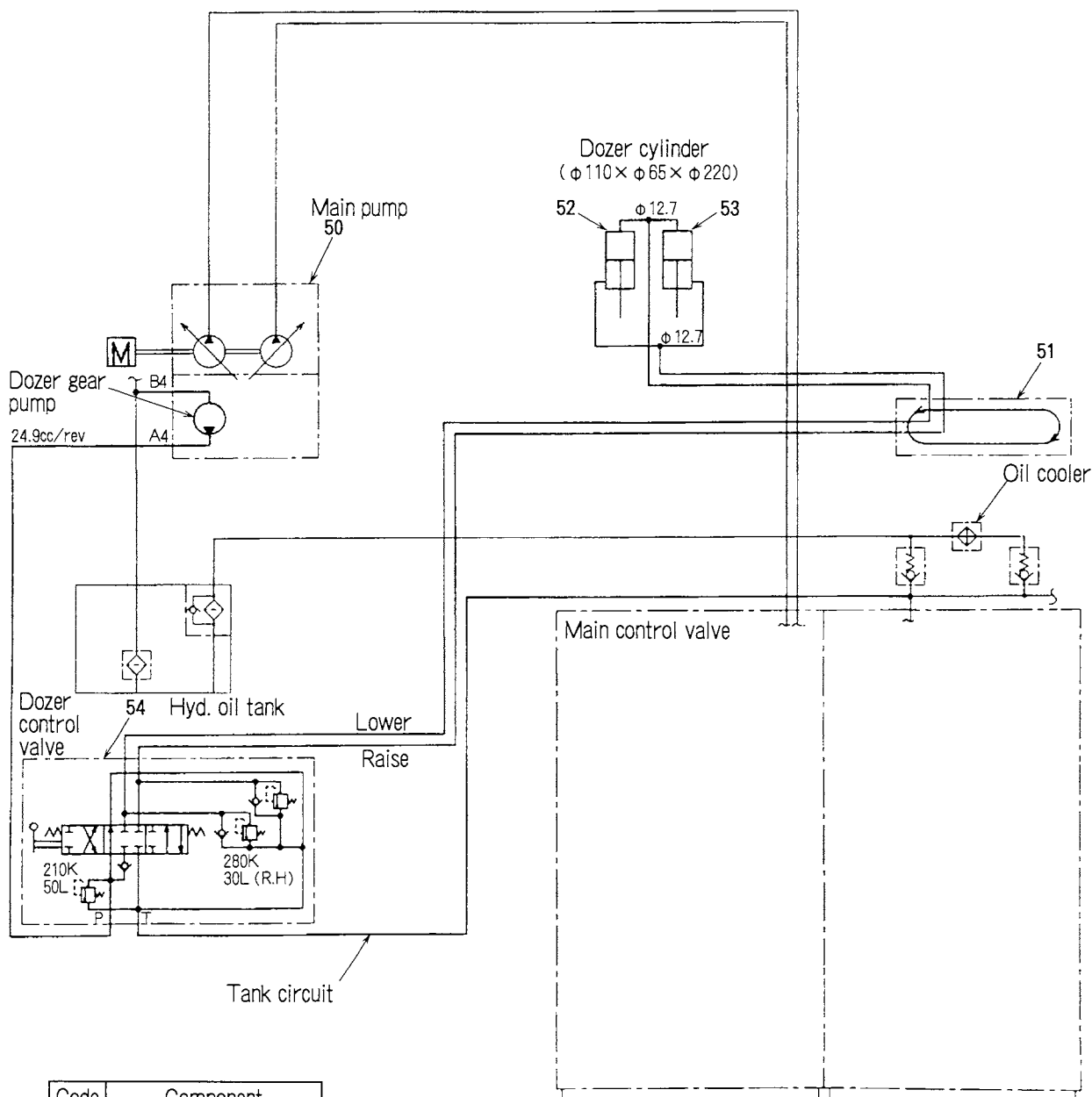
- ① P2 pump delivery oil passes through P2 port of main control valve (50) and flows to P2 by-pass circuit from the upper side of the travel straight section.
- ② The P2 by-pass circuit is closed because the P2 cut spool is moved, and delivery oil opens the load check valve CP2 and flows to P2 parallel circuit.
- ③ And, it opens the load check valve LCo2 of add-on valve through P2 parallel circuit, and passes on the outside of the spool and stop valve (51) and is fed into the breaker.
- ④ The return oil from the breaker passes through stop valve (51), and directly returns to the specialized return filter (53) for the breaker of the hydraulic tank.

Note :

1. Item 50 for main C/V and item 54 for return filter are different from for STD machine.
 - Add the add-on valve to the standard main control valve.
 - Replace the return filter and filter for the breaker with new ones.
2. The pressure of add-on valve port relief valve on the main control valve, symbol 50, should be regulated according to the breaker it is required to attach.

● HYDRAULIC DIAGRAM

Dozer blade (Option) (SK115SRdz ... STD)



Code	Component
50	Main pump
51	Swivel joint
52	Dozer cylinder
53	Dozer cylinder
54	Dozer control valve

Operation

1. Control circuit

With the dozer lever operation on the operator's seat, the dozer control valve (54) is moved because of the manual operation type.

2. Main circuit

- ① Gear pump delivery oil for the dozer flows to the P port of dozer control valve (54).
- ② The delivery oil opens the load check valve through the tandem circuit because the spool is moved from the P port position, and passes on the outside of the spool, and is fed to dozer cylinders (52, 53) through swivel joint (51).
- ③ The return oil from dozer cylinders (52, 53) flows through swivel joint (51) and dozer control valve (54), and returns into the hydraulic tank through the tank circuit.

Travel straight and dozer blade simultaneous operation

- ① For this machine, the travel operation is controlled by the main pump circuit and the dozer blade operation is controlled by the gear pump circuit separately, without affecting the travel speed.
- ② The auto accel function is released with the operation of the travel lever, and concurrently the dozer blade becomes available.

Note :

1. There is the danger that the blade may be lowered by turning the dozer lever to the "LOWER" side, even if the safety lever lock is locked after the engine stops.

Because the spool of dozer control valve (54) moves directly by turning the dozer lever to the "LOWER" side, the oil in the dozer cylinder head side returns into the hydraulic tank through the outside of the spool due to the dozer blade own weight, and the oil opens the check valve on the port relief valve through the hydraulic tank, and is fed to the cylinder rod side as a make-up oil, consequently the dozer blade lowers.

2. The auto accel function is not released with the dozer lever only.
And, since the work with the dozer is carried out concurrently with the travel operation, the auto accel function is released with the travel operation.
3. Make sure to adjust the pressure of the main port relief valve on dozer control valve (54) to the specified pressure after the installation of dozer blade at the site.

SUPPLEMENTARY EXPLANATION FOR SK135SRLC HYDRAULIC CIRCUIT DIAGRAM (KAI Spec.)

SK135SR LC

● Principal Modification

1. The C/V travel straight section is made up of four positions.
2. One spool add-on valve is added on the downstream of block on the C/V P1 side and is used as the slewing conflux section.
3. Two spool proportional valve is added, and one spool is used for pressure releasing, and other spool for the slewing conflux operation.

A. Travel Straight System Control

- ① Operate the travel and ATT operations concurrently, and each pressure sensor detects the signal, and the signal is input into the mechatro controller, and the mechatro controller processes the pilot signal and outputs the current corresponding to the command value to the travel straight proportional valve.
- ② The proportional valve secondary pressure corresponding to the output current acts on the PTb port in the C/V travel straight section, and the travel straight proportional valve has the travel straight spool half-stroked upward.
- ③ After the travel straight proportional valve has half-stroked, the travel straight condition is obtained. However, the P1 and P2 pump delivery oil is led through the notched orifice outside of spool.

Note : The purpose of this connection is to prevent the travel hunting.

- ④ The P2 pump delivery oil acts on the travel motor to drive, and the P1 pump acts on the ATT to move.

Consequently the travel speed is reduced, but the machine travels straight without deviation.

Note : In the half-stroke condition, the P1 and P2 pump delivery oil is led through the notched orifice outside of spool, therefore the load of either of travel operation and ATTs becomes higher, and consequently the high loaded section becomes unavailable to operate.

- ⑤ After the travel straight spool is fully stroked, the P1 and P2 pump delivery oil is completely isolated, and the P2 pump delivery oil acts on the travel motor to drive, and the P1 pump delivery oil acts on the ATTs to operate. This function is called "New Travel Straight System".

Note : After the spool is fully stroked, the malfunction shown in Note in Article ④ is removed, the travel and ATTs operations are normal, and the machine travels straight without deviation.

B. Arm-in Slewing Priority System Control

1. After the slewing operation concurrently with the arm-in operation (or the arm-in operation concurrently with the slewing operation), the pilot secondary pressure acts on the arm spool and slewing spool to switch, and is input in each low pressure sensor.
2. The low pressure sensor output voltage is input into the mechatro controller corresponding to the input voltage to the P1 and P2 pump, P1 and P2 cut, slewing priority and arm variable recirculation proportional valves respectively, and also outputs to the slewing parking brake solenoid valve.
3. Each proportional valve outputs the proportional valve secondary pressure corresponding to the command value output by the mechatro controller, changes the delivery rate of P1 and P2 pumps and also changes the P1 and P2 cut valve, slewing priority valve and arm variable recirculation valve on C/V .
4. The slewing parking brake solenoid valve release the braking because the exciting signal output by the mechatro controller is cut.

Supplementary Explanation in Detail for Operation on the Hydraulic Circuit

- ① After arm-in and slewing concurrent operation, the pilot secondary pressure acts on PAa port in the C/V P2 side block arm section and PAs, PBs ports in the slewing section, and have the arm spool and slewing spool moved.
- ② Concurrently, the pilot secondary pressure acts on the P1c2 port in the arm section and release the arm lock valve.
- ③ And, the proportional valve secondary pressure acts on the PA01 port in the block arm section on the C/V P1 side through the slewing priority proportional valve A2 port, and moves the slewing confluent spool.
- ④ And, the proportional valve secondary pressure acts on the PCb port in the block P1 cut arm confluent section on the C/V P1 side through P1 and P2 cut proportional valve D and B ports and moves the P1 cut spool, and acts on the PCa port in the block P2 cut arm variable recirculation section on the C/V P2 side and moves the P2 cut spool.

Note : The arm variable recirculation spool returns from the full stroke position to the neutral position to cut the recirculation.

- ⑤ The P2 pump delivery oil flows through block P2 port on the C/V P1 side, and reaches to the slewing section through the block left travel section on P2 side from the by-pass circuit on P2 side on the upstream of the travel straight section.
- ⑥ Because the slewing spool in the slewing section is moved, the by-pass circuit on P2 side, the by-pass circuit on P2 side is closed, and the load check valve CP2 on the lower stream of the travel left section is opened, and is connected to the parallel circuit on P2 side.

Note : A part of the by-pass circuit on P2 side passes through the orifice outside of the slewing spool and flows to the downstream.

- ⑦ And the delivery oil opens the load check valve LCs through the parallel circuit on P2 side and reaches to the slewing spool through U-shaped passage.
- ⑧ The delivery spool passes through outside of the slewing spool and feeds into the slewing motor through the C/V AS, BS ports.

- ⑨ On the other hand, the P1 pump delivery oil flows through the block P1 port on C/V P1 side, and reaches to the by-pass circuit on P1 side through the travel straight section.
- ⑩ The by-pass circuit on P1 side is closed because the P1 cut spool is moved, and opens the load check valve CP1 on the downstream of the travel right section and flows into the parallel circuit on P1 side.
- ⑪ The delivery oil opens the load check valve LC01 through the parallel circuit on P1 side and flows into the slewing priority spool through U-shaped passage.
- ⑫ And the oil passes through on the outside of slewing priority spool and flows through SG port in the block slewing section on P2 side from the C/V AO1 port, confluges with the oil delivered by P2 pump and is fed into the slewing motor.
- ⑬ And for the arm side, the delivery oil passes through the parallel circuit on P2 side and opens the load check valve LCa and reaches to the arm spool through U-shaped passage.
- ⑭ And the oil passes through the outside of the arm spool, and feeds into the arm cylinder head side through the C/V Aa port.
- ⑮ The return oil in the arm cylinder rod side flows to the C/V Ba port, and passes through the arm recirculation circuit because the arm lock valve is open, and consequently reaches to the arm variable recirculation section.
- ⑯ The arm variable recirculation spool is cut to recirculate by the command output by the mechatro controller (neutral position), all the return oil in the arm recirculation circuit returns into the hydraulic tank through the tank circuit.
- ⑰ The return oil from the slewing motor reaches to the arm spool from the C/V AS, BS port, passes through the outside of the arm spool and returns into the hydraulic tank through the tank circuit.

Arm and Slewing Operation

1. During the arm-out independent operation, the function is switched to P1 and P2 pump delivery oil conflux circuit, and the arm spool, P1 cut spool and arm conflux spool are moved.
2. During the arm-in independent operation, the P2 pump and arm spool, arm lock valve, arm variable recirculation spool and slewing parking brake are released, and the return oil from the arm cylinder rod side is recirculated on the head side.
3. During the slewing independent operation, the P2 pump and slewing spool, and P2 cut spool actuates, and the slewing parking brake is released. (This is not conflused circuit.)
4. During the arm-in and slewing concurrent operation, the P1 and P2 pumps and arm spool, slewing spool, slewing conflux spool, P1 cut spool, arm lock valve and arm variable recirculation valve actuates, and the slewing parking brake is released.
That is, only during the slewing operation, P1 and P2 delivery oil is conflused, the arm is actuated with the P2 pump and the arm variable recirculation is not performed to improve the capacity in the slewing priority operation.

C. Reasons why 2 Spools Proportional Valve is added

1. To use for pressure releasing

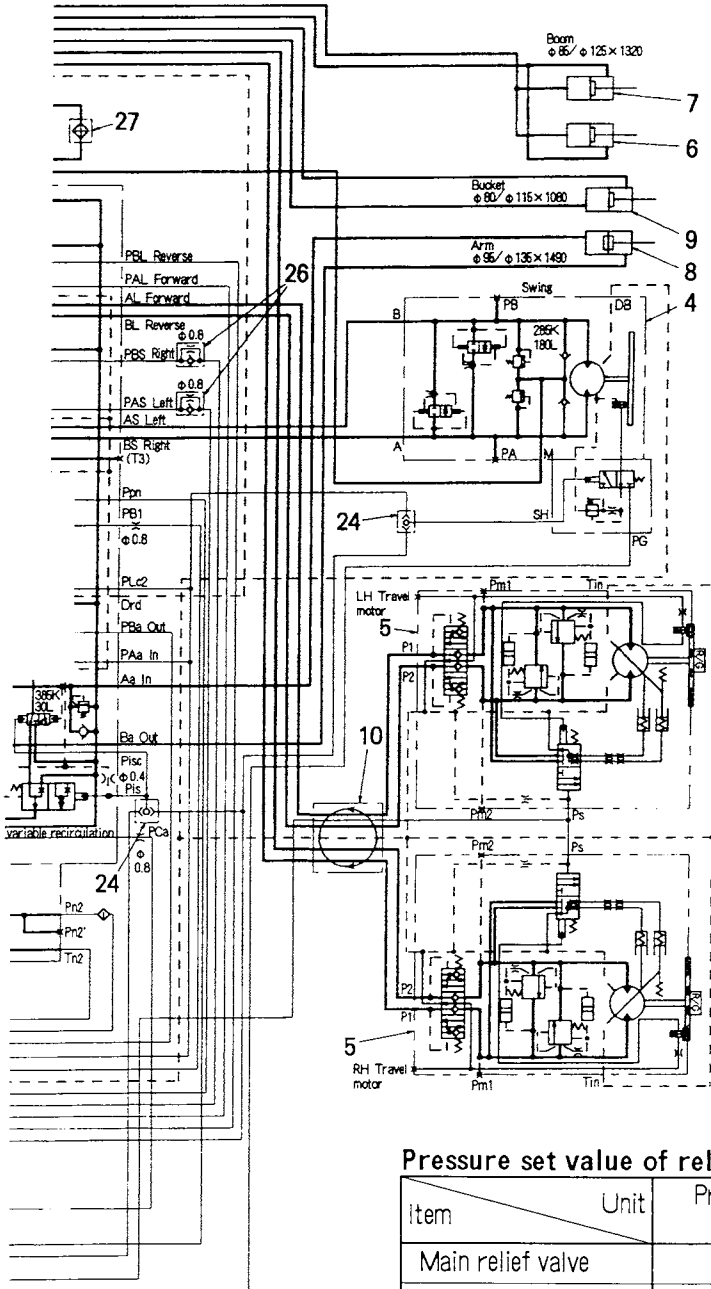
- ① One spool is for the pressure release. Turn the pressure release switch on, and the pressure is input in the mechatro controller, executes the pilot signal processing, and the command current is output to the governor motor and the engine revolution (rpm) is reduced to the speed lower than the low speed.
- ② At the same time, the mechatro controller outputs the command current to the pressure release proportional valve, the proportional valve secondary pressure acts on the PTa port in the C/V travel straight section, and moves the travel straight spool down.
- ③ After the travel straight spool is moved, P1 and P2 pump delivery oil enters into the C/V P1 and P2 ports, flows in the tank circuit through the outside of travel straight spool, and returns in the hydraulic tank.
- ④ In this condition, each ATT and travel control lever is, operated and the pressure oil in the circuit is connected to the tank circuit and consequently the pressure is released.
- ⑤ Turn the engine off and press the air bleeder on the upper section of hydraulic tank, and the pressure in the tank is released. Remove the pipes on the abnormal section to repair.

2. In the arm-in and slewing operation, execute the slewing operation in preference to the arm-in operation

- ① Execute the arm-in and slewing operation concurrently, and each sensor senses the pressure, and the pressure is input to the mechatro controller, executes the pilot signal processing, output the signal to the slewing priority proportional valve, and acts on the slewing conflux spool.
- ② Only during the slewing operation, P1 and P2 pump delivery oil is conflused, the arm is operated by P2 pump delivery oil, and the arm variable recirculation is cut, and consequently the slewing operation has priority over the arm-in operation.

● HYDRAULIC DIAGRAM



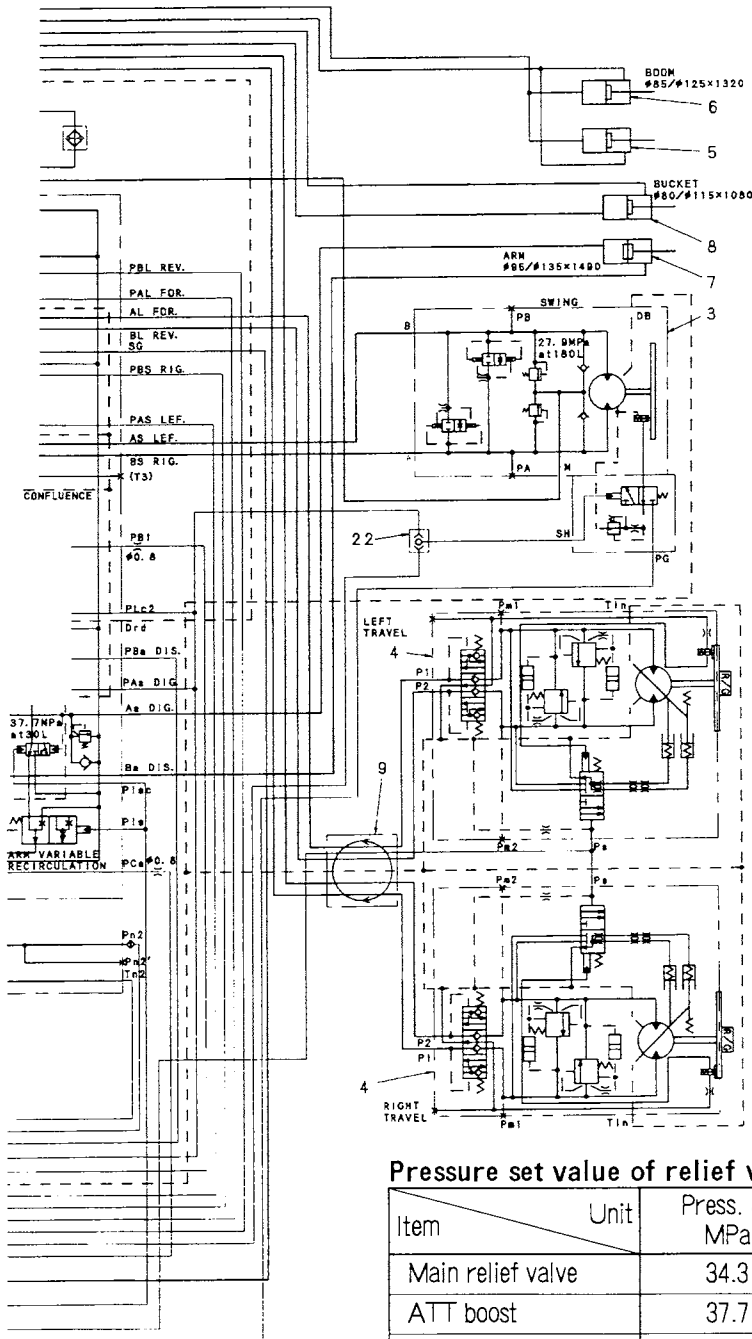


Code	Component
1	Main pump
2	Gear pump (for Pilot)
3	Main control valve
4	Swing motor
5	Travel motor
6	Boom cylinder (RH)
7	Boom cylinder (LH)
8	Arm cylinder
9	Bucket cylinder
10	Swivel joint
11	Pilot valve (for ATT)
12	Pilot valve (for Travel)
13	Multifunction control valve (STD)
14	Multi control valve (Opt.)
15	Manifold block
16	Accumulator
17	Suction strainer
18	Solenoid-Propo. valve block
19	By-pass valve
20	Return filter
21	Air breather
22	Boost check valve
23	By-pass check valve
24	Shuttle valve
25	Restrictor
26	Restrictor
27	Oil cooler
28	Hydraulic tank

Pressure set value of relief valve

Item	Unit	Press. SI MPa	Press. JIS kgf/cm ²	Flow rate L/min
Main relief valve		34.3	350	100
ATT boost		37.7	385	60
Port relief valve		39.7	405	30
Port relief valve		37.7	385	30
Swing relief valve		27.9	285	180
Pilot relief valve		4.9	50	20

● HYDRAULIC DIAGRAM



Code	Component
1	Main pump
2	Main control valve
3	Swing motor
4	Travel motor
5	Boom cylinder (RH)
6	Boom cylinder (LH)
7	Arm cylinder
8	Bucket cylinder
9	Swivel joint
10	Pilot valve (for ATT)
11	Pilot valve (for travel)
12	Multi valve
13	Manifold block
14	Accumulator
15	Suction strainer
16	Solenoid - Propo. valve block
17	By-pass valve
18	Return filter
19	Air breather
20	Boost check valve
21	By-pass check valve
22	Shuttle valve
23	Shuttle valve
24	Restrictor
25	Valve

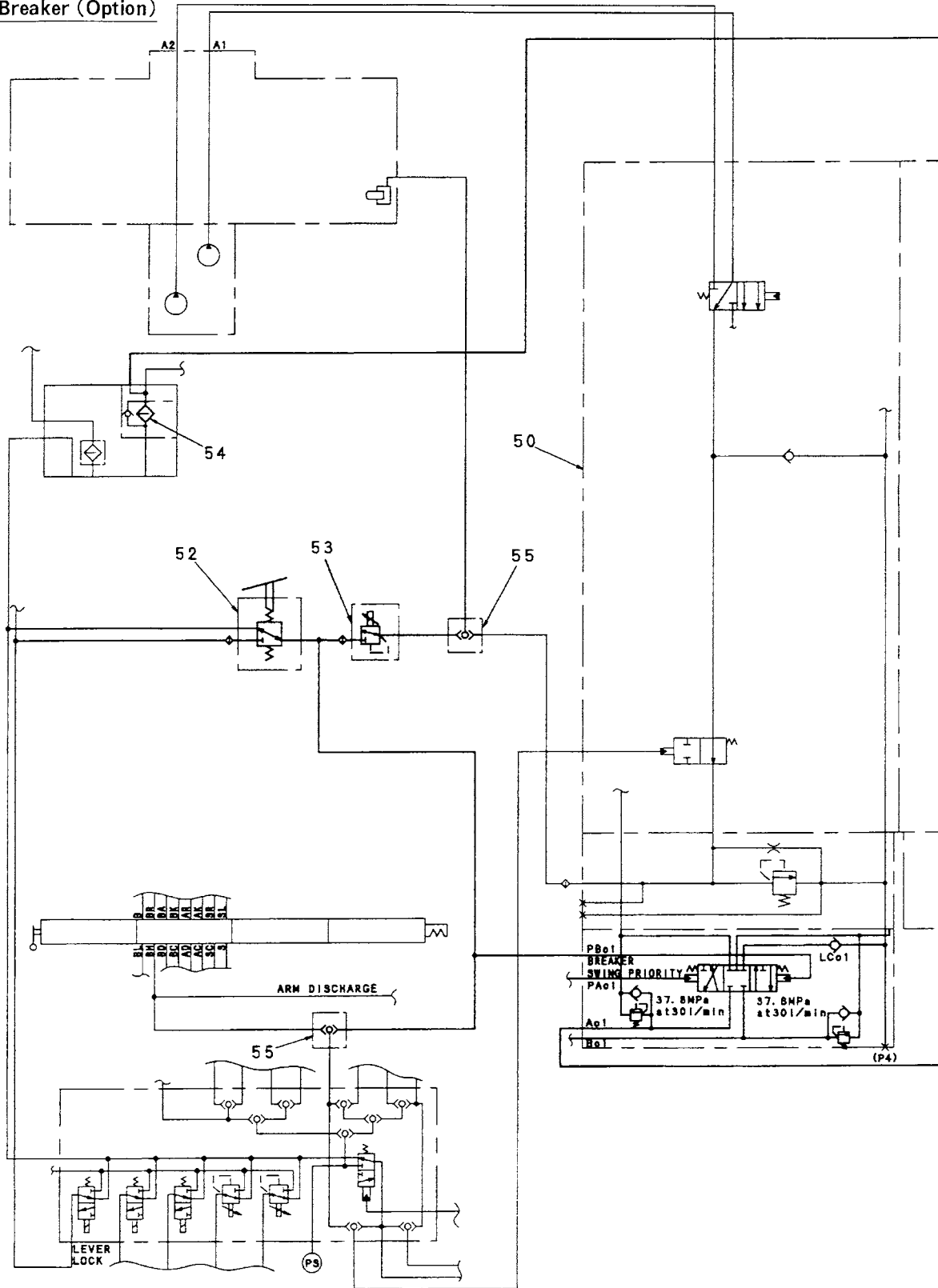
Pressure set value of relief valve

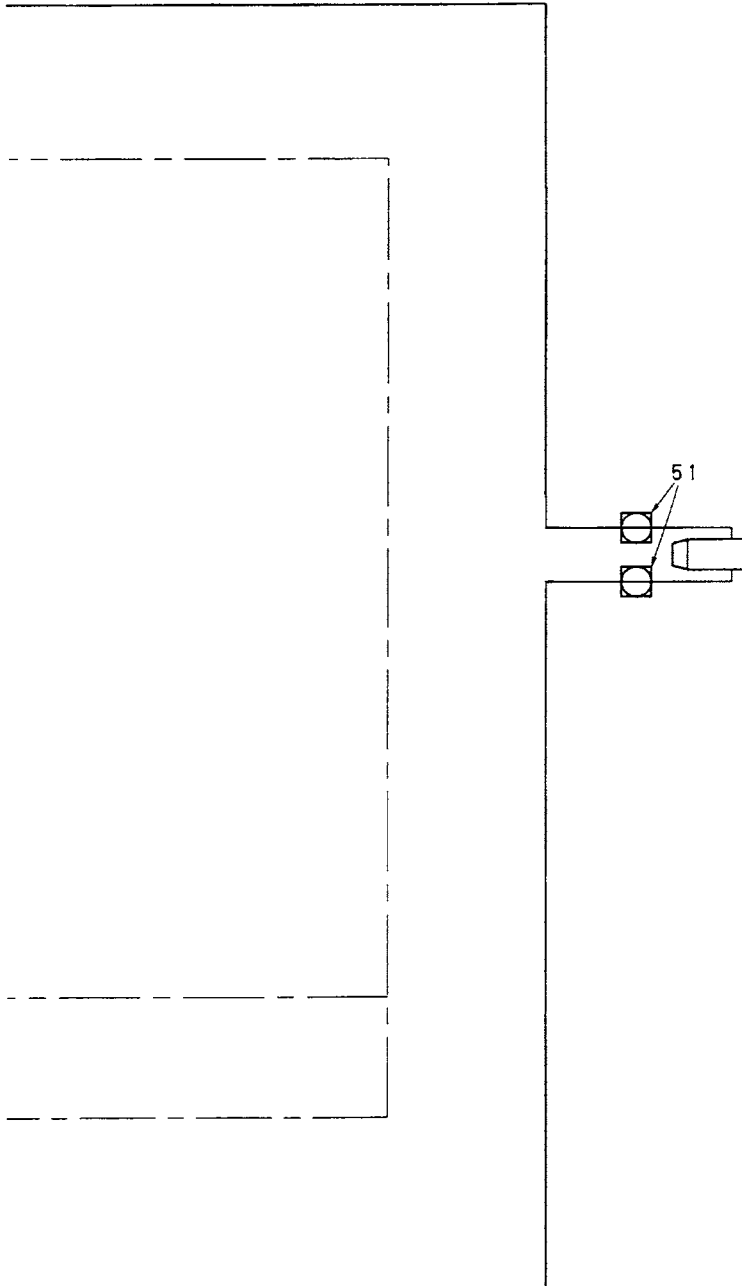
Item	Unit	Press. SI MPa	Press. JIS kgf/cm ²	Flow rate L/min
Main relief valve		34.3	350	100
ATT boost		37.7	385	60
Port relief valve		39.7	405	30
Port relief valve		37.7	385	30
Swing relief valve		27.9	285	180
Pilot relief valve		4.9	50	20

SK235SR

● HYDRAULIC DIAGRAM

KAI Breaker (Option)





Code	Component
50	Control valve
51	Selector valve
52	Pilot valve
53	Solenoid valve
54	Return filter
55	Shuttle valve

Note :

This hydraulic circuit is used by adding to following circuit.

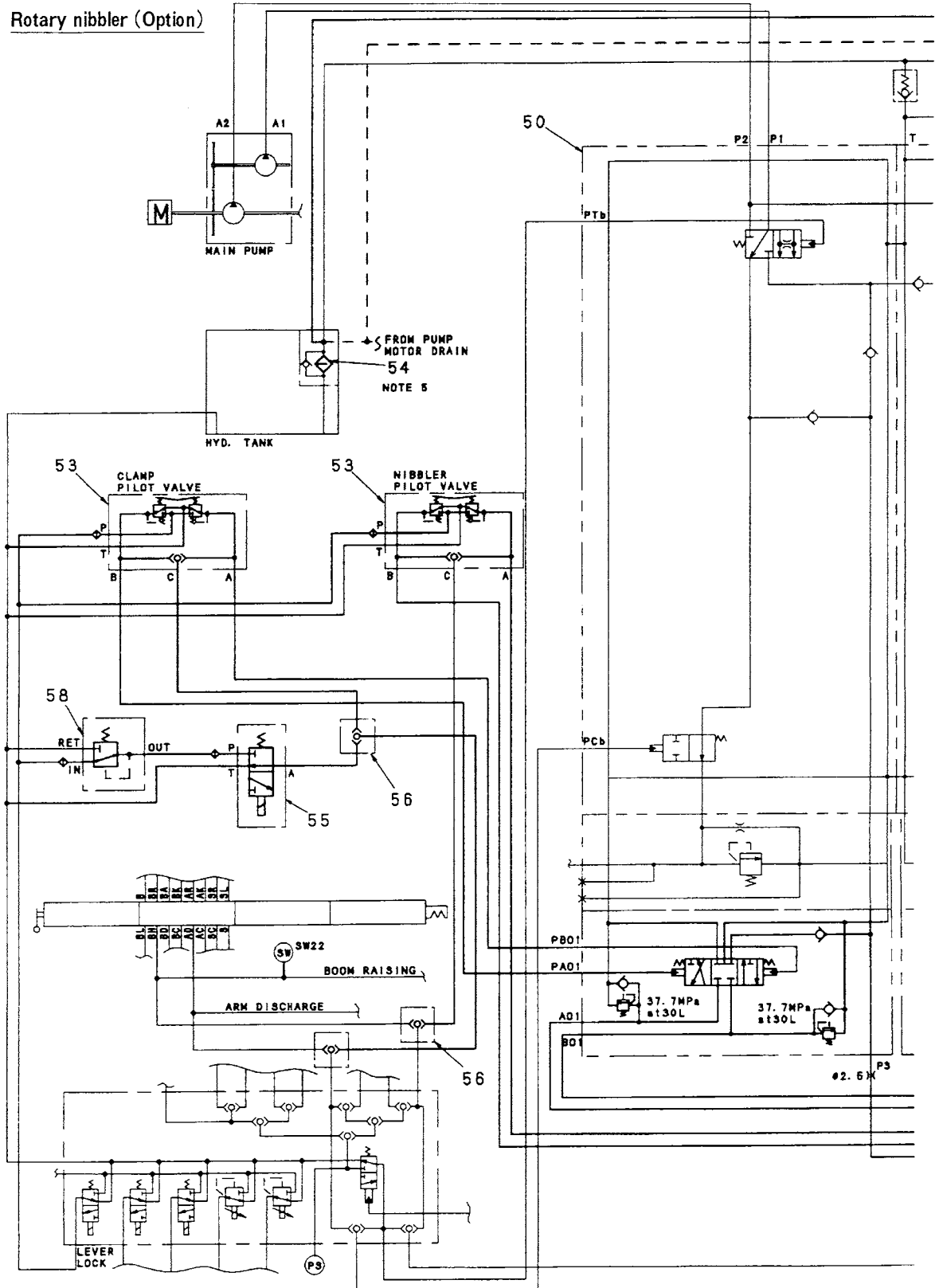
STD YN01Z00063P1

Replace the main control valve by N&B option type.

SK235SR

● HYDRAULIC DIAGRAM

Rotary nibbler (Option)



Code	Component
50	Control valve
51	Selector valve
52	Stop valve
53	Pilot valve (N&B)
54	Return filter
55	Solenoid valve
56	Shuttle valve
57	Solenoid valve
58	Reducing valve
59	Swivel Assy
60	Cylinder Assy

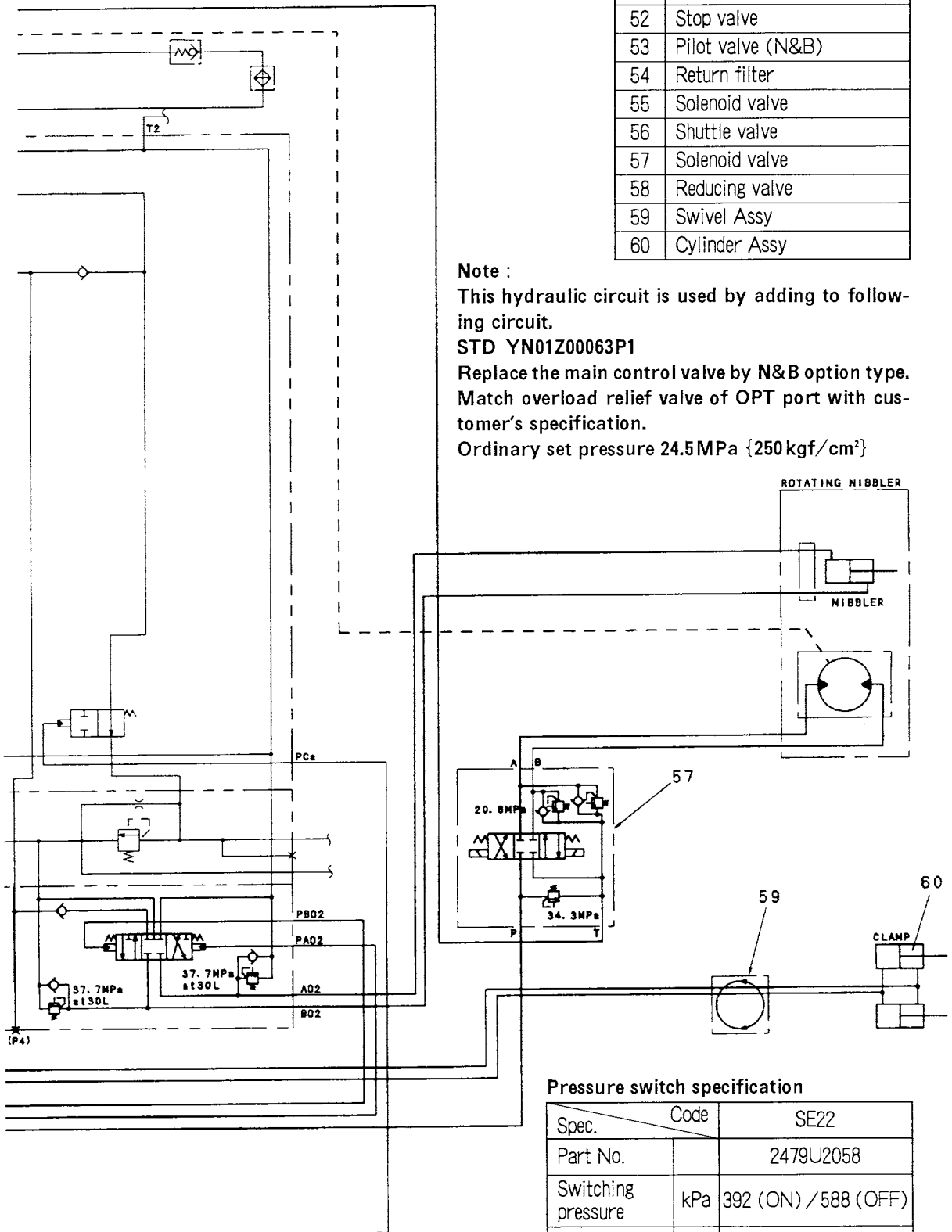
Note :

This hydraulic circuit is used by adding to following circuit.

STD YN01Z00063P1

Replace the main control valve by N&B option type.
Match overload relief valve of OPT port with customer's specification.

Ordinary set pressure 24.5 MPa {250 kgf/cm²}

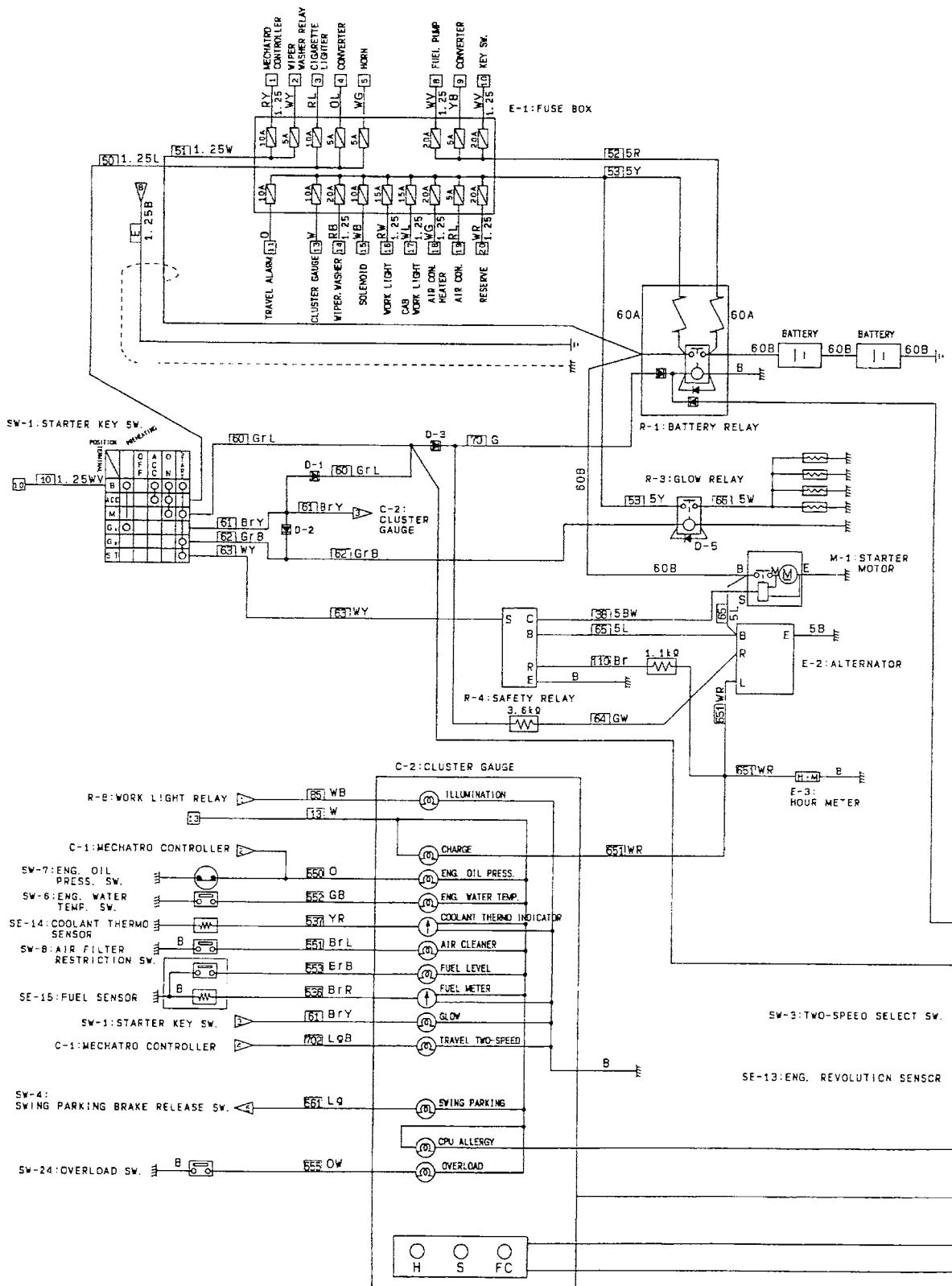
**Pressure switch specification**

Spec.	Code	SE22
Part No.		2479U2058
Switching pressure	kPa	392 (ON) / 588 (OFF)
Power supply	V	24 DC

18. ELECTRIC CIRCUIT DIAGRAM

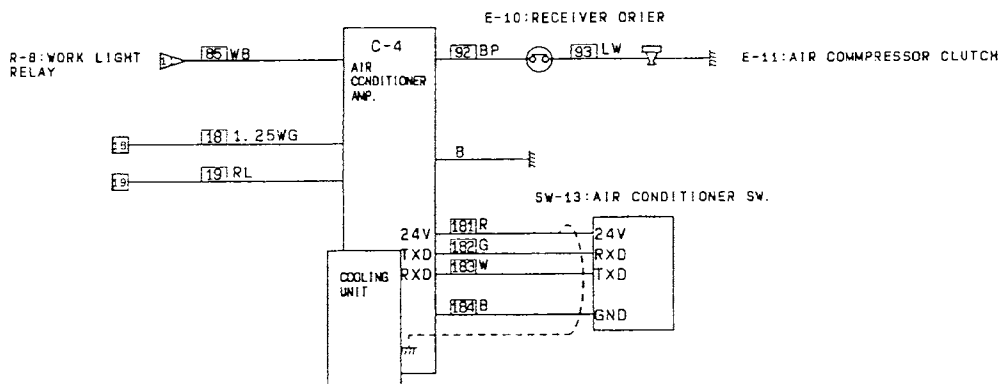
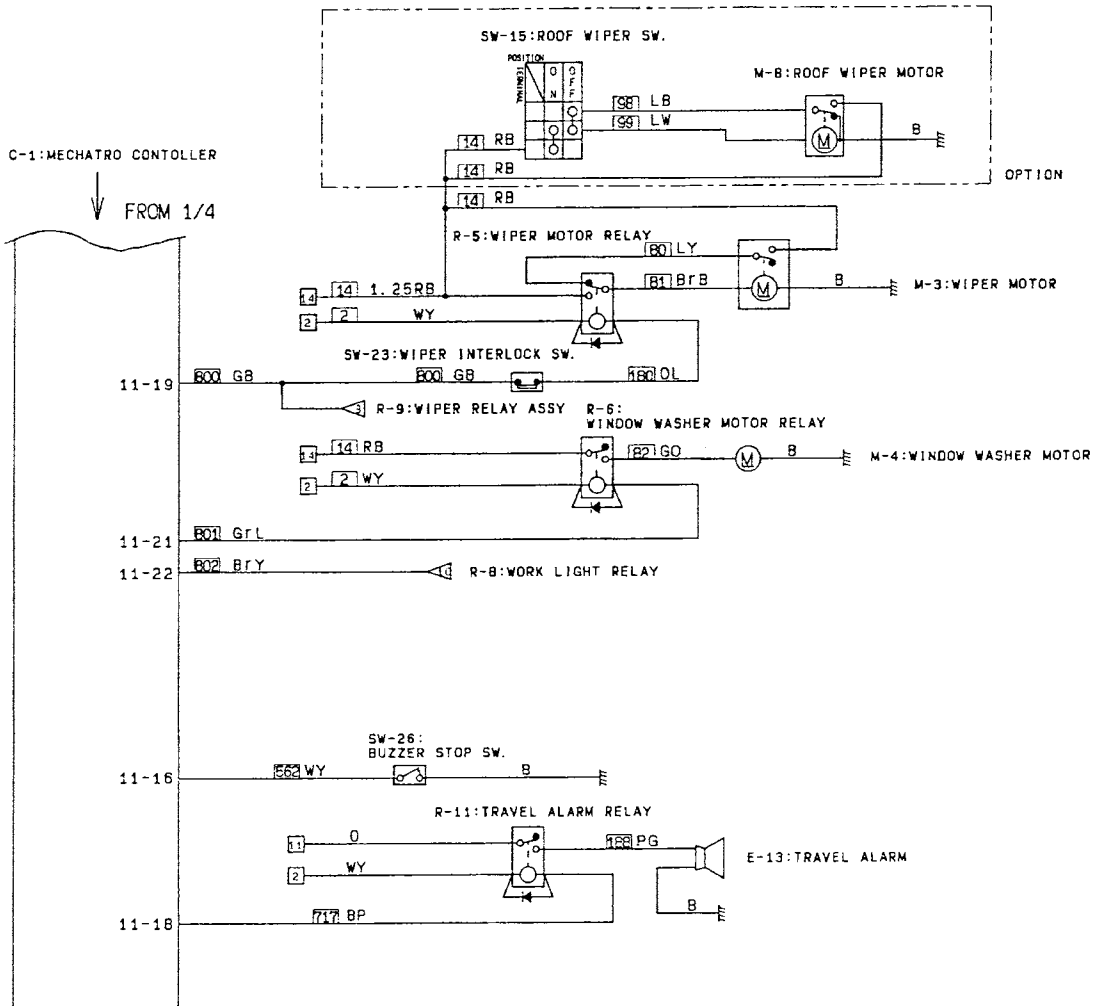
SK70SR

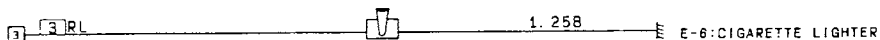
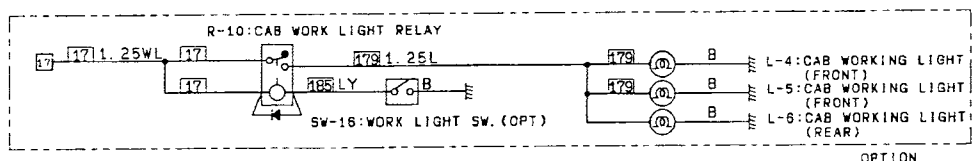
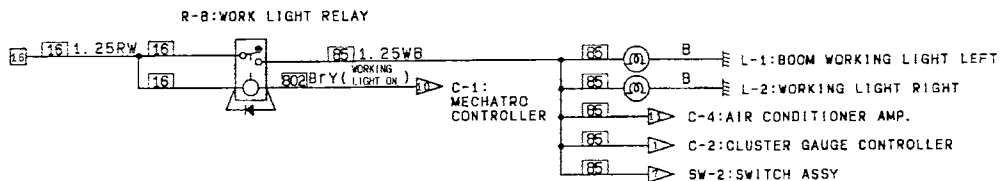
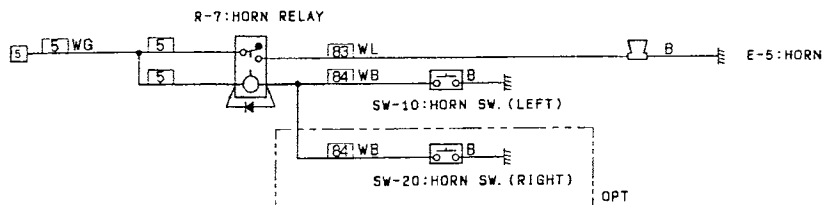
● ELECTRIC DIAGRAM (1/3)



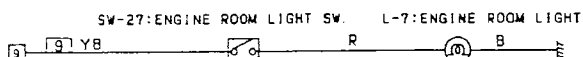
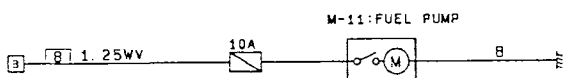
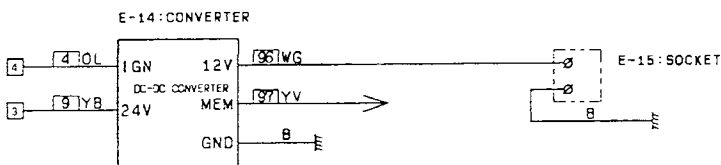
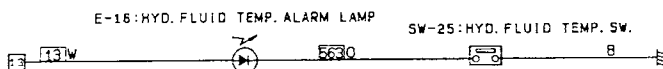


● ELECTRIC DIAGRAM (2/3)



**Example of cable color**

W L
 Stripe color (Blue)
 Ground color (White)

**Legend**

BZ : Buzzer
 SV : Solenoid valve
 SW : Switch
 SE : Sensor
 M : Motor
 R : Relay
 L : Light
 PSV : Propo-valve
 D : Diode

Color code table of cables

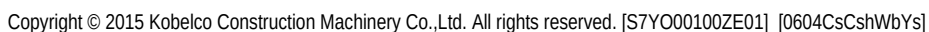
Symbol	Color	Symbol	Color
B	Black	P	Pink
G	Green	O	Orange
L	Blue	Br	Brown
R	Red	Lg	Light green
W	White	Gr	Gray
Y	Yellow	Sb	Sky blue

● ELECTRIC DIAGRAM (3/3)

Type	Item	Name	P/No.
SWITCH	SW-1	Key SW.	YN50S00002F1
	SW-2	SW. Assy.	YT50E00002F1
	SW-3	Two-speed select SW.	YN03M01039P1
	SW-4	Swing parking release SW.	YT50E00001F1
	SW-5		
	SW-6	E/G water temp. SW.	Accessory parts
	SW-7	E/G oil press. SW.	Accessory parts
	SW-8	Air filter restriction SW.	Accessory parts
	SW-9		
	SW-10	Horn SW. (L.H)	YN50E01001P1
	SW-11	Lever lock SW.	YN50S01001P1
	SW-12		
	SW-13	Air conditioner SW.	Accessory parts
	SW-14		
	SW-15	Roof wiper SW. (Opt.)	2479Z2334
	SW-16	Work light SW. (Opt.)	2479U1190F1
	SW-17		
	SW-18	Opt. pedal press. SW Assy.	2479U2010
	SW-19	Opt. Pedal press. SW Assy.	2479U2010
	SW-20	Horn SW. (R.H) (Opt.)	YN50E01001P1
	SW-21		
	SW-22		
	SW-23	Wiper interlock SW.	YT50E00003P1
	SW-24	Over load SW.	Installed on the spot
	SW-25	Hyd. fluid temp. SW.	2479R2348
	SW-26	Buzzer stop SW.	2479U1224F1
	SW-27	Engine room light SW.	YT50S00005P1
SENSOR	SE-1	Press. sensor (low):Bucket digging	LC52S00001P2
	SE-2	Press. sensor (low):Bucket dump	↑
	SE-3	Press. sensor (low):Boom raising	↑
	SE-4	Press. sensor (low):Boom lowering	↑
	SE-5	Press. sensor (low):Swing left	↑
	SE-6	Press. sensor (low):Swing right	↑
	SE-7	Press. sensor (low):Arm in	↑
	SE-8	Press. sensor (low):Arm out	↑
	SE-9	Press. sensor (low):Travel right	↑
	SE-10	Press. sensor (low):Travel left	↑
	SE-11		
	SE-12		
	SE-13	E/G speed sensor	Accessory parts
	SE-14	Coolant thermo sensor	YT52S00001P1
	SE-15	Fuel sensor	2489U267F1
	SE-16	Accel potentio.	YN52S00009P1
SV	SV-1	Swing Parking brake sol.	YT35V00002F1
	SV-2	(Valve Assy.)	
	SV-3	Two-speed select sol.	
	SV-4	Operating lever lock sol.	
PSV	PSV-B	P2 by-pass cut proportional sol.	YT35V00002F1
	PSV-C	Travel priority proportional sol.	(Valve Assy.)
	PSV-D	P1 by-pass cut proportional sol.	

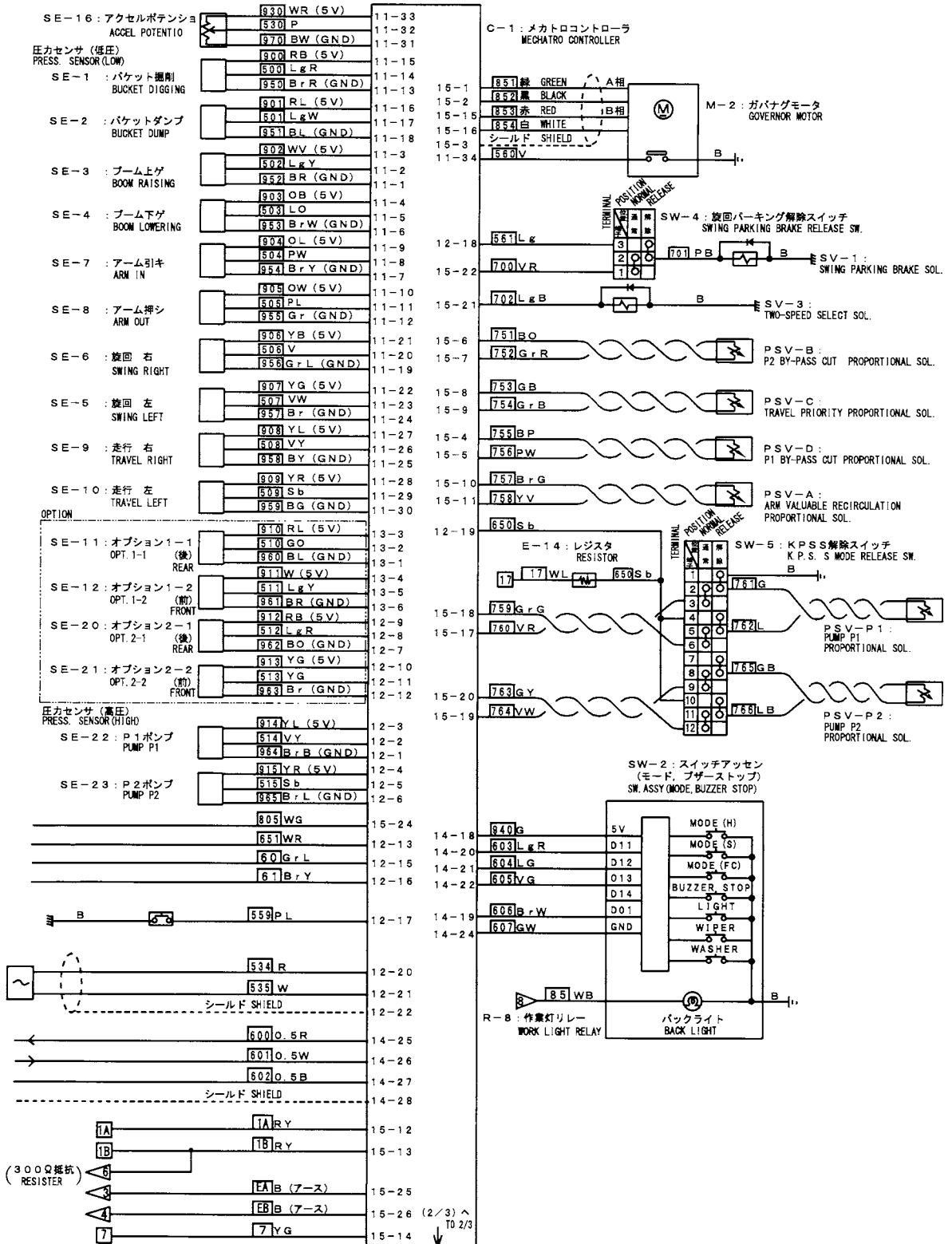
Type	Item	Name	P/No.
RELAY	R-1	Battery relay	YT24S00001F1
	R-2		
	R-3	Glow relay	Accessory parts
	R-4	Safety relay	Accessory parts
	R-5	Wiper motor relay	YR24S00002P1
	R-6	Washer motor relay	↑
	R-7	Horn relay	↑
	R-8	Work light relay	↑
	R-9		
	R-10	Cab work light relay	YR24S00002P1
	R-11	Travel alarm relay	↑
LIGHT	L-1	Boom working light left	YN80S00012F1
	L-2	Working light right	YN80S00010F1
	L-3	Room light	2456Z322F1
	L-4	Cab working light front (Opt.)	Installed on the spot
	L-5	Cab working light front (Opt.)	↑
	L-6	Cab working light rear (Opt.)	↑
	L-7	Engine room light	4056R4F1
CONTROLLER	C-1	Mechatro controller	YT22E00008F1
	C-2	Cluster gauge (KAI.)	YT59S00001F1
	C-2	Cluster gauge (EU)	YT59S00002F1
	C-4	Air conditioner amp.	Accessory parts
	C-5		
MOTOR	M-1	Starter motor	Accessory parts
	M-2	Stepping motor	YT20S00002F1
	M-3	Wiper motor	YT53C00001P1
	M-4	Washer motor	24100U157F1
	M-5		
	M-6		
	M-7		
	M-8	Roof wiper motor (Opt.)	YT76S00001P1
	M-9		
	M-10		
	M-11	Fuel pump	YT22P00001F1
DIODE	D-1	Diode	YN02D01001P1
	D-2	↑	↑
	D-3	↑	↑
	D-4	↑	↑
	D-5	↑	2475R132
ELEC EQUIPMENTS	E-1	Fuse box	YT73E00002F2
	E-2	Alternator	Accessory parts
	E-3	Hour meter	YN58S00004P1
	E-4		
	E-5	Horn	2479U1009F1
	E-6	Cigarette lighter	2421R180F1
	E-7		
	E-7		
	E-8		
	E-9		
	E-10	Receiver drier	Accessory parts
	E-11	Air compressor clutch	↑
	E-12		
	E-13	Travel alarm	24100P4490F1
	E-14	Converter	YT77S00001P1
	E-15	Socket	YN81S00001P1
	E-16	Hyd. fluid temp. alarm lamp	2456U168

●ELECTRIC DIAGRAM (1/4)



SK115SR

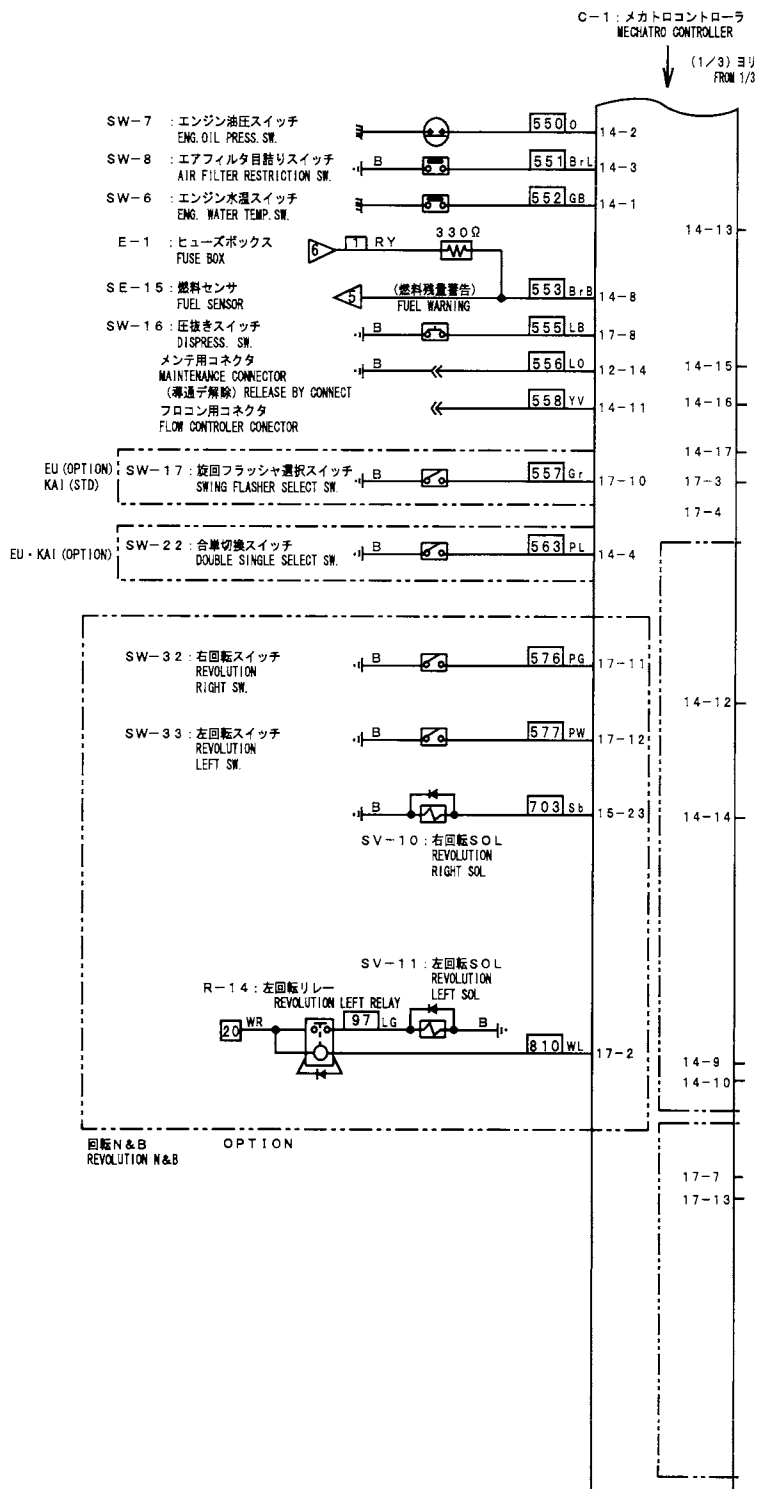
SK135SR(LC)



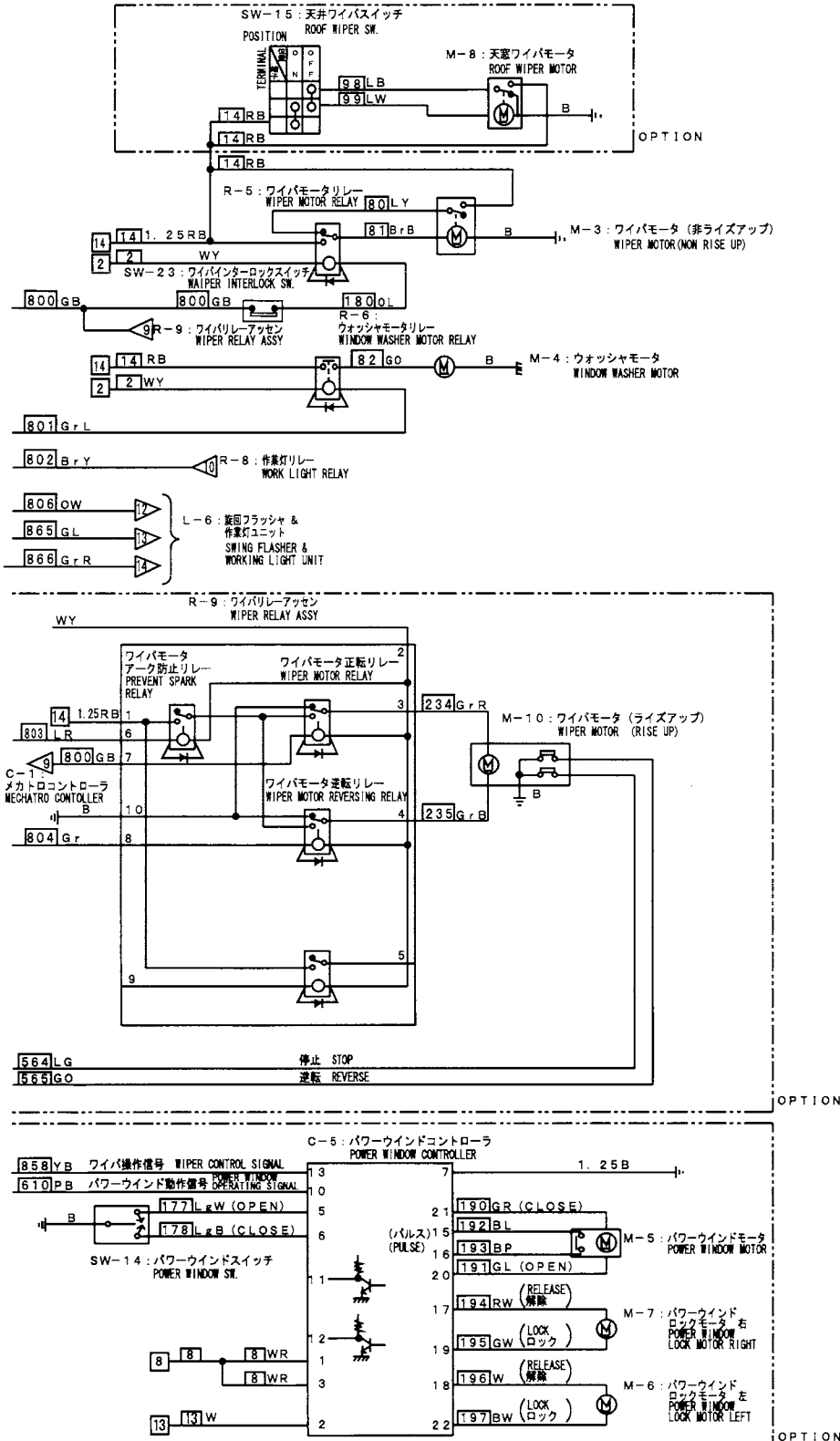
SK115SR

SK135SR(LC)

●ELECTRIC DIAGRAM (2/4)

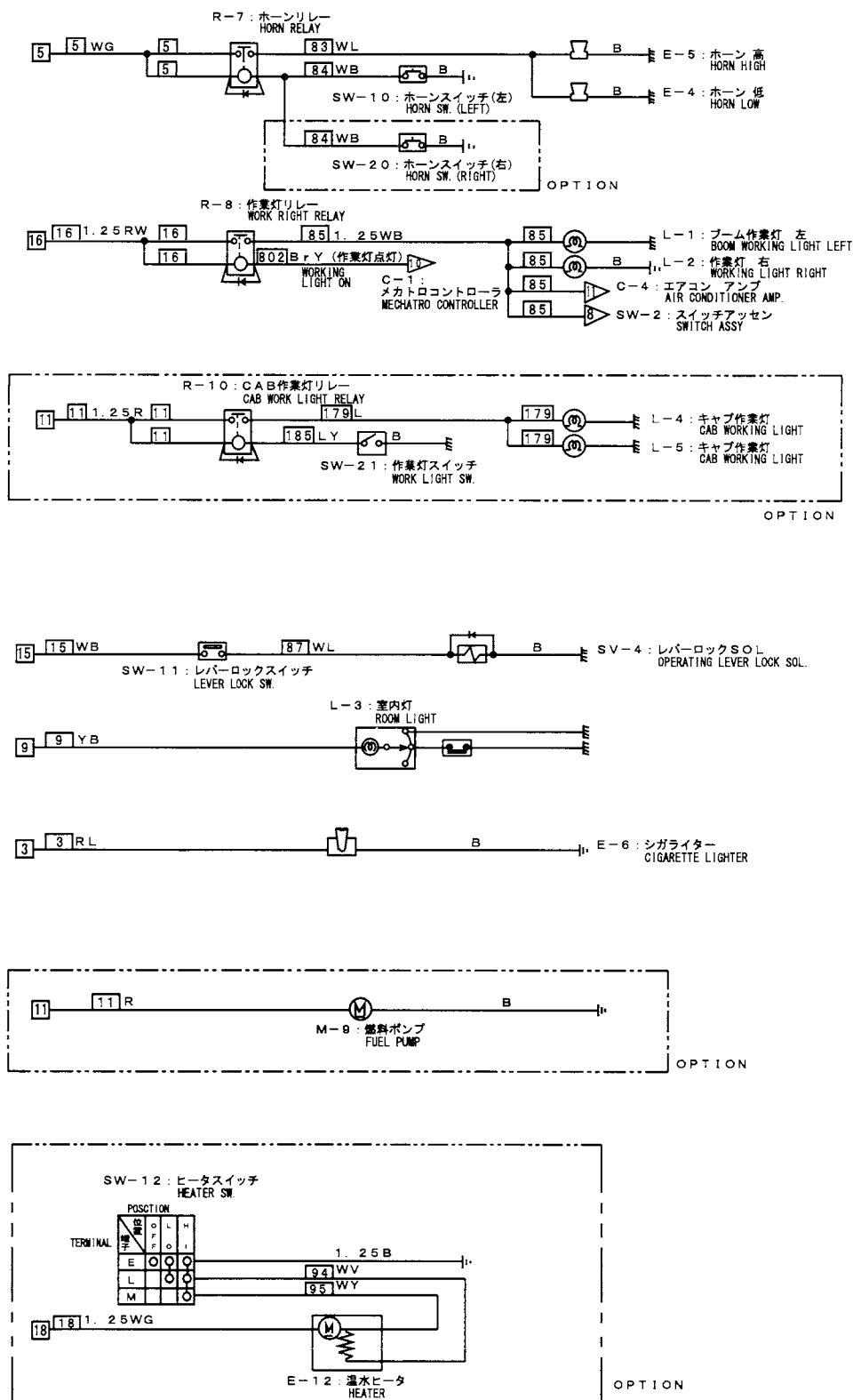


SK115SR SK135SR(LC)



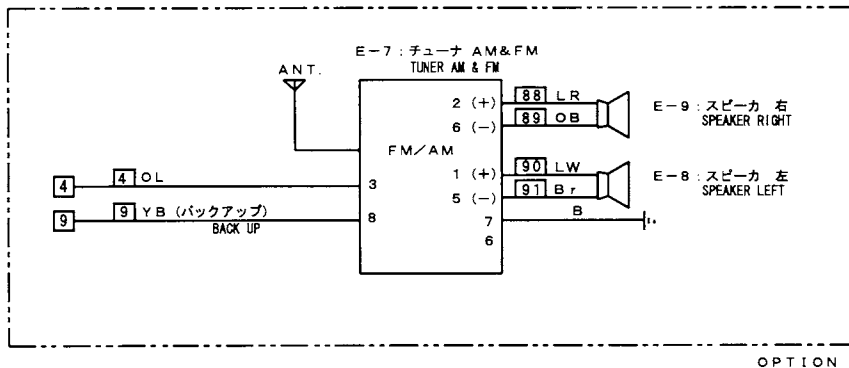
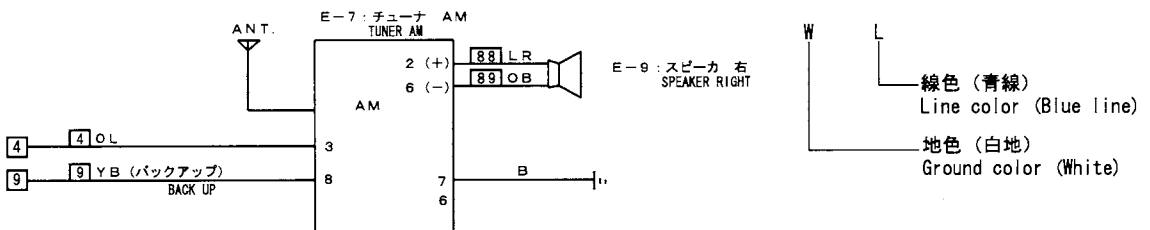
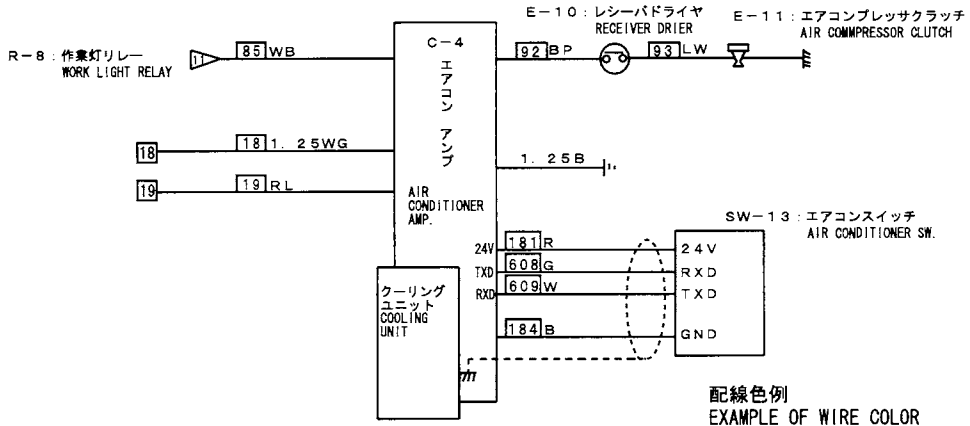
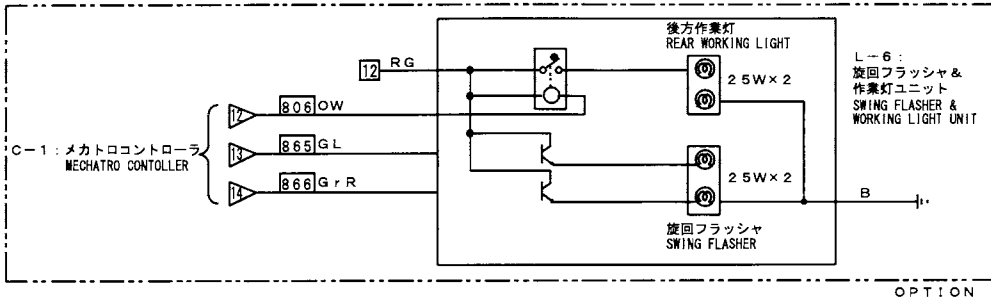
SK135SR(LC)

●ELECTRIC DIAGRAM (3/4)



SK115SR

SK135SR(LC)



NOTES

1. Wires used to be
1) "AVSS" or "AVX" for 0.75mm² and 1.25mm²
2) "AVS" for 2mm² 5mm²
3) "AV" for others.
2. Wires to be 0.75mm² unless otherwise specified.
3. Grounding for which wire color is not shown to be performed with component case.
4. Number in square shows line No.

符号 Sign	色 color	符号 Sign	色 color	符号 Sign	色 color	符号 Sign	色 color
B	黒 Black	W	白 white	Br	茶 Brown	V	紫 Violet
G	緑 Green	Y	黄 Yellow	Lg	若葉 Light Green		
L	青 Blue	P	ピンク Pink	Gr	灰 Grey		
R	赤 Red	O	オレンジ Orange	Sb	空 Sky Blue		

● ELECTRIC DIAGRAM (4/4)

Type	Item	Name	P/No.
Switch	SW-1	Key SW.	YN50S00002F1
	SW-2	SW. Assy. (Mode, Buzzer stop)	YT50E00002F1
	SW-3	Two-speed select SW.	YN03M01039P1
	SW-4	Swing P/B release SW.	YT50E00001F1
	SW-5	KPSS release SW.	YX50S00001F1
	SW-6	E/G water temp. SW.	Accessory parts
	SW-7	E/G oil press. SW.	Accessory parts
	SW-8	Air filter clogging SW.	LE11P01015S001
	SW-9		
	SW-10	Horn SW. (L.H)	PY50E01001P1
	SW-11	Lever lock SW.	YN50S01001P1
	SW-12	Heater SW. (Opt.)	2479U325
	SW-13	Air conditioner SW.	Accessory parts
	SW-14		
	SW-15		
	SW-16	Drain pressure SW.	2479U1224F8
	SW-17	Swing flasher select SW.	2479U1190F19
	SW-18		
	SW-19		
	SW-20	Horn SW. (R.H)	PY50E01001P1
	SW-21	Working light SW. (Opt.)	2479U1190F1
	SW-22	Single/Conflux select SW.	2479U1190F29
	SW-23	Wiper interlock SW.	YT50E00003P1
Sensor	SE-1	Press. sensor (low):Bucket digging	YX52S00005P1
	SE-2	Press. sensor (low):Bucket dump	↑
	SE-3	Press. sensor (low):Boom raising	↑
	SE-4	Press. sensor (low):Boom lowering	↑
	SE-5	Press. sensor (low):Swing L.H	↑
	SE-6	Press. sensor (low):Swing R.H	↑
	SE-7	Press. sensor (low):Arm in	↑
	SE-8	Press. sensor (low):Arm out	↑
	SE-9	Press. sensor (low):Travel R.H	↑
	SE-10	Press. sensor (low):Travel L.H	↑
	SE-11	Press. sensor (low):Option 1-1	↑
	SE-12	Press. sensor (low):Option 1-2	↑
	SE-13	E/G speed sensor	Accessory parts
	SE-14	Coolant thermo sensor	YT52S00001P1
	SE-15	Fuel sensor	2489U267F1
	SE-16	Accel potentio.	YN52S00009P1
	SE-17		
	SE-18		
	SE-19		
	SE-20	Press. sensor (low):Option 2-1	LC52S00001P2
	SE-21	Press. sensor (low):Option 2-2	↑
	SE-22	Press. sensor (high):P1 pump	LC52S00002P1
	SE-23	Press. sensor (high):P2 pump	↑
Solenoid valve	SV-1	Swing parking brake sol.	
	SV-2		YX35V00002F1 (Valve Assy.)
	SV-3	Two-speed select sol.	
	SV-4	Operating lever lock sol.	
Propo. solenoid valve	PSV-A	Arm variable recirculation prop. valve	
	PSV-B	P2 by-pass cut propo. valve	YX35V00002F1 (Valve Assy.)
	PSV-C	Travel straight propo. valve	
	PSV-D	P1 by-pass cut propo. valve	
	PSV-P1	P1 pump propo. valve	YX10V00001F1 (Valve Assy.)
	PSV-P2	P2 pump prop. valve	

Type	Item	Name	P/No.
Propo. solenoid valve	PSV-1		
	PSV-2		
	PSV-3		
	PSV-4		
	PSV-5		
Relay	R-1	Battery relay	YT24S00001F1
	R-2		
	R-3	Glow relay	Accessory parts
	R-4	Safety relay	Accessory parts
	R-5	Wiper motor relay	YR24S00002P1
	R-6	Washer motor relay	↑
	R-7	Horn relay	↑
	R-8	Work light relay	↑
	R-9	Wiper relay Assy.	YT24E00001F1
	R-10	Cab work light relay	YR24S00002P1
Light	L-1	Boom working light L.H	YW80S00001F1
	L-2	Working light R.H	YN80S00010F1
	L-3	Room light	2456Z322F1
	L-4	Cab working light front (Opt.)	YN80S00010F2
	L-5	Cab working light front (Opt.)	↑
	L-6	Swing flasher & Working light unit	YN24E00006F1
Controller	C-1	Mechatro controller	YV22E00001F1
	C-1	Mechatro controller (P/W)	YV22E00001F2
	C-2	Gauge cluster	YV59S00001F1
	C-4	Air conditioner amp.	Accessory parts
	C-5	Power window controller	YN22E00016F1
Motor	M-1	Starter motor	Accessory parts
	M-2	Governor motor	YT20S00002F1
	M-3	Wiper motor	YR76S00001P1
	M-4	Washer motor	24100U157F1
	M-5	Power window motor	YN76S01001P1
	M-6	Power window lock motor (L.H)	YN02C01384F2
	M-7	Power window lock motor (R.H)	YN02C01384F1
	M-8	Roof wiper motor (Opt.)	YT76S00001P1
	M-9	Fuel pump (Opt.)	YR22P00001P1
	M-10	Wiper motor (Rise-up)	YT53C00004P1
Diode	D-1	Diode	YN02D01001P1
	D-2	↑	↑
	D-3	↑	↑
	D-4	↑	YAZAKI:7321-9332-60
	D-5	↑	YN02D01001P1
Electric equipments	E-1	Fuse box	YV73E00001F1
	E-2	Alternator	Accessory parts
	E-3	Hour meter	YN58S00004P1
	E-4	Horn (Low)	2479U1009F2
	E-5	Horn (High)	2479U1009F1
	E-6	Cigarette lighter	2421R180F1
	E-7	Tuner AM & FM (Opt.)	LC54S00001P1
	E-7	Tuner AM	LE54S00003P1
	E-8	Speaker (L.H)(Opt.)	YN54S00006P1
	E-9	Speaker (R.H)	↑
	E-10	Receiver drier	Accessory parts
	E-11	Air compressor clutch	↑
	E-12	Heater (Opt.)	2479U293D3
	E-13	Resister	YR26E01001P1
	E-14	↑	LC22E01001D1

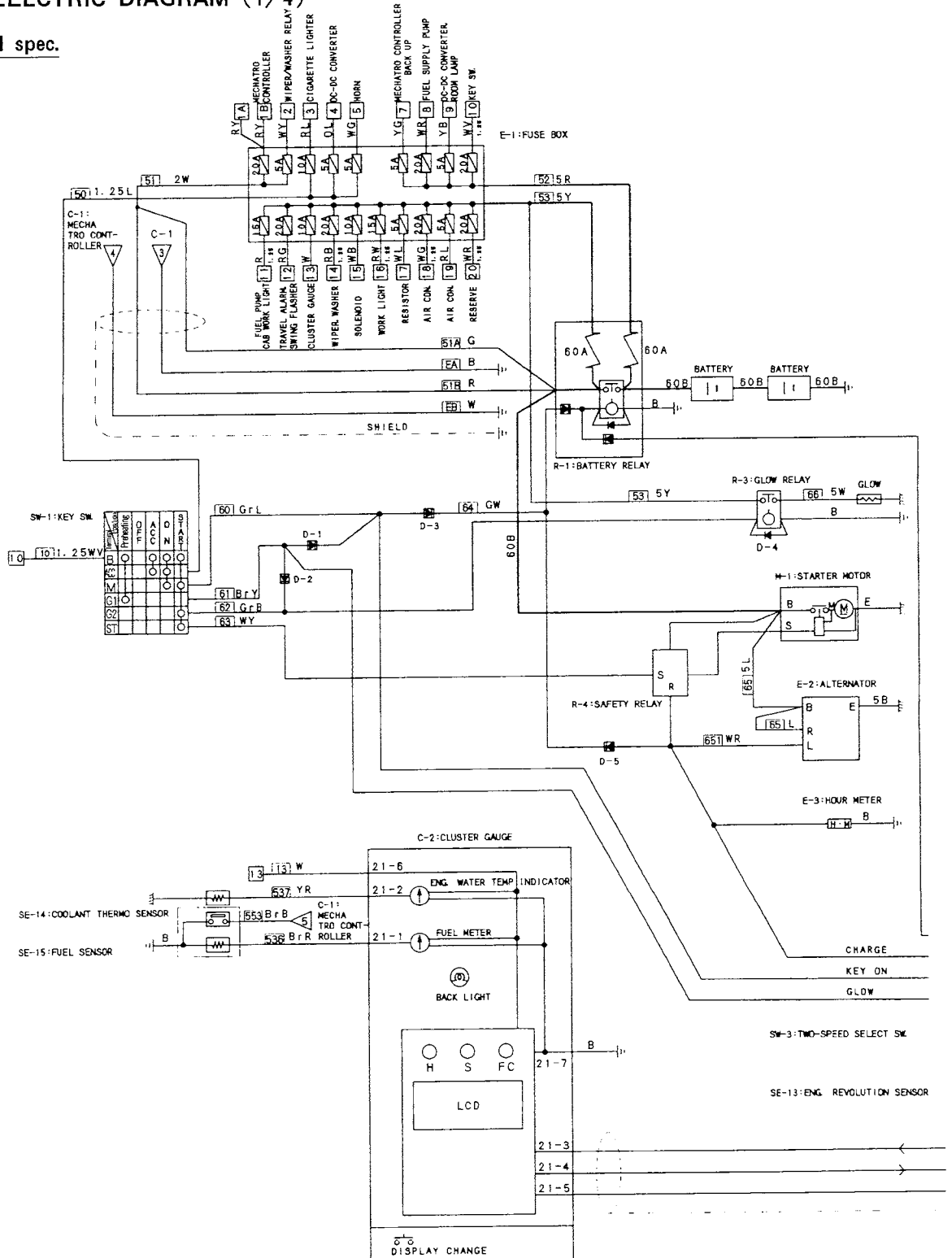
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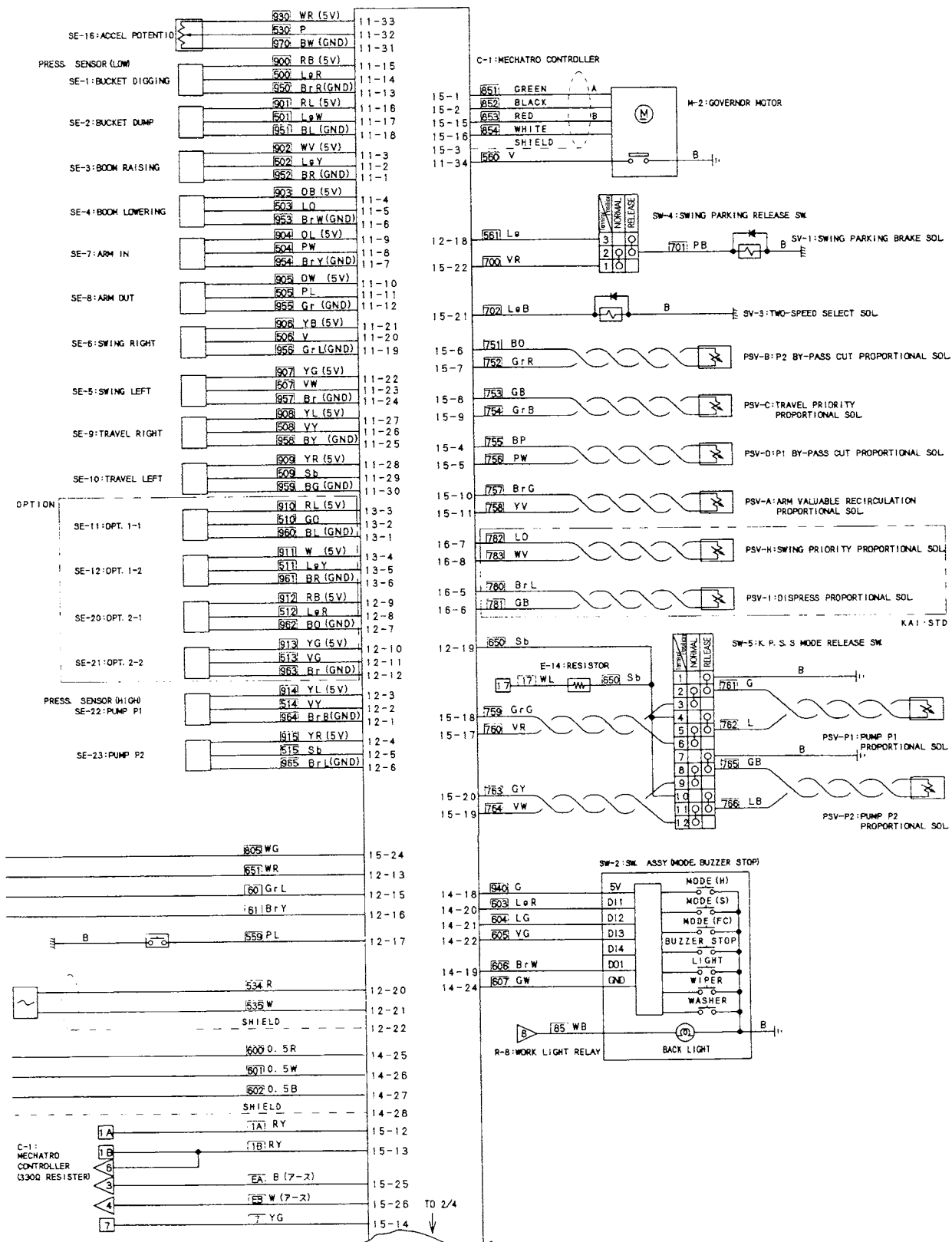
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• ELECTRIC DIAGRAM (1/4)

KAI spec.



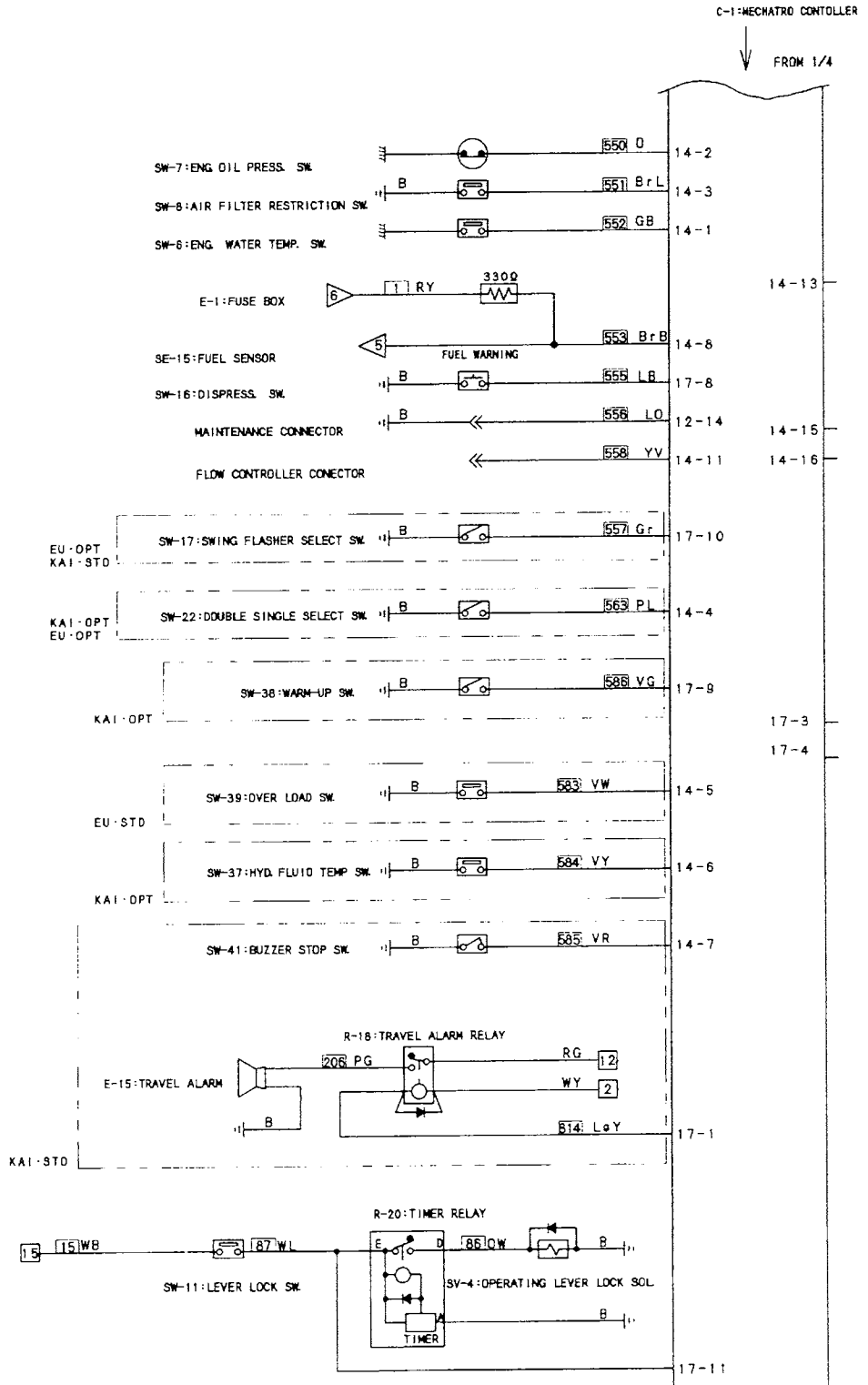


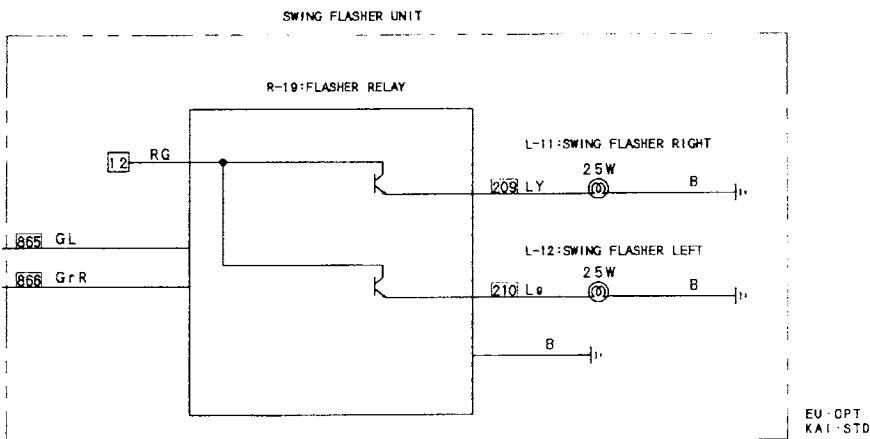
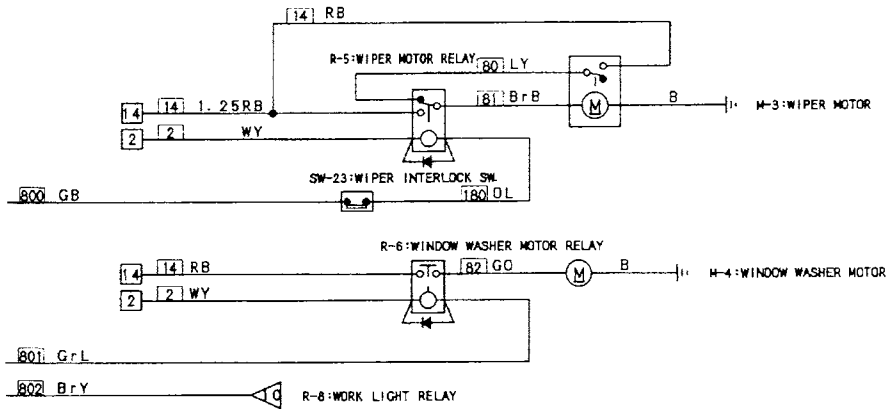
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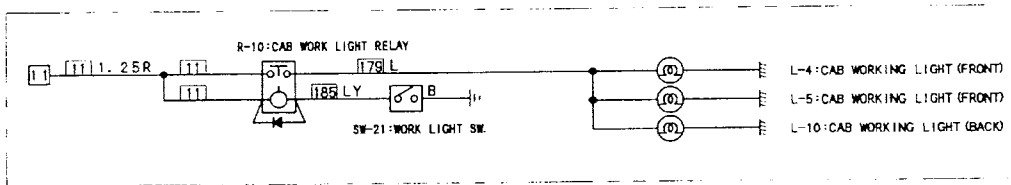
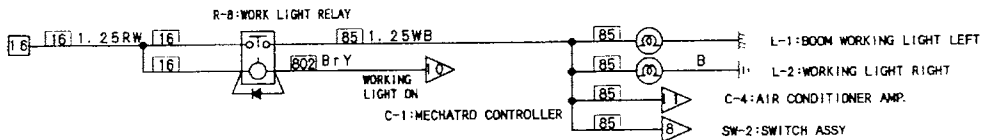
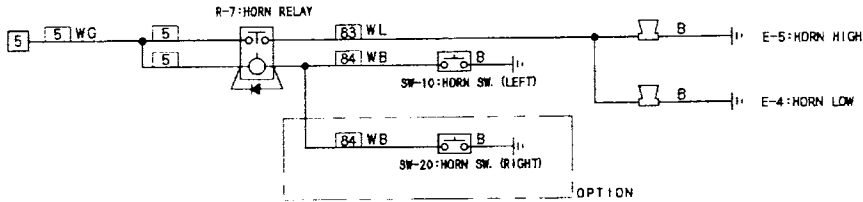
SK115SRDz • SK135SRLC

● ELECTRIC DIAGRAM (2/4)

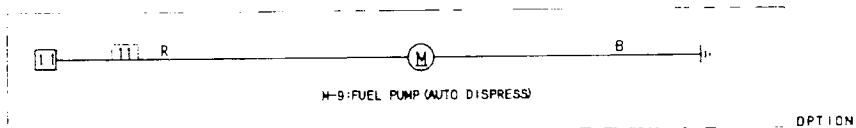


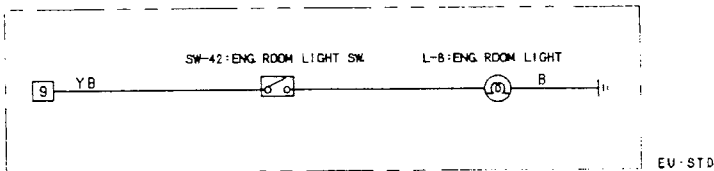
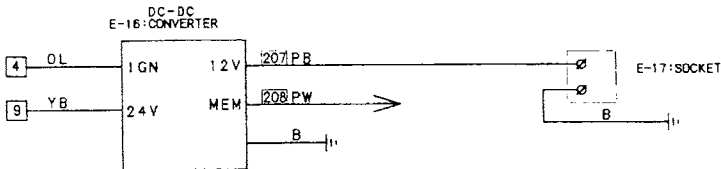


● ELECTRIC DIAGRAM (3/4)



EU-STD



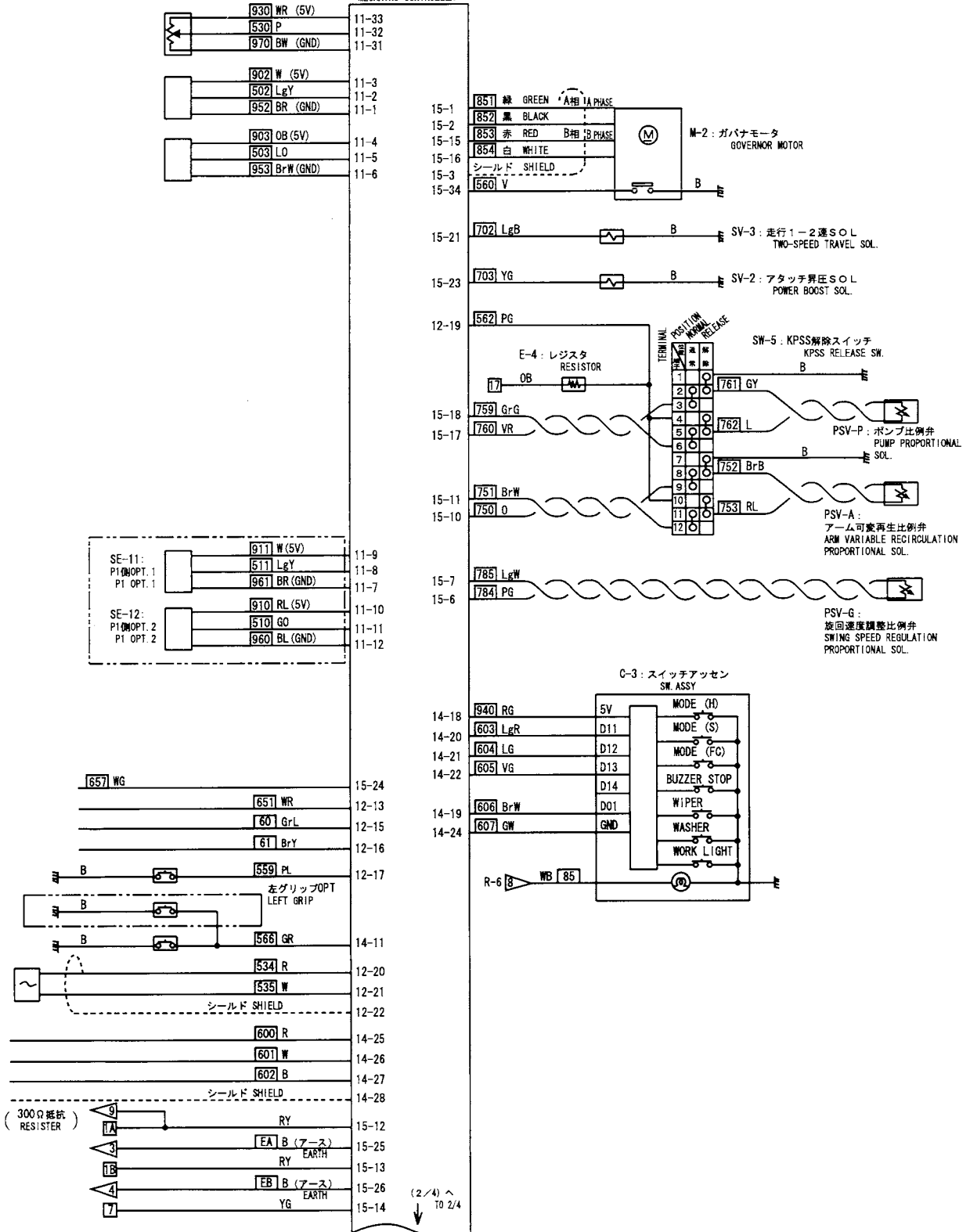


● ELECTRIC DIAGRAM (4/4)

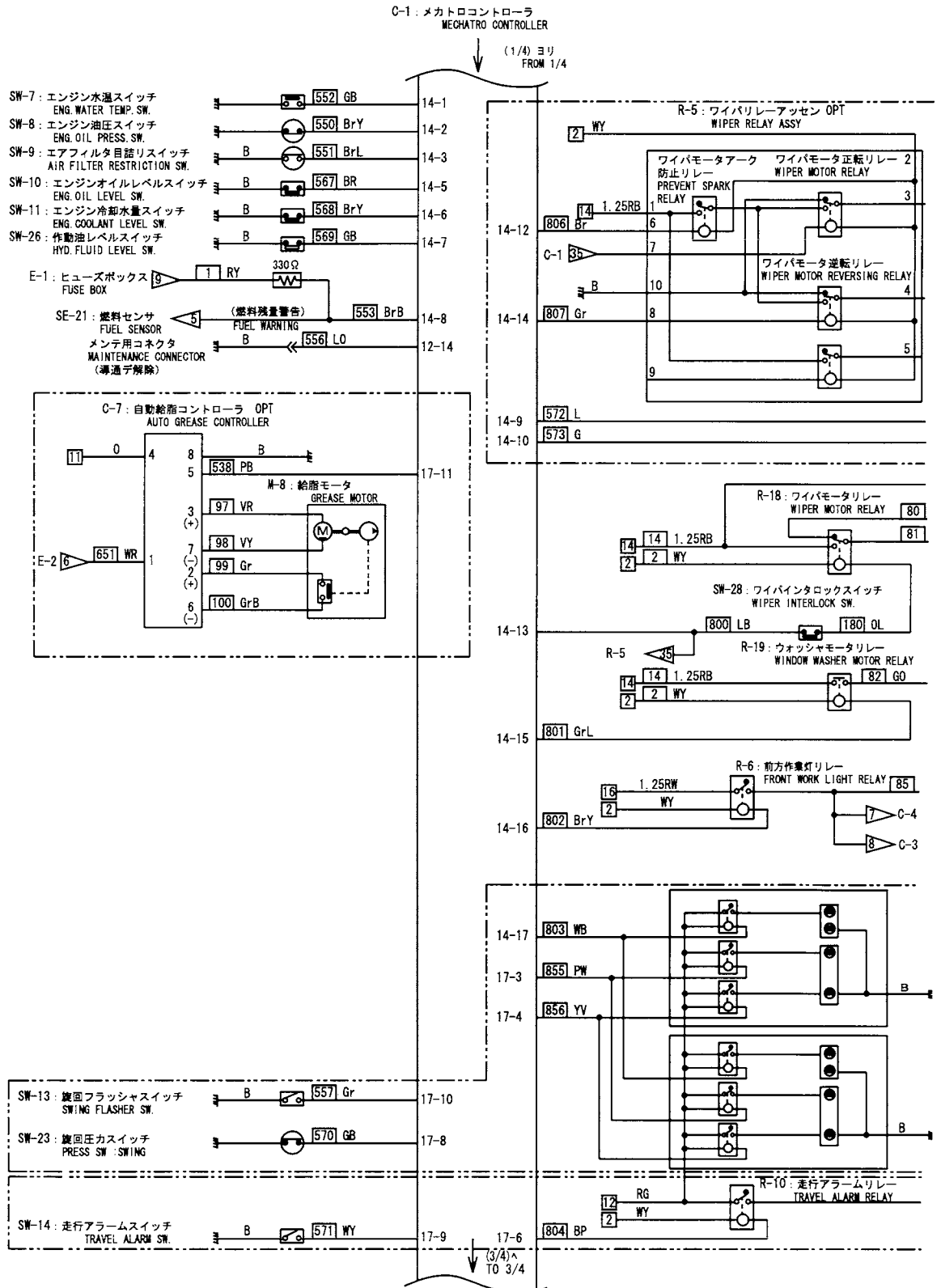
Type	Item	Name	P/No.
Switch	SW-1	Key SW.	YN50S00002F1
	SW-2	SW. Assy. (Mode, Buzzer stop)	YT50E00002F1
	SW-3	Two-speed select SW.	YN03M01039P1
	SW-4	Swing P/B release SW.	YT50E00001F1
	SW-5	KPSS mode release SW.	YX50S00001F1
	SW-6	E/G water temp. SW.	Accessory parts
	SW-7	E/G oil press. SW.	Accessory parts
	SW-8	Air filter clogging SW.	LE11P01015S001
	SW-10	Horn SW. (L.H)	PY50E01001P1
	SW-11	Lever lock SW.	YN50S01001P1
	SW-13	Air conditioner SW.	Accessory parts
	SW-16	Press. remove SW.	2479U1224F8
	SW-17	Swing flasher select SW.	2479U1190F19
	SW-20	Horn SW. (R.H)	PY50E01001P1
	SW-21	Work light SW.	2479U1190F1
	SW-22	Single/conflux select SW.	2479U1190F32
	SW-23	Wiper interlock SW.	YT50E00003P1
	SW-37	Hyd. oil temp SW.	2479R2348
	SW-38	Warm-up SW.	2479U1190F31
	SW-39	Over load SW.	Installed on the spot
	SW-41	Buzzer stop Sw.	2479U1224F1
	SW-42	E/G room light SW.	YT50S00005P1
Sensor	SE-1	Press. sensor (low):Bucket digging	YX52S00005P1
	SE-2	Press. sensor (low):Bucket dump	↑
	SE-3	Press. sensor (low):Boom raising	↑
	SE-4	Press. sensor (low):Boom lowering	↑
	SE-5	Press. sensor (low):Swing L.H	↑
	SE-6	Press. sensor (low):Swing R.H	↑
	SE-7	Press. sensor (low):Arm in	↑
	SE-8	Press. sensor (low):Arm out	↑
	SE-9	Press. sensor (low):Travel R.H	↑
	SE-10	Press. sensor (low):Travel L.H	↑
	SE-11	Press. sensor (low):Option 1-1	↑
	SE-12	Press. sensor (low):Option 1-2	↑
	SE-13	E/G speed sensor	Accessory parts
	SE-14	Coolant thermo sensor	YT52S00001P1
	SE-15	Fuel sensor	2489U267F1
	SE-16	Accel potentio.	YN52S00009P1
	SE-20	Press. sensor (low):Option 2-1	LC52S00001P2
	SE-21	Press. sensor (low):Option 2-2	↑
	SE-22	Press. sensor (high):P1 pump	LC52S00002P1
	SE-23	Press. sensor (high):P2 pump	↑
Solenoid valve	SV-1	Swing parking brake sol.	YX35V00002F1 (Valve Assy.)
	SV-2		
	SV-3	Two-speed select sol.	
	SV-4	Operating lever lock sol.	
Propo. solenoid valve	PSV-A	Arm variable recirculation prop. valve	YX35V00002F1 (Valve Assy.)
	PSV-B	P2 by-pass cut propo. valve	
	PSV-C	Travel priority propo. valve	
	PSV-D	P1 by-pass cut propo. valve	
	PSV-H	Swing priority proportional sol.	YY35V00001F1 (Valve solenoid)
	PSV-I	Dispress proportional sol.	
	PSV-P1	P1 pump propo. valve	YX10V00001F1 (Pump Assy.)
	PSV-P2	P2 pump propo. valve	

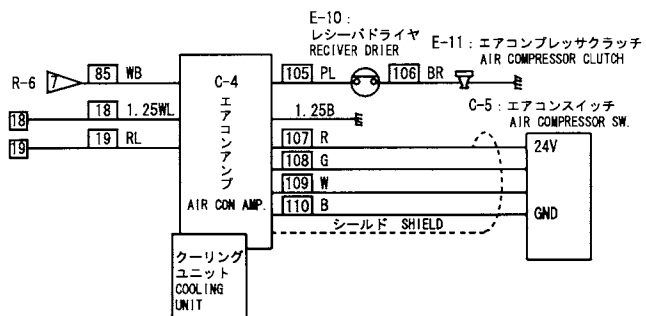
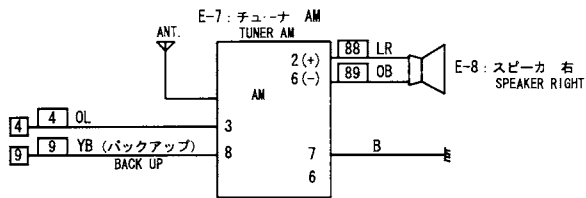
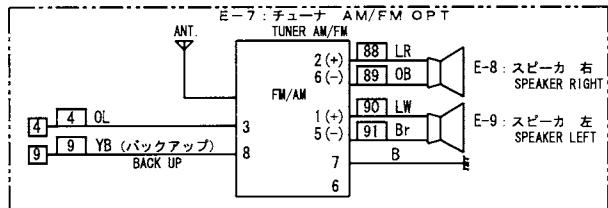
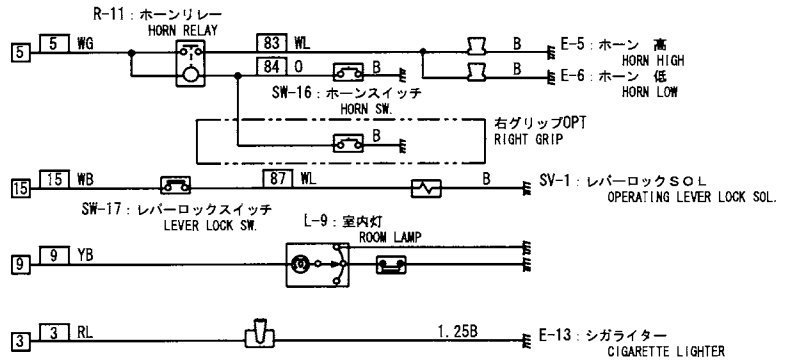
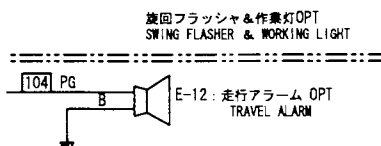
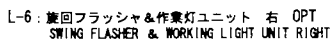
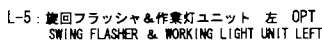
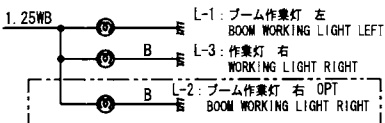
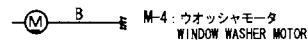
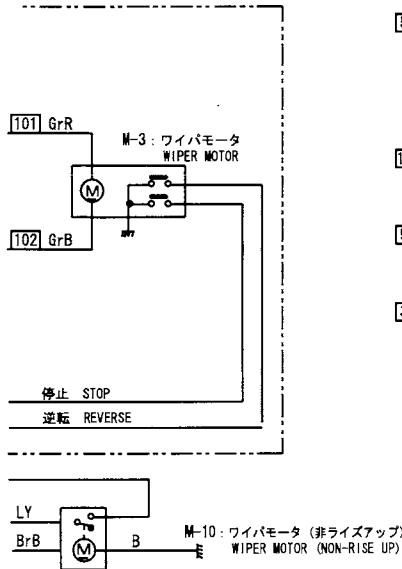
Type	Item	Name	P/No.
Relay	R-1	Battery relay	YT24S00001F1
	R-2		
	R-3	Glow relay	Accessory parts
	R-4	Safety relay	Accessory parts
	R-5	Wiper motor relay	YR24S00002P1
	R-6	Washer motor relay	↑
	R-7	Horn relay	↑
	R-8	Work light relay	↑
	R-20	Timer relay	YN25S00001P1
	R-10	Cab work light relay	YR24S00002P1
	R-18	Travel alarm relay	YR24S00002P1
	R-19	Flasher relay	YY24S00001P1
Light	L-1	Boom working light L.H	YW80S00001F1
	L-2	Working light R.H	YN80S00010F1
	L-3	Room light	2456Z322F1
	L-4	Cab working light front (Opt.)	YN80S00010F2
	L-5	Cab working light front (Opt.)	↑
	L-8	E/G room light	4056R4F1
	L-10	Cab working light (Back)	Installed on the spot
	L-11	Swing flasher R.H	YY80S00001F1
	L-12	Swing flasher L.H	↑
Controller	C-1	Mechatro controller KAI Spec.	YY22E00005F1
	C-1	Mechatro controller EU Spec.	YY22E00006F1
	C-2	Gauge cluster KAI Spec.	YY59S00001F1
	C-2	Gauge cluster EU Spec.	YY59S00001F2
	C-4	Air conditioner AMP.	Accessory parts
Motor	M-1	Starter motor	Accessory parts
	M-2	Governor motor	YT20S00002F1
	M-3	Wiper motor	YR76S00001P1
	M-4	Washer motor	24100U157F1
	M-9	Fuel pump (Auto dispress)	YR22P00001P1
	M-11	Fuel supply pump	YT22P00001F1
Diode	D-1	Diode	YN02D01001P1
	D-2	↑	↑
	D-3	↑	↑
	D-4	↑	YAZAKI:7321-9332-60
	D-5	↑	YN02D01001P1
Electric equipments	E-1	Fuse box	YV73E00001F1
	E-2	Alternator	Accessory parts
	E-3	Hour meter	YN58S00004P1
	E-4	Horn (Low)	2479U1009F2
	E-5	Horn (High)	2479U1009F1
	E-6	Cigarette lighter	2421R180F1
	E-7	Tuner AM & FM	LB54S00001P1
	E-8	Speaker L.H (Opt.)	YN54S00006P1
	E-9	Speaker R.H	↑
	E-10	Receiver drier	Accessory parts
	E-11	Air compressor clutch	↑
	E-14	Resistor	LC22E01001D1
	E-15	Travel alarm	2479U1710
	E-16	Converter	YT77S00001P1
	E-17	Socket	YN81S00001P1

●ELECTRIC DIAGRAM (1/4)

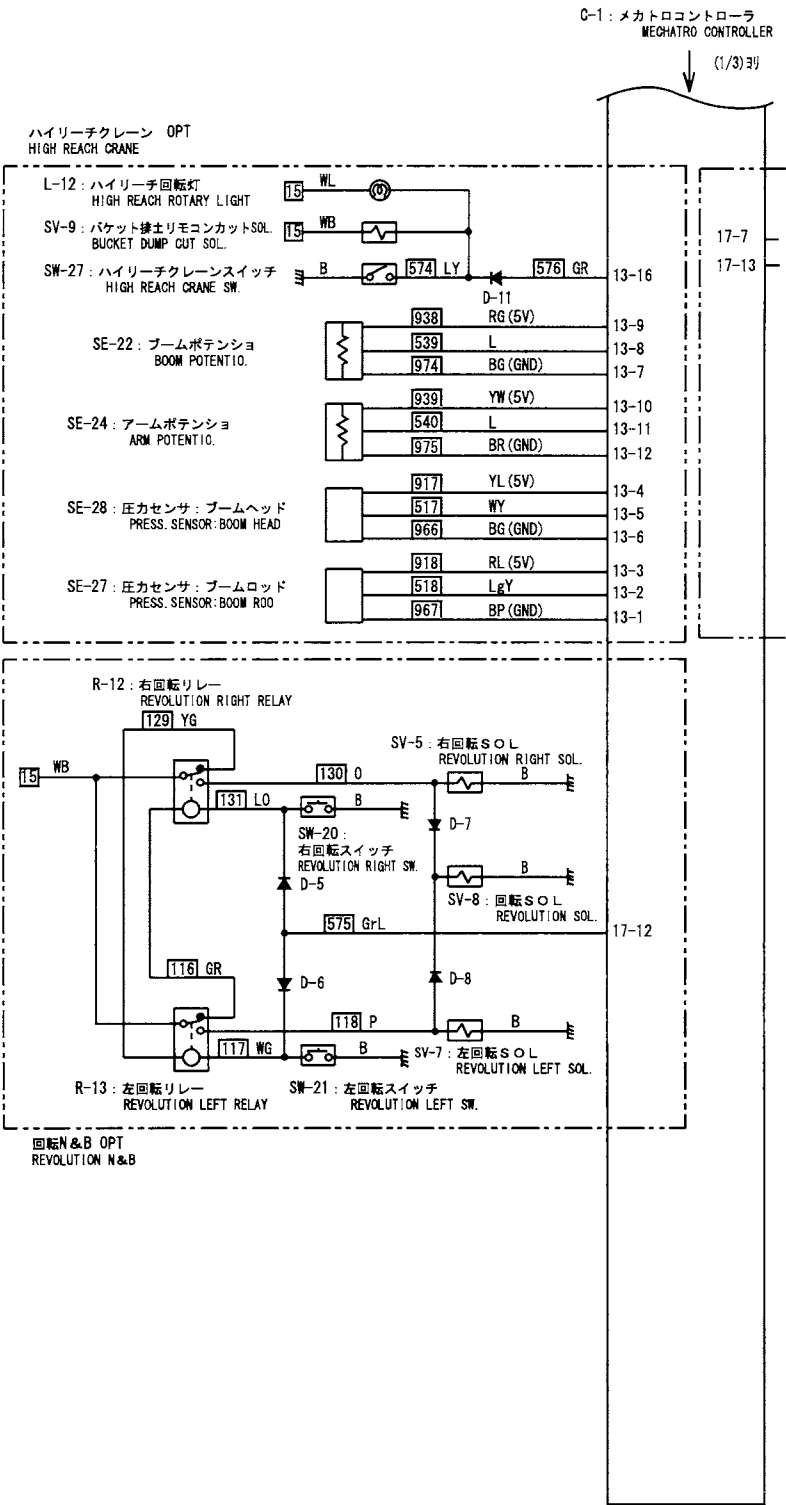
C-1: メカトロコントローラ
MECHATRO CONTROLLER

●ELECTRIC DIAGRAM (2/4)

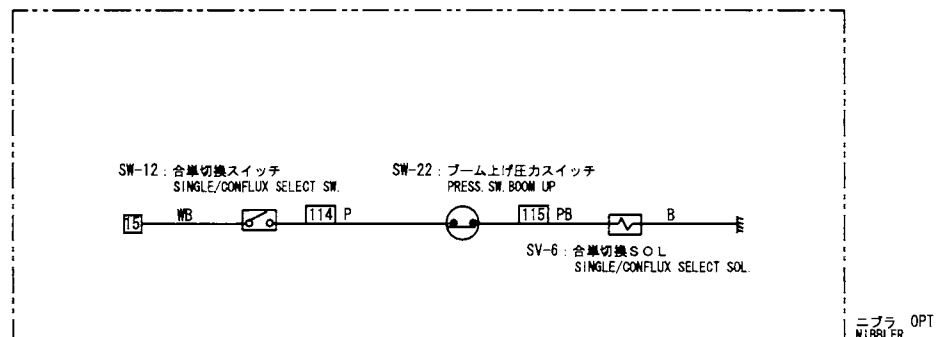
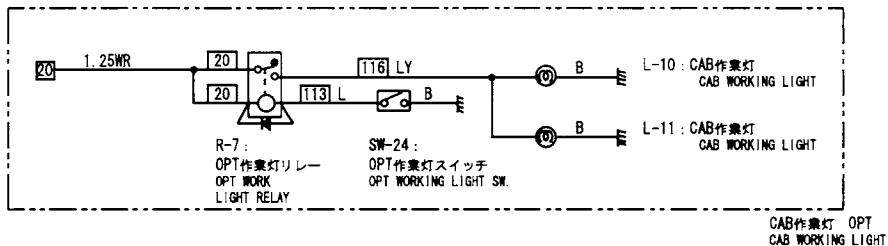
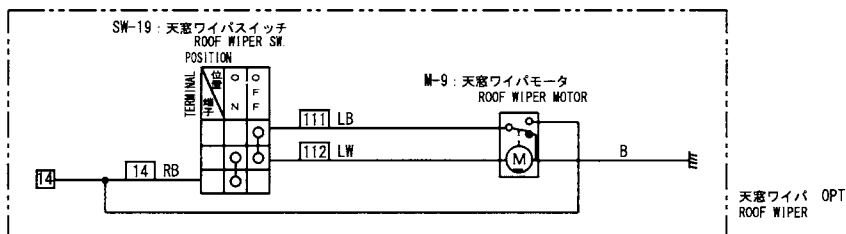
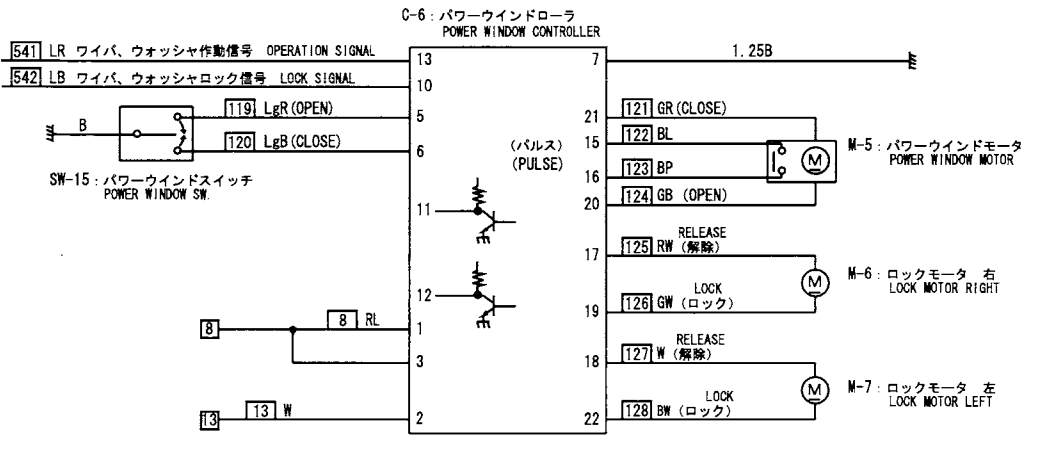




●ELECTRIC DIAGRAM (3/4)



パワーウィンド OPT
POWER WINDOW



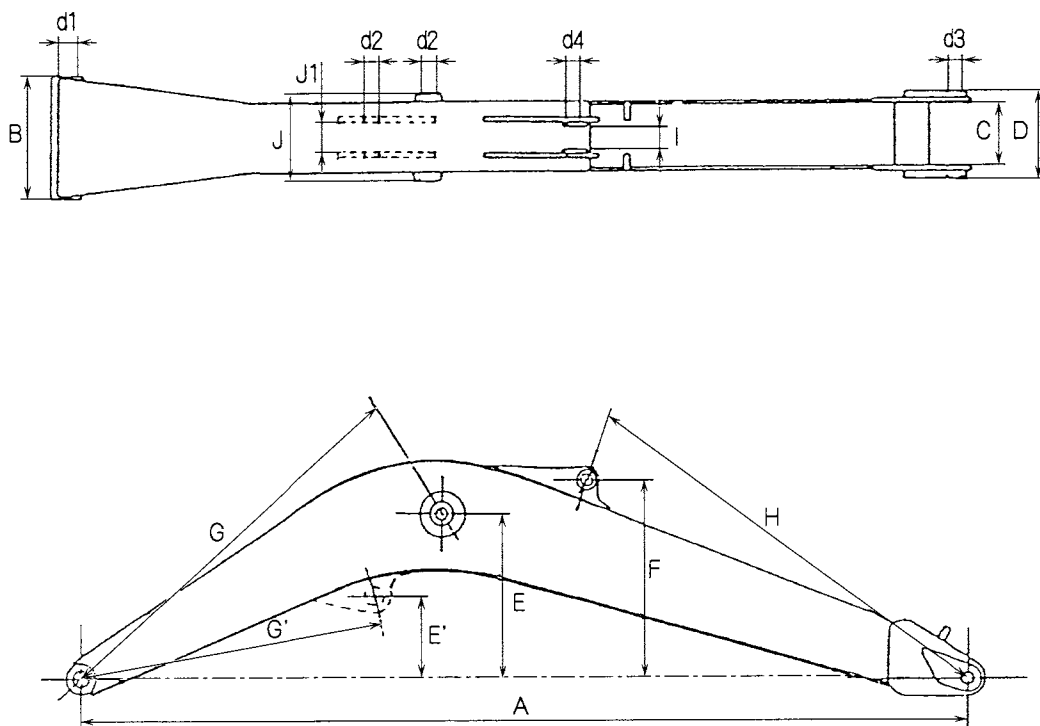
• ELECTRIC DIAGRAM (4/4)

Type	Item	Name	P/No.
Switch	SW-1	Key SW.	YN50S00002F1
	SW-2	Two-speed select SW.	YN03M01039P1
	SW-3	Att boost SW.	YN50E01001P1
	SW-5	KPSS release SW.	YN50S01003P1
	SW-7	E/G water temp. SW.	E/G accessory parts
	SW-8	E/G oil press. SW.	↑
	SW-9	Air filter clogging SW.	YR11P00008S005
	SW-10	E/G oil level SW.	E/G accessory parts
	SW-11	E/G coolant level SW.	↑
	SW-12	Single/Conflux select SW.	2479U1190F29
	SW-13	Swing flasher select SW.	2479U1190F19
	SW-14	Travel alarm SW. (Opt.)	2479U1190F16
	SW-15	Power window SW. (Opt.)	YN50S01005D2
	SW-16	Horn SW.	YN50E01001P1
	SW-17	Lever lock SW.	YN50S01001P1
	SW-19	Roof wiper SW. (Opt.)	2479Z2334
	SW-20	RH rotating SW. (Opt.)	YN03M01221P1
	SW-21	LH rotating SW. (Opt.)	↑
	SW-22	Boom raise press. SW. (Opt.)	2479U2058
	SW-23	Swing press. SW. (Opt.)	↑
	SW-24	OPT Working light SW. (Opt.)	2479U1190F1
	SW-26	Hydraulic level SW.	YN52S00012P2
	SW-27	High reach crane SW. (Opt.)	YN50S01004D1
	SW-28	Wiper interlock SW.	YT50E00003P1
Sensor	SE-11	Press. sensor : P1 side Opt. 1	LC52S00001P2
	SE-12	Press. sensor : P1 side Opt. 2	↑
	SE-18	Accel potentio.	YN52S00009P1
	SE-19	E/G speed sensor	E/G accessory parts
	SE-20	E/G coolant temp. SW.	YT52S00001P1
	SE-21	Fuel sensor	2489U267F1
	SE-22	Boom potentio (high reach) (Opt.)	YR52S00013P1
	SE-24	Arm potentio (high reach) (Opt.)	↑
	SE-27	Press. sensor : Boom rod (high reach) (Opt.)	LC52S00002P1
	SE-28	Press. sensor : Boom head (high reach) (Opt.)	↑
	SE-32	Press. sensor : Travel	LC52S00001P2
Solenoid valve	SV-1	Lever lock sol.	YN35V00024F1
	SV-2	ATT boost sol.	
	SV-3	Two-speed select sol.	
	SV-5	RH rotating sol. (Opt.)	YN30V00013F1
	SV-6	Single/Conflux select sol. (Opt.)	YN35V00010F1
	SV-7	LH rotating sol. (Opt.)	YN30V00013F1
	SV-8	Rotating sol. (Opt.)	YN35V00010F1
	SV-9	Bucket dump remo-con cut sol. (Opt.)	YN35V00008F1
	PSV-P	Pump propo. valve	YN35V00018F2
	PSV-A	Arm variable recirculation valve	YN35V00024F1
Propo. solenoid valve	PSV-G	Swing speed adjust propo. valve	
Relay	R-1	Battery relay	YT24S00001F1
	R-2	Starter relay	E/G accessory parts
	R-3	Glow relay	↑
	R-4	Safety relay	↑
	R-5	Wiper relay Assy.	YT24E00001F1
	R-6	Working light front	YR24S00002P1
	R-7	OPT Working light (Opt.)	↑
	R-10	Travel alarm relay (Opt.)	↑
	R-11	Horn relay	↑

Type	Item	Name	P/No.
Relay	R-12	RH rotating relay (Opt.)	YR24S00002P1
	R-13	LH rotating relay (Opt.)	↑
	R-18	Wiper motor relay	↑
	R-19	Washer motor relay	↑
Light	L-1	Boom working light LH	YW80S00001F1
	L-2	Boom working light RH (Opt.)	↑
	L-3	Working light RH	YN80S00010F1
	L-5	Swing flasher & Working light unit LH (Opt.)	YN24E00006F1
	L-6	Swing flasher & Working light unit RH (Opt.)	↑
	L-9	Room light	2456Z322F1
	L-10	Cab work light (Opt.)	YN80S00010F2
	L-11	Cab work light (Opt.)	↑
	L-12	Rotary light (Opt.)	2456R457
Controller	C-1	Mechatro controller	YN22E00040F1
	C-1	Mechatro controller (P/W)(Opt.)	YN22E00040F2
	C-2	Gauge cluster	YV59S00001F1
	C-2	Gauge cluster (high reach)(Opt.)	YV59S00002F1
	C-3	SW. Assy. (Mode-Buzzer stop)	YT50E00002F1
	C-4	Air conditioner amp.	A/C accessory parts
	C-5	Air conditioner SW.	LC20M01013P1
Motor	C-6	Power window controller (Opt.)	YN22E00016P1
	C-7	Auto greaseter controller	2480P40
	M-1	Starter motor	E/G accessory parts
	M-2	Governor motor	YT20S00002F2
	M-3	Wiper motor	YT53C00004P1
	M-4	Washer motor	2427U900
	M-5	Power window motor (Opt.)	YN76S01001P1
	M-6	Lock motor RH (Opt.)	YN02C01384F1
	M-7	Lock motor LH (Opt.)	YN02C01384F2
	M-8	Grease motor	24100N8530
Electric equipments	M-9	Roof wiper motor (Opt.)	YT76S00001P1
	M-10	Wiper motor (Non-rise up)	YN53C00001F1
	E-1	Fuse box	YN73E00002F1
	E-2	Alternator	E/G accessory parts
	E-3	Hour meter	YN58S00004P1
	E-4	Resister	LC22E01001D1
	E-5	Horn (High)	2479U1009F1
	E-6	Horn (Low)	2479U1009F2
	E-7	Tuner AM & FM (Opt.)	LC54S00001P1
	E-7	Tuner AM	LE54S00003P1
	E-8	Speaker (L.H)(Opt.)	YN54S00006P1
	E-9	Speaker (R.H)	↑
	E-10	Receiver drier	YN20M01068P1
Diode	E-11	Air compressor (Opt.)	LC91V00001F1
	E-12	Travel alarm (Opt.)	2479U1710
	E-13	Cigarette lighter	2421R180F1
	D-1	Diode	YN02D01001P1
	D-2	Diode	↑
	D-3	Diode	2475R132
	D-4	Diode	↑
	D-5	Diode	YN02D01001P1
	D-6	Diode	↑
	D-7	Diode	↑
	D-8	Diode	↑
	D-10	Diode	↑
	D-11	Diode	↑

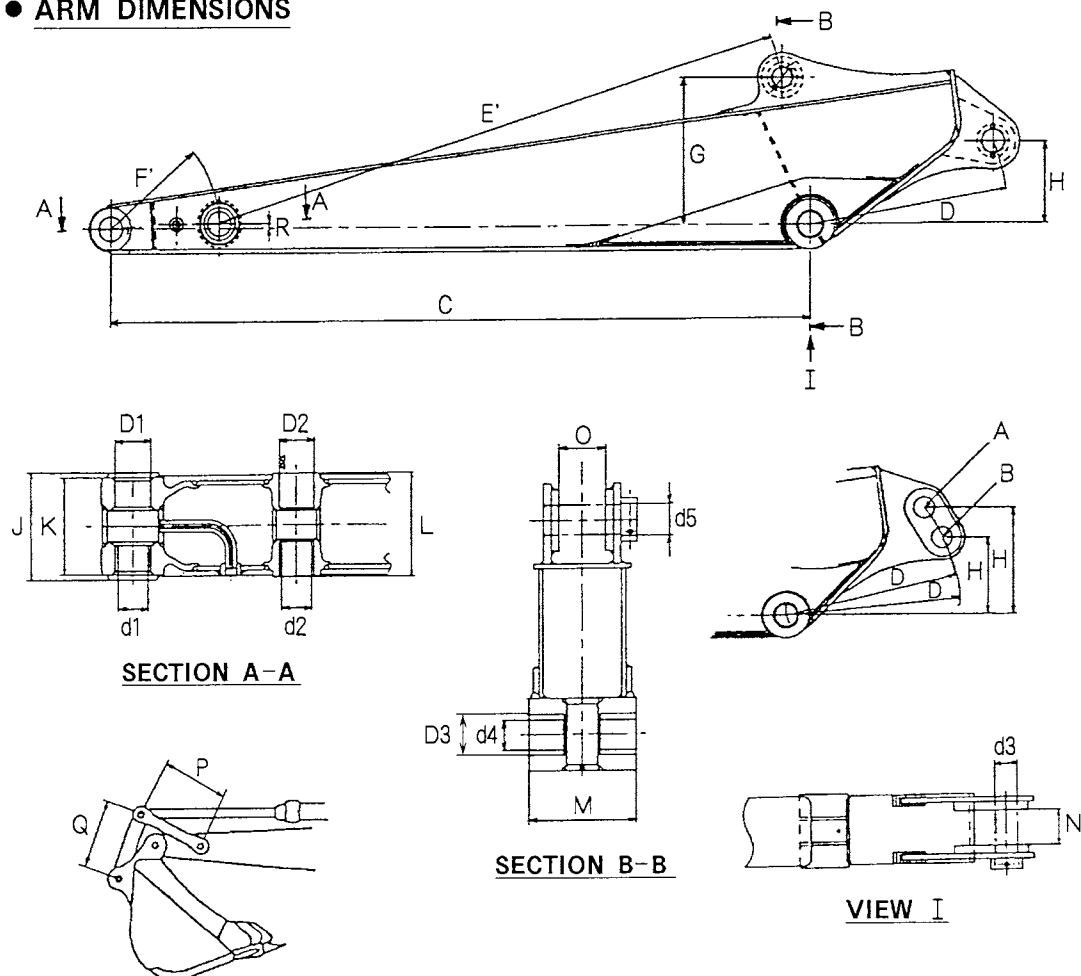
19. DIMENSIONS OF ATTACHMENTS

● BOOM DIMENSIONS



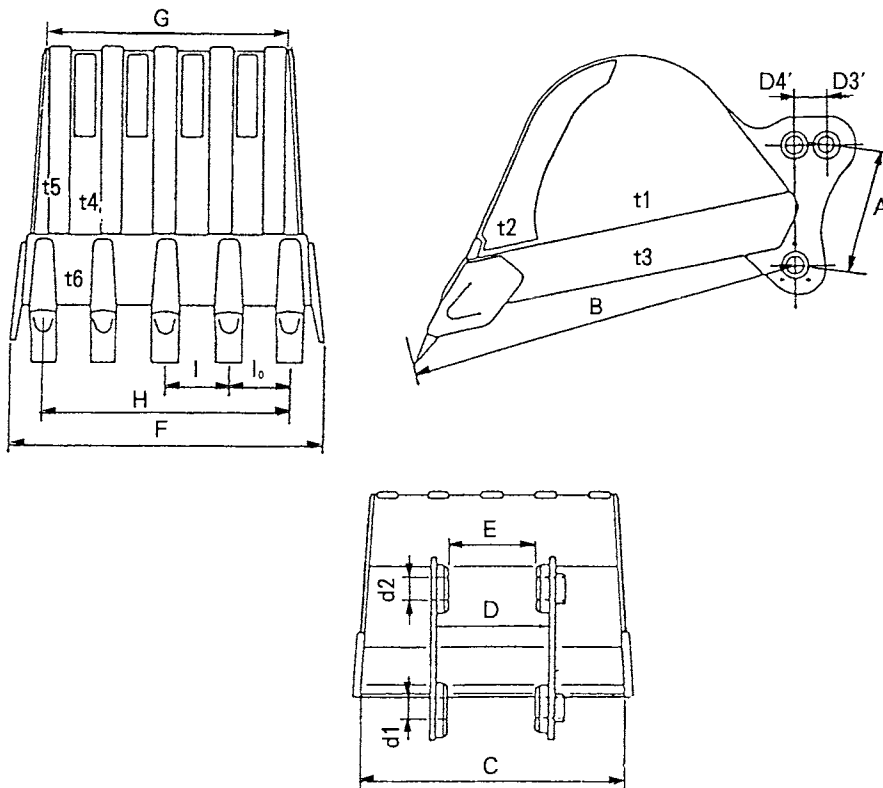
- A : Boom length
- B : Boom foot width
- C : Boom end inner width
- D : Boom end outer width
- E : Height of boom cylinder rod pin
- E1 : Height of boom cylinder rod pin
- F : Height of arm cylinder (head side) pin
- G : Distance between pins of boss
- G' : Distance between pins of boss
- H : Distance between pins of bracket
- I : Arm cylinder (head side) inner width
- J : External width of boom cylinder (rod side) mounting part
- J' : Bracket internal width of boom cylinder (rod side) mounting part
- d1 : Boom foot pin diameter
- d2 : Boom cylinder (rod side) pin diameter
- d3 : Boom end pin diameter
- d4 : Arm cylinder (head side) pin diameter

● ARM DIMENSIONS



- | | |
|--|--|
| C : Arm length | L : Arm top end |
| D : Distance between pins of boss and bracket | M : Boss width |
| D1 : Inside diameter of boss | N : Bracket inner width |
| D2 : Inside diameter of boss | O : Bracket inner width |
| D3 : Inside diameter of boss | P : Link dimension |
| E' : Distance between pins of boss and bracket | Q : Link dimension |
| F' : Distance between of boss and boss | R : Height between pins of boss and center |
| G : Height between pins of boss and bracket | d1 : Pin diameter |
| H : Height between pins of boss and bracket | d2 : Pin diameter |
| J : Arm top end width (with bushing) | d3 : Pin diameter |
| K : Boss width | d4 : Pin diameter |
| | d5 : Pin diameter |

● BUCKET DIMENSIONS



- A : Distance between pin and bracket
 B : Distance between bucket pin and tooth end
 C : Inner width of bucket top end
 D : Inner width of lug
 E : Inner width of bracket
 F : Outer width of side cutter
 G : Outer width of bucket bottom
 H : Tooth outer width
 I : Pitch between teeth
 I_o : Pitch between teeth
 D3' } Boss offset distance
 D4' }
 d1 : Pin diameter
 d2 : Pin diameter
 t1 : Side plate thickness
 t2 : Side plate (wear plate) thickness
 t3 : Side edge plate thickness
 t4 : Bottom plate thickness
 t5 : Bottom plate (wear plate) thickness
 t6 : Front edge plate thickness

Unit : mm (ft-in)

SK70SR

BOOM		ARM		BUCKET (Heaped capacity)							
	STD 3.72m (12'2") YT02B00008P1	STD 2.07m (6'9") YT12B00014P1	1.65m (5'5") YT12B00008P1		STD 0.22 m³ (0.29cuyd) LE61B00031P1	0.28m³ (0.37cuyd) YT161B00002P1	0.11m³ (0.14cuyd) LEF61B00037P1	0.14m³ (0.18cuyd) YR61B00013P1	0.18m³ (0.24cuyd) LE61B00033P1	0.35m³ (0.46cuyd) LE61B00029P1	
A	3.715 (12'2.2")	—	—	A	290 (11.4")	290 (11.4")	290 (11.4")	290 (11.4")	290 (11.4")	290 (11.4")	
B	360 (1'2.1")	—	—	B	R1,037 (R3'4.8")	R1,037 (R3'4.8")	R990 (R3'2.9")	R1,037 (R3'4.8")	R1,037 (R3'4.8")	R1,037 (R3'4.8")	
C	215 (8.4")	2,070 (6'9.4")	1,650 (5'4.9")	C	450 (11'1.7")	550 (1'9.6")	318 (1'0.5")	281 (11")	350 (1'1.7")	650 (2'1.5")	
D	315 (1'0.4")	A point R498 (R1'7.6") B point R495 (R1'7.4")	R483 (R1'7")	D	238 (9.3")	238 (9.3")	238 (9.3")	238 (9.3")	238 (9.3")	238 (9.3")	
D ₁	—	Φ 65 (Φ2.5")	Φ 65 (Φ2.5")		—	—	—	—	—	—	
D ₂	—	Φ 60 (Φ2.3")	Φ 60 (Φ2.3")		—	—	—	—	—	—	
D ₃	—	Φ 75 (Φ2.9")	Φ 75 (Φ2.9")	D ₃	12 (0.4")	12 (0.4")	—	12 (0.4")	12 (0.4")	12 (0.4")	
E	E' 781 (2'6.7")	E' R1,504 (R4'11.2")	E' R1,504 (R4'11.2")	E	182 (7.1")	182 (7.1")	182 (7.1")	182 (7.1")	182 (7.1")	182 (7.1")	
F	1,085.5 (3'6.7")	F' R240 (R9.4")	F' R240 (R9.4")	F	650 (2'1.5")	750 (2'5.5")	400 (1'3.7")	450 (1'5.7")	550 (1'9.6")	850 (2'9.4")	
G	G' R1,858.5 (R6'1.1")	405.5 (1'3.9")	405.5 (1'3.9")	G	582 (1'10.9")	682 (2'2.8")	400 (1'3.7")	413 (1'4.2")	482 (1'6.9")	782 (2'6.7")	
H	R1,706.5 (R5'7.1")	A point 308.5 (1'0.1") B point 222.5 (8.7")	282.5 (11.1")	H	466 (1'6.3")	566 (1'10.2")	292 (11.4")	297 (11.6")	366 (1'2.4")	666 (2'2.2")	
I	100 (3.9")	—	—	I	166 (6.5")	190 (7.5")	146 (5.7")	148.5 (5.8")	183 (7.2")	222 (8.7")	
J	100 (3.9")	180 (7")	180 (7")	I ₀	150 (5.9")	188 (7.4")	146 (5.7")	148.5 (5.8")	183 (7.2")	222 (8.7")	
K	—	162 (6.3")	162 (6.3")	t ₁	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	
L	—	180 (7")	180 (7")	t ₂	—	—	—	—	—	—	
M	—	210 (8.2")	210 (8.2")	t ₃	16 (0.6")	16 (0.6")	16 (0.6")	16 (0.6")	16 (0.6")	16 (0.6")	
N	—	100 (3.9")	100 (3.9")	t ₄	6 (0.2")	6 (0.2")	9 (0.3")	6 (0.2")	6 (0.2")	6 (0.2")	
O	—	90 (3.5")	90 (3.5")	t ₅	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	
P	—	436.5 (1'5.1")	436.5 (1'5.1")	t ₆	25 (0.9")	25 (0.9")	25 (0.9")	25 (0.9")	25 (0.9")	25 (0.9")	
Q	—	380±0.5 (1'2.9"±0.01")	380±0.5 (1'2.9"±0.01")		—	—	—	—	—	—	
R	—	15 (0.5")	15 (0.5")		—	—	—	—	—	—	
d ₁	Φ 60 (Φ2.3")	Φ 50 (Φ1.9")	Φ 50 (Φ1.9")	d ₁	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	
d ₂	Φ 70 (Φ2.7")	Φ 50 Φ 50 (Φ1.9")	Φ 50 (Φ1.9")	d ₂	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	Φ 50 (Φ0.5")	
d ₃	Φ 60 (Φ2.3")	Φ 60 (Φ2.3")	Φ 60 (Φ2.3")		—	—	—	—	—	—	
d ₄	Φ 60 (Φ2.3")	Φ 60 (Φ2.3")	Φ 60 (Φ2.3")		—	—	—	—	—	—	
d ₅	—	Φ 50 (Φ1.9")	Φ 50 (Φ1.9")		—	—	—	—	—	—	

SK115SR

Unit : mm (ft-in)

	BOOM			ARM			BUCKET (Heaped capacity)									
	STD	STD	1.9m (6'3")	1.9m (6'3")	2.7m (8'10")	STD	STD	0.45m ³ (0.58cuyd)	0.17m ³ (0.22cuyd)	0.23m ³ (0.30cuyd)	0.30m ³ (0.39cuyd)	0.37m ³ (0.48cuyd)	0.51m ³ (0.66cuyd)			
	YV02B00002P1	YV12B00002P1	YV12B00014P2	YV12B00014P2	YV12B00007P1	YV12B00002P1	YV12B00002P1	YV61B00025P1	YV61B00016P2	YV61B00014P2	YV61B00012P2	YV61B00010P2	YV61B00008P2			
A	4,260 (13'11.7")	—	—	—	—	—	—	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	574 (1'10.5")	—	—	—	—	—	—	R1,201 (R3'11.2")	R1,193 (R3'10.9")	R1,201 (R3'11.2")	R1,201 (R3'11.2")	R1,201 (R3'11.2")	R1,201 (R3'11.2")			
C	232 (9.1")	2,200 (7'2.6")	1,900 (6'2.8")	1,900 (6'2.8")	2,700 (8'10.2")	—	—	812 (2'7.9")	420 (1'4.5")	462 (1'6.1")	562 (1'10.1")	662 (2'2")	872 (2'10.3")			
D	376 (1'2.8")	R626.5 (R2'0.6")	R647.5 (R2'1.4")	R647.5 (R2'1.4")	A point (27.1") B point (22.1")	—	—	274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")	274 (10.7")			
D ₁	—	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	—	—	—	—	—	—	—	—			
D ₂	—	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	Φ 75 (Φ 2.9")	—	—	—	—	—	—	—	—			
D ₃	—	Φ 85 (Φ 3.3")	Φ 85 (Φ 3.3")	Φ 85 (Φ 3.3")	Φ 85 (Φ 3.3")	—	—	—	—	—	—	—	—			
E	919 (3'0.1")	E R1,815.5 (R6'11.4")	E R1,815.5 (R6'11.4")	E R1,815.5 (R6'11.4")	E R1,815.5 (R6'11.4")	—	—	218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")	218 (8.5")			
F	1,037.5 (3'4.8")	F R350 (R1'1.7")	F R350 (R1'1.7")	F R350 (R1'1.7")	F R350 (R1'1.7")	—	—	950 (3'1.4")	450 (1'5.7")	600 (1'11.6")	700 (2'3.5")	800 (2'7.4")	1,010 (3'3.7")			
G	R1,939 (R6'4.3")	442 (1'5.4")	496.5 (1'7.5")	496.5 (1'7.5")	442 (1'5.4")	—	—	685 (2'2.9")	354 (1'1.9")	336 (1'1.2")	435 (1'5.1")	535 (1'9")	745 (2'5.3")			
H	R2,129.5 (R6'11.8")	418 (1'4.4")	279 (10.9")	279 (10.9")	A point (10.3") B point (6.1")	—	—	724 (2'4.5")	345 (1'1.5")	375 (1'2.7")	474 (1'6.6")	574 (1'10.5")	784 (2'6.8")			
I	108 (4.2")	—	—	—	—	—	—	242 (9.5")	172.5 (6.7")	187.5 (7.3")	237 (9.3")	192 (7.6")	196 (7.7")			
J	400 (1'3.7")	216 (8.5")	216 (8.5")	216 (8.5")	216 (8.5")	—	—	241 (9.4")	172.5 (6.7")	187.5 (7.3")	237 (9.3")	191 (7.5")	196 (7.7")			
K	—	198 (7.7")	198 (7.7")	198 (7.7")	198 (7.7")	—	—	t ₁ 6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")			
L	—	210 (8.2")	210 (8.2")	210 (8.2")	210 (8.2")	—	—	t ₂ 8 (0.3")	—	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")			
M	—	226 (8.8")	226 (8.8")	226 (8.8")	226 (8.8")	—	—	t ₃ 19 (0.7")	16 (0.6")	19 (0.7")	19 (0.7")	19 (0.7")	19 (0.7")			
N	—	108 (4.2")	108 (4.2")	108 (4.2")	108 (4.2")	—	—	t ₄ 6 (0.2")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")			
O	—	98 (3.8")	98 (3.8")	98 (3.8")	98 (3.8")	—	—	t ₅ 6 (0.2")	9 (0.4")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")			
P	—	501 (1'7.7")	501 (1'7.7")	501 (1'7.7")	501 (1'7.7")	—	—	t ₆ 28 (1.1")	25 (0.9")	28 (1.1")	28 (1.1")	28 (1.1")	28 (1.1")			
Q	—	468 (1'6.4")	468 (1'6.4")	468 (1'6.4")	468 (1'6.4")	—	—	—	—	—	—	—	—			
R	—	15 (0.5")	15 (0.5")	15 (0.5")	15 (0.5")	—	—	—	—	—	—	—	—			
d ₁	Φ 70 (Φ 2.7")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	—	—	d ₁ Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")			
d ₂	Φ 75 (Φ 2.9")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	—	—	d ₂ Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")			
d ₃	Φ 70 (Φ 2.7")	Φ 70 (Φ 2.7")	Φ 70 (Φ 2.7")	Φ 70 (Φ 2.7")	Φ 70 (Φ 2.7")	—	—	—	—	—	—	—	—			
d ₄	Φ 70 (Φ 2.7")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	—	—	—	—	—	—	—	—			
d ₅	—	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	Φ 60 (Φ 2.3")	—	—	—	—	—	—	—	—			

Unit : mm (ft-in)

SK115SRDZ • SK135SR (LC)

	BOOM		ARM		BUCKET (Heaped capacity)						
	STD 4.6m (15'1") Y02B00002P1	STD 2.45m (8') YY12B0002P1 ※YY12B0104P1 (EU) ※YY12B0104P1 (KAI)	2.1m (6'10") LP12B00021P2	STD 2.95m (9'8") YY12B0003P1 ※YY12B0104P1 (KAI) ※YY12B00009P1		STD 0.50m³ (0.65cuyd) LP61B000031P1	0.24m³ (0.31cuyd) LP61B000020P2	0.31m³ (0.41cuyd) LP61B000014P2	STD 0.38m³ (0.50cuyd) LP61B000012P2	0.45m³ (0.59cuyd) LP61B000018P2	0.57m³ (0.75cuyd) LP61B000010P2
A	4,600 (15'1.1")	—	—	—	A	370 (1'2.5")	370 (1'2.5")	370 (1'2.5")	370 (1'2.5")	370 (1'2.5")	370 (1'2.5")
B	574 (1'10.5")	—	—	—	B	R1,225 (R4')	R1,225 (R4')	R1,225 (R4')	R1,225 (R4')	R1,225 (R4')	R1,225 (R4')
C	274 (10.7")	2,450 (8'0.4")	2,100 (6'10.6")	2,950 (6'8.1")	C	862 (2'9.9")	462 (1'6.1")	562 (1'10.1")	662 (2'2")	772 (2'6.3")	962 (3'1.8")
D	386 (1'3.1")	R638.5 (R2'1.1")	R645 (R2'1.3")	A point (R2'1.9") B point (R2'2.5")	D	324 (1'0.7")	324 (1'0.7")	324 (1'0.7")	324 (1'0.7")	324 (1'0.7")	324 (1'0.7")
D ₁	—	φ80 (φ3.1")	φ80 (φ3.1")	φ80 (φ3.1")		—	—	—	—	—	—
D ₂	—	φ75 (φ2.9")	φ75 (φ2.9")	φ75 (φ2.9")		—	—	—	—	—	—
D ₃	—	φ85 (φ3.3")	φ85 (φ3.3")	φ85 (φ3.3")	D ₃	—	—	—	—	—	—
E	961 (3'1.8")	E R1,820 (R5'11.6")	E R1,820 (R5'11.6")	E R1,820 (R5'11.6")	E	252 (9.9")	252 (9.9")	252 (9.9")	252 (9.9")	252 (9.9")	252 (9.9")
F	1,084.5 (3'6.6")	F R350 (R1'1.7")	F R350 (R1'1.7")	F R350 (R1'1.7")	F	1,000 (3'3.3")	59 (2.3")	700 (2'3.5")	800 (2'7.4")	910 (2'11.8")	1,100 (3'7.3")
G	R2,024 (R6'7.6")	456.5 (1'5.9")	456.5 (1'5.9")	456.5 (1'5.9")	G	739 (2'5")	383 (1'3")	439 (1'5.2")	539 (1'9.2")	649 (2'1.5")	839 (2.9")
H	R2,303 (R7'6.6")	246.5 (9.7)	280 (11")	A point (10.1") B point (5.9")	H	774 (2'6.4")	374 (1'2.7")	474 (1'6.6")	573 (1'10.5")	684 (2'2.9")	874 (2'10.4")
I	108 (4.2")	—	—	—	I	193.5 (7.6")	187 (7.3")	237 (9.3")	191 (7.5")	228 (8.9")	218.5 (8.6")
J	400 (1'3.7")	250 (9.8")	250 (9.8")	250 (9.8")	I ₀	193.5 (7.6")	187 (7.3")	237 (9.3")	191 (7.5")	228 (8.9")	218.5 (8.6")
K	—	232 (9.1")	232 (9.1")	232 (9.1")	t ₁	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")
L	—	244 (9.6")	244 (9.6")	244 (9.6")	t ₂	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")
M	—	268 (10.5")	268 (10.5")	268 (10.5")	t ₃	19 (0.7")	19 (0.7")	19 (0.7")	19 (0.7")	19 (0.7")	19 (0.7")
N	—	108 (4.2")	108 (4.2")	108 (4.2")	t ₄	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")
O	—	98 (3.8")	98 (3.8")	98 (3.8")	t ₅	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")	6 (0.2")
P	—	501 (17.7")	501 (17.7")	501 (17.7")	t ₆	28 (1.1")	28 (1.1")	28 (1.1")	28 (1.1")	28 (1.1")	28 (1.1")
Q	—	482 (16.9")	482 (16.9")	482 (16.9")		—	—	—	—	—	—
R	—	20 (0.7")	20 (0.7")	20 (0.7")		—	—	—	—	—	—
d ₁	φ70 (φ2.7")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	d ₁	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")
d ₂	φ80 (3.1")	φ60 (φ2.3")	φ60 (φ2.3")	φ60 (φ2.3")	d ₂	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")	φ65 (φ2.5")
d ₃	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")		—	—	—	—	—	—
d ₄	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")	φ70 (φ2.7")		—	—	—	—	—	—
d ₅	—	φ60 (φ2.3")	φ60 (φ2.3")	φ60 (φ2.3")		—	—	—	—	—	—

※ Reinforcement

Note) EU Bucket is prepared by customer.

Unit : mm (ft-in)

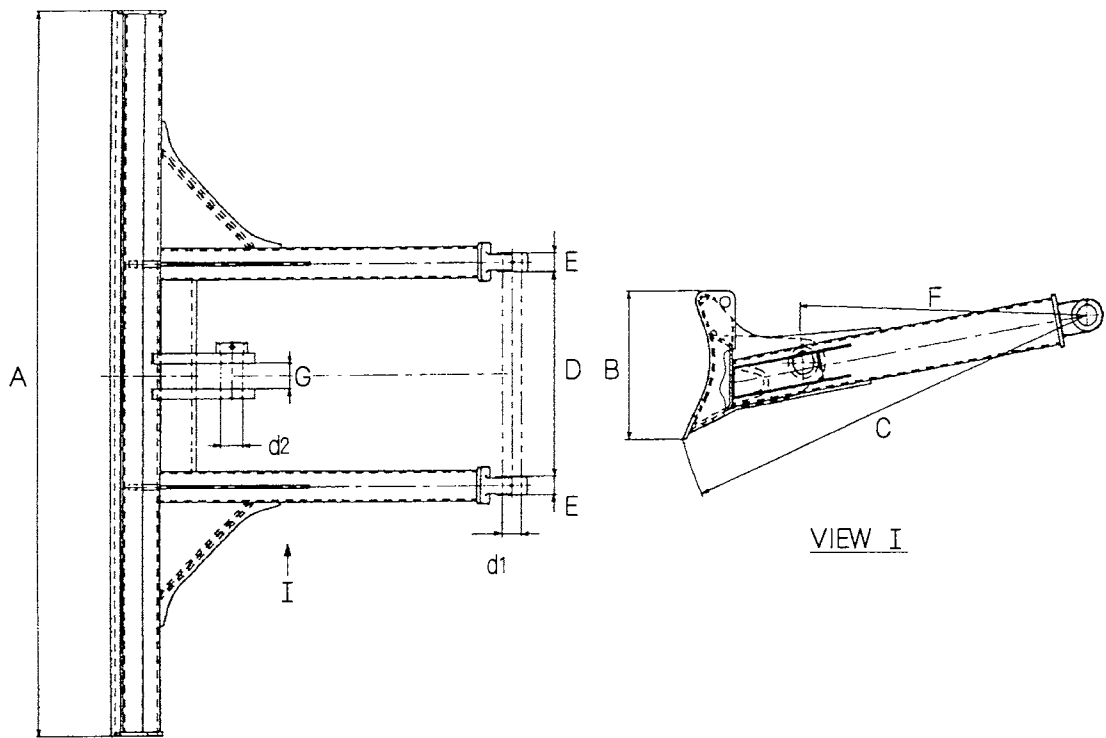
SK235SR

BOOM				ARM			BUCKET (Heaped capacity)						
STD	2.94m (9'7")	2.4m (7'10")	3.3m (10'9")	STD	0.80m³ (1.04cu yd) YN61B00065P1	0.51m³ (0.66cu yd) YN61B00077P1	0.70m³ (0.91cu yd) YN61B00095P1	0.93m³ (1.2cu yd) YN61B00081P1	1.05m³ (1.37cu yd) YN61B00083P1	A	B	C	D
5.65m (18'6") YN02B00138P1	2.94m (9'7") YN12B00224P1	2.4m (7'10") YN12B00224P1	3.3m (10'9") YN12B00227P1										
A	5,650 (18'6.4")	—	—	—	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")	444 (1'5.4")
B	674 (2'2.5")	—	—	—	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")	R1,440 (R4'8.6")
C	347 (1'1.6")	2,940 (9'7.7")	2,400 (7'10.4")	3,300 (10'9.9")	1,000 (3'3.3")	711 (2'3.9")	921 (3'0.2")	1,173 (3'10.1")	1,303 (4'3.2")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")
D	482 (1'6.9")	R834 (R2'8.8")	R866 (R2'10")	R869 (R2'10.2")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")	399 (1'3.7")
D ₁	—	Φ95 (Φ3.7")	Φ95 (Φ3.7")	Φ95 (Φ3.7")	—	—	—	—	—	—	—	—	—
D ₂	—	Φ85 (Φ3.3")	Φ85 (Φ3.3")	Φ85 (Φ3.3")	—	—	—	—	—	—	—	—	—
D ₃	—	Φ105 (Φ4.1")	Φ105 (Φ4.1")	Φ105 (Φ4.1")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")	24 (0.9")
E	990 (3'2.9")	E' R2,171 (R7'1.4")	E' R2,171 (R7'1.4")	E' R2,171 (R7'1.4")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")	327 (1'0.8")
F	1,182 (3'10.5")	F' R420 (R1'4.5")	F' R420 (R1'4.5")	F' R420 (R1'4.5")	1,159 (3'9.6")	868 (2'10.1")	1,080 (3'5.5")	1,332 (4'4.4")	1,462 (4'9.5")	1,332 (4'4.4")	1,332 (4'4.4")	1,332 (4'4.4")	1,332 (4'4.4")
G	R2,555 (R8'4.5")	615.5 (2'0.2")	615.5 (2'0.2")	615.5 (2'0.2")	863 (2'9.9")	572 (1'10.5")	784 (2'6.8")	1,036 (3'4.7")	1,166 (3'9.9")	812 (2'7.9")	812 (2'7.9")	812 (2'7.9")	812 (2'7.9")
H	R2,750 (R9'0.2")	298 (1'1.7")	366.5 (1'2.4")	A point (1'1.4") B point (8'1")	892 (2'11.1")	600 (1'11.6")	812 (2'7.9")	1,064 (3'5.8")	1,196 (3'11")	812 (2'7.9")	812 (2'7.9")	812 (2'7.9")	812 (2'7.9")
I	122 (4.8")	—	—	—	223 (8.7")	300 (11.8")	203 (7.9")	266 (10.4")	240 (9.4")	223 (8.7")	223 (8.7")	223 (8.7")	223 (8.7")
J	470 (1'6.5")	325 (1'0.7")	325 (1'0.7")	325 (1'0.7")	223 (8.7")	300 (11.8")	203 (7.9")	266 (10.4")	238 (9.3")	223 (8.7")	223 (8.7")	223 (8.7")	223 (8.7")
K	—	325 (1'0.7")	325 (1'0.7")	325 (1'0.7")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")
L	—	320 (1'0.5")	320 (1'0.5")	320 (1'0.5")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")
M	—	346 (1'1.6")	346 (1'1.6")	346 (1'1.6")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")	22 (0.8")
N	—	122 (4.8")	122 (4.8")	122 (4.8")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")	8 (0.3")
O	—	102 (4")	102 (4")	102 (4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")	12 (0.4")
P	—	630 (2'0.8")	630 (2'0.8")	630 (2'0.8")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")	32 (1.2")
Q	—	610 (2")	610 (2")	610 (2")	—	—	—	—	—	—	—	—	—
R	—	23 (0.9")	23 (0.9")	23 (0.9")	—	—	—	—	—	—	—	—	—
d ₁	Φ90 (Φ3.5")	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)	Φ80 (Φ3.1)	Φ80 (Φ3.1)	Φ80 (Φ3.1)
d ₂	Φ85 (Φ3.3")	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)	Φ80 (Φ3.1)	Φ80 (Φ3.1)	Φ80 (Φ3.1)
d ₃	Φ90 (Φ3.5")	Φ85 (Φ3.3")	Φ85 (Φ3.3")	Φ85 (Φ3.3")	—	—	—	—	—	—	—	—	—
d ₄	Φ85 (Φ3.3")	Φ90 (Φ3.5")	Φ90 (Φ3.5")	Φ90 (Φ3.5")	—	—	—	—	—	—	—	—	—
d ₅	—	Φ80 (Φ3.1)	Φ80 (Φ3.1)	Φ80 (Φ3.1)	—	—	—	—	—	—	—	—	—

DOZER

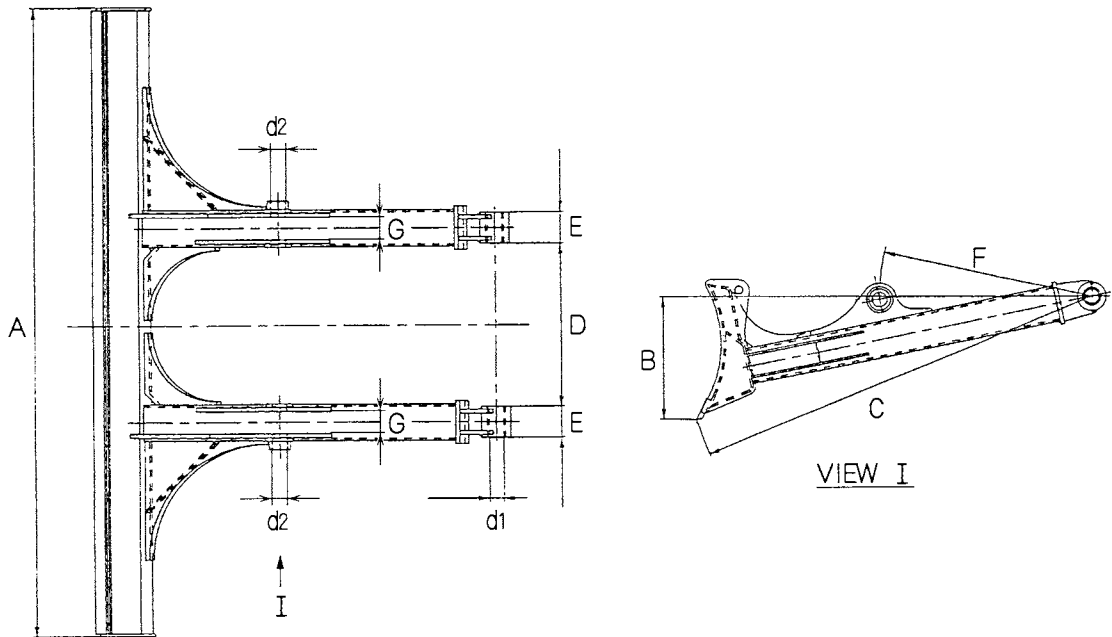
SK70SR

● DOZER DIMENSIONAL DRAWING



Dozer dimensional drawing

		Unit : mm (ft-in)	
		YT51B00006F1	YT51B00014F1
No.	NAME	DIMENSION	EU. SPEC.
A	Blade width	2,320 (7'7")	2,494 (8'2")
B	Blade height	470 (18.5")	388 (15.3")
C	Distance from dozer attaching pin center to cutting edge end	R1,375 (4'6")	←
D	Inner width of dozer attaching bracket	650 (25.7")	←
E	Width of dozer attaching bracket	60 (2.36")	←
F	Distance from dozer attaching pin center to attaching pin on dozer cylinder head side	R933 (36.7")	←
G	Attaching bracket inner width on dozer cylinder head side	82 (3.23")	←
d1	Dozer attaching pin dia.	φ 50 (1.97")	←
d2	Attaching pin dia. on dozer cylinder head side	φ 70 (2.76")	←

SK135SRLC(EU)(KAI)
● DOZER DIMENSIONAL DRAWING

Dozer dimensional drawing

Unit : mm (ft-in)

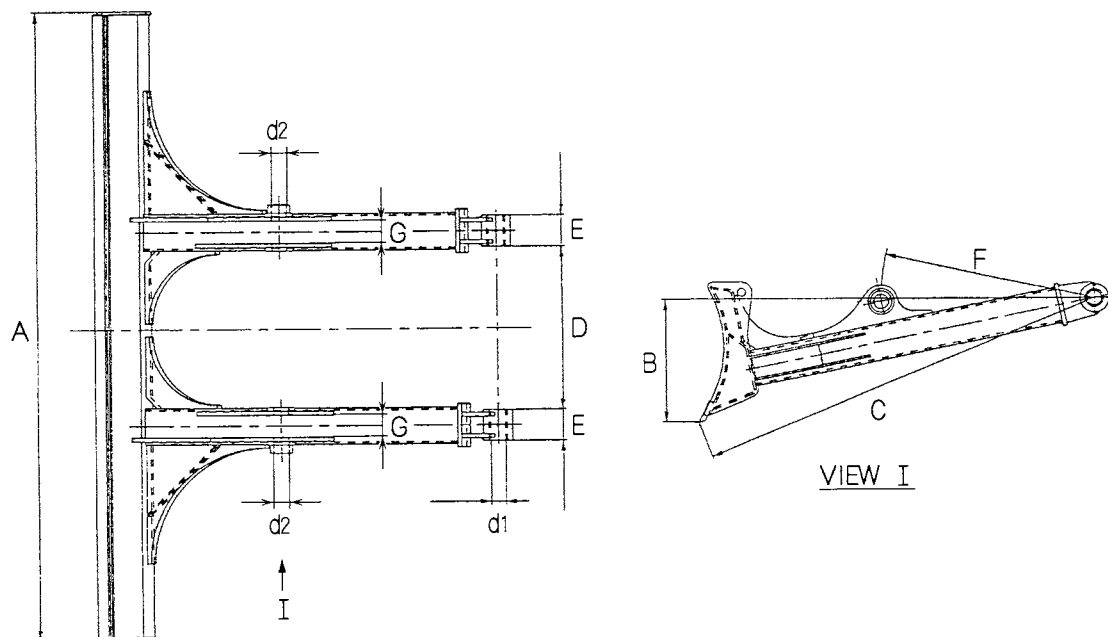
No.	NAME	YY51B00003F1	YY51B00003F1
		DIMENSION	KAI EU SPEC.
A	Blade width	2,590 (8'6")	←
B	Blade height	590 (1'11")	←
C	Distance from dozer attaching pin center to cutting edge end	R1,729 (5'8")	←
D	Inner width of dozer attaching bracket	672 (2.3")	←
E	Width of dozer attaching bracket	128 (5.04")	←
F	Distance from dozer attaching pin center to attaching pin on dozer cylinder head side	R881 (2'11")	←
G	Attaching bracket inner width on dozer cylinder head side	92 (3.62")	←
d1	Dozer attaching pin dia.	φ 60 (2.37")	←
d2	Attaching pin dia. on dozer cylinder head side	φ 60 (2.37")	←

SK115SRDZ

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SK135SR

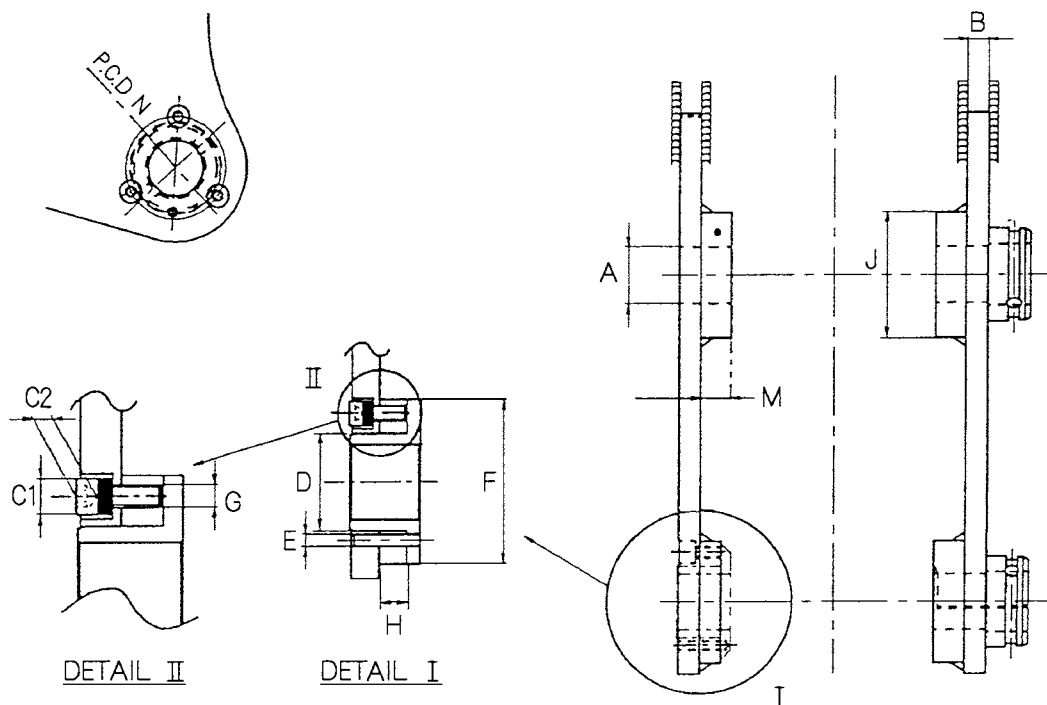
● DOZER DIMENSIONAL DRAWING



Dozer dimensional drawing

Unit : mm (ft-in)

No.	NAME	YY51B00001F1	YY51B00001F1
		DIMENSION	KAI SPEC.
A	Blade width	2,590 (8'6")	←
B	Blade height	590 (1'11")	←
C	Distance from dozer attaching pin center to cutting edge end	R1,633 (5'4")	←
D	Inner width of dozer attaching bracket	672 (2.3")	←
E	Width of dozer attaching bracket	128 (5.04")	←
F	Distance from dozer attaching pin center to attaching pin on dozer cylinder head side	R881 (2'11")	←
G	Attaching bracket inner width on dozer cylinder head side	92 (3.62")	←
d1	Dozer attaching pin dia.	φ 60 (2.37")	←
d2	Attaching pin dia. on dozer cylinder head side	φ 60 (2.37")	←

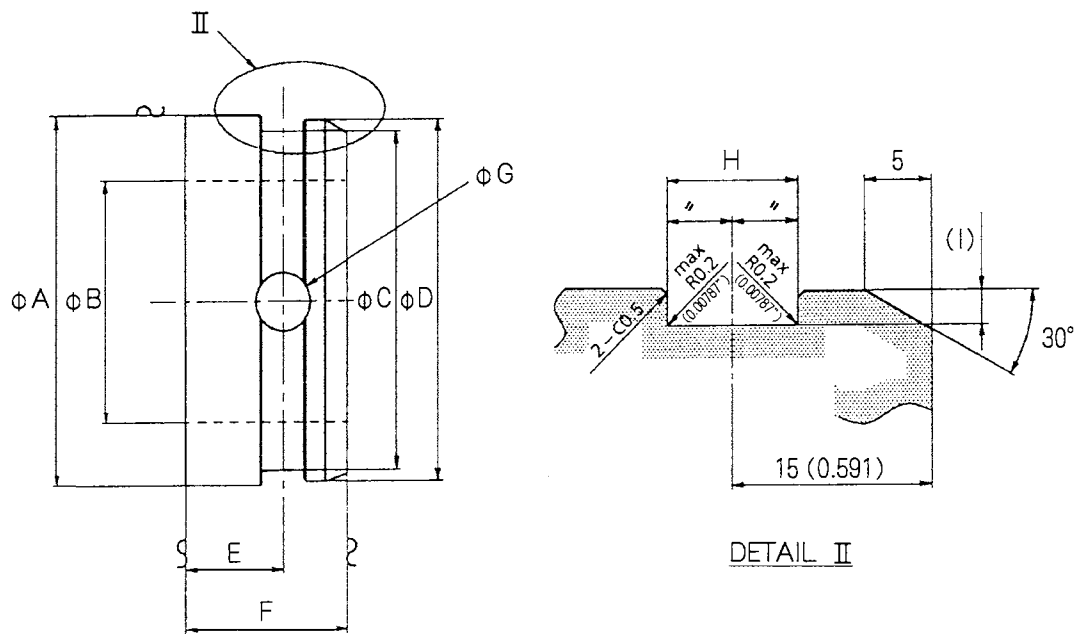
SK70SR**● DETAIL DIMENSIONAL DRAWING OF LUG SECTION****Dimension of lug section**

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Pin hole dia.	Lug plate thickness	Bolt head Hole dia./Hole depth	Hole dia.	Spring pin dia.	Boss outer dia.	Screw dia.	Boss width	Boss outer dia.	Boss width	Screw hole P.C.D
			A	B	C1/C2	D	E	F	G	H	J	M	N
Hoe bucket	0.28 (0.37) 0.35 (0.46) 0.22 (0.29) 0.18 (0.24) 0.14 (0.14) 0.11 (0.14) (Heaped capacity)	YT61B00002P1 LE61B00029P1 LE61B00031P1 LE61B00033P1 LE61B00035P1 LE61B00037P1	φ 50 (1.97")	19 (0.748")	φ 20/15 (0.787"/0.591")	φ 65 (2.56")	φ 8 (0.315")	φ 110 (4.33")	M10	19 (0.748")	φ 110 (4.33")	28 (1.10")	91 (3.58")
Slope finishing bucket	1500 width (4'11") × 740 length (29")	2412J1493	φ 50 (1.97")	16 (0.630")	φ 20/13 (0.787"/0.512")	φ 65 (2.56")	φ 8 (0.315")	φ 106 (4.17")	M10	22 (0.866")	φ 110 (4.33")	31 (1.22")	91 (3.58")
V-shape bucket	0.24 (0.31)	LB61B00024P1	φ 50 (1.97")	19 (0.748")	φ 20/15 (0.787"/0.591")	φ 65 (2.56")	φ 8 (0.315")	φ 110 (4.33")	M10	19 (0.748")	φ 110 (4.33")	28 (1.10")	91 (3.58")
Loder bucket	0.41 (0.46) 0.34 (0.44)	LE63B00005F1 LE63B00005F2	φ 50 (1.97")	19 (0.748")	—	φ 65 (2.56")	—	φ 102 (4.02")	—	19 (0.748")	φ 102 (4.02")	19 (0.748")	—

SK70SR

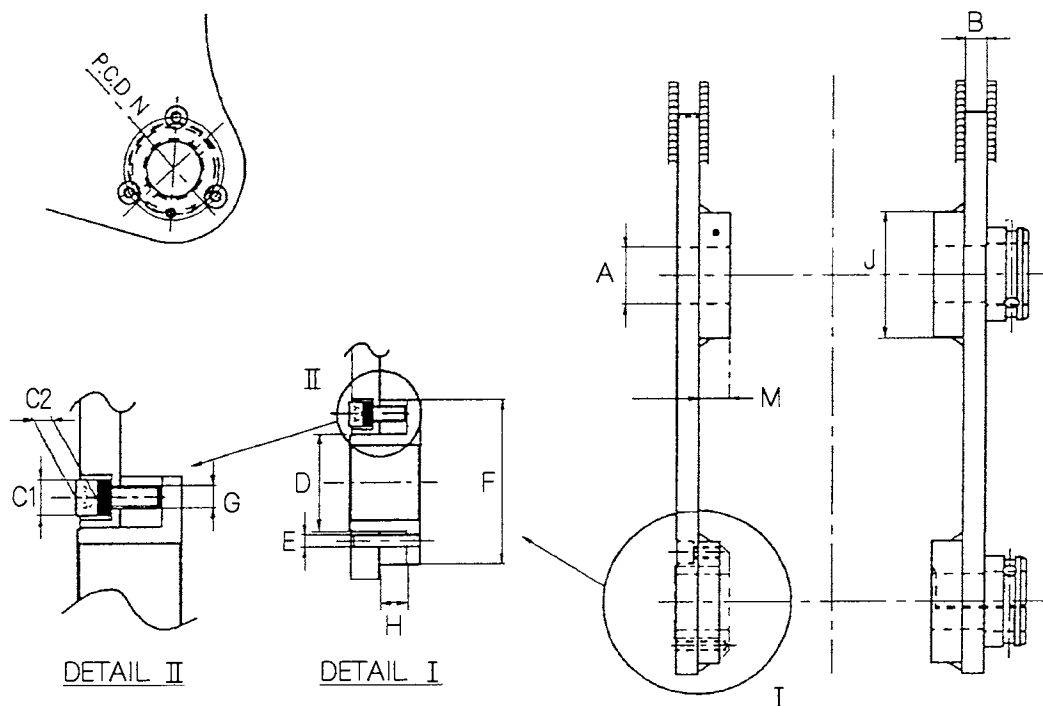
● DETAIL DIMENSIONAL DRAWING OF BOSS SECTION



Dimension of boss section

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Part No. of boss	φ A	φ B	φ C	φ D	E	F	φ G	H	I
Hoe bucket	0.28 (0.37) 0.35 (0.46) 0.22 (0.29) 0.18 (0.24) 0.14 (0.14) 0.11 (0.14) (Heaped capacity)	YT61B00002P1 LE61B00029P1 LE61B00031P1 LE61B00033P1 LE61B00035P1 LE61B00037P1	2418P26830	82.6 (3.25")	54 (2.13")	75.5±0.2 (2.972"±0.0078")	80.5 (3.17")	23 (0.906")	38 (1.50")	13 (0.512")	10 (0.394")	2.5 (0.0984")
Slope finishing bucket	1500width (4'11") × 740length (29")	2412J1493										
V-shape bucket	0.24 (0.31)	LB61B00024P1	2418P27140	82.6 (3.25")	54 (2.13")	75.5±0.2 (2.972"±0.0078")	80.5 (3.17")	19 (0.748")	34 (1.33")	13 (0.512")	10 (0.394")	2.5 (0.0984")
Loder bucket	0.41 (0.46) 0.34 (0.44)	LE63B00005F1 LE63B00005F2										

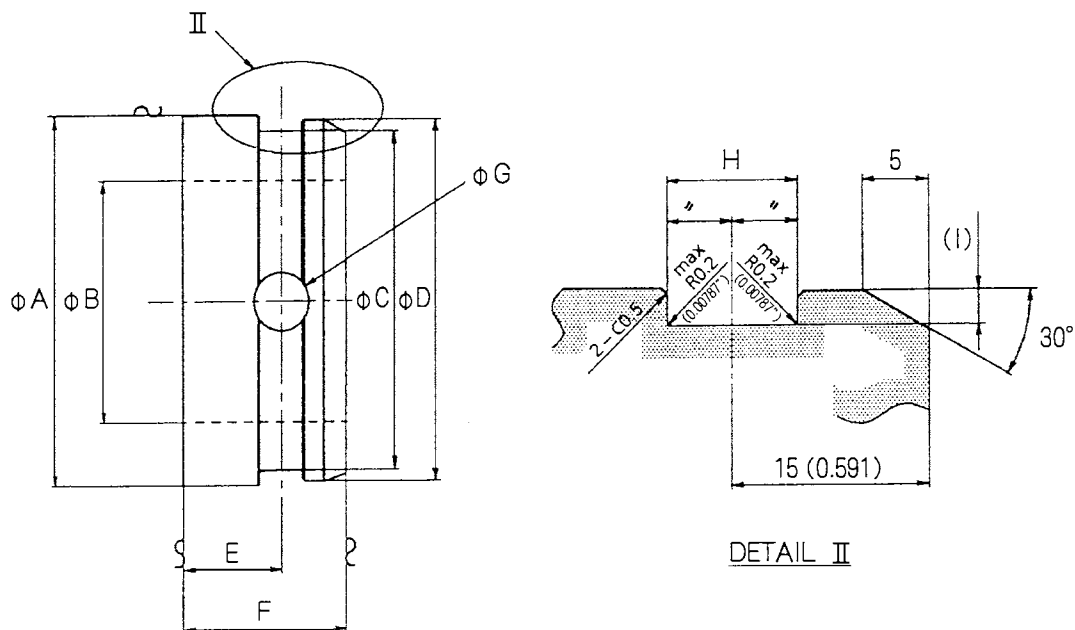
SK115SR**● DETAIL DIMENSIONAL DRAWING OF LUG SECTION****Dimension of lug section**

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Pin hole dia.	Lug plate thickness	Bolt head Hole dia./Hole depth	Hole dia.	Spring pin dia.	Boss outer dia.	Screw dia.	Boss width	Boss outer dia.	Boss width	Screw hole P.C.D
			A	B	C1/C2	D	E	F	G	H	J	M	N
Hoe bucket	0.45 (0.59)	YW61B00005P1	φ 60 (2.36")	22 (0.866")	φ 25 / 22 (0.985" / 0.867")	φ 75 (2.96")	φ 10 (0.394")	φ 140 (5.52")	M14	22 (0.866")	φ 128 (5.04")	φ 28 (1.10")	107 (4.22")
	0.51 (0.67)	YW61B00008P1											
	0.37 (0.48)	YW61B00010P1											
	0.30 (0.39)	YW61B00012P1											
	0.23 (0.30)	YW61B00014P1											
	0.17 (0.22)	YW61B00016P1											
(Heaped capacity)													
Slope finishing bucket	1600 width (5'3") × 900 length (2'11")	YW61B00018P1	φ 60 (2.36")	19 (0.748")	φ 25 / 22 (0.985" / 0.867")	φ 75 (2.96")	φ 10 (0.394")	φ 140 (5.52")	M14	19 (0.748")	φ 128 (5.04")	φ 31 (1.22")	107 (4.22")
V-shape bucket	0.46 (0.60)	YW61B00027P1	φ 60 (2.36")	22 (0.866")	φ 25 / 22 (0.985" / 0.867")	φ 75 (2.96")	φ 10 (0.394")	φ 140 (5.52")	M14	16 (0.63")	φ 128 (5.04")	φ 28 (1.10")	107 (4.22")
Ejector bucket	0.21 (0.27)	YW61B00037P1											

SK115SR

● DETAIL DIMENSIONAL DRAWING OF BOSS SECTION

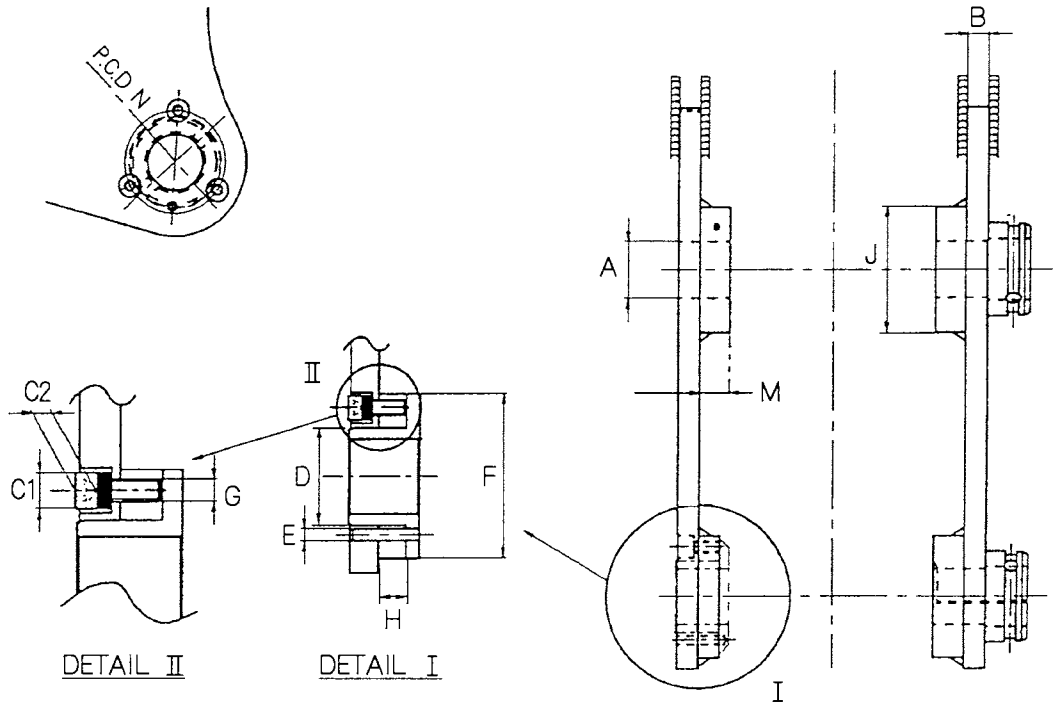


Dimension of boss section

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Part No. of boss	ΦA	ΦB	ΦC	ΦD	E	F	ΦG	H	I
Hoe bucket	0.45 (0.59) 0.51 (0.67) 0.37 (0.48) 0.30 (0.39) 0.23 (0.30) 0.17 (0.22) (Heaped capacity)	YW61B00005P1 YW61B00008P1 YW61B00010P1 YW61B00012P1 YW61B00014P1 YW61B00016P1	2418P26831	95 (3.74")	64 (2.52")	88.5±0.2 (3.487"±0.0078")	93.5 (3.68")	30 (1.182")	45 (1.77")	15 (0.591")	13 (0.512")	2.5 (0.0984")
Slope finishing bucket	1600width (5'3") × 900length (2'11")	YW61B00018P1										
V-shape bucket	0.46 (0.60)	YW61B00027P1										
Ejector bucket	0.21 (0.27)	YW61B00037P1										

● DETAIL DIMENSIONAL DRAWING OF LUG SECTION

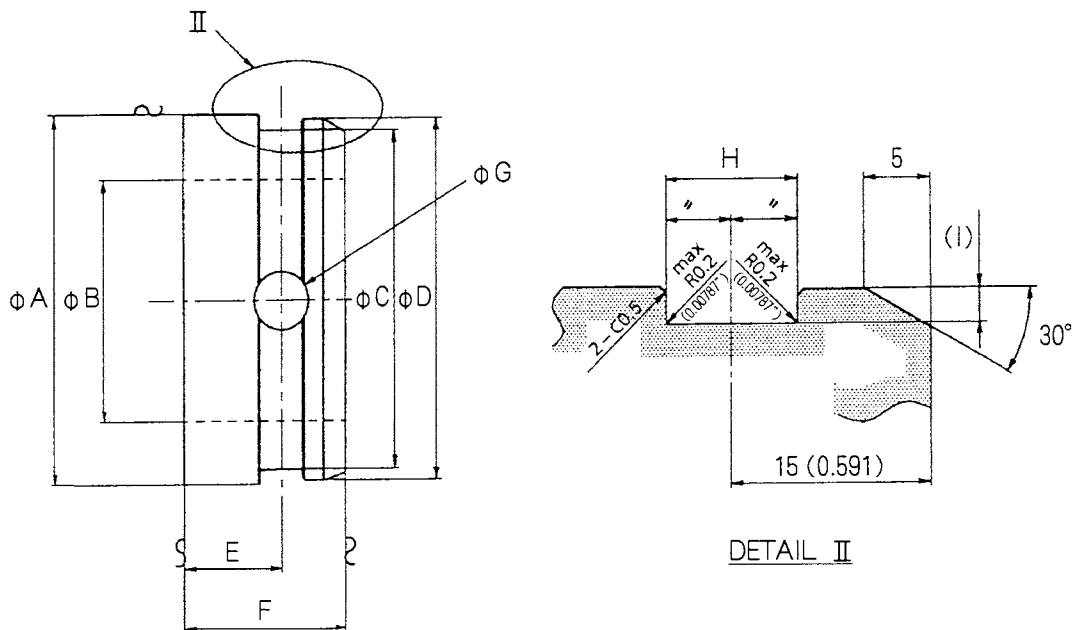


Dimension of lug section

Unit : mm (ft-in)

[illegible]

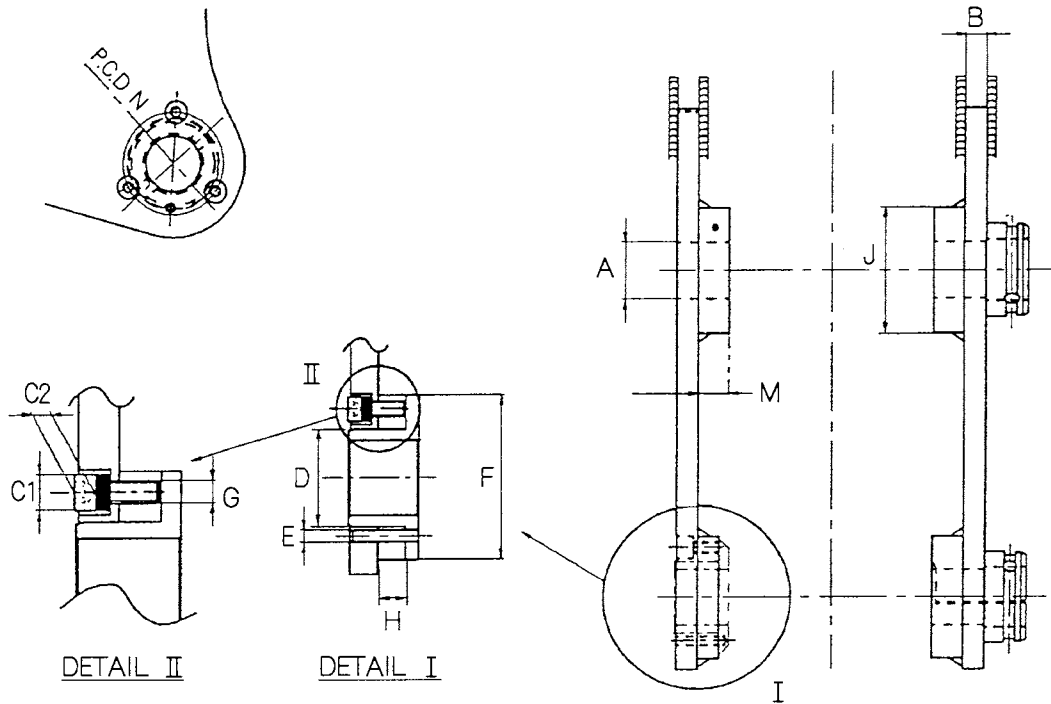
● DETAIL DIMENSIONAL DRAWING OF BOSS SECTION



Dimension of boss section

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m³ (cu·yd)	Part No. of bucket	Part No. of boss	ΦA	ΦB	ΦC	ΦD	E	F	ΦG	H	I
Hoe bucket	0.50 (0.65) 0.70 (0.92) 0.57 (0.75) 0.45 (0.59) 0.38 (0.50) 0.31 (0.41) 0.24 (0.31) (Heaped capacity)	LP61B00031P1 LP61B00016P2 LP61B00010P1 LP61B00018P2 LP61B00012P2 LP61B00014P2 LP61B00020P2	2418P26832	101.6 (4.00")	69 (2.72")	94.5±0.2 (3.723"±0.0078")	99.5 (3.92")	19 (0.749")	34 (1.34")	15 (0.591")	13 (0.512")	2.5 (0.0984")
Slope finishing bucket	1800width (5'11") × 900length (2'11")	LP61B00022P1										
V-shape bucket	0.46 (0.60)	LP61B00033P1										
Ejector bucket	0.21 (0.27)	LP61B00029P1										

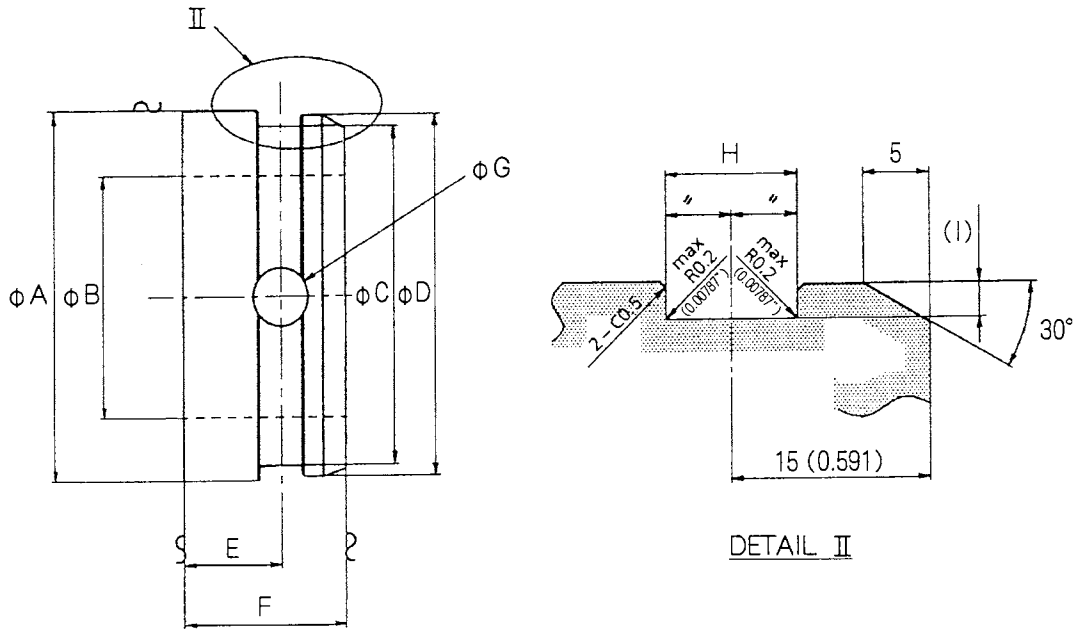
SK235SR**● DETAIL DIMENSIONAL DRAWING OF LUG SECTION****Dimension of lug section**

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Pin hole dia.	Lug plate thickness	Bolt head Hole dia./Hole depth	Hole dia.	Spring pin dia.	Boss outer dia.	Screw dia.	Boss width	Boss outer dia.	Boss width	Screw hole P.C.D
			A	B	C1/C2	D	E	F	G	H	J	M	N
Hoe bucket	0.80 (1.05)	YN61B00065P1	Φ 80 (3.15")	25 (0.985")	Φ 26 / 25 (1.025" / 0.985")	Φ 95 (3.74")	Φ 13 (0.512")	Φ 180 (7.09")	M16	25 (0.985")	Φ 170 (6.70")	36 (1.42")	140 (5.52")
	1.05 (1.37)	YN61B00083P1											
	0.93 (1.22)	YN61B00081P1											
	0.70 (0.92)	YN61B00095P1											
	0.51 (0.67) (Heaped capacity)	YN61B00077P1											
Slope finishing bucket	2200 width (7'3") × 1100 length (3'7")	2412N714	Φ 80 (3.15")	25 (0.985")	Φ 26 / 29 (1.025" / 1.143")	Φ 95 (3.74")	Φ 13 (0.512")	Φ 180 (7.09")	M16	25 (0.985")	Φ 170 (6.70")	36 (1.42")	140 (5.52")

SK235SR

● DETAIL DIMENSIONAL DRAWING OF BOSS SECTION



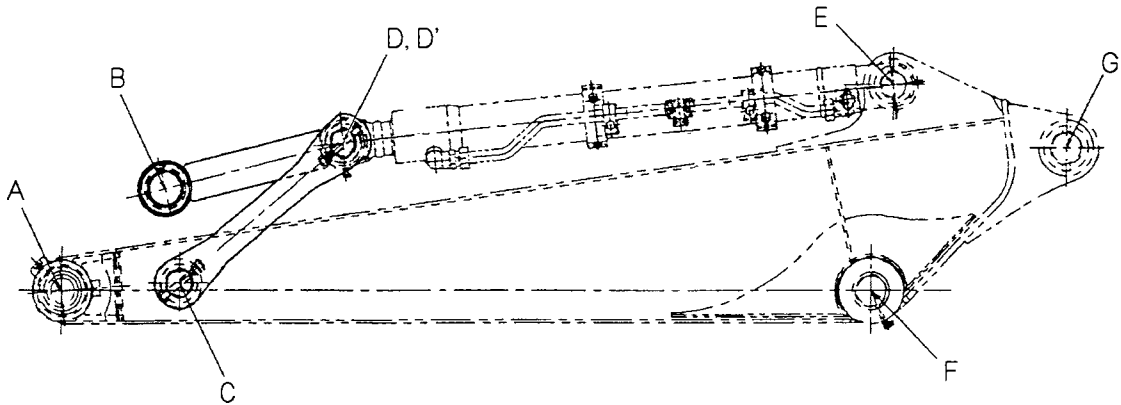
Dimension of boss section

Unit : mm (ft-in)

Type of bucket	Capacity of bucket m ³ (cu·yd)	Part No. of bucket	Part No. of boss	ΦA	ΦB	ΦC	ΦD	E	F	ΦG	H	I
Hoe bucket	0.80 (1.05)	YN61B00065P1	2418P26833	114.3 (4.50")	84 (3.31")	105.5±0.2 (4.157"±0.0078")	111.5 (4.39")	27 (1.064")	42 (1.66")	17 (0.67")	13 (0.512")	3.0 (0.118")
	1.05 (1.37)	YN61B00083P1										
	0.93 (1.22)	YN61B00081P1										
	0.70 (0.92)	YN61B00095P1										
	0.51 (0.67) (Heaped capacity)	YN61B00077P1										
Slope finishing bucket	2200width (7'3") × 1100length (3'7")	2412N714	2418P27139	114.3 (4.50")	84 (3.31")	105.5±0.2 (4.157"±0.0078")	111.5 (4.39")	25 (0.985")	40 (1.58")	17 (0.67")	13 (0.512")	3.0 (0.118")

20. MAINTENANCE STANDARD**SK70SR****20-1 PIN AND BUSHING TABLE OF ATTACHMENT**

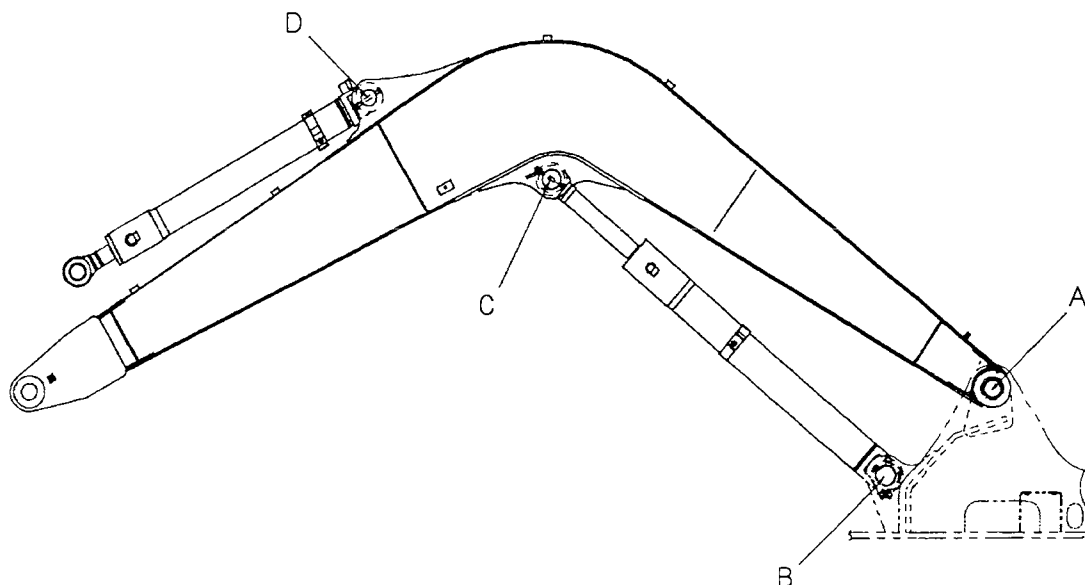
● Clearance of pin and bushing

**Clearance of pin and bushing on arm section**

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Arm point	YR12B01019P1	φ 50 (1.9685)	-0.06 (-0.0024) -0.09 (-0.0035)	+0.12 (+0.0047) +0.05 (+0.0020)	+0.11 (+0.0043) +0.21 (+0.0083)	2.0 (0.08)	2.5 (0.1)	Replace bushing or pin
B	Bucket link (Bucket side)	↑				+0.11 (+0.0043) +0.21 (+0.0083)			
C	Idler link (Arm connection)	YT12B01018P1		-0.06 (-0.0024) -0.12 (-0.0047)	+0.12 (+0.0047) +0.05 (+0.0020)	+0.11 (+0.0043) +0.24 (+0.0094)			
D	Bucket link (Idler link side)	YT12B01019P1							
D'	Bucket cylinder (Rod side)				+0.25 (+0.0020) +0.05 (+0.0020)	+0.11 (+0.0043) +0.37 (+0.0015)			
E	Bucket cylinder (Bottom side)	YT12B01020P1			+0.20 (+0.0079) +0.00 (+0.0000)	+0.06 (+0.0024) +0.32 (+0.0126)			
G	Arm cylinder (Rod side)	YT12B01015P1			+0.25 (+0.0020) +0.05 (+0.0020)	+0.11 (+0.0043) +0.37 (+0.0015)			
F	Connecting part of arm and boom	YT12B01037P1	φ 60 (2.3622)	-0.06 (-0.0024) -0.09 (-0.0035)	+0.20 (+0.0079) +0.08 (+0.0032)	+0.14 (+0.0055) +0.29 (+0.0114)			

● Clearance of pin and bushing on boom section

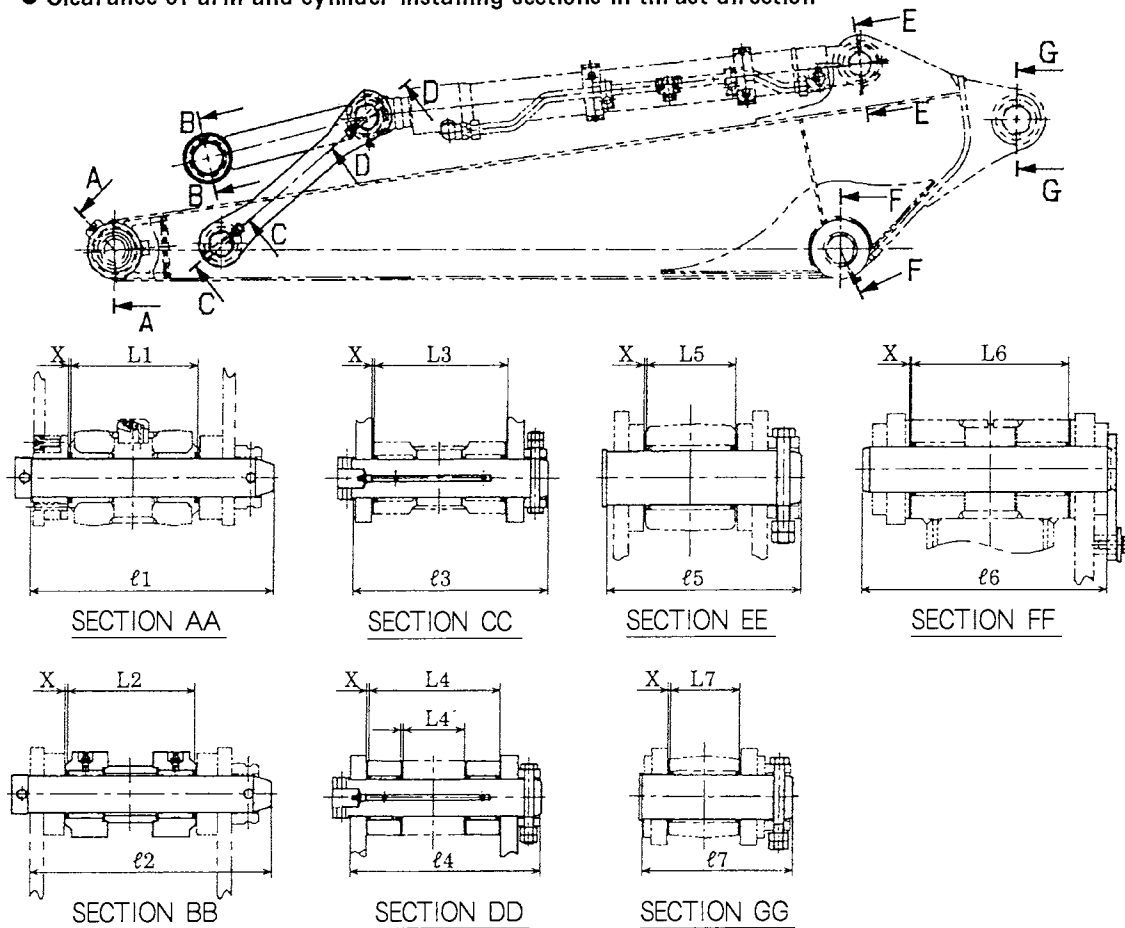


Clearance of pin and bushing on boom section

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YT02B01014P1	Φ 60 (2.3622")	-0.06 (-0.0024") -0.09 (-0.0035")	+0.10 (+0.0039") +0.03 (+0.0012")	0.09~0.19 (0.0035~0.0075")	2.0 (0.08")	2.5 (0.1")	Replace bushing or pin
B	Boom cylinder (Head side)	YT02B01006P1	Φ 75 (2.9528")						
C	Boom cylinder (Rod side)	YT02B01005P1	Φ 70 (2.7559")	-0.06 (-0.0024") -0.12 (-0.0047")	+0.05 (+0.0020") +0.25 (+0.0098")	0.11~0.37 (0.0043~0.0015")			
D	Arm cylinder (Head side)	YT02B01009P1	Φ 60 (2.3622")						

● Clearance of arm and cylinder installing sections in thrust direction

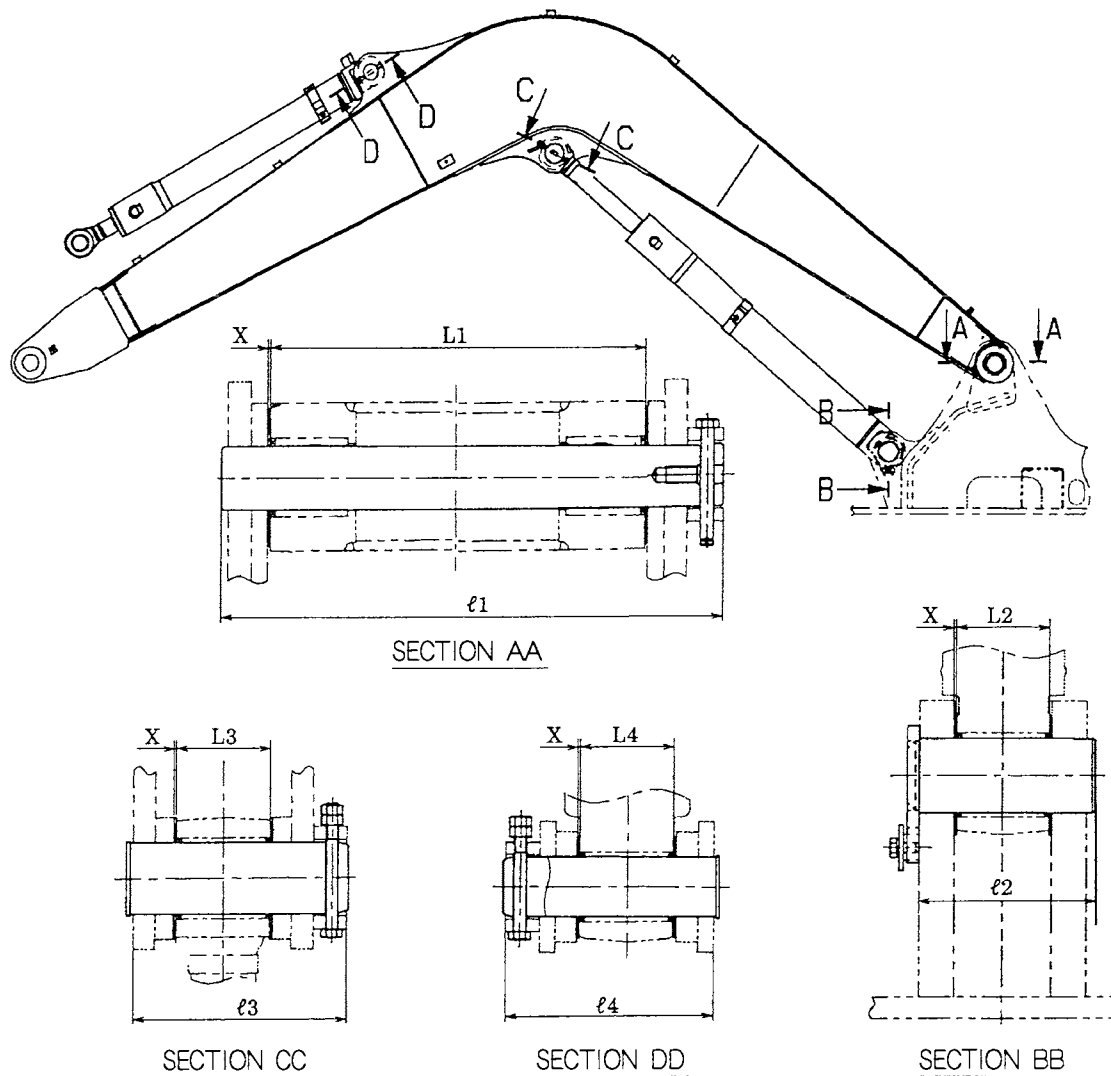


Clearance of arm and cylinder installing sections in thrust direction

Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy	
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length		
A	Arm point	Arm	L1	180 (7.09")	1.0 (0.04") or less	2.0 (0.08")	2.5 (0.10")	ℓ1	263 (10.4")	Shim adjustment	
		Bucket		182 (7.17")							
B	Bucket link	Link side	L2	—	0.6 (0.02") or less	1.0 (0.04")	1.5 (0.06")	ℓ2	263 (10.4")		
		Bucket		—							
C	Idler link (Arm connection)	Arm	L3	180 (7.09")				ℓ3	263 (10.4")		
		Link side		—							
D	Bucket link (Idler link side)	Bucket link	L4	—	0.6~1.0 (0.02"~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ4	263 (10.4")		
		Idler link side		—							
	Bucket link (Cylinder side)	Rod side	L4'	85 (3.35")				—	—		
		Link side		—							
E	Bucket cylinder (Arm side)	Bottom side	L5	85 (3.35")	0.6~2.0 (0.02"~0.08")	3.0 (0.12")	4.0 (0.16")	ℓ5	185 (7.28")		
		Arm		90 (3.54")							
F	Arm and boom connection	Arm	L6	210 (8.27")	0.6 (0.02") or less	1.0 (0.04")	1.5 (0.06")	ℓ6	328 (12.9")		
		Boom		215 (8.46")							
G	Arm cylinder (Arm side)	Rod side	L7	95 (3.74")	0.6~2.0 (0.02"~0.08")	3.0 (0.12")	4.0 (0.16")	ℓ7	204 (8.03")		
		Arm		100 (3.94")							

● Clearance in thrust direction on the boom cylinder installation section



Clearance in thrust direction on the boom cylinder installation section

Unit : mm (in)

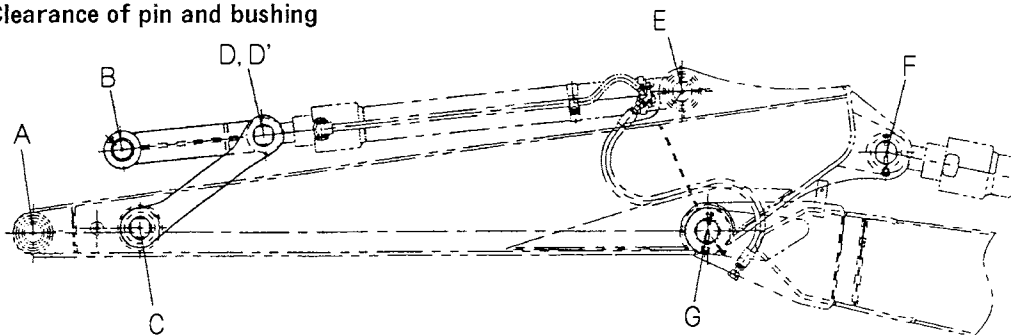
Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length	
A	Boom foot	Boom	L1	360 (14.2")	0.6(0.02") or less	1.0 (0.04")	1.5 (0.06")	ℓ 1	※481 (18.9")	Shim adjustment
		Upper frame		365 (14.4")						
B	Boom cylinder (Head side)	Boom cylinder	L2	95 (3.74")	0.6~1.0 (0.02~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 2	180 (7.09")	
		Upper frame		100 (3.94")						
C	Boom cylinder (Rod side)	Boom cylinder	L3	95 (3.74")	0.6~2.0 (0.02~0.08")	3.0 (0.12")	4.0 (0.16")	ℓ 3	221 (8.70")	
		Boom		100 (3.94")						
D	Arm cylinder (Head side)	Boom cylinder	L4	95 (3.74")	0.6~1.0 (0.02~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 4	215 (8.46")	
		Boom		100 (3.94")						

Provide ※ indicates a full length as it has no under neck.

SK115SR • SK115SRdz • SK135SR (LC)

MAINTENANCE STANDARD

● Clearance of pin and bushing



Clearance of pin and bushing on arm section

1) [SK115SR]

Unit : mm (in)

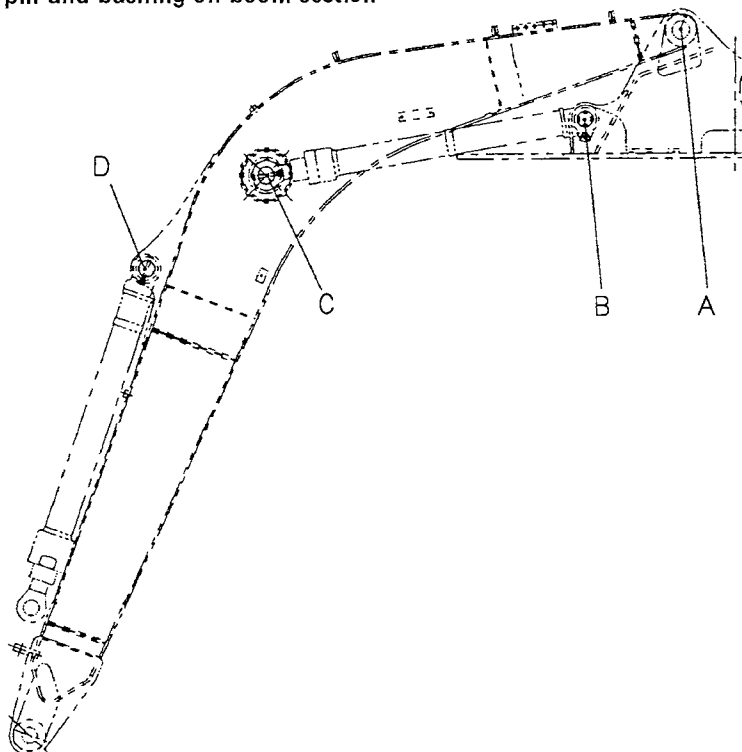
Symbol	Item	Pin part No.	Standard value			Clearance			Remedy	
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit		
A	Arm point	YW12B01032P1	Φ 60 (2.3622")	0 (0.0000") -0.060 (-0.0024")	+ 0.228 (+ 0.0089")	+ 0.288 (+ 0.0113")	1.2 (0.0472")	2.0 (0.08")	Replace bushing or pin	
B	Bucket link (Bucket side)				- 0.020 (- 0.0007")	+ 0.168 (+ 0.0066")				+ 0.234 (+ 0.0092")
C	Idler link (Arm connection)	YW12B01064P1			+ 0.246 (0.0096")	+ 0.306 (+ 0.0120")				+ 0.294 (+ 0.0115")
D	Bucket link (Idler link side)	YW12B01065P1			+ 0.187 (0.0073")	+ 0.187 (+ 0.0073")				+ 0.191 (+ 0.0075")
D'	Bucket cylinder (Rod side)				+ 0.236 (+ 0.0092")	+ 0.296 (+ 0.0116")				+ 0.180 (+ 0.0073")
E	Bucket cylinder (Bottom side)	YW12B01043P1			+ 0.030 (+ 0.0011")	+ 0.180 (+ 0.0073")				+ 0.210 (+ 0.0082")
F	Arm cylinder (Rod side)	YW02B01059P1			- 0.030 (- 0.0011")	+ 0.100 (+ 0.0039")				+ 0.070 (+ 0.0027")
G	Connecting part of arm and boom	YW02B01057P1	Φ 70 (2.7559")	0 (0.0000") - 0.060 (- 0.0024")	+ 0.231 (+ 0.0091") + 0.160 (+ 0.0063")	+ 0.291 (+ 0.0114") + 0.160 (+ 0.0063")				

2) [SK115SRdz • SK135SR (LC)]

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy	
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit		
A	Arm point	LP12B01027P1	$\phi 65$ (2.5611")	0 (-0.0024")	+0.228 (+0.0089")	+0.288 (+0.0113")	1.2 (0.0472")	2.0 (0.08")	Replace bushing or pin	
B	Bucket link (Bucket side)				-0.020 (-0.0007")	+0.188 (+0.0066")				+0.234 (+0.0092")
C	Idler link (Arm connection)	-0.060 (-0.0024")			+0.171 (0.0067")	+0.246 (0.096")				+0.306 (+0.0120")
D	Bucket link (Idler link side)	0 (0.0000")			+0.187 (0.0073")	+0.187 (+0.0073")				+0.296 (+0.0116")
D'	Bucket cylinder (Rod side)	-0.080 (-0.0024")			+0.236 (+0.0092")	+0.180 (+0.0073")				+0.210 (+0.0082")
E	Bucket cylinder (Bottom side)	+0.030 (+0.0011")			+0.180 (+0.0073")	+0.100 (+0.0027")				+0.070 (+0.0027")
F	Arm cylinder (Rod side)	-0.030 (-0.0011")								
G	Connecting part of arm and boom	YW02B01059P1	$\phi 70$ (2.7559")	0 (0.0000")	+0.231 (+0.0091")	+0.251 (+0.0098")				
		LP02B01012P2			-0.020 (-0.0007")	+0.160 (+0.0063")	+0.140 (+0.0055")			

● Clearance of pin and bushing on boom section



Clearance of pin and bushing on boom section

1) [SK115SR]

Unit : mm (in)

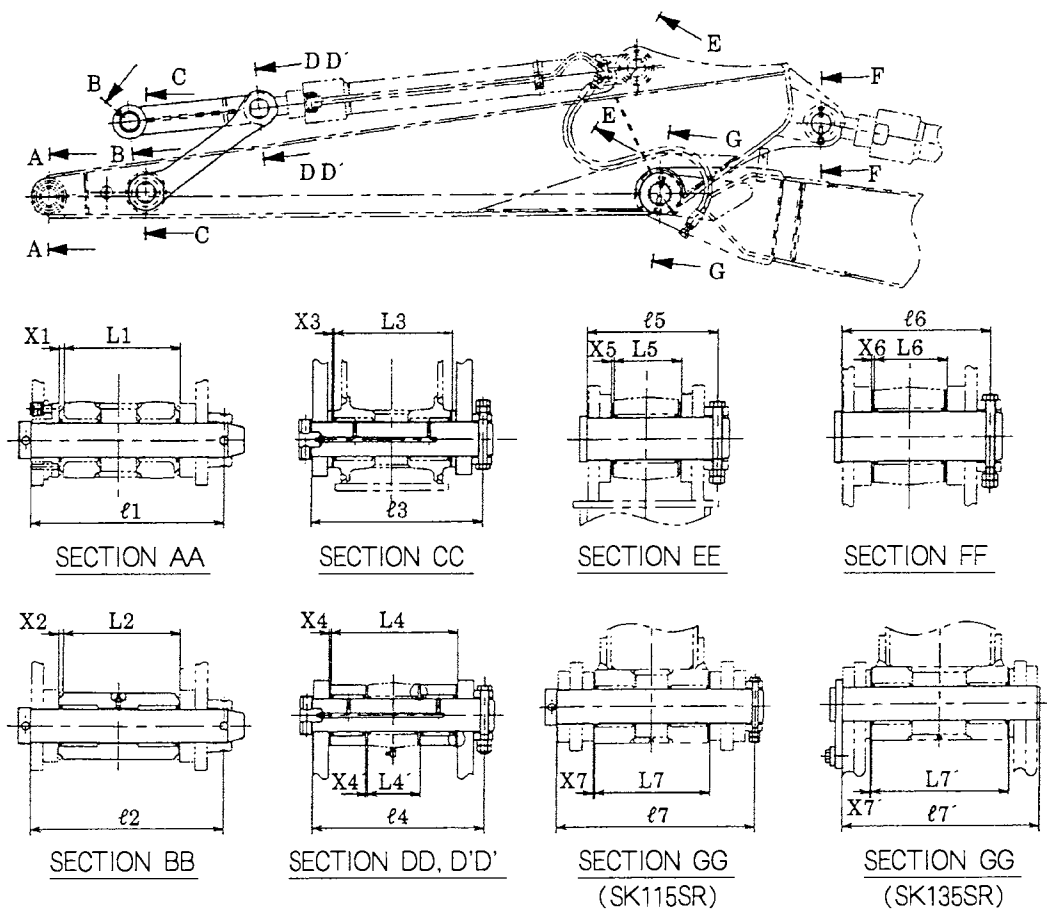
Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YX02B01002P1	Φ 70 (2.7559")	0 (+0.0000") -0.060 (-0.0024")	+0.231 (+0.0091") +0.160 (+0.0063")	+0.291 (+0.0114") +0.160 (+0.0063")	1.2 more (0.0472")	2.0 (0.08")	Replace bushing or pin
B	Boom cylinder (Head side)	YV02B01011P1		+0.030 (+0.0011") -0.030 (-0.0011")		+0.210 (+0.0082") +0.070 (+0.0027")			
C	Boom cylinder (Rod side)	YW02B01058P1	Φ 75 (2.9528")	0 (+0.0000") -0.060 (-0.0024")	+0.180 (+0.0070") +0.100 (+0.0039")	+0.240 (+0.0094") +0.100 (+0.0039")			
D	Arm cylinder (Head side)	YW02B01059P1	Φ 70 (2.7559")	+0.030 (+0.0011") -0.030 (-0.0011")		+0.210 (+0.0082") +0.070 (+0.0027")			

2) [SK115SRdz • SK135SR (LC)]

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YX02B01002P1	Φ 70 (2.7559")	0 (+0.0000") -0.060 (-0.0024")	+0.231 (+0.0091") +0.160 (+0.0063")	+0.291 (+0.0114") +0.160 (+0.0063")	1.2 more (0.0472")	2.0 (0.08")	Replace bushing or pin
B	Boom cylinder (Head side)	YV02B01011P1		+0.030 (+0.0011") -0.030 (-0.0011")		+0.210 (+0.0082") +0.070 (+0.0027")			
C	Boom cylinder (Rod side)	LP02B01053P1	Φ 80 (3.152")	0 (+0.0000") -0.060 (-0.0024")	+0.180 (+0.0070") +0.100 (+0.0039")	+0.240 (+0.0094") +0.100 (+0.0039")			
D	Arm cylinder (Head side)	YW02B01059P1	Φ 70 (2.7559")	+0.030 (+0.0011") -0.030 (-0.0011")		+0.210 (+0.0082") +0.070 (+0.0027")			

● Clearance of arm and cylinder installing sections in thrust direction



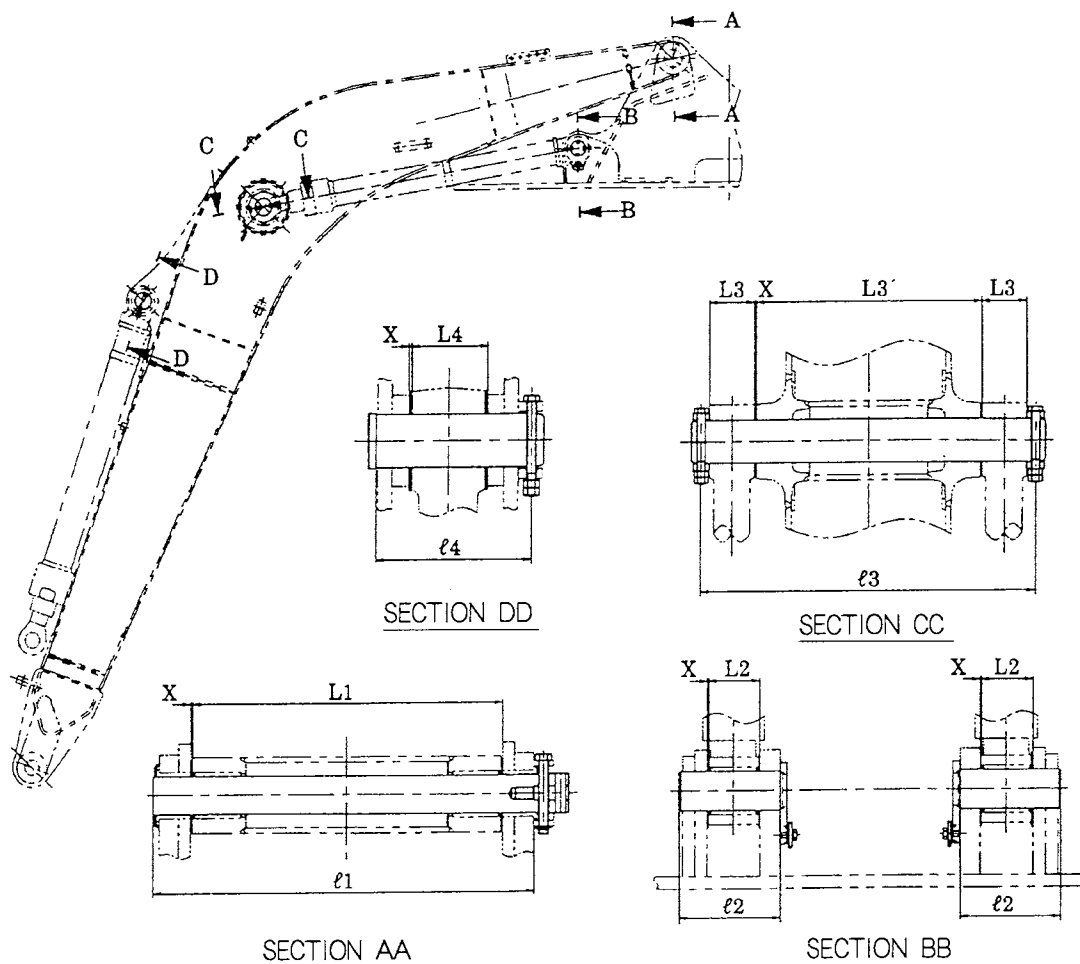
Clearance of arm and cylinder installing sections in thrust direction

Unit : mm (in)

Section	Item		Symbol	Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck			Remedy
				Size		Standard value	Repairable level	Service limit	No.	Length		
				SK115SR	SK115SRDZ SK135SR (LC)					SK115SR	SK115SRDZ SK135SR (LC)	
A	Arm point	Arm	L1	216 (8.51")	250 (9.85")	0.6~1.0 (0.02"~ 0.04")	1.2 (0.05")	2.0 (0.08")	ℓ 1	※351 (13.83")	※391 (15.41")	Shim adjust- ment
		Bucket		218 (8.58")	251 (9.88")							
B	Bucket link	Link side	L2	216 (8.51")	250 (9.85")	0.6~1.0 (0.02"~ 0.04")	1.2 (0.05")		ℓ 2	※351 (13.83")	※391 (15.41")	
		Bucket		218 (8.58")	252 (9.92")							
C	Idler link (Arm connection)	Arm	L3	210 (8.27")	244 (9.61")	0.5 (0.02") or less	1.0 (0.04")	ℓ 3	※310 (12.21")	※328 (12.92")		
		Link side		—	—							
D	Link connection	Bucket link	L4	226 (8.90")	244 (9.61")	0.6~1.0 (0.02"~ 0.04")	1.2 (0.05")	ℓ 4	※310 (12.21")	※328 (12.92")		
				Idler link side	—						—	
D'	Bucket cylinder connection	Rod side	L4'	90 (3.54")	←	0.6~1.0 (0.02"~ 0.04")	1.2 (0.05")	2.0 (0.08")	ℓ 5	※184 (7.25")	※196 (7.72")	
				Link side	98 (3.86")							
E	Bucket cylinder (Bottom side)	Bottom side	L5	90 (3.54")	←	0.6~2.0 (0.02"~ 0.08")	2.0 (0.08")	2.5 (0.10")	ℓ 6	※212 (8.35")	←	
		Arm		98 (3.86")	←							
F	Arm cylinder (Rod side)	Rod side	L6	100 (3.94")	←	0.6~2.0 (0.02"~ 0.08")	2.0 (0.08")	2.5 (0.10")	ℓ 7	※398 (15.68")	386	
		Arm		108 (4.25")	←							
G	Arm foot	Arm	L7	226 (8.90")	268 (10.55")	0.5 (0.02") or less	1.0 (0.04")	2.0 (0.08")	ℓ 7	※398 (15.68")	386	
		Boom	L7'	232 (9.14")	274 (10.79")							

Provide ※ indicates a full length as it has no under neck.

● Clearance in thrust direction on the boom cylinder installation section

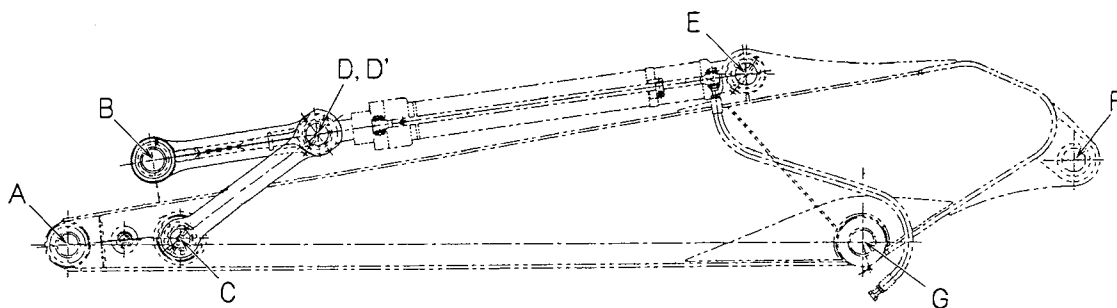


Clearance in thrust direction on the boom cylinder installation section

Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length	
A	Boom foot	Boom	L1	574 (22.6")	0.5 (0.01") or less	1.0 (0.04")	1.5 (0.06")	ℓ 1	716 (28.21")	Shim adjustment
		Upper frame		581 (22.8")						
B	Boom cylinder (Head side)	Boom cylinder	L2	90 (3.54")	0.6~1.0 (0.02"~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 2	180 (7.09")	
		Upper frame		94 (3.70)						
C	Boom cylinder (Rod side)	Boom cylinder	L3	80 (3.15")	0.6~2.0 (0.02"~0.08")	2.5 (0.10")	3.0 (0.12")	ℓ 3	597 (23.52")	
		Boom	L3'	400 (15.76")						
D	Arm cylinder (Head side)	Boom cylinder	L4	100 (3.94")	0.6~1.0 (0.02"~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 4	212 (8.35")	
		Boom		108 (4.25")						

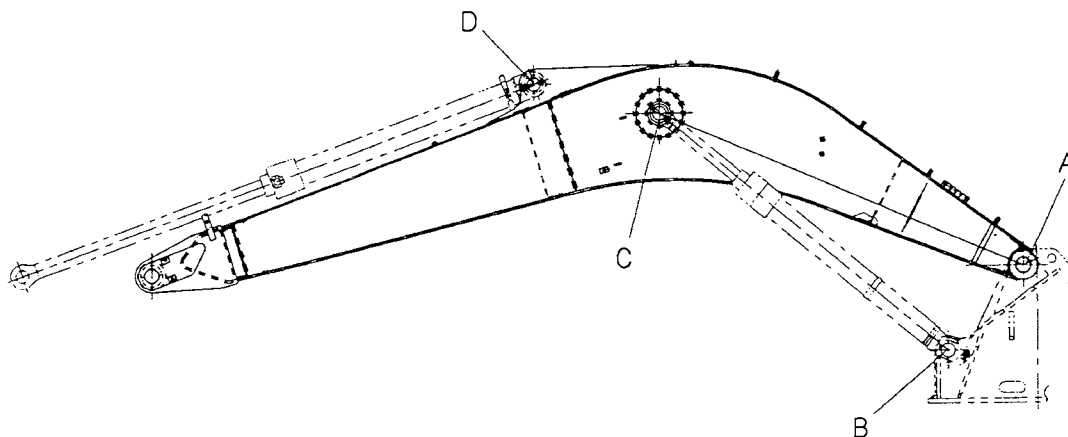
Provide ※ indicates a full length as it has no under neck.

SK235SR**MAINTENANCE STANDARD**● **Clearance of pin and bushing****Clearance of pin and bushing on arm section**

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Arm point	YN12B01073P1	φ 80 (3.152")	+0.020 (+0.0007") -0.060 (-0.0024")	+0.226 (+0.0089")	+0.286 (+0.0112")	2.0 (0.08")	2.5 (0.10")	Replace bushing or pin
B	Bucket link (Bucket side)	↑			+0.153 (+0.0060")	+0.133 (+0.0052")			
C	Idler link (Arm connection)	YN12B01307P1			φ 70 (2.7599")	+0.231 (+0.0091")			
D	Bucket link (Idler link side)	LQ12B01089P1	φ 80 (3.152")	+0.161 (+0.0063")	+0.141 (+0.0055")				
D'	Bucket cylinder (Rod side)			+0.240 (+0.0094")	+0.300 (+0.0118")				
E	Bucket cylinder (Bottom side)	YN12B01218P1	φ 80 (3.152")	+0.174 (+0.0068")	+0.174 (+0.0068")				
F	Arm cylinder (Rod side)	YN12B01243P1		φ 85 (3.349")	+0.000 (+0.0000")	+0.227 (+0.0089")			
G	Connecting part of arm and boom	YN12B01042P1	φ 90 (3.546")	-0.060 (-0.0024")	+0.155 (0.0061")	+0.155 (+0.0061")			

● Clearance of pin and bushing on boom section

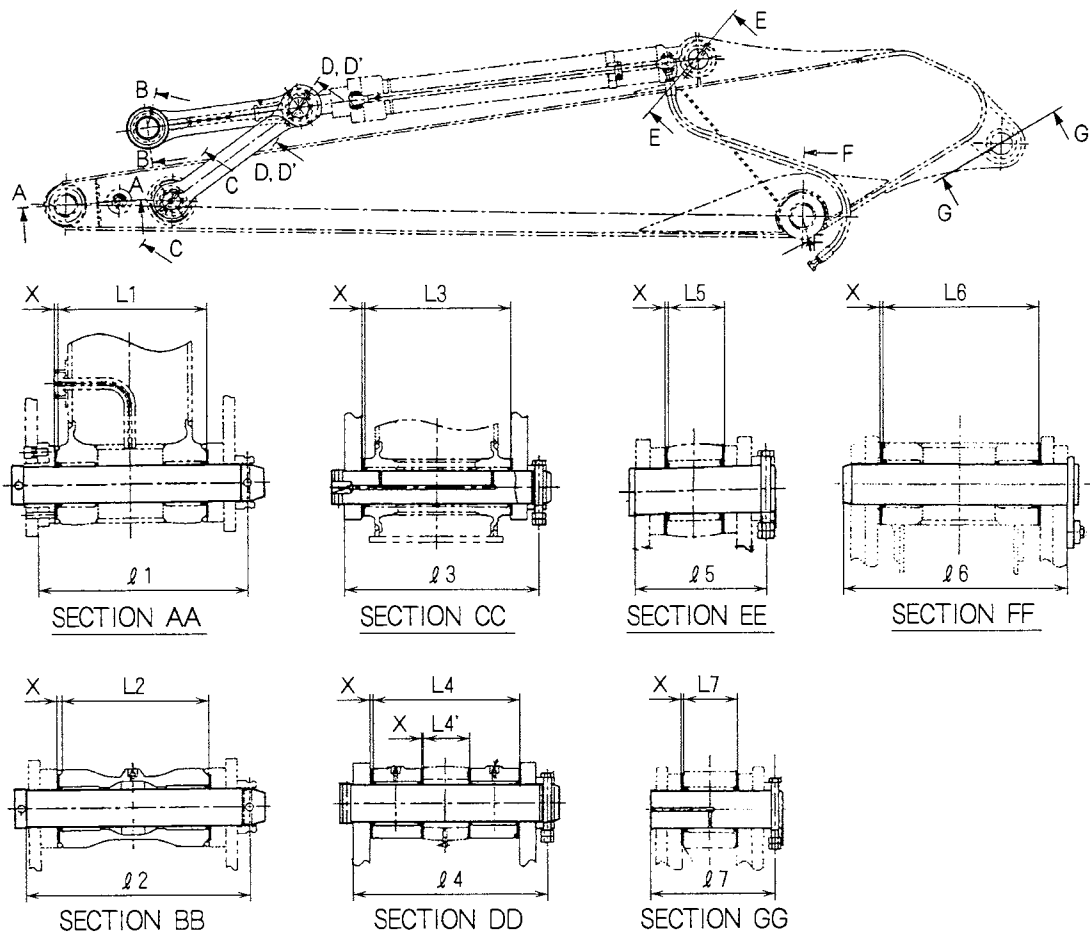


Clearance of pin and bushing on boom section

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value			Clearance			Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Standard value	Repairable level	Service limit	
A	Boom foot	YN02B01184P1	Φ 90 (3.546")	+0.020 (+0.0007")	+0.204 (+0.0080")	+0.224 (+0.0088")	2.0 (0.08")	2.5 (0.10")	Replace bushing or pin
B	Boom cylinder (Head side)	YN02B01195P1		-0.020 (-0.0007")	+0.073 (+0.0028")	+0.053 (+0.0020")			
C	Boom cylinder (Rod side)	YN02B01186P1		+0.230 (+0.0090")	+0.150 (+0.0059")	+0.250 (+0.0098")			
D	Arm cylinder (Head side)	YN02B01187P1		+0.130 (+0.0051")	+0.260 (+0.0102")	+0.120 (+0.0047")			

● Clearance of arm and cylinder installing sections in thrust direction

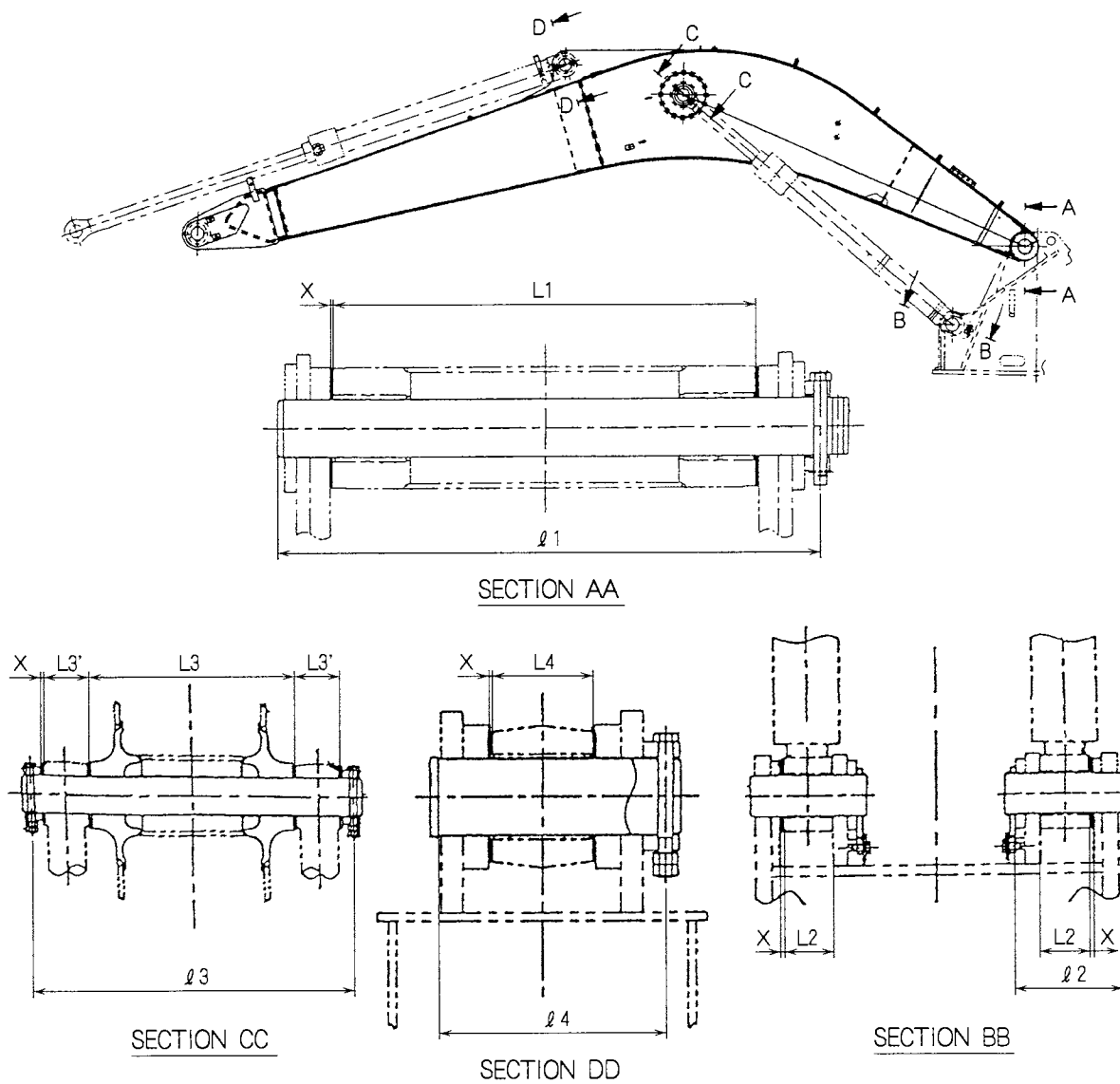


Clearance of arm and cylinder installing sections in thrust direction

Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy	
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length		
A	Arm point	Arm	L1	325 (12.81")	0.6~1.0	2.0 (0.08")		φ 1	481 (18.95")	Shim adjustment	
		Bucket		326 (12.84")	(0.02"~0.04")						
B	Bucket link	Link side	L2	325 (12.81")	0.6 (0.02")	1.0 (0.04")	2.5 (0.10")	φ 2			
		Bucket		327 (12.88")							
C	Idler link (Arm connection)	Arm	L3	320 (12.61")				φ 3			
		Link side		—							
D	Bucket link (Idler link)	Rod side	L4	—	0.6~1.0 (0.02"~0.04")	2.0 (0.08")		φ 4	419 (16.51")		
		Idler link side		320 (12.61")							
D'	Bucket link (Rod side)	Rod side	L4'	100 (3.94")							
		Bucket link		102 (4.02")							
E	Bucket cylinder (Arm side)	Bottom side	L5	100 (3.94")	0.6~2.0	3.0	4.0	φ 5	229 (9.02")		
		Arm		102 (4.02")	(0.02"~0.08")	(0.12")	(0.16")				
F	Arm foot	Arm	L6	346 (13.63")	0.6	1.0	2.5	φ 6	503 (19.82")		
		Boom		347 (13.67")	(0.02")	(0.04")	(0.10")				
G	Arm cylinder (Arm side)	Rod side	L7	120 (4.73")	0.6~2.0	3.0	4.0	φ 7	272 (10.72")		
		Arm		122 (4.81")	(0.02"~0.08")	(0.12")	(0.16")				

● Clearance in thrust direction on the boom cylinder installation section



Clearance in thrust direction on the boom cylinder installation section

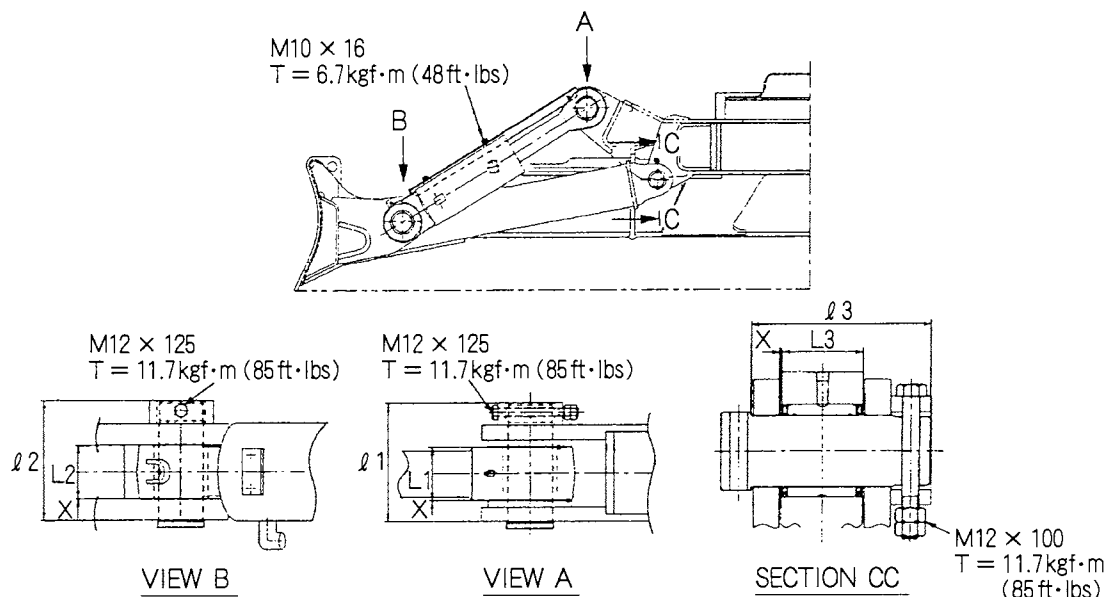
Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length	
A	Boom foot	Boom	L1	674 (26.55")	0.6 (0.02") or less	2.0 (0.08")	2.5 (0.10")	ℓ 1	859 (33.84")	Shim adjustment
		Upper frame		676 (26.63")						
B	Boom cylinder (Head side)	Boom cylinder	L2	110 (4.33")	0.6~1.0 (0.02"~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 2	238 (9.37")	
		Upper frame		113 (4.45")						
C	Boom cylinder (Rod side)	Boom cylinder	L3'	105 (4.13")	0.6~2.0 (0.02"~0.08")	3.0 (0.12")	4.0 (0.16")	ℓ 3	734 (28.91")	
		Boom	L3	470 (18.51")						
D	Arm cylinder (Head side)	Boom cylinder	L4	120 (4.72")	0.6~1.0 (0.02"~0.04")	2.0 (0.08")	2.5 (0.10")	ℓ 4	256. (10.08")	
		Boom		122 (4.80")						

Provide ※ indicates a full length as it has no under neck.

SK70SR

● **DOZER MAINTENANCE STANDARD**
CLEARANCE BETWEEN PIN AND BUSHING

**Dozer maintenance standard****(1) Clearance of pin and bushing**

Unit : mm (in)

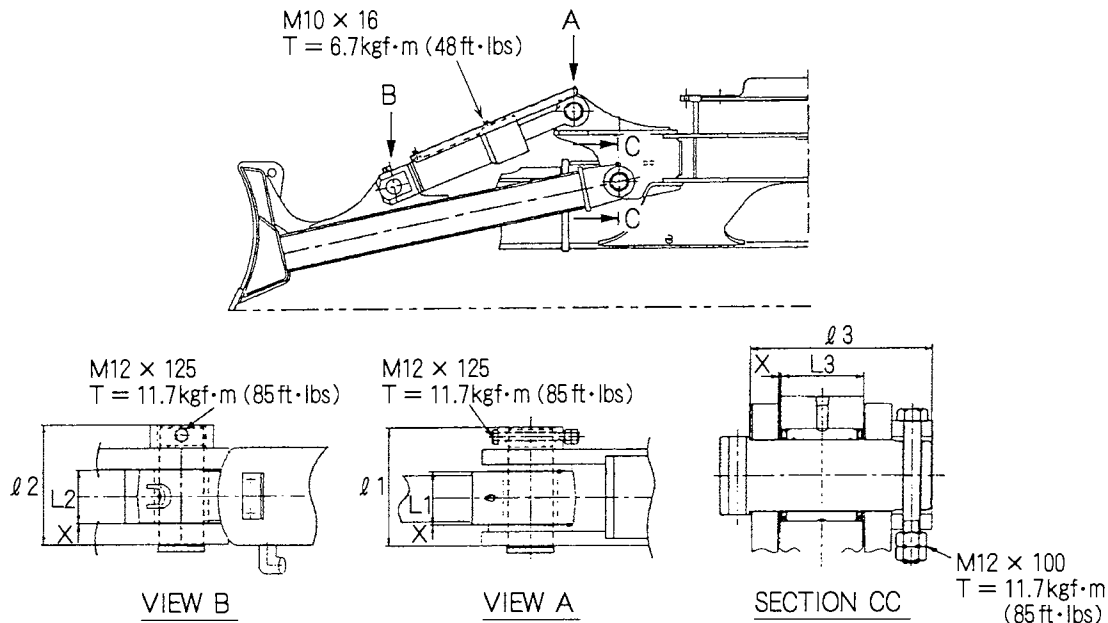
Symbol	Item	Pin part No.	Standard value				Clearance		Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Clearance	Repairable level	Service limit	
A	Dozer cylinder (Rod side)	YT51B01004P1	φ 70 (2.7519")	-0.06 (-0.0024")	+0.25 (+0.0098")	+0.11 (+0.0043")	1.2 (0.05") or more	2.0 (0.08")	Replace bushing or pin
B	Dozer cylinder (Head side)	↑		-0.12 (-0.0047")	+0.05 (+0.0020")	+0.37 (+0.015")			
C	Dozer foot	YT51B01003P1	φ 50 (1.9685")	-0.06 (-0.0024") -0.09 (-0.0035")	+0.19 (+0.0075") +0.06 (+0.0024")	+0.12 (+0.0047") +0.28 (+0.0110")			

(2) Clearance in thrust direction on the dozer cylinder installation section

Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length	
A	Dozer cylinder (Rod side)	Rod side	L1	80 (3.15")	1.0~2.0 (0.04"~0.08")	2.0 (0.08") or more	3.0 (0.12")	ℓ 1	181 (7.13")	Shim adjustment
		Lower frame		82 (3.23")					181 (7.13")	
B	Dozer cylinder (Head side)	Head side	L2	80 (3.15")				ℓ 2	181 (7.13")	
		Dozer		82 (3.23")					181 (7.13")	
C	Dozer foot	Dozer	L3	60 (2.36")				ℓ 3	132 (5.20")	
		Lower frame		63 (2.48")					132 (5.20")	

● DOZER MAINTENANCE STANDARD CLEARANCE BETWEEN PIN AND BUSHING



Dozer maintenance standard

(1) Clearance of pin and bushing

Unit : mm (in)

Symbol	Item	Pin part No.	Standard value				Clearance		Remedy
			Pin dia.	Pin dia. tolerance	Bushing i.d. tolerance	Clearance	Repairable level	Service limit	
A	Dozer cylinder (Rod side)	YX51B01006P1	Φ 60 (2.36")	-0.060 (-0.0024")	+0.200 (+0.0079")	+0.32 (+0.0126")	1.2 (0.05") or more	2.0 (0.08")	Replace bushing or pin
B	Dozer cylinder (Head side)	↑		-0.120 (-0.0047")	0 (0)	+0.060 (+0.0024")			
C	Dozer foot	2419P1556D5	Φ 60 (2.36")	-0.150 (-0.0059") -0.210 (-0.0083")	+0.230 (+0.0090") +0.130 (+0.0051")	+0.440 (+0.0173") +0.280 (+0.0110")			

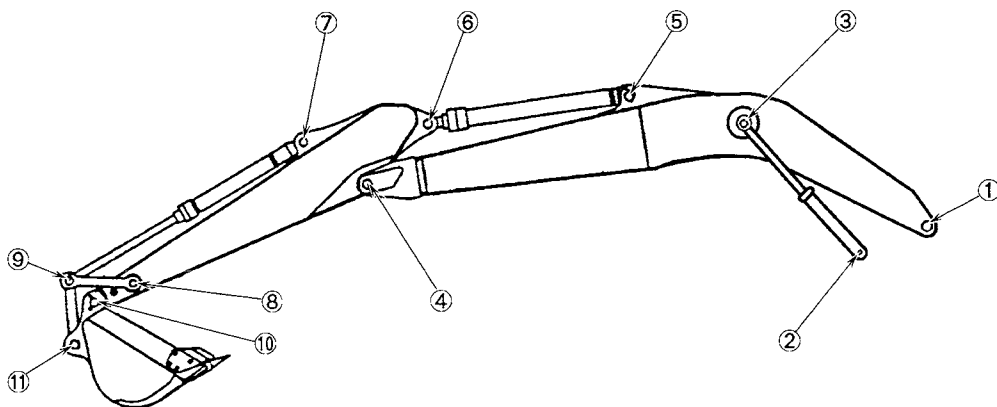
(2) Clearance in thrust direction on the dozer cylinder installation section

Unit : mm (in)

Section	Item		Basic size		Shim adjusting clearance (Total of both sides)			Length under pin neck		Remedy
			Symbol	Size	Standard value	Repairable level	Service limit	No.	Length	
A	Dozer cylinder (Rod side)	Rod side	L1	90 (3.55")	1.0~2.0 (0.04"~0.08")	2.0 (0.08") or more	3.0 (0.12")	ℓ 1	197 (7.76")	Shim adjustment
		Lower frame		92 (3.63")						
B	Dozer cylinder (Head side)	Head side	L2	90 (3.55")				ℓ 2	197 (7.76")	
		Dozer		92 (3.63")						
C	Dozer foot	Dozer	L3	128 (5.04")				ℓ 3	228 (8.98")	
		Lower frame		130 (5.12")						

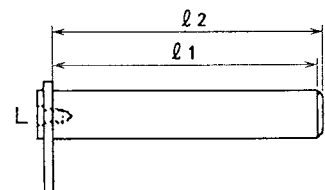
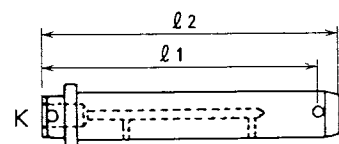
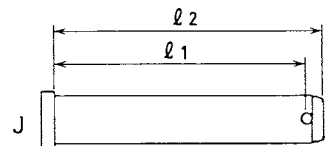
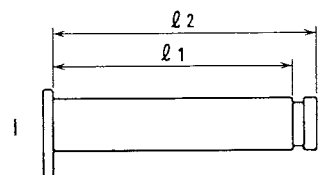
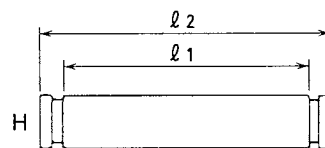
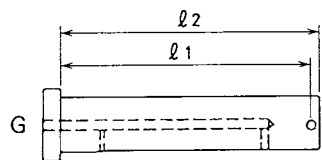
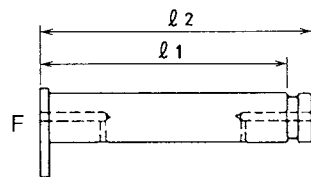
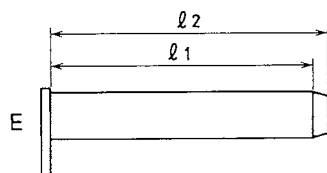
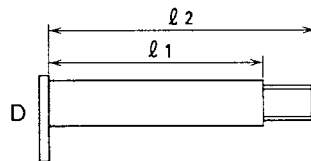
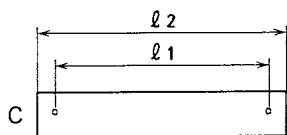
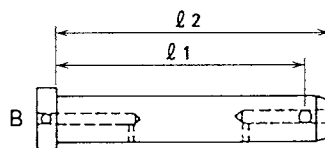
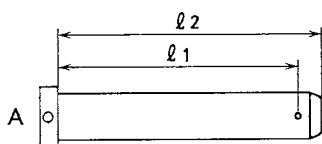
20-2 PIN AND BUSHING TABLE OF ATTACHMENT

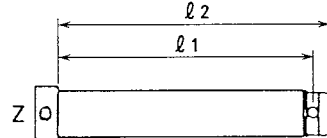
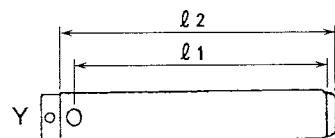
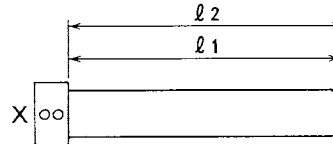
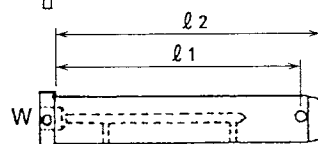
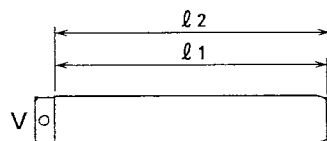
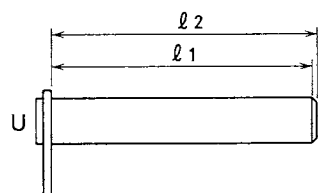
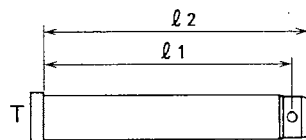
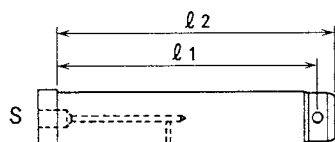
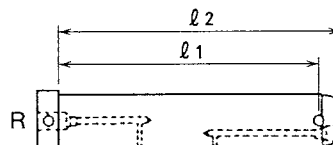
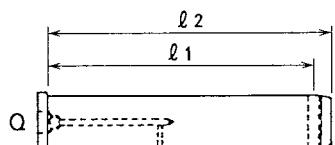
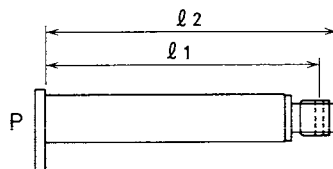
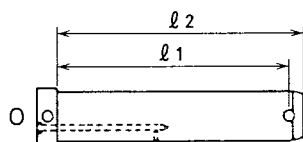
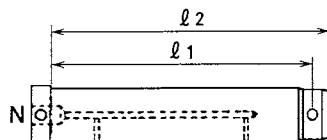
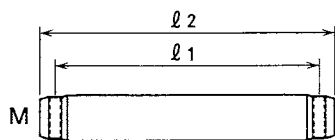
● Location of Pin and Bushing



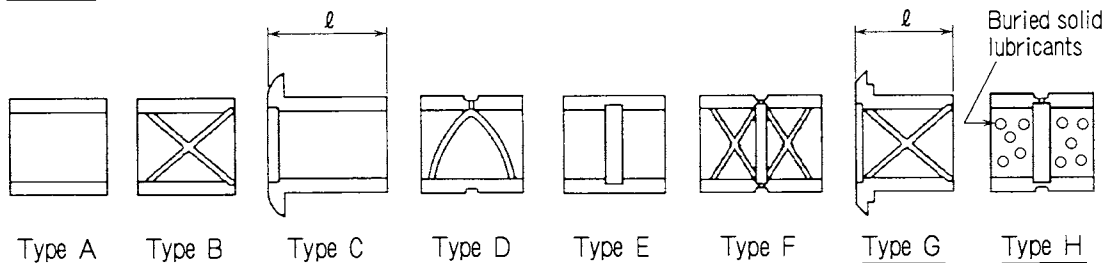
● Types of Pin and Bushing

Pin





Bushing



SK70SR

Unit : mm (ft-in)

Item Location	Pin				Bushing		Remarks
	Diameter	ℓ 1	ℓ 2	Type	I.D. × O.D. × Length (ℓ)	Type	
①	60 (2.36")	438 (1'5.24")	441 (1'5.36")	V	60 × 75 × 65 (2.36" × 2.95" × 2.55")	B	Dust seal
②	75 (2.95")	177 (6.96")	180 (7.08")	E	_____		
③	70 (2.75")	204 (8.03")	221 (8.7")	J	_____		
④	60 (2.36")	318 (1'0.51")	328 (1'0.91")	E	60 × 75 × 55 (2.36" × 2.95" × 2.16")	A	Dust seal
⑤	60 (2.36")	198 (7.79")	215 (8.46")	J	_____		
⑥	60 (2.36")	186 (7.32")	204 (8.03")	J	_____		
⑦	50 (1.96")	168 (6.61")	185 (7.28")	J	_____		
⑧	50 (1.96")	246 (9.68")	263 (10.35")	W	50 × 60 × 50 (1.96" × 2.36" × 1.96")	B	Dust seal
⑨	50 (1.96")	246 (9.68")	263 (10.35")	W	50 × 60 × 36 (1.96" × 2.36" × 1.41")	B	Dust seal
⑩	50 (1.96")	302 (11.88")	334 (1'1.14")	A	50 × 65 × 57 (1.96" × 2.55" × 2.24")	G	Dust seal, O-ring
⑪	50 (1.96")	302 (11.88")	334 (1'1.14")	A	50 × 65 × 47 (1.96" × 2.55" × 1.85")	B	Dust seal, O-ring
Bucket	_____				50 × 65 × 48 (1.96" × 2.55" × 1.88")	C	

SK115SR

Unit : mm (ft-in)

Item Location	Pin				Bushing		Remarks
	Diameter	ℓ 1	ℓ 2	Type	I.D. × O.D. × Length (ℓ)	Type	
①	70 (2.75")	713 (2'4.07")	716 (2'4.18")	X	70 × 85 × 85 (2.75" × 3.34" × 3.34")	B	Dust seal
②	70 (2.75")	177 (6.96")	180 (7.08")	E	_____		
③	75 (2.95")	597 (1'11.5")	631 (2'0.84")	C	_____		
④	70 (2.75")	398 (1'3.66")	415 (1'4.33")	A	70 × 85 × 70 (2.75" × 3.34" × 2.75")	B	Dust seal
⑤	70 (2.75")	212 (8.34")	229 (9.01")	J	_____		
⑥	70 (2.75")	212 (8.34")	229 (9.01")	J	_____		
⑦	60 (2.36")	184 (7.24")	201 (7.91")	J	_____		
⑧	60 (2.36")	309 (1'0.16")	327 (1'0.87")	W	60 × 75 × 66 (2.36" × 2.95" × 2.59")	B	Dust seal
⑨	60 (2.36")	309 (1'0.16")	327 (1'0.87")	W	60 × 75 × 54 (2.36" × 2.95" × 2.12")	B	Dust seal
⑩	60 (2.36")	351 (1'1.81")	388 (1'3.27")	A	60 × 75 × 72 (2.36" × 2.95" × 2.83")	G	Dust seal, O-ring
⑪	60 (2.36")	351 (1'1.81")	388 (1'3.27")	A	60 × 75 × 66 (2.36" × 2.95" × 2.59")	B	Dust seal, O-ring
Bucket	_____				60 × 75 × 50 (2.36" × 2.95" × 1.96")	C	

SK115SRdz SK235SR SK135SR(LC)

<https://tracemasterhub.com/>

SK115SR dz

• SK135SR (LC)

Unit : mm (ft-in)

Item Location	Pin				Bushing		Remarks
	Diameter	ℓ 1	ℓ 2	Type	I.D. × O.D. × Length (ℓ)	Type	
①	70 (2.75")	713 (2'4.07")	716 (2'4.18")	X	70 × 85 × 85 (2.75" × 3.34" × 3.34")	B	Dust seal
②	70 (2.75")	177 (6.96")	180 (7.08")	E	_____		
③	80 (3.14")	597 (1'11.5")	631 (2'0.84")	C	_____		
④	70 (2.75")	386 (1'3.66")	392 (1'3.43")	E	70 × 85 × 70 (2.75" × 3.34" × 2.75")	B	Dust seal
⑤	70 (2.75")	212 (8.34")	229 (9.01")	J	_____		
⑥	70 (2.75")	212 (8.34")	229 (9.01")	J	_____		
⑦	60 (2.36")	196 (7.71")	213 (8.38")	J	_____		
⑧	60 (2.36")	328 (1'0.91")	346 (1'1.62")	W	60 × 75 × 66 (2.36" × 2.95" × 2.59")	B	Dust seal
⑨	60 (2.36")	328 (1'0.91")	346 (1'1.62")	W	60 × 75 × 63 (2.36" × 2.95" × 2.48")	B	Dust seal
⑩	65 (2.55")	391 (1'3.39")	428 (1'4.85")	A	65 × 80 × 75 (2.55" × 3.14" × 2.95")	G	Dust seal, O-ring
⑪	65 (2.55")	391 (1'3.39")	428 (1'4.85")	A	65 × 80 × 61 (2.55" × 3.14" × 2.4")	B	Dust seal, O-ring
Bucket					65 × 80 × 59 (2.55" × 3.14" × 2.32")	C	

Notes : EU — Ground pin

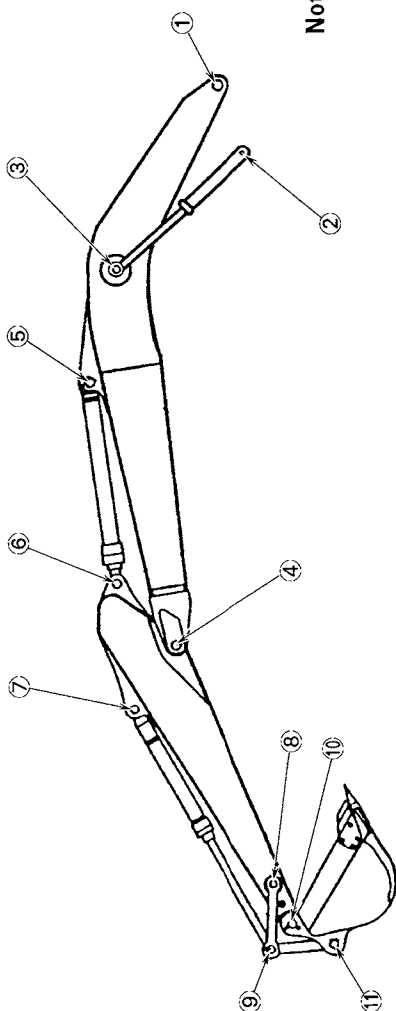
SK235SR

Unit : mm (ft-in)

Item Location	Pin				Bushing		Remarks
	Diameter	ℓ 1	ℓ 2	Type	I.D. × O.D. × Length (ℓ)	Type	
①	90 (3.54")	849 (2'9.42")	875 (2'10.44")	Y	90 × 105 × 110 (3.54" × 4.13" × 4.33")	H	Dust seal
②	90 (3.54")	230 (9.05")	238 (9.37")	E	_____		
③	85 (3.34")	734 (2'4.89")	774 (2'6.47")	M	_____		
④	90 (3.54")	483 (1'7.01")	503 (1'7.8")	E	90 × 105 × 90 (3.54" × 4.13" × 3.54")	B	Dust seal
⑤	85 (3.34")	256 (10.07")	273 (10.74")	J	_____		
⑥	85 (3.34")	272 (10.7")	289 (11.37")	J	_____		
⑦	80 (3.14")	229 (9.01")	246 (9.68")	J	_____		
⑧	70 (2.75")	419 (1'4.49")	444 (1'5.48")	N	70 × 85 × 67 (2.75" × 3.34" × 2.63")	B	Dust seal
⑨	80 (3.14")	419 (1'4.49")	444 (1'5.48")	Z	80 × 95 × 97 (3.14" × 3.74" × 3.81")	F	Dust seal
⑩	80 (3.14")	481 (1'6.93")	516 (1'8.31")	Z	80 × 95 × 82 (3.14" × 3.74" × 3.22")	B	Dust seal, O-ring
⑪	80 (3.14")	481 (1'6.93")	516 (1'8.31")	Z	80 × 95 × 86 (3.14" × 3.74" × 3.38")	B	Dust seal, O-ring
Bucket					80 × 95 × 63 (3.14" × 3.74" × 2.48")	C	

ATTACHMENT

20-3 ● Resin shim (HI-MOLER EX 1300) code



Notes : Code ⑨ — 4 pcs.
Other — 2 pcs.

Unit : mm (ft-in)

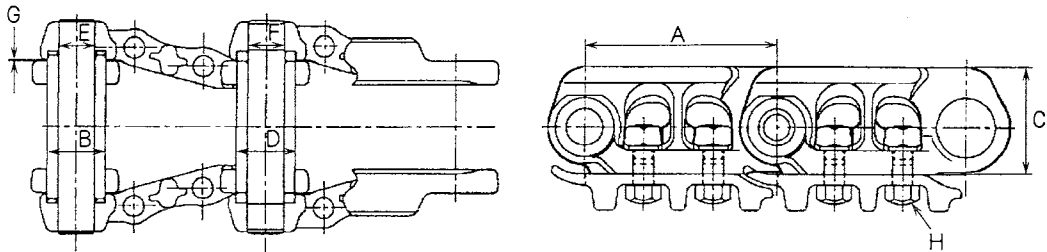
Model Location	SK70SR		SK115SR		SK115SRdz • SK135SR (LC)		SK235SR	
	P. NO	I.D. x O.D. x Thickness	P. NO	I.D. x O.D. x Thickness	P. NO	I.D. x O.D. x Thickness	P. NO	I.D. x O.D. x Thickness
①	YR02B01265P1	62 x 130 x 2 (2.44" x 5.11" x 0.07")	YN12B01009P1	72 x 130 x 3 (2.83" x 5.11" x 0.11")	YN12B01009P1	72 x 130 x 3 (2.83" x 5.11" x 0.11")	—	—
②	YR02B01261P1	77 x 120 x 2 (3.03" x 4.72" x 0.07")	—	—	—	—	—	—
③	YR02B01262P1	72 x 120 x 2 (2.83" x 4.72" x 0.07")	YW02B01032P1	77 x 120 x 3 (2.83" x 4.72" x 0.11")	LP02B01055P1	82 x 130 x 3 (3.22" x 5.11" x 0.11")	—	—
④	YR02B01265P1	62 x 130 x 2 (2.44" x 5.11" x 0.07")	YN12B01009P1	72 x 130 x 3 (2.83" x 5.11" x 0.11")	YN12B01009P1	72 x 130 x 3 (2.83" x 5.11" x 0.11")	—	—
⑤	PY02B01028P1	62 x 100 x 2 (2.44" x 3.93" x 0.07")	YW12B01025P1	62 x 100 x 3 (2.44" x 3.93" x 0.11")	YW12B01025P1	62 x 100 x 3 (2.44" x 3.93" x 0.11")	—	—
⑥	↑	↑	YN12B01009P1	72 x 130 x 3 (2.83" x 5.11" x 0.11")	↑	↑	—	—
⑦	↑	↑	YW12B01025P1	62 x 100 x 3 (2.44" x 3.93" x 0.11")	↑	↑	—	—
⑧	↑	↑	↑	↑	↑	↑	—	—
⑨	↑	↑	↑	↑	↑	↑	—	—

SK70SR SK115SRDZ SK235SR SK115SR SK135SR(LC)

<https://www.manualshub.com/>

20-4 UNDER CARRIAGE

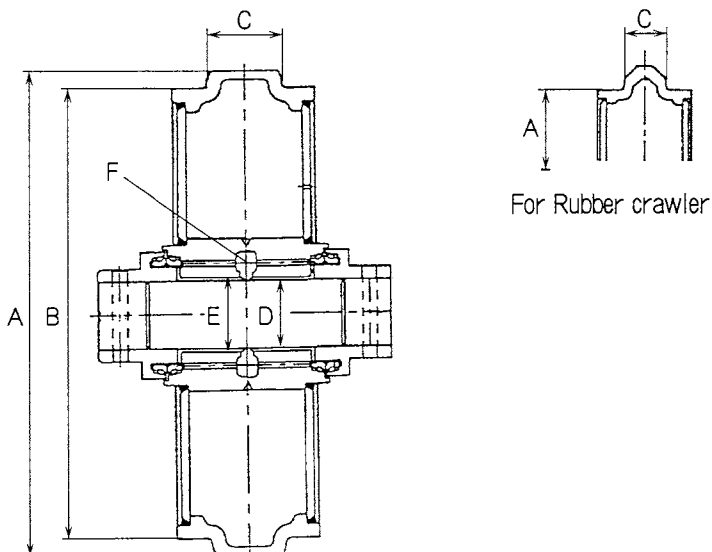
● Maintenance Standard of Track Link



Unit : mm (in)

Model			SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR	Remedy
Applicable machine			YT00101~	YV00101~	YY00101~ YH00101~	YF00101~	
A	Link pitch	Standard Value	155.6 ± 0.1 (6.130 ± 0.0039")	171.07 ± 0.1 (6.740 ± 0.0039")	171.07 ± 0.1 (6.740 ± 0.0039")	190 ± 0.1 (7.486 ± 0.0039")	Replace the link assy if the dimension of part exceeds service limit.
		Repairable level	160 (6.304")	175 (6.895")	175 (6.895")	194.5 (7.643")	
		Service limit	164 (6.461")	179 (7.052")	179 (7.052")	198 (7.801")	
B	O.D. of bushing	Standard Value	$\phi 41^{+0.214}_{-0.18}$ ($\phi 1.615^{+0.0084}_{-0.0071}$)	$\phi 47^{+0.228}_{-0.204}$ ($\phi 1.851^{+0.0090}_{-0.0081}$)	$\phi 47^{+0.228}_{-0.204}$ ($\phi 1.851^{+0.0090}_{-0.0081}$)	$\phi 58.78 \pm 0.5$ ($\phi 2.315 \pm 0.0197$)	
		Repairable level	$\phi 37$ ($\phi 1.457$)	$\phi 43$ ($\phi 1.694$)	$\phi 43$ ($\phi 1.694$)	$\phi 55$ ($\phi 2.167$)	
		Service limit	$\phi 36$ ($\phi 1.418$)	$\phi 42$ ($\phi 1.654$)	$\phi 42$ ($\phi 1.654$)	$\phi 54$ ($\phi 2.127$)	
C	Link height	Standard Value	75±0.15 (2.955±0.0059")	90 (3.546")	90 (3.546")	106 ± 0.3 (4.176 ± 0.0118)	
		Repairable level	69 (2.718")	84 (3.309")	84 (3.309")	100 (3.940")	
		Service limit	67 (2.639")	82 (3.230")	82 (3.230")	98 (3.861")	
D	Interference between bushing and link	Standard Value	$\phi 41$ (1.615")	$\phi 47$ (1.851")	$\phi 47$ (1.851")	$\phi 58.78$ (2.315")	
		Tolerance	Shaft	+0.214(+0.0084") +0.174(+0.0068")	+0.29(+0.0114") +0.24(+0.0094")	+0.29(+0.0114") +0.24(+0.0094")	+0.05(+0.0019") -0.05(-0.0019")
			Hole				
		Repairable level	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	
E	Interference between track pin and link	Standard Value	$\phi 24$ ($\phi 0.945$ ")	$\phi 30$ ($\phi 1.182$ ")	$\phi 30$ ($\phi 1.182$ ")	$\phi 36.63$ ($\phi 1.443$ ")	
		Tolerance	Shaft	±0.14 (±0.0055")	+0.14(+0.0055") +0.11(+0.0043")	+0.14(+0.0055") +0.11(+0.0043")	+0.05(+0.019") -0.05(-0.019")
			Hole				
		Repairable level	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	
F	Interference between master pin and link	Standard Value	$\phi 24$ ($\phi 0.9456$ ")	$\phi 30$ ($\phi 1.182$ ")	$\phi 30$ ($\phi 1.182$ ")	$\phi 36.5$ ($\phi 1.438$ ")	
		Tolerance	Shaft	-0.05(-0.0019") -0.08(-0.0031")	+0.01(+0.0003") -0.02(-0.0007")	+0.01(+0.0003") -0.02(-0.0007")	+0.03(+0.011") -0.088(-0.0034")
			Hole				
		Repairable level	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	0.05 (0.0019")	
G	Clearance between links (both sides)	Standard Value	1.6 (0.0630")	1.2 (0.0472")	1.2 (0.0472")	1.5 (0.0591")	
		Repairable level	8 (0.3152")	8 (0.3152")	8 (0.3152")	8 (0.3152")	
		Service limit	10 (0.394")	10 (0.394")	10 (0.394")	10 (0.394")	
H	Torque of shoe bolt kgf·m (ft·lbs)		30 ± 3 (217 ± 22)	41 ± 4 (297 ± 29)	41 ± 4 (297 ± 29)	87 ± 3 (629 ± 22)	Retighten

● Maintenance Standard of Idler

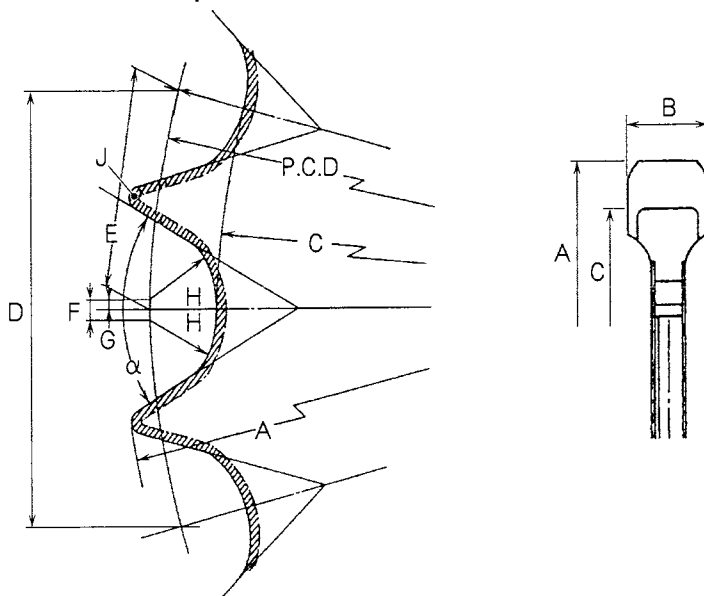


Unit : mm (in)

Model			SK70SR	SK115SR	SK115SR DZ SK135SR (LC)	SK235SR	Remedy	
A	Dia. of idler projection	Standard Value	φ 446 (φ 17.572")	φ 510±1.5 (φ 20.094±0.0591")	φ 510±1.5 (φ 20.094±0.0591")	φ 535 (φ 21.079")	Replace	
		Repairable level	φ 440 (φ 17.336")	φ 504 (φ 19.857")	φ 504 (φ 19.857")	φ 529 (φ 20.842")		
		Service limit	φ 438 (φ 17.257")	φ 502 (φ 19.778")	φ 502 (φ 19.778")	φ 527 (φ 20.763")		
B	Tread dia	Standard Value	φ 400 ⁺¹ _{-2.394} (φ 15.76 ⁺¹ _{-0.094})	φ 456±2.0 (φ 17.966±0.0788")	φ 456±2.0 (φ 17.966±0.0788")	φ 497 (φ 19.581")		
		Repairable level	φ 394 (φ 15.523")	φ 450 (φ 17.73")	φ 450 (φ 17.73")	φ 490 (φ 19.306")		
		Service limit	φ 392 (φ 15.444")	φ 448 (φ 17.651")	φ 448 (φ 17.651")	φ 487 (φ 19.187")		
C	Flange width	Standard Value	43 (1.694")	58±1.0 (2.285±0.0394")	58±1.0 (2.285±0.0394")	84±0.5 (3.309±0.0197")	Replace bushing	
		Repairable level	38 (1.497")	52 (2.048")	52 (2.048")	78 (3.073")		
		Service limit	36 (1.418")	50 (1.97")	50 (1.97")	76 (2.994")		
D	Clearance between shaft and bushing	Standard Value	φ 50 (φ 1.97")	φ 60 (φ 2.364")	φ 60 (φ 2.364")	φ 75 (φ 2.955")		Replace bushing
		Tolerance	Shaft	-0.050(-0.0019") -0.075(-0.0029")	-0.030(-0.0011") -0.060(-0.0023")	-0.030(-0.0011") -0.060(-0.0023")	-0.030(-0.0011") -0.060(-0.0023")	
		Repairable level	1.5 (0.059")	1.5 (0.059")	1.5 (0.059")	1.5 (0.059")		
		Service limit	2.0 (0.0788")	2.0 (0.0788")	2.0 (0.0788")	2.0 (0.0788")		
E	Interference between idler and bushing	Standard Value	φ 57 (φ 2.245")	φ 64 (φ 2.521")	φ 64 (φ 2.521")	φ 83 (φ 3.270")	Replenish	
		Tolerance	Hole	+0.03(+0.0011") -0.02(-0.0007")	+0.03(+0.0011") 0 (0)	+0.03(+0.0011") 0 (0)		+0.035(+0.0013") 0 (0)
		Repairable level	0	0	0	0		
		Service limit	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")		
F	Oil : Engine oil API grade CD CLASS#30		160cc (9.76cu·in)	200cc (12.2cu·in)	200cc (12.2cu·in)	←	Replenish	
	Idler rotation		Rotates smoothly by hand.				Reassemble	

SK70SR SK115SRDZ SK235SR SK115SR SK135SR(LC)

● Maintenance Standard of Sprocket



Unit : mm (in)

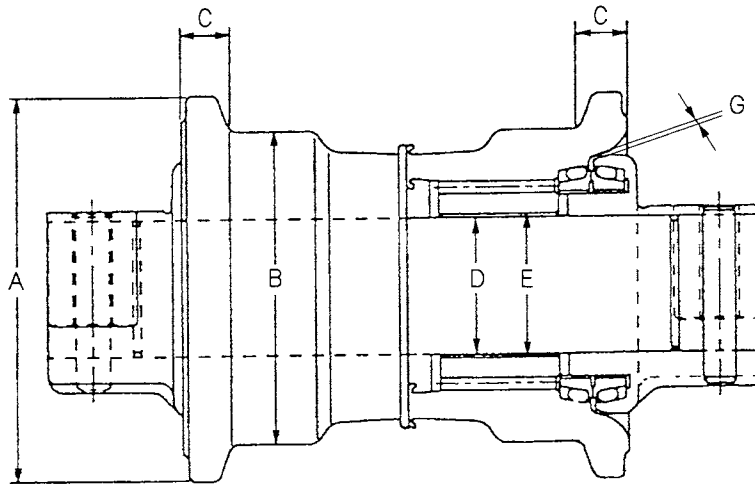
Model		SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR	Remedy
A	O.D. of sprocket	Standard Value $\phi 540^{+3}_{-2}$ ($\phi 21.276^{+0.1182}_{-0.0787}$)	$\phi 601 \pm 3$ ($\phi 23.679 \pm 0.1182$)	$\phi 601 \pm 3$ ($\phi 23.679 \pm 0.1182$)	$\phi 664 \pm 3$ ($\phi 26.161 \pm 0.1182$)	Reinforcement weld, repair or replace.
		Repairable level $\phi 534$ ($\phi 21.039$)	$\phi 590$ ($\phi 23.246$)	$\phi 590$ ($\phi 23.246$)	$\phi 656$ ($\phi 25.846$)	
		Service limit $\phi 532$ ($\phi 20.960$)	$\phi 588$ ($\phi 23.167$)	$\phi 588$ ($\phi 23.167$)	$\phi 654$ ($\phi 25.767$)	
B	Width of sprocket teeth	Standard Value $38^{+0}_{-0.52}$ ($1.497^{+0}_{-0.0208}$)	$49^{+0}_{-0.28}$ ($1.930^{+0}_{-0.0110}$)	$49^{+0}_{-0.28}$ ($1.930^{+0}_{-0.0110}$)	$70^{+0}_{-0.576}$ ($2.758^{+0}_{-0.0228}$)	Replace
		Repairable level 32 (1.260)	44 (1.733)	44 (1.733)	64 (2.521)	
		Service limit 30 (1.182)	42 (1.654)	42 (1.654)	62 (2.442)	
C	I.D. of sprocket	Standard Value $\phi 486.56$ ($\phi 19.170$)	$\phi 516$ ($\phi 20.330$)	$\phi 516$ ($\phi 20.330$)	$\phi 586$ ($\phi 23.088$)	Reinforcement weld, repair or replace.
		Repairable level $\phi 481$ ($\phi 18.951$)	$\phi 511$ ($\phi 20.133$)	$\phi 511$ ($\phi 20.133$)	$\phi 578$ ($\phi 22.773$)	
		Service limit $\phi 479$ ($\phi 18.872$)	$\phi 509$ ($\phi 20.054$)	$\phi 509$ ($\phi 20.054$)	$\phi 576$ ($\phi 22.694$)	

Standard value

Unit : mm (in)

Model		SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR	Remedy
E	Pitch	78.7 ± 1 (3.100 ± 0.0394)	86.34 (3.401)	86.34 (3.401)	96.07 (3.785)	Repair by build-up welding or replace.
	Number of teeth	21	21	21	21	
—	Pitch dia	527.895 (20.799)	580.379 (22.866)	580.379 (22.866)	644.602 (25.397)	
	Roller dia	41 (1.615)	47 (1.851)	47 (1.851)	58.72 (2.313)	
D	Tooth profile	155.6 ± 1 (6.130 ± 0.0394)	171.07 ± 1 (6.740 ± 0.0394)	171.07 ± 1 (6.740 ± 0.0394)	190 ± 1 (7.486 ± 0.0394)	
F		8 (0.315)	7 (0.275)	7 (0.275)	9 ± 1 (0.354 ± 0.0394)	
G		4 (0.157)	3.5 (0.137)	3.5 (0.137)	4.5 (0.177)	
H		20.64 (0.813)	24 ± 0.5 (0.945 ± 0.0197)	24 ± 0.5 (0.945 ± 0.0197)	29.5 ± 2 (1.162 ± 0.0787)	
J		10 (0.394)	5 (0.197)	5 (0.197)	8 (0.315)	
α		62° ± 30'	62° ± 30'	62° ± 30'	60° ± 30'	

● Maintenance Standard of Lower roller



Unit : mm (in)

Model			SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR	Remedy
A	O.D. of flange	Standard Value	φ 147 (φ 5.791")	φ 170 (φ 6.698")	φ 170 (φ 6.698")	φ 185 (φ 7.289")	Reinforcement weld, repair or replace.
		Repairable level	-----	-----	-----	-----	
		Service limit	-----	-----	-----	-----	
B	Tread dia	Standard Value	φ 120 (φ 4.728")	φ 140 (φ 5.516")	φ 140 (φ 5.516")	φ 150±2 (φ 5.910±0.0788")	Reinforcement weld, repair or replace.
		Repairable level	φ 110 (φ 4.334")	φ 130 (φ 5.122")	φ 130 (φ 5.122")	φ 134 (φ 5.279")	
		Service limit	φ 106 (φ 4.176")	φ 126 (φ 4.964")	φ 126 (φ 4.964")	φ 128 (φ 5.043")	
C	Flange width	Standard Value	17.5 (0.689")	23.5 (0.925")	23.5 (0.925")	23.5 (0.925")	Replace bushing
		Repairable level	12 (0.472")	18 (0.709")	18 (0.709")	18 (0.709")	
		Service limit	10 (0.394")	16.5 (0.650")	16.5 (0.650")	16.5 (0.650")	
D	Clearance between shaft and bushing (Coiled busing)	Standard Value	φ 40 (φ 1.576")	φ 50 (φ 1.97")	φ 50 (φ 1.97")	φ 65 (φ 2.561")	
		Tolerance Shaft	-0.060(-0.0023") -0.090(-0.0035")	-0.060(-0.0023") -0.090(-0.0035")	-0.060(-0.0023") -0.090(-0.0035")	-0.060(-0.0023") -0.090(-0.0035")	
		Repairable level	0.7 (0.027")	1.0 (0.039")	1.0 (0.039")	0.7 (0.027")	
E	Interference between roller and bushing	Standard Value	φ 44 (φ 1.733")	φ 57 (φ 2.245")	φ 57 (φ 2.245")	φ 69 (φ 2.718")	
		Tolerance Hole	+0.025(+0.0009") -0.020(-0.0007")	+0.030(+0.0011") 0 (0)	+0.030(+0.0011") 0 (0)	+0.03(+0.0011") -0.02(-0.0007")	
		Repairable level	0	0	0	0	
		Service limit	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")	
		Oil : Engine oil API grade CD CLASS #30	90cc (5.49cu·in)	150cc (9.15cu·in)	150cc (9.15cu·in)	160cc (9.76cu·in)	Replenish
G	Clearance between roller and collar	Conserve 2.5±0.5 (0.0985±0.0197")					Reassembly
	Roller rotation	Roller rotates smoothly by hand					Reassembly
	Confirm that oil is not leaking	Before tightening plug, check it for leakage in the condition of air pressure 2.0kgf/cm² (28psi).					

SK70SR SK115SRDZ SK235SR SK115SR SK135SR(LC)

<https://trucksmanualshub.com/>

● Maintenance Standard of Upper roller

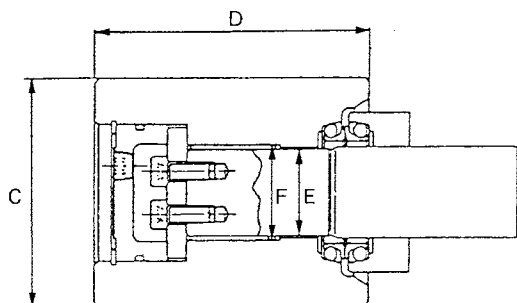


Fig (a)

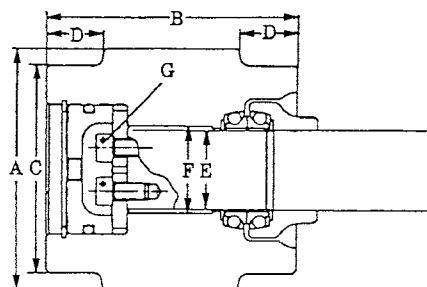


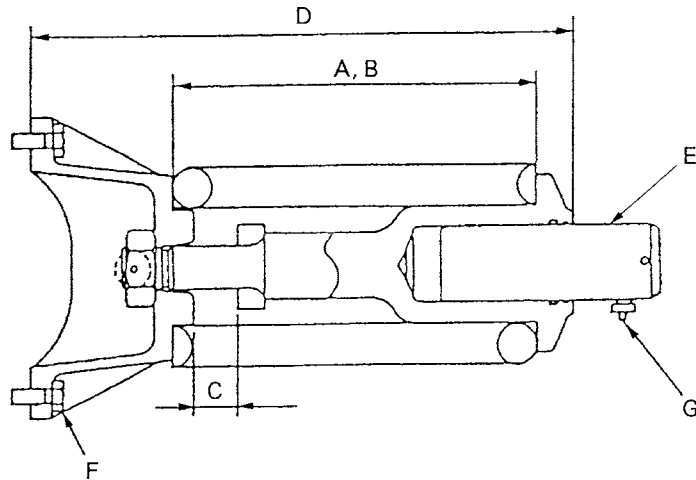
Fig (b)

Unit : mm (in)

Model			SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR	Remedy	
	Shape		(a)	(a)	(a)	(b)		
A	Tread dia	Standard Value	—	—	—	φ 160 (φ 6.304")	Replace	
		Repairable level	—	—	—	—		
		Service limit	—	—	—	—		
B	Tread width	Standard Value	—	—	—	φ 150 (φ 5.91")		
		Repairable level	—	—	—	—		
		Service limit	—	—	—	—		
C	Tread dia	Standard Value	φ 82 (φ 3.230")	φ 100 (φ 3.94")	φ 100 (φ 3.94")	φ 140 (φ 5.516")		
		Repairable level	φ 73 (φ 2.876")	φ 92 (φ 3.624")	φ 92 (φ 3.624")	φ 132 (φ 5.2")		
		Service limit	φ 70 (φ 2.758")	φ 88 (φ 3.467")	φ 88 (φ 3.467")	φ 128 (φ 5.043")		
D	Tread width	Standard Value	102 (4.018")	130 (5.122")	130 (5.122")	33 (1.3")		
		Repairable level	95 (3.743")	—	—	37 (1.457")		
		Service limit	92 (3.624")	—	—	39 (1.536")		
E	Clearance between roller and bushing	Standard Value	φ 32 (φ 1.260")	φ 38 (φ 1.497")	φ 38 (φ 1.497")	φ 50 (φ 1.97")	Replace bushing	
		Tolerance	Shaft	-0.025(-0.0009") -0.050(-0.0019")	-0.025(-0.0009") -0.050(-0.0019")	-0.025(-0.0009") -0.050(-0.0019")		-0.025(-0.0009") -0.050(-0.0019")
		Repairable level	0.7 (0.027")	0.7 (0.027")	0.7 (0.027")	0.7 (0.027")		
		Service limit	1.0 (0.039")	1.0 (0.039")	1.0 (0.039")	1.0 (0.039")		
F	Interference between roller and bushing	Standard Value	φ 36 (φ 1.418")	φ 42 (φ 1.654")	φ 42 (φ 1.654")	φ 55 (φ 2.167")		
		Tolerance	Hole	+0.03(+0.0011") 0 (0)	+0.025(+0.0009") 0 (0)	+0.025(+0.0009") 0 (0)		+0.03(+0.0011") 0 (0)
		Repairable level	0	0	0	0		
		Service limit	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")	0.01 (0.0003")		
G	Tightening torque of capscrew kg·m (ft·lbs)		3.4±0.35 (24.5±2.5)	6.7±0.17 (48.4±1.2)	6.7±0.17 (48.4±1.2)	11.7±1.2 (84.6±8.6)	Apply Locktite # 262	
	Oil : Engine oil API grade CD CLASS #30		20cc (1.22cu·in)	20cc (1.22cu·in)	20cc (1.22cu·in)	50cc (3.05cu·in)	Replenish	
	Roller rotation		Roller rotates smoothly by hand				Reassembly	

<https://smc.kobelco.com/>
SK70SR SK115SRdz SK235SR
SK115SR SK135SR(LC)

● Maintenance Standard of Track spring



Unit : mm (ft-in)

Model	SK70SR		SK115SR	SK115SRdz SK135SR (LC)	SK235SR
	Iron shoe	Rubber shoe			
A	Installed Length of spring				
	270 (10.638")	257 (10.125")	358 (1'2.105")	358 (1'2.105")	437 (1'5.218")
B	Free length of spring				
	320.5 (1'0.627")		423 (1'4.666")	423 (1'4.666")	519.4 (1'8.464")
C	Stroke				
	35 (1.379")	22 (0.866")	43 (1.694")	43 (1.694")	49 (1.930")
D	Set length				
	495 (1'7.50")	505.5 (1'7.917")	606 (1'11.876)	606 (1'11.876)	672 (2'2.476")

E	Outer circumference of piston	Outer circumference of piston
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Unit : kgf·m (ft·lbs)

F	Track spring attaching capscrew tightening torque	11.7±1.2 (84.624±8.6794)	11.7±1.0 (84.624±7.2329)	11.7±1.0 (84.624±7.2329)	28.5±3 (206.137±21.6987)
G	Tightening torque of grease nipple	6±1 (43.397±7.2329)	6±1 (43.397±7.2329)	6±1 (43.397±7.2329)	6±1 (43.397±7.2329)

※ 1

※ 1 Apply Locktite #262

Unit : kg (lbs)

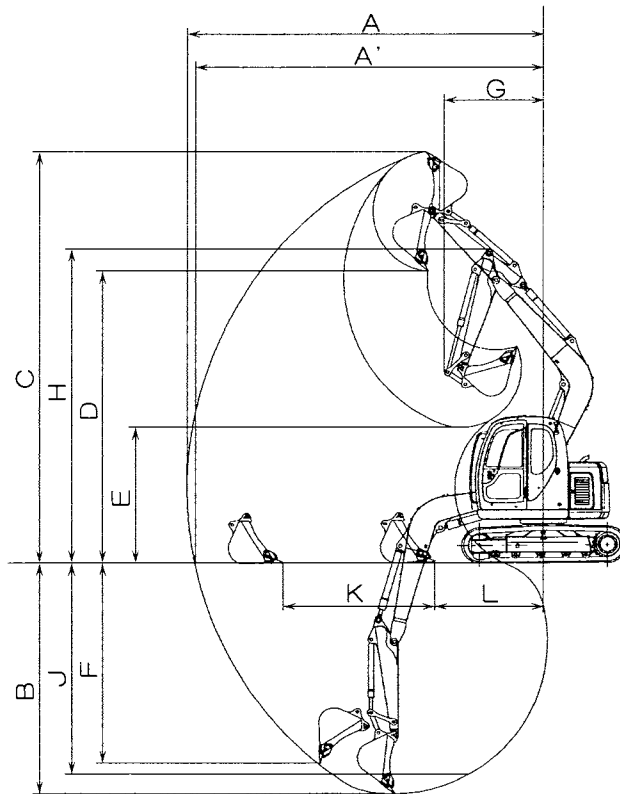
Spring set load	5,350±250 (11,796±551)	8,164±888 (18,001±1,962)	8,164±888 (18,001±1,962)	15,730 ⁻⁷⁸⁰ (34,684 ^{-1,719})
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21. WORKING RANGES

SK70SR

Working ranges

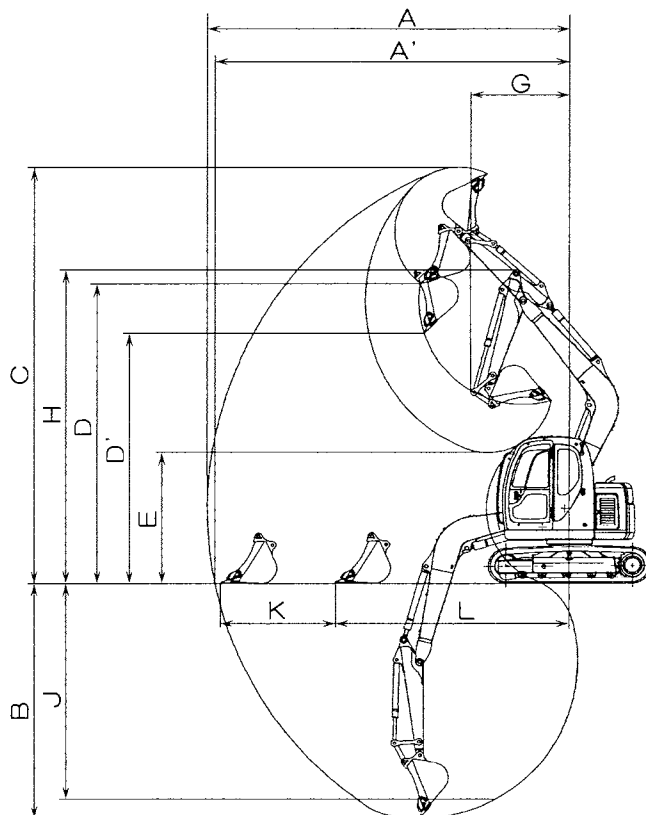
● Backhoe attachment



Unit : mm (ft-in)

Item	Attachment Type		1.65 m (5'5") Short Arm with 0.28 m ³ (0.37 cuyd) Bucket	2.07 m (6'9") STD Arm with 0.22 m ³ (0.29 cuyd) Bucket
	Range			
A	Maximum digging reach		6,310 (20'8")	6,710 (22'0")
A'	Maximum reach at ground level		6,170 (20'3")	6,570 (21'7")
※B	Maximum digging depth		4,100 (13'5")	4,520 (14'10")
※C	Maximum digging height		7,180 (23'7")	7,500 (24'7")
※D	Maximum dumping clearance		5,120 (16'9")	5,430 (17'10")
※E	Minimum dumping clearance		2,380 (7'10")	2,070 (6'9")
※F	Vertical digging depth		3,540 (11'7")	3,970 (13'0")
G	Minimum swing radius		1,750 (5'9")	2,090 (6'10")
※H	Height at minimum swing radius		5,480 (17'12")	5,510 (18'1")
※J	Digging depth for 2.4m (8') level bottom		3,740 (12'3")	4,220 (13'10")
K	Horizontal digging	Stroke	2,720 (8'11")	3,150 (10'4")
L	stroke at ground level	Minimum	1,880 (6'2")	1,850 (6'1")

NOTE : Bucket capacities are indicated in heaped capacity.**Dimensions marked ※ do not include the height of the shoe lug.**

SK70SR**Working ranges**● **Face shovel attachment**

Unit : mm (ft-in)

Attachment Type			1.65m (5'5") Short Arm with 0.28m³ (0.37cuyd) Bucket	2.07m (6'9") STD Arm with 0.22 m³ (0.29cuyd) Bucket
Item	Range			
A	Maximum digging reach		6,390 (20'12")	6,790 (22'3")
A'	Maximum reach at ground level		6,250 (20'6")	6,660 (21'10")
※B	Maximum digging depth		4,180 (13'9")	4,600 (15'1")
※C	Maximum digging height		7,270 (23'10")	7,580 (24'10")
※D	Maximum dumping clearance		5,250 (17'3")	5,570 (18'3")
※D'	Maximum dumping clearance (45°)		4,390 (14'5")	4,530 (14'10")
※E	Minimum dumping clearance		2,300 (7'6")	1,990 (6'6")
G	Minimum swing radius		1,750 (5'9")	2,090 (6'10")
※H	Height at minimum swing radius		5,480 (17'12")	5,510 (18'1")
※J	Digging depth for 2.4m(8') level bottom		3,840 (12'7")	4,310 (14'2")
K	Horizontal digging	Stroke	2,010 (6'7")	2,660 (8'9")
L	stroke at ground level	Minimum	4,120 (13'6")	3,880 (12'9")

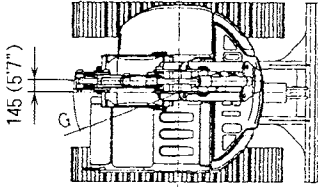
NOTE : Bucket capacities are indicated in heaped capacity.**Dimensions marked ※ do not include the height of the shoe lug.**

SK70SR

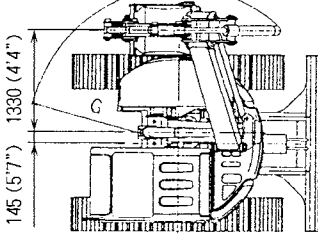
Working ranges

- Backhoe attachment (EU) OPT.

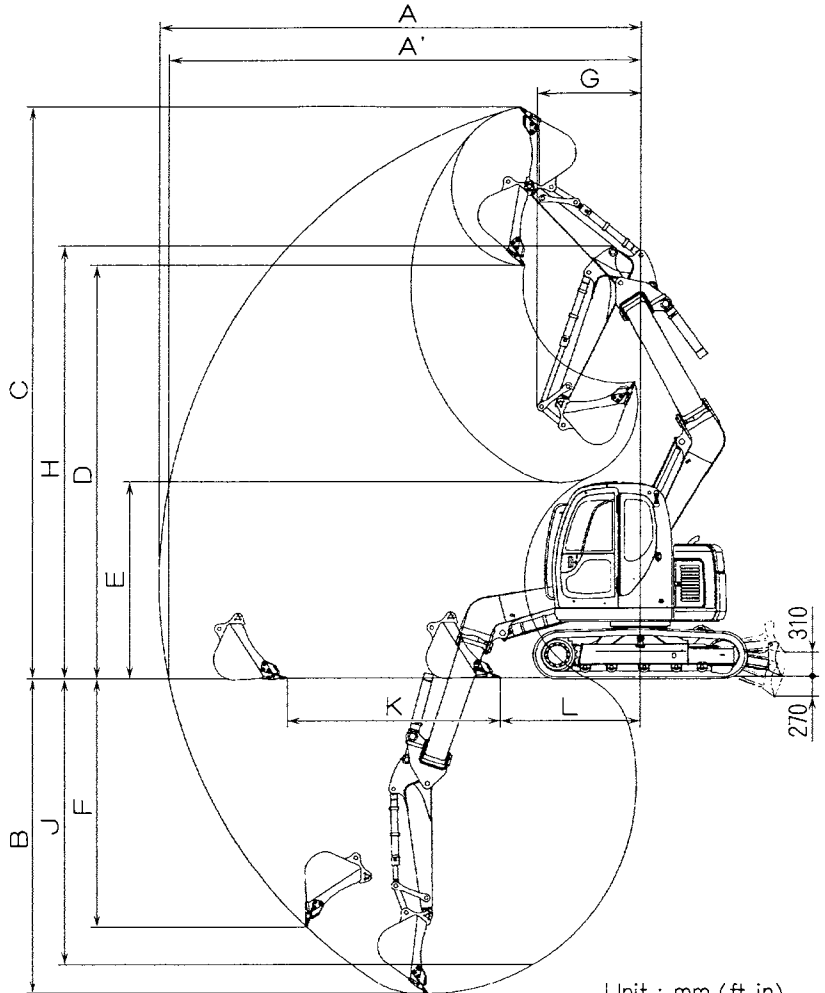
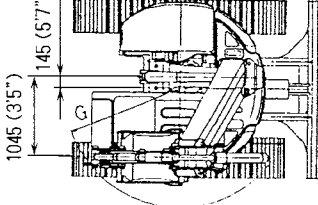
[OFFSET 0°]



[OFFSET R]



[OFFSET L]

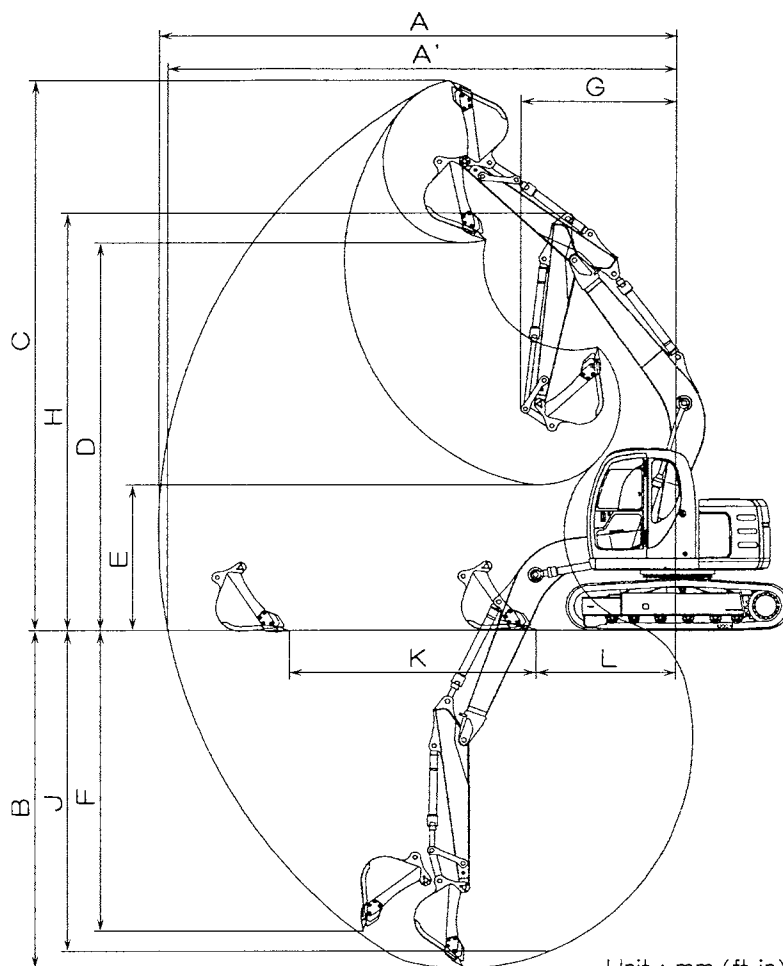


Unit : mm (ft-in)

Attachment Type		[OFFSET 0°] 3.87m (12'8") Boom 1.76m (5'9") Arm with 0.28m³ (0.37cuyd) Bucket	[OFFSET R] 3.87m (12'8") Boom 1.76m (5'9") Arm with 0.28m³ (0.37cuyd) Bucket	[OFFSET L] 3.87m (12'8") Boom 1.76m (5'9") Arm with 0.28m³ (0.37cuyd) Bucket
Item	Range			
A	Maximum digging reach	6,440 (21'2")	5,750 (18'10")	6,060 (19'11")
A'	Maximum reach at ground level	6,300 (20'8")	5,600 (18'4")	5,920 (19'5")
※B	Maximum digging depth	4,190 (13'9")	3,510 (11'6")	3,820 (12'6")
※C	Maximum digging height	7,480 (24'7")	6,860 (22'6")	7,140 (23'5")
※D	Maximum dumping clearance	5,410 (17'9")	4,790 (15'9")	5,050 (16'8")
※E	Maximum dumping clearance	2,570 (8'5")	1,960 (6'5")	2,240 (7'4")
※F	Vertical digging depth	3,280 (10'9")	2,640 (8'8")	2,930 (9'7")
G	Minimum swing radius	1,410 (4'8")	2,050 (6'9")	1,560 (5'1")
※H	Height at minimum swing radius	5,650 (18'6")	5,030 (16'6")	5,310 (17'5")
※J	Digging depth for 2.4m (8') level bottom	3,800 (12'6")	3,110 (10'2")	3,420 (11'3")
K	Horizontal digging	Stroke	2,840 (9'4")	2,880 (9'5")
L	stroke at ground level	Minimum	1,890 (6'2")	1,160 (3'10")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

SK115SR**Working ranges**● **Backhoe attachment**

Unit : mm (ft-in)

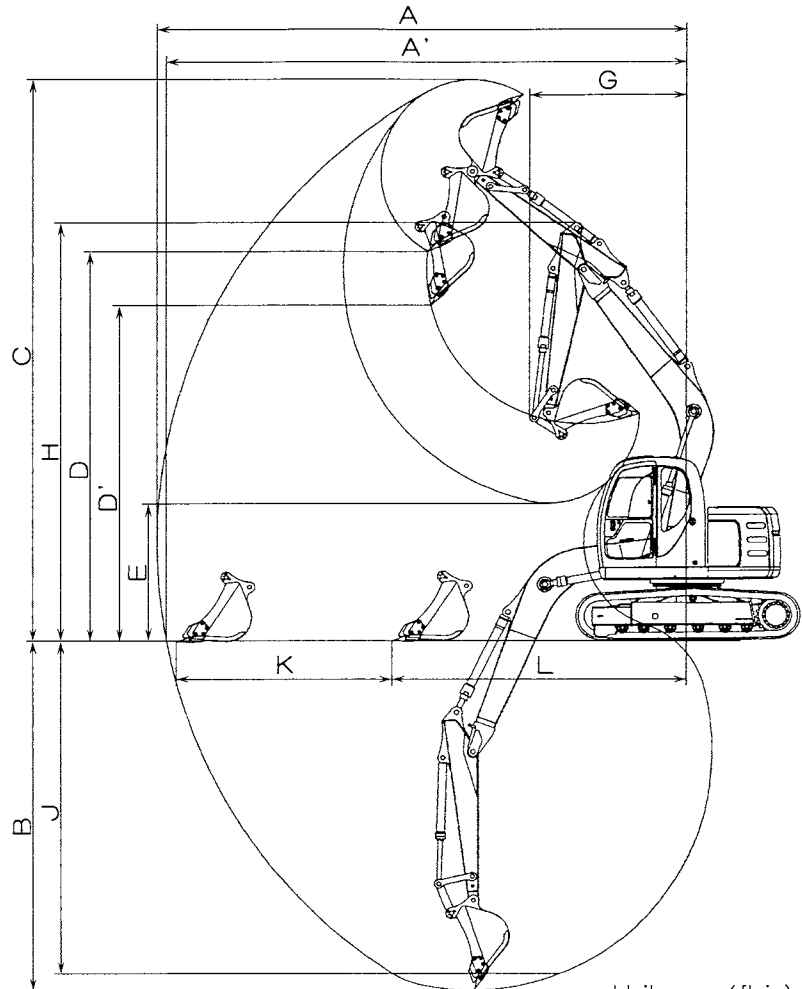
Attachment Type		1.9m (6'3") Short Arm with 0.50m³ (0.65cuyd) Bucket	2.2m (7'3") STD Arm with 0.45m³ (0.59cuyd) Bucket	2.7m (8'10") Long Arm with 0.37m³ (0.48cuyd) Bucket
Item	Range			
A	Maximum digging reach	7,430 (24'5")	7,710 (25'4")	8,180 (26'10")
A'	Maximum reach at ground level	7,290 (23'11")	7,560 (24'10")	8,050 (26'5")
※B	Maximum digging depth	4,760 (15'7")	5,060 (16'7")	5,560 (18'3")
※C	Maximum digging height	7,960 (26'1")	8,160 (26'9")	8,490 (27'10")
※D	Maximum dumping clearance	5,570 (18'3")	5,780 (19'0")	6,100 (20'0")
※E	Minimum dumping clearance	2,510 (8'3")	2,170 (7'1")	1,720 (5'8")
※F	Vertical digging depth	3,960 (12'12")	4,500 (14'9")	4,860 (15'11")
G	Minimum swing radius	2,440 (8'0")	2,330 (7'8")	2,590 (8'6")
※H	Height at minimum swing radius	6,240 (20'6")	6,220 (20'5")	6,260 (20'6")
※J	Digging depth for 2.4m(8') level bottom	4,480 (14'8")	4,800 (15'9")	5,350 (17'7")
K	Horizontal digging	Stroke		
L	stroke at ground level	Minimum		
		3,030 (9'11")	3,650 (11'12")	4,220 (13'10")
		2,430 (7'12")	2,100 (6'11")	1,990 (6'6")

NOTE : Bucket capacities are indicated in heaped capacity.**Dimensions marked ※ do not include the height of the shoe lug.**

SK115SR

Working ranges

- Face shovel attachment



Unit : mm (ft-in)

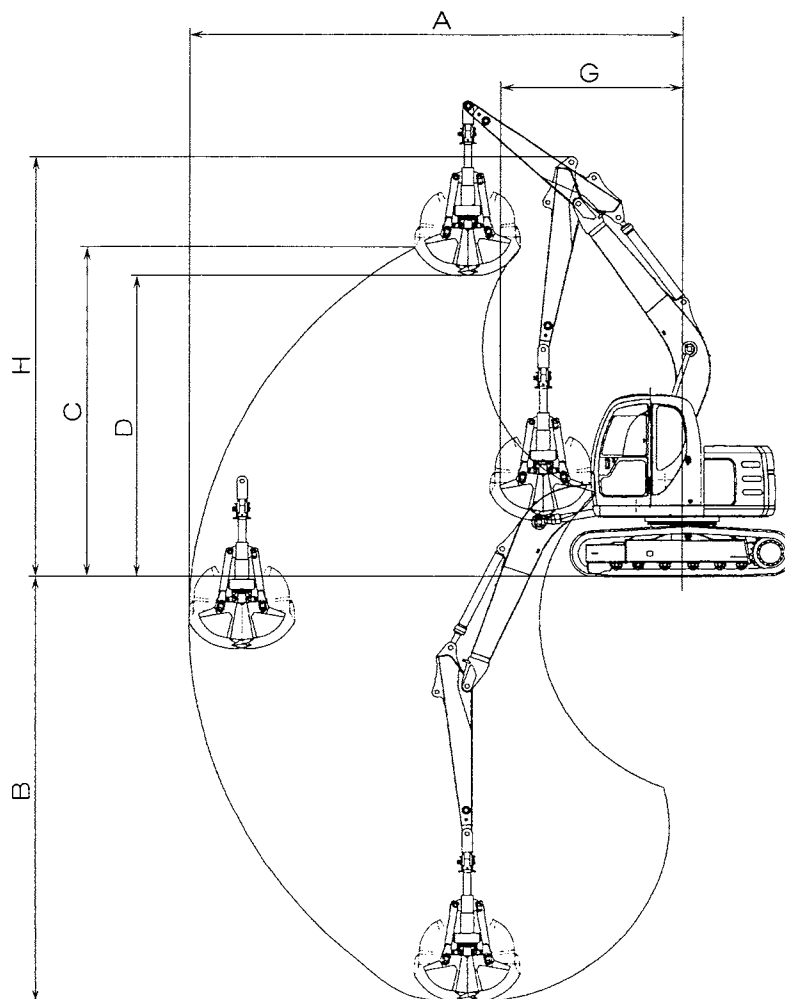
Attachment Type		1.9m (6'3") Short Arm with 0.50m³ (0.65cuyd) Bucket	2.2m (7'3") STD Arm with 0.45m³ (0.59cuyd) Bucket	2.7m (8'10") Long Arm with 0.37m³ (0.48cuyd) Bucket
Item	Range			
A	Maximum digging reach	7,580 (24'10")	7,850 (25'9")	8,330 (27'4")
A'	Maximum reach at ground level	7,440 (24'5")	7,710 (25'4")	8,200 (26'11")
※B	Maximum digging depth	4,910 (16'1")	5,200 (17'1")	5,710 (18'9")
※C	Maximum digging height	8,140 (26'8")	8,330 (27'4")	8,660 (28'5")
※D	Maximum dumping clearance	5,540 (18'2")	5,800 (19'0")	6,120 (20'1")
※D'	Maximum dumping clearance (45°)	5,010 (16'5")	4,980 (16'4")	5,150 (16'11")
※E	Minimum dumping clearance	2,360 (7'9")	2,030 (6'8")	1,570 (5'2")
G	Minimum swing radius	2,440 (8'0")	2,330 (7'8")	2,590 (8'6")
※H	Height at minimum swing radius	6,240 (20'6")	6,220 (20'5")	6,260 (20'6")
※J	Digging depth for 2.4m (8') level bottom	4,640 (15'3")	4,960 (16'3")	5,510 (18'1")
K	Horizontal digging	Stroke		
L	stroke at ground level	Minimum		
		2,660 (8'9")	3,210 (10'6")	4,090 (13'5")
		4,630 (15'2")	4,340 (14'3")	3,950 (12'12")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

SK115SR**Working ranges**

- Clamshell (OPT. For reference)



Unit : mm (ft-in)

Attachment Type		2.2m (7'3") STD Arm with 0.40m³ (0.52cuyd) Bucket
Item	Range	
A	Maximum digging reach	7,290 (23'11")
※B	Maximum reach at ground level	6,370 (20'11")
※C	Maximum digging height	4,870 (15'12")
※D	Maximum dumping clearance	4,460 (14'8")
G	Minimum swing radius	2,700 (8'10")
H	Height at minimum swing radius	6,220 (20'5")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

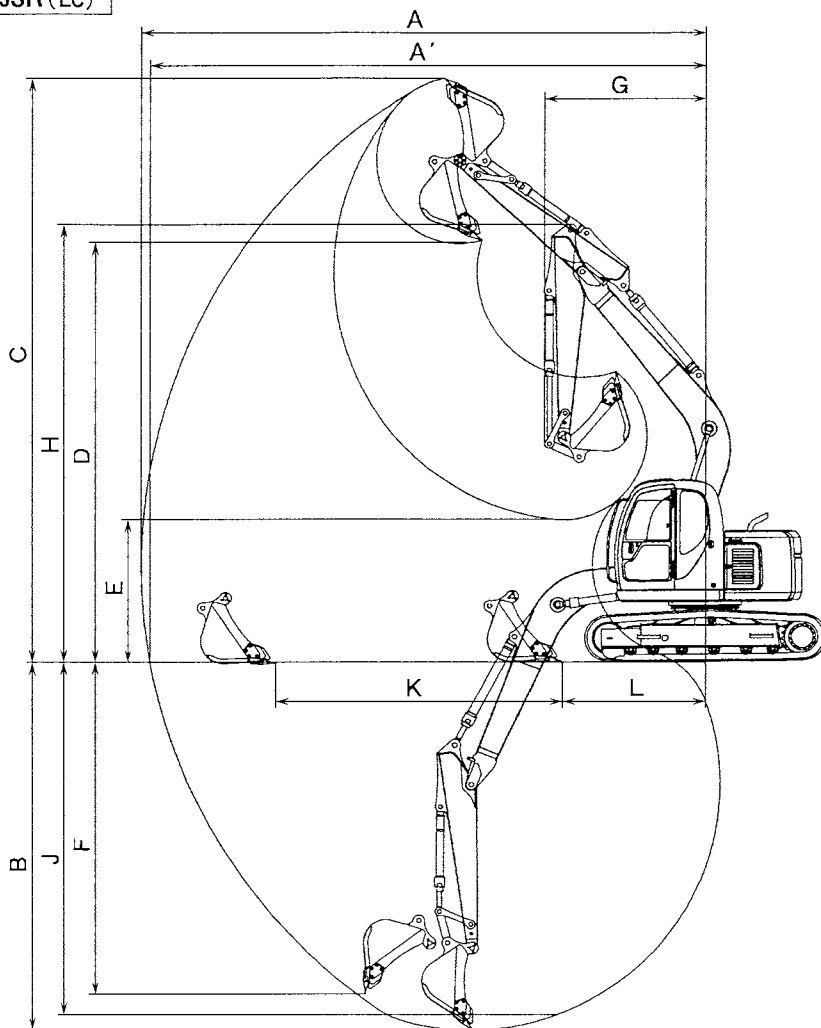
SK115SRDZ SK135SR(LC)

<https://truckmanualshub.com/>

SK115SRDZ • SK135SR(LC)

Working ranges

● Backhoe attachment



Unit : mm (ft-in)

Attachment Type		2.1 m (6'11") Short Arm with 0.57 m ³ (0.75 cu yd) Bucket	2.45 m (8'0") Arm with 0.50 m ³ (0.65 cu yd) Bucket	2.95 m (9'8") Arm with 0.38 m ³ (0.50 cu yd) Bucket
Item	Range			
A	Maximum digging reach	8,030 (26'4")	8,340 (27'4")	8,770 (28'9")
A'	Maximum reach at ground level	7,890 (25'11")	8,210 (26'11")	8,650 (28'5")
※B	Maximum digging depth	5,160 (16'11")	5,520 (18'1")	6,010 (19'9")
※C	Maximum digging height	8,460 (27'9")	8,630 (28'4")	8,860 (29'1")
※D	Maximum dumping clearance	6,020 (19'9")	6,200 (20'4")	6,440 (21'2")
※E	Minimum dumping clearance	2,490 (8'2")	2,120 (6'11")	1,650 (5'5")
※F	Vertical digging depth	4,580 (15'0")	4,960 (16'3")	5,250 (17'3")
G	Minimum swing radius	2,490 (8'2")	2,380 (7'10")	2,650 (8'8")
※H	Height at minimum swing radius	6,490 (21'4")	6,480 (21'3")	6,540 (21'5")
※J	Digging depth for 2.4m (8') level bottom	4,930 (16'2")	5,300 (17'5")	5,830 (19'2")
K	Horizontal digging	Stroke	3,580 (11'9")	4,240 (13'11")
L	stroke at ground level	Minimum	2,480 (8'2")	2,130 (6'12")

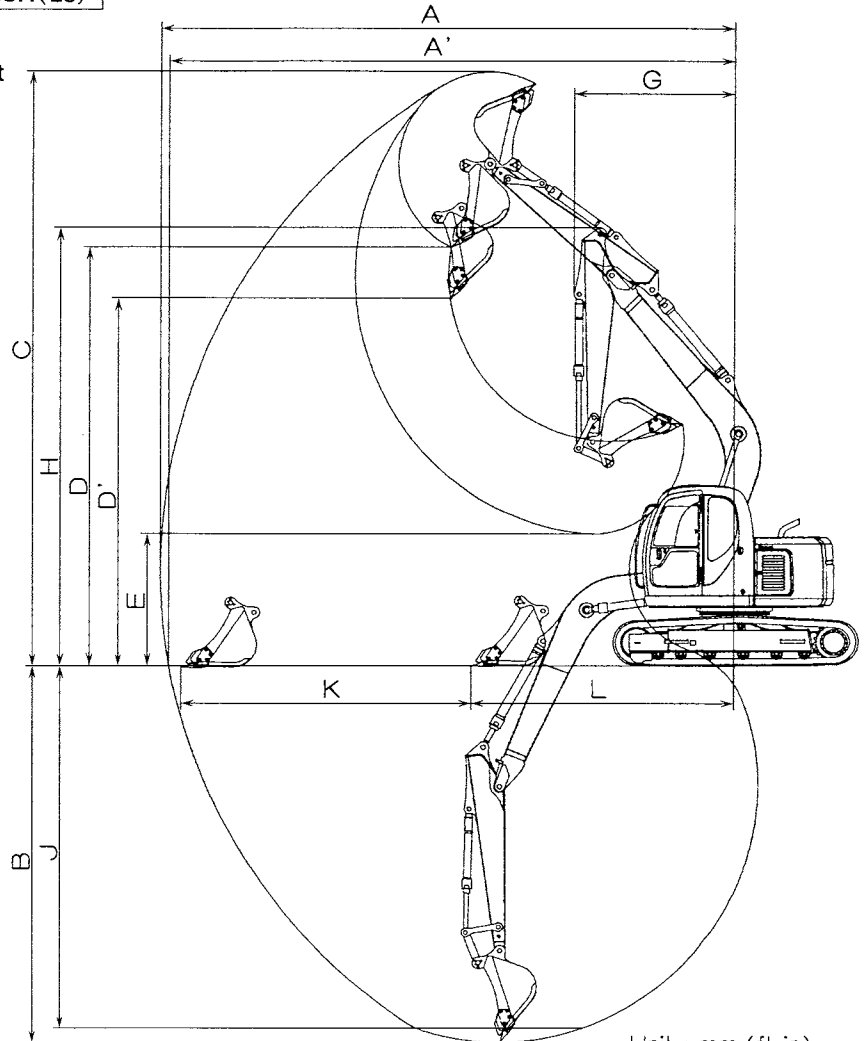
NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

SK115SRdz • SK135SR(LC)

Working ranges

● Face shovel attachment



Unit : mm (ft-in)

Attachment Type		2.1m (6'11") Short Arm with 0.57m ³ (0.75cuyd) Bucket	2.45m (8'0") Arm with 0.50m ³ (0.65cuyd) Bucket	2.95m (9'8") Arm with 0.38m ³ (0.50cuyd) Bucket
Item	Range			
A	Maximum digging reach	8,160 (26'9")	8,470 (27'9")	8,900 (29'2")
A'	Maximum reach at ground level	8,030 (26'4")	8,340 (27'4")	8,780 (28'10")
※B	Maximum digging depth	5,290 (17'4")	5,640 (18'6")	6,140 (20'2")
※C	Maximum digging height	8,600 (28'3")	8,780 (28'10")	9,020 (29'7")
※D	Maximum dumping clearance	6,040 (19'10")	6,200 (20'4")	6,410 (21'0")
※D'	Maximum dumping clearance (45°)	5,290 (17'4")	5,430 (17'10")	5,640 (18'6")
※E	Minimum dumping clearance	2,360 (7'9")	1,990 (6'6")	1,530 (5'0")
G	Minimum swing radius	2,490 (8'2")	2,380 (7'10")	2,650 (8'8")
※H	Height at minimum swing radius	6,490 (21'4")	6,480 (21'3")	6,540 (21'5")
※J	Digging depth for 2.4m (8') level bottom	5,070 (16'8")	5,440 (17'10")	5,960 (19'7")
K	Horizontal digging	Stroke	4,260 (13'12")	4,440 (14'7")
L	stroke at ground level			
		Minimum	4,820 (15'10")	3,890 (12'9")
				4,150 (13'7")

NOTE : Bucket capacities are indicated in heaped capacity.**Dimensions marked ※ do not include the height of the shoe lug.**

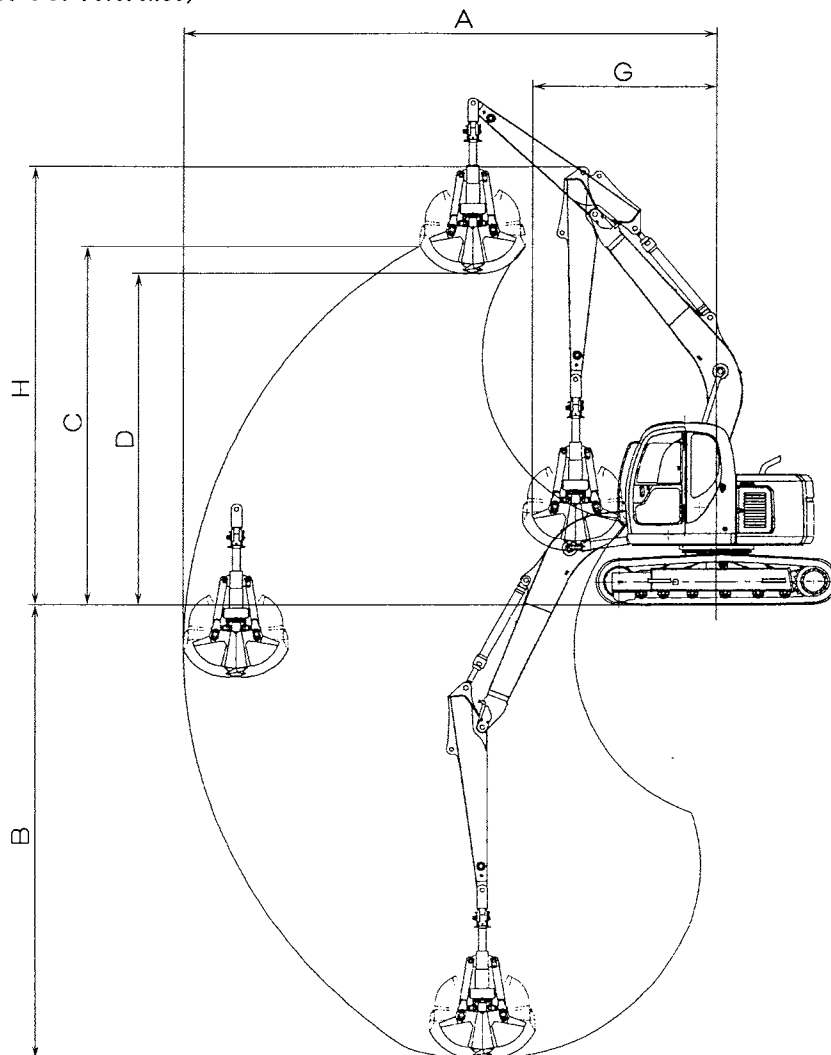
SK115SRDZ SK135SR(LC)

<https://truckmanualshub.com/>

SK115SRDZ • SK135SR(LC)

Working ranges

- Clamshell (OPT. For reference)

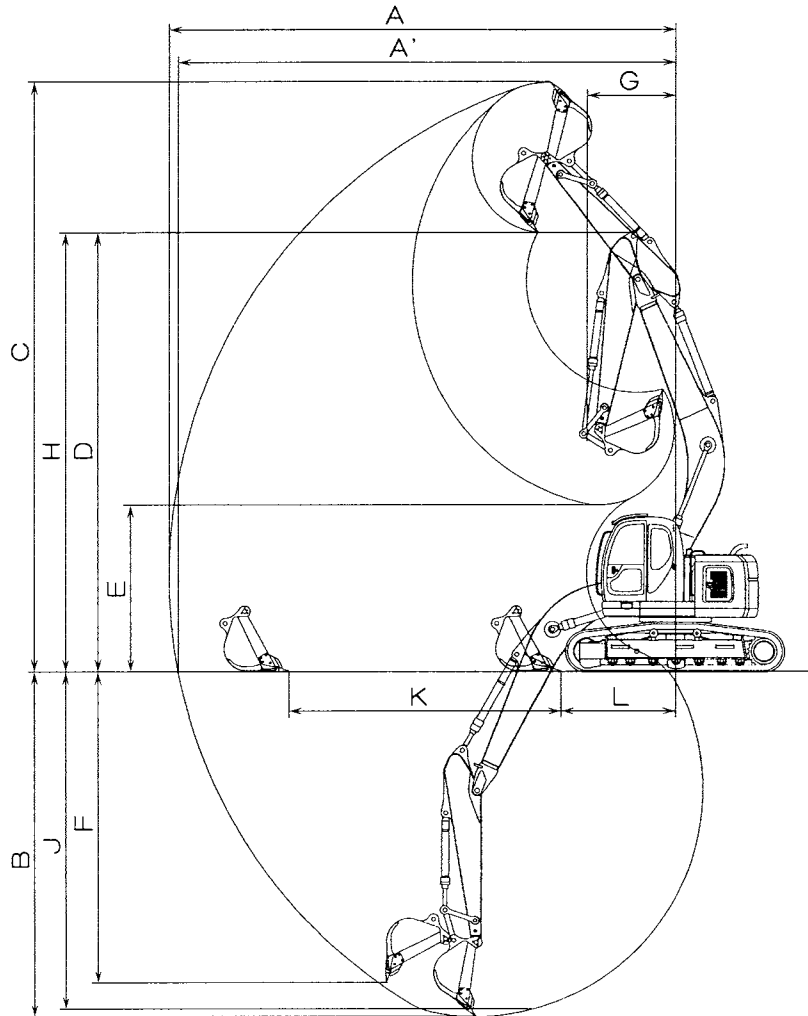


Unit : mm (ft-in)

Item	Range	Attachment Type	
		2.1m (6'11") Short Arm with 0.40m³ (0.52cuyd) Bucket	2.45m (8'0") Arm with 0.40m³ (0.52cuyd) Bucket
A	Maximum digging reach	7,590 (24'11")	7,900 (25'11")
※B	Maximum reach at ground level	6,460 (21'2")	6,810 (22'4")
※C	Maximum digging height	5,140 (16'10")	5,320 (17'6")
※D	Maximum dumping clearance	4,720 (15'6")	4,900 (16'1")
G	Minimum swing radius	2,850 (9'4")	2,740 (8'12")
H	Height at minimum swing radius	6,490 (21'4")	6,480 (21'3")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

SK235SR**Working ranges**● **Backhoe attachment**

Unit : mm (ft-in)

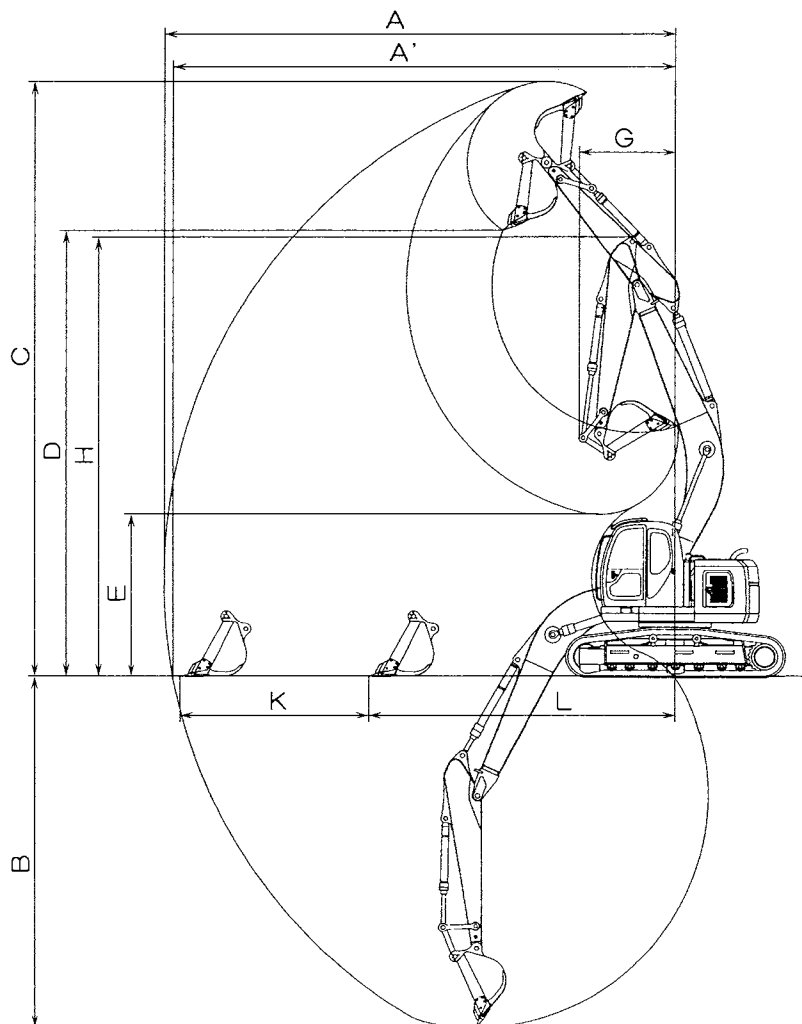
Attachment Type		2.4m (7'10") Short Arm with 0.93 m ³ (1.2 cuyd) Bucket	2.94m (9'7") STD Arm with 0.80 m ³ (1.04 cuyd) Bucket	3.3m (10'9") Long Arm with 0.68 m ³ (0.88 cuyd) Bucket
Item	Range			
A	Maximum digging reach	9,370 (30'9")	9,850 (32'4")	10,210 (33'6")
A'	Maximum reach at ground level	9,170 (30'1")	9,660 (31'8")	10,030 (32'11")
※B	Maximum digging depth	6,160 (20'3")	6,700 (21'12")	7,100 (23'4")
※C	Maximum digging height	10,890 (35'9")	11,290 (37'1")	11,590 (38'0")
※D	Maximum dumping clearance	8,030 (26'4")	8,420 (27'8")	8,690 (28'6")
※E	Minimum dumping clearance	3,870 (12'8")	3,220 (10'7")	2,980 (9'9")
※F	Vertical digging depth	5,520 (18'1")	6,060 (19'11")	6,480 (21'3")
G	Minimum swing radius	2,160 (7'1")	1,900 (6'3")	2,450 (8'1")
※H	Height at minimum swing radius	8,470 (27'10")	8,440 (27'8")	8,480 (27'10")
※J	Digging depth for 2.4m(8') level bottom	5,950 (19'6")	6,520 (21'5")	6,930 (22'9")
K	Horizontal digging	Stroke	4,090 (13'5")	5,290 (17'4")
L	stroke at ground level	Minimum	2,930 (9'7")	2,200 (7'3")

NOTE : Bucket capacities are indicated in heaped capacity.**Dimensions marked ※ do not include the height of the shoe lug.**

SK235SR

Working ranges

- Face shovel attachment



Unit : mm (ft-in)

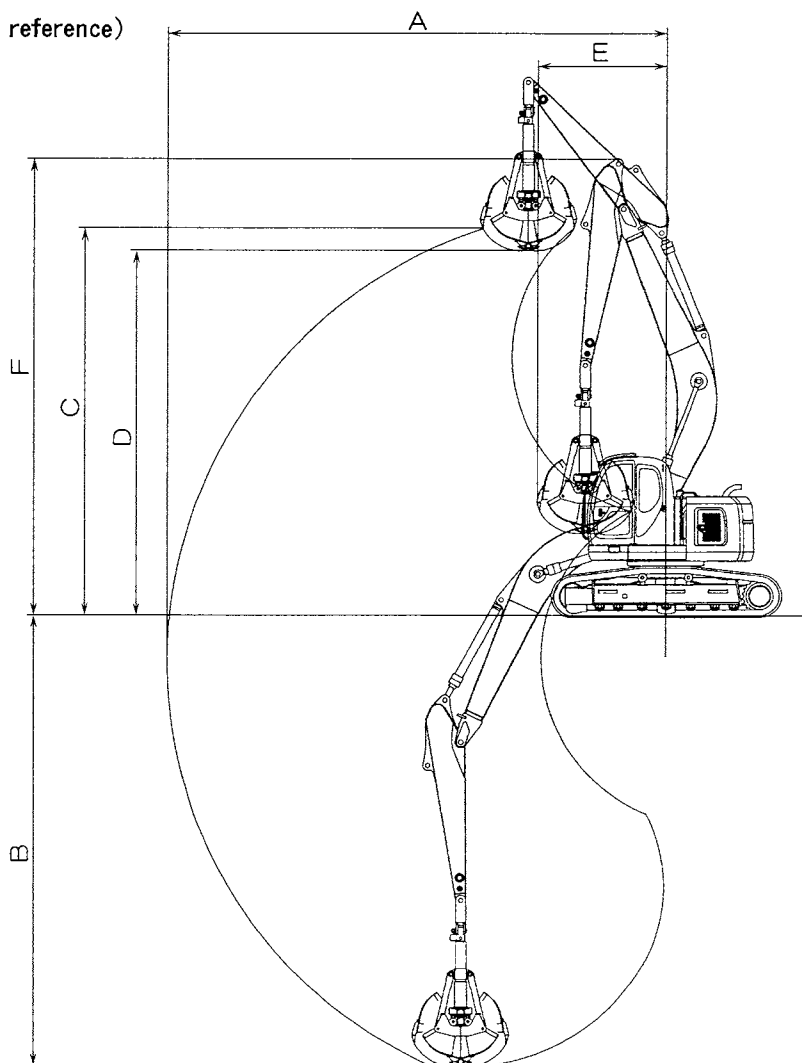
Attachment Type			2.4m (7'10") Short Arm with 0.93m³ (1.2cuyd) Bucket	2.94m (9'7") STD Arm with 0.80m³ (1.04cuyd) Bucket	3.3m (10'9") Long Arm with 0.68m³ (0.88cuyd) Bucket
Item	Range				
A	Maximum digging reach		9,470 (31'1")	9,950 (32'8")	10,330 (33'11")
A'	Maximum reach at ground level		9,270 (30'5")	9,770 (32'1")	10,150 (33'4")
※B	Maximum digging depth		6,270 (20'7")	6,810 (22'4")	7,220 (23'8")
※C	Maximum digging height		11,000 (36'1")	11,400 (37'5")	11,700 (38'5")
※D	Maximum dumping clearance		7,180 (23'7")	8,560 (28'1")	8,790 (28'10")
※E	Minimum dumping clearance		3,770 (12'4")	3,120 (10'3")	2,870 (9'5")
G	Minimum swing radius		2,160 (7'11")	1,900 (6'3")	2,450 (8'1")
※H	Height at minimum swing radius		8,470 (27'10")	8,440 (27'8")	8,480 (27'10")
K	Horizontal digging	Stroke	4,120 (13'6")	3,640 (11'11")	4,480 (14'8")
L	stroke at ground level	Minimum	4,980 (16'4")	5,950 (19'6")	5,480 (17'12")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

SK235SR**Working ranges**

- Clamshell (OPT. For reference)



Unit : mm (ft-in)

Item	Attachment Type	
	Range	2.94m (9'7") Arm with 0.50m ³ (0.65cuyd) Bucket
A	Maximum digging reach	9,270 (30'5")
※B	Maximum reach at ground level	8,370 (27'6")
※C	Maximum digging height	7,170 (23'6")
※D	Maximum dumping clearance	6,750 (22'2")
E	Minimum swing radius	2,410 (7'11")
※F	Height at minimum swing radius	8,440 (27'8")

NOTE : Bucket capacities are indicated in heaped capacity.

Dimensions marked ※ do not include the height of the shoe lug.

22. LIFTING DIAGRAM

SK70SR

● LIFTING CAPACITIES (GENERAL EXPORT)

(1) Conditions of calculation

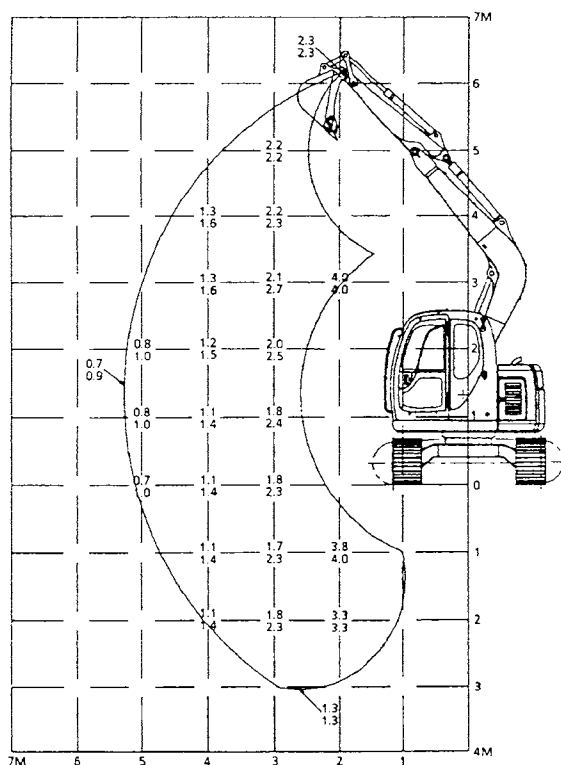
- 1) The lifting load shows the lower value either 87% of hydraulic lifting capacity or 75% of tipping load.
- 2) The load point is on the bucket supporting point, and the bucket position is a closed position.
- 3) The values in the upper rows show the lifting capacity of a machine facing sideways, and values in the lower rows show a machine facing longitudinally.
- 4) Unit : ton Crawler : 450mm (18in), iron crawler
- 5) Set hydraulic pressure 300kgf/cm² (4270psi)

(2) Reference No. list of lifting diagram

Arm	1.65m (5'5") Short Arm	2.07m (6'9") STD Arm
Bucket W of W/O	0.28m ³ (0.37cuyd) Bucket	0.22m ³ (0.29cuyd) Bucket
No.	(1)	(2)

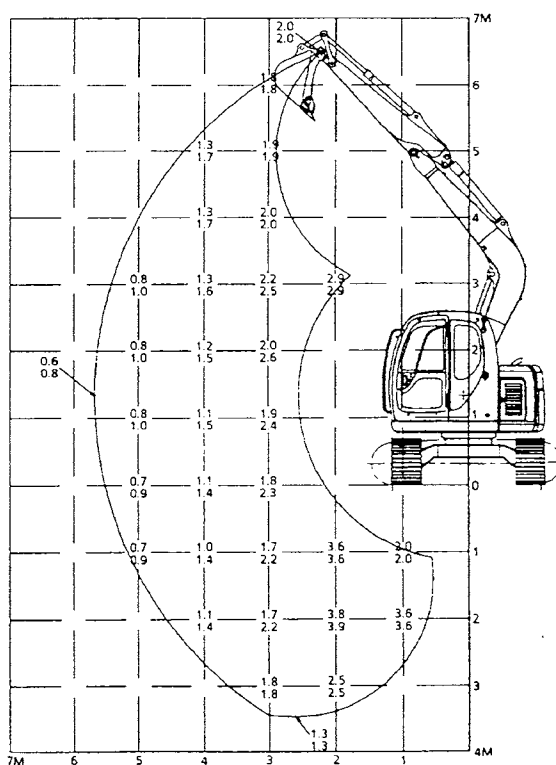
(1)

Unit : TON



(2)

Unit : TON

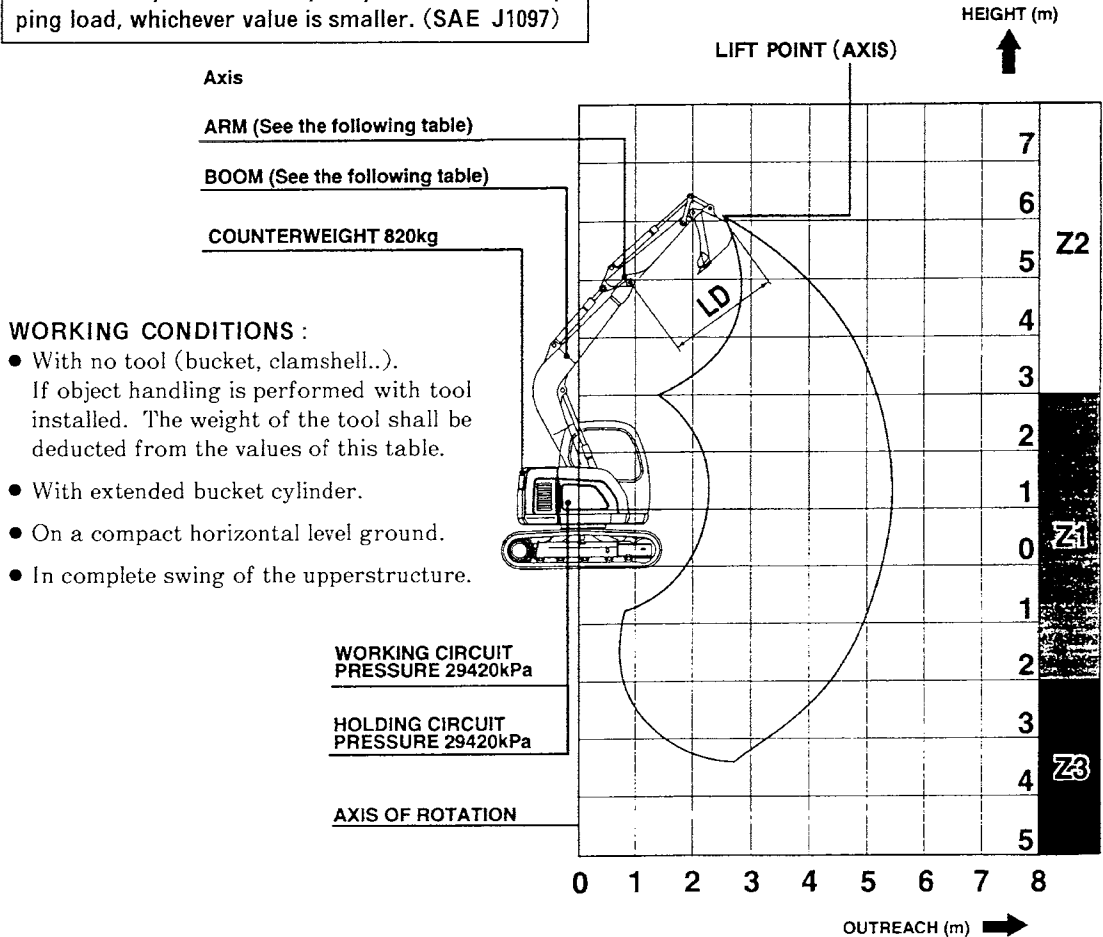


LIFTING DIAGRAM

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD.
SK70SR
SHOE WIDTH 450mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM LENGTH 3.72m

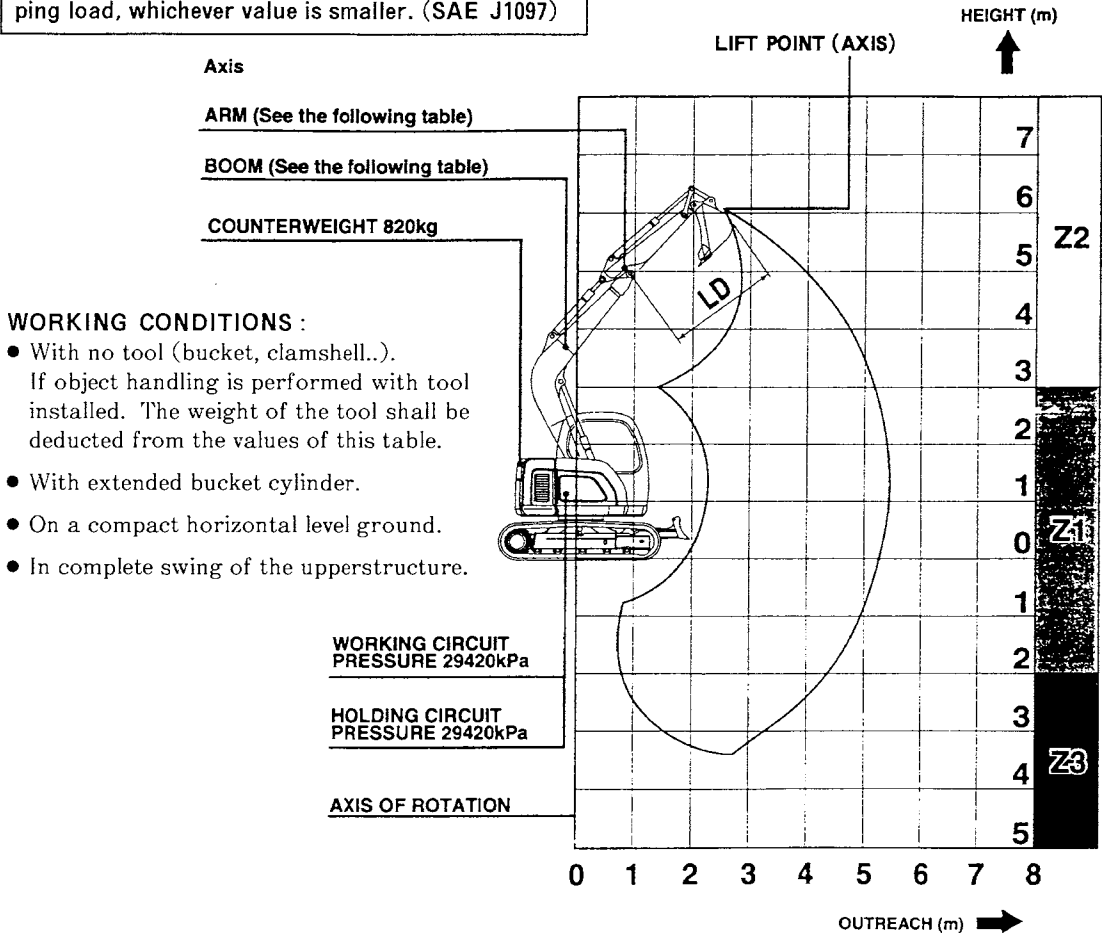
ARM LENGTH (m)	OUTREACH IN METERS					
	LOADS IN kg					(BOOM FOOT HEIGHT)
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH
1.65	LD= 1.99	Z2	1800	900	-	-
		Z1	1700		-	700 (5.42 m)
		Z3	1700		-	-
2.07	LD= 2.40	Z2	2000	900	-	-
		Z1	1700		-	600 (5.83 m)
		Z3	1500		-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD.
SK70SR
SHOE WIDTH 450mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM LENGTH 3.72m

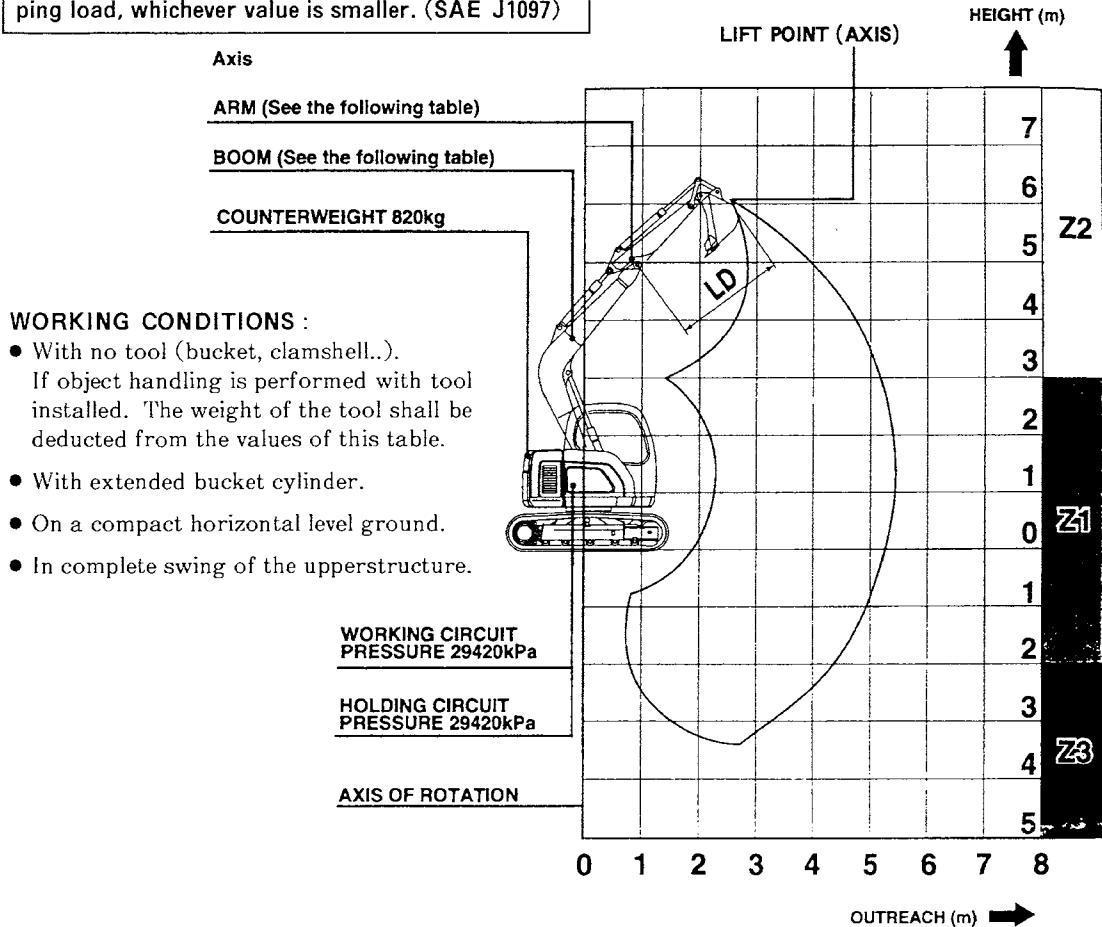
ARM LENGTH (m)	OUTREACH IN METERS					
	LOADS IN kg					(BOOM FOOT HEIGHT)
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH
1.65	LD= 1.99	Z2	1800	1000	—	—
		Z1	1900		—	800 (5.42 m)
		Z3	1700		—	—
2.07	LD= 2.40	Z2	2000	1000	—	—
		Z1	1800		—	700 (5.83 m)
		Z3	1500		—	—

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD.
SK70SR
SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



**THESE LOADS ARE VALID FOR THE HEIGHT OF
THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH**

BOOM LENGTH 3.72m

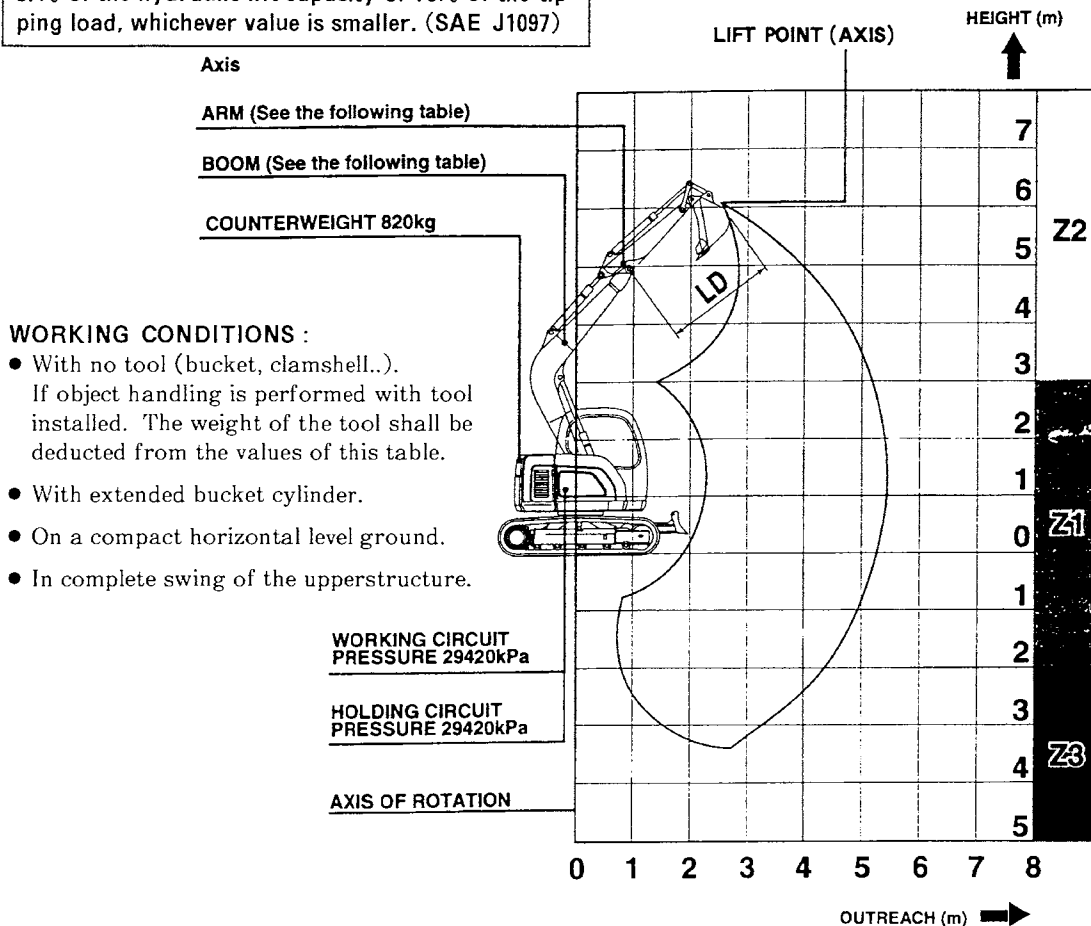
ARM LENGTH (m)	OUTREACH IN METERS					
	LOADS IN kg (BOOM FOOT HEIGHT)					
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH
1.65	LD= 1.99	Z2 1800	900	—	—	—
		Z1 1800		—	—	700 (5.42 m)
		Z3 1700		—	—	—
2.07	LD= 2.40	Z2 2000	900	—	—	—
		Z1 1800		—	—	600 (5.83 m)
		Z3 1500		—	—	—

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD.
SK70SR
SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM LENGTH 3.72m

ARM LENGTH (m)	OUTREACH IN METERS						
	LOADS IN kg						(BOOM FOOT HEIGHT)
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH	
1.65	LD= 1.99	Z2	1800	1000	—	—	—
		Z1	2000		—	—	800 (5.42 m)
		Z3	1700		—	—	—
2.07	LD= 2.40	Z2	2000	1000	—	—	—
		Z1	1900		—	—	700 (5.83 m)
		Z3	1500		—	—	—

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE (EU) OPT

KOBELCO STEEL, LTD

SK70SR

SHOE WIDTH 450mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)

WORKING CONDITIONS :

- With no tool (bucket, clamshell..).
- If object handling is performed with tool installed. The weight of the tool shall be deducted from the values of this table.
- With extended bucket cylinder.
- On a compact horizontal level ground.
- In complete swing of the upperstructure.

WORKING CIRCUIT
PRESSURE 29420 kPa

HOLDING CIRCUIT
PRESSURE 29420 kPa

AXIS OF ROTATION

Axis

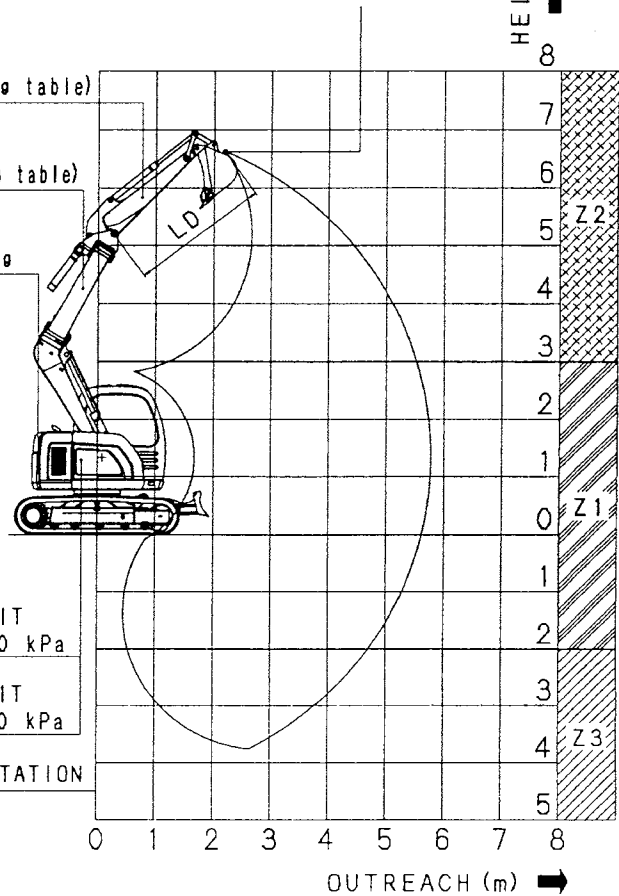
ARM(see the following table)

BOOM(see the following table)

COUNTERWEIGHT 1100kg

LIFT POINT (axis)

HEIGHT (m)



THESE LOADS ARE VALID FOR THE HEIGHT OF
THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 3.87m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(BOOM FOOT HEIGHT) MAX REACH
1.76	LD= 2.10	Z2	2300	890	-	-
		Z1	1710		-	710 (5.50m)
		Z3	1640		-	-
2.06	LD= 2.39	Z2	1870	890	-	-
		Z1	1700		-	660 (5.78m)
		Z3	1790		-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

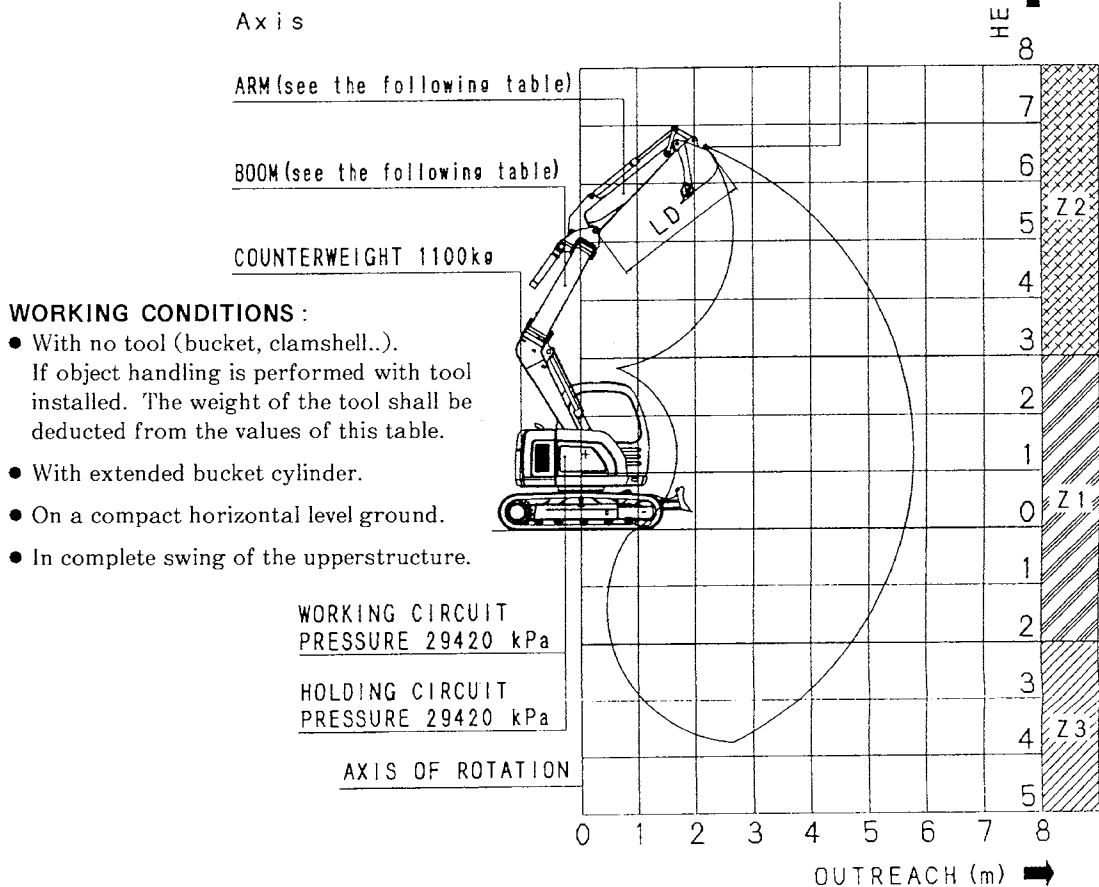
RATED OBJECT HANDLING CAPACITIES TABLE (EU) OPT

KOBELCO STEEL, LTD

SK70SR

SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF
THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 3.87m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(BOOM FOOT HEIGHT) MAX REACH
1.76	LD= 2.10	Z2	2300	940	-	-
		Z1	1790		-	750 (5.50m)
		Z3	1640		-	-
2.06	LD= 2.39	Z2	1870	930	-	-
		Z1	1780		-	700 (5.78m)
		Z3	1870		-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

● LIFTING CAPACITIES (USA)

1. Lifting Capacity Specifications are based on the Standard Machine with 1.65 Arm and 450 mm Shoes.

SK70SR LIFTING CAPACITIES

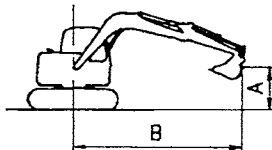
Based on a machine equipped with

Arm 5'-5" (1650 mm)

Bucket SAE heaped 0.37 cu yd (0.28 m³) Bucket

Shoe 17.7" (450 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20'	lb			* 4500	* 4500						
(6.1 m)	kg			* 2000	* 2000						
15'	lb	* 9300	* 9300	* 5500	4800	2900	2300				
(4.6 m)	kg	* 4200	* 4200	* 2500	2100	1300	1000				
10'	lb			5300	4200	2700	2200				
(3.0 m)	kg			2400	1900	1200	900				
5'	lb			4900	3800	2600	2000				
(1.5 m)	kg			2200	1700	1100	900				
GROUND	lb	* 9300	* 9300	4800	3800	2500	2000				
LEVEL	kg	* 4200	* 4200	2200	1700	1100	900				
- 5'	lb	* 5400	* 5400	* 3600	* 3600						
(- 1.5 m)	kg	* 2400	* 2400	* 1600	* 1600						
-10'	lb										
(- 3.0m)	kg										



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

2. Lifting Capacity Specifications are based on the Standard Machine with 1.65 Arm and 600 mm Shoes.

SK70SR LIFTING CAPACITIES

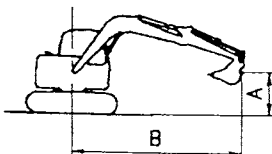
Based on a machine equipped with

Arm 5'-5" (1650 mm)

Bucket SAE heaped 0.37 cu yd (0.28 m³) Bucket

Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20'	lb			* 4500	* 4500						
(6.1 m)	kg			* 2000	* 2000						
15'	lb	* 9300	* 9300	* 5500	5000	3000	2400				
(4.6 m)	kg	* 4200	* 4200	* 2500	2200	1300	1100				
10'	lb			5600	4400	2800	2300				
(3.0 m)	kg			2500	2000	1300	1000				
5'	lb			5100	4000	2700	2100				
(1.5 m)	kg			2300	1800	1200	900				
GROUND	lb	* 9300	* 9300	5100	3900	2600	2100				
LEVEL	kg	* 4200	* 4200	2300	1800	1200	900				
- 5'	lb	* 5400	* 5400	* 3600	* 3600						
(- 1.5 m)	kg	* 2400	* 2400	* 1600	* 1600						
-10'	lb										
(- 3.0m)	kg										

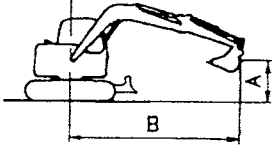


- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

3. Lifting Capacity Specifications are based on the Standard Machine with 1.65 Arm + Dozer Blade and 450 mm Shoes.

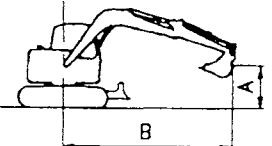
SK70SR LIFTING CAPACITIES											
Based on a machine equipped with											
Arm 5'-5" (1650 mm)											
Bucket SAE heaped 0.37 cu yd (0.28 m³) Bucket											
Shoe 17.7" (450 mm) Triple Grouser Shoe											
A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20' (6.1 m)	lb			* 4500	* 4500						
	kg			* 2000	* 2000						
15' (4.6 m)	lb	* 9300	* 9300	* 5500	5200	2900	2500				
	kg	* 4200	* 4200	* 2500	2300	1300	1100				
10' (3.0 m)	lb			5300	4800	2700	2400				
	kg			2400	2000	1200	1000				
5' (1.5 m)	lb			4900	4200	2500	2200				
	kg			2200	1900	1100	1000				
GROUND LEVEL	lb	* 9300	* 9300	4800	4100	2500	2200				
	kg	* 4200	* 4200	2200	1800	1100	1000				
- 5' (- 1.5 m)	lb	* 5400	* 5400	* 3600	* 3600						
	kg	* 2400	* 2400	* 1600	* 1600						
- 10' (- 3.0 m)	lb										
	kg										



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

4. Lifting Capacity Specifications are based on the Standard Machine with 1.65 Arm + Dozer Blade and 600 mm Shoes.

SK70SR LIFTING CAPACITIES											
Based on a machine equipped with											
Arm 5'-5" (1650 mm)											
Bucket SAE heaped 0.37 cu yd (0.28 m³) Bucket											
Shoe 23.6" (600 mm) Triple Grouser Shoe											
A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20' (6.1 m)	lb			* 4500	* 4500						
	kg			* 2000	* 2000						
15' (4.6 m)	lb	* 9300	* 9300	* 5500	5300	3000	2600				
	kg	* 4200	* 4200	* 2500	2400	1300	1200				
10' (3.0 m)	lb			5500	4700	2800	2500				
	kg			2500	2100	1200	1100				
5' (1.5 m)	lb			5100	4400	2600	2300				
	kg			2300	2000	1200	1000				
GROUND LEVEL	lb	* 9300	* 9300	5000	4300	2600	2300				
	kg	* 4200	* 4200	2200	1900	1200	1000				
- 5' (- 1.5 m)	lb	* 5400	* 5400	* 3600	* 3600						
	kg	* 2400	* 2400	* 1600	* 1600						
- 10' (- 3.0 m)	lb										
	kg										



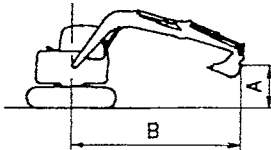
- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

5. Lifting Capacity Specifications are based on the Standard Machine with 2.07m Arm and 450 mm Shoes.

SK70SR LIFTING CAPACITIES

Based on a machine equipped with
 Arm 6'-9" (2070 mm)
 Bucket SAE heaped 0.29 cu yd (0.22 m³) Bucket
 Shoe 17.7" (450 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20'	lb			* 3400	* 3400						
(6.1 m)	kg			* 1500	* 1500						
15'	lb					3000	2400				
(4.6 m)	kg					1300	1100				
10'	lb			* 4900	* 4900	2900	2400				
(3.0 m)	kg			* 2200	* 2200	1300	1000				
5'	lb			5400	4300	2700	2200				
(1.5 m)	kg			2400	1900	1200	1000				
GROUND	lb			4900	3800	2500	2000				
LEVEL	kg			2200	1700	1100	900				
- 5'	lb	* 8000	* 8000	4600	3700	2400	1900				
(- 1.5 m)	kg	* 3600	* 3600	2100	1600	1100	800				
- 10'	lb	* 7700	* 7700	* 4800	3800						
(- 3.0 m)	kg	* 3500	* 3500	* 2100	1700						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

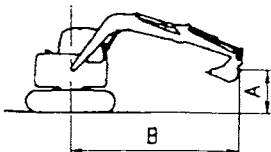
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

6. Lifting Capacity Specifications are based on the Standard Machine with 2.07m Arm and 600 mm Shoes.

SK70SR LIFTING CAPACITIES

Based on a machine equipped with
 Arm 6'-9" (2070 mm)
 Bucket SAE heaped 0.29 cu yd (0.22 m³) Bucket
 Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20'	lb			* 3400	* 3400						
(6.1 m)	kg			* 1500	* 1500						
15'	lb					* 3100	2500				
(4.6 m)	kg					* 1400	1100				
10'	lb			* 4900	* 4900	3000	2500				
(3.0 m)	kg			* 2200	* 2200	1400	1100				
5'	lb			5600	4500	2800	2300				
(1.5 m)	kg			2500	2000	1300	1000				
GROUND	lb			5100	4000	2600	2100				
LEVEL	kg			2300	1800	1200	900				
- 5'	lb	* 8000	* 8000	5000	3800	2600	2000				
(- 1.5 m)	kg	* 3600	* 3600	2200	1700	1100	900				
- 10'	lb	* 7700	* 7700	* 4800	4000						
(- 3.0 m)	kg	* 3500	* 3500	* 2100	1800						

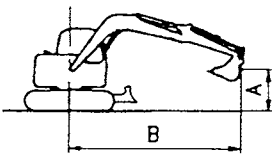


- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

7. Lifting Capacity Specifications are based on the Standard Machine with 2.07m Arm + Dozer Blade and 450 mm Shoes.

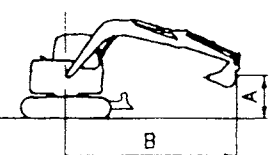
SK70SR LIFTING CAPACITIES											
Based on a machine equipped with											
Arm 6'-9" (2070 mm)											
Bucket SAE heaped 0.29 cu yd (0.22 m³) Bucket											
Shoe 17.7" (450 mm) Triple Grouser Shoe											
A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20' (6.1 m)	lb			* 3400	* 3400						
	kg			* 1500	* 1500						
15' (4.6 m)	lb					3000	2600				
	kg					1300	1200				
10' (3.0 m)	lb			* 4900	* 4900	2900	2600				
	kg			* 2200	* 2200	1300	1100				
5' (1.5 m)	lb			5400	4700	2700	2400				
	kg			2400	2100	1200	1000				
GROUND LEVEL	lb			4900	4200	2500	2200				
	kg			2200	1900	1100	1000				
- 5' (- 1.5 m)	lb	* 8000	* 8000	4700	4000	2400	2100				
	kg	* 3600	* 3600	2100	1800	1100	900				
-10' (-3.0m)	lb	* 7700	* 7700	* 4800	4100						
	kg	* 3500	* 3500	* 2100	1800						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

8. Lifting Capacity Specifications are based on the Standard Machine with 2.07m Arm + Dozer Blade and 600 mm Shoes.

SK70SR LIFTING CAPACITIES											
Based on a machine equipped with											
Arm 6'-9" (2070 mm)											
Bucket SAE heaped 0.29 cu yd (0.22 m³) Bucket											
Shoe 23.6" (600 mm) Triple Grouser Shoe											
A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)					
20' (6.1 m)	lb			* 3400	* 3400						
	kg			* 1500	* 1500						
15' (4.6 m)	lb					3100	2700				
	kg					1400	1200				
10' (3.0 m)	lb			* 4900	* 4900	3000	2700				
	kg			* 2200	* 2200	1300	1200				
5' (1.5 m)	lb			5600	4800	2800	2500				
	kg			2500	2200	1200	1100				
GROUND LEVEL	lb			5100	4300	2600	2300				
	kg			2300	1900	1200	1000				
- 5' (- 1.5 m)	lb	* 8000	* 8000	4900	4200	2500	2200				
	kg	* 3600	* 3600	2200	1900	1100	1000				
-10' (-3.0m)	lb	* 7700	* 7700	* 4800	4300						
	kg	* 3500	* 3500	* 2100	1900						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBE STEEL, LTD.

SK115SR**● LIFTING CAPACITIES (GENERAL EXPORT)****(1) Conditions of calculation**

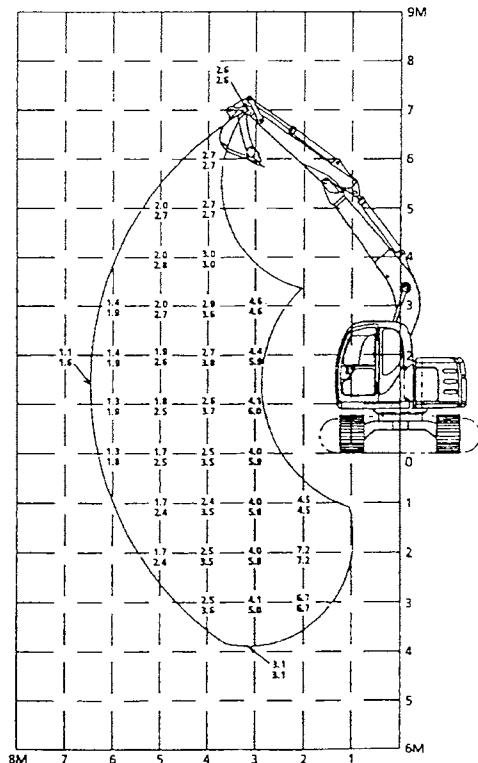
- 1) The lifting load shows the lower value either 87% of hydraulic lifting capacity or 75% of tipping load.
- 2) The load point is on the bucket supporting point, and the bucket position is a closed position.
- 3) The values in the upper rows show the lifting capacity of a machine facing sideways, and values in the lower rows show a machine facing longitudinally.
- 4) Unit : ton Crawler : 500mm (20in), iron crawler
- 5) Set hydraulic pressure 330 kgf/cm² (4,694 psi)

(2) Reference No. list of lifting diagram

Arm Bucket W or W/O	2.20m (7'3") STD Arm		2.70m (8'10") Long Arm		1.90m (6'3") Short Arm	
	0.45m ³ (0.59cuyd) Bucket W	W/O	0.37m ³ (0.48cuyd) Bucket W	W/O	0.50m ³ (0.65cuyd) Bucket W	W/O
No.	(1)	(2)	(3)	(4)	(5)	(6)

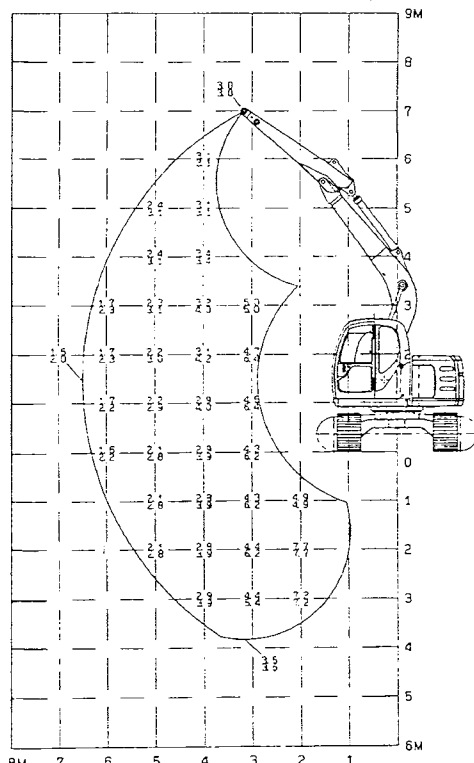
(1)

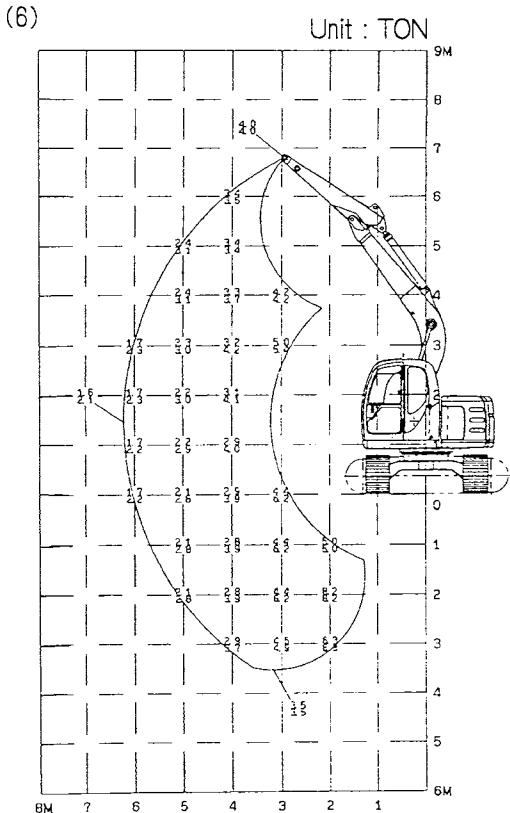
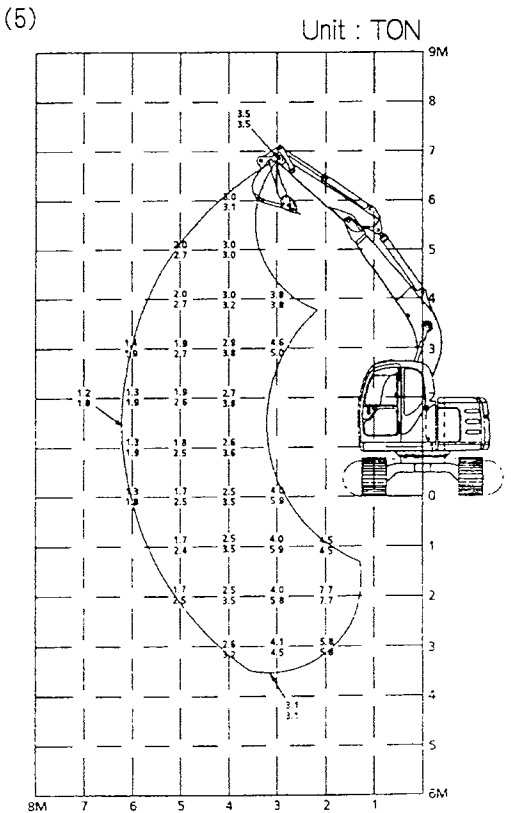
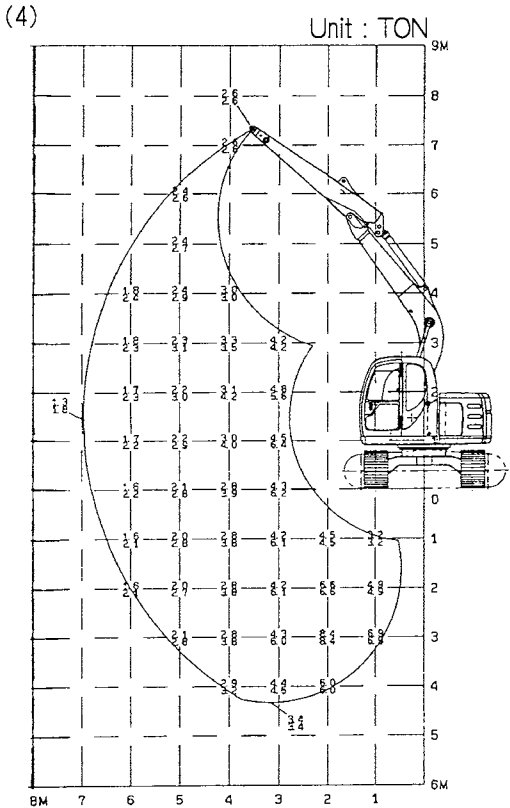
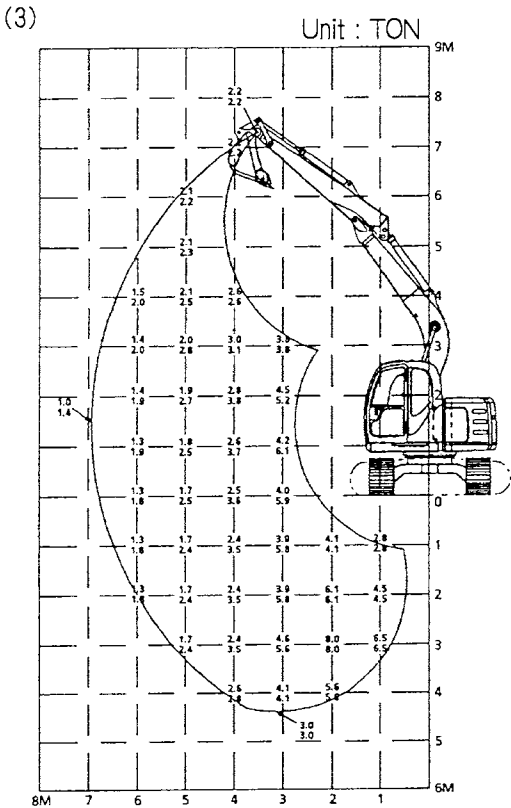
Unit : TON



(2)

Unit : TON





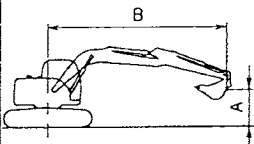
● LIFTING CAPACITIES (AUSTRALIA)

1. Lifting Capacity Specifications are based on the Standard Machine with 2.2m Arm and 500 mm Shoes.

SK11 5SR LIFTING CAPACITIES

Based on machine equipped with
 Arm 2200mm (7' 2") arm
 Bucket 0.45m³ SAE (0.59cu. yd)
 Shoe 500mm (19.7") triple grouser shoe

A \ B		LOAD RADIUS									
		1.5m (4.9')		3.0m (9.8')		4.5m (14.8')		6.0m (19.7')			
(19.7')	lb					* 4900	* 4900				
(6.0m)	kg					* 2200	* 2200				
(14.8')	lb					* 5700	* 5700				
(4.5m)	kg					* 2500	* 2500				
(9.8')	lb			* 9100	* 9100	* 6800	* 5400	4500	3200		
(3.0m)	kg			* 4100	* 4100	* 3100	* 2400	2000	1400		
(4.9')	lb			* 13400	* 9300	* 6900	* 4900	4300	3000		
(1.5m)	kg			* 6000	* 4200	* 3100	* 2200	1900	1300		
GROUND LEVEL	lb			12800	8600	6500	4500	4100	2900		
	kg			5800	3900	2900	2000	1800	1300		
(-4.9')	lb	* 11500	* 11500	12500	8400	6300	4400				
(-1.5m)	kg	* 5200	* 5200	5700	3800	2800	2000				
(-9.8')	lb	* 18700	* 18700	* 11700	8700	6400	4500				
(-3.0m)	kg	* 8400	* 8400	* 5300	3900	2900	2000				



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level, firm and uniform ground. User must make allowance for job conditions such as soft or uneven ground out of level conditions, side loads, sudden stopping of loads, hazardous conditions, experience of personnel, etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance Instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL LTD.

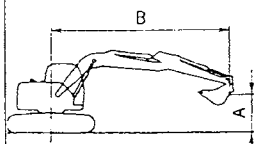
● LIFTING CAPACITIES (NEWZEALAND)

1. Lifting Capacity Specifications are based on the Standard Machine with 2.2m Arm and 600 mm Shoes.

SK11 5SR LIFTING CAPACITIES

Based on machine equipped with
 Arm 2200mm (7' 2") arm
 Bucket 0.45m³ SAE (0.59cu. yd)
 Shoe 600mm (23.6") triple grouser shoe

A \ B		LOAD RADIUS									
		1.5m (4.9')		3.0m (9.8')		4.5m (14.8')		6.0m (19.7')			
(19.7')	lb					* 4900	* 4900				
(6.0m)	kg					* 2200	* 2200				
(14.8')	lb					* 5700	* 5700				
(4.5m)	kg					* 2500	* 2500				
(9.8')	lb			* 9100	* 9100	* 6800	* 5500	4500	3300		
(3.0m)	kg			* 4100	* 4100	* 3100	* 2500	2000	1500		
(4.9')	lb			* 13400	* 9500	* 7000	* 5000	4300	3100		
(1.5m)	kg			* 6000	* 4300	* 3100	* 2200	1900	1400		
GROUND LEVEL	lb			13000	8700	6600	4600	4200	2900		
	kg			5900	3900	3000	2100	1900	1300		
(-4.9')	lb	* 11500	* 11500	12800	8600	6400	4500				
(-1.5m)	kg	* 5200	* 5200	5800	3900	2900	2000				
(-9.8')	lb	* 18700	* 18700	* 11700	8800	6500	4600				
(-3.0m)	kg	* 8400	* 8400	* 5300	4000	2900	2000				



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level, firm and uniform ground. User must make allowance for job conditions such as soft or uneven ground out of level conditions, side loads, sudden stopping of loads, hazardous conditions, experience of personnel, etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance Instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL LTD.

SK115SRdz • SK135SR(LC)

● LIFTING CAPACITIES (GENERAL EXPORT)

(1) Conditions of calculation

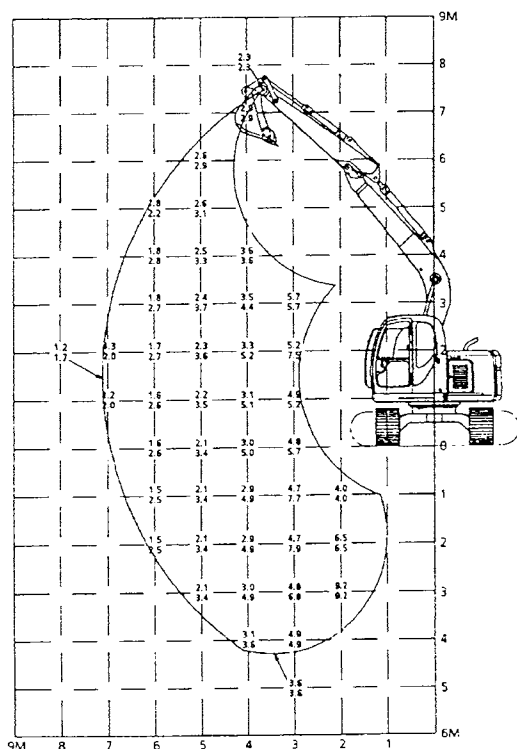
- 1) The lifting load shows the lower value either 87% of hydraulic lifting capacity or 75% of tipping load.
- 2) The load point is on the bucket supporting point, and the bucket position is a closed position.
- 3) The values in the upper rows show the lifting capacity of a machine facing sideways, and values in the lower rows show a machine facing longitudinally.
- 4) Unit : ton Crawler : 500mm (20in), iron crawler
- 5) Set hydraulic pressure 350kgf/cm² (4,978psi)

(2) Reference No. list of lifting diagram

Arm		2.45m (8'0") Arm		2.95m (9'8") Arm	
Bucket	W or W/O	0.50m ³ (0.65cuyd) Bucket W	W/O	0.38m ³ (0.50cuyd)	W/O
	No.	(1)	(2)	(3)	(4)

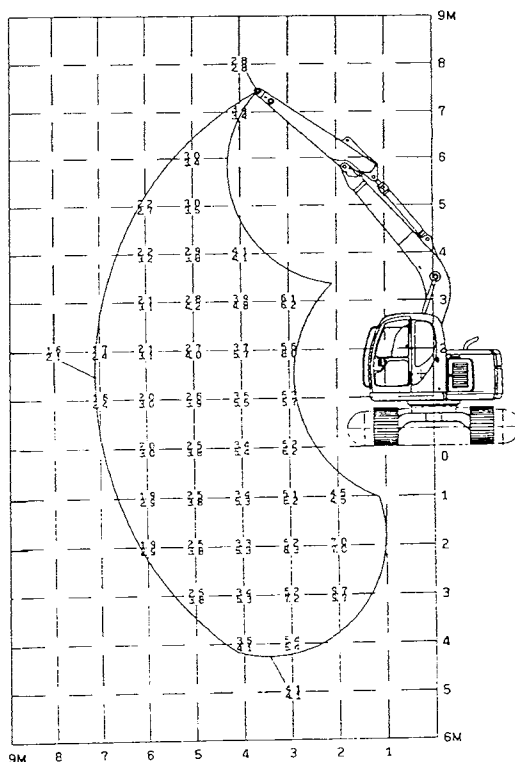
(1)

Unit : TON



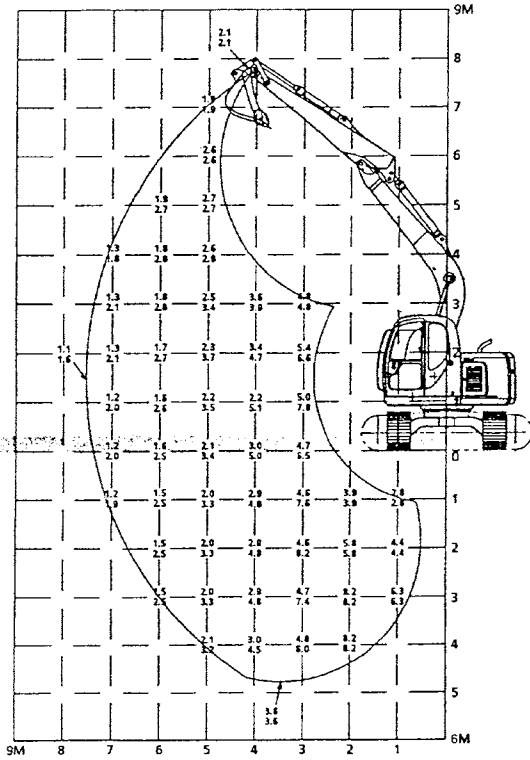
(2)

Unit : TON



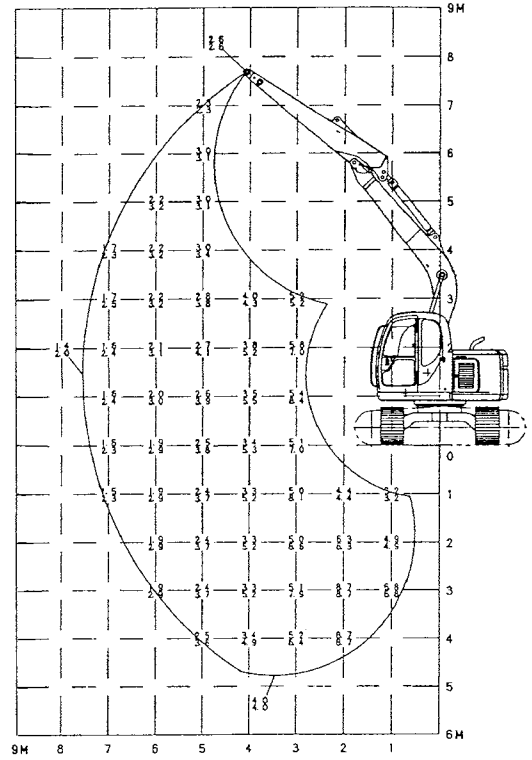
(3)

Unit : TON



(4)

Unit : TON



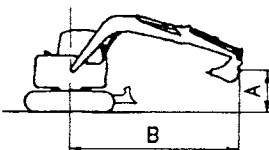
● LIFTING CAPACITIES

1. Lifting Capacity Specifications are based on the Standard Machine with 2.45m Arm + Dozer Blade and 600 mm Shoes.

SK115SRDZ LIFTING CAPACITIES

Based on machine equipped with
 Arm 8'-0" (2450 mm)
 Bucket SAE heaped 0.65 cu yd (0.50 m³) Bucket
 Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb					* 6300	* 6300				
	kg					* 2800	* 2800				
15' (4.6 m)	lb					* 6700	* 6700	* 5300	4400		
	kg					* 3000	* 3000	* 2400	1900		
10' (3.0 m)	lb			* 11200	* 11200	* 8200	6900	6800	4200		
	kg			* 5100	* 5100	* 3700	3100	3000	1900		
5' (1.5 m)	lb			* 16600	11800	* 10200	6300	6500	3900		
	kg			* 7500	5300	* 4600	2800	2900	1800		
GROUND LEVEL	lb			* 17000	10900	9800	5800	6300	3700		
	kg			* 7700	4900	4400	2600	2800	1700		
- 5' (- 1.5 m)	lb	* 11300	* 11300	* 18000	10800	9600	5700	6200	3600		
	kg	* 5100	* 5100	* 8100	4800	4300	2500	2800	1600		
-10' (- 3.0 m)	lb	* 18300	* 18300	* 15100	11000	9700	5700				
	kg	* 8300	* 8300	* 6800	4900	4400	2600				



1. Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
2. Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
3. Ratings at bucket lift hook.

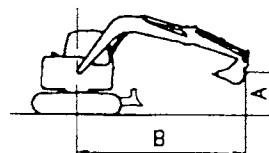
4. The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
6. Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

2. Lifting Capacity Specifications are based on the Standard Machine with 2.45m Arm + Dozer Blade and 700 mm Shoes.

SK115SRDZ LIFTING CAPACITIES

Based on machine equipped with
 Arm 8'-0" (2450 mm)
 Bucket SAE heaped 0.65 cu yd (0.50 m³) Bucket
 Shoe 27.6" (700 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb					* 6300	* 6300				
	kg					* 2800	* 2800				
15' (4.6 m)	lb					* 6700	* 6700	* 5300	4400		
	kg					* 3000	* 3000	* 2400	2000		
10' (3.0 m)	lb			* 11200	* 11200	* 8200	7000	6900	4300		
	kg			* 5100	* 5100	* 3700	3100	3100	1900		
5' (1.5 m)	lb			* 16600	11900	* 10200	6400	6600	4000		
	kg			* 7500	5400	* 4600	2900	3000	1800		
GROUND LEVEL	lb			* 17000	11100	10000	5900	6400	3800		
	kg			* 7700	5000	4500	2700	2900	1700		
- 5' (- 1.5 m)	lb	* 11300	* 11300	* 18000	10900	9800	5800	6300	3700		
	kg	* 5100	* 5100	* 8100	4900	4400	2600	2800	1700		
-10' (- 3.0 m)	lb	* 18300	* 18300	* 15100	11100	9900	5800				
	kg	* 8300	* 8300	* 6800	5000	4500	2600				



1. Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
2. Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
3. Ratings at bucket lift hook.

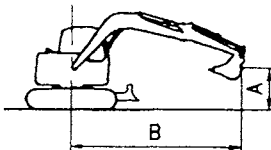
4. The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
5. Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
6. Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

3. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm + Dozer Blade and 600 mm Shoes.

SK115SRDZ LIFTING CAPACITIES

Based on machine equipped with
 Arm 9'-8" (2950 mm)
 Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket
 Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb							* 5800	4500		
	kg							* 2600	2000		
15' (4.6 m)	lb					* 7300	7000	* 6400	4300		
	kg					* 3300	3200	* 2900	1900		
10' (3.0 m)	lb			* 14900	12100	* 9400	6400	6500	4000		
	kg			* 6700	5500	* 4200	2900	2900	1800		
5' (1.5 m)	lb			* 18200	10900	9800	5800	6200	3700		
	kg			* 8200	4900	4400	2600	2800	1700		
GROUND LEVEL	lb	* 10200	* 10200	* 18300	10600	9500	5600	6100	3600		
	kg	* 4600	* 4600	* 8300	4800	4300	2500	2700	1600		
- 5' (- 1.5 m)	lb	* 15900	* 15900	* 16300	10700	9500	5500				
	kg	* 7200	* 7200	* 7400	4800	4300	2500				
-10' (- 3.0 m)	lb			* 11400	11100						
	kg			* 5100	5000						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

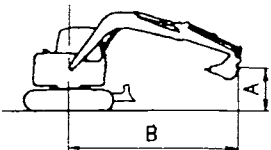
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

4. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm + Dozer Blade and 700 mm Shoes.

SK115SRDZ LIFTING CAPACITIES

Based on machine equipped with
 Arm 9'-8" (2950 mm)
 Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket
 Shoe 27.6" (700 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb							* 5800	4500		
	kg							* 2600	2000		
15' (4.6 m)	lb					* 7300	7100	* 6400	4300		
	kg					* 3300	3200	* 2900	1900		
10' (3.0 m)	lb			* 14900	12300	* 9400	6500	6600	4000		
	kg			* 6700	5600	* 4200	2900	3000	1800		
5' (1.5 m)	lb			* 18200	11100	10000	5900	6400	3800		
	kg			* 8200	5000	4500	2700	2900	1700		
GROUND LEVEL	lb	* 10200	* 10200	* 18300	10800	9700	5700	6200	3600		
	kg	* 4600	* 4600	* 8300	4800	4400	2500	2800	1600		
- 5' (- 1.5 m)	lb	* 15900	* 15900	* 16300	10800	9700	5600				
	kg	* 7200	* 7200	* 7400	4900	4400	2500				
-10' (- 3.0 m)	lb			* 11400	11300						
	kg			* 5100	5100						



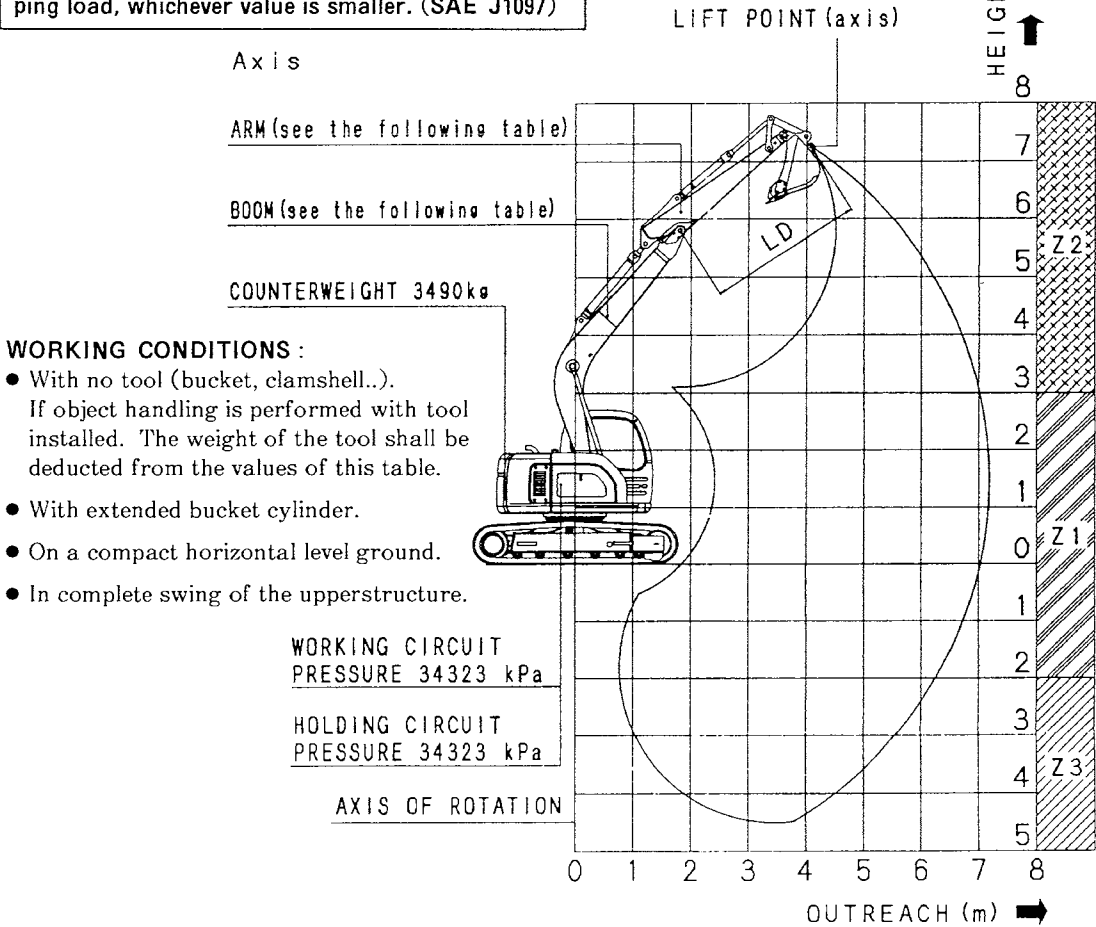
- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD
SK135SR
SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(BOOM FOOT HEIGHT) MAX REACH
2.45	LD= 2.70	Z2 5300	2400	1800	-	-
		Z1 4700		1600	-	1200 (7.19m)
		Z3 4800		-	-	-
2.95	LD= 3.19	Z2 -	2400	1600	-	-
		Z1 4600		1500	1100	1100 (7.62m)
		Z3 4700		1500	-	-

LD:BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBELCO STEEL, LTD

SK135SR

SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)

WORKING CONDITIONS:

- With no tool (bucket, clamshell..).
- If object handling is performed with tool installed. The weight of the tool shall be deducted from the values of this table.
- With extended bucket cylinder.
- On a compact horizontal level ground.
- In complete swing of the upperstructure.

WORKING CIRCUIT
PRESSURE 34323 kPa

HOLDING CIRCUIT
PRESSURE 34323 kPa

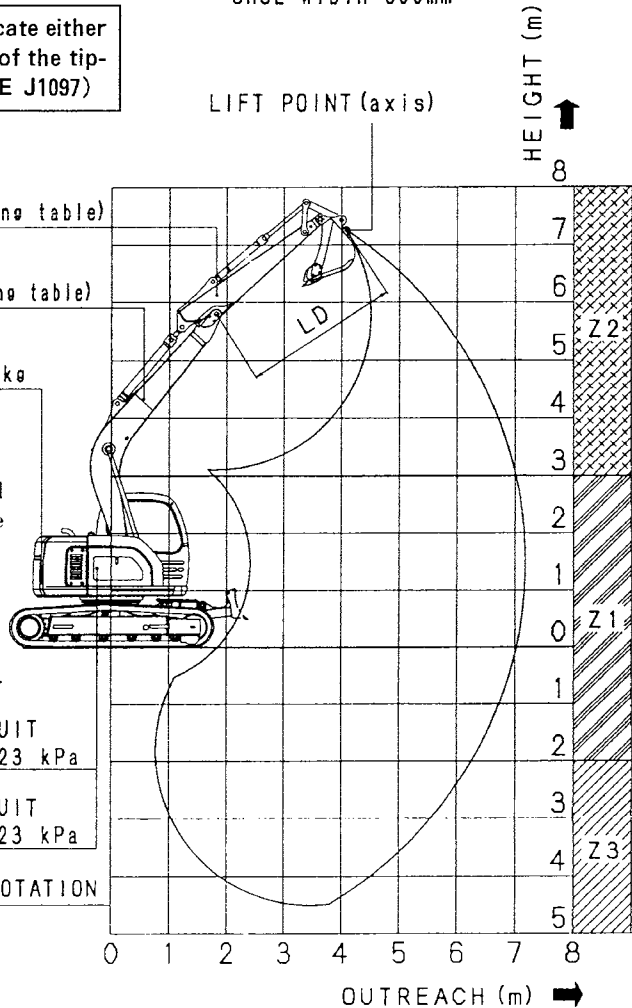
AXIS OF ROTATION

Axis

ARM (see the following table)

BOOM (see the following table)

COUNTERWEIGHT 3490kg



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

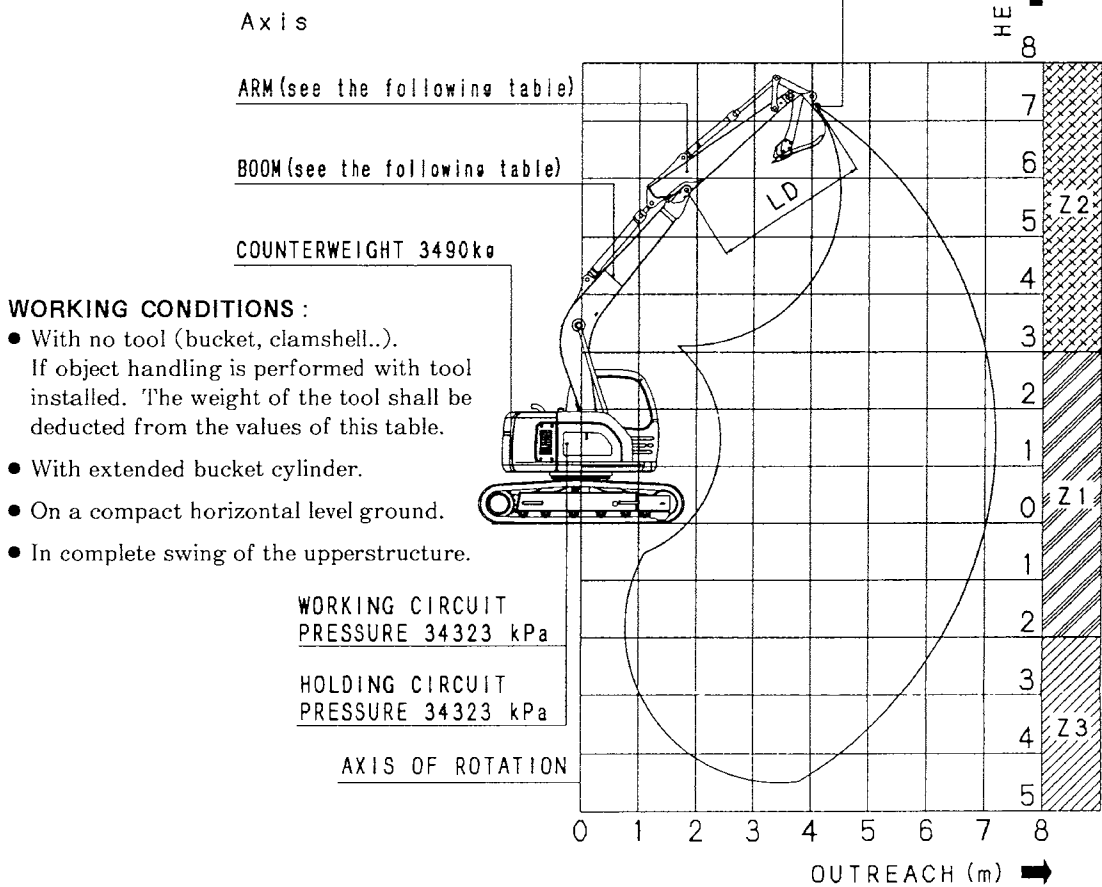
ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(BOOM FOOT HEIGHT) MAX REACH
2.45	LD= 2.70	Z2	5300	2600	2000	-
		Z1	5000		1700	-
		Z3	5100		-	-
2.95	LD= 3.19	Z2	-	2600	1600	-
		Z1	5000		1700	1200 (7.62m)
		Z3	5000		1700	-

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD
SK135SR
SHOE WIDTH 700mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg (BOOM FOOT HEIGHT)					
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH
2.45	LD= 2.70	Z2	5300	1900	-	-
		Z1	4800	1600	-	1300 (7.19m)
		Z3	4800	-	-	-
2.95	LD= 3.19	Z2	-	1600	-	-
		Z1	4700	1600	1100	1100 (7.62m)
		Z3	4700	1600	-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBELCO STEEL, LTD

SK135SR

SHOE WIDTH 700mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)

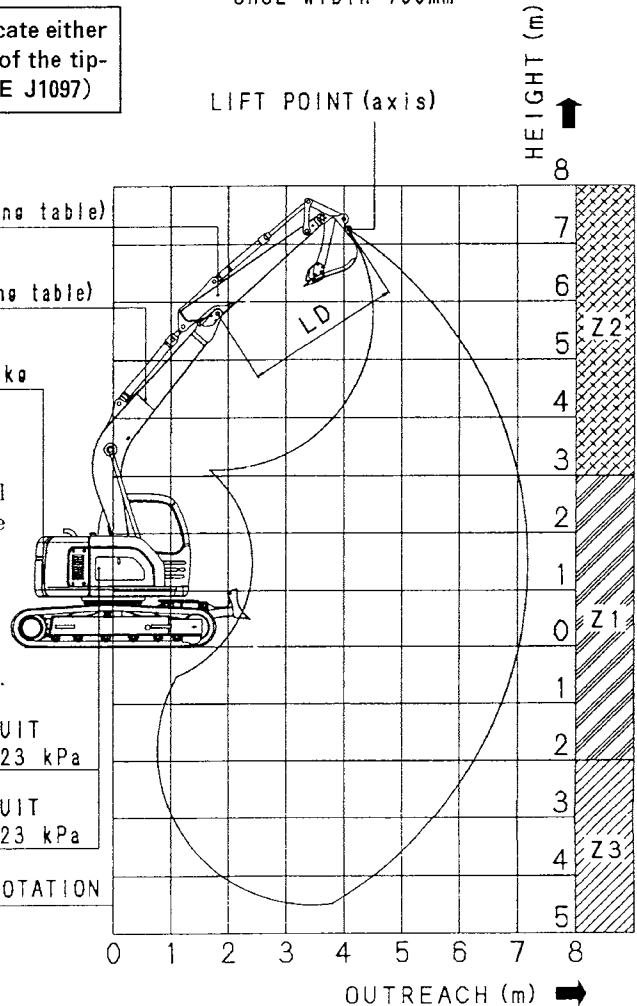
WORKING CONDITIONS :

- With no tool (bucket, clamshell..).
- If object handling is performed with tool installed. The weight of the tool shall be deducted from the values of this table.
- With extended bucket cylinder.
- On a compact horizontal level ground.
- In complete swing of the upperstructure.

WORKING CIRCUIT
PRESSURE 34323 kPa

HOLDING CIRCUIT
PRESSURE 34323 kPa

AXIS OF ROTATION



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(BOOM FOOT HEIGHT) MAX REACH
2.45	LD= 2.70	Z2	5300	2600	2000	-
		Z1	5100		1700	-
		Z3	5200		-	-
2.95	LD= 3.19	Z2	-	2600	1600	-
		Z1	5000		1700	1200 (7.62m)
		Z3	5100		1700	-

LD: BOOM POINT TO HOOK POINT DISTANCE

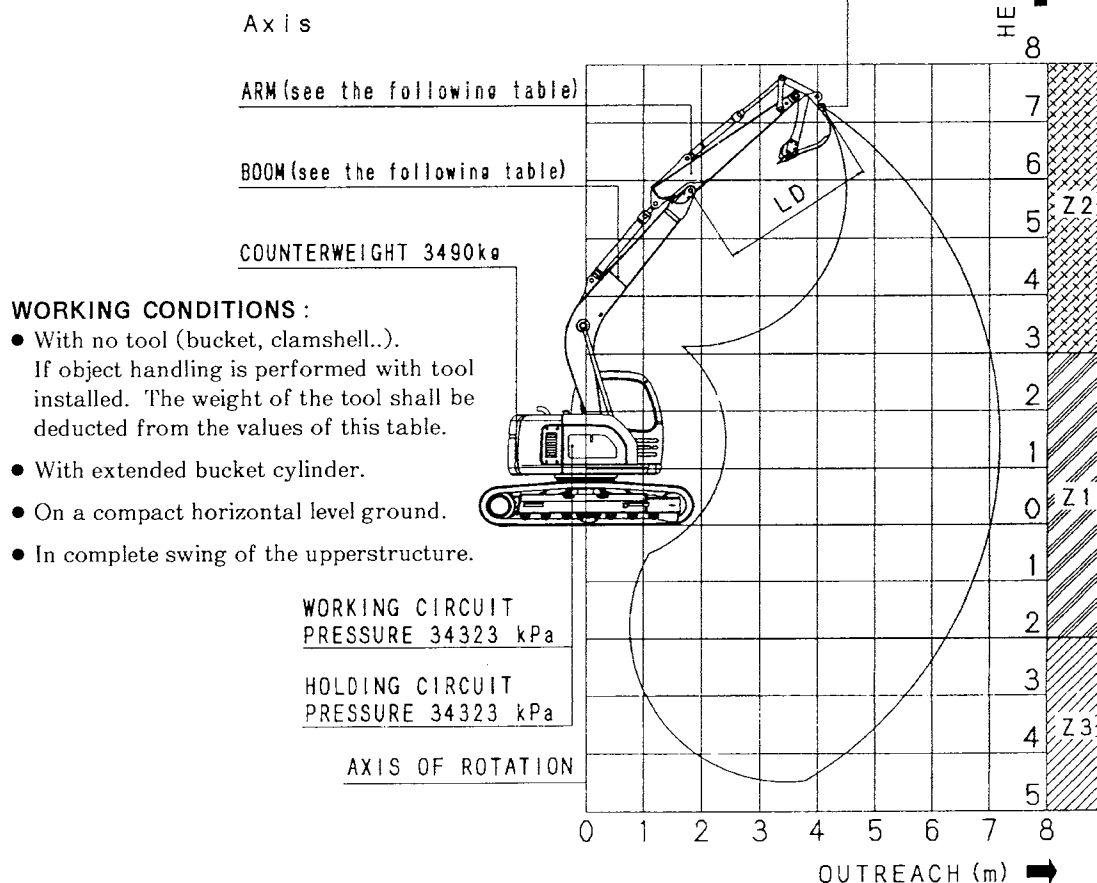
RATED OBJECT HANDLING CAPACITIES TABLE

KOBELCO STEEL, LTD

SK135SRLC

SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH (BOOM FOOT HEIGHT)
2.45	LD=2.70	Z2	5300	2500	1900	-
		Z1	4800		1600	-
		Z3	4900		-	-
2.95	LD=3.19	Z2	-	2500	1700	-
		Z1	4700		1600	1100 (7.62m)
		Z3	4800		1600	-

LD: BOOM POINT TO HOOK POINT DISTANCE

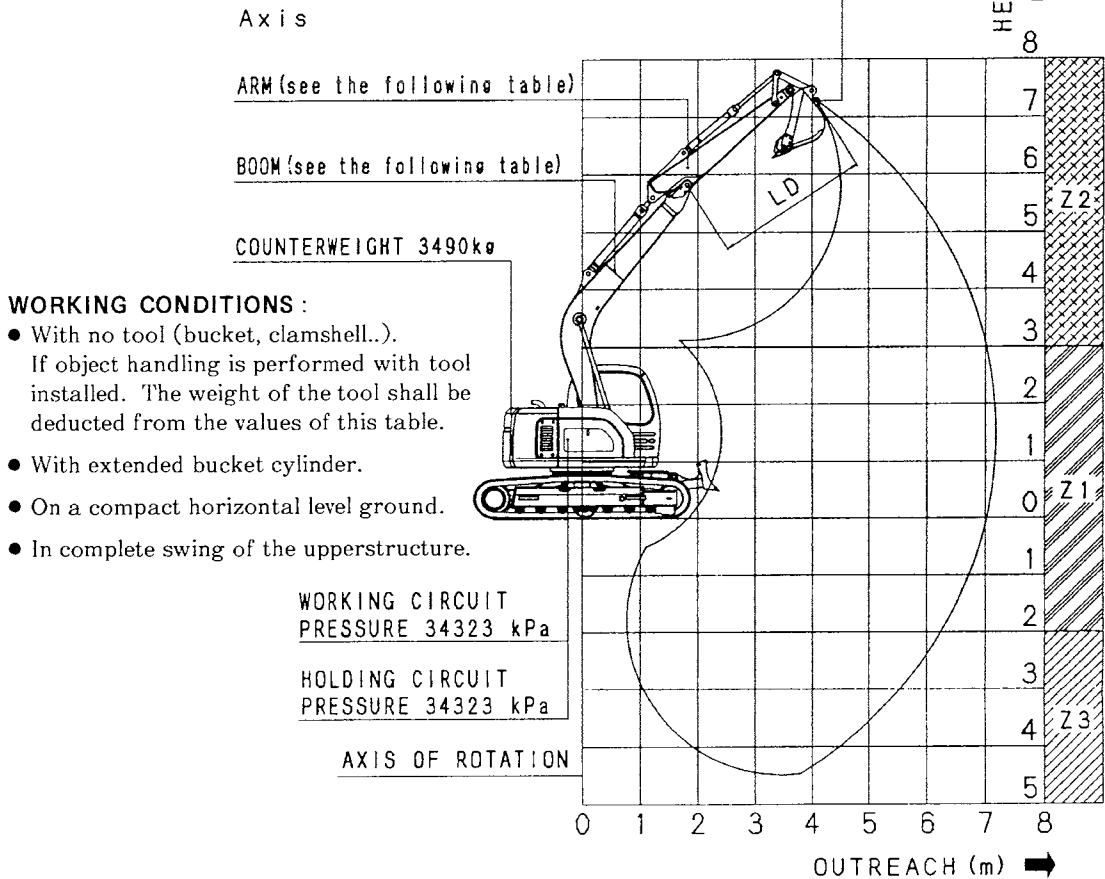
RATED OBJECT HANDLING CAPACITIES TABLE

KOBELCO STEEL, LTD

SK135SRLC

SHOE WIDTH 600mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

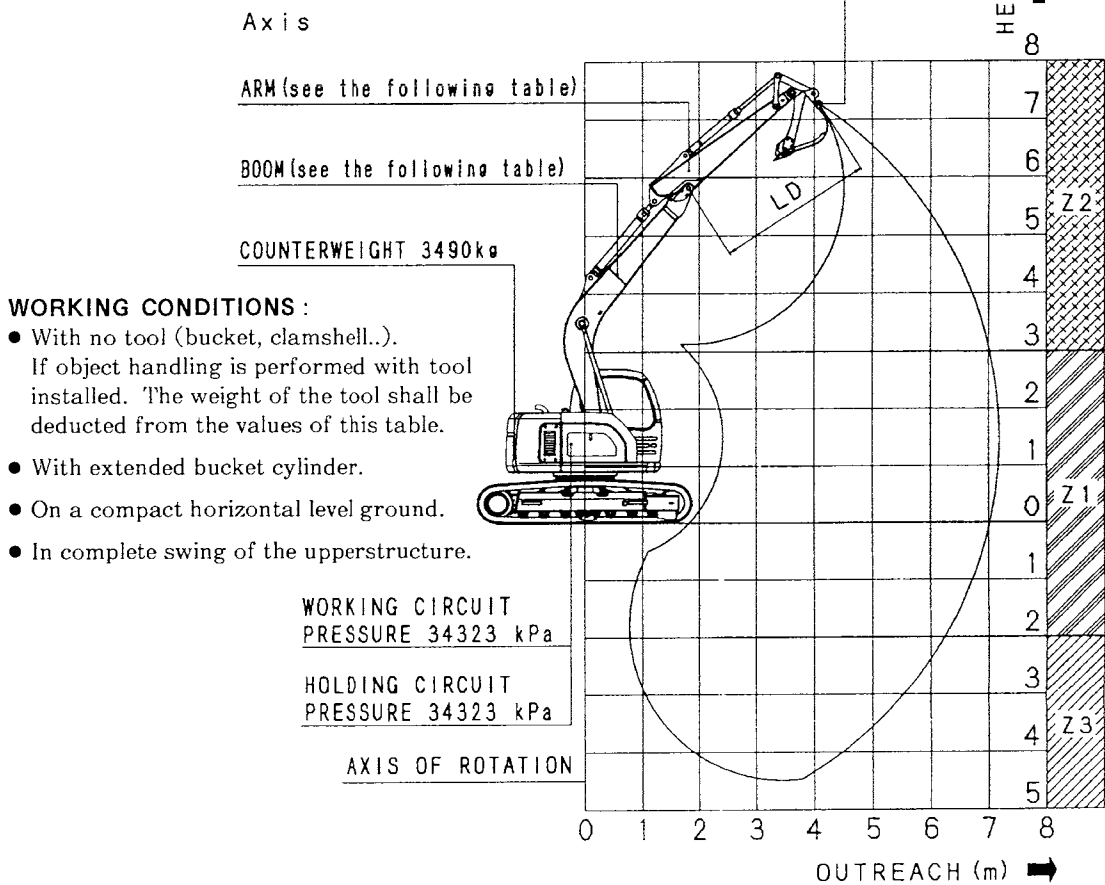
ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg					
	OUTREACH (m)	3	4.5	6	7.5	(800M FOOT HEIGHT) MAX REACH
2.45	LD= 2.70	Z2	5300	2600	2000	-
		Z1	5100		1700	1400 (7.19m)
		Z3	5200		-	-
2.95	LD= 3.19	Z2	-	2600	1700	-
		Z1	5100		1700	1200 (7.62m)
		Z3	5100		1700	-

LD: BOOM POINT TO HOOK POINT DISTANCE

RATED OBJECT HANDLING CAPACITIES TABLE

KOBE STEEL, LTD
SK135SRLC
SHOE WIDTH 700mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)	OUTREACH IN m- LOADS IN kg (BOOM FOOT HEIGHT)					
	OUTREACH (m)	3	4.5	6	7.5	MAX REACH
2.45	LD= 2.70	Z2	5300	1900	-	-
		Z1	4900	1600	-	1300 (7.19m)
		Z3	4900	-	-	-
2.95	LD= 3.19	Z2	-	1700	-	-
		Z1	4800	1600	1200	1200 (7.62m)
		Z3	4800	1600	-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

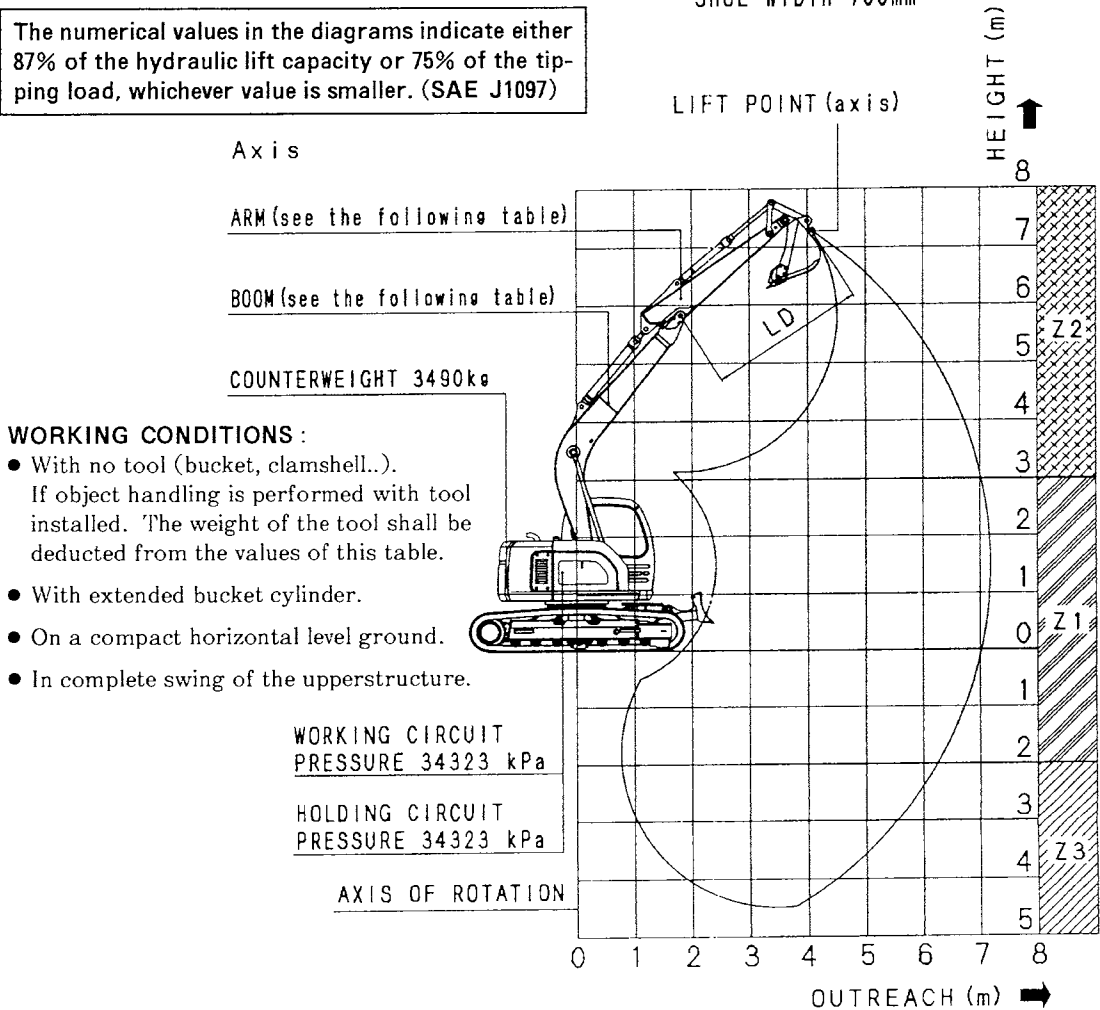
RATED OBJECT HANDLING CAPACITIES TABLE

KOBELCO STEEL, LTD

SK135SRLC

SHOE WIDTH 700mm

The numerical values in the diagrams indicate either 87% of the hydraulic lift capacity or 75% of the tipping load, whichever value is smaller. (SAE J1097)



THESE LOADS ARE VALID FOR THE HEIGHT OF THE CONSIDERED ZONE (Z.) FOR THE INTENDED OUTREACH

BOOM length 4.60m

ARM LENGTH (m)		OUTREACH IN m- LOADS IN kg					(BOOM FOOT HEIGHT)
		OUTREACH (m)	3	4.5	6	7.5	
2.45	LD=2.70	Z2	5300		2000	-	-
		Z1	5200	2600	1800	-	1400 (7.19m)
		Z3	5300		-	-	-
2.95	LD=3.19	Z2	-		1700	-	-
		Z1	5200	2700	1700	1300	1300 (7.62m)
		Z3	5200		1700	-	-

LD: BOOM POINT TO HOOK POINT DISTANCE

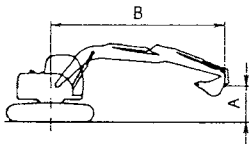
● LIFTING CAPACITIES (KAI)

1. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm and 600 mm Shoes.

SK135SRLC LIFTING CAPACITIES

Based on machine equipped with
 Arm 9'-8" (2950 mm)
 Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket
 Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb							* 5900	4300		
	kg							* 2600	1900		
15' (4.6 m)	lb					* 7400	6800	* 6500	4100		
	kg					* 3300	3100	* 2900	1900		
10' (3.0 m)	lb			* 15100	11800	* 9500	6200	6400	3900		
	kg			* 6800	5300	* 4300	2800	2900	1700		
5' (1.5 m)	lb			* 18300	10600	9800	5700	6200	3600		
	kg			* 8300	4800	4400	2500	2800	1600		
GROUND LEVEL	lb	* 10300	* 10300	* 18500	10200	9500	5400	6000	3500		
	kg	* 4600	* 4600	* 8400	4600	4300	2400	2700	1500		
- 5' (- 1.5 m)	lb	* 16100	* 16100	* 16400	10300	9400	5400				
	kg	* 7300	* 7300	* 7400	4700	4300	2400				
- 10' (- 3.0 m)	lb			* 11400	10800						
	kg			* 5100	4900						



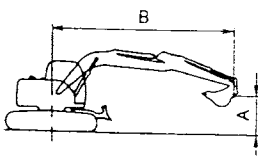
- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

2. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm and 600 mm Shoes.

SK135SRLC LIFTING CAPACITIES

Based on machine equipped with
 Arm 9'-8" (2950 mm)
 Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket
 Shoe 23.6" (600 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
20' (6.1 m)	lb							* 5900	4600		
	kg							* 2600	2100		
15' (4.6 m)	lb					* 7400	7200	* 6500	4400		
	kg					* 3300	3200	* 2900	2000		
10' (3.0 m)	lb			* 15100	12400	* 9500	6600	6800	4100		
	kg			* 6800	5600	* 4300	3000	3100	1900		
5' (1.5 m)	lb			* 18300	11300	10400	6100	6600	3900		
	kg			* 8300	5100	4700	2700	2900	1700		
GROUND LEVEL	lb	* 10300	* 10300	* 18500	10900	10100	5800	6400	3700		
	kg	* 4600	* 4600	* 8400	4900	4500	2600	2900	1700		
- 5' (- 1.5 m)	lb	* 16100	* 16100	* 16400	11000	10100	5800				
	kg	* 7300	* 7300	* 7400	5000	4500	2600				
- 10' (- 3.0 m)	lb			* 11400	* 11400						
	kg			* 5100	* 5100						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.
- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

3. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm and 700 mm Shoes.

SK135SRLC LIFTING CAPACITIES

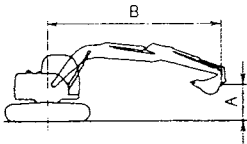
Based on machine equipped with

Arm 9'-8" (2950 mm)

Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket

Shoe 27.6" (700 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
											
20' (6.1 m)	lb							* 5900	4400		
	kg							* 2600	2000		
15' (4.6 m)	lb					* 7400	6900	* 6500	4200		
	kg					* 3300	3100	* 2900	1900		
10' (3.0 m)	lb			* 15100	11900	* 9500	6300	6500	3900		
	kg			* 6800	5400	* 4300	2800	2900	1800		
5' (1.5 m)	lb			* 18300	10800	9900	5800	6300	3700		
	kg			* 8300	4900	4500	2600	2800	1600		
GROUND LEVEL	lb	* 10300	* 10300	* 18500	10400	9600	5500	6100	3500		
	kg	* 4600	* 4600	* 8400	4700	4300	2500	2700	1600		
- 5' (-1.5 m)	lb	* 16100	* 16100	* 16400	10500	9600	5500				
	kg	* 7300	* 7300	* 7400	4700	4300	2500				
-10' (-3.0 m)	lb			* 11400	11100						
	kg			* 5100	5000						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

4. Lifting Capacity Specifications are based on the Standard Machine with 2.95m Arm and 700 mm Shoes.

SK135SRLC LIFTING CAPACITIES

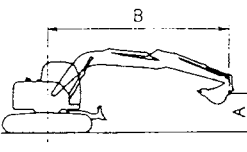
Based on machine equipped with

Arm 9'-8" (2950 mm)

Bucket SAE heaped 0.50 cu yd (0.38 m³) Bucket

Shoe 27.6" (700 mm) Triple Grouser Shoe

A \ B		LOAD RADIUS									
		5' (1.5 m)		10' (3.0 m)		15' (4.6 m)		20' (6.1 m)		25' (7.6 m)	
											
20' (6.1 m)	lb							* 5900	4700		
	kg							* 2600	2100		
15' (4.6 m)	lb					* 7400	7300	* 6500	4500		
	kg					* 3300	3300	* 2900	2000		
10' (3.0 m)	lb			* 15100	12600	* 9500	6700	6900	4200		
	kg			* 6600	5700	* 4300	3000	3100	1900		
5' (1.5 m)	lb			* 18300	11500	10500	6200	6700	4000		
	kg			* 8300	5200	4800	2800	3000	1800		
GROUND LEVEL	lb	* 10300	* 10300	* 18500	11100	10200	5900	6500	3800		
	kg	* 4600	* 4600	* 8400	5000	4600	2600	2900	1700		
- 5' (-1.5 m)	lb	* 16100	* 16100	* 16400	11200	10200	5900				
	kg	* 7300	* 7300	* 7400	5100	4600	2600				
-10' (-3.0 m)	lb			* 11400	11400						
	kg			* 5100	5100						



- Do not attempt to lift or hold any load that is greater than these rated values at their specified load radius and height. Weight of all accessories must be deducted from the above lifting capacities.
- Lifting capacities are based on machine standing on level firm and uniform ground. User must make allowance for job conditions. Side loads sudden stopping of loads hazardous conditions, experience of personnel etc.
- Ratings at bucket lift hook.

- The above rated loads are in compliance with BS1757:1986. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Rated loads marked with an asterisk (*) are limited by hydraulic capacity rather than tipping load.
- Operator should be fully acquainted with the operator's and Maintenance instructions before operating this machine and rules for safe operation of equipment should be adhered to at all times.
- Capacities apply only to machine as original manufactured and normally equipped by KOBELCO STEEL, LTD.

SK235SR

● LIFTING CAPACITIES (GENERAL EXPORT)

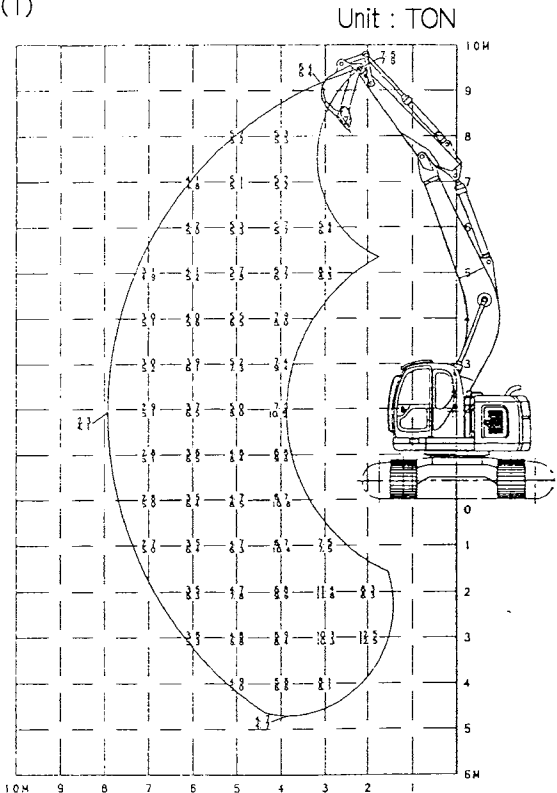
(1) Conditions of calculation

- 1) The lifting load shows the lower value either 87% of hydraulic lifting capacity or 75% of tipping load.
- 2) The load point is on the bucket supporting point, and the bucket position is a closed position.
- 3) The values in the upper rows show the lifting capacity of a machine facing sideways, and values in the lower rows show a machine facing longitudinally.
- 4) Unit : ton Crawler : 600mm (24in), iron crawler
- 5) Set hydraulic pressure 350kgf/cm² (4,978psi)

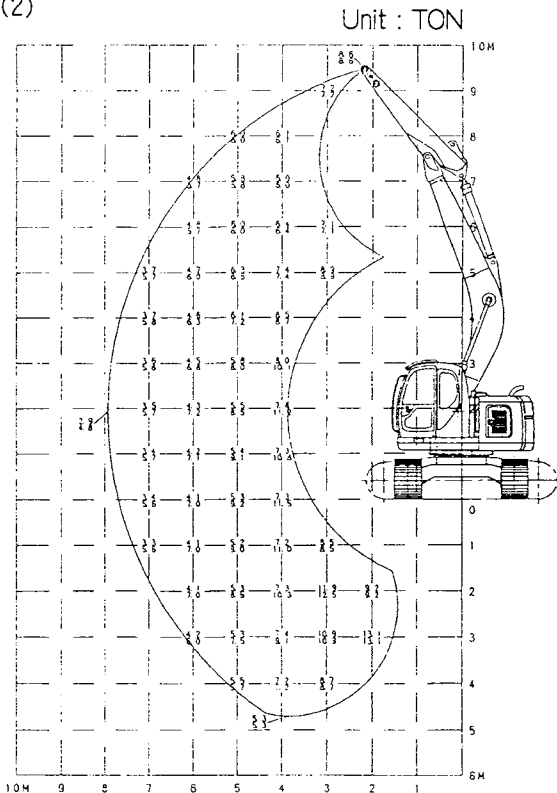
(2) Reference No. list of lifting diagram

Arm	2.4m (7'10") Short Arm		2.94m (9'7") STD Arm		3.3m (10'9") Long Arm	
	0.93m ³ (1.2cuyd) Bucket W	W/O	0.80m ³ (1.04cuyd) Bucket W	W/O	0.68m ³ (0.88cuyd) Bucket W	W/O
Bucket W or W/O						
No.	(1)	(2)	(3)	(4)	(5)	(6)

(1)

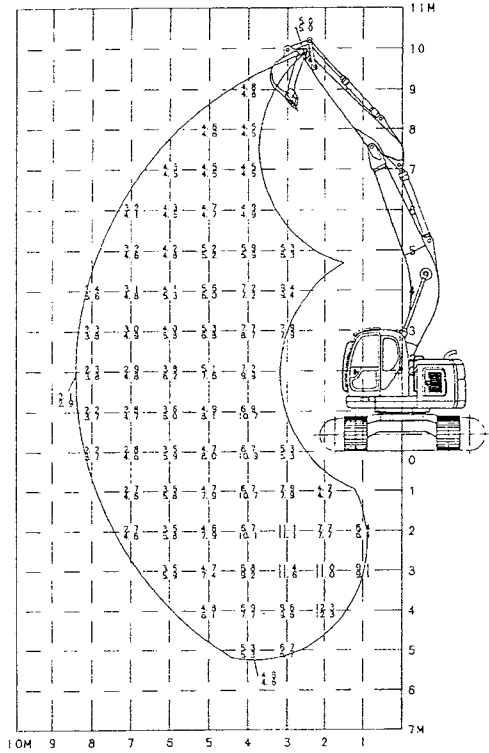


(2)



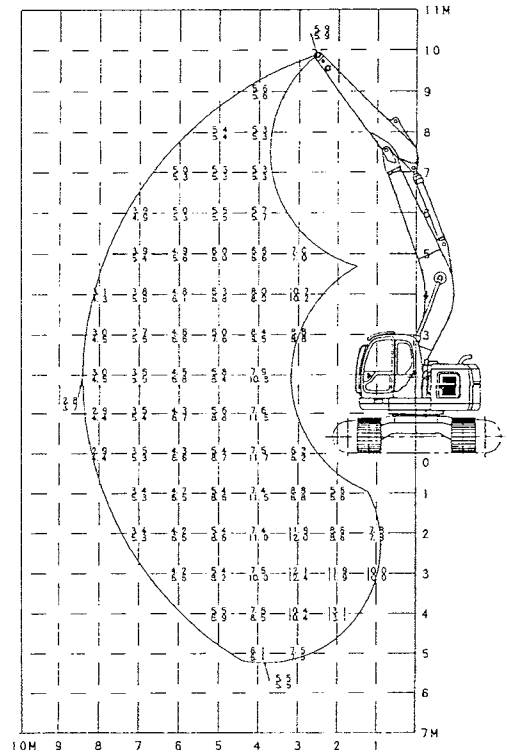
(3)

Unit : TON



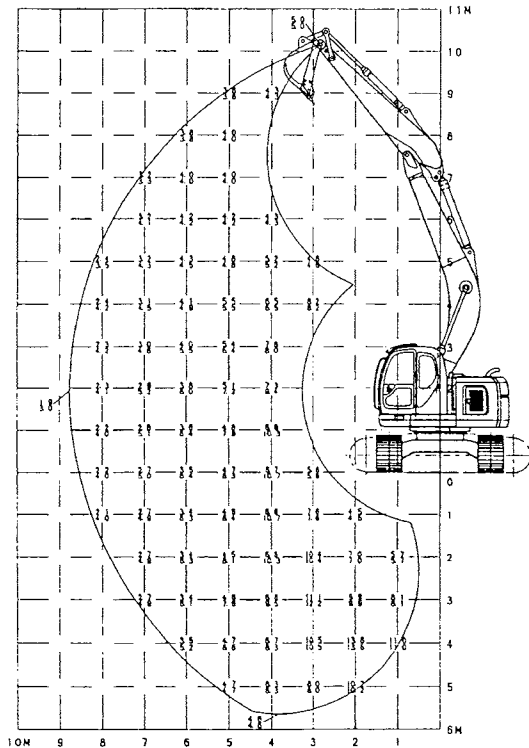
(4)

Unit : TON



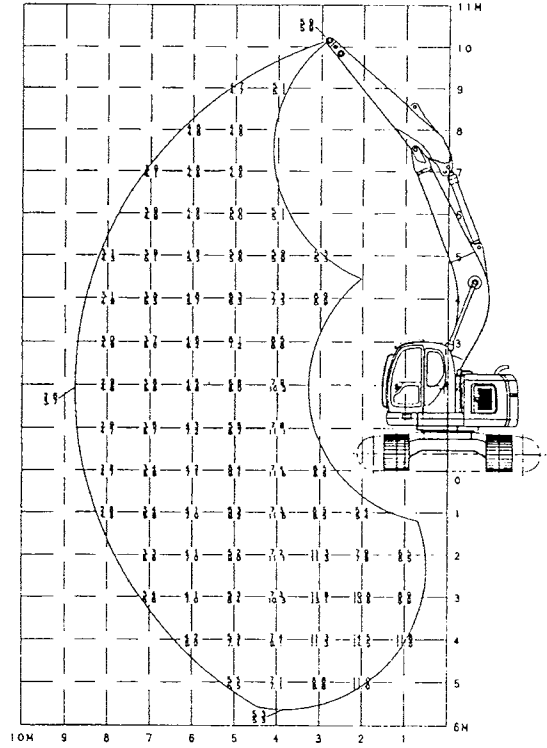
(5)

Unit : TON



(6)

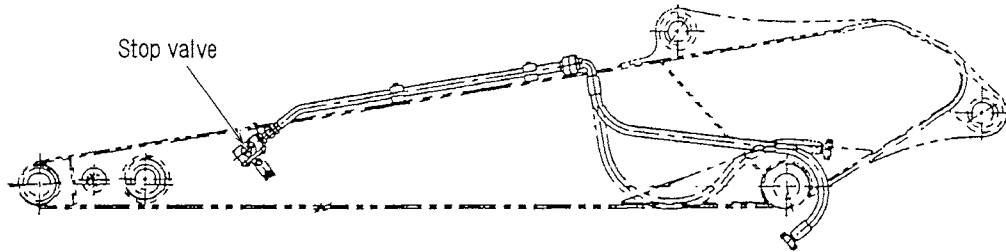
Unit : TON

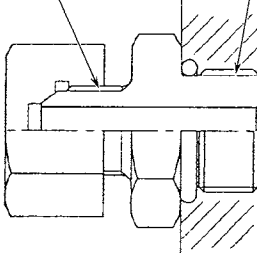
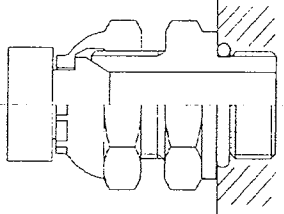
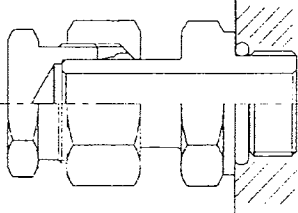


23. OPTIONAL PARTS AND DIMENSIONS OF ATTACHMENTS

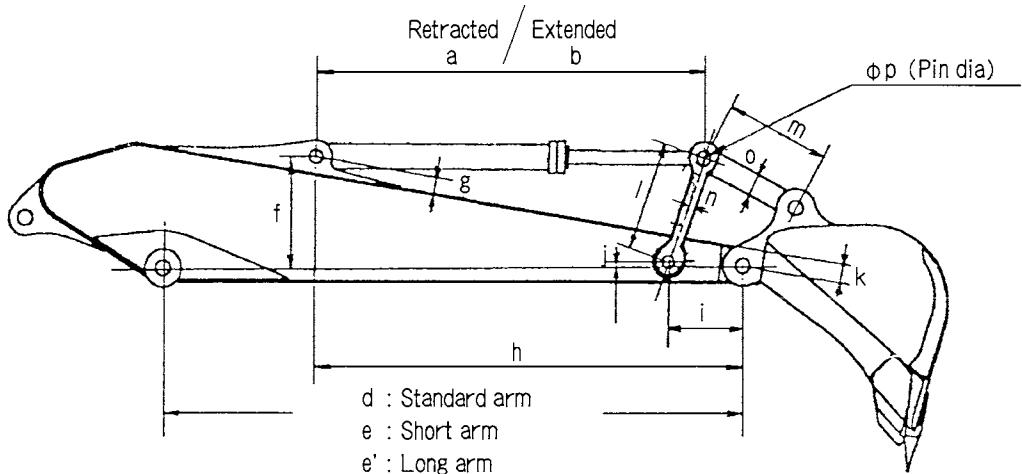
23-1 Optional parts

- Attach the optional parts to the tip of the stop valve.



Thread size of tip of the connector				Connector (genuine parts)	Thread size of tip of the stop valve			
SK70SR	SK115SR	SK115SR ₀₂ SK135SR (LC)	SK235SR		SK70SR	SK115SR	SK115SR ₀₂ SK135SR (LC)	SK235SR
3/4-16 UNF	1 1/16-12 UNF	1 5/16-12 UNF		 For Breaker A				
	PF 3/4	PF 1		 For Breaker B		PF 3/4		PF 1 1/4
M30×1.5	M36 × 1.5	M45×1.5		 For Nibbler				

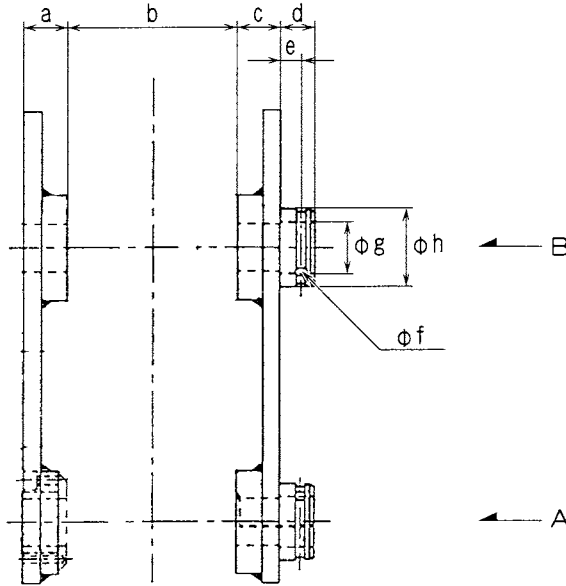
23-2 Arm section • Cylinder • Bucket link installing sections in dimensional drawing



Unit : mm (ft-in)

Mode Code	SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR
a	1,120 (3'8.09")	1,365 (4'5.74")	1,365 (4'5.74")	1,600 (5'2.99")
b	1,855 (6'1.03")	2,250 (7'4.58")	2,250 (7'4.58")	2,680 (8'9.51")
d	2,070 (6'9.5")	2,200 (7'2.61")	(KA) 2,950 (9'8.14") 2,450 (8'0.45")	2,940 (9'7.74")
e	1,650 (5'4.96")	1,900 (6'2.8")	2,100 (6'10.67")	2,400 (7'10.48")
e'	—	2,700 (8'10.3")	2,950 (9'8.14")	3,300 (10'9.92")
f	405.5 (1'3.96")	442 (1'5.4")	456.5 (1'5.97")	615.5 (2'0.23")
g	95 (3.74")	85 (3.34")	85 (3.34")	98 (3.85")
h	1,744 (5'8.66")	2,165 (7'1.23")	2,170 (7'1.43")	2,591 (8'6")
i	240 (9.44")	350 (13.77")	350 (13.77")	420 (1'4.53")
j	15 (0.59")	15 (0.59")	20 (0.78")	23 (0.9")
k	66.3 (2.61")	74.5 (2.93)	79.5 (3.12")	93.5 (3.68")
l	436.5 (1'5.18")	501 (1'7.72")	501 (1'7.72)	630 (2'0.8")
m	380 (1'2.96")	468 (1'6.42")	482 (1'6.97")	610 (2'0.01")
n	30 (1.18")	55 (2.16")	55 (2.16")	42.5 (1.67")
o	75 (2.95")	110 (4.33")	110 (4.33")	100 (3.93")
p	50 (1.96")	60 (2.36")	60 (2.36")	80 (3.14")

23-3 Dimension of boss section



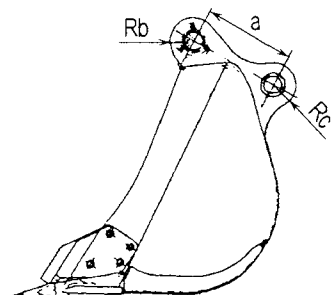
Unit : mm (in)

Location \ Model		SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR
A Arm side	a	47 (1.85")	50 (1.97")	58 (2.28")	61 (2.4")
	b	182 (7.17")	218 (8.58")	252 (9.92")	327 (12.88")
	c	47 (1.85")	50 (1.97")	58 (2.28")	61 (2.4")
	d	38 (1.49")	45 (1.77")	34 (1.33")	42 (1.65")
	e	23 (0.9")	30 (1.18")	19 (0.74")	27 (1.06")
	φ f	13 (0.51")	15 (0.59")	15 (0.59")	17 (0.66")
	φ g	54 (2.12")	64 (2.52")	69 (2.71")	84 (3.3")
	φ h	82.6 (3.25")	95 (3.74")	101.6 (4")	114.3 (4.5")
B Bucket link side	a	47 (1.85")	50 (1.97")	58 (2.28")	61 (2.4")
	b	182 (7.17")	218 (8.58")	252 (9.92")	327 (12.88")
	c	47 (1.85")	50 (1.97")	58 (2.28")	61 (2.4")
	d	38 (1.49")	45 (1.77")	34 (1.33")	42 (1.65")
	e	23 (0.9")	30 (1.18")	19 (0.74")	27 (1.06")
	φ f	13 (0.51")	15 (0.59")	15 (0.59")	17 (0.66")
	φ g	54 (2.12")	64 (2.52")	69 (2.71")	84 (3.3")
	φ h	82.6 (3.25")	95 (3.74")	101.6 (4")	114.3 (4.5")

● Dimension of bucket bracket

Unit : mm (ft-in)

	SK70SR	SK115SR	SK115SRDZ SK135SR (LC)	SK235SR
a	290 (11.42")	375 (1'2.76")	370 (1'2.56")	444 (1'5.48")
Rb	65 (2.56")	80 (3.15")	88 (3.46")	110 (4.33")
Rc	65 (2.56")	80 (3.15")	84 (3.3")	105 (4.13")



24. SUMMARY FOR NIBBLER & BREAKERS

1.1 GENERAL PRECAUTIONS

(1) Applications of Breaker or Nibbler & Breaker Breaker piping Applicable only when a breaker is mounted.

Nibbler & breaker piping...Applicable only when a nibbler and a breaker are mounted.

(2) Modifying a Breaker and a Nibbler & Breaker
There are specific procedures to be followed when modifying a breaker and a nibbler & breaker. Therefore, when they are to be modified at our service shop, contact the nearest breaker and nibbler manufacturer's office, and obtain instructions, so that you install the pipes and handle the machinery correctly.

(3) Differences Between a Breaker Circuit and a Nibbler & Breaker Piping

- Breaker Piping

There is a single oil flow from pump P1 to the breaker. The oil returns to the hydraulic tank directly. The flow is single flow.



If the return oil from the breaker is fed back to the control valve, the pulsation of the breaker is transmitted to the oil cooler. This causes the machine to break down.

- Nibbler Piping

The oil flows to the nibbler is confluent flow ; the oil flow is changed to the rod and the head of the nibbler cylinder.

1.2 BASIC METHOD TO BE TAKEN WHEN MOUNTING

When mounting the breaker or nibbler, always execute the following six items :

(1) Install an option valve to the main control valve, to use the pressure oil from pump P1 for the breaker and nibbler.

(2) Functions of the option valve :

The option valve transmits oil pressure to the nibbler or the breaker. It contains a spool that changes the flow of the oil to the rod and the head of the nibbler cylinder. It also contains a single / confluent flow spool that selects a single flow from the A1 port of the main pump or confluent flow of the A1 and A2 ports of the main pump.

(3) Action of the single / confluent flow spool :

A solenoid valve is provided under the floor plate and the single / confluent select switch in the instrument panel, in order to operate the single / confluent change spool.

(4) Installing the operation panel :

A pedal and a pilot valve are mounted to the floor plate and a remote control piping is placed between the option valves and pedal, in order to operate the breaker or the nibbler.

(5) Installing the selector valve :

On the nibbler & breaker attached machine, a selector valve is mounted to the boom in order to change the oil flow for the breaker and for the nibbler.

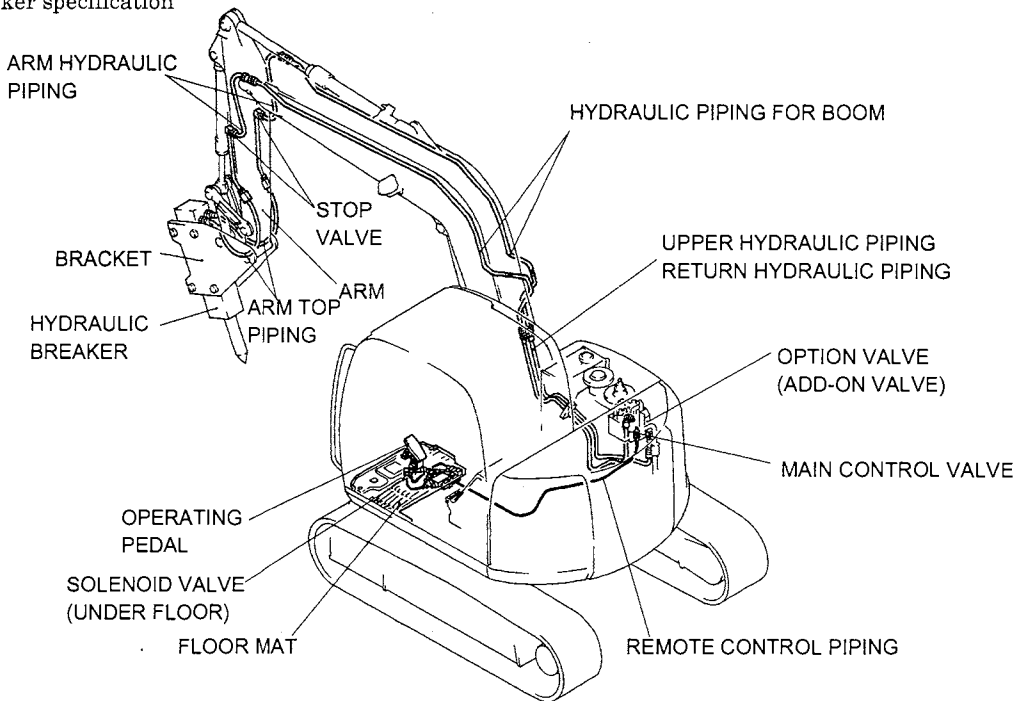
(6) Reinforcement of the attachment :

Reinforcement plates are welded to the standard arm (civil engineering services : for general use) and to the idler links of the nibbler & breaker attached machine.

24-1. LAYING OF EQUIPMENTS

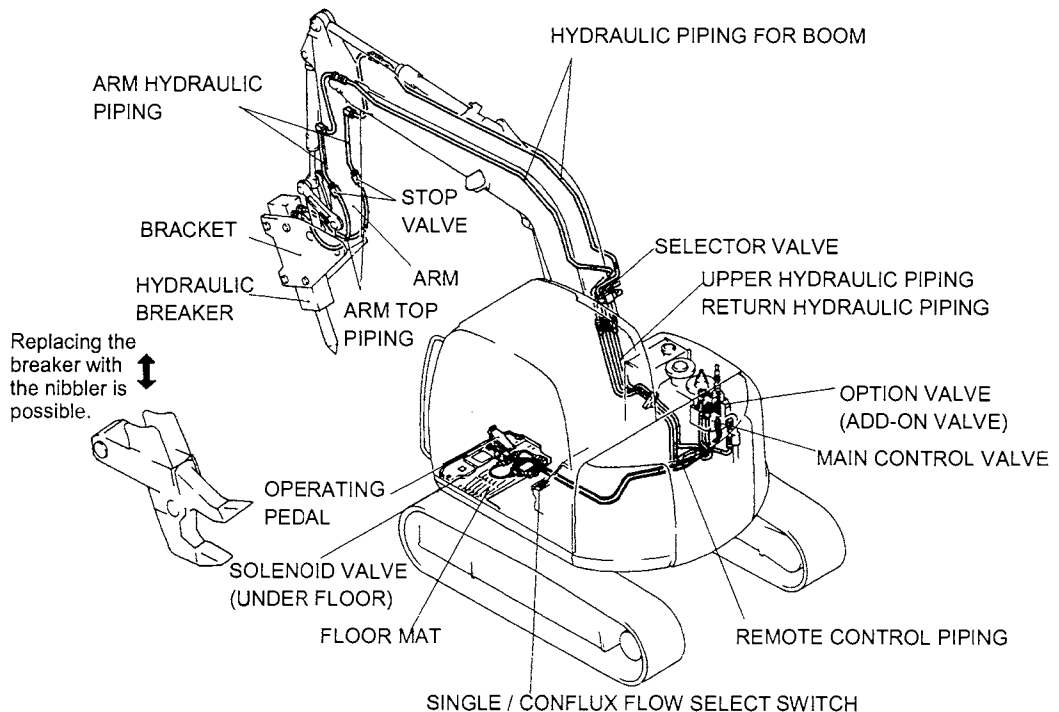
● LAYING OF PIPING (Example:SK70SR)

(1) Breaker specification



Outside view of Breaker-attached machine

(2) Nibbler & Breaker specification



Outside view of Nibbler & Breaker-attached machine

24-2. REFERENCE (BREAKER MANUFACTURER)

Typical combinations are quoted from breaker manufacturers' catalog use as below, but concerning applicable breaker models, decide it after consultation with the breaker manufacturer.

When fitting a breaker, read through reminders on the use of breakers and cautions instructed by breaker manufacturers.

Manufacturer	Applicable breaker	Working press kgf/cm ² (psi)	Oil volume used ℓ/min (gal/min)	Total weight kg (lbs)	Total length mm (in)	Bucket capacity m ³ (cuyd)
N P K	H-10XB	120~140 (1,710~1,990)	160~200 (42.2~52.8)	1,450 (3,200)	2,156 (84.9")	
	H-4XB	130~150 (1,850~2,130)	35~60 (9.24~15.8)	410 (900)	1,644 (64.7")	
T O K U	TNB-10B	100~140 (1,420~1,990)	110~140 (29.0~37.0)	1,000 (2,210)		0.55~0.70 (0.72~0.92)
	TNB-14B	120~140 (1,710~1,990)	140~160 (37.0~42.2)	1,400 (3,100)		0.70~0.90 (0.92~1.18)
	TNB-6E	100~160 (1,420~2,280)	45~80 (11.9~21.1)	391 (860)	1,476 (58.1")	0.25~0.35 (0.33~0.46)
	TNB-10E	120~170 (1,710~2,420)	100~140 (26.4~37.0)	997 (2,200)	1,850 (72.8")	0.55~0.70 (0.72~0.92)
	TNB-14E	130~170 (1,850~2,420)	130~170 (34.3~44.9)	1,500 (3,300)	2,190 (86.2")	0.70~0.90 (0.92~1.18)
K R U P P	MKB1100	150~160 (2,130~2,280)	80~110 (21.1~29.0)	1,100~1,250 (2,430~2,760)	2,278 (89.7")	0.50~0.90 (0.65~1.18)
	MKB1200	150~180 (2,130~2,560)	90~130 (23.8~34.3)	1,120~1,200 (2,470~2,650)		0.55~1.00 (0.72~1.31)
O K A D A	UB 11	150~180 (2,130~2,560)	110~ (29.0~)	1,450 (3,200)	2,240 (88.2")	0.70~ (0.92~)
	OUB 310	130~160 (1,850~2,280)	110~155 (29.0~40.9)	1,070 (2,360)	2,040 (80.3")	0.55~0.70 (0.72~0.92)
T A I S E I	TF-150	150~170 (2,130~2,420)	100~120 (26.4~31.7)	1,330 (2,930)	[1,596] (62.8")	0.60~0.90 (0.78~1.18)
FURUKAWA	HB20G	160~180 (2,280~2,560)	125~150 (33.0~39.6)	1,400 (3,100)	2,119 (83.4")	

[] Excludes chisels.

General precautions to be exercised on the installation of breakers by different manufacturers

	Manufacturer	Installation of accumulators	Installation of a relief valve	Restriction of engine revolution	High-low speed changeover
◎	NPK	○	×	×	changeover type not available.
◎	TOKU Series B	△	○	○	changeover type not available.
◎	TOKU Series E	※ ○	×	○	changeover type not available.
—	KRUPP	△	○	○	changeover type available for large machines.
—	OKADA	△	○	○	changeover type available on special request.
—	FURUKAWA	△	○	○	changeover type not available.
—	TAISEI	△	○	○	changeover type not available.

○ One that must be installed.

△ One that must be adjusted at installation.

×

※ Capacity 1 liter, pressure is 70kgf/cm² (1,000psi)

◎ Adaptation test completed.

24-3. REMINDERS ON THE USE OF NIBBLER & BREAKERS

● CHANGING OVER THE SELECTOR VALVE

A nibbler & breaker-attached machine is equipped with a selector valve in both the operation circuit and the main circuit. When running the machine after completion of modification, always set the selector valves according to a nibbler or a breaker used.

NOTE : Incorrect setting of the selector valves not only deteriorates operating efficiency and decreases speed but also causes failure of the machine. Therefore, confirm completion of the modification and give proper advice to the user.

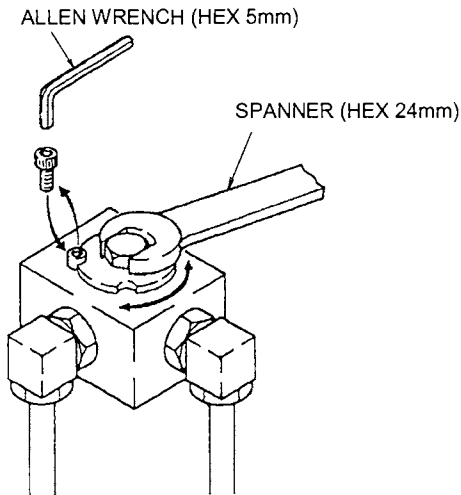
● Tools used

For main circuit changeover

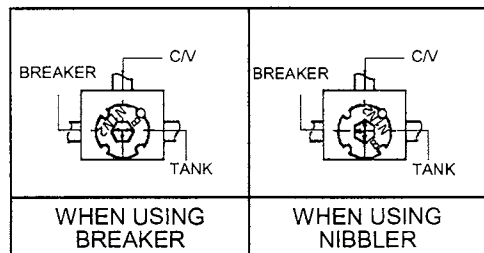
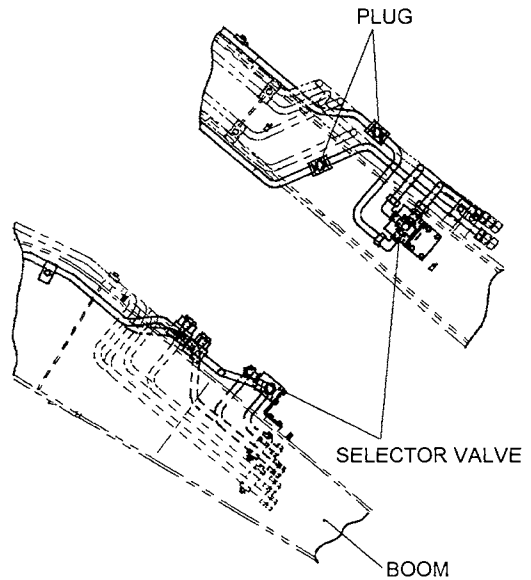
 : 5mm
 : 24mm

● Changing over procedure of the selector valve

- 1) Remove socket bolt with an allen wrench.
- 2) Turn the nibbler or the breaker to its operating position, using a spanner.
- 3) Stop it at a specified position and tighten the setscrew.



Changing over procedure of the selector valve



Changing over procedure of the selector valve

24-4. PRECAUTIONS TO BE EXERCISED ON BREAKERS OF DIFFERENT MANUFACTURERS

There are some differences between manufacturers as to the piping to breakers and the handling of breakers. For this reason, consult with the manufacturer when mounting a breaker in the field. The following is a summary of how breakers should be handled that is extracted from manufacturers' catalog use and operation manuals

NOTE : This is a general outline of how breakers should be used and may differ with excavator models. Always contact the breaker manufacturer before field mounting.

(1) Placing high and low pressure accumulators
N P K They must be placed basically (depending upon models).

T O K U	} Check the oscillation of the pulsation of the breaker pressure and if pulsation is large, always install accumulators.
K R U P P	
O K A D A	
FURUKAWA	

Standard of judgment on the installation of accumulators

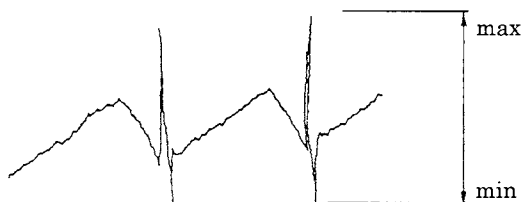
High pressure : Measure the pulse oscillation by side pressure on the high pressure side of the breaker at the inspection port for the pump's delivery pressure by actuating the breaker at the full revolution of the engine in mode H and set the maximum pressure difference to within 20% of the excavator's system pressure 300kgf/cm² (4270psi).

In case it exceeds 20%, install a high pressure accumulator.

NOTE : The pulse oscillation is $300 \times 20\% = 60\text{kgf/cm}^2$ (850psi). Therefore, if it is more than this level, an accumulator must be installed.



Install the accumulator by referring to result of verification test.



Max. press - Min press < system press $\times 20\%$

Low pressure : Measure the inlet pressure of the side line filter on the breaker side by actuating the breaker at full engine revolution in the H mode, and in case the maximum pressure exceeds 55kgf/cm² (780 psi), install a low pressure accumulator.

max. < 55kgf/cm² (780 psi)

Regarding the capacity and the charge pressure of accumulators, contact the breaker manufacturer before installation.

(2) Installation of a relief valve

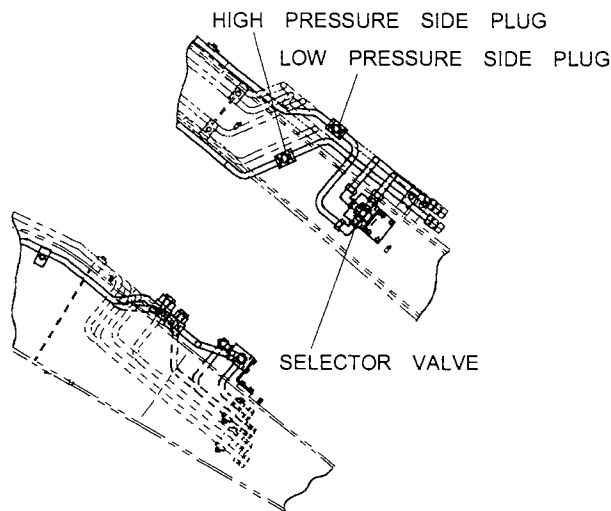
N P K — Installation is not necessary. (Contact the breaker manufacturer as it is necessary depending upon models.)

Installation is necessary.

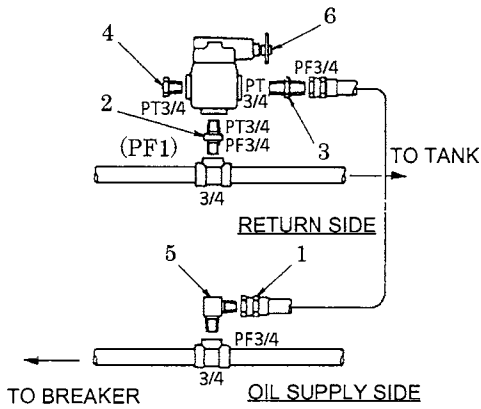
T O K U	} A relief valve is specified by each breaker manufacturer. Since the method of pressure setting of the relief valve differs with breaker manufacturers, install a relief valve according to the manufacturer's instructions.
K R U P P	
O K A D A	
T A I S E I	
FURUKAWA	

NOTE : Only the B sires TOKU machine requires a relief valve to be installed.

INSTALLATION OF A RELIEF VALVE



Relief valve mounting



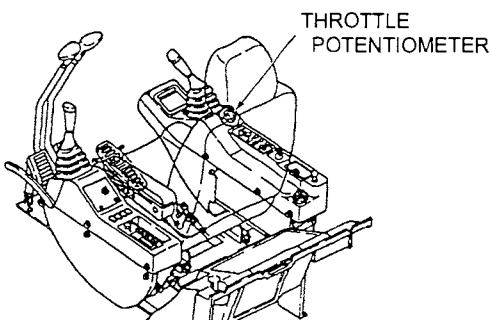
- | | |
|-----------------------|-----------------|
| 1. HIGH PRESSURE HOSE | 4. PLUG |
| 2. NIPPLE | 5. ELBOW |
| 3. ADAPTER | 6. RELIEF VALVE |

(3) Restriction of engine revolution

N P K Full engine revolution may be used.

T O K U	There are restriction on the engine revolution. Since a specified revolution differs with breakers, follow the breaker manufacturer's instructions.
K R U P P	
O K A D A	
T A I S E I	
F U R U K A W A	

NOTE : In the case of a breaker for which the engine revolution is limited, the breaker does not increase impact power and cycles even at full engine revolution. Since extra hydraulic oil returns to the hydraulic oil via the relief valve, it causes the hydraulic oil temperature to rise and the fuel consumption to increase. Plaster the label (furnished by the breaker maker) indicating the revolution (Check the engine revolution.), to the throttle potentiometer position. Always observe the indicated revolution.



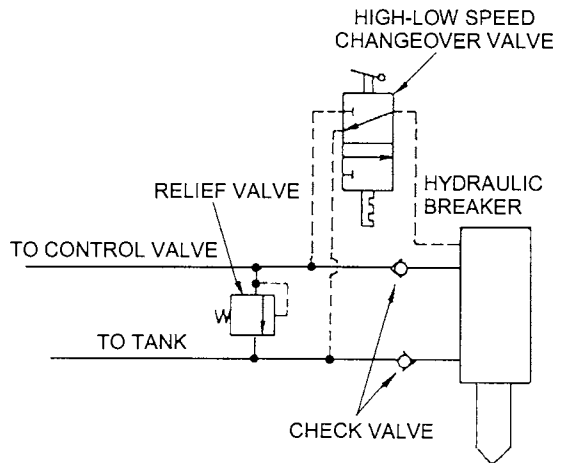
(4) Changing over the breaker to high and low speeds

N P K	These breakers are not so constructed as to be switched over to high and low speed.
T O K U	
T A I S E I	
F U R U K A W A	

KRUPP — Breakers on and after MKB1200 are constructed with a switching function. It can be operated from inside the cab by the installation of a solenoid valve. For piping work, consult with the breaker manufacturer.

NOTE : Piping work is not required in some cases if a high-low changeover function is not necessary at user's request.

On that occasion, it is necessary to fix the changeover valve contained in the breaker to the low speed side beforehand. Consult with the breaker manufacturer in that case. It is prohibited to use the high-low speed changeover valve without laying high-low speed piping and without fixing the high-low speed changeover valve.



● FLUSHING METHOD

After completion of piping work, connect the high pressure side and the low pressure side, as shown in Fig. 60, open the stop valves on both sides and depress the operating pedal to perform flushing.

- Before beginning flushing, run the engine at low speed, depress the breaker operating pedal and then run the engine at high speed.
- Perform flushing operation for at least 40 minutes, and during the operation, make sure of no oil leakage from each of the connections of the newly attached breaker circuit and the nibbler & breaker circuits.

● REPLACING HYDRAULIC OIL AND RETURN FILTER

Contamination and deterioration of hydraulic oil may develop malfunctioning of the control valve, early wear and seizure of the hydraulic pumps and malfunctioning of the entire hydraulic circuits : always replace hydraulic oil at regular intervals, based on table 47.

Table 47

Item	Inspection / maintenance points	Replacement intervals			
		First replacement	2nd replacement	Regular replacement	
Hydraulic oil	Hydraulic oil tank	—	—	Every 600h	
Return filter	Hydraulic oil tank	SK70SR	25h	100h	Every 200h
		SK115SR			
		SK135SR	50h	250h	Every 250h
		SK235SR			

● OPERATING PROCEDURE

This machine is provided with breaker single circuit and nibbler and breaker combined (conflux) circuit. To use breaker or nibbler, select circuit appropriate to the specification through switch on the left rear side of driver's seat.

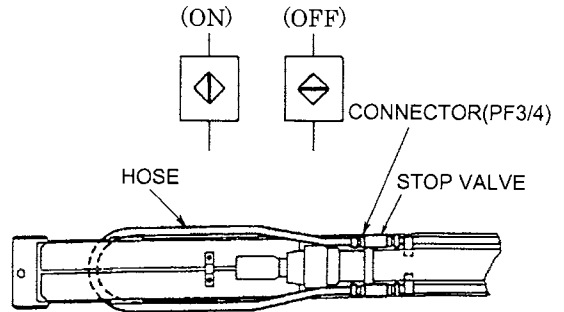
● SWITCH OPERATING (NIBBLER & BREAKER SPECIFICATION)

Specification	Switch position	Circuit
Breaker	OFF	Single flow
Nibbler	ON	Conflux flow



CAUTION

Never turn switch on (conflux) to operate breaker. It may cause trouble of machine.



An example of flushing time (23min.) in a single process

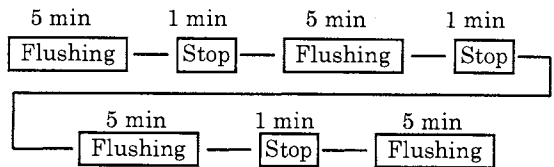
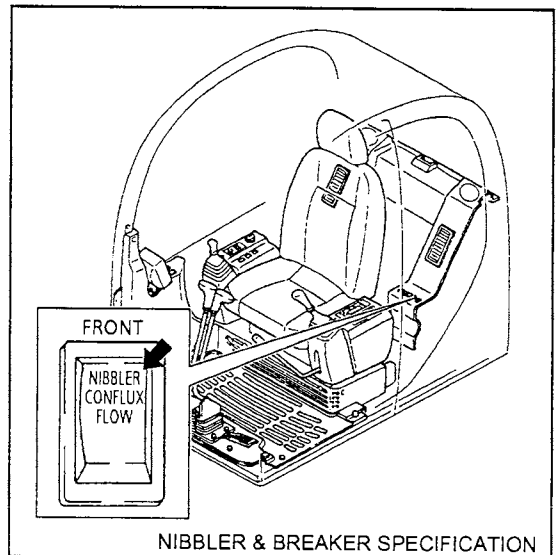


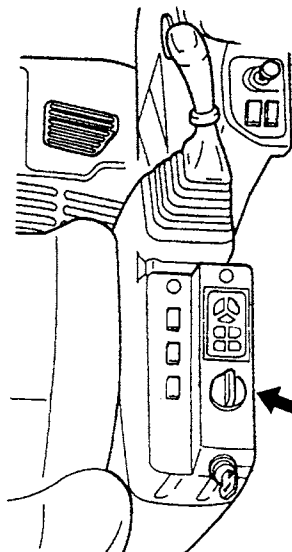
Fig60. Flushing method



● THROTTLE POTENTIOMETER

When operating the machine with a hydraulic breaker, do the following operations :

Use the throttle potentiometer on the high idle side.



Throttle potentiometer position

● CONTROL PEDAL

(1) Hydraulic breaker single circuit

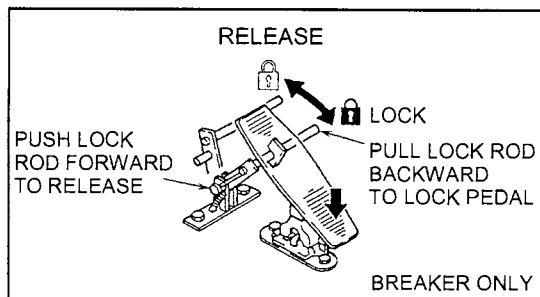
Release pedal lock on the right front side of driver's seat to operate pedal.

⚠ WARNING

Precaution for pedal operation

The operation varies in the specifications, so before operating, read the Operator Manual carefully.

Foot pedal depressing section	Operating condition.
Depress heel section	Breaker starts operation.
Pedal in neutral position.	Breaker stops operating.



(2) Nibbler and breaker combined (conflux) circuit.

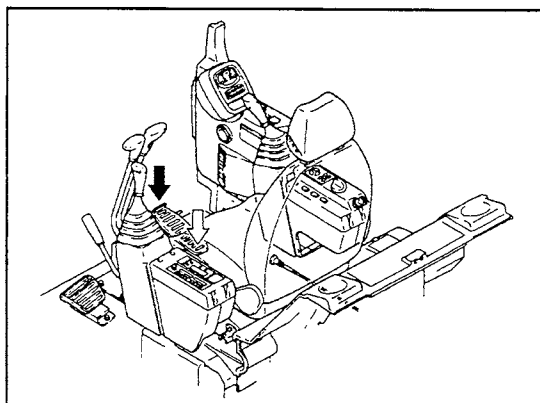
Release pedal lock on the right front side of driver's seat to operate pedal.

● Hydraulic breaker

Foot pedal depressing section	Operating condition.
Pedal in neutral position	Breaker stops operating.
Depress heel section.	Breaker starts operation.

● Nibbler

Foot pedal depressing section	Operating condition.
Depress toe section	Nibbler close
Depress heel section	Nibbler open



Operate pedal

25. REFERENTIAL DATUM

25-1 TIGHTENING TORQUES FOR NUTS AND SLEEVES

Table 3 indicates standard tightening torques applicable to cases where no particular note is given.

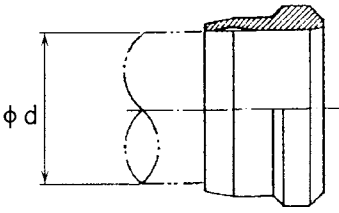
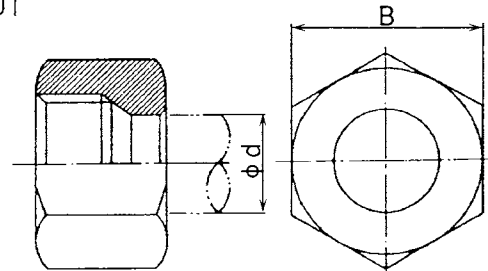
Overtightening or undertightening of nuts and

sleeves in flareless joint type may develop oil leaks through pipe connections.

Always tighten nuts and sleeves to proper torques.

Table 3

Manufacturer's name	Working pressure kgf/cm ² (psi)	Tube size OD × thickness mm (in)	HEX mm	Tightening torque kgf·m (lb·ft)
Nippon A.M.C	300 (4270)	10 × 1.5 (0.394 × 0.059)	19	5 ± 1 (36 ± 7)
		15 × 2.0 (0.591 × 0.079)	27	12 ± 1.2 (87 ± 9)
		18 × 2.5 (0.709 × 0.098)	32	15 ± 1.5 (108 ± 11)
		22 × 3.0 (0.866 × 0.118)	36	22 ± 2.2 (159 ± 16)
		28 × 4.0 (1.10 × 0.157)	41	28 ± 2.8 (203 ± 20)
Ihara Koatsu	300 (4270)	35 × 5.0 (1.38 × 0.20)	55	45 ± 4.5 (325 ± 33)

SLEEVE			NUT			
						
Tube size φd mm	Parts No.		Tube size φd mm	HEX B mm	Parts No.	
	Ihara Koatsu	Nippon A.M.C.			Ihara Koatsu	Nippon A.M.C.
6	ZF93S06000	—————	6	14	ZF93N06000	—————
8	ZF93S08000	—————	8	17	ZF93N08000	—————
10	ZF93S10000	ZA93S10000	10	19	ZF93N10000	ZA93N10000
12	ZF93S12000	—————	12	22	ZF93N12000	—————
15	ZF93S15000	ZA93S15000	15	27	ZF93N15000	ZA93N15000
18	ZF93S18000	ZA93S18000	18	32	ZF93N18000	ZA93N18000
22	ZF93S22000	ZA93S22000	22	36	ZF93N22000	ZA93N22000
28	ZF93S28000	ZA93S28000	28	41	ZF93N28000	ZA93N28000
32	ZF93S32000	—————	32	50	ZF93N32000	—————
35	ZF93S35000	ZA93S35000	35	55	ZF93N35000	ZA93N35000
38	ZF93S38000	—————	38	60	ZF93N38000	—————

25-2 PIPE JOINT TIGHTENING TORQUE

Clean all tubes and hoses with cleaning solvent, and dry with air.

1. FITTING FLARE-TYPE JOINT

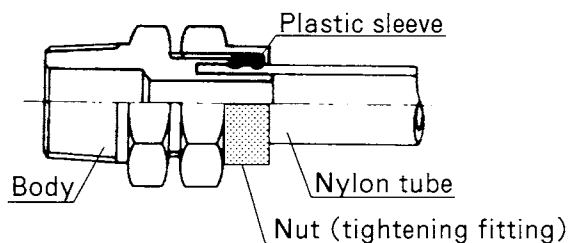
Over-tightening flare-type (union nut type) metal parts may not only damage nuts or seat surfaces, but may also prevent optimum sealing by line contact, causing oil leak.

Unit : kgf·m (lb·ft)

Pipe threads	Nominal size	1/4"		3/8"		1/2"
	Tightening torque	2.5±0.3 (18.1±1.8)		5±0.5 (36.2±3.6)		6±0.6 (43.4±4.3)
Unified threads	Thread size	—	7/16"-20	1/2"-20	9/16"-18 5/8"-18	3/4"-16
	Tightening torque	—	2±0.2 (14.5±1.4)	3±0.3 (21.7±2.2)	4±0.4 (28.9±2.9)	5±0.5 (36.2±3.6)

Pipe threads	Nominal size	3/4"		1"	1-1/4"	1-1/2"	2"
	Tightening torque	12±1.2 (86.8±8.7)		14±1.4 (101±10)	17±1.7 (123±12)	21±2.1 (152±15)	42±4.2 (304±30)
Unified threads	Thread size	7/8"-14	1-1/16"-12	1-5/16"-12	1-5/8"-12	—	—
	Tightening torque	6±0.6 (43.4±4.3)	2±0.2 (14.5±1.4)	14±1.4 (101±10)	17±1.7 (123±12)	—	—

2. FITTING N₂ (NYLON) TUBE JOINTS



Insert the tube securely into the fitting, and turn the nut approximately 1-1/4 turns with a spanner from the position where the nut is fully screwed in with hand.

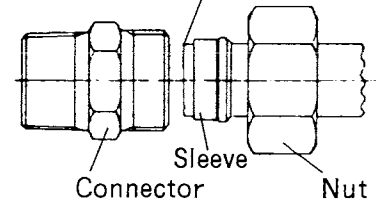
3. TIGHTENING FLARELESS JOINTS

1) Preliminary assembly (pre-setting)

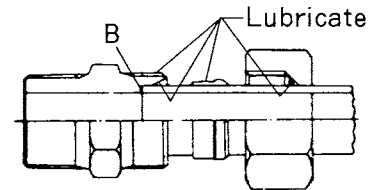
To connect directly pipe and joints by hand, proceed as follows :

- (1) Insert the nut, and then the sleeve cutting edge into the pipe toward the pipe ends.

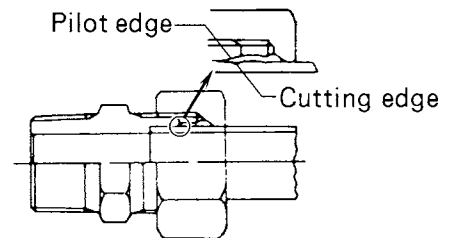
Cut the pipe as close to a right angle as possible and chamfer slightly the cut end.



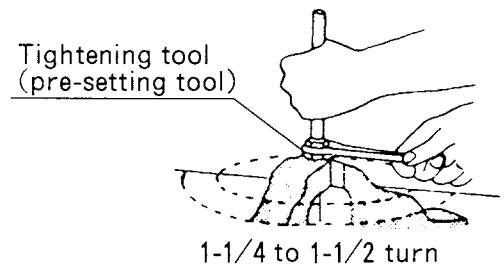
- (2) Insert the pipe into the connector, and securely place the pipe end to the bottom (B) of the connector. (Be sure to lubricate the contacting and turning parts.)



- (3) Tighten the nut with a spanner while turning the pipe with the other hand. When the pipe cannot be turned any further, stop turning with the spanner and note the spanner position. (Mark a line on the point.) At this point the sleeve grips the pipe. The point (where the sleeve's cutting edge starts gripping the pipe) is called the grip point.



- (4) By turning the nut 1-1/4 to 1-1/2 turns from the grip point position, the sleeve's cutting edge will completely grip the pipe.



Procedures (1) through (4) above are called the preliminary assembly (pre-setting). This should not be done at the actual pipe assembly site, but beforehand on a work bench in order to grip the sleeve.

2) Reassembly (resetting)

To install the pre-set pieces to the machine, proceed as follows :

- (1) Set the preset piece on the machine and tighten the nut, while turning the pipe by hand, until the tightening torque value rapidly increases (sharp torque rise point).
- (2) Give another 1/4 turn (1/3 turn if needed) from the sharp torque rise point.

25-3 SI UNIT

(1) Base Unit

Quantity	Designation	Symbol
Length	Meter	m
Mass	Kilogram	kg
Time	Seconds	s
Current	Ampere	A
Thermodynamic temperature	Kelvin	K
Gram molecule	Mol	mol
Luminous intensity	Candela	cd

(2) Supplementary Unit

Quantity	Designation	Symbol
Plane angle	Radian	rad
Solid angle	Steradian	sr

(3) Derived Unit of Base Unit

Quantity	Designation	Symbol
Area	Square meter	m ²
Volume	Cubic meter	m ³
Speed	Meter per second	m/s
Acceleration	Meter per every second	m/s ²
Density	Kilogram per cubic meter	kg/m ³

(4) Derived Unit having proper Designation

Quantity	Designation	Symbol	
Frequency	Hertz	Hz	1Hz = 1s ⁻¹
Force	Newton	N	1N = 1kg·m/s ²
Pressure, Stress	Pascal	Pa	1Pa = 1N/m ²
Energy, Work Quantity of heat	Joule	J	1J = 1N·m
Power, Motive power, Electric power	Watt	W	1W = 1J/s
Electric charge, Quantity of electricity	Coulomb	C	1C = 1A·s
Electric Potential Voltage, Electromotive	Volt	V	1V = 1J/C (1W/A)
Quantity of static electricity Capacitance	Farad	F	1F = 1C/V
Electric resistance	Ohm	Ω	1Ω = 1V/A
Celcius temperature	Celcius Degree or degree	°C	(t + 273.15) K
Illuminance	lx	lx	1lx = 1lm/m ²

(5) SI conjunctive words

Quantity		Unit
Designation	Symbol	
Giga-	G	10 ⁹
Mega-	M	10 ⁶
Kilo-	k	10 ³
Hecto-	h	10 ²
Deca-	da	10
Deci-	d	10 ⁻¹
Centi-	c	10 ⁻²
Milli-	m	10 ⁻³
Micro-	μ	10 ⁻⁶
Nano-	n	10 ⁻⁹
Pico-	p	10 ⁻¹²

25-4 CONVERSION TABLES

1. Length

m	cm	in	ft
1	1×10^2	3.937×10	3.281
1×10^{-2}	1	3.937×10^{-1}	3.281×10^{-2}
2.54×10^{-2}	2.540	1	8.333×10^{-2}
3.048×10^{-1}	3.048×10	12	1

2. Area

m ²	cm ²	in ²	ft ²
1	1×10^4	1.550×10^3	1.076×10
1×10^{-4}	1	1.55×10^{-1}	1.076×10^{-3}
6.45×10^{-4}	6.452	1	6.944×10^{-3}
39.290×10^{-1}	9.290×10^2	1.44×10^2	1

3. Volume

m ³	cm ³	in ³	ft ³
1	1×10^6	6.1023×10^4	3.531×10
1×10^{-6}	1	6.1023×10^{-2}	3.531×10^{-5}
1.639×10^{-5}	1.639×10	1	5.787×10^{-4}
2.832×10^{-2}	2.8320×10^4	1.728×10^3	1

m ³	ℓ	gal (UK)	gal (US)
1	1.000×10^3	2.200×10^2	2.642×10^2
1×10^{-3}	1	2.200×10^{-1}	2.642×10^{-1}
4.546×10^{-3}	4.546	1	1.201
3.785×10^{-3}	3.785	8.327×10^{-1}	1

Note : 1gal (US) = 231in³, 1ft³ = 7.48gal (US)

4. Mass

kg	t	lb	ton (long ton : UK)	sh tn (short ton : US)
1	1×10^{-3}	2.20462	9.842×10^{-4}	1.1023×10^{-3}
1×10^3	1	2.20462×10^3	9.842×10^{-1}	1.1023
4.5359×10^{-1}	4.5359×10^{-4}	1	4.464×10^{-4}	5×10^{-4}
1.01605×10^3	1.01605	2.240×10^3	1	1.12
9.07185×10^2	9.07185×10^{-1}	2.000×10^3	8.9286×10^{-1}	1

5. Density

kg/m ³	g/cm ³	lb/in ³	lb/ft ³
1	1×10^{-3}	3.613×10^{-5}	6.243×10^{-2}
1.000×10^3	1	3.613×10^{-2}	6.243×10
2.7680×10^4	2.768 × 10	1	1.728×10^3
1.602×10	1.602×10^{-2}	5.787×10^{-4}	1

Note : $1\text{g/cm}^3 = 1\text{t/m}^3$

6. Force

N	dyn	kgf	lbf	Pdl
1	1×10^5	1.01972×10^{-1}	2.248×10^{-1}	7.233
1×10^{-5}	1	1.01972×10^{-8}	2.248×10^{-6}	7.233×10^{-5}
9.80665	9.80665×10^5	1	2.205	7.093×10
4.44822	4.44822×10^5	4.536×10^{-1}	1	3.217×10
1.38255×10^{-1}	1.38255×10^4	1.410×10^{-2}	3.108×10^{-2}	1

Note : $1\text{dyn} = 10^{-5}\text{N}$, $1\text{Pdl (poundal)} = 1\text{ft}\cdot\text{lb/s}^2$

7. Pressure

Pa	bar	kgf/cm ²	atm	mH ₂ O	mHg	lbf/in ² (psi)
1	1×10^{-5}	1.0197×10^{-5}	9.869×10^{-5}	1.0197×10^{-4}	7.501×10^{-6}	1.450×10^{-4}
1×10^5	1	1.0197	9.869×10^{-1}	1.0197×10	7.501×10^{-1}	1.450×10
9.80665×10^4	9.80665×10^{-1}	1	9.678×10^{-1}	1.0000×10	7.356×10^{-1}	1.422×10
1.01325×10^5	1.01325	1.0332	1	1.033×10	7.60×10^{-1}	1.470×10
9.80665×10^3	9.806×10^{-2}	1.0000×10^{-1}	9.678×10^{-2}	1	7.355×10^{-2}	1.4222×10
1.3332×10^5	1.3332	1.3595	1.3158	1.360×10	1	1.934×10
6.895×10^3	6.895×10^{-2}	7.031×10^{-2}	6.805×10^{-2}	7.031×10^{-1}	5.171×10^{-2}	1

Note : $1\text{Pa} = 1\text{N/m}^2$, $1\text{bar} = 10^5\text{Pa}$, $1\text{lbf/in}^2 = 1\text{psi}$

8. Stress

Pa	N/mm ² (MPa)	kgf/mm ²	kgf/cm ²	lbf/ft ²
1	1×10^{-8}	1.0197×10^{-7}	1.0197×10^{-5}	2.089×10^{-2}
1×10^6	1	1.01972×10^{-1}	1.01972×10	2.089×10^4
9.80665×10^6	9.80665	1	1×10^2	2.048×10^5
9.80665×10^4	9.80665×10^{-2}	1×10^{-2}	1	2.048×10^3
4.786×10	4.786×10^{-5}	4.882×10^{-6}	4.882×10^{-4}	1

Note : $1\text{N/mm}^2 = 1\text{MPa}$

25-5 PRESSURE CONVERSION TABLE

(kgf/cm² ↔ psi) ∴ kgf/cm² × 14.223 = psi

kgf/cm ²	psi	kgf/cm ²	psi	kgf/cm ²	psi
0.5	7	115	1635.9	235	3342.9
1	14	120	1707.0	240	3414.0
5	71	125	1778.1	245	3485.1
10	142.3	130	1849.3	250	3556.3
15	213.4	135	1920.4	255	3627.4
20	285.5	140	1991.5	260	3698.5
25	355.6	145	2062.6	265	3769.6
30	426.7	150	2133.8	270	3840.8
35	497.9	155	2204.9	275	3911.9
40	569.0	160	2276.0	280	3983.0
45	640.3	165	2347.1	285	4054.1
50	711.3	170	2418.3	290	4125.3
55	782.4	175	2489.4	295	4196.4
60	853.5	180	2560.5	300	4267.5
65	924.6	185	2631.6	305	4338.6
70	995.8	190	2702.8	310	4409.8
75	1066.9	195	2773.9	315	4480.9
80	1138.0	200	2845.0	320	4552.0
85	1209.1	205	2916.1	325	4623.1
90	1280.3	210	2987.3	330	4694.3
95	1351.4	215	3058.4	335	4765.4
100	1422.5	220	3129.5	340	4836.5
105	1493.6	225	3200.6	345	4907.6
110	1564.8	230	3271.8	350	4978.8

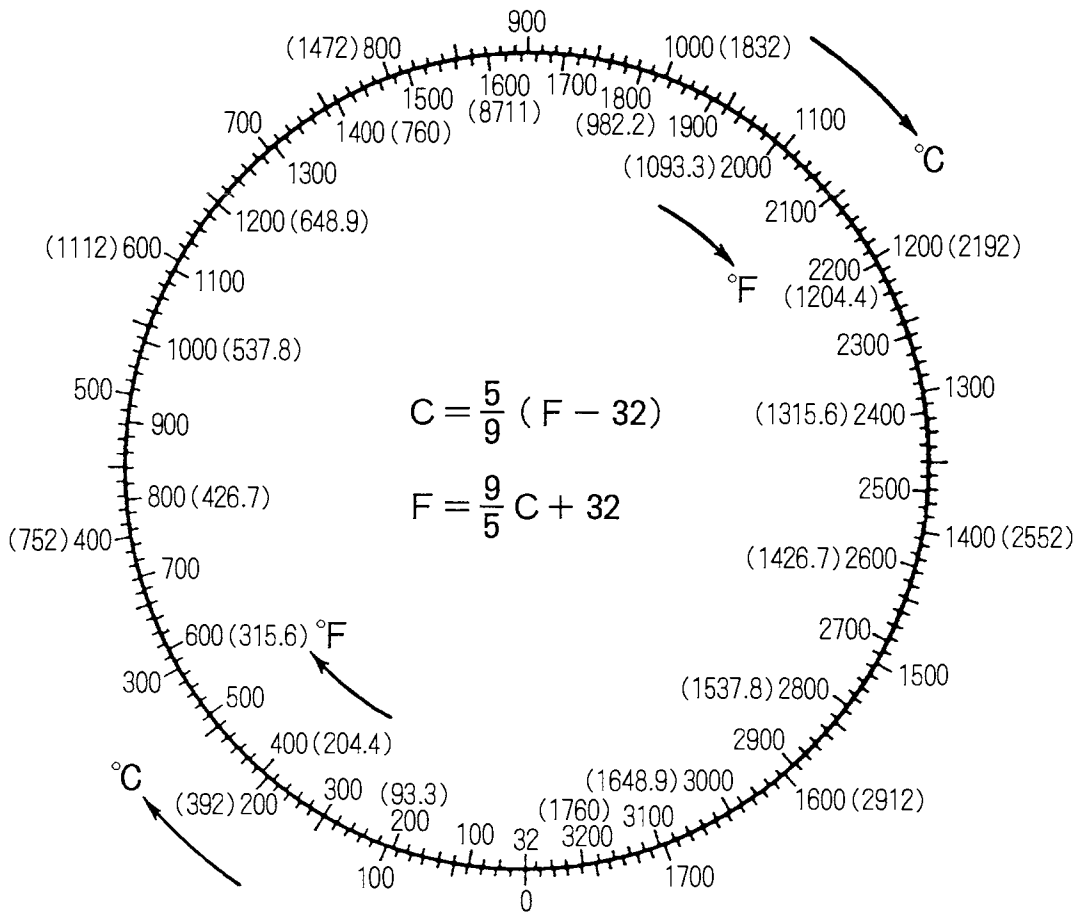
25-6 TEMPERATURE CONVERSION TABLE

Centigrade ↔ Fahrenheit

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-19	-2.2	+25	+77.0	+69	+156.2	+113	+235.4	+157	+314.6
-18	-0.4	26	78.8	70	158.0	114	237.2	158	316.4
-17	+1.4	27	80.6	71	159.8	115	239.0	159	318.2
-16	3.2	28	82.4	72	161.6	116	240.8	160	320.0
-15	5.0	29	84.2	73	163.4	117	242.6	161	321.8
-14	6.8	30	86.0	74	165.2	118	244.4	162	322.6
-13	8.6	31	87.8	75	167.0	119	246.2	163	325.4
-12	0.4	32	89.6	76	168.8	120	248.0	164	327.2
-11	12.2	33	91.4	77	170.6	121	249.8	165	329.0
-10	14.0	34	93.2	78	172.4	122	251.6	166	330.8
-9	15.8	35	95.0	79	174.2	123	253.4	167	332.6
-8	17.6	36	96.8	80	176.0	124	255.2	168	334.4
-7	19.4	37	98.6	81	177.8	125	257.0	169	335.0
-6	11.2	38	100.4	82	179.6	126	258.8	170	338.0
-5	23.0	39	102.2	83	181.4	127	260.6	171	339.8
-4	24.8	40	104.0	84	183.2	128	262.4	172	341.6
-3	26.6	41	105.8	85	185.0	129	264.2	173	343.4
-2	28.4	42	107.6	86	186.8	130	266.0	174	345.2
-1	20.2	43	109.4	87	188.6	131	267.8	175	347.0
0	32.0	44	111.2	88	190.4	132	269.6	176	348.8
+1	33.8	45	113.0	89	192.2	133	271.4	177	350.6
2	35.6	46	114.8	90	194.0	134	273.2	178	352.4
3	37.4	47	116.6	91	195.8	135	275.0	179	354.2
4	39.2	48	118.4	92	197.6	136	276.8	180	356.0
5	31.0	49	120.2	93	199.4	137	278.6	181	357.8
6	42.8	50	122.0	94	201.2	138	280.4	182	359.6
7	44.6	51	123.8	95	203.0	139	282.2	183	361.4
8	46.4	52	125.6	96	204.8	140	284.0	184	363.2
9	48.2	53	126.4	97	206.6	141	285.8	185	365.0
10	40.0	54	129.2	98	208.4	142	287.6	186	366.8
11	51.8	55	131.0	99	210.2	143	289.4	187	368.6
12	53.6	56	132.8	100	212.0	144	291.2	188	370.4
13	55.4	57	134.6	101	213.8	145	293.0	189	372.2
14	57.2	58	136.4	102	215.6	146	294.8	190	374.0
15	59.0	59	138.2	103	217.4	147	296.6	191	375.8
16	60.8	60	140.0	104	219.2	148	298.4	192	377.6
17	62.6	61	141.8	105	221.0	149	300.2	193	379.4
18	64.4	62	143.6	106	222.8	150	302.0	194	381.2
19	66.2	63	145.4	107	224.6	151	303.8	195	383.0
20	68.0	64	147.2	108	226.4	152	305.8	196	374.8
21	69.8	65	149.0	109	228.2	153	307.4	197	386.6
22	71.6	66	150.8	110	230.0	154	309.2	198	388.4
23	73.4	67	152.6	111	231.8	155	311.0	199	390.2
24	85.2	68	154.4	112	233.6	156	312.8	200	392.0

$$\therefore F = \frac{9}{5} C + 32 \quad \therefore C = \frac{5}{9} (F - 32)$$

25-7 TEMPERATURE CONVERSION DIAGRAM



HOW TO USE :

The outer scale is Centigrade, the inner is Fahrenheit.

Figures in () show the exact temperature corresponding to that specific temperature.

e.g. 1,000°F = 537.8°C

600°C = 1,112°F

25-8 WEIGHT CONVERSION TABLE

(1) Pound ↔ Kilogram

lb	kg
1	0.45
10	4.5
20	9.1
30	13.6
40	18.1
50	22.7
60	27.2
70	31.8
80	36.3
90	40.8
100	45.4
110	49.9
120	54.4
130	59.0
140	63.5
150	68.0
160	72.6
170	77.1
180	81.6
190	86.2
200	90.7
220	99.8
240	108.9

lb	kg
260	117.9
280	127.0
300	136.1
320	145.2
340	154.2
360	163.3
380	172.4
400	181.4
420	190.5
440	199.6
460	208.7
480	217.7
500	226.8
520	235.9
540	244.9
560	254.0
580	263.1
600	272.2
700	317.5
800	362.9
900	408.2
1000	453.6
1100	499.0

lb	kg
1200	544.3
1300	589.7
1400	635.0
1500	680.4
1600	725.8
1700	771.1
1800	816.5
1900	861.8
2000	907.2
2200	997.9
2400	1088.6
2600	1179.4
2800	1270.1
3000	1360.8
3200	1451.5
3400	1542.2
3600	1633.0
3800	1723.7
4000	1814.4
4200	1905.1
4400	1995.8
4600	2086.6

lb	kg
4800	2177.3
5000	2268.0
5200	2358.7
5400	2449.4
5600	2540.2
5800	2630.9
6000	2721.6
7000	3175.2
8000	3628.8
9000	4082.4
10000	4536.0
11000	4989.6
12000	5443.2
13000	5896.8
14000	6350.4
15000	6804.0
16000	7257.6
17000	7711.2
18000	8164.8
19000	8618.4
20000	9072.0

(2) Kilogram ↔ Pound

kg	lb
1	2.2
5	11
15	33
20	44
25	55
30	66
35	77
40	88
45	99
50	110
55	121
60	132
65	143
70	154
75	165
80	176
85	187
90	198
95	209
100	221
110	243
120	265

kg	lb
130	287
140	309
150	331
160	353
170	375
180	397
190	419
200	441
210	463
220	485
230	507
240	529
250	551
260	573
270	595
280	617
290	639
300	661
350	772
400	882
450	992
500	1102
550	1213

kg	lb
600	1323
650	1433
700	1543
750	1654
800	1764
850	1874
900	1984
950	2094
1000	2205
1100	2425
1200	2646
1300	2866
1400	3086
1500	3307
1600	3527
1700	3748
1800	3968
1900	4189
2000	4409
2100	4630
2200	4850
2300	5071
2400	5291

kg	lb
2500	5512
2600	5732
2700	5952
2800	6173
2900	6393
3000	6614
3500	7716
4000	8816
4500	9921
5000	11023
5500	12125
6000	13228
6500	14330
7000	15432
7500	16535
8000	17637
8500	18739
9000	19841
9500	20944
10000	22046

25-9 INCLINE CONVERSION TABLE

Degree	%
1	1.8
2	3.5
3	5.2
4	7.0
5	8.8
6	10.5
7	12.3
8	14.1
9	15.8
10	17.6
11	19.4
12	21.3
13	23.1
14	24.9
15	26.8

Degree	%
16	28.7
17	30.6
18	32.5
19	34.4
20	36.4
21	38.4
22	40.4
23	42.5
24	44.5
25	46.6
26	48.8
27	51.0
28	53.2
29	55.4
30	57.7

Degree	%
31	60.1
32	62.5
33	64.9
34	67.5
35	70.0
36	72.7
37	75.4
38	78.1
39	81.0
40	83.9
41	86.9
42	90.0
43	93.3
44	96.6
45	100.0

25-10 MATERIAL WEIGHT TABLE

- Bank Condition : Condition of natural ground at the time of excavation
- Loose Condition : Condition of soil pushing or of transportation

Example 1 Unit : kg/m³ (lb/yd³)

MATERIAL	Loose	Bank
Bauxite	1425 (2400)	1900 (3200)
Kalium	1485 (2500)	2200 (3700)
Cinders	650 (1100)	—
Clay Dry	1485 (2500)	1840 (3100)
Wet	1725 (2900)	2675 (4510)
Natural Condition	1650 (2780)	2015 (3400)
Clay and Sand Dry	1185 (2000)	1650 (2780)
Wet	1650 (2780)	1840 (3100)

Example 2 Unit : kg/m³ (lb/yd³)

MATERIAL	Loose	Bank
Coal Anthracite (Natural)	1190 (2000)	
Bituminous Coal (//)	950 (1600)	
Weathered Rock	1955 (3300)	2800 (4720)
75 % Rock, 25 % Soil	1725 (2900)	2290 (3800)
50 % Rock, 50 % Soil	1585 (2670)	1970 (3320)
25 % Rock, 75 % Soil		
Soil Dry	1550 (2610)	1780 (3000)
Wet	1725 (2900)	2075 (3500)
Loam	1250 (2110)	1600 (2700)
Granite	1650 (2780)	2725 (4590)

Example 3 Unit : kg/m³ (lb/yd³)

MATERIAL	Loose	Bank
Sand or Gravel Dry	1725 (2900)	2015 (3400)
Wet	2015 (3400)	2250 (3790)
Ore	1780 (3000)	2965 (5000)
Snow Dry	130 (220)	
Wet	515 (870)	
Crushed Stone	1600 (2700)	
Surface Soil	960 (1620)	1365 (2300)
Eruptive Rock	1725 (2910)	2600 (4380)

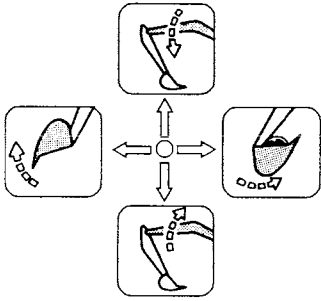
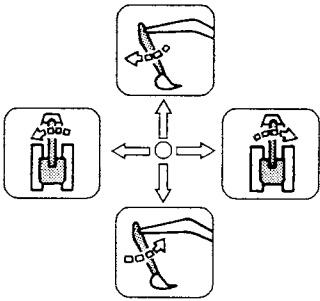
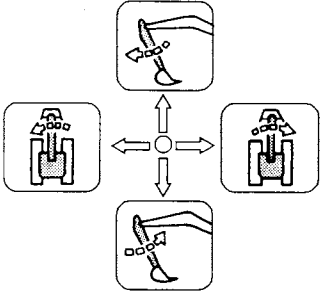
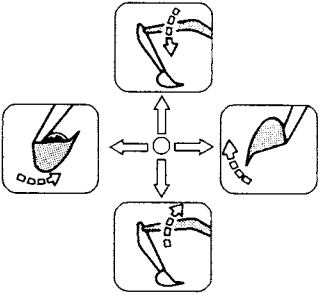
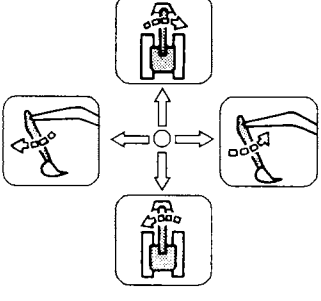
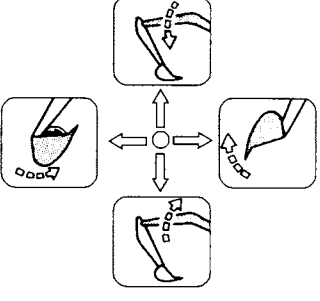
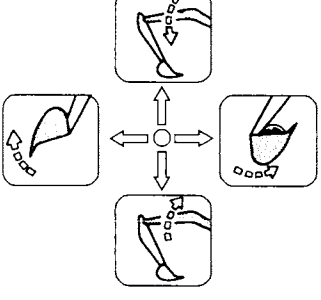
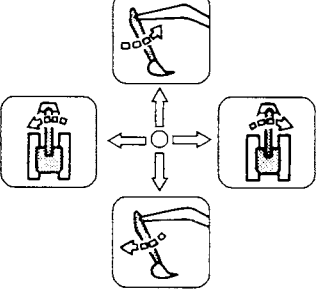
Example 4 Unit : kg/m³ (lb/yd³)

MATERIAL	Loose	Bank
Gravel Pit	1900 (3200)	2200 (3710)
Dry	1485 (2500)	1650 (2780)
Sand and Gravel	1600 (2700)	2015 (3400)
Gypsum	1600 (2700)	2015 (3400)
Limestone	1550 (2610)	2600 (4380)
Peat Dry	415 (700)	675 (1140)
Wet	800 (1350)	1340 (2260)
Moistened	1125 (1900)	1900 (3200)
Sandstone	1550 (2610)	2550 (4300)
Sand Dry	1425 (2400)	1600 (2700)
Wet	1680 (2830)	1900 (3200)
Moistened	1840 (3100)	2075 (3500)

25-11 LEVER (CONTROL) PATTERN LIST

CONTROL LEVER SYSTEM

● CONTROL LEVER PATTERNS

METHOD	LH CONTROL LEVER	RH CONTROL LEVER
K METHOD (KOBELCO)	 Boom and bucket lever	 Arm and swing lever
ISO METHOD	 Arm and swing lever	 Boom and bucket lever
H METHOD	 Arm and swing lever	 Boom and bucket lever
M METHOD	 Boom and bucket lever	 Arm and swing lever

25-12 SPECIAL SPANNER FOR TUBE

Applicable tube diameter mm (in)	Part No.	HEX mm (in)	Shape of a special spanner (in)
15 (0.59)	2421T160	27 (1.06)	
18 (0.71)	2421T138	32 (1.26)	
22 (0.87)	2421T130	36 (1.42)	
28 (1.10)	2421T115	41 (1.61)	
32 (1.26)	2421T232	50	
35 (1.38)	2421T314	55 (2.17)	

25-13 TIGHTENING TORQUES FOR CAPSCREWS AND NUTS

Use specified bolts and nuts and tighten them at specified torques according to the following table, unless otherwise specified.

Standard torques for metric coarse threads (No plating)

kgf•m (lb•ft)

Classification	4 T		7 T		10 T	
Nominal size	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 6 P = 1	0.45±0.05 (3.2±0.4)	0.38±0.04 (2.7±0.3)	0.98±0.1 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (12.8±1.3)	1.5±0.15 (10.8±1.1)
M 8 P = 1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.6±0.7)	2.4±0.2 (17.3±1.4)	2.0±0.2 (14.4±1.4)	4.3±0.4 (31.0±2.9)	3.6±0.4 (26.0±2.9)
M10 P = 1.5	2.2±0.2 (15.9±1.4)	1.83±0.18 (13.2±1.3)	4.7±0.5 (33.9±3.6)	4.0±0.4 (28.9±2.9)	8.5±0.9 (61.3±6.5)	7.2±0.7 (52.0±5.1)
M12 P = 1.75	3.7±0.4 (26.7±2.9)	3.2±0.3 (23.1±2.2)	8.1±0.8 (58.5±5.8)	6.8±0.7 (49.1±5.1)	14.6±1.5 (105±10.8)	12.3±1.2 (88.8±8.7)
M14 P = 2	5.9±0.6 (42.6±4.3)	5.0±0.5 (36.1±3.6)	12.8±1.3 (92.5±9.4)	10.8±1.1 (78.0±7.9)	23±2 (166±14)	19.5±1.9 (140±14)
M16 P = 2	9.0±0.9 (64.9±6.5)	7.6±0.7 (54.8±5.1)	19.5±2.0 (140±14.4)	16.4±1.6 (118±11.5)	35±4 (252±28.9)	29±3 (2.9±21.6)
M18 P = 2.5	12.4±1.2 (89.6±8.7)	10.5±1.0 (75.8±7.2)	27±3 (195±22)	23±2 (166±14)	49±5 (354±36)	41±4 (296±29)
M20 P = 2.5	17.5±1.7 (126±12.3)	14.7±1.4 (106±10.1)	38±4 (274±29)	32±3 (231±22)	68±7 (491±51)	57±6 (412±43)
M22 P = 2.5	23±2 (166±14)	19.6±2.0 (142±14)	51±5 (368±36)	43±4 (310±29)	92±9 (663±65)	77±8 (555±58)
M24 P = 3	30±3 (217±22)	24±3 (173±22)	65±7 (469±51)	53±5 (383±36)	118±12 (852±87)	96±10 (693±72)
M27 P = 3	44±4 (318±29)	36±3 (260±22)	96±10 (693±72)	78±8 (563±58)	173±17 (1250±120)	140±14 (1010±100)
M30 P = 3.5	60±6 (433±43)	50±5 (361±36)	131±13 (946±94)	110±11 (794±79)	235±24 (1700±170)	198±20 (1430±140)
M33 P = 3.5	81±8 (585±58)	68±7 (491±51)	176±18 (1270±130)	148±15 (1070±110)	317±32 (2290±230)	266±27 (1920±200)
M36 P = 4	105±10 (758±72)	88±9 (636±65)	227±23 (1640±170)	190±19 (1370±140)	409±41 (2950±300)	343±34 (2480±250)

Standard torques for metric fine threads (No plating)

kgf•m (lb•ft)

Classification	4 T		7 T		10 T	
Nominal size	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 8 P = 1	1.15±0.11 (8.3±0.8)	0.97±0.1 (7.0±0.7)	2.5±0.2 (18.0±1.4)	2.1±0.2 (15.2±1.4)	4.5±0.4 (32.5±2.9)	3.8±0.4 (27.4±2.9)
M10 P = 1.25	2.3±0.2 (16.6±1.4)	1.91±0.19 (13.8±1.4)	4.9±0.5 (35.4±3.6)	4.2±0.4 (30.3±2.9)	8.9±0.9 (64.2±6.5)	7.5±0.7 (54.2±5.1)
M12 P = 1.25	4.0±0.4 (28.9±2.9)	3.4±0.3 (24.5±2.2)	8.7±0.9 (62.8±6.5)	7.3±0.7 (52.7±5.1)	15.7±1.6 (113±12)	13.2±1.3 (95.3±9.4)
M16 P = 1.5	9.4±0.9 (67.9±6.5)	7.9±0.8 (57.0±5.8)	20±2 (144±14)	17.2±1.7 (124±12)	37±4 (267±29)	31±3 (224±22)
M20 P = 1.5	19±1.9 (137±14)	15.8±1.6 (114±12)	41±4 (296±29)	34±3 (246±22)	74±7 (535±51)	62±6 (448±43)
M24 P = 2	32±3 (231±22)	27±3 (195±22)	70±7 (506±51)	58±6 (419±43)	126±12 (910±87)	105±10 (758±72)
M30 P = 2	65±6 (469±43)	54±5 (390±36)	142±14 (1030±100)	118±12 (852±87)	255±26 (1840±190)	212±21 (1530±150)
M33 P = 2	87±9 (630±65)	72±7 (520±50)	190±19 (1370±137)	158±16 (1140±115)	341±34 (2470±245)	284±28 (2050±200)
M36 P = 3	109±11 (787±79)	91±9 (657±65)	238±23 (1720±170)	198±20 (1430±140)	428±43 (3090±310)	357±36 (2580±260)

