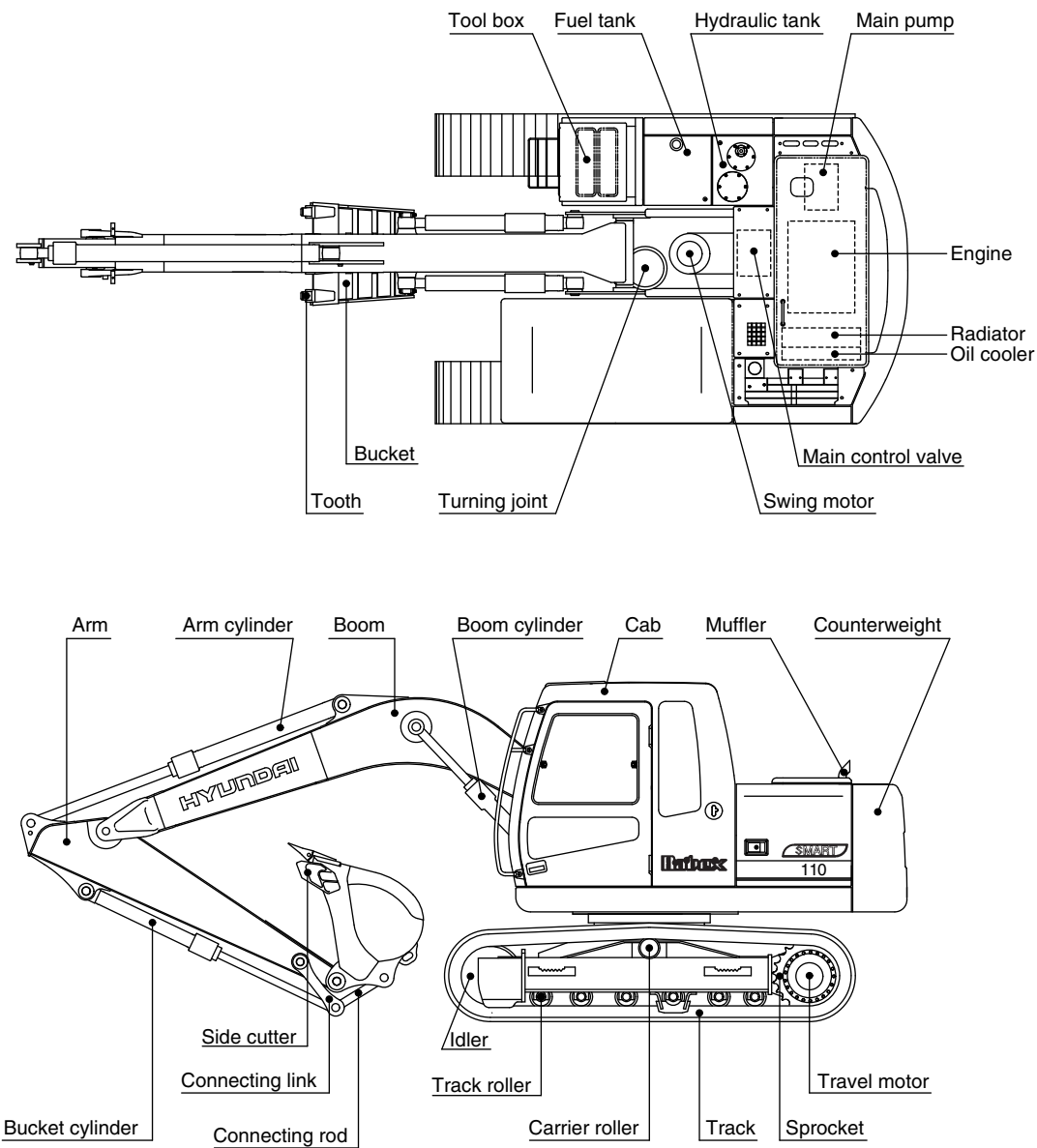


1. MAJOR COMPONENT

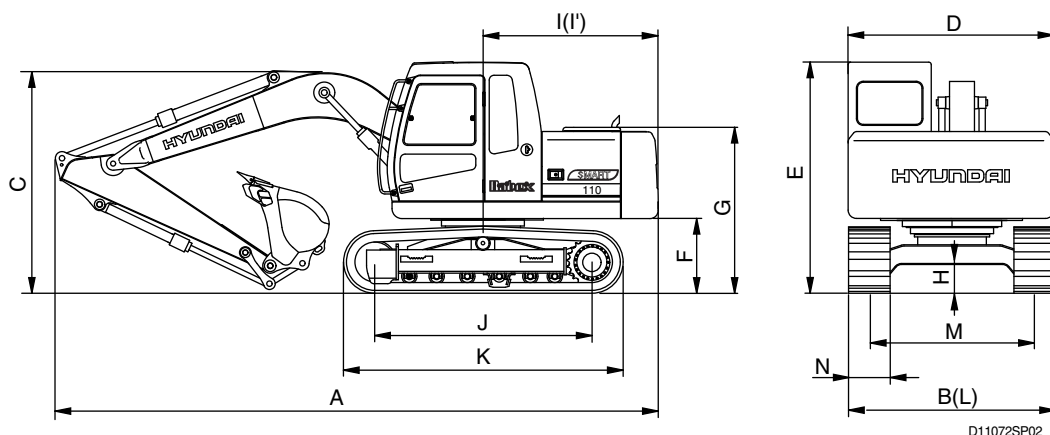


D11072SP01

2. SPECIFICATIONS

1) R110

(1) 4.3m(14' 1") MONO BOOM, 1.96m(6' 5") ARM

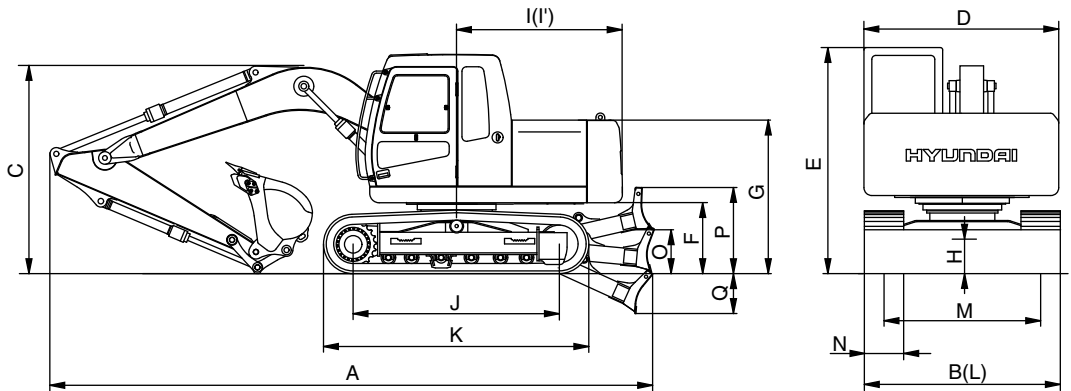


D11072SP02

Description		Unit	Specification
Operating weight		kg(lb)	11800(26222)
Bucket capacity(SAE heaped), standard		m ³ (yd ³)	0.60(0.78)
Overall length	A	mm(ft-in)	7240(23' 9")
Overall width, with 500mm shoe	B		2490(8' 2")
Overall height	C		2550(8' 4")
Superstructure width	D		2475(8' 1")
Overall height of cab	E		2800(9' 2")
Ground clearance of counterweight	F		900(2' 11")
Engine cover height	G		1990(6' 6")
Minimum ground clearance	H		440(1' 5")
Rear-end distance	I		2110(6' 11")
Rear-end swing radius	I'		2130(7' 0")
Distance between tumblers	J		2610(8' 7")
Undercarriage length	K		3340(10' 11")
Undercarriage width	L		2490(8' 2")
Track gauge	M		1990(6' 6")
Track shoe width, standard	N		500(20")
Travel speed(Low/high)		km/hr(mph)	3.4/5.5(2.1/3.4)
Swing speed		rpm	12.0
Gradeability		Degree(%)	35(70)
Ground pressure(500mm shoe)		kgf/cm ² (psi)	0.41(5.83)

2) R110

(1) 4.3m(14' 1") MONO BOOM, 1.96m(6' 5") ARM AND REAR DOZER BLADE



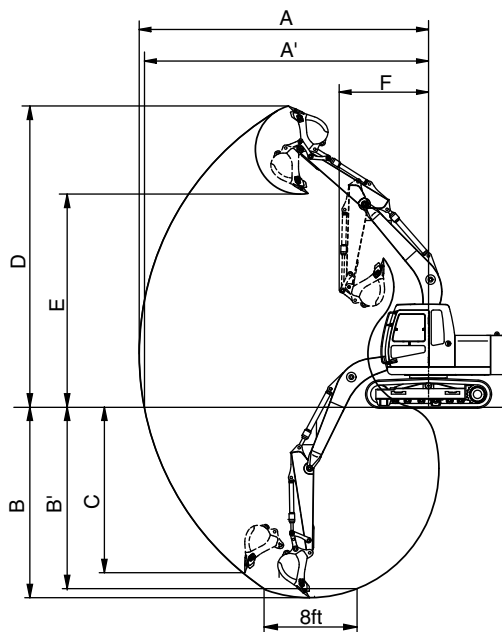
D11072SP02A

Description		Unit	Specification
Operating weight		kg(lb)	11800(26222)
Bucket capacity(SAE heaped), standard		m ³ (yd ³)	0.60(0.78)
Overall length	A	mm(ft-in)	7620(25' 0")
Overall width, with 500mm shoe	B		2490(8' 2")
Overall height	C		2550(8' 4")
Superstructure width	D		2475(8' 1")
Overall height of cab	E		2800(9' 2")
Ground clearance of counterweight	F		900(2' 11")
Engine cover height	G		1990(6' 6")
Minimum ground clearance	H		440(1' 5")
Rear-end distance	I		2110(6' 11")
Rear-end swing radius	I'		2130(7' 0")
Distance between tumblers	J		2610(8' 7")
Undercarriage length	K		3340(10' 11")
Undercarriage width	L		2490(8' 2")
Track gauge	M		1990(6' 6")
Track shoe width, standard	N		500(20")
Height of blade	O		550(1' 10")
Ground clearance of blade up	P		500(1' 8")
Depth of blade down	Q		520(1' 8")
Travel speed(Low/high)		km/hr(mph)	3.4/5.5(2.1/3.4)
Swing speed		rpm	12.0
Gradeability		Degree(%)	35(70)
Ground pressure(500mm shoe)		kgf/cm ² (psi)	0.42(5.97)

3. WORKING RANGE

1) R110

(1) 4.3m(14' 1") MONO BOOM

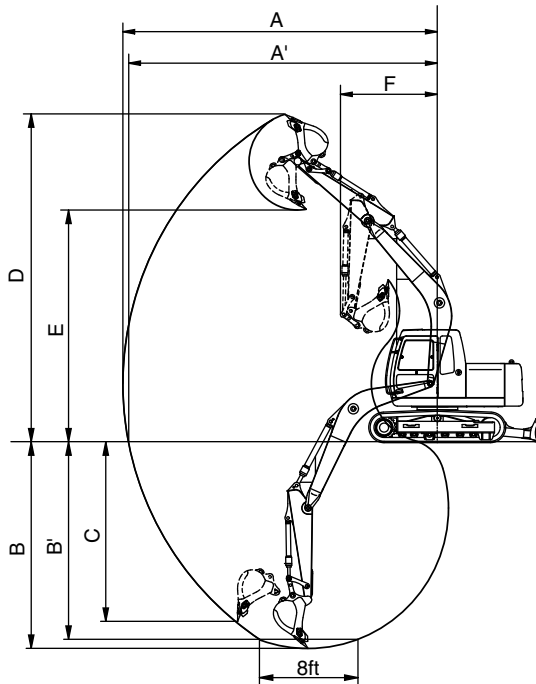


D11072SP03

Description		1.96m(6' 5") Arm	2.26m(7' 5") Arm
Max digging reach	A	7460mm (24' 6")	7740mm (25' 5")
Max digging reach on ground	A'	7320mm (24' 0")	7610mm (25' 0")
Max digging depth	B	4770mm (15' 8")	5090mm (16' 8")
Max digging depth (8ft level)	B'	4510mm (14' 10")	4870mm (16' 0")
Max vertical wall digging depth	C	4070mm (13' 4")	4430mm (14' 6")
Max digging height	D	7900mm (25' 11")	8070mm (26' 6")
Max dumping height	E	5540mm (18' 2")	5710mm (18' 9")
Min swing radius	F	2340mm (7' 8")	2380mm (7' 10")
Bucket digging force	SAE	78.5 kN	78.5 kN
		8000 kgf	8000 kgf
		17640 lbf	17640 lbf
	ISO	90.2 kN	90.2 kN
		9200 kgf	9200 kgf
		20280 lbf	20280 lbf
Arm digging force	SAE	60.2 kN	55.7 kN
		6140 kgf	5680 kgf
		13540 lbf	12520 lbf
	ISO	62.9 kN	58.1 kN
		6410 kgf	5920 kgf
		14130 lbf	13050 lbf

2) R110

(1) 4.3m(14' 1") MONO BOOM



D11072SP04

Description		1.96m(6' 5") Arm	2.26m(7' 5") Arm
Max digging reach	A	7460mm (24' 6")	7740mm (25' 5")
Max digging reach on ground	A'	7320mm (24' 0")	7610mm (25' 0")
Max digging depth	B	4770mm (15' 8")	5090mm (16' 8")
Max digging depth (8ft level)	B'	4510mm (14'10")	4870mm (16' 0")
Max vertical wall digging depth	C	4070mm (13' 4")	4430mm (14' 6")
Max digging height	D	7900mm (25'11")	8070mm (26' 6")
Max dumping height	E	5540mm (18' 2")	5710mm (18' 9")
Min swing radius	F	2340mm (7' 8")	2380mm (7'10")
Bucket digging force	SAE	78.5 kN	78.5 kN
		8000 kgf	8000 kgf
		17640 lbf	17640 lbf
	ISO	90.2 kN	90.2 kN
		9200 kgf	9200 kgf
		20280 lbf	20280 lbf
Arm digging force	SAE	60.2 kN	55.7 kN
		6140 kgf	5680 kgf
		13540 lbf	12520 lbf
	ISO	62.9 kN	58.1 kN
		6410 kgf	5920 kgf
		14130 lbf	13050 lbf

4. WEIGHT

1) R110

Item	kg	lb
Upperstructure assembly	3300	7280
Main frame weld assembly	1030	2270
Engine assembly	550	1210
Main pump assembly	90	200
Main control valve assembly	130	260
Swing motor assembly	80	180
Hydraulic oil tank assembly	180	400
Fuel tank assembly	130	290
Counterweight	1450	3200
Cab assembly	310	680
Lower chassis assembly	3990	8800
Track frame weld assembly	1260	2780
Swing bearing	160	250
Travel motor assembly	330	730
Turning joint	60	130
Track recoil spring	210	460
Idler	390	860
Carrier roller	30	66
Track roller	300	660
Track-chain assembly(500mm standard triple grouser shoe)	1350	2980
Front attachment assembly(4.3m boom, 1.96m arm, 0.60m³ SAE heaped bucket)	1680	3700
4.3m boom assembly	740	1630
1.96m arm assembly	320	710
0.60m³ SAE heaped bucket	500	1100
Boom cylinder assembly	230	510
Arm cylinder assembly	140	310
Bucket cylinder assembly	90	200
Bucket control link assembly	80	180

5. LIFTING CAPACITIES

1) R110

(1) 4.3m(14' 1") boom, 2.26m(7' 5") arm equipped with 0.45m³(SAE heaped) bucket and 500mm(20") triple grouser shoe.

Load point height		Load radius								At max. reach		
		1.5m(5ft)		3.0m(10ft)		4.5m(15ft)		6.0m(20ft)		Capacity		Reach
												m(ft)
6.0m (20ft)	kg lb					*1750 *3860	*1750 *3860			*1750 *3860	*1560 *3440	5.99 (19.7)
4.5m (15ft)	kg lb					*1790 *3950	*1790 *3950	*1530 *3370	1490 3280	1520 3350	1130 2490	6.92 (22.7)
3.0m (10ft)	kg lb			*2820 *6220	*2820 *6220	*2270 *5000	*2270 *5000	1940 4280	1450 3200	1300 2870	940 2070	7.38 (24.2)
1.5m (5ft)	kg lb			*4700 *10360	4370 9630	*2970 *6550	2250 4960	1840 4060	1360 3000	1240 2730	880 1940	7.46 (24.5)
Ground Line	kg lb			5660 12480	3950 8710	2830 6240	2060 4540	1760 3880	1280 2820	1300 2870	930 2050	7.18 (23.6)
-1.5m (-5ft)	kg lb	*5580 *12300	*5580 *12300	5550 12240	3850 8490	2740 6040	1980 4370	1720 3790	1240 2730	1560 3440	1130 2490	6.49 (21.3)
-3.0m (-10ft)	kg lb	*8530 *18810	*8530 *18810	*5440 *11990	3930 8660	2770 6110	2010 4430			*2270 *5000	1730 3810	5.17 (17.0)

(2) 4.3m(14' 1") boom, 1.96m(6' 5") arm equipped with 0.60m³(SAE heaped) bucket and 500mm(20") triple grouser shoe.

Load point height		Load radius								At max. reach		
		1.5m(5ft)		3.0m(10ft)		4.5m(15ft)		6.0m(20ft)		Capacity		Reach
												m(ft)
6.0m (20ft)	kg lb					*1730 *3810	*1730 *3810			*1770 *3900	1670 3680	5.62 (18.4)
4.5m (15ft)	kg lb					*1900 *4190	*1900 *4190			1570 3460	1140 2510	6.62 (21.7)
3.0m (10ft)	kg lb			*3110 *6860	*3110 *6860	*2360 *5200	2350 5180	1830 4030	1340 2950	1310 2890	930 2050	7.10 (23.3)
1.5m (5ft)	kg lb			*4890 *10780	4110 9060	2890 6370	2110 4650	1740 3840	1250 2760	1240 2730	870 1920	7.18 (23.6)
Ground Line	kg lb			5440 11990	3750 8270	2700 5950	1940 4280	1660 3660	1180 2600	1320 2910	920 2030	6.89 (22.6)
-1.5m (-5ft)	kg lb	*6140 *13540	*6140 *13540	5390 11880	3700 8160	2630 5800	1870 4120			1630 3590	1160 2560	6.15 (20.2)
-3.0m (-10ft)	kg lb	*9120 *20110	*9120 *20110	*5020 *11070	3830 8440	2710 5970	1940 4280					

- Note
1. Lifting capacity are based on SAE J1097 and ISO 10567.
 2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
 3. The load point is a hook located on the back of the bucket.
 4. *indicates load limited by hydraulic capacity.

(3) 4.3m(14' 1") boom, 2.26m(7' 5") arm equipped with 0.45m³(SAE heaped) bucket and 500mm(20") triple grouser shoe, and rear dozer blade down.

•  : Rating over-front

•  : Rating over-side or 360 degree

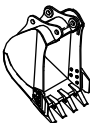
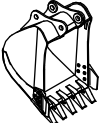
Load point height		Load radius								At max. reach		
		1.5m(5ft)		3.0m(10ft)		4.5m(15ft)		6.0m(20ft)		Capacity		Reach
												m(ft)
6.0m (20ft)	kg lb					*1750 *3860	*1750 *3860			*1750 *3860	*1750 *3860	5.99 (19.7)
4.5m (15ft)	kg lb					*1790 *3950	*1790 *3950	*1530 *3370	*1530 *3370	1650 3640	1340 2950	6.92 (22.7)
3.0m (10ft)	kg lb			*2820 *6220	*2820 *6220	*2270 *5000	*2270 *5000	*2060 *4540	1710 3770	1420 3130	1140 2510	7.38 (24.2)
1.5m (5ft)	kg lb			*4700 *10360	*4700 *10360	*2970 *6550	2650 5840	2000 4410	1620 3570	1360 3000	1080 2380	7.46 (24.5)
Ground Line	kg lb			*5860 *12920	4750 10470	3060 6750	2460 5420	1910 4210	1540 3400	1430 3150	1140 2510	7.18 (23.6)
-1.5m (-5ft)	kg lb	*5580 *12300	*5580 *12300	5980 13180	4640 10230	2970 6550	2370 5220	1880 4140	1500 3310	1700 3750	1360 3000	6.49 (21.3)
-3.0m (-10ft)	kg lb	*8530 *18810	*8530 *18810	*5440 *11990	4720 10410	3000 6610	2400 5290			*2270 *5000	2050 4520	5.17 (17.0)

(4) 4.3m(14' 1") boom, 1.96m(6' 5") arm equipped with 0.60m³(SAE heaped) bucket and 500mm(20") triple grouser shoe, and rear dozer blade down.

Load point height		Load radius								At max. reach		
		1.5m(5ft)		3.0m(10ft)		4.5m(15ft)		6.0m(20ft)		Capacity		Reach
												m(ft)
6.0m (20ft)	kg lb					*1730 *3810	*1730 *3810			*1770 *3900	*1770 *3900	5.62 (18.4)
4.5m (15ft)	kg lb					*1900 *4190	*1900 *4190			1700 3750	1370 3020	6.62 (21.7)
3.0m (10ft)	kg lb			*3110 *6860	*3110 *6860	*2360 *5200	*2360 *5200	1990 4390	1600 3530	1440 3170	1140 2510	7.10 (23.3)
1.5m (5ft)	kg lb			*4890 *10780	*4890 *10780	*3010 *6640	2510 5530	1900 4190	1520 3350	1360 3000	1070 2360	7.18 (23.6)
Ground Line	kg lb			*5810 *12810	4540 10010	2930 6460	2330 5140	1820 4010	1440 3170	1450 3200	1140 2510	6.89 (22.6)
-1.5m (-5ft)	kg lb	*6140 *13540	*6140 *13540	*5810 *12810	4490 9900	2860 6310	2270 5000			1780 3920	1410 3110	6.15 (20.2)
-3.0m (-10ft)	kg lb	*9120 *20110	*9120 *20110	*5020 *11070	4620 10190	2940 6480	2340 5160					

6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET

	
0.45m³ SAE heaped bucket	※ 0.60m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation	
					4.3m (14' 1") Mono boom	
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.96m arm (6' 5")	2.26m arm (7' 5")
0.45m³ (0.59yd³)	0.40m³ (0.52yd³)	830mm (32.7")	940mm (37.0")	430kg (950lb)		
※0.60m³ (0.79yd³)	0.52m³ (0.68yd³)	1020mm (40.2")	1130mm (44.5")	490kg (1080lb)		

※ : Standard bucket

 Applicable for materials with density of 2000kg/m³ (3370lb/yd³) or less

 Applicable for materials with density of 1600kg/m³ (2700lb/yd³) or less

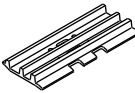
 Applicable for materials with density of 1100kg/m³ (1850lb/yd³) or less

7. UNDERCARRIAGE

1) TRACKS

X-leg type center frame is integrally welded with reinforced box-section track frames. The design includes dry tracks, lubricated rollers, idlers, sprockets, hydraulic track adjusters with shock absorbing springs and assembled track-type tractor shoes with triple grousers.

2) TYPES OF SHOES

Model	Shapes		Triple grouser
			
R110	Shoe width	mm(in)	500(20)
	Operating weight	kg(lb)	11800(26222)
	Ground pressure	kgf/cm ² (psi)	0.39(5.55)
	Overall width	mm(ft-in)	2490(8' 2")
R110	Overall width	mm(ft-in)	11900(26230)
	Overall width	mm(ft-in)	0.42(5.97)
	Overall width	mm(ft-in)	2500(8' 2")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	1EA
Track rollers	6EA
Track shoes	41EA

4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

Method of selecting shoes

Confirm the category from the list of applications in **table 2**, then use **table 1** to select the shoe. Wide shoes (Categories B and C) have limitations on applications. Before using wide shoes, check the precautions, then investigate and study the operating conditions to confirm if these shoes are suitable.

Select the narrowest shoe possible to meet the required flotation and ground pressure. Application of wider shoes than recommendations will cause unexpected problem such as bending of shoes, crack of link, breakage of pin, loosening of shoe bolts and the other various problems.

※ **Table 1**

Track shoe	Specification	Category
500mm triple grouser	Standard	A

※ **Table 2**

Category	Applications	Precautions
A	Rocky ground, river beds, normal soil	• Travel at low speed on rough ground with large obstacles such as boulders or fallen trees

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Kirloskar 4R1040T
Type	4-cycle turbocharged diesel engine
Cooling method	Water cooling
Number of cylinders and arrangement	4 cylinders, in-line
Firing order	1-3-4-2
Combustion chamber type	Direct injection type
Cylinder bore × stroke	105 × 120mm(4.13" × 4.72")
Piston displacement	4160cc(254cu in)
Compression ratio	17:1
Rated gross horse power(SAE J1995)	94Hp at 1950rpm(70kW at 1950rpm)
Maximum torque at 1500rpm	38.3kgf · m(276lbf · ft)
Engine oil quantity	11.5 l (3.0U.S. gal)
Dry weight	550kg(1213lb)
High idling speed	2069+50rpm
Low idling speed	750 ± 50rpm
Rated fuel consumption	163g/Hp · hr at 1950rpm
Starting motor	LUCAS 24V, 5.0 kW
Alternator	LUCAS 24V, 55A
Battery	2 × 12V × 80Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 57.5cc/rev
Maximum pressure	330kgf/cm ² (4694psi)
Rated oil flow	2 × 112 l /min (2 × 29.6U.S.gpm)
Rated speed	1950rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15cc/rev
Maximum pressure	35kgf/cm ² (500psi)
Rated oil flow	29.3 l /min(7.7U.S.gpm/6.4U.K.gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	11 spools mono-block
Operating method	Hydraulic pilot system
Main relief valve pressure	330kgf/cm ² (4695psi)
Overload relief valve pressure	380kgf/cm ² (5550psi)

5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	64.3cc/rev
Relief pressure	240kgf/cm ² (3414psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	25kgf · m ² (181lbf · ft)
Brake release pressure	33~50kgf/cm ² (469~711psi)
Reduction gear type	2 - stage planetary
Swing speed	13.0rpm

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	330kgf/cm ² (4695psi)
Reduction gear type	2 stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	Less then 9kgf/cm ² (128psi)
Braking torque	24.36kgf · m ² (176lbf · ft)

7) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5kgf/cm ² (92psi)
	Maximum	26kgf/cm ² (370psi)
Single operation stroke	Lever	61mm(2.4in)
	Pedal	123mm(4.84in)

8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 95 × ∅ 70 × 1015mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅ 110 × ∅ 75 × 1070mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 95 × ∅ 65 × 855mm
	Cushion	Extend only
Dozer cylinder	Bore dia × Rod dia × Stroke	∅ 100 × ∅ 70 × 240mm
	Cushion	-

※ **Discoloration of cylinder rod can occur when the friction reduction additive of lubrication oil spreads on the rod surface.**

※ **Discoloration does not cause any harmful effect on the cylinder performance.**

9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R110	Standard	500mm(20")	0.39kgf/cm ² (5.55psi)	41	2490mm(8' 2")

10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R110	STD	0.60m ³ (0.79yd ³)	0.52m ³ (0.68yd ³)	5	1020mm(40.2")	1130mm(44.5")
	OPT	0.45m ³ (0.59yd ³)	0.40m ³ (0.52yd ³)	4	830mm(32.7")	940mm(37.0")

9. RECOMMENDED OILS

Use only oils listed below or equivalent.

Do not mix different brand oil.

Service point	Kind of fluid	Capacity l (U.S. gal)	Ambient temperature °C(°F)						
			-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Engine oil pan	Engine oil	11.50(3.04)				SAE 30			
			SAE 10W						
			SAE 10W-30						
				SAE 15W-40					
Swing drive	Gear oil	2.5(0.7)		SAE 85W-140					
Final drive		2.5×2 (0.7 × 2)							
Swing drive	Grease	0.35(0.09)	NLGI NO.1						
					NLGI NO.2				
Hydraulic tank	Hydraulic oil	Tank:100(26.4) System: 210(55.5)	ISO VG 32						
				ISO VG 46					
				ISO VG 68					
Fuel tank	Diesel fuel	250(66.0)	ASTM D975 NO.1						
					ASTM D975 NO.2				
Fitting (Grease nipple)	Grease	As required	NLGI NO.1						
					NLGI NO.2				
Radiator (Reservoir tank)	Mixture of antifreeze and water 50 : 50	24(6.3)		Ethylene glycol base permanent type					

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material