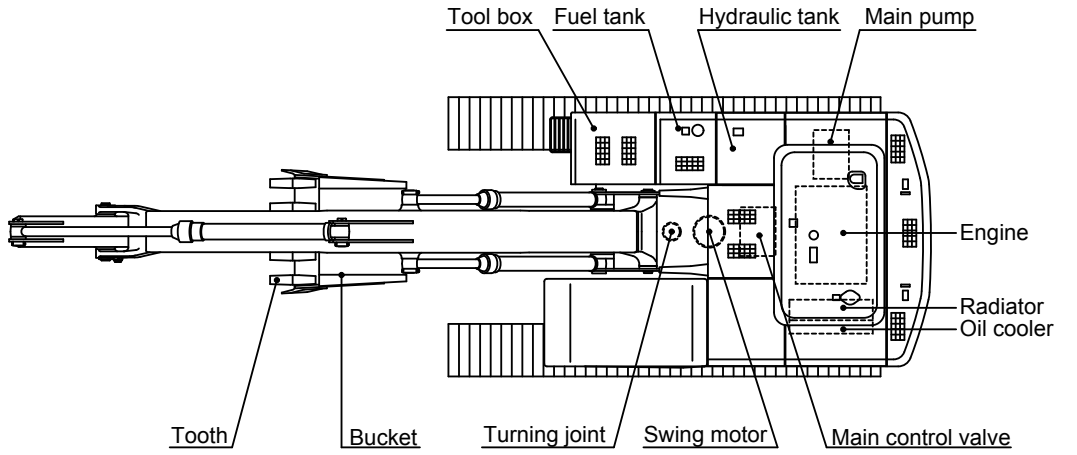
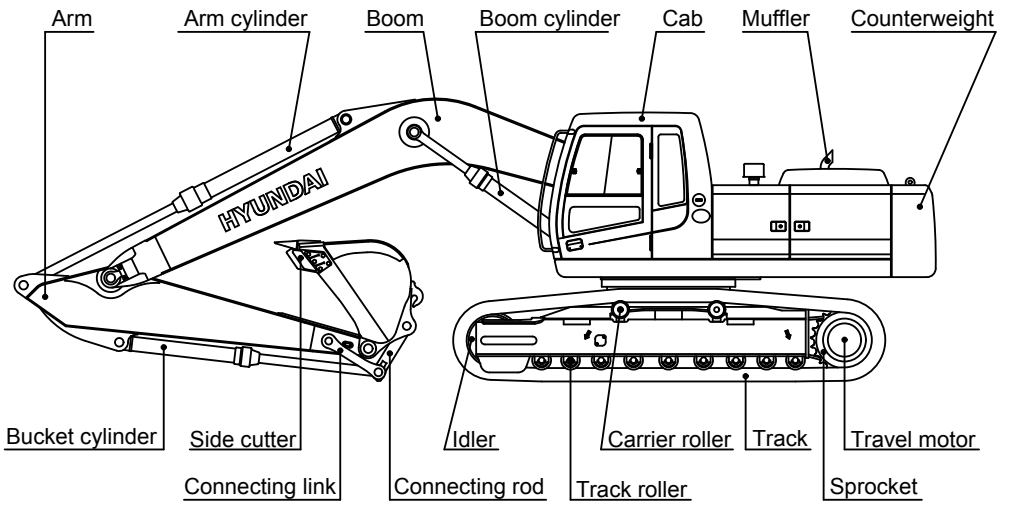
1. MAJOR COMPONENT

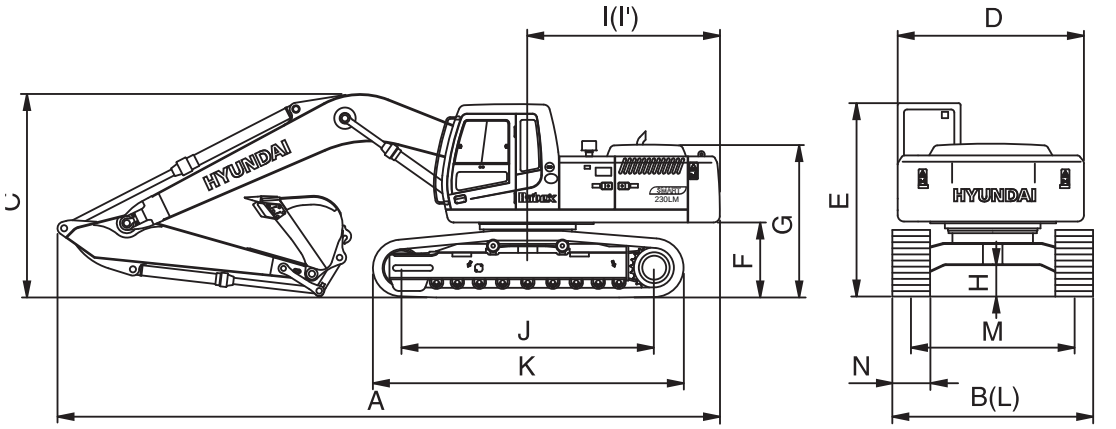




RD21072SP01

2. SPECIFICATIONS

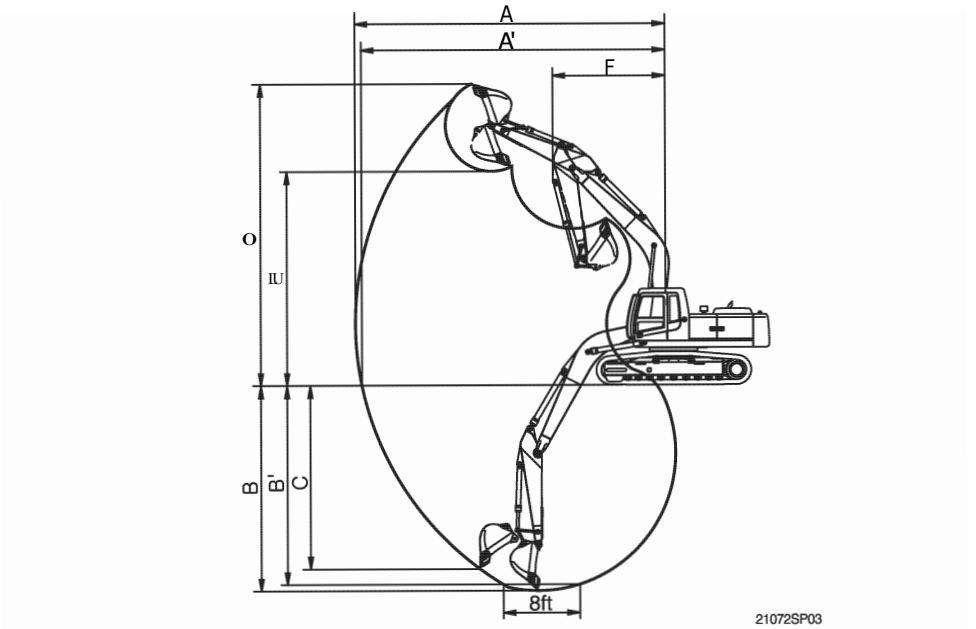
1) R230LM



RD22072SP02

Description		Unit	Specification
Operating weight		kg(lb)	23500 (51700)
Bucket capacity(SAE heaped), standard		$m^3(yd^3)$	1.05(1.37)
Overall length	A	mm(ft-in)	9570(31' 5")
Overall width, with 600mm shoe	B		2990(9' 10")
Overall height	C		3110(10' 2")
Superstructure width	D		2700(8' 10")
Overall height of cab	E		2920(9' 7")
Ground clearance of counterweight	F		1060(3' 6")
Engine cover height	G		2320(7' 7")
Minimum ground clearance	H		480(1' 7")
Rear-end distance	I		2770(9' 1")
Rear-end swing radius	I'		2830(9' 3")
Distance between tumblers	J		3650(12' 0")
Undercarriage length	K		4440(14' 7")
Undercarriage width	L		2990(9' 10")
Track gauge	M		2390(7' 10")
Track shoe width, standard	N		600(24")
Travel speed(Low/high)		km/hr(mph)	3.4/5.3(2.1/3.3)
Swing speed		rpm	11.0
Gradeability		Degree(%)	35(70)
Ground pressure(600mm shoe)		$kgf/cm^2(psi)$	0.46(6.54)

1) **R230LM** [5.68m(18' 8") BOOM]



Description		*2.40m(7' 10") Arm
Max digging reach	A	9500mm (31' 2")
Max digging reach on ground	A'	9330mm (r ° 7")
Max digging depth	B	6220mm (2<Y 5''
Max digging deplh(Bfl level)	B'	6010mm (1g 9")
Max vertical wall digging depth	C	5720mm (18' 9")
Max digging height	D	9340mm (r ° 8")
Max dumping height	E	6520mm (21' 5")
Min swing radius	F	3740mm (12' 3")
Bucket digging force		133kN
	SAE	13600 kgf
		29980 lbf
		152kN
	ISO	15500 kgf
		34170 lbf
Arm digging force		113 kN
	SAE	11500 kgf
		25350 lbf
		118 kN
	ISO	12000 kgf
		26460 lbf

* : Standard

4. WEIGHT

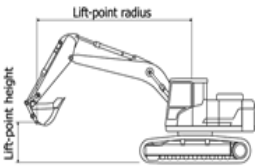
1) R230LM

Item	R230LM	
	kg	lb
Upperstructure assembly	8950	19730
Main frame weld assembly	1720	3790
Engine assembly	530	1170
Main pump assembly	120	265
Main control valve assembly	200	440
Swing motor assembly	190	420
Hydraulic oil tank assembly	240	530
Fuel tank assembly	195	430
Counterweight	4400	9700
Cab assembly	310	680
Lower chassis assembly	8700	19180
Track frame weld assembly	2720	6000
Swing bearing	260	570
Travel motor assembly	305	670
Turning joint	55	120
Track recoil spring	140	310
Idler	170	370
Carrier roller	20	45
Track roller	50	110
Track-chain assembly(600㎜ standard triple grouser shoe)	1400	3090
Front attachment assembly(5.68m boom, 2.4m arm, 1.05m^3 SAE heaped bucket)	4005	8830
5.68m boom assembly	1530	3370
2.4m arm assembly	670	1480
1.05m^3 SAE heaped bucket	810	1790
Boom cylinder assembly	180	400
Arm cylinder assembly	290	640
Bucket cylinder assembly	175	390
Bucket control link assembly	170	370

5. LIFTING CAPACITIES

1) R230LM

(1) 5.68m(18' 8") boom, 2.40m(7' 10") arm equipped with 1.05㎥(SAE heaped) bucket, 600mm(24") triple grouser shoe and 4400kg counterweight.



- : Rating over-front
- : Rating over-side or 360 degree

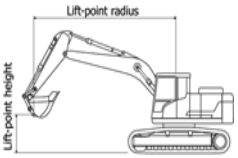
Lift-point height (m/ft)		Lift-point radius								At max. reach		
		3.0m (9.8ft)		4.5m (14.8ft)		6.0m (19.7ft)		7.5m (24.6ft)		Capacity		Reach
												m(ft)
7.5m	kg									*3910	*3910	5.70
24.6ft	lb									*8620	*8620	(18.7)
6.0m	kg					*3830	*3830			*3850	3740	6.91
19.7ft	lb					*8440	*8440			*8490	8250	(22.7)
4.5m	kg			*5000	*5000	*4240	*4240	*3930	3120	*3920	3000	7.64
14.8ft	lb			*11020	*11020	*9350	*9350	*8660	6880	*8640	6610	(25.1)
3.0m	kg			*6520	*6520	*4930	4390	*4200	2990	*4060	2640	8.02
9.8ft	lb			*14370	*14370	*10870	9680	*9260	6590	*8950	5820	(26.3)
1.5m	kg			*7920	6340	*5630	4090	*4540	2850	4250	2500	8.11
4.9ft	lb			*17460	13980	*12410	9020	*10010	6280	9370	5510	(26.6)
0.0m	kg	*6110	*6110	*8630	6040	*6120	3900	4720	2750	4350	2530	7.90
0.0ft	lb	*13470	*13470	*19030	13320	*13490	8600	10410	6060	9590	5580	(25.9)
-1.5m	kg	*11070	*11070	*8640	5970	*6230	3830			*4800	2800	7.39
-4.9ft	lb	*24410	*24410	*19050	13160	*13730	8440			*10580	6170	(24.2)
-3.0m	kg	*11460	*11460	*7970	6080	*5750	3900			*5130	3480	6.49
-9.8ft	lb	*25260	*25260	*17570	13400	*12680	8600			*11310	7670	(21.3)
-4.5m	kg	*8770	*8770	*6160	*6160					*5380	*5380	5.00
-14.8ft	lb	*19330	*19330	*13580	*13580					*11860	*11860	(16.4)

Notes:
1. Lifting capacity are based on 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 Lift-point is a hook (standard equipment) located on the back of the bucket.
4. (*) indicates load limited by hydraulic capacity.

5. LIFTING CAPACITIES

R230LM

(2) 5.68m(18' 8") boom, 2.40m(7' 10") arm equipped with 1.05m³(SAE heaped) bucket, 600mm(24") triple grouser shoe and 4400kg counterweight.



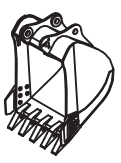
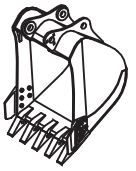
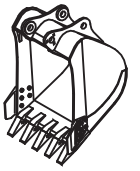
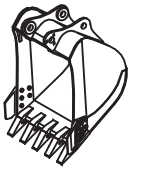
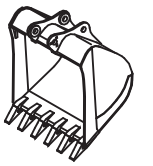
- : Rating over-front
- : Rating over-side or 360 degree

Lift-point height (m/ft)		Lift-point radius								At max. reach		
		3.0m (9.8ft)		4.5m (14.8ft)		6.0m (19.7ft)		7.5m (24.6ft)		Capacity		Reach
												m(ft)
7.5m	kg									*3910	*3910	5.70
24.6ft	lb									*8620	*8620	(18.7)
6.0m	kg					*3830	*3830			*3850	3740	6.91
19.7ft	lb					*8440	*8440			*8490	8250	(22.7)
4.5m	kg			*5000	*5000	*4240	*4240	*3930	3120	*3920	3000	7.64
14.8ft	lb			*11020	*11020	*9350	*9350	*8660	6880	*8640	6610	(25.1)
3.0m	kg			*6520	*6520	*4930	4390	*4200	2990	*4060	2640	8.02
9.8ft	lb			*14370	*14370	*10870	9680	*9260	6590	*8950	5820	(26.3)
1.5m	kg			*7920	6340	*5630	4090	*4540	2850	4250	2500	8.11
4.9ft	lb			*17460	13980	*12410	9020	*10010	6280	9370	5510	(26.6)
0.0m	kg	*6110	*6110	*8630	6040	*6120	3900	4720	2750	4350	2530	7.90
0.0ft	lb	*13470	*13470	*19030	13320	*13490	8600	10410	6060	9590	5580	(25.9)
-1.5m	kg	*11070	*11070	*8640	5970	*6230	3830			*4800	2800	7.39
-4.9ft	lb	*24410	*24410	*19050	13160	*13730	8440			*10580	6170	(24.2)
-3.0m	kg	*11460	*11460	*7970	6080	*5750	3900			*5130	3480	6.49
-9.8ft	lb	*25260	*25260	*17570	13400	*12680	8600			*11310	7670	(21.3)
-4.5m	kg	*8770	*8770	*6160	*6160					*5380	*5380	5.00
-14.8ft	lb	*19330	*19330	*13580	*13580					*11860	*11860	(16.4)

Notes:
1. **Lifting capacity are based on 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 Lift-point is bucket pivot mounting pin on the arm(without bucket mass).**
4. **(*) indicates load limited by hydraulic capacity.**

6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET

				
0.80m³ SAE heaped bucket	0.92m³ SAE heaped bucket	※ 1.05m³ SAE heaped bucket	1.20m³ SAE heaped bucket	1.34m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation
					5.68m (18' 8") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4m arm (7' 10")
0.80m³ (1.05yd³)	0.70m³ (0.92yd³)	1000mm (39.4")	1120mm (44.1")	700kg (1540lb)	
0.92m³ (1.20yd³)	0.80m³ (1.05yd³)	1150mm (45.3")	1270mm (50.0")	770kg (1700lb)	
※ 1.05m³ (1.37yd³)	0.90m³ (1.18yd³)	1250mm (49.2")	1370mm (53.9")	810kg (1790lb)	
1.20m³ (1.57yd³)	1.00m³ (1.31yd³)	1400mm (55.1")	1520mm (59.8")	850kg (1870lb)	
1.34m³ (1.75yd³)	1.15m³ (1.50yd³)	1550mm (61.0")	1670mm (65.7")	920kg (2030lb)	

※ : Standard bucket

Applicable for materials with density of 2000kgf/m³ (3370lbf/yd³) or less

Applicable for materials with density of 1600kgf/m³ (2700lbf/yd³) or less

Applicable for materials with density of 1100kgf/m³ (1850lbf/yd³) or less

2) HEAVY DUTY, ROCK-HEAVY DUTY AND SLOPE FINISHING BUCKET

	
◈ 0.90, 1.05m³ SAE heaped bucket	⊙ 0.87, 0.95, 1.20m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation
					5.68m (18' 8") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.4m arm (7' 10")
◈0.90m³ (1.18yd³)	0.80m³ (1.05yd³)	1070mm (42.0")	-	810kg (1790lb)	
◈1.05m³ (1.37yd³)	0.92m³ (1.20yd³)	1290mm (50.8")	-	890kg (1960lb)	
⊙0.87m³ (1.14yd³)	0.75m³ (0.98yd³)	1140mm (44.9")	-	900kg (1980lb)	
⊙1.20m³ (1.57yd³)	1.00m³ (1.31yd³)	1410mm (55.5")	-	1030kg (2270lb)	
0.95m³ (1.25yd³)	0.83m³ (1.09yd³)	1240mm (44.9")	1360mm (53.5")	994kg (2191lb)	

◈ : Heavy duty bucket ⊙: Rock-Heavy duty bucket

Applicable for materials with density of 2000kgf/m³ (3370lbf/yd³) or less

Applicable for materials with density of 1600kgf/m³ (2700lbf/yd³) or less

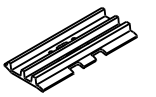
Applicable for materials with density of 1100kgf/m³ (1850lbf/yd³) or less

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	
				
R230LM	Shoe width	mm(in)	600(24)	800(32)
	Operating weight	kg(lb)	23500(51700)	24070(52954)
	Ground pressure	kgf/cm^2(psi)	0.46(6.54)	0.35(4.98)
	Overall width	mm(ft-in)	2990(9' 10")	3190(10' 6")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2EA
Track rollers	9EA
Track shoes	49EA

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
600㎜ triple grouser	Standard	A
800㎜ triple grouser	Option	B, C

※ **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
B	Normal soil, soft ground	· These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles
C	Extremely soft gound (Swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · These shoes cannot be used on rough ground with large obstacles such as boulders or fallen trees · Travel at high speed only on flat ground · Travel slowly at low speed if it is impossible to avoid going over obstacles

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins 6BTAA5.9 (Cummins-India)
Type	4-cycle turbocharged diesel engine, low emission
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	102 × 120mm(4.02" × 4.72")
Piston displacement	5880cc(359cu in)
Compression ratio	17.4 : 1
Rated gross horse power (SAE J1995)	148Hp at 2000rpm(110kW at 2000rpm)
Maximum torque at 1300rpm	62.9kgf · m(456lbf · ft)
Engine oil quantity	17 ℓ (4.49U.S. gal)
Dry weight	432kg(952lb)
High idling speed	2200＋50rpm
Low idling speed	1000 ± 100rpm
Rated fuel consumption	166.3g/Hp · hr at 2000rpm
Starting motor	24V-4.5kW
Alternator	Lucas TVS(24V-4.5A)
Battery	2 × 12V × 100Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 113cc/rev
Maximum pressure	330kgf/cm^2 (4694psi)
Rated oil flow	2 × 210 ℓ /min (55.5U.S. gpm/ 46.2U.K. gpm)

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	10cc/rev
Maximum pressure	35kgf/cm^2(500psi)
Rated oil flow	19.5 ℓ /min(5.2U.S. gpm/4.3U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	9 spools mono-block
Operating method	Hydraulic pilot system
Main relief valve pressure	330kgf/cm^2(4695psi)
Overload relief valve pressure	390kgf/cm^2(5550psi)

5) SWING MOTOR

Item	Specification
Type	Two fixed displacement axial piston motor
Capacity	151cc/rev
Relief pressure	240kgf/cm^2(3414psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	59kgf · m(427lbf · ft)
Brake release pressure	33~50kgf/cm^2(470~711psi)
Reduction gear type	2 - stage planetary
Swing speed	11.0rpm

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	11kgf/cm^2(156psi)
Braking torque	49.3kgf · m(357lbf · ft)

7) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5kgf/cm²(92psi)
	Maximum	26kgf/cm²(370psi)
Single operation stroke	Lever	61mm(2.4in)
	Pedal	123mm(4.84in)

8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 120× ø 85× 1290mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 140× ø 100× 1510mm #ø 140 × ø 95× 1460mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 125× ø 85× 1055mm #ø 100 × ø 70× 870mm
	Cushion	Extend only

※ **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.**

: LONG REACH

9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R230LM	Standard	600mm(24")	0.46kgf/cm²(6.54psi)	49	2990mm(9' 10")
	Option	800mm(32")	0.35kgf/cm²(4.98psi)	49	3190mm(10' 6")

10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R230LM	STD	1.05m³(1.37yd³)	0.90m³(1.18yd³)	5	1250mm(49.2")	1370mm(53.9")
	OPT	0.92m³(1.20yd³)	0.80m³(1.05yd³)	5	1150mm(45.3")	1270mm(50.0")
		1.20m³(1.57yd³)	1.00m³(1.31yd³)	5	1400mm(55.1")	1520mm(59.8")
		0.95m³(1.25yd³)	0.83m³(1.09yd³)	5	1240mm(44.09")	1360mm(53.5")
		1.34m³(1.75yd³)	1.15m³(1.50yd³)	6	1550mm(61.0")	1670mm(65.7")
		◈0.90m³(1.18yd³)	0.80m³(1.05yd³)	5	1070mm(42.0")	-
		◈1.05m³(1.37yd³)	0.92m³(1.20yd³)	5	1290mm(50.8")	-
		⊙0.87m³(1.14yd³)	0.75m³(0.98yd³)	5	1140mm(44.9")	-
		⊙1.20m³(1.57yd³)	1.00m³(1.31yd³)	5	1410mm(55.5")	-

◈ : Heavy duty bucket
⊙ : Rock-Heavy duty bucket

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 ℃ (℉)
			-20 (-4) / -10 (14) / 0 (32) / 10 (50) / 20 (68) / 30 (86) / 40 (104)
Engine oil pan	Engine oil	17.0(4.49)	SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	5.0(1.3)	SAE 85W-140
Final drive		5.8 ×2 (1.5 ×2)	
Hydraulic tank	Hydraulic oil	Tank; 180(48) System; 290(77)	ISO VG 32 ISO VG 46 ISO VG 68 LF*/ ISO VG 68*
Fuel tank	Diesel fuel	340(90)	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	35(9.2)	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
ISO VG 68 LF : Long Life Oil
ISO VG 68 : Conventional Oil