HYUNDAI
CONSTRUCTION EQUIPMENT

Robex 380LC-9

CRAWLER EXCAVATOR

SERVICE MANUAL

1. STRUCTURE

This service manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.
This service manual mainly contains the necessary technical information for operations performed in a service workshop.
For ease of understanding, the manual is divided into the following sections.

SECTION 1 GENERAL
This section explains the safety hints and gives the specification of the machine and major components.

SECTION 2 STRUCTURE AND FUNCTION
This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

SECTION 3 HYDRAULIC SYSTEM
This section explains the hydraulic circuit, single and combined operation.

SECTION 4 ELECTRICAL SYSTEM
This section explains the electrical circuit, monitoring system and each component. It serves not only to give an understanding electrical system, but also serves as reference material for trouble shooting.

SECTION 5 MECHATRONICS SYSTEM
This section explains the computer aided power optimization system and each component.

SECTION 6 TROUBLESHOOTING
This section explains the troubleshooting charts correlating **problems** to **causes**.

SECTION 7 MAINTENANCE STANDARD
This section gives the judgement standards when inspecting disassembled parts.

SECTION 8 DISASSEMBLY AND ASSEMBLY
This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

SECTION 9 COMPONENT MOUNTING TORQUE
This section shows bolt specifications and standard torque values needed when mounting components to the machine.

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your HYUNDAI distributor for the latest information.

2. HOW TO READ THE SERVICE MANUAL

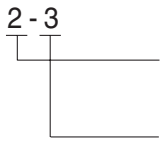
Distribution and updating

Any additions, amendments or other changes will be sent to HYUNDAI distributors.

Get the most up-to-date information before you start any work.

Filing method

1. See the page number on the bottom of the page.
   File the pages in correct order.
2. Following examples shows how to read the page number.
   Example 1



Item number(2. Structure and Function)

Consecutive page number for each item.

3. Additional pages : Additional pages are indicated by a hyphen(-) and number after the page number. File as in the example.

10 - 4
10 - 4 - 1
10 - 4 - 2] Added pages
10 - 5

Revised edition mark(①②③…)

When a manual is revised, an edition mark is recorded on the bottom outside corner of the pages.

Revisions

Revised pages are shown at the list of revised pages on the between the contents page and section 1 page.

Symbols

So that the shop manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
		Extra special safety precautions are necessary when performing the work because it is under internal pressure.
※	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.

3. CONVERSION TABLE

Method of using the Conversion Table
The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

Example

1. Method of using the Conversion Table to convert from millimeters to inches

Convert 55mm into inches.

(1) Locate the number 50in the vertical column at the left side, take this as ⓐ, then draw a horizontal line from ⓐ.

(2) Locate the number 5in the row across the top, take this as ⓑ, then draw a perpendicular line down from ⓑ.

(3) Take the point where the two lines cross as ⓒ. This point ⓒ gives the value when converting from millimeters to inches. Therefore, 55mm = 2.165 inches.

2. Convert 550mm into inches.

(1) The number 550 does not appear in the table, so divide by 10(Move the decimal point one place to the left) to convert it to 55mm.

(2) Carry out the same procedure as above to convert 55mm to 2.165 inches.

(3) The original value(550mm) was divided by 10, so multiply 2.165 inches by 10(Move the decimal point one place to the right) to return to the original value.
This gives 550mm = 21.65 inches.

Millimeters to inches

1mm = 0.03937 in

	0	1	2	3	4	5 ⓑ	6	7	8	9
0		0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
ⓐ 50	1.969	2.008	2.047	2.087	2.126	ⓒ 2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Millimeters to inches

1mm = 0.03937in

	0	1	2	3	4	5	6	7	8	9
0		0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

1kg = 2.2046lb

	0	1	2	3	4	5	6	7	8	9
0		2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.5.	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

Liter to U.S. Gallon

1 ℓ = 0.2642 U.S.Gal

	0	1	2	3	4	5	6	7	8	9
0		0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.6076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.631	25.625	25.889	26.153

Liter to U.K. Gallon

1 ℓ = 0.21997 U.K.Gal

	0	1	2	3	4	5	6	7	8	9
0		0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.969	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

kgf · m to lbf · ft

1kgf · m = 7.233lbf · ft

	0	1	2	3	4	5	6	7	8	9
		7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	396.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	10005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.6	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

kgf/cm² to lbf/in²

1kgf / cm² = 14.2233lbf / in²

	0	1	2	3	4	5	6	7	8	9
		14.2	28.4	42.7	56.9	71.1	85.3	99.6	113.8	128.0
10	142.2	156.5	170.7	184.9	199.1	213.4	227.6	241.8	256.0	270.2
20	284.5	298.7	312.9	327.1	341.4	355.6	369.8	384.0	398.3	412.5
30	426.7	440.9	455.1	469.4	483.6	497.8	512.0	526.3	540.5	554.7
40	568.9	583.2	597.4	611.6	625.8	640.1	654.3	668.5	682.7	696.9
50	711.2	725.4	739.6	753.8	768.1	782.3	796.5	810.7	825.0	839.2
60	853.4	867.6	881.8	896.1	910.3	924.5	938.7	953.0	967.2	981.4
70	995.6	1010	1024	1038	1053	1067	1081	1095	1109	1124
80	1138	1152	1166	1181	1195	1209	1223	1237	1252	1266
90	1280	1294	1309	1323	1337	1351	1365	1380	1394	1408
100	1422	1437	1451	1465	1479	1493	1508	1522	1536	1550
110	1565	1579	1593	1607	1621	1636	1650	1664	1678	1693
120	1707	1721	1735	1749	1764	1778	1792	1806	1821	1835
130	1849	2863	1877	1892	1906	1920	1934	1949	1963	1977
140	1991	2005	2020	2034	2048	2062	2077	2091	2105	2119
150	2134	2148	2162	2176	2190	2205	2219	2233	2247	2262
160	2276	2290	2304	2318	2333	2347	2361	2375	2389	2404
170	2418	2432	2446	2460	2475	2489	2503	2518	2532	2546
180	2560	2574	2589	5603	2617	2631	2646	2660	2674	2688
200	2845	2859	2873	2887	2901	2916	2930	2944	2958	2973
210	2987	3001	3015	3030	3044	3058	3072	3086	3101	3115
220	3129	3143	3158	3172	3186	3200	3214	3229	3243	3257
230	3271	3286	3300	3314	3328	3343	3357	3371	3385	3399
240	3414	3428	3442	3456	3470	3485	3499	3513	3527	3542

TEMPERATURE

Fahrenheit-Centigrade Conversion.

A simple way to convert a fahrenheit temperature reading into a centigrade temperature reading or vice verse is to enter the accompanying table in the center or boldface column of figures.

These figures refer to the temperature in either Fahrenheit or Centigrade degrees.

If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left.

If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

˚C		˚F	˚C		˚F	˚C		˚F	˚C		˚F
-40.4	-40	-40.0	-11.7	11	51.8	7.8	46	114.8	27.2	81	117.8
-37.2	-35	-31.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	179.6
-34.4	-30	-22.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	181.4
-31.7	-25	-13.0	-10.0	14	57.2	9.4	49	120.2	28.9	84	183.2
-28.9	-20	-4.0	-9.4	15	59.0	10.0	50	122.0	29.4	85	185.0
-28.3	-19	-2.2	-8.9	16	60.8	10.6	51	123.8	30.0	86	186.8
-27.8	-18	-0.4	-8.3	17	62.6	11.1	52	125.6	30.6	87	188.6
-27.2	-17	1.4	-7.8	18	64.4	11.7	53	127.4	31.1	88	190.4
-26.7	-16	3.2	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-26.1	-15	5.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-25.6	-14	6.8	-6.1	21	69.8	13.3	56	132.8	32.8	91	195.8
-25.0	-13	8.6	-5.6	22	71.6	13.9	57	134.6	33.3	92	197.6
-24.4	-12	10.4	-5.0	23	73.4	14.4	58	136.4	33.9	93	199.4
-23.9	-11	12.2	-4.4	24	75.2	15.0	59	138.2	34.4	94	201.2
-23.3	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	203.0
-22.8	-9	15.8	-3.3	26	78.8	16.1	61	141.8	35.6	96	204.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	206.6
-21.7	-7	19.4	-2.2	28	82.4	17.2	63	145.4	36.7	98	208.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	210.2
-20.6	-5	23.0	-1.1	35	95.0	21.1	70	158.0	51.7	125	257.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	40.6	105	221.0
-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	43.3	110	230.0
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	46.1	115	239.0
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	48.9	120	248.0
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	51.7	125	257.0
-17.2	1	33.8	2.2	36	96.8	21.7	71	159.8	54.4	130	266.0
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	57.2	135	275.0
-16.1	3	37.4	3.3	38	100.4	22.8	73	163.4	60.0	140	284.0
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	62.7	145	293.0
-15.0	5	41.0	4.4	40	104.0	23.9	75	167.0	65.6	150	302.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	68.3	155	311.0
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	71.1	160	320.0
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	73.9	165	329.0
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	76.7	170	338.0
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	79.4	172	347.0

SECTION 1 GENERAL

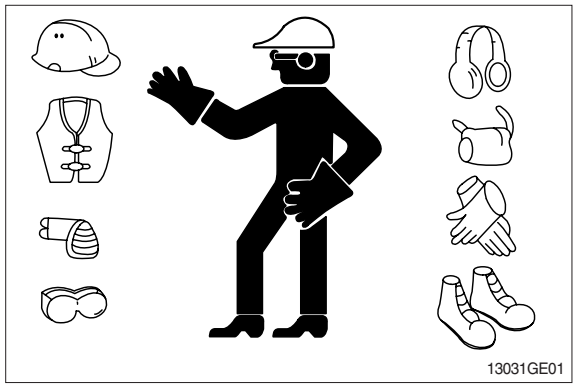
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

Unsafe work practices are dangerous. Understand service procedure before doing work; Do not attempt shortcuts.

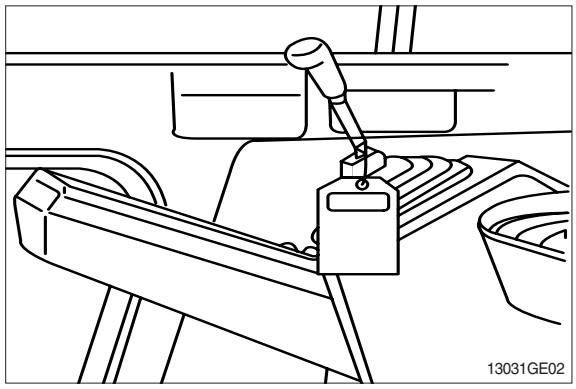
WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.



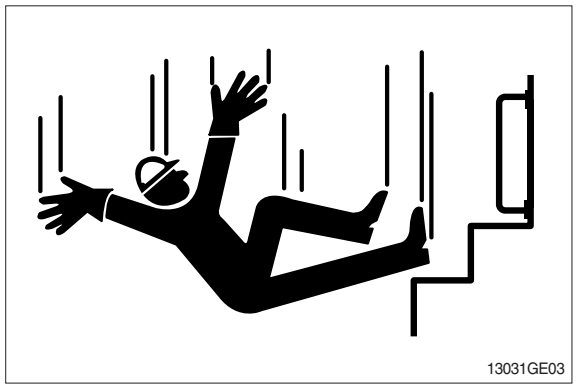
WARN OTHERS OF SERVICE WORK

Unexpected machine movement can cause serious injury.
Before performing any work on the excavator, attach a 「**Do Not Operate**」 tag on the right side control lever.



USE HANDHOLDS AND STEPS

Falling is one of the major causes of personal injury.
When you get on and off the machine, always maintain a three point contact with the steps and handrails and face the machine. Do not use any controls as handholds.
Never jump on or off the machine. Never mount or dismount a moving machine.
Be careful of slippery conditions on platforms, steps, and handrails when leaving the machine.

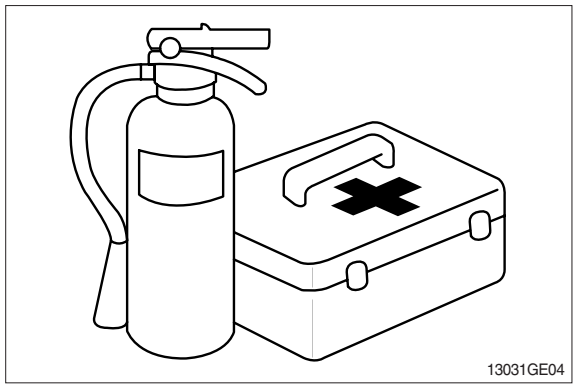


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

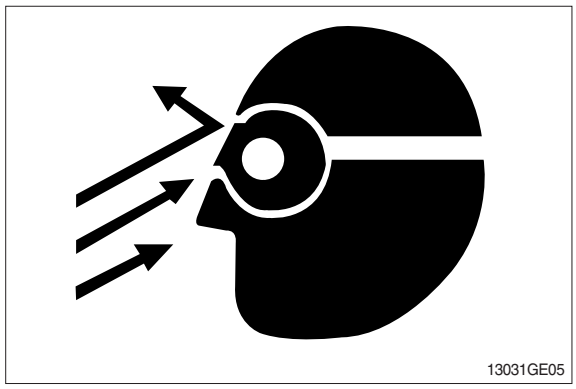
Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.


13031GE04

PROTECT AGAINST FLYING DEBRIS

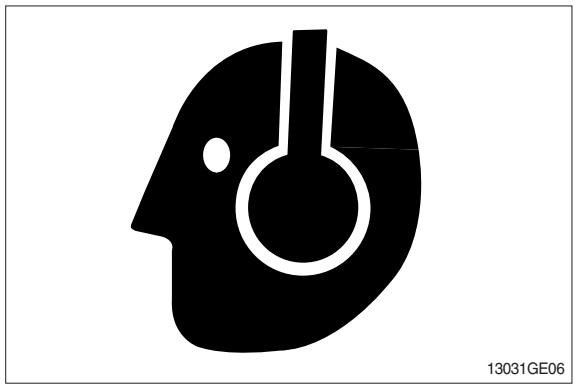
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.


13031GE05

PROTECT AGAINST NOISE

Prolonged exposure to loud noise can cause impairment or loss of hearing.

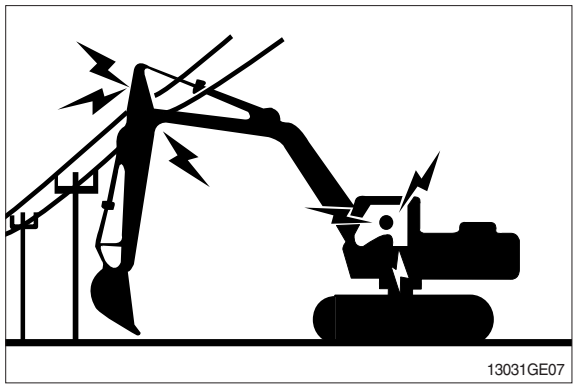
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.


13031GE06

AVOID POWER LINES

Serious injury or death can result from contact with electric lines.

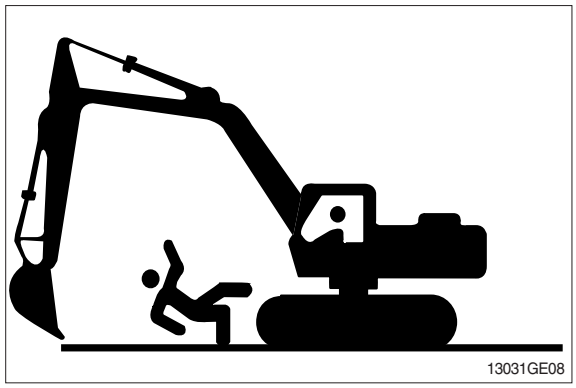
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.


13031GE07

KEEP RIDERS OFF EXCAVATOR

Only allow the operator on the excavator. Keep riders off.

Riders on excavator are subject to injury such as being struck by foreign objects and being thrown off the excavator. Riders also obstruct the operator's view resulting in the excavator being operated in an unsafe manner.

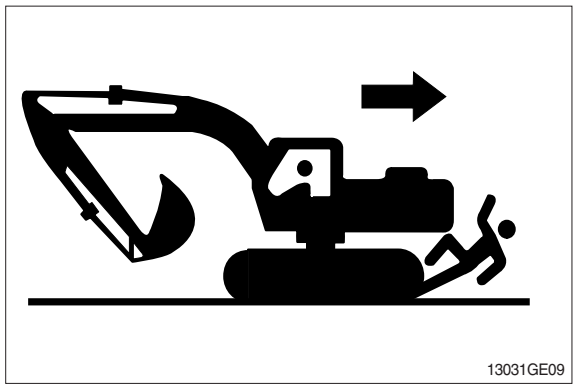

13031GE08

MOVE AND OPERATE MACHINE SAFELY

Bystanders can be run over. Know the location of bystanders before moving, swinging, or operating the machine.

Always keep the travel alarm in working condition. It warns people when the excavator starts to move.

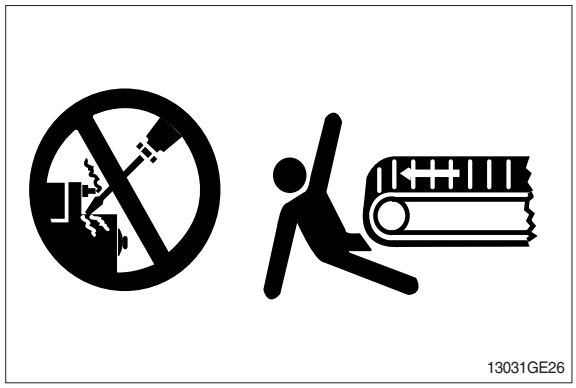
Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the excavator.


13031GE09

OPERATE ONLY FORM OPERATOR'S SEAT

Avoid possible injury machine damage. Do not start engine by shorting across starter terminals.

NEVER start engine while standing on ground. Start engine only from operator's seat.


13031GE26

PARK MACHINE SAFELY

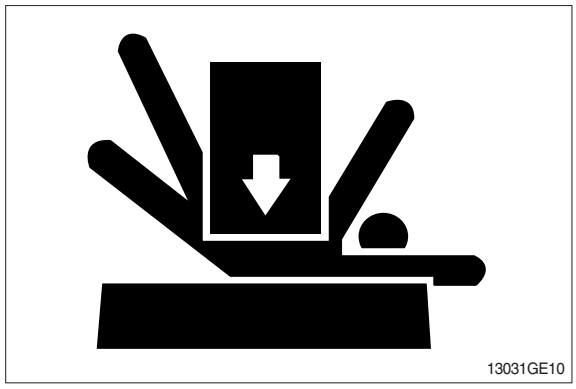
Before working on the machine:

- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine. Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

SUPPORT MACHINE PROPERLY

Always lower the attachment or implement to the ground before you work on the machine. If you must work on a lifted machine or attachment, securely support the machine or attachment.

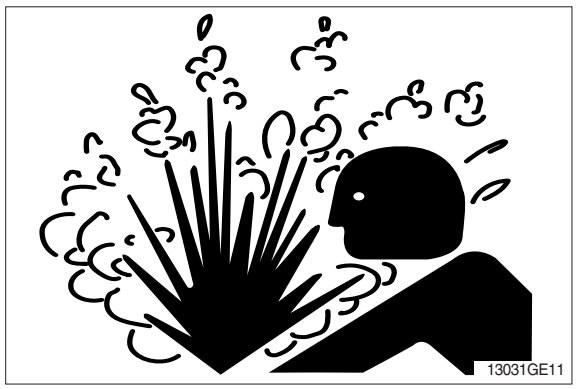
Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



SERVICE COOLING SYSTEM SAFELY

Explosive release of fluids from pressurized cooling system can cause serious burns.

Shut off engine. Only remove filler cap when cool enough to touch with bare hands.



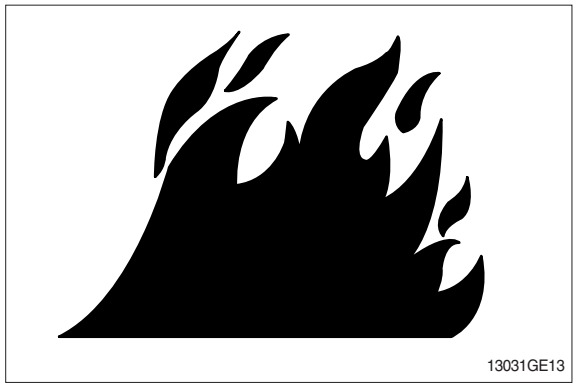
HANDLE FLUIDS SAFELY-AVOID FIRES

Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine.
Fill fuel tank outdoors.

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

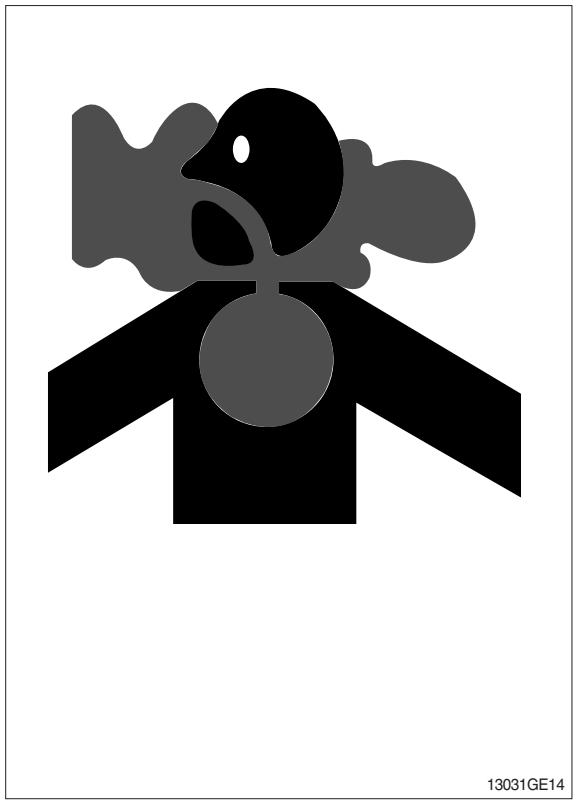
Do not store oily rags; They can ignite and burn spontaneously.



BEWARE OF EXHAUST FUMES

Prevent asphyxiation. Engine exhaust fumes can cause sickness or death.

If you must operate in a building, be positive there is adequate ventilation. Either use an exhaust pipe extension to remove the exhaust fumes or open doors and windows to bring enough outside air into the area.


13031GE14

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

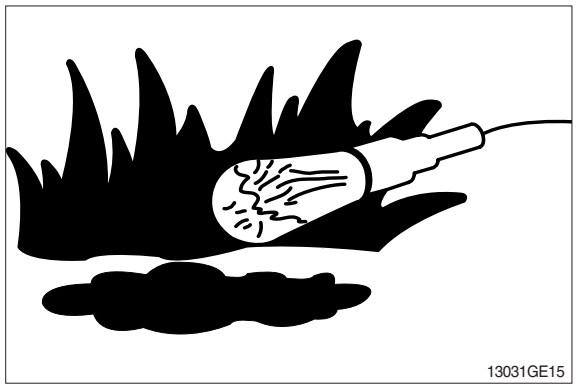
Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

Remove paint before welding or heating:

- If you sand or grind paint, avoid breathing the dust.
  Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

ILLUMINATE WORK AREA SAFELY

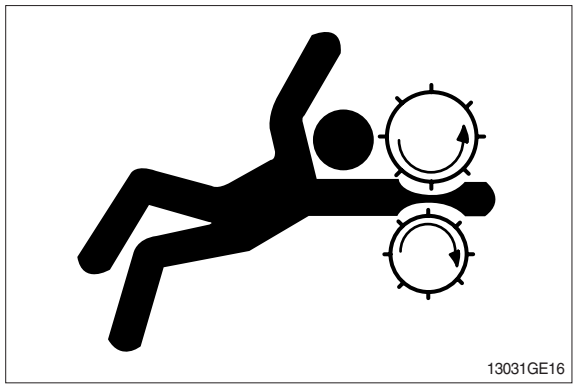
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.


13031GE15

SERVICE MACHINE SAFELY

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

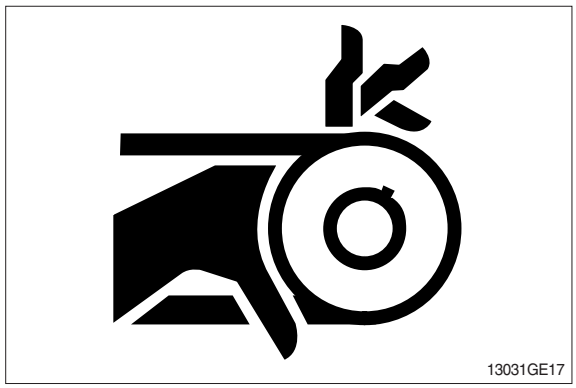
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

To prevent accidents, use care when working around rotating parts.



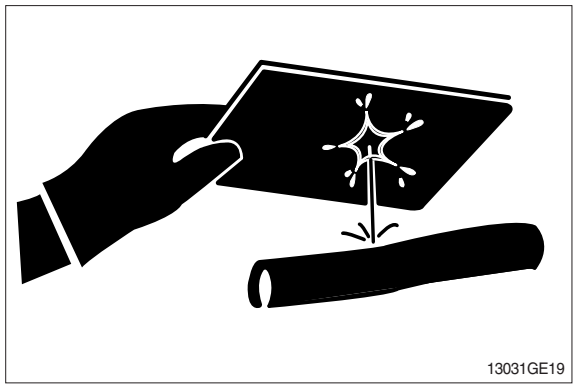
AVOID HIGH PRESSURE FLUIDS

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result.



AVOID HEATING NEAR PRESSURIZED FLUID LINES

Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to yourself and bystanders. Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials.

Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install fire resisting guards to protect hoses or other materials.

PREVENT BATTERY EXPLOSIONS

Keep sparks, lighted matches, and flame away from the top of battery. Battery gas can explode.

Never check battery charge by placing a metal object across the posts. Use a volt-meter or hydrometer.

Do not charge a frozen battery; It may explode. Warm battery to 16˚C (60˚F).

PREVENT ACID BURNS

Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, eat holes in clothing, and cause blindness if splashed into eyes.

Avoid the hazard by:

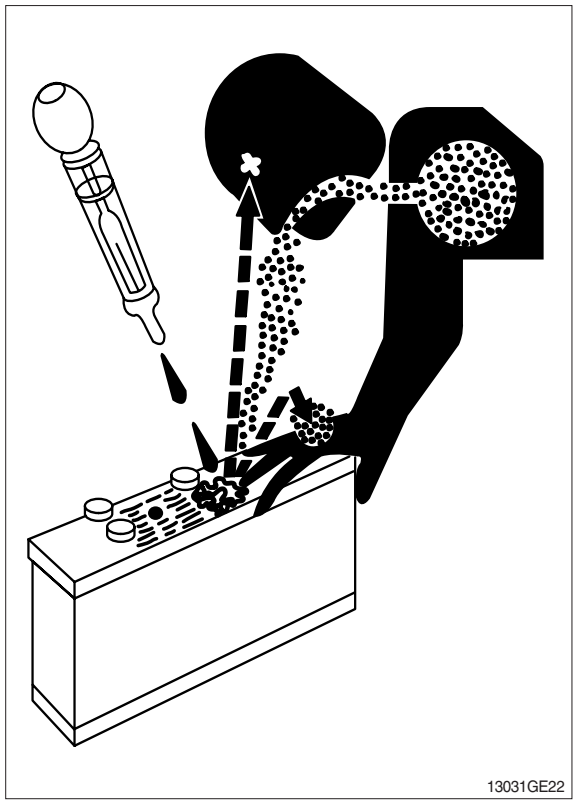
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling of dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

1. Flush your skin with water.
2. Apply baking soda or lime to help neutralize the acid.
3. Flush your eyes with water for 10-15 minutes. Get medical attention immediately.

If acid is swallowed:

1. Drink large amounts of water or milk.
2. Then drink milk of magnesia, beaten eggs, or vegetable oil.
3. Get medical attention immediately.



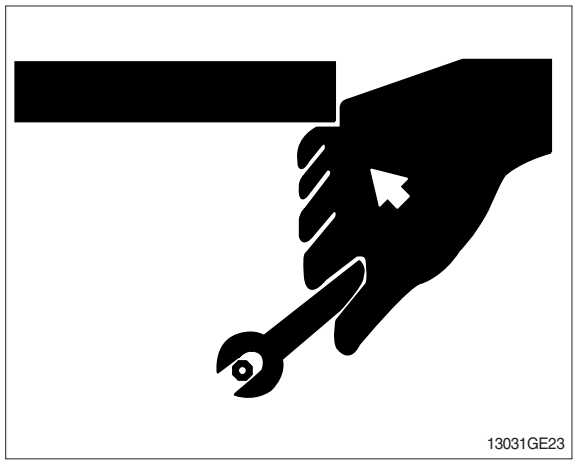
USE TOOLS PROPERLY

Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

Use power tools only to loosen threaded tools and fasteners.

For loosening and tightening hardware, use the correct size tools. DO NOT use U.S. measurement tools on metric fasteners. Avoid bodily injury caused by slipping wrenches.

Use only recommended replacement parts. (See Parts catalogue.)

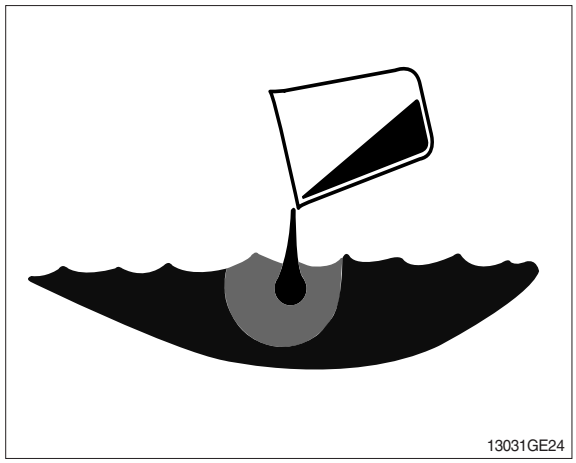


DISPOSE OF FLUIDS PROPERLY

Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.

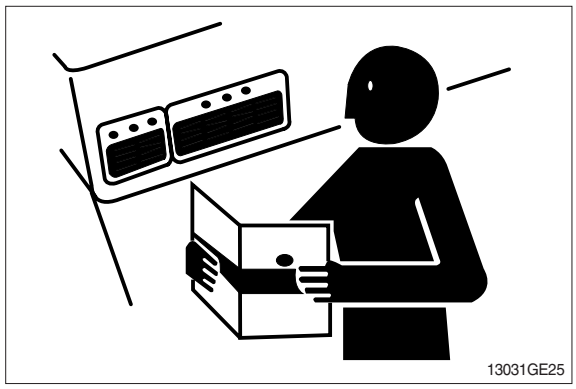
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

DO NOT pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.


13031GE24

REPLACE SAFETY SIGNS

Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

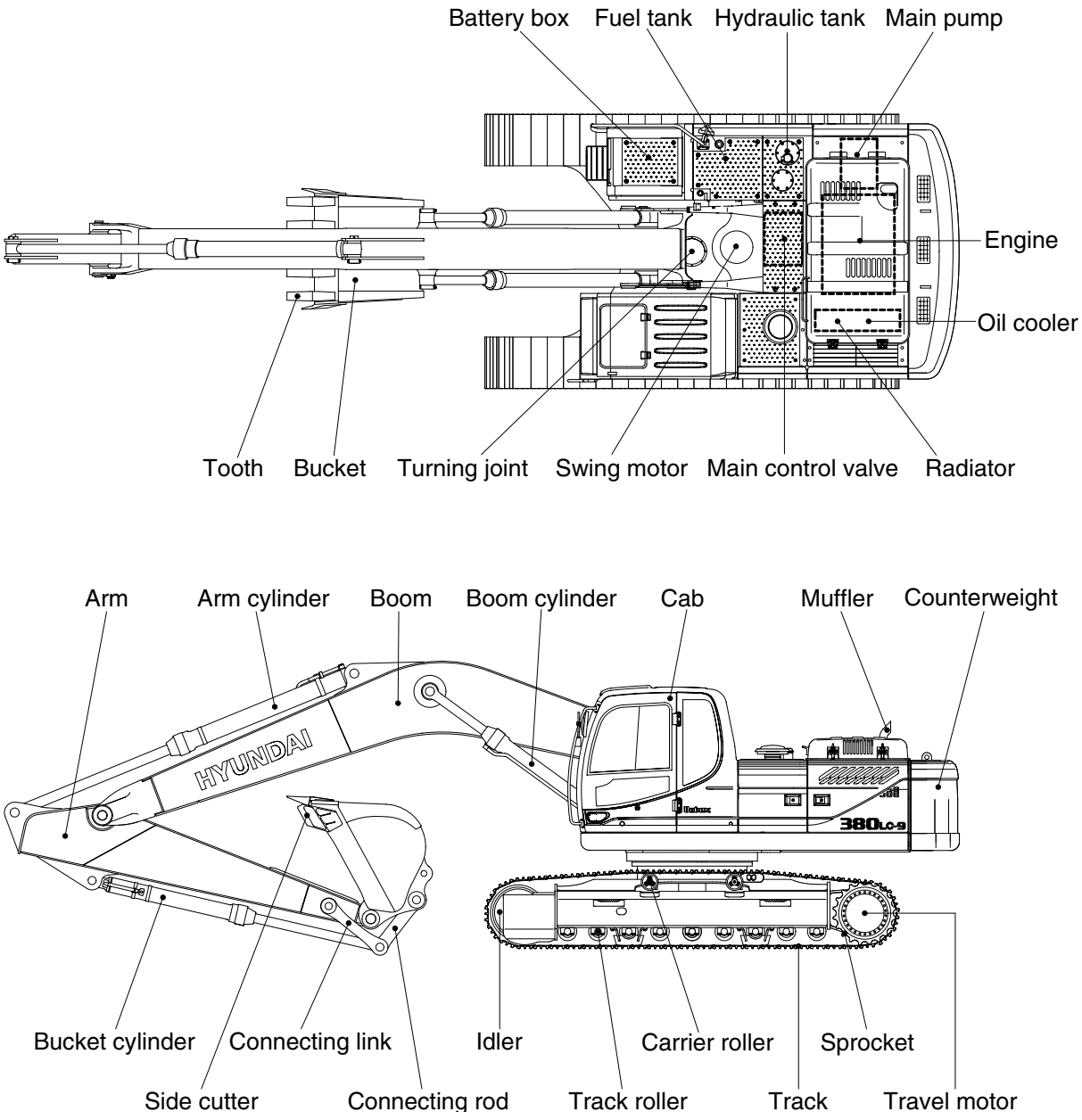

13031GE25

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.

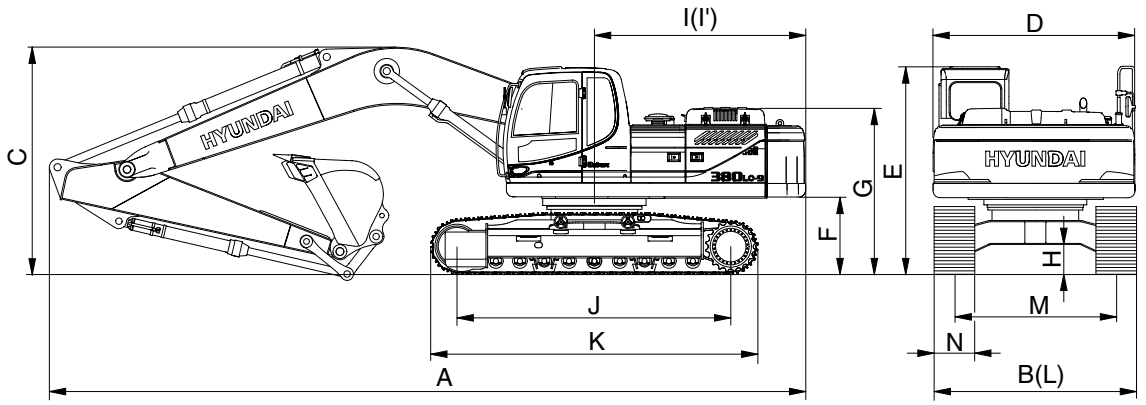
GROUP 2 SPECIFICATIONS

1. MAJOR COMPONENT



38092SP01

2. SPECIFICATIONS

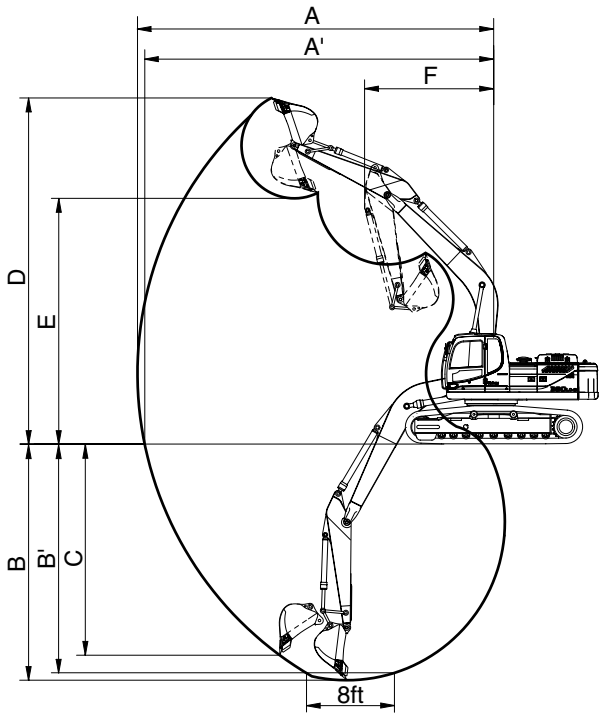


38092SP02

Description		Unit	Specification
Operating weight		kg (lb)	38200 (84220)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	1.62 (2.12)
Overall length	A	mm (ft-in)	11120 (36' 6")
Overall width, with 600 mm shoe	B		3340 (10'11")
Overall height	C		3450 (11' 4")
Superstructure width	D		2980 (9' 9")
Overall height of cab	E		3175 (10' 5")
Ground clearance of counterweight	F		1290 (4' 3")
Engine cover height	G		3190 (10' 6")
Minimum ground clearance	H		550 (1' 10")
Rear-end distance	I		3350 (11' 1")
Rear-end swing radius	I'		3415 (11' 2")
Distance between tumblers	J		4340 (14' 3")
Undercarriage length	K		5280 (17' 4")
Undercarriage width	L		3340 (11' 0")
Track gauge	M		2740 (9' 0")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.0/4.8 (1.9/3.0)
Swing speed		rpm	9.3
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm^2(psi)	0.68 (9.67)
Max traction force		kg (lb)	32000 (70550)

3. WORKING RANGE

1) 6.5 m (21' 4") BOOM

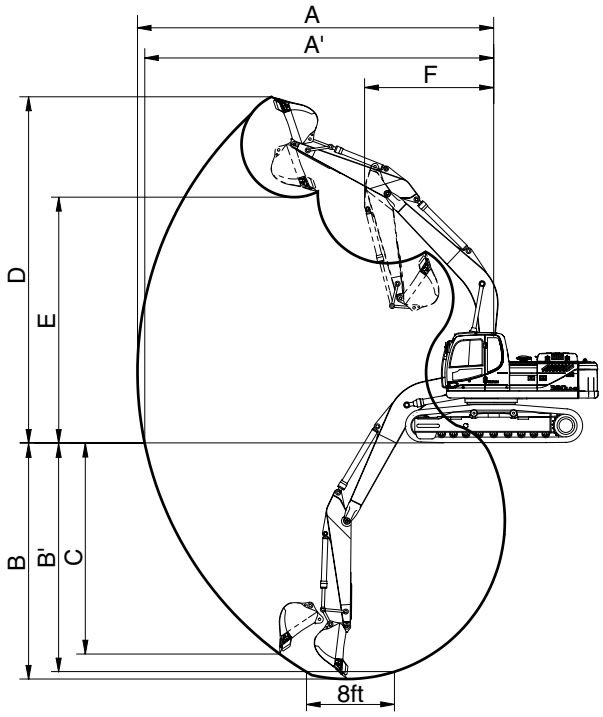


38092SP03

Description		2.5 m (8' 2") Arm	*3.2 m (10' 6") Arm	3.9 m (12' 10") Arm	4.3 m (14' 1") Arm
Max digging reach	A	10720 mm (35' 2")	11250 mm (36'11")	11870 mm (38'11")	12380 mm (40' 7")
Max digging reach on ground	A'	10490 mm (34' 5")	11040 mm (36' 3")	11670 mm (38' 3")	12180 mm (40' 0")
Max digging depth	B	6820 mm (22' 5")	7520 mm (24' 8")	8220 mm (27' 0")	8620 mm (28' 3")
Max digging depth (8ft level)	B'	6640 mm (21' 9")	7360 mm (24' 2")	8080 mm (26' 6")	8490 mm (27'10")
Max vertical wall digging depth	C	5930 mm (19' 5")	6330 mm (20' 9")	7040 mm (23' 1")	7540 mm (24' 9")
Max digging height	D	10590 mm (34' 9")	10570 mm (34' 8")	10800 mm (35' 5")	11360 mm (37' 3")
Max dumping height	E	7370 mm (24' 2")	7410 mm (24' 4")	7640 mm (25' 1")	8160 mm (26' 9")
Min swing radius	F	4530 mm (14'10")	4450 mm (14' 7")	4440 mm (14' 7")	4460 mm (14' 8")
Bucket digging force	SAE	201.0 [219.3] kN	201.0 [219.3] kN	201.0 [219.3] kN	201.0 [219.3] kN
		20500 [22360] kgf	20500 [22360] kgf	20500 [22360] kgf	20500 [22360] kgf
		45190 [49300] lbf	45190 [49300] lbf	45190 [49300] lbf	45190 [49300] lbf
	ISO	228.5 [249.3] kN	228.5 [249.3] kN	228.5 [249.3] kN	228.5 [249.3] kN
		23300 [25420] kgf	23300 [25420] kgf	23300 [25420] kgf	23300 [25420] kgf
		51370 [56040] lbf	51370 [56040] lbf	51370 [56040] lbf	51370 [56040] lbf
Arm crowd force	SAE	184.4 [201.1] kN	152.0 [165.8] kN	135.3 [147.6] kN	124.5 [135.9] kN
		18800 [20510] kgf	15500 [16910] kgf	13800 [15050] kgf	12700 [13850] kgf
		41450 [45220] lbf	34170 [37280] lbf	30420 [33190] lbf	28000 [30550] lbf
	ISO	192.2 [209.7] kN	156.9 [171.2] kN	139.3 [151.9] kN	128.5 [140.1] kN
		19600 [21380] kgf	16000 [17450] kgf	14200 [15490] kgf	13100 [14290] kgf
		43210 [47140] lbf	35270 [38480] lbf	31310 [34160] lbf	28880 [31510] lbf

[ ] : Power boost * : STD

· 6.15 m (20' 2") BOOM

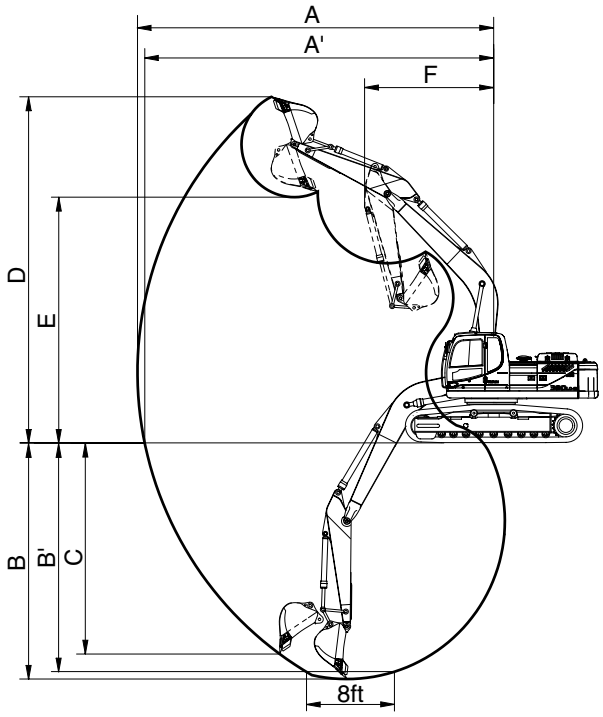


38092SP03

Description		2.5 m (8' 2") Arm
Max digging reach	A	10330 mm (33'11")
Max digging reach on ground	A'	10100 mm (33' 2")
Max digging depth	B	6450 mm (21' 2")
Max digging depth (8ft level)	B'	6270 mm (20' 7")
Max vertical wall digging depth	C	5490 mm (18' 0")
Max digging height	D	10320 mm (33'10")
Max dumping height	E	7120 mm (23' 4")
Min swing radius	F	4220 mm (13'10")
Bucket digging force	SAE	201.0 [219.3] kN
		20500 [22360] kgf
		45190 [49300] lbf
	ISO	228.5 [249.3] kN
		23300 [25420] kgf
		51370 [56040] lbf
Arm crowd force	SAE	184.4 [201.1] kN
		18800 [20510] kgf
		41450 [45220] lbf
	ISO	192.2 [209.7] kN
		19600 [21380] kgf
		43210 [47140] lbf

[ ] : Power boost

· 8.3 m (28' 3") BOOM



38092SP03

Description		5.1 m (16' 9") Arm
Max digging reach	A	15280 mm (50' 2")
Max digging reach on ground	A'	15120 mm (49' 7")
Max digging depth	B	11230 mm (36'10")
Max digging depth (8ft level)	B'	11120 mm (36' 6")
Max vertical wall digging depth	C	10060 mm (33' 0")
Max digging height	D	13350 mm (43'10")
Max dumping height	E	10150 mm (33' 4")
Min swing radius	F	5900 mm (19' 4")
Bucket digging force	SAE	201.0 [220.4] kN
		20500 [22470] kgf
		45190 [49550] lbf
	ISO	228.5 [250.3] kN
		23300 [25530] kgf
		51370 [56280] lbf
Arm crowd force	SAE	109.8 [119.8] kN
		11200 [12220] kgf
		24690 [26930] lbf
	ISO	112.8 [123.0] kN
		11500 [12550] kgf
		25350 [27650] lbf

[ ] : Power boost

4. WEIGHT

Item		R380LC-9	
		kg	lb
Upperstructure assembly		15040	33160
Main frame weld assembly		2995	6600
Engine assembly		740	1630
Main pump assembly		190	420
Main control valve assembly		340	750
Swing motor assembly		360	790
Hydraulic oil tank assembly		340	750
Fuel tank assembly		230	510
Counterweight	6.5, 6.15 m boom	6500	14330
	8.6 m boom	8100	17860
Cab assembly		490	1080
Lower chassis assembly		14310	31550
Track frame weld assembly		5415	11940
Swing bearing		590	1300
Travel motor assembly		400	880
Turning joint		65	140
Track recoil spring and idler		270	600
Idler		230	510
Carrier roller		40	90
Track roller		80	180
Track-chain assembly (600 mm standard triple grouser shoe)		2420	5340
Front attachment assembly (6.5 m boom, 3.2 m arm, 1.62 m^3 SAE heaped bucket)		7670	16910
6.5 m boom assembly		2930	6460
3.2 m arm assembly		1340	2950
1.62 m^3 SAE heaped bucket		1280	2820
Boom cylinder assembly		370	820
Arm cylinder assembly		490	1080
Bucket cylinder assembly		320	710
Bucket control linkage assembly		370	820

5. LIFTING CAPACITIES

1) 6.5 m (21' 4") boom, 3.2 m (10' 6") arm equipped with 1.62 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 6500 kg (14330 lb) counterweight.

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

Load point height		Load radius												At max. reach		
		1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		Capacity		Reach
																m (ft)
9.0 m (30 ft)	kg													*5950	*5950	7.97
	lb													*13120	*13120	(26.1)
7.5 m (25.0 ft)	kg									*4560	*4560			*6020	4820	9.12
	lb									*10050	*10050			*13270	10630	(29.9)
6.0 m (20.0 ft)	kg									*6620	*6620			*6110	4010	9.87
	lb									*14590	*14590			*13470	8840	(32.4)
4.5 m (15.0 ft)	kg							*8260	*8260	*7320	6530	*4450	*4450	*6190	3550	10.32
	lb							*18210	*18210	*16140	14400	*9810	*9810	*13650	7830	(33.9)
3.0 m (10.0 ft)	kg					*13520	*13520	*9960	8910	*8240	6150	*6360	4430	5940	3310	10.50
	lb					*29810	*29810	*21960	19640	*18170	13560	*14020	9770	13100	7300	(34.4)
1.5 m (5.0 ft)	kg					*16390	12870	*11570	8270	*9170	5790	*7510	4230	5890	3250	10.45
	lb					*36130	28370	*25510	18230	*20220	12760	*16560	9330	12990	7170	(34.3)
Ground Line	kg			*13090	*13090	*17880	12230	*12690	7820	*9880	5520	*7070	4090	6130	3380	10.14
	lb			*28860	*28860	*39420	26960	*27980	17240	*21780	12170	*15590	9020	13510	7450	(33.3)
-1.5 m (-5.0 ft)	kg	*13720	*13720	*17520	*17520	*18150	12020	*13170	7600	9750	5370			6730	3740	9.57
	lb	*30250	*30250	*38620	*38620	*40010	26500	*29030	16760	21500	11840			14840	8250	(31.4)
-3.0 m (-10.0 ft)	kg	*17880	*17880	*22800	*22800	*17430	12080	*12880	7580	9750	5370			*7730	4490	8.65
	lb	*39420	*39420	*50270	*50270	*38430	26630	*28400	16710	21500	11840			*17040	9900	(28.4)
-4.5 m (-15.0 ft)	kg	*22600	*22600	*21880	*21880	*15520	12390	*11510	7790					*7690	6200	7.25
	lb	*49820	*49820	*48240	*48240	*34220	27320	*25380	17170					*16950	13670	(23.8)
-6.0 m (-20.0 ft)	kg					*11410	*11410									
	lb					*25150	*25150									

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.

(2) 6.15 m (20' 2") boom, 2.5 m (8' 2") arm equipped with 1.62 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 6500 kg (14330 lb) counterweight.

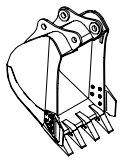
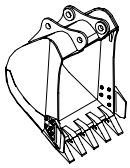
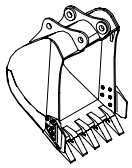
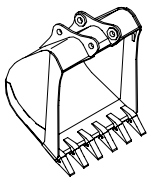
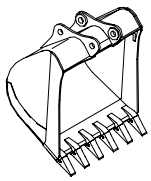
Load point height		Load radius								At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		Capacity		Reach
												m (ft)
9.0 m	kg									*7580	*7580	6.65
(30.0 ft)	lb									*16710	*16710	(21.8)
7.5 m	kg									*7420	6190	8.02
(25.0 ft)	lb									*16360	13650	(26.3)
6.0 m	kg					*8590	*8590	*6510	*6510	*7460	4980	8.88
(20.0 ft)	lb					*18940	*18940	*14350	*14350	*16450	10980	(29.1)
4.5 m	kg	*18270	*18270	*12170	*12170	*9790	9680	*8620	6560	7480	4350	9.38
(15.0 ft)	lb	*40280	*40280	*26830	*26830	*21580	21340	*19000	14460	16490	9590	(30.8)
3.0 m	kg			*15380	14190	*11300	9030	*9350	6250	7050	4040	9.58
(10.0 ft)	lb			*33910	31280	*24910	19910	*20610	13780	15540	8910	(31.4)
1.5 m	kg			*17740	13080	*12640	8450	*10060	5940	7010	3980	9.52
(5.0 ft)	lb			*39110	28840	*27870	18630	*22180	13100	15450	8770	(31.2)
Ground	kg	*13400	*13400	*18580	12560	*13410	8060	10120	5710	7360	4170	9.19
Line	lb	*29540	*29540	*40960	27690	*29560	17770	22310	12590	16230	9190	(30.2)
-1.5 m	kg	*21020	*21020	*18170	12420	*13400	7880	10010	5610	8290	4710	8.53
(-5.0 ft)	lb	*46340	*46340	*40060	27380	*29540	17370	22070	12370	18280	10380	(28.0)
-3.0 m	kg	*22960	*22960	*16580	12540	*12330	7930			*8180	5950	7.47
(-10 ft)	lb	*50620	*50620	*36550	27650	*27180	17480			*18030	13120	(24.5)
-1.5 m	kg	*17870	*17870	*13110	12970							
(-10 ft)	lb	*39400	*39400	*28900	28590							

(3) 8.6 m (28' 3") boom, 5.1 m (16' 9") arm equipped with 1.46 m³ (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 8100 kg (17860 lb) counterweight.

Load point height		Load radius																At max. reach		
		1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		10.5 m (35.0 ft)		12.0 m (40.0 ft)		13.5 m (45.0 ft)		Capacity		Reach
																						m (ft)
9.0 m	kg													*3010	*3010					*3030	2510	12.91
(30 ft)	lb													*6640	*6640					*6680	5530	(42.4)
7.5 m	kg													*3110	*3110	*2630	*2630			*3100	2100	13.61
(25.0 ft)	lb													*6860	*6860	*5800	*5800			*6830	4630	(44.7)
6.0 m	kg													*3360	*3360	*3300	2820			*3180	1820	14.10
(20.0 ft)	lb													*7410	*7410	*7280	6220			*7010	4010	(46.3)
4.5 m	kg											*4100	*4100	*3730	3670	*3520	2680			*3290	1640	14.40
(15.0 ft)	lb											*9040	*9040	*8220	8090	*7760	5910			*7250	3620	(47.2)
3.0 m	kg					*10920	*10920	*7400	*7400	*5710	*5710	*4750	4620	*4160	3410	*3790	2520	*1720	*1720	3310	1530	14.53
(10.0 ft)	lb					*24070	*24070	*16310	*16310	*12590	*12590	*10470	10190	*9170	7520	*8360	5560	*3790	*3790	7300	3370	(47.7)
1.5 m	kg					*10890	*10890	*8990	8120	*6710	5760	*5420	4230	*4610	3150	*4090	2350	*1900	1730	3270	1480	14.49
(5.0 ft)	lb					*24010	*24010	*19820	17900	*14790	12700	*11950	9330	*10160	6940	*9020	5180	*4190	3810	7210	3260	(47.5)
Ground	kg					*10400	*10400	*10190	7440	*7560	5280	*6010	3900	*5030	2930	*4370	2210			3320	1500	14.28
Line	lb					*22930	*22930	*22470	16400	*16670	11640	*13250	8600	*11090	6460	*9630	4870			7320	3310	(46.9)
-1.5 m	kg			*7990	*7990	*11720	11200	*10930	7060	*8180	4970	*6480	3670	*5370	2770	4390	2110			3470	1590	13.90
(-5.0 ft)	lb			*17610	*17610	*25840	24690	*24100	15560	*18030	10960	*14290	8090	*11840	6110	9680	4650			7650	3510	(45.6)
-3.0 m	kg	*8910	*8910	*10270	*10270	*13880	11160	*11250	6900	*8540	4800	*6780	3530	5420	2670	4340	2060			3760	1770	13.31
(-10.0 ft)	lb	*19640	*19640	*22640	*22640	*30600	24600	*24800	15210	*18830	10580	*14950	7780	11950	5890	9570	4540			8290	3900	(43.7)
-4.5 m	kg	*11090	*11090	*12810	*12810	*15320	11300	*11200	6910	*8610	4760	*6850	3490	5400	2660					*4230	2080	12.50
(-15.0 ft)	lb	*24450	*24450	*28240	*28240	*33770	24910	*24690	15230	*18980	10490	*15100	7690	11900	5860					*9330	4590	(41.0)
-6.0 m	kg	*13540	*13540	*15800	*15800	*14460	11590	*10750	7050	*8340	4850	*6630	3570	*5260	2770					*4390	2610	11.41
(-20.0 ft)	lb	*29850	*29850	*34830	*34830	*31880	25550	*23700	15540	*18390	10690	*14620	7870	*11600	6110					*9680	5750	(37.4)
-7.5 m	kg	*16440	*16440	*18490	*18490	*12970	12050	*9770	7350	*7580	5080	*5850	3790							*4450	3570	9.94
(-25.0 ft)	lb	*36240	*36240	*40760	*40760	*28590	26570	*21540	16200	*16710	11200	*12900	8360							*9810	7870	(32.6)
-9.0 m	kg			*14620	*14620	*10500	*10500	*7900	7870	*5800	5550											
(-30.0 ft)	lb			*32230	*32230	*23150	*23150	*17420	17350	*12790	12240											

6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET

				
1.46 m³ SAE heaped bucket	※ 1.62 m³ SAE heaped bucket	1.86 m³ SAE heaped bucket	2.10 m³ SAE heaped bucket	2.32 m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation					
					6.5 m (21' 4") boom				6.15 m (20' 2") boom	8.6 m (28' 3") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.5 m arm (8' 2")	3.2 m arm (10' 6")	3.9 m arm (12' 10")	4.3 m arm (14' 1")	2.5 m arm (8' 2")	5.1 m arm (16' 9")
1.46 m³ (1.91 yd³)	1.27 m³ (1.66 yd³)	1380 mm (54.3")	1510 mm (59.4")	1170 kg (2580 lb)						
※ 1.62 m³ (2.12 yd³)	1.40 m³ (1.83 yd³)	1440 mm (56.7")	1570 mm (61.8")	1280 kg (2820 lb)						
1.86 m³ (2.43 yd³)	1.60 m³ (2.1 yd³)	1620 mm (63.8")	1750 mm (68.9")	1390 kg (3060 lb)						
2.10 m³ (2.75 yd³)	1.80 m³ (2.4 yd³)	1810 mm (71.3")	1940 mm (76.4")	1520 kg (3350 lb)						
2.32 m³ (3.03 yd³)	2.00 m³ (2.62 yd³)	1990 mm (78.3")	2120 mm (83.5")	1760 kg (3880 lb)						

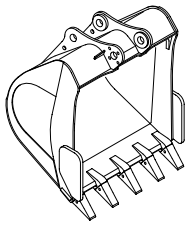
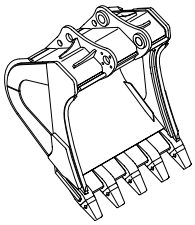
※ : Standard bucket

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

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

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

2) HEAVY DUTY AND ROCK-HEAVY DUTY BUCKET

	
◈1.62 m³ SAE heaped bucket	⊙1.44 m³, 1.62 m³, 1.86 m³ SAE heaped bucket

Capacity		Width		Weight	Recommendation				
					6.5 m (21' 4") boom				6.15 m (20' 2") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		2.5 m arm (8' 2")	3.2 m arm (10' 6")	3.9 m arm (12' 10")	4.3 m arm (14' 1")	2.5 m arm (8' 2")
◈1.62 m³ (2.12 yd³)	1.40 m³ (1.83 yd³)	1540 mm (60.6")	-	1570 kg (3460 lb)					
⊙1.44 m³ (1.88 yd³)	1.27 m³ (1.66 yd³)	1280 mm (50.4")	-	1565 kg (3450 lb)					
⊙1.62 m³ (2.12 yd³)	1.40 m³ (1.83 yd³)	1545 mm (60.8")	-	1610 kg (3550 lb)					
⊙1.86 m³ (2.43 yd³)	1.60 m³ (2.1 yd³)	1725 mm (67.9")	-	1710 kg (3770 lb)					

◈ : Heavy duty bucket

⊙ : Rock-heavy duty bucket

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

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

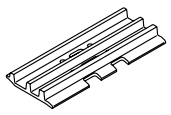
Applicable for materials with density of 1100 kg/m³ (1850 lb/yd³) or less

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 				
R380LC-9	Shoe width	mm (in)	600 (24)	700 (28)	750 (30)	800 (32)	900 (36)
	Operating weight	kg (lb)	38200 (84220)	38650 (85210)	38875 (85700)	39100 (86200)	39550 (87190)
	Ground pressure	kgf/cm^2 (psi)	0.68 (9.67)	0.59 (8.39)	0.56 (7.96)	0.52 (7.39)	0.47 (6.68)
	Overall width	mm (ft-in)	3340 (10' 11")	3440 (11' 3")	3490 (11' 5")	3540 (11' 7")	3640 (11' 11")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	2 EA
Track rollers	9 EA
Track shoes	51 EA

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 mm triple grouser	Standard	A
700 mm triple grouser	Option	B
750 mm triple grouser	Option	B
800 mm triple grouser	Option	C
900 mm triple grouser	Option	C

※ **Table 2**

Category	Applications	Applications
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 QSL / HYUNDAI HE8.9
Type	4-cycle turbocharged charger air cooled diesel engine
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	114 × 145 mm (4.49" × 5.70")
Piston displacement	8900 cc (540 cu in)
Compression ratio	17.8 : 1
Rated gross horse power (SAE J1995)	296 Hp at 1850 rpm (221 kW at 1850 rpm)
Maximum torque	148 kgf · m (1070 lbf · ft) at 1400 rpm
Engine oil quantity	31.7 ℓ (8.4 U.S. gal)
Dry weight	740 kg (1630 lb)
Low idling speed	800 ± 100 rpm
High idling speed	1700 + 50 rpm
Rated fuel consumption	164.8 g/Hp · hr at 1850 rpm
Starting motor	Denso (24V-7.5 kW)
Alternator	Delco Remy 24V-50A
Battery	2 × 12V × 160Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 175 cc/rev
Maximum pressure	330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]
Rated oil flow	2 × 306 ℓ /min (80.8 U.S. gpm / 67.3 U.K. gpm)
Rated speed	1750 rpm

[ ]: Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	27 ℓ /min (7.1 U.S. gpm/5.9 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	9 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	330 kgf/cm^2 (4690 psi) [360 kgf/cm^2 (5120 psi)]
Overload relief valve pressure	390 kgf/cm^2 (5550 psi)

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	233 cc/rev
Relief pressure	290 kgf/cm^2 (4120 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	107 kgf · m (773 lbf · ft)
Brake release pressure	30~50 kgf/cm^2 (427~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	360 kgf/cm^2 (5120 psi)
Capacity (max / min)	185.2/114.2 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	8.5 kgf/cm^2 (121 psi)
Braking torque	44.4 kgf · m (321 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 160 × ø 110 × 1500 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 170 × ø 120 × 1760 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 150 × ø 105 × 1295 mm
	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.**

8) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R380LC-9	Standard	600 mm (24")	0.68 kgf/cm^2 (9.67 psi)	51	3340 mm (10' 11")
	Option	700 mm (28")	0.59 kgf/cm^2 (8.39 psi)	51	3440 mm (11' 3")
		750 mm (30")	0.56 kgf/cm^2 (7.96 psi)	51	3490 mm (11' 5")
		800 mm (32")	0.52 kgf/cm^2 (7.39 psi)	51	3540 mm (11' 7")
		900 mm (36")	0.47 kgf/cm^2 (6.68 psi)	51	3640 mm (11' 11")

9) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R380LC-9	Standard	1.62 m^3 (2.12 yd^3)	1.40 m^3 (1.8 yd^3)	5	1440 mm (56.7")	1570 mm (61.8")
		1.46 m^3 (1.91 yd^3)	1.27 m^3 (1.66 yd^3)	4	1380 mm (54.3")	1510 mm (59.4")
		◈1.62 m^3 (2.12 yd^3)	1.40 m^3 (1.83 yd^3)	5	1540 mm (60.6")	-
		◎1.44 m^3 (1.88 yd^3)	1.27 m^3 (1.66 yd^3)	5	1280 mm (50.4")	-
		◎1.62 m^3 (2.12 yd^3)	1.40 m^3 (1.83 yd^3)	5	1545 mm (60.8")	-
		◎1.86 m^3 (2.43 yd^3)	1.60 m^3 (2.1 yd^3)	5	1725 mm (67.9")	-
		1.86 m^3 (2.43 yd^3)	1.60 m^3 (2.1 yd^3)	5	1620 mm (63.8")	1750 mm (68.9")
		2.10 m^3 (2.75 yd^3)	1.80 m^3 (2.4 yd^3)	6	1810 mm (71.3")	1940 mm (76.4")
		2.32 m^3 (3.03 yd^3)	2.00 m^3 (2.62 yd^3)	6	1990 mm (78.3")	2120 mm (83.5")

◈ : Heavy duty bucket

◎ : Rock bucket (esco type)