



Robex 145CR-9

CRAWLER EXCAVATOR

Robex 145CR-9



SERVICE MANUAL

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FOREWORD

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

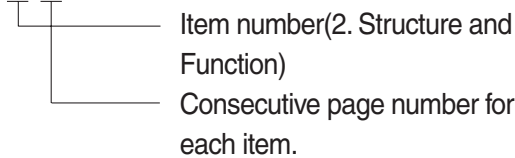
1. See the page number on the bottom of the page.

File the pages in correct order.

2. Following examples shows how to read the page number.

Example 1

2 - 3



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

10 - 5

Added pages

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 50 in the vertical column at the left side, take this as ①, then draw a horizontal line from ①.
- (2) Locate the number 5 in the row across the top, take this as ②, then draw a perpendicular line down from ②.
- (3) Take the point where the two lines cross as ③. This point ③ 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

②

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
① 50	1.969	2.008	2.047	2.087	2.126	③ 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	6.076	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	7.699	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

1 kgf · m = 7.233 lbf · 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	296.6	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

1 kgf / cm² = 14.2233 lbf / 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 Hints	1-1
Group 2 Specifications	1-10

SECTION 1 GENERAL

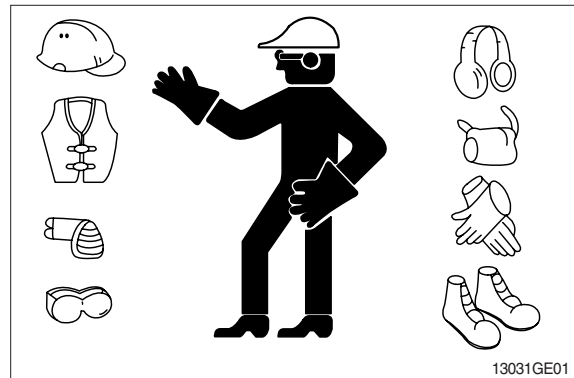
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

WEAR PROTECTIVE CLOTHING

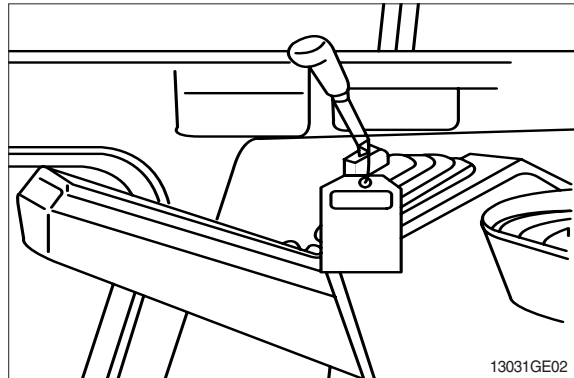
Wear close fitting clothing and safety equipment appropriate to the job.



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.



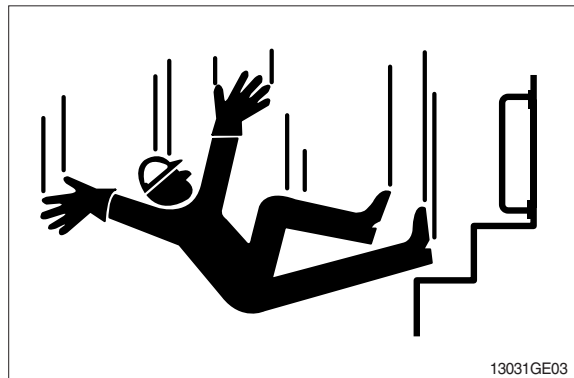
USE HANDHOLDS AND STEPS

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.

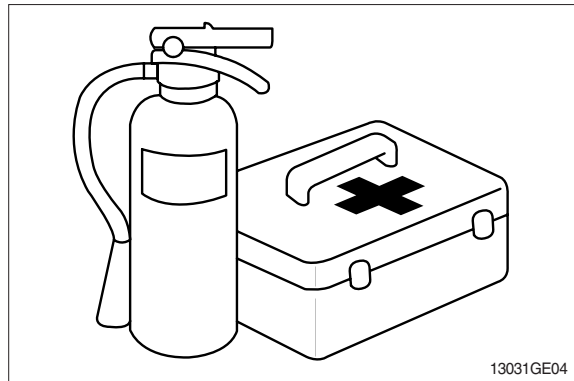


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

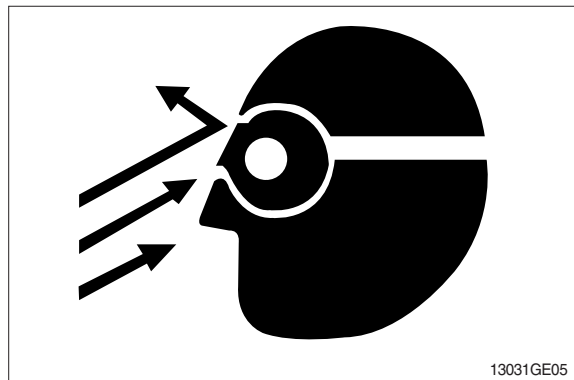
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

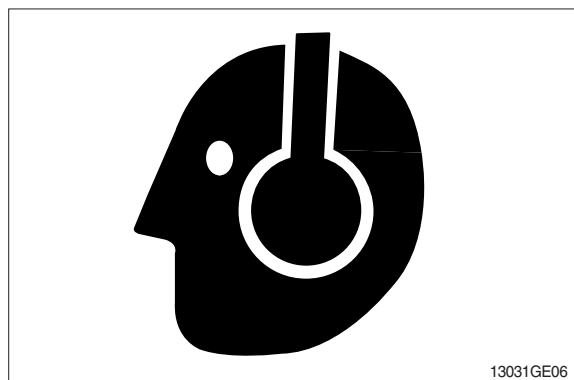
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

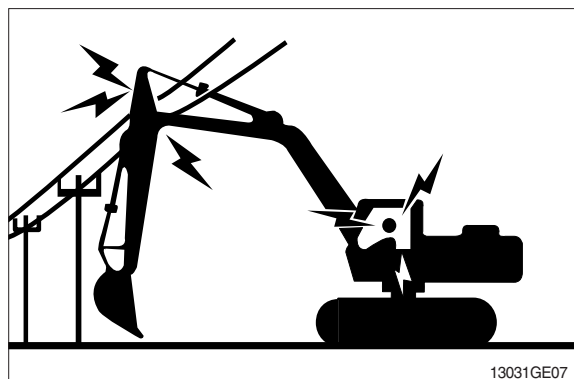
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

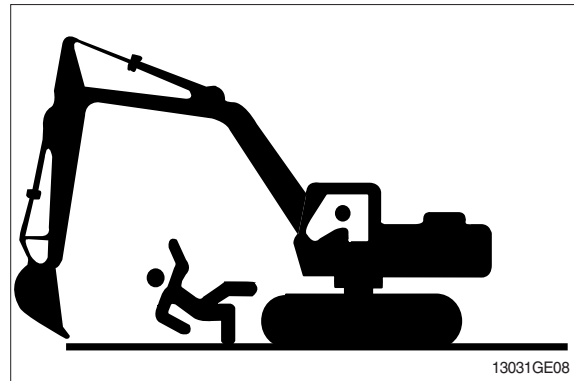
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.

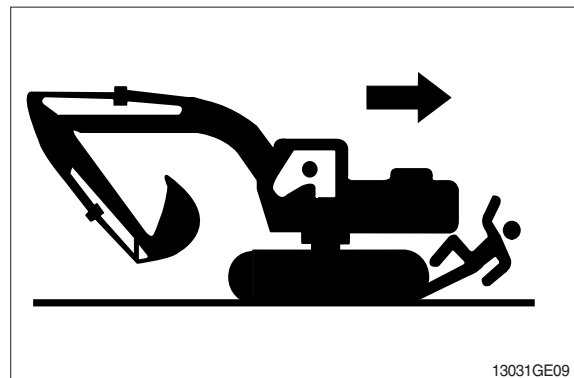


MOVE AND OPERATE MACHINE SAFELY

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.



OPERATE ONLY FROM 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.



PARK MACHINE SAFELY

Before working on the machine:

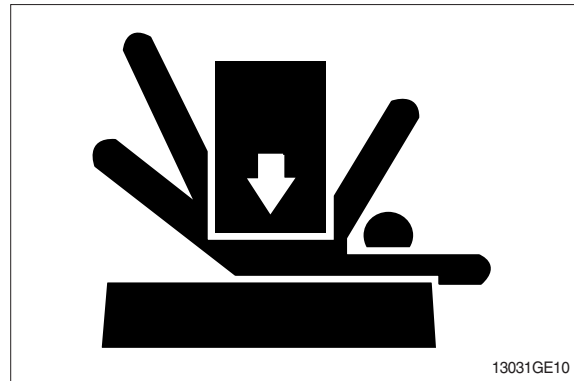
- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine. Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

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.

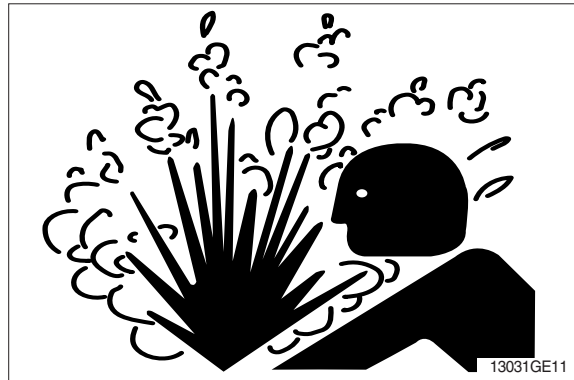
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



SERVICE COOLING SYSTEM SAFELY

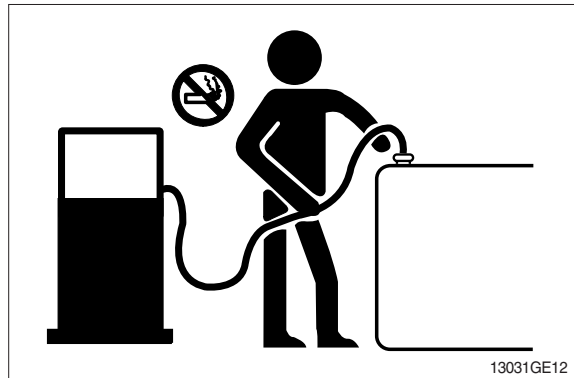
Explosive release of fluids from pressurized cooling system can cause serious burns.

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



HANDLE FLUIDS SAFELY-AVOID FIRES

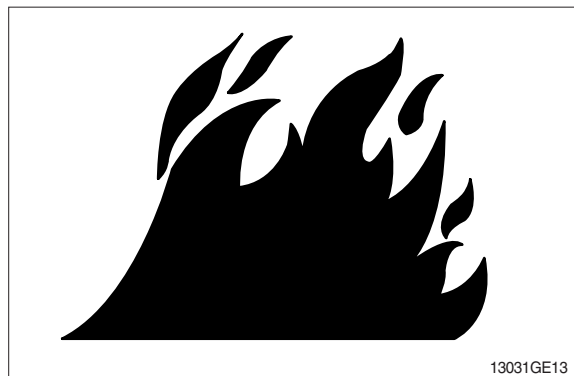
Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine. Fill fuel tank outdoors.



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.

REMOVE PAINT BEFORE WELDING OR HEATING

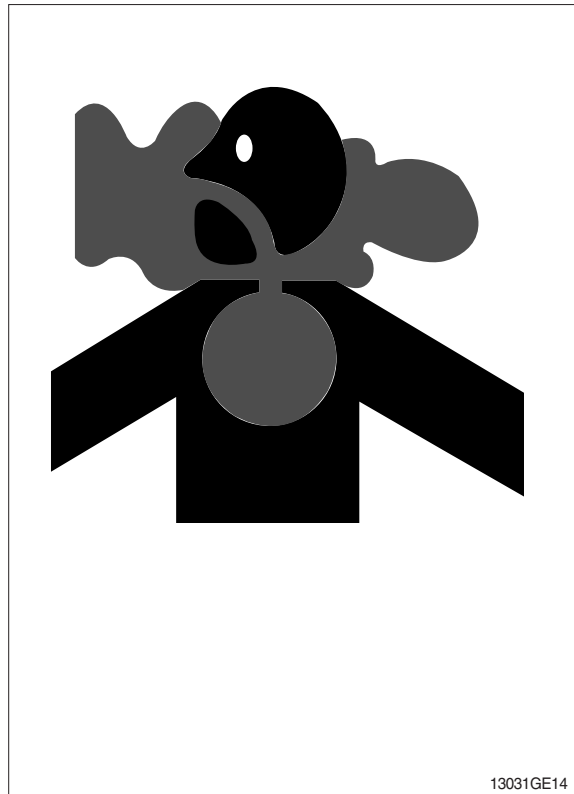
Avoid potentially toxic fumes and dust.

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

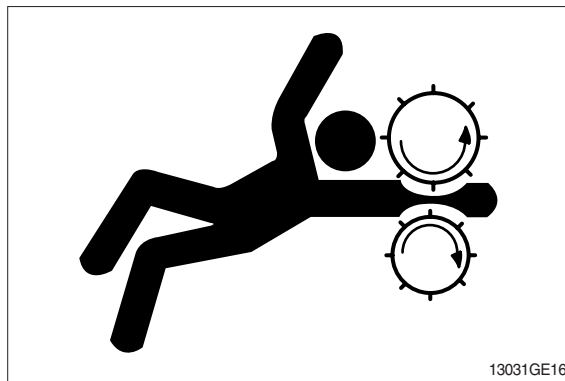
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



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.

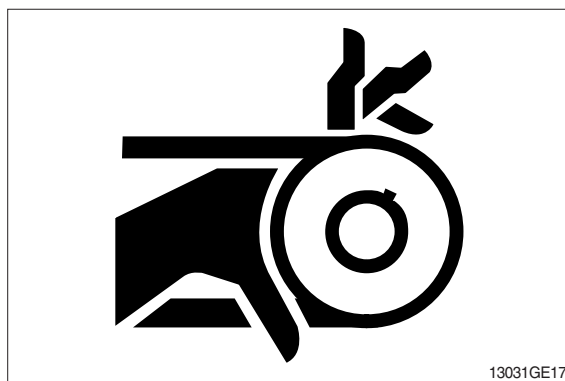
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



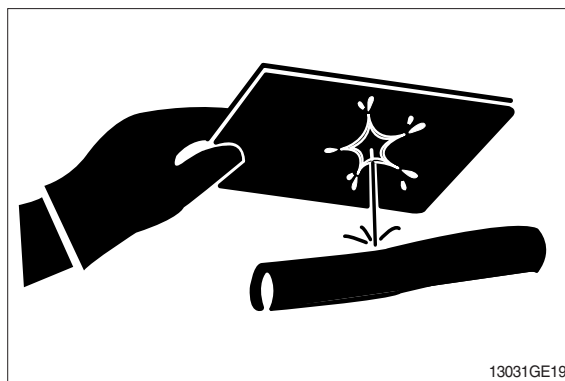
AVOID HIGH PRESSURE FLUIDS

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:

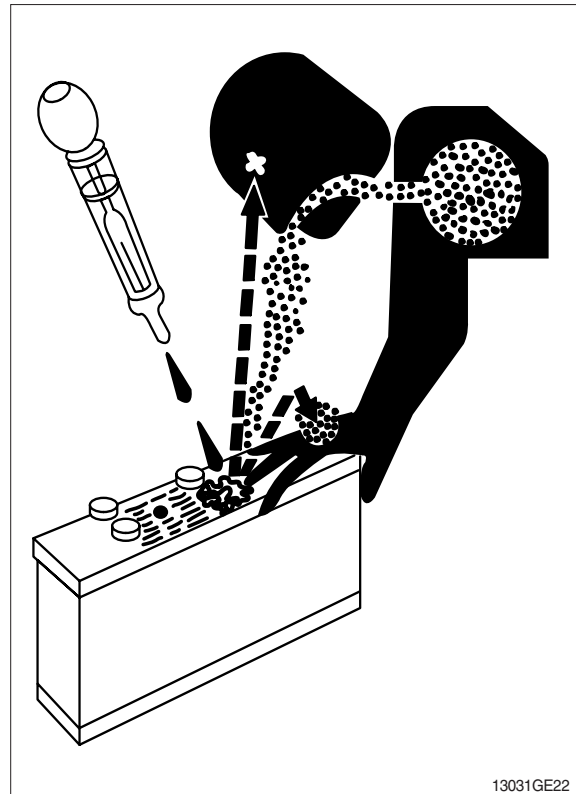
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.



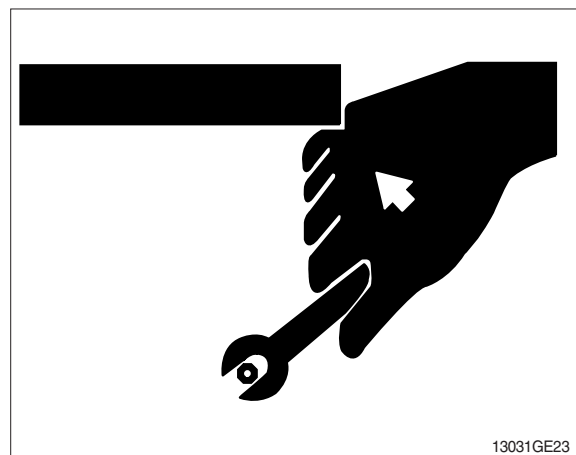
USE TOOLS PROPERLY

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.)

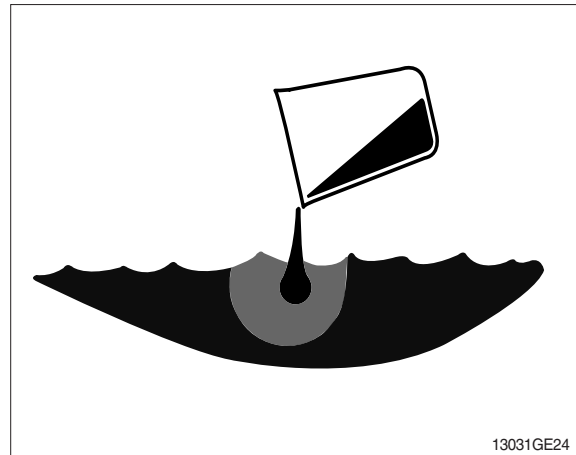


DISPOSE OF FLUIDS PROPERLY

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.

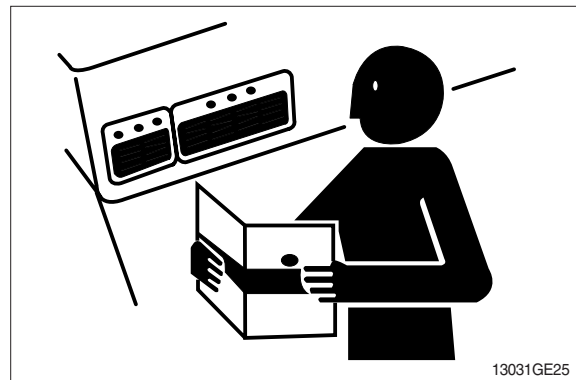
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.



REPLACE SAFETY SIGNS

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

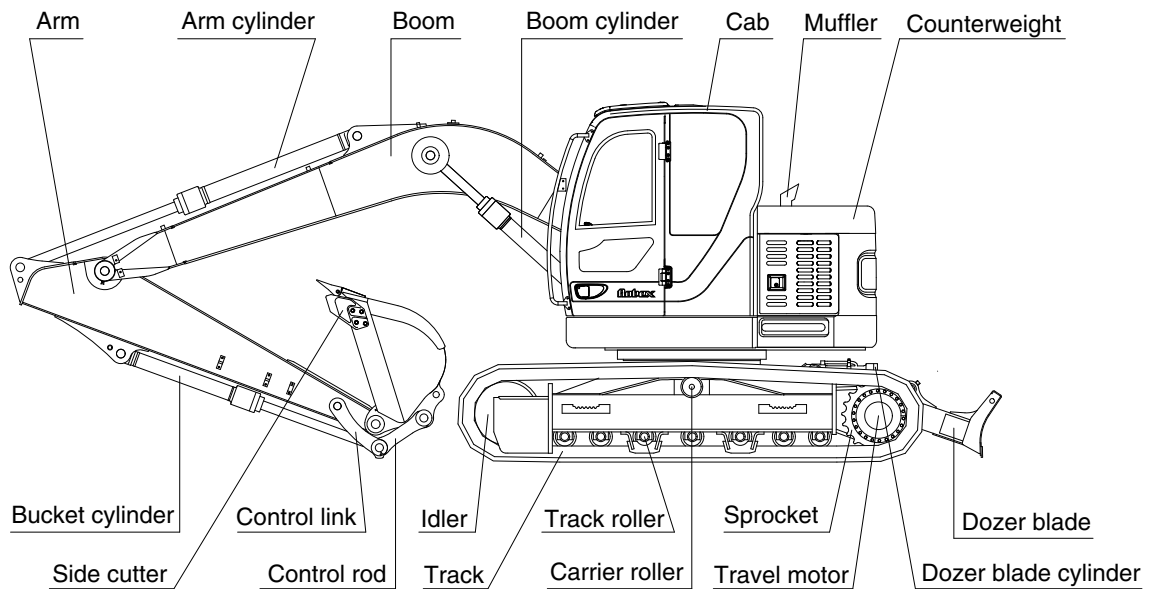
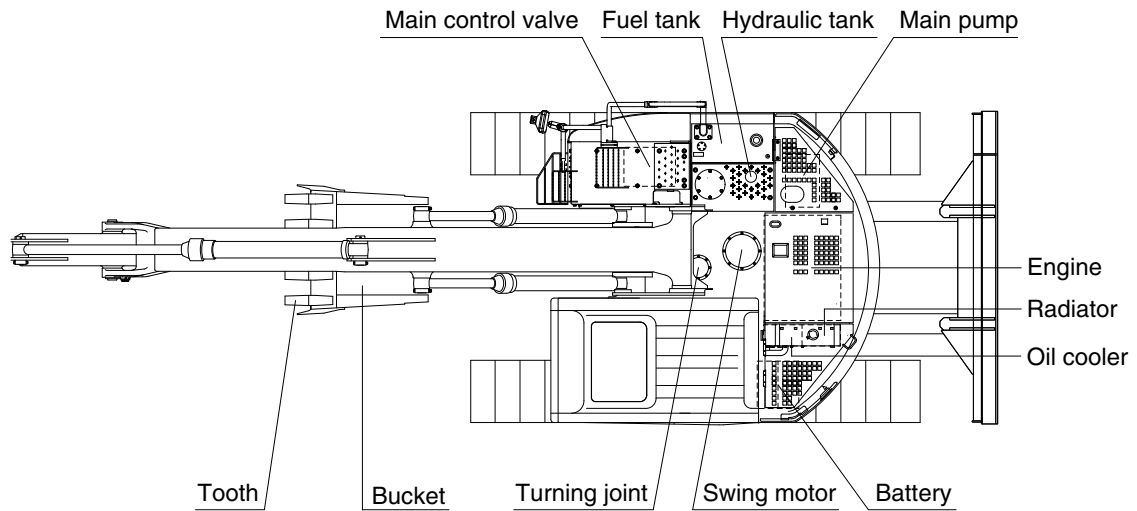


LIVE WITH SAFETY

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

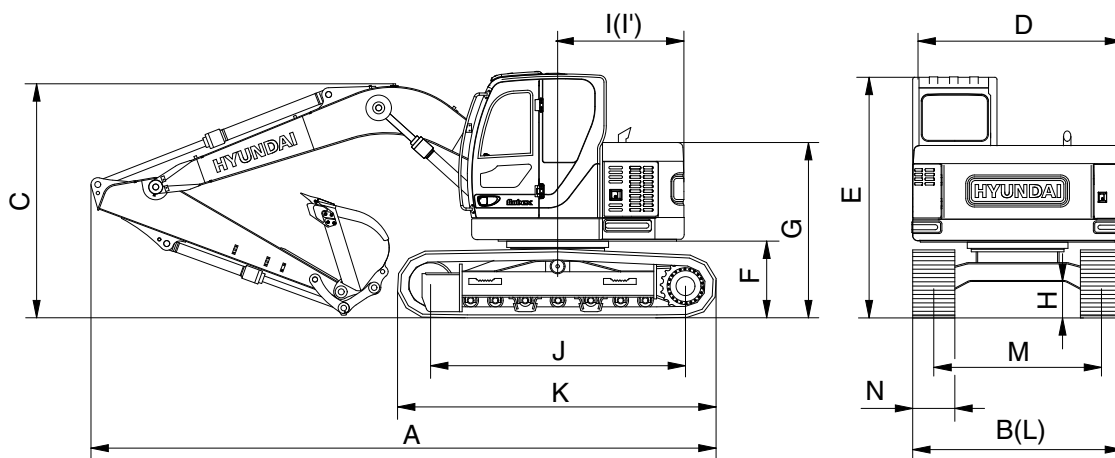


140Z92SP01

2. SPECIFICATIONS

1) R145CR-9

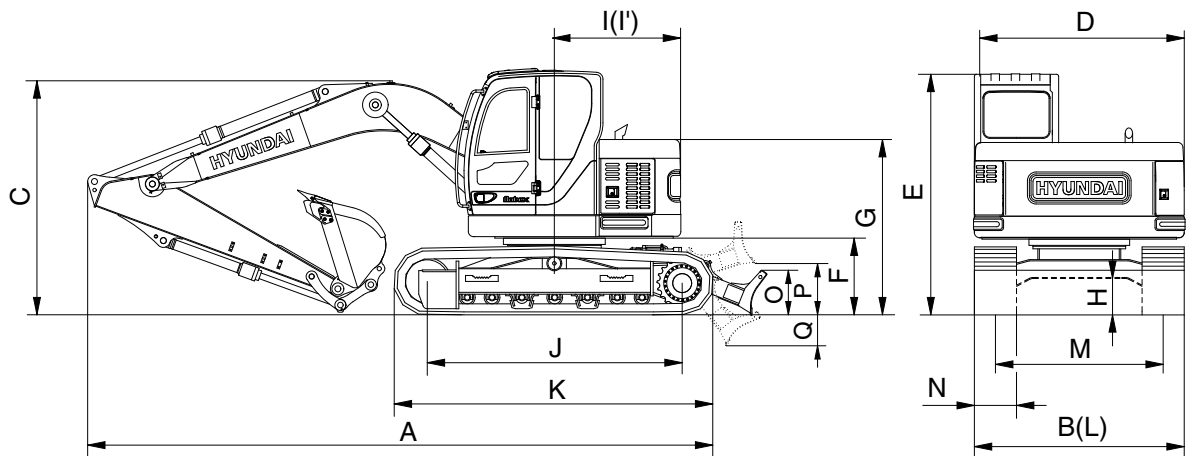
• 4.60 m (15' 1") BOOM and 2.50 m (8' 2") ARM



140Z92SP02

Description		Unit	Specification
Operating weight		kg (lb)	14600 (32190)
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	0.52 (0.68)
Overall length	A	mm (ft-in)	7270 (23' 10")
Overall width, with 500 mm shoe	B		2500 (8' 2")
Overall height	C		2860 (9' 5")
Superstructure width	D		2500 (8' 2")
Overall height of cab	E		2900 (9' 6")
Ground clearance of counterweight	F		930 (3' 1")
Engine cover height	G		2065 (6' 9")
Minimum ground clearance	H		440 (1' 5")
Rear-end distance	I		1480 (4' 10")
Rear-end swing radius	I'		1480 (4' 10")
Distance between tumblers	J		2910 (9' 7")
Undercarriage length	K		3640 (11' 11")
Undercarriage width	L		2500 (8' 2")
Track gauge	M		2000 (6' 7")
Track shoe width, standard	N		500 (20")
Travel speed (low/high)		km/hr (mph)	3.2/5.5 (2.0/3.4)
Swing speed		rpm	12.0
Gradeability		Degree (%)	35 (70)
Ground pressure (500 mm shoe)		kgf/cm ² (psi)	0.46 (6.54)
Max traction force		kg (lb)	13300 (29320)

2) R145CRD-9

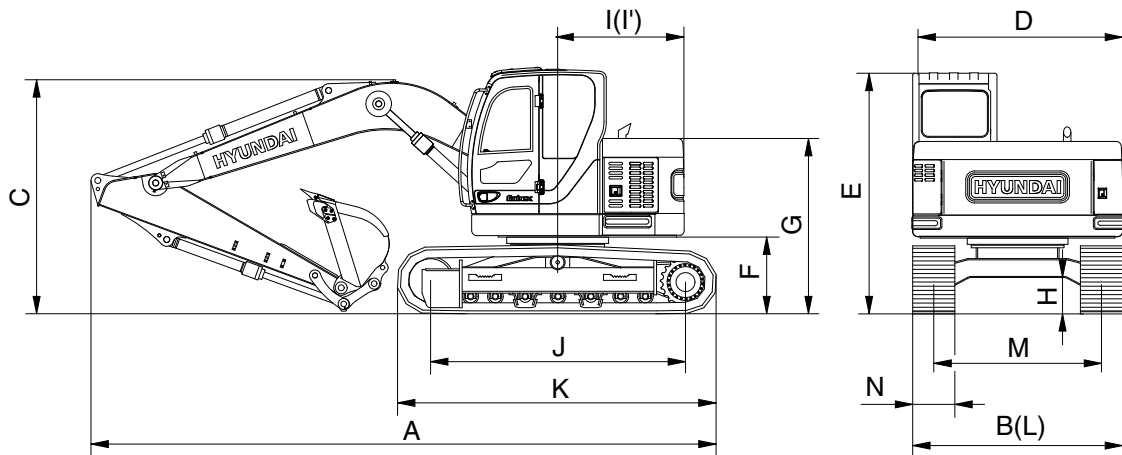


140Z92SP04

Description		Unit	Specification
Operating weight		kg (lb)	15400 (33950)
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	0.52 (0.68)
Overall length	A	mm (ft-in)	7820 (25' 8")
Overall width, with 500 mm shoe	B		2500 (8' 2")
Overall height	C		2860 (9' 5")
Superstructure width	D		2500 (8' 2")
Overall height of cab	E		2900 (9' 6")
Ground clearance of counterweight	F		930 (3' 1")
Engine cover height	G		2065 (6' 9")
Minimum ground clearance	H		440 (1' 5")
Rear-end distance	I		1480 (4' 10")
Rear-end swing radius	I'		1480 (4' 10")
Distance between tumblers	J		2910 (9' 7")
Undercarriage length	K		3640 (11' 11")
Undercarriage width	L		2500 (8' 2")
Track gauge	M		2000 (6' 7")
Track shoe width, standard	N		500 (20")
Height of blade	O		575 (1' 8")
Ground clearance of blade up	P		420 (1' 8")
Depth of blade down	Q		430 (1' 6")
Travel speed (low/high)		km/hr (mph)	3.2/5.5 (2.0/3.4)
Swing speed		rpm	12.0
Gradeability		Degree (%)	35 (70)
Ground pressure (500 mm shoe)		kgf/cm ² (psi)	0.49 (6.97)
Max traction force		kg (lb)	13300 (29320)

3) R145LCR-9

• 4.60 m (15' 1") BOOM and 2.50 m (8' 2") ARM



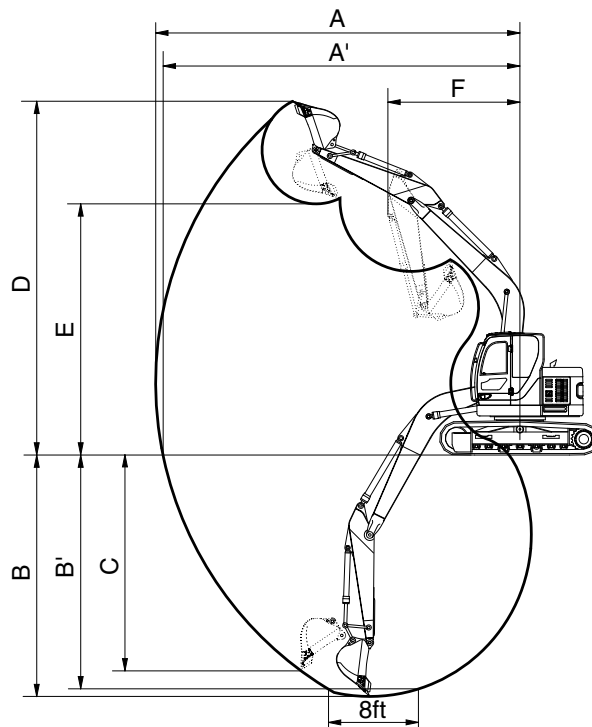
140Z92SP02

Description		Unit	Specification
Operating weight		kg (lb)	14980 (33030)
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	0.52 (0.68)
Overall length	A	mm (ft-in)	7360 (24' 2")
Overall width, with 600 mm shoe	B		2600 (8' 6")
Overall height	C		2860 (9' 5")
Superstructure width	D		2500 (8' 2")
Overall height of cab	E		2900 (9' 6")
Ground clearance of counterweight	F		930 (3' 1")
Engine cover height	G		2065 (6' 9")
Minimum ground clearance	H		440 (1' 5")
Rear-end distance	I		1480 (4' 10")
Rear-end swing radius	I'		1480 (4' 10")
Distance between tumblers	J		3090 (10' 2")
Undercarriage length	K		3820 (12' 6")
Undercarriage width	L		2600 (8' 6")
Track gauge	M		2000 (6' 7")
Track shoe width, standard	N		600 (24")
Travel speed (low/high)		km/hr (mph)	3.2/5.5 (2.0/3.4)
Swing speed		rpm	12.0
Gradeability		Degree (%)	35 (70)
Ground pressure (600 mm shoe)		kgf/cm ² (psi)	0.37 (5.26)
Max traction force		kg (lb)	13300 (29320)

3. WORKING RANGE

1) R145CR/CRD/LCR-9

(1) 4.60 m (15' 1") MONO BOOM



140Z92SP06

Description		1.90 m (6' 3") Arm	2.10 m (6' 11") Arm	※2.50 m (8' 2") Arm	3.00 m (9' 10") Arm
Max digging reach	A	7730 mm (25' 4")	7900 mm (25' 11")	8310 mm (27' 3")	8770 mm (28' 9")
Max digging reach on ground	A'	7580 mm (24' 10")	7750 mm (25' 0")	8170 mm (26' 10")	8630 mm (28' 4")
Max digging depth	B	4890 mm (16' 1")	5100 mm (16' 9")	5500 mm (18' 1")	5990 mm (19' 8")
Max digging depth (8ft level)	B'	4640 mm (15' 3")	4870 mm (16' 0")	5290 mm (17' 4")	5810 mm (19' 1")
Max vertical wall digging depth	C	4400 mm (14' 5")	4600 mm (15' 1")	5000 mm (16' 5")	5400 mm (17' 9")
Max digging height	D	8840 mm (29' 0")	8970 mm (29' 5")	9350 mm (30' 8")	9730 mm (31' 11")
Max dumping height	E	6350 mm (20' 10")	6470 mm (21' 3")	6850 mm (22' 6")	7230 mm (23' 9")
Min swing radius	F	1860 mm (6' 1")	2030 mm (6' 8")	1980 mm (6' 6")	2260 mm (7' 5")
Bucket digging force	SAE	87.3 [94.8] kN	87.3 [94.8] kN	87.3 [94.8] kN	87.3 [94.8] kN
		8900 [9670] kgf	8900 [9670] kgf	8900 [9670] kgf	8900 [9670] kgf
		19620 [21300] lbf	19620 [21300] lbf	19620 [21300] lbf	19620 [21300] lbf
	ISO	102 [110.8] kN	102 [110.8] kN	102 [110.8] kN	102 [110.8] kN
		10400 [11290] kgf	10400 [11290] kgf	10400 [11290] kgf	10400 [11290] kgf
		22930 [24890] lbf	22930 [24890] lbf	22930 [24890] lbf	22930 [24890] lbf
Arm crowd force	SAE	76.5 [83.1] kN	73.6 [79.9] kN	62.8 [68.2] kN	55.9 [60.7] kN
		7800 [8470] kgf	7500 [8140] kgf	6400 [6950] kgf	5700 [6190] kgf
		17200 [18670] lbf	16530 [17950] lbf	14110 [15320] lbf	12570 [13640] lbf
	ISO	80.4 [87.3] kN	77.5 [84.1] kN	65.7 [71.4] kN	57.9 [62.8] kN
		8200 [8900] kgf	7900 [8580] kgf	6700 [7270] kgf	5900 [6410] kgf
		18080 [19630] lbf	17420 [18910] lbf	14770 [16040] lbf	13010 [14120] lbf

※ : STD

[] : Power boost

4. WEIGHT

Item	R145CR-9		R145CRD-9		R145LCR-9	
	kg	lb	kg	lb	kg	lb
Upper structure assembly	6950	15320	←		←	
Main frame weld assembly	1315	2900	←		←	
Engine assembly	420	930	←		←	
Main pump assembly	90	200	←		←	
Main control valve assembly	140	310	←		←	
Swing motor assembly	120	260	←		←	
Hydraulic oil tank assembly	150	330	←		←	
Fuel tank assembly	120	260	←		←	
Counterweight	2800	6170	←		←	
Cab assembly	450	990	←		←	
Lower chassis assembly	5230	11530	6030	13290	5600	12350
Track frame weld assembly	1480	3260	1640	3620	1820	4010
Swing bearing	215	470	←		←	
Travel motor assembly	240	530	←		←	
Turning joint	50	110	←		←	
Track recoil spring	105	230	←		←	
Idler	125	280	←		←	
Carrier roller	20	45	←		←	
Track roller	35	80	←		←	
Track-chain assembly (500 mm standard triple grouser shoe)	910	2010	←		940	2070
Dozer blade assembly	-		465	1025	-	
Front attachment assembly (4.6 m boom, 2.5 m arm, 0.52 m³ SAE heaped bucket)	2420	5330	←		←	
4.6 m boom assembly	830	1830	←		←	
2.5 m arm assembly	435	960	←		←	
0.52 m³ SAE heaped bucket	460	1010	←		←	
Boom cylinder assembly	130	290	←		←	
Arm cylinder assembly	160	350	←		←	
Bucket cylinder assembly	100	220	←		←	
Bucket control rod assembly	90	200	←		←	
Dozer blade cylinder assembly	-		55	120	-	

5. LIFTING CAPACITIES

1) R145CR-9

(1) 4.60 m (15' 1") boom, 2.50 m (8' 2") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight.

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

Load point height		Load radius								At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg lb					*2960 *6530	*2960 *6530			2710 5970	1700 3750	6.50 (21.3)
4.5 m (15.0 ft)	kg lb					*3460 *7630	3310 7300	*2670 *5890	1930 4250	2120 4670	1280 2820	7.37 (24.2)
3.0 m (10.0 ft)	kg lb			*6090 *13430	*6090 *13430	*4480 *9880	3090 6810	2990 6590	1850 4080	1870 4120	1090 2400	7.81 (25.6)
1.5 m (5.0 ft)	kg lb			*8480 *18700	5380 11860	4640 10230	2810 6190	2870 6330	1730 3810	1780 3920	1030 2270	7.90 (25.9)
Ground Line	kg lb			9050 19950	4920 10850	4390 9680	2590 5710	2750 6060	1630 3590	1850 4080	1060 2340	7.67 (25.2)
-1.5 m (-5.0 ft)	kg lb	*5850 *12900	*5850 *12900	*8700 *19180	4820 10630	4280 9440	2490 5490	2700 5950	1580 3480	2120 4670	1240 2730	7.07 (23.2)
-3.0 m (-10 ft)	kg lb	*8930 *19690	*8930 *19690	*7030 *15500	4900 10800	4300 9480	2510 5530			*2400 *5290	1700 3750	5.97 (19.6)
-4.5 m (-15.0 ft)	kg lb			*3750 *8270	*3750 *8270							

- 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) 4.60 m (15' 1") boom, 1.90 m (6' 3") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight.

Load point height		Load radius								At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg lb					*3270 *7210	*3270 *7210			3360 7410	2130 4700	5.75 (18.9)
4.5 m (15.0 ft)	kg lb			*4960 *10930	*4960 *10930	*4310 *9500	3250 7170			2500 5510	1550 3420	6.73 (22.1)
3.0 m (10.0 ft)	kg lb			*7230 *15940	5970 13160	4900 10800	3050 6720	2980 6570	1850 4080	2170 4780	1310 2890	7.22 (23.7)
1.5 m (5.0 ft)	kg lb			*9120 *20110	5220 11510	4620 10190	2800 6170	2880 6350	1750 3860	2070 4560	1230 2710	7.32 (24.0)
Ground Line	kg lb			*8610 *18980	4970 10560	4430 9770	2640 5820	2800 6170	1680 3700	2170 4780	1290 2840	7.06 (23.2)
-1.5 m (-5.0 ft)	kg lb	*6830 *15060	*6830 *15060	*8140 *17950	4970 10960	4370 9630	2580 5690			2560 5640	1540 3400	6.40 (21.0)
-3.0 m (-10 ft)	kg lb			*6010 *13250	5100 11240	*4100 *9040	2650 5840			*2250 *4960	*2250 *4960	5.12 (16.8)

(3) 4.60 m (15' 1") boom, 3.0 m (9' 10") arm equipped with 0.52 m³ (SAE heaped) bucket and 700 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight.

Load point height		Load radius										At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		7.0 m (25 ft)		Capacity		Reach
														m (ft)
6.0 m (20.0 ft)	kg lb					*2560 *5640	*2560 *5640	*1730 *3810	*1730 *3810			2350 5180	1450 3200	7.07 (23.2)
4.5 m (15.0 ft)	kg lb					*2760 *6080	*2760 *6080	*2550 *5620	1980 4370			1890 4170	1120 2470	7.86 (25.8)
3.0 m (10.0 ft)	kg lb			*3690 *8140	*3690 *8140	*3690 *8140	3170 6990	3030 6680	1880 4140	*1430 *3150	1180 2600	1680 3700	960 2120	8.27 (27.1)
1.5 m (5.0 ft)	kg lb			*7740 *17060	5620 12390	4720 10410	2880 6350	2890 6370	1750 3860	1950 4300	1130 2490	1610 3550	910 2010	8.36 (27.4)
Ground Line	kg lb			9180 20240	5020 11070	4440 9790	2630 5800	2760 6080	1630 3590	*1830 *4030	1080 2380	1660 3660	930 2050	8.14 (26.7)
-1.5 m (-5.0 ft)	kg lb	*5380 *11860	*5380 *11860	8930 19690	4820 10630	4280 9440	2490 5490	2680 5910	1560 3440			1860 4100	1060 2340	7.59 (24.9)
-3.0 m (-10 ft)	kg lb	*7860 *17330	*7860 *17330	*7790 *17170	4830 10650	4250 9370	2460 5420	2680 5910	1560 3440			2380 5250	1400 3090	6.59 (21.6)
-4.5 m (-15 ft)	kg lb	*8050 *17750	*8050 *17750	*5160 *11380	5020 11070	*3260 *7190	2580 5690							

2) R145CRD-9 (with dozer blade)

(1) 4.60 m (15' 1") boom, 2.50 m (8' 2") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight with dozer blade.

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

Load point height		Load radius								At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg lb					*2960 *6530	*2960 *6530			*2910 *6420	1820 4010	6.50 (21.3)
4.5 m (15.0 ft)	kg lb					*3460 *7630	*3460 *7630	*2670 *5890	2060 4540	2340 5160	1380 3040	7.37 (24.2)
3.0 m (10.0 ft)	kg lb			*6090 *13430	*6090 *13430	*4480 *9880	3280 7230	3270 7210	1980 4370	2070 4560	1190 2620	7.81 (25.6)
1.5 m (5.0 ft)	kg lb			*8480 *18700	5720 12610	5060 11160	3000 6610	3150 6940	1860 4100	1980 4370	1120 2470	7.90 (25.9)
Ground Line	kg lb			*9170 *20220	5260 11600	4810 10600	2780 6130	3030 6680	1760 3880	2060 4540	1160 2560	7.67 (25.2)
-1.5 m (-5.0 ft)	kg lb	*5850 *12900	*5850 *12900	*8700 *19180	5160 11380	4700 10360	2680 5910	2980 6570	1710 3770	2350 5180	1340 2950	7.07 (23.2)
-3.0 m (-10 ft)	kg lb	*8930 *19690	*8930 *19690	*7030 *15500	5230 11530	4720 10410	2700 5950			*2400 *5290	1830 4030	5.97 (19.6)
-4.5 m (-15.0 ft)	kg lb			*3750 *8270	*3750 *8270							

- 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) 4.60 m (15' 1") boom, 3.0 m (9' 10") arm equipped with 0.52 m³ (SAE heaped) bucket and 700 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight with dozer blade.

Load point height		Load radius										At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		7.0 m (25 ft)		Capacity		Reach
														m (ft)
6.0 m (20.0 ft)	kg lb					*2560 *5640	*2560 *5640	*1730 *3810	*1730 *3810			2570 5670	1560 3440	7.07 (23.2)
4.5 m (15.0 ft)	kg lb					*2760 *6080	*2760 *6080	*2550 *5620	2110 4650			2090 4610	1220 2690	7.86 (25.8)
3.0 m (10.0 ft)	kg lb			*3690 *8140	*3690 *8140	*3690 *8140	3360 7410	*3210 *7080	2020 4450	*1430 *3150	1280 2820	1860 4100	1050 2310	8.27 (27.1)
1.5 m (5.0 ft)	kg lb			*7740 *17060	5950 13120	*5030 *11090	3070 6770	3170 6990	1890 4170	*1990 *4390	1230 2710	1790 3590	990 2180	8.36 (27.4)
Ground Line	kg lb			*9190 *20260	5360 11820	4850 10690	2820 6220	3040 6700	1770 3900	*1830 *4030	1180 2600	1850 4080	1020 2250	8.14 (26.7)
-1.5 m (-5.0 ft)	kg lb	*5380 *11860	*5380 *11860	*9060 *19970	5160 11380	4700 10360	2680 5910	2960 6530	1690 3730			2070 4560	1160 2560	7.59 (24.9)
-3.0 m (-10 ft)	kg lb	*7860 *17330	*7860 *17330	*7790 *17170	5170 11400	4670 10300	2650 5840	2960 6530	1690 3730			*2460 *5420	1520 3350	6.59 (21.6)
-4.5 m (-15 ft)	kg lb	*8050 *17750	*8050 *17750	*5160 *11380	*5160 *11380	3260 7190	2770 6110							

3) R145LCR-9

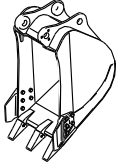
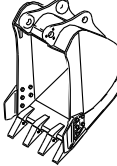
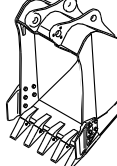
(1) 4.60 m (15' 1") boom, 2.50 m (8' 2") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight.

Load point height		Load radius								At max. reach		
		1.5 m (5 ft)		3.0 m (10 ft)		4.5 m (15 ft)		6.0 m (20 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg lb					*2960 *6530	*2960 *6530			2870 6330	1710 3770	6.50 (21.3)
4.5 m (15.0 ft)	kg lb					*3460 *7630	3340 7360	*2670 *5890	1950 4300	2250 4960	1300 2870	7.37 (24.2)
3.0 m (10.0 ft)	kg lb			*6090 *13430	*6090 *13430	*4480 *9880	3120 6880	3170 6990	1870 4120	1990 4390	1110 2450	7.81 (25.6)
1.5 m (5.0 ft)	kg lb			*8480 *18700	5420 11950	4930 10870	2840 6260	3040 6700	1750 3860	1900 4190	1040 2290	7.90 (25.9)
Ground Line	kg lb			*9170 *20220	4970 10960	4680 10320	2620 5780	2930 6460	1650 3640	1970 4340	1080 2380	7.67 (25.2)
-1.5 m (-5.0 ft)	kg lb	*5850 *12900	*5850 *12900	*8700 *19180	4870 10740	4570 10080	2520 5560	2870 6330	1600 3530	2260 4980	1250 2760	7.07 (23.2)
-3.0 m (-10 ft)	kg lb	*8930 *19690	*8930 *19690	*7030 *15500	4940 10890	4590 10120	2540 5600			*2400 *5290	1720 3790	5.97 (19.6)
-4.5 m (-15 ft)	kg lb			*3750 *8270	*3750 *8270							

6. BUCKET SELECTION GUIDE

1) R145CR-9, R145CRD-9, R145LCR-9

(1) General bucket

		
0.23 m³ SAE heaped bucket	0.40, 0.46 m³ SAE heaped bucket	※ 0.52, 0.58, 0.65, 0.71 m³ SAE heaped bucket

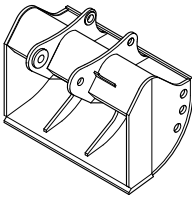
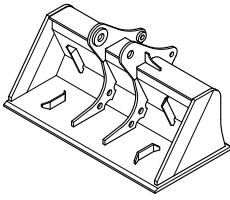
Capacity		Width		Weight	Recommendation			
					4.6 m (15' 1") boom			
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.9 m arm (6' 3")	2.1 m arm (6' 11")	2.5 m arm (8' 2")	3.0 m arm (9' 10")
0.23 m³ (0.30 yd³)	0.20 m³ (0.26 yd³)	520 mm (20.5")	620 mm (24.4")	335 kg (740 lb)				
0.40 m³ (0.52 yd³)	0.35 m³ (0.46 yd³)	750 mm (29.5")	850 mm (33.5")	410 kg (900 lb)				
0.46 m³ (0.60 yd³)	0.40 m³ (0.52 yd³)	840 mm (33.1")	940 mm (37.0")	435 kg (960 lb)				
0.52 m³ (0.68 yd³)	0.45 m³ (0.59 yd³)	915 mm (36.0")	1015 mm (40.0")	460 kg (1010 lb)				
0.58 m³ (0.76 yd³)	0.50 m³ (0.65 yd³)	1000 mm (39.4")	1100 mm (43.3")	480 kg (1060 lb)				
0.65 m³ (0.85 yd³)	0.55 m³ (0.72 yd³)	1105 mm (43.5")	1205 mm (47.4")	500 kg (1100 lb)				
0.71 m³ (0.93 yd³)	0.60 m³ (0.78 yd³)	1190 mm (46.9")	1290 mm (50.8")	540 kg (1190 lb)				

 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) Special bucket

Ditch cleaning bucket 	Slope finishing bucket 
★0.45 m³ SAE heaped bucket	◎0.55 m³ SAE heaped bucket

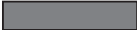
Capacity		Width		Weight	Recommendation			
					4.6 m (15' 1") boom			
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.9 m arm (6' 3")	2.1 m arm (6' 11")	2.5 m arm (8' 2")	3.0 m arm (9' 10")
★0.45 m ³ (0.59 yd ³)	0.40 m ³ (0.52 yd ³)	1520 mm (59.8")	-	410 kg (900 lb)				—
◎0.55 m ³ (0.72 yd ³)	0.45 m ³ (0.59 yd ³)	1800 mm (70.9")	-	585 kg (1290 lb)				—

★ : Ditch cleaning bucket

◎ : Slope finishing bucket

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

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

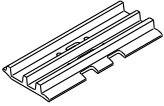
 Applicable for materials with density of 1100 kgf/m³ (1850 lbf/yd³) or less

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		
					
R145CR-9	Shoe width	mm (in)	※ 500 (20)	600 (24)	700 (28)
	Operating weight	kg (lb)	14600/32190	14790 (32610)	15020 (33110)
	Ground pressure	kgf/cm ² (psi)	0.46 (6.54)	0.39 (5.55)	0.34 (4.83)
	Overall width	mm (ft-in)	2500 (8' 2")	2600 (8' 6")	2700 (8' 10")
R145CRD-9	Shoe width	mm (in)	※ 500 (20)	600 (24)	700 (28)
	Operating weight	kg (lb)	15400 (33950)	15610 (34610)	15840 (34920)
	Ground pressure	kgf/cm ² (psi)	0.49 (6.97)	0.41 (5.83)	0.36 (5.12)
	Overall width	mm (ft-in)	2500 (8' 2")	2600 (8' 6")	2700 (8' 10")
R145LCR-9	Shoe width	mm (in)	※ 500 (20)	600 (24)	700 (28)
	Operating weight	kg (lb)	14660 (32320)	14850 (32740)	15080 (33250)
	Ground pressure	kgf/cm ² (psi)	0.44 (6.26)	0.37 (5.26)	0.32 (4.55)
	Overall width	mm (ft-in)	2500 (8' 2")	2600 (8' 6")	2700 (8' 10")

※ : Standard

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity	
	R145CR-9/R145CRD-9	R145LCR-9
Carrier rollers	1 EA	2 EA
Track rollers	7 EA	7 EA
Track shoes	45 EA	47 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
500 mm triple grouser	Standard	A
600 mm triple grouser	Option	A
700 mm triple grouser	Option	B

※ **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

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Mitsubishi D04FD-TAA
Type	4-cycle turbocharged charge air cooled 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	102 × 130 mm
Piston displacement	4250cc (260cu in)
Compression ratio	16.5 : 1
Rated gross horse power (SAE J1995)	119 Hp (89 kW) at 2000 rpm
Maximum torque	45.4 kgf · m (328 lbf · ft) at 1700 rpm
Engine oil quantity	17.5 l (4.6 U.S. gal)
Dry weight	420 kg (930 lb)
High idling speed	2100 ± 50 rpm
Low idling speed	800 ± 100 rpm
Rated fuel consumption	165 g/Hp · hr at 2000 rpm
Starting motor	24 V-5.0 kW
Alternator	24 V-50 A
Battery	2 × 12 V × 80 Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 65 cc/rev
Maximum pressure	350 kgf/cm ² (4980 psi) [380 kgf/cm ² (5400 psi)]
Rated oil flow	2 × 123.5 l /min (32.6 U.S. gpm / 27.2 U.K. gpm)
Rated speed	2000 rpm

[]: Power boost

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