SECTION 1 GENERAL

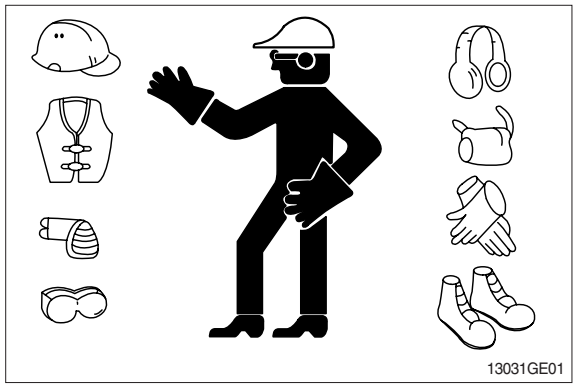
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

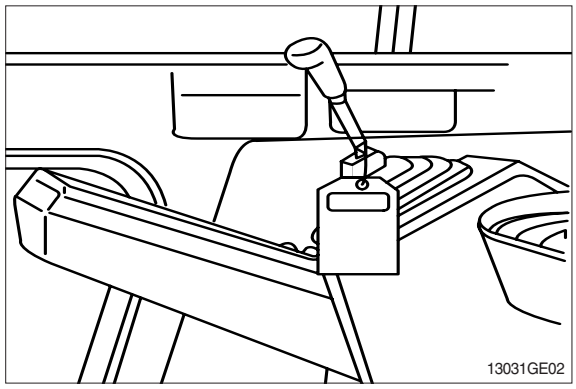
WEAR PROTECTIVE CLOTHING

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



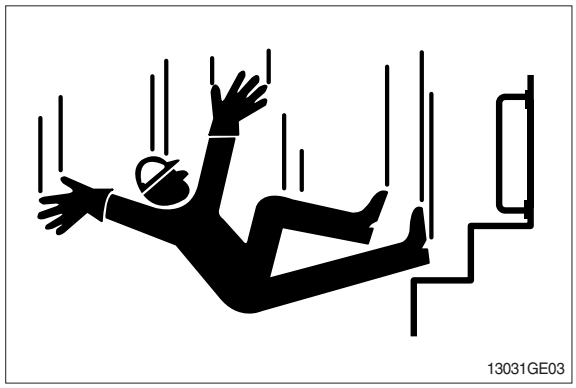
WARN OTHERS OF SERVICE WORK

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.

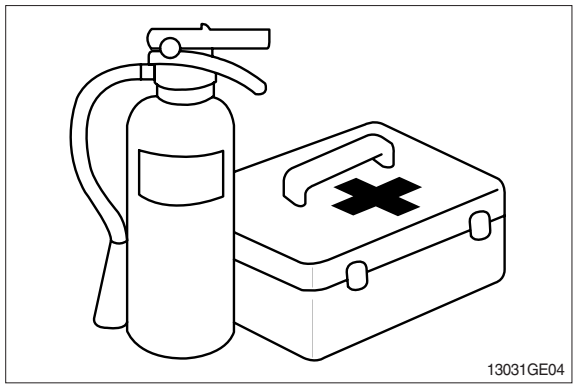


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

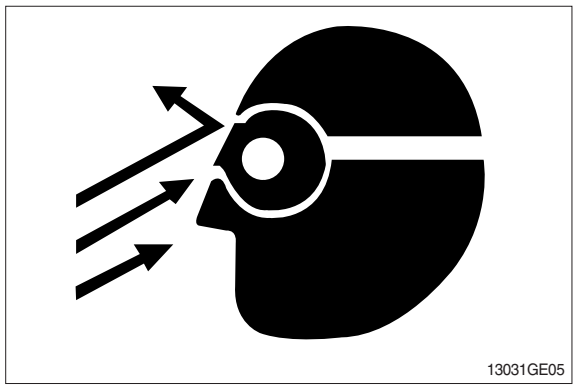
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

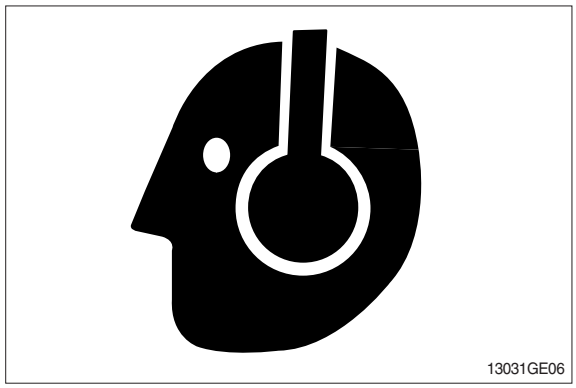
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

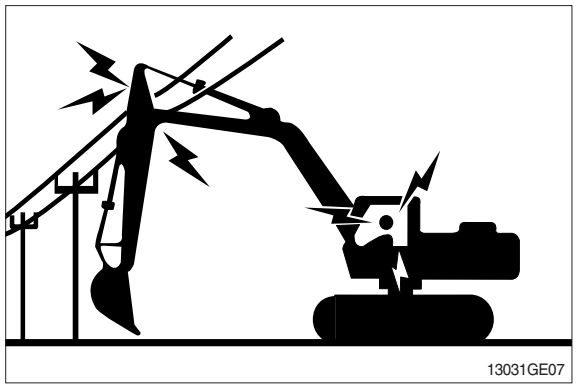
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

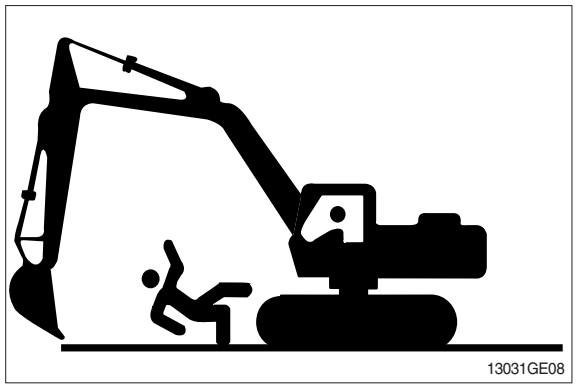
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.

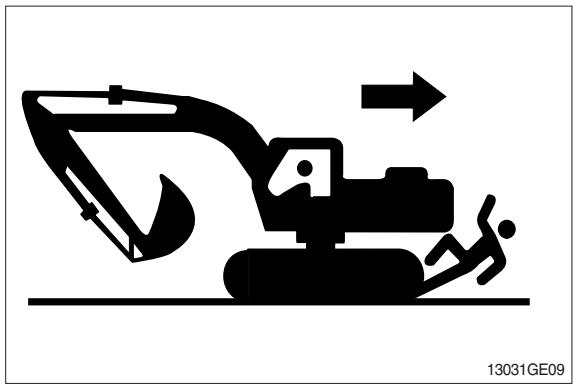


MOVE AND OPERATE MACHINE SAFELY

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.

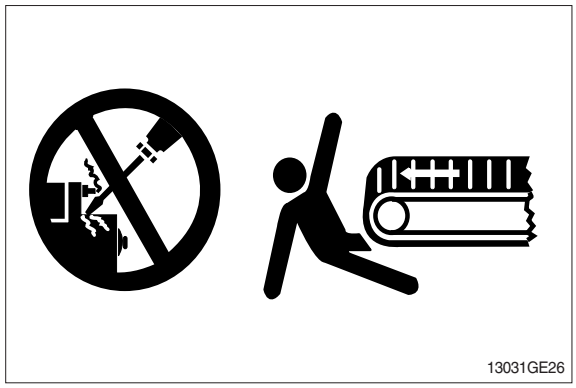
Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the excavator.



OPERATE ONLY 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.



PARK MACHINE SAFELY

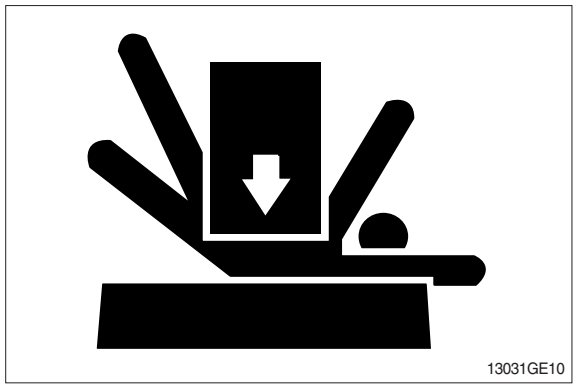
Before working on the machine:

- 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.

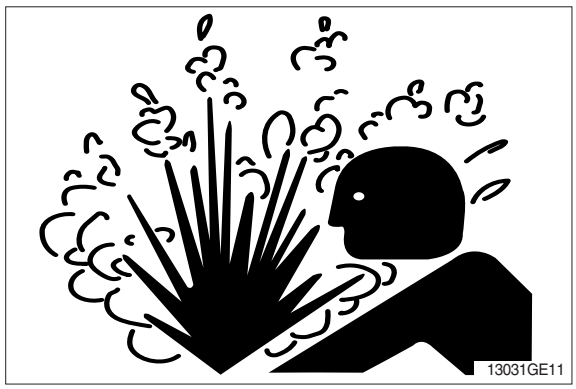
Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.


13031GE10

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.


13031GE11

HANDLE FLUIDS SAFELY-AVOID FIRES

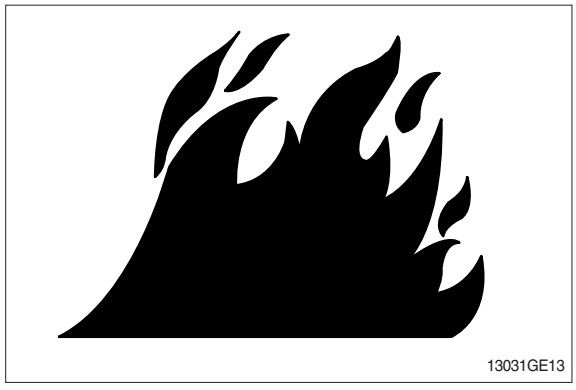
Handle fuel with care; It is highly flammable. Do not refuel the machine while smoking or when near open flame or sparks. Always stop engine before refueling machine.
Fill fuel tank outdoors.


13031GE12

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

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

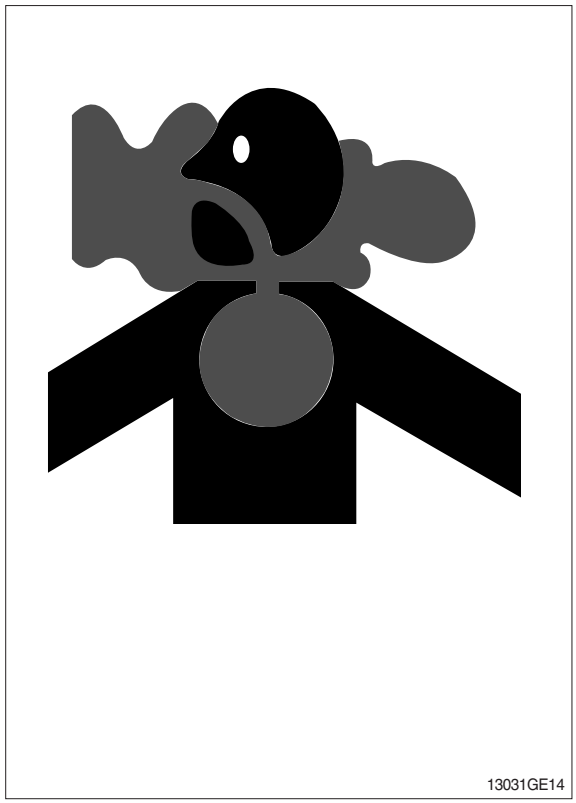
Do not store oily rags; They can ignite and burn spontaneously.


13031GE13

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.

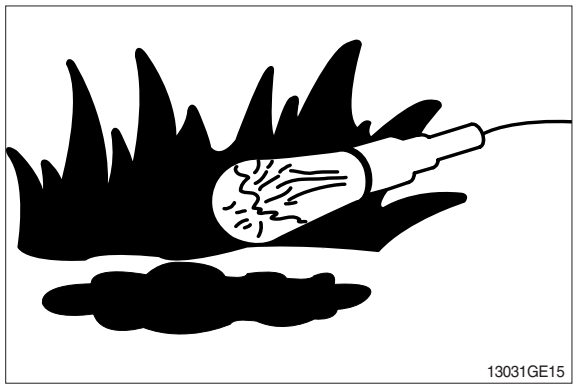
Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

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

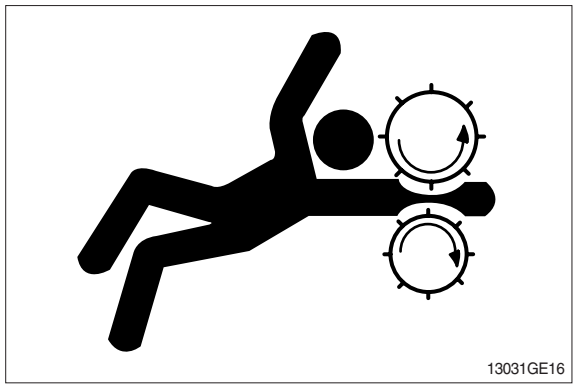
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



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.

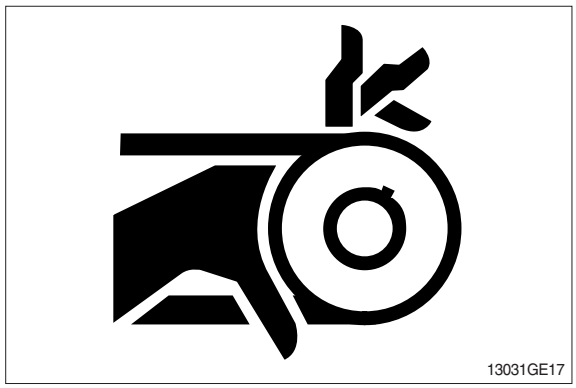
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



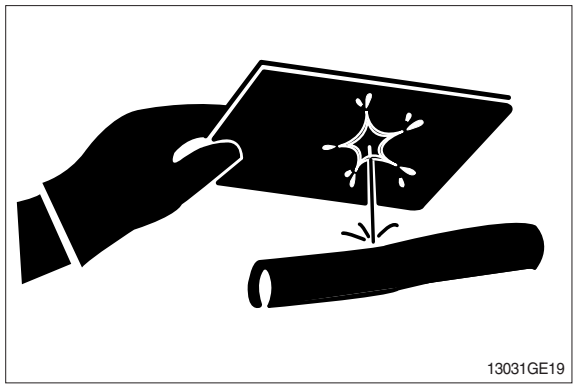
AVOID HIGH PRESSURE FLUIDS

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.


13031GE20

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).


13031GE21

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:

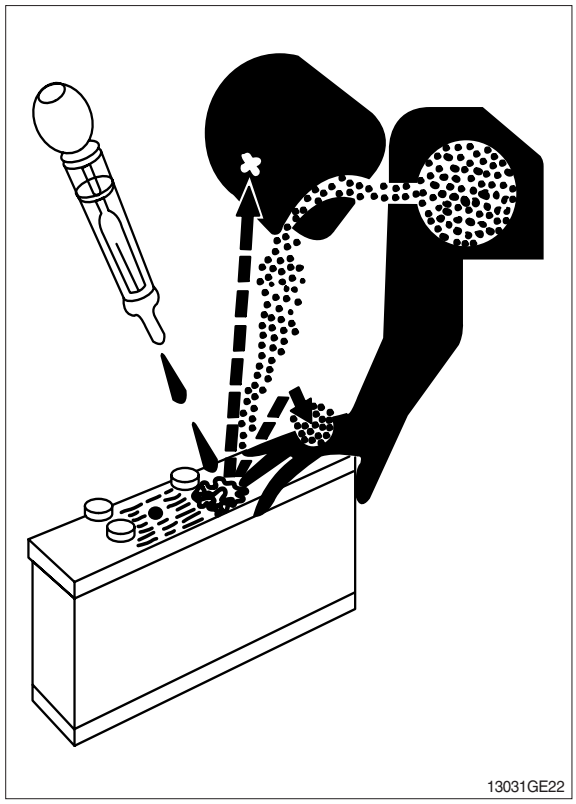
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling of dripping electrolyte.
5. Use proper jump start procedure.

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.



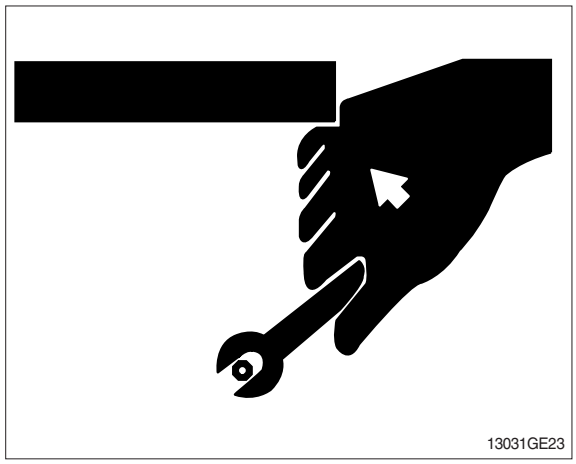
USE TOOLS PROPERLY

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.)

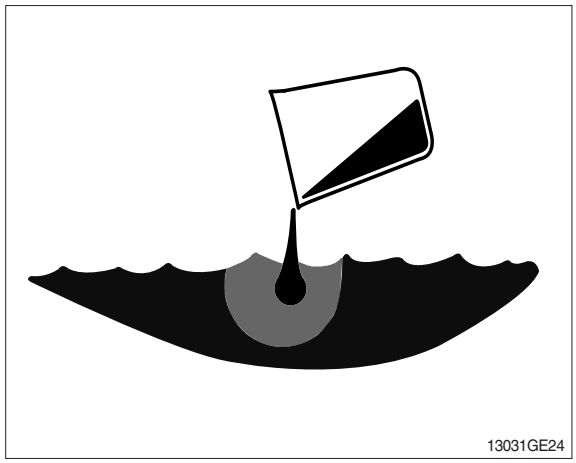


DISPOSE OF FLUIDS PROPERLY

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.

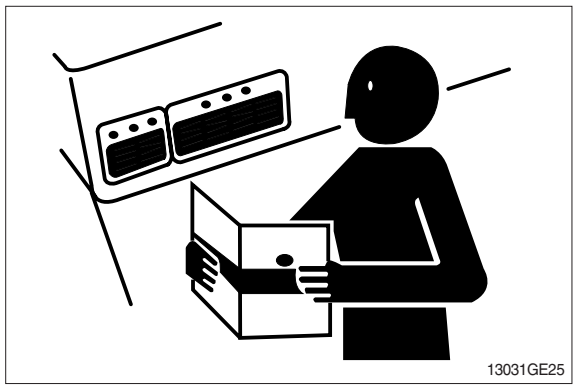
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.

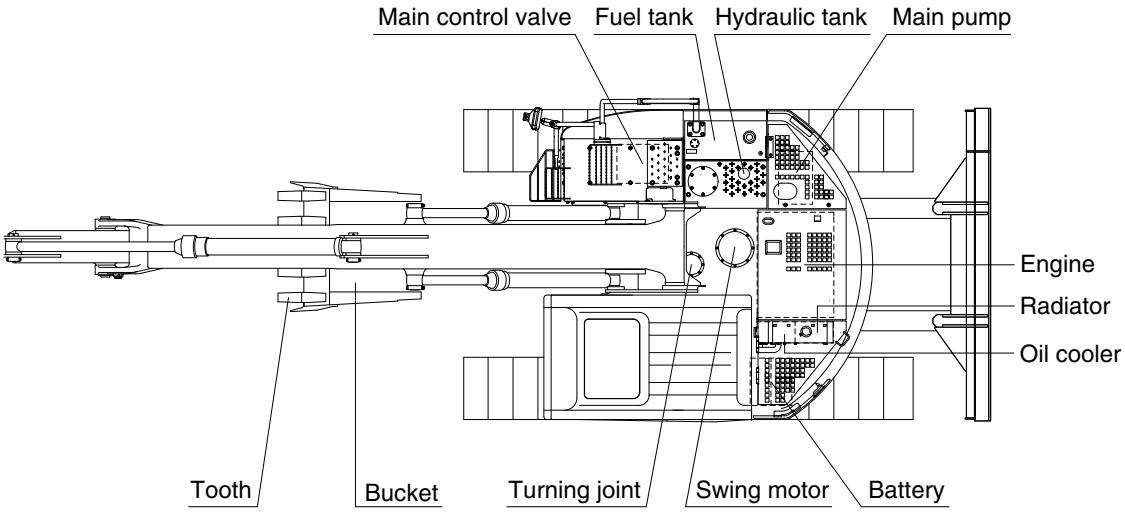

13031GE25

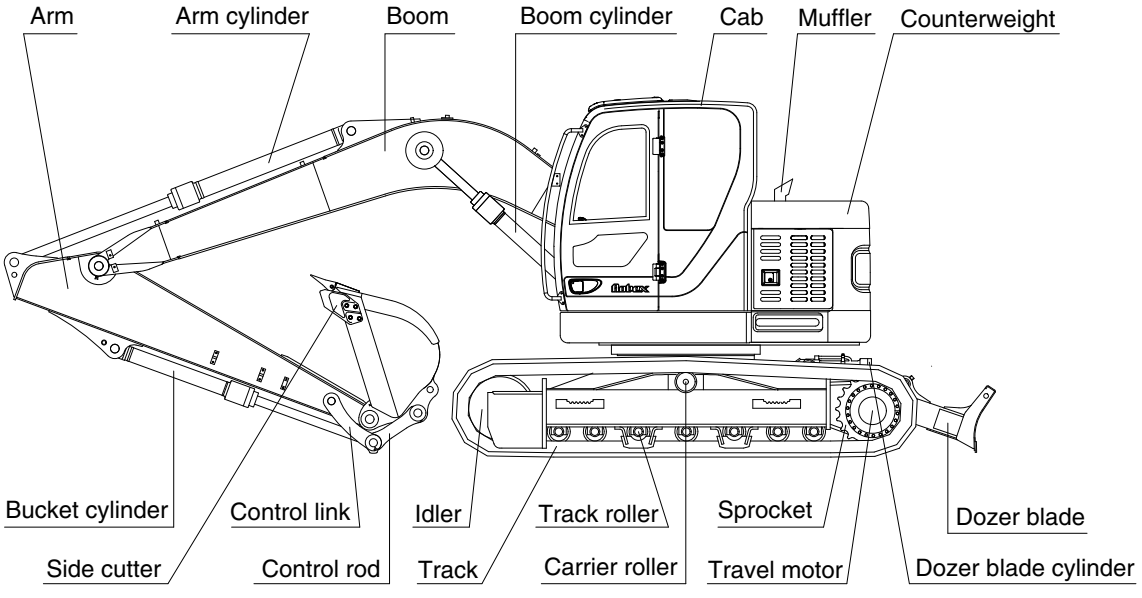
LIVE WITH SAFETY

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



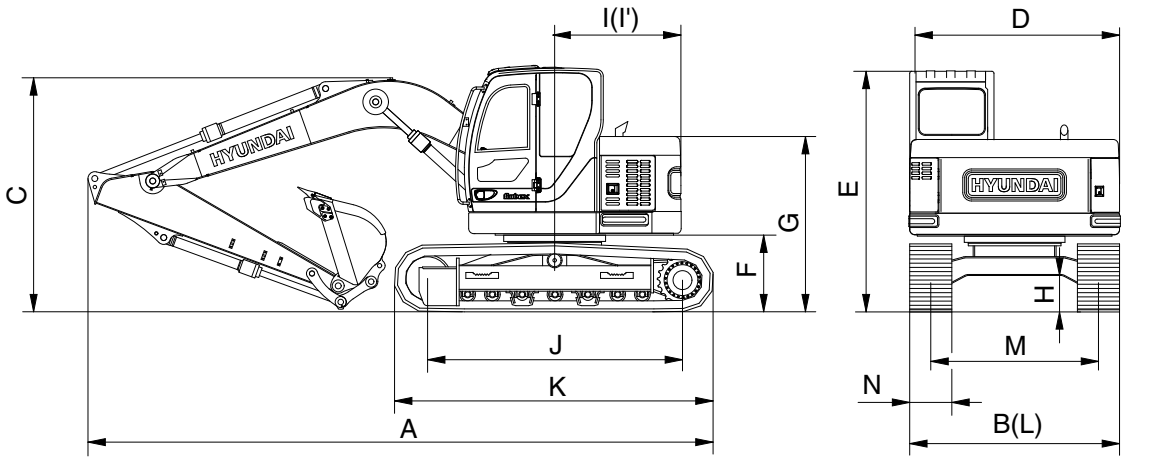


140Z92SP01

2. SPECIFICATIONS

1) R145CR-9

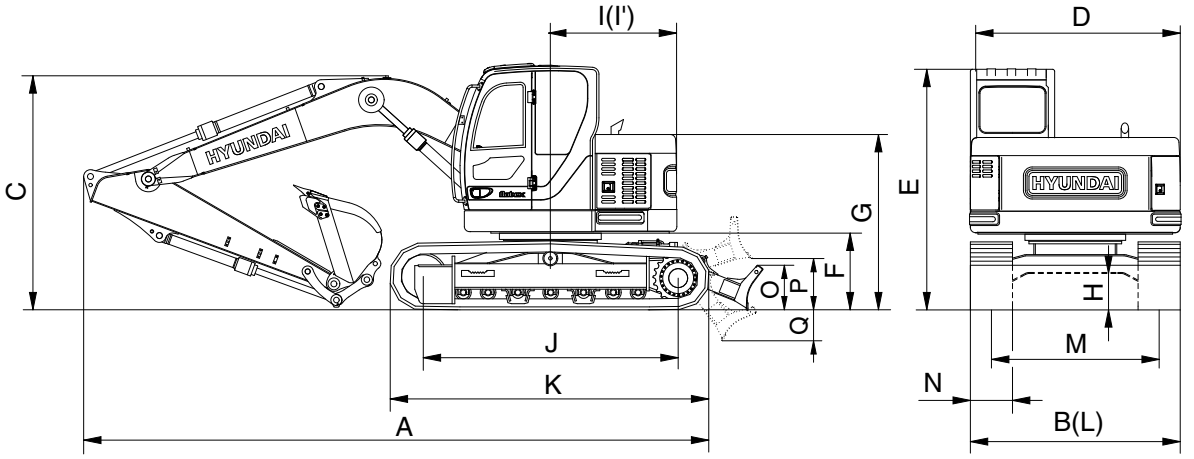
· 4.60 m (15' 1") BOOM and 2.50 m (8' 2") ARM



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

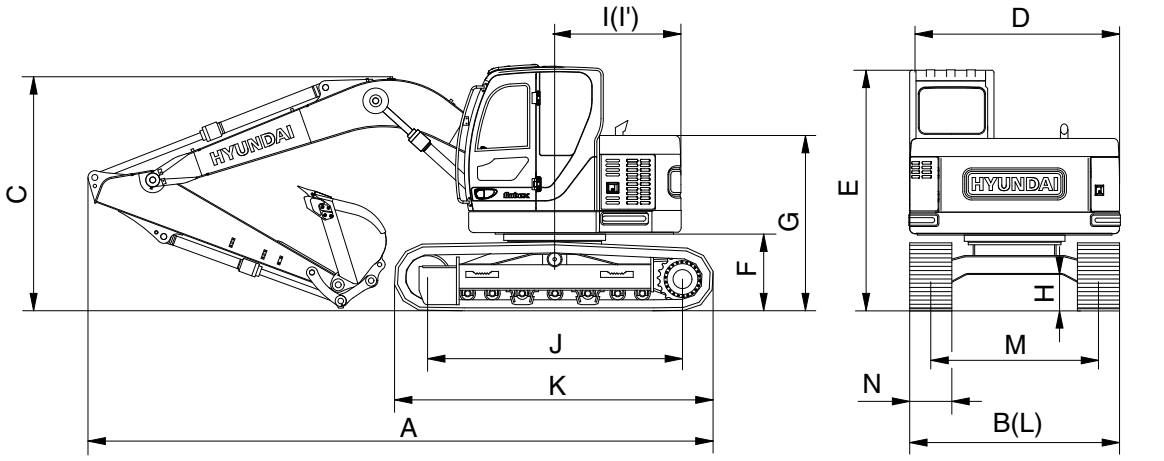


140Z92SP04

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



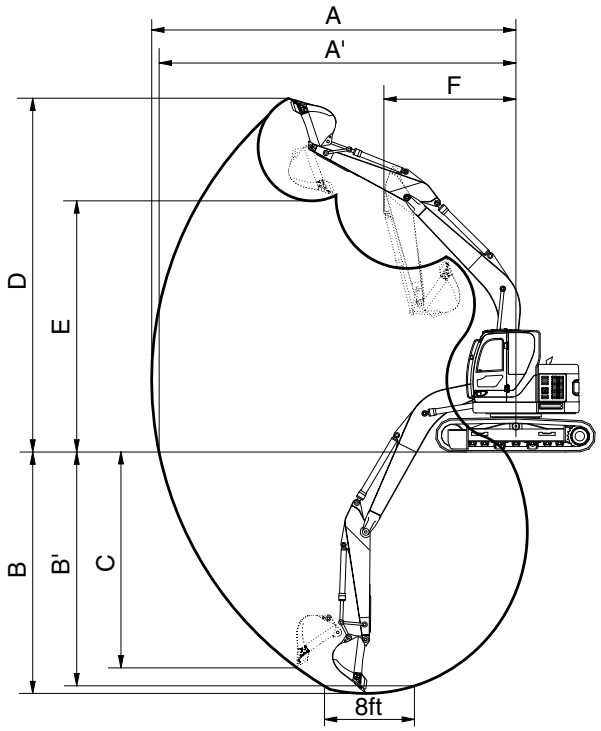
140Z92SP02

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 m^3 SAE heaped bucket)	2420	5330	←		←	
4.6 m boom assembly	830	1830	←		←	
2.5 m arm assembly	435	960	←		←	
0.52 m^3 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					*2960	*2960			2710	1700	6.50
	lb					*6530	*6530			5970	3750	(21.3)
4.5 m (15.0 ft)	kg					*3460	3310	*2670	1930	2120	1280	7.37
	lb					*7630	7300	*5890	4250	4670	2820	(24.2)
3.0 m (10.0 ft)	kg			*6090	*6090	*4480	3090	2990	1850	1870	1090	7.81
	lb			*13430	*13430	*9880	6810	6590	4080	4120	2400	(25.6)
1.5 m (5.0 ft)	kg			*8480	5380	4640	2810	2870	1730	1780	1030	7.90
	lb			*18700	11860	10230	6190	6330	3810	3920	2270	(25.9)
Ground Line	kg			9050	4920	4390	2590	2750	1630	1850	1060	7.67
	lb			19950	10850	9680	5710	6060	3590	4080	2340	(25.2)
-1.5 m (-5.0 ft)	kg	*5850	*5850	*8700	4820	4280	2490	2700	1580	2120	1240	7.07
	lb	*12900	*12900	*19180	10630	9440	5490	5950	3480	4670	2730	(23.2)
-3.0 m (-10 ft)	kg	*8930	*8930	*7030	4900	4300	2510			*2400	1700	5.97
	lb	*19690	*19690	*15500	10800	9480	5530			*5290	3750	(19.6)
-4.5 m (-15.0 ft)	kg			*3750	*3750							
	lb			*8270	*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					*3270	*3270			3360	2130	5.75
	lb					*7210	*7210			7410	4700	(18.9)
4.5 m (15.0 ft)	kg			*4960	*4960	*4310	3250			2500	1550	6.73
	lb			*10930	*10930	*9500	7170			5510	3420	(22.1)
3.0 m (10.0 ft)	kg			*7230	5970	4900	3050	2980	1850	2170	1310	7.22
	lb			*15940	13160	10800	6720	6570	4080	4780	2890	(23.7)
1.5 m (5.0 ft)	kg			*9120	5220	4620	2800	2880	1750	2070	1230	7.32
	lb			*20110	11510	10190	6170	6350	3860	4560	2710	(24.0)
Ground Line	kg			*8610	4970	4430	2640	2800	1680	2170	1290	7.06
	lb			*18980	10560	9770	5820	6170	3700	4780	2840	(23.2)
-1.5 m (-5.0 ft)	kg	*6830	*6830	*8140	4970	4370	2580			2560	1540	6.40
	lb	*15060	*15060	*17950	10960	9630	5690			5640	3400	(21.0)
-3.0 m (-10 ft)	kg			*6010	5100	*4100	2650			*2250	*2250	5.12
	lb			*13250	11240	*9040	5840			*4960	*4960	(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	kg					*2560	*2560	*1730	*1730			2350	1450	7.07
(20.0 ft)	lb					*5640	*5640	*3810	*3810			5180	3200	(23.2)
4.5 m	kg					*2760	*2760	*2550	1980			1890	1120	7.86
(15.0 ft)	lb					*6080	*6080	*5620	4370			4170	2470	(25.8)
3.0 m	kg			*3690	*3690	*3690	3170	3030	1880	*1430	1180	1680	960	8.27
(10.0 ft)	lb			*8140	*8140	*8140	6990	6680	4140	*3150	2600	3700	2120	(27.1)
1.5 m	kg			*7740	5620	4720	2880	2890	1750	1950	1130	1610	910	8.36
(5.0 ft)	lb			*17060	12390	10410	6350	6370	3860	4300	2490	3550	2010	(27.4)
Ground	kg			9180	5020	4440	2630	2760	1630	*1830	1080	1660	930	8.14
Line	lb			20240	11070	9790	5800	6080	3590	*4030	2380	3660	2050	(26.7)
-1.5 m	kg	*5380	*5380	8930	4820	4280	2490	2680	1560			1860	1060	7.59
(-5.0 ft)	lb	*11860	*11860	19690	10630	9440	5490	5910	3440			4100	2340	(24.9)
-3.0 m	kg	*7860	*7860	*7790	4830	4250	2460	2680	1560			2380	1400	6.59
(-10 ft)	lb	*17330	*17330	*17170	10650	9370	5420	5910	3440			5250	3090	(21.6)
-4.5 m	kg	*8050	*8050	*5160	5020	*3260	2580							
(-15 ft)	lb	*17750	*17750	*11380	11070	*7190	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					*2960	*2960			*2910	1820	6.50
	lb					*6530	*6530			*6420	4010	(21.3)
4.5 m (15.0 ft)	kg					*3460	*3460	*2670	2060	2340	1380	7.37
	lb					*7630	*7630	*5890	4540	5160	3040	(24.2)
3.0 m (10.0 ft)	kg			*6090	*6090	*4480	3280	3270	1980	2070	1190	7.81
	lb			*13430	*13430	*9880	7230	7210	4370	4560	2620	(25.6)
1.5 m (5.0 ft)	kg			*8480	5720	5060	3000	3150	1860	1980	1120	7.90
	lb			*18700	12610	11160	6610	6940	4100	4370	2470	(25.9)
Ground Line	kg			*9170	5260	4810	2780	3030	1760	2060	1160	7.67
	lb			*20220	11600	10600	6130	6680	3880	4540	2560	(25.2)
-1.5 m (-5.0 ft)	kg	*5850	*5850	*8700	5160	4700	2680	2980	1710	2350	1340	7.07
	lb	*12900	*12900	*19180	11380	10360	5910	6570	3770	5180	2950	(23.2)
-3.0 m (-10 ft)	kg	*8930	*8930	*7030	5230	4720	2700			*2400	1830	5.97
	lb	*19690	*19690	*15500	11530	10410	5950			*5290	4030	(19.6)
-4.5 m (-15.0 ft)	kg			*3750	*3750							
	lb			*8270	*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					*2560	*2560	*1730	*1730			2570	1560	7.07
	lb					*5640	*5640	*3810	*3810			5670	3440	(23.2)
4.5 m (15.0 ft)	kg					*2760	*2760	*2550	2110			2090	1220	7.86
	lb					*6080	*6080	*5620	4650			4610	2690	(25.8)
3.0 m (10.0 ft)	kg			*3690	*3690	*3690	3360	*3210	2020	*1430	1280	1860	1050	8.27
	lb			*8140	*8140	*8140	7410	*7080	4450	*3150	2820	4100	2310	(27.1)
1.5 m (5.0 ft)	kg			*7740	5950	*5030	3070	3170	1890	*1990	1230	1790	990	8.36
	lb			*17060	13120	*11090	6770	6990	4170	*4390	2710	3590	2180	(27.4)
Ground Line	kg			*9190	5360	4850	2820	3040	1770	*1830	1180	1850	1020	8.14
	lb			*20260	11820	10690	6220	6700	3900	*4030	2600	4080	2250	(26.7)
-1.5 m (-5.0 ft)	kg	*5380	*5380	*9060	5160	4700	2680	2960	1690			2070	1160	7.59
	lb	*11860	*11860	*19970	11380	10360	5910	6530	3730			4560	2560	(24.9)
-3.0 m (-10 ft)	kg	*7860	*7860	*7790	5170	4670	2650	2960	1690			*2460	1520	6.59
	lb	*17330	*17330	*17170	11400	10300	5840	6530	3730			*5420	3350	(21.6)
-4.5 m (-15 ft)	kg	*8050	*8050	*5160	*5160	3260	2770							
	lb	*17750	*17750	*11380	*11380	7190	6110							

3) R145LCR-9

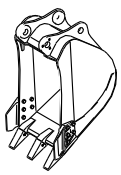
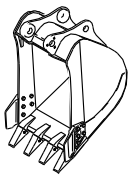
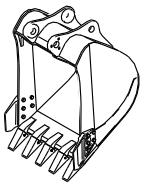
(1) 4.60 m (15' 1") boom, 2.50 m (8' 2") arm equipped with 0.52 m³ (SAE heaped) bucket and 500 mm (20") triple grouser shoe and 2800 kg (6170 lb) counterweight.

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

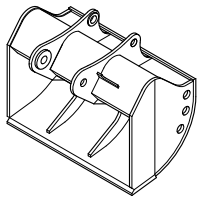
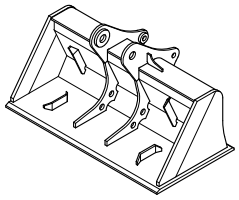
Capacity		Width		Weight	Recommendation			
					4.6 m (15' 1") boom			
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.9 m arm (6' 3")	2.1 m arm (6' 11")	2.5 m arm (8' 2")	3.0 m arm (9' 10")
0.23 m³ (0.30 yd³)	0.20 m³ (0.26 yd³)	520 mm (20.5")	620 mm (24.4")	335 kg (740 lb)				
0.40 m³ (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 m³ (0.59 yd³)	0.40 m³ (0.52 yd³)	1520 mm (59.8")	-	410 kg (900 lb)				–
⊙0.55 m³ (0.72 yd³)	0.45 m³ (0.59 yd³)	1800 mm (70.9")	-	585 kg (1290 lb)				–

★ : Ditch cleaning bucket
⊙ : Slope finishing bucket

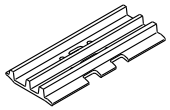
Applicable for materials with density of 2000 kgf/m³ (3370 lbf/yd³) or less
Applicable for materials with density of 1600 kgf/m³ (2700 lbf/yd³) or less
Applicable for materials with density of 1100 kgf/m³ (1850 lbf/yd³) or less

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 ㎜ triple grouser	Standard	A
600 ㎜ triple grouser	Option	A
700 ㎜ 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

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	30 ℓ /min (7.9 U.S. gpm / 6.6 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	11 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	350 kgf/cm^2 (4980 psi) [380 kgf/cm^2 (5400 psi)]
Overload relief valve pressure	400 kgf/cm^2 (5690 psi)

[ ]: Power boost

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	72 cc/rev
Relief pressure	260 kgf/cm^2 (3689 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	25 kgf · m (181 lbf · ft)
Brake release pressure	15~50 kgf/cm^2 (213~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	350 kgf/cm^2 (4970 psi)
Capacity (max / min)	77/45 cc/rev
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	9.5 kgf/cm^2 (135 psi)
Braking torque	19.7 kgf · m (280.2 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 105 × ø 75 × 1105 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 115 × ø 80 × 1138 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 100 × ø 70 × 840 mm
	Cushion	Extend only
Dozer cylinder (option)	Bore dia × Rod dia × Stroke	ø 100 × ø 70 × 250 mm
	Cushion	-

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

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

8) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R145CR-9	Standard	500 mm (20")	0.46 kgf/cm^2 (6.54 psi)	45	2500 mm (8' 2")
	Option	600 mm (24")	0.39 kgf/cm^2 (5.55 psi)	45	2600 mm (8' 6")
		700 mm (28")	0.34 kgf/cm^2 (4.83 psi)	45	2700 mm (8' 10")
R145CRD-9	Standard	500 mm (20")	0.49 kgf/cm^2 (6.97 psi)	45	2500 mm (8' 2")
	Option	600 mm (24")	0.41 kgf/cm^2 (5.81 psi)	45	2600 mm (8' 6")
		700 mm (28")	0.36 kgf/cm^2 (5.12 psi)	45	2700 mm (8' 10")
R145LCR-9	Standard	500 mm (20")	0.47 kgf/cm^2 (6.68 psi)	46	2500 mm (8' 2")
	Option	600 mm (24")	0.39 kgf/cm^2 (5.55 psi)	46	2600 mm (8' 6")
		700 mm (28")	0.34 kgf/cm^2 (4.83 psi)	46	2700 mm (8' 10")

BUCKET

Item	Capacity		Tooth quantity	Width	
	SAE heaped	CECE heaped		Without side cutter	With side cutter
R145CR-9	0.52 m^3 (0.68 yd^3)	0.45 m^3 (0.59 yd^3)	5	915 mm (36.0")	1015 mm (40.0")
	0.23 m^3 (0.30 yd^3)	0.20 m^3 (0.26 yd^3)	3	520 mm (20.5")	620 mm (24.4")
	0.40 m^3 (0.52 yd^3)	0.35 m^3 (0.46 yd^3)	4	750 mm (29.5")	850 mm (33.5")
	0.46 m^3 (0.60 yd^3)	0.40 m^3 (0.52 yd^3)	4	840 mm (33.1")	940 mm (37.0")
	0.58 m^3 (0.76 yd^3)	0.50 m^3 (0.65 yd^3)	5	1000 mm (39.4")	1100 mm (43.3")
	0.65 m^3 (0.85 yd^3)	0.55 m^3 (0.72 yd^3)	5	1105 mm (43.5")	1205 mm (47.4")
	0.71 m^3 (0.93 yd^3)	0.60 m^3 (0.78 yd^3)	5	1190 mm (46.9")	1290 mm (50.8")
	★0.45 m^3 (0.59 yd^3)	0.40 m^3 (0.52 yd^3)	-	1520 mm (59.8")	-
	⊙0.55 m^3 (0.72 yd^3)	0.45 m^3 (0.59 yd^3)	-	1800 mm (70.9")	-

★ : Ditch cleaning bucket

⊙ : Slope finishing bucket

9. RECOMMENDED OILS

Use only oils listed below. Do not mix different brand oil.
Please use HYUNDAI genuine oil and grease.

Service point	Kind of fluid	Capacity ℓ (U.S. gal)	Ambient temperature °C(°F) -50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	17.5 (4.6)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Grease	0.35 (0.09)	NLGI NO.1 NLGI NO.2
Swing drive	Gear oil	2.5 (0.7)	★SAE 75W-90
Final drive	Gear oil	1.8×2 (0.48×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank: 96 (25.4) System: 180 (47.6)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	232 (61.3)	★ASTM D975 NO.1 ASTM D975 NO.2
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	15.5 (4.1)	Ethylene glycol base permanent type (50 : 50) ★Ethylene glycol base permanent type (60 : 40)

SAE : Society of Automotive Engineers
API : American Petroleum Institute
ISO : International Organization for Standardization
NLGI : National Lubricating Grease Institute
ASTM : American Society of Testing and Material

★1 : Soft water
City water or distilled water

★ : Cold region
Russia, CIS, Mongolia