SECTION 1 GENERAL

Group 1 Safety Hints 1-1
Group 2 Specifications 1-9

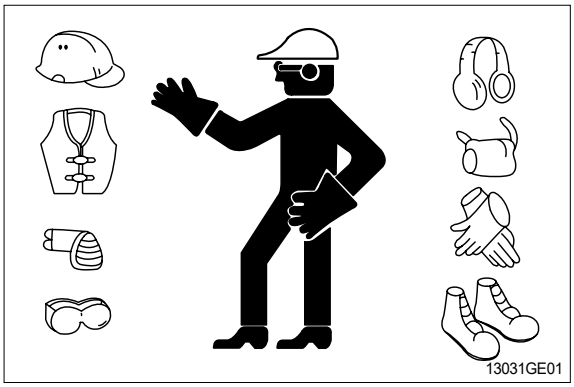
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

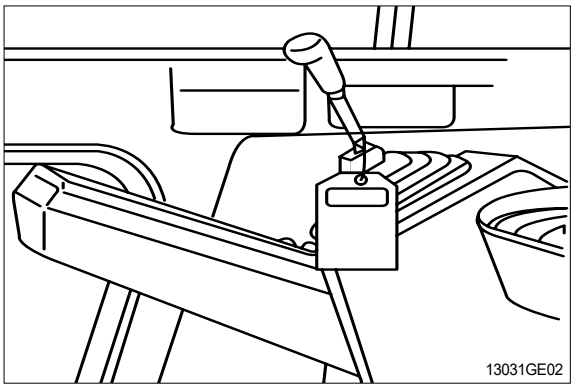
WEAR PROTECTIVE CLOTHING

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



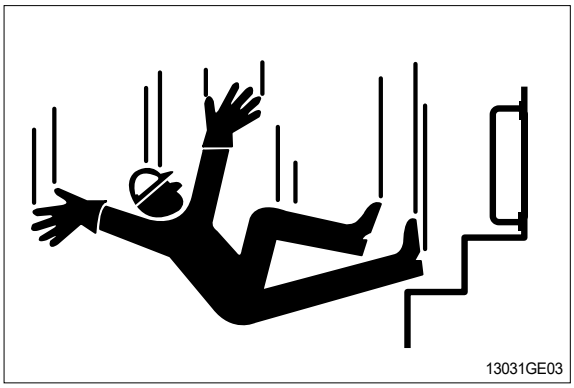
WARN OTHERS OF SERVICE WORK

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.

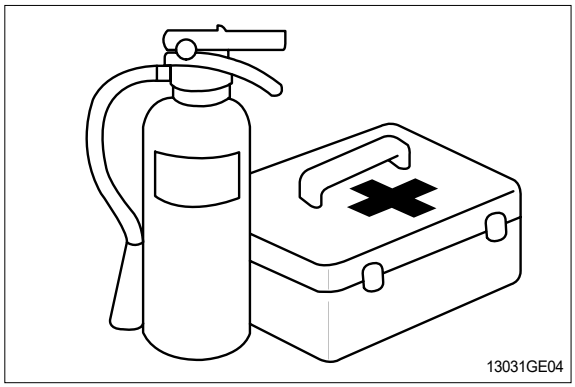


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

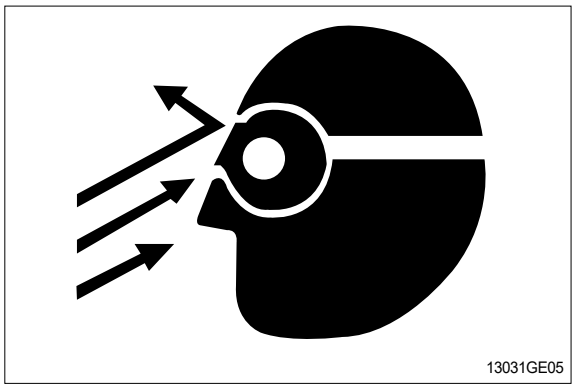
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

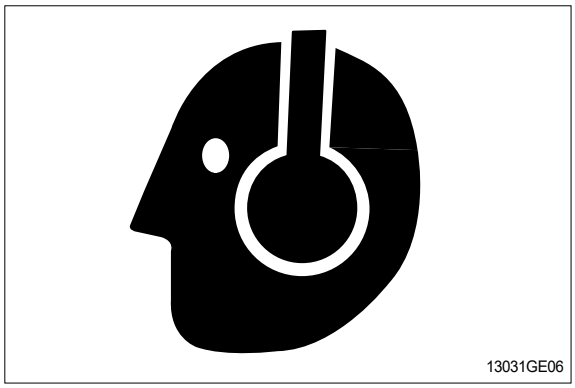
Guard against injury from flying pieces of metal or debris; wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

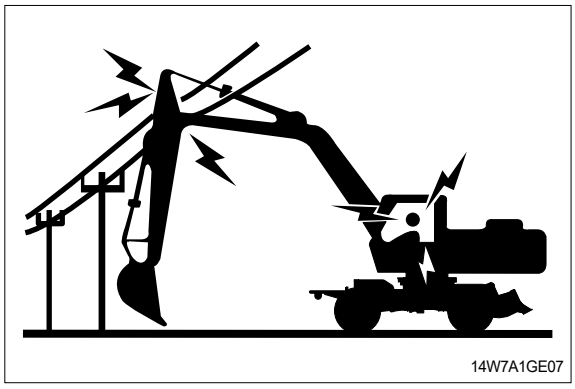
Wear a suitable hearing protective device such as ear-
muffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

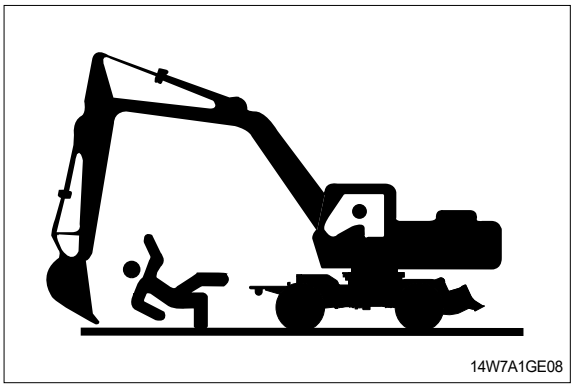
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.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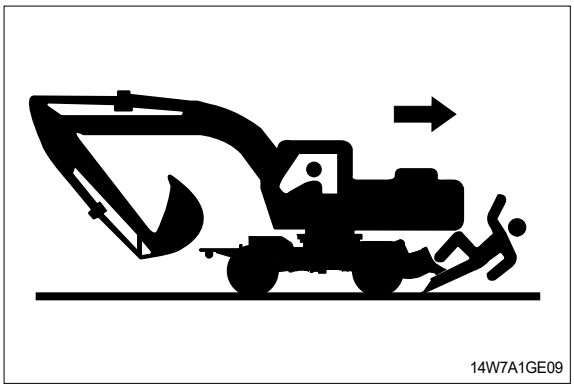
MOVE AND OPERATE MACHINE SAFELY

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.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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.


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PARK MACHINE SAFELY

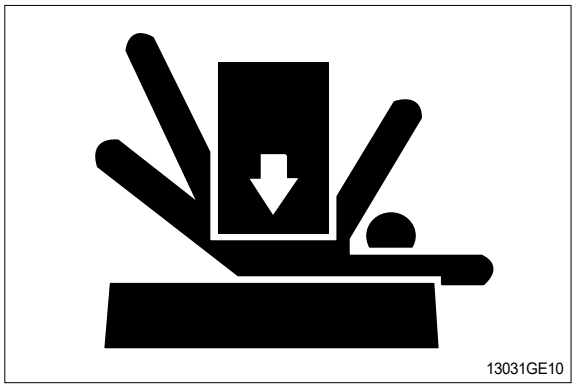
Before working on the machine:

- 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.

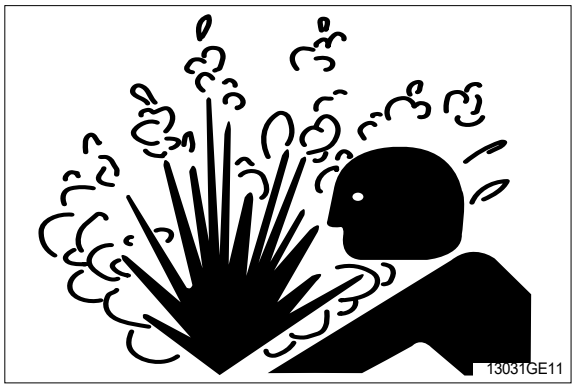
Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



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.



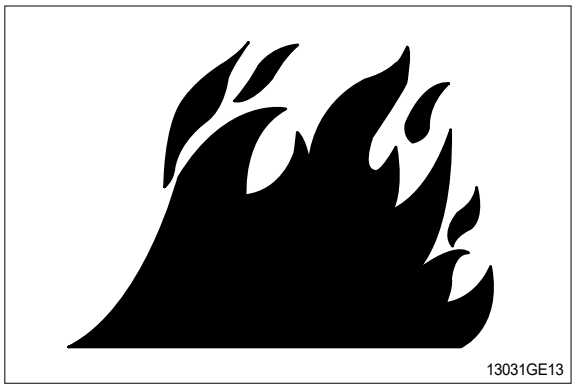
HANDLE FLUIDS SAFELY-AVOID FIRES

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.

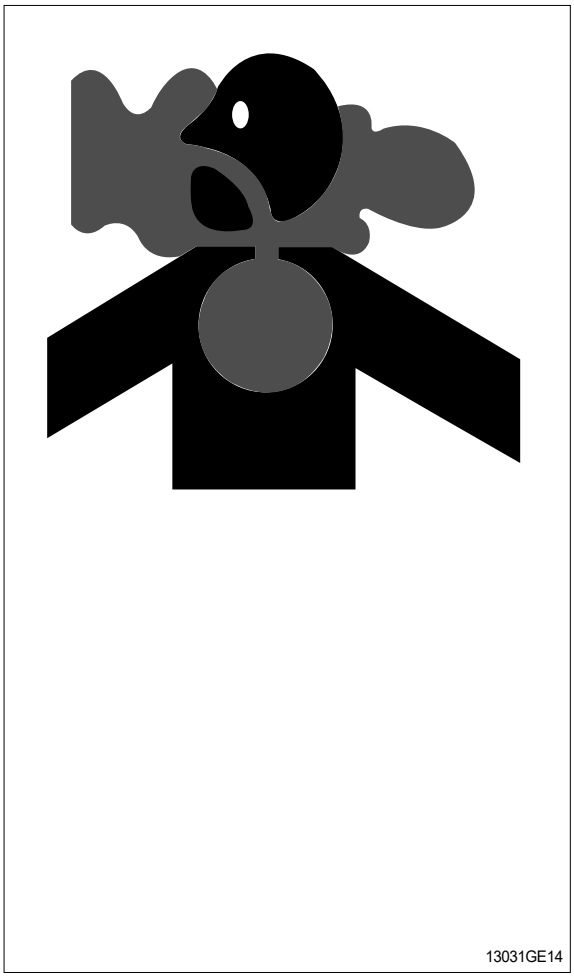
Do not store oily rags ; they can ignite and burn spontaneously.



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.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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.

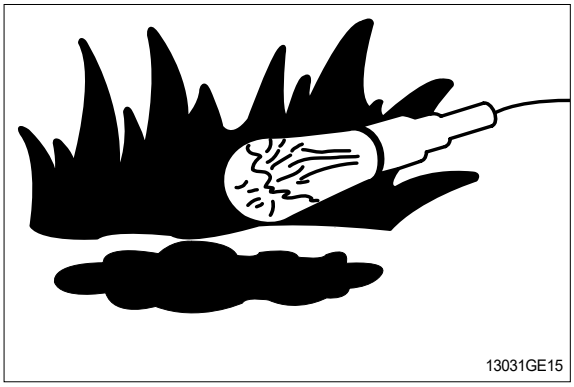
Do all work outside or in a well ventilated area. Dispose of paint and solvent properly.

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.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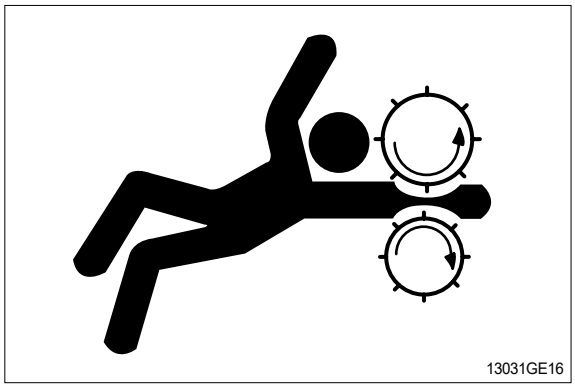
SERVICE MACHINE SAFELY

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

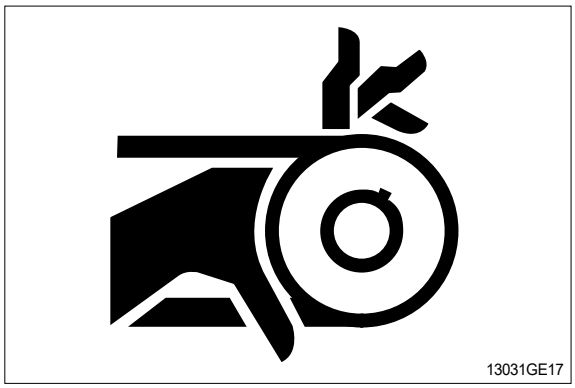
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



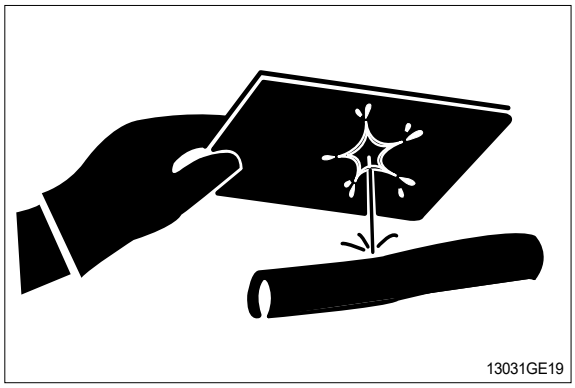
AVOID HIGH PRESSURE FLUIDS

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

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

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

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



AVOID HEATING NEAR PRESSURIZED FLUID LINES

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

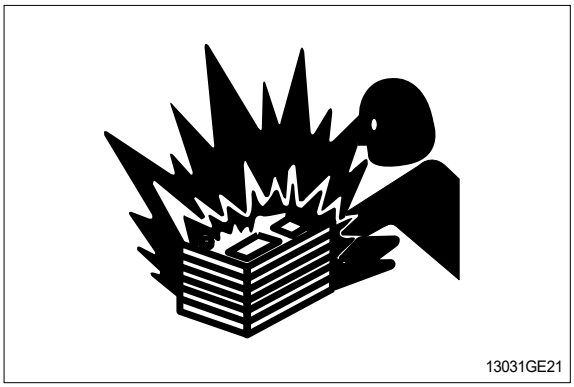
Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area. Install fire resisting guards to protect hoses or other materials.

PREVENT BATTERY EXPLOSIONS

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

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

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



PREVENT ACID BURNS

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

Avoid the hazard by:

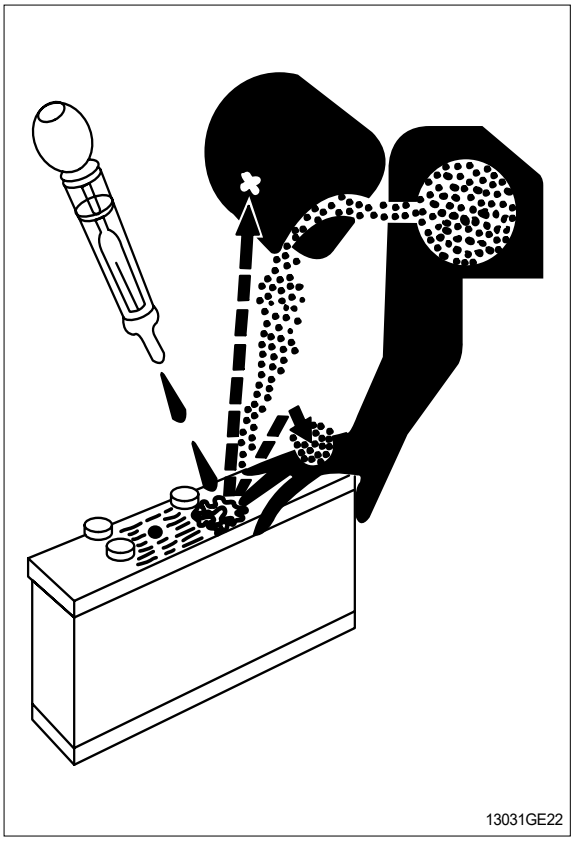
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling of dripping electrolyte.
5. Use proper jump start procedure.

If you spill acid on yourself:

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

If acid is swallowed:

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



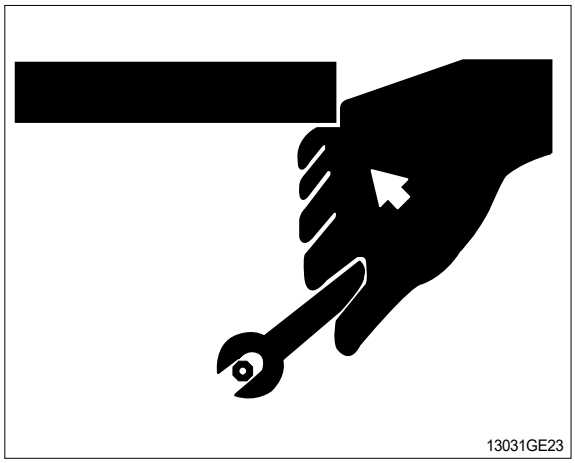
USE TOOLS PROPERLY

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

Use power tools only to loosen threaded tools and fasteners.

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

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

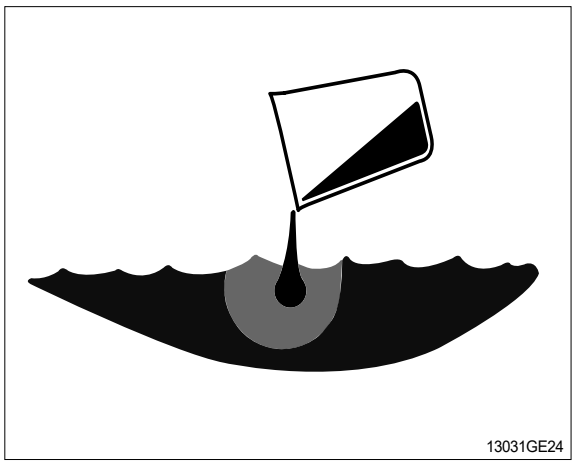


DISPOSE OF FLUIDS PROPERLY

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.

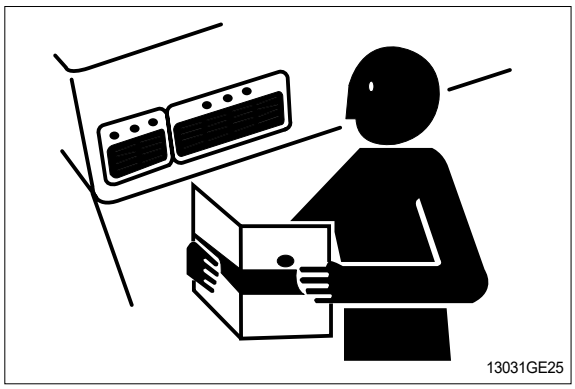
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.

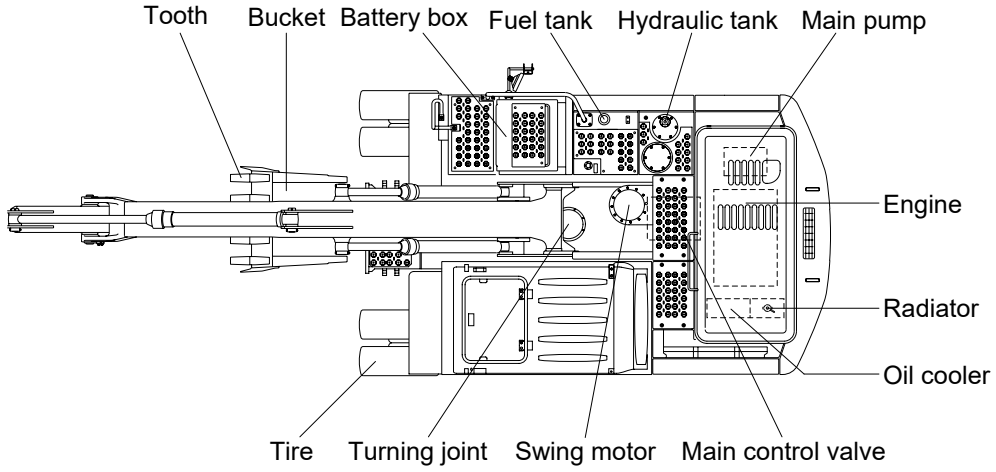


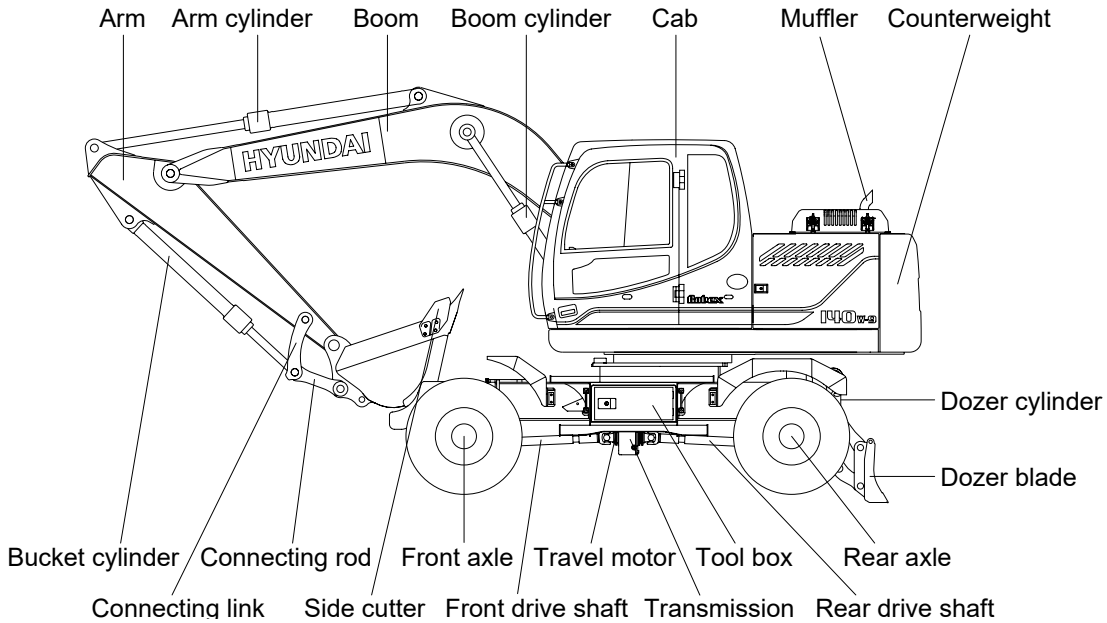
LIVE WITH SAFETY

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

GROUP 2 SPECIFICATIONS

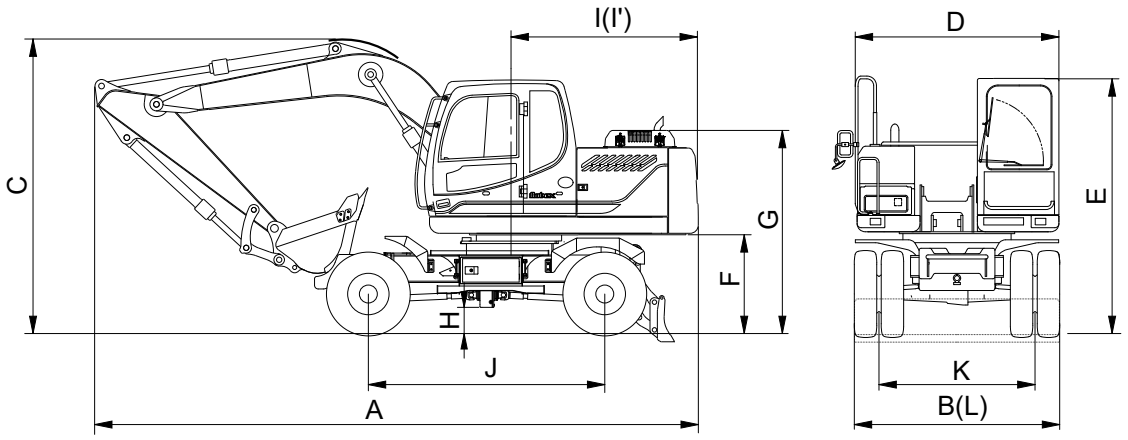
1. MAJOR COMPONENT





2.SPECIFICATIONS

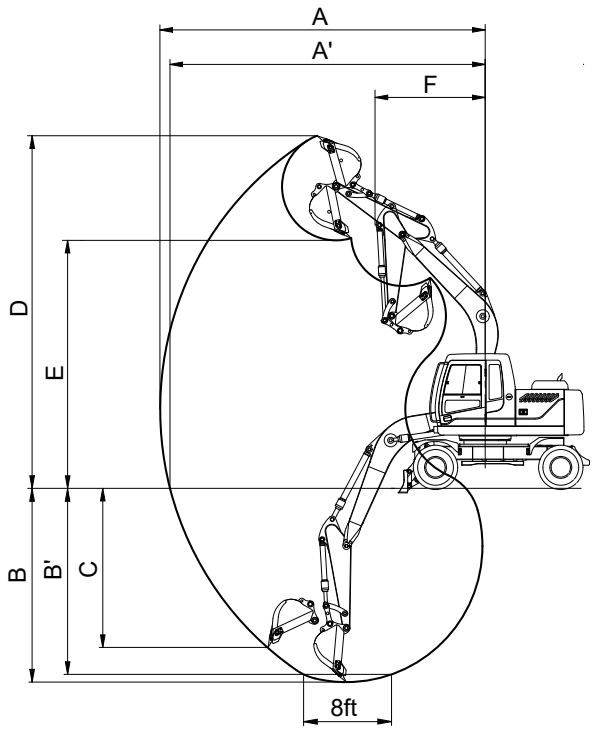
1)4.6 m (15' 1") ONE PIECE BOOM, 2.1 m (6' 11") ARM AND REAR DOZER BLADEARM



Description		Unit	Specification
Operating weight		kg (lb)	13780 (30380)
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	0.58 (0.76)
Overall length	A	mm (ft-in)	7760 (25' 6")
Overall width	B		2495 (8' 2")
Overall height	C		3500 (11' 6")
Upperstructure width	D		2475 (8' 1")
Cab height	E		3140 (10' 4")
Ground clearance of counterweight	F		1233(4' 0")
Engine cover height	G		2320 (7' 7")
Minimum ground clearance	H		365 (1' 2")
Rear-end distance	I		2310 (7' 6")
Rear-end swing radius	I'		2310 (7' 6")
Wheel base	J		2800 (9' 2")
Tread	K		1944 (6' 5")
Dozer blade width	L		2490 (8' 2")
Travel speed	Low	km/hr (mph)	10(5.3)
	High		38(23.6)
	Creep		3.8 (2.4)
Swing speed		rpm	11
Gradeability		Degree (%)	35 (70)
Max traction force		kgf (lbf)	8500 (18740)

3. WORKING RANGE

1)4.6 m (15' 1") MONO BOOM



Description		1.9 m (6' 3") Arm	*2.1 m (6' 11") Arm	2.5 m (8' 2") Arm	3.0 m (9' 10") Arm
Max digging reach	A	7750 mm (25' 5")	7920 mm (26' 0")	8320 mm (27' 4")	8780 mm (28'10")
Max digging reach on ground	A'	7530 mm (24' 8")	7700 mm (25' 3")	8120 mm (26' 8")	8590 mm (28' 2")
Max digging depth	B	4650 mm (15' 3")	4850 mm (15'11")	5250 mm (17' 3")	5750 mm (18'10")
Max digging depth (8 ft level)	B'	4390 mm (14' 5")	4600 mm (15' 1")	5040 mm (16' 6")	5570 mm (18' 3")
Max vertical wall digging depth	C	4350 mm (14' 3")	4460 mm (14' 8")	5030 mm (16' 6")	5550 mm (18' 3")
Max digging height	D	8400 mm (27' 7")	8470 mm (27' 9")	8790 mm (28'10")	9070 mm (29' 9")
Max dumping height	E	5960 mm (19' 7")	6040 mm (16'10")	6350 mm (20'10")	6620 mm (21' 9")
Min swing radius	F	2620 mm (8' 7")	2670 mm (8' 10")	2650 mm (8' 8")	2670 mm (8' 9")
Bucket digging force	SAE	87.3 [94.8] kN	87.3 [94.8] kN	87.3 [94.8] kN	87.3 [94.8] kN
		8800 [9660] kgf	8800 [9660] kgf	8800 [9660] kgf	8800 [9660] 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	10100 [11060] kgf	10400 [11290] kgf	10400 [11290] kgf
		22930 [24890] lbf	22270 [24170] lbf	22930 [24890] lbf	22930 [24890] lbf
Arm digging 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	77.4 [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

* : Standard [ ] : Power boost

4. WEIGHT

1) MONO BOOM

Item	R150WVSPRO	
	kg	lb
Upperstructure assembly	5090	11220
Main frame weld assembly	1145	2525
Engine assembly	485	1069
Main pump assembly	100	220
Main control valve assembly	80	175
Swing motor assembly	107	235
Hydraulic oil tank assembly	180	400
Fuel tank assembly	140	310
Counterweight	1650	3640
Cab assembly	500	1100
Lower frame weld assembly	1550	3420
Swing bearing	186	410
Travel motor assembly	60	130
Turning joint	120	265
Transmission assembly	140	310
Front axle assembly	540	1190
Rear axle assembly	450	990
Dozer blade assembly (rear)	400	880
Front attachment assembly (4.6m boom, 2.1 m arm, 0.58 m^3 SAE heaped bucket)	2400	5290
4.6 m boom assembly	870	1918
2.1 m arm assembly	385	850
0.58 m^3 SAE heaped bucket assembly	480	1060
Boom cylinder assembly	130	285
Arm cylinder assembly	160	350
Bucket cylinder assembly	100	220
Bucket control link assembly	80	175
Oscillating cylinder assembly	30	70
Blade cylinder assembly (rear)	55	120

5. LIFTING CAPACITIES

1) HX150WVSPRO

4.60 m (15' 1") boom, 2.1 m (6'11") arm equipped with 0.58 m³ (SAE heaped) bucket and rear dozer blade down with 1700 kg counterweight.

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

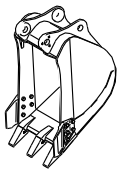
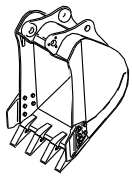
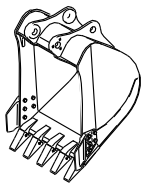
Load point height		Load radius								At max. reach		
		1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		Capacity		Reach
												m (ft)
6.0 m (20.0 ft)	kg					*3130	*3130			*3050	1950	6.43
	lb					*6900	*6900			*6720	4300	(21.1)
4.5 m (15.0 ft)	kg					*3540	*3540	*3210	2120	*3160	1520	7.23
	lb					*7800	*7800	*7080	4670	*6970	3350	(23.7)
3.0 m (10.0 ft)	kg			*6620	6450	*4510	3310	*3770	2040	3230	1340	7.59
	lb			*14590	14220	*9940	7300	*8310	4500	7120	2950	(24.9)
1.5 m (5.0 ft)	kg			*8650	5730	*5580	3060	*4230	1930	3180	1300	7.59
	lb			*19070	12630	*12300	6750	*9330	4250	7010	2870	(24.9)
Ground Line	kg			*9090	5510	*6240	2900	*4540	1860	3420	1390	7.24
	lb			*20040	12150	*13760	6390	*10010	4100	7540	3060	(23.8)
-1.5 m (-5.0 ft)	kg	*7380	*7380	*9530	5530	*6240	2860			*3760	1700	6.45
	lb	*16270	*16270	*21010	12190	*13760	6310			*8290	3750	(21.2)
-3.0 m (-10.0 ft)	kg	*11710	*11710	*7990	5690	*5240	2950					
	lb	*25820	*25820	*17610	12540	*11550	6500					

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.

6. BUCKET SELECTION GUIDE

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") Mono boom				4.9 m (16' 9") Hyd adjustable 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")	1.9 m arm (6' 3")	2.1 m arm (6' 11")	2.5 m arm (8' 2")
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)	760 mm (29.9")	860 mm (33.9")	410 kg (900 lb)							
0.46 m³ (0.60 yd³)	0.40 m³ (0.52 yd³)	850 mm (33.5")	950 mm (37.4")	435 kg (960 lb)							
0.52 m³ (0.68 yd³)	0.45 m³ (0.59 yd³)	935 mm (36.8")	1035 mm (40.7")	460 kg (1010 lb)							
※0.58 m³ (0.76 yd³)	0.50 m³ (0.65 yd³)	1030 mm (40.6")	1130 mm (44.5")	480 kg (1060 lb							
0.65 m³ (0.85 yd³)	0.55 m³ (0.72 yd³)	1110 mm (43.7")	1210 mm (47.6")	500 kg (1100 lb)							
0.71 m³ (0.93 yd³)	0.60 m³ (0.78 yd³)	1205 mm (47.4")	1305 mm (51.4")	540 kg (1190 lb)							

※ : Standard bucket

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

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

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

7. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Cummins QSB 7
Type	4-cycle turbocharged diesel engine, low emission
Cooling method	Water cooling
Number of cylinders and arrangement	6 cylinders, in-line
Firing order	1-5-3-6-2-4
Combustion chamber type	Direct injection type
Cylinder bore × stroke	107 × 124 mm (4.2" × 4.9")
Piston displacement	6700 cc (409 cu in)
Compression ratio	17.2 : 1
Rated gross horse power (SAE J1995)	168Hp (124 kW) at 2050 rpm
Maximum torque	65.8kgf · m (475lbf · ft) at 1200 rpm
Engine oil quantity	24 ℓ (6.3U.S. gal)
Dry weight	485kg (1069lb)
High idling speed	1450 ± 50 rpm
Low idling speed	800 ± 50 rpm
Rated fuel consumption	151.4g/Hp · hr at 1900 rpm
Starting motor	24 V - 7.8kW
Alternator	24 V - 90 A
Battery	2 × 12 V × 120 Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 80 cc/rev
Maximum pressure	350 kgf/cm^2 (4980 psi) [380 kgf/cm^2 (5400 psi)]
Rated oil flow	2 × 172 ℓ /min (45.4 U.S. gpm / 37.8 U.K. gpm)
Rated speed	2150 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	32.3 ℓ /min (8.3 U.S. gpm/6.9 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	11 spools two-block
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	280 kgf/cm^2(3978 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	36.8kgf · m (266lbf · ft)
Brake release pressure	20.4~50 kgf/cm^2 (289~711 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement bent-axis axial piston motor
Relief pressure	400kgf/cm^2 (5689psi)
Counter balance valve	Applied
Capacity	107 cc/rev

7) POWER TRAIN

Item	Description		Specification
Transmission	Type		2 speed power shift transmission
	Gear ratio	1st	4.87
		2nd	1.20
Parking brake	Type		Multi disc brake integrated in transmission
	Maximum braking torque		2124 kgf · m (15360 lbf · ft)
Axle	Type		4 wheel drive with differential
	Gear ratio		16.0
	Brake		Multi disc brake

8) REMOTE CONTROL VALVE

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

9) CYLINDER

Item			Specification
Boom cylinder		Bore dia × Rod dia × Stroke	ø 105 × ø 75 × 1075mm
		Cushion	Extend only
Arm cylinder		Bore dia × Rod dia × Stroke	ø 115 × ø 80 × 1138mm
		Cushion	Extend and retract
Bucket cylinder		Bore dia × Rod dia × Stroke	ø 100 × ø 70 × 850mm
		Cushion	Extend only
Dozer cylinder	Rear	Bore dia × Rod dia × Stroke	ø 100 × ø 65 × 236mm
		Cushion	Extend only
Outrigger cylinder		Bore dia × Rod dia × Stroke	ø 110 × ø 75 × 475mm
		Cushion	-
Adjust cylinder		Bore dia × Rod dia × Stroke	ø 145 × ø 90 × 613mm
		Cushion	Extend only
Adjust boom cylinder		Bore dia × Rod dia × Stroke	ø 105 × ø 75 × 975mm
		Cushion	Extend only

10) BUCKET

Item	Capacity		Tooth quantity	Width	
	SAE heaped	CECE heaped		Without side cutter	With side cutter
Standard	※ 0.58 m^3 (0.76 yd^3)	0.50 m^3 (0.65 yd^3)	5	1030 mm (39.4")	1130 mm (44.5")
Option	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	760 mm (29.9")	860 mm (33.9")
	0.46 m^3 (0.60 yd^3)	0.40 m^3 (0.52 yd^3)	4	850 mm (33.5")	950 mm (37.4")
	0.52 m^3 (0.68 yd^3)	0.45 m^3 (0.59 yd^3)	5	935 mm (36.8")	1035 mm (40.7")
	0.65 m^3 (0.85 yd^3)	0.55 m^3 (0.72 yd^3)	5	1110 mm (43.7")	1210 mm (47.6")
	0.71 m^3 (0.93 yd^3)	0.60 m^3 (0.78 yd^3)	5	1205 mm (47.4")	1305 mm (51.4")
	◎ 0.55 m^3 (0.72 yd^3)	0.45 m^3 (0.59 yd^3)	-	1800 mm (70.9")	-
	★ 0.45 m^3 (0.59 yd^3)	0.40 m^3 (0.52 yd^3)	-	1520 mm (59.8")	-

◎ : Slope finishing bucket

★ : Ditch cleaning bucket

8. RECOMMENDED OILS

Use only oils listed below or equivalent.
Do not mix different brand oil.

Service point	Kind of fluid	Capacity l (U.S. gal)	Ambient temperature °C(°F)
			-50 (-58) -30 (-22) -20 (-4) -10 (14) 0 (32) 10 (50) 20 (68) 30 (86) 40 (104)
Engine oil pan	Engine oil	24 (6.3)	★SAE 5W-40 SAE 30
Transmission case		2.5 (0.7)	SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	2.5 (0.7)★1 3.5 (1.0)	★SAE 75W-90 SAE 85W-140
	Grease	0.35 (0.1)	★NLGI NO.1 NLGI NO.2
Front axle	Gear oil	Center : 9.0(2.37) Hub : 2.4×2 (0.63×2)	SAE 85W-90 LSD or UTTO
Rear axle		Center : 11.2(2.95 Hub : 2.4×2 (0.63×2)	
Hydraulic tank	Hydraulic oil	Tank: 124 (32.8) System: 240 (67.9	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	270 (71.3)	★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	19.5 (5.2)	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 Materia
UTTO : Universal Tractor Transmission Oil

★ : Cold region
Russia, CIS, Mongolia
★1 : Soft water
City water or distilled water
★2 : Service when the grease inlet exists on the equipment