

# SECTION 1 GENERAL

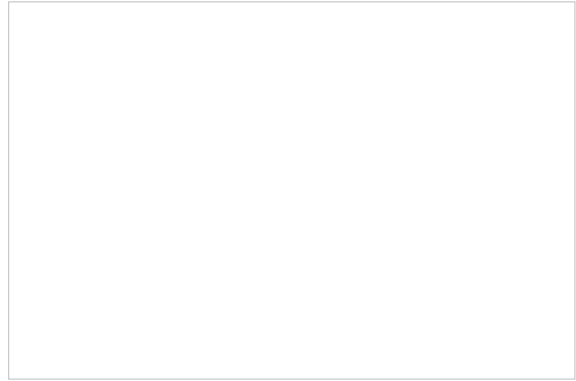
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# SECTION 1 GENERAL

## GROUP 1 SAFETY

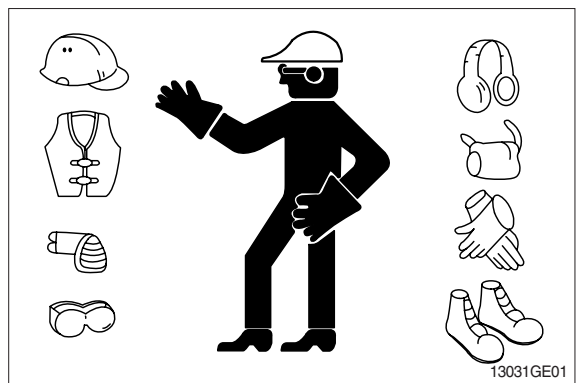
### FOLLOW SAFE PROCEDURE

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



### WEAR PROTECTIVE CLOTHING

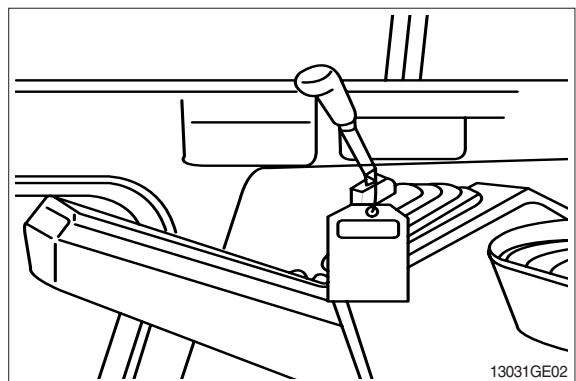
Wear close fitting clothing and safety equipment appropriate to the job.



### 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.



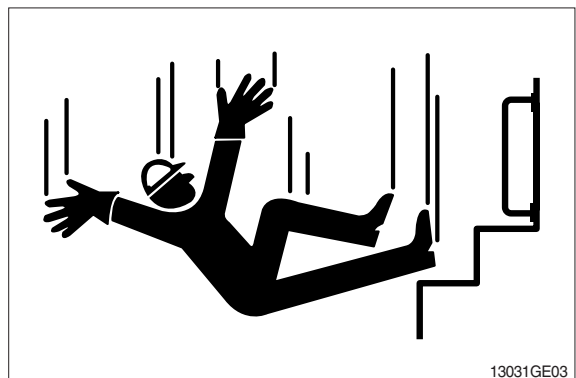
### USE HANDHOLDS AND STEPS

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.

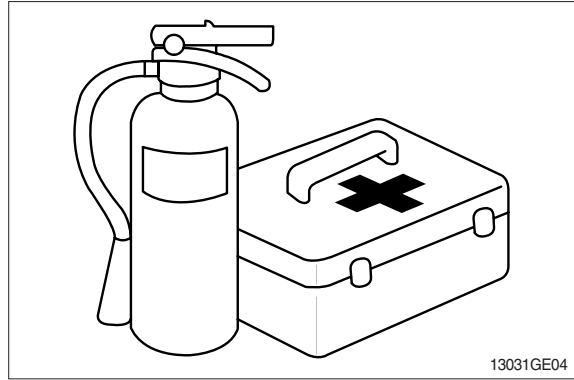


## PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

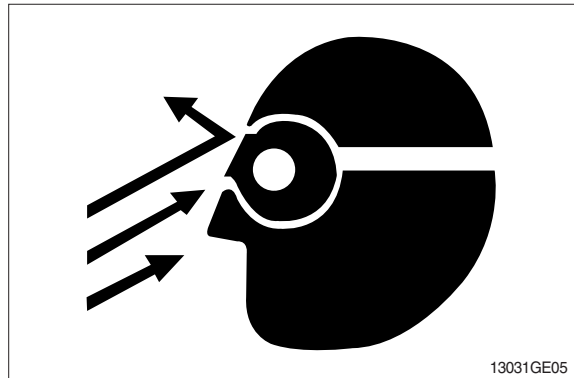
Keep a first aid kit and fire extinguisher handy.

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



## PROTECT AGAINST FLYING DEBRIS

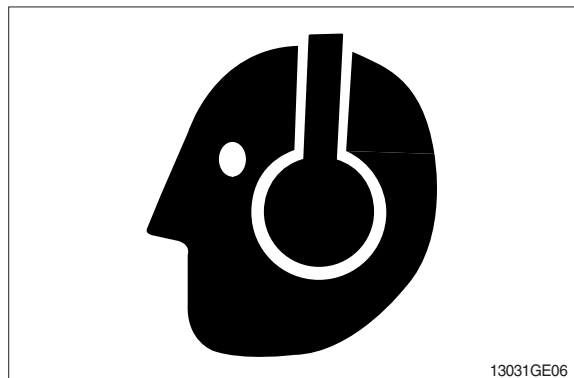
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



## PROTECT AGAINST NOISE

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

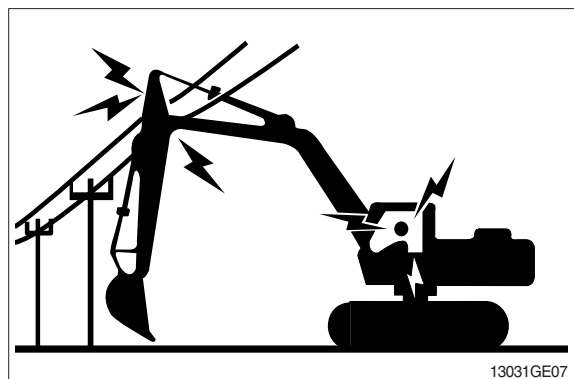
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



## AVOID POWER LINES

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

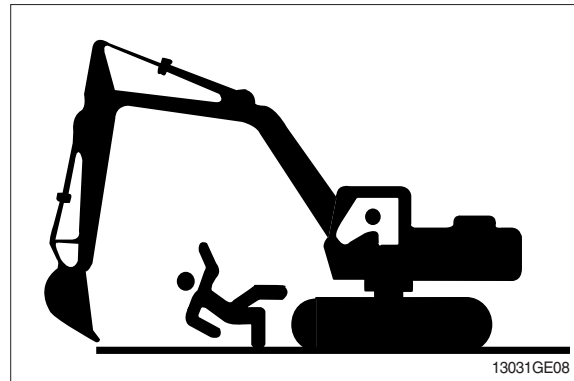
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



## 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.

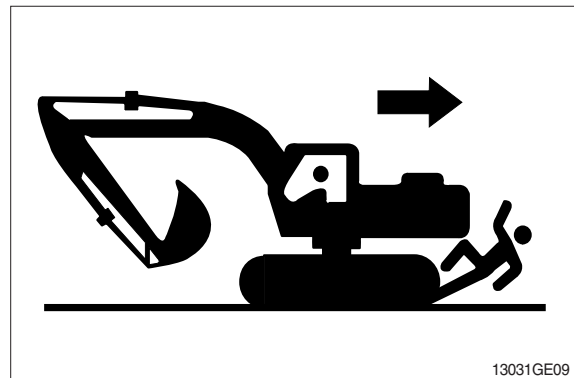


## MOVE AND OPERATE MACHINE SAFELY

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:

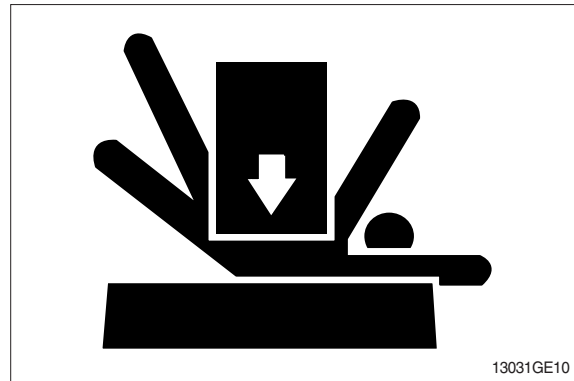
- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine.  
Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

## 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.

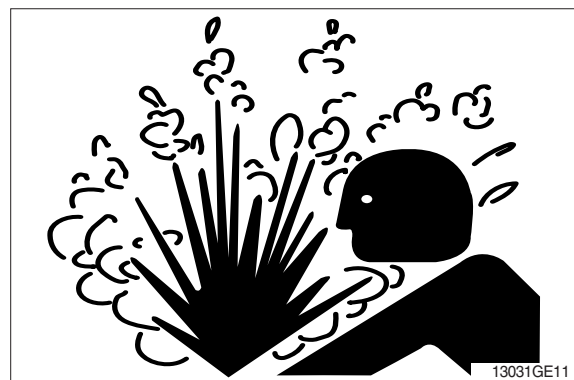
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



## SERVICE COOLING SYSTEM SAFELY

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

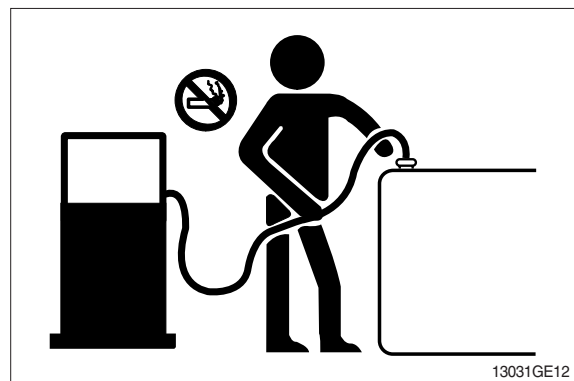
Shut off engine. Only remove filler cap when cool enough to touch with bare hands.



## 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

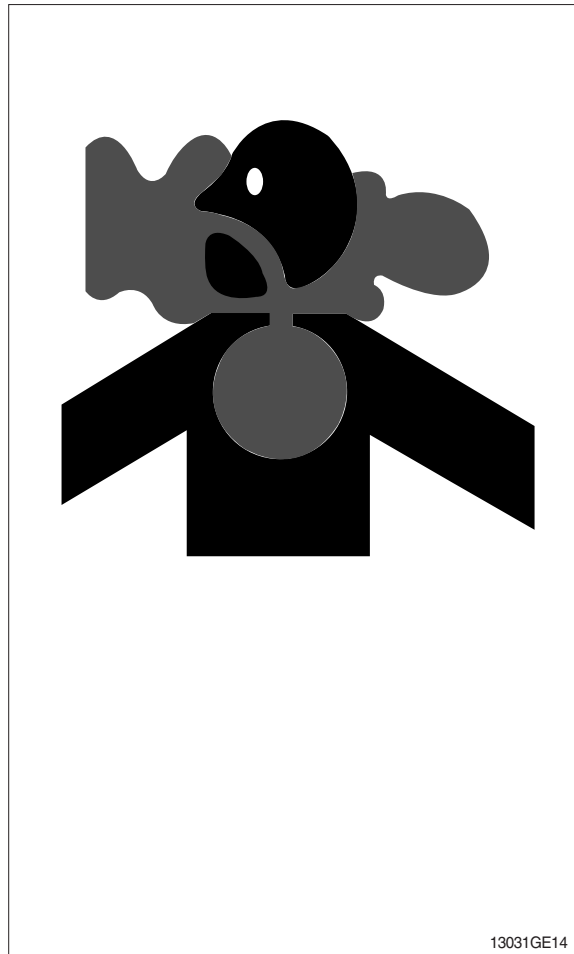
Avoid potentially toxic fumes and dust.

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.

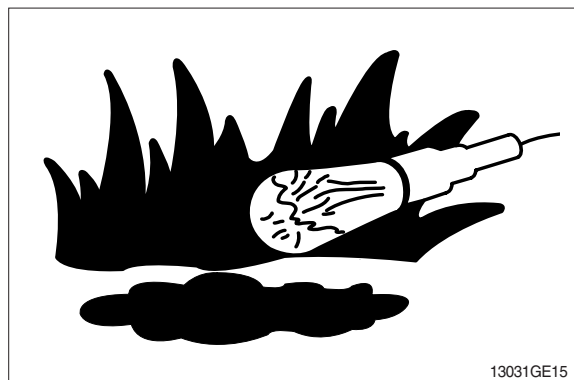
Remove paint before welding or heating:

- 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

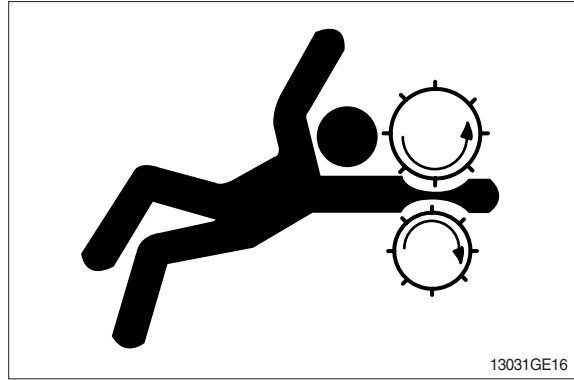
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



## 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.

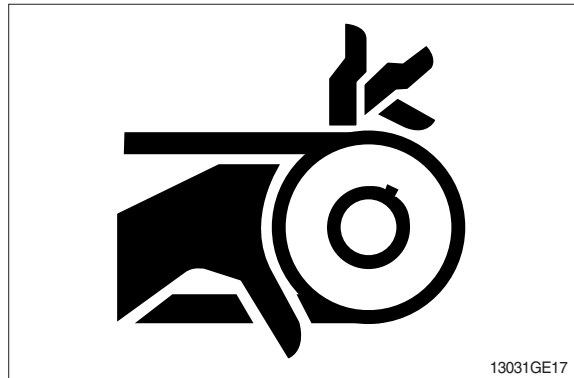
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



## STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



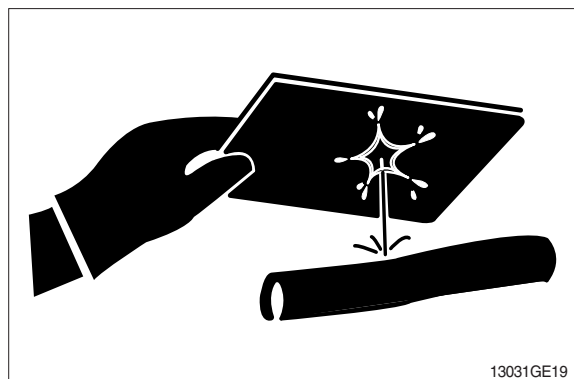
## AVOID HIGH PRESSURE FLUIDS

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:

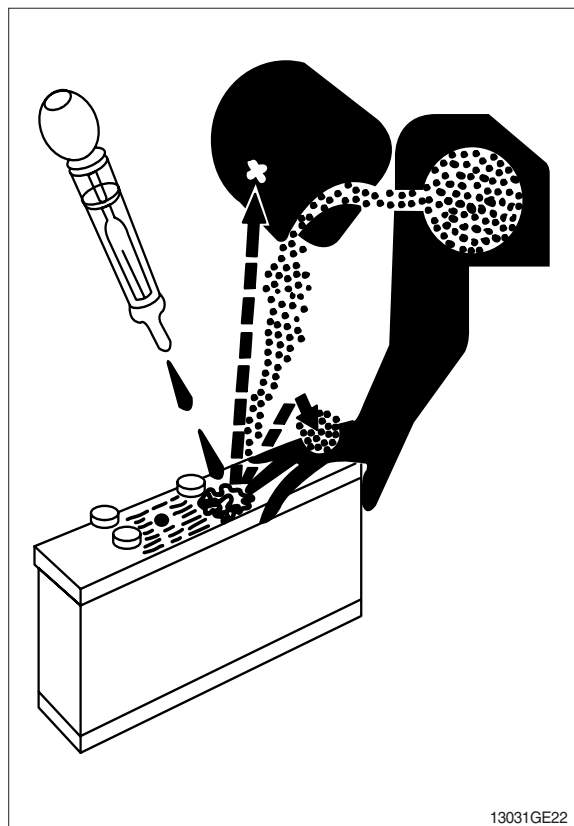
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.





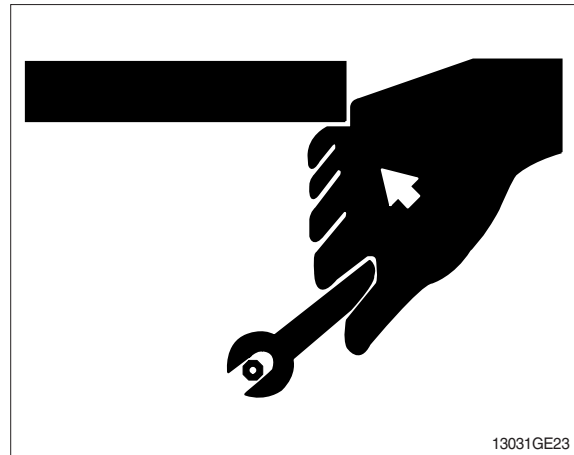
## USE TOOLS PROPERLY

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.)



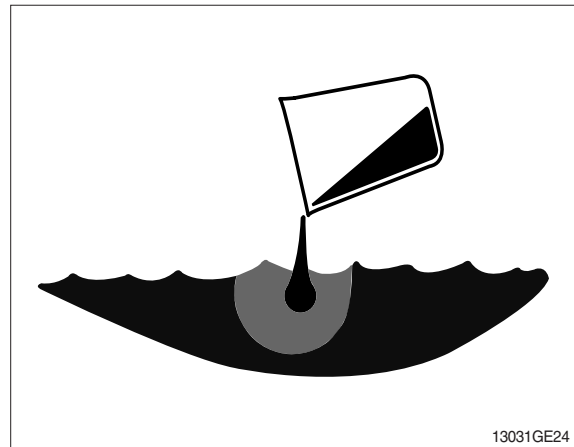
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## DISPOSE OF FLUIDS PROPERLY

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.

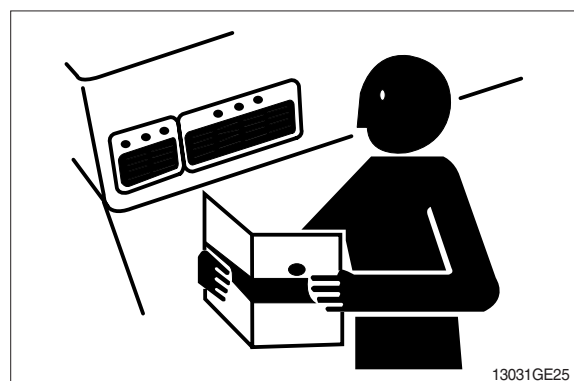
DO NOT pour oil into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters, batteries, and other harmful waste.



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## REPLACE SAFETY SIGNS

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



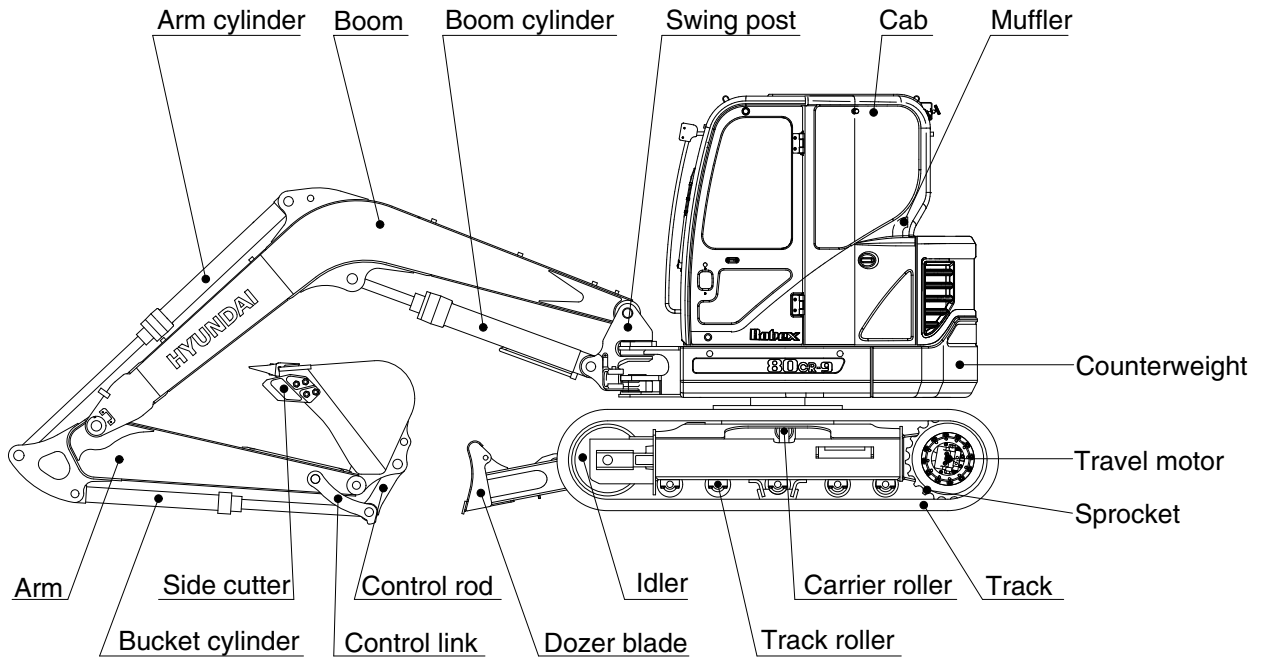
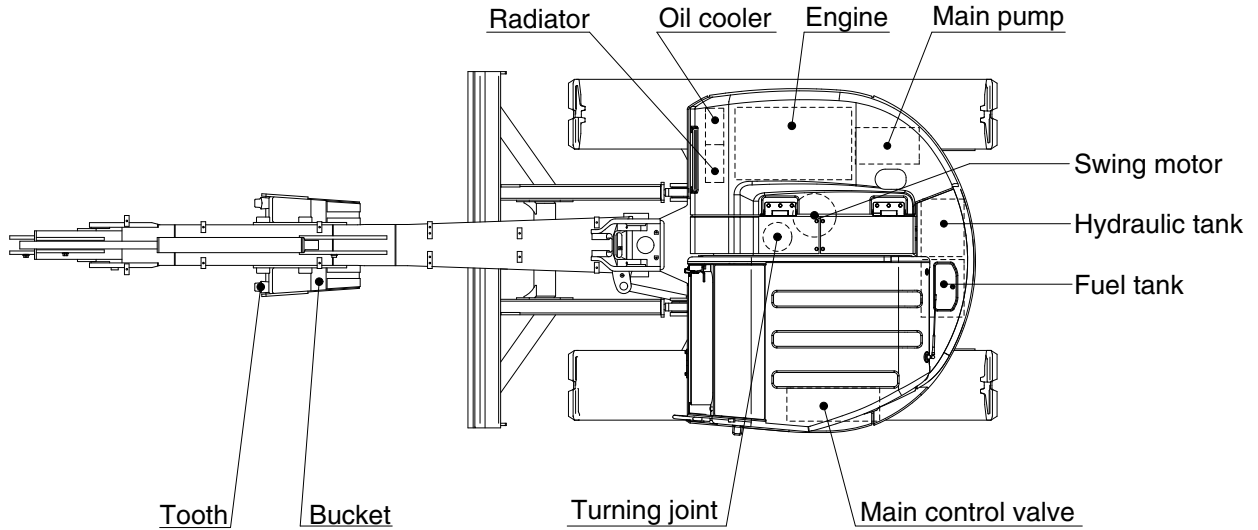
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## LIVE WITH SAFETY

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

# GROUP 2 SPECIFICATIONS

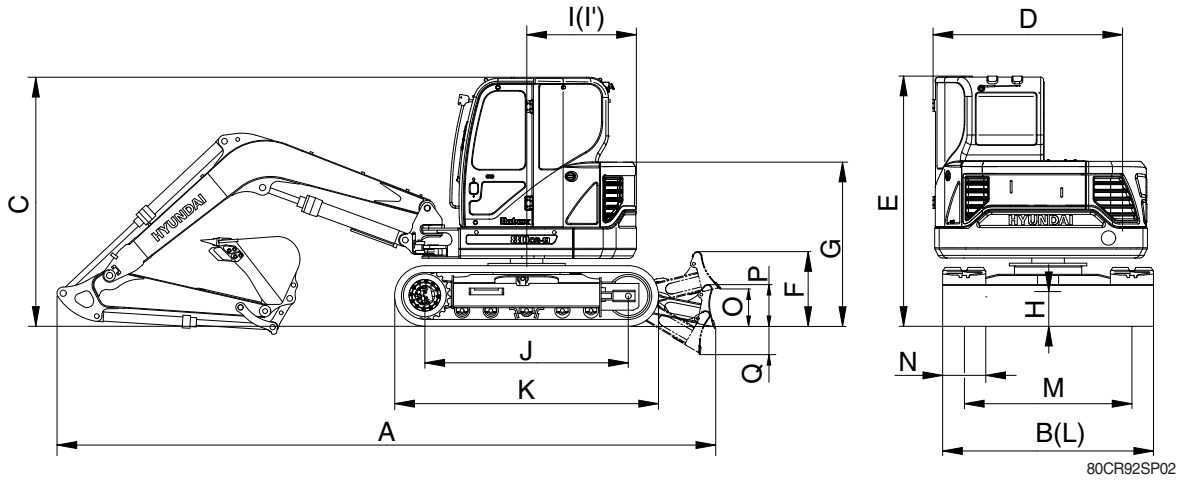
## 1. MAJOR COMPONENT



80CR92SP01

## 2. SPECIFICATIONS

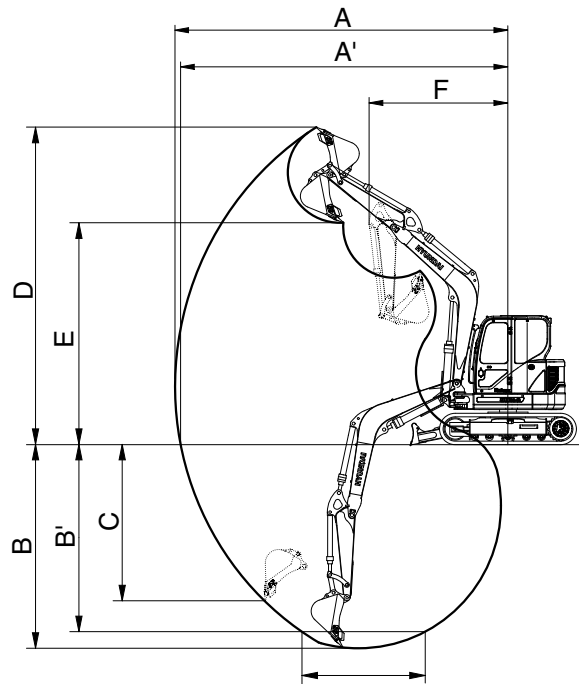
### 1) 3.4 m (11' 2") MONO BOOM, 1.67 m (5' 6") ARM WITH BOOM SWING SYSTEM



Description		Unit	Specification
Operating weight		kg (lb)	8200 (18080)
Bucket capacity (SAE heaped), standard		m <sup>3</sup> (yd <sup>3</sup> )	0.28 (0.25)
Overall length	A	mm (ft-in)	6170 (20' 3")
Overall width, with 450 mm shoe	B		2300 ( 7' 7")
Overall height	C		2640 ( 8' 8")
Superstructure width	D		2220 ( 7' 3")
Overall height of cab	E		2640 ( 8' 8")
Ground clearance of counterweight	F		740 ( 2' 5")
Engine cover height	G		1750 ( 5' 9")
Minimum ground clearance	H		360 ( 1' 2")
Rear-end distance	I		1280 ( 4' 2")
Rear-end swing radius	I'		1280 ( 4' 2")
Distance between tumblers	J		2200 ( 7' 3")
Undercarriage length	K		2790 ( 9' 2")
Undercarriage width	L		2300 ( 7' 7")
Track gauge	M		1850 ( 6' 1")
Track shoe width, standard	N		450 ( 1' 6")
Height of blade	O		460 ( 1' 6")
Ground clearance of blade up	P		400 ( 1' 4")
Depth of blade down	Q		280 ( 0' 11")
Travel speed (Low/high)			km/hr (mph)
Swing speed		rpm	9.6
Gradeability		Degree (%)	30 (58)
Ground pressure (450 mm shoe)		kgf/cm <sup>2</sup> (psi)	0.39 (5.55)
Max traction force		kg (lb)	7400 (16310)

### 3. WORKING RANGE

#### 1) 3.4 m (11' 2") MONO BOOM



80CR92SP03









Description		1.67 m (5' 6") Arm
Max digging reach	A	6960 mm (22' 10")
Max digging reach on ground	A'	6820 mm (22' 5")
Max digging depth	B	4140 mm (13' 7")
Max digging depth (8ft level)	B'	3780 mm (12' 5")
Max vertical wall digging depth	C	3570 mm (11' 9")
Max digging height	D	6740 mm (22' 1")
Max dumping height	E	4730 mm (15' 6")
Min swing radius	F	2500 mm ( 8' 2")
Boom swing radius (left/right)		70°/60°
Bucket digging force	SAE	48.4 kN
		4940 kgf
		10890 lbf
	ISO	55.9 kN
		5700 kgf
		12570 lbf
Arm crowd force	SAE	40.3 kN
		4110 kgf
		9060 lbf
	ISO	42.2 kN
		4300 kgf
		9480 lbf

#### 4. WEIGHT









Item	kg	lb
Upperstructure assembly	4090	9020
Main frame weld assembly	720	1590
Engine assembly	270	600
Main pump assembly	60	130
Main control valve assembly	40	90
Swing motor assembly	80	170
Hydraulic oil tank assembly	75	165
Fuel tank assembly	70	155
Boom swing post	260	570
Counterweight	930	2050
Cab assembly	330	730
Lower chassis assembly	2940	6480
Track frame weld assembly	990	2180
Swing bearing	140	310
Travel motor assembly	85	190
Turning joint	30	60
Track recoil spring	110	240
Idler	130	290
Carrier roller	20	40
Track roller	160	360
Track-chain assembly (450 mm standard triple grouser shoe)	830	1830
Dozer blade assembly	320	700
Front attachment assembly (3.4 m boom, 1.67 m arm, 0.28 m <sup>3</sup> SAE heaped bucket)	1170	2580
3.4 m boom assembly	420	930
1.67 m arm assembly	180	400
0.28 m <sup>3</sup> SAE heaped bucket	230	510
Boom cylinder assembly	110	240
Arm cylinder assembly	90	200
Bucket cylinder assembly	60	130
Dozer cylinder assembly	80	180
Bucket control link assembly	80	180
Boom swing cylinder assembly	70	150

## 5. LIFTING CAPACITIES

1) 3.4 m (11' 2") boom, 1.67m (5' 6") arm equipped with 0.28 m<sup>3</sup> (SAE heaped) bucket and 450 mm (18") triple grouser shoe and dozer blade up with 930 kg (2050 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)		Capacity		Reach
										m (ft)
4.5 m (15.0 ft)	kg lb					*1550 *3420	1480 3260	*1470 *3240	1040 2290	5.47 (17.9)
3.0 m (10.0 ft)	kg lb					*1740 *3840	1430 3150	*1530 *3370	780 1720	6.23 (20.4)
1.5 m (5.0 ft)	kg lb			*4050 *8930	2510 5530	*2260 *4980	1320 2910	*1620 *3570	700 1540	6.45 (21.2)
Ground Line	kg lb			*4830 *10650	2320 5110	*2650 *5840	1230 2710	*1710 *3770	740 1630	6.20 (20.3)
-1.5 m (-5.0 ft)	kg lb	*4730 *10430	*4730 *10430	*4410 *9720	2320 5110	*2550 *5620	1210 2670	*1760 *3880	940 2070	5.38 (17.7)
-3.0 m (-10.0 ft)	kg lb			*2810 *6190	2430 5360					

2) 3.4 m (11' 2") boom, 1.67 m (5' 6") arm equipped with 0.28 m<sup>3</sup> (SAE heaped) bucket and 450 mm (18") triple grouser shoe and dozer blade down with 930 kg (2050 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)		Capacity		Reach
										m (ft)
4.5 m (15.0 ft)	kg lb					*1550 *3420	1380 3040	1110 2450	970 2140	5.47 (17.9)
3.0 m (10.0 ft)	kg lb					1540 3400	1340 2950	840 1850	730 1610	6.23 (20.4)
1.5 m (5.0 ft)	kg lb			2770 6110	2320 5110	1430 3150	1230 2710	760 1680	650 1430	6.45 (21.2)
Ground Line	kg lb			2570 5670	2140 4720	1330 2930	1140 2510	790 1740	680 1500	6.20 (20.3)
-1.5 m (-5.0 ft)	kg lb	*4730 *10430	*4730 *10430	2670 5670	2140 4720	1310 2890	1120 2470	1010 2230	870 1920	5.38 (17.7)
-3.0 m (-10.0 ft)	kg lb			2690 5930	2250 4960					

Note 1. Lifting capacity are based on SAE J1097 and ISO 10567.

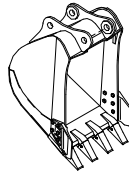
2. Lifting capacity of the ROBEX series does not exceed 75 % of tipping load with the machine on firm, level ground or 87 % of full hydraulic capacity.

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



0.28 m<sup>3</sup> SAE heaped bucket

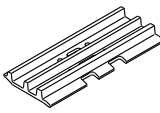
Capacity		Width		Weight	Recommendation
					3.4 m (11' 2") Mono boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.67 m arm (5' 6")
0.28 m <sup>3</sup> (0.37 yd <sup>3</sup> )	0.25 m <sup>3</sup> (0.33 yd <sup>3</sup> )	730 mm (28.7")	810 mm (31.9")	230 kg (510 lb)	Applicable for materials with density of 1600 kg/m <sup>3</sup> (2700 lb/yd <sup>3</sup> ) 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	
				
R80CR-9	Shoe width	mm (in)	450 (18)	600 (24)
	Operating weight	kg (lb)	8200 (18080)	8360 (18430)
	Ground pressure	kgf/cm <sup>2</sup> (psi)	0.39 (5.55)	0.30 (4.27)
	Overall width	mm (ft-in)	2300 (7' 7")	2390 (7' 10")

### 3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	1 EA
Track rollers	5 EA
Track shoes	39 EA

### 4) SELECTION OF TRACK SHOE

Suitable track shoes should be selected according to operating conditions.

※ Table 1

Track shoe	Specification	Category
450 mm triple grouser	Standard	A
600 mm triple grouser	Option	A

※ Table 2

Category	Applications	Precautions
A	Rocky ground, river beds, normal soil	<ul style="list-style-type: none"> <li>Travel at low speed on rough ground with large obstacles such as boulders or fallen trees</li> </ul>



## 8. SPECIFICATIONS FOR MAJOR COMPONENTS

### 1) ENGINE

Item	Specification
Model	Yanmar 4TNV98-ZVHYB
Type	4-cycle diesel engine, low emission
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	98 × 110 mm (3.86" × 4.33")
Piston displacement	3319 cc (203 cu in)
Compression ratio	18.5:1
Rated gross horse power (SAE J1995)	60.4 Hp at 2100 rpm (45.0 kW at 2100 rpm)
Maximum torque at 1350 rpm	24.5 kgf · m (177 lbf · ft)
Engine oil quantity	11.6 ℓ (3.1 U.S. gal)
Dry weight	270 kg (595 lb)
High idling speed	2250 ± 50 rpm
Low idling speed	1050 ± 50 rpm
Rated fuel consumption	174.4 g/Hp · hr at 2100 rpm
Starting motor	12 V-3 kW
Alternator	12 V-80 A
Battery	1 × 12 V × 100 Ah

### 2) MAIN PUMP (P1, P2)

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 36 cc/rev
Maximum pressure	280 kgf/cm <sup>2</sup> (3980 psi)
Rated oil flow	2 × 72 ℓ /min (2 × 19 U.S.gpm)
Rated speed	2000 rpm

### 3) PISTON PUMP (P3)

Item	Specification
Type	Fixed displacement axis piston pump
Capacity	28 cc/rev
Maximum pressure	230 kgf/cm <sup>2</sup> (3270 psi)
Rated oil flow	56 ℓ /min (14.8 U.S.gpm)

#### 4) GEAR PUMP (P4)

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	8.9 cc/rev
Maximum pressure	35 kgf/cm <sup>2</sup> (500 psi)
Rated oil flow	17.8 ℓ /min (4.7 U.S.gpm/3.7 U.K.gpm)

#### 5) MAIN CONTROL VALVE

Item	Specification
Type	12 spools sectional inline
Operating method	Hydraulic pilot system
Main relief valve pressure	280 kgf/cm <sup>2</sup> (3980psi)
Overload relief valve pressure	310 kgf/cm <sup>2</sup> (4410psi)

#### 6) SWING MOTOR (machine serial No.: -#1002)

Item	Specification
Type	Axial piston motor
Capacity	39 cc/rev
Relief pressure	230 kgf/cm <sup>2</sup> (3270 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	14 kgf · m (101 lbf · ft)
Brake release pressure	20~40 kgf/cm <sup>2</sup> (280~570 psi)
Reduction gear type	2 - stage planetary

#### SWING MOTOR (machine serial No.: #1003-)

Item	Specification
Type	Axial piston motor
Capacity	43.4 cc/rev
Relief pressure	230 kgf/cm <sup>2</sup> (3270 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	17 kgf · m (123 lbf · ft)
Brake release pressure	25~50 kgf/cm <sup>2</sup> (356~711 psi)
Reduction gear type	2 - stage planetary

## 7) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	280 kgf/cm <sup>2</sup> (3980 psi)
Reduction gear type	2 stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	Less than 9 kgf/cm <sup>2</sup> (128 psi)
Braking torque	8.4 kgf · m (61 lbf · ft)

## 8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 115 × ∅ 70 × 850 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅ 100 × ∅ 65 × 873 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 85 × ∅ 55 × 685 mm
	Cushion	Extend only
Dozer cylinder	Bore dia × Rod dia × Stroke	∅ 130 × ∅ 70 × 152 mm
	Cushion	-
Boom swing cylinder	Bore dia × Rod dia × Stroke	∅ 110 × ∅ 60 × 744 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.

## 9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R80CR-9	Standard	450 mm (18")	0.35 kgf/cm <sup>2</sup> (4.98 psi)	38	2300 mm ( 7' 7")
	Option	600 mm (24")	0.27 kgf/cm <sup>2</sup> (3.84 psi)	38	2390 mm ( 7' 10")

## 10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R80CR-9	STD	0.28 m <sup>3</sup> (0.37yd <sup>3</sup> )	0.25 m <sup>3</sup> (0.33yd <sup>3</sup> )	4	730 mm (28.7")	810 mm (31.9")

## 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)						
			-20 (-4)	-10 (14)	0 (32)	10 (50)	20 (68)	30 (86)	40 (104)
Engine oil pan	Engine oil	11.6 (3.1)	SAE 30						
			SAE 10W						
			SAE 10W-30						
			SAE 15W-40						
Swing drive (-#1002)	Gear oil	1.5 (0.4)	SAE 80W-90						
Final drive		1.2×2 (0.32×2)							
Swing drive (-#1002)	Grease	3.3 (0.87)	NLGI NO.1						
			NLGI NO.2						
Hydraulic tank	Hydraulic oil	Tank : 71 (18.8) System : 120 (31.7)	ISO VG 32						
			ISO VG 46						
			ISO VG 68						
Fuel tank	Diesel fuel	120 (31.7)	ASTM D975 NO.1						
			ASTM D975 NO.2						
Fitting (Grease nipple)	Grease	As required	NLGI NO.1						
			NLGI NO.2						
Radiator (Reservoir tank)	Mixture of antifreeze and water 50 : 50	11 (2.9)	Ethylene glycol base permanent type						

SAE : Society of Automotive Engineers

API : American Petroleum Institute

ISO : International Organization for Standardization

NLGI : National Lubricating Grease Institute

ASTM : American Society of Testing and Material