

SECTION 1 GENERAL

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SECTION 1 GENERAL

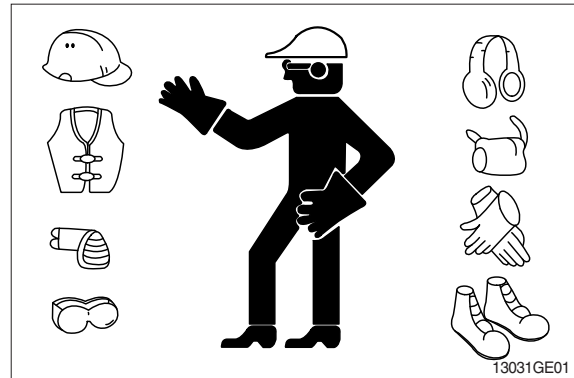
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

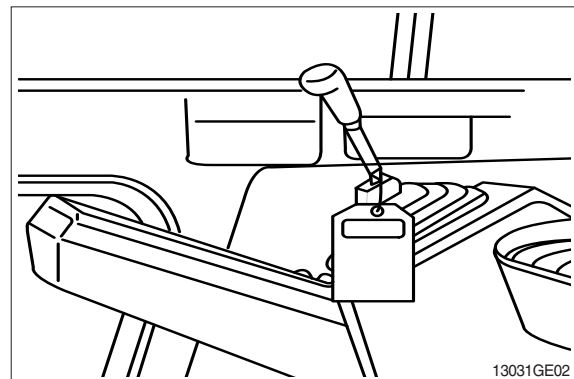
WEAR PROTECTIVE CLOTHING

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



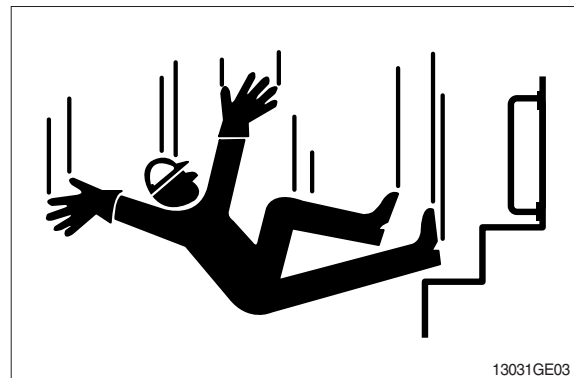
WARN OTHERS OF SERVICE WORK

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.

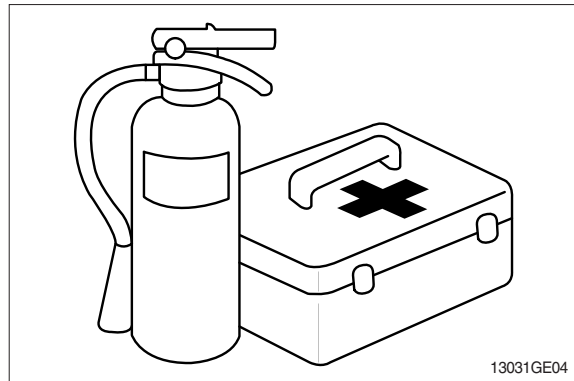


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

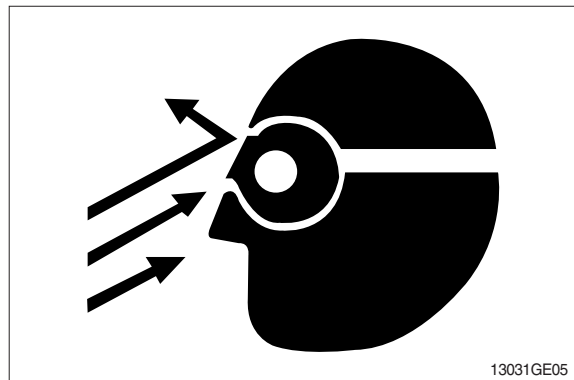
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

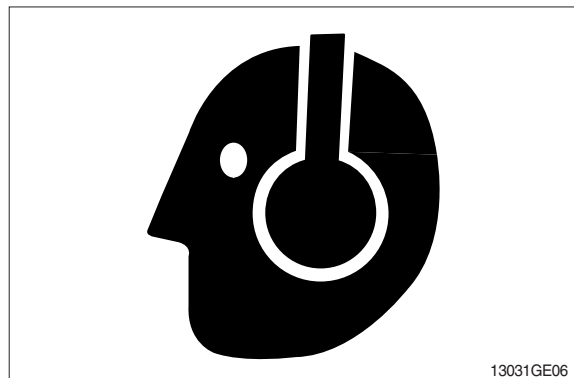
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

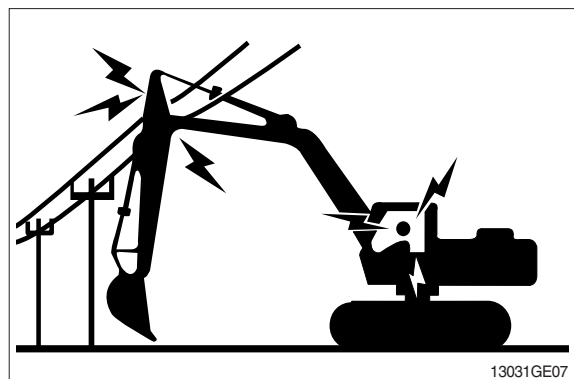
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

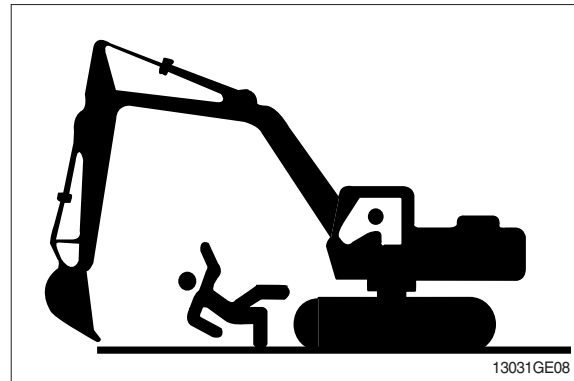
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.

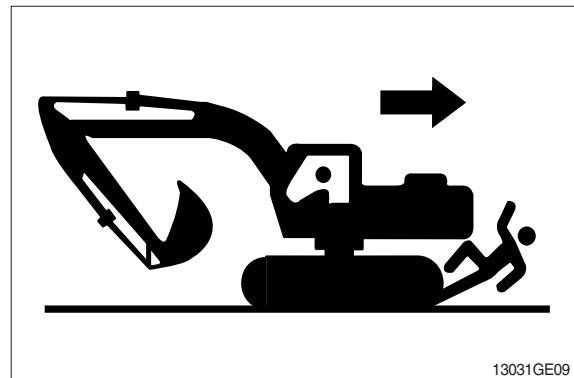


MOVE AND OPERATE MACHINE SAFELY

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:

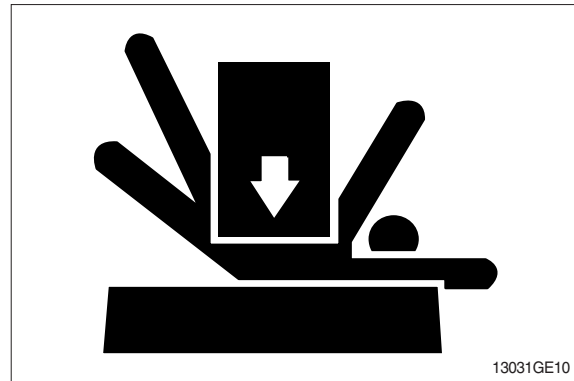
- Park machine on a level surface.
- Lower bucket to the ground.
- Turn auto idle switch off.
- Run engine at 1/2 speed without load for 2 minutes.
- Turn key switch to OFF to stop engine.
Remove key from switch.
- Move pilot control shutoff lever to locked position.
- Allow engine to cool.

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.

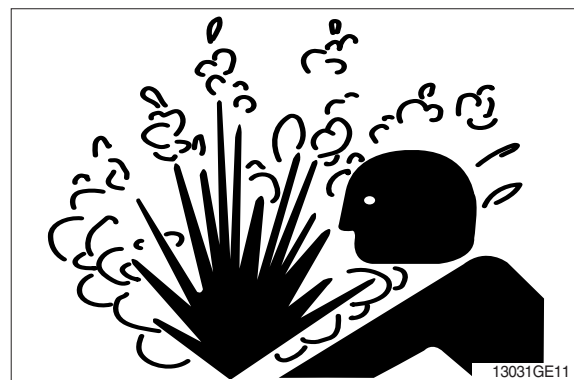
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



SERVICE COOLING SYSTEM SAFELY

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

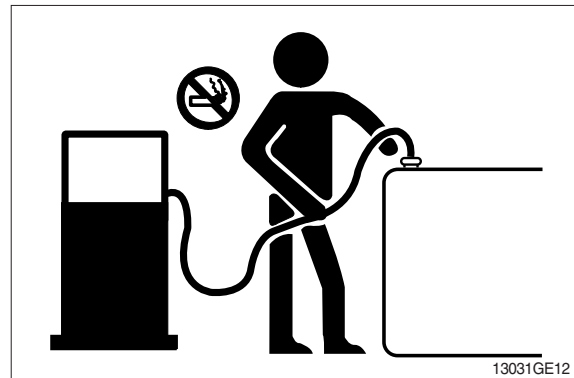
Shut off engine. Only remove filler cap when cool enough to touch with bare hands.



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

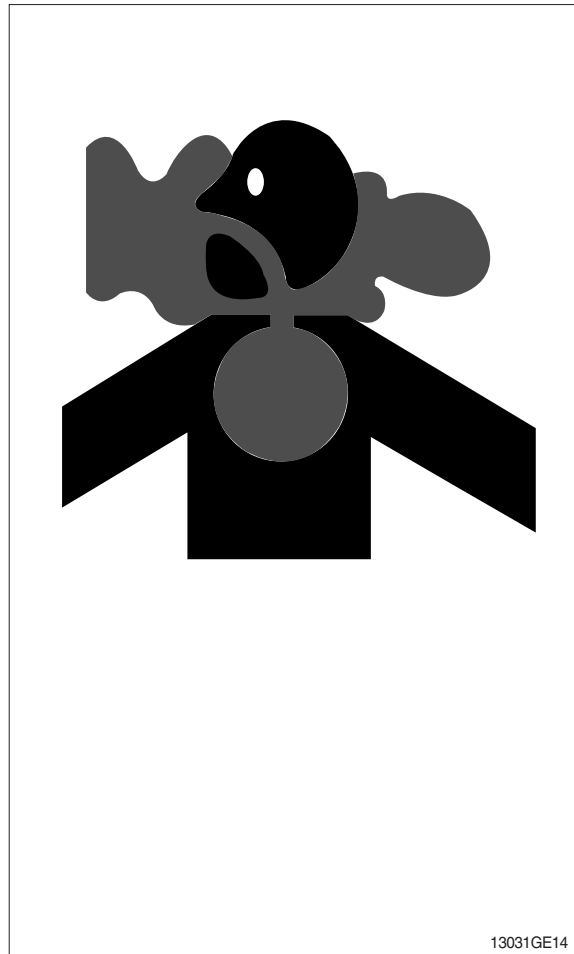
Avoid potentially toxic fumes and dust.

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.

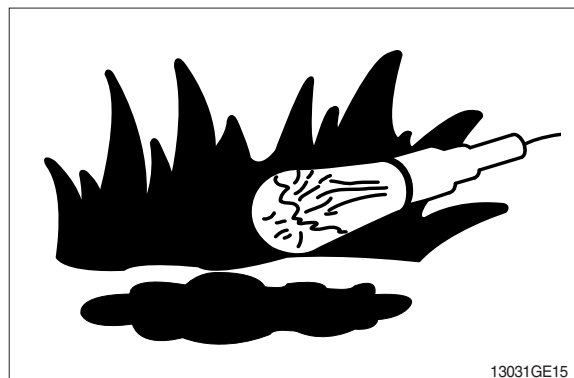
Remove paint before welding or heating:

- 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

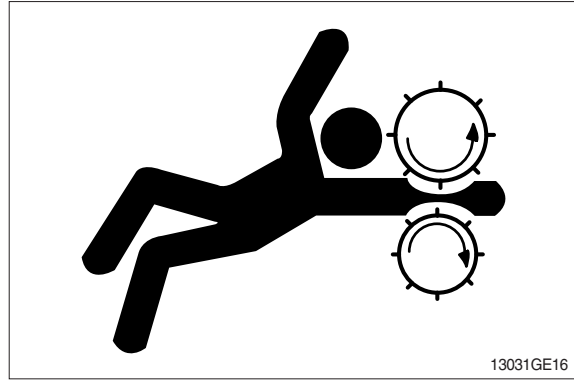
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.



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.

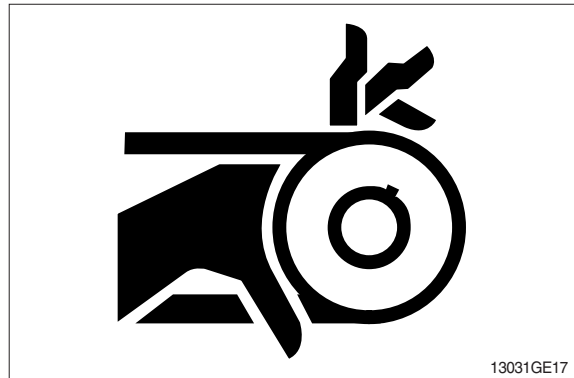
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



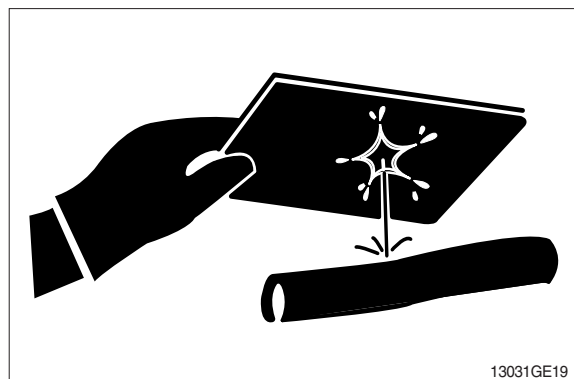
AVOID HIGH PRESSURE FLUIDS

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:

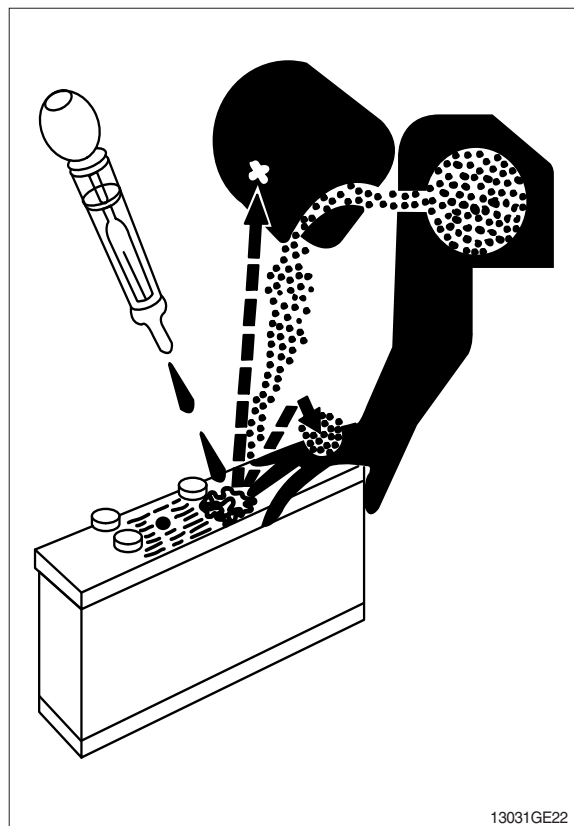
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling or dripping electrolyte.
5. Use proper jump start procedure.

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.



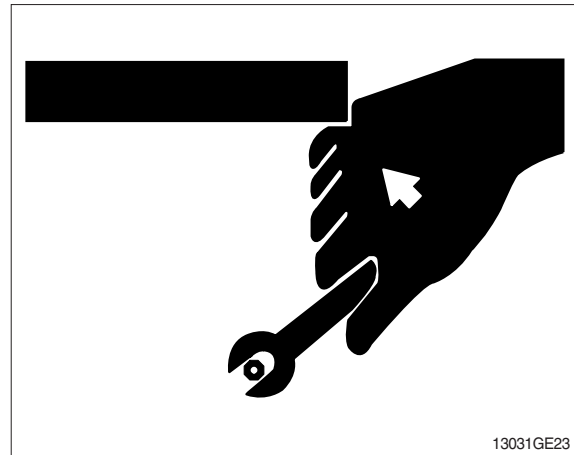
USE TOOLS PROPERLY

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.)

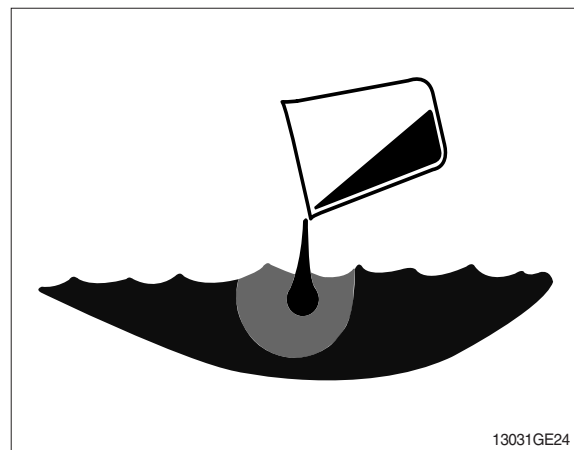


DISPOSE OF FLUIDS PROPERLY

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.

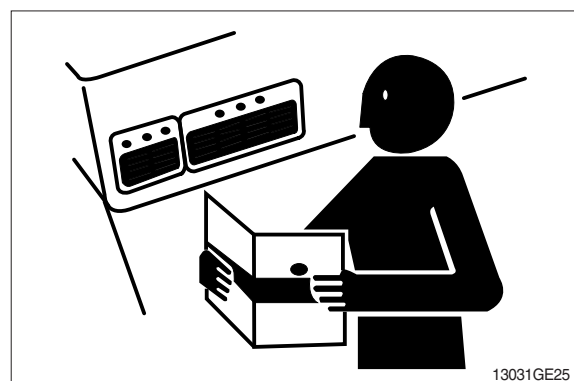
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.

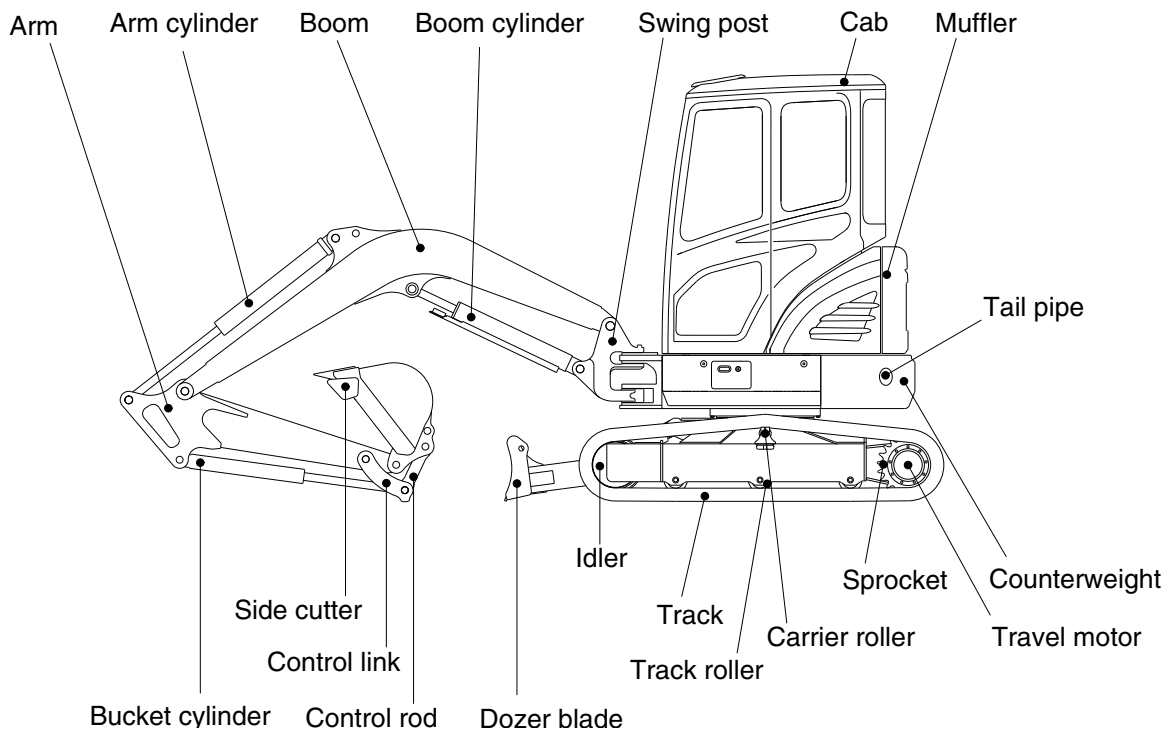
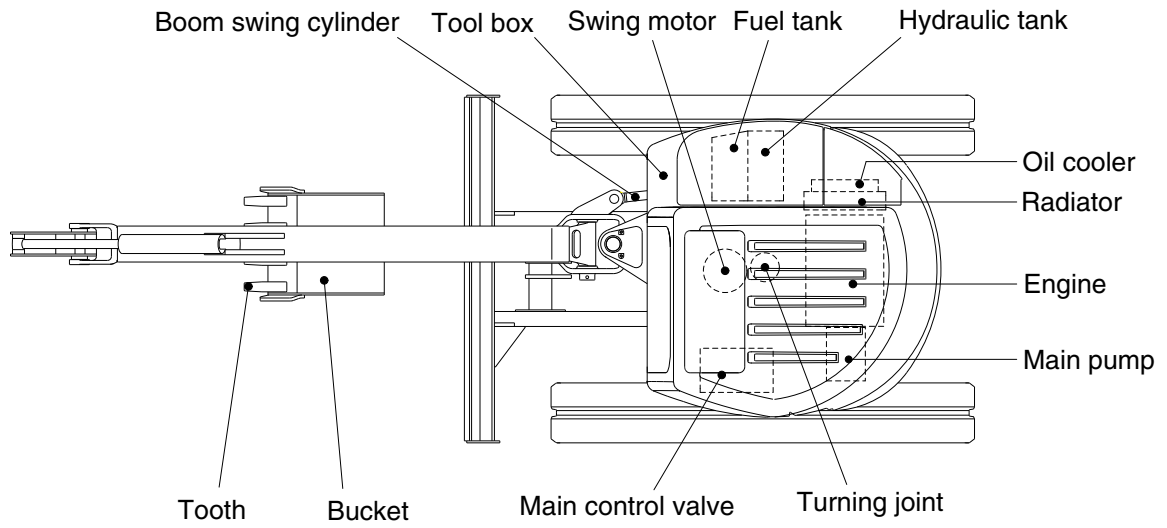


LIVE WITH SAFETY

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

GROUP 2 SPECIFICATIONS

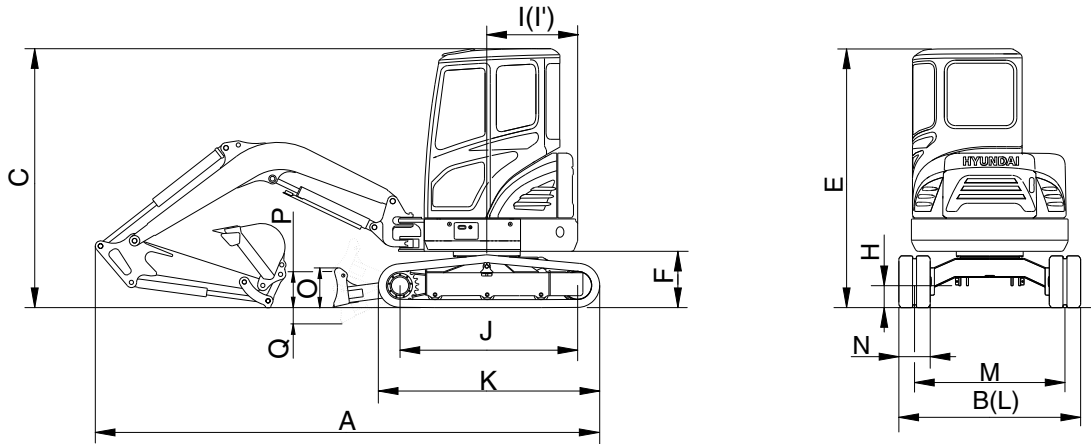
1. MAJOR COMPONENT



R27Z92SP01

2. SPECIFICATIONS

1) 1.945 m (6' 5") MONO BOOM, 1.12 m (3' 8") ARM, WITH BOOM SWING POST

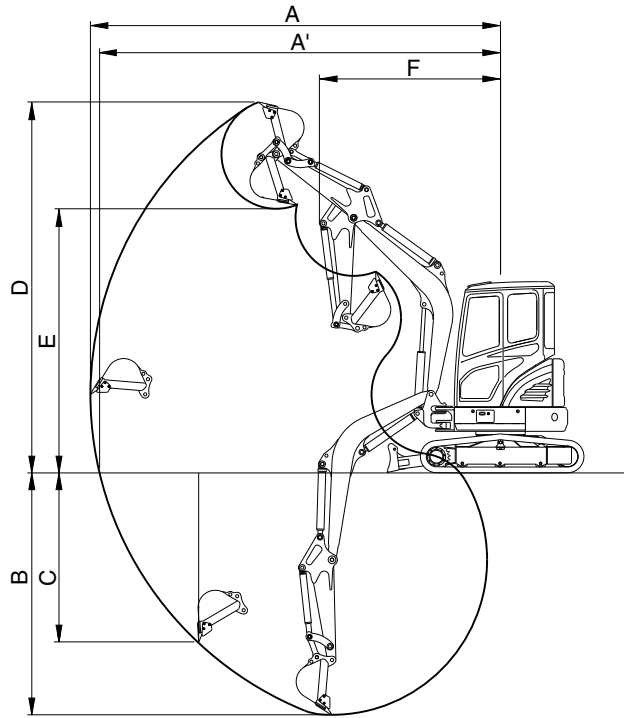


R27Z92SP02

Description		Unit	Specification
Operating weight (cabin / canopy)		kg (lb)	2600 (5730) / 2450 (5400)
Bucket capacity (SAE heaped), standard		m ³ (yd ³)	0.07 (0.09)
Overall length	A	mm (ft-in)	4030 (13' 3")
Overall width, with 250 mm shoe	B		1500 (4' 11")
Overall height	C		2500 (8' 2")
Overall height of cab	E		2500 (8' 2")
Ground clearance of counterweight	F		540 (1' 9")
Minimum ground clearance	H		290 (0' 11")
Rear-end distance	I		775 (2' 7")
Rear-end swing radius	I'		775 (2' 7")
Distance between tumbler	J		1490 (4' 11")
Undercarriage length	K		1910 (6' 3")
Undercarriage width	L		1500 (4' 11")
Track gauge	M		1250 (4' 1")
Track shoe width, standard	N		250 (9.8")
Height of blade	O		300 (1' 0")
Ground clearance of blade up	P		330 (1' 1")
Depth of blade down	Q	380 (1' 3")	
Travel speed (low/high)		km/hr (mph)	2.5/4.5 (1.6/2.8)
Swing speed		rpm	9.1
Gradeability		Degree (%)	30 (58)
Ground pressure 250 mm rubber shoe (cab / canopy)		kgf/cm ² (psi)	0.33 (4.69) / 0.31 (4.41)

3. WORKING RANGE

1) 1.945 m (6' 5") MONO BOOM WITH BOOM SWING POST



R27Z92SP03

Description		1.12 m (3' 8") Arm	
Max digging reach	A	4480 mm (14' 8")	
Max digging reach on ground	A'	4340 mm (14' 3")	
Max digging depth	B	2420 mm (7' 11")	
Max vertical wall digging depth	C	1460 mm (4' 9")	
Max digging height	D	4150 mm (13' 7")	
Max dumping height	E	2930 mm (9' 7")	
Min swing radius	F	1980 mm (6' 6")	
Boom swing radius (left/right)		75°/50°	
Bucket digging force	SAE	19.2 kN	
		1960 kgf	
		4320 lbf	
	ISO	21.1 kN	
		2150 kgf	
		4740 lbf	
Arm crowd force	SAE	14.2 kN	
		1450 kgf	
		3200 lbf	
	ISO	14.6 kN	
		1490 kgf	
		3280 lbf	

4. WEIGHT











Item	kg	lb
Upperstructure assembly	1480	3260
Main frame weld assembly	310	683
Engine assembly	136	300
Main pump assembly	19	42
Main control valve assembly	25	55
Swing motor assembly	34	75
Hydraulic oil tank assembly	50	110
Fuel tank assembly	30	70
Boom swing post	75	165
Counterweight	118	260
Cab assembly	210	460
Lower chassis assembly	805	1770
Track frame weld assembly	220	485
Swing bearing	47	100
Travel motor assembly	36	80
Turning joint	11	24
Track recoil spring	16	35
Idler	19	42
Carrier roller	3	7
Track roller	6	13
Sprocket	7	15
Rubber track (250 mm)	93	210
Dozer blade assembly	92	200
Front attachment assembly (1.945 m boom, 1.12 m arm, 0.07 m ³ SAE heaped bucket)	315	694
1.945 m boom assembly	80	176
1.12 m arm assembly	40	88
0.07 m ³ SAE heaped bucket	57	126
Boom cylinder assembly	26	57
Arm cylinder assembly	26	57
Bucket cylinder assembly	20	44
Bucket control link assembly	20	45
Dozer cylinder assembly	21	46
Boom swing cylinder assembly	23	51

5. LIFTING CAPACITIES

1) 1.945 m (6' 5") boom, 1.12 m (3' 8") arm equipped with 0.07 m³ (SAE heaped) bucket and 250 mm (10") rubber track, the dozer blade up with 118 kg (260 lb) counterweight.

•  : Rating over-front

•  : Rating over-side or 360 degree

Load point height		Load radius								At max. reach		
		2.0 m (7.0 ft)		2.5 m (8.0 ft)		3.0 m (10.0 ft)		3.5 m (11.0 ft)		Capacity		Reach
												m (ft)
3.5 m (11.0 ft)	kg									460	400	2.88
	lb									1010	880	(9.4)
3.0 m (10.0 ft)	kg					410	360			330	290	3.48
	lb					900	790			730	640	(11.4)
2.5 m (8.0 ft)	kg					410	360			270	240	3.85
	lb					900	790			600	530	(12.6)
2.0 m (7.0 ft)	kg			560	490	410	360	310	270	240	210	4.09
	lb			1230	1080	900	790	680	600	530	460	(13.4)
1.5 m (5.0 ft)	kg	800	680	540	470	400	350	300	260	220	190	4.22
	lb	1760	1500	1190	1040	880	770	660	570	490	420	(13.8)
1.0 m (3.0 ft)	kg			520	450	380	340	290	260	210	190	4.26
	lb			1150	990	840	750	640	570	460	420	(14.0)
0.5 m (2.0 ft)	kg	730	610	500	430	370	330	290	250	210	190	4.22
	lb	1610	1340	1100	950	820	730	640	550	460	420	(13.8)
Ground Line	kg	720	600	490	420	370	320	290	250	220	190	4.09
	lb	1590	1320	1080	930	820	710	640	550	490	420	(13.4)
-0.5 m (-2.0 ft)	kg	720	610	490	420	370	320			240	210	3.86
	lb	1590	1340	1080	930	820	710			530	460	(12.7)
-1.0 m (-3.0 ft)	kg	730	610	500	430	370	320			290	250	3.49
	lb	1610	1340	1100	950	820	710			640	550	(11.5)
-1.5 m (-5.0 ft)	kg	750	630	510	440					400	350	2.90
	lb	1650	1390	1120	970					880	770	(9.5)
-2.5 m (-8.0 ft)	kg									370	330	3.14
	lb									820	730	(10.3)

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











1. 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.
2. The load point is a hook located on the back of the bucket.

*indicates load limited by hydraulic capacity.

2) 1.945 m (6' 5") boom, 1.12 m (3' 8") arm equipped with 0.07 m³ (SAE heaped) bucket and 250 mm (10") rubber track, the dozer blade down with 118 kg (260 lb) counterweight.

•  : Rating over-front

•  : Rating over-side or 360 degree

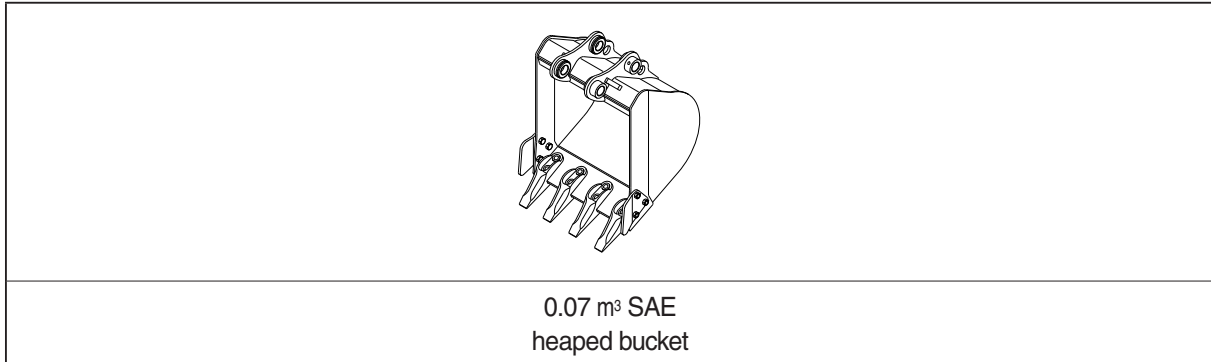
Load point height		Load radius								At max. reach		
		2.0 m (7.0 ft)		2.5 m (8.0 ft)		3.0 m (10.0 ft)		3.5 m (11.0 ft)		Capacity		Reach m (ft)
												
3.5 m (11.0 ft)	kg lb									*550 *1210	400 880	2.88 (9.4)
3.0 m (10.0 ft)	kg lb					*660 *1460	360 790			*570 *1260	290 640	3.48 (11.4)
2.5 m (8.0 ft)	kg lb					*640 *1410	360 790			*580 *1280	240 530	3.85 (12.6)
2.0 m (7.0 ft)	kg lb			*740 *1630	490 1080	*700 *1540	360 790	*680 *1500	270 600	*600 *1320	210 460	4.09 (13.4)
1.5 m (5.0 ft)	kg lb	*1360 *3000	680 1500	*970 *2140	470 1040	*810 *1790	350 770	*730 *1610	260 570	*620 *1370	190 420	4.22 (13.8)
1.0 m (3.0 ft)	kg lb			*1220 *2690	450 990	*940 *2070	340 750	*790 *1740	260 570	*630 *1380	190 420	4.26 (14.0)
0.5 m (2.0 ft)	kg lb	*1310 *2890	610 1340	*1380 *3040	430 950	*1040 *2290	330 730	*840 *1850	250 550	*650 *1430	190 420	4.22 (13.8)
Ground Line	kg lb	*1760 *3880	600 1320	*1450 *3200	430 950	*1080 *2380	320 710	*860 *1900	250 550	*670 *1480	190 420	4.09 (13.4)
-0.5 m (-2.0 ft)	kg lb	*1990 *4390	610 1340	*1410 *3110	420 930	*1050 *2310	320 710			*690 *1520	210 460	3.86 (12.7)
-1.0 m (-3.0 ft)	kg lb	*1740 *3840	610 1340	*1250 *2760	430 950	*900 *1980	320 710			*690 *1520	250 550	3.49 (11.5)
-1.5 m (-5.0 ft)	kg lb	*1250 *2760	630 1390	*840 *1850	440 970					*650 *1430	350 770	2.90 (9.5)
-2.5 m (-8.0 ft)	kg lb									*490 *1080	330 730	3.14 (10.3)

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

1. 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.
2. The load point is a hook located on the back of the bucket.

*indicates load limited by hydraulic capacity.

6. BUCKET SELECTION GUIDE



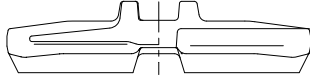
Capacity		Width		Weight	Recommendation
SAE heaped	CECE heaped	Without side cutter	With side cutter		1.945 m (6' 5") boom
					1.12 m (3' 8") arm
0.07m ³ (0.09 yd ³)	0.06m ³ (0.07 yd ³)	435 mm (17.1")	490 mm (19.3")	57 kg (125 lb)	Applicable for materials with density of 1600 kgf/m ³ (2700 lb /yd ³) or 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		Rubber track
			
R25Z-9A	Shoe width	mm (in)	250 (10")
	Operating weight	kg (lb)	2600 (5730)
	Ground pressure	kgf/cm ² (psi)	0.33 (4.69)
	Overall width	mm (ft-in)	1500 (4' 11")

(3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	1 EA
Track rollers	3 EA

8. SPECIFICATIONS FOR MAJOR COMPONENTS

1) ENGINE

Item	Specification
Model	Mitsubishi S3L2
Type	4-cycle vertical overhead valve, diesel fuel
Cooling method	Water cooling
Number of cylinders and arrangement	3 cylinders, in-line
Firing order	1-3-2
Combustion chamber type	Swirl chamber type
Cylinder bore × stroke	78 × 92 mm (3.07" × 3.62")
Piston displacement	1318 cc (80.4 cu in)
Compression ratio	22 : 1
Rated gross horse power (SAE J1995)	24.7 Hp at 2300 rpm (18.4 kW at 2300 rpm)
Maximum torque at 1800 rpm	8 kgf · m (57.8 lbf · ft)
Engine oil quantity	5.9 l (1.6 U.S. gal)
Dry weight	136 kg (300 lb)
High idling speed	2500+ 30 rpm
Low idling speed	1160 ± 25 rpm
Rated fuel consumption	198 g/Hp · hr at 2300 rpm (265 g/kW · hr at 2300 rpm)
Starting motor	12V-1.7 kW
Alternator	12V-40 A
Battery	1 × 12 V × 58 Ah (5h rating)

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 12 cc/rev
Rated oil flow	2 × 27.6 l /min (7.3 U.S. gpm / 6.1 U.K. gpm)
Rated speed	2300 rpm

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	8.5/4.5 cc/rev
Rated oil flow	19.6/10.4 l /min (5.2/2.7 U.S. gpm / 4.3/2.3 U.K. gpm)

4) MAIN CONTROL VALVE

Item	Specification
Type	Sectional, 9 spools (12 blocks)
Operating method	Hydraulic pilot system
Main relief valve pressure	220 kgf/cm ² (3130 psi)
Overload relief valve pressure	240 kgf/cm ² (3410 psi)

5) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	12.5 cc/rev
Relief pressure	170 kgf/cm ² (2420 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	7.0 kgf · m (50.6 lbf · ft)
Brake release pressure	25~50 kgf/cm ² (356~710 psi)
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	220 kgf/cm ² (3130 psi)
Reduction gear type	2-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	19 kgf/cm ² (270 psi)
Braking torque	5.7 kgf · m (41 lbf · ft)

7) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	∅ 75 × ∅ 45 × 565 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	∅ 70 × ∅ 45 × 500 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	∅ 60 × ∅ 35 × 420 mm
	Cushion	-
Boom swing cylinder	Bore dia × Rod dia × Stroke	∅ 75 × ∅ 40 × 400 mm
	Cushion	-
Dozer cylinder	Bore dia × Rod dia × Stroke	∅ 85 × ∅ 45 × 140 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) BUCKET

Item	Capacity		Tooth quantity	Width	
	SAE heaped	CECE heaped		Without side cutter	With side cutter
Standard	0.07 m ³ (0.09 yd ³)	0.06 m ³ (0.07 yd ³)	4	435 mm (17.1")	490 mm (19.3")

9. 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)
Engine oil pan	Engine oil	5.9 (1.6)	★SAE 5W-40						
			SAE 30						
			SAE 10W						
			SAE 10W-30						
			SAE 15W-40						
Final drive	Gear oil	0.6×2 (0.16×2)	★SAE 75W-90						
			SAE 85W-140						
Hydraulic tank	Hydraulic oil	Tank; 27(7.1) System; 55 (14.5)	★ISO VG 15						
			ISO VG 46						
			ISO VG 68						
Fuel tank	Diesel fuel	30 (7.9)	★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	4.2 (1.1)	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

★ : Cold region

Russia, CIS, Mongolia