SECTION 1 GENERAL

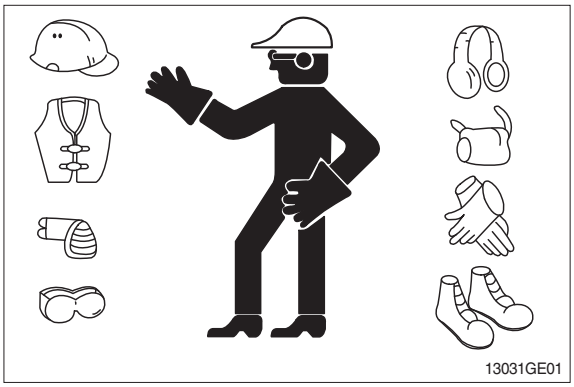
GROUP 1 SAFETY

FOLLOW SAFE PROCEDURE

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

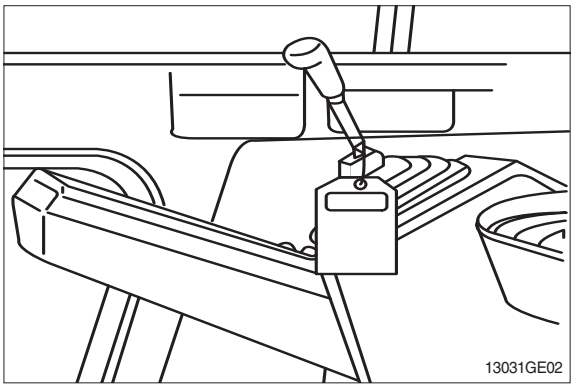
WEAR PROTECTIVE CLOTHING

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



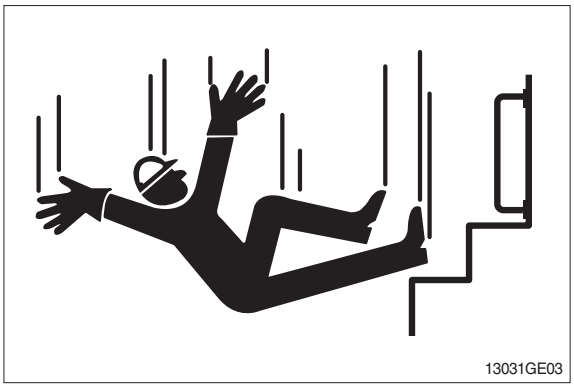
WARN OTHERS OF SERVICE WORK

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.

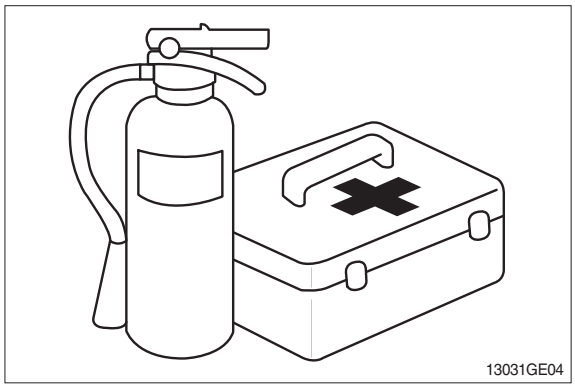


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

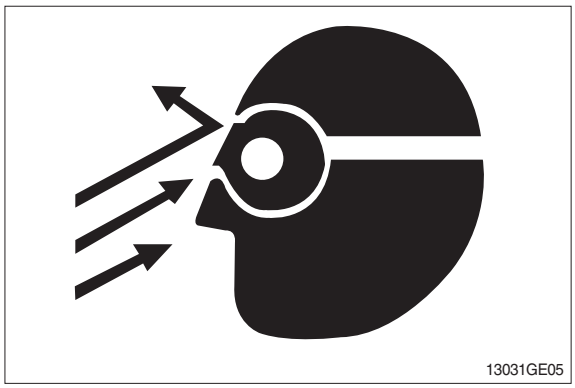
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

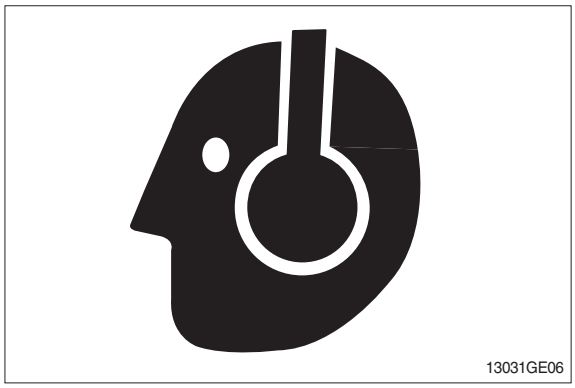
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

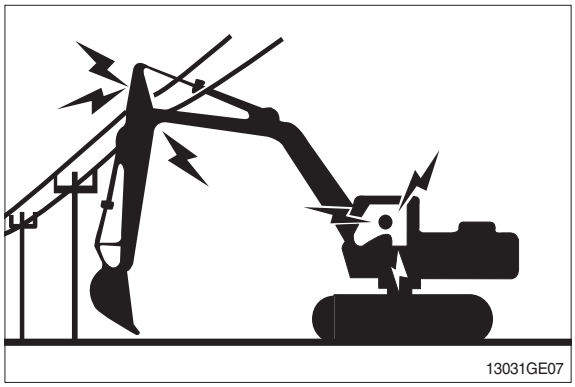
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

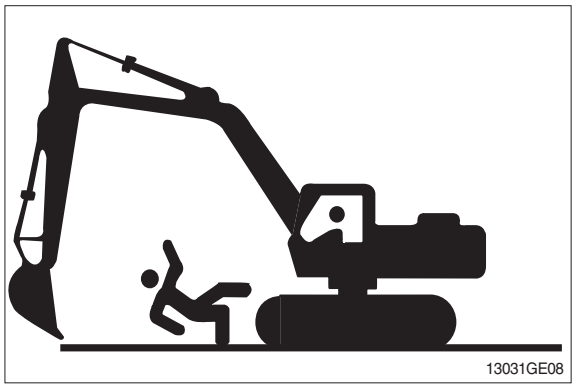
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.

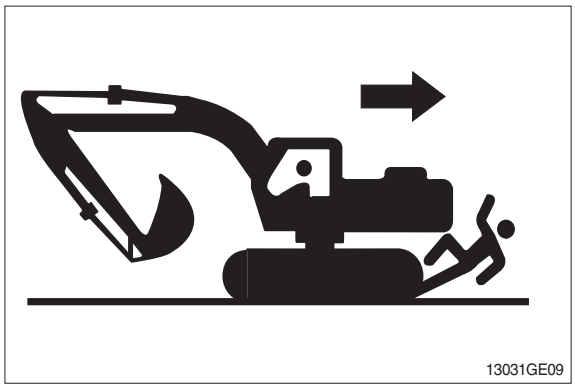


MOVE AND OPERATE MACHINE SAFELY

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

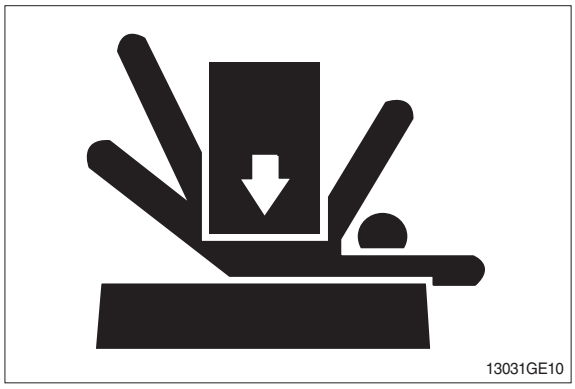
Before working on the machine :

- 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.



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.

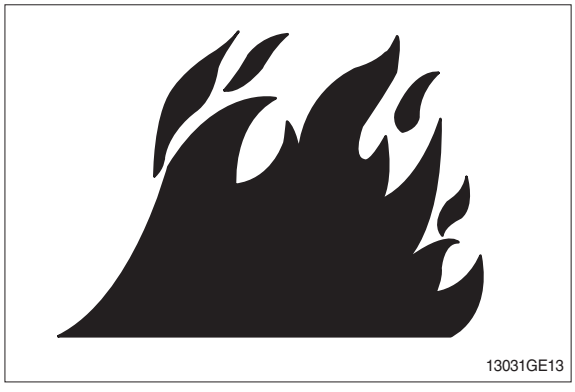
HANDLE FLUIDS SAFELY-AVOID FIRES

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.

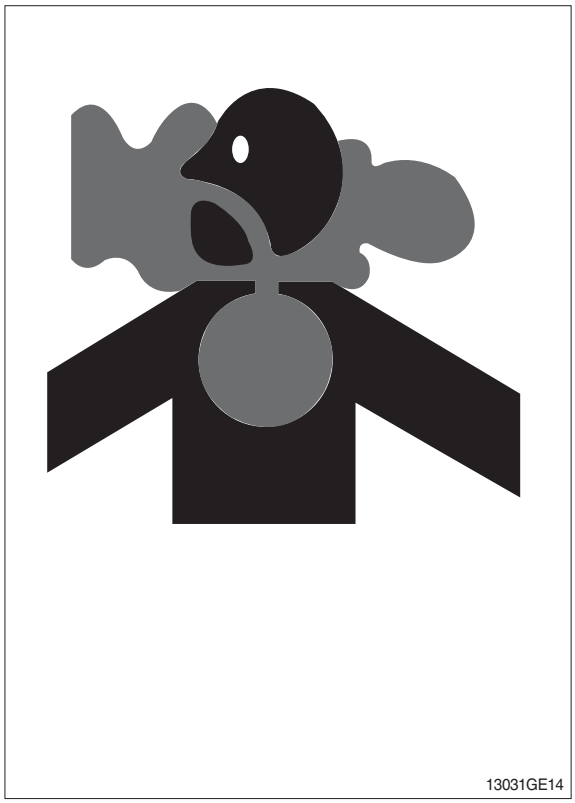
Do not store oily rags; They can ignite and burn spontaneously.



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.


13031GE14

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

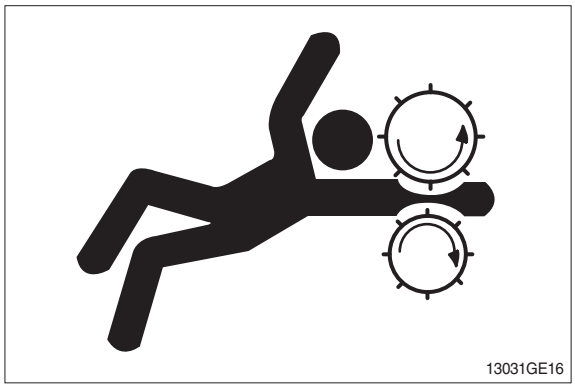
Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.


13031GE15

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.

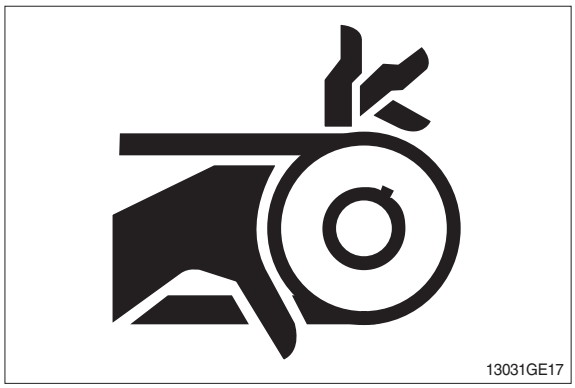
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



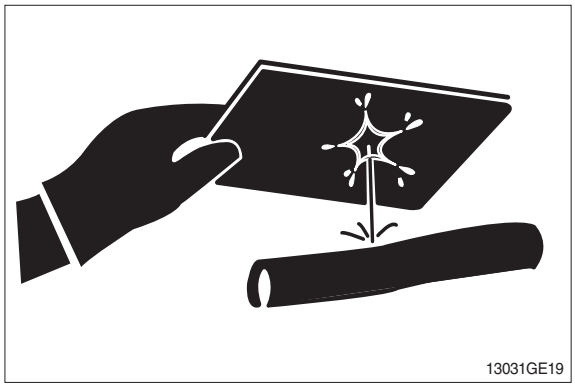
AVOID HIGH PRESSURE FLUIDS

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:

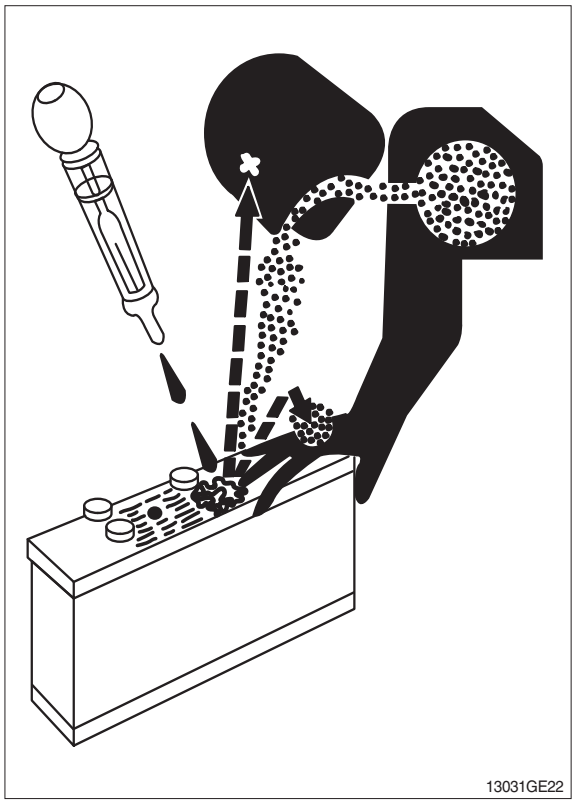
1. Filling batteries in a well-ventilated area.
2. Wearing eye protection and rubber gloves.
3. Avoiding breathing fumes when electrolyte is added.
4. Avoiding spilling of dripping electrolyte.
5. Use proper jump start procedure.

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.



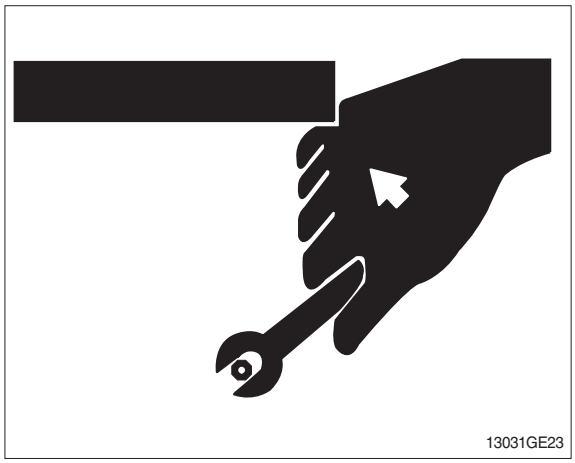
USE TOOLS PROPERLY

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.)

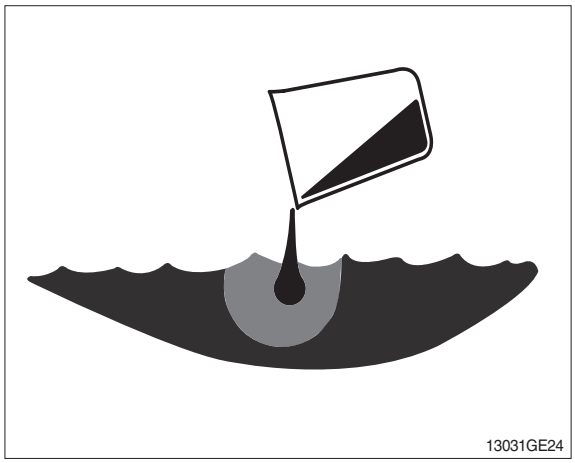


DISPOSE OF FLUIDS PROPERLY

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.

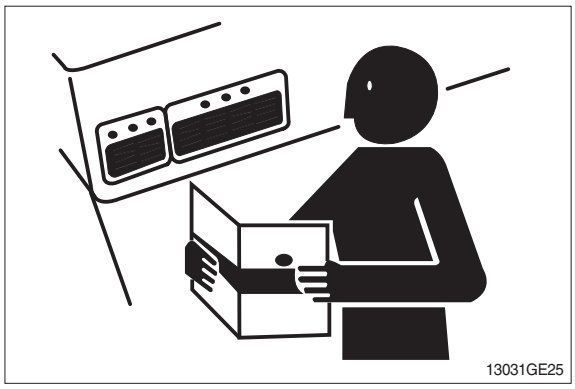
Use proper containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them.

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.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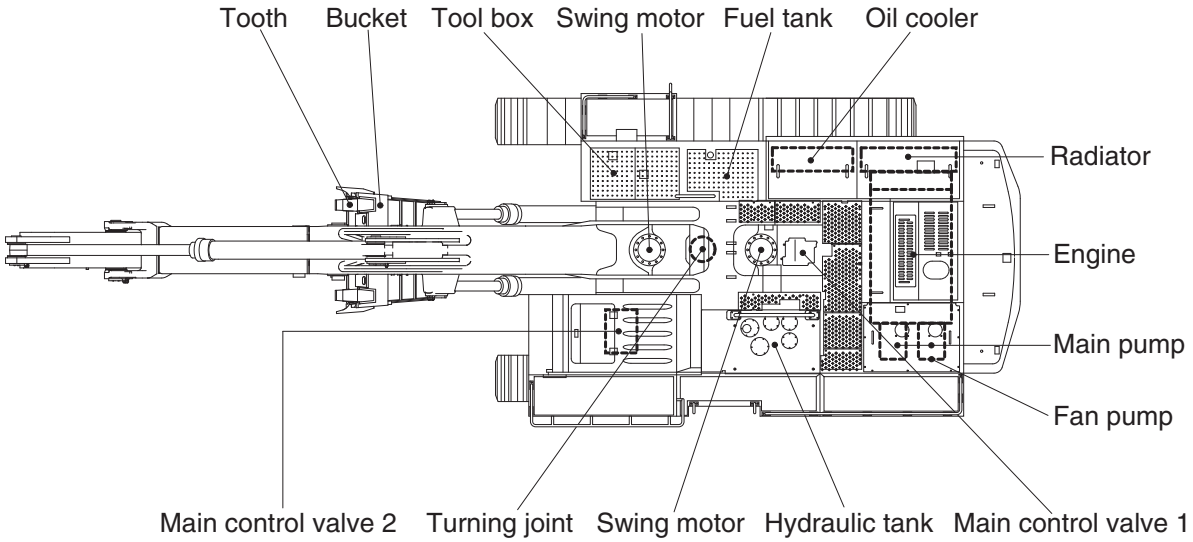
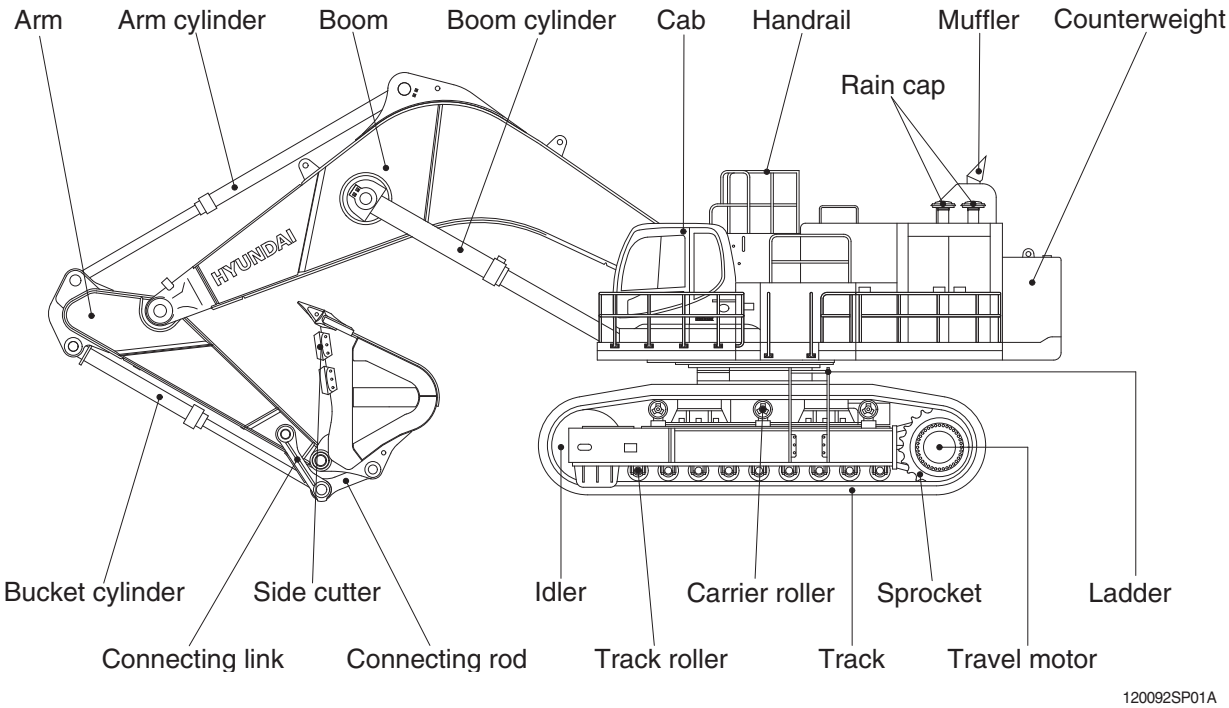
LIVE WITH SAFETY

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

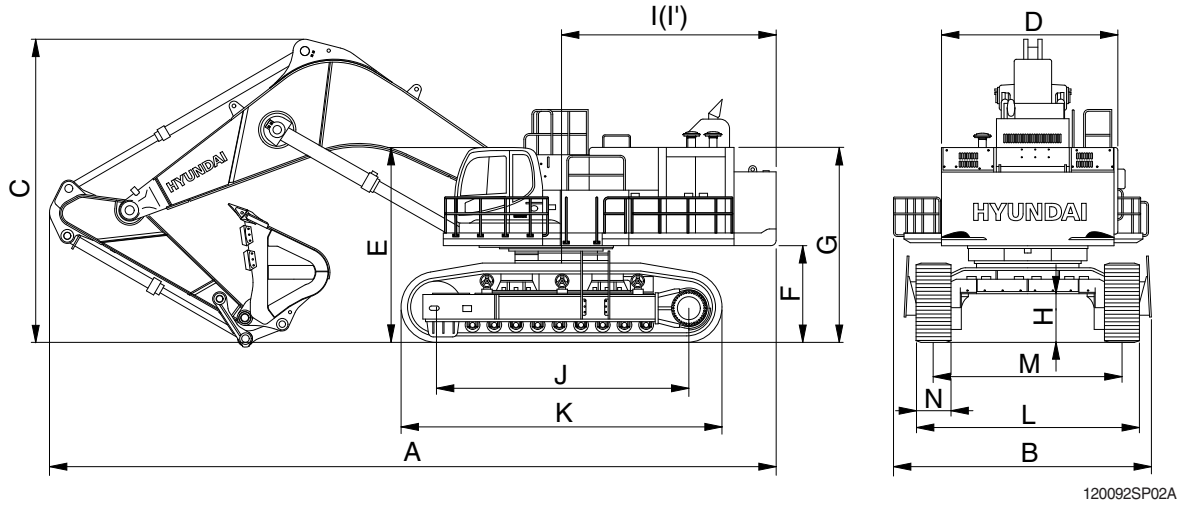




120092SP01A

2. SPECIFICATIONS

· 7.55 m (24' 9") BOOM, 3.40 m (11' 2") ARM



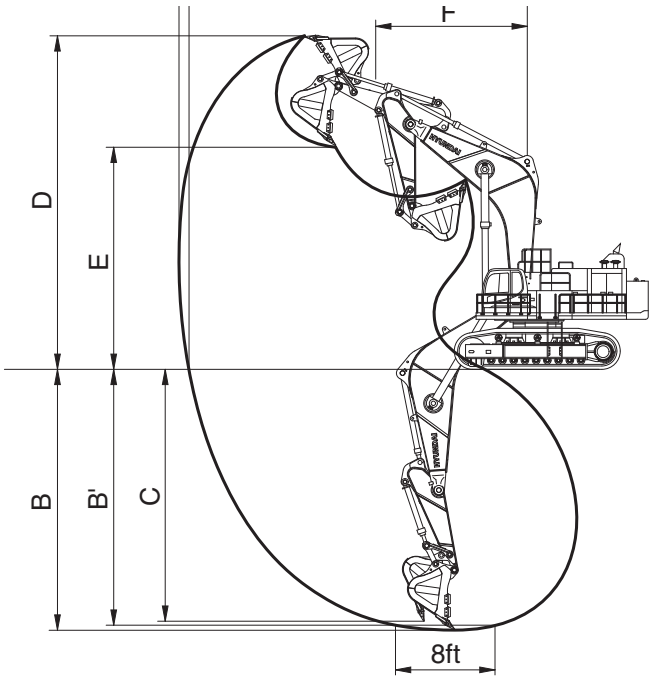
120092SP02A

Description		Unit	Specification
Operating weight		kg (lb)	118000 (260140) <118860 (262036)>
Bucket capacity (SAE heaped), standard		m^3 (yd^3)	6.70 (8.76)
Overall length	A	mm (ft-in)	14580 (47' 10")
Overall width, with 700 mm shoe	B		5560 (18' 3")
Overall height	C		6210 (20' 4")
Superstructure width	D		3520 (11' 7")
Overall height of cab	E		4250 (13' 11") <5450 (17' 11")>
Ground clearance of counterweight	F		1825 (6' 0")
Body height	G		4460 (14' 8")
Minimum ground clearance	H		990 (3' 3")
Rear-end distance	I		4805 (15' 9")
Rear-end swing radius	I'		4870 (16' 0")
Distance between tumblers	J		5010 (16' 5")
Undercarriage length	K		6400 (21' 0")
Undercarriage width	L		4600 (15' 1")
Track gauge	M		3900 (12' 10")
Track shoe width, standard	N		700 (28")
Travel speed (low/high)		km/hr (mph)	2.3/3.2 (1.4/2.0)
Swing speed		rpm	5.6
Gradeability		Degree (%)	35 (70)
Ground pressure (700 mm shoe)		kgf/cm^2(psi)	1.51 (21.47)
Max traction force		kg (lb)	70200 (154760)

< > : Cabin riser

3. WORKING RANGE

· 7.55 m (24' 9") BOOM



120092SP03A

Description		3.40 m (11' 2") Arm
Max digging reach	A	13760 mm (45' 2")
Max digging reach on ground	A'	13380 mm (43'11")
Max digging depth	B	8010 mm (26' 3")
Max digging depth (8ft level)	B'	7840 mm (25' 9")
Max vertical wall digging depth	C	5230 mm (17' 2")
Max digging height	D	12420 mm (40' 9")
Max dumping height	E	7840 mm (25' 9")
Min swing radius	F	6550 mm (21' 6")
Bucket digging force	SAE	511.9[558.5] kN
		52200[56950] kgf
		115080[125550] lbf
	ISO	581.5[636.0] kN
		59300[64690] kgf
		130730[142610] lbf
Arm crowd force	SAE	423.7[462.2] kN
		43200[47130] kgf
		95240[103900] lbf
	ISO	429.5[468.6] kN
		43800[47780] kgf
		96560[105340] lbf

[ ] : Power boost

4. WEIGHT

Item	R1250-9	
	kg	lb
Upperstructure assembly	43700	96340
Main frame weld assembly	11960	26370
Engine assembly	2720	6000
Main pump assembly	160	350
Fan pump	55	120
Gear box	580	1280
Main control valve assembly 1	450	990
Main control valve assembly 2	160	350
Swing motor assembly	440	970
Hydraulic oil tank assembly	1770	3900
Fuel tank assembly	1940	4280
Counterweight	20400	44970
Cab assembly	435	960
Cab riser assy	860	1896
Lower chassis assembly	45940	101280
Lower track center frame	17700	39020
Swing bearing	2170	4780
Travel motor assembly	970	2140
Turning joint	75	165
Track recoil spring and tension body	1030	2270
Idler	850	1870
Sprocket	315	700
Carrier roller	70	150
Track roller	210	460
Track-chain assembly (700 ㎜ double grouser shoe)	5070	11180
Front attachment assembly (7.55 m boom, 3.40m arm, 6.70 m^3 SAE heaped bucket)	28360	62520
7.55 m boom assembly	10310	22730
3.40 m arm assembly	4010	8840
6.70 m^3 SAE heaped bucket	5860	12920
Boom cylinder assembly	1190	2620
Arm cylinder assembly	1510	3330
Bucket cylinder assembly	1050	2310
Bucket control rod assembly	1450	3200

5. LIFTING CAPACITIES

1) ROBEX R1250-9

(1) 7.55 m (24' 9") boom, 3.40 m (11' 2") arm equipped with 6.70 m^3 (SAE heaped) bucket and 700 mm (28") double grouser shoe and 20400 kg (44970 lb) counterweight.

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

Load point height		Load radius												At max. reach		
		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)		10.5 m (35.0 ft)		Capacity		Reach
																m (ft)
9.0 m (30 ft)	kg													*12990	*12990	11.22
	lb													*28640	*28640	(36.8)
7.5 m (25.0 ft)	kg									*19680	*19680	*6060	*6060	*12910	*12910	11.91
	lb									*43390	*43390	*13360	*13360	*28460	*28460	(39.1)
6.0 m (20.0 ft)	kg									*21470	*21470	*13680	*13680	*13160	12140	12.33
	lb									*47330	*47330	*30160	*30160	*29010	26760	(40.5)
4.5 m (15.0 ft)	kg					*36250	*36250	*27920	*27920	*22880	22750	*19250	16820	*13710	11340	12.53
	lb					*79920	*79920	*61550	*61550	*50440	50160	*42440	37080	*30230	25000	(41.1)
3.0 m (10.0 ft)	kg					*40020	*40020	*30110	29510	*24120	21540	*20020	16120	*14610	11030	12.52
	lb					*88230	*88230	*66380	65060	*53180	47490	*44140	35540	*32210	24320	(41.1)
1.5 m (5.0 ft)	kg					*41590	40030	*31330	27820	*24800	20470	*20170	15490	*15100	11210	12.28
	lb					*91690	88250	*69070	61330	*54670	45130	*44470	34150	*33290	24710	(40.3)
Ground Line	kg			*52630	*52630	*40870	38600	*31210	26690	*24590	19690	*19550	15010	*14600	11950	11.82
	lb			*116030	*116030	*90100	85100	*68810	58840	*54210	43410	*43100	33090	*32190	26350	(38.8)
-1.5 m (-5.0 ft)	kg	*47300	*47300	*49630	*49630	*38120	38060	*29560	26110	*23150	19270			*13620	13510	11.08
	lb	*104280	*104280	*109420	*109420	*84040	83910	*65170	57560	*51040	42480			*30030	29780	(36.4)
-3.0 m (-10.0 ft)	kg	*52360	*52360	*42230	*42230	*33290	*33290	*26020	*26020	*19800	19280			*11570	*11570	10.01
	lb	*115430	*115430	*93100	*93100	*73390	*73390	*57360	*57360	*43650	42510			*25510	*25510	(32.8)
-4.5 m (-15.0 ft)	kg	*37090	*37090	*31790	*31790	*25700	*25700	*19620	*19620					*6850	*6850	8.43
	lb	*81770	*81770	*70080	*70080	*56660	*56660	*43250	*43250					*15100	*15100	(27.7)
-6.0 m (-20.0 ft)	kg					*13170	*13170									
	lb					*29030	*29030									

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.

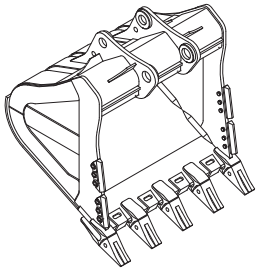
3. The load point is a hook located on the back of the bucket.

4. *indicates load limited by hydraulic capacity.

6. BUCKET SELECTION GUIDE

1) ROBEX 1250-9

(1) GENERAL BUCKET



6.70 m³ SAE
heaped bucket

Capacity		Width		Weight	Recommendation
					7.55 m (24' 9") boom
SAE heaped	CECE heaped	Without side cutter	With side cutter		3.40 m arm (11' 2")
※ 6.70 m³ (8.76 yd³)	5.88 m³ (7.69 yd³)	2390 mm (94.1")	-	5864 kg (12930 lb)	

※ : Standard bucket

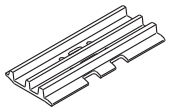
Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

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		Double grouser		
					
R1250-9	Shoe width	mm (in)	700 (28)	800 (32)	900 (36)
	Operating weight	kg (lb)	118000 (260140)	118670 (261620)	119470 (263380)
	Ground pressure	kgf/cm^2 (psi)	1.51 (21.47)	1.34 (19.05)	1.20 (17.06)
	Under carriage width	mm (ft-in)	4600 (15' 1")	4700 (15' 5")	4800 (15' 9")

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
Carrier rollers	3 EA
Track rollers	8 EA
Track shoes	52 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
700 mm double grouser	Standard	A
800 mm double grouser	Option	B
900 mm double grouser	Option	C

※ 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
C	Extremely soft gound (swampy ground)	· Use the shoes only in the conditions that the machine sinks and it is impossible to use the shoes of category A or B · 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	Cummins QSK 23
Type	4-cycle turbocharged charge air cooled diesel engine
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	170 × 170 mm (6.7" × 6.7")
Piston displacement	23000 cc (1404 cu in)
Compression ratio	16 : 1
Rated gross horse power(SAE J1995)	760 hp at 1800 rpm (567 kW at 1800 rpm)
Maximum torque	354 kgf · m (2560 lbf · ft) at 1350 rpm
Engine oil quantity	70 ℓ (18.5 U.S. gal)
Dry weight	2070 kg (6000 lb)
High idling speed	1800 ± 50 rpm
Low idling speed	900 ± 50 rpm
Rated fuel consumption	153.6 g/Hp · hr at 1800 rpm
Starting motor	Nikko (24 V-7.5 kW × 2EA)
Alternator	Sawafuji 24 V-75 A
Battery	4 × 12 V × 160 Ah

2) GEAR BOX

Item	Specification
Model	Stiebel 4325
Ratio	1.05452 (speed increae)

3) MAIN PUMP

Item	Specification
Type	Variable displacement axis piston pumps
Capacity	3 × 280 cc/rev
Maximum pressure	320 kgf/cm^2 (4550 psi) [350 kgf/cm^2 (4980 psi)]
Rated oil flow	3 × 490 ℓ /min (129.4 U.S. gpm / 107.8 U.K. gpm)
Rated speed	1800 rpm

[ ] : Power boost

4) FAN PUMP

Item	Specification
Type	Variable displacement axis piston pumps
Capacity	65 cc/rev
Maximum pressure	270 kgf/cm^2 (3840 psi)
Rated speed	1800 rpm

5) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	30 cc/rev
Maximum pressure	40 kgf/cm^2 (570 psi)
Rated oil flow	54 ℓ /min (14.3 U.S. gpm/11.9 U.K. gpm)

6) MAIN CONTROL VALVE

Item	Specification
Type	13 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	320 kgf/cm^2 (4550 psi) [350 kgf/cm^2 (4980 psi)]
Overload relief valve pressure	360 kgf/cm^2 (5120 psi)

[ ]: Power boost

7) SWING MOTOR

Item	Specification
Type	Fixed displacement axial piston motor
Capacity	250 cc/rev
Relief pressure	300 kgf/cm^2 (4270 psi)
Braking system	Automatic, spring applied hydraulic released
Braking torque	107 kgf · m (774 lbf · ft)
Brake release pressure	30~50 kgf/cm^2 (427~711 psi)
Reduction gear type	2 - stage planetary

8) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5 kgf/cm^2 (92 psi)
	Maximum	25 kgf/cm^2 (360 psi)
Single operation stroke	Lever	61 mm (2.4 in)
	Pedal	123 mm (4.84 in)

9) TRAVEL MOTOR

Item	Specification
Type	Variable displacement axial piston motor
Relief pressure	350 kgf/cm^2 (4980 psi)
Capacity (max / min)	337.2/228.6 cc/rev
Reduction gear type	3-stage planetary
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	18 kgf/cm^2 (256 psi)
Braking torque	114 kgf · m (825 lbf · ft)

10) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 230 × ø 160 × 2165 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 260 × ø 180 × 2180 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 240 × ø 170 × 1792 mm
	Cushion	Extend only

※ 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.

11) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R1250-9	Standard	※700 mm (28")	1.51 kgf/cm^2 (21.47 psi)	52	4600 mm (15' 1")
	Option	※800 mm (32")	1.34 kgf/cm^2 (19.05 psi)	52	4700 mm (15' 5")
		※900 mm (36")	1.20 kgf/cm^2 (17.06 psi)	52	4800 mm (15' 9")

※ Double grouser

12) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R1250-9	Standard	6.70 m^2 (8.76 yd^3)	5.88 m^2 (7.69 yd^3)	5	2390 mm (94.1")	-

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	70 (18.5)	★SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Gear box	Heavy duty gear oil	6.0 (1.6)	★SAE 75W-90 ISO VG 100~220
Swing drive	Gear oil	8.0×2 (2.1×2)	★SAE 75W-90
Final drive		20×2 (5.3×2)	SAE 80W-90
Hydraulic tank	Hydraulic oil	Tank : 670 (177) System: 1160 (306)	★ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	1475 (390)	★ASTM D975 NO.1 ASTM D975 NO.2
Lower roller	Gear oil	1.08 (0.3)	★SAE 75W-90
Upper roller		0.68 (0.18)	
Idler		0.83 (0.22)	SAE 85W-140
Fitting (grease nipple)	Grease	As required	★NLGI NO.1 NLGI NO.2
Radiator (reservoir tank)	Mixture of antifreeze and soft water★1	100 (26.4)	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