SECTION 1 GENERAL

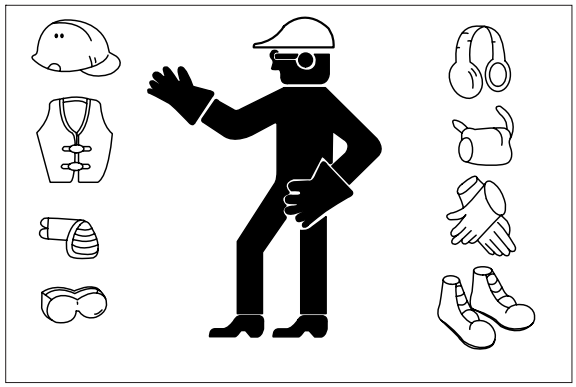
GROUP 1 SAFETY HINTS

FOLLOW SAFE PROCEDURE

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

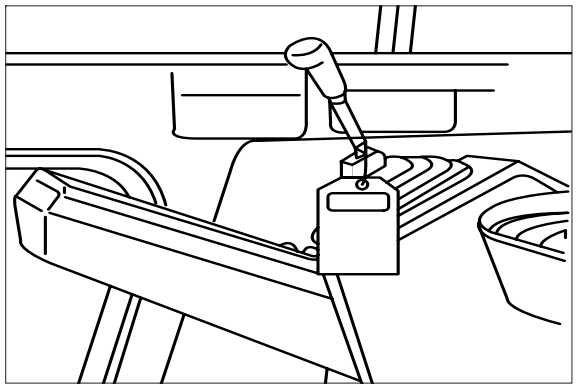
WEAR PROTECTIVE CLOTHING

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



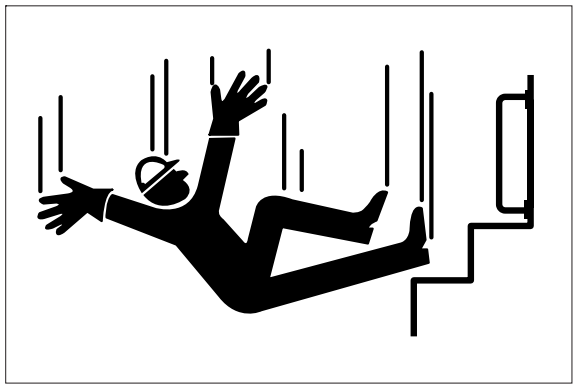
WARN OTHERS OF SERVICE WORK

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.

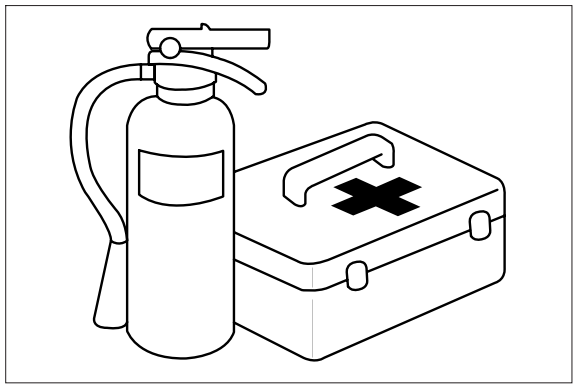


PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

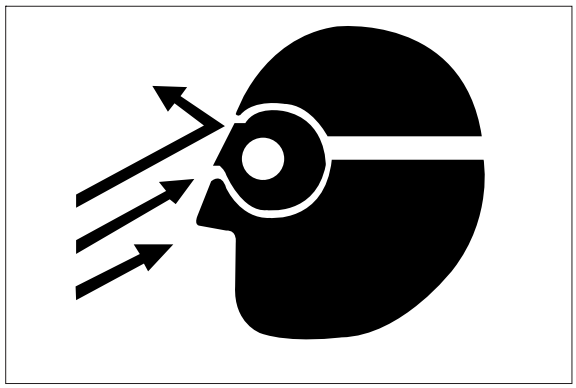
Keep a first aid kit and fire extinguisher handy.

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



PROTECT AGAINST FLYING DEBRIS

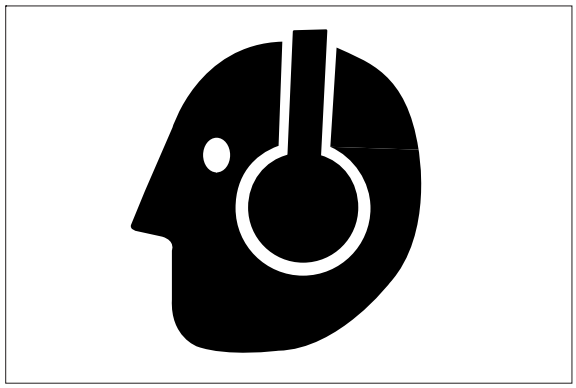
Guard against injury from flying pieces of metal or debris; Wear goggles or safety glasses.



PROTECT AGAINST NOISE

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

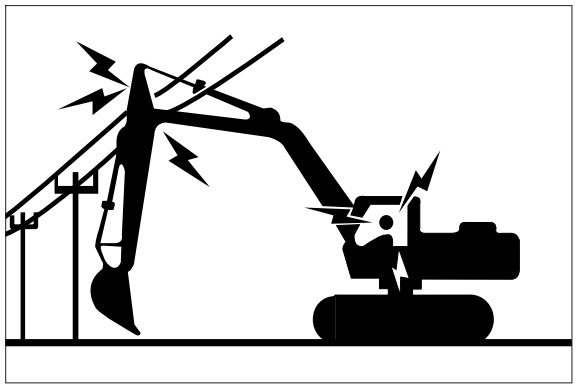
Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.



AVOID POWER LINES

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

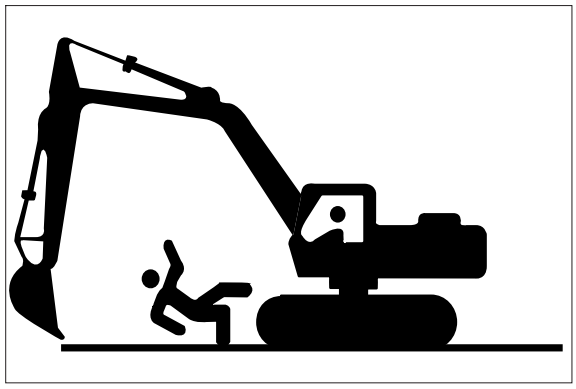
Never move any part of the machine or load closer to electric line than 3m(10ft) plus twice the line insulator length.



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.

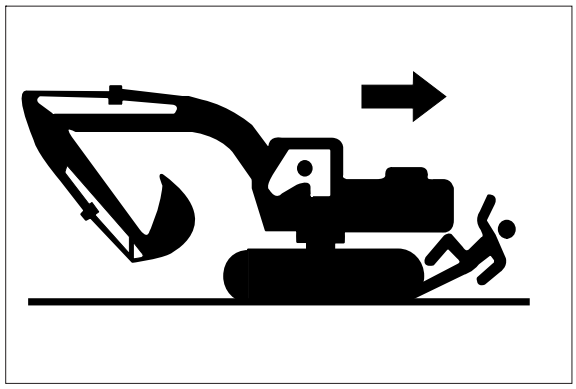


MOVE AND OPERATE MACHINE SAFELY

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.

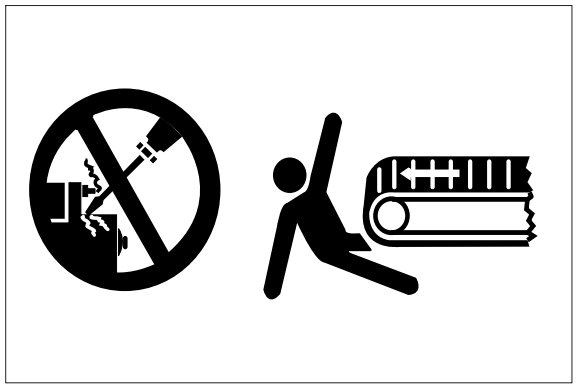
Use a signal person when moving, swinging, or operating the machine in congested areas. Coordinate hand signals before starting the excavator.



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

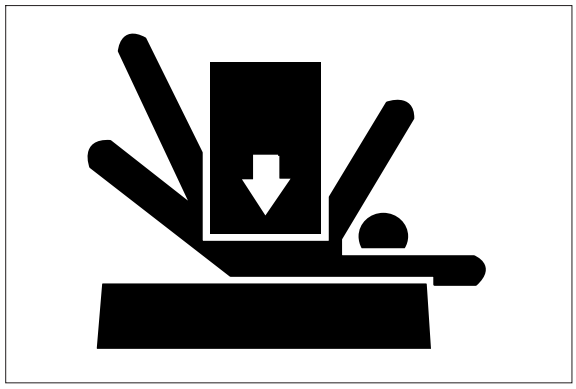
Before working on the machine:

- 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.

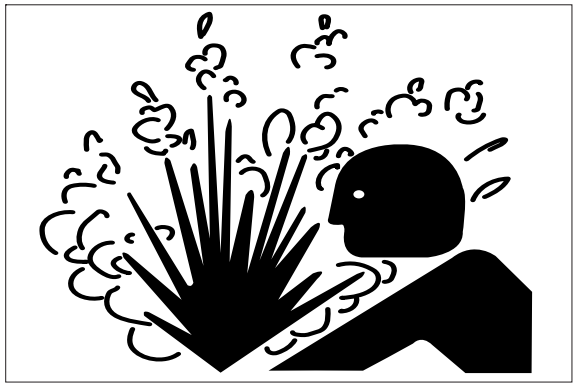
Do not support the machine on cinder blocks, hollow tiles, or props that may crumble under continuous load.
Do not work under a machine that is supported solely by a jack. Follow recommended procedures in this manual.



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.



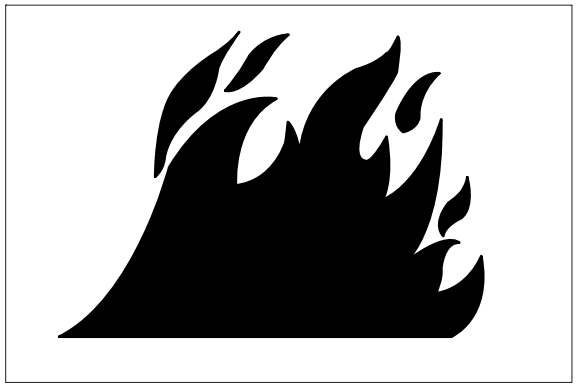
HANDLE FLUIDS SAFELY-AVOID FIRES

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.

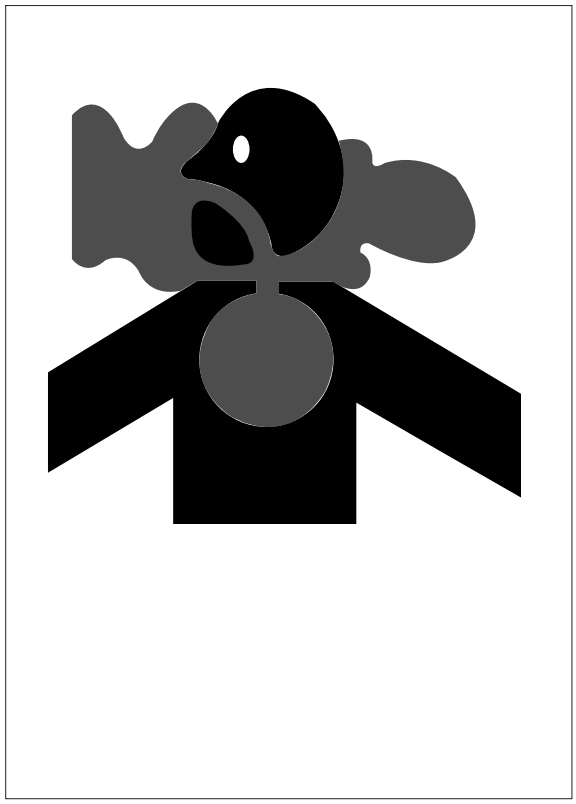
Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

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.

REMOVE PAINT BEFORE WELDING OR HEATING

Avoid potentially toxic fumes and dust.

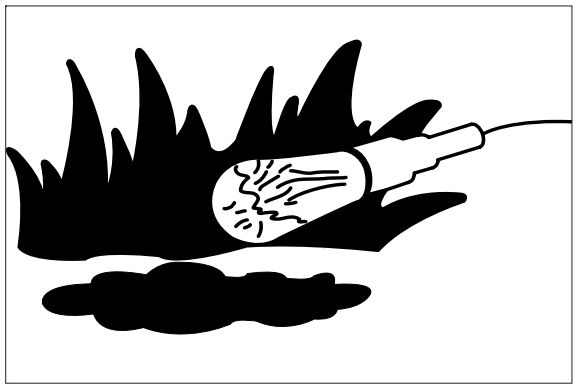
Hazardous fumes can be generated when paint is heated by welding, soldering, or using a torch.

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

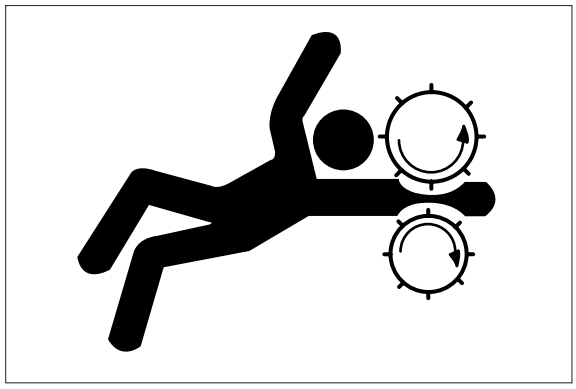


Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

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.

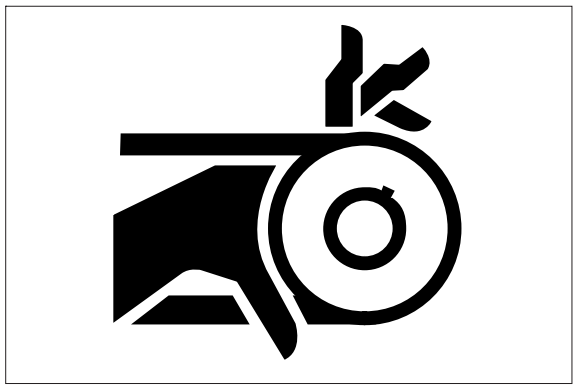
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



STAY CLEAR OF MOVING PARTS

Entanglements in moving parts can cause serious injury.

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



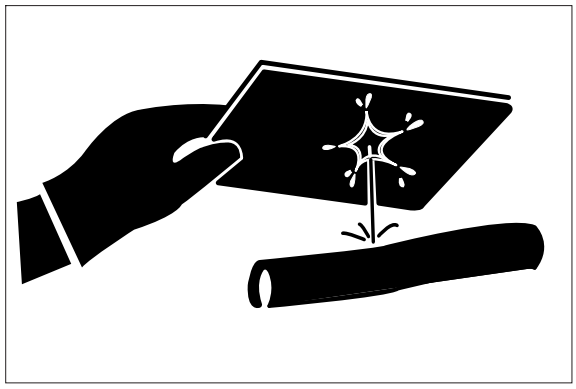
AVOID HIGH PRESSURE FLUIDS

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.

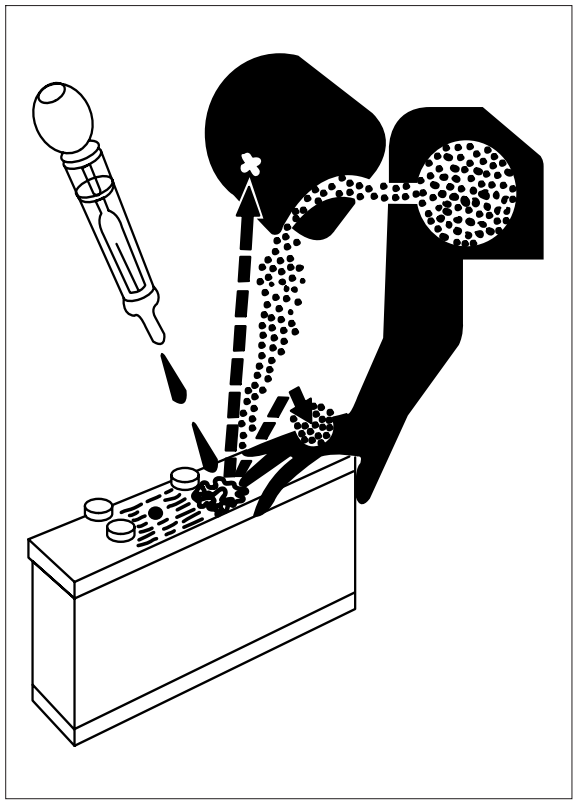
PREVENT BATTERY EXPLOSIONS

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 of dripping electrolyte.
5. Use proper jump start procedure.

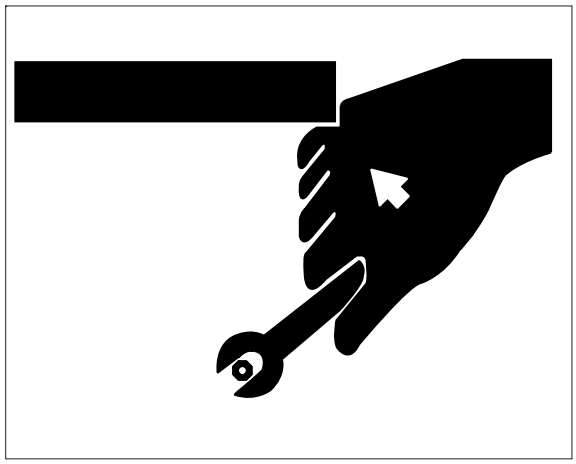
If you spill acid on yourself:

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



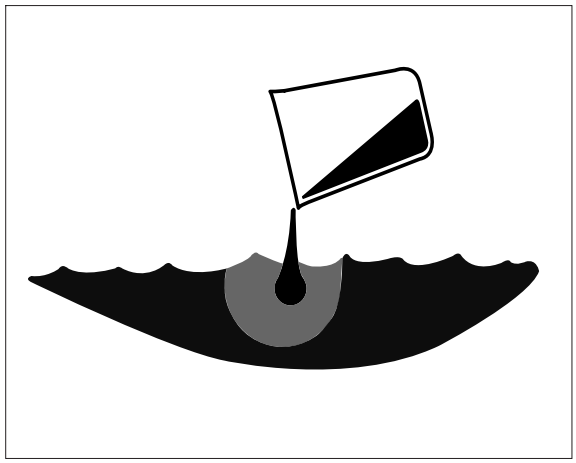
Use tools appropriate to the work. Makeshift tools, parts, and procedures can create safety hazards.

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

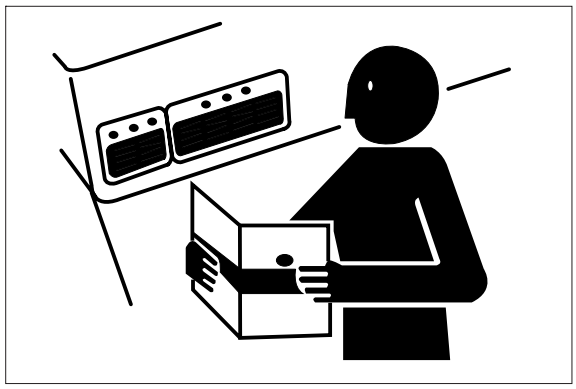


Improperly disposing of fluids can harm the environment and ecology. Before draining any fluids, find out the proper way to dispose of waste from your local environmental agency.

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.

REPLACE SAFETY SIGNS



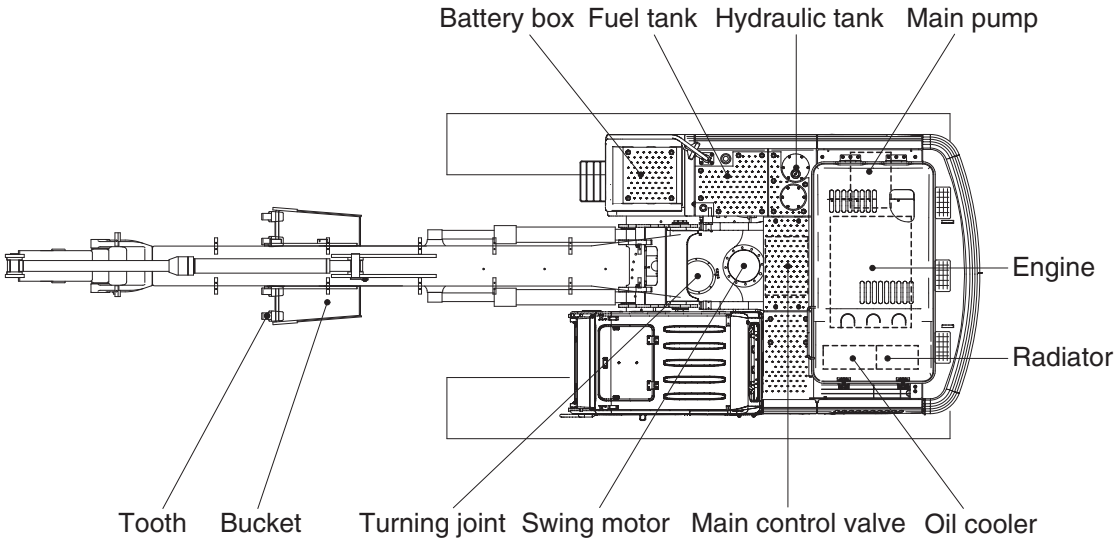
Replace missing or damaged safety signs. See the machine operator's manual for correct safety sign placement.

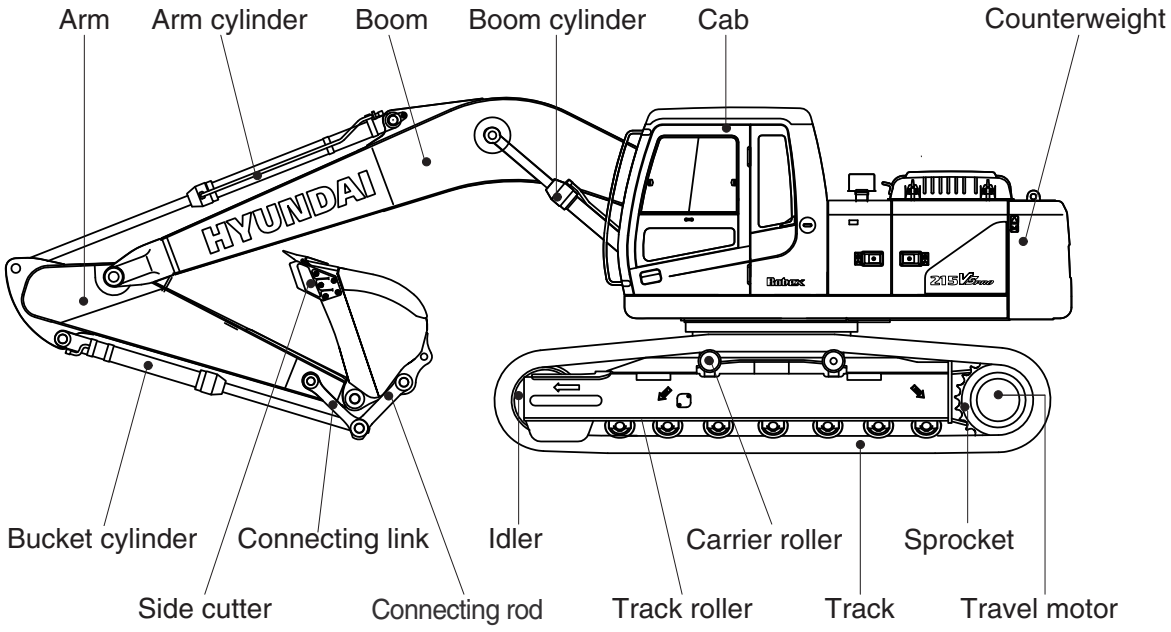
LIVE WITH SAFETY

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

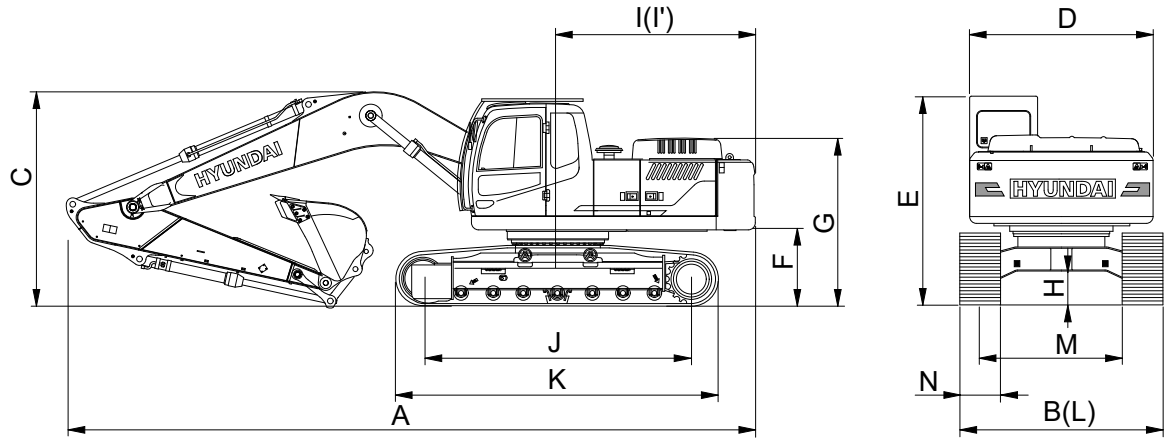




2. SPECIFICATIONS

1) R215VS PRO

· 5.68 m (18' 8") BOOM and 2.92 m (9' 7") ARM

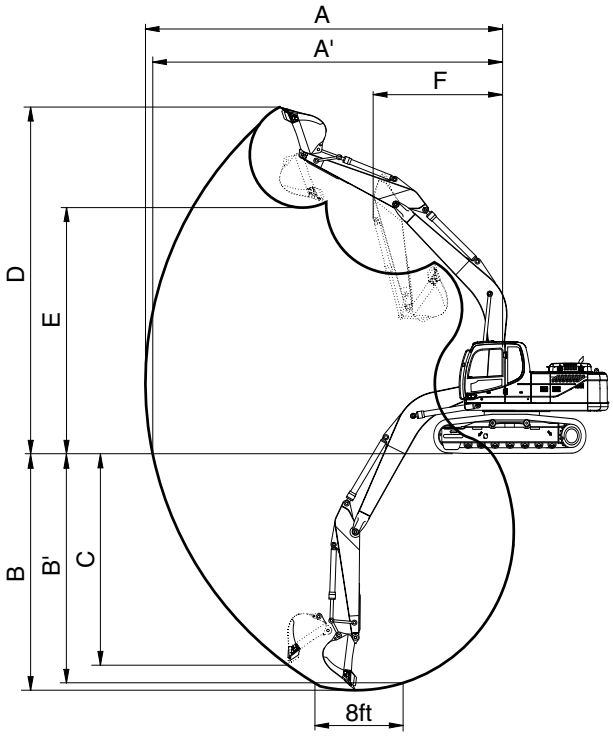


Description		Unit	Specification
Operating weight		kg	20900
Bucket capacty (SAE heaped)		m^3	1.00
Overall length	A	mm	9560
Overall width	B		2800
Overall height	C		3030
Superstructure width	D		2740
Overall height of cab	E		3000
Ground clearance of counterweight	F		1060
Engine cover height	G		2390
Minimum ground clearance	H		480
Rear-end distance	I		2890
Rear-end swing radius	I'		2830
Distance between tumblers	J		3360
Undercarriage length	K		4165
Undercarriage width	L		2800
Track gauge	M		2200
Track shoe width, standard	N		600
Travel speed (low/high)		km/hr	3.5/5.7
Swing speed		rpm	11.4
Gradeability		Degree (%)	35 (70)
Ground pressure		kgf/cm^2	0.47
Max traction force		kg	20200

3. WORKING RANGE

1) R215VS PRO

· 5.68 m (18' 8") BOOM



Description		※2.92m Arm
Max digging reach	A	9940mm
Max digging reach on ground	A'	9780mm
Max digging depth	B	6490mm
Max digging depth (8 ft level)	B'	6315mm
Max vertical wall digging depth	C	5860mm
Max digging height	D	10000mm
Max dumping height	E	7150mm
Min swing radius	F	3250mm
Bucket digging force(1.00m³)	SAE	130.4 kN
Arm digging force	SAE	102.0 kN

※ : STD

4. WEIGHT

1) R215VS PRO

Item	R215VS PRO	
	kg	lb
Upperstructure assembly	9140	20150
Main frame weld assembly	1654	3650
Engine assembly	522	1200
Main pump assembly	122	270
Main control valve assembly	140	310
Swing motor assembly	250	550
Hydraulic oil tank assembly	226	500
Fuel tank assembly	186	410
Counterweight	3800	8380
Cab assembly	310	680
Lower chassis assembly	7550	16650
Track frame weld assembly	2370	5200
Swing bearing	260	570
Travel motor assembly	305	670
Turning joint	53	120
Track recoil spring	130	290
Idler	138	300
Carrier roller	21	46
Track roller	38	84
Track-chain assembly (600 mm standard triple grouser shoe)	1319	2900
Front attachment assembly (5.68 m boom, 2.92 m arm, 1.00 m^3 SAE heaped bucket)	4200	9260
5.68 m boom assembly	1535	3390
2.92 m arm assembly	750	1650
1.00 m^3 SAE heaped bucket	833	1840
Boom cylinder assembly	180	390
Arm cylinder assembly	260	570
Bucket cylinder assembly	170	370
Bucket control rod assembly	174	380

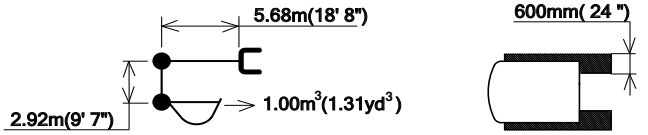
5. LIFTING CAPACITIES

1) R215VS PRO

(1) 5.68 m (18' 8") boom, 2.92 m (9' 7 ") arm equipped with 1.00 m^3 (SAE heaped) bucket and 600 mm (24") triple grouser shoe and 3800 kg (9260 lb) counterweight.

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

ROBEX 215VS PRO



		1.5m(5 ft)		3.0m(10 ft)		4.5m(15 ft)		6.0m(20 ft)		7.5m(25 ft)				
														m(ft)
7.5m 24.6 ft	kg lb											*2250 ***4960**	*2250 ***4960**	6.45 **(21.2)**
6.0m 19.7 ft	kg lb									*2270 ***5000**	*2270 ***5000**	*2100 ***4630**	*2100 ***4630**	7.54 **(24.7)**
4.5m 14.8 ft	kg lb							*3980 ***8770**	3900 **8600**	*3780 ***8330**	2520 **5560**	*2100 ***4630**	2060 **4540**	8.21 **(27.0)**
3.0m 9.8 ft	kg lb			*9880 ***21780**	*9880 ***21780**	*6140 ***13540**	5820 **12830**	*4800 ***10580**	3600 **7940**	3970 **8750**	2380 **5250**	*2200 ***4850**	1790 **3950**	8.57 **(28.1)**
1.5m 4.9 ft	kg lb			*6860 ***15120**	*6860 ***15120**	*7910 ***17440**	5180 **11420**	5530 **12190**	3290 **7250**	3800 **8380**	2230 **4920**	*2420 ***5340**	1680 **3700**	8.65 **(28.4)**
0.0m 0.0 ft	kg lb			*7770 ***17130**	*7770 ***17130**	8480 **18700**	4790 **10560**	5270 **11620**	3060 **6750**	3660 **8070**	2100 **4630**	*2810 ***6190**	1690 **3730**	8.47 **(27.8)**
-1.5m -4.9 ft	kg lb	*7000 ***15430**	*7000 ***15430**	*10950 ***24140**	9230 **20350**	8310 **18320**	4640 **10230**	5140 **11330**	2940 **6480**	3600 **7940**	2040 **4500**	3260 **7190**	1840 **4060**	7.99 **(26.2)**
-3.0m -9.8 ft	kg lb	*10520 ***23190**	*10520 ***23190**	*13780 ***30380**	9420 **20770**	8350 **18410**	4670 **10300**	5150 **11350**	2950 **6500**			3900 **8600**	2240 **4940**	7.17 **(23.5)**
-4.5m -14.8 ft	kg lb			*11640 ***25660**	9800 **21610**	*7960 ***17550**	4870 **10740**					5540 **12210**	3230 **7120**	5.86 **(19.2)**

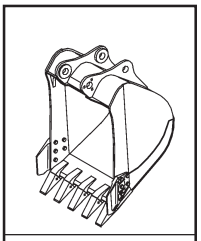
Note
1. Lifting capacity are based on SAE J1097 and ISO 10567.
2. Lifting capacity of the ROBEX series does not exceed 75% of tipping load with the machine on firm, level ground or 87% of full hydraulic capacity.
3. The load point is a hook (standard equipment) located on the back of the bucket.
4. *indicates load limited by hydraulic capacity.

※ Lifting capacities are based upon a standard machine conditions.
Lifting capacities will vary with different work tools, ground conditions and attachments.
The difference between the weight of a work tool attachment must be subtracted.
Consult your Hyundai dealer regarding the lifting capacities for specific work tools and attachments.

⚠ Failure to comply to the rated load can cause possible personal injury or property damage.
Make adjustments to the rated load as necessory for non-standard configurations.

6. BUCKET SELECTION GUIDE

1) GENERAL BUCKET



※1.00m³SAE heaped bucket

STD 1.00 m³ SAE Heaped OPT 0.92 m³ SAE Heaped

Type	Capacity		Width		Weight	Tooth	Recommendation
	SAE Heaped	CECE heaped	With side cutter	Without side cutter			
	m³	m³	mm	mm	kg	EA	5.68 m (18' 8") Boom
General bucket	1.00m³	0.86 m³	1410 mm	1315 mm	833kg	5	
	0.92m³	0.80 m³	1275 mm	1178 mm	828kg	5	

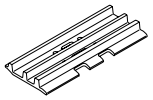
※ Applicable for materials with density of 2000 kg/m³ (3370 lb/yd³) or less

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		Triple grouser
			
R215VS PRO	Shoe width	mm	600
	Operating weight	kg	20900
	Ground pressure	kgf/cm^2	0.47
	Overall width	mm	2800

3) NUMBER OF ROLLERS AND SHOES ON EACH SIDE

Item	Quantity
	R215VS PRO
Carrier rollers	2 EA
Track rollers	7 EA
Track shoes	46 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
600 mm triple grouser	Standard	A
700 mm triple grouser	-	B
800 mm triple grouser	-	C

※ **Table 2**

Category	Applications	Precautions
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 ground (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	GCIC QSB7 CM2880 B117
Type	4-cycle turbocharged, charger 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	107 × 124 mm
Piston displacement	6700 cc
Compression ratio	17.2 : 1
Rated gross horse power (SAE J1995)	167 Hp at 2050 rpm (125 kW at 2050 rpm)
Maximum torque	67 kgf · m at 1200 rpm
Engine oil quantity	25.4 ℓ
Dry weight	556 kg
High idling speed	1950 + 50 rpm
Low idling speed	900 ± 100 rpm
Rated fuel consumption	163.2 g/Hp · hr at 2050 rpm
Starting motor	Remy (24V-7.8 kW)
Alternator	Delco Remy 24V-90A
Battery	2 × 12V × 120 Ah

2) MAIN PUMP

Item	Specification
Type	Variable displacement tandem axis piston pumps
Capacity	2 × 117 cc/rev
Maximum pressure	350 kgf/cm² [380 kgf/cm²]
Rated oil flow	2 × 222 ℓ /min
Rated speed	1900 rpm

[ ] : Power boost

3) GEAR PUMP

Item	Specification
Type	Fixed displacement gear pump single stage
Capacity	15 cc/rev
Maximum pressure	40 kgf/cm^2
Rated oil flow	28.5 ℓ /min

4) MAIN CONTROL VALVE

Item	Specification
Type	9 spools
Operating method	Hydraulic pilot system
Main relief valve pressure	350 kgf/cm^2 [380 kgf/cm^2]
Overload relief valve pressure	400 kgf/cm^2

[ ] : Power boost

5) SWING MOTOR

Item	Specification
Type	Axial piston motor
Capacity	142.8 cc/rev
Relief pressure	250 kgf/cm^2
Braking system	Automatic, spring applied hydraulic released
Braking torque	1419kgf · m
Brake release pressure	20.9~35.5 kgf/cm^2
Reduction gear type	2 - stage planetary

6) TRAVEL MOTOR

Item	Specification
Type	Axial piston motor
Relief pressure	350 kgf/cm^2
Capacity (max / min)	171.2/108.5 cc/rev
Reduction gear type	Planetary differential
Braking system	Automatic, spring applied hydraulic released
Brake release pressure	15.2 kgf/cm^2
Braking torque	2878 kgf · m

7) REMOTE CONTROL VALVE

Item		Specification
Type		Pressure reducing type
Operating pressure	Minimum	6.5 kgf/cm^2
	Maximum	26 kgf/cm^2
Single operation stroke	Lever	61 mm
	Pedal	123 mm

8) CYLINDER

Item		Specification
Boom cylinder	Bore dia × Rod dia × Stroke	ø 120 × ø 85 × 1290 mm
	Cushion	Extend only
Arm cylinder	Bore dia × Rod dia × Stroke	ø 140 × ø 95 × 1510 mm
	Cushion	Extend and retract
Bucket cylinder	Bore dia × Rod dia × Stroke	ø 120 × ø 80 × 1055 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.

9) SHOE

Item		Width	Ground pressure	Link quantity	Overall width
R215VSPRO	Standard	600 mm (24")	0.47 kgf/cm^2 (6.81 psi)	46	2800 mm (9' 2")

10) BUCKET

Item		Capacity		Tooth quantity	Width	
		SAE heaped	CECE heaped		Without side cutter	With side cutter
R215VS PRO	STD	1.00 m^3	0.86 m^3	5	1315 mm	1410 mm
	OPT	0.92 m^3	0.80 m^3	5	1178 mm	1275 mm

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	25.4	SAE 5W-40 SAE 30 SAE 10W SAE 10W-30 SAE 15W-40
Swing drive	Gear oil	6.2	SAE 80W-90
Final drive		4.5×2	SAE 85W-140
Hydraulic tank	Hydraulic oil	Tank 180 System 270	ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68
Fuel tank	Diesel fuel	340	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	35	Ethylene glycol base permanent type (50 : 50)

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