NEW HOLLAND

CRAWLER EXCAVATOR

E215B TIER III

REPAIR MANUAL

87612178 NA

Issued 01-2007

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REPAIR MANUAL

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REVISION HISTORY			
Issue	Issue Date	Applicable Machines	Remarks
First Edition	01-2007	E215B TIER III	87612178 NA

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SAFETY

GENERAL SAFETY INFORMATION

WARNING

Do not operate or perform any maintenance on this machine until all instructions found in the OPERATOR'S MANUAL and this MANUAL have been thoroughly read and understood.
Improper operation or maintenance of this machine may cause accidents and could result in serious injury or death.
Always keep the manual in storage.
If it is missing or damaged, place an order with your dealer for a replacement.
If you have any questions, consult your dealer.

(1) Most accidents, which occur during operation, are due to neglect of precautionary measures and safety rules. Sufficient care should be taken to avoid these accidents. Incorrect operation, lubrication or maintenance services are very dangerous and may cause injury or death of personnel. Therefore all precautionary measures, NOTES, DANGERS, WARNINGS and CAUTIONS contained in the manual and on the machine should be read and understood by all personnel before starting any work with or on the machine.

(2) Operation, inspection, and maintenance should be carefully carried out, and safety must be given the first priority. Messages of safety are indicated with marks. The safety information contained in the manual is intended only to supplement safety codes, insurance requirements, local laws, rules and regulations.

(3) Messages of safety appear in the manual and on the machine : All messages of safety are identified by either word of "DANGER", "WARNING" and "CAUTION".

1) **DANGER-** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury and is represented as follows:

DANGER

2) **WARNING-** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury and is represented as follows:

WARNING

3) **CAUTION-** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against possible damage to the machine and its components and is represented as follows:

CAUTION

(4) It is very difficult to forecast every danger that may occur during operation. However, safety can be ensured by fully understanding proper operating procedures for this machine according to methods recommended by Manufacturer.

(5) While operating the machine, be sure to perform work with great care, so as not to damage the machine, or allow accidents to occur.

(6) Continue studying the manual until all Safety, Operation and Maintenance procedures are completely understood by all persons working with the machine.

SAFETY PRECAUTIONS

WARNING

The proper and safe lubrication and maintenance procedures for this machine, are outlined in the OPERATOR'S MANUAL for the machine. Improper lubrication or maintenance procedures are dangerous and could result in injury or death. Read and understand the MANUAL before performing any lubrication or maintenance.

The service technician may be unfamiliar with many of the systems on this machine. This makes it important to use caution when performing service work. A knowledge of the system and or components is important before the removal or disassembly of any component.

Because of the size of some of the machine components, the technician should check the weights noted in this manual. Use proper lifting procedures when removing any components. Weight of components table is shown in the section; SPECIFICATIONS.

The following is a list of basic precautions that must always be observed.

(1) Read and understand all Warning plates and decal on the machine before Operating, Maintaining or Repairing this machine.

(2) Always wear protective glasses and protective shoes when working around machines. In particular, wear protective glasses when using hammers, punches or drifts on any part of the machine or attachments. Use welders gloves, hood/goggles, apron and the protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing. Remove all rings from fingers, loose jewelry, confine long hair and loose clothing before working on this machinery.

(3) Disconnect the battery and hang a "Do Not Operate" tag in the Operators Compartment. Remove ignition keys.

(4) If possible, make all repairs with the machine parked on a firm level surface. Block the machine so it does not roll while working on or under the machine. Hang a "Do Not Operate" tag in the Operators Compartment.

(5) Do not work on any machine that is supported only by lift, jacks or a hoist. Always use blocks or jack stands, capable of supporting the machine, before performing any disassembly.

WARNING

Do not operate this machine unless you have read and understand the instructions in the OPERATOR'S MANUAL. Improper machine operation is dangerous and could result in injury or death.

(6) Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.

(7) Lower the bucket, dozer, or other attachments to the ground before performing any work on the machine. If this cannot be done, make sure the bucket, dozer, ripper or other attachment is blocked correctly to prevent it from dropping unexpectedly.

(8) Use steps and grab handles when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. Always face to the machine when using steps, ladders and walkways. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.

(9) To avoid back injury, use a hoist when lifting components which weigh 20kg (45lbs) or more. Make sure all chains, hooks, slings, etc., are in good condition and are the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.

(10) To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and compartments.

(11) Be careful when removing cover plates. Gradually back off the last two capscrews or nuts located at opposite ends of the cover or device and carefully pry cover loose to relieve any spring or other pressure, before removing the last two capscrews or nuts completely.

(12) Be careful when removing filler caps, breathers and plugs on the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

(13)Always use the proper tools that are in good condition and that are suited for the job at hand. Be sure you understand how to use them before performing any service work.

(14)Reinstall all fasteners with the same part number. Do not use a lesser quality fastener if replacements are necessary.

(15)Repairs which require welding should be performed only with the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine the type of metal being welded and select the correct welding procedure. Use electrodes, rods or wire to provide a weld metal strength equivalent at least to that of the parent metal. Make sure to disconnect the battery before any welding procedures are attempted.

(16)Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will be damaged in operation of the machine by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.

(17)Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution and replace the guard or shield after repair is completed.

(18)The maintenance and repair work while holding the bucket raised is dangerous due to the possibility of a falling attachment. Don't fail to lower the attachment and place the bucket to the ground before starting the work.

(19)Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Very small (pinhole) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use card-board or paper to locate pinhole leaks.

(20)Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.

(21)Do not operate a machine if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.

(22)Be careful when servicing or separating the tracks (crawlers). Chips can fly when removing or installing a track (crawlers) pin. Wear safety glasses and long sleeve protective clothing. Tracks (crawlers) can unroll very quickly when separated. Keep away from front and rear of machine. The machine can move unexpectedly when both tracks (crawlers) are disengaged from the sprockets. Block the machine to prevent it from moving.

NOTE:

This Manual contains important information necessary for the maintenance and repair of your hydraulic excavator. Information is categorized into 6 Chapters, Specification, Maintenance, System, Disassembly, Troubleshooting and Engine.

- The Chapter "Specification" describes the specifications for entire machine and material, which is instructive for replacement and repairing attachments.
- The Chapter "Maintenance" describes the standards and procedures, which is helpful for maintenance service and adjustments for the entire machine.
- The Chapter "System" describes the operating system such as the hydraulic system, electric system, components, and so on.
- The Chapter "Disassembly" describes the removal and installation of assemblies mounted on the upper structure and undercarriage, and the assembling and disassembling of the associated hydraulic equipment.
- The Chapter "Troubleshooting" describes how to find faulty equipment.
- The Chapter "Engine" describes the engines making use of the "Maintenance Manual" provided by the suppliers.

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1. OUTLINE

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Book Code No. **5-4580**

Issue	Date of Issue	Applicable Machines	Remarks
First edition	January, 2007	E215B : YQ11-06001~	5-4580

1.1 GENERAL PRECAUTIONS FOR MAKING REPAIRS

1.1.1 PREPARATION BEFORE DISASSEMBLING

(1) Knowledge of operating procedure
Read Operator's Manual carefully to understand the operating procedure.

(2) Cleaning machines
Clean machines of soil, mud, and dust before carrying into the service shop.
Carrying a soiled machine into the service shop, causes making less efficient work and damage of parts.

(3) Inspecting machines
Confirm the disassembling section before starting work, determine the disassembly procedure taking the conditions in work shop into account, and request to procure necessary parts in advance.

(4) Recording
Record the following items to keep contact and prevent malfunction from recurring.
1) Inspecting date, place
2) Model name, Serial number and Record on hour meter
3) Trouble condition, place, cause
4) Visible oil leak, water leak and damage
5) Clogging of filters, oil level, oil quality, oil contamination and looseness.
6) Examine the problems on the basis of monthly operation rate with the last inspection date and records on hour meter.

(5) Arrangement and cleaning in service shop
1) Tools required for repair work.
2) Prepare the places to put the disassembled parts.
3) Prepare oil pans for leaking oil, etc.

1.1.2 SAFETY WHEN DISASSEMBLING AND ASSEMBLING

(1) Safety
1) Wear appropriate clothing, safety shoes, safety helmet, goggles, and clothes with long sleeves.
2) Attach "Don't operate" tag to control lever, and begin a meeting before starting the work.
3) Before starting inspection and maintenance stop the engine.
4) Confirm the position of first-aid kit and fire extinguisher, and also where to make contact for emergency measure and ambulance to prepare for accidents and fire.
5) Choose a hard, lever and safe place. The attachment **must** be fully on the ground.
6) Use hoist, etc. to remove parts of heavy weight (23kg [50 lb] or more).
7) Use proper tools, and change or repair defective tools.
8) Machine and attachment required to be serviced in the lifting condition should be supported with hoists and blocked securely.

1.1.3 DISASSEMBLING AND ASSEMBLING HYDRAULIC EQUIPMENT

(1) Removing hydraulic equipment assy
1) Before removing pipes, release the pressure in the hydraulic system.
2) Drain the oil in the removed pipes into a pan to prevent the oil from spilling on the ground.
3) Install plugs or caps in pipe ends to prevent oil from leaking, entry of dust, etc.
4) Clean the outside surface of the machine area to be worked on before disassembling. Drain hydraulic oil and gear oil before putting parts on the work bench.

(2) Disassembling hydraulic equipment
1) Make alignment marks on parts for assembly.
2) Before disassembling, read Disassembling Instruction in advance, and determine if the disassembly and assembly are permitted or not.
3) For parts which are required to use jig and tools, don't fail to use the specified jig and tools.
4) Parts that can not be removed in the specified procedure, never force removal. First check for the cause.
5) The removed parts should be put in order and tagged for ease of assembly.
6) For common parts, pay attention to the quantity and places.

(3) Inspecting parts
   1) Check the disassembled parts for dammage or heavy wear.
   2) Measure the wear of parts and clearance, and record the measured values.
   3) If a part has damage or heavy wear, replace the part.

(4) Reassembling hydraulic equipment
   1) During the parts cleaning, ventilate the room.
   2) Before assembly, thoroughly clean all parts.
   3) Apply clean hydraulic oil or gear oil prior to assembly.
   4) Replace the removed O-ring, back-up rings and oil seal with new ones, and apply grease or oil on them before assembling.
   5) Fully clean the surface on which liquid sealants are applied.
   6) Before assembling, remove rust preventives on new parts.
   7) Use special tools to fit bearings, bushing and oil seals.
   8) Assemble parts using the alignment marks made during disassembly.

(5) Installing hydraulic equipment
   1) Confirm hydraulic oil and lubrication oil.
   2) Air release is required in the following cases ;
      1. Change of hydraulic oil
      2. Replacement of parts on suction pipe side
      3. Removing and attaching hydraulic pump
      4. Removing and attaching swing motor
      5. Removing and attaching travel motor
      6. Removing and attaching hydraulic cylinder

WARNING

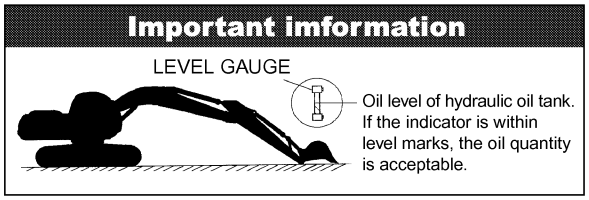
If hydraulic oil and lubricating oil are not filled and also air bleed is not performed, the hydraulic equipment may be damaged.

   3) For air removal in the hydraulic the pump and swing motor, loosen but do not remove the drain plug on the upper housing, start engine and run in low idle until hydraulic fluid flows from the port. Tighten the plug securely.
   4) For air removal from the travel motor and hydraulic cylinder, start engine and operate for 10 minutes or more at no-load and low idle.

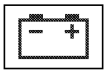
WARNING

For cylinder, don't move it to the stroke end at beginning.

   5) Air in pilot circuits can only be removed by operating digging, swing and traveling motions thoroughly.
   6) Check hydraulic oil level.
      Move attachments to hydraulic oil check position, and check hydraulic oil level of tank. Add oil if the oil level is lower than the specified level.
      How to check oil level of hydraulic oil tank



1.1.4 ELECTRICAL EQUIPMENT



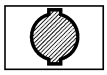
(1) Handle equipment with care so as not to drop or bump it.
(2) Connectors should be removed by unlocking while holding the connector.
   Never stress the sealed end of a connector by pulling on the wire.
(3) Check that connector is completely connected and securely locked.
(4) Turn the engine key OFF before disconnecting and connecting connectors.
(5) Turn the engine key OFF before touching terminals of starter and alternator.
(6) Remove battery grounding terminal before beginning work close to battery and battery relay with tools.
(7) Wash machine with care so as not to splash water on electrical equipment and connectors.
(8) Before connecting a waterproofed connector, check the connector ends for moisture. If moisture is present, dry it completely before connecting.

⚠WARNING

BATTERY ACID CAUSES SERVER BURNS. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote:

- **EXTERNAL- Flush with water.**
- **INTERNAL - Drink large quantities of water or milk. DO NOT induce vomiting. Seek medical attention immediately.**
- **EYES - Flush with water for 15 minutes and seek medical attention immediately.**
- **BATTERIES PRODUCE EXPLOSIVE GASES. Keep sparks, flame, cigars and cigarettes away. Ventilate when charging or using in enclosed area. Always wear eye protection when working near batteries. Wash hands after handling. KEEP OUT OF REACH OF CHILDERN.**
- **When battery acid has spilled out in large quantity, use sodium bicarbonate to neutralize, or wash away with water.**

1.1.5 HYDRAULIC PARTS



(1) O-ring
- Check that O-ring is free from flaw and has elasticity before fitting.
- Even if the size of O-ring is equal, the usage differs, for example in dynamic and static sections, the rubber hardness also differs according to the pressure force, and also the quality differs depending on the materials to be seated. Always install the correct O-ring.
- Install O-ring so there is no distortion or twist.
- Floating seal should be put in pairs.

(2) Flexible hose (F hose)
- Even if the connector and length of hose are the same, the parts can differ according to the pressure rating. Use the correct parts.
- Tighten hose to the specified torque. Check that it is free from twist, over tension, interference, and oil leaks.

1.1.6 WELD REPAIR

(1) The weld repair should be made by qualified personnel in the specified procedure after disconnecting the grounding cable of battery. If the grounding cable is not disconnected electrical components may be damaged.

(2) Remove parts which may cause fire due to the entry of spark before starting.

(3) When repairing attachments which are damaged, give particular attention to the plated section of piston rod to protect it from sparks. Cover the section with flame-proof material.

1.1.7 ENVIRONMENTAL ISSUES

(1) Engine should be started and operated in an area where air can be sufficiently ventilated.

(2) Waste disposal
Follow local regulations for the disposal of Waste oil and batteries.

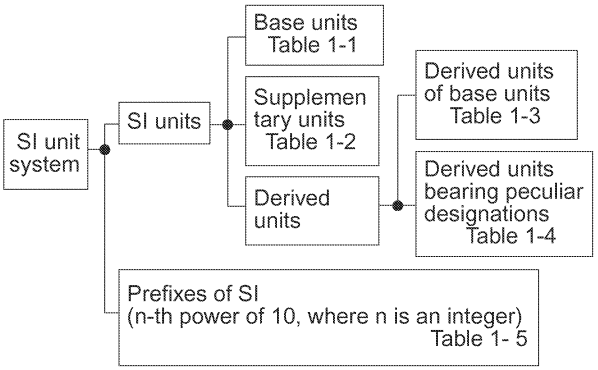
(3) Precautions for handling hydraulic oil
Hydraulic oil may cause inflammation of eyes. Wear goggles to protect eyes when handling.
- When it has got in eyes ;
Wash eyes with water until the oil is gone.
- When it was swallowed ;
Do not induce vomiting. Seek immediate medical attention.
- When it has contact with the skin ;
Wash with soap and water.

1.2 INTERNATIONAL UNIT SYSTEM

Introduction

Although this manual uses the SI units system. Outline of SI units system is described here.
Given hereinunder are an excerpt of the units that are related to this manual :

1. Etymology of SI Units
   English : International System of units
2. Construction of SI Unit System



(1) Basic Units

Table1-1

QUANTITIES	DESIGNATION	SIGN
Length	Meter	m
Mass	Kilogram	kg
Time	Second	s
Current	Ampere	A
Thermodynamic temperature	Kelvin	K
Gram molecule	Mol	mol
Luminous intensity	Candela	cd

(2) Supplementary Units

Table1-2

QUANTITIES	DESIGNATION	SIGN
Plain angle	Radian	rad
Solid angle	Steradian	sr

(3) Derived Units of Basic Units

Table1-3

QUANTITIES	DESIGNATION	SIGN
Area	Square meter	m^2
Volume	Cubic meter	m^3
Velocity	Meter per second	m/s
Acceleration	Meter per second / second	m/s^2
Density	Kilogram per cubic meter	kg/m^3

(4) Derived Units bearing Peculiar Designations

Table1-4

QUANTITY	UNIT	SYMBOL	FORMULA
Frequency	hertz	Hz	1Hz=1/s
Force	newton	N	$kg \cdot m/s^2$
Pressure and Stress	pascal	Pa	N/m^2
Energy, Work and Quantity of heat	joule	J	N•m
Power	watt	W	J/s
Quantity of electricity	coulomb	C	A•s
Electric potential difference, Voltage, and Electromotive force	volt	V	W/A
Quantity of static electricity and Electric capacitance	farad	F	C/V
Electric resistance	ohm	Ω	V/A
Celcius temperature	celcius degree or degree	°C	(t+273.15)K
Illuminance	lux	lx	$l\ m/m^2$

(5) Prefixes of SI

Table1-5

PREFIX		POWER
DESIGNATION	SIGN	
Giga	G	10^9
Mega	M	10^6
Kilo	k	10^3
Hecto	h	10^2
Deca	da	10
Deci	d	10^{-1}
Centi	c	10^{-2}
Milli	m	10^{-3}
Micro	μ	10^{-6}
Nano	n	10^{-9}
Pico	p	10^{-12}

(6) Unit Conversion Table

QUANTITIES	JIS	SI	REMARKS
Mass	kg	kg	
Force	kgf	N	1kgf=9.807N
Torque	kgf•m	N•m	1kgf•m=9.807N•m
Pressure	kgf/cm^2	MPa	$1kgf/cm^2$=0.098MPa
Motive power	PS	kW	1PS=0.7355kW
Revolution	r.p.m	min^{-1}	1r.p.m=$1min^{-1}$

[MEMO]

2. SPECIFICATIONS

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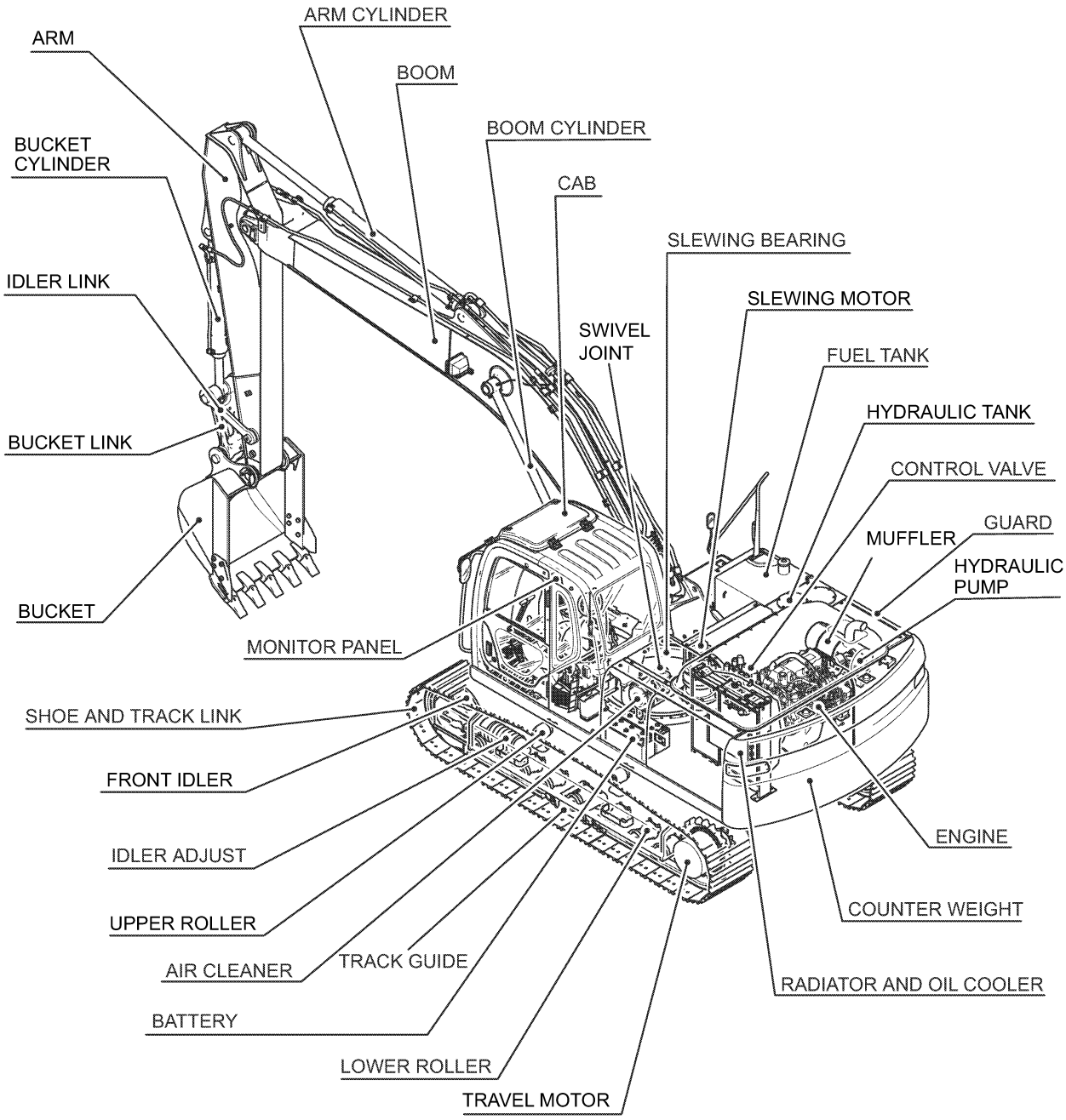
Book Code No. **5-4590**

Issue	Date of Issue	Applicable Machines	Remarks
First edition	January, 2007	E215B : YQ11-06001~	5-4590

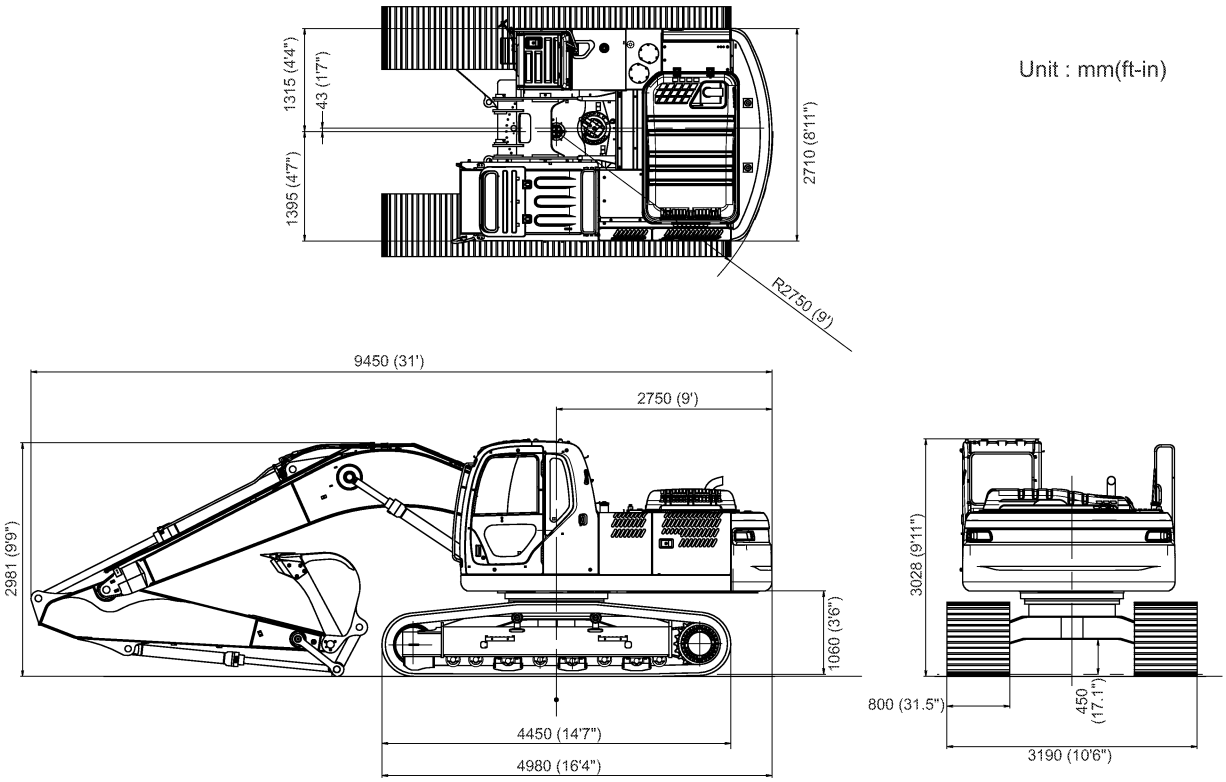
2.1 NAME OF COMPONENTS



2.2 GENERAL DIMENSIONS

2.2.1 E215B [5.65m (18ft-6in) Boom+2.94m (9ft-8in) Standard Arm+0.80m³ (1.05cu•yd) Bucket Shoe]

Unit : mm(ft-in)

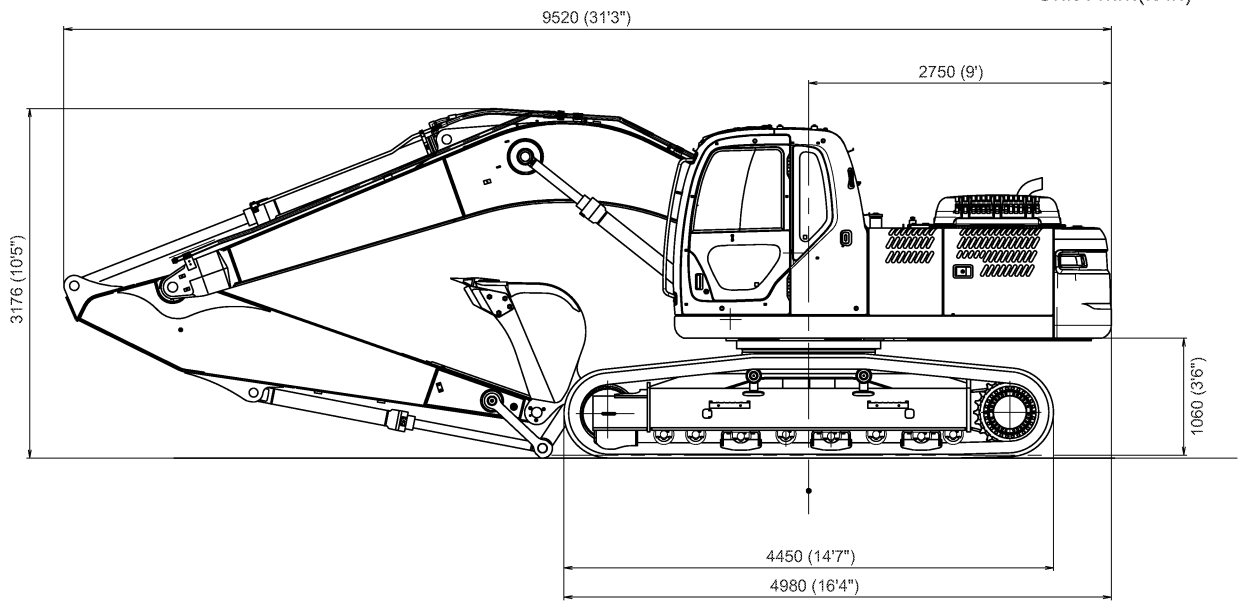


Note

Dimensions marked * do not include the height of the shoe lug.

2.2.2 E215B [5.65m (18ft-6in) Boom+3.5m (11ft-6in) Long Arm+0.70m³ (0.92cu•yd) Bucket Shoe]

Unit : mm(ft-in)



2.3 WEIGHT OF COMPONENTS

Unit ; kg (lb)

Item \ Model	E215B
Machine complete	21,700 (47,800)
1. Upper frame assy (Assembly of following :)	9,500 (21,000)
1.1 Upper frame	1,770 (3,900)
1.2 Counter weight (Semi-weighted)	4,640 (10,230)
1.3 Cab	260 (570)
1.4 Engine	*520 (1,150)
1.5 Hydraulic oil tank	*150 (330)
1.6 Fuel tank	*110 (240)
1.7 Slewing motor (including reduction unit)	*210 (460)
1.8 Control valve	*230 (510)
1.9 Boom cylinder	*170 (375) × 2
1.10 Pin (for mounting boom)	70 (150)
1.11 Pump	*130 (290)
1.12 Radiator (including intercooler)	*100 (220)
2. Lower frame assy (Assembly of following :)	7,980 (17,600)
2.1 Lower frame	2,420 (5,340)
2.2 Slewing bearing	250 (550)
2.3 Travel motor (including reduction unit)	260 (570) × 2
2.4 Upper roller	20 (44) × 2
2.5 Lower roller	30 (66) × 16
2.6 Front idler	110 (240) × 2
2.7 Idler adjuster	100 (220) × 2
2.8 Sprocket	50 (110) × 2
2.9 Swivel joint	*30 (66)
2.10 Track link with 800mm (31.5in) shoes assy	1,700 (3,750) × 2
2.10.1 Track link assy	540 (1,190) × 2
3. Attachment (Assembly of following / STD :)	3,640 (8,030)
{5.65m (18ft-6in) Boom + 2.94m (9ft-8in) Arm + 0.80m³ (1cu•yd) Bucket}	
3.1 Bucket assy (STD)	640 (1,410)
3.2 STD Arm assy (Assembly of following :)	1,170 (2,580)
3.2.1 STD Arm	770 (1,700)
3.2.2 Bucket cylinder	*140 (310)
3.2.3 Idler link	20 (44) × 2
3.2.4 Bucket link	90 (198)
3.2.5 Pin (2pcs. for mounting bucket cylinder / 2pcs. for mounting bucket)	100 (220)
3.3 Boom assy (Assembly of following :)	1,830 (4,040)
3.3.1 Boom	1,420 (3,130)
3.3.2 Arm cylinder	*250 (550)
3.3.3 Pin (Mounting arm • Mounting arm cylinder)	80 (180)