CASE
PROFESSIONAL PARTNER

# REPAIR MANUAL
# SCHEMATIC SET
# CRAWLER EXCAVATOR
# CX160B

87637607 NA



Issued 03-2007

# CRAWLER EXCAVATOR
# CX160B
# SCHEMATIC SET
# LEP 87637607B

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**NOTE:** CNH Company reserves the right to make changes in the specification and design of the machine without prior notice and without incurring any obligation to modify units previously sold.

The description of the models shown in this manual has been made in accordance with the technical specifications known as of the date of design of this document.



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Issued March, 2007

# Section

# 1001

## SAFETY, GENERAL INFORMATION AND TORQUE SPECIFICATIONS


Issued February, 2006

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**WARNING :** *This symbol is used in this manual to indicate important safety messages. Whenever you see this symbol, carefully read the message that follows, as there is a risk of serious injury.*

# GENERAL INFORMATION

## Cleanning

Clean all metal parts except bearings, in a suitable cleaning solvent or by steam cleaning. Do not use caustic soda for steam cleaning. After cleaning, dry and put oil on all parts. Clean oil passages with compressed air. Clean bearings in a suitable cleaning solvent, dry the bearings completely and put oil on the bearings.

## Inspection

Check all parts when the parts are disassembled. Replace all parts that have wear or damage. Small scoring or grooves can be removed with a hone or crocus cloth. Complete a visual inspection for indications of wear, pitting and the replacement of parts necessary to prevent early failures.

## Bearings

Check bearings for easy action. If bearings have a loose fit or rough action replace the bearing. Wash bearings with a suitable cleaning solvent and permit to air dry. DO NOT DRY BEARINGS WITH COMPRESSED AIR.

## Needle bearings

Before you press needle bearings in a bore always remove any metal protrusions in the bore or edge of the bore. Before you press bearings into position put petroleum jelly on the inside and outside diameter of the bearings.

## Gears

Check all gears for wear and damage. Replace gears that have wear or damage.

## Oil seals, O-rings and gaskets

Always install new oil seals, O-rings and gaskets. Put petroleum jelly on seals and O-rings.

## Shafts

Check all shafts that have wear or damage. Check the bearing and oil seal surfaces of the shafts for damage.

## Service parts

Always install genuine Case service parts. When ordering refer to the Parts Catalog for the correct part number of the genuine Case replacement items. Failures due to the use of other than genuine Case replacement parts are not covered by warranty.

## Lubrication

Only use the oils and lubricants specified in the Operator's or Service Manuals. Failures due to the use of non-specified oils and lubricants are not covered by warranty.

# SAFETY

*This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death.*

To prevent injury always follow the Warning, Caution and Danger notes in this section and throughout the manual.

Put the warning tag shown below on the key for the keyswitch when servicing or repairing the machine. One warning tag is supplied with each machine. Additional tags Part Number 331-4614 are available from your service parts supplier

.

**WARNING:** *Read the operator's manual to familiarize yourself with the correct control functions.*

**WARNING:** *Operate the machine and equipment controls from the seat position only. Any other method could result in serious injury.*

**WARNING:** *This is a one man machine, no riders allowed.*

**WARNING:** *Before starting engine, study Operator's Manual safety messages. Read all safety signs on machine. Clear the area of other persons. Learn and practice safe use of controls before operating.*
*It is your responsibility to understand and follow manufacturers instructions on machine operation, service and to observe pertinent laws and regulations. Operator's and Service Manuals may be obtained from your Case dealer.*

**WARNING:** *If you wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing.*

**WARNING:** *When working in the area of the fan belt with the engine running, avoid loose clothing if possible, and use extreme caution.*

**WARNING:** *When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure.*

**WARNING:** *When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure all people are out of the way.*

**WARNING:** *Use insulated gloves or mittens when working with hot parts.*

**WARNING:** *Lower all attachments to the ground or use stands to safely support the attachments before you do any maintenance or service.*

**WARNING:** *Pin sized and smaller streams of hydraulic oil under pressure can penetrate the skin and result in serious infection. If hydraulic oil under pressure does penetrate the skin, seek medical treatment immediately. Maintain all hoses and tubes in good condition. Make sure all connections are tight. Make a replacement of any tube or hose that is damaged or thought to be damaged. DO NOT use your hand to check for leaks, use a piece of cardboard or wood.*

**WARNING:** *When removing hardened pins such as a pivot pin, or a hardened shaft, use a soft head (brass or bronze) hammer or use a driver made from brass or bronze and a steel head hammer.*

**WARNING:** *When using a hammer to remove and install pivot pins or separate parts using compressed air or using a grinder, wear eye protection that completely encloses the eyes (approved goggles or other approved eye protectors).*

**WARNING:** *Use suitable floor (service) jacks or chain hoist to raise wheels or tracks off the floor. Always block machine in place with suitable safety stands.*

**WARNING:** *When servicing or repairing the machine, keep the shop floor and operator's compartment and steps free of oil, water, grease, tools, etc. Use an oil absorbing material and/or shop cloths as required. Use safe practices at all times.*

**WARNING:** *Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in this Service Manual.*

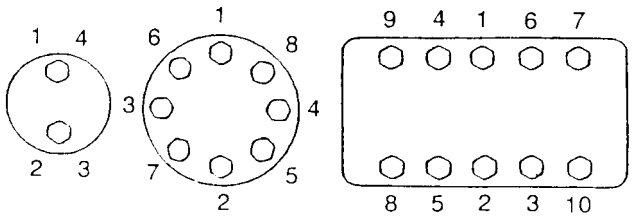
**WARNING:** *Engine exhaust fumes can cause death. If it is necessary to start the engine in a closed place, remove the exhaust fumes from the area with an exhaust pipe extension. Open the doors and get outside air into the area.*

**WARNING:** *When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others in the area can be injured.*

# STANDARD TORQUE DATA FOR CAP SCREWS AND NUTS

## Tightening of cap screws, nuts

Tighten alternately so that tightening torque can be applied evenly. The numbers in the figure below indicate the order of tightening.




JS00481A

Cap screws which have had Loctite used (white residue remains after removal) should be cleaned with loght oil or suitable cleaning solvent and dried. Apply 2-3 drops of Loctite to the thread portion of the cap screw and then tighten.

## Torque table

Tighten cap screws and nuts according to the table below if there are no other special instructions.

| **Cap Screw Name Size (Size)** | | | **M6** | **M8** | **M10** | **M12** | **M14** | **M16** | **M18** | **M20** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hexagon Screw** | Spanner | [mm] | 10 | 13 | 17 | 19 | 22 | 24 | 27 | 30 |
| | | [in.] | 0.39 | 0.51 | 0.67 | 0.75 | 0.87 | 0.95 | 1.06 | 1.18 |
| | Tightening torque | [Nm] | 6.9 | 19.6 | 39.2 | 58.8 | 98.1 | 156.9 | 196.1 | 294.2 |
| | | [lb-ft] | 5.1 | 14.5 | 28.9 | 43.4 | 72.3 | 115.7 | 144.6 | 217 |
| **Hexagon Socket Head Cap Screw** | Spanner | [mm] | 5 | 6 | 8 | 10 | 12 | 14 | 14 | 17 |
| | | [in.] | 0.20 | 0.24 | 0.32 | 0.39 | 0.47 | 0.55 | 0.55 | 0.67 |
| | Tightening torque | [Nm] | 8.8 | 21.6 | 42.1 | 78.5 | 117.7 | 176.5 | 245.2 | 343.2 |
| | | [lb-ft] | 6.5 | 15.9 | 31.1 | 57.9 | 86.9 | 130.2 | 181 | 253.2 |

# Section

# 1002

## SPECIFICATIONS AND SPECIAL TORQUE SETTINGS


February 2007

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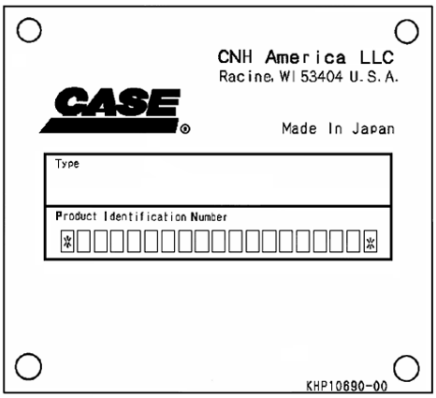
**WARNING:** *This symbol is used in this manual to indicate important safety messages. Whenever you see this symbol, carefully read the message which follows. Your safety depends on it.*

# TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE

For all part orders, request for information or assistance, always specify the type and the serial number of the machine to your Case dealer.

Fill in the following lines with the required information: Type, serial number, year of manufacture of the machine and the serial numbers of the hydraulic and mechanical components.

## Machine




CRIL05J002E00

Type.....

Serial number.....

Year of manufacture .....

## Engine

Make and type.....

Serial number.....

## Serial numbers of the components

Hydraulic pump .....

Swing reduction gear .....

Travel reduction gears.....

Control valve .....

# FLUIDS AND LUBRICANTS

Lubricants must have the correct properties for each application.

**WARNING:** The conditions of use for individual fluids and lubricants must be respected.

## Hydraulic fluid

CASE/AKCELA hydraulic fluid is specially designed for high pressure applications and for the CASE hydraulic system. The type of fluid to be used depends on the ambient temperature.

**Temperate climates: -20°C to +40°C (-4° to 104° F)**

CASE/AKCELA: HYDRAULIC EXCAVATOR FLUID (MS 1230. ISO VG 46. DIN 51524 PART 2 HV)

**Hot climates: 0°C to +50°C (32° to 122° F)**

CASE/AKCELA: AW HYDRAULIC FLUID 68 HV (MS 1216. ISO VG 68. DIN 51524 PART 3 CATEGORY HVLP)

**Cold climates: -25°C to +20°C (-13° to 68° F)**

CASE/AKCELA: AW HYDRAULIC FLUID 32 (MS 1216. ISO VG 32. DIN 51524 PART 2)

**Biodegradable fluid: -30°C to +40°C (-22° to 104° F)**

This yellow-colored fluid is miscible with standard fluid. If used to change standard fluid, it is advised to drain the circuit completely before refilling with this fluid.

CASE/AKCELA: HYDRAULIC EXCAVATOR FLUID BIO (MS 1230. ISO VG 46. DIN 51524 PART 2 HV)

## Transmission component oil

Extreme pressure oil used for enclosed transmission components.

CASE/AKCELA: GEAR 135H EP (SAE 80W-90. API GL 5. MIL-L-2105 D. MS 1316. ZF TE-ML 05A)

## Grease

CASE/AKCELA: MOLY GREASE 251H EP-M (251H EP-M. NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap and molybdenum disulphide.

CASE/AKCELA: MULTIPURPOSE GREASE 251H EP (251H EP. NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap and calcium.

CASE/AKCELA: PREMIUM GREASE EP2 (NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap.

### Hydraulic breakers

CASE/AKCELA: MULTIPURPOSE GREASE 251H EP (NLGI 2).

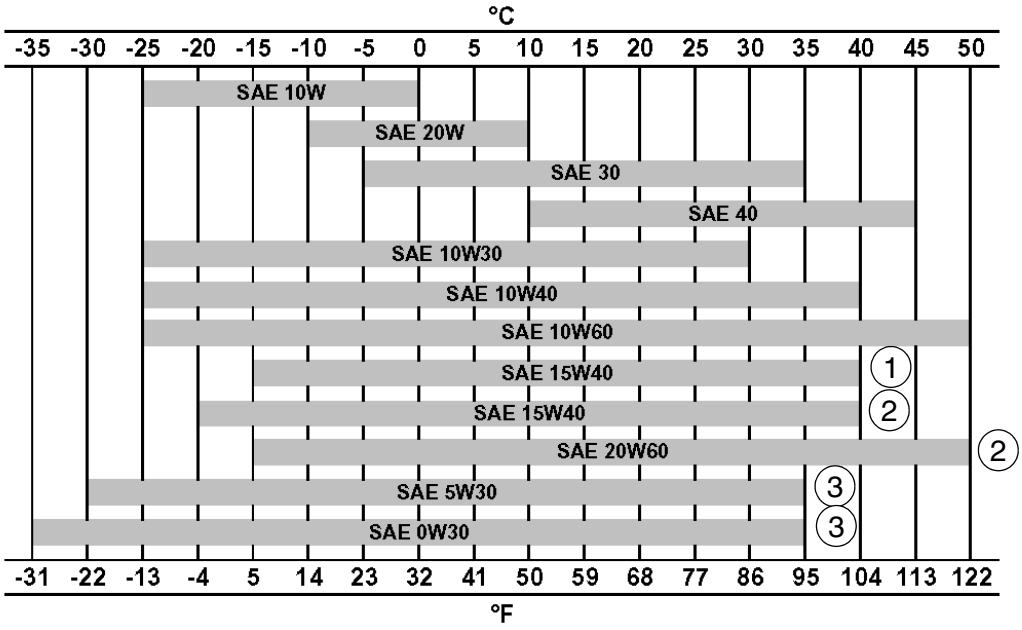
# Engine Oil

THE CASE/AKCELA No. 1 engine oil is recommended for your engine. This oil ensures proper lubrication of your engine for all operating conditions.

If the CASE/AKCELA Multigrade "No. 1 ENGINE OIL" cannot be obtained, use the oil corresponding to one of the following categories: ACEA E7. API CI-4.


CP02N001

## Oil viscosity / Oil range




CT02M001

1) With mineral base

(2) With semi-synthetic base

(3) With synthetic base

# Fuel

Use fuel which is to ASTM (American Society for Testing and Materials) D975 standard.

Use grade No. 2-D fuel. The use of other types of fuel can result in a loss of power of the engine and may cause high fuel consumption.

In cold weather (below -7°C (19.4°F)), it is provisionally approved to use a mixture of fuels No. 1-D and No. 2-D. Consult your fuel supplier or your CASE Dealer.

If the temperature falls below the fuel cloud point (point at which wax begins to form) the wax crystals will cause power loss or will prevent the engine from starting.

**Required conditions for diesel fuel**

The diesel fuel used must:

- be free from dust particles, even minute ones.
- have the proper viscosity.
- have a high cetane number.
- present great fluidity at low temperatures.
- have low sulphur content.
- have very little residual carbon.

**Diesel fuel recommendation**

- JIS (Japanese Industrial Standard) : No. 2
- DIN (Deutsche Industrie Normen) : DIN 51601
- SAE (Society of Automotive Engineers) Based on SAE-J-313C: No. 2-D
- BS (British Standard) Based on BS/2869-1970: Class A-1

**IMPORTANT :** *Using any other fuel will reduce the operating performance of the engine.*

Using fuels other than those recommended can damage the fuel injection pump, the injector and other parts of the fuel supply system and the engine. **CASE disowns any responsibility concerning this kind of damage, which is not covered by the guarantee.** To avoid any damage to the engine fuel supply system, you are recommended to take the following safety messages into account:
Some fuel suppliers mix used engine oil with diesel fuel. Certain manufacturers of large engines allow them to do this. However, for your engine, do not use diesel fuel contaminated by engine oil. In addition to damaging the engine, this fuel can actually adversely affect the correct purification of exhaust gases. Before using any diesel fuel, ask the supplier if this fuel has been mixed with engine oil.

**IMPORTANT :** *For a proper use of fuel additives consult your supplier or your CASE Dealer. Do not inject fuel oil or gasoline, both fuels can damage the engine.*

**IMPORTANT :** *In cold weather, fill the fuel tank at the end of the day's work, in order to prevent the formation of condensation.*

## Fuel storage

Long storage can lead to the accumulation of impurities and condensation in the fuel. Engine trouble can often be traced to the presence of water in the fuel.

The storage tank must be placed outside and the temperature of the fuel should be kept as low as possible. Drain off water and impurities regularly.

## Anti-freeze/Anti-corrosion

Use anti-freeze in all seasons to protect the cooling system from corrosion and all risk of freezing.

CASE/AKCELA: PREMIUM ANTI-FREEZE (MS 1710)

For areas where the temperature goes down to -38°C (-36.4°F), mix 50/50 with water.

**IMPORTANT :** *Do not mix products of a different origin or brand. The same product must be used when topping up the system.*

## Environment

Before carrying out any maintenance operation on this machine and before disposing of used fluids or lubricants, always think of the environment. Never throw oil or fluid on the ground and never place it in leaking receptacles.

Contact your local ecological recycling centre or your CASE Dealer to obtain information on the correct method of disposing of these lubricants.

## Plastic and resin parts

When cleaning plastic parts, the console, the instrument panel, the indicators etc... avoid using petrol, kerosene, paint solvents etc... Use only water, soap and a soft cloth.

The use of petrol, kerosene, paint solvents etc... causes discoloration, cracks or deformation of these parts.

# SPECIFICATIONS

## Main data

Model name ..... CX160B Hydraulic Excavator
Operating weight ..... 17100 kg (37699 lbs)
Engine output ..... 89.2 kW / 2200 rpm

## Performance

Swing speed ..... 11.5 Tr/min.
Travel speed
- Low Speed ..... 2.8 km/h (1.74 mph)
- High Speed ..... 5.4 km/h (3.35 mph)

Maximum drawbar pull ..... 161 kN (36194.24 lbf)
Grade ability ..... 70% (35°)
Ground pressure
- 600 mm (23.62 in) grouser shoe ..... 42 kPa
- 700 mm (27.56 in) grouser shoe ..... 37 kPa

## Complete machine dimensions

| | Arm (dipper) | |
|---|---|---|
| | 2620 mm (103.15 in) | 3050 mm (120.08 in) |
| Lenght (without attachment) | 4410 mm (173.62 in) | 4410 mm (173.62 in) |
| Lenght (with attachment) | 8440 mm (332.22 in) | 8520 mm (335.43 in) |
| Height (with attachment) | 2960 mm (116.53 in) | 3130 mm(123.23 in) |

## Main body dimensions

Main body width ..... See machine overall dimensions
Upper side swing body width ..... 2540 mm (100 in)
Cab width ..... 1000 mm (39.37 in)
Main body height ..... 2950 mm (116.14 in)
Tail swing radius ..... 2450 mm (96.46 in)
Swing body tail distance ..... 2410 mm (94.88 in)
Swing body rear section bottom height ..... 1020 mm (40.16 in)
Distance between tumblers ..... 3190 mm (125.59 in)
Overall track length ..... 3990 mm (157.09 in)
Width of track shoe ..... 600 mm (23.62 in) (Optional: 700 mm (27.56 in)
Minimum ground clearance (To bottom of lower frame) ..... 440 mm (17.32 in)

## Engine

Name ..... ISUZU, 4JJ1X
Type: ..... 4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electronic control), with turbocharger.
No. of cylinders - bore x stroke ..... 4 - Ø95.4 mm x 104.9 mm (3.76 x 4.13 in)
Displacement ..... 2.999 L (0.792 gal)
Compression ratio ..... 17.5
Rated output ..... 89.2 kW / 2200 $min^{-1}$
Maximum torque ..... 391 N.m (288.39 lb-ft) / 1800 $min^{-1}$
Engine dimensions (LxWxH) ..... 926.4x763x891.8 mm (36.47 x30.04x35.11 in)
Oil pan ..... All direction 0.61 rad, inclinable
Oil pan capacity ..... Maximum: 15 L (3.92 gal) Minimum: 11 L (2.91 gal) (excluding oil filter)
Direction of rotation ..... Right (as seen from fan)
Starter, reduction type ..... 24 V, 4 kW
Alternator, AC type ..... 24 V, 50 A
Battery ..... 2 x 12V, 92 Ah/5 Hr

## Cooling system

Fan type ..... Ø 550 mm (21.65 in), suction type - 8 blades, plastic with belt mouth-type fan guide
Pulley ratio ..... 0.95 (reduction)
Radiator
  Fin type ..... wavy
  Fin pitch ..... 2.0 mm (0.078 in)
Oil cooler
  Fin type ..... wavy
  Fin pitch ..... 1.75 mm (0.069 in)
Inter-cooler
  Fin type ..... triangular straight
  Fin pitch ..... 2.0 mm (0.078 in)
Fuel cooler
  Fin type ..... wavy
  Fin pitch ..... 2.0 mm (0.078 in)
Coolant capacity ..... 6 L (1.58 gal) (engine only)

## Capacity of coolant and lubricants

Coolant ..... 14.6 L (3.86 gal)
Fuel ..... 300 L (79.5 gal)
Lubricant for engine ..... 17 L (4.49 gal)
Lubricant for travel reduction gear (per side) ..... 5.8 L (1.53 gal)
Lubricant for swing reduction gear (per side) ..... 5 L (1.32 gal)
Hydraulic oil ..... 165 L (43.59 gal)
Capacity of hydraulic oil tank ..... 90 L (23.77 gal)

## Hydraulic oil filter

Suction filter (inside tank) ..... 150 mesh
Return filter (inside tank) ..... 6 µm
Pilot line filter (inside housing) ..... 8 µm

## Fuel filter

Main filter ..... 4 µm
Pre-filter ..... 10 µm

## Operating devices

Operator's seat
  Location: left side
  Structure: Adjustable forward and back and up and down, reclining mechanism, with seat suspension.
Cab
  Sealed steel type, all reinforced glass.
Levers and pedals
  For travel use: Lever and pedal type (hydraulic pilot type) (x2)
  For operating machine use: Lever type (hydraulic pilot type) (x2)
Instruments and switches
  Work mode select switch: 3 modes (SP / super power, H / heavy duty, A / automatic)
  Travel mode select switch: Low-speed / high-speed switch type
  One-touch idle: Knob switch type
  Engine emergency stop: Switch type
Monitor device
  Machine status display (full-dot liquid crystal)
  Work mode selection status: SP / H / A

Instruments (full-dot liquid crystal, except for hour meter)
- Fuel gauge: bar graph indicator
- Engine coolant temperature gauge: bar graph indicator
- Hydraulic oil temperature gauge: bar graph indicator
- Hour meter: digital type
- Machine Status and Warning Alarms (full-dot liquid crystal and warning tone) *Items have a warning alarm

| | | |
|---|---|---|
| Over heat* | Battery charge* | Faulty electrical system* |
| Refill fuel* | Engine oil pressure* | Refill coolant* |
| Engine preheat | Auto warm-up | Air cleaner clogged |
| Anti-theft device triggered | Faulty engine system | Engine emergency stop |

- Lighting

| | | |
|---|---|---|
| Working light | Tank: | 24V, 70W (x1) |
| | Boom: | 24V, 70W (x1) |
| | Cab: | 24V, 70W (x2) |
| Interior light | | 24V, 10W (x1) |

- Horn: electric horn (x2)
- Other
  - Wiper with intermittent function, Window washer, Air conditioner, Rear view mirrors (left and right), Clock

## Hydraulic system

Hydraulic pump drive system, directly coupled to the engine (no transmission)
- Main pump
  - Manufacturer ..... Kawasaki
  - Pump type ..... double variable displacement piston pump
  - Displacement volume ..... 65.2 $cm^3$ (3.98 cu in) x 2 /rev
  - Rated operating pressure ..... 34.3 MPa (4975 psi)
  - Maximum operating pressure ..... 36.3 MPa (5265 psi)
  - Input revolution speed ..... 2200 min-1
  - Maximum discharge flow ..... 142.5 L/min (37.64 gpm) x 2 at 2200 $min^{-1}$
- Pilot pump
  - Pump type ..... Gear pump
  - Displacement volume ..... 10 $cm^3$ (0.61 cu in)/rev
  - Operating pressure ..... 3.92 MPa (568 psi)
  - Maximum flow ..... 22 L/min (5.81 gpm) (at 2200 $min^{-1}$)
- Control method
  - Hydraulic simultaneous constant output control.
  - Maximum flow adjustment control through external commands (negative control).
  - Setting horsepower adjustment control through external command current.

Control Valve
- Model; 4-spool section: integrated (1) or 5-spool section: integrated (1)
- Operation method: hydraulic pilot method: travel, swing and operating machine
- Maximum flow ..... 143 L / min (37.78 gpm) (at 2200 min-1)
- Main relief set pressure .....standard; 34.3 MPa (4975 psi), power boost 36.3 MPa (5265 psi)
- Overload set pressure ..... when boom down; 32.3 MPa (4685 psi)
  ..... other: 38.2 MPa (5540 psi)
- Foot relief set pressure ..... 2.55 MPa (369.85 psi)
- Functions
  - Straight travel circuit
  - Boom up / arm 2 pumps internal flow
  - Boom and arm load holding circuit
  - Boom-down regenerative circuit
  - Bucket-close regenerative circuit
  - Arm-in forced regenerative circuit
  - Swing priority variable orifice (for arm operation)
  - 2 pumps flow
  - Variable foot relief

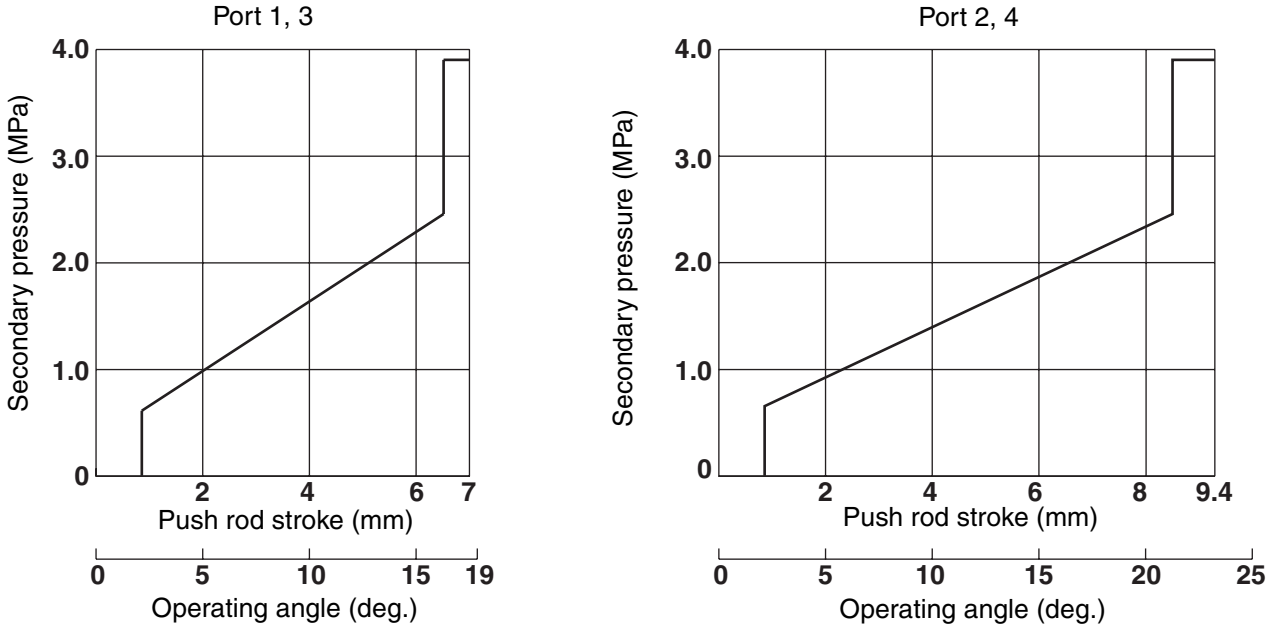
Hydraulic Cylinders
- Boom cylinder (x2)
  - Cylinder bore ..... Ø115 mm (Ø4.53 in)
  - Rod diametre ..... Ø80 mm (Ø3.15 in)
  - Maximum retracted lenghth ..... 1698 mm (66.85 in)
  - Stroke ..... 1179 mm (46.42 in)
- Arm (dipper) cylinder
  - Cylinder bore ..... Ø125 mm (Ø4.92 in)
  - Rod diametre ..... Ø90 mm (Ø3.54 in)
  - Maximum retracted lenghth ..... 1830 mm (72.05 in)
  - Stroke ..... 1280 mm (50.39 in)
- Bucket cylinder
  - Cylinder bore ..... Ø105 mm (Ø4.13 in)
  - Rod diametre ..... Ø75 mm (Ø2.95 in)
  - Maximum retracted lenghth ..... 1507 mm (59.33 in)
  - Stroke ..... 985 mm (38.78 in)

Rotating Joint
- Operating pressure
  - High pressure passage (ABCD) ..... 34.3 MPa (4975 psi)
  - Drain port (E) ..... 0.5 MPa (72.52 psi)
  - Pilot port (F) ..... 3.9 MPa (566 psi)
- Flow
  - High pressure passage (ABCD) ..... 234 L/min (61.82 gpm)
  - Drain port (E) ..... 10 L/min (2.64 gpm)
  - Pilot port (F) ..... 21 L/min (5.55 gpm)
- Port A; forward right ..... G3/4
- Port B; forward left ..... G3/4
- Port C; backward right ..... G3/4
- Port D; backward left ..... G3/4
- Port E; drain port ..... G1/2
- Port F; pilot port ..... G1/4

Solenoid Valve
- Maximum flow ..... P -> B: 25 L/min (6.60 gpm) Other: 5 L/min (1.32 gpm)
- Rated pressure ..... 4.5 MPa (652.67 psi)
- Port size
  - P, T, B port ..... G3/8
  - C1, C2, C3, C4, C5 port ..... G1/4
- Solenoid specifications
  - Operating voltage ..... DC 20 to 32 V
  - Power consumption ..... 17 W max.

Hand control valve

- Manufacturer ..... Kawasaki
- Operating pressure ..... 3.92 MPa (569 psi)
- Secondary pressure, primary short type ..... 0.64 to 2.45 MPa (92.82 to 355.34 psi)
- Operating angle
  - Ports 1, 3 ..... 19°
  - Ports 2, 4 ..... 25°

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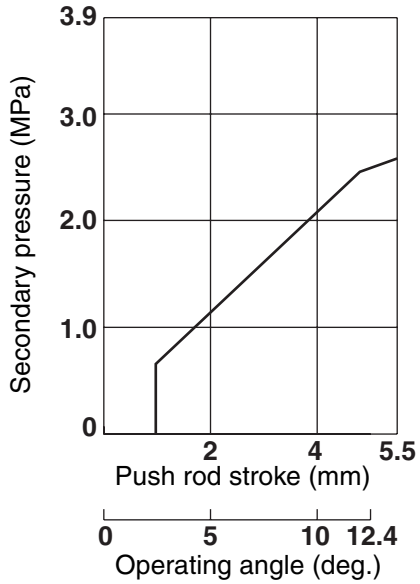
Foot control valve

- Manufacturer ..... Kawasaki
- Operating pressure ..... 3.92 MPa (569 psi)
- Secondary pressure, primary short type ..... 0.64 to 2.45 MPa (92.82 to 355.34 psi)
- Operating angle ..... 12.4°




RST-03-01-001D

## Swing unit

Swing circle ..... Swing bearing type (with internal gear)
Swing parking brake ..... Mechanical lock (operational lever linkage type)
Swing hydraulic motor ..... Fixed displacement piston motor
- Displacement ..... 151 $cm^3$ (9.21 cu in)/rev
- Operating pressure ..... 27.9 MPa (4046 psi)
- Operating flow ..... 143 L/min(37.78 gpm)
- Mechanical brake torque ..... 821.5 Nm (605.91 lb-ft) min.
- Brake off pressure ..... 3.2 MPa (464.12 psi) max.
- Relief valve set pressure ..... 27.9 MPa (4046 psi) max.

Reduction gear ..... Planetary gear 2-stage reduction gear
- Reduction ratio ..... 13.338

## Travel lower body

Travel hydraulic motor (x2) ..... Variable displacement piston motor, automatic 2-speed switch-over with parking brake
- Displacement ..... 143.5/72.8 $cm^3$ (8.76/4.44 cu in)/rev
- Operating pressure ..... 34.3 MPa (4975 psi)
- Operating flow ..... 143 L/min (37.78 gpm)
- Brake torque ..... 25.1 KNm (18512.8 lb-ft) min. (including reduction gear)
- Relief valve set pressure ..... 35.3 MPa (5119.83 psi)
- Automatic 2-speed switch-over pressure ..... 25 MPa (3625.94 psi)

Reduction gear ..... Planetary gear 2-stage reduction gear
- Reduction ratio ..... 43.246

Travel brake ..... Hydraulic lock
Parking brake ..... Mechanical lock (travel lever linkage type)
Track shoe
- Model ..... Assembly type triple grouser shoe
- Number of shoes (per side) ..... 44
- Shoe width
  - Standard ..... 600 mm (23.62 in)
  - Optional ..... 700 mm (27.56 in)
- Grouser height ..... 26 mm (1.02 in)
- Link pitch ..... 190 mm (7.48 in)

Roller
- Number of upper rollers (per side) ..... 2
- Number of lower rollers (per side) ..... 7

Track belt tension adjuster ..... Grease cylinder type (with cushion spring)
- Mounting length of spring ..... 445 mm (17.52 in)

# Work Unit

Model.....Backhoe attachment
Components / dimensions / working dimensions

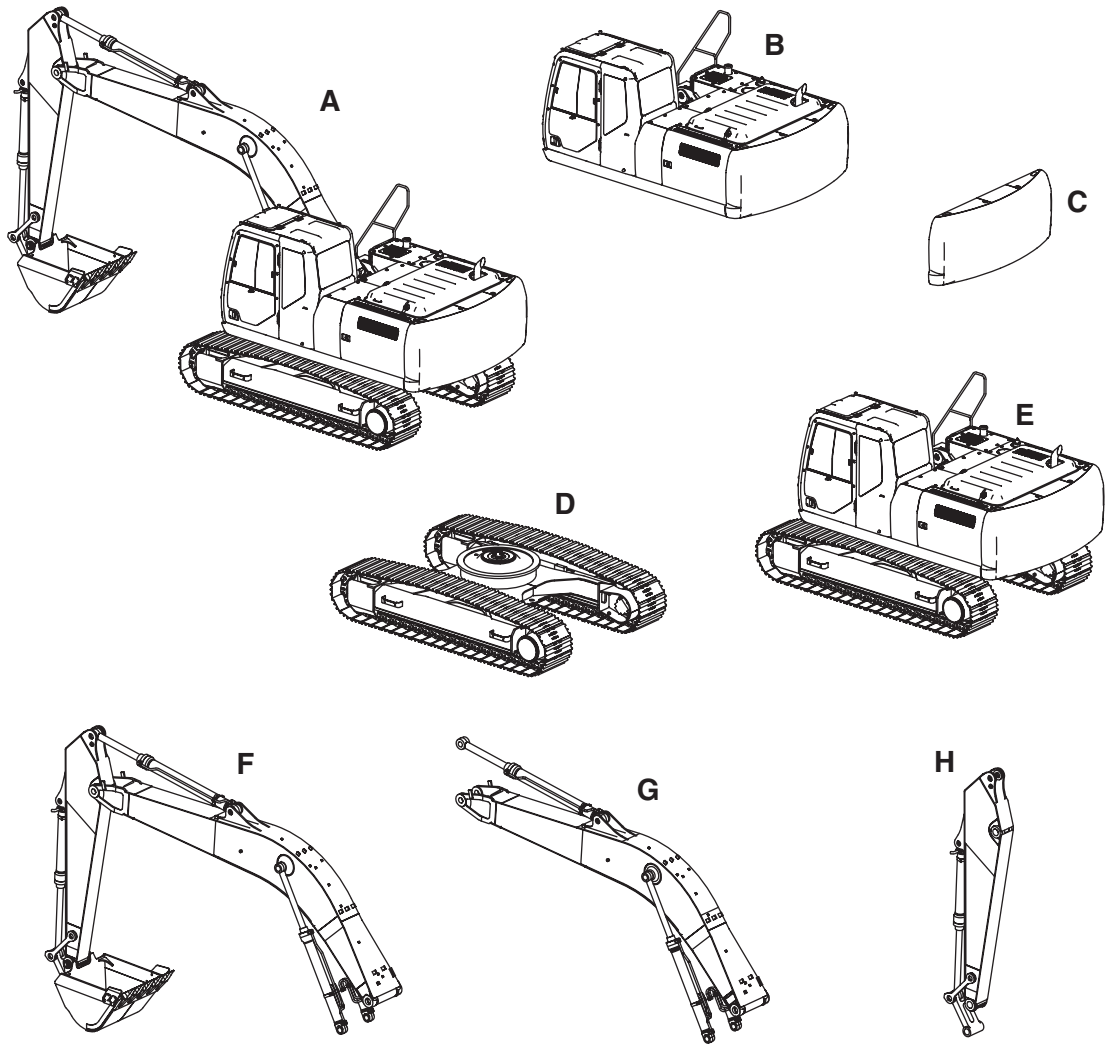
| | Standard Boom | |
|---|---|---|
| | Standard arm | Long arm |
| Arm (dipper) length | 2620 mm (103.15 in) | 3050 mm (120.08 in) |
| Boom length (Standard boom spec.) | 5150 mm (202.75 in) | |
| Bucket radius | 1350 mm (53.15 in) | |
| Bucket wrist angle | 178° | |
| Maximum digging radius | 9040 mm (355.90 in) | 9380 mm (369.29 in) |
| Maximum digging radius at ground line | 8870 mm (349.21 in) | 9220 mm (362.99 in) |
| Maximum digging depth | 6060 mm (238.58 in) | 6490 mm (255.51 in) |
| Maximum vertical straight wall digging depth | 5080 mm (200.00 in) | 5220 mm (205.51 in) |
| Maximum digging height | 9240 mm (363.78 in) | 9290 mm (365.75 in) |
| Maximum dump height | 6610 mm (260.24 in) | 6690 mm (263.39 in) |
| Minimum swing radius at front | 2990 mm (117.72in) | 2980 mm (117.32 in) |
| Height for minimum swing radius at front | 7140 mm (281.10 in) | 7160 mm (281.89 in) |

# Digging force (ISO 6015)

| | Arm (dipper) | |
|---|---|---|
| | 2620 mm (103.15 in) | 3050 mm (120.08 in) |
| Arm (dipper) digging force (standard) | 79 kN (17759.9 lbf) | 72 kN (16186.2 lbf) |
| Arm (dipper) digging force (power up) | 84 kN (18883.9 lbf) | 77 kN (17310.3 lbf) |
| Bucket digging force (standard) | 112 kN (25178.6 lbf) | 112 kN (25178.6 lbf) |
| Bucket digging force (power up) | 118 kN (26527.4 lbf) | 118 kN (26527.4 lbf) |

# COMPONENT WEIGHT

## Major component weight




RST-11-01-001A

Weight information is approximate

- A) Operating weight ..... 17100 kg (37699 lbs)
- B) Upper mechanism (including counterweight and turntable bearing) ..... 7540 kg (16623 lbs)
- C) Counterweight ..... 3420 kg (7540 lbs)
- D) Lower mechanism (with standard grouser shoe) ..... 6090 kg (13426 lbs)
- E) Main Unit Weighty ..... 14800 kg (32628 lbs)
- F) Attachments ..... 2940 kg (6482 lbs)
- G) Boom (including cylinders) ..... 1550 kg (3417 lbs)
- H) Arm (dipper) (including cylinders and linkage) ..... 670 kg (1477 lbs)

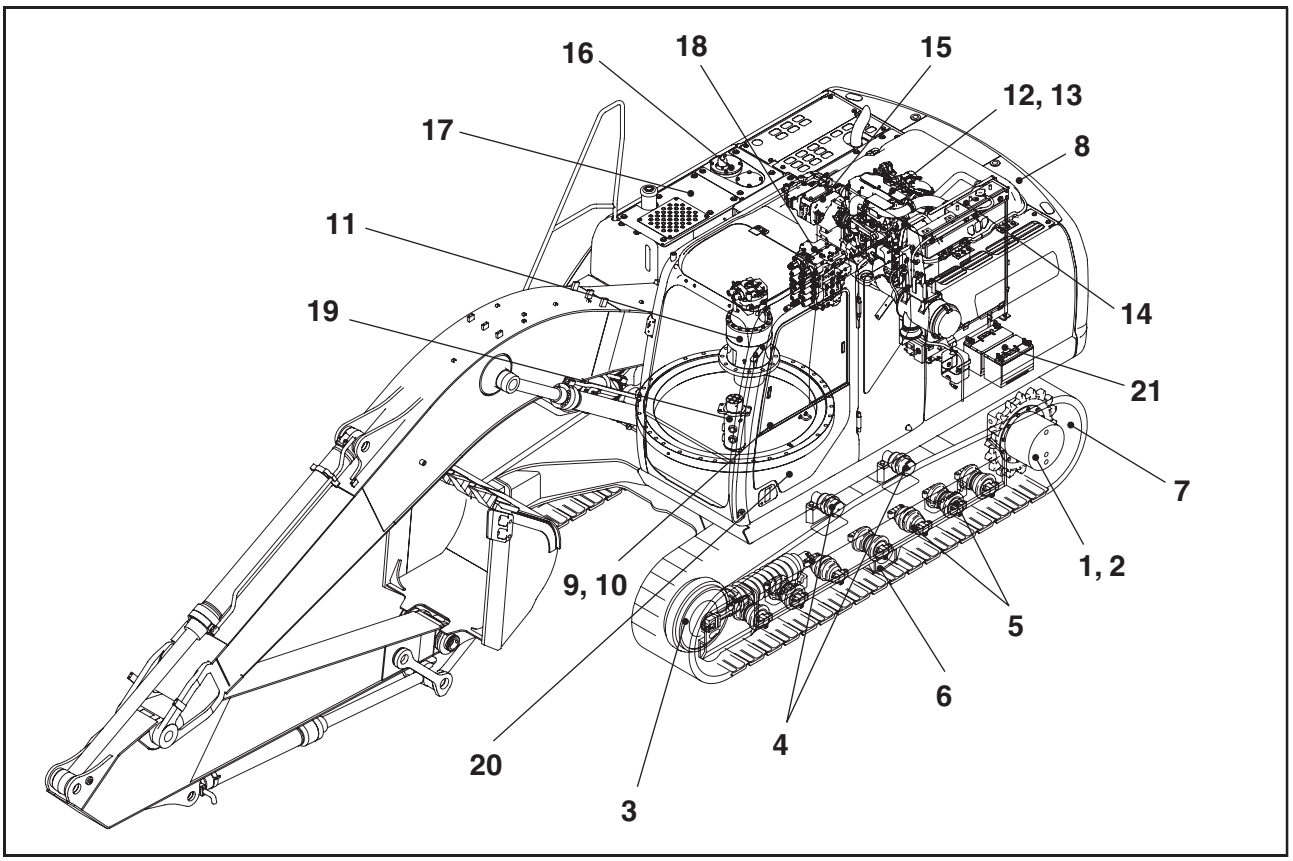
# Other component weight

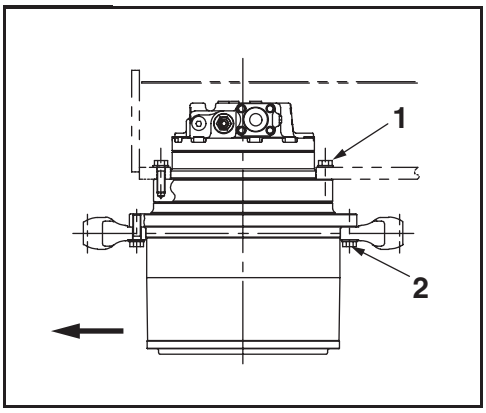
| | |
|---|---|
| Engine | 328 kg (723.1 lbs) |
| Air cleaner | 5.4 kg (11.9 lbs) |
| Hydraulic pump | 86 kg (189.6 lbs) |
| Attachment control valve | 173 kg (381.4 lbs) |
| Swing motor and reduction gear assembly | 235 kg (518.1 lbs) |
| Travel motor and reduction gear assembly | 260 kg (573.2 lbs) |
| Rotary joint | 30 kg (66.1 lbs) |
| Solenoid valve bank | 6.7 kg (14.8 lbs) |
| Cushion valve | 12.5 kg (27.6 lbs) |
| Hand control valve | 1.9 kg (4.2 lbs) |
| Foot control valve | 7.8 kg (17.2 lbs) |
| Standard boom | 1032 kg (2275.2 lbs) |
| Standard arm (dipper) | 468 kg (1031.8 lbs) |
| Long arm (dipper) | 540 kg (1190.5 lbs) |
| Boom cylinder (one) | 157 kg (346 lbs) |
| Articulated boom cylinder | 184 kg (405.7 lbs) |
| Arm (dipper) cylinder | 201 kg (443 lbs) |
| Bucket cylinder | 117 kg (258 lbs) |
| Fuel tank | 107 kg (235.9 lbs) |
| Hydraulic oil tank | 95 kg (209.4 lbs) |
| Turntable bearing | 244 kg (537.9 lbs) |
| Muffler | 13.5 kg (29.8 lbs) |
| Radiator total weight | 79 kg (174.2 lbs) |
| Oil cooler | 15.2 kg (33.5 lbs) |
| Radiator | 9.9 kg (21.8 lbs) |
| Air cooler | 4.6 kg (10.1 lbs) |
| Fuel cooler | 0.7 kg (1.54 lbs) |
| Idler wheel | 86.8 kg (191.4 lbs) |
| Upper roller | 17.2 kg (37.9 lbs) |
| Lower roller | 34.4 kg (75.8 lbs) |
| Recoil spring assembly | 127 kg (280 lbs) |
| Recoil spring | 42.9 kg (94.6 lbs) |
| Grease cylinder assembly | 30.4 kg (67 lbs) |
| Threaded rod | 25.3 kg (55.8 lbs) |
| Yoke | 25.6 kg (56.4 lbs) |
| Track chains (per side) | |
| 600 mm (23.62 in) | 1190 kg (2623.5 lbs) |
| 700 mm (27.56 in) | 1400 kg (3086.5 lbs) |

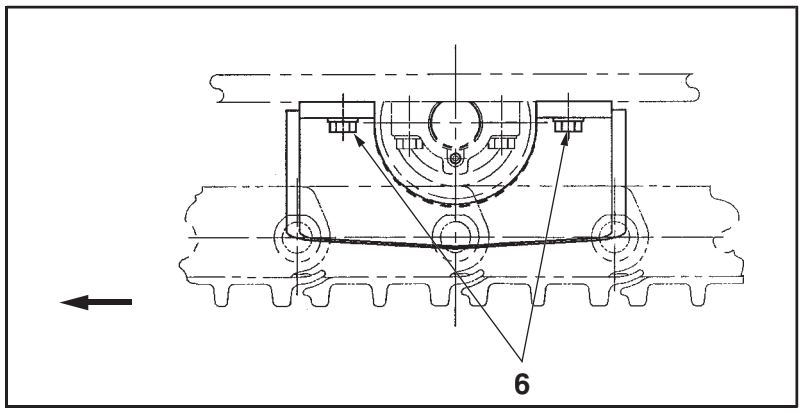
# SPECIAL TORQUE SETTINGS

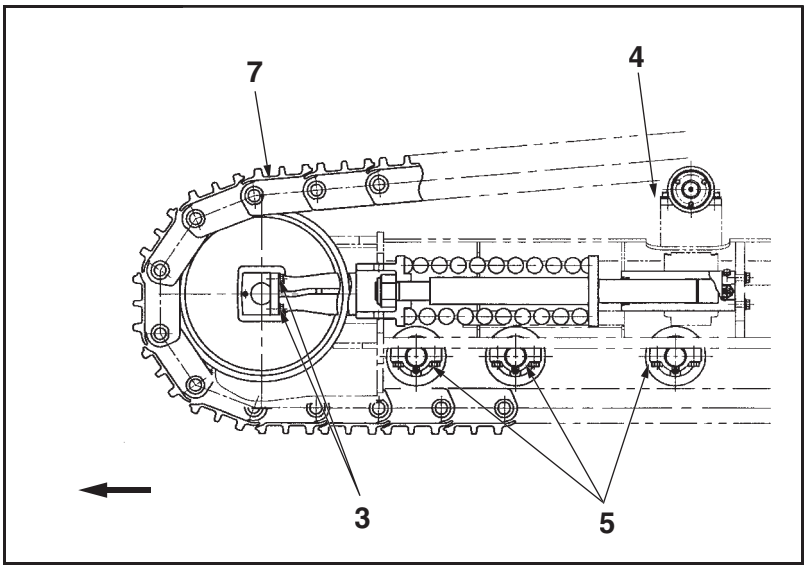
| No. | Component | Screw | Wrench (mm) | Torque setting |
|---|---|---|---|---|
| 1 * | Travel motor and reduction gear assembly | M16 | 24 | 267-312 Nm (197-230 lb-ft) |
| 2 * | Drive sprocket | M16 | 24 | 267-312 Nm (197-230 lb-ft) |
| 3 * | Idler wheel | M16 | 24 | 267-312 Nm (197-230 lb-ft) |
| 4 * | Upper roller | M20 | 30 | 521-608 Nm (385-448 lb-ft) |
| 5 * | Lower roller | M18 | 27 | 371-432 Nm (274-318 lb-ft) |
| 6 * | Track guard | M18 | 27 | 400-462 Nm (295-341 lb-ft) |
| 7 | Shoe bolt | M20 | 30 | 820 Nm (604.8 lb-ft) + 120° |
| 8 | Counterweight | M33 | 50 | 1862-2058 Nm (1374-1517 lb-ft) |
| 9 | Turntable bearing (lower frame) | M20 | 30 | 468-545 Nm (346-402 lb-ft) |
| 10 | Turntable (swing frame) | M20 | 30 | 468-545 Nm (346-402 lb-ft) |
| 11 * | Swing unit | M20 | 30 | 539-630 Nm (398-464 lb-ft) |
| 12 * | Engine (engine mount) | M16 | 24 | 265-314 Nm (196-231 lb-ft) |
| 13 * | Engine bracket | M12 | 19 | 64-74 Nm (47.20-54.58 lb-ft) |
| 14 | Radiator | M12 | 19 | 64-74 Nm (47.20-54.58 lb-ft) |
| 15 * | Hydraulic pump | M10 | 17 | 64-74 Nm (47.20-54.58 lb-ft) |
| | | M16 | | 223-247 Nm (165-182 lb-ft) |
| 16 * | Hydraulic reservoir | M16 | 24 | 232-276 Nm (172-203 lb-ft) |
| 17 * | Fuel reservoir | M16 | 24 | 232-276 Nm (172-203 lb-ft) |
| 18 | Control valve | M16 | 24 | 330-360 Nm (244-265 lb-ft) |
| 19 * | Hydraulic swivel | M12 | 19 | 88-107 Nm (65-78 lb-ft) |
| 20 | | M16 | 24 | 109-127 Nm (81-93 lb-ft) |
| 21 | Cab | M16 | 24 | 245-294 Nm (181-216 lb-ft) |
| 22 | Battery | M10 | 17 | 20-29 Nm (14.75-21.39 lb-ft) |

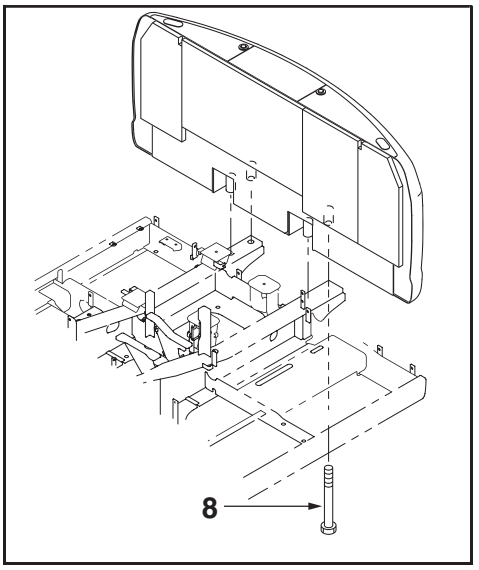
**NOTE:** *Use Loctite 262 or an equivalent on retaining screws of those components marked with an asterisk (*).*



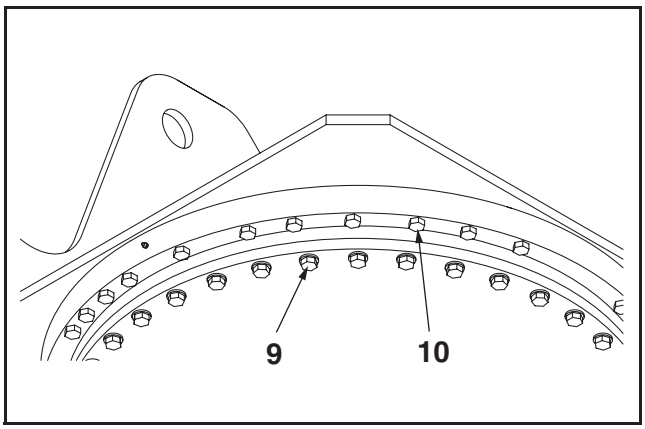



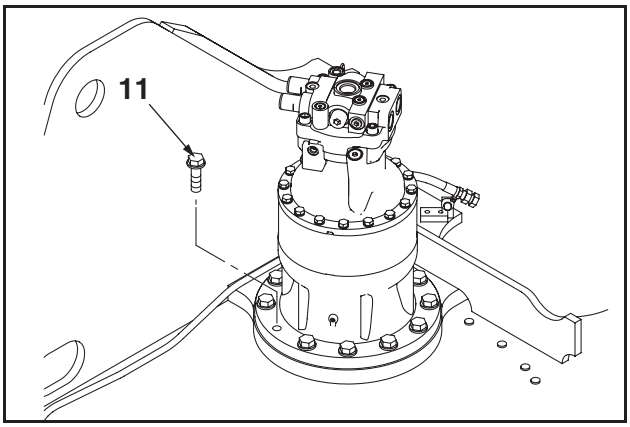



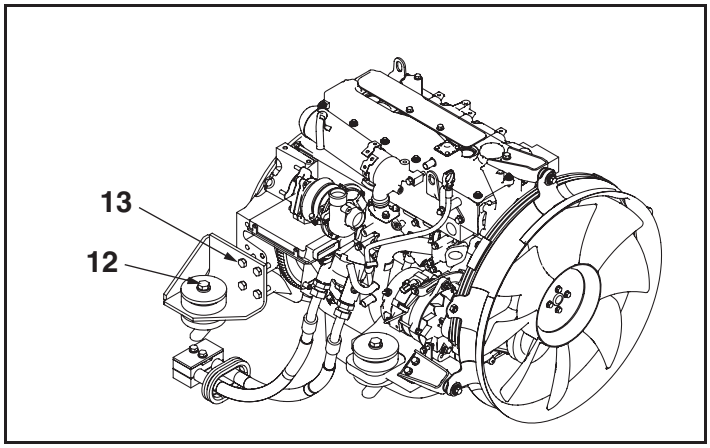



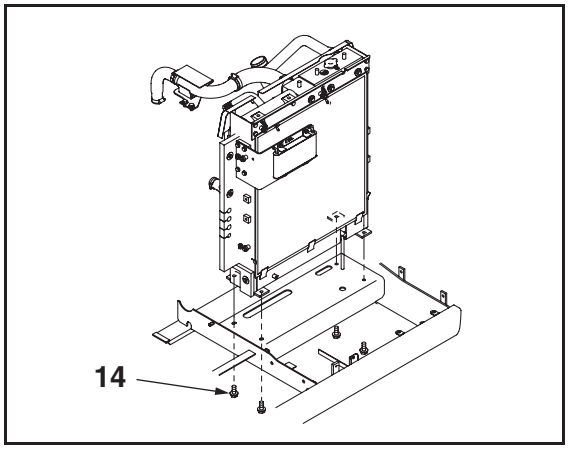



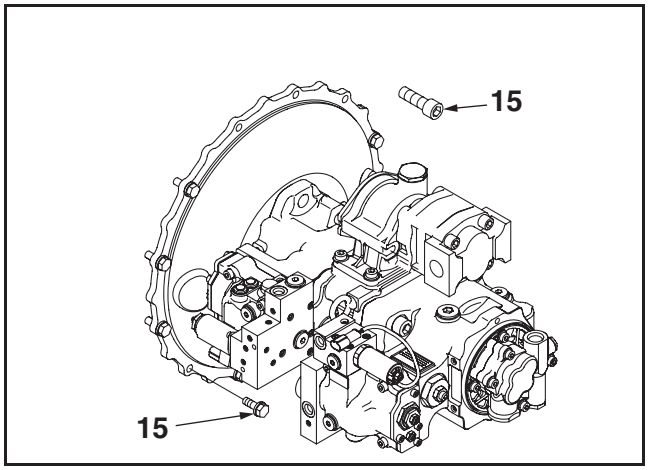

TORQUE_1

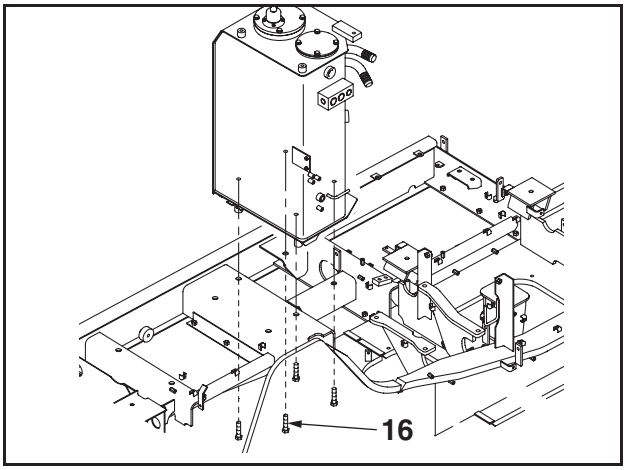


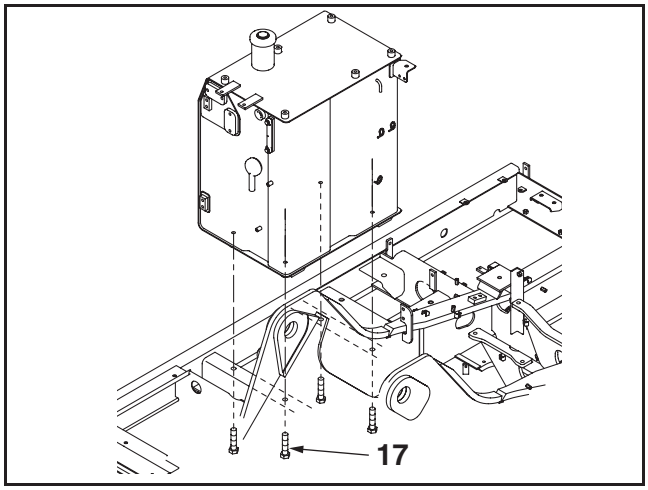



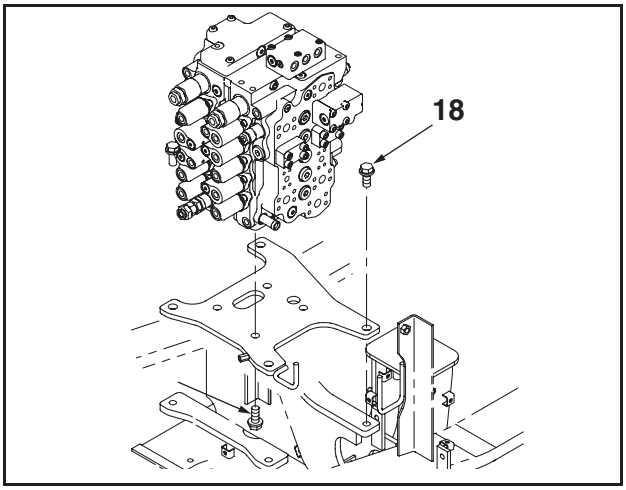



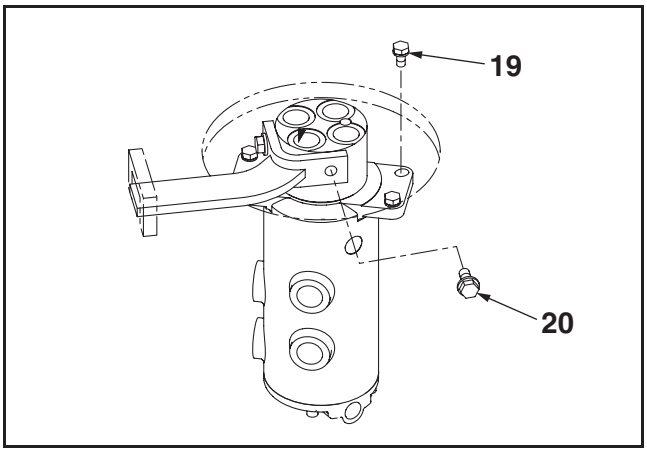



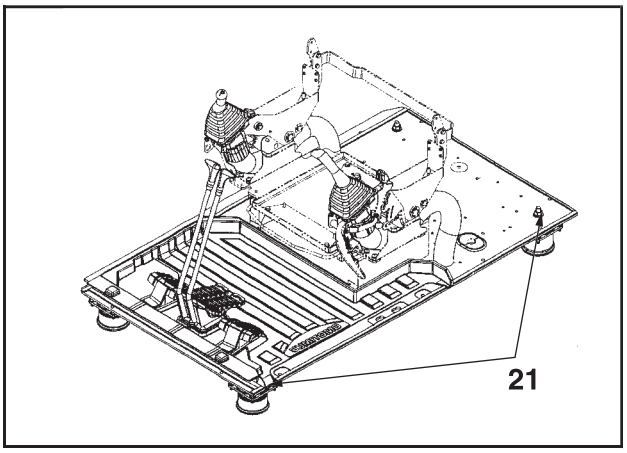



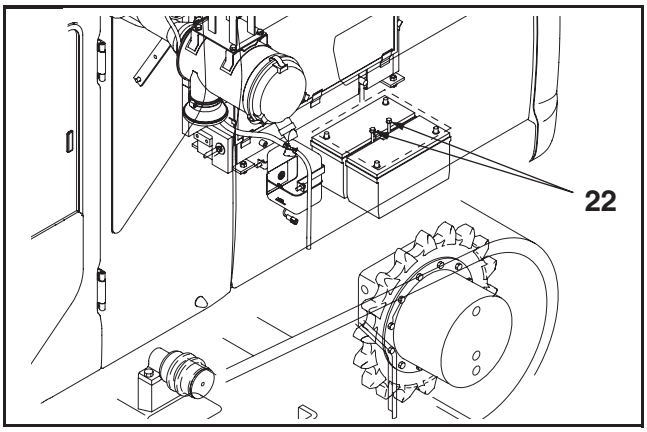




TORQUE_2




TORQUE_3

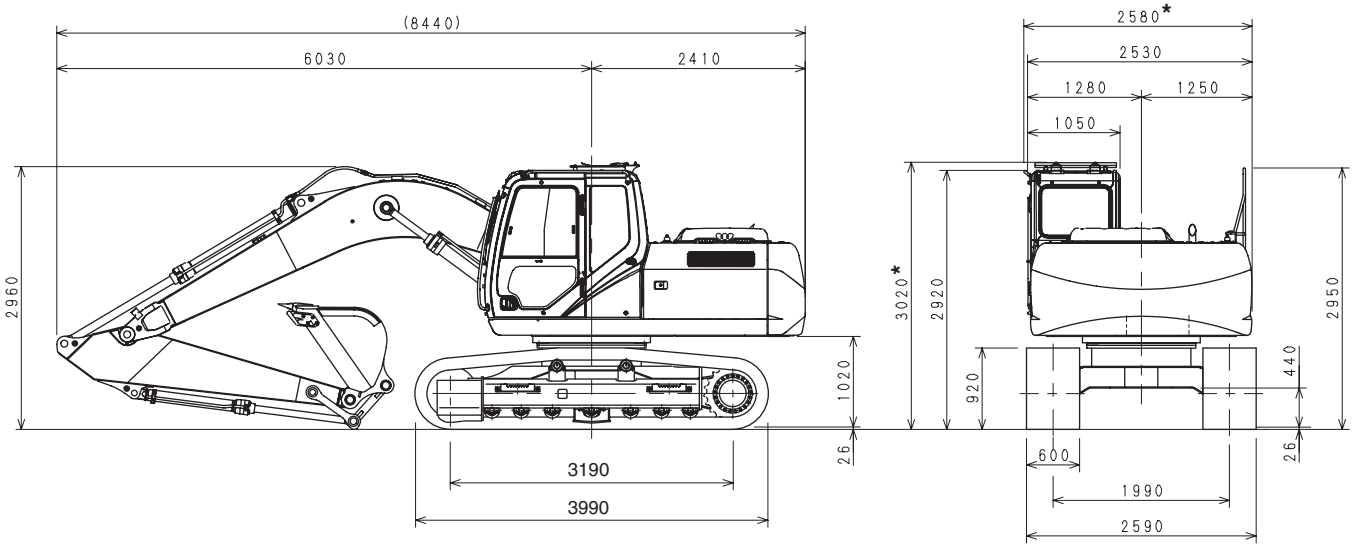
# MACHINE OVERALL DIMENSIONS



**NOTE:** *Numbers are subject to change without notice due to design change or other reasons.*
*The figures give values that include the shoe lug height (26 mm (1.02 in))*

## Standard arm (2620 mm (103.15 in))

* : with vandal cover

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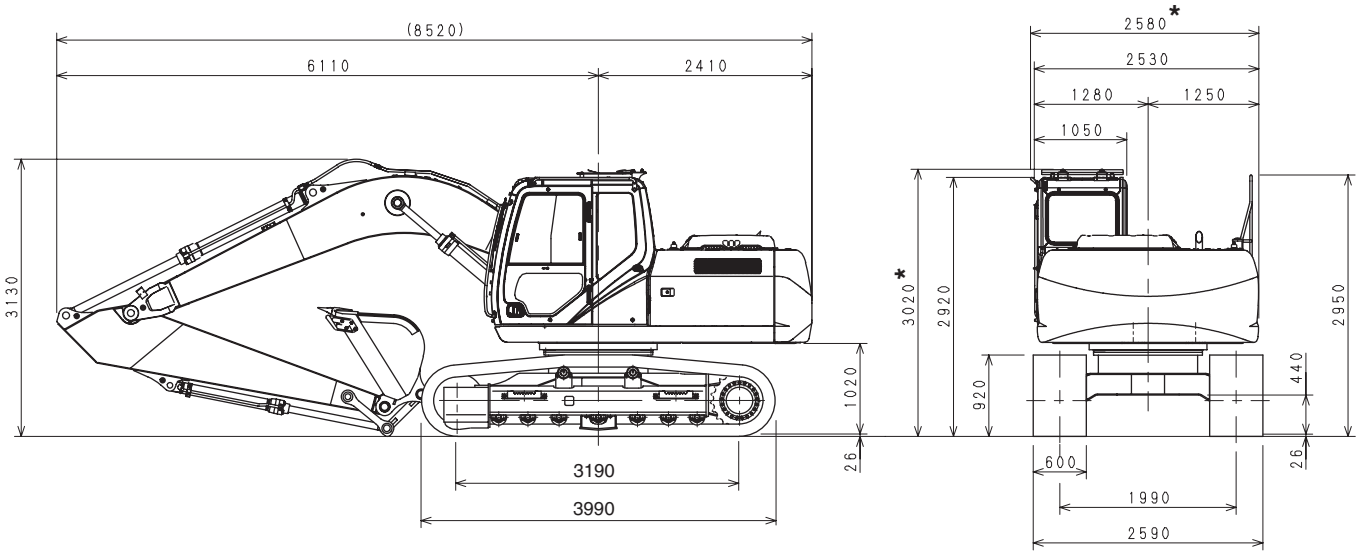
## Long arm (3050 mm (120.08 in))

* : with vandal cover

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