

CRAWLER EXCAVATOR CX470B SERVICE MANUAL

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* For electrical schematic option, see section 4020

NOTE: CNH France S.A. 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.

All data given in this manual is subject to production variations. Dimensions and weights are provided with approximate values and the machine fitting shown in the illustrations may not correspond with standard models. For precise information on specific machine models and versions, please contact your CASE dealer.

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Section 1001

**SAFETY, GENERAL INFORMATION
AND TORQUE SPECIFICATIONS**

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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

Cleaning

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.

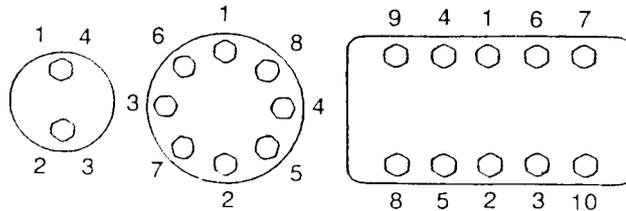


WARNING: When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others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

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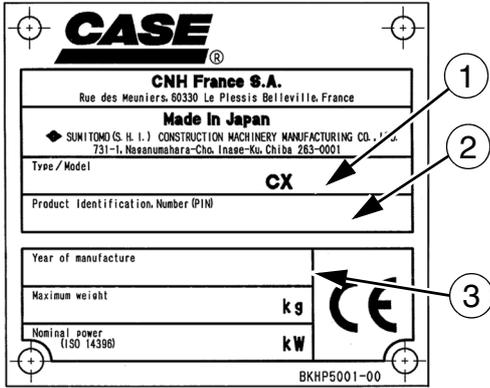
 Short attachment (6.55 m boom) with retractable side frame38

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



CT04A171A

- (1) Type
- (2) Serial number.....
- (3) 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

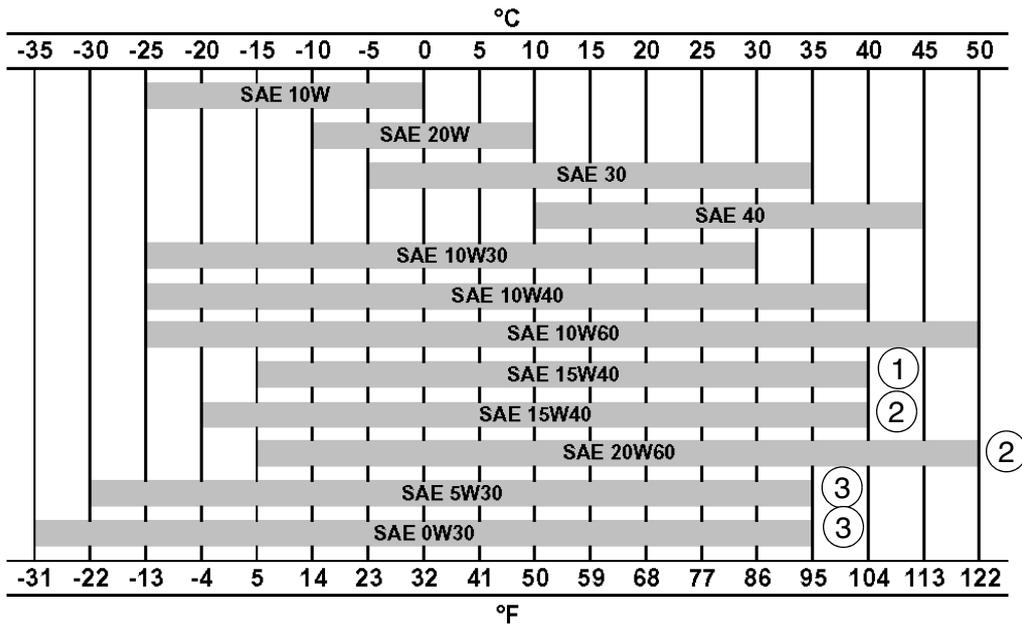
THE CASE/AKCELA No. 1 engine oil is recommended for your engine. This oil ensures proper lubrication of your engine for all operating conditions.

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

Engine fuel, maintenance of fuel filters and fuel storage

In order to meet the emission control regulation of 3rd-stage, the engine components have been made precisely and they are to be used under high-pressure conditions.

Therefore, the specified fuel must be used for the engine.

As a matter of course, not only the guarantee will not be given for the use of a fuel other than the specified but also it may invite a serious breakdown.

In addition, since suitable specifications for the fuel filter elements have been established for this engine, use of the genuine filter is essential.

The following describes the specifications and the requirements of the fuel to be applied, and maintenance of the fuel and the fuel elements.

Fuel to be applied

Selection of fuel

Following conditions must be met for the diesel engines, that is the one;

- 1 In which no dust even fine one is mixed,
- 2 With proper viscosity,
- 3 With high cetane rating,
- 4 With good flow properties in lower temperature,
- 5 With not much sulfur content, and
- 6 With less content of carbon residue

Applicable standards for diesel fuel

Applicable Standard	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/2869-197	Class A-1
EN590	

If a standard applied to the fuel for the diesel engine is stipulated in your country, check the standard for details.

Requirements for diesel fuel

Although conditions required for the diesel fuel are illustrated above, there are other requirements exerting a big influence on its service durability and service life.

Be sure to observe the following requirements for selecting fuel.

Sulfur content	2500 ppm or less
HFRR*	460 mm or less
Water content	0.05 wt% or less

* HFRR (High-Frequency Reciprocating Rig.): An index showing lubricating properties of the fuel.

Sulfur content reacts to moisture to change into sulfuric acid after combustion.

Use of a fuel containing much sulfur content allows it to accelerate internal corrosion and wear.

In addition, much sulfur content quickens deterioration of engine oil allowing its cleaning dispersive property to be worse which results in acceleration of wear of sliding portions.

HFRR is an index that indicates lubricating property of a fuel.

Large value of the index means poor lubrication so that seizure of the machine components may result if such a fuel is used.

Since a fuel with high HFRR value also has lower viscosity, it can easily be leaked out.

If the fuel is mixed with the engine oil, the oil is diluted to deteriorate its lubricating property resulting in acceleration of wear.

Water content allows inside of the fuel tank to rust which in turn blocking the fuel line and the fuel filter.

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

This may also cause wear and seizure of the machine components.

If atmospheric temperature goes below the freezing point, moisture content in the fuel forms fine particle of ice allowing the fuel line to be clogged.

IMPORTANT : *Obtain table of analysis for the fuel you are using from the fuel supplier to confirm that it meets the criteria described above.*

IMPORTANT : *If a fuel which does not meet the specifications and the requirements for the diesel engine, function and performance of the engine will not be delivered. In addition, never use such a fuel because a breakdown of the engine or an accident may be invited.*

Guarantee will not be given to a breakdown caused by the use of a improper fuel.

Some fuels are used with engine oil or additives mixed together with diesel engine fuel.

In this case, do not use these fuels because damage to the engine may result as the fuel has been contaminated.

It is natural that the emission control regulation of 3rd-stage will not be cleared in case where a fuel that does not meet the specifications and the requirements is used.

Use the specified fuel for compliance of the exhaust gas control.

IMPORTANT : *If you use diesel fuel which contains much sulfur content more than 2500 ppm, be sure to follow the items below for the engine oil selection and maintenance of engine parts. Guarantee will not be given to breakdowns caused by not to follow these items.*

1 Selection of engine oil

Use API grade CF-4 or JASO grade DH-1.

2 Exchange the engine oil and engine oil filter element by the periodical interval reported on the Operator's Manual.

3 Inspect and exchange the EGR (*)parts and fuel injector parts of engine every 3000 hour of use.

* EGR: Exhaust Gas Recirculation

Maintenance of fuel filters

Be sure to use the genuine fuel filters.

The fuel injection system is precisely constructed and the genuine filter employs finer mesh than conventional filters to improve protection of machine equipment.

If a filter with coarse mesh is used, foreign object passing through the filter enters into the engine so that machine equipment can wear out in a short period of time.

IMPORTANT : *If a fuel filter other than the genuine filter is used, guaranty will not be applied to a fault caused by the use of a wrong filter.*

Two kinds of fuel filter, the pre-filter and the main filter, are mounted on the machine.

Be sure to use the genuine fuel filters and replace them at the periodic intervals reported on the operator's Manual.

IMPORTANT : *Since the pre-filter also has a function of water separation, discharge water and sediment when the float reaches lower part of the filter elements. CHECK EVERY DAY before to start the engine.*

Time to replace filters may be advanced according to properties of the fuel being supplied.

- Therefore, take measures to prevent dust or water from being entered in the fuel tank when supplying fuel.
- When supplying fuel directly from a fuel drum can, leave the drum as it stands for a long period of time to supply clean fuel standing above a precipitate.
- If it is hard to leave the drum for a long period of time, install a fuel strainer and a water separator before the fuel tank of the machine to supply clean fuel.

Water drain cock is provided on the bottom side of the fuel tank.

- Drain water before starting the engine every morning.
- In addition, remove the cover under the tank once a year to clean up inside of the tank.

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.....	CX470B Hydraulic Excavator
Operating weight	
Standard attachment, fixed side frame	46600 kg (102735 lbs)
Standard attachment, retractable side frame	48100 kg (106042 lbs)
Short attachment, fixed side frame	47100 kg (103838 lbs)
Short attachment, retractable side frame	48600 kg (107145 lbs)
Engine output	270 kW / 1950 rpm

Performance

Swing speed.....	9.0 Tr/min.
Travel speed:	
Low Speed	3.1 km/h (1.93 mph)
High Speed	5.3 km/h (3.29 mph)
Maximum drawbar pull	341 kN (76660 lbf)
Grade ability	70% (35°)
Ground pressure with 600 mm (23.62 in) grouser shoe	
Standard attachment, fixed side frame	80 kPa
Standard attachment, retractable side frame	82 kPa
Short attachment, fixed side frame	81 kPa
Short attachment, retractable side frame	83 kPa
Ground pressure with 750 mm (29.53 in) grouser shoe	
Standard attachment, fixed side frame	65 kPa
Standard attachment, retractable side frame	67 kPa
Short attachment, fixed side frame	66 kPa
Short attachment, retractable side frame	68 kPa
Ground pressure with 900 mm (35.43 in) grouser shoe	
Standard attachment, fixed side frame	55 kPa
Standard attachment, retractable side frame	57 kPa
Short attachment, fixed side frame	55 kPa
Short attachment, retractable side frame	57 kPa

Main body dimensions

Main body width	See machine overall dimensions
Main unit length	6395 mm (251.77 in)
Main unit width, fixed side frame	3350 mm (131.89 in)
Main unit width, retractable side frame	3700 mm (145.67 in) (maximum track retraction for transport = 3200 mm)
Upper swing body width	3060 mm (120.47 in) (3590 mm (141.34 in) with catwalk)
Cab width	1000 mm (39.37 in)
Main unit height, fixed side frame	3290 mm (129.53 in)
Main unit height, retractable side frame	3440 mm (134.43 in)
Swing radius (rear end)	3680 mm (144.88 in)
Swing body rear end distance	3670 mm (144.49 in)
Swing body rear section bottom height, fixed side frame	1330 mm (52.36 in)
Swing body rear section bottom height, retractable side frame	1480 mm (58.27 in)
Overall track length	5450 mm (214.57 in)
Overall track width, fixed side frame	3350 mm (131.89 in)
Overall track width, retractable side frame	3490 mm (137.40 in) (maximum track retraction for transport = 2990 mm (117.72 in))
Distance between tracks fixed side frame	2750 mm (108.27 in)
Distance between tracks, retractable side frame	2890 mm (113.78 in) (maximum track retraction for transport = 2390 mm (94.09 in))
Width of track shoe	600 mm (23.2 in) (Option: 750 mm (29.53 in), 900 mm (35.43 in))
Minimum ground clearance (To bottom of lower frame), fixed side frame	540 mm (21.26 in)
Minimum ground clearance (To bottom of lower frame), retractable side frame	740 mm (29.13 in)

Engine

Name.....	ISUZU, 6UZ1
Type: 4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electric control), with turbo-charger, without cooling fan.	
No. of cylinders - bore x stroke.....	6-dia. 120 mm x 145 mm (4.72 x 5.71 in)
Displacement	9839 cc (600.4 cu.in)
Compression ratio	17.5
Rated output	270 kW / 1950 min ⁻¹
Maximum torque	1435 Nm (1058 lb-ft) / 1500 min ⁻¹
Engine dimensions (LxWxH).....	1235 x 953 x 1272 mm (48.62 x 37.52 x 50.08 in)
Oil pan.....	All direction 35°, inclinable
Starter, reduction type.....	24 V, 5.5 kW
Alternator, AC type.....	24 V, 50 A
Battery.....	2x 12V/24V,128 Ah/5 Hr

Cooling system

Fan type	Hydraulic drive, diameter 1016 mm (40 in), suction type-6blades plastic & steel
Pulley ratio	-
Direction of rotation	Right (viewed from fan side)
Radiator	
Fin type	wavy
Fin space	2.0 mm (0.08 in)
Oil cooler	
Fin type	wavy
Fin space	1.75 mm (0.07 in)
Inter-cooler	
Fin type	triangular straight
Fin space	2.0 mm (0.08 in)
Fuel cooler	
Fin type	wavy
Fin space	2.25 mm (0.09 in)

Capacity of coolant and lubricants

Coolant.....	38 L (10.04 gal)
Fuel	650 L (171.71 gal)
Lubricant for engine	36 L (9.51 gal)
Lubricant for travel reduction gear (per side)	15 L (3.96 gal)
Lubricant for swing reduction gear	10.5 L (2.77 gal)
Hydraulic oil.....	460 L (121.52 gal)
Capacity of hydraulic oil tank	230 L (60.76 gal)

Air conditioning

R134 gas load.....	1Kg (2.20 lbs)
--------------------	----------------

Hydraulic oil filter

Suction filter (inside tank).....	105 μ m
Return filter (inside tank).....	6 μ m
Pilot line filter (inside housing)	8 μ m

Fuel filter

Main filter.....	4 μ m
Pre-filter.....	7 μ m

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*	Fan reverse operation*	Anti-theft device triggered
Refill fuel*	Battery charge*	Electrical system abnormality*
Engine preheat	Engine oil pressure*	Refill coolant*
Air cleaner*	Auto warm-up	Engine system abnormality*
Service due	Engine emergency stop*	Idling

Lighting

Working light	Boom up:	24V, 70W (x2)
	Cab top:	24V, 70W (x2)
	Tank top surface	24V, 70W (x1)
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, DC-DC converter

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	182 cm ³ (11.11 cu in) x 2 /rev
Rated operating pressure	31.4 MPa (4555 psi)
Maximum operating pressure	34.3 MPa (4975 psi)
Input revolution speed	1980 min ⁻¹
Maximum discharge flow	360 L/min (95.11 gpm) x 2 at 1980 min ⁻¹

Pilot pump

Pump type	Gear pump
Displacement volume	15 cm ³ (0.91 cu in)/rev
Operating pressure	3.92 MPa (569 psi)
Maximum flow	29.7 L/min (7.85 gpm) (at 1980 min ⁻¹)

Control method

- Hydraulic simultaneous constant output control.
- Maximum flow adjustment control through external commands (negative control).
- Maximum flow adjustment control through external command (negative control, front side).
- Setting horsepower adjustment control through external command milli-amp.

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	360 L / min (95.11 gpm) at 1980 min ⁻¹
Main relief set pressure	standard; 31.4 MPa (4555 psi), power boost 34.3 MPa (4975 psi)
Overload set pressure	when boom down; 24.5 MPa (3553 psi) other: 36.3 MPa (5265 psi)
Foot relief set pressure	3.38 MPa (490.2 psi)

Functions

- Straight travel circuit
- Boom up / arm 2 pumps internal flow
- Boom and arm load holding circuit
- Boom-down regenerative circuit
- Arm-in forced regenerative circuit
- Swing priority variable orifice (for arm operation)
- Boom-up priority variable orifice (for arm operation)
- Reserve 2 pumps flow
- Bucket - close regenerative circuit

Hydraulic Cylinders

Boom cylinder (x2)

Cylinder bore	Ø170 mm (Ø6.69 in)
Rod diameter	Ø115 mm (Ø4.53 in)
Maximum retracted length	2230 mm (87.80 in)
Stroke	1550 mm (61.02 in)

Arm (dipper) cylinder

Cylinder bore	Ø200 mm (Ø7.87 in)
Rod diameter	Ø140 mm (Ø5.51 in)
Maximum retracted length	2588 mm (101.89 in)
Stroke	1820 mm (71.65 in)

Bucket cylinder with standard boom

Cylinder bore	Ø165 mm (Ø6.50 in)
Rod diameter	Ø115 mm (Ø4.53 in)
Maximum retracted length	1972 mm (77.64 in)
Stroke	1285 mm (50.59 in)

Bucket cylinder with short boom

Cylinder bore	Ø170 mm (Ø6.69 in)
Rod diameter	Ø115 mm (Ø4.53 in)
Stroke	1335 mm (52.56 in)

Cushion Valve

Port size

A-P ports	G3/8
Q-V ports	G1/4

Rotating Joint

Operating pressure

High pressure passage (ABCD)	51.5 MPa (7469 psi)
Drain port (T)	2.0 MPa (290 psi)
Pilot port (P)	5.9 MPa (856 psi)

With stand pressure test pressure

High pressure passage (ABCD)	34.3 MPa (4975 psi)
Drain port (T)	1.0 MPa (145 psi)
Pilot port (P)	3.9 MPa (566 psi)

Flow

High pressure passage (ABCD)	360 L/min (95.11 gpm)
Drain port (T)	40 L/min (10.57 gpm)
Pilot port (P)	31 L/min (8.19 gpm)

Speed

15 min⁻¹

Rotation torque

When pressurizing 2 ports

196 Nm (144.56 lb-ft)

Port A; forward right

G1

Port B; forward left

G1

Port C; backward right

G1

Port D; backward left

G1

Port T; drain port

G1/2

Port P; 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 ports

G1/4

Solenoid specifications

Operating voltage

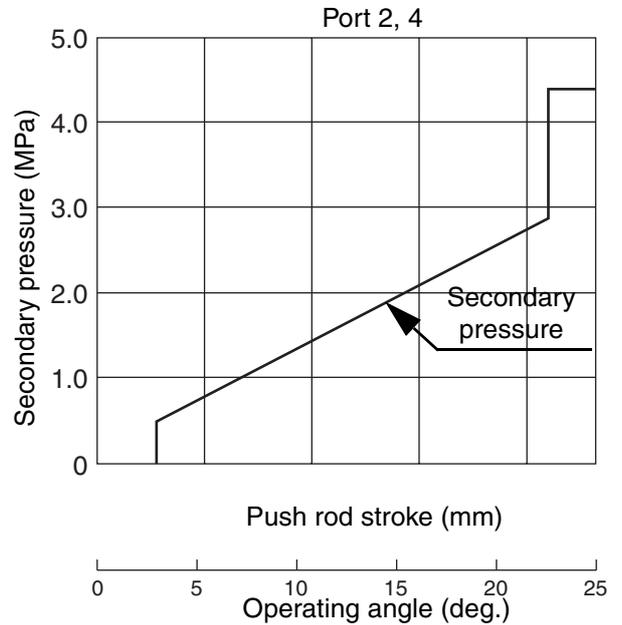
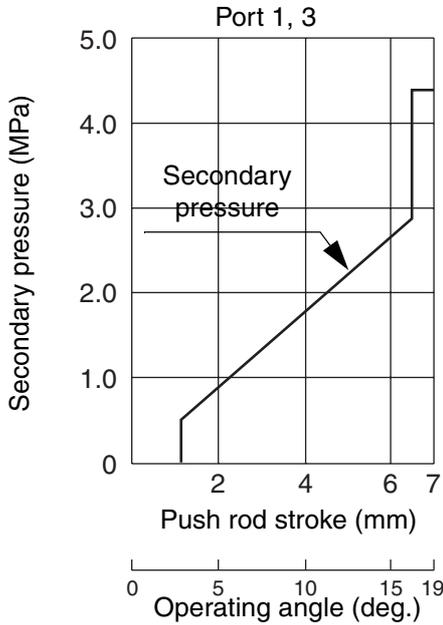
DC 20 to 32 V

Power consumption

17 W max.

Hand control valve

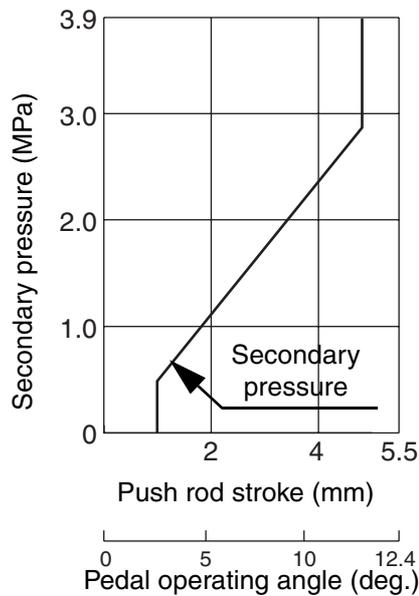
Manufacturer..... Kawasaki
 Operating pressure..... 3.92 MPa (569 psi)
 Secondary pressure, primary short type 0.49 to 2.89 MPa (71.07 to 419.16 psi)
 Operating angle
 Ports 1, 3..... 19°
 Ports 2, 4..... 25°



WC01014-004

Foot control valve

Manufacturer..... Kawasaki
 Operating pressure..... 3.92 MPa (569 psi)
 Secondary pressure, primary short type 0.49 to 2.89 MPa (71.07 to 419.16 psi)
 Operating angle 12.4°



WC01014-005

Swing unit

Swing circle; swing bearing type (with internal gears)

Swing hydraulic motor (x1)	fixed displacement piston motor (with parking brake reverse prevention valve).
Intake amount	250 cm ³ /(15.26 cu in)/rev
Operating pressure	29.4 MPa (4264 psi)
Operating flow	360L/min (95.11 gpm)
Mechanical brake torque	1288 Nm (950 lb-ft)
Brake off pressure	2.9 MPa max. (420.61 psi)
Relief valve set pressure	29.4 MPa (4264 psi) at 50L/min (13.21 gpm)
Reduction gears	planetary gear 2-stage reduction system
Reduction ratio	27.143
Swing parking brake	Mechanical lock (operational lever linkage type)

Travel lower body

Travel hydraulic motor (x2)	Variable displacement piston motor, automatic 2-speed switchover with parking brake
Displacement	290.7/170.1 cm ³ (17.74/10.38 cu in)/rev
Operating pressure	34.3 MPa (4975 psi)
Operating flow	360.4 L/min (95.21 gpm)
Brake torque	71 KNm (52367 lb-ft) min. (including reduction gear)
Relief valve set pressure	35.8/37.8 MPa (5192/5482 psi)
Automatic 2-speed switch-over pressure (with parking brake)	26.5 MPa (3843 psi)
Reduction gear	Planetary gear 2-stage reduction gear
Reduction ratio	60.652
Travel brake	Hydraulic lock
Parking brake	Mechanical lock (travel lever linkage type)
Track shoe	
Model	Assembly type double grouser shoe
Number of shoes (per side)	50
Shoe width	600 mm (23.62 in), (optional 750 mm (29.53 in), 900 mm (35.43 in))
Grouser height	36 mm (1.42 in)
Link pitch	228.6 mm (9.00 in)
Roller	
Number of upper rollers (per side), fixed side frame	2
Number of upper rollers (per side), retractable side frame	3
Number of lower rollers (per side)	9
Track belt tension adjuster	Grease cylinder type (with cushion spring)
Mounting length of spring	740 mm (29.13 in)

Work Unit

Model Backhoe attachment

CX470B	Standard Boom 6980 mm (274.80 in)				Short boom 6550 mm (257.87 in)	
	Fixed side frame		Retractable side frame		Fixed side frame	Retractable side frame
	Standard arm	Short arm	Standard arm	Short arm	Short arm	
Arm (dipper) length	3380 mm (133.07 in)	2530 mm (99.61 in)	3380 mm (133.07 in)	2530 mm (99.61 in)	2530 mm (99.61 in)	
Bucket radius	1840 mm (72.44 in)				1850 mm (in)	
Bucket wrist angle	176°				161°	
Maximum digging radius	12000 mm (472.44 in)	11230 mm (442.12 in)	12000 mm (472.44 in)	11230 mm (442.12 in)	10810 mm (425.59 in)	
Maximum digging radius at ground line	11770 mm (463.38 in)	10990 mm (432.68 in)	11740 mm (462.20 in)	10950 mm (431.10 in)	10560 mm (415.75 in)	10520 mm (414.17 in)
Maximum digging depth	7720 mm (303.94 in)	6870 mm (270.47 in)	7570 mm (298.03 in)	6720 mm (264.57 in)	6490 mm (255.51 in)	6340 mm (249.61 in)
Maximum vertical straight wall digging depth	6570 mm (258.66 in)	5670 mm (223.23 in)	6420 mm (252.76 in)	5520 mm (217.32 in)	4920 mm (193.70 in)	4770 mm (187.79 in)
Maximum digging height	11140 mm (438.58 in)	10820 mm (425.98 in)	11290 mm (444.49 in)	10970 mm (431.89 in)	10520 mm (414.17 in)	10670 mm (420.08 in)
Maximum dump height	7740 mm (304.72 in)	7420 mm (292.13 in)	7890 mm (310.63 in)	7570 mm (298.03 in)	7180 mm (282.68 in)	7340 mm (288.98 in)
Minimum swing radius at front	4990 mm (196.46 in)	5130 mm (201.97 in)	4990 mm (196.46 in)	5130 mm (201.97 in)	4800 mm (188.98 in)	
Height for minimum swing radius at front	9250 mm (364.17 in)	9320 mm (366.93 in)	9400 mm (370.08 in)	9470 mm (372.83 in)	9050 mm (356.30 in)	9200 mm (362.20 in)

New Machine Performance

SP Mode (with standard bucket)

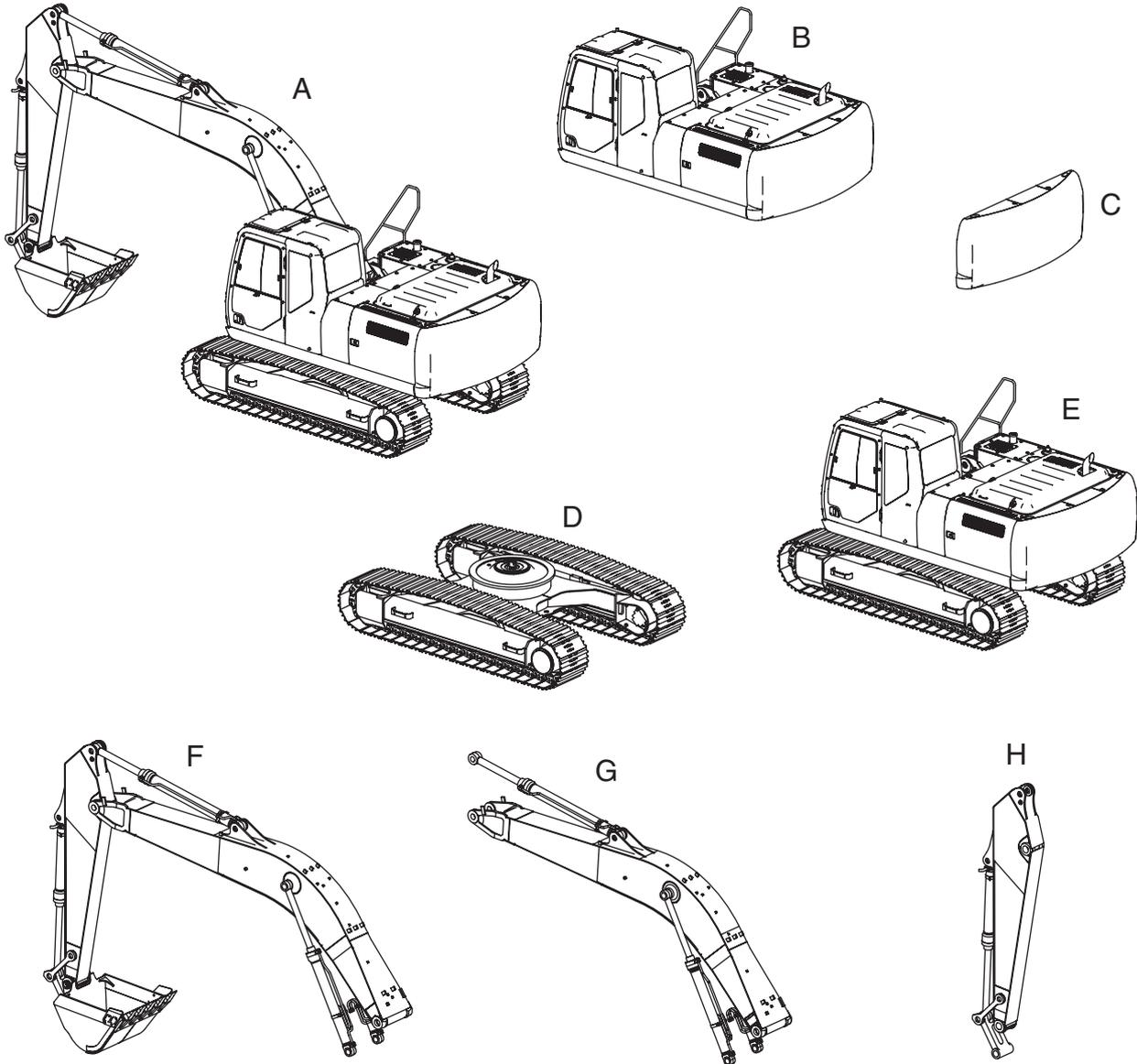
		Item		Unit	Reference value	
1	Engine speed	Idling		min ⁻¹	900 ± 10	
		No load A mode			1750 ± 10	
		No load H mode			1900 ± 10	
		No load SP mode			2000 ± 10	
2	Pressure in each section	Main relief	Standard	MPa	30.6 ± 2.0	
			Boosted pressure		33.8 ± 2.0	
		Boom relief	Up		40.5 ± 2.0	
			Down		28.0 ± 2.0	
		Arm relief	Out		40.5 ± 2.0	
			In			
		Bucket relief	Open		39.5 ± 2.0	
			Close		40.5 ± 2.0	
		Swing relief	Left and right		30.6 ± 2.0	
		Travel relief	Left and right, front and back		33.8 ± 2.0	
		4th pump relief				20.6 ± 2.0
		Pilot pump				3.9 ± 1.0
Option relief	For crusher		-			
	For breaker		-			
3	Natural fall distance (position change) for each cylinder with no load (in 10 min.)	Boom cylinder retraction		mm	13 max.	
		Arm cylinder extension			19 max.	
		Bucket cylinder retraction			22 max.	
		Overall bucket tip falling			250 max.	
4	Attachment speed	Boom (bucket open)	Up (stroke 941)	sec.	4.5 ± 0.6	
			Down (stroke 941)		3.7 ± 0.6	
		Arm	Out		3.6 ± 0.6	
			In		4.5 ± 0.6	
		Bucket	Open		3.0 ± 0.6	
			Close		4.3 ± 0.6	

SP Mode (with standard bucket)

Item				Unit	Reference value
5	Swing speed (one rotation)		Left and right	sec./rev.	6.7 ± 0.6
				min ⁻¹	9.0 ± 0.6
6	Swing brake angle (180°)		Left and right	deg.	40 ° max.
7	Swing motor leakage amount			L/min	2.5
8	Travel speed (6 m travel speed)	Forwards and backwards	High speed	sec./6 m	4.1 ± 0.6
				km/h	5.3 ± 0.6
			Low speed	sec./6 m	6.8 ± 0.6
				km/h	3.2 ± 0.4
9	Travel sprocket speed (10 rotations)		High speed	sec.	17.0 ± 2.0
			Low speed		29.1 ± 2.0
10	Travel turning amount (20 m travel meandering amount)	Forwards and backwards	High speed	mm	1000 max.
			Low speed		
11	Shoe tension amount			mm	360 - 380
12	Travel motor leakage amount			L/min	3.0
13	Swing ball race bearing movement distance		Up and down	mm	2.5 max.
			Left and right		6.0 max.
14	Bucket tip movement amount		Left and right	mm	110 max.
15	Recoil spring dimensions		Compression ratio	mm	740
			Free		914.6
16	Coil resistance of each solenoid valve	Coil resistance temperature 20 °C	Travel high speed	Ω	35
			Boosted pressure		
			Swing brake		
			Lever lock		
17	Milli- amp for hydraulic pump electromagnetic proportional valve	No load	SP mode	mA	490 ± 20
			H mode		460 ± 20
			A mode		420 ± 20

COMPONENT WEIGHT

Major component weight



RST-11-01-001a

Weight information is approximate

A) Operating weight	
Standard attachment, fixed side frame	46600 kg (102735 lbs)
Standard attachment, retractable side frame	48100 kg (106042 lbs)
Short attachment, fixed side frame	47100 kg (103838 lbs)
Short attachment, retractable side frame	48600 kg (107145 lbs)
B) Upper mechanism (including counterweight and turntable bearing)	
	19900 kg (43872 lbs)
C) Counterweight	
	9200 kg (20283 lbs)
D) Lower mechanism (with standard grouser shoe)	
Fixed side frame	16400 kg (645.67 lbs)
Retractable side frame	17900 kg (704.72 lbs)
E) Main Unit Weight	
Fixed side frame	36300 kg (1429.13 lbs)
Retractable side frame	37800 kg (1488.18 lbs)
F) Attachments	
Standard attachment	10300 kg (405.51 lbs)
Short attachment	10800 kg (425.20 lbs)

G) Boom (including cylinders).....	5630 kg (221.65 lbs)
H) Arm (dipper) (including cylinders and linkage)	
Standard attachment	2690 kg (105.91 lbs)
Short attachment.....	2610 kg (102.76lbs)

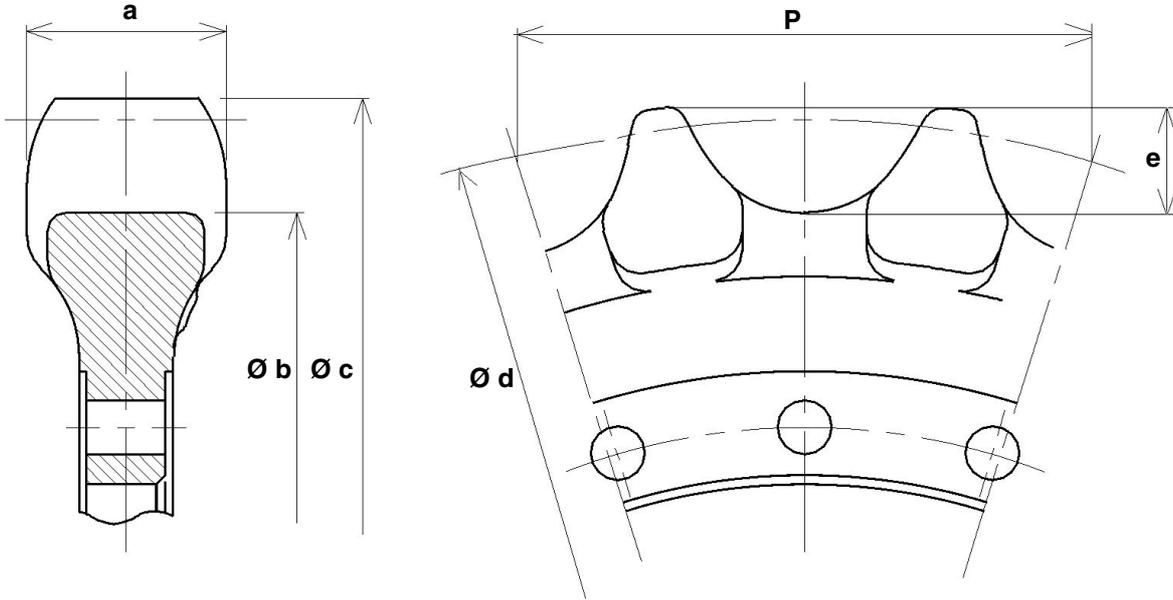
Other component weight

Engine	Approximately 869 kg (1915.81 lbs)
Air cleaner	17.6 kg (38.80 lbs)
Hydraulic pump	245 kg (540.13 lbs)
Control valve	424 kg (934.76 lbs)
Cushion valve.....	12.5 kg (27.56 lbs)
Swing motor and reduction gear assembly	581 kg (1280.88 lbs)
Travel motor and reduction gear assembly	613 kg (1351.43 lbs)
Rotary joint.....	56 kg (123.46 lbs)
Turbtable bearing	656 kg (1446.23 lbs)
5 solenoid valve bank.....	6.7 kg (14.77 lbs)
Hand control valve	1.9 kg (4.19 lbs)
Foot control valve	5.5 kg (12.13 lbs)
Cab	255 kg (562.18 lbs)
Muffler	21 kg (46.30 lbs)
Radiator total weight	211 kg (465.17 lbs)
Oil cooler.....	34 kg (74.96 lbs)
Radiator	24 kg (52.91 lbs)
Air cooler.....	29 kg (63.93 lbs)
Fuel cooler.....	6 kg (13.23 lbs)
Idler wheel.....	251 kg (553.36 lbs)
Upper roller	44 kg (97.00 lbs)
Lower roller	82 kg (180.78 lbs)
Tension damper assembly	343 kg (756.18 lbs)
Recoil spring assembly	141 kg (310.85 lbs)
Grease cylinder assembly	62 kg (136.69 lbs)
Track chains	
600 mm (23.62 in) (50 shoe)	2585 kg (5698.94 lbs)
750 mm (29.53 in) (50 shoe)	2930 kg (6459.54 lbs)
900 mm (35.43 in) (50 shoe)	3280 kg (7231.15 lbs)
Boom cylinder	400 kg (881.85 lbs)
Arm (dipper) cylinder.....	695 kg (1532.21 lbs)
Bucket cylinder	390 kg (859.80 lbs)
Fuel tank	255 kg (562.18 lbs)
Hydraulic oil tank.....	219 kg (482.81 lbs)
Standard boom.....	3540 kg (7804.35 lbs)
Short boom	3570 kg (7870.49 lbs)
Standard arm	1711 kg (3772.10 lbs)
Short arm	
With standard boom.....	1511 kg (3331.18 lbs)
With short boom	1580 kg (3483.30 lbs)

DIMENSIONS AND WEAR LIMIT OF THE TRACK ASSEMBLY

Sprocket

Dimensions

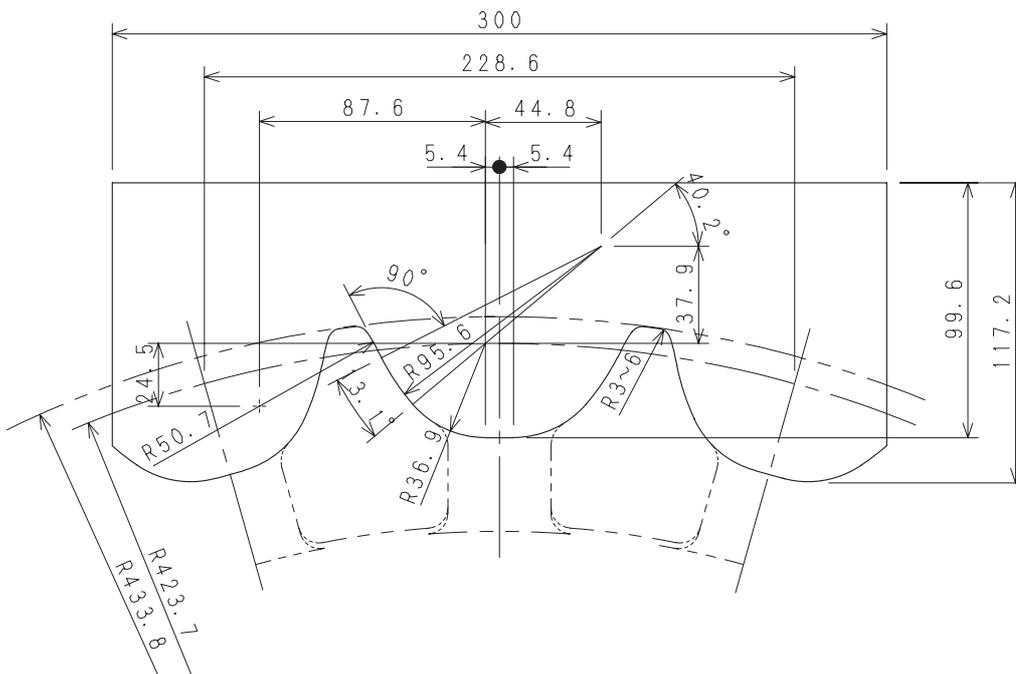


330-6-10-00-13A

Mark	Dimension		Mark	Dimension	
	mm	in		mm	in
a	Standard	90	Ø d	Standard	847.3
	Limit	78		Limit	-
Ø b	Standard	773.6	e	Standard	43.4
	Limit	763.6		Limit	48.4
Ø c	Standard	867.5	P	Standard	228.6
	Limit	854.5		Limit	-

Gauge

unit in mm



Sample manual. Download All pages at:

<https://www.aresairmanual.com/downloads/2016-case-cx470b-crawler-excavator-service-manual-48004716/>

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