

# CRAWLER EXCAVATOR CX470B SERVICE MANUAL

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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

### 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.

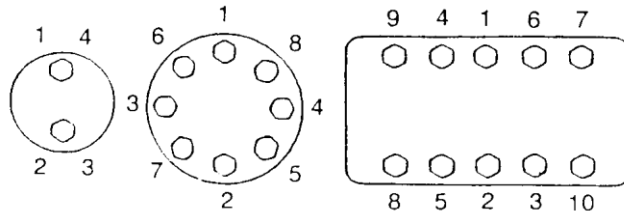


**WARNING:** When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you 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 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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## 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, w ater-cooled, o verhead cam shaft, v ertical in-line, direct injec tion ty pe (electric cont rol), 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<sup>-1</sup>  
 Maximum torque ..... 1435 Nm (1058 lb-ft) / 1500 min<sup>-1</sup>  
 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 <sup>3</sup> (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 <sup>-1</sup>
Maximum discharge flow .....	360 L/min (95.11 gpm) x 2 at 1980 min <sup>-1</sup>

### Pilot pump

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

### 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 <sup>-1</sup>
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<sup>-1</sup>

## 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

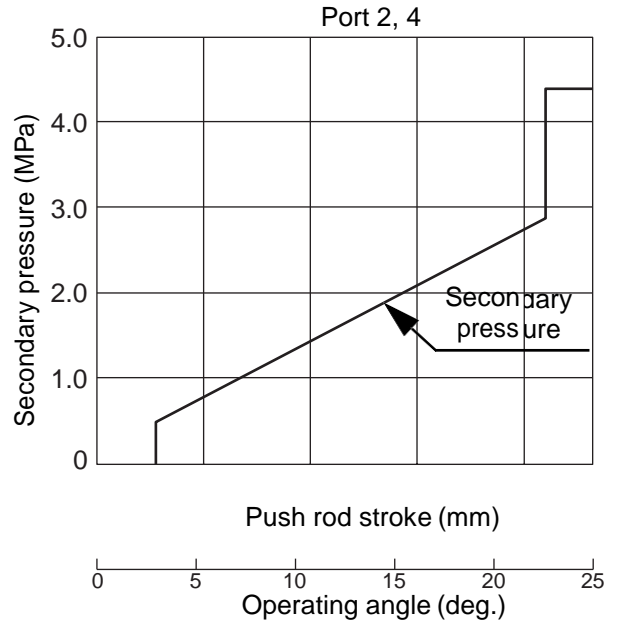
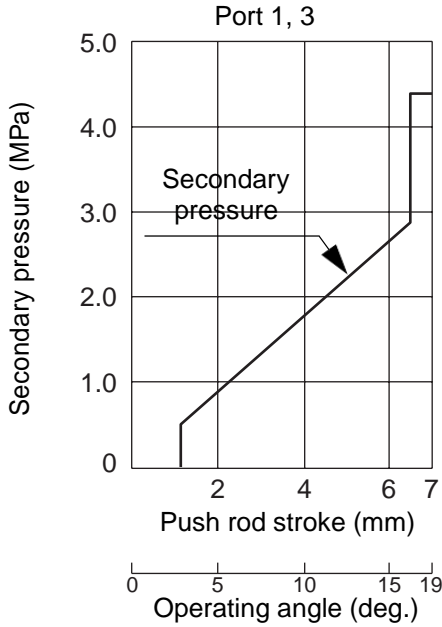
Operating voltage .....DC 20 to 32 V

Power consumption ..... 17 W max.



Hand control valve

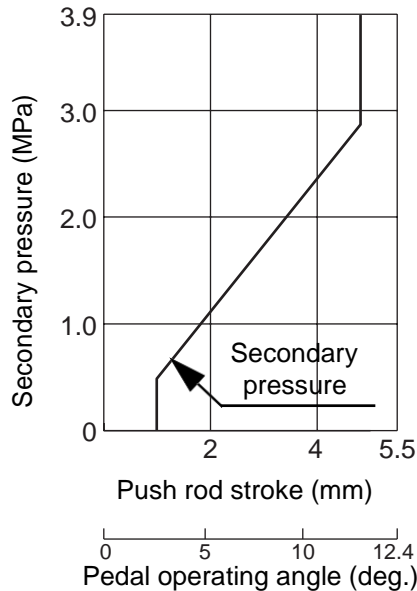
Manufacturer..... Kawasaki  
 Operating pressure ..... 3.92 MPa (569 psi)  
 Secondary pressure, primary short type ..... 0.49 to 2.89 MPa (71.07 to 419.16 psi)  
 Operating angle  
 Ports 1, 3 ..... 19°  
 Ports 2, 4 ..... 25°



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 <sup>3</sup> /(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 <sup>3</sup> (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 w all 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 <sup>-1</sup>	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 <sup>-1</sup>	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	∧	35
			Boosted pressure		
			Swing brake		
			Lever lock		
			Power save		
17	Milli- amp for hydraulic pump electromagnetic proportional valve	No load	SP mode	mA	490 ± 20
			H mode		460 ± 20
			A mode		420 ± 20

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