

CX330, CX330NLC and CX350 Tier 3 Crawler Excavators

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* Consult the Engine Service Manual

Sections to be distributed at a later date

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.

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.

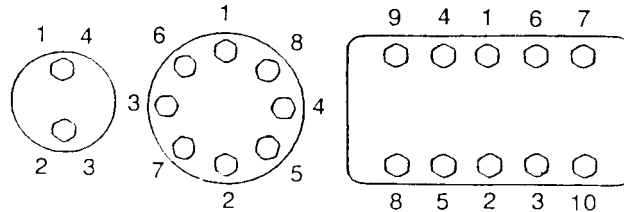


WARNING: When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others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

1002

SPECIFICATIONS AND SPECIAL TORQUE SETTINGS

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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.*

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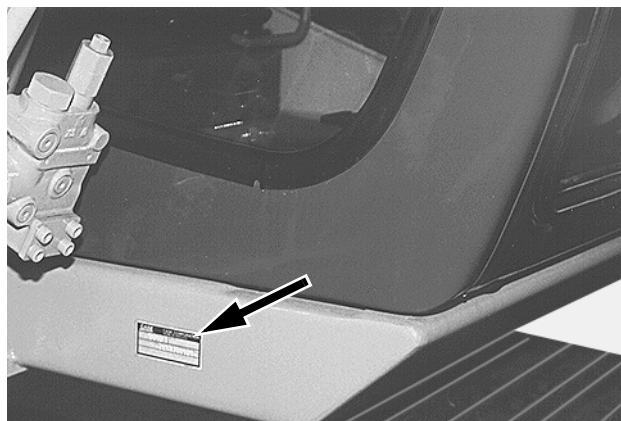
MACHINE OVERALL DIMENSIONS..... 33

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



CP98N006

CASE [®]	
CNH France S.A. Rue des Meuniers, 60330 Le Plessis Belleville, France	
Made in Japan SUNITOMO (S. H. L.) CONSTRUCTION MACHINERY MANUFACTURING CO., LTD. 731-1, Naganumahara-Cho, Inase-Ku, Chiba 263-0001	
Type / Model	CX
Product Identification Number (PIN)	
Year of manufacture	
Maximum weight	
Nominal power (ISO 14396)	
BKHP5001-00	

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

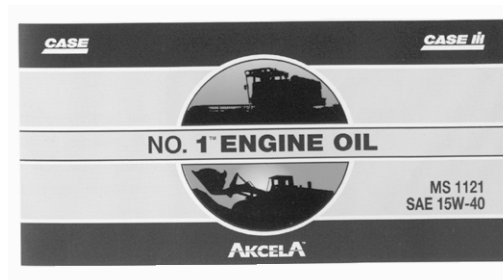
CASE/AKCELA: MULTIPURPOSE GREASE 251H EP (NLGI 2).

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.

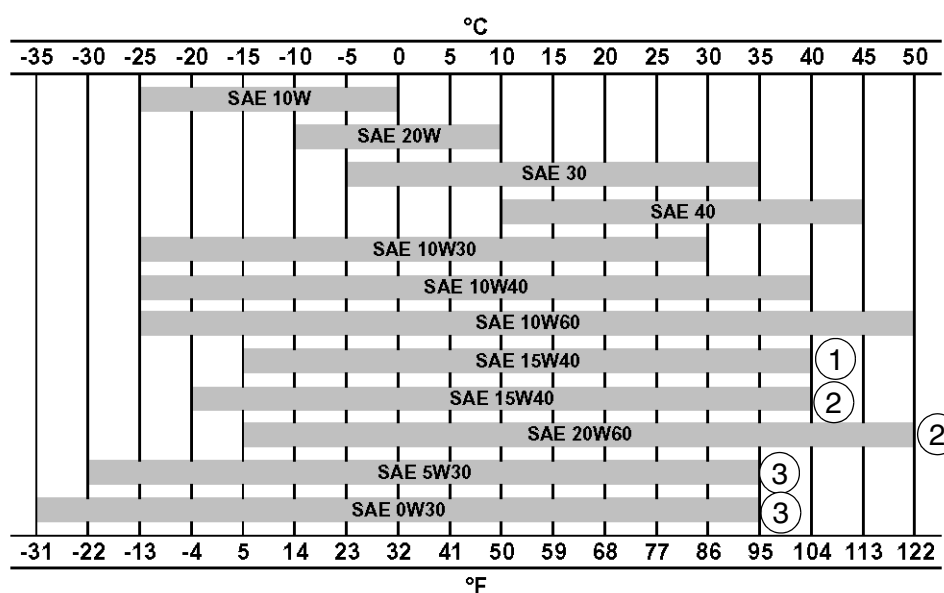
If you are unable to procure the CASE No. 1 Multiperformance or Performance engine oil, use the corresponding oil from the API/CG/CF category.

NOTE: Do not put any Performance Additives or any other additives in the engine housing. The oil changing intervals are indicated in the Operator's manual based on tests carried out on CASE lubricants.



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), it is provisionally approved to use a mixture of fuels No. 1-D and No. 2-D.

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 following specific conditions are required for diesel fuel:

- Must be free from minute dust particles.
- Must have adequate viscosity.
- Must have high cetane value.
- Must have high fluidity at low temperature.
- Must have low sulphur content.
- Must have 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 : *If fuel other than the specified one is used, engine operation will be impaired.*

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 use of the correct fuel additives, consult your oil or lubrication supplier. 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, 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 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	CX330 Hydraulic Excavator
.....	CX330NLC Hydraulic Excavator
.....	CX350 Hydraulic Excavator
Operating weight	CX330 34100 kg (75178 lbs)
.....	CX330NLC 34000 kg (74957 lbs)
.....	CX350 36100kg (79587 lbs)
Engine output	202 kW / 2000 rpm

Performance

Standard weight.....	18.0 kN (4047 lbf)
Swing speed	9.6 Tr/min.
Travel speed.....	Low Speed 3.2 km/h (1.9 mph)
.....	High Speed 5.5 km/h (3.4 mph)
Maximum drawbar pull	278 kN (62497 lbf)
Grade ability	70% (35°)
Ground pressure.....	64 kPa (600 mm (23.6 in) grouser shoe)

Complete machine dimensions

CX330, CX330NLC

	Standard arm 3.25 m (10 ft 8 in)	Super short arm (2.21m) (7 ft 3 in)	Short arm (2.63 m) (8 ft 8 in)	Long arm (4.04 m) (13 ft 3 in)
Length	11050 mm (36 ft 3 in)	11250 mm (36 ft 11 in)	11130 mm (36 ft 6 in)	11090 mm (36 ft 3 in)
Width	CX330 = 3200 mm (10 ft 6 in) CX330NLC = 3040 mm (10 ft 0 in)			
Height	3290 mm (10 ft 9 in)	3600 mm (11 ft 9 in)	3530 mm (11 ft 7 in)	3510 mm (11 ft 6 in)

CX350

	HD Standard arm (3.25 m) (10 ft 8 in)	HD Super short arm (2.21m) (7 ft 3 in)	HD Short arm (2.63 m) (8 ft 8 in)
Length	11050 mm (36 ft 3 in)	11250 mm (36 ft 11 in)	11130 mm (36 ft 6 in)
Width	3200 mm (10 ft 6 in)		
Height	3290 mm (10 ft 9 in)	3570 mm (11ft 8 in)	3530 mm (11 ft 7 in)

Main body dimensions

Main body length	5910 mm (19 ft 5 in)
Main body width.....	3200 mm (10 ft 6 in)
Upper swing body width	3040 mm (10 ft 0 in)
Cab width.....	1000 mm (39.36 in)
Main body height	3130 mm (10 ft 26 in)
Tail swing radius	3450 mm (11 ft 2 in)
Distance of rear swing body	3420 mm (11 ft 2.5 in)
Ground clearance for upperstructure.....	1210 mm (4 ft 0.5 in)
Center-to-center of wheels	4040 mm (13 ft 3 in)
Overall track length.....	4980 mm (16 ft 2.5 in)
Maximum track width.....	CX330, CX350 3200 mm (10 ft 6 in)
.....	CX330NLC 2990 mm (9 ft 9 in)
Center-to-center for track.....	CX330, CX350..... 2600 mm (8 ft 6 in)
.....	CX330NLC 2390 mm (7 ft 9.5 in)

Width of track shoe 600 mm (23.6 in)
 Minimum ground clearance 480 mm (19 in) (To bottom of lower frame)

Engine

Name ISUZU, AH-6HK1XYSS
 Type: 4-cycle, water-cooled, overhead camshaft, common rail injection (electric control),
 with air-cooling type inter-cooler turbo with air-cooling.
 No. of cylinders - bore x stroke 6-dia. 115 mm x 125 mm (4.53 x 4.92 in)
 Displacement 7790 cc (475 cu.in)
 Compression ratio 17.5
 Rated output 202± 3.0 kW / 2000 min⁻¹
 Maximum torque 1080Nm (797 lb-ft) / 1500 min⁻¹
 Engine dimensions (LxWxH) 1357 x 995.4 x 1141 mm (53.42 x 39.19 x 44.92 in)
 Oil pan All direction 35°, inclinable
 Starter, reduction type 24 V, 5 kW
 Alternator, AC type 24 V, 50 A
 Battery 2x 12V/24V, 128 Ah/5 Hr

Cooling system

Fan type diameter 850 mm (33.5 in), suction type-6blades resin & steel
 Pulley ratio80 (reduction)
 Direction of rotation Right (viewed from fan side); compliant with
 Radiator capacity 96.0 kW
 Fin type wavy
 Fin space 2.0 mm (0.08 in)
 Oil cooler capacity 66.6 kW
 Fin type Wavy
 Fin space 1.75 mm (0.07 in)
 Inter-cooler capacity 29.9 kW
 Fin type triangular straight
 Fin space 2.0 mm (0.08 in)
 Fuel cooler capacity 1.7 kW
 Fin type wavy
 Fin space 2.0 mm (0.08 in)

Capacity of coolant and lubricants

Coolant 30 L (7.92 gal)
 Fuel 580 L (153 gal)
 Lubricant for engine 38 L (10 gal)
 Lubricant for travel reduction gear (per side) 9.5 L (2.5 gal)
 Lubricant for swing reduction gear (per side) 6 L (1.59 gal)
 Hydraulic oil 350 L (92.5 gal)
 Capacity of hydraulic oil tank 175 L (46.2 gal)

Hydraulic oil filter

Suction filter (inside tank) 150 mesh
 Return filter (inside tank) 10 µ m
 Nephron filter (inside housing) 1 µ m
 Pilot line filter (inside housing) 10 µ m

Operating devices

Operator's seat

Location; left side

Structure; low frequency air suspension with helical springs and double acting hydraulic damper.

Cab

Smooth and round shape design cab, fabricated by press work Safety glass for all windows.

Levers and pedals

For travel use; levers and pedals (hydraulic pilot type) (2)

For operating machine use; levers (hydraulic pilot type) (2)

Instruments and switches

Work mode switchover; 4 modes (heavy digging, standard, finishing and auto)

Travel speed switchover; Low Speed / High Speed panel switch

One-touch idle; Knob switch type

Monitor device

Machine status display (full-dot liquid crystal)

Travel speed selection status; Low Speed / High Speed

Work mode selection status; H/S/L/A

Auto idle selection status; ON/OFF

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*

Idling

Service interval

Lighting

Working light	Upper:	24V, 70W (1)
	Boom:	24V, 70W (1)
	Cab:	24V, 70W (1)
Interior light		24V, 10W (1)

Horn; electric horn (2)

Other

Wiper with intermittent function (1)

Window washer fluid (1)

Air conditioner (1)

Rear view mirror (right-hand side) (1)

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	140 cm ³ (8.54 cu in) X 2 /rev
Rated operating pressure	34.3 MPa (4975 psi)
Maximum operating pressure	37.3 MPa (5410 psi)
Input revolution speed	2030 min-1
Maximum flow	284 L/min (75 gpm) x 2 at 2030 min-1
Input horsepower	171.7 kW
Shaft input horsepower	174.7 kW at 2030 min-1
Shaft input torque	821.8 N•m (1085 lb-ft) at 2030 min-1

Pilot pump

Pump type	Gear pump
Displacement	15 cm ³ (0.91 cu in)/rev
Operating pressure	3.9 to 4.1 MPa (565 to 595 psi)
Maximum flow	30.5 L/min (8 gpm) at 2030 min-1
Input horsepower	3.0 kW

Control characteristics; simultaneous output control of overall, negative control, electric horse power control

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	284 L / min (75 gpm)
Set pressure of main relief valve	standard; 34.3 MPa (4975 psi), power boost 37.3 MPa (5410 psi)
Set pressure of overload relief valve	when boom down; 27.4 MPa (3974 psi) at 20 L / min
.....	other: 39.2 MPa (5685 psi) at 20 L / min
Set pressure of foot relief valve	2.89 MPa (420 psi) at 53 L / min

Functions

- Straight travel circuit
- Boom UP / 2-speed internal confluence for Arm
- Boom/arm load holding circuit
- Boom down regenerative circuit
- Arm IN forced regenerative circuit
- Variable throttle valve in parallel circuit arm
- Swing priority variable throttle valve
- Preliminary 2-speed confluence

Hydraulic Cylinders

Boom cylinder (2)

Inner diameter of tube x rod diameter x stroke	145x100x1495 mm
--	-----------------

Arm (dipper) cylinder

Inner diameter of tube x rod diameter x stroke	170x120x1748 mm
--	-----------------

Bucket cylinder

Inner diameter of tube x rod diameter x stroke	150x105x1210 mm
--	-----------------

Rotating Joint

Operating 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)

Hydrostatic test pressure

High pressure passage (ABCD).....	51.5 MPa (7470 psi)
Drain port (T)	2.0 MPa (290 psi)
Pilot port (P)	5.9 MPa (856 psi)

Flow

High pressure passage (ABCD).....	360 L/min (95 gpm)
Drain port (T)	40 L/min (10.6 gpm)
Pilot port (P)	31 L/min (8.2 gpm)

Number of revolutions 15 min⁻¹

Torque, when pressurizing 2 ports 196 Nm (145 lb-ft)

Port A; forward right G1-A Class

Port B; forward left..... G1-A Class

Port C; backward right..... G1-A Class

Port D; backward left..... G1-A Class

Port T; drain port G1/2-A Class

Port P; pilot port G1/4-A Class

Solenoid Valve

Maximum flow P -> B: 20 L / min (5.28 gpm) Other: 5 L / min (1.32 gpm)

Rated pressure..... 4.41 MPa (640 psi)

Operating voltage DC 20 to 32 V

Current 13.0 W (at 24 V, 20° C)

Hand control valve

ManufacturerKawasaki

Operating pressure3.92 MPa (569 psi)

Secondary pressure, primary short type0.64 ± 0.1 to 2.45 ± 0.14 MPa

Operating angle

Ports 1, 3..... 19 ± 1.9°

Ports 2, 4..... 25 ± 2.5°

Operating torque

Port 1 1.18 to 2.67 Nm (0.87 to 1.97 lb-ft)

Port 3 0.94 to 2.38 Nm (0.70 to 1.76 lb-ft)

Ports 2, 4..... 1.37 to 3.19 Nm (1.01 to 2.35 lb-ft)

Foot control valve

ManufacturerNishina

Operating pressure3.92 MPa (569 psi)

Secondary pressure; primary short type0.64 ± 0.1 to 2.45: 0.14 MPa

Operating angle..... 12.4 ± 0.3°

Operating torque

Valve 4.16 to 10.6 Nm (3.06 to 7.81 lb-ft)

Damper 4.90 ± 0.98 Nm (3.61 ± 0.72 lb-ft) at 0.0275 m/s

Click on the image link below for the full version of the service manual

