



SERVICE MANUAL
CRAWLER EXCAVATOR
CX290B

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CRAWLER EXCAVATOR CX290B 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**

**Thanks very much for your reading,
Want to get more information,
Please click here, Then get the complete
manual**

JustClickHere 

NOTE:

**If there is no response to click on the link above,
please download the PDF document first, and then
click on it.**

**Have any questions please write to me:
admin@servicemanualperfect.com**

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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.

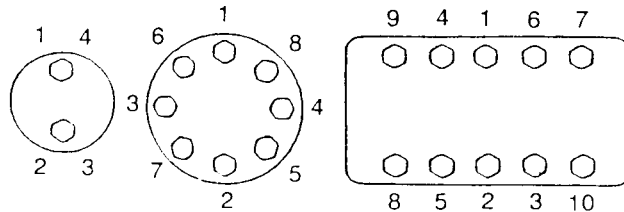


WARNING: When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others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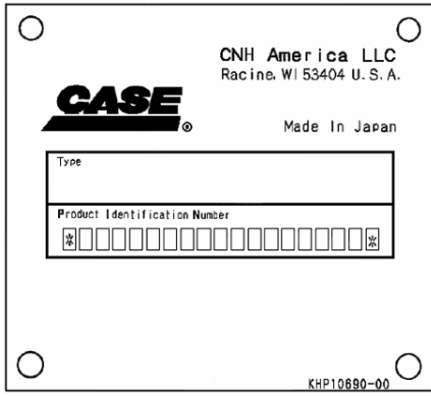
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TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE

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

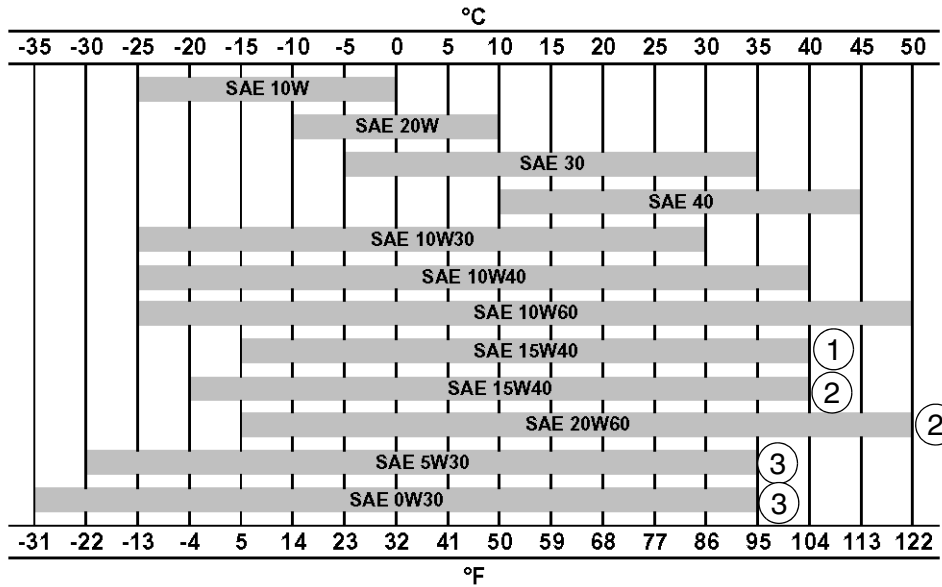
THE CASE/AKCELA No. 1 engine oil is recommended for your engine. This oil ensures proper lubrication of your engine for all operating conditions.

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 CX290B Hydraulic Excavator
 Operating weight 29800 kg (65698 lbs)
 Engine output 154 kW / 1800 rpm

Performance

Swing speed 10.2 Tr/min.
 Travel speed Low Speed 3.2 km/h (1.99 mph)
 High Speed 5.6 km/h (3.48 mph)
 Maximum drawbar pull 233.2kN (52425.45 lbf)
 Grade ability 70% (35°)
 Ground pressure 56 kPa (600 mm (23.62 in) grouser shoe)
 49 kPa (700 mm (27.56 in) grouser shoe)
 43 kPa (800 mm (31.50 in) grouser shoe)

Complete machine dimensions

	Arm (dipper)		
	3180 mm (125.20 in)	2650 mm (104.33 in)	3600 mm (141.73 in)
Lenght (without attachment)	5590 mm (220.08 in)	5590 mm (220.08 in)	5590 mm (220.08 in)
Lenght (with attachment)	10450 mm (411.4 in)	10480 mm (412.6 in)	10470 mm (412.2 in)
Height (with attachment)	3260 mm (128.35 in)	3340 mm (131.5 in)	3460 mm (136.22 in)

Main body dimensions

Main body width See machine overall dimensions
 Upper side swing body width 2870 mm (112.99 in)
 Cab width 1000 mm (39.37 in)
 Main body height 3110 mm (122.44 in)
 Engine displacement 3160 mm (124.41 in)
 Swing body tail distance 3150 mm (124.01 in)
 Swing body rear section bottom height 1190 mm (46.85 in)
 Distance between tumblers 3980 mm (156.69 in)
 Overall track length 4850 mm (190.94 in)
 Width of track shoe 800 mm (31.50 in) (Optional: 600 mm (23.62 in) 700 mm (27.56 in))
 Minimum ground clearance 470 mm (18.50 in) (To bottom of lower frame)

Engine

Name	ISUZU, 6HK1X
Type:	4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electronic control), with turbocharger.
No. of cylinders - bore x stroke	6 - Ø115 mm x 125 mm (4.53 x 4.92 in)
Displacement	7.79 L (2.06 gal)
Compression ratio	17.5
Rated output	154 kW / 1800 min ⁻¹
Maximum torque	850 N.m (626.93 lb-ft) / 1500 min ⁻¹
Engine dimensions (LxWxH)	1357x995.4x1141 mm (53.42 x39.19x44.92 in)
Oil pan	All direction 35 rad, inclinable
Oil pan capacity	Maximum: 38 L (10.04 gal) Minimum: 28 L (7.40 gal) (excluding oil filter)
Direction of rotation	Right (as seen from fan)
Starter, reduction type	24 V, 5 kW
Alternator, AC type	24 V, 50 A
Battery	2 x 12V,128 Ah/5 Hr

Cooling system

Fan type	Ø 850 mm (33.46 in), suction type - 6 blades, plastic with belt mouth-type fan guide
Pulley ratio	0.80 (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	14.5 L (3.83 gal) (engine only)

Capacity of coolant and lubricants

Coolant	29 L (7.66 gal)
Fuel	450 L (118.88 gal)
Lubricant for engine	38 L (10.04 gal)
Lubricant for travel reduction gear (per side)	9.1 L (2.40 gal)
Lubricant for swing reduction gear (per side)	6 L (1.58 gal)
Hydraulic oil	300 L (79.25 gal)
Capacity of hydraulic oil tank	147 L (38.43 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	8 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	136.7 cm ³ (8.34 cu in) x 2 /rev
Rated operating pressure	34.3 MPa (4975 psi)
Maximum operating pressure	37.3 MPa (5410 psi)
Input revolution speed.....	1800 min ⁻¹
Maximum discharge flow	246 L/min (64.99 gpm) x 2 / 243 L/min (64.19 gpm) x 2 at 1800 min ⁻¹

Pilot pump

Pump type	Gear pump
Displacement volume	15 cm ³ (0.91 cu in)/rev
Operating pressure	3.92 MPa (568 psi)
Maximum flow	27 L/min (7.13 gpm) (at 1800 min ⁻¹)
Input horsepower	2.8 kW

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	243 L / min (64.19 gpm)
Main relief set pressure.....	standard; 34.3 MPa (4975 psi), power boost 37.3 MPa (5410 psi)
Overload set pressure.....	when boom down; 29.4 ± 0.5 MPa (4264 ± 72.5 psi)
.....	other: 39.2 MPa (5685 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	Ø140 mm (Ø5.51 in)
Rod diameter	Ø95 mm (Ø3.74 in)
Maximum retracted length	1918 mm (75.51 in)
Stroke	1369 mm (53.90 in)

Arm (dipper) cylinder

Cylinder bore	Ø150 mm (Ø5.90 in)
Rod diameter	Ø105 mm (Ø4.13 in)
Maximum retracted length	2205 mm (86.81 in)
Stroke	1569 mm (61.77 in)

Bucket cylinder

Cylinder bore	Ø135 mm (Ø5.31 in)
Rod diameter	Ø90 mm (Ø3.54 in)
Maximum retracted length	1692 mm (66.61 in)
Stroke	1078 mm (42.44 in)

Rotating Joint

Operating pressure

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

Flow

High pressure passage (ABCD)	360 L/min (95.10 gpm)
Drain port (E)	40 L/min (10.57 gpm)
Pilot port (F)	31 L/min (8.19 gpm)

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

Port A; forward right	G1
Port B; forward left	G1
Port C; backward right	G1
Port D; backward left	G1
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

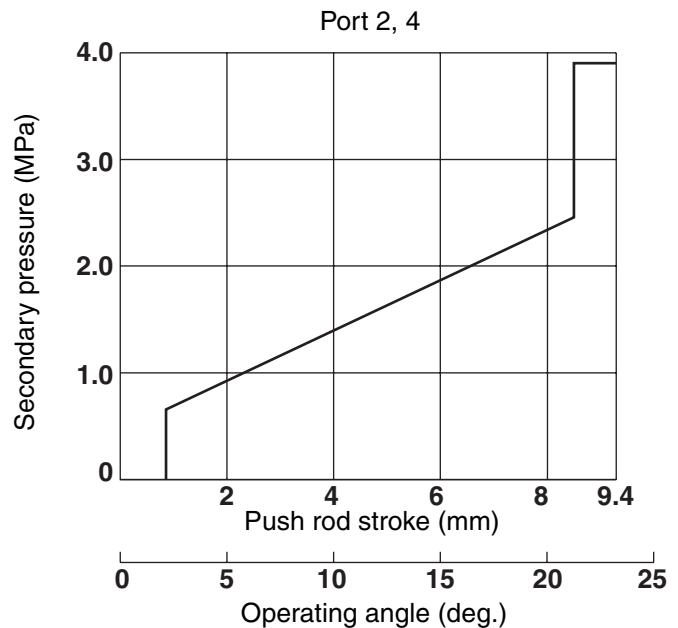
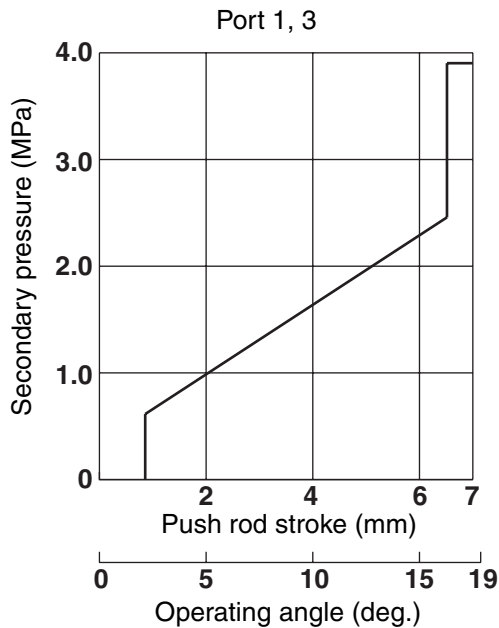
P, T, B port	G3/8
C1, C2, C3, C4, C5 port	G1/4

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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