CASE CONSTRUCTION

SERVICE MANUAL

CRAWLER EXCAVATOR

CX225SR TIER 3

84184367A EN-US

Issued 01Dec 08

CRAWLER EXCAVATOR CX225SR TIER 3
SERVICE MANUAL

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* *Consult the Engine Service Manual*

CNH AMERICA LLC.
700 State Street
Racine, WI 53404 U.S.A.

Issued december, 2008

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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CNH

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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.*

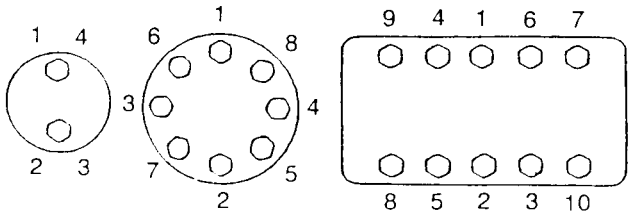
WARNING: *Engine exhaust fumes can cause death. If it is necessary to start the engine in a closed place, remove the exhaust fumes from the area with an exhaust pipe extension. Open the doors and get outside air into the area.*

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.



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

Torque table

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

Cap Screw Name Size (Size)			**M6**	**M8**	**M10**	**M12**	**M14**	**M16**	**M18**	**M20**
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

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SPECIFICATIONS AND SPECIAL TORQUE SETTINGS

December 2008

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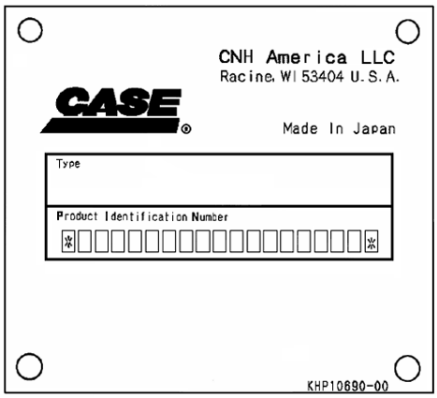
WARNING: *This symbol is used in this manual to indicate important safety messages. Whenever you see this symbol, carefully read the message which follows. Your safety depends on it.*

TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE

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

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

Machine



CRIL05J002E00

Type .....

Serial number .....

Year of manufacture .....

Engine

Make and type .....

Serial number .....

Serial numbers of the components

Hydraulic pump .....

Swing reduction gear .....

Travel reduction gears .....

Control valve .....

FLUIDS AND LUBRICANTS

Lubricants must have the correct properties for each application.

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

Hydraulic fluid

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

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

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

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

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

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

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

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

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

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

Transmission component oil

Extreme pressure oil used for enclosed transmission components.

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

Grease

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

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

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

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

CASE/AKCELA: PREMIUM GREASE EP2 (NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap.

Hydraulic breakers

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

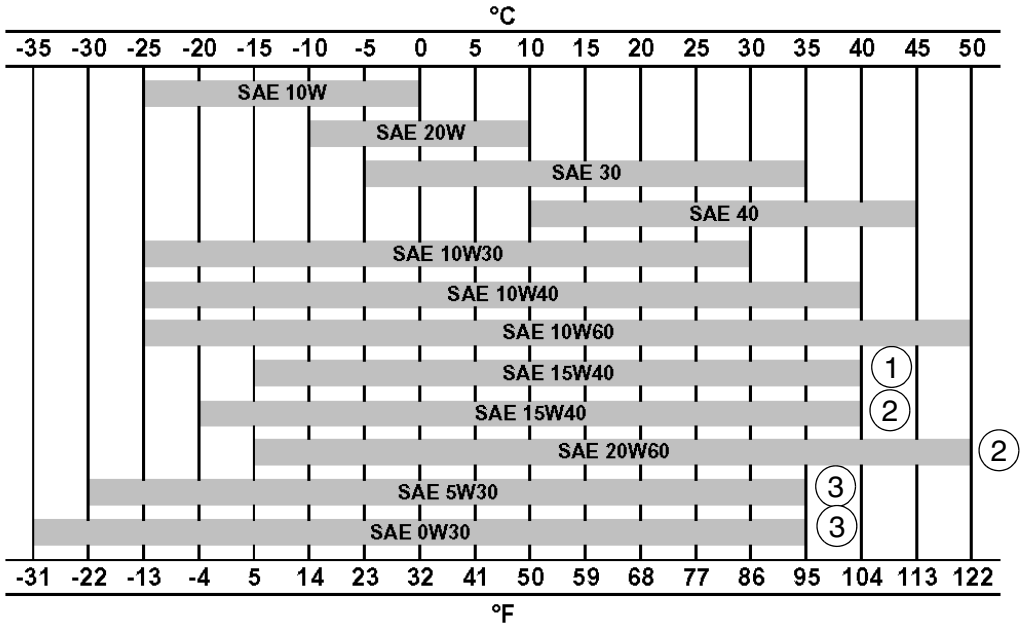
Engine Oil

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

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

CP02N001

Oil viscosity / Oil range



CT02M001

1) With mineral base

(2) With semi-synthetic base

(3) With synthetic base

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 : *It you use diesel fuel which contains much sulfur content more than 2500 ppm, be sure to fol- low 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 Recircultion

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 sup- plying 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 ..... CX225SR, CX225SR with blade
Operating weight ..... 23500 kg (51809 lbs)
With Blade ..... 24400 kg (53793 lbs)
Engine output ..... 114.4 kW / 1800 rpm
Bucket capacity
Heaped ..... 0.90 m^3
Leveled ..... 0.65 m^3

Performance

Swing speed ..... 10.6 Tr/min.
Travel speed
Low Speed ..... 3.1 km/h (1.93 mph)
High Speed ..... 5.0 km/h (3.11 mph)
Maximum drawbar pull ..... 187 kN (42039.27 lbf
Grade ability ..... 70% (35°)
Ground pressure ..... 49 kPa (600 mm (23.62 in) grouser shoe)
With Blade ..... 55 kPa (600 mm (23.62 in) grouser shoe)

Complete machine dimensions

	Arm 1900 mm	Arm 2400 mm	Arm 3000 mm
Overall length (without attachment)	4460 mm (175.59 in)	4460 mm (175.59 in)	4460 mm (175.59 in)
Overall length (with attachment)	8970 mm (353.15 in)	8930 mm (351.57 in)	8850 mm (348.42 in)
Overall height (with attachment)	3080 mm (121.26 in)	3140 mm (123.62 in)	2970 mm (116.93 in)
Cab height (with vandal cover)	2970 mm (116.93 in)	2970 mm (116.93 in)	2970 mm (116.93 in)
Upper structure overall width	2800 mm (110.24 in)	2800 mm (110.24 in)	2800 mm (110.24 in)
Swing (rear end) radius	1720 mm (67.72 in)	1720 mm (67.72 in)	1720 mm (67.72 in)
Clearance height under upper structure	1020 mm (40.16 in)	1020 mm (40.16 in)	1020 mm (40.16 in)
Minimum ground clearance	460 mm (18.11 in)	460 mm (18.11 in)	460 mm (18.11 in)
Wheel base (Center to center of wheels)	3660 mm (144.09 in)	3660 mm (144.09 in)	3660 mm (144.09 in)
Crawler overall length	4460 mm (175.59 in)	4460 mm (175.59 in)	4460 mm (175.59 in)
Track gauge	2390 mm (94.09 in)	2390 mm (94.09 in)	2390 mm (94.09 in)
Undercarriage overall width (with 600 mm shoes)	2990 mm (117.72 in)	2990 mm (117.72 in)	2990 mm (117.72 in)
Crawler tracks height	920 mm (36.22 in)	920 mm (36.22 in)	920 mm (36.22 in)

WORKING RANGES

	Arm 1900 mm	Arm 2400 mm	Arm 3000 mm
Boom length	5700 mm (224.41 in)	5700 mm (224.41 in)	5700 mm (224.41 in)
Bucket radius	1450 mm (57.09 in)	1450 mm (57.09 in)	1450 mm (57.09 in)
Bucket wrist action	177°	177°	177°
Maximum reach at GRP	8730 mm (343.70 in)	9180 mm (361.42 in)	9730 mm (383.07 in)
Maximum reach	8920 mm (351.18 in)	9370 mm (368.90 in)	9910 mm (390.16 in)
Max. digging depth	5620 mm (221.26 in)	6100 mm (240.16 in)	6700 mm (263.78 in)
Max. digging height	10170 mm (400.39 in)	10520 mm (414.17 in)	10910 mm (429.53 in)
Max. dumping height	7290 mm (287 in)	7630 mm (300.39 in)	8020 mm (315.75 in)

Complete machine dimensions

With Blade

	Arm 1900 mm	Arm 2400 mm	Arm 3000 mm
Overall length (without attachment)	4720 mm (185.83 in)	4720 mm (185.83 in)	4720 mm (185.83 in)
Overall length (with attachment)	9370 mm (368.90 in)	9330 mm (367.32 in)	9250 mm (364.17 in)
Overall height (with attachment)	3080 mm (121.26 in)	3140 mm (123.62 in)	2970 mm (116.93 in)
Cab height (with vandal cover)	2970 mm (116.93 in)	2970 mm (116.93 in)	2970 mm (116.93 in)
Upper structure overall width	2800 mm (110.24 in)	2800 mm (110.24 in)	2800 mm (110.24 in)
Swing (rear end) radius	1720 mm (67.72 in)	1720 mm (67.72 in)	1720 mm (67.72 in)
Clearance height under upper structure	1020 mm (40.16 in)	1020 mm (40.16 in)	1020 mm (40.16 in)
Minimum ground clearance	460 mm (18.11 in)	460 mm (18.11 in)	460 mm (18.11 in)
Wheel base (Center to center of wheels)	3370 mm (132.68 in)	3370 mm (132.68 in)	3370 mm (132.68 in)
Crawler overall length	4180 mm (164.57 in)	4180 mm (164.57 in)	4180 mm (164.57 in)
Track gauge	2200 mm (86.61 in)	2200 mm (86.61 in)	2200 mm (86.61 in)
Undercarriage overall width (with 600 mm shoes)	2800 mm (110.24 in)	2800 mm (110.24 in)	2800 mm (110.24 in)
Crawler tracks height	920 mm (36.22 in)	920 mm (36.22 in)	920 mm (36.22 in)

WORKING RANGES

	Arm 1900 mm	Arm 2400 mm	Arm 3000 mm
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Max. digging height	10170 mm (400.39 in)	10520 mm (414.17 in)	10910 mm (429.53 in)
Max. dumping height	7290 mm (287 in)	7630 mm (300.39 in)	8020 mm (315.75 in)

Main body dimensions

Main body length ..... 4460 mm (175.59 in)
Main body width ..... 3190 mm (125.59 in)
Upper side swing body width ..... 2800 mm (110.24 in)
Cab width ..... 1000 mm (39.37 in)
Main body height ..... 2970 mm (116.92 in)
Tail swing radius ..... 1720 mm (67.72 in)
Swing body tail distance ..... 1720 mm (67.72 in)
Swing body rear section bottom height ..... 1020 mm (40.16 in)
Distance between tumblers ..... 3660 mm (144.09 in)
With Blade ..... 3370 mm (132.68 in)
Overall track length ..... 4460 mm (175.59 in)
With Blade ..... 4170 mm (164.17 in)
Overall track Width ..... 4460 mm (175.59 in)
With Blade ..... 2800 mm (110.24 in)
Distance between tracks ..... 2390 mm (94.09 in)
With Blade ..... 2200 mm (86.61 in)
Width of track shoe ..... 600 mm (23.62 in), (Optional: 700 mm (27.56 in), 800 mm (31.50 in)
Minimum ground clearance (To bottom of lower frame), ... 460 mm (18.11 in)

Engine

Name ..... ISUZU, AI-4HK1X
Type: ..... water-cooled, 4-cycle diesel, 4-cylinder in-line, direct injection type
..... (electronic control), turbocharger with air cooled intercooler.
No. of cylinders - bore x stroke ..... 4 - Ø115 mm x 125 mm (4.53 x 4.92 in)
Total exhaust amount ..... 5193 cc
Compression ratio 17.5
Rated output ..... 114.4 kW / 1800 min^{-1}
Maximum torque ..... 616 N.m (454.34 lb-ft) / 1500 min^{-1}
Fuel consumption ratio ..... 223.6 g/KW-h max
Engine dimensions (LxWxH) ..... 1020.4x829x1011.8 mm (40.17x32.64x39.83 in)
Oil pan ..... All direction 0.61 rad, inclinable
Cooling fan ..... Ø 650 mm (25.59 in)- suction type -7 vanes, plastic
..... with bell mouth-type - fan guide
Pulley ratio ..... 1.01 (reduction)
Oil pan capacity ..... Maximum: 20.5 L (5.42 gal) Minimum: 13 L (3.43 gal) (excluding oil filter)
Coolant capacity ..... 14.0 L (3.69 gal)
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, 92 Ah/5 Hr

Cooling system

Fan type ..... Ø 650 mm (25.59 in), suction type - 7 blades, intake
Radiator
- Capacity..... 66900 kcal/h
- Fin type.....wavy
- Fin pitch ..... 2 mm (0.079 in)

Oil cooler
- Capacity..... 46600 kcal/h
- Fin type.....wavy
- Fin pitch ..... 1.75 mm (0.069 in)

Inter-cooler
- Capacity..... 10200 kcal/h
- Fin type.....triangular straight
- Fin pitch ..... 1.75 mm (0.069 in)

Fuel cooler
- Capacity..... 1120 kcal/h
- Fin type.....wavy
- Fin pitch ..... 2.0 mm (0.079 in)

Capacity of coolant and lubricants

Coolant..... 25.6 L (6.76 gal)
Fuel ..... 265 L (70 gal)
Lubricant for engine ..... 23.1 L (6.10 gal)
Lubricant for travel reduction gear (per side) ..... 4.7 L (1.24 gal)
Lubricant for swing reduction gear (per side)..... 5.0 L (1.32 gal)
Hydraulic oil..... 205 L (54.15 gal)
Capacity of hydraulic oil tank ..... 120 L (31.70 gal)

Air conditioning

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

Hydraulic oil filter

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

Fuel filter

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

Operating devices

Operator's seat
- Location: left side
- Structure: Adjustable forward and back and up and down, reclining mechanism, with seat suspension.

Cab
- Sealed steel type, all reinforced glass.

Levers and pedals
- For travel use: Lever and pedal type (hydraulic pilot type) (x2)
- For operating machine use: Lever type (hydraulic pilot type) (x2)
- For blade use: Lever type (hydraulic pilot type) (x1)

With Blade
- For offset-boom operating use.....Pedal type (hydraulic pilot type) (x1)

Instruments and switches
- Work mode select switch: 2 modes (N/Standerd operating mode, E/Economy operating mode)
- 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: N/E

Instruments (full-dot liquid crystal, except for hour meter)

Fuel gauge: Analog
Engine coolant temperature gauge: Analog
Hour meter: digital type
Machine Status and Warning Alarms * Items have a warning alarm

Over heat*	Battery charge*	Check engine*
Refill fuel*	Engine oil pressure*	Engine preheat

Lighting

Working light	Cab top:	24V, 55W (x1)
	Boom:	24V, 70W (x1)
Interior light		24V, 6W (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.....TOSHIBA MACHINE CO, LTD
Pump type ..... double variable displacement piston pump
Displacement volume ..... 107.4 x 2 cm^3/rev
Operating pressure (Rated) ..... 34.3 MPa (4974 psi)
Operating pressure (Maximum) ..... 37.2 MPa (5395 psi)
Input revolution speed..... 1800 min-1
Maximum discharge flow ..... 190.0 x 2 L/min (at 1800 min-1) (50.19 gpm)
Piston pump
Pump type..... Gear pump
Displacement volume ..... 11 cm^3/rev (0.67 cu in)
Operating pressure ..... 3.92 MPa (568 psi)
Maximum discharge flow ..... 19.8 L/min (at 1800 min-1) (5.23 gpm)
Blade pump
Pump type..... Fixed displacement gear pump
Displacement volume ..... 40.6 cm^3/rev (2.47 cu in)
Operating pressure ..... 22.6 MPa (3277 psi)
Maximum output ..... 73 L/min (at 1800 min-1) (19.2 gpm)
Control method
Hydraulic simultaneous constant output control.
Maximum flow adjustment control through external commands (negative control).
Setting horsepower adjustment control through external command currrent.
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 ..... 190 L/min (50.19 gpm) (at 2000 min-1)
Overload set pressure
Boom down..... 27.5 MPa (at 20 L/min) 39.88 psi (at 5.28 gpm)
Other..... 39.2 MPa (at 20 L/min) 56.85 psi (at 5.28 gpm)
Main relief set pressure..... 34.3 MPa (at 126 L/min) 4974 psi (at 33.28 gpm)
at boosting ..... 37.3 MPa (at 108 L/min) 5409 psi (at 28.53 gpm)
Foot relief set pressure ..... 2.55 MPa (at 50 L/min) 369.85 psi (at 13.2 gpm)
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
Arm semi-parallel variable throttle

- Swing override variable throttle
- Backup 2-speed confluence
- Blade control
  - Maximum flow ..... 165 L/min (17.17 gpm)
  - Overload set pressure ..... 23.5 MPa (3408 psi) (at 10L/min) (2.64 gpm)
  - Main relief set pressure ..... 20.6 MPa (2987 psi) (2.64 gpm)

Hydraulic Cylinders

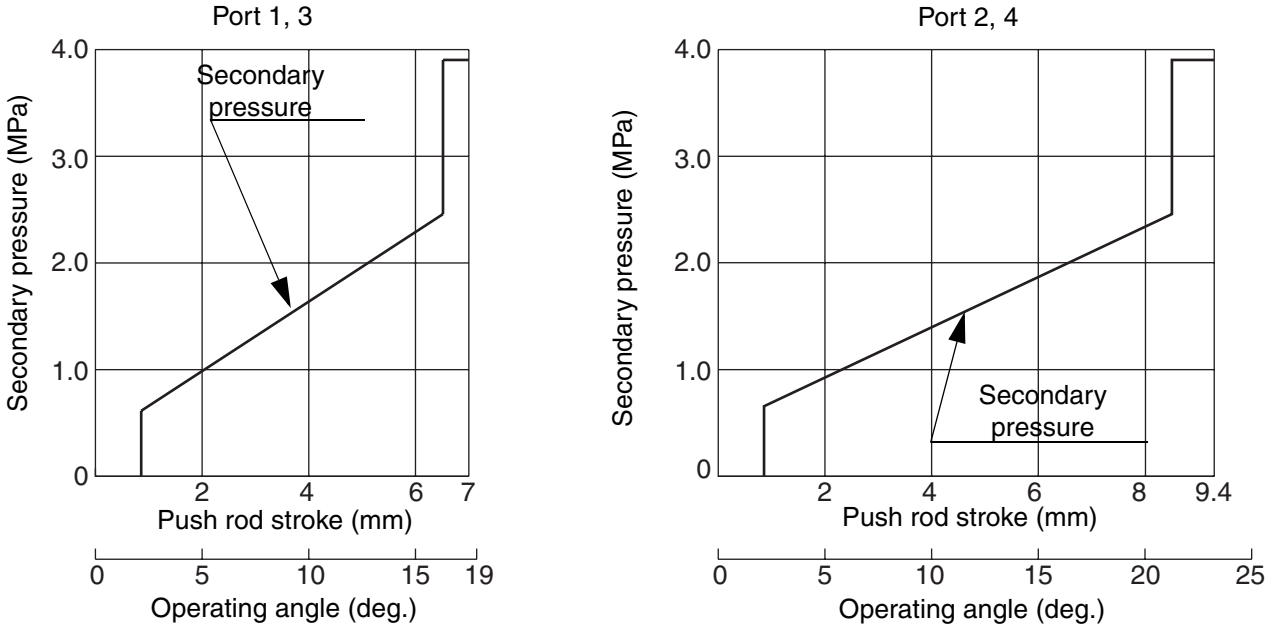
- Boom cylinder (x2)
  - Cylinder bore ..... Ø125 mm (Ø4.92 in)
  - Rod diametre ..... Ø90 mm (Ø3.54 in)
  - Maximum retracted length ..... 1824 mm (71.81 in)
  - Stroke ..... 1284 mm (50.55 in)
- Arm (dipper) cylinder
  - Cylinder bore ..... Ø135 mm (Ø5.31 in)
  - Rod diametre ..... Ø95 mm (Ø3.74 in)
  - Maximum retracted length ..... 2024 mm (79.68 in)
  - Stroke ..... 1474 mm (58.03 in)
- Bucket cylinder
  - Cylinder bore ..... Ø115 mm (Ø4.52 in)
  - Rod diametre ..... Ø80 mm (Ø3.14 in)
  - Maximum retracted length ..... 1558 mm (61.33 in)
  - Stroke ..... 1012 mm (39.84 in)
- Blade cylinder (x2)
  - Cylinder bore ..... Ø130 mm (Ø5.12 in)
  - Rod diametre ..... Ø80 mm (Ø3.15 in)
  - Maximum retracted length ..... 708 mm (27.87 in)
  - Stroke ..... 260 mm (10.24 in)

Rotating Joint
- Operating pressure
  - High pressure passage (ABCD) ..... 34.3 MPa (4975 psi)
  - Drain port (E) ..... 0.5 MPa (72.52 psi)
  - Pilot port (F) ..... 3.9 MPa (566 psi)
- Flow
  - High pressure passage (ABCD) ..... 234 L/min (61.82 gpm)
  - Drain port (E) ..... 10 L/min (2.64 gpm)
  - Pilot port (F) ..... 21 L/min (5.55 gpm)
- Number of revolutions 15 min-1
- Torque
  - No load ..... 140 Nm (103 lb-ft)
  - When pressurizing 2 ports ..... 160 Nm (118 lb-ft)
- Port A; forward right G3/4
- Port B; forward left G3/4
- Port C; backward right G3/4
- Port D; backward left G3/4
- Port E; drain port G1/2
- Port F; pilot port G1/4

Solenoid Valve (4 stack)
- Manufacturer ..... Yuken kogyo co., LTD
- Maximum flow ..... P -> B: 20 L/min (5.28 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 port G1/4
- Solenoid specifications
  - Operating voltage ..... DC 20 to 32 V
  - Power consumption ..... 17 W max.

Remote control valve

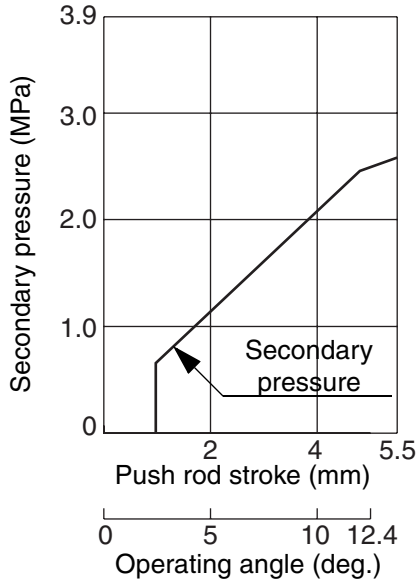
1) Hand control valve
   - Manufacturer ..... Kawasaki
   - Operating pressure ..... 3.92 MPa (569 psi)
   - Secondary pressure, primary short type ..... 0.64 to 2.45 MPa (92.82 to 355.34 psi)
   - Operating angle
     - Ports 1, 3 ..... 19°
     - Ports 2, 4 ..... 25°
   - Operating torque
     - Ports 1 ..... 0.58 - 2.03 Nm (0.42 - 1.49 (lb-ft)
     - Ports 3 ..... 0.47 - 1.92 Nm (0.34 - 1.41 (lb-ft)
     - Ports 2, 4 ..... 0.71 - 2.30 Nm (0.52 - 1.69 (lb-ft)



RST-03-01-001B

Foot control valve (for travel)

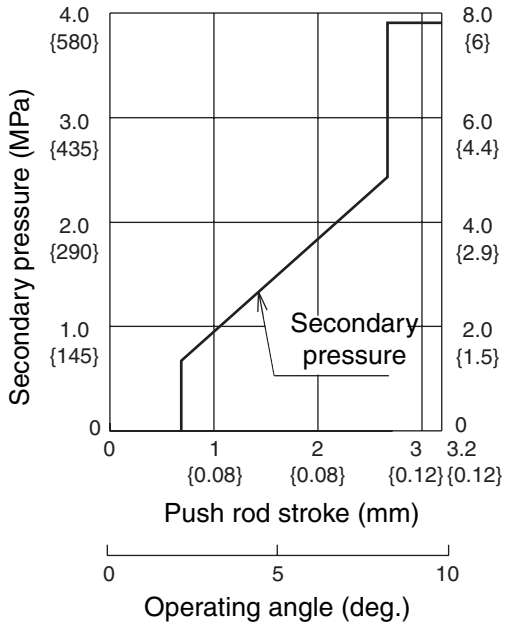
Manufacturer	Kawasaki
Operating pressure	3.92 MPa (569 psi)
Secondary pressure, primary short type	0.64 to 2.45 MPa (92.82 to 355.34 psi)
Operating angle	12.4°
Operating torque	
Valve	2.62 Nm (1.93 (lb-ft)
Damper	12.9 Nm (9.51 (lb-ft) (at 0.0275 m/s)



RST-03-01-001D

Foot control valve (for Dozer Blade)

Manufacturer	Kawasaki
Operating pressure	3.92 MPa (569 psi)
Secondary pressure, primary short type	0.64 to 2.45 MPa (92.82 to 355.34 psi)
Operating angle	12.4°
Operating torque	27.9 - 54.3 Nm (20.5 - 40.0 lb-ft)



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Swing unit

Swing circle ..... Swing bearing type (with internal gear)
Swing hydraulic motor ..... Fixed displacement piston motor
Reduction gear ..... Plantary gear 2-stage reduction gear
Swing parking brake ..... Mechanical lock (operational lever linkage type)
- Displacement ..... 151 cm^3 /rev
- Operating pressure ..... 30.4 MPa (4409 psi)
- Operating flow ..... 190 L/min (50.19 gpm)
- Mechanical brake torque ..... 821.5 Nm (605.90 lb-ft) min.
- Brake off pressure ..... 3.2 MPa (464.12 psi) max
- Relief valve set pressure ..... 30.4 MPa (4409 psi) (at 122 L/min)
  ..... 28.4 MPa (4119 psi) (at 40 l/min)

Reduction gear ..... Planetary gear 2-stage reduction gear
- Reduction ratio 16.757

Travel lower body

Travel hydraulic motor (x2) ..... Variable displacement piston motor, automatic 2-speed switch-over with parking brake
- Displacement ..... 168.9/100.3 cm^3 (10.31/6.12 cu in)/rev
- Operating pressure ..... 34.3 MPa (4975 psi)
- Operating flow ..... 211 L/min (55.74 gpm)
- Brake torque ..... 20.9 KNm (15.42 lb-ft) min. (including reduction gear)
- Relief valve set pressure ..... 35.3 MPa (5120 psi) (at 40 L/min)
- Automatic 2-speed switch-over pressure ..... 25 .5 MPa (3698.42 psi) (at 3.9 MPa) (568.65 psi)

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

Travel brake ..... Hydraulic lock
Parking brake ..... Mechanical lock (travel lever linkage type)
Track shoe
- Model ..... Assembly type triple grouser shoe
- Number of shoes (per side) 46
- Shoe width
  - Standard ..... 600 mm (23.62 in)
  - Optional ..... 700 mm (27.55 in) 800 mm (31.49 in)
- Grouser height ..... 26 mm (1.02 in)
- Link pitch ..... 190 mm (7.48 in)

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

Track belt tension adjuster ..... Grease cylinder type (with cushion spring)
- Mounting length of spring ..... 556 mm (21.89 in)

Work Unit

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

	CX225SR/CX225SR (Blade)		
Model	Backhoe attachment		
Components, dimensions, working dimensions			
Boom length	5700 mm (224.41 in)		
Arm type	Standard (3.00 m) (118.11 in)	Short (2.40 m) (94.49 in)	S-short (1.91 m) (75.20 in)
Arm length	2990 mm (117.72 in)	2220 mm (87.40 in)	1928 mm (75.90 in)
Bucket capacity	Heaped 0.90 m^3 (leveled 0.65 m^3)		Heaped 1.0 m^3 (leveled 0.70 m^3)
Bucket width	1150 mm (45.27 in)		1240 mm (48.82 in)
Bucket width with side cutter	1250 mm (49.21 in)		1340 mm (52.76 in)
Bucket weight with side cutter	646 kg (1424.18 lb)		694 kg (1530 lb)
Bucket radius	1450 mm (57.09 in)		
Bucket wrist angle	176.7°		
Maximum digging radius	9910 mm (390.16 in)	9370 mm (368.90 in)	8920 mm (351.18 in)
Maximum digging radius at ground line	9730 mm (383.07 in)	9180 mm (361.42 in)	8730 mm (343.70 in)
Maximum digging depth	6700 mm (263.78 in)	6100 mm (240.16 in)	5620 mm (221.26 in)
Maximum vertical straight wall digging depth	6070 mm (238.97 in)	5480 mm (215.75 in)	5050 mm (198.81 in)
Maximum digging height	10910 mm (429.53 in)	10520 mm (414.17 in)	10170 mm (400.39 in)
Maximum dump height	8820 mm (347.24 in)	7630 mm (300.29 in)	7290 mm (287 in)
Minimum swing radius at front	2300 mm (90.55 in)	2540 mm (100 in)	2820 mm (111.02 in)
Height for minimum swing radius at front	8290 mm (326.38 in)	8340 mm (328.34 in)	8340 mm (328.34 in)

Digging force (ISO 6015)

Arm (dipper) digging force	115kN (25853.03 lbf)
With power up	126 kN (28325.93 lbf)
Bucket digging force	130 kN (29225.16 lbf)
With power up	141 kN (31698.06 lbf)