

# CRAWLER EXCAVATOR CX290B SERVICE MANUAL

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\* Consult the Engine 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.

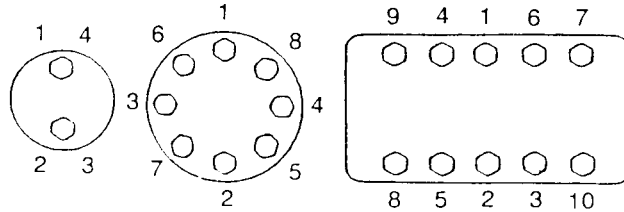


**WARNING:** When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you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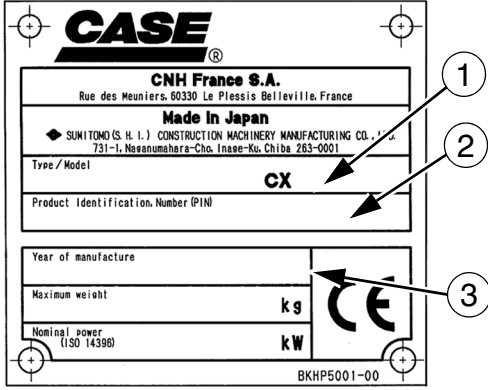
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## TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE

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



CT04A171A

- (1) Type .....
- (2) Serial number.....
- (3) Year of manufacture .....

### Engine

- Make and type .....
- Serial number .....

### Serial numbers of the components

- Hydraulic pump .....
- Swing reduction gear.....
- Travel reduction gears .....
- Control valve.....

## FLUIDS AND LUBRICANTS

Lubricants must have the correct properties for each application.



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

### Hydraulic fluid

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

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

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

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

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

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

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

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

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

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

### Transmission component oil

Extreme pressure oil used for enclosed transmission components.

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

### Grease

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

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

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

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

CASE/AKCELA: PREMIUM GREASE EP2 (NLGI 2)

"Extreme Pressure" multipurpose grease with lithium soap.

### Hydraulic breakers

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

## Engine Oil

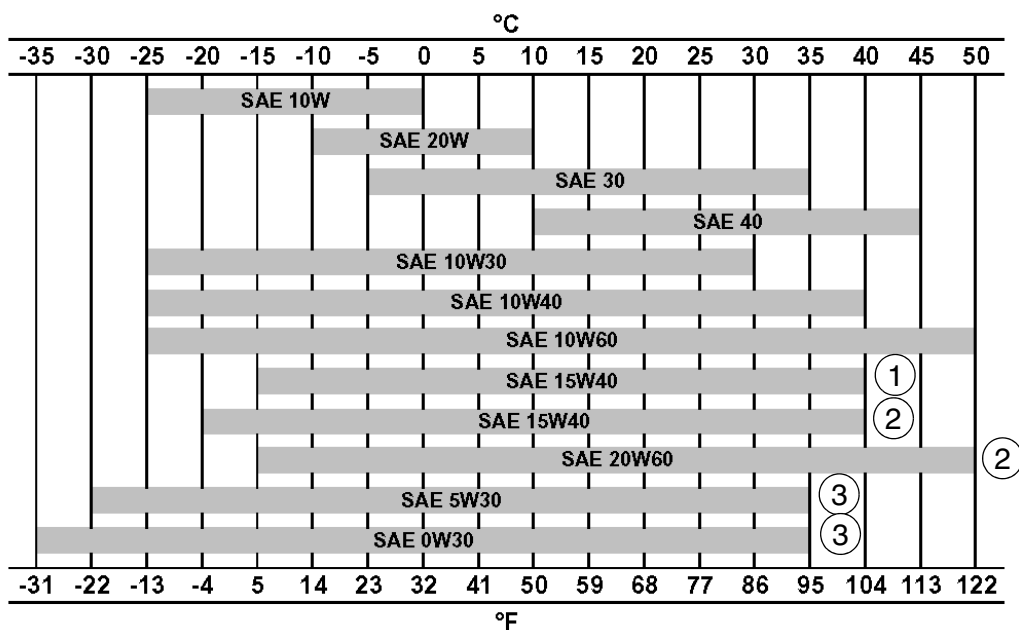
THE CASE/AKCELA No. 1 engine oil is recommended for your engine. This oil ensures proper lubrication of your engine for all operating conditions.

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



CP02N001

## Oil viscosity / Oil range



CT02M001

- 1) With mineral base
- 2) With semi-synthetic base
- 3) With synthetic base

## Engine fuel, maintenance of fuel filters and fuel storage

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

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

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

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

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

### Fuel to be applied

#### Selection of fuel

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

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

#### Applicable standards for diesel fuel

Applicable Standard	Recommendation
JIS (Japanese Industrial Standard)	NO.2
DIN (Deutsche Industrie Normen)	DIN 51601
SAE (Society of Automotive Engineers)	
Based on SAE-J-313C	NO. 2-D
BS (British Standard) Based on BS/2869-197	Class A-1
EN590	

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

#### Requirements for diesel fuel

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

Be sure to observe the following requirements for selecting fuel.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1 Selection of engine oil

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

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

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

\* EGR: Exhaust Gas Recirculation

## Maintenance of fuel filters

Be sure to use the genuine fuel filters.

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

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

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

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

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

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

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

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

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

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

## Fuel storage

Long storage can lead to the accumulation of impurities and condensation in the fuel. Engine trouble can often be traced to the presence of water in the fuel.

The storage tank must be placed outside and the temperature of the fuel should be kept as low as possible. Drain off water and impurities regularly.

## Anti-freeze/Anti-corrosion

Use anti-freeze in all seasons to protect the cooling system from corrosion and all risk of freezing.

CASE/AKCELA: PREMIUM ANTI-FREEZE (MS 1710)

For areas where the temperature goes down to  $-38^{\circ}\text{C}$  ( $-36.4^{\circ}\text{F}$ ), 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.



## 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 <sup>-1</sup>
Maximum torque .....	850 N.m (626.93 lb-ft) / 1500 min <sup>-1</sup>
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*
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Refill fuel*	Engine oil pressure*	Refill coolant*
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Engine preheat	Auto warm-up	Air cleaner clogged
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Anti-theft device triggered	Faulty engine system	Engine emergency stop
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### Lighting

Working light	Tank:	24V, 70W (x1)
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Boom:	24V, 70W (x1)
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Cab:	24V, 70W (x2)
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Interior light	24V, 10W (x1)
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Horn: electric horn (x2)

### Other

Wiper with intermittent function, Window washer, Air conditioner, Rear view mirrors (left and right), DC converter,

### 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 <sup>3</sup> (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 <sup>-1</sup>
Maximum discharge flow .....	246 L/min (64.99 gpm) x 2 / 243 L/min (64.19 gpm) x 2 at 1800 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 (568 psi)
Maximum flow .....	27 L/min (7.13 gpm) (at 1800 min <sup>-1</sup> )
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

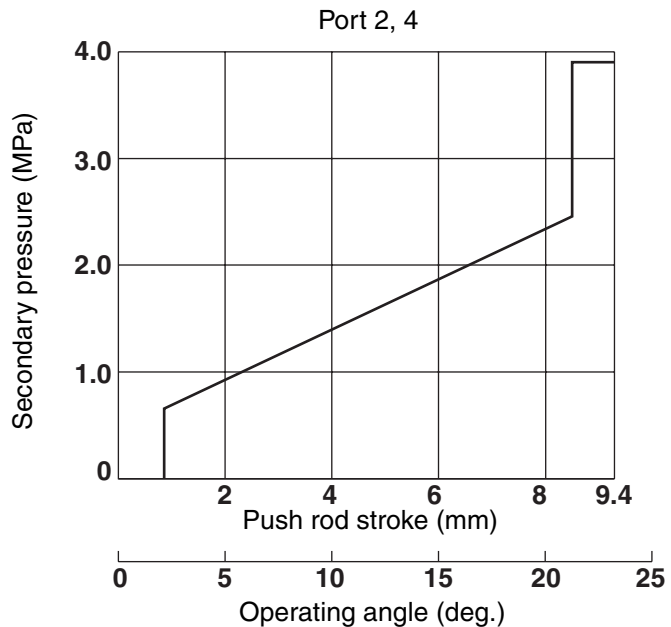
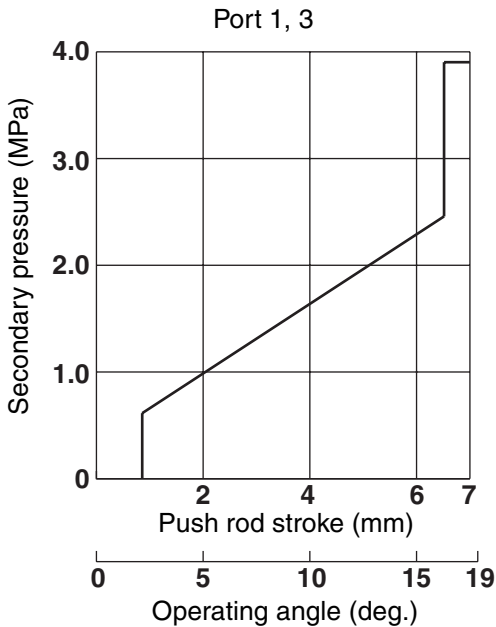
P, T, B port .....	G3/8
C1, C2, C3, C4, C5 port .....	G1/4

Solenoid specifications

Operating voltage .....	DC 20 to 32 V
Power consumption .....	17 W max.

Hand control valve

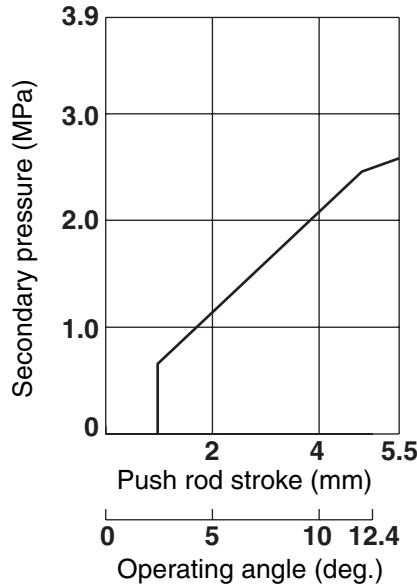
Manufacturer .....	Kawasaki
Operating pressure .....	3.92 MPa (569 psi)
Secondary pressure, primary short type .....	0.64 to 2.45 MPa (92.82 to 355.34 psi)
Operating angle	
Ports 1, 3 .....	19°
Ports 2, 4 .....	25°



RST-03-01-001B

Foot 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 ..... 12.4°



RST-03-01-001D

**Swing unit**

Swing circle ..... Swing bearing type (with internal gear)  
 Swing parking brake ..... Mechanical lock (operational lever linkage type)  
 Swing hydraulic motor ..... Fixed displacement piston motor  
     Displacement ..... 164.7 cm<sup>3</sup> (10.05 cu in)/rev  
     Operating pressure ..... 29.4 MPa (4264 psi)  
     Operating flow ..... 217 L/min(57.32 gpm)  
     Mechanical brake torque ..... 1013 Nm (747.15 lb-ft) min.  
     Brake off pressure ..... 3.1 MPa (449.62 psi) max.  
     Relief valve set pressure ..... 29.3 MPa (4249.61 psi)  
 Reduction gear ..... Planetary gear 2-stage reduction gear  
 Reduction ratio ..... 27.143

**Travel lower body**

Travel hydraulic motor (x2) ..... Variable displacement piston motor, automatic 2-speed switch-over with parking brake  
     Displacement ..... 244.3/141.1 cm<sup>3</sup> (14.91/8.61 cu in)/rev  
     Operating pressure ..... 34.3 MPa (4975 psi)  
     Operating flow ..... 243 L/min (64.19 gpm)  
     Brake torque ..... 36 KNm (26552.2 lb-ft) min. (including reduction gear)  
     Relief valve set pressure ..... 36.2 to 39.7 MPa (5250.37 to 5758 psi)  
     automatic 2-speed switch-over pressure ..... 26.5 MPa (3843.5 psi)  
 Reduction gear ..... Planetary gear 2-stage reduction gear  
 Reduction ratio ..... 39.875  
 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) ..... 50  
     Shoe width  
         standard ..... 600 mm (23.62 in)  
         optional ..... 700 mm (27.56 in), 800 mm (31.50 in)  
     Grouser height ..... 26 mm (1.02 in)  
     Link pitch ..... 203 mm (7.99 in)

## Roller

Number of upper rollers (per side) .....	2
Number of lower rollers (per side) .....	9
Track belt tension adjuster .....	Grease cylinder type (with cushion spring)
Mounting length of spring .....	774 mm (30.47 in)

**Work Unit**

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

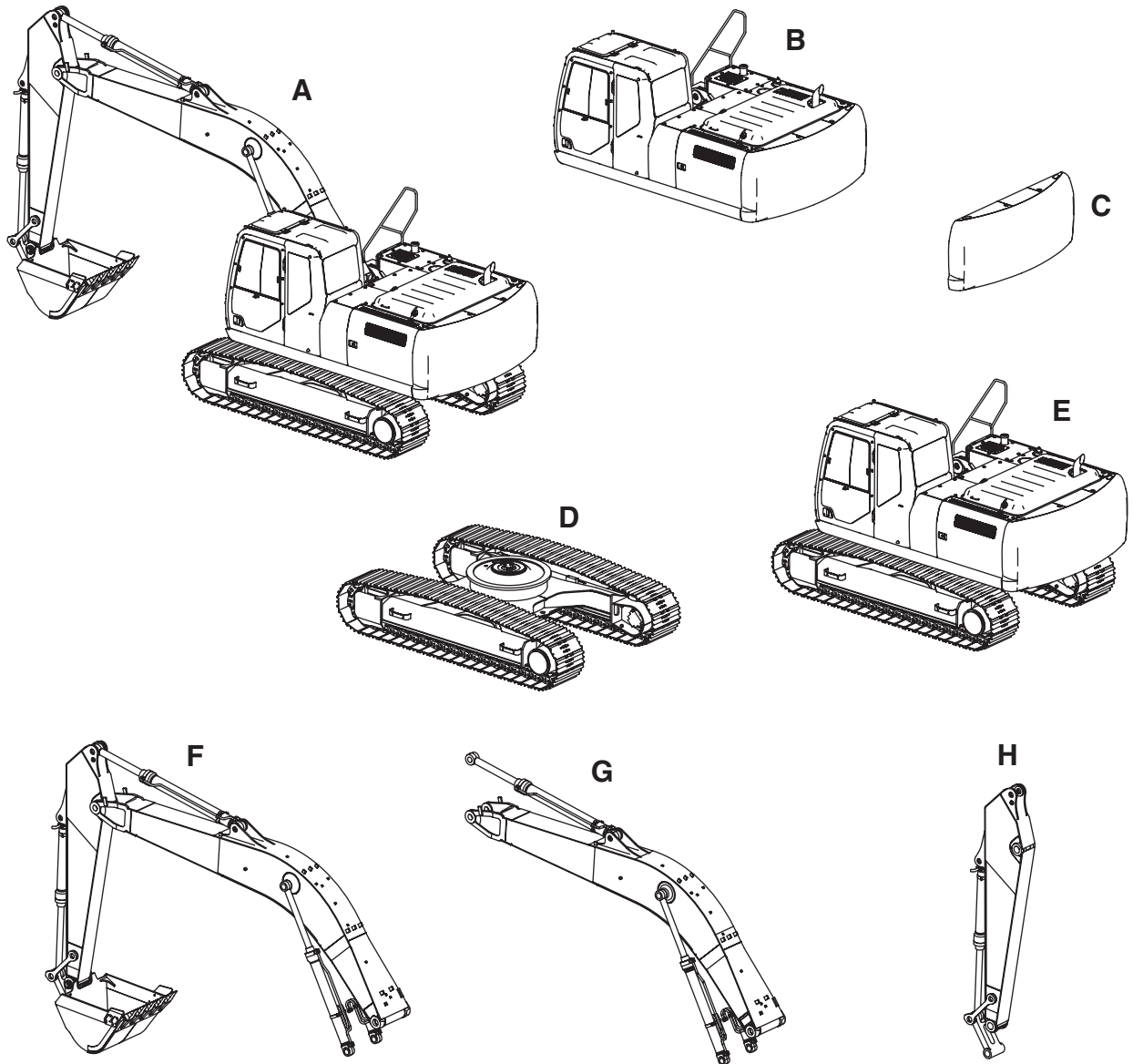
	Standard boom		
	Standard arm	Short arm	Long arm
Arm (dipper) length	3180 mm 125.20 in	2650 mm 104.33 in	3600 mm 141.73 in
Boom length (Standard boom spec.)	6150 mm 242.12 in		
Bucket radius	1571.2 mm 61.86 in		
Bucket wrist angle	176°		
Maximum digging radius	10670 mm 420.08 in	10220 mm 402.36 in	11160 mm 439.67 in
Maximum digging radius at ground line	10500 mm 413.38 in	10040 mm 395.27 in	10990 mm 432.68 in
Maximum digging depth	7100 mm 279.53 in	6570 mm 258.66 in	7580 mm 298.42 in
Maximum vertical straight wall digging depth	6120 mm 240.94 in	5760 mm 226.77 in	6720 mm 264.57 in
Maximum digging height	10060 mm 396.06 in	9930 mm 390.94 in	10390 mm 409.05 in
Maximum dump height	7090 mm 279.13 in	6940 mm 273.23 in	7390 mm 290.94 in
Minimum swing radius at front	3920 mm 154.33 in	4000 mm 157.48 in	4000 mm 157.48 in
Height for minimum swing radius at front	8190 mm 322.44 in	8220 mm 323.62 in	8170 mm 321.65 in

**Digging force (ISO 6015)**

	Arm (dipper)		
	3.18 m (125.20 in)	2.65 m (104.33 in)	3.60 m (141.73 in)
Arm (dipper) digging force (standard)	121.6 kN (27336.8 lbf)	140.2 kN (35518.2 lbf)	109.8 kN (24684 lbf)
Arm (dipper) digging force (power up)	132.4 kN (29764.7 lbf)	153.0 kN (34395.8 lbf)	118.7 kN (26684.8 lbf)
Bucket digging force (standard)	174.6 kN (39251.6 lbf)	174.6 kN (39251.6 lbf)	174.6 kN (39251.6 lbf)
Bucket digging force (power up)	190.2 kN (42758.7 lbf)	190.2 kN (42758.7 lbf)	190.2 kN (42758.7 lbf)

# COMPONENT WEIGHT

## Major component weight



RST-11-001A

Weight information is approximate

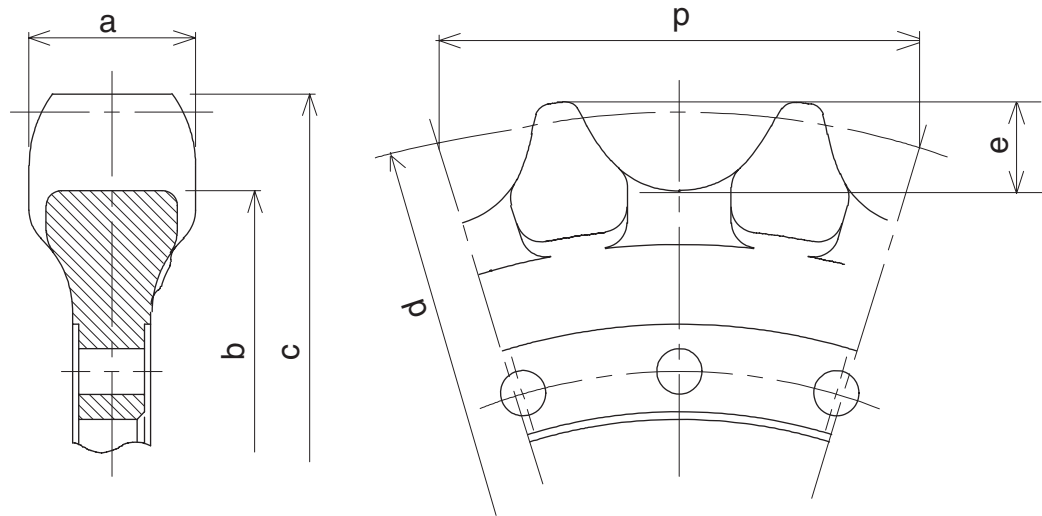
A) Operating weight .....	29800 kg (65698 lbs)
B) Upper mechanism (including counterweight and turntable bearing) .....	12600 kg (27778 lbs)
C) Counterweight.....	5410 kg (11927 lbs)
D) Lower mechanism (with standard grouser shoe) .....	11100 kg (24471 lbs)
E) Main Unit Weighty .....	23700 kg (52249 lbs)
F) Attachments .....	5400 kg (11904 lbs)
G) Boom (including cylinders).....	3100 kg (6834 lbs)
H) Arm (dipper) (including cylinders and linkage).....	1360 kg (2998 lbs)

## Other component weight

Engine .....	696 kg (1534 lbs)
Air cleaner .....	13.6 kg (30 lbs)
Hydraulic pump .....	156 kg (344 lbs)
Attachment control valve .....	220 kg (485 lbs)
Swing motor and reduction gear assembly .....	464 kg (1023 lbs)
Travel motor and reduction gear assembly.....	456 kg (1005 lbs)
Rotary joint .....	58 kg (128 lbs)
Solenoid valve bank .....	6.7 kg (14.8 lbs)
Cushion valve .....	12.5 kg (26.6 lbs)
Hand control valve .....	1.9 kg (4.2 lbs)
Foot control valve .....	7.8 kg (17.2 lbs)
Boom .....	2110 kg (4652 lbs)
Standard arm (dipper) .....	860 kg (1896 lbs)
Short arm (dipper) .....	760 kg (1676 lbs)
Long arm (dipper).....	990 kg (2183 lbs)
Boom cylinder (one) .....	237 kg (522 lbs)
Arm (dipper) cylinder .....	335 kg (739 lbs)
Bucket cylinder .....	207 kg (456 lbs)
Fuel tank.....	169 kg (373 lbs)
Hydraulic oil tank .....	152 kg (335 lbs)
Turntable bearing.....	543 kg (1197 lbs)
Muffler .....	20 kg (44.1 lbs)
Radiator total weight.....	170 kg (375 lbs)
Oil cooler.....	26 kg (57.3 lbs)
Radiator .....	19.4 kg (42.8 lbs)
Air cooler.....	18.7 kg (41.2 lbs)
Fuel cooler .....	1.2 kg (2.65 lbs)
Idler wheel .....	165 kg (364 lbs)
Upper roller.....	44 kg (97 lbs)
Lower roller.....	56 kg (123.5 lbs)
Recoil spring assembly .....	263 kg (580 lbs)
Recoil spring .....	119.4 kg (263.2 lbs)
Grease cylinder assembly .....	41.4 kg (91.3 lbs)
Threaded rod .....	50.3 kg (110.9 lbs)
Yoke .....	39.8 kg (87.7 lbs)
Track chains (per side)	
600 mm (23.62 in) .....	1860 kg (4101 lbs)
700 mm (27.56 in) .....	2040 kg (4497 lbs)
800 mm (31.5 in).....	2210 kg (4872 lbs)

# DIMENSIONS AND WEAR LIMIT OF THE TRACK ASSEMBLY

## Sprocket

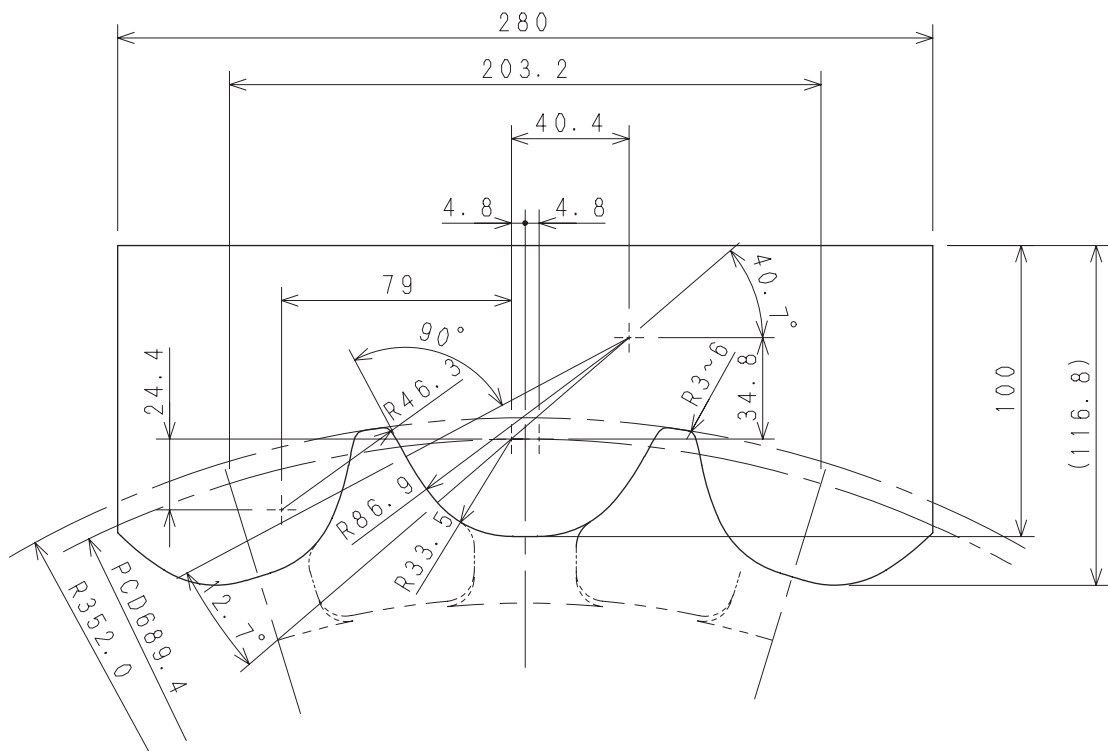


SI14004-007

Part name	Code	Measured dimensions (mm)	Standard value (mm)	Usage limit (mm)	Judgment	Solution
Sprocket	a		86	76	Acceptable/Unacceptable	Cladding by welding or replacement
	b	∅	∅622.34	∅612.34	Acceptable/Unacceptable	
	c	∅	∅704	∅695	Acceptable/Unacceptable	
	d	∅	∅689.39	-	Acceptable/Unacceptable	
	e		37.4	32.4	Acceptable/Unacceptable	
	p		203.2	-	Acceptable/Unacceptable	

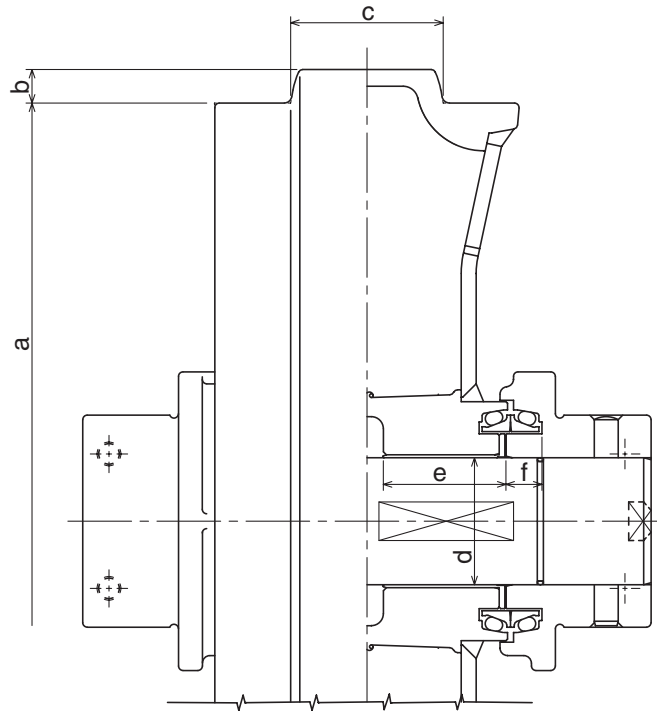
## Gauge

unit in mm



BI14012-001

# Idler wheel

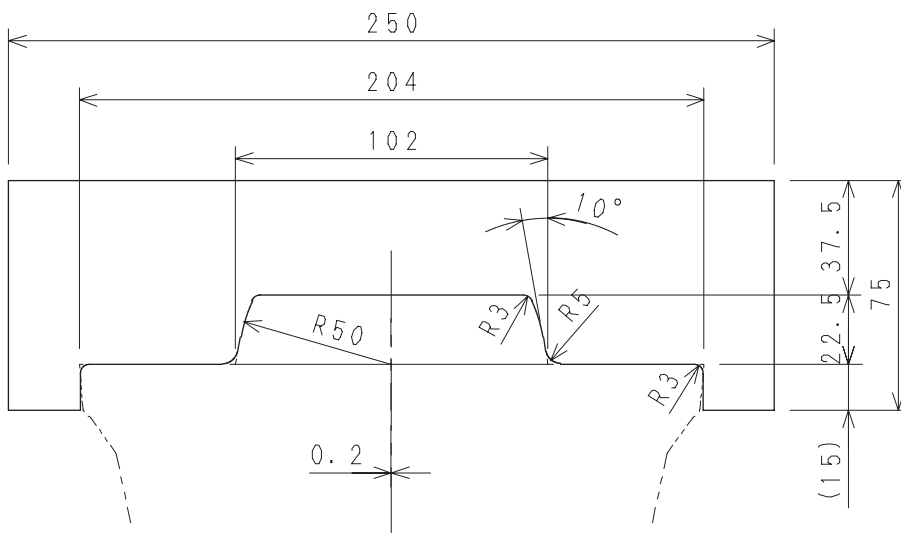


SI14004-008

Part name	Code	Measured dimensions (mm)	Standard value (mm)	Usage limit (mm)	Judgment	Solution
Idler wheel	a	Ø	Ø560	Ø550	Acceptable/Unacceptable	Cladding by welding or replacement
	b		22.5	-	Acceptable/Unacceptable	
	c		102	92	Acceptable/Unacceptable	
Shaft	d	Ø	Ø85	Ø84	Acceptable/Unacceptable	Replacement
Bushing	d	Ø	Ø85	Ø86	Acceptable/Unacceptable	Replacement
	e		82	81	Acceptable/Unacceptable	
Hub	f		24	23.6	Acceptable/Unacceptable	Replacement

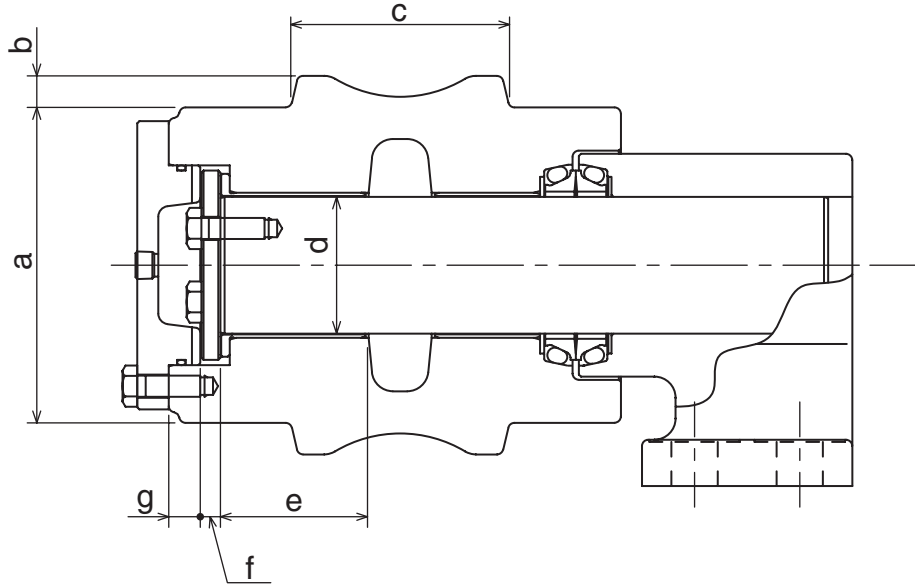
## Gauge

unit in mm



300-6-10-03-03b

# Upper roller

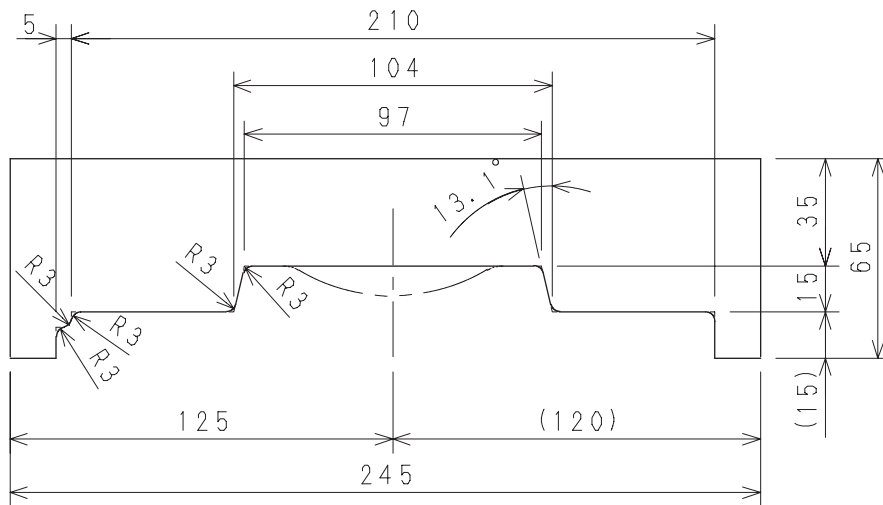


SI14004-009

Part name	Code	Measured dimensions (mm)	Standard value (mm)	Usage limit (mm)	Judgment	Solution
Carrier roller	a	∅	∅150	∅140	Acceptable/Unacceptable	Cladding by welding or replacement
	b		15	-	Acceptable/Unacceptable	
	c		104	-	Acceptable/Unacceptable	
Shaft	d	∅	∅65	∅64	Acceptable/Unacceptable	Replacement
Bushing	d	∅	∅65	∅66	Acceptable/Unacceptable	Replacement
	e		69	68	Acceptable/Unacceptable	
Thrust plate	f		9	8.5	Acceptable/Unacceptable	Replacement
Cover	g		15	-	Acceptable/Unacceptable	Replacement

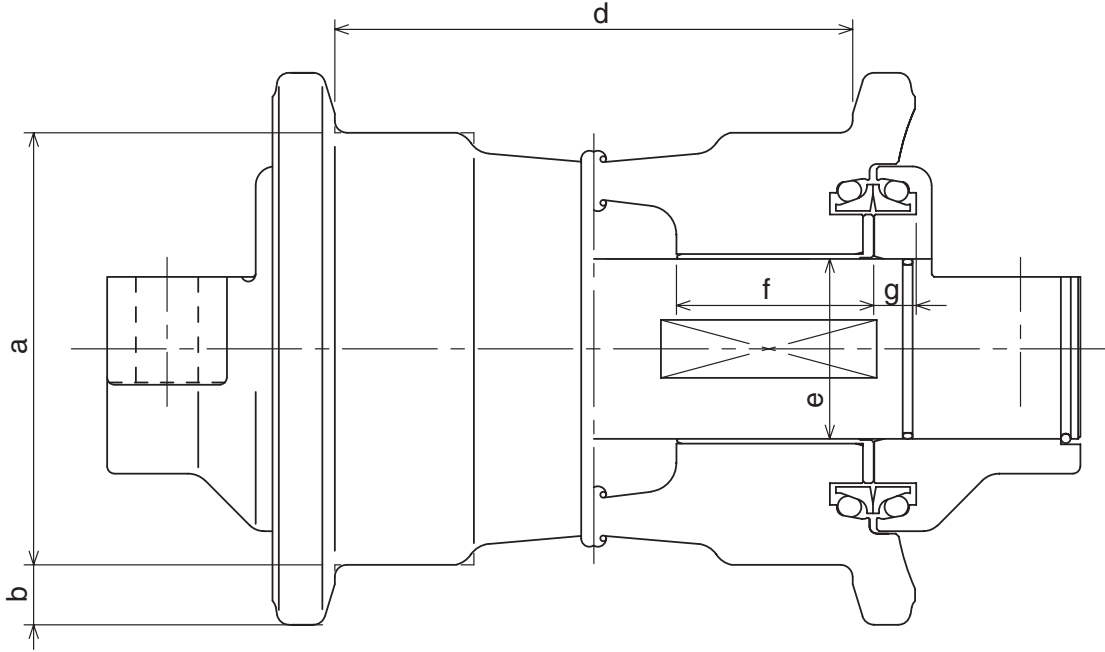
## Gauge

unit in mm



300-6-10-03-03c

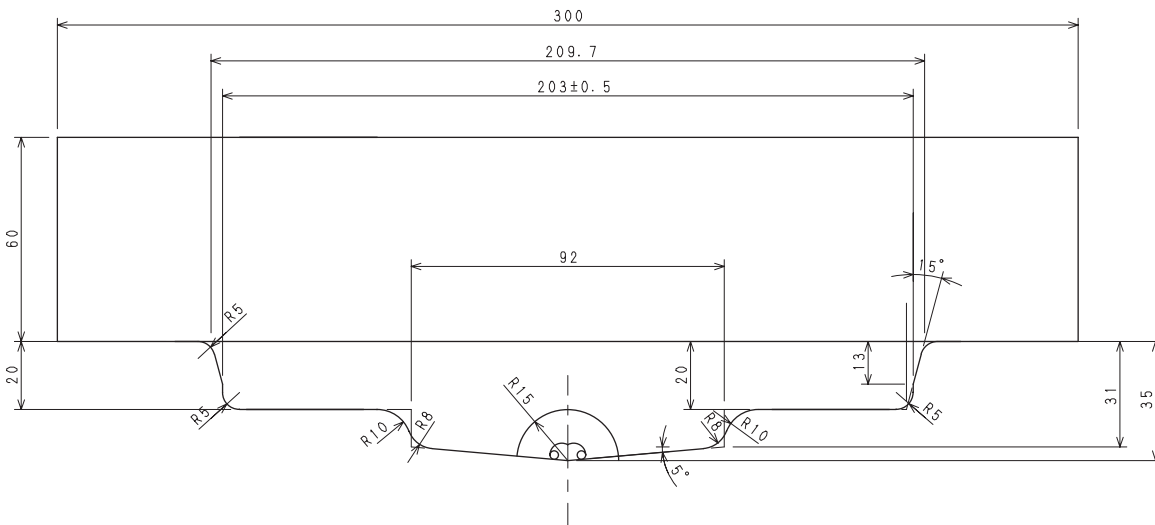
## Lower roller



Part name	Code	Measured dimensions (mm)	Standard value (mm)	Usage limit (mm)	Judgment	Solution
Track roller	a	∅	∅180	∅170	Acceptable/Unacceptable	Cladding by welding or replacement
	b		20	16	Acceptable/Unacceptable	
	d		203	211	Acceptable/Unacceptable	
Shaft	e	∅	∅75	∅74	Acceptable/Unacceptable	Replacement
Bushing	e	∅	∅75	∅76	Acceptable/Unacceptable	Replacement
	f		82	81	Acceptable/Unacceptable	
Collar	g		17.7	17.2	Acceptable/Unacceptable	Replacement

## Gauge

unit in mm



BI14012-002

Sample manual. Download All pages at:

<https://www.arepairmanual.com/downloads/2010-case-cx290b-crawler-excavator-service-manual/>