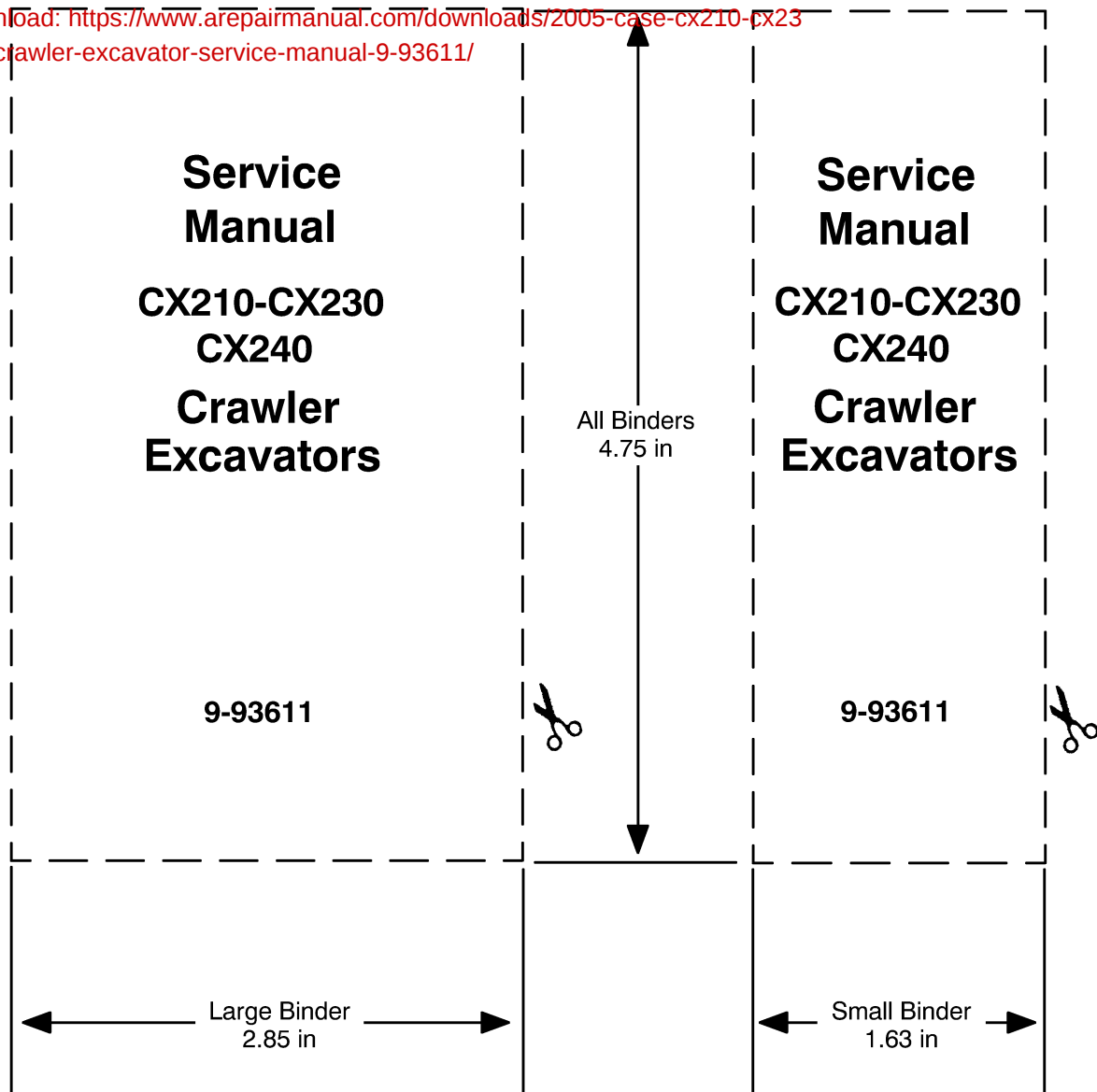




Product: 2005 Case CX210 CX230 CX240 Crawler Excavator Service Manual 9-93611

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CX210 - CX230 - CX240 Crawler Excavators

Table of Contents

DIVISION/SECTION	SECTION N°	REFERENCE N°
1 GENERAL INFORMATION		
Safety, general information and standard torque data	1001	7-27690GB
General specifications and special torque setting.....	1002	7-29361GB
2 ENGINE		
Removal and installation of the engine	2000	7-28230GB
Radiator and oil-cooler	2001	7-28050GB
Engine specifications	*	
Disassembly and assembly of the engine.....	*	
3 FUEL SYSTEM		
Fuel tank	3001	7-27970GB
Fuel engine system	*	
4 ELECTRICAL SYSTEM		
Electrical system, electrical and electronic troubleshooting	4001	7-27724GB
Inspection and maintenance of batteries and connecting a booster battery	4002	7-27921GB
Main and engine electronic control boxes.....	4003	7-27933GB
5 UNDERCARRIAGE		
Removal and installation of tracks	5001	7-27750GB
Rollers	5003	7-27772GB
Sprocket.....	5004	7-27781GB
Idler wheel and tension shock absorber	5005	7-27803GB
6 DRIVE TRAIN		
Drive motor and final drive transmission removal and installation	6001	7-27841GB
Drive motor and final drive transmission disassembly and assembly.....	6002	7-28090GB
Swing reduction gear, removal and installation.....	6003	7-27820GB
Swing reduction gear, disassembly and assembly (CX210 - CX230).....	6004	7-28371GB
Swing reduction gear, disassembly and assembly (CX240)	6004	7-28391GB
7 UNDERCARRIAGE HYDRAULICS		
8 UPPERSTRUCTURE HYDRAULICS		
Depressurising and decontaminating the hydraulic system, use of the vacuum pump and bleeding the components.....	8000	7-27952GB
Specifications, troubleshooting, checks and hydraulic pressure settings	8001	7-27704GB
Hydraulic reservoir removal and installation	8002	7-27990GB
Main and pilot pumps, removal and installation	8003	7-27860GB
Main hydraulic control valve, removal and installation	8004	7-27890GB
Attachment cylinders, removal and installation.....	8005	7-27791GB
Hydraulic swivel, removal and installation	8006	7-27811GB
Pilot blocs, removal and installation	8007	7-28130GB
Swing motor, removal and installation (CX210 - CX230)	8008	7-28071GB
Swing motor, removal and installation (CX240)	8008	
Main hydraulic pump, disassembly and assembly.....	8010	7-35490GB
Main hydraulic control valve, disassembly and assembly.....	8011	9-36270GB
Attachment cylinders, disassembly and assembly.....	8012	7-27902GB
Hand control levers, disassembly and assembly	8013	7-28110GB
Foot control levers, disassembly and assembly	8014	7-28210GB
Six-solenoid valves, disassembly and assembly	8015	7-27911GB
Caution valve, disassembly and assembly	8016	7-27942GB
Safety valve	8017	7-29631GB
Hydraulic swivel, disassembly and assembly	8018	7-28080GB
Swing motor, disassembly and assembly (CX210 - CX230).....	8019	7-28011GB
Swing motor, disassembly and assembly (CX240).....	8019	7-29760GB
Hydraulic functions.....	8020	7-28490GB

DIVISION/SECTION	SECTION N°	REFERENCE N°
9 UPPERSTRUCTURE		
Quick coupler	9000	9-93630GB
Upperstructure, turntable and counterweight.....	9002	7-27982GB
Boom, dipper and bucket	9003	7-27963GB
Seat and seat belt	9004	7-28120GB
Cab and cab equipment.....	9005	7-28022GB
Air conditioning troubleshooting.....	9006	9-88730GB
Air conditioning unit disassembly and assembly.....	9007	
Air conditioning servicing	9008	
Air conditioning components.....	9009	
Articulated boom supplement (CX210 - CX230).....	9010	9-93770GB
Large format hydraulic and electrical schematics	Pocket	7-27623

* Consult the Engine Service Manual

Sections to be distributed at a later date

NOTE: CNH Company reserves the right to make changes in the specification and design of the machine without prior notice and without incurring any obligation to modify units previously sold.

The description of the models shown in this manual has been made in accordance with the technical specifications known as of the date of design of this document.

Section

1001

SAFETY, GENERAL INFORMATION AND TORQUE SPECIFICATIONS

TABLE OF CONTENTS

GENERAL INFORMATION 3

SAFETY 4

STANDARD TORQUE DATA FOR CAP SCREWS AND NUTS..... 6



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.

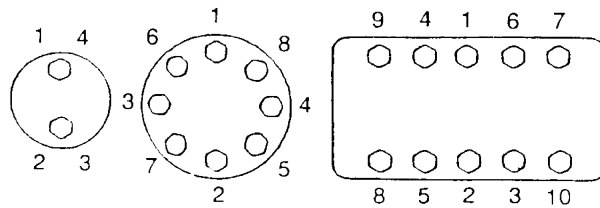


WARNING: When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others 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 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	15.7	32.3	58.8	98.0	137.2	196.0	274.0
		[lb-ft]	5.1	11.6	23.9	43.4	72.3	101.2	144.6	202.4
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	78.4	117.6	176.4	245.0	343.0
		[lb-ft]	6.5	15.9	31.1	57.8	86.8	130.1	180.8	253.1

Section

1002

1002

GENERAL SPECIFICATIONS AND SPECIAL TORQUE SETTINGS

TABLE OF CONTENTS

TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE	3
Machine	3
Engine	3
Component serial numbers	3
FLUIDS AND LUBRICANTS	4
Hydraulic fluid	4
Transmission component oil	4
Grease	4
Engine oil	5
Oil viscosity/Oil range	5
Fuel	6
Anti-freeze/Anti-corrosion	6
Environment	6
Components made from plastic or resin	6
SPECIFICATIONS	7
Engine	7
Capacities	7
Electrical system	7
Hydraulic system	8
Cylinder	8
Control valve	9
Swing	9
Travel	9
Undercarriage	9
Attachment	9
Weight of components	10
DIMENSIONS AND LIMIT OF WEAR AND TEAR OF THE TRACKS SET	11
Toothed wheel	11
Idler wheel	12
Upper roller	13
Lower roller	14
Track	15
DIMENSIONS AND LIMIT OF WEAR AND TEAR OF THE MOBILE JOINTS OF THE ATTACHMENT	16
Boom foot/Undercarriage	16
Boom cylinder foot/Undercarriage	17
Boom cylinder head/Boom	17
Dipper cylinder foot/Boom	18
Boom/Dipper	18
Dipper cylinder head/Dipper	18
Bucket cylinder foot/Dipper	19
Connecting rod/Dipper	19
Compensator/Bucket	19
Connecting rod/Compensator/Bucket cylinder head	20
Dipper/Bucket	20
SPECIAL TORQUE SETTINGS	21
MACHINE OVERALL DIMENSIONS	24



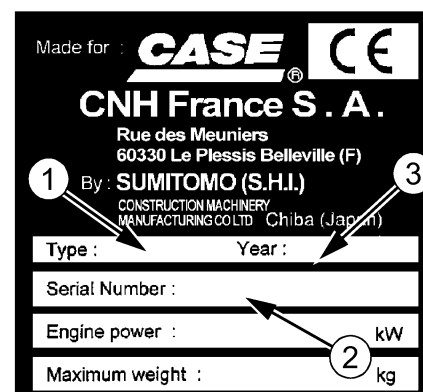
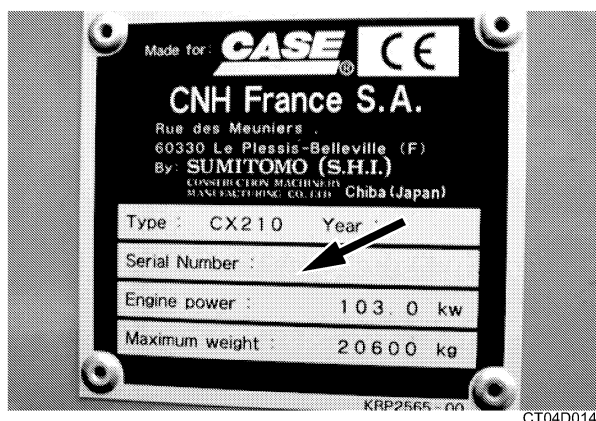
WARNING: *This symbol is used in this manual to indicate important safety messages. Whenever you see this symbol, carefully read the message that follows, as there is a risk of serious injury.*

TYPE, SERIAL NUMBER AND YEAR OF MANUFACTURE OF THE MACHINE

When placing a parts order or making a request for information or assistance, always give you CASE Dealer the type and serial number of the machine concerned.

Enter the required information on the lines below: Type, serial number, year of manufacture of the machine and the serial numbers of hydraulic and mechanical components

Machine



CT04A171

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

Engine

Make and type

Serial number

Component serial numbers

Hydraulic pump.....

Swing reduction gear.....

Travel reduction gears.....

Travel control valve.....

Attachment control valve

Swing 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 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

Fluid type ISO VG 46

CASE reference: POHYDR

Hot climates

0°C to +60°C

Fluid type ISO VG 100

CASE reference: POHYPC

Cold climates

-40°C to +20°C

Fluid type ISO VG 22

CASE reference: POHYPF

These various grades of fluid must be in conformity with the CASE specification.

Transmission component oil

Extreme pressure oil used for transmission components inside sealed housings.

Extreme pressure oil TYPE API GL5 GRADE 80W90 or ISO VG 150.

Grease

The type of grease to use depends on ambient temperature.

Temperate and hot climates

-20°C to +60°C

Extreme pressure grease EP NLGI grade 2 with molybdenum disulphide.

Cold climates

-40°C to +20°C

Extreme pressure grease EP NLGI grade 0.

Engine oil

CASE engine oil No. 1 is recommended for your engine. This oil ensures correct lubrication of your engine in all working conditions.

If CASE No. 1 Multipurpose or Performance engine oil is not available, use oil corresponding to category API/CG/CF.

NOTE: Do not put any Performance Additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out on CASE lubricants.

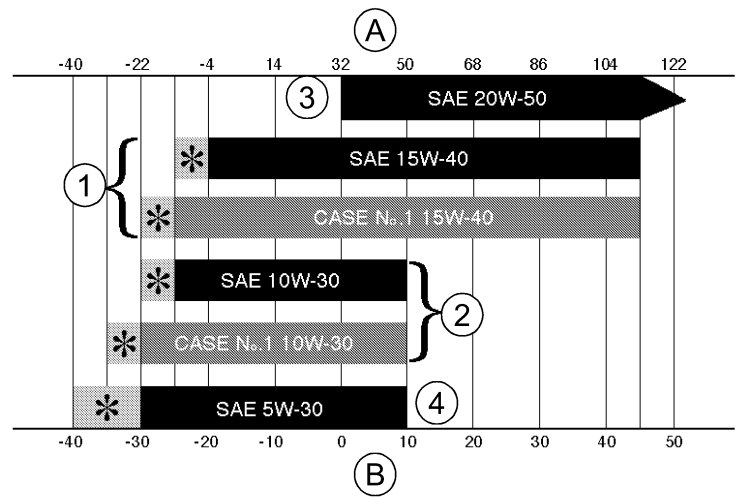


RD97F136



RD97F100

Oil viscosity/Oil range



(A) FAHRENHEIT TEMPERATURE

(B) CELSIUS TEMPERATURE

(1) ALL SEASONS

(2) WINTER

(3) TROPICAL

(4) ARCTIC

(*) SHOWS THAT AN ENGINE OIL HEATER OR ENGINE COOLANT SOLUTION HEATER MUST BE USED

CS98M561

Fuel

Use fuel that is to ASTM (American Society for Testing and Materials) D975 standard.

Use Grade No. 2 fuel. The use of other types of fuel can result in a loss of power and may cause high fuel consumption.

In cold weather, the use of a mixture of fuels No. 1 and No. 2 is temporarily permitted. Consult your fuel supplier.

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.

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.

In environments with a temperature higher than -36°C, use a mixture of 50% ethylene-glycol based anti-freeze.

For areas where the temperature is below -36°C, it is advisable to use a blend of 40% water and 60% anti-freeze.

Environment

Before carrying out any servicing operation on this machine and before disposing of used fluids or lubricants, always think of the environment. Never throw fluid or oil on the ground and never keep them in leaking receptacles.

Consult your local ecological recycling centre to obtain information on the appropriate means of disposing of these substances.

Components made from plastic or resin

When cleaning plastic parts, the console, the instrument panel, the gauges, etc., do not use petrol (gasoline), paraffin (kerosene), paint solvents, etc. Use only water, soap and a soft cloth.

The use of petrol (gasoline), paraffin (kerosene), paint solvents, etc, will cause discoloration, cracking or deformation of these components.

SPECIFICATIONS

Engine

	CX210/CX230	CX240
Make.....	Isuzu	Isuzu
Model.....	BB-6BG1T	
Type: Four stroke, water-cooled, overhead valve, direct injection (electronically controlled), in-line engine with turbo-charger.		
Number of cylinders.....	6	
Bore and stroke	105x125 mm	
Displacement.....	6494 cm ³	
Operating conditions		
Idling.....	1000 rpm	
Max speed	1950 rpm	2150 rpm
ECC 1289 power rating	105 kW (143 hp)	140,5 kW (190 hp)
Max torque.....	532 Nm at 1600 rpm	676 Nm at 1800 rpm

Capacities

Engine oil capacity.....	24 litres	
Engine cooling system.....	27 litres	
Capacity of the radiator only.....	12 litres	12.2 litres
Fuel tank.....	265 litres	340 litres
Hydraulic fluid reservoir capacity.....	120 litres	
Total hydraulic system capacity	206 litres	225 litres
Capacity of the cooler only	5.3 litres	5.7 litres
Travel reduction gear housing capacity	4.7 litres	
Swing drive housing capacity	4.5 litres	6 litres
Idler wheel capacity	180 cm ³	
Upper roller capacity.....	50 to 55 cm ³	

	CX210	CX230/CX240
Lower roller capacity.....	210 cm ³	250 cm ³

NOTE: These capacities are only provided in an indicative manner. To check fluid levels, always use the oil dipstick, sight glasses or the filler cap.

Electrical system

Type of system	24 volts negative earth
Alternator amperage.....	40 A
Battery	
Number of batteries required	2
Voltage of each battery	12 volts
Capacity	140 Ah
Reserve.....	160 min
Cold starting capacity at -17°C.....	800 A
Load for load checking	400 A
Starter motor	
Voltage	24 volts
Power	4.5 kW
Voltage regulator	integrated, not adjustable

Hydraulic system

Main hydraulic pump

	CX210/CX230	CX240
Double, axial piston, variable flow pump.		
Max flow	2x201 l/min	2x212 l/min
Displacement.....	2x101.5 cm ³	2x97.2 cm ³

Hydraulic pilot pump

	CX210	CX230	CX240
Fixed flow pump.			
Max flow	22 l/min	20L/mn	22 l/min
Displacement.....	CX210/CX230		CX240
		10 cm ³	

Pressure settings

Pilot circuit secondary relief valve	39±1 bar
Main relief valve (standard)	343±3 bar
Main relief valve (higher pressure - 2-stage relief)	373±5 bar
Relief valves (boom, dipper and bucket)	392±5 bar
Relief valves (swing).....	279±4 bar
Relief valves (travel).....	353±5 bar
Safety valve (boom and dipper).....	392±5 bar
	290±4 bar

Cylinder

Boom cylinder

Barrel diameter	120 mm	125 mm
Rod diameter	85 mm	90 mm
Stroke	1255 mm	1284 mm

Dipper cylinder

Barrel diameter	135 mm	145 mm
Rod diameter	95 mm	105 mm
Stroke	1474 mm	1627 mm

Bucket cylinder

Barrel diameter	115 mm	130 mm
Rod diameter	80 mm	90 mm
Stroke	1012 mm	1073 mm

Leaks on the cylinder - attachment lowering (without load)

Boom cylinders (rod retracting)	≤ 5 mm/5 min
Dipper cylinder (rod extending)	≤ 5 mm/5 min
Bucket cylinder (rod extending)	≤ 7 mm/5 min
Full (at the end of the attachment)	≤ 200 mm/10 min

Cylinder speeds (in mode S)

Boom raising (open bucket on the floor).....	3.5±0.6 sec.	3.7±0.6 sec.
Boom lowering (open bucket).....	2.9±0.6 sec.	3±0.6 sec.
Dipper extension.....	2.7±0.6 sec.	3±0.6 sec.
Dipper retraction	3.7±0.6 sec.	4.2±0.6 sec.
Bucket opening.....	2.3±0.6 sec.	2.8±0.6 sec.
Bucket closing	4±0.6 sec.	5±0.6 sec.

Control valve

Five section control valve for dipper, boom acceleration, swing, option and RH travel.

Four section control valve for dipper acceleration, bucket, boom and LH travel.

Load holding valve for boom and dipper.

Swing

CX210/CX230

CX240

Fixed flow, axial piston motor.

Automatic disc brake.

Upperstructure swing speed 12 rpm 10,4 rpm

Displacement 151 cm³ 146 cm³

Work output 155 l/min 182 l/min

Reduction ratio 16.757 22.097

Braking torque ≥ 739 Nm ≥ 806 Nm

Minimum brake pressure 29 bar

Acceptable hydraulic motor leakage xx l/min xx l/min

Travel

CX210

CX230

CX240

Two-speed, axial piston motor.

Automatic disc brake.

Slow speed 3.3 km/h 3,2 Km/h 3.4 km/h

Fast speed 5.7 km/h 5,3 Km/h 5.5 km/h

CX210/CX230

CX240

Incline that can be overcome 70% (35°)

CX210

CX230

CX240

Tractive force 18 340 daN daN 19 100 daN

CX210

CX230/CX240

Displacement 162.2/95 cm³ 168.9/100.3 cm³

Work output 201 l/min 212 l/min

Reduction ratio 43.246

Braking torque (including reducer) 20 900 Nm

Number of turns at the sprockets (10 turns)

Mode "S", fast speed 14.2±0.6 sec. 13±0.6 sec.

Mode "S", slow speed 23.4±0.7 sec. 21.4±0.7 sec.

Permitted deviation in travel over a distance of 20 m

Mode "H", full speed 1 m

Acceptable hydraulic motor leakage xx l/mn xx l/mn xx l/mn

Undercarriage

CX210

CX230

CX240

One-piece undercarriage with welded components.

Lubricated rollers and idler wheels.

Grease type track tension.

Ground pressure

with 550 mm track pads 0,54 Bar

with 600 mm track pads 0.41 bar 0.47 bar

with 700 mm track pads 0.36 bar 0.42 bar

with 800 mm track pads 0.33 bar 0.37 bar

Track tension 280 to 300 mm

Attachment

	CX210/CX230	CX240
Break-out force	14 110 daN	17 300 daN
Penetration force		
1.90 m dipper.....	14 500 daN	
2.40 m dipper.....	12 560 daN	
3.00 m dipper.....	10 050 daN	
2.50 m dipper.....		15 000 daN
3.10 m dipper.....		12 500 daN
3.50 m dipper.....		11 400 daN

Weight of components

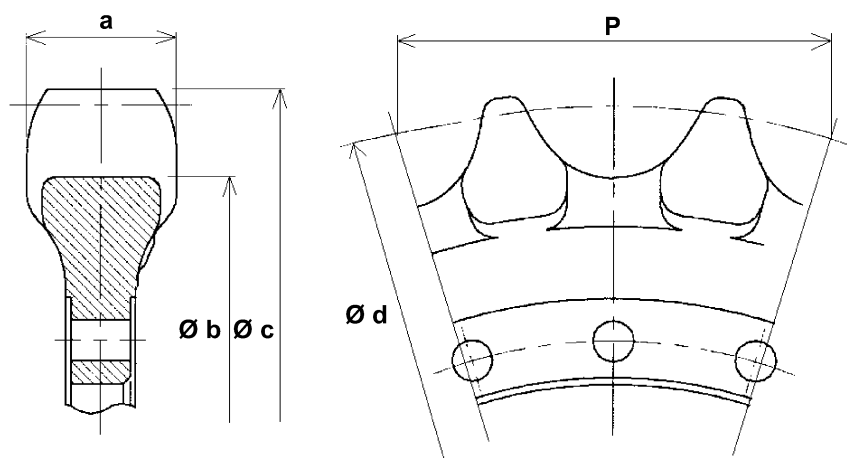
	CX210/CX230	CX240
Engine	512 kg	
Hydraulic pump.....	157 kg	
Attachment control valve	199 kg	
Swing motor/reduction gear assembly	223 kg	345 kg
Travel motor/reduction gear assembly	308 kg	
Boom cylinder.....	169 kg	192 kg
Dipper cylinder.....	257 kg	327 kg
Bucket cylinder	151 kg	194 kg
Counterweight	4000 kg	5100 kg
Cab	254 kg	
Upperstructure attachment	8670 kg	10 290 kg
Machine without attachment.....	15 430 kg	18 110 kg
Attachment	3680 kg	4620 kg
Boom attachment	2110 kg	2620 kg
Dipper attachment	928 kg	1190 kg
Radiator and cooler set	76 kg	84 kg
Fuel tank.....	87 kg	
Hydraulic tank.....	127 kg	

	CX210	CX230/CX240
Turnable bearing	263 kg	389 kg
Undercarriage attachment.....	6570 kg	7610 kg
Hydraulic swivel.....	31 kg	
Idler wheel	82 kg	91 kg
Upper roller.....	17 kg	
Lower roller.....	36 kg	40 kg
Shock absorber	126 kg	142 kg
Track 550 mm.....		
Track 600 mm.....	1263 kg	1365 kg
Track 700 mm.....	1470 kg	1502 kg
Track 800 mm.....	1599 kg	1633 kg

DIMENSIONS AND LIMIT OF WEAR AND TEAR OF THE TRACKS SET

Toothed wheel

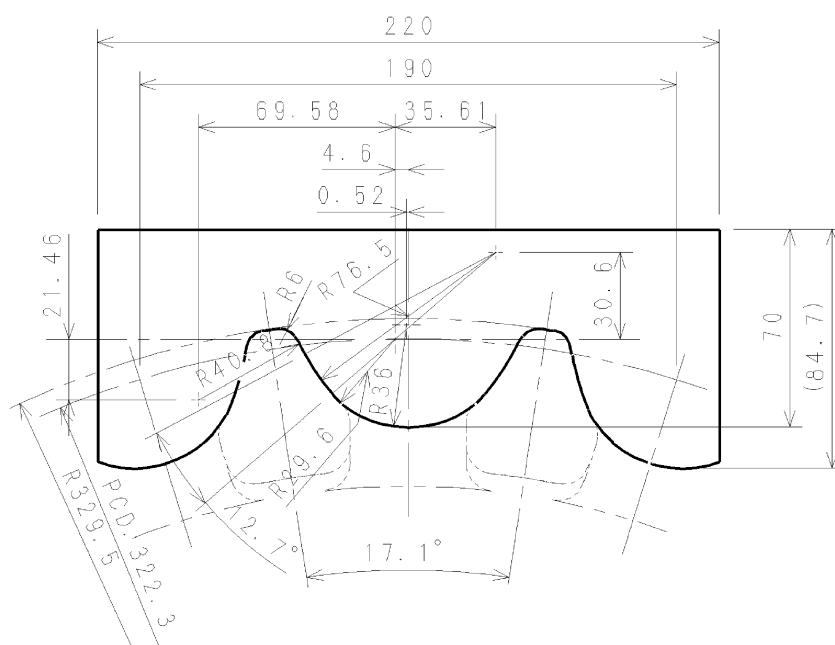
Dimensions

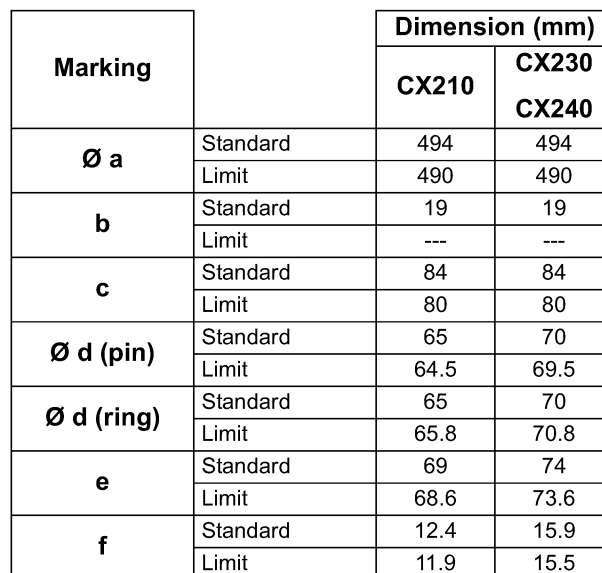


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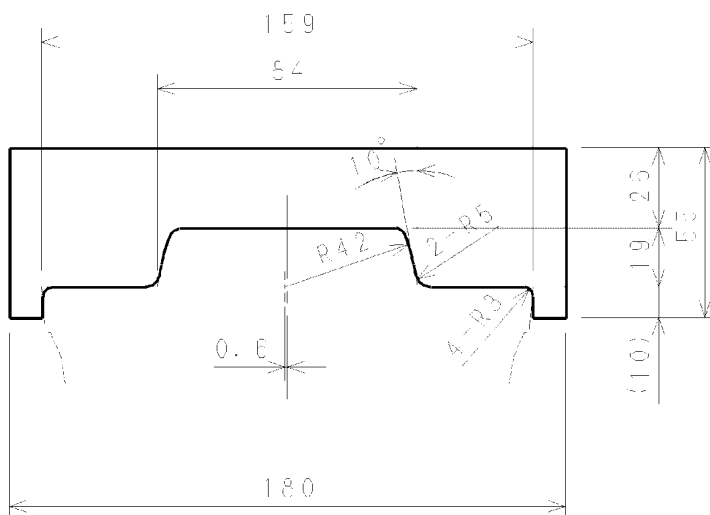
Marking		Dimension (mm)
a	Standard	66
	Limit	60
Ø b	Standard	582.5
	Limit	576.5
Ø c	Standard	659
	Limit	653
Ø d	Standard	644.6
	Limit	---
P	Standard	190
	Limit	---

Gauge



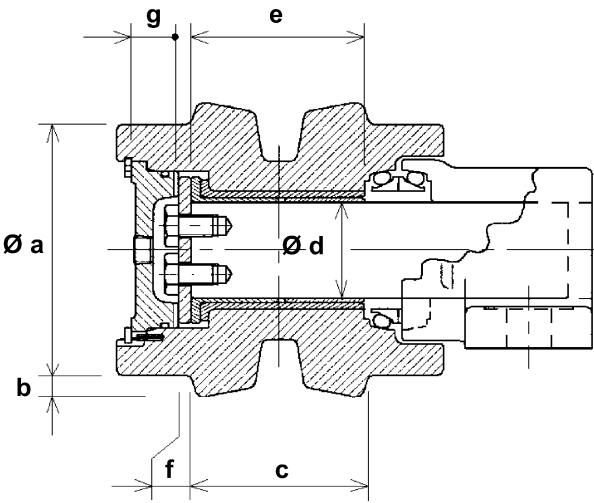


Gauge



Upper roller

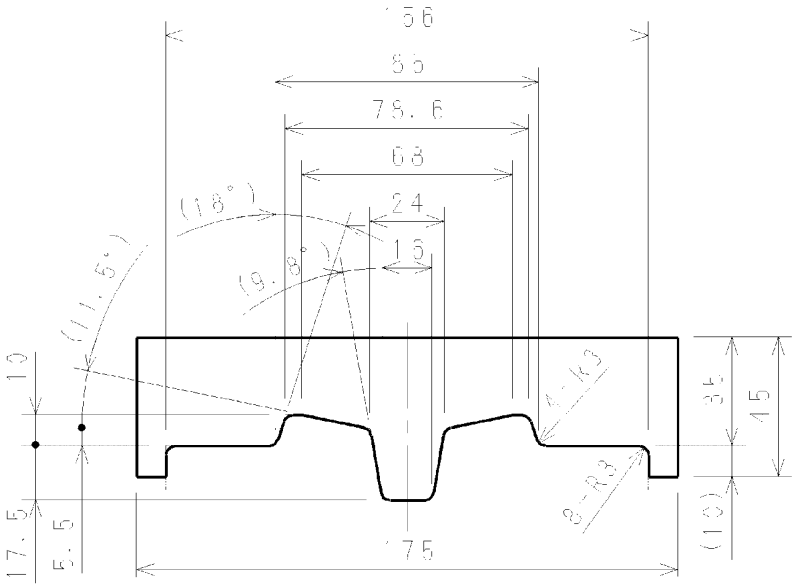
Dimensions



CS01B516

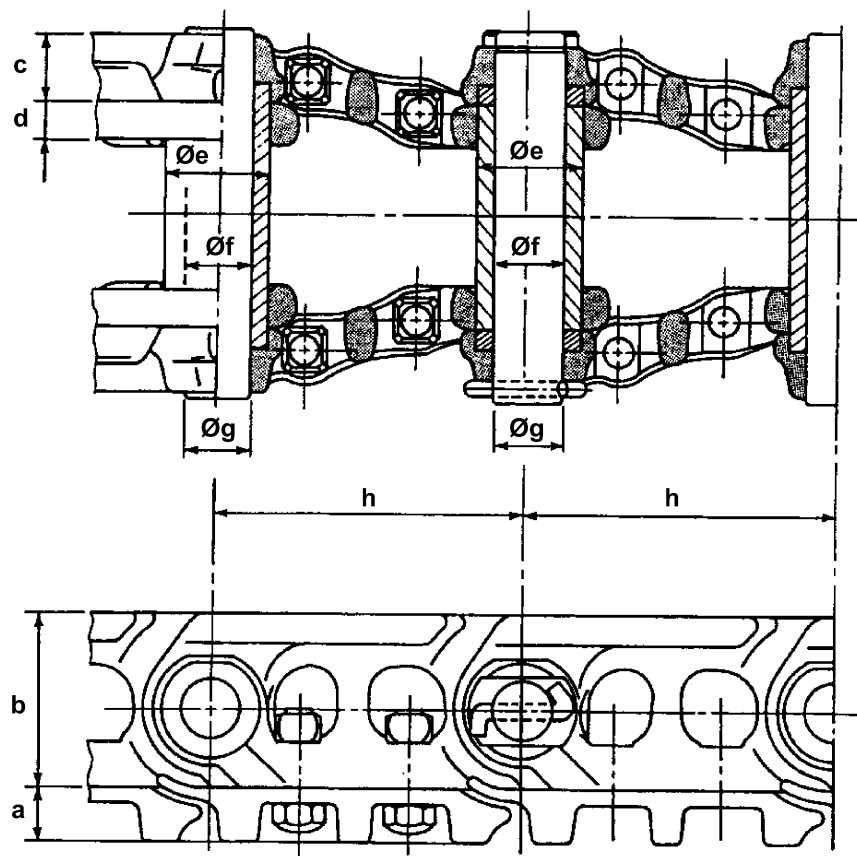
Marking		Dimension (mm)
$\varnothing a$	Standard	120
	Limit	112
b	Standard	10
	Limit	---
c	Standard	85
	Limit	79
$\varnothing d$ (pin)	Standard	46
	Limit	45.5
$\varnothing d$ (ring)	Standard	46
	Limit	46.8
e	Standard	83
	Limit	82.6
f	Standard	5.5
	Limit	5
g	Standard	22.5
	Limit	22

Gauge



CS01B517

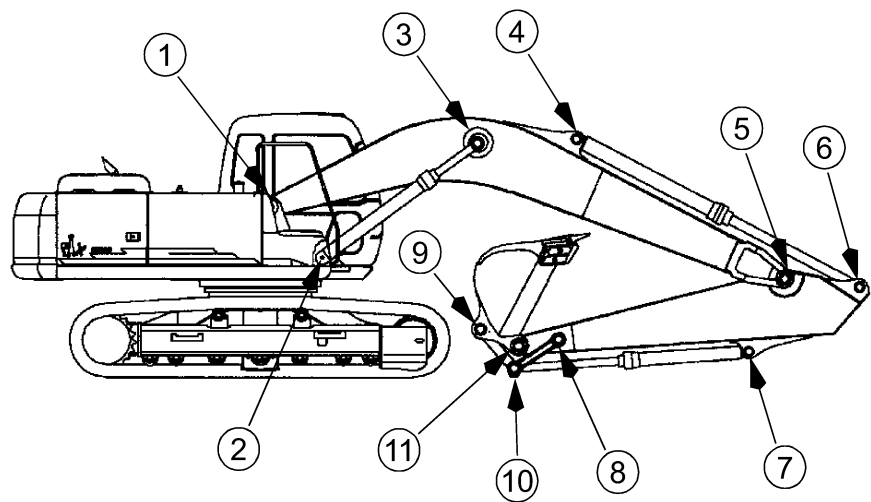
Track



CS01B520

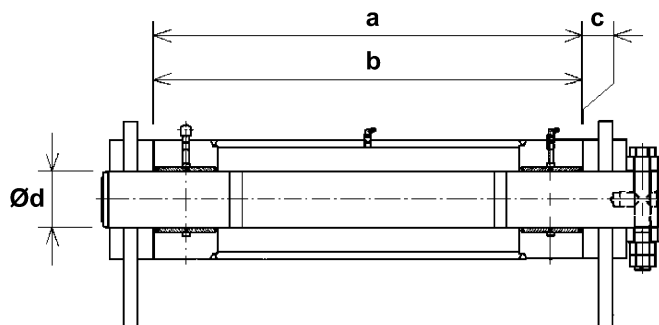
Marking		Dimension (mm)		Marking		Dimension (mm)	
		CX210	CX230 CX240			CX210	CX230 CX240
a	Standard	34.5	36	Ø e (ring)	Standard	58.72	58.72
	Limit	21.5	23		Limit	57.5	57.5
b	Standard	106	106	Ø f (ring)	Standard	37.3	37.3
	Limit	101	101		Limit	38.3	38.3
c	Standard	37.985	37.985	Ø g (pin)	Standard	36.3	36.3
	Limit	36	36		Limit	35.5	35.5
d	Standard	19.95	17.95	h	Standard	190	190
	Limit	16	16		Limit	195	195

DIMENSIONS AND LIMIT OF WEAR AND TEAR OF
THE MOBILE JOINTS OF THE ATTACHMENT



CS01B521

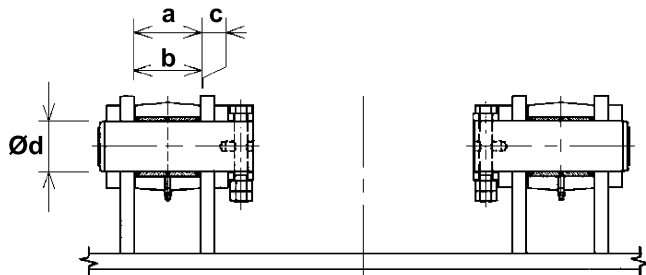
1. Boom foot/Undercarriage



CS01B522

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	682	696
	Limit	692	706
b	Standard	681.5	695.5
	Limit	679.5	693.5
c (a - b)	Standard	0.5 to 3	0.5 to 3
	Limit	Shims	Shims
Ø d (pin)	Standard	90	100
	Limit	89	99
Ø d (ring)	Standard	90	100
	Limit	91.5	101.5

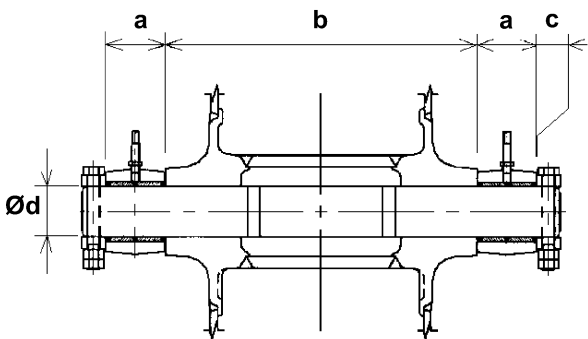
2. Boom cylinder foot/Undercarriage



CS01B523

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	106	109
	Limit	112	115
b	Standard	105	108
	Limit	103	106
c (play)	Standard	1 to 2.5	1 to 2.5
	Limit	Shims	Shims
Ø d (pin)	Standard	80	90
	Limit	79	89
Ø d (ring)	Standard	80	90
	Limit	81.5	91.5

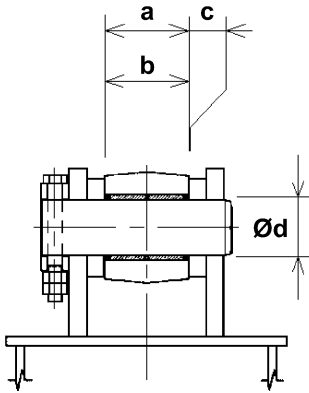
3. Boom cylinder head/Boom



CS01B524

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	100	108
	Limit	98	106
b	Standard	525	528
	Limit	512	522
c (play)	Standard	1 to 2.5	1 to 2.5
	Limit	Shims	Shims
Ø d (pin)	Standard	85	90
	Limit	84	89
Ø d (ring)	Standard	85	90
	Limit	86.5	91.5

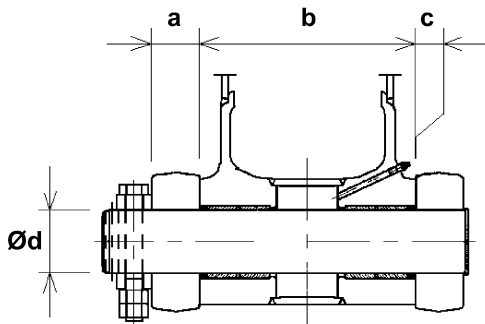
4. Dipper cylinder foot/Boom



CS01B525

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	121	121
	Limit	127	127
b	Standard	120	120
	Limit	118	118
c (a - b)	Standard	0.5 to 2	0.5 to 2
	Limit	Shims	Shims
Ø d (pin)	Standard	80	90
	Limit	79	89
Ø d (ring)	Standard	80	90
	Limit	81.5	91.5

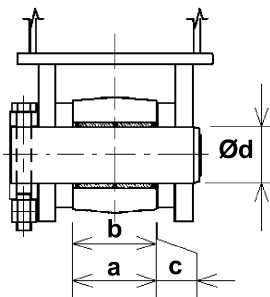
5. Boom/Dipper



CS01B526

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	310	330
	Limit	313.5	333.5
b	Standard	309.5	329.5
	Limit	307.5	327.5
c (play)	Standard	0.5 to 1.1	0.5 to 1.1
	Limit	Shims	Shims
Ø d (pin)	Standard	90	100
	Limit	89	99
Ø d (dipper)	Standard	90	100
	Limit	91.5	101.5
Ø d (boom)	Standard	90	100
	Limit	91.5	101.5

6. Dipper cylinder head/Dipper



CS01B527

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	121	121
	Limit	127	127
b	Standard	120	120
	Limit	118	118
c (a - b)	Standard	0.5 to 3	0.5 to 3
	Limit	Shims	Shims
Ø d (pin)	Standard	80	90
	Limit	79	89
Ø d (ring)	Standard	80	90
	Limit	81.5	91.5