CX160D
CX180D
Crawler Excavator

SERVICE MANUAL

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English
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CASE
CONSTRUCTION

SERVICE MANUAL

CX160D Crawler excavators LC version (TIER 4 FINAL) - EU Market
CX180D Crawler excavators LC version (TIER 4 FINAL) - EU Market

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INTRODUCTION

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INTRODUCTION

(*) See content for specific models

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Foreword - Important notice regarding equipment servicing

All repair and maintenance work listed in this manual must be carried out only by qualified dealership personnel, strictly complying with the instructions given, and using, whenever possible, the special tools.

Anyone who performs repair and maintenance operations without complying with the procedures provided herein shall be responsible for any subsequent damages.

The manufacturer and all the organizations of its distribution chain, including - without limitation - national, regional, or local dealers, reject any responsibility for damages caused by parts and/or components not approved by the manufacturer, including those used for the servicing or repair of the product manufactured or marketed by the manufacturer. In any case, no warranty is given or attributed on the product manufactured or marketed by the manufacturer in case of damages caused by parts and/or components not approved by the manufacturer.

The manufacturer reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication but are subject to change without notice.

In case of questions, refer to your CASE CONSTRUCTION Sales and Service Networks.

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Safety rules

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules – General information

Cleaning

Clean the metal parts with cleaning solution that meets the standard and steam cleaning. (except for bearings)

After cleaning, dry well, and inject oil in all parts.

Also inject oil into the bearings after drying.

Inspection

When disassembling parts, check all the parts.

If there are any worn or damaged parts, replace them.

Inspect carefully to prevent initial breakdowns.

Bearing

Replace any loose bearings.

Air dry bearings before installing them.

Needle bearing

When inserting needle bearings, be very careful not to damage them.

Apply grease to the section where the needle bearing will be inserted.

Gear

Check that there is no wear and no damage.

Oil seal, O-ring, gasket

Always install new oil seals, O-rings, and gaskets.

Apply grease to sections where oil seals and O-rings will be inserted.

Shaft

Check that there is no wear and no damage.

Check the bearings and check for damaged oil seals on the shaft.

Service parts

Install CASE CONSTRUCTION genuine service parts.

When placing an order, check the parts catalog. It contains the CASE CONSTRUCTION genuine part numbers.

Any breakdowns arising from the installation of non-genuine parts are not covered by the warranty.

Lubricants (fuel, hydraulic oil)

Use the oil from the specified company or specified in the operator's manual or service Manual.

Any breakdowns arising from any fuel or hydraulic oil other than those specified are not covered by the warranty.

Safety rules – Personal safety

WARNING:

This symbol indicates a precaution.

It gives information concerning the safety of the operator and those in the surroundings.

Read and understand these precautions thoroughly before performing the work.

Always comply with warnings and precautions so as to avoid any accidents.

This section covers information related to overall safety.

Check whether all warning labels are in place.

Additional labels can be ordered from Service Parts.

WARNING:

Read the operator's manual to gain a thorough understanding of machine control operations.

WARNING:

Perform any machine operations from the seating position.

Any other method may cause severe injuries.

WARNING:

Only the one operator is to ride on the machine. No one else is to ride on it.

WARNING:

Check the safety messages in the operator's manual before starting the engine.

Check all the warning labels on the machine.

Check that no one is within the machine’s operating range.

Check the operating methods in a safe location before starting the actual work.

Understand the machine operations well, then operate in compliance with all service-related laws and regulations.

The operator's manual can be purchased at your CASE CONSTRUCTION dealer.

WARNING:

Working with sloppy clothes or clothes with which safety cannot be ensured leads to damage to the machine and injury to the operator.

Always wear clothes that ensures safety.

In order to work more safely, it is recommended to wear additional safety equipment.

Helmet, safety shoes, ear protection, goggles, work clothes, and gloves

WARNING:

Pay careful attention when working with the engine running.

WARNING:

Check hydraulic equipment.

Work according to the procedure.

Do not change the procedure.

WARNING:

Check that there is no one in the surroundings before draining the pressure from hydraulic circuits during machine hydraulic cylinder inspection.

WARNING:

Use gloves when handling high-temperature parts.

WARNING:

Bring the lower parts or attachments in contact with the ground before inspecting or repairing them.

WARNING:

Check that hoses and tubes are securely connected.

If there is any damage to a hose or tube, replace it.

Do not check for oil leaks by hand. Use cardboard or wood.

WARNING:

When removing an attachment pin or other hardened pin, use a hammer that has a soft head.

WARNING:

Wear eye protection when using a hammer to install a pin or when working with a grinder.

At this time, use goggles or eye protectors that meet standards.

WARNING:

Park the machine in a safe location when repairing or inspecting it.

WARNING:

Use work site protection when repairing the machine.

Check the oil, coolant, grease, and tools.

Recover materials and parts as necessary.

Pay enough attention to safety.

WARNING:

Some of the machine's parts are extremely heavy.

Use an appropriate lifting equipment for such parts.

For weights and procedures, see the Service Manual.

WARNING:

Exhaust gases are toxic.

Always provide good ventilation when working indoors or in any other enclosed space.

WARNING:

If the electrolytic battery solution freezes, it may explode.

Safety rules – ROPS judgment

1. Purpose

Judge whether or not the model is compliant with ROPS by the ROPS criteria.

Compliance with ROPS is highly dependent on its deadweight and boom.

The model has passed the ROPS test for its deadweight with all selectable options installed (as of 2014).

However, the judgment is required because its deadweight or boom position may go beyond the assumption depending on derivative or order conditions.

2. ROPS criteria

Weight

For each class, the following weight shall not be exceeded.

If the weight is exceeded, a cab may become damaged in case of a rollover, causing the operator to die or become severely disabled.

It is not applicable beyond the criterion.

The ROPS-compliant model shall not exceed the weight shown in the table.

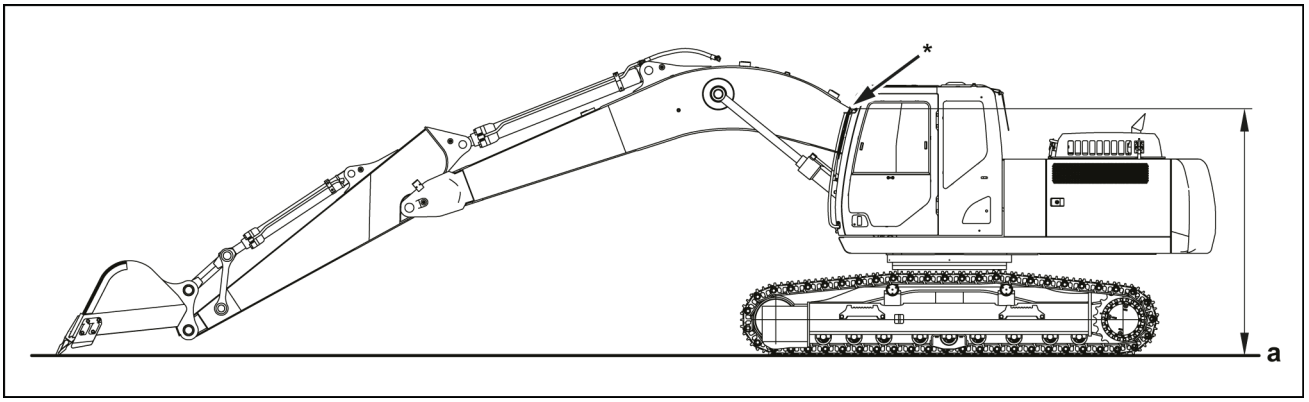
(The following weight is shown on the decal in the ROPS cab.)

Gross body weight	Class
20500 kg (**45194.76 lb**) or less	CX130D
	CX160D
	CX180D
32000 kg (**70547.92 lb**) or less	CX210D
	CX240D
	CX250D
	CX300D

Boom position

Warning

- If you make such modification as lowers the boom position, ROPS is not applicable.
- Consultation with us is required whenever it is assumed that the boom position is lowered by modification.
- The range of change in the boom position cannot be determined uniformly.



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(a) Ground point

It is not applicable if the position overlapping with a cab on the side view (mark * in the figure) is lowered significantly as compared with the standard model (standard arm), within the maximum digging radius with the bucket tip on the surface of the ground.

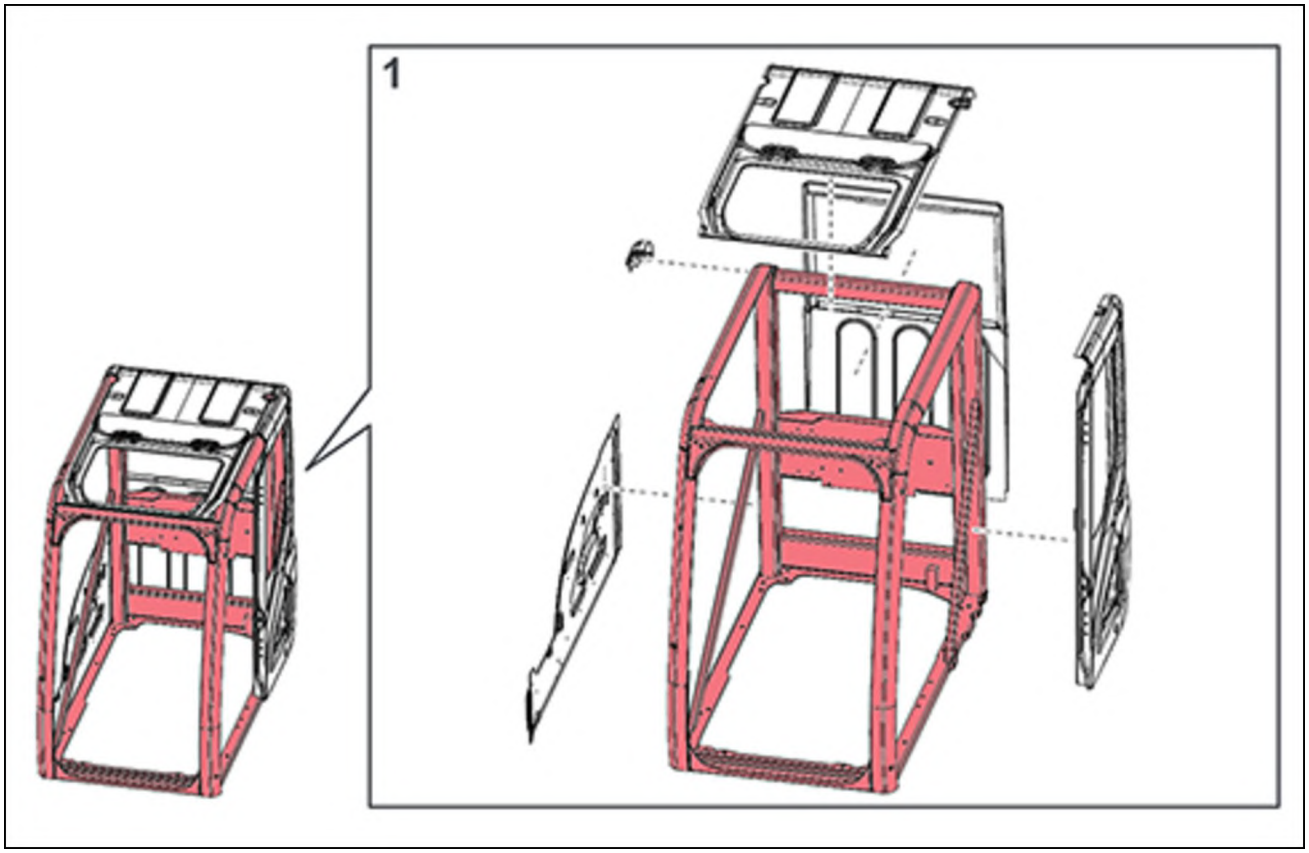
Moreover, it cannot be said that the 24-ton model, close to the limit weight, with a cab that can bear up to 31-tons and the 21-ton model with the same cab are the same in the degree of influence.

3. Prohibitions

- Such modification as reduces the strength of the platform where the ROPS cab is installed. (Such action or modification as reduces the function of the retaining anchor in the left rear of the cab)
- Such modification as affects the ROPS strength of the ROPS cab.

Modification prohibited (Red components)	All changes (grinding, welding, drilling, removal, etc.) are prohibited.
Conditional modification permitted (Gray components)	Removal of components is prohibited. Welding and drilling of bars (limited to **20 mm** (**0.79 in**) or less in diameter) are allowed.

Cab (CX130D/CX160D/CX180D)



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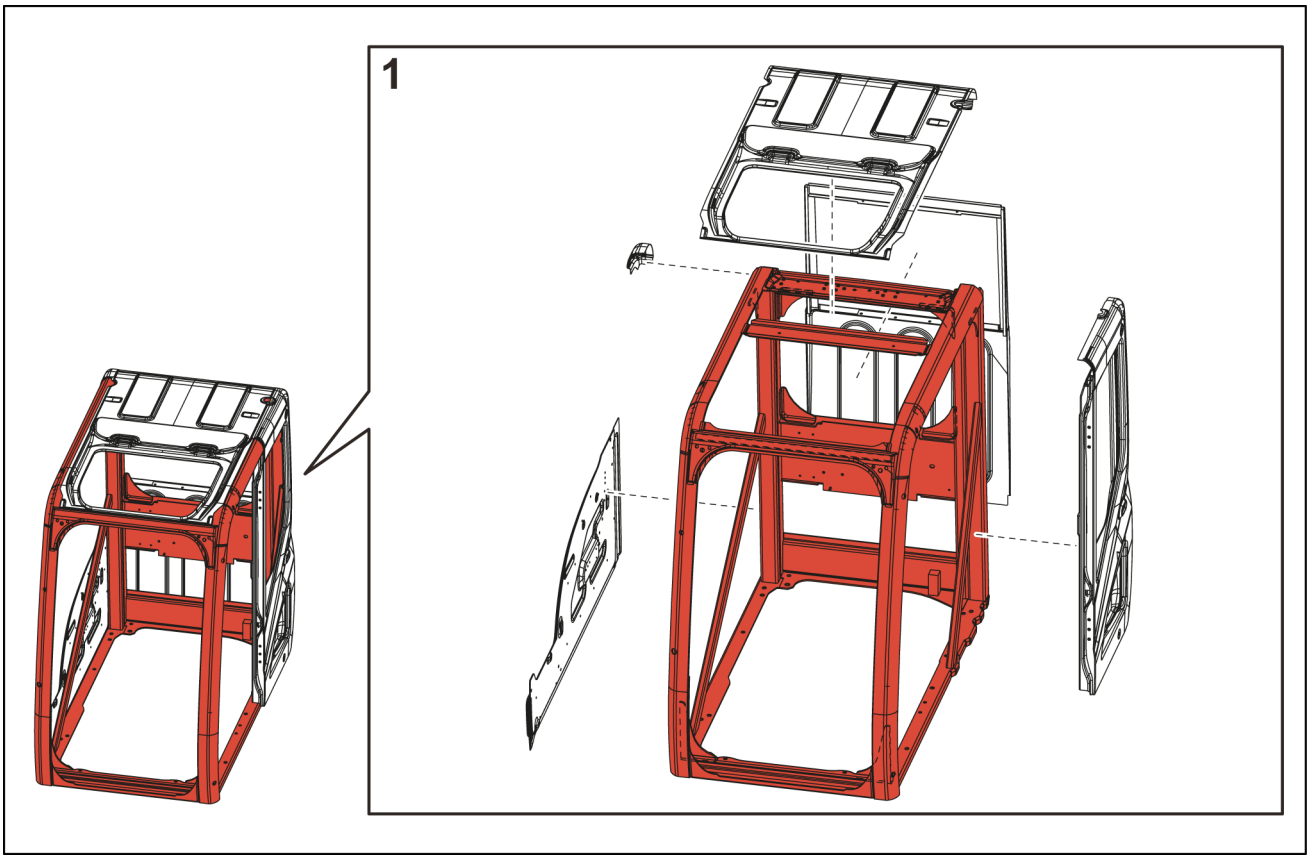
Cab (CX210D/CX240D/CX250D/CX300D)



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Safety rules - Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

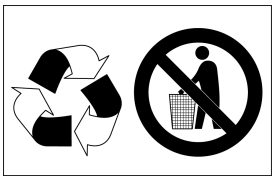
Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- The air-conditioning system contains gases that should not be released into the atmosphere. Consult an air-conditioning specialist or use a special extractor to recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CASE CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

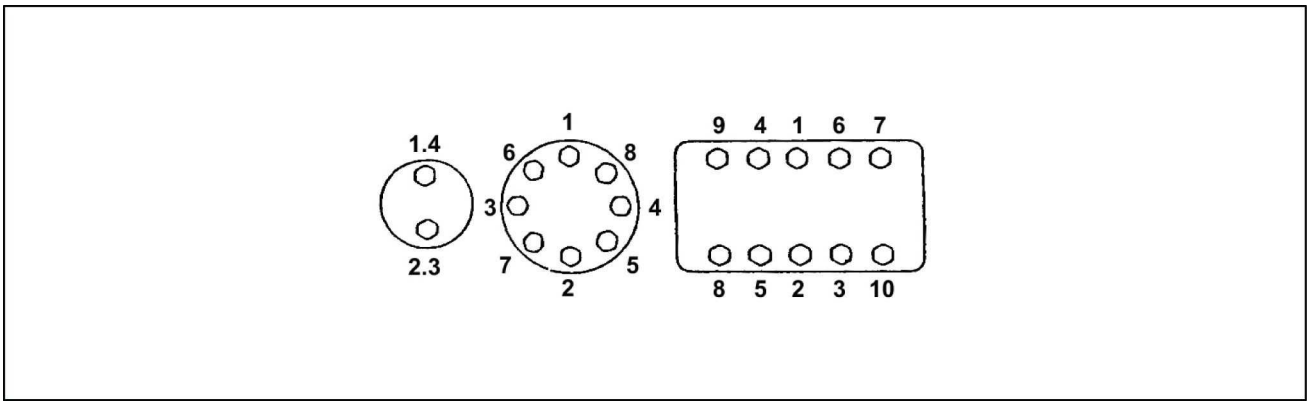
Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

Torque – Bolt and nut

- Tighten alternating between left and right and top and bottom so that uniform tightening force is applied.



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- If **LOCTITE®** was used on a removed bolt (there is something white sticking to the bolt when it is removed), clean the old **LOCTITE®** off with cleaning fluid, dry the bolt, then apply 2 - 3 drops of **LOCTITE®** to the thread section of the bolt.

Torque table

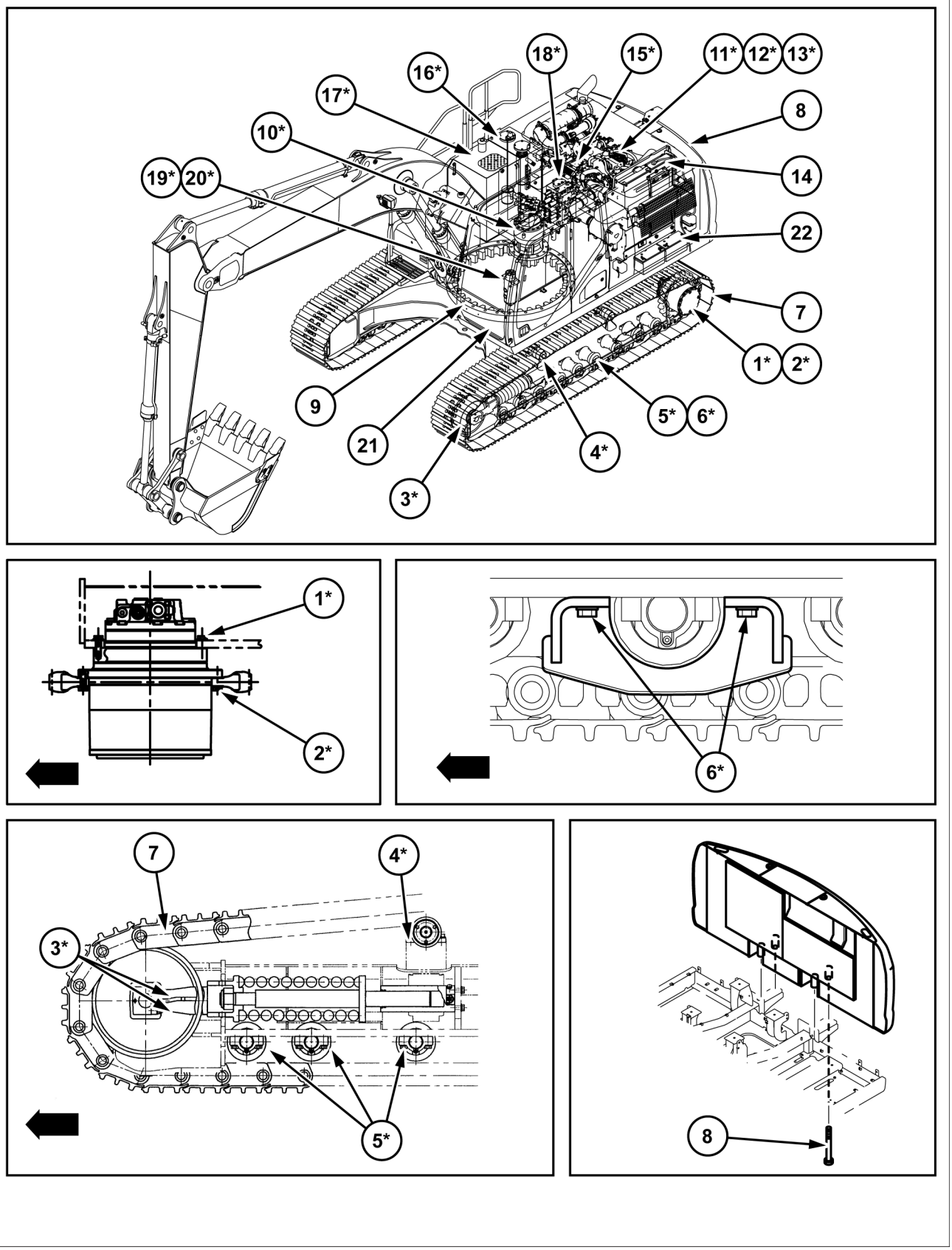
Bolt nominal diameter (size)		M6	M8	M10	M12	M14	M16	M18	M20
Hexagon bolt	Wrench	10 mm	13 mm	17 mm	19 mm	22 mm	24 mm	27 mm	30 mm
	Tightening torque	6.9 N·m (5.089 lb ft)	19.6 N·m (14.456 lb ft)	39.2 N·m (28.912 lb ft)	58.8 N·m (43.369 lb ft)	98.1 N·m (72.355 lb ft)	156.9 N·m (115.723 lb ft)	196.1 N·m (144.636 lb ft)	294.2 N·m (216.991 lb ft)
Hexagon socket head bolt	Wrench	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	14 mm	17 mm
	Tightening torque	8.8 N·m (6.491 lb ft)	21.6 N·m (15.931 lb ft)	42.1 N·m (31.051 lb ft)	78.5 N·m (57.899 lb ft)	117.7 N·m (86.811 lb ft)	176.5 N·m (130.180 lb ft)	245.2 N·m (180.850 lb ft)	343.2 N·m (253.131 lb ft)

Torque - Special torque setting

Code	Retightening location		Bolt nominal diameter	Wrench	Tightening torque
1*	Travel motor		**M16**	**24 mm**	**267 - 312 N·m** (**196.93 - 230.12 lb ft**)
2*	Drive sprocket		**M16**	**24 mm**	**267 - 312 N·m** (**196.93 - 230.12 lb ft**)
3*	Take-up roller		**M16**	**24 mm**	**267 - 312 N·m** (**196.93 - 230.12 lb ft**)
4*	Upper roller		**M20**	**30 mm**	**521 - 608 N·m** (**384.27 - 448.44 lb ft**)
5*	Lower roller		**M18**	**27 mm**	**371 - 432 N·m** (**273.64 - 318.63 lb ft**)
6*	Track guard		**M18**	**27 mm**	**400 - 462 N·m** (**295.02 - 340.75 lb ft**)
7	Shoe		**M20**	**30 mm**	**755 - 853 N·m** (**556.86 - 629.14 lb ft**)
8	Counterweight		**M27**	**41 mm**	**1078 - 1274 N·m** (**795.09 - 939.65 lb ft**)
9*	Turntable bearing		**M20**	**30 mm**	**468 - 545 N·m** (**345.18 - 401.97 lb ft**)
10*	Swing unit		**M20**	**30 mm**	**540 - 629 N·m** (**398.28 - 463.93 lb ft**)
11*	Engine	Mount	**M16**	**24 mm**	**264.9 - 313.9 N·m** (**195.38 - 231.52 lb ft**)
12*		Front bracket	**M12**	**19 mm**	**109 - 127 N·m** (**80.39 - 93.67 lb ft**)
13*		Rear bracket	**M12**	**19 mm**	**109 - 127 N·m** (**80.39 - 93.67 lb ft**)
14*	Radiator		**M12**	**19 mm**	**63.8 - 73.6 N·m** (**47.06 - 54.28 lb ft**)
15*	Hydraulic pump	Pump	**M16**	**14 mm** hexagon socket head	**223 - 247 N·m** (**164.48 - 182.18 lb ft**)
16*	Hydraulic oil tank		**M16**	**24 mm**	**232.4 - 276 N·m** (**171.41 - 203.57 lb ft**)
17*	Fuel tank		**M16**	**24 mm**	**232.4 - 276 N·m** (**171.41 - 203.57 lb ft**)
18*	Control valve		**M16**	**24 mm**	**267 - 312 N·m** (**196.93 - 230.12 lb ft**)
19*	Center Joint	Lock bar	**M12**	**19 mm**	**88.3 - 107 N·m** (**65.13 - 78.92 lb ft**)
20*		Joint	**M12**	**19 mm**	**109 - 127 N·m** (**80.39 - 93.67 lb ft**)
21	Cab		**M16**	**24 mm**	**149 - 173 N·m** (**109.90 - 127.60 lb ft**)
22	Battery		**M10**	**17 mm**	**8 - 12 N·m** (**5.90 - 8.85 lb ft**)

⚠ CAUTION:

- Make sure to apply **LOCTITE® 262™** or equivalent to the locations with the * mark, and tighten according to the specified torque.
- Tightening torque: N· m÷9.8 = kgf· m



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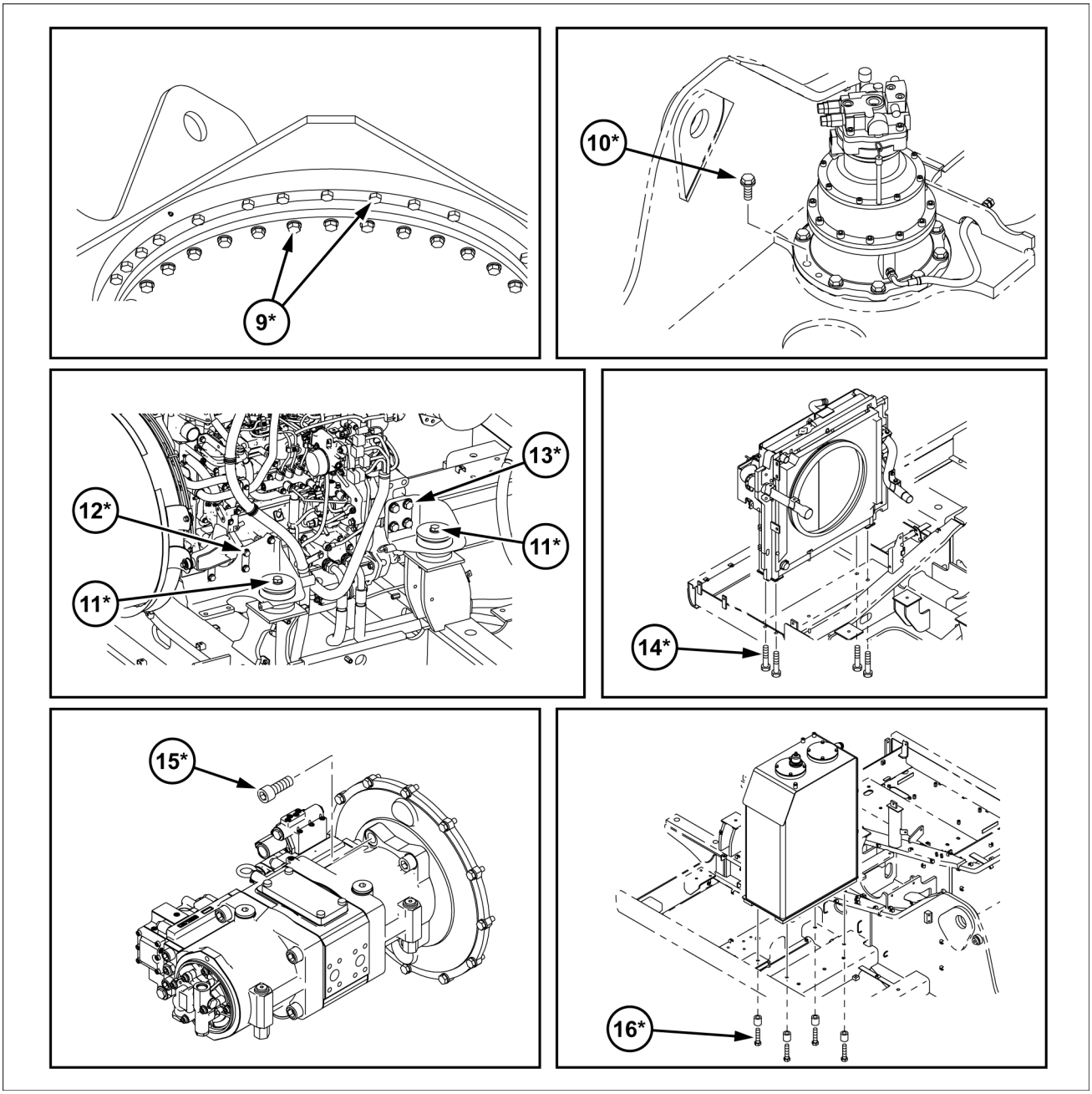

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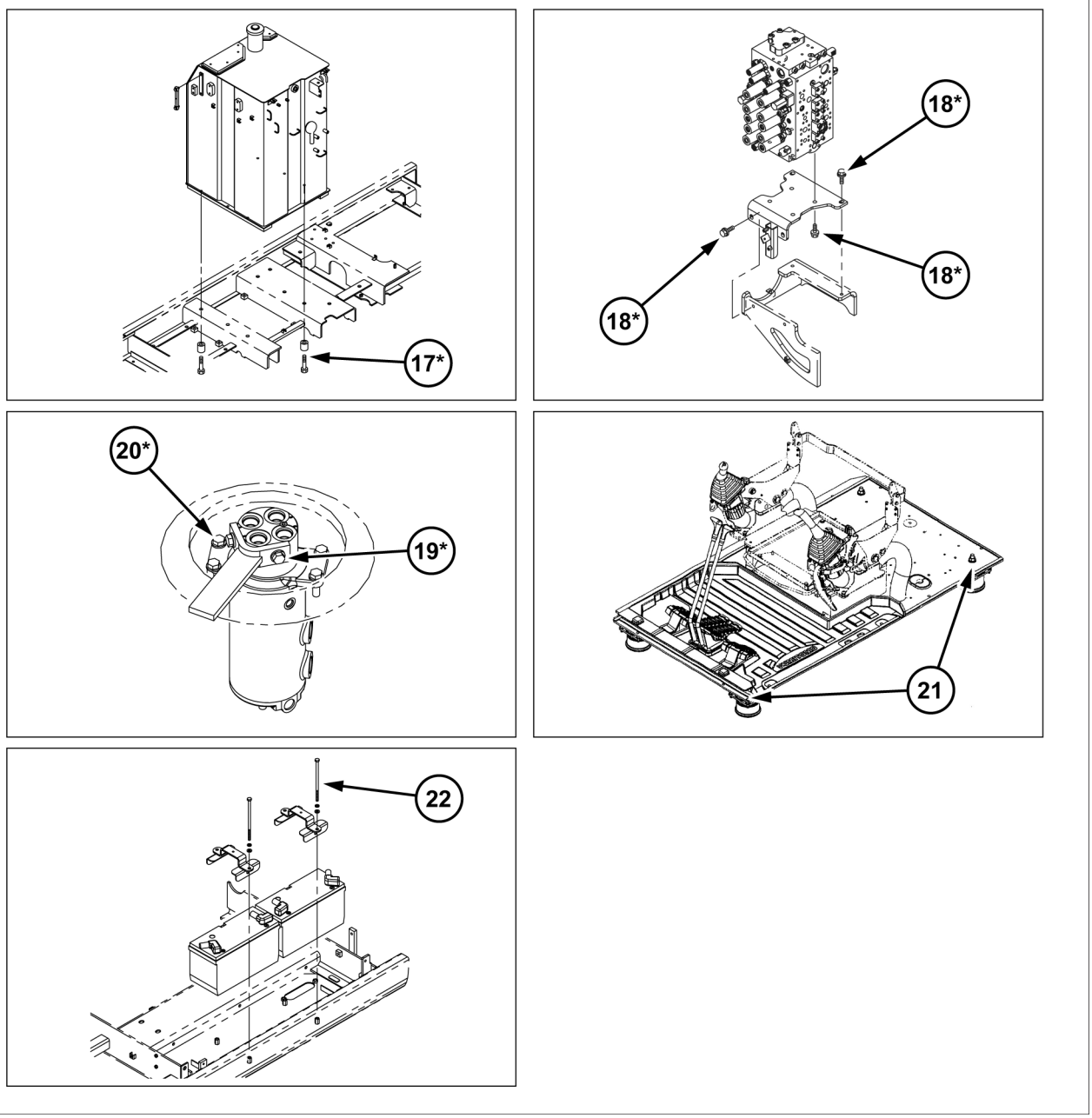

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Basic instructions - Shop and assembly

Shimming

For each adjustment operation, select adjusting shims and measure the adjusting shims individually using a micrometer, then add up the recorded values. Do not rely on measuring the entire shimming set, which may be incorrect, or the rated value shown on each shim.

Rotating shaft seals

For correct rotating shaft seal installation, proceed as follows:

1. Before assembly, allow the seal to soak in the oil it will be sealing for at least thirty minutes.
2. Thoroughly clean the shaft and check that the working surface on the shaft is not damaged.
3. Position the sealing lip facing the fluid.

   NOTE: *With hydrodynamic lips, take into consideration the shaft rotation direction and position the grooves so that they will move the fluid towards the inner side of the seal.*
4. Coat the sealing lip with a thin layer of lubricant (use oil rather than grease). Fill the gap between the sealing lip and the dust lip on double lip seals with grease.
5. Insert the seal in its seat and press down using a flat punch or seal installation tool. Do not tap the seal with a hammer or mallet.
6. While you insert the seal, check that the seal is perpendicular to the seat. When the seal settles, make sure that the seal makes contact with the thrust element, if required.
7. To prevent damage to the seal lip on the shaft, position a protective guard during installation operations.

O-ring seals

Lubricate the O-ring seals before you insert them in the seats. This will prevent the O-ring seals from overturning and twisting, which would jeopardize sealing efficiency.

Sealing compounds

Apply a sealing compound on the mating surfaces when specified by the procedure. Before you apply the sealing compound, prepare the surfaces as directed by the product container.

Spare parts

Only use CNH Original Parts or CASE CONSTRUCTION Original Parts.

Only genuine spare parts guarantee the same quality, duration, and safety as original parts, as they are the same parts that are assembled during standard production. Only CNH Original Parts or CASE CONSTRUCTION Original Parts can offer this guarantee.

When ordering spare parts, always provide the following information:

- Machine model (commercial name) and Product Identification Number (PIN)
- Part number of the ordered part, which can be found in the parts catalog

Protecting the electronic and/or electrical systems during charging and welding

To avoid damage to the electronic and/or electrical systems, always observe the following practices:

1. Never make or break any of the charging circuit connections when the engine is running, including the battery connections.
2. Never short any of the charging components to ground.
3. Always disconnect the ground cable from the battery before arc welding on the machine or on any machine attachment.
   - Position the welder ground clamp as close to the welding area as possible.
   - If you weld in close proximity to a computer module, then you should remove the module from the machine.
   - Never allow welding cables to lie on, near, or across any electrical wiring or electronic component while you weld.
4. Always disconnect the negative cable from the battery when charging the battery in the machine with a battery charger.

   NOTICE: *If you must weld on the unit, you must disconnect the battery ground cable from the machine battery. The electronic monitoring system and charging system will be damaged if this is not done.*
5. Remove the battery ground cable. Reconnect the cable when you complete welding.

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

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Special tools

The special tools that CASE CONSTRUCTION suggests and illustrate in this manual have been specifically researched and designed for use with CASE CONSTRUCTION machines. The special tools are essential for reliable repair operations. The special tools are accurately built and rigorously tested to offer efficient and long-lasting operation.

By using these tools, repair personnel will benefit from:

- Operating in optimal technical conditions
- Obtaining the best results
- Saving time and effort
- Working in safe conditions

Hydraulic contamination

Contamination in the hydraulic system is a major cause of the malfunction of hydraulic components. Contamination is any foreign material in the hydraulic oil.

Contamination can enter the hydraulic system in several ways:

- When you drain the oil or disconnect any line
- When you disassemble a component
- From normal wear of the hydraulic components
- From damaged seals or worn seals
- From a damaged component in the hydraulic system

All hydraulic systems operate with some contamination. The design of the components in this hydraulic system permits efficient operation with a small amount of contamination. An increase in this amount of contamination can cause problems in the hydraulic system.

The following list includes some of these problems:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- Movement of control valve spools is difficult
- Hydraulic oil that becomes too hot
- Pump gears, housing, and other parts that wear rapidly
- Relief valves or check valves held open by dirt
- Quick failure of components that have been repaired
- Slow cycle times are slow. The machine does not have enough power.

If your machine has any of these problems, check the hydraulic oil for contamination.

There are two types of contamination: microscopic and visible.

Microscopic contamination occurs when very fine particles of foreign material are suspended in the hydraulic oil. These particles are too small to see or feel. Microscopic contamination can be found by identification of the following problems or by testing in a laboratory.

Examples of problems caused by microscopic contamination:

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- The hydraulic system has a high operating temperature

Visible contamination is foreign material that can be found by sight, touch, or odor. Visible contamination can cause a sudden failure of components.

Examples of problems caused by visible contamination:

- Particles of metal or dirt in the oil
- Air in the oil
- Dark or thick oil
- Oil with an odor of burned oil
- Water in the oil

If you find contamination, use a portable filter to clean the hydraulic system.

General specification

CX160D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Engine

Type		Water-cooled, 4-cycle diesel, 4-cylinder in line, High pressure common rail system (electric control), Turbocharger with air cooled intercooler, SCR system
Model		ISUZU AR-4JJ1X
Rated flywheel horse power		
	SAE J1349, **ISO 9249**	**83.2 kW** (**113.1 Hp**) at **2200 RPM**
	ISO 14396	**86.0 kW** (**116.9 Hp**) at **2200 RPM**
Piston displacement		**2999 cm³** (**183 in³**)
Maximum torque		
	SAE J1349, **ISO 9249**	**349 N·m** (**257 lb ft**) at **1800 RPM**
	ISO 14396	**356 N·m** (**263 lb ft**) at **1800 RPM**
Bore and stroke		**95.4 - 104.9 mm** (**3.76 - 4.13 in**)
Voltage		**24 V**
Alternator		**50 A**
Starter		**24 V 4.0 kW**

Hydraulic system

Main pumps		2 variable displacement axial piston pumps with regulating system	
	Max. oil flow		2 × **142.0 L** (**37.5 US gal**) at **2200 RPM**
	Working circuit pressure	Boom/Arm/Bucket	**34.3 MPa** (**4970 psi**)
			36.3 MPa (**5260 psi**) with auto power up
		Swing circuit	**27.9 MPa** (**4050 psi**)
		Travel circuit	**34.3 MPa** (**4970 psi**)
Pilot pump		1 gear pump	
	Max. oil flow		**22 L** (**5.8 US gal**)
	Working circuit pressure		**3.9 MPa** (**570 psi**)
Control valves		With Boom/Arm holding valve	
		One 4-spool valve for Right track travel, Bucket, Boom and Arm acceleration	
		One 5-spool valve for Left track travel, Auxiliary, Swing, Boom acceleration and Arm	
Swing device			
	Motor	Fixed displacement axial piston motor	
	Brake	Mechanical disc brake	
	Final drive	Planetary gear reduction	
	Turn table bearing	Ball bearing type with internal gear	
	Maximum swing speed	**11.5 RPM**	
	Swing torque	**45100 N·m** (**33264 lb ft**)	
Cylinders		NO. of cylinders – bore X Rod diameter X Stroke	
	Boom	2 x Ø **115 mm** (**4.528 in**) - Ø **80 mm** (**3.150 in**) - **1179 mm** (**46.417 in**)	
	Arm	1 x Ø **125 mm** (**4.921 in**) - Ø **90 mm** (**3.543 in**) - **1280 mm** (**50.394 in**)	
	Bucket	1 x Ø **105 mm** (**4.134 in**) - Ø **75 mm** (**2.953 in**) - **985 mm** (**38.780 in**)	
Cooling system			
	Fan		Ø **550 mm** (**21.654 in**) with 8-blades
	Radiator capacity		**74.1 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**1.75 mm** (**0.06890 in**)
	Long life coolant		Coolant **55 %**, Water **45 %**

	Oil cooler capacity		**44.8 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**1.75 mm** (**0.06890 in**)
	Intercooler capacity		**10.8 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**2.0 mm** (**0.0787 in**)
	Fuel cooler capacity		**1.1 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**2.0 mm** (**0.0787 in**)
Filters			
	Suction filter		105 µm
	Return filter		6 µm
	Pilot line filter		8 µm

Hydraulic controls

Boom/Arm/Bucket/Swing	Pilot pressure control system (ISO control pattern)
Travel	Pilot pressure control system
Work mode select	SP - mode
	H - mode
	Auto - mode
Travel mode select	2-speed travel
Attachment cushion control	
Hydraulic lock (gate lock, left side tilt console)	

Electrical system

Engine control			
			Dial type throttle control
			One touch idle / Auto deceleration / Auto idle shutdown system
			Emergency stop
Monitor system			
			Message display (Caution, condition, etc.)
			Work mode display (SP, H, Auto)
			Machine condition (Power boost, etc.)
			Alarm display and buzzer
			Water temperature
			Hydraulic oil temperature
			Fuel level
			Diagnosis system
			Rear view camera image
			Urea water level
Wire harness			
			Waterproof type connector
Safety			
			Double horn
Battery			2 X **12 V 72 A·h**/5HR
Lights			
	Working light	Upper	**24 V 70 W** X 1
		Boom	**24 V 70 W** X 1
		Cab	**24 V 70 W** X 2
	Operator's cab room		**24 V 10 W** X 1

Operator environment

Operator's cab			
	Smooth and round shape design cab, fabricated by press work		
	Safety glass for all windows		
	Shock-less cab suspension by 4-point fluid mounting		
	Sliding front window with auto lock		
	Built-in type full-color LCD monitor display		
	Membrane switch on monitor display		
	Windshield wiper & washer		
	AM/FM Radio with auto-tuner & auxiliary port		
	Floor mat		
	Polycarbonate roof hatch & Sun shade		
	Auto air-conditioner		
	Roll-over protective structure (ROPS)		
	Top guard OPG level 1 (in CAB structure)		
	Top guard OPG level 2 (additional guard)		
Operator's seat			
	Low frequency mechanical suspension with helical springs and double acting hydraulic damper. (Achieves ISO7096 in category EM6)		
	With following features		
		Manual weight adjustment	Backrest angle adjustment
		Seat height adjustment	Adjustable pivoting armrests linked to consoles
		Adjustable headrest	Retractable seat belt
		Adjustable lumbar support	Control consoles adjust independently of seat
Others			
	Rear view mirror (Cab side & Right side)		
	Rear view Camera		

Undercarriage

Travel motor		Variable displacement axial piston motor
Brake		Mechanical disc brake
Hydraulic service brake		Brake valve
Final drive		Planetary gear reduction
Travel speeds	High	**5.4 km/h** (**3.4 mph**) (Automatic travel speed shifting)
	Low	**2.8 km/h** (**1.7 mph**)
Drawbar pull		**160 kN** (**35969 lb**)
Number of carrier rollers (each side)		2
Number of track rollers (each side)		7
Number of shoes (each side)		44
Type of shoe		Triple grouser shoe
Link pitch		**190 mm** (**7.480 in**)
Width of shoe		**600 mm** (**23.622 in**) (S.T.D)
Grade-ability		**70 %** (**35 °**)

Mass

Operating mass		**17400 kg** (**38360 lb**)
	with **2.62 m** (**8.60 ft**) Arm, **0.62 m³** Bucket, **600 mm** (**23.622 in**) grouser shoe, operator, lubricant, coolant and full fuel tank	
Shipping mass		**16600 kg** (**36597 lb**)
	Operating mass - (operator mass [**75 kg** (**165.35 lb**)] + **90 %** of fuel mass [**225 kg** (**496.040 lb**)] + bucket mass [**484 kg** (**1067.037 lb**)]	
Counter weight mass		**2920 kg** (**6437 lb**)
Ground pressure		**0.041 MPa** (**5.947 psi**)

	with **2.62 m** (**8.60 ft**) Arm, **0.62 m³** Bucket, **600 mm** (**23.622 in**) grouser shoe

Digging force (with 0.62 m³ bucket) (ISO 6015)

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)] Arm
Arm digging force	**79 kN** (**17760 lb**)	**72 kN** (**16186 lb**)	**90 kN** (**20232.8 lb**)
With auto power up	**84 kN** (**18884 lb**)	**77 kN** (**17310 lb**)	**95 kN** (**21356.8 lb**)
Bucket digging force	**112 kN** (**25179 lb**)	**112 kN** (**25179 lb**)	**112 kN** (**25178.6 lb**)
With auto power up	**118 kN** (**26527 lb**)	**118 kN** (**26527 lb**)	**118 kN** (**26527.5 lb**)

Dimensions

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)] Arm
Overall length (without attachment)	**4430 mm** (**174.409 in**)	**4430 mm** (**174.409 in**)	**4430 mm** (**174.4 in**)
Overall length (with attachment)	**8460 mm** (**333.071 in**)	**8520 mm** (**335.433 in**)	**8490 mm** (**334.3 in**)
Overall height (to top of boom)	**2960 mm** (**116.535 in**)	**3130 mm** (**123.228 in**)	**3000 mm** (**118.1 in**)
Overall height (to top of Cab)	**2970 mm** (**116.929 in**)	**2970 mm** (**116.929 in**)	**3050 mm** (**120.1 in**)
Overall height (to top of handrail)	**3260 mm** (**128.346 in**)	**3260 mm** (**128.346 in**)	**3260 mm** (**128.3 in**)
Upper structure overall width	**2530 mm** (**99.606 in**)	**2530 mm** (**99.606 in**)	**2530 mm** (**99.606 in**)
Swing (rear end) radius	**2430 mm** (**95.669 in**)	**2430 mm** (**95.669 in**)	**2430 mm** (**95.669 in**)
Clearance height under upper structure	**1020 mm** (**40.157 in**)	**1020 mm** (**40.157 in**)	**1020 mm** (**40.157 in**)
Minimum ground clearance	**420 mm** (**16.535 in**)	**420 mm** (**16.535 in**)	**420 mm** (**16.535 in**)
Wheel base (Center to center of wheels)	**3190 mm** (**125.591 in**)	**3190 mm** (**125.591 in**)	**3190 mm** (**125.591 in**)
Crawler overall length	**3990 mm** (**157.087 in**)	**3990 mm** (**157.087 in**)	**3990 mm** (**157.087 in**)
Track gauge	**1990 mm** (**78.346 in**)	**1990 mm** (**78.346 in**)	**1990 mm** (**78.346 in**)
Undercarriage overall width [with **600 mm** (**23.622 in**) shoes]	**2590 mm** (**101.969 in**)	**2590 mm** (**101.969 in**)	**2590 mm** (**101.969 in**)
Crawler tracks height	**920 mm** (**36.220 in**)	**920 mm** (**36.220 in**)	**990 mm** (**38.976 in**)

Working ranges

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)] Arm
Boom length	**5150 mm** (**202.756 in**)	**5150 mm** (**202.756 in**)	**5150 mm** (**202.756 in**)
Bucket radius	**1350 mm** (**53.150 in**)	**1350 mm** (**53.150 in**)	**1350 mm** (**53.150 in**)
Bucket wrist action	**178 °**	**178 °**	**178 °**
Maximum reach at GRP	**8870 mm** (**349.213 in**)	**9220 mm** (**362.992 in**)	**8490 mm** (**334.252 in**)
Maximum reach	**9040 mm** (**355.906 in**)	**9380 mm** (**369.291 in**)	**8670 mm** (**341.339 in**)
Max. digging depth	**6060 mm** (**238.583 in**)	**6490 mm** (**255.512 in**)	**5660 mm** (**222.835 in**)
Max. digging height	**9240 mm** (**363.780 in**)	**9290 mm** (**365.748 in**)	**9010 mm** (**354.724 in**)
Max. dumping height	**6610 mm** (**260.236 in**)	**6690 mm** (**263.386 in**)	**6380 mm** (**251.181 in**)

General specification

CX180D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Engine

Type		Water-cooled, 4-cycle diesel, 4-cylinder in line, High pressure common rail system (electric control), Turbocharger with air cooled intercooler, SCR system
Model		ISUZU AR-4JJ1X
Rated flywheel horse power		
	SAE J1349, **ISO 9249**	**83.2 kW** (**113.1 Hp**) at **2200 RPM**
	ISO 14396	**86.0 kW** (**116.9 Hp**) at **2200 RPM**
Piston displacement		**2999 cm³** (**183 in³**)
Maximum torque		
	SAE J1349, **ISO 9249**	**349 N·m** (**257 lb ft**) at **1800 RPM**
	ISO 14396	**356 N·m** (**263 lb ft**) at **1800 RPM**
Bore and stroke		**95.4 - 104.9 mm** (**3.76 - 4.13 in**)
Voltage		**24 V**
Alternator		**50 A**
Starter		**24 V 4.0 kW**

Hydraulic system

Main pumps		2 variable displacement axial piston pumps with regulating system	
	Max. oil flow		2 × **142.0 L** (**37.5 US gal**) at **2200 RPM**
	Working circuit pressure	Boom/Arm/Bucket	**34.3 MPa** (**4970 psi**)
			36.3 MPa (**5260 psi**) with auto power up
		Swing circuit	**27.9 MPa** (**4050 psi**)
		Travel circuit	**34.3 MPa** (**4970 psi**)
Pilot pump		1 gear pump	
	Max. oil flow		**22 L** (**5.8 US gal**)
	Working circuit pressure		**3.9 MPa** (**570 psi**)
Control valves		With Boom/Arm holding valve	
		One 4-spool valve for Right track travel, Bucket, Boom and Arm acceleration	
		One 5-spool valve for Left track travel, Auxiliary, Swing, Boom acceleration and Arm	
Swing device			
	Motor	Fixed displacement axial piston motor	
	Brake	Mechanical disc brake	
	Final drive	Planetary gear reduction	
	Turn table bearing	Ball bearing type with internal gear	
	Maximum swing speed	**11.5 RPM**	
	Swing torque	**45100 N·m** (**33264 lb ft**)	
Cylinders		NO. of cylinders – bore X Rod diameter X Stroke	
	Boom	2 x Ø **115 mm** (**4.528 in**) - Ø **80 mm** (**3.150 in**) - **1179 mm** (**46.417 in**)	
	Arm	1 x Ø **125 mm** (**4.921 in**) - Ø **90 mm** (**3.543 in**) - **1280 mm** (**50.394 in**)	
	Bucket	1 x Ø **105 mm** (**4.134 in**) - Ø **75 mm** (**2.953 in**) - **985 mm** (**38.780 in**)	
Cooling system			
	Fan		Ø **550 mm** (**21.654 in**) with 8-blades
	Radiator capacity		**74.1 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**1.75 mm** (**0.06890 in**)
	Long life coolant		Coolant **55 %**, Water **45 %**

	Oil cooler capacity		**44.8 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**1.75 mm** (**0.06890 in**)
	Intercooler capacity		**10.8 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**2.0 mm** (**0.0787 in**)
	Fuel cooler capacity		**1.1 kW**
		fin type	Corrugated fin (wavy type)
		fin space	**2.0 mm** (**0.0787 in**)
Filters			
	Suction filter		105 µm
	Return filter		6 µm
	Pilot line filter		8 µm

Hydraulic controls

Boom/Arm/Bucket/Swing	Pilot pressure control system (ISO control pattern)
Travel	Pilot pressure control system
Work mode select	SP - mode
	H - mode
	Auto - mode
Travel mode select	2-speed travel
Attachment cushion control	
Hydraulic lock (gate lock, left side tilt console)	

Electrical system

Engine control			
			Dial type throttle control
			One touch idle / Auto deceleration / Auto idle shutdown system
			Emergency stop
Monitor system			
			Message display (Caution, condition, etc.)
			Work mode display (SP, H, Auto)
			Machine condition (Power boost, etc.)
			Alarm display and buzzer
			Water temperature
			Hydraulic oil temperature
			Fuel level
			Diagnosis system
			Rear view camera image
			Urea water level
Wire harness			
			Waterproof type connector
Safety			
			Double horn
Battery			2 X **12 V 72 A·h**/5HR
Lights			
	Working light	Upper	**24 V 70 W** X 1
		Boom	**24 V 70 W** X 1
		Cab	**24 V 70 W** X 2
	Operator's cab room		**24 V 10 W** X 1

Operator environment

Operator's cab			
	Smooth and round shape design cab, fabricated by press work		
	Safety glass for all windows		
	Shock-less cab suspension by 4-point fluid mounting		
	Sliding front window with auto lock		
	Built-in type full-color LCD monitor display		
	Membrane switch on monitor display		
	Windshield wiper & washer		
	Floor mat		
	Polycarbonate roof hatch & Sun shade		
	Auto air-conditioner		
	Rain deflector		
	Sun visor		
	Roll-over protective structure (ROPS)		
	Top guard OPG level 1 (in CAB structure)		
	Top guard OPG level 2 (additional guard)		
Operator's seat			
	Low frequency mechanical suspension with helical springs and double acting hydraulic damper. (Achieves ISO7096 in category EM6)		
	With following features		
		Manual weight adjustment	Backrest angle adjustment
		Seat height adjustment	Adjustable pivoting armrests linked to consoles
		Adjustable headrest	Retractable seat belt
		Adjustable lumbar support	Control consoles adjust independently of seat
Others			
	Rear view mirror (Cab side & Right side)		
	Rear view Camera		

Undercarriage

Travel motor		Variable displacement axial piston motor
Brake		Mechanical disc brake
Hydraulic service brake		Brake valve
Final drive		Planetary gear reduction
Travel speeds	High	**5.4 km/h** (**3.4 mph**) (Automatic travel speed shifting)
	Low	**2.8 km/h** (**1.7 mph**)
Drawbar pull		**160 kN** (**35969 lb**)
Number of carrier rollers (each side)		2
Number of track rollers (each side)		7
Number of shoes (each side)		46
Type of shoe		Triple grouser shoe
Link pitch		**190 mm** (**7.480 in**)
Width of shoe		**600 mm** (**23.622 in**) (S.T.D)
Grade-ability		**70 %** (**35 °**)

Mass

Operating mass	**18500 kg** (**40786 lb**)
with **2.62 m** (**8.60 ft**) Arm, **0.68 m³** Bucket, **600 mm** (**23.622 in**) grouser shoe, operator, lubricant, coolant and full fuel tank and top guard OPG level 2	
Shipping mass	**17600 kg** (**38801 lb**)
Operating mass - (operator mass [**75 kg** (**165.35 lb**)] + **90 %** of fuel mass [**225 kg** (**496.040 lb**)] + bucket mass [**521 kg** (**1148.608 lb**)]	
Counter weight mass	**3170 kg** (**6989 lb**)

Ground pressure	**0.041 MPa** (**5.947 psi**)
with **2.62 m** (**8.60 ft**) Arm, **0.68 m³** Bucket, **600 mm** (**23.622 in**) grouser shoe	

Digging force (with 0.68 m³ bucket) (ISO 6015)

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)
Arm digging force	**79 kN** (**17760 lb**)	**72 kN** (**16186 lb**)	**90 kN** (**20233 lb**)
With auto power up	**84 kN** (**18884 lb**)	**77 kN** (**17310 lb**)	**95 kN** (**21357 lb**)
Bucket digging force	**112 kN** (**25179 lb**)	**112 kN** (**25179 lb**)	**112 kN** (**25179 lb**)
With auto power up	**118 kN** (**26527 lb**)	**118 kN** (**26527 lb**)	**118 kN** (**26527 lb**)

Dimensions

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)
Overall length (without attachment)	**4520 mm** (**177.953 in**)	**4520 mm** (**177.953 in**)	**4520 mm** (**177.953 in**)
Overall length (with attachment)	**8460 mm** (**333.071 in**)	**8510 mm** (**335.039 in**)	**8490 mm** (**334.252 in**)
Overall height (to top of boom)	**2960 mm** (**116.535 in**)	**3120 mm** (**122.835 in**)	**3000 mm** (**118.110 in**)
Overall height (to top of Cab)	**3070 mm** (**120.866 in**)	**3070 mm** (**120.866 in**)	**3070 mm** (**120.866 in**)
Overall height (to top of handrail)	**3280 mm** (**129.134 in**)	**3280 mm** (**129.134 in**)	**3280 mm** (**129.134 in**)
Upper structure overall width	**2530 mm** (**99.606 in**)	**2530 mm** (**99.606 in**)	**2530 mm** (**99.606 in**)
Swing (rear end) radius	**2470 mm** (**95.669 in**)	**2470 mm** (**95.669 in**)	**2470 mm** (**95.669 in**)
Clearance height under upper structure	**1040 mm** (**40.945 in**)	**1040 mm** (**40.945 in**)	**1040 mm** (**40.945 in**)
Minimum ground clearance	**440 mm** (**17.323 in**)	**440 mm** (**17.323 in**)	**440 mm** (**17.323 in**)
Wheel base (Center to center of wheels)	**3370 mm** (**132.677 in**)	**3370 mm** (**132.677 in**)	**3370 mm** (**132.677 in**)
Crawler overall length	**4180 mm** (**164.567 in**)	**4180 mm** (**164.567 in**)	**4180 mm** (**164.567 in**)
Track gauge	**2200 mm** (**86.614 in**)	**2200 mm** (**86.614 in**)	**2200 mm** (**86.614 in**)
Undercarriage overall width [with **600 mm** (**23.622 in**) shoes]	**2800 mm** (**110.236 in**)	**2800 mm** (**110.236 in**)	**2800 mm** (**110.236 in**)
Crawler tracks height	**925 mm** (**36.417 in**)	**925 mm** (**36.417 in**)	**925 mm** (**36.417 in**)

Working ranges

	[**2.62 m** (**8.60 ft**)] Arm	[**3.05 m** (**10.01 ft**)] Arm	[**2.23 m** (**7.32 ft**)] Arm
Boom length	**5150 mm** (**202.756 in**)	**5150 mm** (**202.756 in**)	**5150 mm** (**202.756 in**)
Bucket radius	**1350 mm** (**53.150 in**)	**1350 mm** (**53.150 in**)	**1350 mm** (**53.150 in**)
Bucket wrist action	**178 °**	**178 °**	**178 °**
Maximum reach at GRP	**8870 mm** (**349.213 in**)	**9210 mm** (**362.598 in**)	**8490 mm** (**334.252 in**)
Maximum reach	**9040 mm** (**355.906 in**)	**9380 mm** (**369.291 in**)	**8670 mm** (**341.339 in**)
Max. digging depth	**6040 mm** (**237.795 in**)	**6470 mm** (**254.724 in**)	**5650 mm** (**222.441 in**)
Max. digging height	**9250 mm** (**364.173 in**)	**9300 mm** (**366.142 in**)	**9030 mm** (**355.512 in**)
Max. dumping height	**6630 mm** (**261.024 in**)	**6710 mm** (**264.173 in**)	**6400 mm** (**251.969 in**)

General specification – Main equipment

CX160D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Lower component

Travel unit

Manufacturer	KYB Corporation
Motor type	Variable displacement piston motor
	Automatic 2-speed switchover with parking brake
Intake amount	**72.8 - 143.5 cm³/rev** (**4.4 - 8.8 in³/rev**)
Operating pressure	**34.3 MPa** (**4975 psi**)
Operating flow	**143 L/min** (**37.7766 US gpm**)
Brake torque	**25.1 N·m** (**18.51 lb ft**) min. (reduction gear included)
Relief valve set pressure	**35 MPa** (**5076.8 psi**) at **40 L/min** (**10.6 US gpm**)
Automatic 2-speed switch over pressure	**25.8 MPa** (**3742.3 psi**)
Reduction gear	
Reduction gear type	Planetary gear 2-stage reduction gear
Reduction ratio	43.246
Dry weight	**260 kg** (**573.202 lb**)

Take-up roller

Weight	**96.4 kg** (**212.53 lb**)

Upper roller

Weight	**17.8 kg** (**39.24 lb**)

Lower roller

Weight	**35.5 kg** (**78.26 lb**)

Recoil Spring

Recoil Spring	
Weight	**43.9 kg** (**96.783 lb**)
Outer diameter	∅ **188 mm** (**7.402 in**)
Material	SUP11AM
Strand diameter	∅ **42 mm** (**1.654 in**)
Mean diameter of coil	**146 mm** (**5.748 in**)
Total number of turns	9.3
Direction of helix	Right
Free height	**548 mm** (**21.575 in**)
Mounting length of spring	**478 mm** (**18.819 in**)
Mounting load	**94 kN** (**21132.04 lb**)
Stroke end height	**418 mm** (**16.457 in**)
Stroke end load	**175 kN** (**39341.57 lb**)
Grease cylinder	
Weight	**28.3 kg** (**62.391 lb**)
Yoke	
Weight	**23.9 kg** (**52.690 lb**)
Threaded rod	
Weight	**21.9 kg** (**48.281 lb**)
Total assembly	
Weight	**119.25 kg** (**262.901 lb**)

Track

Item	Weight or Quantity
600 grouser with M seal (standard)	**1547.5 kg** (**3411.654 lb**)
Link	1 pair
Track	44
Bolt	176
Nut	176
700 grouser with M seal	**1406 kg** (**3099.699 lb**)
Link	1 pair
Track	44
Bolt	176
Nut	176
500 grouser with M seal	**1358.5 kg** (**2994.980 lb**)
Link	1 pair
Track	44
Bolt	176
Nut	176

Upper component

Swing unit

Swing motor assembly	
Swing motor	
Manufacturer	SungBo P&T Co., Ltd.
Motor type	Fixed displacement piston motor
	With parking brake
Absorption amount	**151 cm³/rev** (**9.21 in³/rev**)
Operating pressure	**27.9 MPa** (**4047 psi**)
Operating flow	**143 L/min** (**37.777 US gpm**)
Mechanical brake torque	**822 N·m** (**606.276 lb ft**) min.
Brake off pressure	**3.2 MPa** (**464.160 psi**) max.
Relief valve set pressure	**27.9 MPa** (**4047 psi**) at **120 L** (**31.70 US gal**) **26 MPa** (**3771.300 psi**) at **40 l/min** (**10.567 US gpm**)
Dry weight	**52 kg** (**114.640 lb**)
Swing reduction gear	
Reduction gear type	Planetary gear 2-stage reduction gear
Dry weight	**172.05 kg** (**379.305 lb**)
Turntable bearing	
Number of teeth	92
Weight	**243.9 kg** (**537.707 lb**)
Counterweight	
Weight	**2900 kg** (**6393.406 lb**)

Engine-related

Engine

Engine model name	Isuzu 4JJ1X diesel engine
Engine type	4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electronics control type)
Number of cylinders - diameter - stroke	∅ **95.4 mm** (**3.756 in**) - **104.9 mm** (**4.130 in**)
Total displacement	**2999 L** (**792.252 US gal**)
Compression ratio	17.5
Rated output	**80.6 - 85.8 kW** (**109.59 - 116.66 Hp**) / **2200 RPM**
Maximum torque	**349 N·m** (**257.41 lb ft**) / **1800 RPM**
Engine dry weight	About **333 kg** (**734.139 lb**)
Oil pan	All direction allowable inclination angle 0.61 rad
Cooling fan	∅ **550 mm** (**21.654 in**) - suction type - 8 blades resin
	With bell mouth-type fan guide
Pulley ratio	0.95 (reduction)
Charging generator	**24 V 50 A** AC type
Starter motor	**24 V 4.0 kW** (**5.4 Hp**) reduction type
Coolant capacity	**6.0 L** (**1.585 US gal**)
Oil pan capacity	Max: **15 L** (**3.96 US gal**) Min: **11 L** (**2.91 US gal**) (excluding oil filter)
Direction of rotation	Right (viewed from fan side)

Air cleaner (double element)

Manufacturer	Nippon Donaldson, Ltd.
Element (outer) - Filtering area size	**3.24 m²** (**5022.01 in²**)
Element (inner) - Filtering area size	**0.08 m²** (**124.00 in²**)
Weight	**2.7 kg** (**5.952 lb**)

Radiator

Manufacturer		Tokyo Radiator MFG. Co.,Ltd.
Oil cooler	Weight	**17.5 kg** (**38.5809 lb**)
	Oil volume	**6.9 l** (**1.823 US gal**)
Radiator	Weight	**8.8 kg** (**19.4007 lb**)
	Coolant capacity	**6.3 l** (**1.664 US gal**)
Air cooler	Weight	**6.3 kg** (**13.8891 lb**)
	Capacity	**4.4 l** (**1.162 US gal**)
Fuel cooler	Weight	**0.7 kg** (**1.5432 lb**)
	Capacity	**0.2 l** (**0.053 US gal**)
Total weight		**72.5 kg** (**159.835 lb**)

SCR

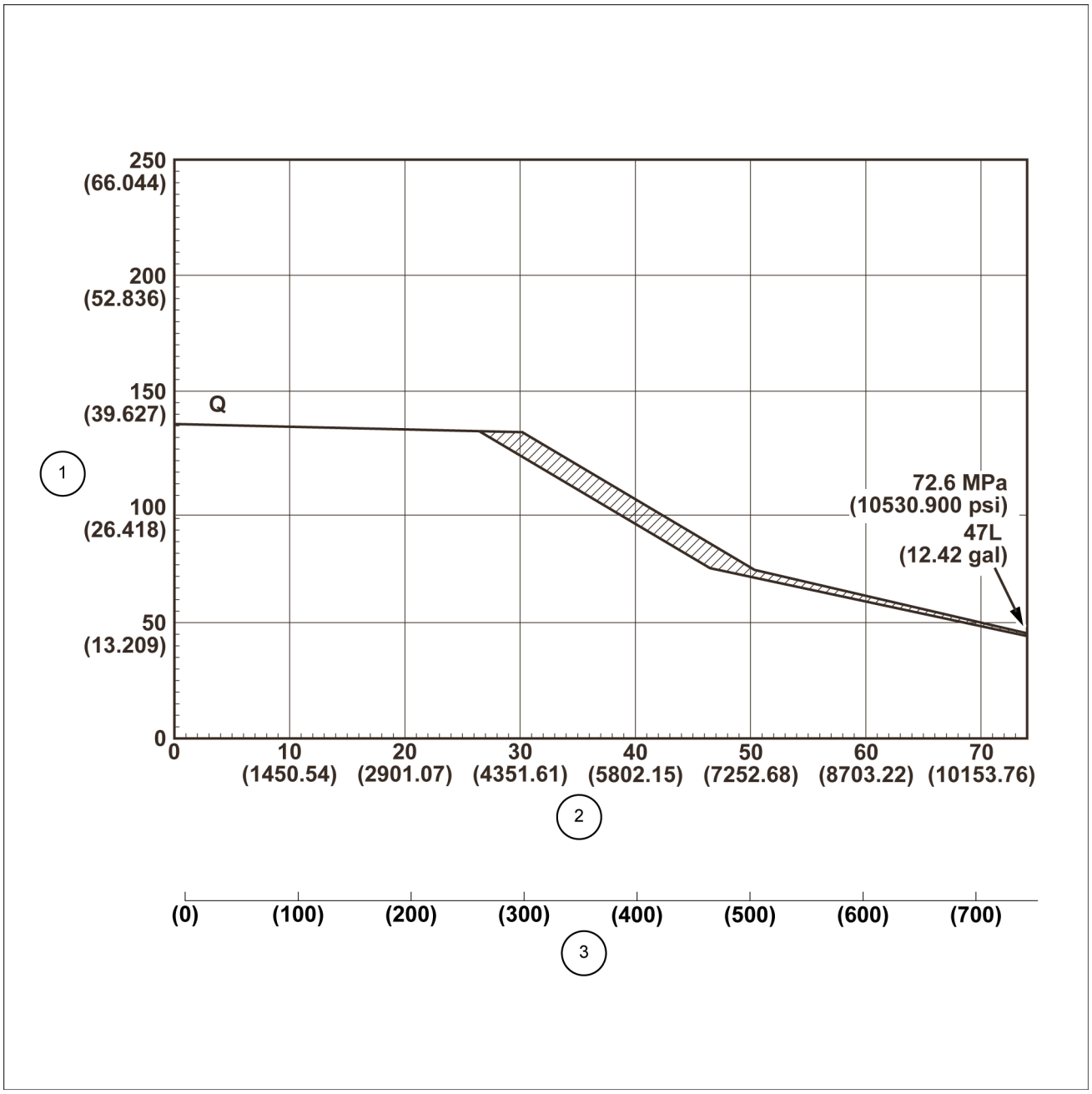
Manufacturer	Tokyo Radiator MFG. Co.,Ltd.
Urea capacity	**75.1 L** (**19.84 US gal**)
Weight	**9.2 kg** (**20.283 lb**)

Hydraulic device

Hydraulic pump

Manufacturer			Kawasaki Heavy Industries, Ltd.
Main pump			
	Pump type		Double variable displacement piston pump
	Displacement capacity		**65.2 cm³/rev** (**3.98 in³/rev**)x 2
	Operating pressure	Rated	**34.3 MPa** (**4975 psi**)
		Maximum	**36.3 MPa** (**5265 psi**)
	Input revolution speed		**2200 RPM**
	Maximum discharge flow		**143 L/min** (**37.777 US gpm**) x 2 (at **2200 RPM**) **142 L/min** (**37.512 US gpm**) x 2 (at **2200 RPM**)
Pilot pump			
	Pump type		Gear pump
	Displacement capacity		**10 cm³/rev** (**0.61 in³/rev**)
	Operating pressure		**3.92 MPa** (**569 psi**)
	Maximum discharge flow		**22 L/min** (**5.812 US gpm**) (at **2200 RPM**)
Control method			Hydraulic simultaneous constant output control (as fail-safe)
			Electrical negative control by external command milli-amp (front and rear side)
Dry weight			**86 kg** (**189.598 lb**)

Pump P - Q Diagram



SMIL15CEX6821GB 1

(1) Discharge flow Q [L/min (gpm)]

(2) Discharge pressure Pd [MPa (psi)]

(3) Discharge pressure Pd [kgf/cm2]

Control-related

Control valve

Manufacturer		Hyest Corporation Ltd.
Maximum flow		**143 L/min** (**37.777 US gpm**) (at **2200 RPM**)
Overload set pressure		**32.3 MPa** (**4685 psi**) boom down
		38.2 MPa (**5541 psi**) boom up, arm, bucket
Main relief set pressure		**34.3 MPa** (**4975 psi**)
	(Upon pressure boost)	**36.3 MPa** (**5265 psi**)
Foot relief set pressure		**3.05 MPa** (**442.40 psi**)
Function		Pressure boost circuit
		Straight travel circuit
		Boom-up and arm-out/in 2 pumps internal flow
		Boom-down and arm-in load holding circuit
		Boom-down and bucket-close regenerative circuit
		Arm-in forced regenerative circuit
		Swing priority variable orifice (for arm operation)
		2 pumps flow
Weight		**160 kg** (**352.740 lb**)

Solenoid valve (4 stack)

Manufacturer		Yuken Kogyo Co., Ltd.	
Valve specifications			
Maximum flow		P→B **20 l/min** (**5.283 US gpm**) Other **5 l/min** (**1.321 US gpm**)	
Rated pressure		**4.5 MPa** (**652 psi**)	
Port size		P.T.B port	**G3/8**
		C1, C2, C3 ports	**G1/4**
Solenoid specifications			
Operating voltage		DC **20 - 32 V**	
Power consumption		**17 W** max.	
Weight		**5.0 kg** (**11.0232 lb**)	

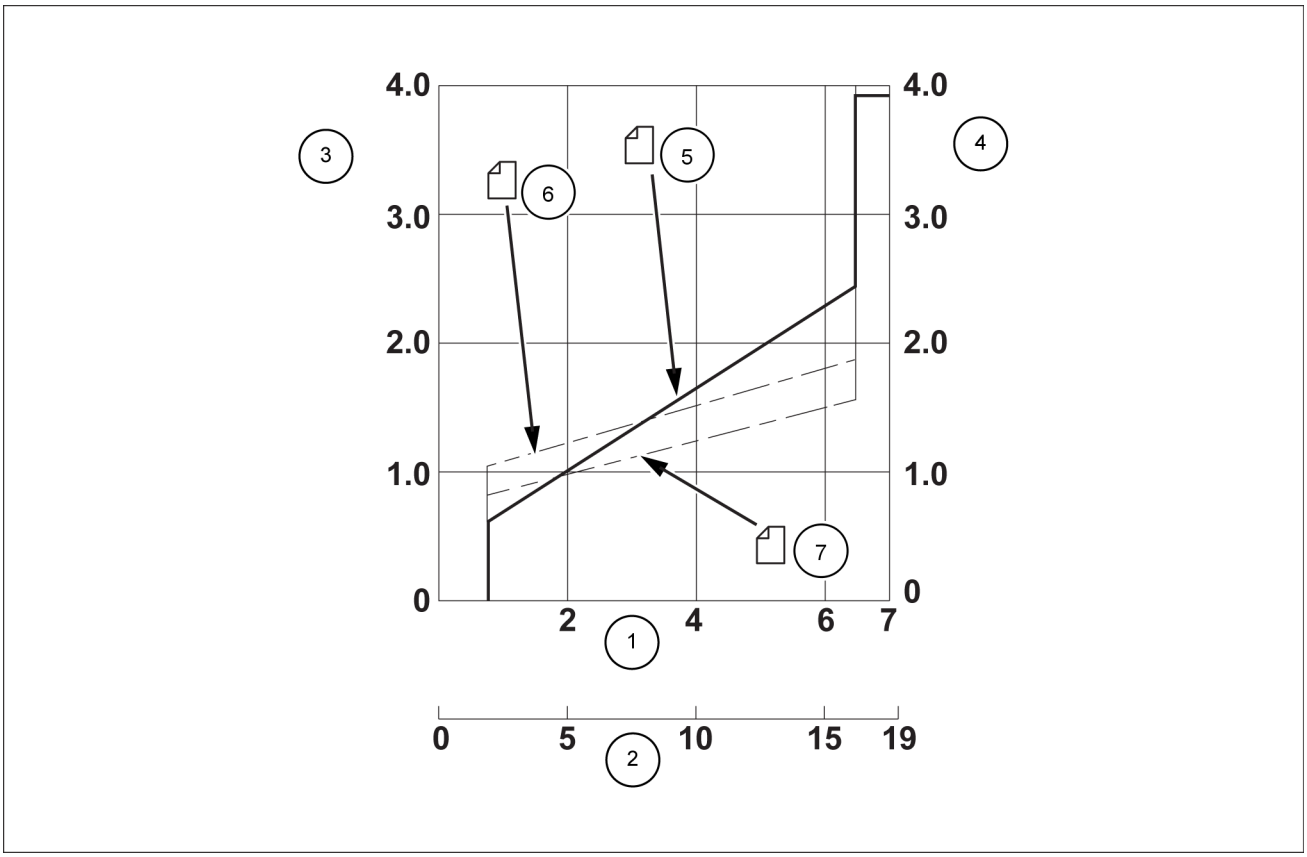
Remote control valve for left/right operations

Manufacturer		Kawasaki Heavy Industries, Ltd.
Operating pressure		**3.92 MPa** (**569 psi**)
Secondary pressure		**0.64 - 2.45 MPa** (**92.8320 - 355 psi**) primary short type
Operating angle	1,3 port	19°
	2,4 port	25°
Weight		**1.9 kg** (**4.1888 lb**)

Remote control valve for travel operation

Manufacturer	Kawasaki Heavy Industries, Ltd.
Operating pressure	**3.92 MPa** (**569 psi**)
Secondary pressure	**0.64 - 2.45 MPa** (**92.8320 - 355 psi**) primary short type
Operating angle	12.4°
Weight	**4.1 kg** (**9.039 lb**)

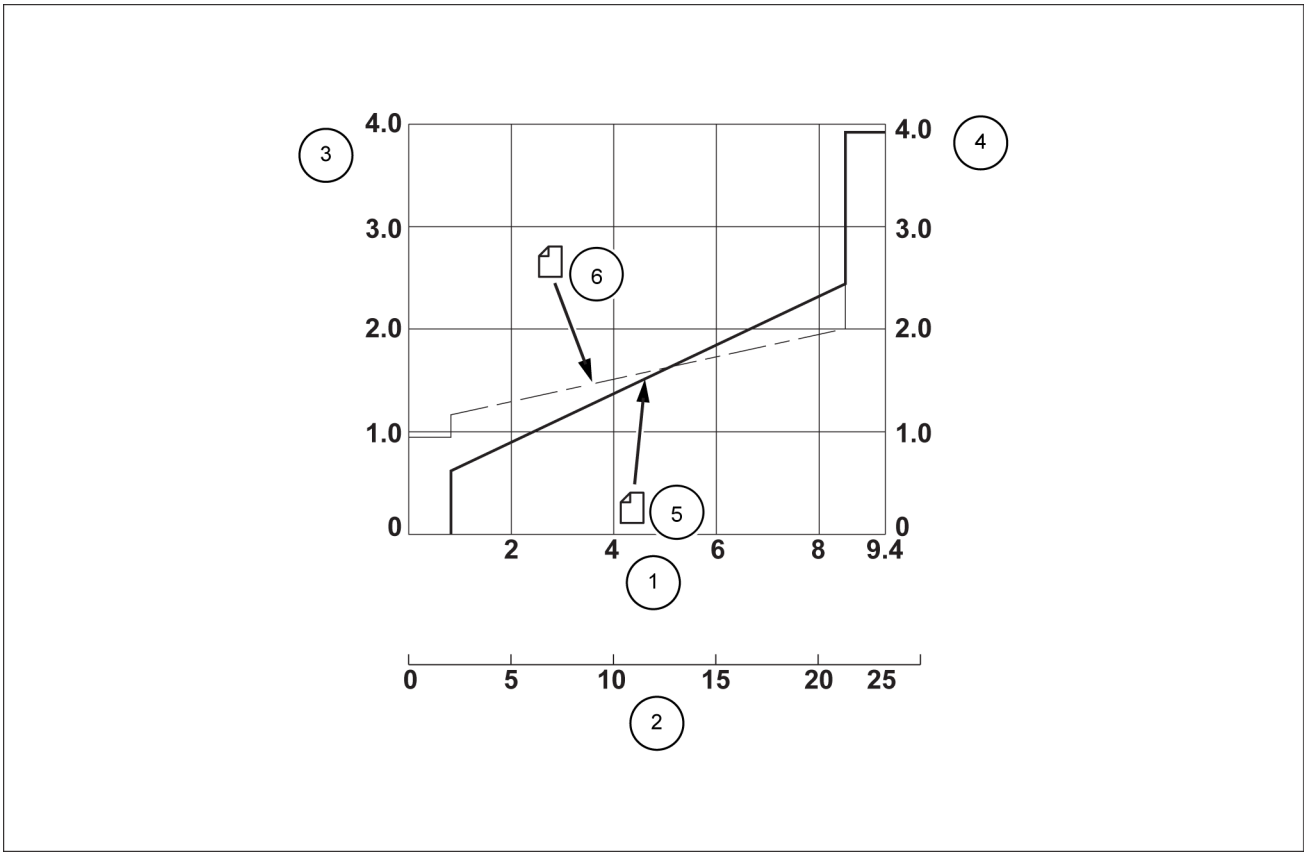
Operation remote control valve control diagram



SMIL15CEX4380FB 2

Ports 1, 3

1 Push rod stroke [mm (in)]
2 Operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque (Port 1)
7 Independent operating torque (Port 3)

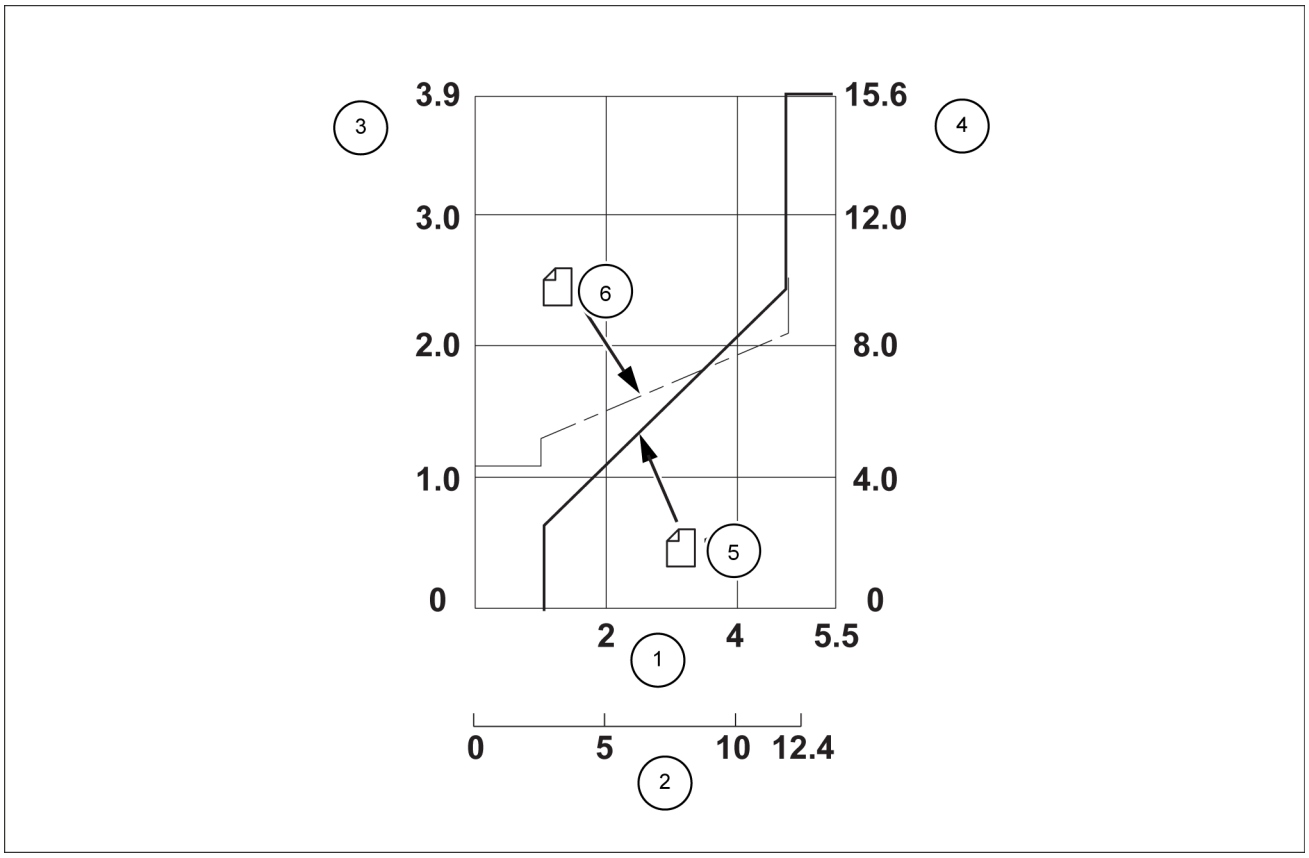


SMIL15CEX4381FB 3

Ports 2, 4

1 Push rod stroke [mm (in)]
2 Operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque

Travel remote control valve control diagram



SMIL15CEX4382FB 4

1 Push rod stroke [mm (in)]
2 Pedal operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque

Cushion valve (heat circuit, with shuttle valve)

Manufacturer	KYB-YS CO., LTD.
Port size	**G3/8** (A - P ports)
	G1/4 (Q - V ports)
Weight	**12.5 kg** (**27.5578 lb**)

Selector valve

2WAY	
Manufacturer	Nishina Industrial Co., Ltd.
Rated flow	**25 l/min** (**6.604 US gpm**)
Operating method	D (ISO), C (JD)
Port size	G3/8
Weight	**4 kg** (**8.8185 lb**)

Center 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 amount	High-pressure passage (ABCD)	**234 L/min** (**61.816 US gpm**)
	Drain port (E)	**10 L/min** (**2.642 US gpm**)
	Pilot port (F)	**21 L/min** (**5.548 US gpm**)
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
Weight	**29.5 kg** (**65.04 lb**)	

Cylinder

Boom cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **115 mm** (**4.528 in**)
Rod diameter	∅ **80 mm** (**3.150 in**)
Maximum retracted length	**1698 mm** (**66.850 in**)
Stroke	**1179 mm** (**46.417 in**)
Weight	Right **157 kg** (**346.126 lb**) Left **157 kg** (**346.126 lb**)

Arm cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **125 mm** (**4.921 in**)
Rod diameter	∅ **90 mm** (**3.543 in**)
Maximum retracted length	**1830 mm** (**72.047 in**)
Stroke	**1280 mm** (**50.394 in**)
Weight	**201 kg** (**443.129 lb**)

Bucket cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **105 mm** (**4.134 in**)
Rod diameter	∅ **75 mm** (**2.953 in**)
Maximum retracted length	**1507 mm** (**59.331 in**)
Stroke	**985 mm** (**38.780 in**)
Weight	**117 kg** (**257.941 lb**)

General specification – Main equipment

CX180D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Lower component

Travel unit

Manufacturer	KYB Corporation
Motor type	Variable displacement piston motor
	Automatic 2-speed switchover with parking brake
Intake amount	**100.3 - 168.9 cm³/rev** (**6.1 - 10.3 in³/rev**)
Operating pressure	**34.3 MPa** (**4975 psi**)
Operating flow	**210.6 L/min** (**55.6346 US gpm**)
Brake torque	**32.7 N·m** (**24.12 lb ft**) min. (reduction gear included)
Relief valve set pressure	**35.3 MPa** (**5120.3 psi**) at **40 L/min** (**10.6 US gpm**)
Automatic 2-speed switch over pressure	**25.8 - 26.5 MPa** (**3742.290 - 3843.8 psi**)
Reduction gear	
Reduction gear type	Planetary gear 2-stage reduction gear
Reduction ratio	43.246
Dry weight	**268 kg** (**590.839 lb**)

Take-up roller

Weight	**96.4 kg** (**212.53 lb**)

Upper roller

Weight	**17.8 kg** (**39.24 lb**)

Lower roller

Weight	**35.5 kg** (**78.26 lb**)

Recoil Spring

Recoil Spring	
Weight	**43.9 kg** (**96.783 lb**)
Outer diameter	∅ **188 mm** (**7.402 in**)
Material	SUP11AM
Strand diameter	∅ **42 mm** (**1.654 in**)
Mean diameter of coil	**146 mm** (**5.748 in**)
Total number of turns	9.3
Direction of helix	Right
Free height	**548 mm** (**21.575 in**)
Mounting length of spring	**478 mm** (**18.819 in**)
Mounting load	**94 kN** (**21132.04 lb**)
Stroke end height	**418 mm** (**16.457 in**)
Stroke end load	**175 kN** (**39341.57 lb**)
Grease cylinder	
Weight	**28.3 kg** (**62.391 lb**)
Yoke	
Weight	**23.9 kg** (**52.690 lb**)
Threaded rod	
Weight	**21.9 kg** (**48.281 lb**)
Total assembly	
Weight	**119.25 kg** (**262.901 lb**)

Track

Item	Weight or Quantity
600 grouser with M seal (standard)	**1325.5 kg** (**2922.227 lb**)
Link	1 pair
Track	46
Bolt	184
Nut	184
700 grouser with M seal	**1463 kg** (**3225.363 lb**)
Link	1 pair
Track	46
Bolt	184
Nut	184
800 grouser with M seal	**1592.5 kg** (**3510.862 lb**)
Link	1 pair
Track	46
Bolt	184
Nut	184

Upper component

Swing unit

Swing motor assembly	
Swing motor	
Manufacturer	SungBo P&T Co., Ltd.
Motor type	Fixed displacement piston motor
	With parking brake
Absorption amount	**151 cm³/rev** (**9.21 in³/rev**)
Operating pressure	**27.9 MPa** (**4047 psi**)
Operating flow	**143 L/min** (**37.777 US gpm**)
Mechanical brake torque	**822 N·m** (**606.276 lb ft**) min.
Brake off pressure	**3.2 MPa** (**464.160 psi**) max.
Relief valve set pressure	**27.9 MPa** (**4047 psi**) at **120 L** (**31.70 US gal**) **26 MPa** (**3771.300 psi**) at **40 l/min** (**10.567 US gpm**)
Dry weight	**52 kg** (**114.640 lb**)
Swing reduction gear	
Reduction gear type	Planetary gear 2-stage reduction gear
Dry weight	**172.05 kg** (**379.305 lb**)
Turntable bearing	
Number of teeth	92
Weight	**243.9 kg** (**537.707 lb**)
Counterweight	
Weight	**3150 kg** (**6944.561 lb**)

Engine-related

Engine

Engine model name	Isuzu 4JJ1X diesel engine
Engine type	4-cycle, water-cooled, overhead camshaft, vertical in-line, direct injection type (electronics control type)
Number of cylinders - diameter - stroke	∅ **95.4 mm** (**3.756 in**) - **104.9 mm** (**4.130 in**)
Total displacement	**2999 L** (**792.252 US gal**)
Compression ratio	17.5
Rated output	**80.6 - 85.8 kW** (**109.59 - 116.66 Hp**) / **2200 RPM**
Maximum torque	**349 N·m** (**257.41 lb ft**) / **1800 RPM**
Engine dry weight	About **333 kg** (**734.139 lb**)
Oil pan	All direction allowable inclination angle 0.61 rad
Cooling fan	∅ **550 mm** (**21.654 in**) - suction type - 8 blades resin
	With bell mouth-type fan guide
Pulley ratio	0.95 (reduction)
Charging generator	**24 V 50 A** AC type
Starter motor	**24 V 4.0 kW** (**5.4 Hp**) reduction type
Coolant capacity	**6.0 L** (**1.585 US gal**)
Oil pan capacity	Max: **15 L** (**3.96 US gal**) Min: **11 L** (**2.91 US gal**) (excluding oil filter)
Direction of rotation	Right (viewed from fan side)

Air cleaner (double element)

Manufacturer	Nippon Donaldson, Ltd.
Element (outer) - Filtering area size	**3.24 m²** (**5022.01 in²**)
Element (inner) - Filtering area size	**0.08 m²** (**124.00 in²**)
Weight	**2.7 kg** (**5.952 lb**)

Radiator

Manufacturer		Tokyo Radiator MFG. Co.,Ltd.
Oil cooler	Weight	**17.5 kg** (**38.5809 lb**)
	Oil volume	**6.9 l** (**1.823 US gal**)
Radiator	Weight	**8.8 kg** (**19.4007 lb**)
	Coolant capacity	**6.3 l** (**1.664 US gal**)
Air cooler	Weight	**6.3 kg** (**13.8891 lb**)
	Capacity	**4.4 l** (**1.162 US gal**)
Fuel cooler	Weight	**0.7 kg** (**1.5432 lb**)
	Capacity	**0.2 l** (**0.053 US gal**)
Total weight		**72.5 kg** (**159.835 lb**)

SCR

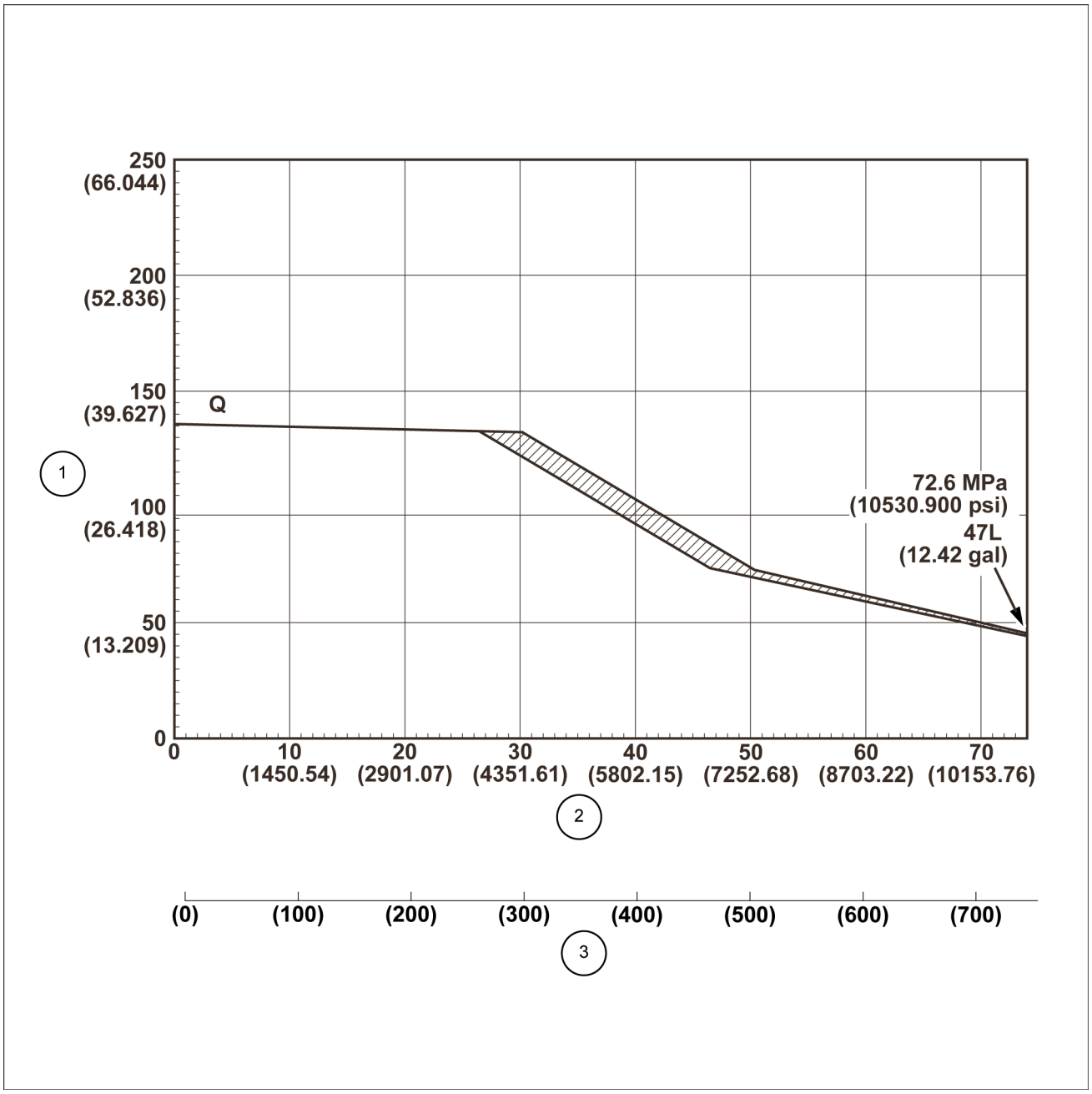
Manufacturer	Tokyo Radiator MFG. Co.,Ltd.
Urea capacity	**75.1 L** (**19.84 US gal**)
Weight	**9.2 kg** (**20.283 lb**)

Hydraulic device

Hydraulic pump

Manufacturer			Kawasaki Heavy Industries, Ltd.
Main pump			
	Pump type		Double variable displacement piston pump
	Displacement capacity		**65.2 cm³/rev** (**3.98 in³/rev**)x 2
	Operating pressure	Rated	**34.3 MPa** (**4975 psi**)
		Maximum	**36.3 MPa** (**5265 psi**)
	Input revolution speed		**2200 RPM**
	Maximum discharge flow		**143 L/min** (**37.777 US gpm**) x 2 (at **2200 RPM**) **142 L/min** (**37.512 US gpm**) x 2 (at **2200 RPM**)
Pilot pump			
	Pump type		Gear pump
	Displacement capacity		**10 cm³/rev** (**0.61 in³/rev**)
	Operating pressure		**3.92 MPa** (**569 psi**)
	Maximum discharge flow		**22 L/min** (**5.812 US gpm**) (at **2200 RPM**)
Control method			Hydraulic simultaneous constant output control (as fail-safe)
			Electrical negative control by external command milli-amp (front and rear side)
Dry weight			**86 kg** (**189.598 lb**)

Pump P - Q Diagram



SMIL15CEX6821GB 1

(1) Discharge flow Q [L/min (gpm)]

(2) Discharge pressure Pd [MPa (psi)]

(3) Discharge pressure Pd [kgf/cm2]

Control-related

Control valve

Manufacturer		Hyest Corporation Ltd.
Maximum flow		**143 L/min** (**37.777 US gpm**) (at **2200 RPM**)
Overload set pressure		**32.3 MPa** (**4685 psi**) boom down
		38.2 MPa (**5541 psi**) boom up, arm, bucket
Main relief set pressure		**34.3 MPa** (**4975 psi**)
	(Upon pressure boost)	**36.3 MPa** (**5265 psi**)
Foot relief set pressure		**3.05 MPa** (**442.40 psi**)
Function		Pressure boost circuit
		Straight travel circuit
		Boom-up and arm-out/in 2 pumps internal flow
		Boom-down and arm-in load holding circuit
		Boom-down and bucket-close regenerative circuit
		Arm-in forced regenerative circuit
		Swing priority variable orifice (for arm operation)
		2 pumps flow
Weight		**160 kg** (**352.740 lb**)

Solenoid valve (4 stack)

Manufacturer		Yuken Kogyo Co., Ltd.	
Valve specifications			
Maximum flow		P→B **20 l/min** (**5.283 US gpm**) Other **5 l/min** (**1.321 US gpm**)	
Rated pressure		**4.5 MPa** (**652 psi**)	
Port size		P.T.B port	**G3/8**
		C1, C2, C3 ports	**G1/4**
Solenoid specifications			
Operating voltage		DC **20 - 32 V**	
Power consumption		**17 W** max.	
Weight		**5.0 kg** (**11.0232 lb**)	

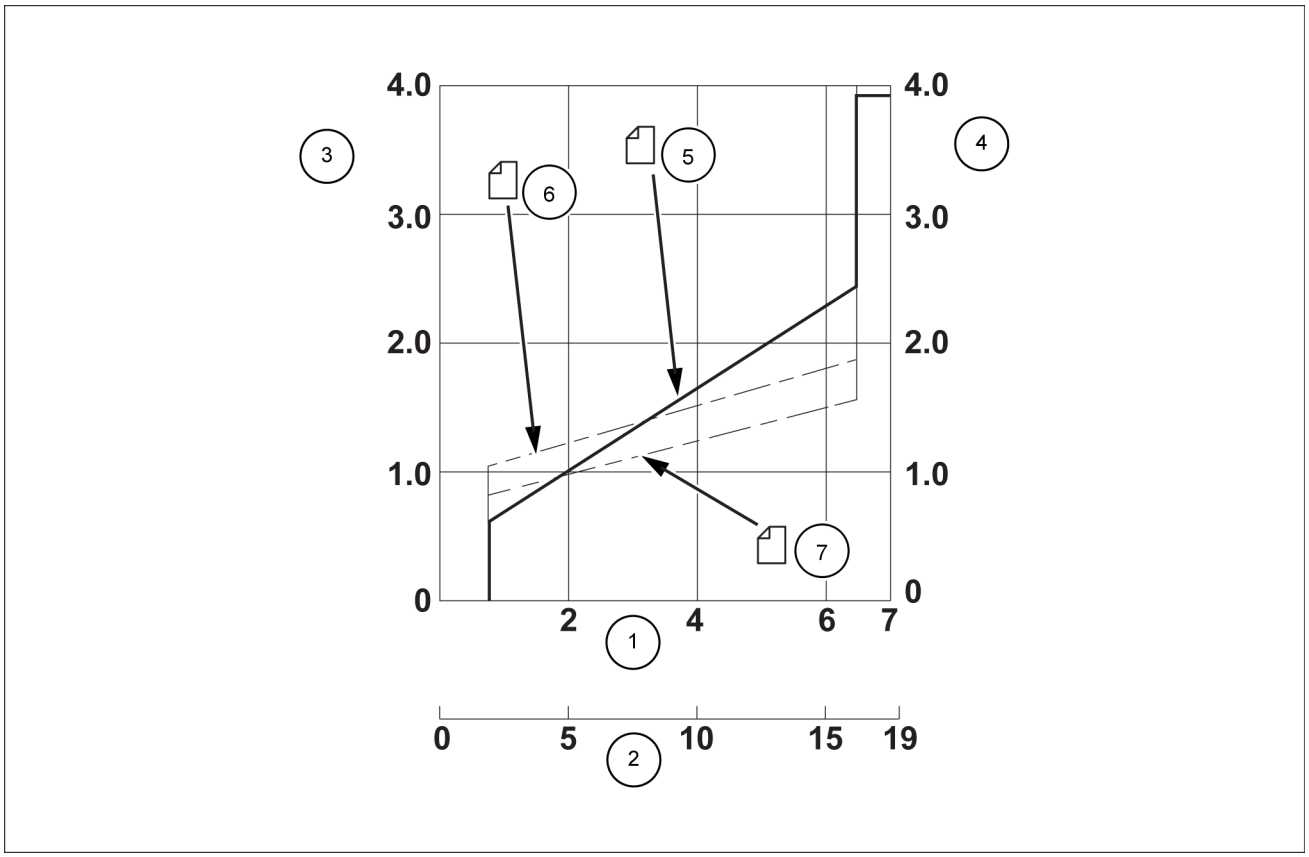
Remote control valve for left/right operations

Manufacturer		Kawasaki Heavy Industries, Ltd.
Operating pressure		**3.92 MPa** (**569 psi**)
Secondary pressure		**0.64 - 2.45 MPa** (**92.8320 - 355 psi**) primary short type
Operating angle	1,3 port	19°
	2,4 port	25°
Weight		**1.9 kg** (**4.1888 lb**)

Remote control valve for travel operation

Manufacturer	Kawasaki Heavy Industries, Ltd.
Operating pressure	**3.92 MPa** (**569 psi**)
Secondary pressure	**0.64 - 2.45 MPa** (**92.8320 - 355 psi**) primary short type
Operating angle	12.4°
Weight	**4.1 kg** (**9.039 lb**)

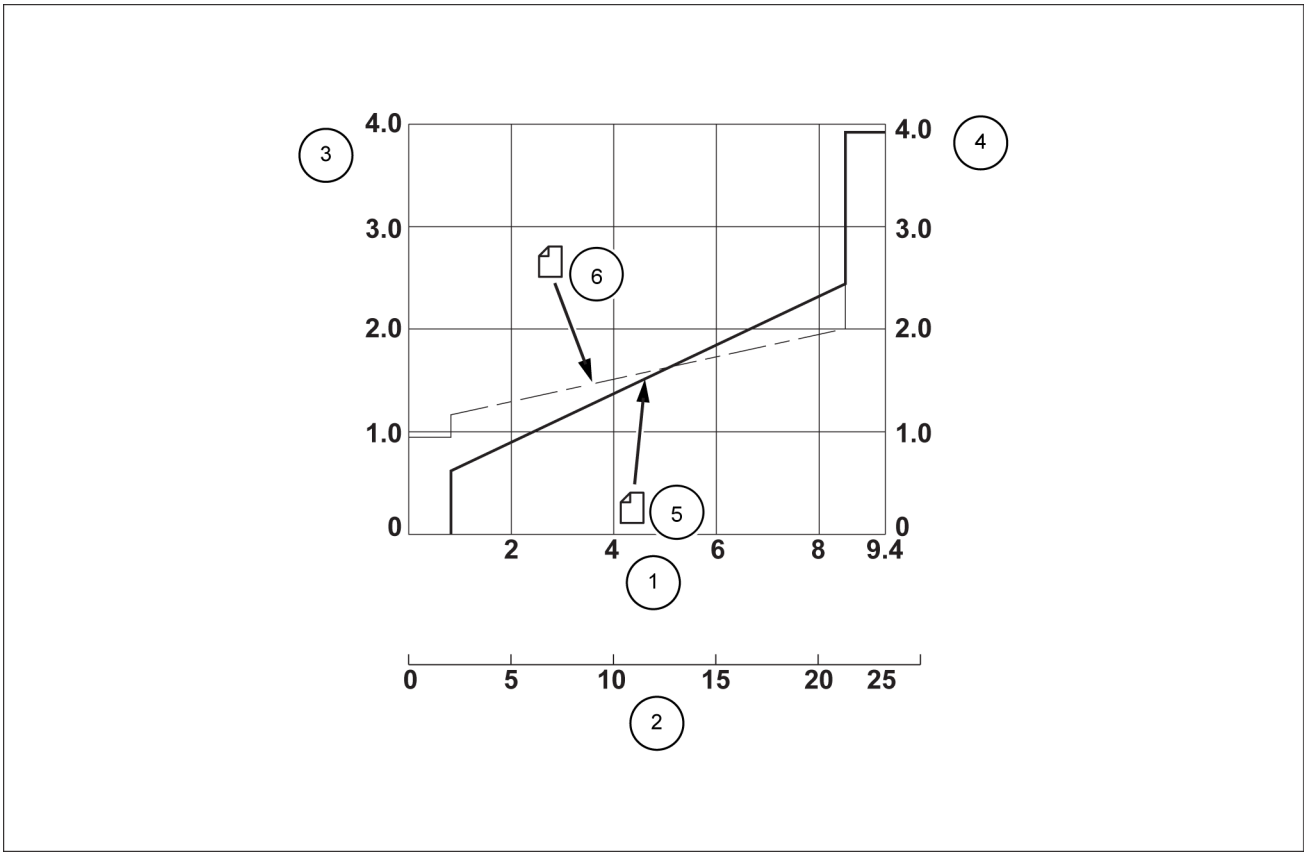
Operation remote control valve control diagram



SMIL15CEX4380FB 2

Ports 1, 3

1 Push rod stroke [mm (in)]
2 Operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque (Port 1)
7 Independent operating torque (Port 3)

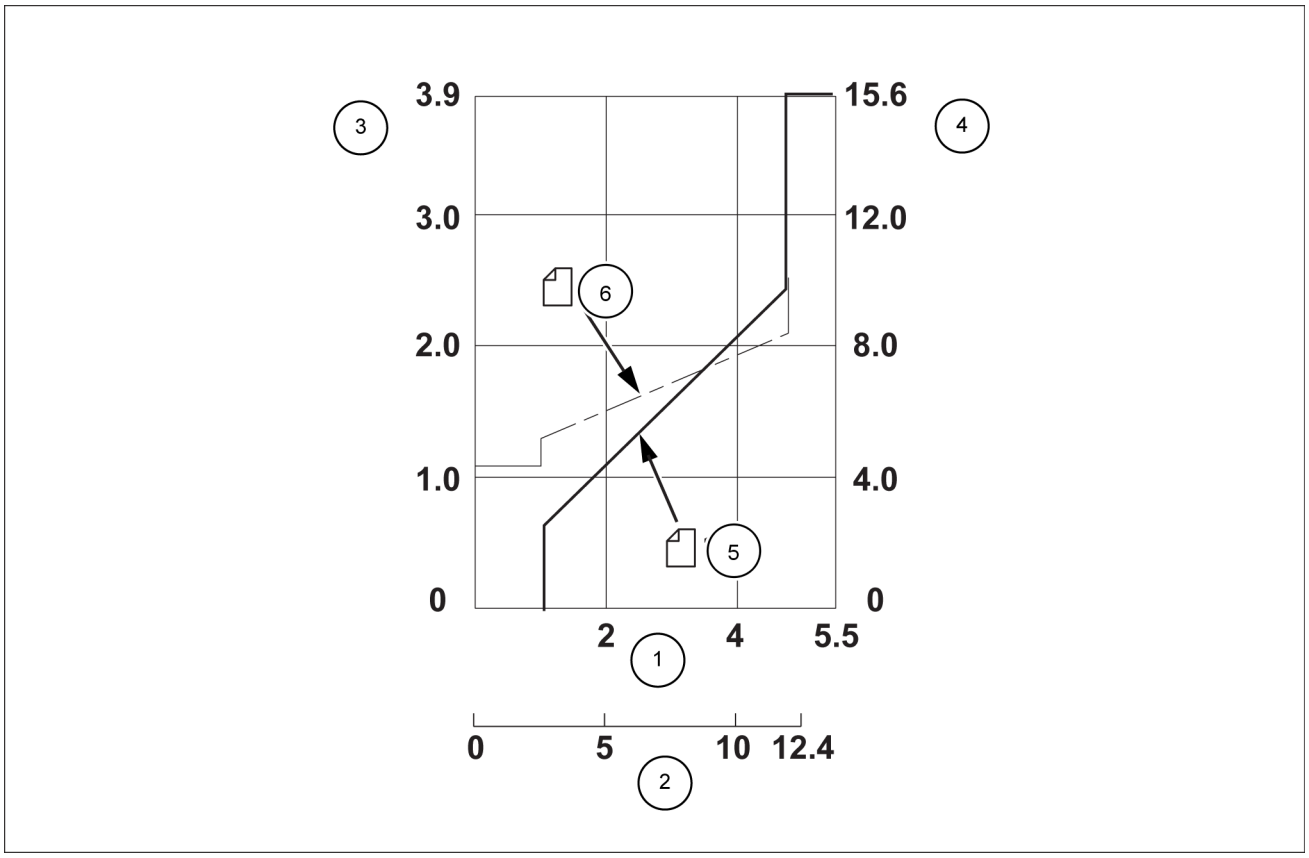


SMIL15CEX4381FB 3

Ports 2, 4

1 Push rod stroke [mm (in)]
2 Operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque

Travel remote control valve control diagram



SMIL15CEX4382FB 4

1 Push rod stroke [mm (in)]
2 Pedal operating angle [deg.]
3 Secondary pressure [MPa]
4 Operating torque [Nm]
5 Secondary pressure
6 Independent operating torque

Cushion valve (heat circuit, with shuttle valve)

Manufacturer	KYB-YS CO., LTD.
Port size	**G3/8** (A - P ports)
	G1/4 (Q - V ports)
Weight	**12.5 kg** (**27.5578 lb**)

Selector valve

2WAY	
Manufacturer	Nishina Industrial Co., Ltd.
Rated flow	**25 l/min** (**6.604 US gpm**)
Operating method	D (ISO), C (JD)
Port size	G3/8
Weight	**4 kg** (**8.8185 lb**)

Center 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 amount	High-pressure passage (ABCD)	**234 L/min** (**61.816 US gpm**)
	Drain port (E)	**10 L/min** (**2.642 US gpm**)
	Pilot port (F)	**21 L/min** (**5.548 US gpm**)
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
Weight	**29.5 kg** (**65.04 lb**)	

Cylinder

Boom cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **115 mm** (**4.528 in**)
Rod diameter	∅ **80 mm** (**3.150 in**)
Maximum retracted length	**1698 mm** (**66.850 in**)
Stroke	**1179 mm** (**46.417 in**)
Weight	Right **157 kg** (**346.126 lb**) Left **157 kg** (**346.126 lb**)

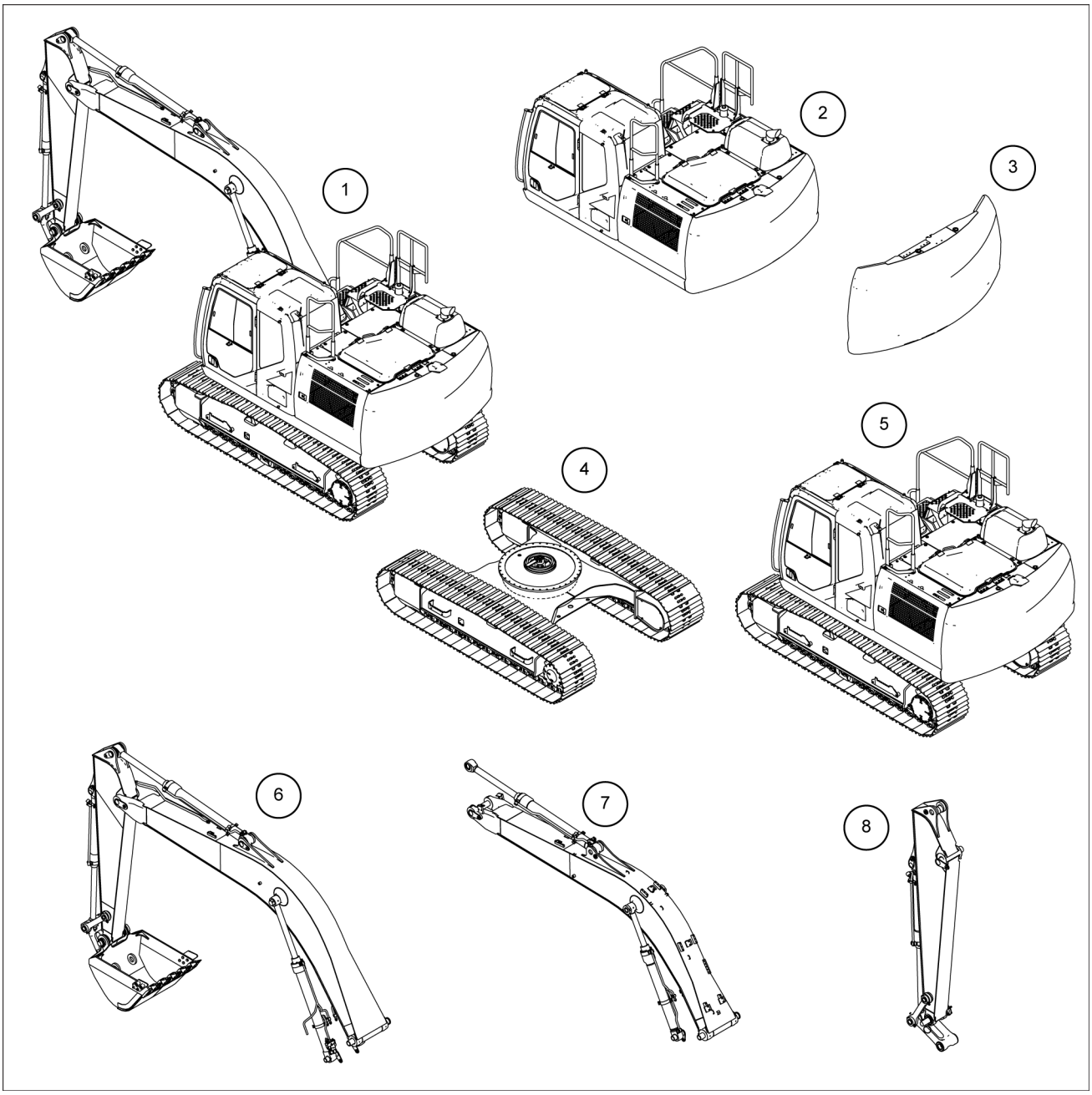
Arm cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **125 mm** (**4.921 in**)
Rod diameter	∅ **90 mm** (**3.543 in**)
Maximum retracted length	**1830 mm** (**72.047 in**)
Stroke	**1280 mm** (**50.394 in**)
Weight	**201 kg** (**443.129 lb**)

Bucket cylinder	
Manufacturer	KYB Corporation
Cylinder bore	∅ **105 mm** (**4.134 in**)
Rod diameter	∅ **75 mm** (**2.953 in**)
Maximum retracted length	**1507 mm** (**59.331 in**)
Stroke	**985 mm** (**38.780 in**)
Weight	**117 kg** (**257.941 lb**)

Weight

CX160D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Divided weight



SMIL15CEX6822GB 1

Code	Part name	Weight
1	Operating weight	**16895 kg** (**37247.099 lb**)
2	Upper component (including counterweight and turntable bearing)	**8216 kg** (**18113.179 lb**)
3	Counterweight	**2918 kg** (**6433.089 lb**)
4	Lower component (with grouser track)	**6068 kg** (**13377.650 lb**)
5	Main unit weight	**14284 kg** (**31490.830 lb**)
6	Attachments (including piping)	**2534 kg** (**5586.514 lb**)
7	Boom (including cylinder and piping)	**1744 kg** (**3844.862 lb**)
8	Arm (including cylinder, linkage and piping)	**790 kg** (**1741.652 lb**)

NOTE: *The weights shown here are approximate values.*

Stand alone part weight

	Part name	Weight
1	Travel unit	**637 kg** (**1404.345 lb**)
2	Take-up roller	**96 kg** (**211.644 lb**)
3	Upper roller	**18 kg** (**39.683 lb**)
4	Lower roller	**36 kg** (**79.366 lb**)
5	Swing unit	**230 kg** (**507.063 lb**)
6	Turntable bearing	**243 kg** (**535.723 lb**)
7	Engine	**415 kg** (**914.918 lb**)
8	Radiator	**108 kg** (**238.099 lb**)
9	Hydraulic pump	**109 kg** (**240.304 lb**)
10	Fuel tank	**150 kg** (**330.693 lb**)
11	Hydraulic oil tank	**125 kg** (**275.578 lb**)
12	Control valve	**169 kg** (**372.581 lb**)
13	Center joint	**29 kg** (**63.934 lb**)
14	Boom	**1072 kg** (**2363.355 lb**)

Track weight (per side)

	Part name	Weight
1	**600 mm** (**23.62 in**) grouser track	**1547 kg** (**3410.551 lb**)
2	**700 mm** (**27.56 in**) grouser track	**1406 kg** (**3099.699 lb**)
3	**500 mm** (**19.69 in**) grouser track	**1358.5 kg** (**2994.980 lb**)

Arm weight

	Part name	Weight
1	Standard arm (EM3 01)	**470.9 kg** (**1038.157 lb**)
2	Standard arm (EM3 O1 PL)	**522.1 kg** (**1151.033 lb**)
3	Standard arm (EM3 O12)	**475.6 kg** (**1048.519 lb**)
4	Standard arm (EM3 O12 PL)	**526.8 kg** (**1161.395 lb**)
5	Long arm (EM3 O1)	**549.5 kg** (**1211.440 lb**)
6	Long arm (EM3 O1 PL)	**603.0 kg** (**1329.387 lb**)
7	Long arm (EM3 O12)	**554.2 kg** (**1221.802 lb**)
8	Long arm (EM3 O12 PL)	**607.7 kg** (**1339.749 lb**)

Bucket weight

General Purpose buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.24 m³ (**0.31 yd³**)	**470 mm** (**19 in**)	**350 kg** (**772 lb**)
0.36 m³ (**0.47 yd³**)	**600 mm** (**24 in**)	**389 kg** (**858 lb**)
0.50 m³ (**0.65 yd³**)	**750 mm** (**30 in**)	**437 kg** (**963 lb**)
0.62 m³ (**0.81 yd³**)	**900 mm** (**35 in**)	**475 kg** (**1047 lb**)
0.70 m³ (**0.92 yd³**)	**1000 mm** (**39 in**)	**501 kg** (**1105 lb**)
0.78 m³ (**1.02 yd³**)	**1100 mm** (**43 in**)	**536 kg** (**1182 lb**)
0.87 m³ (**1.14 yd³**)	**1200 mm** (**47 in**)	**562 kg** (**1239 lb**)
1.00 m³ (**1.31 yd³**)	**1350 mm** (**53 in**)	**625 kg** (**1378 lb**)

Heavy Duty buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.24 m³ (**0.31 yd³**)	**470 mm** (**19 in**)	**376 kg** (**829 lb**)
0.36 m³ (**0.47 yd³**)	**600 mm** (**24 in**)	**415 kg** (**915 lb**)
0.50 m³ (**0.65 yd³**)	**750 mm** (**30 in**)	**463 kg** (**1021 lb**)
0.62 m³ (**0.81 yd³**)	**900 mm** (**35 in**)	**502 kg** (**1107 lb**)
0.70 m³ (**0.92 yd³**)	**1000 mm** (**39 in**)	**532 kg** (**1173 lb**)
0.78 m³ (**1.02 yd³**)	**1100 mm** (**43 in**)	**562 kg** (**1239 lb**)
0.87 m³ (**1.14 yd³**)	**1200 mm** (**47 in**)	**593 kg** (**1307 lb**)
1.00 m³ (**1.31 yd³**)	**1350 mm** (**53 in**)	**659 kg** (**1453 lb**)

Ditch cleaning buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.86 m³ (**1.12 yd³**)	**1830 mm** (**72 in**)	**495 kg** (**1091 lb**)
		625 kg (**1378 lb**) (*)

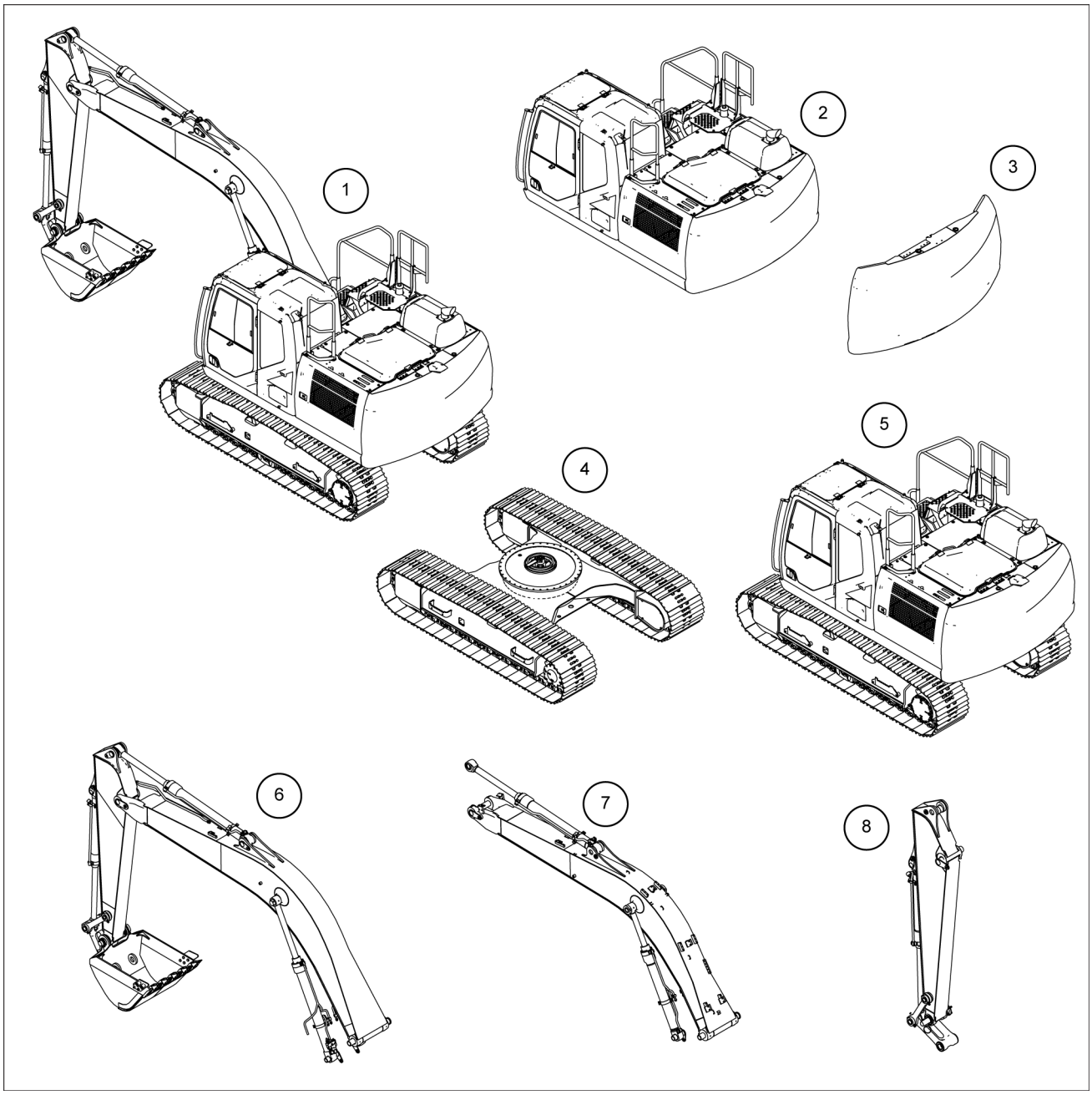
(*) with bolt-on cutting edge

NOTE: *Refer to the Operator's Manual for direct fit buckets application as function of the arm.*

Weight

CX180D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Divided weight



SMIL15CEX6822GB 1

Code	Part name	Weight
1	Operating weight	**17946 kg** (**39564.158 lb**)
2	Upper component (including counterweight and turntable bearing)	**8466 kg** (**18664.335 lb**)
3	Counterweight	**3168 kg** (**6984.244 lb**)
4	Lower component (with grouser track)	**6870 kg** (**15145.757 lb**)
5	Main unit weight	**15336 kg** (**33810.093 lb**)
6	Attachments (including piping)	**2534 kg** (**5586.514 lb**)
7	Boom (including cylinder and piping)	**1744 kg** (**3844.862 lb**)
8	Arm (including cylinder, linkage and piping)	**790 kg** (**1741.652 lb**)

NOTE: *The weights shown here are approximate values.*

Stand alone part weight

	Part name	Weight
1	Travel unit	**652 kg** (**1437.414 lb**)
2	Take-up roller	**96 kg** (**211.644 lb**)
3	Upper roller	**18 kg** (**39.683 lb**)
4	Lower roller	**36 kg** (**79.366 lb**)
5	Swing unit	**230 kg** (**507.063 lb**)
6	Turntable bearing	**243 kg** (**535.723 lb**)
7	Engine	**415 kg** (**914.918 lb**)
8	Radiator	**108 kg** (**238.099 lb**)
9	Hydraulic pump	**109 kg** (**240.304 lb**)
10	Fuel tank	**150 kg** (**330.693 lb**)
11	Hydraulic oil tank	**125 kg** (**275.578 lb**)
12	Control valve	**169 kg** (**372.581 lb**)
13	Center joint	**29 kg** (**63.934 lb**)
14	Boom	**1072 kg** (**2363.355 lb**)

Track weight (per side)

	Part name	Weight
1	**600 mm** (**23.62 in**) grouser track	**1325.5 kg** (**2922.227 lb**)
2	**700 mm** (**27.56 in**) grouser track	**1463 kg** (**3225.363 lb**)
3	**800 mm** (**19.69 in**) grouser track	**1592.5 kg** (**3510.862 lb**)

Arm weight

	Part name	Weight
1	Standard arm (EM3 01)	**470.9 kg** (**1038.157 lb**)
2	Standard arm (EM3 O1 PL)	**522.1 kg** (**1151.033 lb**)
3	Standard arm (EM3 O12)	**475.6 kg** (**1048.519 lb**)
4	Standard arm (EM3 O12 PL)	**526.8 kg** (**1161.395 lb**)
5	Short arm (EM3 O1)	**409.6 kg** (**903.013 lb**)
6	Short arm (EM3 O1 PL)	**459.9 kg** (**1013.906 lb**)
7	Short arm (EM3 O12 PL)	**464 kg** (**1022.945 lb**)
8	Short arm (EM3 O12)	**413.7 kg** (**912.052 lb**)
9	Long arm (EM3 O1)	**549.5 kg** (**1211.440 lb**)
10	Long arm (EM3 O1 PL)	**603.0 kg** (**1329.387 lb**)
11	Long arm (EM3 O12)	**554.2 kg** (**1221.802 lb**)
12	Long arm (EM3 O12 PL)	**607.7 kg** (**1339.749 lb**)

Bucket weight

General Purpose buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.24 m³ (**0.31 yd³**)	**470 mm** (**19 in**)	**350 kg** (**772 lb**)
0.36 m³ (**0.47 yd³**)	**600 mm** (**24 in**)	**389 kg** (**858 lb**)
0.50 m³ (**0.65 yd³**)	**750 mm** (**30 in**)	**437 kg** (**963 lb**)
0.62 m³ (**0.81 yd³**)	**900 mm** (**35 in**)	**475 kg** (**1047 lb**)
0.70 m³ (**0.92 yd³**)	**1000 mm** (**39 in**)	**501 kg** (**1105 lb**)
0.78 m³ (**1.02 yd³**)	**1100 mm** (**43 in**)	**536 kg** (**1182 lb**)
0.87 m³ (**1.14 yd³**)	**1200 mm** (**47 in**)	**562 kg** (**1239 lb**)
1.00 m³ (**1.31 yd³**) (**)	**1350 mm** (**53 in**)	**625 kg** (**1378 lb**)

Heavy Duty buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.24 m³ (**0.31 yd³**)	**470 mm** (**19 in**)	**376 kg** (**829 lb**)
0.36 m³ (**0.47 yd³**)	**600 mm** (**24 in**)	**415 kg** (**915 lb**)
0.50 m³ (**0.65 yd³**)	**750 mm** (**30 in**)	**463 kg** (**1021 lb**)
0.62 m³ (**0.81 yd³**)	**900 mm** (**35 in**)	**502 kg** (**1107 lb**)
0.70 m³ (**0.92 yd³**)	**1000 mm** (**39 in**)	**532 kg** (**1173 lb**)
0.78 m³ (**1.02 yd³**)	**1100 mm** (**43 in**)	**562 kg** (**1239 lb**)
0.87 m³ (**1.14 yd³**)	**1200 mm** (**47 in**)	**593 kg** (**1307 lb**)
1.00 m³ (**1.31 yd³**) (**)	**1350 mm** (**53 in**)	**659 kg** (**1453 lb**)

Ditch cleaning buckets		
Capacity **ISO 7451** (Heaped)	Width	Mass
0.86 m³ (**1.12 yd³**) (**)	**1830 mm** (**72 in**)	**495 kg** (**1091 lb**)
		625 kg (**1378 lb**) (*)

(*) with bolt-on cutting edge

(**) remove for road transport with **3.05 m** (**120.08 in**) arm

NOTE: *Refer to the Operator's Manual for direct fit buckets application as function of the arm.*

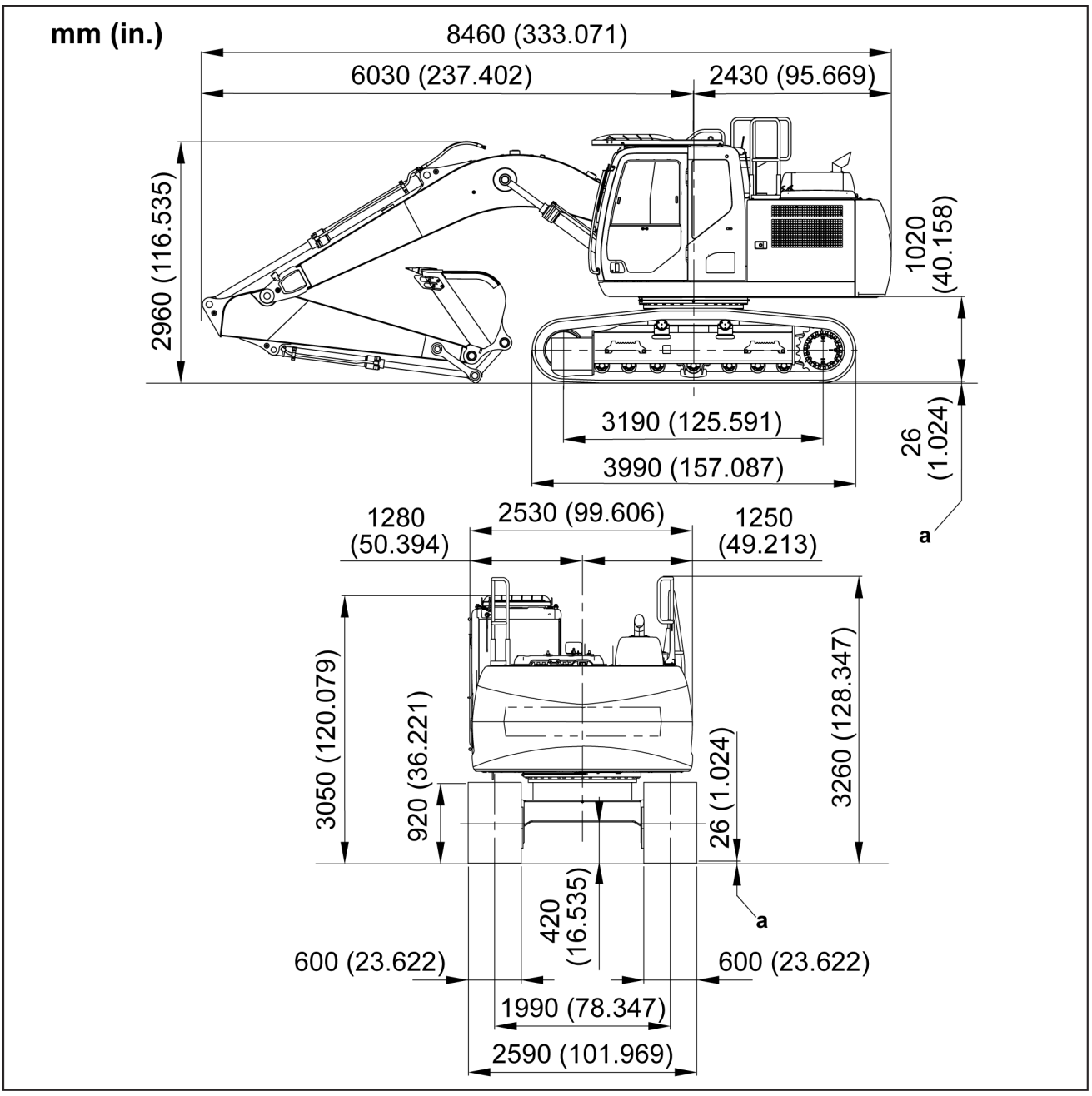
Dimension

CX160D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Standard arm [2.62 m (8.596 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height “a” [* ***26 mm*** *(****1.024 in****)].*

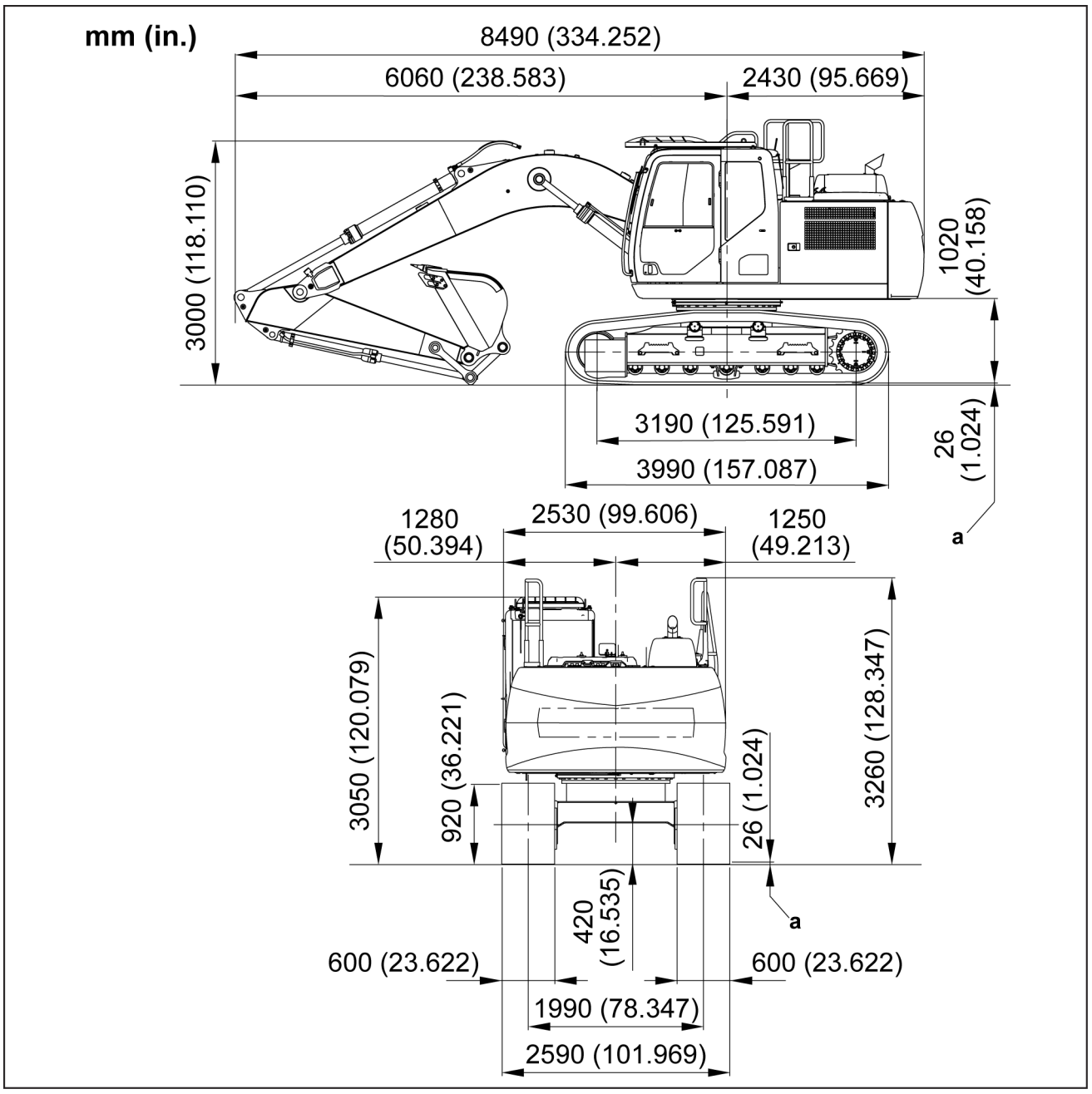


SMIL15CEXY716GA 1

Short arm [2.23 m (7.316 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height “a” [* ***26 mm*** *(****1.024 in****)].*

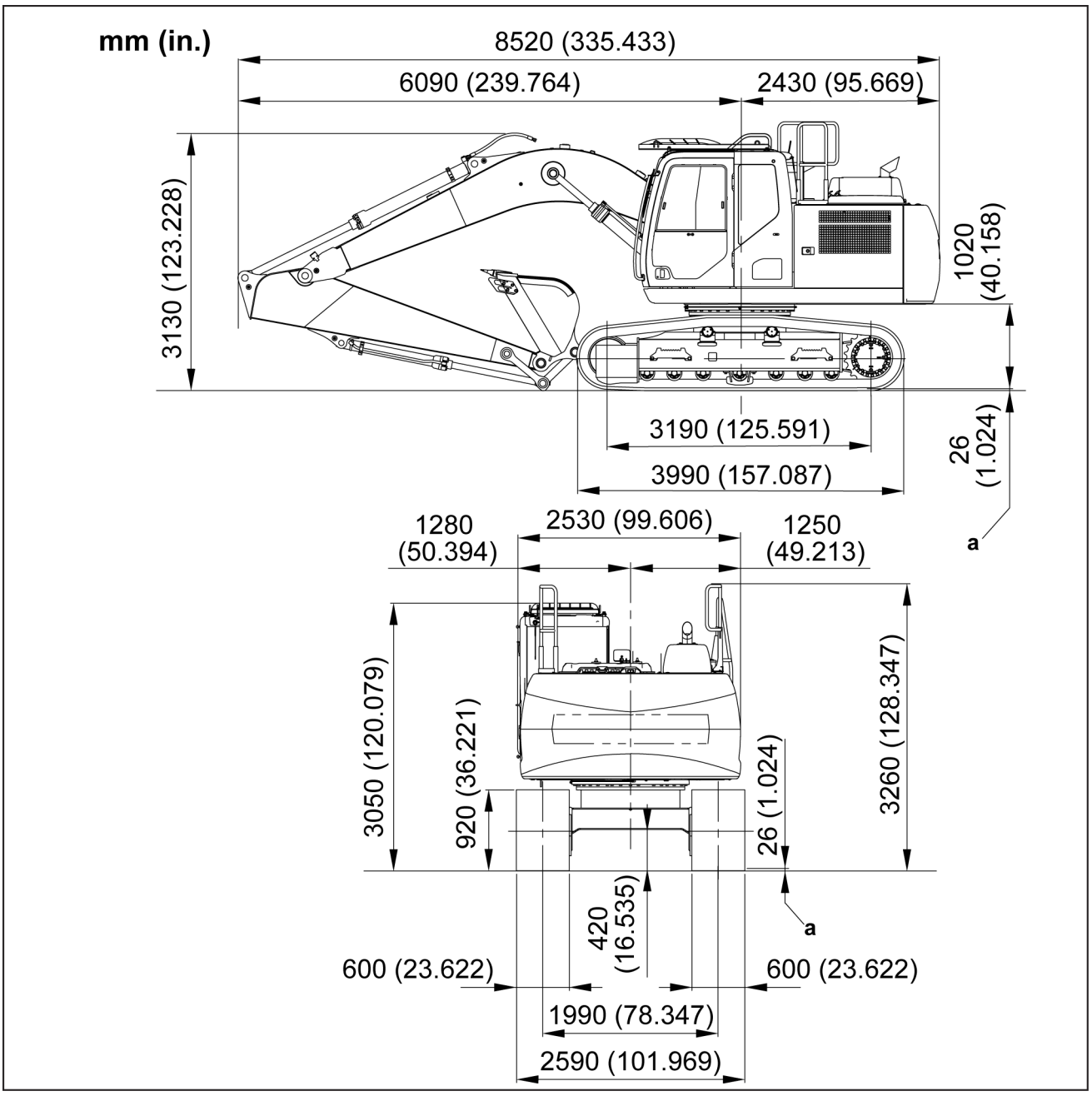


SMIL15CEXY717GA 2

Long arm [3.05 m (10.007 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height "a" [* ***26 mm*** *(****1.024 in****)].*



SMIL15CEXY718GA 3

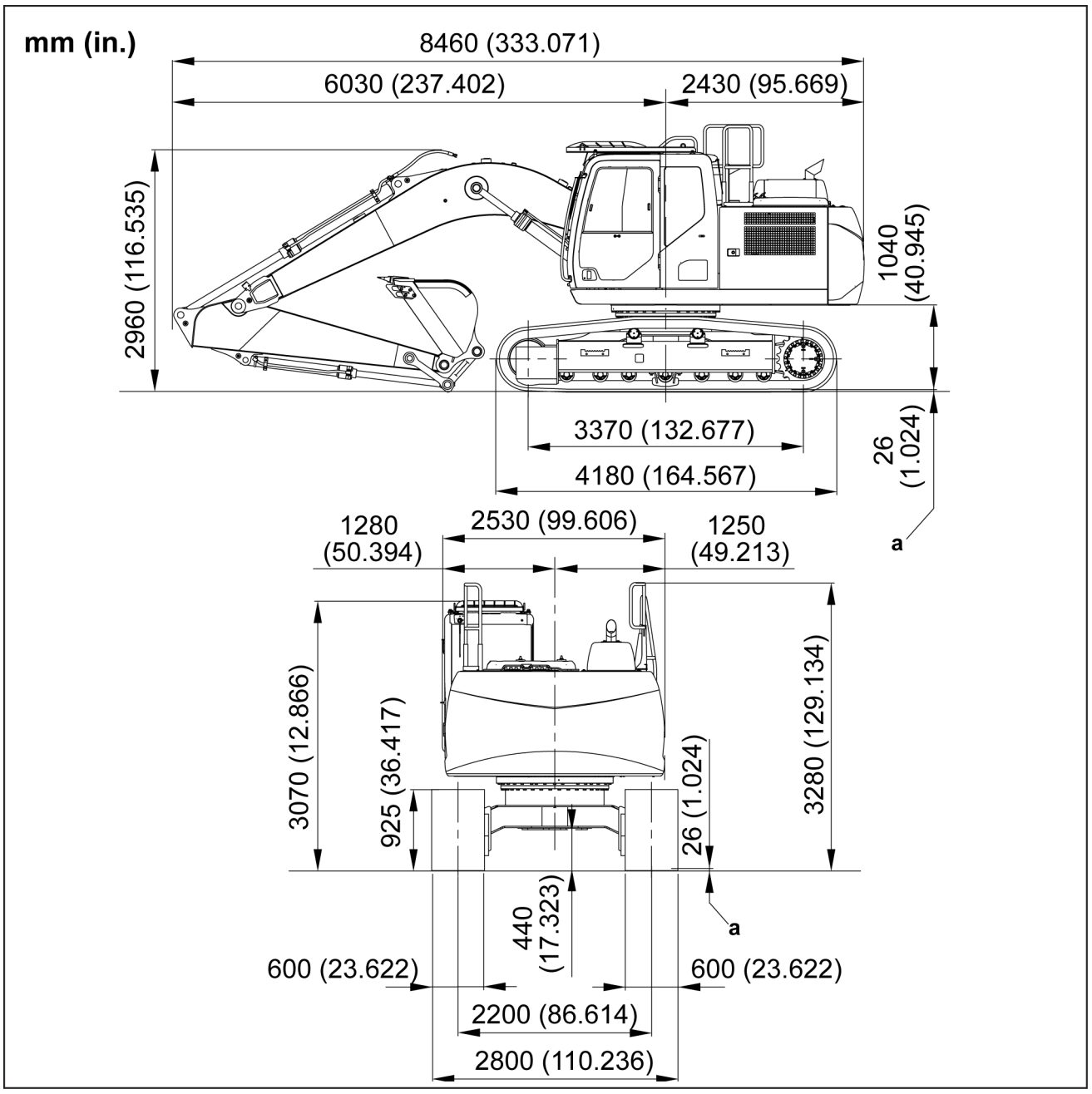
Dimension

CX180D Crawler excavators LC version (TIER 4 FINAL) - EU Market	WE

Standard arm [2.62 m (8.596 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height "a" [* ***26 mm*** *(****1.024 in****)].*

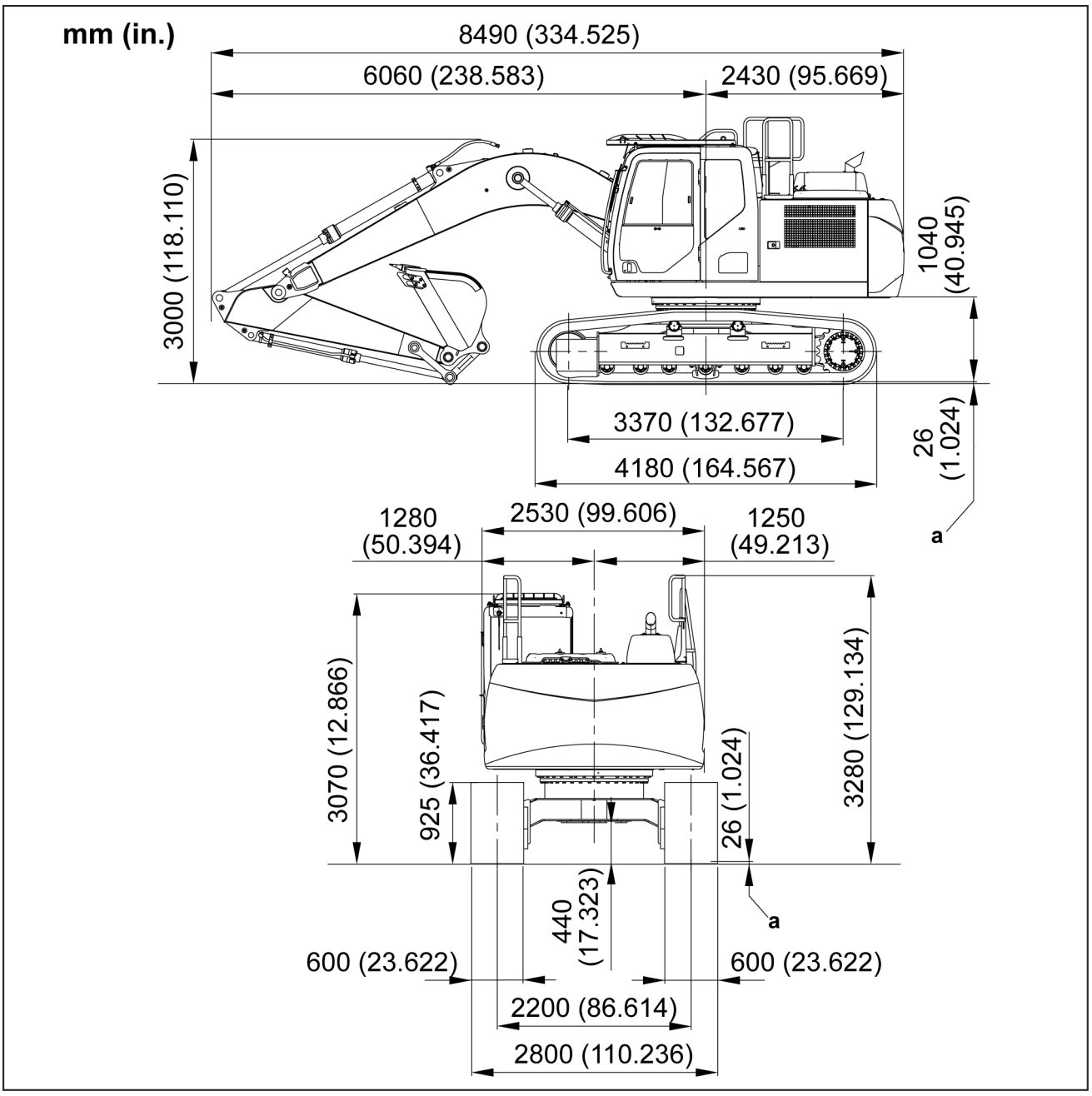


SMIL15CEXY719GA 1

Short arm [2.23 m (7.316 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height "a" [* ***26 mm*** *(****1.024 in****)].*

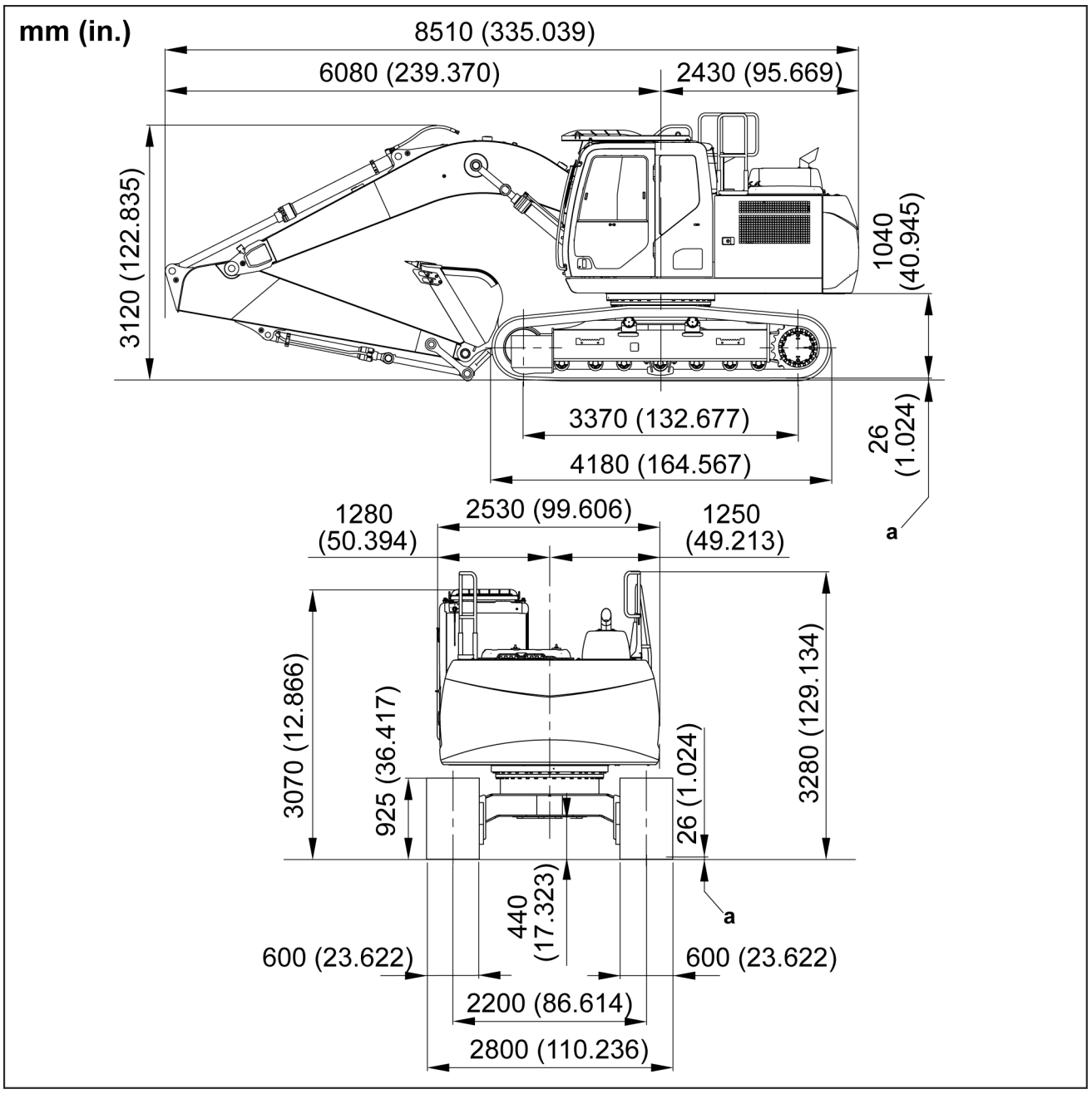


SMIL15CEXY721GA 2

Long arm [3.05 m (10.007 ft)]

NOTE: *Numbers are subject to change without notice due to design change or other reason.*

NOTE: *The diagram gives values that include the shoe lug height “a” [* ***26 mm*** *(****1.024 in****)].*



SMIL15CEXY720GA 3

Capacities and fluids

By using appropriate fluids and lubricants the excavator can operate in ambient temperatures ranging from **-20 °C** (**-4 °F**) to **45 °C** (**113 °F**). Refer to the list of fluids and lubricants contained in this manual.

NOTICE: *When operating the machine in ambient temperatures outside the above mentioned range, consult your CASE CONSTRUCTION Dealer for specific machine provision and for specific fluids and lubricants to be used.*

	Quantity			CASE CONSTRUCTION specification	Reference specification
	CX160D	CX180D			
Fuel tank	**300 L** (**79 US gal**)		—	—	**EN 590**
DEF/ADBLUE® tank	**85 L** (**22.5 US gal**)		—	—	**ISO 22241-1**
Engine oil	**17 L** (**4.5 US gal**)		**CASE AKCELA UNITEK 10W-40**	**MAT3521**	**SAE 10W40** **ACEA E9** **API CJ-4**
Swing reduction unit	**5 L** (**1.3 US gal**)		**CASE AKCELA GEAR 135 H EP 80W-90**	MS 1316	**SAE 80W/90** **API GL-5**
Travel reduction unit	**5.8 L** (**1.5 US gal**)	**5 L** (**1.3 US gal**)	**CASE AKCELA GEAR 135 H EP 80W-90**	MS 1316	**SAE 80W/90** **API GL-5**
Engine coolant	**17.8 L** (**4.7 US gal**)		**CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** CONCENTRATE (*)	**MAT3624** Grade OAT-EG1	**ASTM D6210** TYPE I-FF
			CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT 50/50 PREMIXED	**MAT3624** Grade OAT-EG2	**ASTM D6210** TYPE III-FF
Hydraulic oil tank (**)	**82 L** (**21.7 US gal**)		**CASE AKCELA HYDRAULIC LL 46**	—	**ISO 11158** L-HV46
Grease	—		**CASE AKCELA 251H EP MULTI-PURPOSE GREASE**	IH B-27 251H EP	**NLGI 2**

(*) Concentrate antifreeze to be mixed 50/50 with distilled (deionized) water.

(**) The total capacity of the hydraulic system is **167 L** (**44.1 US gal**).

Engine coolant

CASE CONSTRUCTION requires the use of a fully formulated Organic Acid Technology (OAT) based coolant. **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** is the reference genuine product.

NOTICE: *Use of different coolant brands is not recommended.*

NOTICE: *Never add Supplemental Coolant Additives (SCA) when using* ***CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT****.*

NOTICE: *Never mix* ***CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT*** *coolant with conventional coolant. Mixing OAT based coolant with conventional coolant will reduce the effectiveness of OAT coolant.*

NOTICE: *If only conventional coolant is available, a complete changeover of the fluid into the cooling system shall be carried out. Refer to the procedure described in the Chapter 6 (Engine coolant replacement).*

The engine cooling system shall always be refilled with coolant solution made by mixture of antifreeze and distilled (deionized) water.

NOTICE: *Never refill the cooling system with only antifreeze. Never refill the cooling system with only water.*

Using **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**, a 50/50 mixture of antifreeze and distilled (deionized) water grants proper performance of the engine cooling system in the above mentioned operating temperature range of the machine.

CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT is available as:

- 50/50 PREMIXED coolant solution ready for usage.
- CONCENTRATE antifreeze to be mixed 50/50 with distilled (deionized) water.

NOTICE: *If operating in extreme winter climate, a coolant solution made by 60/40 antifreeze/distilled (deionized) water mixture shall be used in order to grant proper performance of the engine cooling system.*

NOTICE: *Never use coolant solution with more than* ***60 %*** *of antifreeze. This affects the cooling capacity of the mixture.*

When the coolant solution is prepared starting from the CONCENTRATE product, the antifreeze concentration in the mixture of antifreeze and distilled (deionized) water can be determined with a refractometer designed to measure ethylene glycol content.

If distilled (deionized) water is not available, use water for dilution with the following properties:

Property	Maximum limit
Total Solids	**340 ppm**
Total Hardness	**340 ppm**
Chloride (Cl)	**340 ppm**
Sulfate (SO4)	**100 ppm**
Acidity pH	5.5 to 9.0

NOTICE: *Never use hard water, sea water and softened sea water that has been conditioned with salt. The minerals and salts present in potable water can cause corrosion and deposits resulting in shortened engine life.*

Fuel

Use only Ultra-Low Sulphur Diesel (S10) that meets **EN 590** specifications.

Using other types of fuel may lead to stalled engine output or deterioration in fuel economy.

NOTICE: *The warranty shall be invalid if any serious defect is caused by usage of any other fuel. Using fuel other than recommended may cause damage to the fuel injection pump, injector, DOC (Diesel Oxidation Catalist), and other fuel supply system or the engine. CASE CONSTRUCTION may not be responsible to any of such damages.*

If the temperature drops below the fuel cloud point, output deficiency or engine start problems may occur due to wax crystals.

NOTICE: *If operating in severe winter climate, consult the fuel supplier or the CASE CONSTRUCTION dealer for specific diesel fuel according to the* ***EN 590*** *to be used.*

Conditions applicable to diesel fuel. The diesel fuel used must:

- be free from dust particles, even minute ones.
- have the proper viscosity.
- have a high cetane number.
- present great fluidity at low temperatures.
- have low sulphur content.
- have very little residual carbon.

It is recommended that the following safety information be considered in order to prevent damage to the engine fuel supply system.

- Some fuel suppliers mix old engine oil and diesel fuel.
- Makers of larger engine permit the use of this kind of fuel.
- However, do not use diesel fuel contaminated with engine oil in customer's engines.
- Not only will this fuel damage the engine, it may also have a negative impact on the exhaust gas purification function.
- Before using diesel fuel, confirm with the supplier whether the fuel complies with the above specifications.

NOTICE: *consult the supplier or the CASE CONSTRUCTION Dealer regarding appropriate use of fuel additives.*

NOTICE: *in order to prevent condensation during cold weather, fill the fuel tank to full after the completing the day's work.*

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.

Environment and ecology

Before carrying out any maintenance operation on the 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.

Consult your local ecological recycling center or your CASE CONSTRUCTION Dealer to obtain information on the correct method of disposing of these lubricants.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances.
- Local Environmental Agency will, in many cases, be able to help you as well.

Conversion factors

Unit conversion rate

Gravitational unit	- x → ← ÷ -	SI unit
kgf	9.807	N
lbf	4.448	N
kgf•cm	0.0981	N•m
lbf•ft	1.356	N•m
lbf•in	0.113	N•m
kgf/cm^2	0.0981	MPa
atm	0.1013	MPa
lbf/in^2	0.0069	MPa
mm Hg	133.3	Pa
in Hg	3386	Pa
kgf· m/s	0.00981	kW
lbf•ft/s	0.00136	kW
PS	0.7355	kW
HP	0.746	kW
kgf•m	9.807	J
kcal	4186	J
$kgf•s/cm^2$	98067	Pa•s
cP	0.001	Pa•s
P	0.1	Pa•s
cSt	1×10^{-6}	m^2/s
St	0.0001	m^2/s

Length

Millimeters to inches

mm	In.	mm	In.	mm	In.	mm	In.
1	0.0394	26	1.0236	51	2.0079	76	2.9921
2	0.0787	27	1.0630	52	2.0472	77	3.0315
3	0.1181	28	1.1024	53	2.0866	78	3.0709
4	0.1575	29	1.1417	54	2.1260	79	3.1102
5	0.1969	30	1.1811	55	2.1654	80	3.1496
6	0.2362	31	1.2205	56	2.2047	81	3.1890
7	0.2756	32	1.2598	57	2.2441	82	3.2283
8	0.3150	33	1.2992	58	2.2835	83	3.2677
9	0.3543	34	1.3386	59	2.3228	84	3.3071
10	0.3937	35	1.3780	60	2.3622	85	3.3465
11	0.4331	36	1.4173	61	2.4016	86	3.3858
12	0.4724	37	1.4567	62	2.4409	87	3.4252
13	0.5118	38	1.4961	63	2.4803	88	3.4646
14	0.5512	39	1.5354	64	2.5197	89	3.5039
15	0.5906	40	1.5748	65	2.5591	90	3.5433
16	0.6299	41	1.6142	66	2.5984	91	3.5827
17	0.6693	42	1.6535	67	2.6378	92	3.6220
18	0.7087	43	1.6929	68	2.6772	93	3.6614
19	0.7480	44	1.7323	69	2.7165	94	3.7008
20	0.7874	45	1.7717	70	2.7559	95	3.7402
21	0.8268	46	1.8110	71	2.7953	96	3.7795
22	0.8661	47	1.8504	72	2.8346	97	3.8189
23	0.9055	48	1.8898	73	2.8740	98	3.8583
24	0.9449	49	1.9291	74	2.9134	99	3.8976
25	0.9843	50	1.9685	75	2.9528	100	3.9370

Inches to millimeters

in.	mm	in.	mm	in.	mm	in.	mm
1/64	0.3969	17/64	6.7469	33/64	13.0969	49/64	19.4469
1/32	0.7938	9/32	7.1438	17/32	13.4938	25/32	19.8438
3/64	1.1906	19/64	7.5406	35/64	13.8906	51/64	20.2406
1/16	1.5875	5/16	7.9375	9/16	14.2875	13/16	20.6375
5/64	1.9844	21/64	8.3344	37/64	14.6844	53/64	21.0344
3/32	2.3813	11/32	8.7313	19/32	15.0813	27/32	21.4313
7/64	2.7781	23/64	9.1281	39/64	15.4781	55/64	21.8281
1/8	3.1750	3/8	9.5250	5/8	15.8750	7/8	22.2250
9/64	3.5719	25/64	9.9218	41/64	16.2719	57/64	22.6219
5/32	3.9688	13/32	10.3188	21/32	16.6688	29/32	23.0188
11/64	4.3656	27/64	10.7156	43/64	17.0656	59/64	23.4156
3/16	4.7625	7/16	11.1125	11/16	17.4625	15/16	23.8125
13/64	5.1594	29/64	11.5094	45/64	17.8594	61/64	24.2094
7/32	5.5563	15/32	11.9063	23/32	18.2563	31/32	24.6063
15/64	5.9531	31/64	12.3031	47/64	18.6531	63/64	25.0031
1/4	6.3500	1/2	12.7000	3/4	19.0500	1	25.4000

Feet to meters

ft.	0	1	2	3	4	5	6	7	8	9	ft.
	m	m	m	m	m	m	m	m	m	m	
----		0.305	0.610	0.914	1.219	1.524	1.829	2.134	2.438	2.743	----
10	3.048	3.353	3.658	3.962	4.267	4.572	4.877	5.182	5.486	5.791	10
20	6.096	6.401	6.706	7.010	7.315	7.620	7.925	8.230	8.534	8.839	20
30	9.144	9.449	9.754	10.058	10.363	10.668	10.973	11.278	11.582	11.887	30
40	12.192	12.497	12.802	13.106	13.411	13.716	14.021	14.326	14.630	14.935	40
50	15.24	15.545	15.850	16.154	16.459	16.764	17.069	17.374	17.678	17.983	50
60	18.288	18.593	18.898	19.202	19.507	19.812	20.117	20.422	20.726	21.031	60
70	21.336	21.641	21.946	22.250	22.555	22.860	23.165	23.470	23.774	24.079	70
80	24.384	24.689	24.994	25.298	25.603	25.908	26.213	26.518	26.822	27.127	80
90	27.432	27.737	28.042	28.346	28.651	28.956	29.261	29.566	29.870	30.175	90
100	30.480	30.785	31.090	31.394	31.699	32.004	32.309	32.614	32.918	33.223	100

Meters to feet

m	0	1	2	3	4	5	6	7	8	9	m
	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	
----		3.2808	6.5617	9.8425	13.1234	16.4042	19.685	22.9659	26.2467	29.5276	----
10	32.8084	36.0892	39.3701	42.6509	45.9318	49.2126	52.4934	55.7743	59.0551	62.3360	10
20	65.6168	68.8976	72.1785	75.4593	78.7402	82.0210	85.3018	88.5827	91.8635	95.1444	20
30	98.4252	101.7060	104.9869	108.2677	111.5486	114.8294	118.1102	121.3911	124.6719	127.9528	30
40	131.2336	134.5144	137.7953	141.0761	144.3570	147.6378	150.9186	154.1995	157.4803	160.7612	40
50	164.0420	167.3228	170.6037	173.8845	177.1654	180.4462	183.7270	187.0079	190.2887	193.5696	50
60	196.8504	200.1312	203.4121	206.6929	209.9738	213.2546	216.5354	219.8163	223.0971	226.3780	60
70	229.6588	232.9396	236.2205	239.5013	242.7822	246.0630	249.3438	252.6247	255.9055	259.1864	70
80	262.4672	265.7480	269.0289	272.3097	275.5906	278.8714	282.1522	285.4331	288.7139	291.9948	80
90	295.2756	298.5564	301.8373	305.1181	308.3990	311.6798	314.9606	318.2415	321.5223	324.8031	90
100	328.0840	331.3648	334.6457	337.9265	341.2073	344.4882	347.7690	351.0499	354.3307	357.6115	100

Miles to kilometers

miles	0	1	2	3	4	5	6	7	8	9	miles
	km	km	km	km	km	km	km	km	km	km	
----		1.609	3.219	4.828	6.437	8.047	9.656	11.265	12.875	14.484	----
10	16.093	17.703	19.312	20.921	22.531	24.140	25.750	27.359	28.968	30.578	10
20	32.187	33.796	35.406	37.015	38.624	40.234	41.843	43.452	45.062	46.671	20
30	48.280	49.890	51.499	53.108	54.718	56.327	57.936	59.546	61.155	62.764	30
40	64.374	65.983	67.592	69.202	70.811	72.420	74.030	75.639	77.249	78.858	40
50	80.467	82.077	83.686	85.295	86.905	88.514	90.123	91.733	93.342	94.951	50
60	96.561	98.170	99.779	101.39	102.998	104.607	106.217	107.826	109.435	111.045	60
70	112.654	114.263	115.873	117.482	119.091	120.701	122.310	123.919	125.529	127.138	70
80	128.748	130.357	131.966	133.576	135.185	136.794	138.404	140.013	141.622	143.232	80
90	144.841	146.450	148.060	149.669	151.278	152.888	154.497	156.106	157.716	159.325	90
100	160.934	162.544	164.153	165.762	167.372	168.981	170.590	172.200	173.809	175.418	100

Kilometers to miles

km	0	1	2	3	4	5	6	7	8	9	km
	miles	miles	miles	miles	miles	miles	miles	miles	miles	miles	
----		0.621	1.243	1.864	2.485	3.107	3.728	4.350	4.971	5.592	----
10	6.214	6.835	7.456	8.078	8.699	9.321	9.942	10.563	11.185	11.806	10
20	12.427	13.049	13.670	14.292	14.913	15.534	16.156	16.777	17.398	18.020	20
30	18.641	19.263	19.884	20.505	21.127	21.748	22.369	22.991	23.612	24.233	30
40	24.855	25.476	26.098	26.719	27.340	27.962	28.583	29.204	29.826	30.447	40
50	31.069	31.690	32.311	32.933	33.554	34.175	34.797	35.418	36.040	36.661	50
60	37.282	37.904	38.525	39.146	39.768	40.389	41.010	41.632	42.253	42.875	60
70	43.496	44.117	44.739	45.360	45.981	46.603	47.224	47.846	48.467	49.088	70
80	49.710	50.331	50.952	51.574	52.195	52.817	53.438	54.059	54.681	55.302	80
90	55.923	56.545	57.166	57.788	58.409	59.03	59.652	60.273	60.894	61.516	90
100	62.137	62.758	63.380	64.001	64.623	65.244	65.865	66.487	67.108	67.729	100

Area

Square inches to square centimeters

in^2	0	1	2	3	4	5	6	7	8	9	in^2
	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	cm^2	
----		6.452	12.903	19.355	25.806	32.258	38.710	45.161	51.613	58.065	----
10	64.516	70.968	77.419	83.871	90.323	96.774	103.226	109.677	116.129	122.581	10
20	129.032	135.484	141.935	148.387	154.839	161.290	167.742	174.194	180.645	187.097	20
30	193.548	200.000	206.452	212.903	219.355	225.806	232.258	238.710	245.161	251.613	30
40	258.065	264.516	270.968	277.419	283.871	290.323	296.774	303.226	309.677	316.129	40
50	322.581	329.032	335.484	341.935	348.387	354.839	361.290	367.742	374.194	380.645	50
60	387.097	393.548	400.000	406.452	412.903	419.355	425.806	432.258	438.710	445.161	60
70	451.613	458.065	464.516	470.968	477.419	483.871	490.323	496.774	503.226	509.677	70
80	516.129	522.581	529.032	535.484	541.935	548.387	554.839	561.290	567.742	574.194	80
90	580.645	587.097	593.548	600.000	606.452	612.903	619.355	625.806	632.258	638.710	90
100	645.161	651.613	658.065	664.516	670.968	677.419	683.871	690.323	696.774	703.226	100

Square centimeters to square inches

cm^2	0	1	2	3	4	5	6	7	8	9	cm^2
	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	in^2	
----		0.155	0.310	0.465	0.620	0.775	0.930	1.085	1.240	1.395	----
10	1.550	1.705	1.860	2.015	2.170	2.325	2.480	2.635	2.790	2.945	10
20	3.100	3.255	3.410	3.565	3.720	3.875	4.030	4.185	4.340	4.495	20
30	4.650	4.805	4.960	5.115	5.270	5.425	5.580	5.735	5.890	6.045	30
40	6.200	6.355	6.510	6.665	6.820	6.975	7.130	7.285	7.440	7.595	40
50	7.750	7.905	8.060	8.215	8.370	8.525	8.680	8.835	8.990	9.145	50
60	9.300	9.455	9.610	9.765	9.920	10.075	10.230	10.385	10.540	10.695	60
70	10.850	11.005	11.160	11.315	11.470	11.625	11.780	11.935	12.090	12.245	70
80	12.400	12.555	12.710	12.865	13.020	13.175	13.330	13.485	13.640	13.795	80
90	13.950	14.105	14.260	14.415	14.570	14.725	14.880	15.035	15.190	15.345	90
100	15.500	15.655	15.810	15.965	16.120	16.275	16.430	16.585	16.740	16.895	100

Volume

Cubic inches to cubic centimeters

in^3	0	1	2	3	4	5	6	7	8	9	in^3
	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	cm^3 (cc)	
----		16.387	32.774	49.161	65.548	81.936	98.323	114.710	131.097	147.484	----
10	163.871	180.258	196.645	213.032	229.419	245.807	262.194	278.581	294.968	311.355	10
20	327.742	344.129	360.516	376.903	393.290	409.678	426.065	442.452	458.839	475.226	20
30	491.613	508.000	524.387	540.774	557.161	573.549	589.936	606.323	622.710	639.097	30
40	655.484	671.871	688.258	704.645	721.033	737.420	753.807	770.194	786.581	802.968	40
50	819.355	835.742	852.129	868.516	884.904	901.291	917.678	934.065	950.452	966.839	50
60	983.226	999.613	1016.00 0	1032.38 7	1048.77 5	1065.16 2	1081.54 9	1097.93 6	1114.323	1130.71 0	60
70	1147.09 7	1163.48 4	1179.87 1	1196.25 8	1212.64 6	1229.03 3	1245.42 0	1261.80 7	1278.19 4	1294.58 1	70
80	1310.96 8	1327.35 5	1343.74 2	1360.13 0	1376.51 7	1392.90 4	1409.29 1	1425.67 8	1442.06 5	1458.45 2	80
90	1474.83 9	1491.22 6	1507.61 3	1524.00 1	1540.38 8	1556.77 5	1573.16 2	1589.54 9	1605.93 6	1622.32 3	90
100	1638.71 0	1655.09 7	1671.48 4	1687.87 2	1704.25 9	1720.64 6	1737.03 3	1753.42 0	1769.80 7	1786.19 4	100

Cubic centimeters to cubic inches

cm^3 (cc)	0	1	2	3	4	5	6	7	8	9	cm^3 (cc)
	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	in^3	
----		0.0610	0.1220	0.1831	0.2441	0.3051	0.3661	0.4272	0.4882	0.5492	----
10	0.6102	0.6713	0.7323	0.7933	0.8543	0.9154	0.9764	1.0374	1.0984	1.1594	10
20	1.2205	1.2815	1.3425	1.4035	1.4646	1.5256	1.5866	1.6476	1.7087	1.7697	20
30	1.8307	1.8917	1.9528	2.0138	2.0748	2.1358	2.1968	2.2579	2.3189	2.3799	30
40	2.4409	2.5020	2.5630	2.6240	2.6850	2.7461	2.8071	2.8681	2.9291	2.9902	40
50	3.0512	3.1122	3.1732	3.2343	3.2953	3.3563	3.4173	3.4784	3.5394	3.6004	50
60	3.6614	3.7224	3.7835	3.8445	3.9055	3.9665	4.0276	4.0886	4.1496	4.2106	60
70	4.2717	4.3327	4.3937	4.4547	4.5157	4.5768	4.6378	4.6988	4.7598	4.8209	70
80	4.8819	4.9429	5.0039	5.0650	5.1260	5.1870	5.2480	5.3091	5.3701	5.4311	80
90	5.4921	5.5531	5.6142	5.6752	5.7362	5.7972	5.8583	5.9193	5.9803	6.0413	90
100	6.1024	6.1634	6.2244	6.2854	6.3465	6.4075	6.4685	6.5295	6.5905	6.6516	100

Gallons (U.S) to liters

U.S-.gal.	0	1	2	3	4	5	6	7	8	9	U.S-.gal.
	liters	liters	liters	liters	liters	liters	liters	liters	liters	liters	
----		3.7853	7.5707	11.3560	15.1413	18.9266	22.7120	26.4973	30.2826	34.0680	----
10	37.8533	41.6386	45.4239	49.2093	52.9946	56.7799	60.5653	64.3506	68.1359	71.9213	10
20	75.7066	79.4919	83.2772	87.0626	90.8479	94.6332	98.4186	102.2039	105.9892	109.7745	20
30	113.5599	117.3452	121.1305	124.9159	128.7012	132.4865	136.2718	140.0572	143.8425	147.6278	30
40	151.4132	155.1985	158.9838	162.7691	166.5545	170.3398	174.1251	177.9105	181.6958	185.4811	40
50	189.2665	193.0518	196.8371	200.6224	204.4078	208.1931	211.9784	215.7638	219.5491	223.3344	50
60	227.1197	230.9051	234.6904	238.4757	242.2611	246.0464	249.8317	253.6170	257.4024	261.1877	60
70	264.9730	268.7584	272.5437	276.3290	280.1143	283.8997	287.6850	291.4703	295.2557	299.0410	70
80	302.8263	306.6116	310.3970	314.1823	317.9676	321.7530	325.5383	329.3236	333.1090	336.8943	80
90	340.6796	344.4649	348.2503	352.0356	355.8209	359.6063	363.3916	367.1769	370.9622	374.7476	90
100	378.5329	382.3182	386.1036	389.8889	393.6742	397.4595	401.2449	405.0302	408.8155	412.6009	100

Liters to gallons (U.S)

liters	0	1	2	3	4	5	6	7	8	9	liters
	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	U.S.gal.	
----		0.2642	0.5284	0.7925	1.0567	1.3209	1.5851	1.8492	2.1134	2.3776	----
10	2.6418	2.9060	3.1701	3.4343	3.6985	3.9627	4.2268	4.4910	4.7552	5.0194	10
20	5.2836	5.5477	5.8119	6.0761	6.3403	6.6044	6.8686	7.1328	7.3970	7.6612	20
30	7.9253	8.1895	8.4537	8.7179	8.9820	9.2462	9.5104	9.7746	10.0388	10.3029	30
40	10.5671	10.8313	11.0955	11.3596	11.6238	11.8880	12.1522	12.4164	12.6805	12.9447	40
50	13.2089	13.4731	13.7372	14.0014	14.2656	14.5298	14.7940	15.0581	15.3223	15.5865	50
60	15.8507	16.1148	16.3790	16.6432	16.9074	17.1716	17.4357	17.6999	17.9641	18.2283	60
70	18.4924	18.7566	19.0208	19.2850	19.5492	19.8133	20.0775	20.3417	20.6059	20.8700	70
80	21.1342	21.3984	21.6626	21.9268	22.1909	22.4551	22.7193	22.9835	23.2476	23.5118	80
90	23.7760	24.0402	24.3044	24.5685	24.8327	25.0969	25.3611	25.6252	25.8894	26.1536	90
100	26.4178	26.6820	26.9461	27.2103	27.4745	27.7387	28.0028	28.2670	28.5312	28.7954	100

Gallons (Imp.) to liters

Imp.gal.	0	1	2	3	4	5	6	7	8	9	Imp.gal.
	liters	liters	liters	liters	liters	liters	liters	liters	liters	liters	
----		4.5455	9.0909	13.6364	18.1818	22.7273	27.2727	31.8182	36.3636	40.9091	----
10	45.4545	50.0000	54.5455	59.0909	63.6364	68.1818	72.7273	77.2727	81.8182	86.3636	10
20	90.9091	95.4545	100.0000	104.5455	109.0909	113.6364	118.1818	122.7273	127.2727	131.8182	20
30	136.3636	140.9091	145.4545	150.0000	154.5455	159.0909	163.6364	168.1818	172.7273	177.2727	30
40	181.8182	186.3636	190.9091	195.4545	200.0000	204.5455	209.0909	213.6364	218.1818	222.7273	40
50	227.2727	231.8182	236.3636	240.9091	245.4545	250.0000	254.5455	259.0909	263.6364	268.1818	50
60	272.7273	277.2727	281.8182	286.3636	290.9091	295.4545	300.0000	304.5455	309.0909	313.6364	60
70	318.1818	322.7273	327.2727	331.8182	336.3636	340.9091	345.4545	350.0000	354.5455	359.0909	70
80	363.6364	368.1818	372.7273	377.2727	381.8182	386.3636	390.9091	395.4545	400.0000	404.5455	80
90	409.0909	413.6364	418.1818	422.7273	427.2727	431.8182	436.3636	440.9091	445.4545	450.0000	90
100	454.5455	459.0909	463.6364	468.1818	472.7273	477.2727	481.8182	486.3636	490.9091	495.4545	100

Liters to gallons (Imp.)

liters	0	1	2	3	4	5	6	7	8	9	liters
	Imp.gal.	Imp.gal.	Imp.gal.	Imp.gal.	Imp.gal.	Imp.gal.	Imp.gal.	Imp.gal.	Imp.	Imp.gal.	
----		0.2200	0.4400	0.6600	0.8800	1.1000	1.3200	1.5400	1.7600	1.9800	----
10	2.2000	2.4200	2.6400	2.8600	3.0800	3.3000	3.5200	3.7400	3.9600	4.1800	10
20	4.4000	4.6200	4.8400	5.0600	5.2800	5.5000	5.7200	5.9400	6.1600	6.3800	20
30	6.6000	6.8200	7.0400	7.2600	7.4800	7.7000	7.9200	8.1400	8.3600	8.5800	30
40	8.8000	9.0200	9.2400	9.4600	9.6800	9.9000	10.1200	10.3400	10.5600	10.7800	40
50	11.0000	11.2200	11.4400	11.6600	11.8800	12.1000	12.3200	12.5400	12.7600	12.9800	50
60	13.2000	13.4200	13.6400	13.8600	14.0800	14.3000	14.5200	14.7400	14.9600	15.1800	60
70	15.4000	15.6200	15.8400	16.0600	16.2800	16.5000	16.7200	16.9400	17.1600	17.3800	70
80	17.6000	17.8200	18.0400	18.2600	18.4800	18.7000	18.9200	19.1400	19.3600	19.5800	80
90	19.8000	20.0200	20.2400	20.4600	20.6800	20.9000	21.1200	21.3400	21.5600	21.7800	90
100	22.0000	22.2200	22.4400	22.6600	22.8800	23.1000	23.3200	23.5400	23.7600	23.9800	100

Weight

Pounds to kilograms

lbs.	0	1	2	3	4	5	6	7	8	9	lbs.
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	
----		0.454	0.907	1.361	1.814	2.268	2.722	3.175	3.629	4.082	----
10	4.536	4.989	5.443	5.897	6.350	6.804	7.257	7.711	8.165	8.618	10
20	9.072	9.525	9.979	10.433	10.886	11.340	11.793	12.247	12.701	13.154	20
30	13.608	14.061	14.515	14.968	15.422	15.876	16.329	16.783	17.236	17.690	30
40	18.144	18.597	19.051	19.504	19.958	20.412	20.865	21.319	21.772	22.226	40
50	22.680	23.133	23.587	24.040	24.494	24.947	25.401	25.855	26.308	26.762	50
60	27.215	27.669	28.123	28.576	29.030	29.483	29.937	30.391	30.844	31.298	60
70	31.751	32.205	32.658	33.112	33.566	34.019	34.473	34.926	35.380	35.834	70
80	36.287	36.741	37.194	37.648	38.102	38.555	39.009	39.462	39.916	40.370	80
90	40.823	41.277	41.730	42.184	42.637	43.091	43.545	43.998	44.452	44.905	90
100	45.359	45.813	46.266	46.720	47.173	47.627	48.081	48.534	48.988	49.441	100

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