SERVICE MANUAL

E145C EVO

Crawler Excavator

Part number 48024947A
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NEW HOLLAND CONSTRUCTION

SERVICE MANUAL

E145C EVO LC version, Tier 3 engine, Made in Brazil
E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil

48024947A 24/10/2018

EN

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INTRODUCTION

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INTRODUCTION

(*) See content for specific models

Foreword - Important notice regarding equipment servicing

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
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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 NEW HOLLAND CONSTRUCTION Sales and Service Networks.

Foreword - How to use and navigate through this manual

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
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This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through web delivery (eTIM), DVD, and paper manuals. A coding system called SAP has been developed to link the technical information to other Product Support functions, e.g., Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customer's machine. When a customer has a concern on their machine it is usually because a function or system on their machine is not working at all, is not working efficiently, or is not responding correctly to their commands. When you refer to the technical information in this manual to resolve that customer's concern, you will find all the information classified using the SAP coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system, you will then find all the mechanical, electrical or hydraulic devices, components, assemblies, and sub assemblies for that function or system. You will also find all the types of information that have been written for that function or system: the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting), and the service data (remove, install adjust, etc.).

By integrating SAP coding into technical information, you will be able to search and retrieve just the right piece of technical information you need to resolve that customer's concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - the component or function on the machine, that the piece of technical information is going to describe (e.g., Fuel tank).
- INFORMATION TYPE - the piece of technical information that has been written for a particular component or function on the machine (e.g., Capacity would be a type of Technical Data describing the amount of fuel held by the fuel tank).
- PRODUCT - the model for which the piece of technical information is written.

Every piece of technical information will have those three categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customer's concern on their machine.

That information could be:

- the procedure for how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

Manual content

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of each Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.
- Service Data (remove disassemble, assemble, install) for all the mechanical, electrical or hydraulic devices, components, assemblies or sub-assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a number (00, 35, 55, etc.). The Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

	PRODUCT				
	Tractors				
	Vehicles with working arms: backhoes, excavators, skid steers, ….				
	Combines, forage harvesters, balers, ….				
	Seeding, planting, floating, spraying equipment, ….				
SECTION	Mounted equipment and tools, ….				
00 - Maintenance	X	X	X	X	X
05 - Machine completion and equipment	X	X	X	X	X
10 - Engine	X	X	X	X	
14 - Main gearbox and drive	X	X	X	X	
18 - Clutch	X	X	X		
21 - Transmission	X	X	X	X	
23 - Four wheel drive (4WD) system	X	X	X	X	
25 - Front axle system	X	X	X	X	
27 - Rear axle system	X	X	X	X	
29 - Hydrostatic drive	X	X	X	X	
31 - Power Take-Off (PTO)	X		X		
33 - Brakes and controls	X	X	X	X	
35 - Hydraulic systems	X	X	X	X	
36 - Pneumatic system	X	X	X	X	
37 - Hitches, drawbars and implement couplings	X		X	X	
39 - Frames and ballasting	X	X	X	X	X
41 - Steering	X	X	X	X	
44 - Wheels	X	X	X	X	
46 - Steering clutches					
48 - Tracks and track suspension	X	X	X		
50 - Cab climate control	X	X	X	X	
55 - Electrical systems	X	X	X	X	X
56 - Grape harvester shaking					
58 - Attachments/headers			X		
60 - Product feeding			X		

61 - Metering system				X		
62 - Pressing - Bale formation			X			
63 - Chemical applicators				X		
64 - Chopping			X			
66 - Threshing			X			
68 - Tying/Wrapping/Twisting			X			
69 - Bale wagons						
70 - Ejection			X			
71 - Lubrication system	X	X	X	X	X	
72 - Separation			X			
73 - Residue handling			X			
74 - Cleaning			X			
75 - Soil preparation/Finishing						
76 - Secondary cleaning / Destemmer						
77 - Seeding				X		
78 - Spraying				X		
79 - Planting				X		
80 - Crop storage / Unloading			X			
82 - Front loader and bucket	X	X				
83 - Telescopic single arm	X	X				
84 - Booms, dippers and buckets	X	X				
86 - Dozer blade and arm	X	X				
88 - Accessories	X	X	X	X	X	
89 - Tools	X	X	X	X	X	
90 - Platform, cab, bodywork and decals	X	X	X	X		

Chapters

Each Chapter is identified by a number e.g. Engine - Engine and crankcase - 10.001. The first number is identical to the Section number i.e. Chapter 10.001 is inside Section 10, Engine. The second number is representative of the Chapter contained within the Section.

CONTENTS

The Chapter Contents lists all the technical data (specifications), functional data (how it works), diagnostic data (fault codes and troubleshooting), and service data (remove, install, adjust, etc.), that have been written in that Chapter for that function or system on the machine.

Contents

ENGINE

ENGINE - Engine and crankcase – 10.001

INDEX

The Chapter Index lists in alphabetical order all the types of information (called information units) that have been written in that Chapter for that function or system on the machine.

Index

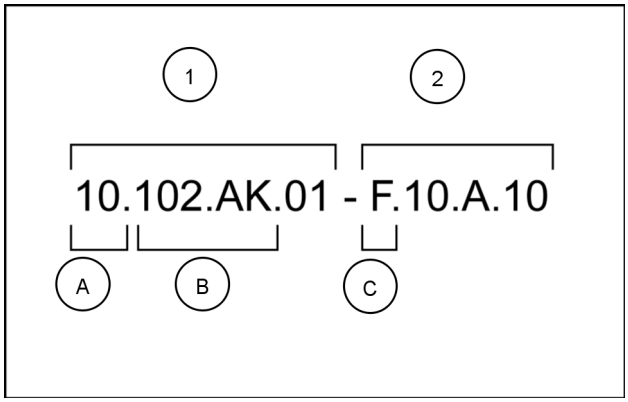
ENGINE - 10

ENGINE

Information units and information search

Each chapter is composed of information units. Each information unit has the SAP code shown in parentheses. This indicates the function and type of information in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

Example information unit	Engine block cover - Front – Remove (10.102.AP.01 - F.10.A.10)					
Information Unit SAP code	10	102	AK	01	F	10.A.10
SAP code classification	Engine	Pan and covers	Engine block cover	Front	Service data	Remove



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Navigate to the correct information unit you are searching for by identifying the function and information type from the SAP code.

- **(1)** Location and **(2)** Information type.
- **(A)** corresponds to the sections of the service manual.
  (B) corresponds to the chapters of the service manual. After **(B)** there may be some additional information. In this case it shows ".01", which represents the "Front" block cover. These options may be front/rear, left/right, hydraulic/mechanical etc.
  (C) corresponds to the type of information listed in the chapter contents: Technical Data, Functional Data, Diagnostic, or Service.
  (A) and **(B)** are also shown in the page numbering on the page footer.
  THE REST OF THE CODING IS NOT LISTED IN ALPHANUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
  You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page header and footer

The page header will contain the following references:

- Section and Chapter description

The page footer will contain the following references:

- Publication number for that Manual.
- Version reference for that publication.
- Publication date
- Section, chapter, and page reference e.g. 10.102 / 9

Safety rules (Signal word definitions)

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
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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 and on machine safety signs, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for your personal safety and for all those involved in the work activity during operation of the machine.

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

DANGER:

Indicates an immediate danger that, if not avoided, will cause death or serious injury. The color associated with Danger is RED.

WARNING:

Indicates a potential danger that, if not avoided, will cause serious injury. The color associated with Warning is ORANGE.

CAUTION:

Indicates a potential danger that, if not avoided, can cause minor or moderate injury. ORANGE also alerts the operator to unsafe practices. The color associated with Caution is YELLOW.

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

Machine safety

NOTICE: *Indicates a situation that, if not avoided, could result in machine or property damage. The color associated with Notice is BLUE.*

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: *Indicates additional information which 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

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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 NEW HOLLAND CONSTRUCTION genuine service parts.

When placing an order, check the parts catalog. It contains the NEW HOLLAND 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

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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 NEW HOLLAND 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 - Cab protective structure

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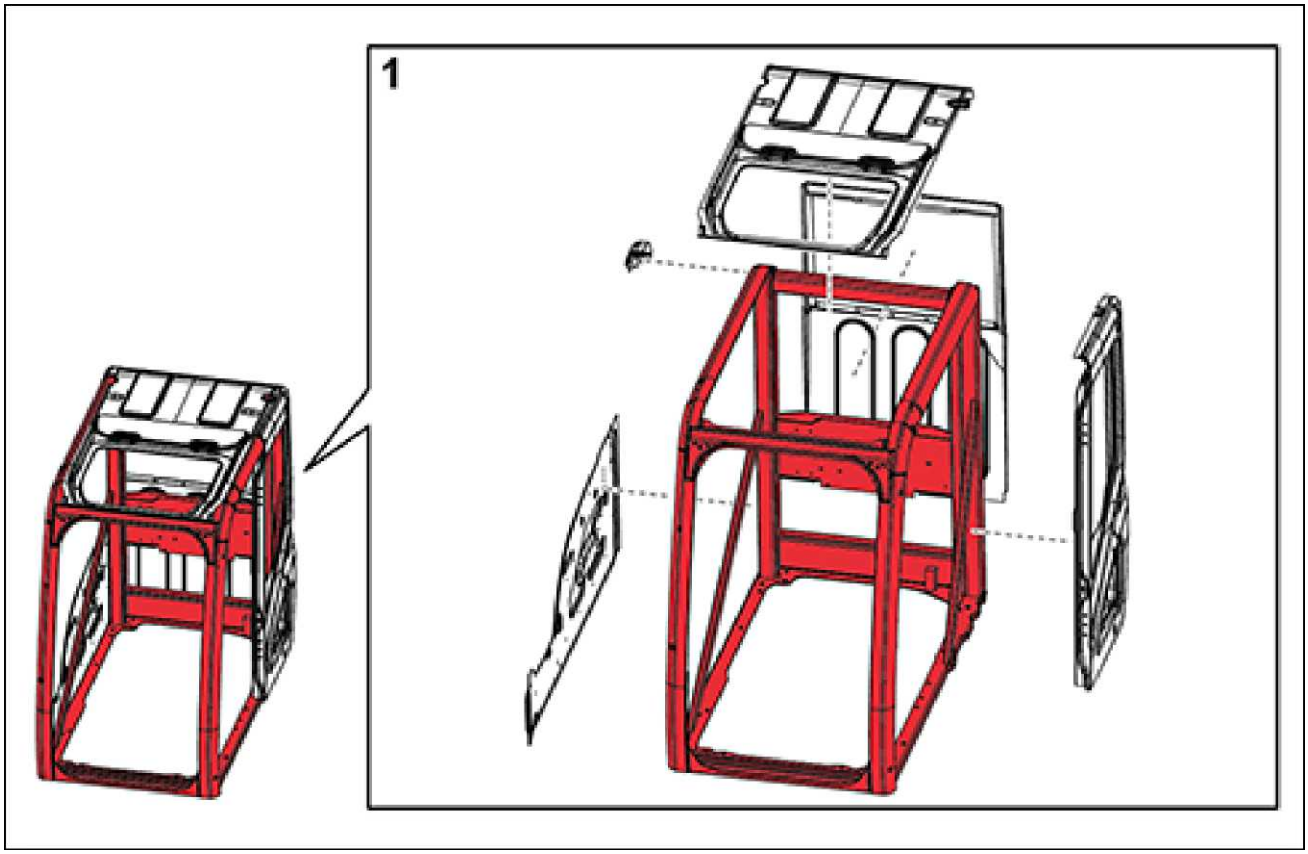
Cab protective structure

Modifying the cab main components is prohibited in order to protect the operator.

Prohibited items

- Modifications that reduce the strength of a platform that has a cab with a protective structure mounted on it. (Actions or modifications that reduce the functionality of the anchoring part at the left-rear of the cab)
- Modifications that effect the strength of the cab with a protective structure.

Modifications prohibited (red part)	All modifications (grinding, welding, drilling holes, removing, etc.) are prohibited.
Modifications permitted under conditions (gray part)	Removal of parts is prohibited. Bar welding and making holes (up to diameter **20 mm** (**0.787 in**)) by drilling are possible.



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Safety rules

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Ecology and environment

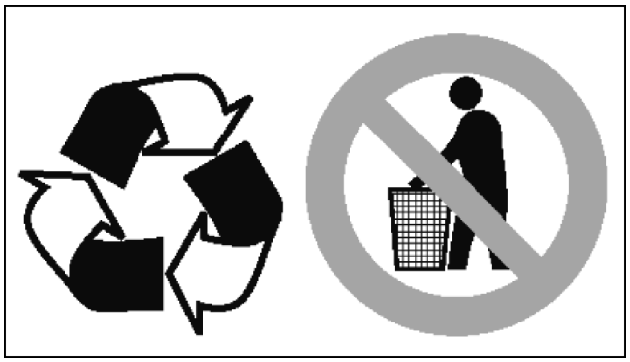
Soil, air and water are vital factors of life in general. Disposing of waste improperly represents a danger for the environment.

NOTE: *Some recommendations must be followed:*

- Obtain information about the correct methods to recycle or dispose of waste from local authorities, collection centers or your dealer.
- Do not dispose of waste onto the ground, into drains, or in water beds.
- Do not fill reservoirs using cans or inappropriate pressurized fluid delivery systems, as they may cause considerable spillage.
- Use sealed containers when draining the fluids. Do not use containers for food or beverages which may induce ingestion.
- The air conditioning system is under pressure, and contains gases that should not be released into the atmosphere. Do not disconnect or remove any component from the pressure line of the air conditioning system. If you need repairs to the air conditioning system, contact a dealer.
- Immediately repair any leaks or defects in the machine's engine cooling and hydraulic systems.
- Generally avoid skin contact with any fuels, oils, fluids, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
- Avoid spills when draining fluid. Store them safely until they can be disposed of properly in compliance with local legislation.
- Protect hoses and pipes during welding works, because the sparks generated during the welding work can damage them, allowing the fluid to leak.

Mandatory recycling

The battery is essentially composed of lead plates and sulfuric acid solution. Because the battery contains heavy metals such as lead, resolution 401 de 2008 of CONAMA orders that all used batteries must be returned to the battery dealer at the time of replacement. Do not dispose of the battery in the garbage. Points of sale are obliged to accept the return of your used battery, and to store it in a suitable place and return it to the manufacturer for recycling.



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Improper disposal of batteries can contaminate the soil, groundwater and waterways. Consumption of contaminated water can cause serious health risks. Contact of the acid solution with the skin or eyes can cause serious injury and blindness. In case of accidental contact with the eyes or skin, immediately wash with running water and seek emergency medical care.

Safety rules (Weld works)

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⚠ WARNING

Avoid injury!
When welding, always wear proper protective equipment and welding clothing. All persons in the work area must, at minimum, wear welding goggles. Never look directly at the welding arc without welding eye protection.
Failure to comply could result in death or serious injury.

W1178A

NOTICE: *Repair works with welding must be performed by a qualified and experienced welder. Appropriate safety regulations should be followed by the personnel involved in the work. The time to perform welding operations depends on the quality and precision of the work. Never make modifications on the machine.*

To perform welding operations on the machine (authorized and in accordance with NEW HOLLAND CONSTRUCTION recommendations), proceed as follows:

- Identify all points of fracture or cracking, and the areas in which welding is required.
- Thoroughly clean the areas involved.
- Remove all paint. Inspect the parts with liquid penetrant or a magnetic tool for particles.
- Shut down the engine. Place the ignition key in the “OFF” position to shut down the engine.

  NOTICE: *After you shut down the machine, wait at least* ***8 min*** *to shut down the battery cables or the master switch (if equipped). This time is necessary so that the engine’s electronic system (if equipped) can store the settings data in the electronic module.*
- Disconnect the batteries and the wires from terminals D+ and B+ of the alternator.
- Disconnect the electrical wiring harnesses from the transmission control modules and from the engine.
- Connect the ground cable of the welding machine to the component to be welded.
- Always connect the welding equipment to the frame that is being welded.
- Never connect the welding equipment ground to a component of the hydraulic system.
- Avoid welding at low temperatures, e.g., below **16 °C**. If necessary, warm up the part involved prior to welding.
- Remove the paint from all surfaces before heating or welding. Painted surfaces can generate toxic gases when heated or welded.
- Use appropriate masks or protective goggles.
- Wear appropriate gloves and protective equipment.
- Disconnect the connectors from all control modules of the machine.

SP0064 1

Heating lines containing pressurized fluid

NOTICE: *Flammable sprays can be generated by heating near lines containing pressurized fluid, resulting in severe burns to those doing the repair and to bystanders.*

- Do not cause heating by welding, or use open flames near the components containing pressurized fluid or other flammable materials.
- Install temporary fire protection to protect the lines and other components of the machine when you perform a welding procedure.

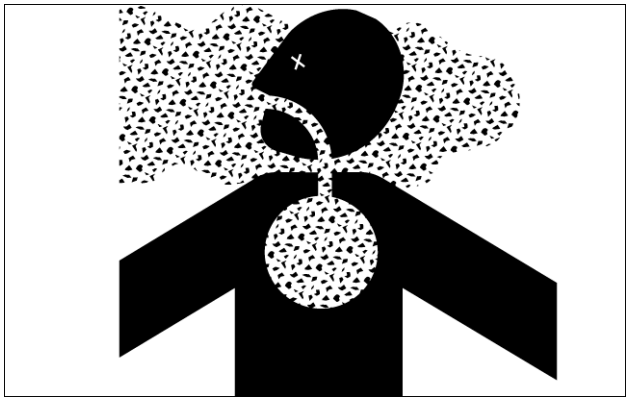
  NOTE: *Pressurized lines can be accidentally cut when the heat goes beyond the area of the flame.*
- Avoid heating lines containing flammable fluids
- Do not weld or torch cut lines that contain flammable fluids.
- Clean the lines to be welded or cut with non-flammable solvents before welding or cutting them.

SP0059 2

Remove the paint before welding or heating

NOTICE: *Hazardous fumes can be generated when the paint is heated by the welding arc or torch flame. If inhaled, these fumes may be harmful to your health.*

- Do not breath in potentially toxic fumes and dust.
- Do all such work outside or in a well-ventilated area.
- Handle and dispose of waste from paints or solvents in accordance with environmental regulations, laws, and government codes.
- Remove the paint from the part to be welded before welding or heating operations.
- When sanding or grinding the paint, avoid breathing in the dust.
- Wear an approved respirator.
- If you use solvent or paint stripper, remove the stripper with soap and water before welding operations.
- Remove solvent or paint stripper containers and other flammable material from area.
- Allow the fumes to disperse for at least **15 min** before welding or heating operations.



SP0060 3

Safety rules - (Machine service)

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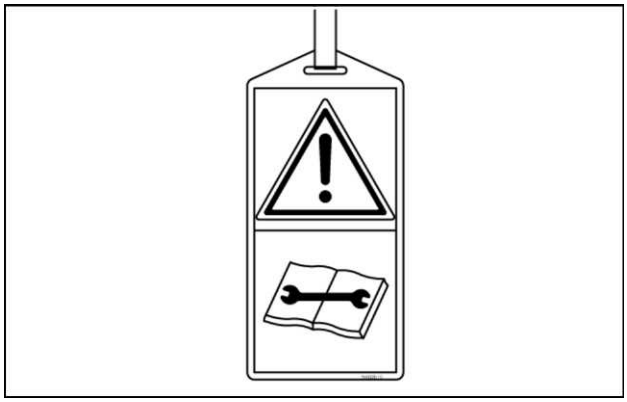
NOTICE: *Carefully read the Operation and Maintenance Manual before you turn on, operate, perform maintenance, fuel, or repair the machine in any way.*

Safe maintenance

- Unexpected machine movement can cause serious injury.
- Place a “Do Not Operate” tag on the ignition key before you start any maintenance procedure on the machine.
- Observe, understand, and follow the instructions on all safety decals on the machine. If you have any questions, see the “Safety Decals” section in this manual.
- Keeps all safety signs and decals clean and legible.

NOTE: *Replace decals that are unreadable, damaged, or missing, as required.*



SP0043 1

- Never allow unauthorized persons without training or knowledge of the machine to perform maintenance tasks.
- Follow all of the recommended maintenance and service procedures.
- Do not leave the operator's seat if the operation requires that the engine remains on. If necessary, call another person to assist you in the verification procedure with the machine in operation.
- Keep all machine components in good condition and installed correctly.
- Immediately repair any fault.
- Replace worn or failed components.
- Remove grease, oil, and accumulated debris.

SP0039 2

Moving parts

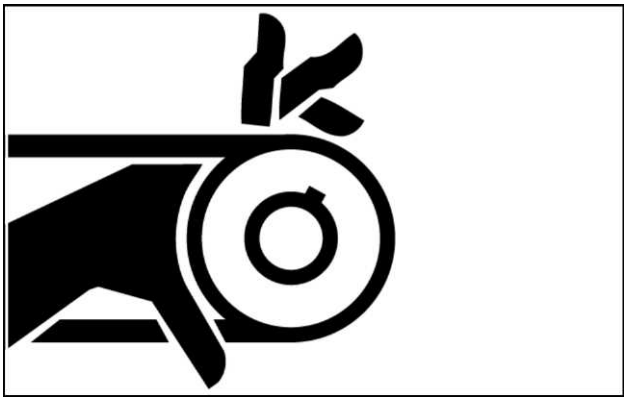
- Keep hands and clothing away from moving parts.
- Do not wear rings, wrist watches, jewellery, loose or hanging garments, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can get caught by movements of rotating components.

SP0041 3

Maintenance with the engine in operation

- Do not perform any maintenance operation with the engine running.
- Contact with moving parts can cause serious injuries.
- Stop the engine and wait for it to cool off prior to performing maintenance operations.

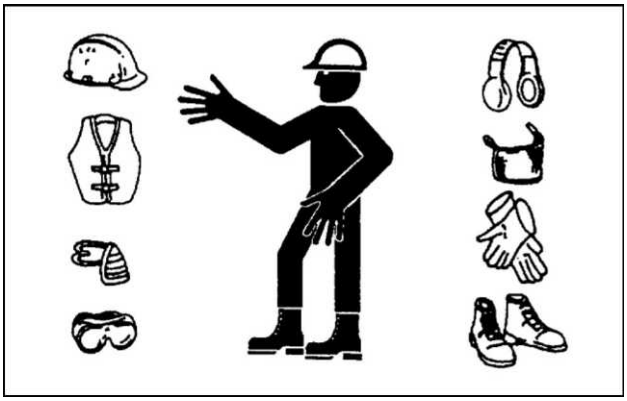
NOTE: *If the engine must be on to make certain adjustments, first place the transmission into neutral. Apply the parking brake. Place the implement in a safe position. Securely block the wheels. Use extreme caution.*



SP0042 4

Protective equipment

- Familiarize yourself with the safety and protection regulations.
- Always wear certified safety equipment such as: hard hat, no-slip footwear, protective gloves (to handle chains and cables), ear protection, protective goggles, reflector vests, and respirators when required.



SP0005 5

Support cradles

- Do not use the control levers or hydraulic hoses as supports.
- The hydraulic hoses and the control levers are movable parts. The hydraulic hoses and the control levers do not provide solid support. Also, the control levers can be moved inadvertently and cause unexpected movement of the machine or its attachments.
- Do not jump on or off the machine. Always maintain at least three points of support between the steps and the handrails.
- Always keep the operator's compartment, steps, handrails and control handles clean and clear of foreign objects, oil, grease, mud or snow to reduce the risk of slipping or stumbling.
- Remove mud or grease from your shoes before entering the cab to operate the machine.

Support, block, and protect the machine properly

SP0040 6

- Do not perform maintenance work on a machine that is not properly supported.
- Always support the implement on the ground before starting the maintenance work.
- If it is necessary to perform maintenance on a machine with the implement raised, make sure to support it firmly.
- Do not support the machine on bricks, boards or other material that could collapse under load.
- Do not perform maintenance work on a machine that is supported solely by a jack.
- Lock the machine components that must be raised for maintenance using appropriate lifting equipment.
- Always lock all moving components or parts of the machine that should be lifted for maintenance purposes using adequate external lifting equipment as required by local regulations.
- Do not allow anyone to pass or remain near or below a raised attachment.

  NOTE: *Never move or stop the bucket above people or a cab of another machine or truck.*

- When the maintenance to be performed requires access to areas that cannot be reached from the ground, use a ladder or scaffolding.
- Workshop maintenance or field scaffolding should be manufactured and maintained in accordance with the safety regulations.

  NOTE: *If a ladder or scaffolding are not available, use the machine handrails and steps.*

- Perform any maintenance work with the greatest care and attention.
- Do not place your head, body, limbs, hands, feet, or fingers near the articulated cutting edges without the necessary protection.
- Securely block the machine or any component that may fall before working on the machine or component. If possible, also use an auxiliary or backup blocking device.

  NOTE: *To prevent unexpected movement, securely block the working elements whenever you service or replace working tool parts such as cutting edges.*

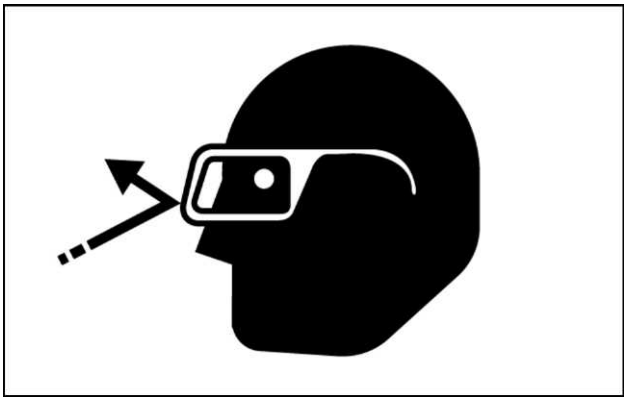
Safe storage of accessories

- Accessories such as buckets, hydraulic brakes and blades stored incorrectly can fall and cause serious injury or death.
- Store accessories and implements safely to prevent falling.
- Keep accessories and implements stored in safe locations without the circulation of people.

SP0054 7

Be careful with any debris that comes off

- Serious injury may occur if your eyes or any other part of the body are struck by flying debris.
- Protect yourself from injury caused by parts or debris that may be thrown; use protective goggles or a face shield.
- Keep people away from the work area before you perform any maintenance on the machine.

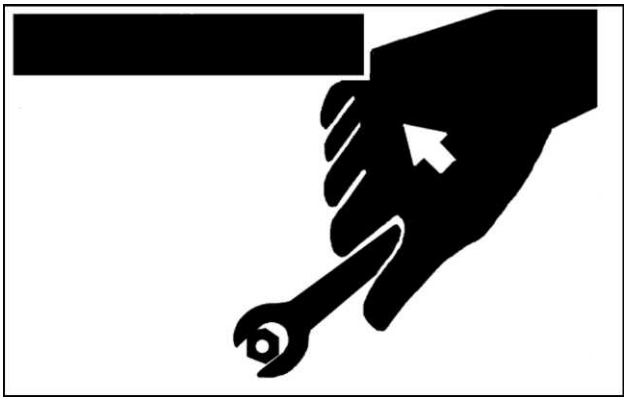


SP0056 8

Use appropriate tools

- Use tools appropriate for the work to be performed.
- Inappropriate tools, parts and procedures may create dangerous conditions.
- Use tools of correct dimensions in the fastening elements.

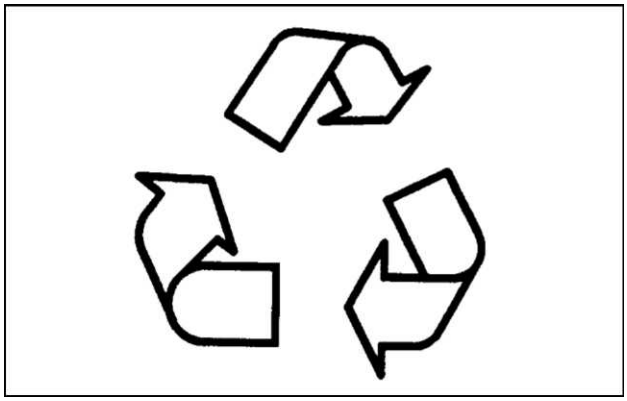
  NOTE: *Avoid injuries caused by an improper wrench.*
- Do not use tools sized in inches with metric bolts and nuts, or vice-versa.
- Only use genuine parts (See the Parts Catalog).



SP0063 9

Dispose of waste correctly

- Disposing of waste improperly represents a danger for the environment.
- Potentially dangerous material used in the machines includes lubricants, fuel, coolant, brake fluid, filters, and batteries.
- Use sealed containers when draining the fluids.
- Do not use containers for food or beverages which may induce ingestion.
- Do not dispose of waste onto the ground, into drains, or in water beds.
- Obtain information about the correct methods to recycle or dispose of waste from local authorities, collection centers or your dealer.
- Keep the maintenance area clean and dry at all times.
- Clean all spills of water, fluid or fuel immediately.
- Do not pile up rags soiled with fluid or grease. This is a fire hazard. Store soiled rags in closed metal containers.
- Rust and corrosion inhibitors are volatile and flammable.
- Prepare parts in well-ventilated areas.
- Keep flames away. Do not smoke.
- Store containers of fluids in cool and well-ventilated areas where they cannot be reached by unauthorized people.



SP0044 10

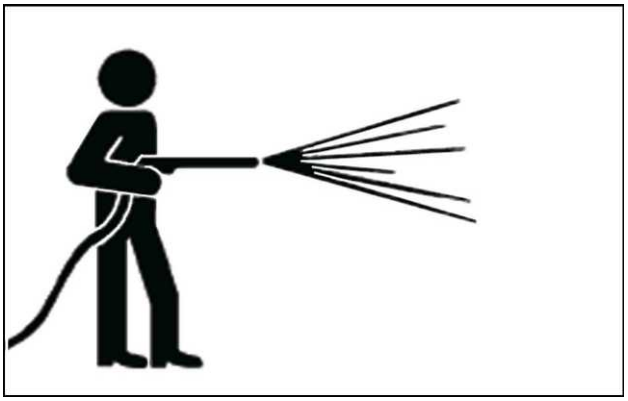
Properly light the work area

- Properly and safely light the working area.
- Use portable safety lights to work inside and under the machine.
- Make sure that the bulb is protected by a cage.
- The incandescent filament of the bulb can accidentally cause a fire if it comes into contact with fuel or oil.

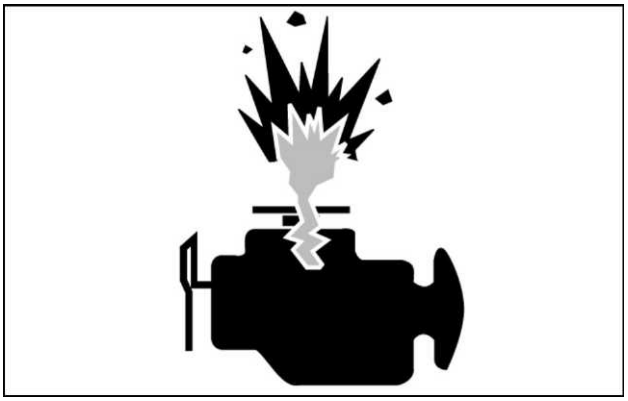
SP0045 11

Keep the machine clean

- Keep the machine clean and free of debris, excess lubricants, and spilled fuel and fluids.
- Do not spray water or steam inside the cab.
- Use approved solvents, detergents and water to clean the machine and its components on a regular basis.
- Keep the engine compartment, air conditioning condenser, radiator, batteries, hydraulic lines, fuel tank, and operator's cab clean.
- After shutting down the engine, the engine compartment temperature can rise rapidly.
- Be careful with possible fires.
- Open the access doors to speed up the engine cooling process and clean the compartment.



SP0053 12



SP0050 13

Battery maintenance precautions

- Disconnect the batteries before you perform any type of service on the electrical system.

  NOTE: *Familiarize yourself with the battery cable disconnection sequence and the disconnection sequence of other electrical and electronic components before you start the service procedure.*

- The sulfuric acid contained in the battery is poisonous. The acid is strong enough to scald the skin, corrode clothes and cause blindness if it comes into contact with the eyes.

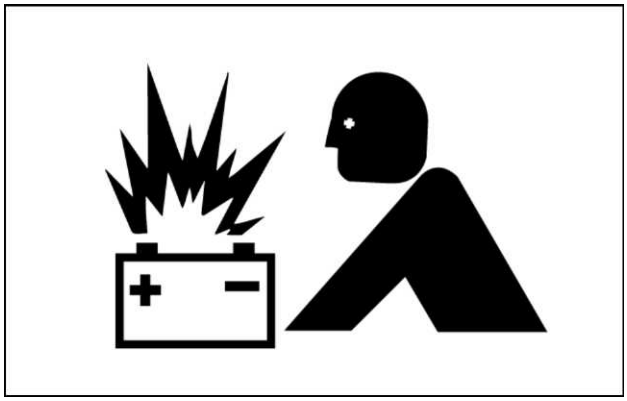
  NOTE: *Wash your eyes with water for* ***15 min*** *in the event of contact. See a doctor immediately.*

- Always top up the battery electrolyte level in ventilated areas.
- Wear eye protections and rubber gloves.
- Avoid breathing the electrolyte vapors when topping up the electrolyte level.
- Avoid spilling or splashing the machine with the electrolyte.
- Use the correct emergency start-up method.
- In case of contact with the acid, thoroughly wash the affected part with water. Place baking soda or clay on the area to help neutralize the acid.

SP0055 14

Avoid a battery explosion

- The gas released by the batteries can be flammable and may explode.
- Keep sparks, matches and flames away from the batteries.
- Never short-circuit the battery terminals to check their charge. Use a voltmeter.
- Do not charge a frozen battery, as it may explode.
- Warm the battery to **16.0 °C** (**60.8 °F**) before you charge the battery.
- Battery electrolyte is poisonous.
- If the battery explodes, the electrolyte can reach the eyes with consequent risk of blindness.
- Be sure to wear eye protection.



SP0052 15

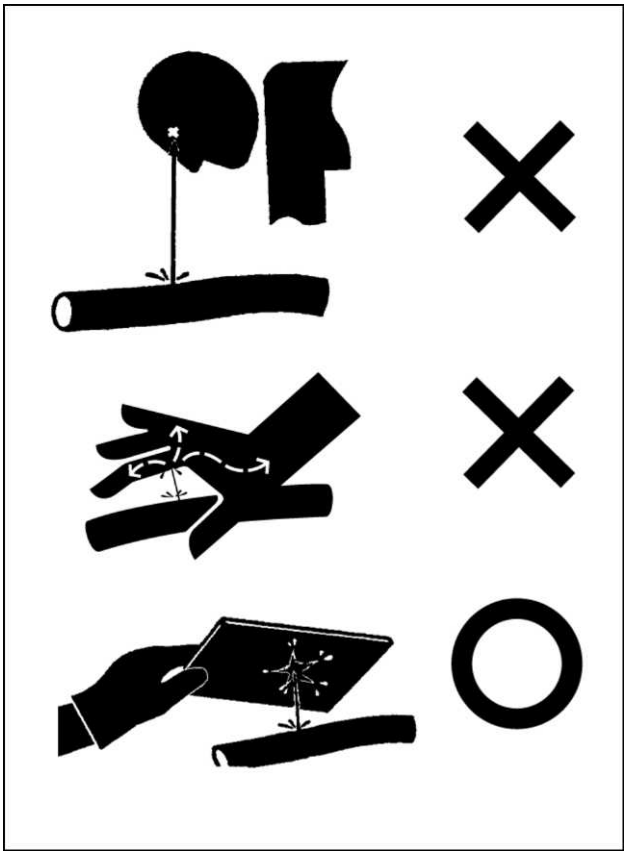
Avoid burns

- After machine operation, the engine coolant is hot and under pressure.
- The engine, radiator, and cooling system lines contain hot water and steam.
- Skin contact with hot water or steam can cause severe burns.
- Avoid possible burns that may be caused by hot water or steam under pressure.
- Do not remove the radiator cap until the engine is cool.
- After the engine has cooled, turn the cap slowly to allow all the pressure to be released. We advise you to wear safety goggles and gloves to perform this operation.
- After the pressure is released, remove the cap completely.
- The hydraulic fluid reservoir is under pressure.
- Be sure to release all pressure before removing the cap.
- Engine oil, reducer oil and hydraulic fluid also become hot during operation.
- Like the engine, the pressure lines and lubrication system components are also heated during machine operation.
- In case of maintenance in any of these components, wait until the system completely cools.
- Wait until all the fluids and components cool before starting any maintenance work.

SP0049 16

Be careful with pressurized fluids

- Fuel or hydraulic fluid under pressure can penetrate the skin or eyes, causing serious injuries, blindness, or death.
- Avoid this hazard by releasing the pressure from the systems before disconnecting the hydraulic or fuel lines.
- Tighten all connections before pressurizing the systems.
- Search for leaks with a piece of cardboard or wood, taking care to protect the hands and body from high pressure fluids.
- Wear a face shield or protective goggles to protect the eyes.
- If an accident occurs, see a doctor immediately.
- Any fluid injected into the skin must be treated quickly to avoid major health problems.
- Never perform repairs on pressurized components until the pressure has been released.
- Use extreme caution when you remove the radiator, the expansion tank or the covers, the drain plugs, the grease fittings, or other pressure components.
- Park the machine and let it cool before opening a pressurized tank.
- Release all pressure before you work on systems with an accumulator.



SP0046 17

- Hydraulic fluid or diesel fuel that leaks under pressure can penetrate the skin and cause infection or other injuries.

  NOTE: *To prevent personal injury, relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system.*

- Before applying pressure, make certain all connections are tight and components are in good condition.
- Use a piece of cardboard, newspaper, or wood to check for any pressurized leaks to prevent fluid penetrating the skin.
- Unexpected movement of the machine could occur.

Torque - Standard torque data for hydraulic connections

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

General information

- Hydraulic connections require a minimum assembly torque in order to provide zero leakage at rated pressure with adequate fatigue resistance. Over-torquing of a hydraulic connection can also lead to leakage or failure. For some connections, NEW HOLLAND CONSTRUCTION requires a different torque value than is listed in the ISO and SAE standards.
- The torque values in this document should be used whenever possible or applicable.

  NOTICE: *Always follow the instructions in this manual for specific torque values when you service components. The information in this section is for general guidance only when a procedure contains no specific torque value.*

Tolerance

- The tolerance for all torque values is ± **10%**. This tolerance must include all assembly variation, not only the torque wrench repeatability.

Lubrication

Application of grease or other lubricants to hydraulic connectors should be avoided. If clean hydraulic oil is already on the connection, it is not required to remove the oil. Generally, application of grease:

- May cause a significant change in the torque required to properly tighten the connection.
- May reduce the connection's resistance to vibration.
- Excessive grease may displace an elastomer seal during tightening.
- Grease extrusion when connection is tightened may be mistaken for leakage.

NEW HOLLAND CONSTRUCTION products generally use O-Ring Boss (ORB) connectors that have Teflon™-coated O-rings, eliminating the need for O-ring lubrication during installation. For connections which are made into aluminum manifolds or with stainless steel connectors, it may be required to apply a lubricant to prevent galling.

Use of **LOCTITE®** and other thread-locking compounds is prohibited. These compounds:

- May cause a significant change in the torque required to properly tighten the connections.
- Reduce the serviceability of the joint.
- May prevent the O-ring from properly sealing if the compound gets on the O-ring.

Torque values for metric O-Ring Boss (ORB) port connections

	S-Series *		L-Series **	
Metric thread	**Ferrous N·m (lb ft) ± 10%**	**Non-Ferrous N·m (lb ft) ± 10%**	**Ferrous N·m (lb ft) ± 10%**	**Non-Ferrous N·m (lb ft) ± 10%**
M8 x 1	10.5 (7.7)	6.3 (4.6)	8.5 (6.3)	5 (3.7)
M10 x 1	21 (15.5)	12.5 (9.2)	15.5 (11.4)	9.3 (6.9)
M12 x 1.5	37 (27.3)	22 (16.2)	27 (19.9)	16 (11.8)
M14 x 1.5	47 (34.7)	28 (20.7)	37 (27.3)	22 (16.2)
M16 x 1.5	58 (42.8)	35 (25.8)	42 (31)	25 (18.4)
M18 x 1.5	74 (54.6)	44 (32.5)	47 (34.7)	28 (20.7)
M22 x 1.5	105 (77.4)	63 (46.5)	63 (46.5)	38 (28)
M27 x 2	178 (131.3)	107 (78.9)	105 (77.4)	63 (46.5)
M30 x 2	225 (166)	135 (99.6)	136 (100.3)	82 (60.5)
M33 x 2	325 (239.7)	195 (143.8)	168 (123.9)	101 (74.5)
M42 x 2	345 (254.5)	207 (152.7)	220 (162.3)	132 (97.4)
M48 x 2	440 (324.5)	264 (194.7)	273 (201.4)	164 (121)
M60 x 2	525 (387.2)	315 (232.3)	330 (243.4)	198 (146)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for metric O-Ring Boss (ORB) port plugs

	Ferrous		Non-ferrous
Metric thread	**Internal hex N·m (lb ft) ± 10%**	**External hex N·m (lb ft) ± 10%**	**N·m (lb ft) ± 10%**
M8 x 1	8.5 (6.3)	10.5 (7.7)	6.3 (4.6)
M10 x 1	16 (11.8)	21 (15.5)	12.5 (9.2)
M12 x 1.5	23 (17)	37 (27.3)	22 (16.2)
M14 x 1.5	47 (34.7)	47 (34.7)	28 (20.7)
M16 x 1.5	58 (42.8)	58 (42.8)	35 (25.8)
M18 x 1.5	74 (54.6)	74 (54.6)	44 (32.5)
M22 x 1.5	105 (77.4)	105 (77.4)	63 (46.5)
M27 x 2	178 (131.3)	178 (131.3)	107 (78.9)
M30 x 2	225 (166)	225 (166)	135 (99.6)
M33 x 2	325 (239.7)	325 (239.7)	195 (143.8)
M42 x 2	345 (254.5)	345 (254.5)	207 (152.7)
M48 x 2	440 (324.5)	440 (324.5)	264 (194.7)
M60 x 2	525 (387.2)	525 (387.2)	315 (232.3)

Torque values for port connections (British Standard Pipe Parallel (BSPP) thread ports and stud ends)

	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
BSPP thread G- Gas; A- medium coarse threads	**S-Series ***	**L-Series ****	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**
G 1/8 A	–	6 (0.236)	–	21 (15.5)	–	12.5 (9.2)
G 1/4 A	6 (0.236) or 8 (0.315)	8 (0.315) or 10 (0.394)	63 (46.5)	53 (39.1)	38 (28)	32 (23.6)
G 3/8 A	10 (0.394) or 12 (0.472)	12 (0.472)	95 (70.1)	84 (62)	57 (42)	50 (36.9)
G 1/2 A	16 (0.630)	15 (0.591) or 18 (0.709)	136 (100.3)	105 (77.4)	82 (60.5)	63 (46.5)
G 3/4 A	20 (0.787)	22 (0.866)	210 (154.9)	210 (154.9)	126 (92.9)	126 (92.9)
G 1 A	25 (0.984)	28 (1.102)	400 (295)	400 (295)	240 (177)	240 (177)
G 1 1/4 A	30 (1.181)	35 (1.378)	525 (387.2)	525 (387.2)	315 (232.3)	315 (232.3)
G 1 1/2 A	38 (1.496)	42 (1.654)	660 (486.8)	660 (486.8)	396 (292.1)	396 (292.1)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for metric port connections (Metric face-seal ports and stud ends)

	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
Metric thread	**S-Series ***	**L-Series ****	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**	**S-Series N·m (lb ft) ± 10%**	**L-Series N·m (lb ft) ± 10%**
M10 x 1	–	4 (0.157)	–	21 (15.5)	–	12.5 (9.2)
M12 x 1.5	4 (0.157)	6 (0.236)	47 (34.7)	32 (23.6)	28 (20.7)	19 (14)
M14 x 1.5	5 (0.197)	7 (0.276)	63 (46.5)	53 (39.1)	38 (28)	32 (23.6)
M16 x 1.5	7 (0.276)	9 (0.354)	84 (62)	63 (46.5)	50 (36.9)	38 (28)
M18 x 1.5	8 (0.315)	11 (0.433)	105 (77.4)	84 (62)	63 (46.5)	50 (36.9)
M20 x 1.5	10 (0.394)	–	147 (108.4)	–	88 (64.9)	–
M22 x 1.5	12 (0.472)	14 (0.551)	158 (116.5)	147 (108.4)	95 (70.1)	88 (64.9)
M26 x 1.5	–	18 (0.709)	–	210 (154.9)	–	126 (92.9)
M27 x 1.2	16 (0.630)	–	210 (154.9)		126 (92.9)	–
M33 x 2	20 (0.787)	23 (0.906)	400 (295)	400 (295)	240 (177)	240 (177)
M42 x 2	25 (0.984)	30 (1.181)	525 (387.2)	525 (387.2)	315 (232.3)	315 (232.3)
M48 x 2	32 (1.260)	36 (1.417)	630 (464.7)	630 (464.7)	396 (292.1)	396 (292.1)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for Inch O-Ring Boss (ORB) port non-adjustable connections

			S-Series *		L-Series **	
SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%
2	5/16-24	3.18 (0.125)	–	–	8.5 (6.3)	5 (3.7)
3	3/8-24	4.76 (0.187)	15.5 (11.4)	9.3 (6.9)	10.5 (7.7)	6.3 (4.6)
4	7/16-20	6.35 (0.250)	37 (27.3)	22 (16.2)	19 (14)	11.5 (8.5)
5	1/2-20	7.94 (0.313)	42 (31)	25 (18.4)	26 (19.2)	15.5 (11.4)
6	9/16-18	9.52 (0.375)	47 (34.7)	28 (20.7)	32 (23.6)	19 (14)
8	3/4-16	12.7 (0.500)	89 (65.6)	53 (39.1)	53 (39.1)	32 (23.6)
10	7/8-14	15.88 (0.625)	121 (89.2)	73 (53.8)	63 (46.5)	38 (28)
12	1-1/16-12	19.05 (0.750)	178 (131.3)	107 (78.9)	100 (73.8)	60 (44.3)
14	1-3/16-12	22.22 (0.875)	225 (166)	135 (99.6)	131 (96.6)	79 (58.3)
16	1-5/16-12	25.4 (1.000)	283 (208.7)	170 (125.4)	156 (115.1)	94 (69.3)
20	1-5/8-12	31.75 (1.250)	300 (221.3)	180 (132.8)	210 (154.9)	126 (92.9)
24	1-7/8-12	38.1 (1.500)	388 (286.2)	233 (171.9)	220 (162.3)	132 (97.4)
32	2-1/2-12	50.8 (2.000)	388 (286.2)	233 (171.9)	315 (232.3)	189 (139.4)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for inch O-Ring Boss (ORB) port adjustable connections

			S-Series *		L-Series **	
SAE dash size	UN/UNF thread size	Inch tube OD mm (in)	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%	Ferrous N·m (lb ft) ± 10%	Non-Ferrous N·m (lb ft) ± 10%
2	5/16-24	3.18 (0.125)	–	–	8.5 (6.3)	5 (3.7)
3	3/8-24	4.76 (0.187)	10.5 (7.7)	9.3 (6.9)	10.5 (7.7)	6.3 (4.6)
4	7/16-20	6.35 (0.250)	21 (15.5)	21 (15.5)	19 (14)	11.5 (8.5)
5	1/2-20	7.94 (0.313)	42 (31)	25 (18.4)	26 (19.2)	15.5 (11.4)
6	9/16-18	9.52 (0.375)	47 (34.7)	28 (20.7)	32 (23.6)	19 (14)
8	3/4-16	12.7 (0.500)	89 (65.6)	53 (39.1)	53 (39.1)	32 (23.6)
10	7/8-14	15.88 (0.625)	121 (89.2)	73 (53.8)	63 (46.5)	38 (28)
12	1-1/16-12	19.05 (0.750)	178 (131.3)	107 (78.9)	100 (73.8)	60 (44.3)
14	1-3/16-12	22.22 (0.875)	225 (166)	135 (99.6)	131 (96.6)	79 (58.3)
16	1-5/16-12	25.4 (1.000)	285 (210.2)	170 (125.4)	156 (115.1)	94 (69.3)
20	1-5/8-12	31.75 (1.250)	300 (221.3)	180 (132.8)	210 (154.9)	126 (92.9)
24	1-7/8-12	38.1 (1.500)	388 (286.2)	233 (171.9)	220 (162.3)	132 (97.4)
32	2-1/2-12	50.8 (2.000)	388 (286.2)	233 (171.9)	315 (232.3)	189 (139.4)

* S-Series connectors are used with O-Ring Face Seals (ORFS).

** L-Series connectors are used with **37°** flare.

Torque values for inch O-Ring Boss (ORB) port plugs

		Ferrous		Non-Ferrous
SAE dash size	UN/UNF thread size	Internal hex N·m (lb ft) ± 10%	External hex N·m (lb ft) ± 10%	N·m (lb ft) ± 10%
2	5/16-24	7.5 (5.5)	12.5 (9.2)	7.5 (5.5)
3	3/8-24	14.5 (10.7)	21 (15.5)	12.5 (9.2)
4	7/16-20	21 (15.5)	37 (27.3)	22 (16.2)
5	1/2-20	28 (20.7)	42 (31)	25 (18.4)
6	9/16-18	47 (34.7)	47 (34.7)	28 (20.7)
8	3/4-16	89 (65.6)	89 (65.6)	53 (39.1)
10	7/8-14	116 (85.6)	116 (85.6)	70 (51.6)
12	1-1/16-12	176 (129.8)	176 (129.8)	106 (78.2)
14	1-3/16-12	247 (182.2)	247 (182.2)	148 (109.2)
16	1-5/16-12	284 (209.5)	284 (209.5)	170 (125.4)
20	1-5/8-12	357 (263.3)	357 (263.3)	214 (157.8)
24	1-7/8-12	441 (325.3)	441 (325.3)	265 (195.5)
32	2-1/2-12	536 (395.3)	536 (395.3)	322 (237.5)

Torque values for four-bolt flange connections (Metric Screws, Class 10.9)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	M8 x 1.25	34 (25.1)	M8 x 1.25	34 (25.1)
19	3/4	M10 x 1.5	74 (54.6)	M10 x 1.5	74 (54.6)
25	1	M10 x 1.5	74 (54.6)	M12 x 1.75	137 (101)
32	1-1/4	M10 x 1.5	74 (54.6)	M12 x 1.75	137 (101)
				M14 x 1.5	189 (139.4)
38	1-1/2	M12 x 1.75	137 (101)	M16 x 2	310 (228.6)
51	2	M12 x 1.75	137 (101)	M20 x 2.5	575 (424.1)
64	2-1/2	M12 x 1.75	137 (101)	M24 x 3	575 (424.1)
76	3	M16 x 2	310 (228.6)	M30 x 3.5	680 (501.5)
89	3-1/2	M16 x 2	310 (228.6)	–	–
102	4	M16 x 2	310 (228.6)	–	–
127	5	M16 x 2	310 (228.6)	–	–

Torque values for four-bolt flange connections (Metric Screws, Class 8.8)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	M8 x 1.25	29 (21.4)	M8 x 1.25	29 (21.4)
19	3/4	M10 x 1.5	57(42)	M10 x 1.5	57(42)
25	1	M10 x 1.5	57(42)	M12 x 1.75	100 (73.8)
32	1-1/4	M10 x 1.5	57(42)	M12 x 1.75	100 (73.8)
				M14 x 1.5	160 (118)
38	1-1/2	M12 x 1.75	100 (73.8)	M16 x 2	250 (184.4)
51	2	M12 x 1.75	100 (73.8)	M20 x 2.5	500 (368.8)
64	2-1/2	M12 x 1.75	100 (73.8)	M24 x 3	575 (424.1)
76	3	M16 x 2	250 (184.4)	M30 x 3.5	680 (501.5)
89	3-1/2	M16 x 2	250 (184.4)	–	–
102	4	M16 x 2	250 (184.4)	–	–
127	5	M16 x 2	250 (184.4)	–	–

Torque values for four-bolt flange connections (Inch Screws, Grade 8)

Metric size mm	Imperial size in	Screw code 61	Code 61 N·m (lb ft) ± 10%	Screw code 62	Code 62 N·m (lb ft) ± 10%
13	1/2	5/16-18	34 (25.1)	5/16-18	34 (25.1)
19	3/4	3/8-16	63 (46.5)	3/8-16	63 (46.5)
25	1	3/8-16	63 (46.5)	7/16-14	97 (71.5)
32	1-1/4	7/16-14	97 (71.5)	1/2-13	158 (116.5)
38	1-1/2	1/2-13	158 (116.5)	5/8-11	310 (228.6)
51	2	1/2-13	158 (116.5)	3/4-10	473 (348.9)
64	2-1/2	1/2-13	158 (116.5)	–	–
76	3	5/8-11	310 (228.6)	–	–
89	3-1/2	5/8-11	310 (228.6)	–	–
102	4	5/8-11	310 (228.6)	–	–
127	5	5/8-11	310 (228.6)	–	–

Tapered thread connection tightening

British Standard Pipe Taper (BSPT) thread size (inch)	National Pipe Thread Fuel (NPTF) thread size (inch)	Turns from finger tight
1/8-28	1/8-27	2 - 3
1/4-19	1/4-18	2 - 3
3/8-19	3/8-18	2 - 3
1/2-14	1/2-14	2 - 3
3/4-14	3/4-14	2 - 3
1-11	1-11 1/2	1.5 - 2.5
1-1/4-11	1-1/4-11 1/2	1.5 - 2.5
1-1/2-11	1-1/2-11 1/2	1.5 - 2.5
2-11	2-11 1/2	1.5 - 2.5

Torque values for banjo bolt connections (Copper washer style)

Bolt thread (metric)	Hex size (mm)	Torque N·m (lb ft) ± 10%
M8 x 1.25	13	13 (9.6)
M10 x 1.25	17	16 (11.8)
M12 x 1.5	17	40 (29.5)
M14 x 1.5	19	45 (33.2)
M16 x 1.5	22	48 (35.4)
M18 x 1.5	24	50 (36.9)
M20 x 1.5	27	73 (53.8)
M22 x 1.5	32	73 (53.8)
M24 x 1.5	32	73 (53.8)

Torque values for O-Ring Face Seals (ORFS) connections

SAE dash size	UN/UNF thread size	Inch tube OD (mm)	Metric tube OD (mm)	Hex size (mm) (Reference only)	* Swivel nut torque N·m (lb ft) ± 10%	** Swivel nut torque N·m (lb ft) ± 10%
4	9/16-18	6.35	6	17	27 (19.9)	27 (19.9)
5	5/8-18	7.94	8	19	34 (25.1)	34 (25.1)
6	11/16-16	9.52	10	22	44 (32.5)	44 (32.5)
8	13/16-16	12.7	12	24	65 (47.9)	65 (47.9)
10	1-14	15.88	16	30	100 (73.8)	100 (73.8)
12	1-3/16-12	19.05	20	36	150 (110.6)	131 (96.6)
14	1-5/16-12	22.23	22	41	163 (120.2)	131 (96.6)
16	1-7/16-12	25.4	25	41	210 (154.9) ***	131 (96.9)
20	1-11/16-12	31.75	30	50	280 (206.5) ***	178 (131.3)
24	2-12	38.1	38	60	375 (276.6) ***	210 (154.9)

* High/Medium-pressure applications > **50 bar** (**725 psi**).

** Low-pressure applications < **50 bar** (**725 psi**).

*** It is recommended to use a four-bolt flange connection instead of O-Ring Face Seals (ORFS) sizes "16" and up.

Torque values for 37° flare connections - Joint Industry Council (JIC)

SAE dash size	UN/UNF thread size	Metric tube OD (mm)	Inch tube OD (mm)	Swivel nut torque N·m (lb ft) ± 10%
2	5/16-24	–	3.18	8.25 (6.1)
3	3/8-24	–	4.76	11.5 (8.5)
4	7/16-20	6	6.35	15.5 (11.4)
5	1/2-20	8	7.94	20 (14.8)
6	9/16-18	10	9.52	25 (18.4)
8	3/4-16	12	12.7	52 (38.4)
10	7/8-14	16	15.88	81 (59.7)
12	1-1/16-12	20	19.05	112 (82.6)
14	1-3/16-12	–	22.22	133 (98.1)
16	1-5/16-12	25	25.4	155 (114.3)
20	1-5/8-12	30/32	31.75	180 (132.8)
24	1-7/8-12	38	38.1	225 (166)
32	2-1/2-12	50	50.8	348 (256.7)

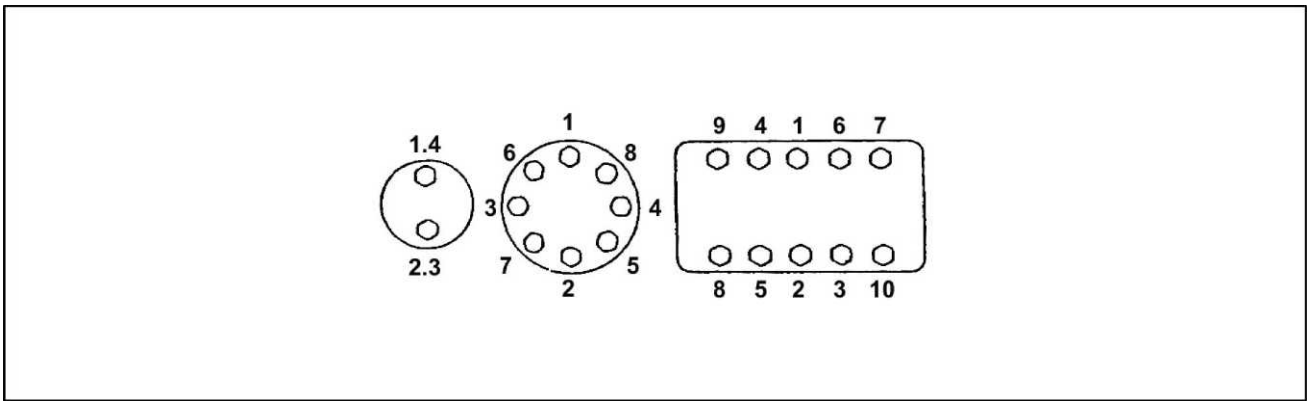
Torque values for 30° flare, 60° cone connections

Nominal size (mm)	British Standard Pipe Parallel (BSPP) thread size	Hex size (mm)	Swivel nut torque N·m (lb ft) ± 10%
5, 6, 6.3	G 1/4	17	25 (18.4)
8, 9, 10	G 3/8	19	34 (25.1)
12, 12.5	G 1/2	22	64 (47.2)
15, 16, 19	G 3/4	30	132 (97.4)
25	G 1	36	196 (144.6)
31.5, 32	G 1-1/4	46	225 (166)
38	G 1-1/2	50	255 (188.1)
50, 51	G 2	65	316 (223.1)

Torque - Bolt and nut

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

- 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 adjustments)

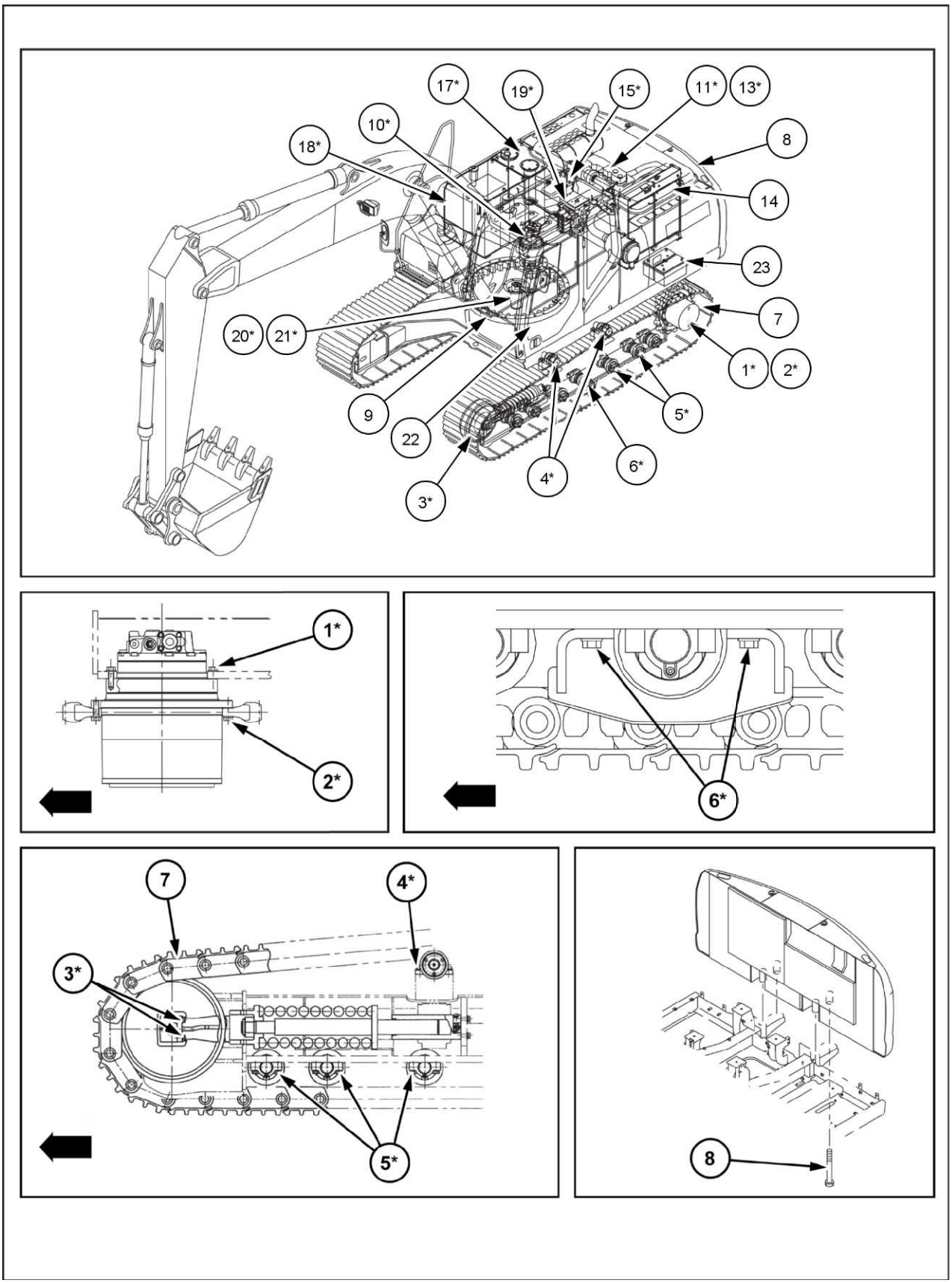
E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

Torque specifications per component

Item	Component	Bolt (Ø)	Wrench	Torque setting
1*	Travel reducer	**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*	Tensioner wheel	M16	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
4*	Top roller	M16	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
5*	Lower roller	M16	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
6*	Track guide	**M16**	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
7	Track shoe	**M16**	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
8	Counterweight	**M27**	**41 mm**	**1078 – 1274 N·m (795.09 – 939.65 lb ft)**
9*	Swing bearing (Lower and upper frame)	**M16**	**24 mm**	**280 – 312 N·m (206.52 – 230.12 lb ft)**
10*	Swing motor reducer	**M16**	**24 mm**	**280 – 312 N·m (206.52 – 230.12 lb ft)**
11*	Motor	**M16**	**24 mm**	**264.9 – 313.9 N·m (195.38 – 231.52 lb ft)**
13*	Motor (Rear cradle)	**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 (Hex head bolt)	**M16**	**14 mm**	**223 – 247 N·m (164.48 – 182.18 lb ft)**
17*	Hydraulic Reservoir	**M16**	**24 mm**	**232.4 – 276 N·m (171.41 – 203.57 lb ft)**
18*	Fuel reservoir	**M16**	**24 mm**	**232.4 – 276 N·m (171.41 – 203.57 lb ft)**
19*	Control valve	**M16**	**24 mm**	**267 – 312 N·m (196.93 – 230.12 lb ft)**
20*	Hydraulic manifold (Locking bar)	**M12**	**19 mm**	**88.3 – 107 N·m (65.13 – 78.92 lb ft)**
21*	Hydraulic manifold (Union)	**M12**	**19 mm**	**109 – 127 N·m (80.39 – 93.67 lb ft)**
22	Cab	**M16**	**24 mm**	**149 – 173 N·m (109.90 – 127.60 lb ft)**
23	Batteries	**M16**	**17 mm**	**19.6 – 29.4 N·m (14.46 – 21.68 lb ft)**

NOTE: *Use* ***LOCTITE® 262™****, or the equivalent, on bolts marked (*).*

NOTE: *The torque in kgf.m is determined with* ***9.8 N·m*** *(****7.2 lb ft****).*



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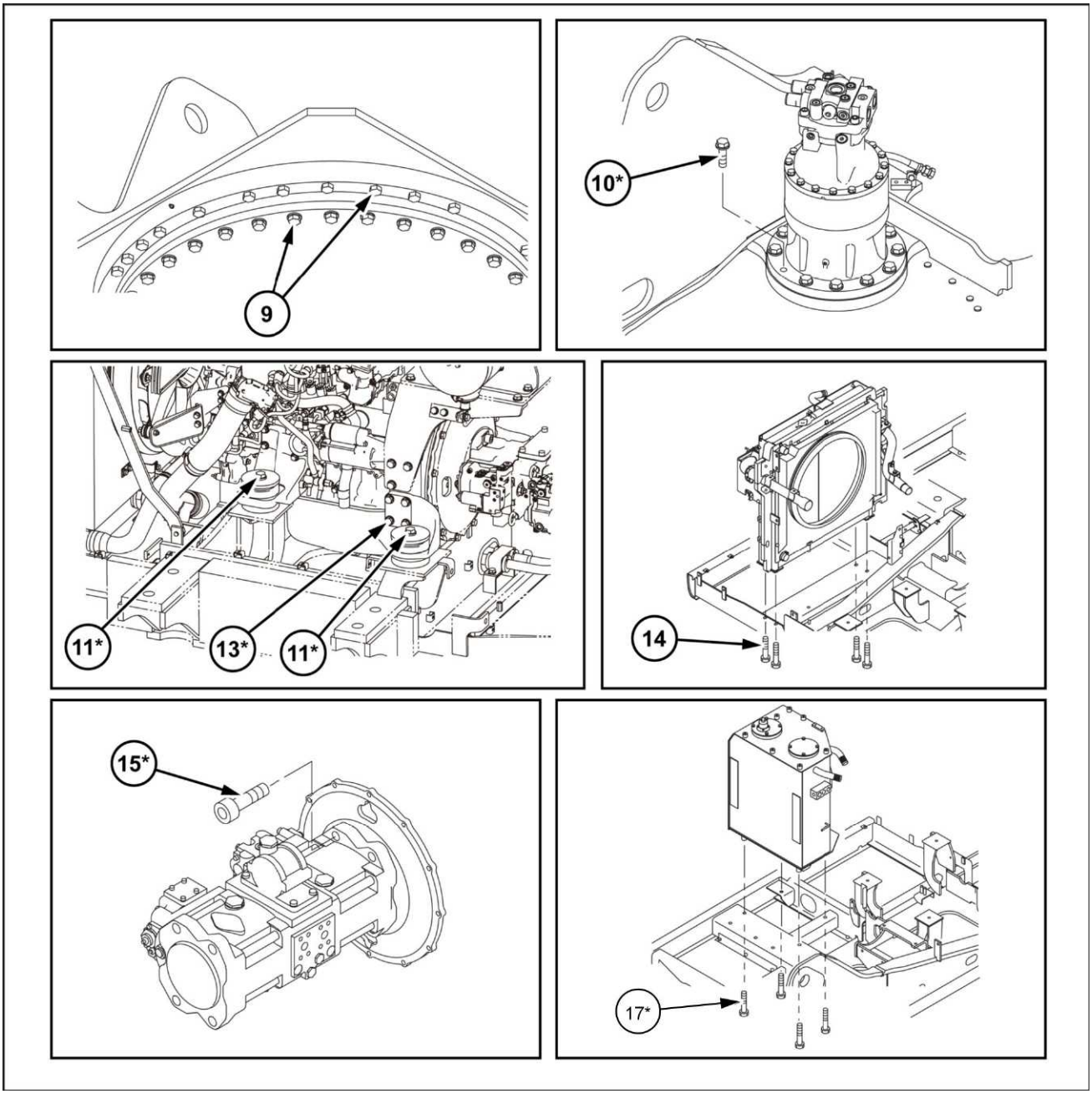

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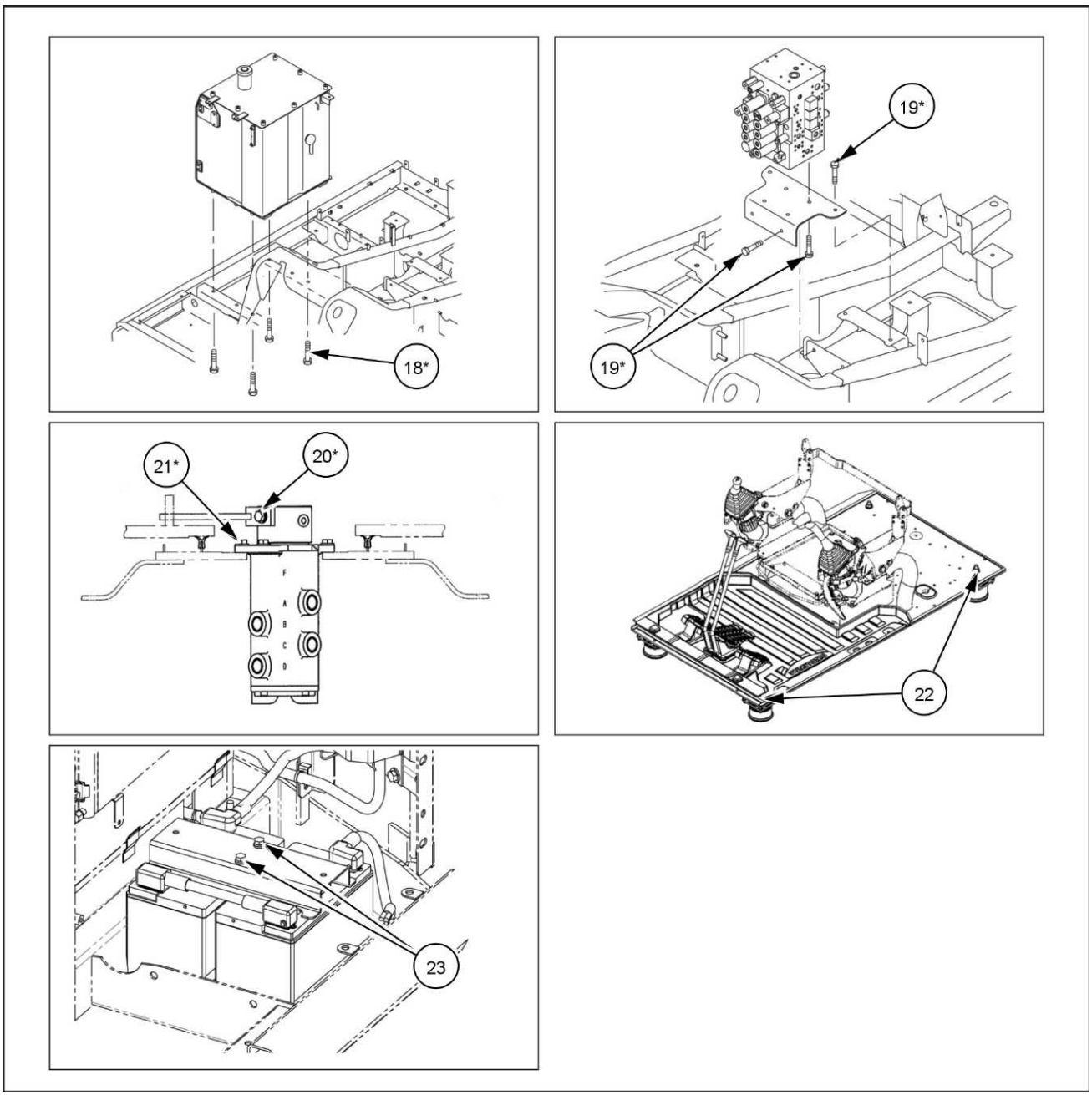

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Basic instructions - Shop and assembly

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

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 NEW HOLLAND 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 NEW HOLLAND 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.

W0111A

Special tools

The special tools that NEW HOLLAND CONSTRUCTION suggests and illustrate in this manual have been specifically researched and designed for use with NEW HOLLAND 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

Basic instructions (Daily inspection)

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

Every day, before starting work, it is necessary to inspect the machine and service certain of its components.

Overall

- Check for water or oil leaks.
- Check that all screws and nuts are correctly tightened.
- Wipe off any dust and clean off any accumulated debris (engine, operator's compartment, etc.).
- Check the tension and wear of the tracks.
- Check for damage.

Motor

- Check the oil level, and change the oil, if necessary.
- Check the level of coolant liquid.
- Check for clogging or damage to the radiator.
- Check the condition of the engine belts.
- Check whether the air filter restriction warning light is lit up on the instrument cluster.
- Check for water or oil leaks on the components.
- Check the condition of all fuel lines.
- Check the fuel level.

Others

- Check the hydraulic fluid level.
- Check that the hydraulic fluid is clean.
- Check the condition of all hydraulic lines.
- Check for electrical short-circuits.
- Check that all battery connections are properly tightened.
- Adjust the rear view mirrors.
- Check for fluid leaks in the cylinders.
- Check the condition of the implements.

After Starting the Engine

- Did the engine start correctly? Is the exhaust smoke normal? Any unusual noises?
- Check for abnormal noise on the hydraulic components.
- Check for water, fuel, or oil leaks on the components.
- Check the audible alarm devices, working lights and windshield wipers.
- Check that all hydraulic circuits are functioning correctly.

General specification

E145C EVO LC version, Tier 3 engine, with blade, Made in Brazil	LA
E145C EVO LC version, Tier 3 engine, Made in Brazil	LA

Motor

Type	Diesel fuel, 4-stroke, water-cooled, 4 cylinders in line, “Common Rail”, high-pressure injection with electronic control, turbocharger and air aftercooler
Manufacturer and Model	ISUZU GJ-4JJ1X
Injection system	Electronic
Number of Cylinders	4
Cylinder bore and stroke	**95.4 mm** (**3.8 in**)X **104.9 mm** (**4.1 in**)
Volumetric displacement	**2999.0 cm³** (**183.0 in³**)
Compression ratio	17.5:1
Maximum Power	
Gross (ISO 14396)	**73.0 kW** (**99.3 Hp**)@ **2000 RPM**
Net (SAE J1349, ISO 9249)	**70.9 kW** (**96.4 Hp**)@ **2000 RPM**
Engine speed	
SP Mode – No load	**1950 ± 10 RPM**
H mode – No load	**1800 ± 10 RPM**
A mode – No load	**1650 ± 10 RPM**
Idle speed – No load	**1050 ± 10 RPM**
SP Mode – With load	**2000 ± 10 RPM**
H mode – With load	**1850 ± 10 RPM**
A mode – With load	**1700 ± 10 RPM**
Idle speed – With load	**1050 ± 10 RPM**
Maximum torque	
Gross (ISO 14396)	**346.0 N·m** (**255.2 lb ft**)@ **1600 RPM**
Net (SAE J1349, ISO 9249)	**340.0 N·m** (**250.8 lb ft**)@ **1600 RPM**
Electrical system voltage	**24 V**
Alternator	**50 A**
Starting Motor	**24 V**, **4 kW**

Hydraulic System

Main pumps

Type	Two variable displacement axial piston pumps with regulating system
Maximum flow rate	2 X **129 L/min** (**34.078 US gpm**) @ **2000 RPM**
Working pressure	
Boom / Arm / Bucket	**34.3 MPa** (**4975.2 psi**)
Boom / Arm / Bucket (with Auto Power up)	**36.3 MPa** (**5265.3 psi**)
Swing circuit	**27.9 MPa** (**4046.9 psi**)
Travel circuit	**34.3 MPa** (**4975.2 psi**)
Set pressures	
Main relief valve (STD)	**35.1 ± 1.5 MPa**
Main relief valve (2-stages)	**37.2 ± 1.5 MPa**
2nd option	**20.6 ± 1.5 MPa**
Breaker 1 – Pump (P1)	**34.3 ± 1.5 MPa**
Breaker 1 – Pump (P2)	Less than **4.7 MPa**
Breaker 2 – Pump (P1, P2)	**34.3 ± 1.5 MPa**
Breaker – Relief solenoid (P1)	**– MPa**
Breaker – Relief solenoid (P2)	**– MPa**
Nibbler	**34.3 ± 1.5 MPa**
Nibbler (Multi)	**20.6 ± 2.5 MPa**
Nibbler – Relief solenoid (P1)	**– MPa**
Pump proportional valve	
Electrical current, with load (relief for 2 pumps)	
SP Mode – No load	**571 ± 20 mA**
H mode – No load	**530 ± 20 mA**
A mode – No load	**470 ± 20 mA**
SP Mode – With load	**600 ± 20 mA**
H mode – With load	**590 ± 20 mA**
A mode – With load	**530 ± 20 mA**
Function speeds	
Boom lift (Bucket open)	**3.1 ± 0.3 s**
Bucket lowering	**2.4 ± 0.4 s**
Arm out	**2.4 ± 0.3 s**
Arm close	**2.8 ± 0.3 s**
Bucket opening	**2.0 ± 0.3 s**
Bucket close	**2.3 ± 0.3 s**
Blade lift (Dozer)	**3.9 ± 0.5 s**
Blade lowering (Dozer)	**5.0 ± 0.8 s**
Equipment movement without load for 10 minutes (Drift)	
Boom Cylinder	Less than **4.0 mm**
Arm cylinder	Less than **8.0 mm**
Bucket cylinder	Less than **10.0 mm**
Blade cylinder	Less than **10.0 mm**
Equipment movement	Less than **150.0 mm**

Pilot pump

Type	One fixed displacement gear pump
Maximum flow rate	**20.0 L/min** (**5.283 US gpm**)
Working pressure	**3.9 MPa** (**565.7 psi**)

Control valves

Type	With load check valve for boom and arm
	One 4-spool valve for travel right, bucket, boom and arm throttle
	One 5-spool valve for travel left, auxiliary, swing, boom and arm throttle

Slew system

Swing motor	One hydraulic fixed displacement axial piston motor
Brake	Mechanical, disk
Final reducer	Planetary reducer
Swing bearing	Ball bearing with inner ring gear
Swing speed	**14.3 ± 0.7 RPM**
Travel in the swing (Drift)	**4.2 ± 0.2 seg/rev**
With no load, **180°** swing in minimum radius	Less than **45°**
Maximum swing torque	**33000 N·m** (**24339.5 lb ft**)

Cylinders

	No. of cylinders – Diameter x Rod Diameter x Stroke
Boom	2 x Ø **105 mm** (**4.134 in**) (diameter) x Ø **70 mm** (**2.756 in**) (rod) x **961 mm** (**37.835 in**) (length)
Arm	1 x Ø **115 mm** (**4.528 in**) (diameter) x Ø **80 mm** (**3.150 in**) (rod) x **1108 mm** (**43.622 in**) (length)
Bucket	1 x Ø **95 mm** (**3.740 in**) (diameter) x Ø **65 mm** (**2.559 in**) (rod) x **881 mm** (**34.685 in**) (length)

Cooling system

Fan	Ø **550 mm** (**21.654 in**) with eight blades
Radiator capacity	**73.9 kW**
Fin type	Corrugated fin (wave type)
Fin pitch	**1.75 mm** (**0.069 in**)
Coolant	**55%** ethylene-glycol-based liquid, **45%** water
Oil heat exchanger capacity	**43.4 kW**
Fin type	Corrugated fin (wave type)
Fin pitch	**1.75 mm** (**0.069 in**)
Air cooler capacity	**11.3 kW**
Fin type	Corrugated fin (wave type)
Fin pitch	**2.0 mm** (**0.0787 in**)
Fuel cooler capacity	**1.1 kW**
Fin type	Corrugated fin (wave type)
Fin pitch	**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 standard)
Travel	Pilot pressure control system
Blade	Pilot pressure control system
Work mode select	SP mode
	H mode
	Auto mode
Travel mode selection	Two travel speeds
Implement dampening control	–
Hydraulic system lock (left-hand reclining console)	–