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# SERVICE MANUAL

## Excavators Wheeled EW160



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**NEW HOLLAND**  
**CONSTRUCTION**

## PROPRIETARY NOTICE

The contents of this manual are proprietary data of New Holland Construction. Reproduction or use of any part for other than the operation and maintenance of New Holland Construction equipment is permissible only if expressly authorized in writing by New Holland Construction. Additional copies may be obtained from your New Holland Construction Dealer. Address requests for copies to your Dealer and refer to the publication number appearing on the bottom of the manual cover.

## COMPANY POLICY

Company policy, which is one of continuous improvement, reserves the right to change prices and to make changes in design and specification at any time without notice and without obligation to modify units previously built.

All data given in this book is subject to production variations. Dimensions and weights are approximate only and the illustrations do not necessarily show machines in standard condition. For exact information about any particular machine please consult your New Holland Construction Dealer.

## PARTS AND ACCESSORIES

Genuine parts and accessories have been specifically designed for these machines. We would like to point out that “non-genuine” parts and accessories have NOT been examined and released by the Company. The installation and or use of such products could have negative effects upon the design characteristics of your machine and thereby affect its safety. The company is not liable for any damage caused by the use of “non-genuine” parts and accessories.

## MODEL CODES

The range of machines listed may not be available in all countries or markets therefore, for the latest information consult your local New Holland Construction Dealer.

**MODEL**  
EW160

**ENGINE TYPE - H.P.**

## **OWNER ASSISTANCE**

We at New Holland and your New Holland dealer want you to be completely satisfied with your investment. Normally any problems with your equipment will be handled by your dealer's Service Department. Sometimes, however, misunderstandings can occur. If your problem has not been handled to your satisfaction, we suggest the following.

1. Contact the owner or General Manager of the dealership, explain the problem, and request assistance. When additional assistance is needed, your dealer has direct access to our office.

2. If you cannot obtain satisfaction by doing this, contact the New Holland Construction office and provide them with:

- Your name, address, and telephone number
  - Machine model and serial number
  - Dealership name and address
  - Machine purchase date and amount of use
  - Nature of problem

### **NEW HOLLAND CONSTRUCTION**

**245 E North Ave**

**Carol Stream, IL 60188**

**Ph # (630) 260-4000**

When contacting New Holland, be aware that your problem will likely be resolved in the dealership using the dealer's facilities, equipment, and personnel. So it is important that your initial contact be with the dealer.

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## **SPARE PARTS**

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To maintain operating efficiency, use NEW HOLLAND original spare parts. When ordering parts, give the following information:

- Machine model
- Machine and engine serial numbers
- Part number from the Parts Catalog

## TO THE OWNER:

The warranty coverage that is extended to your machine is explained in the Warranty and Limitation of Liability form. Your dealer will provide you with a copy of the warranty and retain a copy which you have signed. After you read the warranty, ask your dealer to explain any points that you may not understand.

The machine was designed to power and propel itself. It is intended to move material in the normal and customary applications.

Do not modify or alter or permit anyone else to modify or alter this machine or any of its components mechanical function with first consulting an authorized New Holland Construction dealer. If you have any questions regarding machine modifications, contact New Holland Construction, 245 E. North Ave., Carol Stream, IL 60188.

Your safety and the safety of those around you depend upon the care and good judgment you use while operating this equipment. Read the safety precautions carefully.

After you have operated the machine for 50 hours, take your machine and this manual to your selling dealer. He will perform the factory recommended 50-hour service. You will be responsible for the cost of lubricants, fluids, filters and other items replaced as part of normal maintenance. Prior to taking the machine to your selling dealer for service, it is recommended that you contact them to determine any other charges for which you may be responsible.

All data given in this book is subject to product variations. Dimensions and weights are approximate only and the illustrations do not necessarily show machines in standard condition. For exact information about any particular machine, please consult your New Holland Construction dealer.



**CAUTION: THIS SYMBOL IS USED THROUGHOUT THIS BOOK WHENEVER PERSONAL SAFETY IS INVOLVED. TAKE TIME TO READ AND FOLLOW THE INSTRUCTIONS. BE CAREFUL!**

**CAUTION: PICTURES IN THIS MANUAL MAY SHOW PROTECTIVE SHIELDING OPEN OR REMOVED TO BETTER ILLUSTRATE A PARTICULAR FEATURE OR ADJUSTMENT.**

**BE CERTAIN, HOWEVER, TO CLOSE OR REPLACE ALL SHIELDING BEFORE OPERATING THE MACHINE.**

## IMPROVEMENTS

New Holland Construction is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

# PRECAUTIONARY STATEMENTS

## PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements (“CAUTION”, “WARNING”, and “DANGER”) followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.



**CAUTION: THE WORD “CAUTION” IS USED WHERE A SAFE BEHAVIORAL PRACTICE ACCORDING TO OPERATING AND MAINTENANCE INSTRUCTIONS AND COMMON SAFETY PRACTICES WILL PROTECT THE OPERATOR AND OTHERS FROM ACCIDENT INVOLVEMENT.**



**WARNING: THE WORD WARNING DENOTES A POTENTIAL OR HIDDEN HAZARD WHICH HAS A POTENTIAL FOR SERIOUS INJURY. IT IS USED TO WARN OPERATORS AND OTHERS TO EXERCISE EVERY APPROPRIATE MEANS TO AVOID A SURPRISE INVOLVEMENT WITH MACHINERY.**



**DANGER: THE WORD “DANGER” DENOTES A FORBIDDEN PRACTICE IN CONNECTION WITH A SERIOUS HAZARD.**

**FAILURE TO FOLLOW THE “CAUTION”, “WARNING”, “DANGER”, AND “STOP” INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.**

## MACHINE SAFETY

Additional precautionary statements (“ATTENTION” and “IMPORTANT”) are followed by specific instructions. These statements are intended for machine safety.

*ATTENTION: The word “ATTENTION” is used to warn the operator of potential machine damage if a certain procedure is not followed.*

*IMPORTANT: The word “IMPORTANT” is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

## SAFETY RULES

This symbol is your safety alert sign. It means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

Read and heed all safety instruction carrying the signal words **WARNING** and **DANGER**.

**STUDY THE OPERATION AND MAINTENANCE INSTRUCTION MANUAL THOROUGHLY BEFORE STARTING, OPERATING, MAINTAINING, FUELING OR SERVICING THIS MACHINE.**



MOST ACCIDENTS ARE CAUSED BY FAILURE OF SOME INDIVIDUAL TO FOLLOW SIMPLE AND FUNDAMENTAL SAFETY RULES OR PRECAUTION. FOR THIS REASON MOST ACCIDENTS CAN BE PREVENTED BY RECOGNIZING THE REAL CAUSE AND DOING SOMETHING ABOUT IT BEFORE ACCIDENT OCCURS. REGARDLESS OF THE CARE USED IN THE DESIGN AND CONSTRUCTION OF ANY TYPE OF EQUIPMENT THERE ARE MANY CONDITIONS THAT CAN'T BE COMPLETELY SAFEGUARDED AGAINST WITHOUT INTERFERING WITH REASONABLE ACCESSIBILITY AND EFFICIENT OPERATION.



**“live with it”**

**CALIFORNIA**

**PROPOSITION 65 WARNING**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.



## **SAFETY PRECAUTION INFORMATION**

**UNSAFE OPERATING PRACTICES AND IMPROPER USE OF THE MACHINE AND ITS ATTACHMENTS ON THE PART OF THE OPERATOR OR SERVICE TECHNICIAN CAN RESULT IN INJURIES. OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AT ALL TIMES:**

- 1. FOR SERVICING, THE MACHINE SHOULD BE ON LEVEL TERRAIN, ENGINE STOPPED WITH THE WHEELS BLOCKED OR THE ENTIRE MACHINE SOLIDLY SUPPORTED WITH THE WHEELS OFF THE GROUND BEFORE SERVICING ANY COMPONENT OF THE DRIVETRAIN.**
- 2. FOR SERVICING UNDER THE MOVABLE EQUIPMENT, SUCH AS OPERATOR'S SEAT, ENGINE HOODS, ETC. MOVE THE EQUIPMENT ASSEMBLY TO THE LATCHED POSITION AND SECURELY LATCH.**
- 3. DO NOT OPERATE THE MACHINE UNLESS ALL MOVABLE EQUIPMENT IS LATCHED IN THE OPERATE POSITION.**
- 4. DO NOT SERVICE THE MACHINE WITH A RAISED HYDRAULIC EQUIPMENT UNLESS THE HYDRAULIC EQUIPMENT IS RESTING ON LOCK PINS OR CYLINDER LOCKING TOOLS OR FIXTURES.**
- 5. DO NOT SERVICE THE MACHINE WITH THE ENGINE RUNNING UNLESS THE MACHINE IS PROPERLY AND SECURELY SUPPORTED WITH ALL FOUR WHEELS OFF THE GROUND.**
- 6. USE CAUTION WHEN SERVICING THE UNIT AROUND MOVING PARTS.**
- 7. DO NOT TILT ANY MOVABLE EQUIPMENT WITHOUT PROPER INSTRUCTION.**
- 8. DO NOT TILT ANY MOVABLE EQUIPMENT WITHOUT USING THE PROPER TOOLS.**
- 9. REINSTALL ALL SHIELDS REMOVED FOR SERVICE.**
- 10. NEVER LOOSEN ANY HYDRAULIC CONNECTIONS BEFORE RELIEVING THE PRESSURE IN THE HYDRAULIC SYSTEM.**
- 11. WEAR EYE PROTECTION SUCH AS GOGGLES, ETC.**
- 12. WEAR EAR PROTECTION SUCH AS EARPLUGS, ETC. WHEN YOU FEEL THE NOISE LEVEL IS UNCOMFORTABLE.**
- 13. IF ANY SERVICING OR ADJUSTMENTS REQUIRE THE BATTERY TO BE DISCONNECTED, DISCONNECT THE (-) NEGATIVE GROUND CABLE.**
- 14. WHEN SERVICING ELECTRICAL COMPONENTS, DISCONNECT THE (-) NEGATIVE GROUND CABLE.**
- 15. IF AN ELECTRONIC EQUIPMENT REQUIRES REMOVAL FROM THE DASH AREA OR THE MACHINE, DISCONNECT THE (-) NEGATIVE GROUND BATTERY CABLE. THIS WILL SHUT OFF POWER TO THE ELECTRICAL SYSTEM AND PREVENT DAMAGE TO THE ELECTRICAL SYSTEM.**
- 16. IF WELDING IS REQUIRED ON THE MACHINE, DISCONNECT THE (-) NEGATIVE GROUND CABLE. FAILURE TO DISCONNECT THE BATTERY MAY RESULT IN DAMAGE TO THE ELECTRICAL SYSTEM, MONITORING SYSTEM AND/OR OTHER ELECTRICAL COMPONENTS.**
- 17. IF WELDING IS REQUIRED ON AN ATTACHMENT, REMOVE THE ATTACHMENT FROM THE MACHINE.**

18. GIVE COMPLETE AND UNDIVIDED ATTENTION TO THE JOB AT HAND SO THAT COMPLETE CONTROL OF THE MACHINE IS MAINTAINED AT ALL TIMES.
19. DRIVE SLOWLY OVER ROUGH GROUND AND ON SLOPES; KEEP ALERT FOR HOLES, DITCHES AND OTHER IRREGULARITIES THAT MAY CAUSE THE MACHINE TO OVERTURN.
20. AVOID STEEP HILLSIDE OPERATION WHICH COULD CAUSE THE MACHINE TO OVERTURN.
21. NEVER TRANSPORT A LOADED BUCKET AT FULL HEIGHT. OPERATE THE MACHINE WITH THE LOAD AS LOW AS POSSIBLE UNTIL IT BECOMES NECESSARY TO RAISE THE BOOM TO DISCHARGE THE LOAD INTO A TRUCK, CONTAINER, ETC.
22. REDUCE SPEED WHEN TURNING SO THERE IS NO DANGER OF OVERTURNING.
23. NEVER DRIVE UP OR BACK UP A HILL OR INCLINE WITH A RAISED BOOM OR THE MACHINE COULD OVERTURN.
24. ALWAYS LOOK BEHIND YOU BEFORE BACKING UP THE MACHINE.
25. MAINTAIN PROPER FLUID LEVELS TO PREVENT LOSS OF POWER, BRAKING OR OTHER FUNCTIONS.
26. DO NOT ALLOW PASSENGERS TO RIDE ON THE MACHINE AT ANY TIME.
27. DO NOT ALLOW CHILDREN TO OPERATE THE MACHINE OR RIDE ON THE MACHINE AT ANY TIME.
28. DO NOT ALLOW ANYONE TO OPERATE OR SERVICE THE MACHINE WITHOUT PROPER INSTRUCTION.
29. OSHA REQUIRES THAT ALL OPERATORS BE INSTRUCTED ON THE PROPER OPERATION OF THE MACHINE BEFORE THEY OPERATE THE UNIT.
30. DO NOT OPERATE THE LOADER IN ANY POSITION OTHER THAN WHILE IN THE OPERATOR'S SEAT WITH THE SEAT BELT SECURELY FASTENED.
31. BEFORE STARTING THE ENGINE, BE SURE THAT ALL OPERATING CONTROLS ARE IN NEUTRAL AND THE PARKING BRAKE IS ENGAGED.
32. NEVER OPERATE THE ENGINE IN A CLOSED BUILDING WITHOUT ADEQUATE VENTILATION.
33. REFUEL THE MACHINE OUTDOORS WITH THE ENGINE SHUT OFF. REPLACE THE FUEL CAP SECURELY. USE AN APPROVED FUEL CONTAINER. DO NOT SMOKE WHEN HANDLING FUEL. AVOID SPILLING FUEL.
34. AFTER OPERATING THE ENGINE, NEVER TOUCH THE MUFFLER, EXHAUST PIPE, ENGINE OR RADIATOR UNTIL THEY HAVE HAD TIME TO COOL.
35. DRESS APPROPRIATELY – WEAR RELATIVELY TIGHT-FITTING CLOTHING WHEN OPERATING OR SERVICING THE MACHINE. LOOSE OR TORN CLOTHING CAN CATCH IN MOVING PARTS OR CONTROLS.
36. BEFORE SERVICING THE MACHINE, OR ANY OF ITS ATTACHED EQUIPMENT, BE SURE THAT THE ATTACHMENTS ARE LOWERED TO THE GROUND OR ARE SUPPORTED.
37. DO NOT WORK UNDER OVERHANGS, ELECTRIC WIRES, OR WHERE THERE IS DANGER OF A SLIDE.

38. WEAR AN APPROVED SAFETY HAT WHEN OPERATING THE MACHINE AND WHILE IN ANY WORK AREA.
39. WHEN DRIVING THE MACHINE ON A ROAD OR HIGHWAY, USE WARNING LIGHTS OR WARNING DEVICES AS MAY BE REQUIRED BY LOCAL OR STATE GOVERNMENT REGULATIONS. HEADLIGHTS, WARNING LIGHTS AND SMV SIGNS ARE AVAILABLE THROUGH YOUR NEW HOLLAND DEALER.
40. KEEP THE MACHINE CLEAN. DO NOT ALLOW TRASH, DEBRIS OR OTHER ARTICLES TO ACCUMULATE IN THE CAB, FLOOR OR FOOT CONTROL PEDAL AREA THAT MAY HINDER SAFE MACHINE OPERATION.
41. NEVER OPERATE THE MACHINE WITH ANY OF THE SHIELDING REMOVED.
42. NEVER OPERATE THE MACHINE WITHOUT WINDOWS AND/OR SCREENS IN PLACE.
43. NEVER EXTEND ANY PART OF THE BODY OUTSIDE OF THE OPERATOR'S AREA.
44. ALWAYS PROPERLY TIE DOWN THE MACHINE TO A TRUCK OR TRAILER BEFORE TRANSPORT.
45. MAKE SURE ALL BYSTANDERS ARE AT A SAFE DISTANCE AWAY FROM THE MACHINE BEFORE STARTING THE ENGINE.
46. DO NOT ALLOW ANYONE NEAR THE MACHINE WHILE THE ENGINE IS RUNNING AND THE MACHINE IS OPERATIONAL.
47. WHEN USING THE MACHINE TO CRANE OBJECTS, DO NOT ALLOW ANYONE TO RIDE ON OBJECTS BEING CRANED.
48. DO NOT USE THE MACHINE AS A WORK PLATFORM FOR SUPPORTING MATERIALS.
49. DO NOT LIFT PERSONNEL OR ALLOW PERSONNEL TO WORK WHILE STANDING IN THE BUCKET OR ON OTHER ATTACHMENTS. THIS IS NOT A MAN-LIFT.

OSHA REQUIREMENTS NOW MAKE IT THE EMPLOYER'S RESPONSIBILITY TO FULLY INSTRUCT EACH OPERATOR IN THE PROPER AND SAFE OPERATION OF ALL OPERATIVE EQUIPMENT. BOTH EMPLOYER AND EMPLOYEE SHOULD THOROUGHLY FAMILIARIZE THEMSELVES WITH THE MACHINE OPERATION.



**CAUTION!**

**SOME PICTURES IN THIS MANUAL SHOW SAFETY SHIELDS REMOVED OR OPEN TO SHOW PARTS BEING SERVICED OR FOR CLARITY. ALL SHIELDS SHOULD BE CLOSED OR REPLACED PRIOR TO OPERATING THE MACHINE.**

**DANGER!**

**FASTEN SEAT BELT**

**BEFORE STARTING ENGINE!**

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## FOREWORD

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This **Technical Handbook (THB)** has been written with **the servicing mechanic** in mind and contains important information required to carry out repair and servicing procedures.

Read through the **Technical Handbook**, but also the **Operating Instructions** for the **hydraulic excavator** before commencing any servicing or repair work. The **Technical Handbook**, as well as the **Operating Instructions** and **Spare Parts List** should be used as a source of reference and assistance - even when the user is well acquainted with the range of excavators.

Using the Technical Handbook allows the experienced mechanic to carry out repair work in a correct manner.

### Using the Technical Handbook

The Technical Handbook is divided into main and sub-groups that deal with the machine as actually delivered. Any auxiliary attachments or optional upgrading introduced later are not described.

The main table of contents allows to find the required information quickly.

For the sake of clarity, the illustrations have been simplified and can therefore differ slightly from the actual appearance of the machine.

### Servicing and repair

Servicing and repair work should be carried out as soon as possible. This keeps overall servicing & repair costs to a minimum and increases the availability of the excavator

During servicing and repair work, always follow the instructions contained in the Technical Handbook and Operating instructions.

Major work that is not described in the Technical Handbook will be gladly undertaken by the **After Sales Service**.

The **After Sales Service** is always available for assistance and advice.

When making any enquiries, please always state the Machine Model and the machine's Serial No.

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# **FUNDAMENTAL SAFETY INSTRUCTIONS**

## Warnings and symbols

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The following signs are used in the manual to designate instructions of particular importance:

 <b>DANGER</b>
Imminent danger involving the risk of death or of severe injuries.

 <b>WARNING</b>
Precautionary rules and measures designed to protect the machine operator and other persons from life-threatening danger or injuries and to prevent extensive damage.

 <b>CAUTION</b>
Information and precautionary measures designed to prevent damage to the machine or other property.

## Danger in the event of non-observance of the safety instructions

### **WARNING**

This hydraulic excavator has been built in accordance with state-of-the-art standards and the recognized safety rules.

However, operating the machine if a fault is suspected or has occurred, or carrying out repair work inexpertly may

- endanger the lives of persons in contact with it
- damage the machine and other property.

The hydraulic excavator must be stopped immediately on any damage being suspected or occurring to ensure that the safety of the operator, of other persons at the place of use or of other material property is not compromised.

All components are carefully co-ordinated. Trouble-free operation and a long service life can only be achieved with original spare parts.

# **FUNDAMENTAL SAFETY INSTRUCTIONS**

## **Organizational measures**

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The operating instructions must always be at hand at the place of use of the machine, e.g. by stowing them in the tool compartment or tool-box provided for such purpose.

In addition to the operating instructions, observe and instruct the user in all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection.

These compulsory regulations may also deal with the handling of hazardous substances, issuing and/or wearing of personal protective equipment or traffic regulations.

The operating instructions must be supplemented by instructions covering the duties involved in supervising and notifying special organizational features, such as job organization, working sequences or the personnel entrusted with the work.

Personnel entrusted with work on the machine must have read the operating instructions and in particular the chapter on safety before beginning work. Reading the instructions after work has begun is too late. This applies especially to persons working only occasionally on the machine, e.g. during setting up or maintenance.

Check - at least from time to time - whether the personnel is carrying out the work in compliance with the operating instructions and paying attention to risks and safety factors.

For reasons of security, long hair must be tied back or otherwise secured, garments must be close-fitting and no jewellery, such as rings, may be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts.

Use protective equipment wherever required by the circumstances or by law.

Observe all safety instructions and warnings attached to the machine.

See to it that safety instructions and warnings attached to the machine are always complete and perfectly legible.

In the event of safety-relevant modifications or changes in the behaviour of the machine during operation, stop the machine immediately and report the malfunction to the competent authority/person.

Never make any modifications, additions or conversions which might affect safety without the supplier's approval. This also applies to the installation and adjustment of safety devices and valves as well as to welding work on load-bearing elements.

Spare parts must comply with the technical requirements specified by the manufacturer. Spare parts from original equipment manufacturers can be relied to do so.

Replace hydraulic hoses within stipulated and appropriate intervals, even if no safety-relevant defects have been detected.

Adhere to prescribed intervals or those specified in the operating instructions for routine checks and inspections.

For the execution of maintenance work, tools and workshop equipment adapted to the task on hand are absolutely indispensable.

The personnel must be familiar with the location and operation of fire extinguishers.

Observe all fire-warning and fire-fighting procedures.

## **⚠ FUNDAMENTAL SAFETY INSTRUCTIONS**

### **Selection and qualification of personnel - basic responsibilities**

Any work on and with the machine must be executed by reliable personnel only. Statutory minimum age limits must be observed.

Employ only trained or instructed staff and set out clearly the individual responsibilities of the personnel for operation, set-up, maintenance and repair.

Make sure that only authorized personnel works on or with the machine.

Define the machine operator's responsibilities - also with regard to observing traffic regulations - giving the operator the authority to refuse instructions by third parties that are contrary to safety.

Do not allow persons to be trained or instructed or persons taking part in a general training course to work on or with the machine without being permanently supervised by an experienced person.

Work on the electrical system and equipment of the machine must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.

Work on chassis, brake and steering systems must be performed by skilled personnel only, which has been specially trained for such work.

Work on the hydraulic system must be carried out only by personnel with special knowledge and experience of hydraulic equipment.

### **Safety instructions governing specific operational phases**

#### **Standard operation**

Avoid any operational mode that might be prejudicial to safety.

Before beginning work, familiarize yourself with the surroundings and circumstances of the site, such as obstacles in the working and travelling area, the soil bearing capacity and any barriers separating the construction site from public roads.

Take the necessary precautions to ensure that the machine is used only when in a safe and reliable state.

Operate the machine only if all protective and safety-oriented devices, such as removable safety devices, emergency shut-off equipment, sound-proofing elements and exhausters, are in place and fully functional.

Check the machine at least once per working shift for obvious damage and defects. Report any changes (incl. changes in the machine's working behaviour) to the competent organization/person immediately. If necessary, stop the machine immediately and lock it.

In the event of malfunctions, stop the machine immediately and lock it. Have any defects rectified immediately.

Start the machine from the driver's seat only.

During start-up and shut-down procedures always watch the indicators in accordance with the operating instructions.

Before setting the machine in motion, make sure that nobody is at risk.

Before starting work or travelling with the machine, check that the braking, steering, signalling and lighting systems are fully functional.

Before setting the machine in motion always check that the accessories have been safely stowed away.

When travelling on public roads, ways and places always observe the valid traffic regulations and, if necessary, make sure beforehand that the machine is in a condition compatible with these regulations.

## **⚠ FUNDAMENTAL SAFETY INSTRUCTIONS**

In conditions of poor visibility and after dark always switch on the lighting system.

Persons accompanying the driver must be seated on the passenger seats provided for this purpose.

When crossing underpasses, bridges and tunnels or when passing under overhead lines always make sure that there is sufficient clearance.

Always keep at a distance from the edges of building pits and slopes.

Avoid any operation that might be a risk to machine stability.

Never travel across slopes; always keep the working equipment and the load close to the ground, especially when travelling downhill.

On sloping terrain always adapt your travelling speed to the prevailing ground conditions. Never change to a lower gear on a slope but always before reaching it.

Before leaving the driver's seat always secure the machine against inadvertent movement and unauthorized use.

### **Special work in conjunction with utilization of the machine - maintenance and repairs during operation - disposal of parts and consumables**

Observe the adjusting, maintenance and inspection activities and intervals set out in the operating instructions, including information on the replacement of parts and equipment. These activities may be executed by skilled personnel only.

Brief operating personnel before beginning special operations and maintenance work, and appoint a person to supervise the activities.

In any work concerning the operation, conversion or adjustment of the machine and its safety-oriented devices or any work related to maintenance, inspection and repair, always observe the start-up and shut-down procedures set out in the operating instructions and the information on maintenance work.

Ensure that the maintenance area is adequately secured.

If the machine is completely shut down for maintenance and repair work, it must be secured against inadvertent starting by:

- removing the ignition key and
- attaching a warning sign.

Carry out maintenance and repair work only if the machine is positioned on stable and level ground and has been secured against inadvertent movement and buckling.

To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting tackle and secured. Use only suitable and technically perfect lifting gear and suspension systems with adequate lifting capacity. Never work or stand under suspended loads.

The fastening of loads and the instructing of crane operators should be entrusted to experienced persons only. The marshaller giving the instructions must be within sight or sound of the operator.

## **⚠ FUNDAMENTAL SAFETY INSTRUCTIONS**

For carrying out overhead assembly work always use specially designed or otherwise safety-oriented ladders and working platforms. Never use machine parts as a climbing aid.

Wear a safety harness when carrying out maintenance work at greater heights.

Keep all handles, steps, handrails, platforms, landings and ladders free from dirt, snow and ice.

Clean the machine, especially connections and threaded unions, of any traces of oil, fuel or preservatives before carrying out maintenance/repair. Never use aggressive detergents. Use lint-free cleaning rags.

Before cleaning the machine with water, steam jet (high-pressure cleaning) or detergents, cover or tape up all openings which - for safety and functional reasons - must be protected against water, steam or detergent penetration. Special care must be taken with electric motors and switchgear cabinets.

Ensure during cleaning of the machine that the temperature sensors of the fire-warning and fire-fighting systems do not come into contact with hot cleaning agents as this might activate the fire-fighting system.

After cleaning, remove all covers and tapes applied for that purpose.

After cleaning, examine all fuel, lubricant, and hydraulic fluid lines for leaks, loose connections, chafe marks and damage. Any defects found must be rectified without delay.

Always tighten any screwed connections that have been loosened during maintenance and repair.

Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.

Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact.

### **Warning of special dangers**

#### **Electric energy**

Use only original fuses with the specified current rating. Switch off the machine immediately if trouble occurs in the electrical system.

When working with the machine, maintain a safe distance from overhead electric lines. If work is to be carried out close to overhead lines, the working equipment must be kept well away from them. Caution, danger! Check out the prescribed safety distances.

If your machine comes into contact with a live wire

- do not leave the machine
- drive the machine out of the hazard zone
- warn others against approaching and touching the machine
- have the live wire de-energized
- do not leave the machine until the damaged line has been safely de-energized.

The electrical equipment of machines is to be inspected and checked at regular intervals. Defects such as loose connections or scorched cables must be rectified immediately.

#### **Gas, dust, steam and smoke**

Operate internal combustion engines and fuel-operated heating systems only on adequately ventilated premises. Before starting the machine on enclosed premises, make sure that there is sufficient ventilation.

Observe the regulations in force at the respective site.

Carry out welding, flame-cutting and grinding work on the machine only if this has been expressly authorized, as there may be a risk of explosion and fire.

Before carrying out welding, flame-cutting and grinding operations, clean the machine and its surroundings from dust and other inflammable substances and make sure that the premises are adequately ventilated (risk of explosion).

## **⚠ FUNDAMENTAL SAFETY INSTRUCTIONS**

### **Hydraulic and pneumatic equipment**

Check all lines, hoses and screwed connections regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.

Depressurize all system sections and pressure pipes (hydraulic system, compressed-air system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.

Hydraulic and compressed-air lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements.

### **Noise**

During operation, all sound baffles of the machine must be closed.

Always wear the prescribed ear protectors.

### **Oil, grease and other chemical substances**

When handling oil, grease and other chemical substances, observe the product-related safety regulations.

Be careful when handling hot consumables (risk of burning or scalding).

### **Transporting and towing - recommissioning**

The machine must be towed, loaded and transported only in accordance with the operating instructions.

For towing the machine observe the prescribed transport position, admissible speed and itinerary.

Use only appropriate means of transport and lifting gear of adequate capacity.

The recommissioning procedure must be strictly in accordance with the operating instructions. □

**Repair work - safety instructions**

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**WARNING**

**Operating instructions**

Never carry out repair work without having read and understood the operating instructions.

Pay special attention to:

"Fundamental Safety Instructions",  
"Inspection and servicing - safety instructions" and all warnings and safety instructions attached to the machine.

The descriptions of job sequences provide only experienced personnel with the necessary instructions.

The operating manual must be kept with the machine at all times.

**Repair personnel**

Repair personnel must have know-how and experience relevant to repairing this or comparable machines.

**Working at greater heights**

Always wear safety harnesses when working at greater heights.

Wear an approved safety harness; it must be equipped with stabilizers and safety cables.



**WARNING**

**Pressurized or spring loaded units**

Never open defective pressurized or spring loaded units but replace them as an entirety.

In exceptional cases, open only when the system and the operating sequence are precisely known and any special tools required are available.

The operating manual contains no information on this point.

**Dismantling components**

Never dismantle while the machine is at operating temperature.

Oils, greases, brake fluid or coolants may have a high temperature and result in burning or scalding.

Leave time for the machine to cool down.

Before starting work, depressurize piping and hoses, cylinders, radiator, hydraulic tank, air-brake reservoir and other systems or units.

Replace defective components in good time to prevent major damage.

Clean the defective component carefully before dismantling it.

Mark the dismantled parts in the correct sequence to facilitate assembly.

When dismantling the component, close off exposed hose and piping connections, exposed drill holes and housing carefully to prevent any dust from penetrating.

**Accumulators, safety instructions**



**WARNING**

**Never remove lead seals**

Never change rated pressure of pressure relief valves without the explicit authorization of the manufacturer.

Never remove lead seals from pressure relief valves and accumulators.

**After the repair work**

To prevent corrosion, coat all bright metal machine parts with a grease film.

On completing the work, reassemble all protective devices, covers, and sound- and vibration-insulation material.

Never start up the driving motor while work is being done on the machine.

Check the repaired components and all machine functions with a trial run.

Never release the machine for recommissioning until it is fully functioning.



**DANGER**

Accumulators are installed in the hydraulic system. These accumulators contain nitrogen under high initial pressure.

Wear safety goggles.

Even when the hydraulic pressure in the system is reduced, the nitrogen remains in the accumulator.

The accumulators are completely safe in operation. If incorrectly handled, however, there is a risk of explosion!

The accumulators installed in this machine should not be repaired. Defective accumulators have to be changed.

Never handle accumulator mechanically, never weld or solder it.

Prior to change the accumulator, always wear goggles and working gloves, depressurize the hydraulic part of the system.

Use only genuine spare parts. In case of questions ask your dealer.

Never remove or paint over warning and information plates, rating plates or type identification markings. Replace illegible or damaged plates immediately.

**ENGINE**

2732231

**Engine, repair instructions**



**WARNING**

Read and observe: "Repair, safety instructions" and operating instructions for engine before working on engine.

Risk of injury from rotating or hot engine parts!

Switch off engine and leave to cool down.

Do repair work only if machine is secured as described in section "Securing the machine" of these operating instructions.

Check and change V-belts only when engine is stationary.

Repair work on the engine demands extensive know-how and special tools.

□

**Assisted starting  
(with jump-leads) - safety  
instructions**

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**DANGER**

Keep any potential ignition sources such as unshielded lights or burning cigarettes away from the batteries. The battery vapours are highly flammable. Explosion hazard.

Wear safety goggles.

Do not lean over the batteries when starting the machine from another vehicle.

Risk of injury from acid splashes and battery gases.

Never use assisted starting when the batteries are defective or frozen.

Never connect batteries (battery assemblies) unless they have the same voltage.

Use only tested jump-leads with insulated terminal clips and an adequate lead diameter.

Ensure that the bodies of the supplying and receiving machines are not in contact. Otherwise a current flow could result from connecting the positive poles. Risk of short-circuiting.

Never use welding generators or welding transformers as a source of current.

Position the jump-leads in such a way that they cannot be caught by rotating engine components.

Read and observe: "Inspection and servicing, safety instructions", paying particular attention to the section "Handling batteries".

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**WELDING OPERATIONS**

**Welding operations - safety instructions**

2732228



**WARNING**

Never perform welding operations unless you are qualified to do so.

Observe the accident prevention regulations.

Any work on receptacles that contain or have contained substances which are

- combustible or which encourage combustion, which
- are susceptible to explosion, or which
- may develop health-hazardous gases, vapours, mist or dust during welding operations

must be carried out only under expert supervision and only by experienced persons authorized to do such work.

Detailed information on the correct execution of welding operations is given in the technical manual "Welding for maintenance and repair".

Should you have any problems or queries, apply to the after-sales service department.

If parts of the machine have to be dismantled, read and take note of the following sections:

- "Assembling attachments, safety instructions",
- "Inspection and servicing, safety instructions",
- "Repair, safety instructions".



**WARNING**

Prior to any welding operations on the machine:

- Disconnect the battery, first at the negative pole and then at the positive pole.
- Disconnect the positive pole at the alternator.

Protect the disconnected terminals and plugs from short-circuiting and soiling by covering them with foil or adhesive tape.

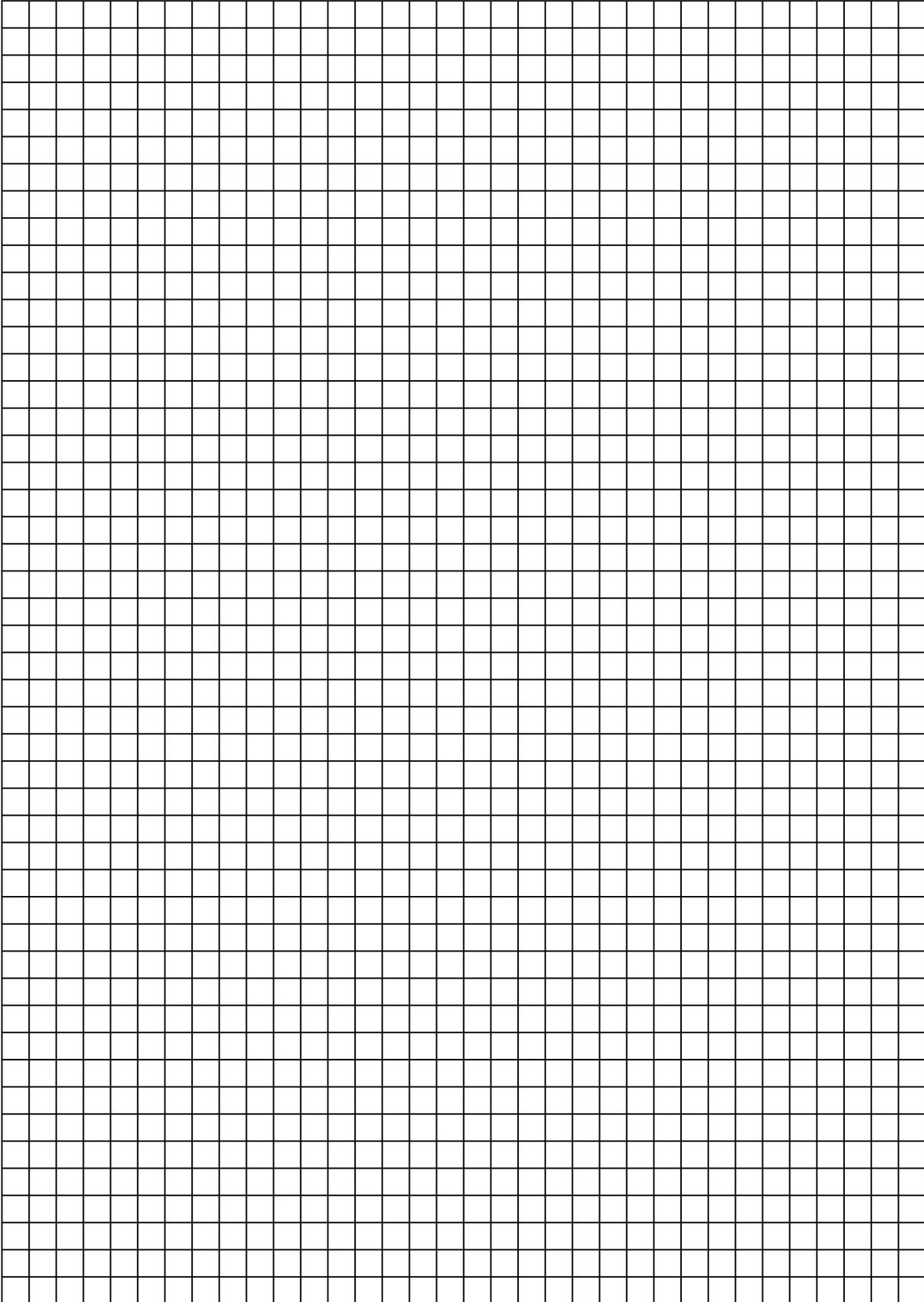
Apply the welding current terminals very close to the welding point.

The welding current must not flow via the ball bearing slewing ring, via pin couplings or link joints of hydraulic cylinders.

On completion of the welding operation, restore all electrical connections.

When connecting the battery, first connect the positive pole and then the negative pole.

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**Service Data General**

**Service Data EW 160**

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**SERVICE DATEN**

**SERVICE DATA**

**Allgemein  
General**

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