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# WX210

# WX240

## HYDRAULIC EXCAVATOR

### Service manual

Print No. 9-91270 English



THIS ALERT SYMBOL SIGNALS IMPORTANT MESSAGES INVOLVING YOUR SAFETY.

Read and heed carefully the safety instructions listed and follow the precautions recommended to avoid potential risks and to safeguard your health and your safety.

You will find this symbol in the text of this Manual referred to the following key words:

**WARNING** - Cautions directed to avoid improper repair interventions involving potential consequences for the safety of the personnel performing the repairs.

**DANGER** - These warnings qualify specifically potential dangers for the safety of the operator or other persons directly or indirectly involved.

#### IMPORTANT NOTICE

All maintenance and repair interventions explained in this Manual **must be performed exclusively by the Service Organisation of the Manufacturer**, observing strictly the instructions explained using, whenever necessary, the recommended specific tools.

Whoever performs the operations reported without following exactly the precautions is responsible on his own, for the damages that may result.

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## AVOID ACCIDENTS

Most accidents, whether they occur in industry, on the farm, at home or on the road, are caused by the failure of some individuals to follow simple and fundamental safety rules and precautions. For this reason **MOST ACCIDENTS CAN BE PREVENTED** by recognising the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering in the reasonable accessibility and efficient operation.

A careful operator is the best insurance against an accident. The complete observance of one simple rule would prevent many serious accidents.

The rule is simple: never attempt to clean, lubricate or maintain a machine while it is in motion.



### WARNING

**Prior to engaging in any maintenance, adjustment or repair operation on machines having hydraulically, mechanically, and/or cable controlled equipment (such as shovels, loaders, dozers, excavators etc.) be certain the equipment is lowered to the ground.**

**If it is necessary to have the equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the devices used for controlling the equipment.**

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# **SUMMARY**

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# **Service manual**

**Section 0 Safety Instructions**



**WX210 - WX240**

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## PREFACE

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### To the reader

The Technical Manual (TM) has been written for the **repair specialist**. It provides important information on carrying out repair work expertly.

Please go carefully through the **Technical Manual** as well as the Owner's Manual for the **hydraulic excavator** before starting any repair work. Use the **Technical Manual** as well as the **Owner's Manual** and **spare-parts list** as a reference book and source of information even if you are familiar with hydraulic excavator technology.

Using the Technical Manual, the experienced construction machine mechanic can carry out any necessary repairs expertly.

### Handling

The Technical Manual is divided into eight sections and covers the originally delivered version of the machine. Any additions or modifications undertaken at a later date are not described in this manual.

- Introduction
- Safety Instructions
- Technical Data and Special Tools
- Description of Functioning
- Performance Testing
- Troubleshooting
- Repair Instructions
- Annex

The **Safety Instructions** section describes the recommended procedures to be observed in order to prevent any risk of accidents to the operator and to the personnel responsible for the works and for machine servicing measures.

The **Description of Functioning** section provides technical information on operating the main devices and systems.

The **Technical Data and Special Tools** section lists service data, conversion tables and special tools and servicing materials required.

The **Performance Testing** section gives the information required for carrying out performance testing.

The **Troubleshooting** section contains information on detecting faults in the machine.

The **Repair Instructions** section gives the technical information needed to carry out servicing and repair work on the machine, describes the equipment needed for servicing works, and provides

information on maintenance standards, removal and installation procedures, and dismantling and assembly procedures.

The required information can easily be found by referring to the table of contents.

For reasons of clarity, some of the illustrations are presented in simplified form. Differences from the actual version at the hydraulic excavator are therefore possible if this adds to the clarity of the information.

### Repair

Carry out any necessary repair work as soon as possible. This reduces repair costs and increases the availability of your hydraulic excavator.

When doing any work on the hydraulic excavator, always observe the instructions given in the Technical Manual and in the Owner's Manual.

Extensive works not described in the Technical Manual will gladly be executed for you by the O&K after-sales service.

Always use **original spare parts** only.

### Further information material


Please consult the following documents in addition to this Manual:

- Owner's Manual
- Spare-parts catalogue




**Warnings and symbols**

The following signs are used in the Technical Manual to designate exceptionally important information:




**Precautionary rules and measures designed to protect the operator and other persons from life-threatening hazards or injury and to prevent extensive damage to property.**



**Information and precautionary measures designed to prevent damage to the machine and other property.**

**Risks resulting from failure to observe the safety instructions**



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

**Nevertheless, its use may constitute a risk if it continues to be operated despite damage being suspected or having occurred, or if it is inexpertly repaired.**

**There is then a risk of**

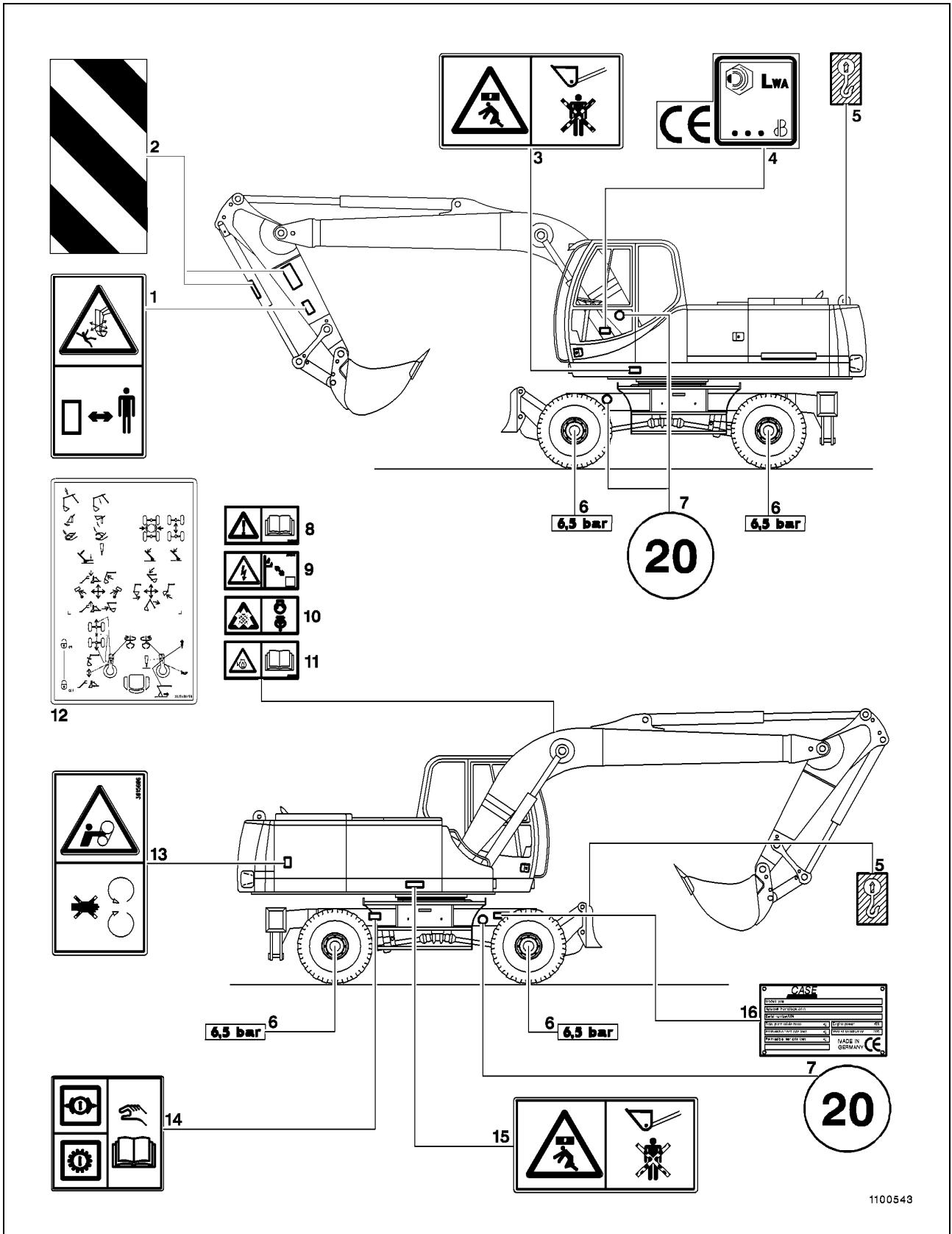
- **life-threatening injury**
- **irreparable damage to the machine and other assets.**

**The hydraulic excavator must be stopped immediately if suspected damage or damage that has occurred affects the safety of the operator, other persons at the excavator deployment site, or other assets. All components are carefully coordinated. Trouble-free operation and a long service life are assured only if original spare parts are used.**

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Warning and instruction signs

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Fig. 1





**Observe the warning and instruction signs attached to the machine.**

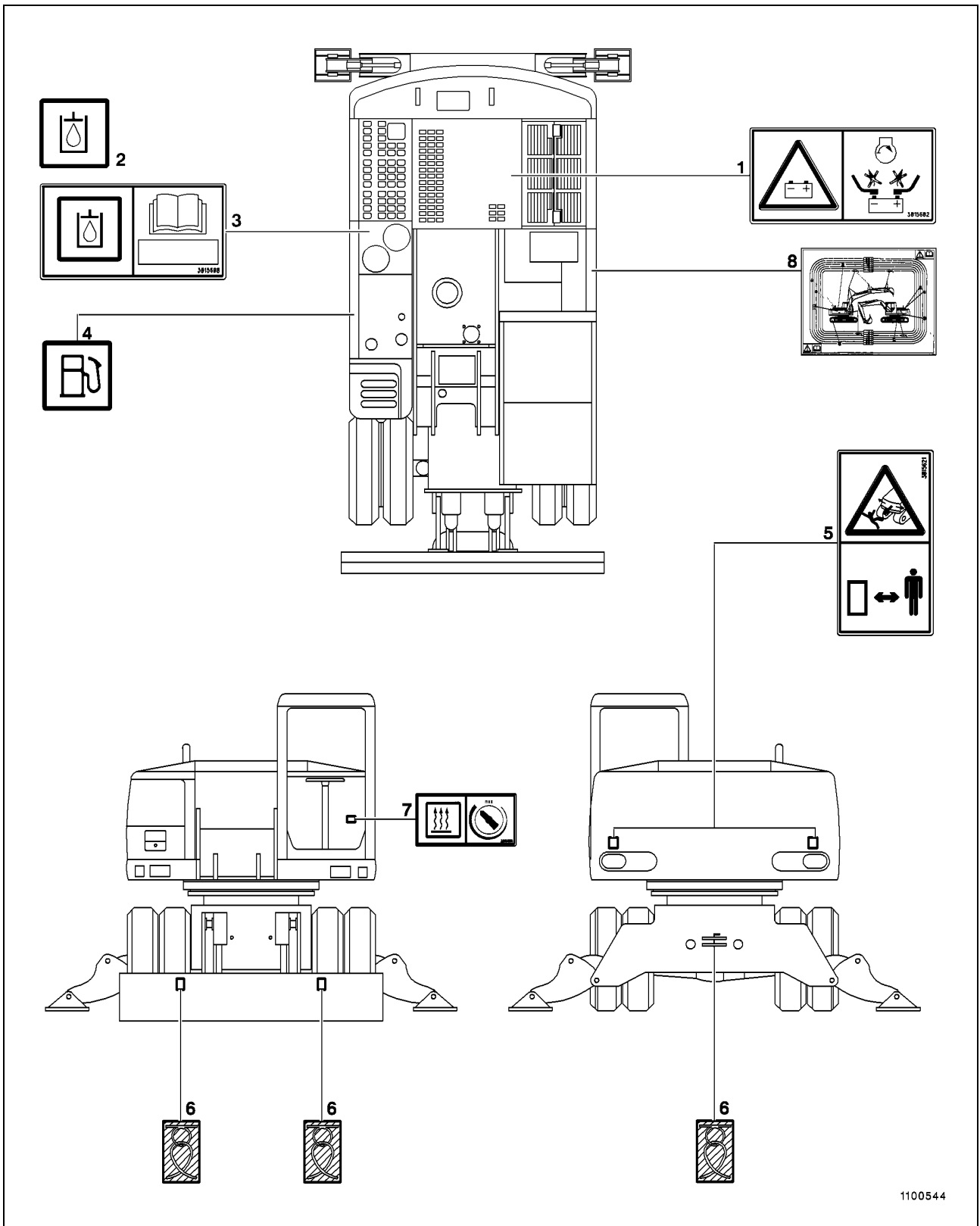
**Keep the signs clean and legible.**

**Replace the signs immediately if they are no longer legible.**

**New warning and instruction signs can be obtained from our spare-parts service. The part no. for ordering is set out in the spare-parts list of your machine.**

#### Legend

1. **Risk of injury** from moving parts of the working equipment. Move the working equipment only after all persons have left the hazard zone.
2. This sign indicates that the working equipment reaches far out over the machine and that it can be moved without moving the machine.
3. **Risk of injury** from falling loads or moving parts of the working equipment. Do not stand under suspended loads or under the working equipment.
4. The CE mark indicates that this machine has been built in compliance with the European directives concerning the safety of machines.  
L<sub>WA</sub> indicates the level of noise emissions in dB<sub>A</sub> (acc. to standard 2000/14/EC).
5. Lifting gear can be attached here when parts of the machine are to be removed.
6. This sign specifies the prescribed air pressure.
7. This sign states the admissible maximum speed for travelling on public roads.
8. Do not put the machine into operation unless you have read and understood the Operator's Manual.
9. **Risk of injury** from electric current. Keep the following distances from live wires:  
up to 1000 V (1 kV) = 1 meter,  
from 1 kV to 110 kV = 3 meters,  
from 110 kV to 220 kV = 4 meters,  
from 220 kV to 380 kV = 5 meters,  
unknown voltage = 5 meters.
10. The steering works only when the engine is running.
11. Check the oil level in the engine before putting the machine into operation.
12. This sign shows all control levers and pedals and the movements of the working equipment and the travelling gear initiated with these elements. Observe also the information set out in the Operator's Manual.
13. **Risk of injury** from hot or rotating parts in the engine compartment. Open the hood of the engine compartment only after the engine is stationary.
14. Emergency operation for slewing drive and parking brake. For detailed information refer to the Operator's Manual.
15. **Risk of injury** from falling loads or moving parts of the working equipment. Do not stand under suspended loads or under the working equipment.
16. Type rating plate of the machine. →



1100544

Fig. 2





Observe the warning and instruction signs attached to the machine.

Keep the signs clean and legible.

Replace the signs immediately if they are no longer legible.

New warning and instruction signs can be obtained from our spare-parts service. The part no. for ordering is set out in the spare-parts list of your machine.

#### Legend

1. Alternator, regulator and electronic modules may be **damaged**, if the batteries are disconnected with the engine running. The engine must therefore be shut off before the batteries are disconnected and removed.
2. Hydraulic oil reservoir.
3. Hydraulic oil reservoir. Observe the Operator's Manual. The reservoir is filled with a special hydraulic fluid (option).
4. Fuel tank.
5. **Risk of injury** from slewing superstructure or moving machine. Slew the superstructure and drive the machine only after all persons have left the hazard zone.
6. Fastening means must be attached here when the machine is to be transported.
7. Control elements for the auxiliary heating system (option).
8. This sign shows the layout of the machine points to be regularly greased. The sign states also the change intervals for consumables and filters.

A detailed list of all regular servicing activities is contained in the inspection and maintenance schedules (Part 3 of these Operator's Manual).

Always perform servicing in compliance with the maintenance schedules.

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## Organizational measures

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The Owner's Manual must always be at hand at the deployment site of the machine, e.g. in the container provided.

In addition to the Owner's Manual, observe and instruct the user in all other generally applicable statutory and other mandatory regulations relevant to accident prevention and environmental protection.

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

The Owner's Manual must be supplemented by instructions covering the duties involved in supervising and notifying special organizational features, such as job organization, working sequences or deployed personnel.

The personnel assigned to work on the machine must have read the operating instructions and in particular the Safety Instructions section before starting 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 servicing.

Check at least occasionally whether the work is being carried out in compliance with the Owner's Manual and with attention being paid to risks and safety factors.

Long hair must be tied back or otherwise secured, garments must be close-fitting, and no jewellery including rings may be worn. Injury may result from such items being caught up in the machinery or catching on moving parts.

Use personal 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 upon 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 Owner's Manual for routine checks and inspections.

For the execution of maintenance work, tools and workshop equipment equal 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.



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

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

Deploy 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 / 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 only by skilled personnel 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 starting 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 the public highway.

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, e.g. removable safety devices, emergency shut-off equipment, sound-proofing elements and extractors, 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 Owner's Manual.

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.

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 driving through underpasses or tunnels, over bridges or 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. Shut off the engine.

### **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 Owner's Manual, 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 Owner's Manual 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.

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 work. 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 have to be protected against water, steam or detergent penetration for safety and functional reasons. 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 extinguishing 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 work.

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: life-threatening 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 and 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 de-energized with certainty.

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 of dust and other inflammable substances and make sure that the premises are adequately ventilated (risk of explosion).



**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 Owner's Manual.

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

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

The recommissioning procedure must be strictly in accordance with the Owner's Manual.

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# **Service manual**

**Section 1 Technical Data and  
Special Tools**



**WX210 - WX240**

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The data contained in this handbook were valid at the time of publication. As we constantly endeavour to improve our products and to provide additional options, modifications or changes made in this context may have an impact on the procedures described in this handbook. Please contact your local dealer if you find any discrepancies.

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