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Operator’s manual

Track excavator

ET35
EZ36





Vehicle models	**E16-01/E16-02**
Edition	**1.2**
Document order number	**1000442686**
Language	**us/us**

1000442686

This Operator's Manual includes the AEM Safety Manual

AEM MEMBER

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Original Operator’s Manual	–
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Technical data, dimensions and weights are only given as an indication. Non-metric data is rounded off. Responsibility for errors or omissions not accepted.

The cover features the vehicle with possible optional equipment. Not all options in this operator's manual must be available in every destination country.

Photographs and graphics are symbolic representations and may differ from the actual products.

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The Operator’s Manual and any amendments to it must always be available at the location where the vehicle is operated. Possible amendments are included at the end of the Operator’s Manual.

Wacker Neuson Linz GmbH
Flughafenstraße 7
A-4063 Hörsching
Phone: +43 (0) 7221 63000
Fax: +43 (0) 7221 63000-2200
E-mail: office.linz@wackerneuson.com
www.wackerneuson.com

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WARNING

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

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.

WARNING

Cancer and Reproductive Harm -

www.P65Warnings.ca.gov.

WARNING

Batteries, battery posts, terminals and related accessories contain lead and lead compounds, and other chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. WASH HANDS AFTER HANDLING.



Notes:

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EC Compliance Statement

Manufacturer

Wacker Neuson Linz GmbH, Flughafenstraße 7, 4063 Hörsching, Austria

CE

Product

Machine designation	**Hydraulic excavator**
Machine model	**E16-01**
Trade name	**ET35**
Serial number	**--**
Engine/output kW	**3TNV88-BPWN/22.2**
Measured sound power level dB(A)	**95**
Guaranteed sound power level dB(A)	**95**

Conformity assessment procedure

Notified body according to directive 2006/42/EC, appendix XI:
DGUV Test, test and certification body
construction department, Am Knie 6, 81241 München, Germany
Notified body of the EU, identification number: 0515

For 2000/14/EG notified body involved in procedure

Industrial Supervisory Board SÜD Industrie Service GmbH
Westendstraße 199
D 80686 München
Notified Body of the EU, identification number: 0036

Directives and standards

We hereby declare that this product corresponds to the relevant regulations of the following Directives and standards:

2006/42/EC, 2005/88/EC, 2000/14/EC - Appendix VIII; 2014/30/EU, 2014/53/EU (if telematics option is installed)

DIN EN ISO 12100:2010, DIN EN 474-1:2006+A4:2013, DIN EN 474-5:2006+A3:2013, DIN EN ISO 3471:2010, DIN EN ISO 3744:1995, DIN EN ISO 3449:2009

Authorized representative for the compilation of technical documentation

Annette Ortmayr, Team Leader Technical Documentation
Flughafenstraße 7
4063 Hörsching
Austria

Robert Finzel,
Managing director

The indications specified above correspond to the existing information at time of going to press. They have possibly changed in the meantime (refer to the original declaration of conformity supplied with the vehicle). Applies to EU countries, and countries with legislation similar to that of the EU. Applies to all vehicles with CE marks that have not been modified without authorization since the product was placed on the market.

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EC Compliance Statement

Manufacturer

Wacker Neuson Linz GmbH, Flughafenstraße 7, 4063 Hörsching, Austria

CE

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Machine designation	**Hydraulic excavator**
Machine model	**E16-02**
Trade name	**EZ36**
Serial number	**--**
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Guaranteed sound power level dB(A)	**94**

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1 Foreword

1.1 Operator’s manual

Information on this Operator’s Manual

Keep the operator's manual in the compartment to the left of the operator's seat and always carry them along with you. A document box behind the seat is available as an option.

Fully read and understand the operator’s manual before starting up, servicing or repairing the vehicle. This will help avoid personal injury and physical damage and the vehicle can be safely and economically operated.

Wacker Neuson recommends distributors or vehicle lessors to instruct operators accordingly.

Please contact your dealer if you require more information on the vehicle or the Operator’s Manual.

Target-group definition

This operator's manual is aimed at new professional operating personnel or those yet to be trained.

Operator qualification and requirements for safe operation

Among other things, safe reliable vehicle operation and a longer service life depend on the following criteria:

- Machine model and its outfitting
- Machine maintenance
- Work and driving speed
- Nature of ground and work environment
- Operator's qualification and ability to make decisions

With a qualified training, the operator is capable of the following:

- Concrete assessment of the work situations
- Feeling for the vehicle
- Identifying potential hazard situations
- Safe working by making the correct decisions for man, vehicle and the environment

Access to the vehicle or vehicle operation is prohibited for children and persons under the influence of alcohol, drugs, or medicine.

Designated use

- The vehicle is used for moving earth, gravel, coarse gravel and rubble or hammer and grab operation as well as applications, including the attachments listed in chapter *– see chapter “ Technical data of attachments” on page 9-13*.
- In applications with lifting gear, the vehicle is used according to its designated use only if the mandatory devices are installed and functional.
- Use the quickhitch only with the corresponding attachments.
- A restricted work range applies to work with attachments (for example hammer) that can cause fragments to fly around.
- Designated use also includes observing the instructions set forth in the Operator’s Manual and observing the maintenance and service conditions.

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- Follow the relevant national and regional regulations.

Machine travel on public roads

Information

The machine is not certified for travel on public roads.

1.2 Warranty and liability

Warranty

Warranty claims can only be made if:

- The warranty conditions are observed. They are included in the General Conditions of Sales and Delivery for new vehicles and spare parts sold by the dealers of Wacker Neuson Linz GmbH.
- The daily and weekly maintenance work is carried out according to the maintenance plan.
- The maintenance work and the handover inspection are carried out by an authorized service center and entered in the service log.

Exemption from liability

The warranty and product liability are void in the event of personal injury and property damage in the following cases:

- Failure to observe the safety and warning information on the vehicle and all supplied documents.
- Failure to properly use the vehicle.
- Violation of due diligence in maintenance, repair and handling and operation of the vehicle.
- Performing vehicle modifications without proper authority and using spare parts, accessories, attachments and optional equipment that have not been checked and released by Wacker Neuson Linz GmbH. The vehicle does not meet the requirements for conformity and registration.
- Changes and modifications to the vehicle that lead to restricted visibility. The vehicle does not meet the requirements for conformity and registration.

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Explanation of symbols and abbreviations

Explanation of symbols

- Identifies a list
  - Identifies a subdivision of a list
  ➥ Description of a result

1. Identifies an activity
   Follow the order of the activity!
2. Continuation of an activity
   Follow the order of the activity!

A Identifies an alphabetical list

B Continuation of an alphabetical list

Cross references: see page *1-1* (page)

Cross references: **7** (pos. no. or table no.)

Cross-references: *Fig. 2* (Fig. no. 1)

Cross references: *– see chapter “5 Operation” on page 5-1* (see chapter)

Cross references: *– see "Operation" on page 5-1* (-see text)

Information

Identifies an information that, when followed, provides for a more efficient and economical use of the vehicle.

Environment

Failure to observe the instructions identified by this symbol can cause damage to the environment.

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Abbreviations

Fig.	=	Figure
AUX	=	Additional control circuit
B	=	Width
o/h	=	Operating hours
approx.	=	approximately
DPF	=	Diesel particulate filter
FGPS	=	Front Guard Protective Structure
FOPS	=	Falling Objects Protective Structure
if nec.	=	if necessary
Hydraulic quick-hitch	=	Hydraulic quickhitch (for example Easy Lock)
max.	=	maximum
min.	=	minimum
MSWS	=	Mechanical quickhitch
Pos.	=	Position
hp	=	Stabilizer blade
ROPS	=	Roll Over Protective Structure (without losing contact with the ground)
TOPS	=	Tip Over Protective Structure
VDS	=	Vertical Digging System
e. g.	=	for example

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Glossary

Attachment	All exchangeable equipment (for example buckets) released by Wacker Neuson and developed for work with the vehicle.
Working lights	The lights on the roof, chassis and boom are referred to as working lights.
Auto 2-Speed	In speed range 2, the vehicle automatically switches back to speed range 1 with increased driving resistance. At normal vehicle travel resistance, the vehicle automatically shifts up to speed range 2.
Towing	The excavator is towed out of an immediate danger zone (railroad crossing or job site, for example).
DOC	Diesel oxidation catalytic converter; removes carbon monoxide and residues of unburned fuel from the exhaust fumes.
DPF	Diesel particulate filter; burns soot particles in the exhaust fumes
Operating company/person	A company (or person) operating the vehicle. This can be a job site operating company, for example.
Operators	Person performing vehicle travel or operation.
Vehicle	Unless otherwise specified, the term **“machine”** refers to the excavator described in this Operator’s Manual. In some cases, the vehicle is also referred to as excavator to avoid confusion with other vehicles.
Machine operation	All work (for example machine travel, moving material, daily maintenance) an operator is allowed to or has to perform in connection with the machine. The term **“machine operation”** does not include maintenance only a Wacker Neuson service center is allowed to perform.
Lift capacity table	The maximum weight which may be lifted in excavating operations. If the upper carriage is rotated, pay attention to the values of the **load diagrams**.
Creep gear	Perform vehicle travel as slowly as possible and jerk free.
Hose rupture	Hydraulic oil under pressure escapes from a hydraulic hose.

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Check the threaded fittings for tightness	Check the threaded fittings and corresponding components/assemblies visually or manually (without using tools) for tightness. In case of slack screw connections, contact an authorized service center.
Visual aids	Visual aids are, for example, rearview mirrors, cameras, but also persons assisting the operator during machine operation.
Control lever base	The foldable control lever base on the left.
Tier III/Tier IV	The vehicles comply with different exhaust-gas standards depending on optional equipment. Engine variants are described separately if there are engine-specific differences (for example regarding operation).
Load diagram	Specifies the maximum load at a given boom extension with which the upper carriage may be rotated by 360° and the excavator may travel in creep gear with the stabilizer blade raised without tipping over.
Loading weight	The actual weight of the vehicle at the beginning of transportation. This weight refers to vehicles which are equipped exclusively with options approved by Wacker Neuson.
Vertical Digging System	This system allows for the variable tilting of the upper carriage by up to 15° and allows for efficient excavating on uneven terrain.
Additional control circuits	Additional control circuits required for certain attachments. • AUX I: auxiliary hydraulics (for example for hydraulic hammer or offset bucket) • AUX II: 3rd control circuit (for example for universal grab) • AUX III: for example Powertilt • AUX IV: hydraulic quickhitch (for example Easy Lock) • AUX V: oscillating grab

Right/left/front/rear

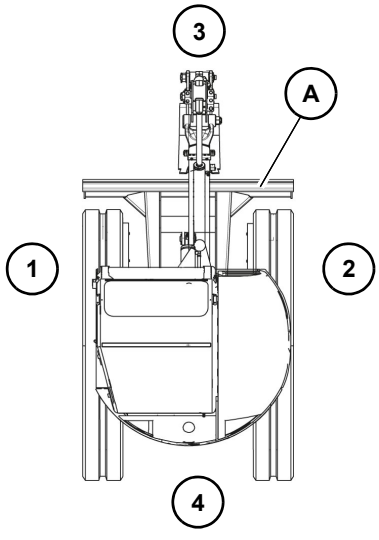


Fig. 1

These terms are used from the view of an operator in the cabin if the front of the cabin faces toward the stabilizer blade **A**.

- **1**: left
- **2**: right
- **3**: front
- **4**: rear

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Conversion table

The rounded imperial values are indicated in brackets, for example 1060 cm³ (64.7 in³)

Volume unit	
1 cm³	(0.061 in³)
1 m³	(35.31 ft³)
1 ml	(0.034 US fl.oz.)
1 l	(0.26 gal)
1 l/min	(0.26 gal/min)
Unit of length	
1 mm	(0.039 in)
1 m	(3.28 ft)
Weight	
1 kg	(2.2 lbs)
1 g	(0.035 oz)
Pressure	
1 bar	(14.5 psi)
1 kg/cm²	(14.22 lbs/in²)
Force/output	
1 kN	(224.81 lbf)
1 kW	(1.34 hp)
1 PS	(0.986 hp)
Torque	
1 Nm	(0.74 ft.lbs.)
Speed	
1 km/h	(0.62 mph)
Acceleration	
1 m/s²	(3.28 ft/s²)

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2 Safety

2.1 Safety symbols and signal words

Explanation

The following symbol identifies safety instructions. It is used for warning against potential personal risk or danger.

DANGER

DANGER identifies a situation causing death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

WARNING

WARNING identifies a situation that can cause death or serious injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury or death.

CAUTION

CAUTION identifies a situation that can cause injury if it is not avoided.

Consequences in case of non-observance.

► Avoidance of injury.

NOTICE

NOTICE identifies a situation that causes damage to the vehicle if it is not observed.

► Avoidance of damage to property.

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2.2 Qualification of operating personnel

Owner's duties

- Only allow specifically authorized, trained and experienced persons to operate, drive and perform maintenance on the vehicle.
- Do not allow persons to be trained or instructed by anyone other than an authorized and experienced person.
- Have persons to be trained or instructed practice under supervision until they are familiar with the machine and its behavior (for example with the steering and braking behavior).
- Access to the vehicle or vehicle operation is prohibited for children and persons under the influence of alcohol, drugs or medicine.
- Clearly and unequivocally define the responsibilities of the operating and maintenance personnel.
- Clearly and unequivocally define the responsibilities on the job site, also in view of traffic regulations.
- Give the operator the authority to refuse instructions by other persons that are contrary to safety.
- Have the vehicle serviced and repaired only by an authorized service center.

Required knowledge of operator

- The operator is responsible for other persons.
- Avoid any operational mode that might be prejudicial to safety.
- The specific national driving license is required.
- The vehicle may only be operated by authorized and safety-conscious persons who are fully aware of the risks involved in operating the vehicle.
- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
- All persons working on or with the vehicle must have read and understood the safety instructions in this Operator's Manual before starting work.
- Follow, and instruct the operator in, legal and other mandatory regulations relevant to accident prevention.
- Observe and instruct the operator in regulations regarding road traffic and environmental protection.
- Use only the defined accesses for getting on and off the vehicle.
- Be familiar with the emergency exit of the vehicle.

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Preparatory measures for the operator

- Before starting, check the vehicle whether it can be driven and operated safely.
- Tie back long hair and remove all jewelry.
- Wear close-fitting work clothes that do not hinder movement.

2.3 Conduct

Prerequisites for operation

- The vehicle has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless its use can cause danger to the operator or other persons, or damage to the vehicle.
- Store this Operator's Manual in the place provided for this in or on the vehicle. Immediately replace a damaged or illegible Operator's Manual and any supplements to it.
- The vehicle must only be operated in accordance with its designated use and the instructions set forth in this Operator's Manual.
- The operator and owner are obligated not to put into operation or operate a damaged or malfunctioning vehicle.
  - If a damage or malfunction occurs during operation, put the vehicle out of operation immediately and secure it against restart.
  - Have all malfunctions jeopardizing the safety of the operator or other persons immediately repaired by an authorized service center.
- Do not put the vehicle into operation or operate it after an accident; have it inspected for damage by an authorized service center.
  - Have the seat belt replaced by an authorized service center after an accident, even if there is no visible damage.
  - Cabin and protective structures
- Remove all dirt, snow and ice from climbing aids (for example from the handholds, footholds, handrails).
- The owner is responsible for requiring the operating and maintenance personnel to wear protective clothing and equipment as required by the circumstances.

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2.4 Operation

Preparatory measures

- Operation is only allowed with correctly installed and intact protective structures.
- Keep the vehicle clean. This reduces injury, accident and fire hazards.
- Safely store objects you carry with you in the places provided for this (for example in the storage compartment, drinks holder).
- Do not carry objects with you that protrude into the operator’s work space. They can create another danger in case of an accident.
- Observe all safety, warning and information labels.
- Start and operate the vehicle only with the seat belt fastened and only from the place provided for this.
- Check the condition and the fastening of the seat belt. Have malfunctioning seat belts and mounting hardware replaced by an authorized service center.
- Before starting work, adjust the seating position so that all control elements can be reached and fully operated.
- Perform the personal adjustment at machine standstill only (for example of the operator seat, steering column).
- Ensure that all safety devices are properly installed and functional before starting work.
- Before starting work or after interrupting work, ensure that the brake, steering, signaling and light systems are functional.
- Before putting the vehicle into operation, ensure that nobody is in the danger zone.

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Job site

- The operator is responsible for other persons.
- Before starting work, familiarize yourself with the job site. This applies to, for example:
  - Obstacles in the job site and vehicle travel area
  - Any barriers separating the job site from public roads
  - Soil weight-bearing capacity
  - Existing overhead and underground lines
  - Special operating conditions (for example dust, steam, smoke, asbestos)
- The operator must know the maximum dimensions of the vehicle and the attachment – see “Technical data”.
- Maintain a safe distance (for example from buildings, edges of building pits).
- During work in buildings or in enclosed areas, look out for:
  - Height of the ceiling/clearances
  - Width of entries/passages
  - Maximum load of ceilings and floors
  - Sufficient room ventilation (for example risk of carbon monoxide poisoning)
- Use existing visual aids to stay aware of the danger zone.
- In conditions of darkness and poor visibility, switch on existing work lights and ensure that motorists are not blinded by these lights.
- If the existing lights of the vehicle are not sufficient for performing work safely, ensure additional lighting of the job site.
- Due to hot vehicle parts, maintain a safe distance from easily flammable material (for example from hay, dry leaves).

Danger zone

- The danger zone is the area in which persons are in danger due to the movements of the vehicle, attachment and/or load.
- The danger zone also includes the area that can be affected by falling material, equipment or by parts that are thrown out.
- Extend the danger zone sufficiently in the immediate vicinity of buildings, scaffolds or other elements of construction.
- Seal off the danger zone should it not be possible to keep a sufficient safety distance.
- Stop vehicle operation immediately if persons do not stay clear of the danger zone.

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Carrying passengers

- Carrying passengers with the vehicle is PROHIBITED.
- Carrying passengers on/in attachments/tools is PROHIBITED.
- Carrying passengers on/in trailers is PROHIBITED.

Mechanical integrity

- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
- Operate the machine only if all protective and safety-oriented equipment (for example protective structures such as a cabin or rollbar, removable safety devices) is installed and functional.
- Check the vehicle for visible damage and defects.
- In case of damage and/or unusual behavior, put the vehicle out of operation immediately and secure it against restart.
- Have all malfunctions jeopardizing the safety of the operator or other persons immediately repaired by an authorized service center.

Starting the engine of the vehicle

- Start the engine only according to the Operator’s Manual.
- Observe all warning and indicator lights.
- Do not use any liquid or gaseous starting aids (for example ether or starting fuel).

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Machine operation

- Start and operate the vehicle only with the seat belt fastened and only from the place provided for this.
- Put the vehicle into operation only if visibility is sufficient (have another person guide you if necessary).
- Operation on slopes:
  - Travel/work only uphill or downhill.
  - Avoid vehicle travel across a slope, observe the vehicle's permissible inclination (and of the trailer if necessary).
  - Keep loads on the uphill side of the vehicle and as close as possible to it.
  - Keep attachments/work equipment close to the ground.
- Adapt the travel speed to the circumstances (for example the ground conditions, weather conditions).
- There is increased danger during backward vehicle travel. Persons in the blind spot of the vehicle cannot be seen by the operator.
  - Ensure that nobody is in the danger zone when you change the travel direction.
- Never get on a moving vehicle and never jump off the vehicle.

Machine travel on public roads/sites

- The specific national driving license is required.
- Observe the national regulations (for example the road traffic regulations) during machine travel on public roads/sites.
- Ensure that the vehicle is in compliance with the national regulations.
- In order not to blind other motorists, using the existing work lights during vehicle travel on public roads/site is prohibited.
- When crossing underpasses, bridges, tunnels, for example, ensure that the clearance height and width is sufficient.
- The attachment fitted onto the machine must be certified for travel on public roads/sites (see for example the registration documents).
- The attachment fitted onto the vehicle must be empty and in transport position.
- The attachment fitted onto the vehicle must be equipped with the mandatory lights and protective equipment.
- Take measures against unintentional operation of the operating hydraulics.
- If the vehicle has different steering modes, ensure that the mandatory steering mode is selected.

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Stopping the engine of the vehicle

- Stop the engine only according to the Operator's Manual.
- Before stopping the engine, lower the work equipment/attachment to the ground.

Stopping and securing the vehicle

- Unbuckle the seat belt only after stopping the engine.
- Before leaving the machine, secure it to prevent it from rolling away (for example with the parking brake, suitable wheel chocks).
- Remove the starting key and secure the vehicle against unauthorized operation.

2.5 Lifting gear applications

Requirements

- Have loads fastened and the operator guided by a qualified person having specific knowledge of lifting gear applications and the usual hand signals.
- The person giving instructions to the operator must stay in visual contact with the operator when fastening, guiding or removing the load (maintain visual contact).
- If this is not possible, ask one more person with the same qualifications to guide.
- The operator may not leave his seat as long as the load is raised.

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Fastening, guiding and removing loads

- Follow the applicable specific regulations for fastening, guiding and removing a load.
- Wear protective clothing and equipment when fastening, guiding and removing loads (for example a hard hat, safety glasses, protective gloves, safety boots).
- Do not place lifting and fastening gear over sharp edges or rotating parts. Loads must be fastened so as to prevent them from slipping or falling.
- Move loads only on horizontal, level and firm ground.
- Move loads close to the ground.
- In order to avoid oscillating movements of loads:
  - Perform smooth, slow movements with the vehicle.
  - Use cables to guide the load (do not use hands to guide).
  - Bear in mind the weather conditions (for example the wind force).
  - Keep a minimum safety distance from objects.
- The operator may allow the load to be fastened and removed only if the vehicle and its work equipment are not being moved.
- Danger zones must not overlap with the work zones of other vehicles.

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Lifting gear applications

- The vehicle must be certified for lifting gear applications.
- Observe the national regulations for lifting gear applications.
- Lifting gear applications are procedures involving raising, transporting and lowering loads with the help of lifting and fastening gear.
- The help of an accompanying person is necessary for fastening, guiding and removing the load.
- There must be nobody under the load.
- Stop the vehicle immediately and stop the engine if persons enter the danger zone.
- Use the machine for lifting gear applications ONLY if the mandatory lifting gear (for example a joint rod and load hook) and safety equipment (for example optical and acoustic warning devices, hose burst valve, stability table) is installed and functional.
- Use only lifting and fastening gear certified by a test/certification body, observe the inspection intervals (use only chains and shackles. No belts, slings or cables).
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Do not interrupt the work process with a load attached.

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2.6 Trailer operation

Trailer operation

- The vehicle must be certified for trailer operation.
- Observe the national regulations for trailer operation.
- The specific national driving license is required.
- Carrying passengers on/in trailers is PROHIBITED.
- Observe the maximum permissible vertical and trailer load.
- Do not exceed the permissible trailer speed.
- Trailer operation with the towing gear of the vehicle is prohibited.
- Trailer operation changes the vehicle's operating behavior, the operator must be familiar with this and act accordingly.
- Bear in mind the vehicle's steering mode and the trailer's turning circle.
- Before hitching/unhitching the trailer, secure it to prevent it from rolling away (for example with the parking brake, suitable wheel chocks).
- There must be nobody between the vehicle and the trailer when hitching a trailer.
- Hitch the trailer onto the vehicle correctly.
- Ensure that all equipment works correctly (for example the brakes, lights).
- Before starting vehicle travel, ensure that nobody is between the vehicle and the trailer.

2.7 Attachment operation

Attachments

- Use only attachments that are certified for the machine or its protective equipment (for example a shatter protection).
- All other attachments require the vehicle manufacturer's release.
- The danger zone and the work zone depend on the attachment used – see the Operator's Manual of the attachment.
- Secure the load.
- Do not overload attachments.
- Check the correct position of the lock.

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Operating

- Carrying persons on/in an attachment is prohibited.
- Installing a work platform is prohibited.
  - Exception: The vehicle is certified and equipped with the necessary safety equipment.
- Attachments and counterweights modify handling, as well as the steering and brake capability of the vehicle.
- The operator must be familiar with these modifications and act accordingly.
- Before starting work, operate the attachment to check that it works correctly.
- Before putting the attachment into operation, ensure that nobody is in danger.
- Lower the attachment to the ground before leaving the operator's seat.

Removing and fitting attachments

- Before uncoupling or coupling hydraulic connections:
  - Stop the engine.
  - Release the pressure in the operating hydraulics
- Picking up and lowering attachments to the ground requires special care:
  - Pick up and safely lock the attachment in accordance with the Operator’s Manual.
  - Lower the attachment only to firm, level ground and secure it to prevent it from tipping over or rolling away.
- Put the vehicle and the attachment into operation only if:
  - The protective equipment has been installed and is functional.
  - The connections for the lights and the hydraulic system have been established and are functional.
- Perform a visual check of the lock after locking the attachment.
- There must be nobody between the vehicle and the equipment when picking up or lowering an attachment to the ground.

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2.8 Towing, loading and transporting

Towing

- Seal off the danger zone.
- Ensure that no one is near the towing bar or cable. The safety distance is equal to 1.5 times the length of the towing equipment.
  Use a towing cable for vehicles with a total weight of up to 4.0 tons.
  Use a towing bar for vehicles with a total weight of over 4.0 tons.
- Observe the mandatory transport position, permissible speed and itinerary.
- A tractor vehicle of the same weight category must be used as a minimum. Furthermore, the tractor vehicle must be equipped with a safe braking system and sufficient tractive power.
- Use only towing bars or cables certified by a test/certification body, observe the inspection intervals.
- Do not use any towing bars or cables that are dirty, damaged or not of sufficient size.
- Fasten towing bars or cables only at the defined points.
- Tow away only in accordance with this Operator’s Manual to avoid damage to the vehicle.
- Observe the national regulations (for example the light regulations) when towing on public roads/sites.

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Crane-lifting

- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Observe the vehicle's overall weight – see "Technical data".
- Wear protective clothing and equipment when fastening, guiding and removing the machine (for example a hard hat, safety glasses, safety boots).
- Use only lifting and fastening gear certified by a test/certification body (for example cables, belts, hooks, shackles), observe the inspection intervals.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Perform a visual check to ensure that all slinging points are neither damaged nor worn (no widening, no sharp edges, no cracks).
- Have loads fastened and crane operators only guided by experienced persons.
- The person guiding the crane operator must be within sight or sound of him.
- Observe all movements of the vehicle and lifting gear.
- Secure the vehicle against unintentional movement.
- Raise the vehicle only after it is safely attached and the person attaching the vehicle has given his approval.
- Use only the slinging points provided for fastening the lifting gear (for example cables, belts).
- Do not attach the machine by twining the lifting gear (for example cables, belts) around it.
- Ensure an even load distribution (center of gravity!) when fastening the lifting gear.
- Ensure that no one is in, on or under the vehicle when loading the vehicle.
- Observe the national regulations (for example "Merkheft Erdbaumaschinen", leaflet on earth moving machines of the German employers' liability insurance association for construction engineering).
- Load the vehicle only in accordance with this Operator's Manual to avoid damage to the vehicle.
- Do not raise a machine that is stuck or frozen onto the ground, for example.
- Bear in mind the weather conditions (for example the wind force, visibility conditions).

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Transportation

- For the safe transportation of the vehicle:
  - The transport vehicle must have a sufficient load capacity and platform – see “Technical data”
  - The maximum weight rating of the transport vehicle must not be exceeded.
- Use only lifting and fastening gear certified by a test/certification body, observe the inspection intervals.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- In order to secure the vehicle on the platform, use only the fastening points provided for this purpose.
- Ensure that nobody is in or on the vehicle during transportation.
- Observe the national regulations (for example “Merkheft Erdbaumaschinen”, leaflet on earth moving machines of the German employers’ liability insurance association for construction engineering).
- Bear in mind the weather conditions (for example ice, snow).
- Ensure the minimum load on the steering axle(s) of the transport vehicle, and ensure an even load distribution.

2.9 Maintenance

Maintenance

- Observe the intervals prescribed by law and those specified in this Operator’s Manual for routine checks/inspections and maintenance.
- For inspection and maintenance, ensure that all tools and service center equipment are adapted to the performance of the task described in this Operator’s Manual.
- Do not use any damaged or malfunctioning tools.
- The vehicle and the engine must be stopped during maintenance.
- Once maintenance is over, correctly install safety equipment again that has been removed.
- Wait for the vehicle to cool down before touching components.

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Personal safety measures

- Avoid any operational mode that might be prejudicial to safety.
- Wear protective clothing and equipment (for example a hard hat, protective gloves, safety boots).
- Tie back long hair and remove all jewelry.
- If maintenance on a running engine cannot be avoided:
  - Only work in groups of two.
  - Both persons must be authorized and trained for the operation of the vehicle.
  - One person must be seated on the operator's seat and stay in contact with the second person.
  - Keep a safe distance from rotating parts (for example from fan blades, belts).
  - Keep a safe distance from hot parts (for example from the exhaust system).
  - Perform maintenance only in well-ventilated rooms or rooms with an exhaust-gas suction system.
- Safely lock/support vehicle components before starting work.
- Apply special care when working on the fuel system due to the increased fire hazard.

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Preparatory measures

- Attach a warning label to the control elements (for example “Machine being serviced, do not start”).
- Before performing assembly work on the vehicle, support the areas to be serviced and use suitable lifting and supporting equipment for the replacement of parts over 9 kg (20 lbs).
- Perform maintenance only if:
  - the vehicle is positioned on firm and level ground
  - the machine is secured to prevent it from rolling away (for example with the parking brake, wheel chocks), and if all attachments/the work equipment is lowered to the ground
  - the engine is stopped
  - the starting key has been removed
  - the pressure in the operating hydraulics has been released
- If maintenance has to be performed under a raised machine/ attachment, support the machine/attachment (for example with a lift platform, trestles) ensuring safety and stability.
- Hydraulic cylinders or jacks alone do not sufficiently secure a raised vehicle/attachment.

Measures for performing maintenance

- Perform only the maintenance described in this Operator’s Manual.
- All work that is not described in this Operator’s Manual must be performed by qualified and authorized technical personnel.
- Follow the maintenance plan – see “Maintenance plan”.
- Always use specially designed or otherwise safety-oriented ladders and working platforms to perform overhead maintenance. Do not use vehicle parts or attachments as a climbing aid.
- Do not use attachments/work equipment as a lift platform for persons.
- Remove all dirt, snow and ice from climbing aids (for example from the handholds, footholds, handrails).
- Disconnect the negative terminal of the battery before working on the electrical system.

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Modifications and spare parts

- Do not modify the machine and the work equipment/attachment (for example the safety equipment, lights, tires, straightening and welding work).
- Modifications must be approved by the manufacturer and performed by an authorized service center.
- Use only original spare parts.

Protective structures

- The cabin, rollbar and protective screen are tested protective structures and may not be modified (for example no drilling, bending, welding).
- Perform a visual check according to the maintenance plan (for example check fastenings for damage).
- If damage or defects are detected, have them immediately checked and repaired by an authorized service center.
- Have retrofitting work only performed by an authorized service center.
- Replace self-locking fasteners (for example self-locking nuts) by new ones after removing them.

2.10 Measures for avoiding risks

Tires

- Have repair work on the tires only performed by trained technical personnel.
- Check the tires for correct pressure and visible damage (for example cracks, cuts).
- Tighten the wheel nuts to the specified tightening torque. (See chapter 7.18 Tires/tracks).
- Use only approved tires.
- The machine must have identical tires (for example profile, revolutions per mile).

Tracks

- Repair work on tracks may be performed only by trained technicians.
- Check the tracks for correct tension and visible damage (for example cracks, cuts).
- Proceed with extreme care on slippery ground (for example on steel plates, ice), increased slipping hazard.
- Use only approved tracks.

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Hydraulic and compressed-air system

- Check all lines, hoses and screw connections regularly for leaks and visible damage.
- Splashed oil can cause injury and fire.
- Leaking hydraulic and compressed-air lines can cause the full loss of the brake effect.
- Have damage and leaks immediately repaired by an authorized service center.
- Check the hydraulic hose in the recommended interval and get it changed.

Electrical system

- Use only fuses with the specified current rating.
- In case of damage or malfunction in the electrical system:
  - Put the vehicle out of operation immediately and secure it against restart
  - Disconnect the battery or operate the battery master switch
  - Have the malfunction repaired
- Ensure that work on the electrical system is only performed by trained technical personnel.
- Have the electrical system checked regularly and malfunctions repaired immediately (for example loose connections, scorched cables).
- The operating voltage of machine, the attachment and the trailer must be the same (for example 12 V).

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Battery

California proposal 65

WARNING

Batteries, battery poles, terminals and corresponding accessory parts contain lead and its compounds and other chemicals that, according to the state of knowledge of the state of California, cause cancer, birth defects or reproductive harm. Wash your hands after use.

WARNING

Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

- Batteries contain caustic substances (for example sulfuric acid). When handling the battery observe the specific safety instructions and regulations relevant to accident prevention.
- A volatile oxyhydrogen mixture forms in batteries during normal operation and especially during charging. Always wear gloves and eye protection when working with batteries.
- Do not perform battery maintenance near open flames.
- Perform battery maintenance only in well-ventilated areas (for example due to vapors harmful to health, explosion hazard).
- Starting the vehicle with battery jumper cables is dangerous if performed improperly. Observe the safety instructions regarding the battery.

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Safety instructions regarding internal combustion engines

California proposal 65

WARNING

The engine exhaust fumes of this product contain chemicals that, according to the state of knowledge of the state of California, cause cancer, birth defects or reproductive harm.

WARNING

Diesel engine exhaust fumes and some of its components cause, according to the state of knowledge of the state of California, cancer, birth defects or reproductive harm.

WARNING

Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

- Internal combustion engines present special hazards during operation and fueling.
- Failure to follow the warnings and safety instructions can cause serious injury or death.
- Keep the area around the exhaust system free of flammable materials.
- Check the engine and fuel system for leaks (for example loose fuel lines). Don't start or let the engine run in case of leaks.
- Breathing the exhaust fumes causes death very quickly.
- Engine exhaust contains gases you cannot see or smell (for example carbon monoxide and dioxide).
  - Never operate the machine in enclosed premises or areas (for example in pits), if there is no suitable ventilation (for example exhaust-gas filters, suction systems).
- Do not operate the vehicle in potentially explosive areas.
- Do not touch the engine, exhaust system and cooling system as long as the engine is still running or has not cooled down yet.
- Do not remove the radiator cap when the engine is running or hot.
- The coolant is hot, under pressure and can cause serious burns.

Bleeding the fuel system and refueling

- Do not bleed the fuel system or refuel near open flames.
- Bleed the fuel system and refuel only in well-ventilated areas (for example due to vapors harmful to health, explosion hazard).
- Wipe away fuel spills immediately (for example due to fire hazard, slipping hazard).
- Firmly close the fuel tank cap; replace a malfunctioning fuel tank cap.

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Handling oil, grease and other substances

- When handling oil, grease and other chemical substances (for example the battery acid, coolant), observe the safety data sheets.
- Wear appropriate protective equipment (for example protective gloves, safety glasses).
- Be careful when handling hot consumables – burn hazard.
- In polluted environment (dust, vapors, smoke, asbestos), work only with appropriate personal protective equipment (for example with a breathing mask).
- Do not operate the vehicle in radioactively, biologically or chemically contaminated areas.

Fire hazard

- Fuel, lubricants and coolants are flammable.
- Do not put the vehicle into operation if there is a fire hazard.
- Do not use flammable detergents.
- Keep the area around the exhaust system free of flammable materials.
- Due to hot vehicle parts, maintain a safe distance from easily flammable material (for example from hay, dry leaves).
  - Stop and park the vehicle only in fire-protected areas.
- If the vehicle is equipped with a fire extinguisher, have it installed in its specific location.
- Keep the vehicle clean to reduce the fire hazard.

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Working near electric supply lines

- Before performing any work, the operator must check whether there are any electric supply lines in the job site.
- If there are electric supply lines, only a vehicle with cabin may be used (Faraday cage).
- Keep a safe distance from existing electric supply lines.
- If this is not possible, the operator must take other safety measures (for example switching off the current) in agreement with the operating company or owner of the supply lines.
- If supply lines are exposed, they must be fastened, supported and secured accordingly.
- If live supply lines are touched nevertheless:
  - Do not leave/touch the cabin (Faraday cage)
  - If possible, drive the vehicle out of the danger zone
  - Warn others against approaching and touching the vehicle
  - Have the live wire de-energized
  - Do not leave the vehicle until the supply lines that have been touched or damaged have been safely de-energized.

Working near non-electric supply lines

- Before performing any work, the operator must check whether there are any non-electric supply lines in the job site.
- If there are non-electric supply lines, the operator must take safety measures (for example switching off the supply line) in agreement with the operating company or owner of the supply lines.
- If supply lines are exposed, they must be fastened, supported and secured accordingly.

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Behavior during thunderstorm

- Stop machine operation if a thunderstorm is gathering, stop the machine, secure and leave it, and avoid being near it.

Noise

- Observe the noise regulations (for example, during applications in enclosed premises).
- Bear in mind external sources of noise (compressed-air hammer, concrete saw).
- Do not remove the sound baffles of the machine/attachment.
- Have damaged sound baffles immediately replaced (for example, an insulating mat, muffler).
- Before starting work, get informed on the noise level of the machine/attachment (for example on the adhesive label) – wear ear protectors.
- Do not wear ear protectors during machine travel on public roads/sites.

Cleaning

- Risk of injury from compressed air and high-pressure cleaners.
  - Wear appropriate protective clothes.
- Do not use any dangerous and aggressive detergents.
  - Wear appropriate protective clothes.
- Operate the machine only in a clean condition.
  - Remove all dirt, snow and ice from climbing aids (for example from the handholds, footholds, handrails).
  - Keep the cabin glazing and visual aids clean.
  - Keep the light system and reflectors clean.
  - Keep the control elements and indicators clean.
  - Keep the safety, warning and information labels clean, and replace damaged and missing labels by new ones.
- Perform cleaning work only if the engine is stopped and cooled down.
- Bear in mind sensitive components and protect them accordingly (for example electronic control units, relays).

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3 Introduction

3.1 Machine overview

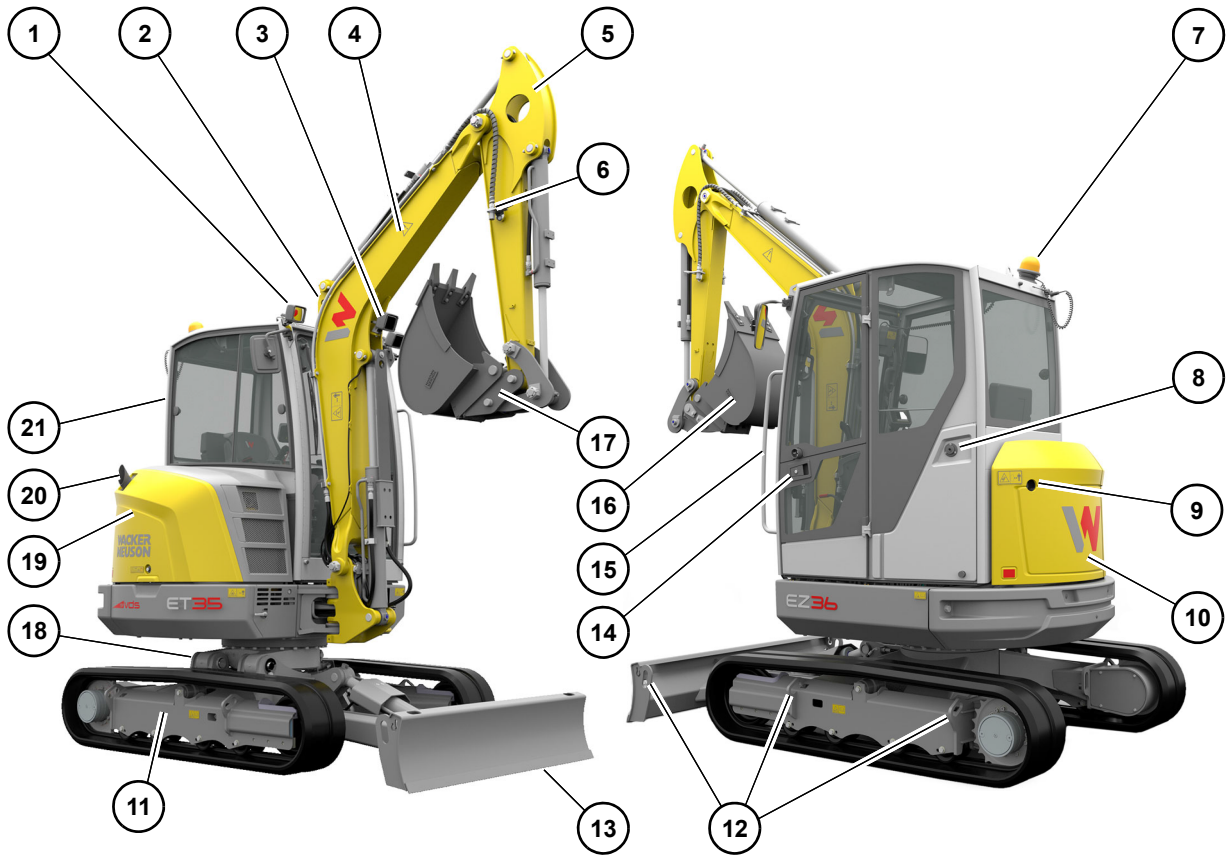


Fig. 2

Pos.	Description	Pos.	Description
1	Roof light	12	Tie-down points
2	Lifting eye	13	Stabilizer blade
3	Boom light	14	Door handle
4	Boom	15	Handhold
5	Shovel arm	16	Bucket
6	Auxiliary hydraulics	17	Hydraulic quickhitch
7	Rotating beacon	18	VDS console
8	Door arrester	19	Engine cover
9	Hydraulic oil level sight glass	20	Exhaust
10	Cover	21	Cab
11	Chassis	--	--

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3.2 Brief description of the vehicle

The Wacker Neuson model E16 track excavators are self-propelled work vehicles.

These vehicles are powerful, highly flexible and efficient construction vehicles with minimum environmental impact. They are mainly used for loosening and moving earth, for example for digging and filling up construction pits. A wide range of attachments offers a large number of applications, for example hammer operation or bulk-material handling with a grab.

Other application possibilities *– see chapter " Technical data of attachments" on page 9-13*.

Model designations and trade names

Machine model	Trade name	Engine
E16-01	ET35	Yanmar 3TNV88-BPWN
		Yanmar 3TNV88F-EPWN/EPWNV
E16-02	EZ36	Yanmar 3TNV88-BPWN
		Yanmar 3TNV88F-EPWN/EPWNV

Information

The machine can be equipped with the **Telematic** option (for transmitting operating data, location, etc. via satellite).

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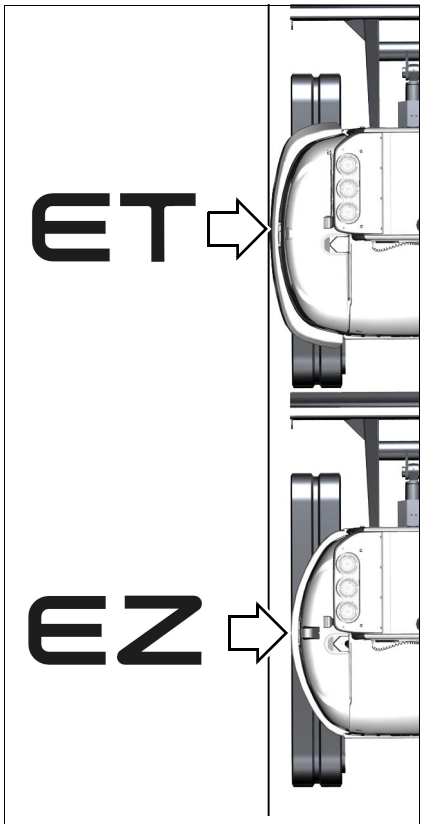


Fig. 3 (symbolic representation)

Superstructure Versions

ET: conventional superstructure

EZ: Zero tail revolving superstructure; the upper carriage does not project over the width of the vehicle **without additional weight** when rotating.

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3.3 Labels

WARNING

Injury hazard due to missing or damaged labels!

An insufficient warning of dangers can cause serious injury or death.

- ► Do not remove warning and information labels.
- ► Immediately replace damaged warning and information labels.

Information

Type, quantity, and position of the labels depend on options, country and vehicle.

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Type labels



Fig. 4

The vehicle type label is located on the swiveling console.

Serial number

The serial number is stamped on the vehicle chassis. It is also located on the type label.

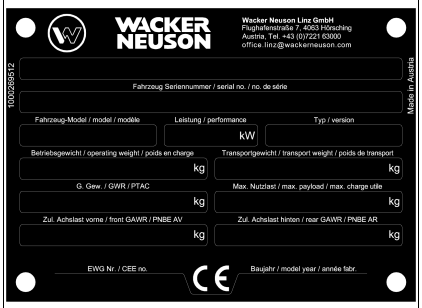


Fig. 5 (symbolic representation)

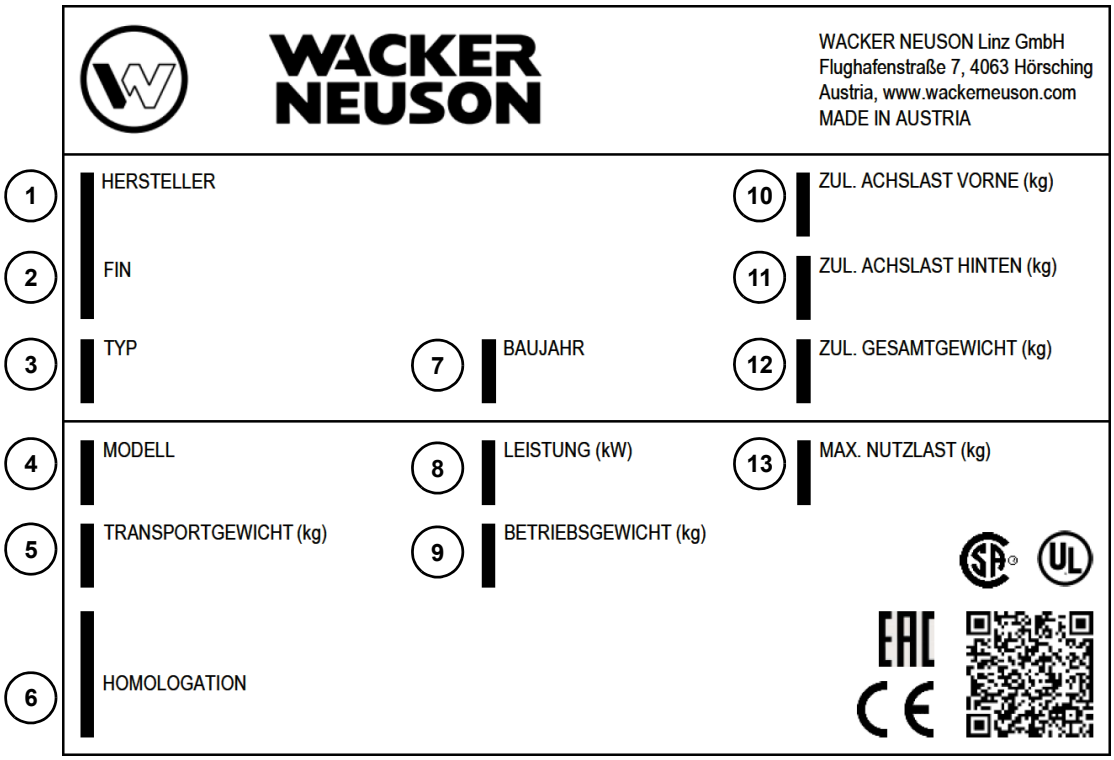
Type label (version 1)

The vehicle type label contains the following information:

Description of attachment	HYDRAULIC EXCAVATOR
Vehicle serial no. /serial no.	Machine serial number
Fahrzeug Modell/model/modèle:	Machine designation
Leistung/performance:	Engine power
Typ/version:	Machine type
Betriebsgewicht/operating weight/poids en charge:	Operating weight
Transportgewicht/transport weight/poids en transport:	Transport weight
G. weight/GWR/PTAC:	Gross weight rating (permissible)
Max. Nutzlast/max. payload/max. charge utile:	Maximum payload
Zul. Achslast vorne/front GAWR/PNBE AV:	Front gross axle weight rating
Zul. Achslast hinten/rear GAWR/PNBE AR:	Rear gross axle weight rating
EWG Nr./CEE no.:	EEC check number
Baujahr/model year/année fabr.:	Year of construction

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Type label (version 2)



.

Number	Type label
1	Manufacturer
2	Machine serial number
3	Internal model designation
4	Trade name
5	Transport weight
6	Certification
7	Year of construction
8	Power
9	Operating weight
10	Front gross axle weight rating
11	Rear gross axle weight rating
12	Permissible maximum weight
13	Maximum payload

Information

The type label is bright for better legibility. The language on the type label may vary.

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17-digit serial number

The 17-digit serial number has additional information, in order to make vehicle identification easier.

Version 1:

Manufacturer code	Machine model	Internal model designation	Check letter	Production site	Serial number
WNC	E (Excavator)	1301	K	PAL	12345
	D (Dumper)				
	A (Unit)				
	S (Skid steer loader)				

Variant 2:

Manufacturer code	Machine model	Internal model designation	Check letter	Serial number
WNC (Austria) WNP (China)	E (Excavator)	1301	K	00012345
	D (Dumper)			
	A (Unit)			

Information

Wacker Neuson components (for example Easy Lock, tilt bucket, rollbar) have numeric serial numbers only.

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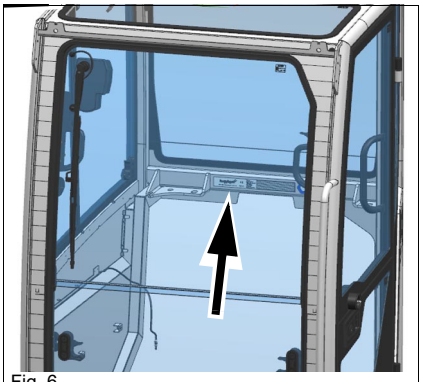


Fig. 6

Canopy/cabin

The type label is located at the rear of the chassis.

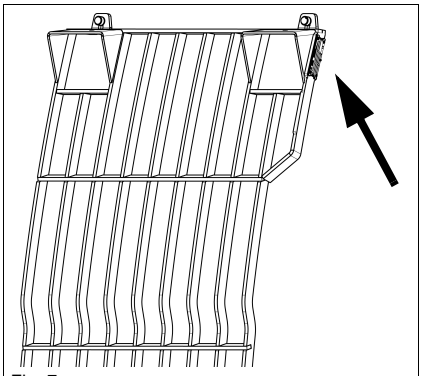


Fig. 7

Front Guard

The type label is located at the upper left of the chassis.

https://truckmanualshub.com/

Warning labels

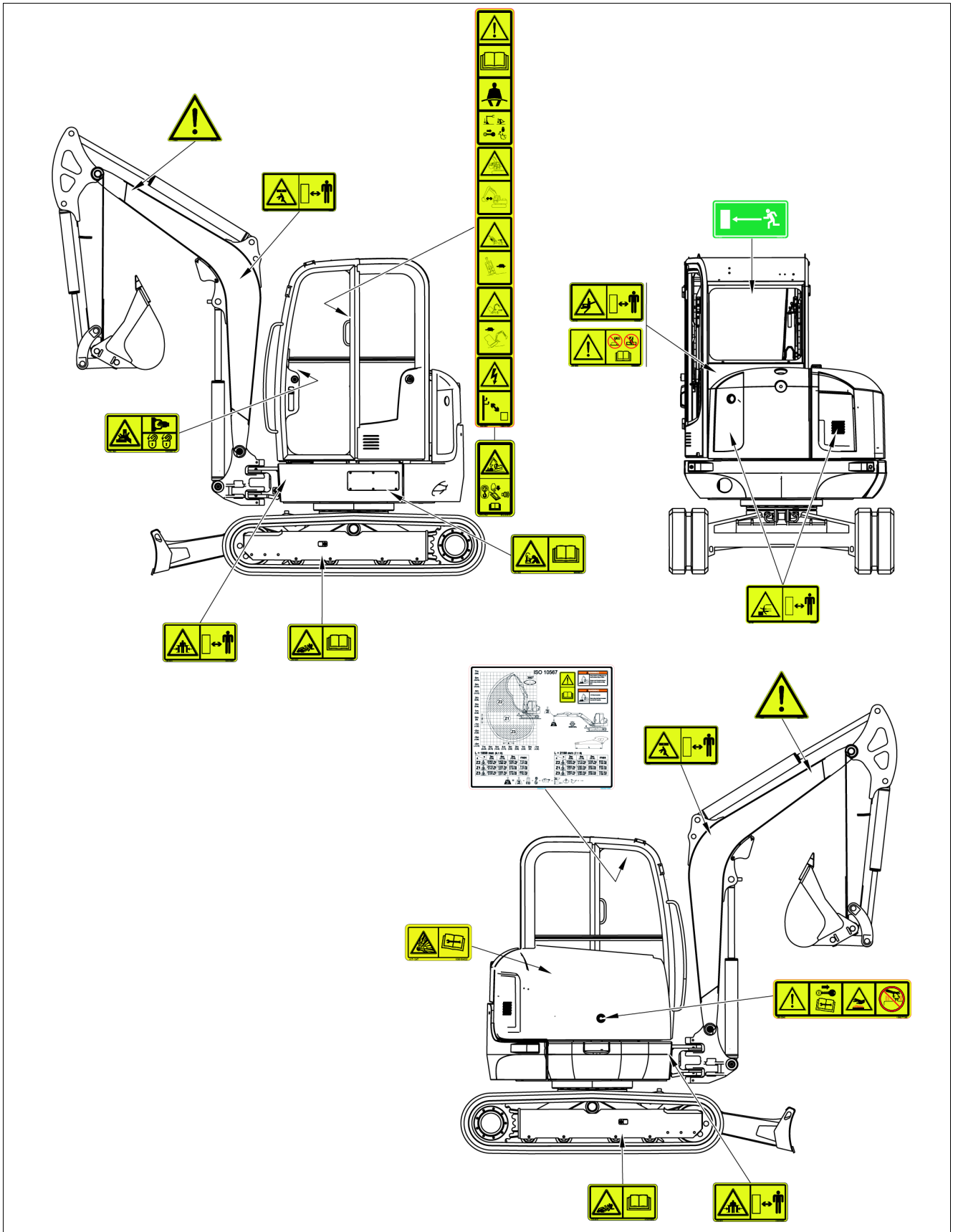


Fig. 8 (symbolic representation)

https://truckmanualshub.com/

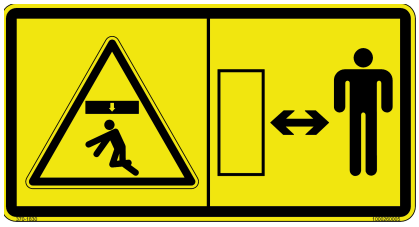


Fig. 9

Meaning

Crush Hazard

All persons must stay clear of a raised load or of the danger zone.

Position

On the left and right side on the lifting arm

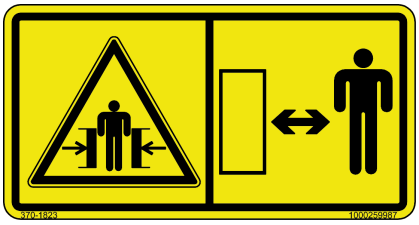


Fig. 10

Meaning

Crush Hazard

Do not allow anyone to stay in the danger zone of the vehicle.

Position

At the front left and right of the chassis



Fig. 11

Meaning

Explosion hazard due to wrong connection of battery jump cables

Position

Next to the battery

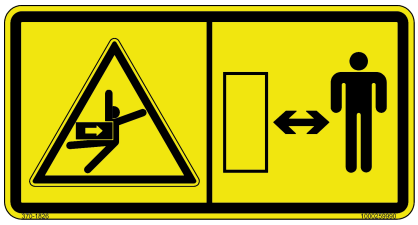


Fig. 12

Meaning

Crush Hazard

Do not allow anyone to stay in the swiveling range of the vehicle.

Position

On the rear left of the cabin

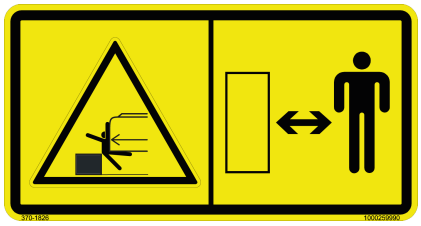


Fig. 13

Meaning

Crush Hazard

Do not allow anyone to stay in the swiveling range of the vehicle.

Position

At the additional weight on the left and right of the vehicle

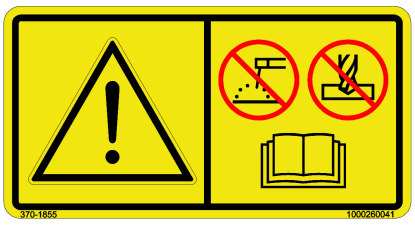


Fig. 14

Meaning

Modifications to the structure (for example welding, drilling), retrofitting, and incorrect repairs affect the protective effect of the cabin and can cause serious injury and even death.

Position

On the rear left of the cabin

https://truckmanualshub.com/



Fig. 15

Meaning

Crush Hazard

1. Use the handholds for opening and closing the front window.
2. Lock the window into place.

Position

On the front window

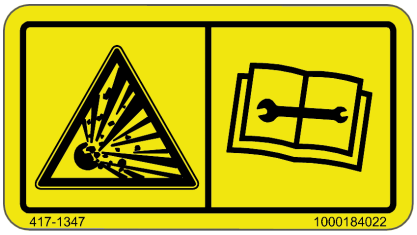


Fig. 16

Meaning

Accumulator is under high pressure. Maintenance or repair work may only be performed by a Wacker Neuson service center.

Position

Under the valve cover

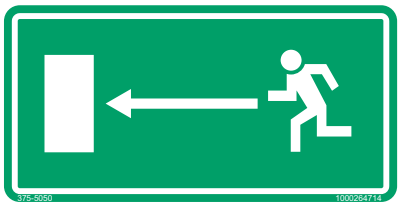


Fig. 17

Meaning (option)

Emergency exit if equipped with **Front Guard** option

Position

Inside the cabin on the rear window



Fig. 18

Meaning (option)

Injury hazard due to grease escaping under pressure

Read the operator’s manual before working with the track tensioner.

Position

On left and right-hand undercarriage

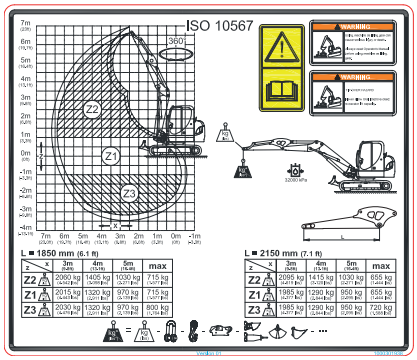


Fig. 19

Meaning (option)

Load diagram

Position

On the headliner

https://truckmanualshub.com/



Fig. 20

Meaning

Read the Operator’s Manual before starting the vehicle.

Fasten your seat belt.

Lower the boom and the stabilizer blade to the ground.

Remove the starting key and carry it with you.

Raise the control lever base.

Crush Hazard

Possible serious vehicle damage.

Keep a safe distance from the cabin.

Crush Hazard

Possible serious vehicle damage.

During vehicle operation on slopes, pay attention to the maximum gradient angle and maximum lateral angle of inclination.

Do not drive in speed range 2.

Risk of fatal injuries due to electric shock

During vehicle operation, maintain a safe distance from overhead electric lines.

Position

Canopy: on the left C pillar

Cabin: on the left B pillar



Fig. 21

Meaning (option)

Switch on the safe load indicator during lifting gear applications.

A vehicle can cause serious injury or death if it tips over.

Possible serious vehicle damage

Read and understand the Operator’s Manual.

Position

On the B pillar on the left

https://truckmanualshub.com/



Fig. 22

Meaning

Read the Operator’s Manual before starting the vehicle.

Remove the starting key and carry it with you.

Injury hazard due to rotating parts.

- Open the engine cover only at engine standstill.

Burn hazard due to hot surfaces

- Let the engine cool down.

Burn hazard due to hot fluid

Injury hazard due to fluid escaping under pressure

- Let the engine cool down.
- Release the pressure in the hydraulic system, then open the locks carefully.

Position

On the engine cover



Fig. 23

Meaning

Burn hazard due to hot surfaces (lines, plug connections, hardware, hydraulic cylinders, couplings, etc.)

Position

On the boom on the left and right

https://truckmanualshub.com/

Information labels

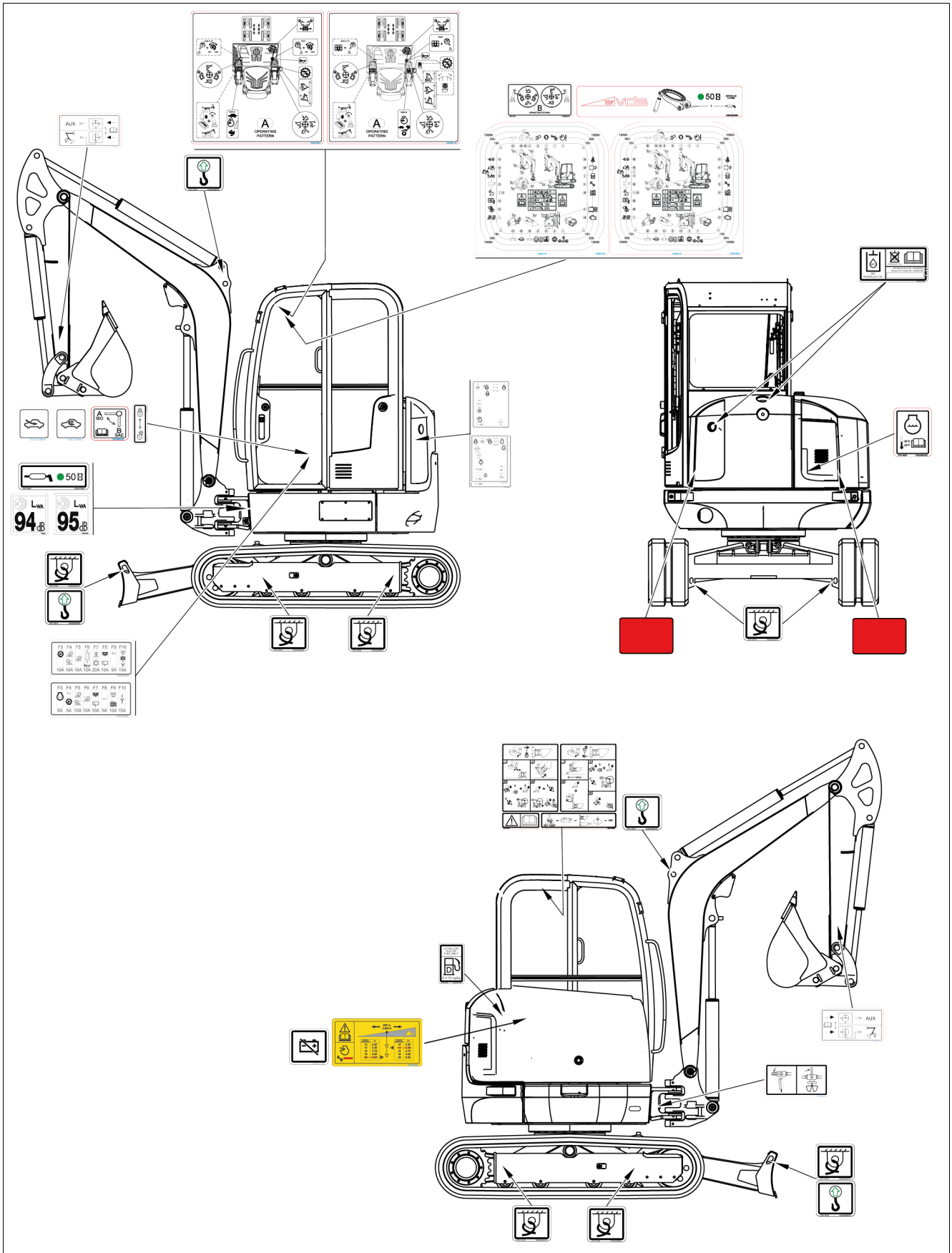


Fig. 24 (symbolic representation)

https://truckmanualshub.com/



Fig. 26

Meaning

Only refuel with diesel fuel with a sulfur content of < 15 mg/kg (= 0.0015%).

Position

Next to the fuel tank filler inlet

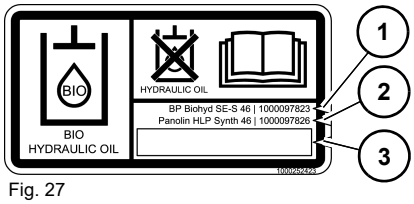


Fig. 27

Meaning (option)

The reservoir contains biodegradable hydraulic oil.

This label is notched on the side depending on the biodegradable hydraulic oil used.

1. BP Biohyd SE-S 46
2. Panolin HLP Synth 46
3. Other biodegradable hydraulic oil

Position

Next to the filler neck of the hydraulic oil tank

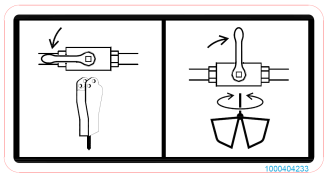


Fig. 28

Meaning (option)

Select hammer operation or excavator operation

Position

At the front right of the chassis

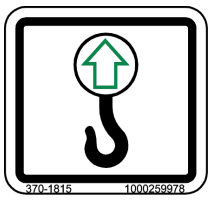


Fig. 29

Meaning

Lifting eyes

Position

Boom: left and right side, near lifting eye

Dozer blade: left and right on lifting eyes



Fig. 30

Meaning

Tie-down points

Position

2 adhesive labels each on dozer blade, rear and front travel gear, and inside of travel gear

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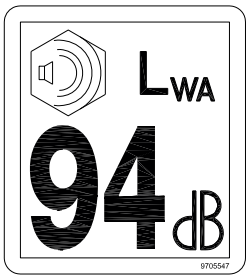


Fig. 31 (symbolic representation)

Meaning

Indication of sound power level produced by the vehicle.

L_{WA} = sound power level

ET35/EZ36 (3TNV88): 95 dB

ET35/EZ36 (3TNV88F): 94 dB (only EU)

Position

At the front left of the chassis

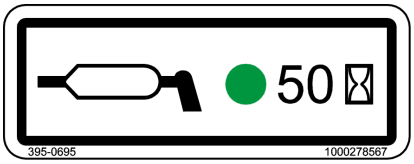


Fig. 32

Meaning

Lubrication interval

Position

At the front left of the chassis

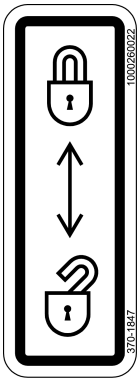


Fig. 33

Meaning

Hydraulic functions active or locked

Position

On control lever base

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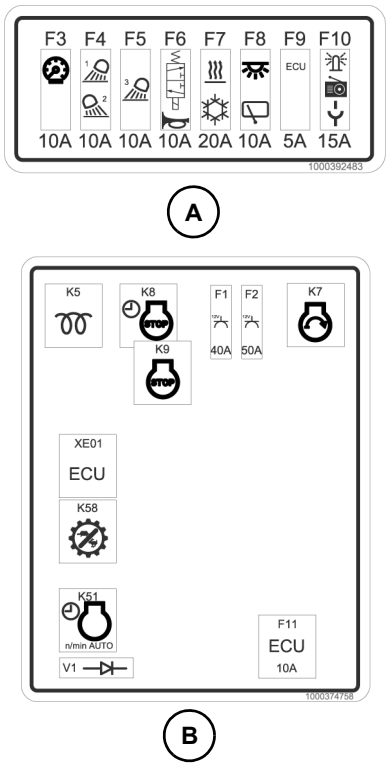


Fig. 34 (symbolic representation)

Meaning

Cabin relays and fuses (**A**)

Engine compartment relays and fuses (**B**)

Position

A: on the outside of the fuse box cover

B: At the main fuse box in the engine compartment



Fig. 35

Meaning

Maintenance of VDS

Position

On the roof window

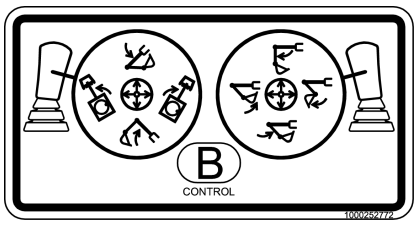


Fig. 36

Meaning (option)

Operating procedures differing from the ISO controls if the SAE controls are set.

Position

On the roof window on the right

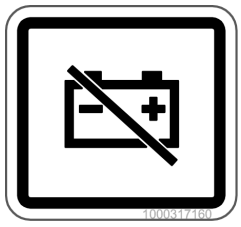


Fig. 37

Meaning

Battery master switch

Position

At battery master switch

https://truckmanualshub.com/

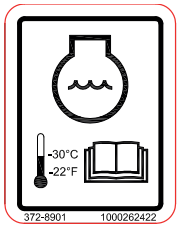


Fig. 38

Meaning

Coolant

Position

For the radiator

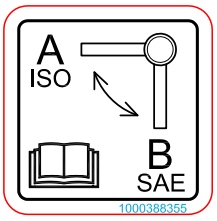


Fig. 39

Meaning

ISO/SAE change-over switch

Position

At the left under the operator seat

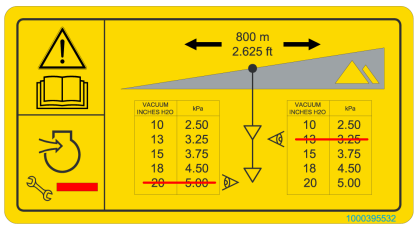


Fig. 40

Meaning

Air filter-dirt indicator (only 3TNV88F)

Position

For the air filter

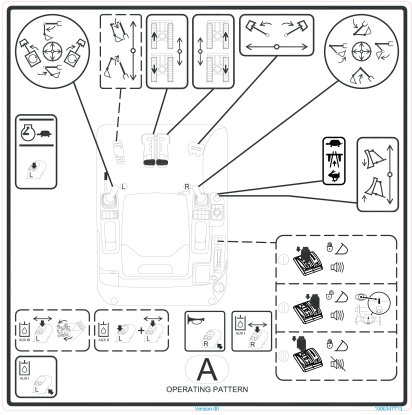


Fig. 41

Meaning

Functional overview (ISO controls)

Check the selected control mode before starting the vehicle.

Position

On the roof window

https://truckmanualshub.com/

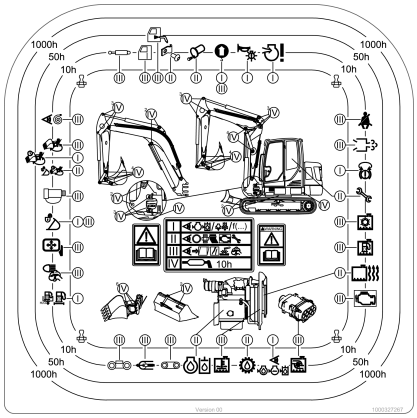


Fig. 42

Meaning

Maintenance intervals

Position

On the cabin, left side

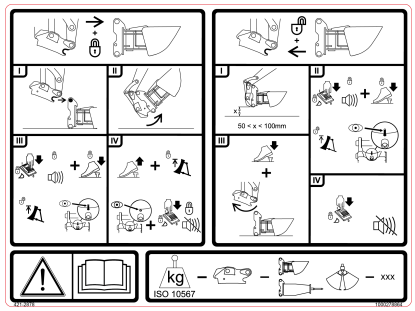


Fig. 43

Meaning

Hydraulic quickhitch

Position

On the headliner

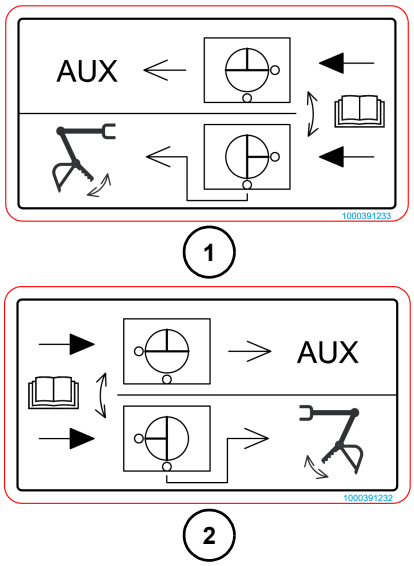


Fig. 44

Meaning

Hydraulic thumb

Position

Left (1) and right (2) on the stick

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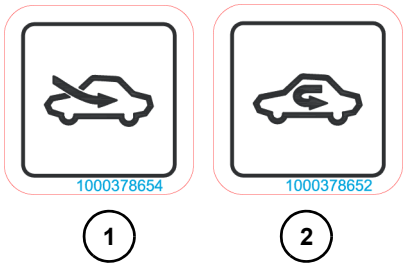


Fig. 45

Meaning

Fresh air (1) / recirculation (2)

Position

On the seat console

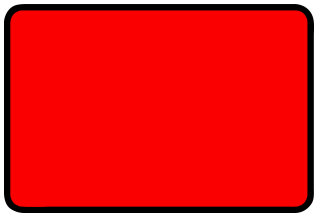


Fig. 46

Meaning (option)

Reflectors

Position

At the rear left and right of the vehicle

ANSI label (option)

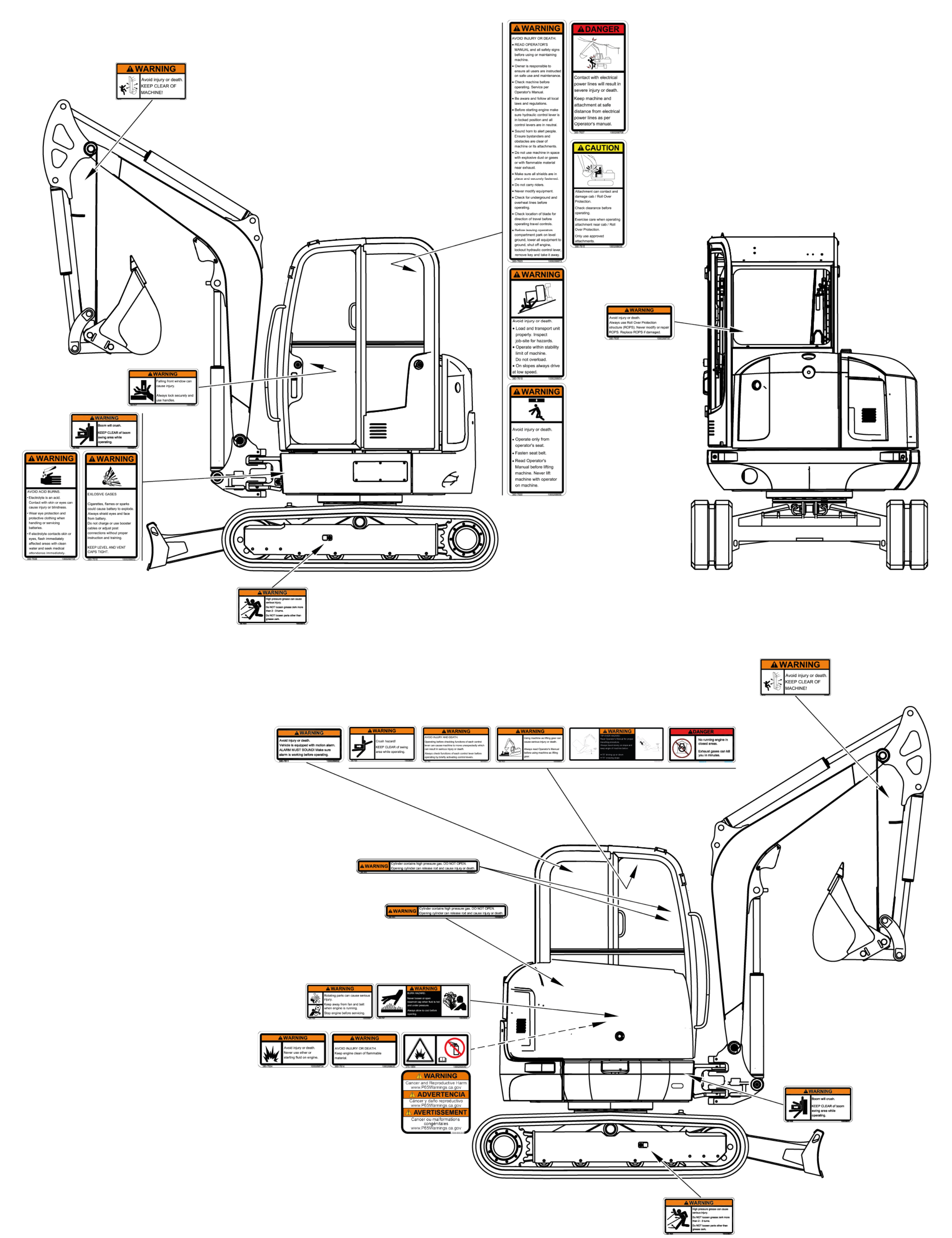


Fig. 47 (symbolic representation)

https://truckmanualshub.com/

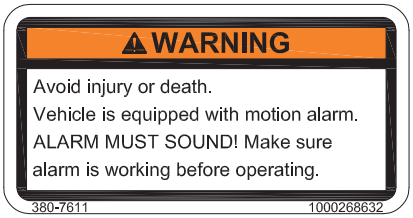


Fig. 48

Position

Canopy: on the C pillar
Cabin: window at the right upper rear

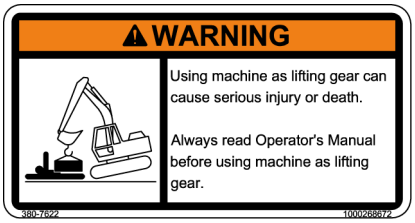


Fig. 49

Position

On the headliner

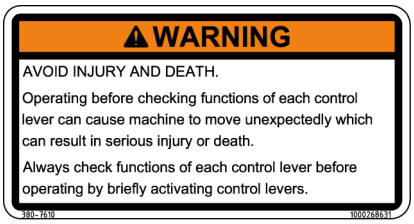


Fig. 50

Position

On the headliner

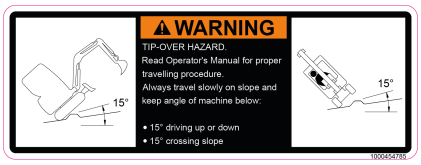


Fig. 51

Position

On the left C pillar

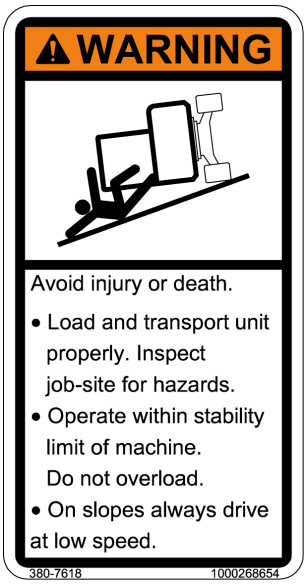


Fig. 52

https://truckmanualshub.com/

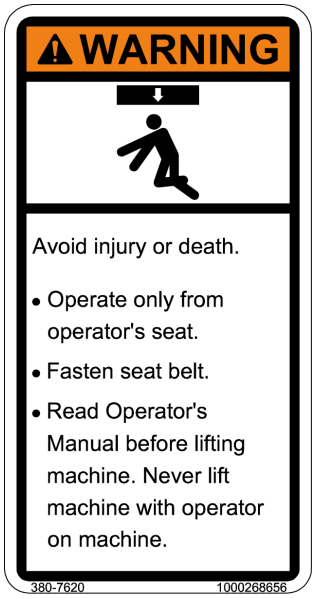


Fig. 53

Position

On the left C pillar

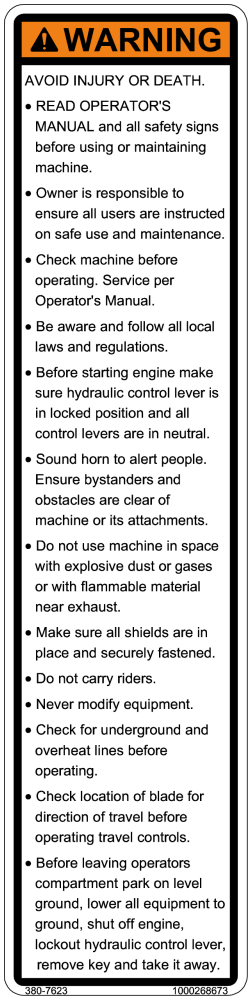


Fig. 54

Position

On the left C pillar

https://truckmanualshub.com/

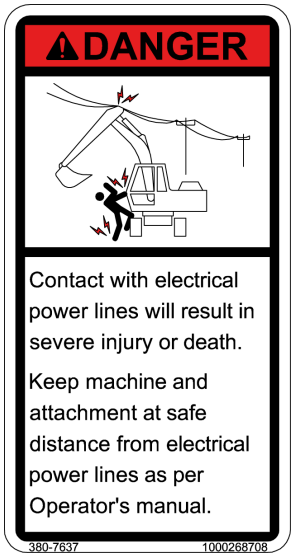


Fig. 55

Position

On the left C pillar



Fig. 56

Position

For the air filter



Fig. 57

Position

For the air filter

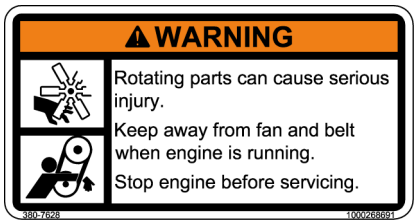


Fig. 58

Position

On the engine cover



Fig. 59

Position

On the engine cover

https://truckmanualshub.com/

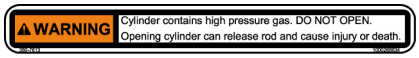


Fig. 60

Position

On the gas struts
Front window: 2
Engine cover: 1

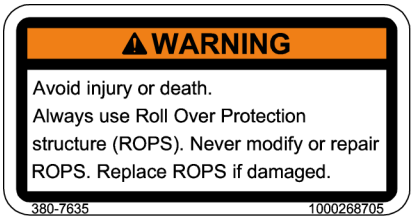


Fig. 61

Position

At the canopy/on the cabin rear

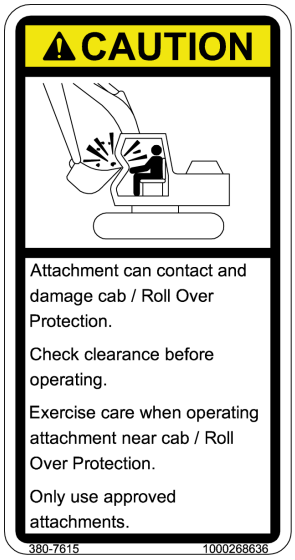


Fig. 62

Position

On the left C pillar



Fig. 63

Position

On the left and right side on the lifting arm

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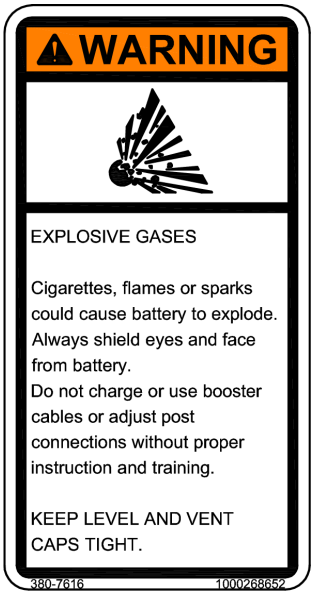


Fig. 64

Position

On the front left of the chassis

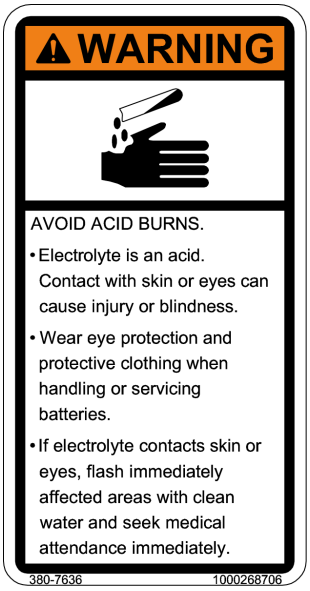


Fig. 65

Position

On the front left of the chassis



Fig. 66

Position

On the headliner

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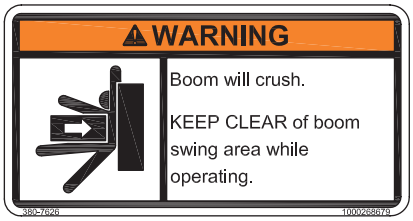


Fig. 67

Position

At the front left and right of the chassis



Fig. 68

Position

On left and right-hand undercarriage



Fig. 69

Position

On the front window



Fig. 70

Position

On the headliner



Fig. 71

Position

On the engine cover

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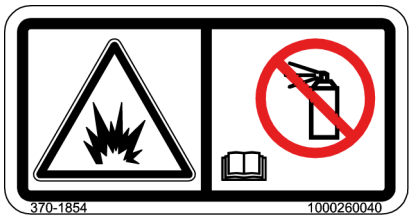


Fig. 72

Meaning

Do not use starting aid sprays

Position

With the right gas strut

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4 Putting into operation

4.1 Cabin/control stand

CAUTION

Risk of injury when getting on and off!

Entering or exiting incorrectly can cause injury.

- ► Keep the mandatory steps **A** and handholds **B** clean and only use them for entering and exiting.
- ► The foldable stage must be folded down while stepping in and stepping out.
- ► Face the vehicle as you enter and leave it.
- ► Immediately have damaged stages and handholds replaced. Do not operate the vehicle.

CAUTION

Crushing hazard due to incorrectly locked door!

Unlocked cabin doors can cause crushing.

- ► Lock the cabin door.
- ► Use the handholds for closing.

CAUTION

Injury hazard when opening or closing the front window!

Opening or closing the front window can cause injury.

- ► Use both handles.
- ► Duck your head.
- ► Let both locks lock into place.
- ► Keep body parts and clothes away from the window channel.

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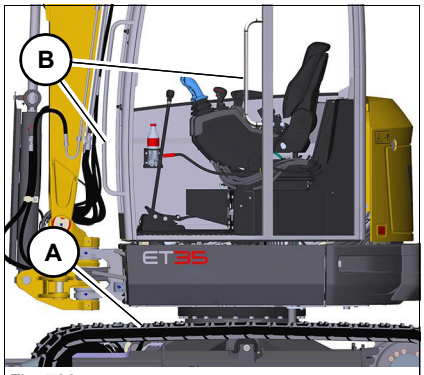


Fig. 733

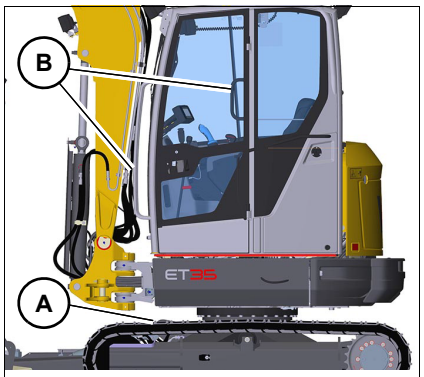


Fig. 74

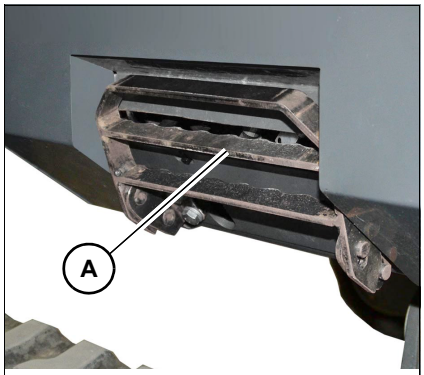


Fig. 75 (symbolic representation)

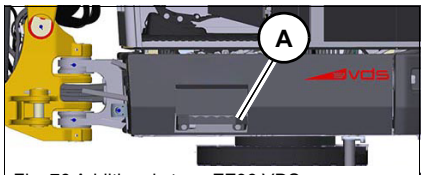


Fig. 76 Additional stage EZ36 VDS

Raise and lower canopy

Use footholds **A** and handles **B**. Do support yourself on the control elements.

Two hands and one foot must be always in contact with the vehicle when getting on and off.

Information

When entering or leaving the cabin, the door must be locked in the arrester.

Cabin entry and exit

Park the vehicle – *see chapter " Parking the machine" on page 5-12*.

Vehicle	Stages
ET35	1
ET35 VDS (Version 1)	2 (Track)
ET35 VDS (Version 2)[1]	2 (chain and foldable stage)
EZ36	1
EZ36 VDS	2 (chain and stage)

1. From serial number WNCE1601HPAL00840

NOTICE

Probable vehicle damage due to the folded stage.

If there is a risk of collision, fold the step **A** up.

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Unlocking and locking the door

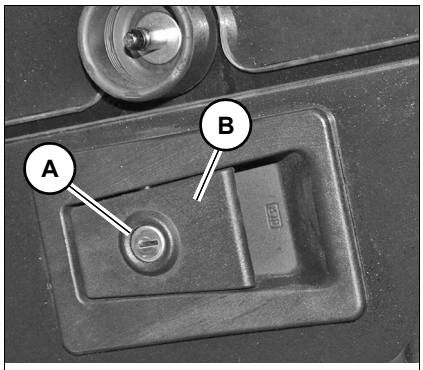


Fig. 77

Unlocking:

Turn the key in door lock **A** anticlockwise.

Locking:

Turn the key in door lock **A** clockwise.

Opening and closing the door

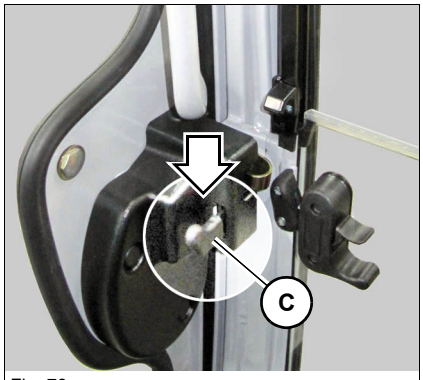


Fig. 78

Opening:

Pull door handle **B**.

Closing:

Close the door applying firm pressure.

Opening the door from the inside:

Press lever **C** on the door lock downward.

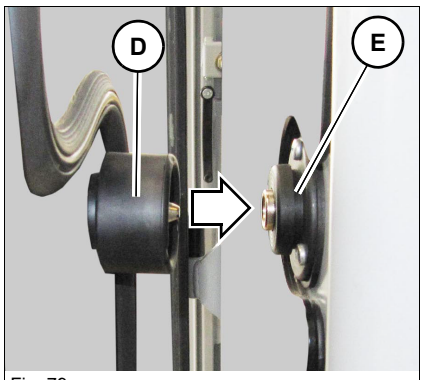


Fig. 79

Securing an open door

Press bracket **D** firmly against arrester **E**.

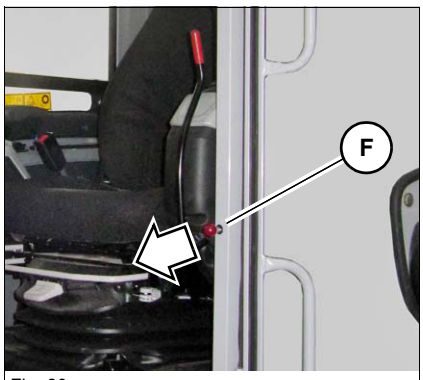


Fig. 80

Releasing the door arrester

Pull button **F**.

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Opening/closing the front window



Fig. 81

Opening the upper front window

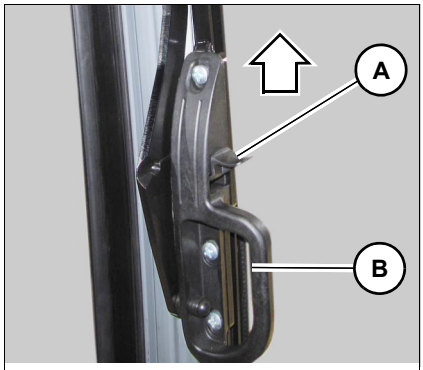


Fig. 82

1. Press and hold levers **A** on the left and right, and pull the front window forward with handles **B** on the left and right.
2. Release levers **A** and press the window upward until it engages.

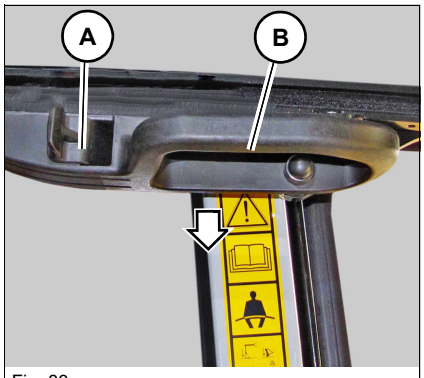


Fig. 83

Closing the upper front window

1. Press levers **A** on the left and right, and pull the front window downward with handles **B** on the left and right.
2. Press the front window fully forward and release levers **A**.

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Fig. 84

Opening the lower front window

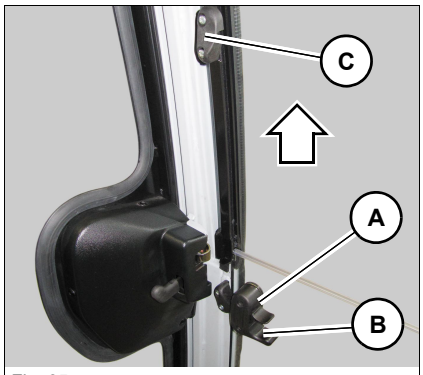


Fig. 85

Press levers **A** on the left and right, and pull the front window upward using handles **B** on the left and right until the front window engages with guide **C**.

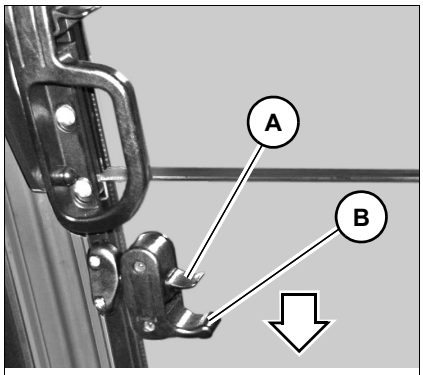


Fig. 86

Closing the lower front window

Keep levers **A** pressed on the left and right, and pull the lower front window downward with handles **B** on the left and right until the front window locks into place.

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Fig. 87

Open the whole front window

1. Open the lower front window as described on page *4-5*.
2. Open both windows together as described on page *4-4*.

Closing the whole front window

1. Close both windows together as described on page *4-4*.
2. Close the lower front window as described on page *4-5*.



Fig. 88

Opening the front window to a gap (ventilation position)

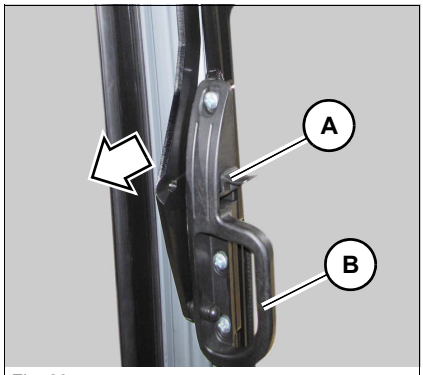


Fig. 89

Open

1. Press levers **A** on the left and right, and slightly pull handles **B** on the left and right.
   ➥ The front window is unlocked.
2. Release levers **A** and pull handles B on the left and right until the front window locks into place.

Opening/closing the side windows

Both side windows on the right can be opened.

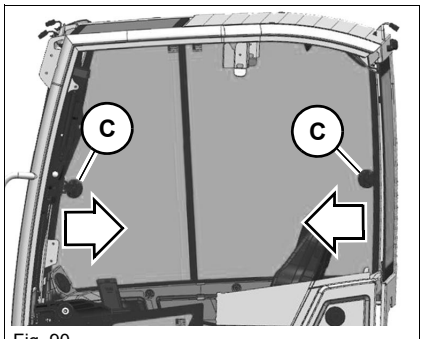


Fig. 90

Open

Press the handle **C** and open the side window.

Close

Press the handle **C** and close the side window.

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Emergency exit

There are several possibilities for an emergency exit:

- Front Guard not installed: front or right window
- Front Guard installed: rear window

WARNING

Injury hazard when leaving the cab in an emergency!

An emergency exit can cause serious injury or death.

► The front and the right of the vehicle have neither footholds nor handles for safely exiting the cabin.

Emergency exit on vehicles equipped with protective Front Guard structures (option)

WARNING

Injury hazard when leaving the cab in an emergency!

An emergency exit can cause serious injury or death.

► There are no footholds nor handles for safely exiting the cabin at the rear and the right side of the vehicle.

► Protect your face and eyes from the glass splinters flying around when you smash a window.

► Pay attention to glass splinters during an emergency exit.

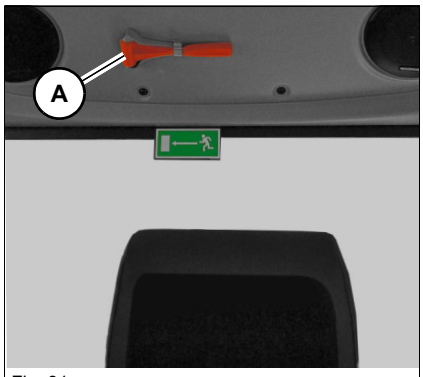


Fig. 91

The rear or right windows can be used as an emergency exit if the cabin door or front windows are blocked.

Smash the rear window with emergency hammer **A** above the rear window.

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Adjust the comfort seat

WARNING

Accident hazard due to seat adjustment during vehicle operation!

Adjusting the operator seat during vehicle operation can cause serious injury or death.

- ► Adjust the operator seat before putting the vehicle into operation.
- ► Ensure that the levers are locked into place.

Weight adjustment

CAUTION

Spinal cord injury due to incorrect seat adjustment!

An incorrect weight adjustment can cause injury to the spinal cord.

- ► Ensure that the seat is correctly adjusted to the operator’s weight before vehicle travel or operation.

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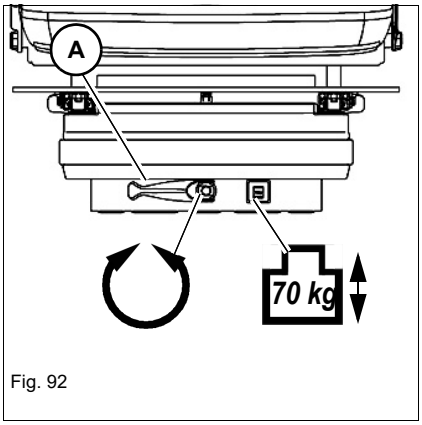
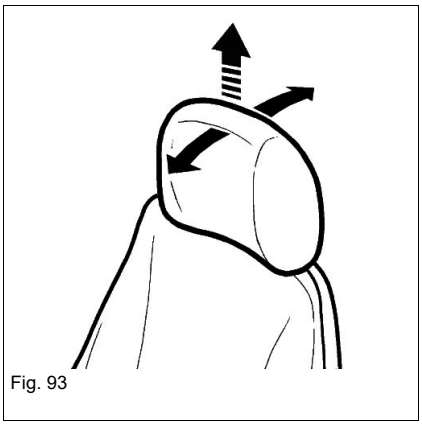


Fig. 92

Weight

Function	Operation
Higher weight	Turn crank **A** clockwise
Lower weight	Turn crank **A** anticlockwise


Fig. 93

Headrest

Function	Operation
Height adjustment	Pull up or push down
Inclination adjustment	Push forward or backward

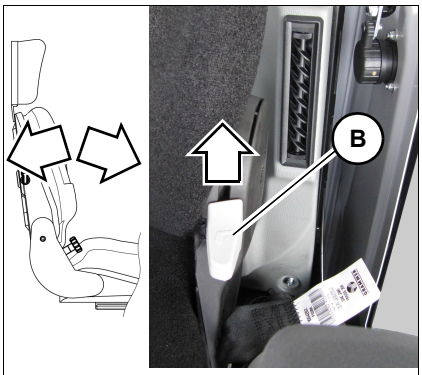


Fig. 94 (symbolic representation)

Backrest

1. Sit down on the operator seat.
2. Push lever **B** upwards and adjust the backrest.

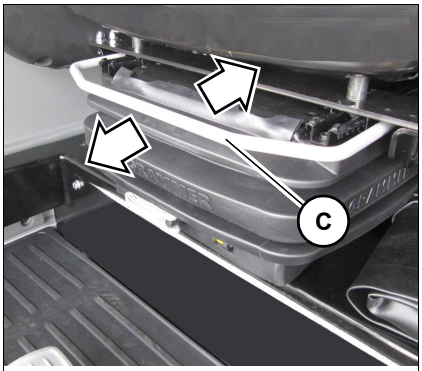


Fig. 95 (symbolic representation)

Horizontal adjustment

1. Sit down on the operator seat.
2. Pull lever **C** upward and move the seat forward or backward at the same time.

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Seat belt

WARNING

Injury hazard if the seat belt is not fastened correctly or not at all!

Fastening the seat belt incorrectly, or not at all, can cause serious injury or death.

- ► Firmly fasten your seat belt over your hips before starting the engine.
- ► Do not loosen the seat belt while the engine is running. This also applies to the work interruptions.
- ► Do not fasten a twisted seat belt, and do not place it over hard, edged or fragile items in your clothes.
- ► Ensure that the buckle is inserted.
- ► Do not use seat belt extensions.

CAUTION

Injury hazard due to damaged or dirty seat belt!

A damaged or dirty seat belt can cause serious injury or death.

- ► Keep the seat belt and buckle clean, and check them for damage.
- ► Have a damaged seat belt and buckle immediately replaced by an authorized service center.
- ► Have the seat belt immediately replaced after every accident and the load-bearing capacity of the fastening points and seat fixtures checked by an authorized service center.

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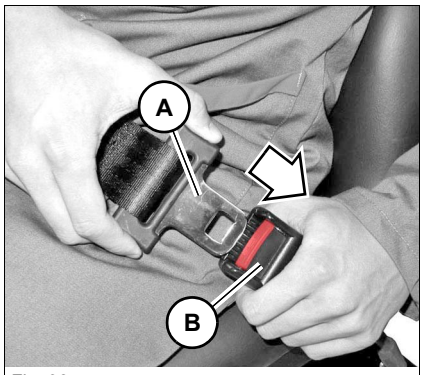


Fig. 96

Fastening the seat belt

Insert buckle latch **A** into seat belt buckle **B** until it engages.

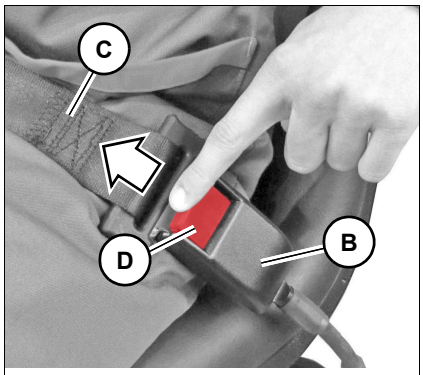


Fig. 97

Unfastening the seat belt

Press the red push button **D** on seat belt buckle **B** until the buckle latch comes out.

➥ Seat belt **C** is automatically retracted.

Armrest

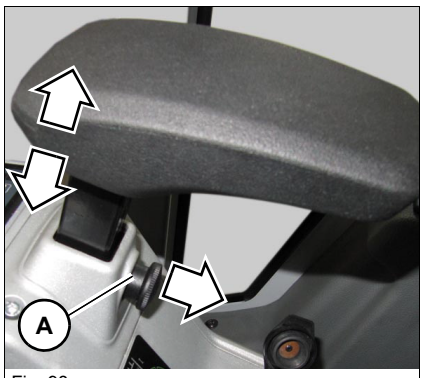


Fig. 98

1. Hold the armrest and pull out button **A**.
2. Adjust the armrest height.
3. Release button **A**.

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Visual aids (option)

WARNING

Risk of injury to persons in the danger zone!

Persons in the danger zone are possibly not seen when reversing the machine. This can cause accidents with serious injuries or death.

- ► Adjust the existing visual aids (for example the rearview mirrors) correctly.
- ► Interrupt work immediately if persons enter the danger zone.
- ► Pay attention to the movements and changing positions of attachments and persons.

WARNING

Accident hazard due to restricted field of vision on the job site!

Accidents resulting in serious injury or death can be caused by a restricted field of vision.

- ► Do not allow anyone to stay in the danger zone.
- ► Use suitable visual aids if necessary (camera, mirrors, guide, for example).
- ► Additional equipment or attachments must not be installed if they impair visibility.

WARNING

Accident hazard due to incorrect adjustment of visual aids!

Incorrectly adjusted visual aids can cause serious injury or death.

- ► Before starting work, ensure that all visual aids are clean, functional and adjusted in accordance with the instructions in this Operator's Manual.
- ► Immediately replace damaged or broken visual aids.
- ► Convex mirrors enlarge, reduce or distort the field of view.
- ► The operator must follow the national and regional regulations.

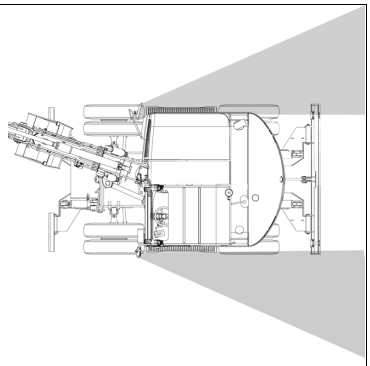


Fig. 99 (symbolic representation)

Adjusting the outside rearview mirrors on left and right

- Ensure sufficient visibility from the operator seat onto the job site.
- Ensure maximum visibility to the rear.
- Ensure visibility of the rear left edge of the vehicle in the mirror on the left.
- Ensure visibility of the rear right edge of the vehicle in the mirror on the right.

Information

Wacker Neuson recommends adjusting the mirrors with two persons.

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Information

Do not make any modifications that impair visibility. Otherwise the vehicle does not meet the requirements for conformity and registration.

- Use safety-oriented ladders and work platforms for adjustment work on the vehicle.
- Do not use vehicle parts or attachments as a climbing aid.
- Set the boom to travel position before adjusting the mirrors.

Fire extinguisher

A fire extinguisher is not available from Wacker Neuson.

Contact an authorized Wacker Neuson service center for the installation of a fire extinguisher.

Wacker Neuson recommends a fire extinguisher of the class ABC, e.g. in accordance with DIN-EN 3, NFPA. Comply with national provisions.

CAUTION

Risk of injury from non-secured fire extinguisher!

Can cause injury.

► Check the mounting and fire extinguisher daily.

► Comply with manufacturer's specifications and test intervals.

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Protective structures

Protective structures are additional elements that protect the operator against hazards. These elements can be installed later on or as standard equipment.

Canopy/cabin

The canopy or cabin has been specially designed and developed for protection in case of an accident.

- ROPS [Roll-over protective structure]/TOPS-tested canopy/ROPS / TOPS-tested cabin
- Standard protective FOPS structure (category I) integrated in THE cabin for canopy and cabin
- Shatter protection (canopy option)

Attaching a protective Front Guard protective structure according to EN 474-5 is not possible on the canopy. Only perform work that does not require a protective Front Guard structure.

Definition of FOPS/Front Guard categories

Category I (FOPS):

Protection against small falling (FOPS) objects (for example bricks, small pieces of concrete, tools) for vehicles which are used for tasks such as road repair, landscaping work and work on other construction sites.

Category II (FOPS/Front Guard):

Protection against heavy falling objects (FOPS) or heavy objects penetrating into the cabin from the front (Front Guard), for example trees or pieces of rock, for vehicles that are used for tasks such as clearance, demolition and forestry work.

Information

Category II protective structures are not available for this vehicle.

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DANGER

Accident hazard due to modified cabin or protective structures!

Modifications (for example drilling) weaken the structure and causes serious injury or death.

- ► No drilling, cutting or grinding.
- ► Do not install any brackets.
- ► No welding, straightening or bending.
- ► Replace the complete protective structure if it is damaged, deformed or cracked.
- ► Contact a Wacker Neuson service center in case of doubt.
- ► Retrofit and repair work may only be performed by a Wacker Neuson service center.
- ► Replace self-locking fasteners.

Information

Machine operation is only allowed with a correctly installed and intact cabin.
For additional protection, only use correctly installed and intact Wacker Neuson protective structures that have been released for the vehicle.

Responsibility for vehicle equipped with protective structures

The decision regarding the necessary protective structures (type and level I or II) must be made by the machine owner and depends on the specific work situation.

The vehicle owner must observe the national regulations and he must inform the operator on the protective structure to be used in a specific work situation.

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Assembly

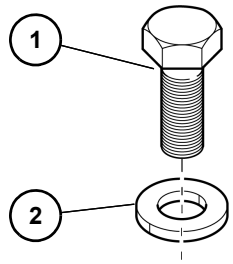


Fig. 100

The term **screw** is used for fastening equipment used in the following sequence:

1. Screw
2. Washer

Information

Only install protective structures with the help of a crane.

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Protective Front Guard structure category I (option)

DANGER

Danger of piercing/penetration by objects from the front!

Causes serious injury or death.

► Install a protective Front Guard structure in areas with danger from the front (for example pipes, tree trunks).

Information

The protective Front Guard structure corresponds to category I according to ISO 10262:1998.

► The vehicle owner must ensure that the hazard situation is evaluated and that the national regulations are observed.

► The vehicle owner must ensure that only work is performed that does not require any higher protection.

► Accidents cannot be fully avoided despite equipping a vehicle with protective structures.

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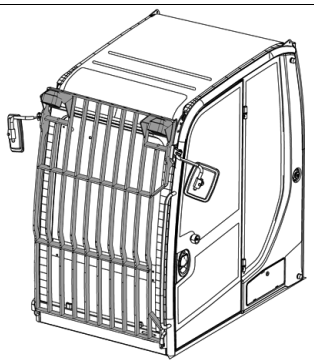


Fig. 101 (symbolic representation)

Assembly

1. Stop and park the vehicle. Stop the engine. – *see chapter " Preparing lubrication" on page 7-7*.

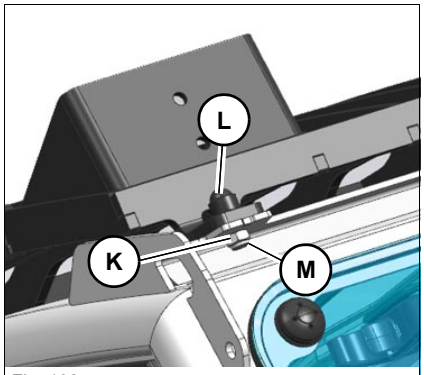


Fig. 102

K: mounting points top left and right.

2. Install screws **L** and lock nuts **M** and tighten to 110 Nm (81 ft.lbs.).

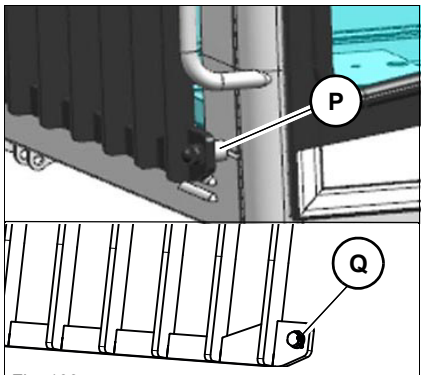


Fig. 103

P: mounting points bottom left and right.

3. Install screws **Q** and tighten to 110 Nm (81 ft.lbs.).
4. Put caps on all screws and nuts.

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Shatter protection (option)

WARNING

Danger of piercing/penetration by objects from the front!

Work involving risk of piercing/penetrating by objects from the front can cause accidents with serious injury or death.

- ► To operate the vehicle, shatter protection must be installed if an attachment (a breaker, for example) causes fragments to fly around. This shatter protection takes over the function of a front window. If the machine is equipped with a cabin, the front window must be closed during hammer operation.
- ► Observe the prescribed work area - see *Job site*.

CAUTION

Accident hazard in conditions of restricted visibility due to rain, snowfall, dust, etc.

Can cause injury.

- ► Stop machine operation immediately.

NOTICE

Possible damage to the vehicle structure from improper assembly.

- ► Only an authorized service center may install the shatter protection for the first time.

Information

The shatter protection (canopy option) protects the user against penetrating fragments from the front.

- ► The vehicle owner must ensure that the hazard situation is evaluated and that the national regulations are observed.
- ► The vehicle owner must ensure that only work is performed that does not require any higher protection.
- ► Accidents cannot be fully avoided despite equipping a vehicle with protective structures.

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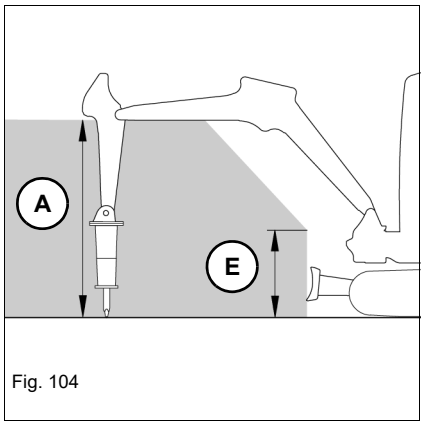


Fig. 104

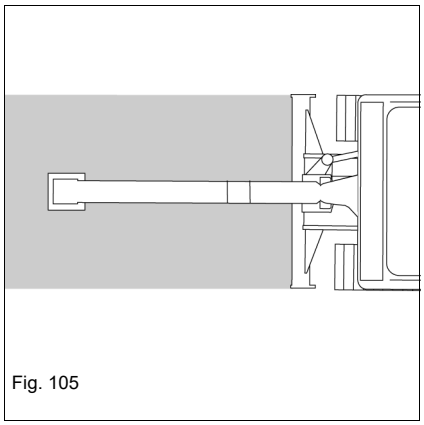


Fig. 105

Job site

Work range height **A**: 120 cm (47 in), **E**: 50 cm (20 in).

The figures *Fig. 104* and *Fig. 105* refer to work with a Wacker Neuson hydraulic hammer.

Information

Working with another attachment can modify the height of the job site.

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Fig. 106

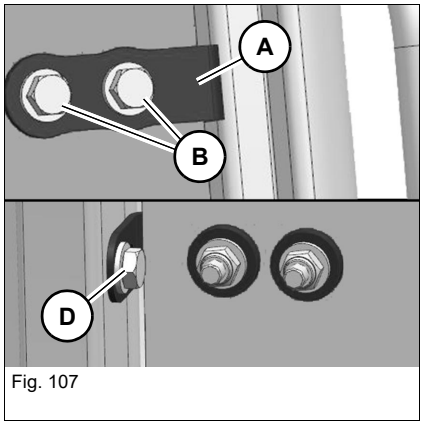


Fig. 107

Installing the shatter protection

At least two people are required for the assembly or disassembly.

Preparations – *see chapter " Parking the machine" on page 5-12*.

1. Install the mounting angle **A** with screws **B** on the shatter protection **C**.
2. Install the shatter protection with screws **D** to the frame.

Information

Torque for screws and nuts: 25 Nm (18 ft.lbs)

Removing the shatter protection

1. Loosen screws **D** and remove shatter protection.
2. Install the screws **D** on the frame to prevent the entry of moisture.
3. Securely store the shatter protection.

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Document box (option)

A document box behind the seat is available as an option.

Connections



Fig. 108

12 V connections

A 12 V connection is located at the rear right of the cabin and on the front left on the chassis.



Fig. 109



Fig. 110

USB connection

A USB connection is located at the front right of the cabin.

Information

Information about the functional scope of the USB connection can be found in the radio operator's manual.

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4.2 Overview of control elements

This chapter describes the controls, and contains information on the function and handling of the indicator lights and controls in the cabin.

The pages stated in the table refer to the description of the controls.

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Cabin

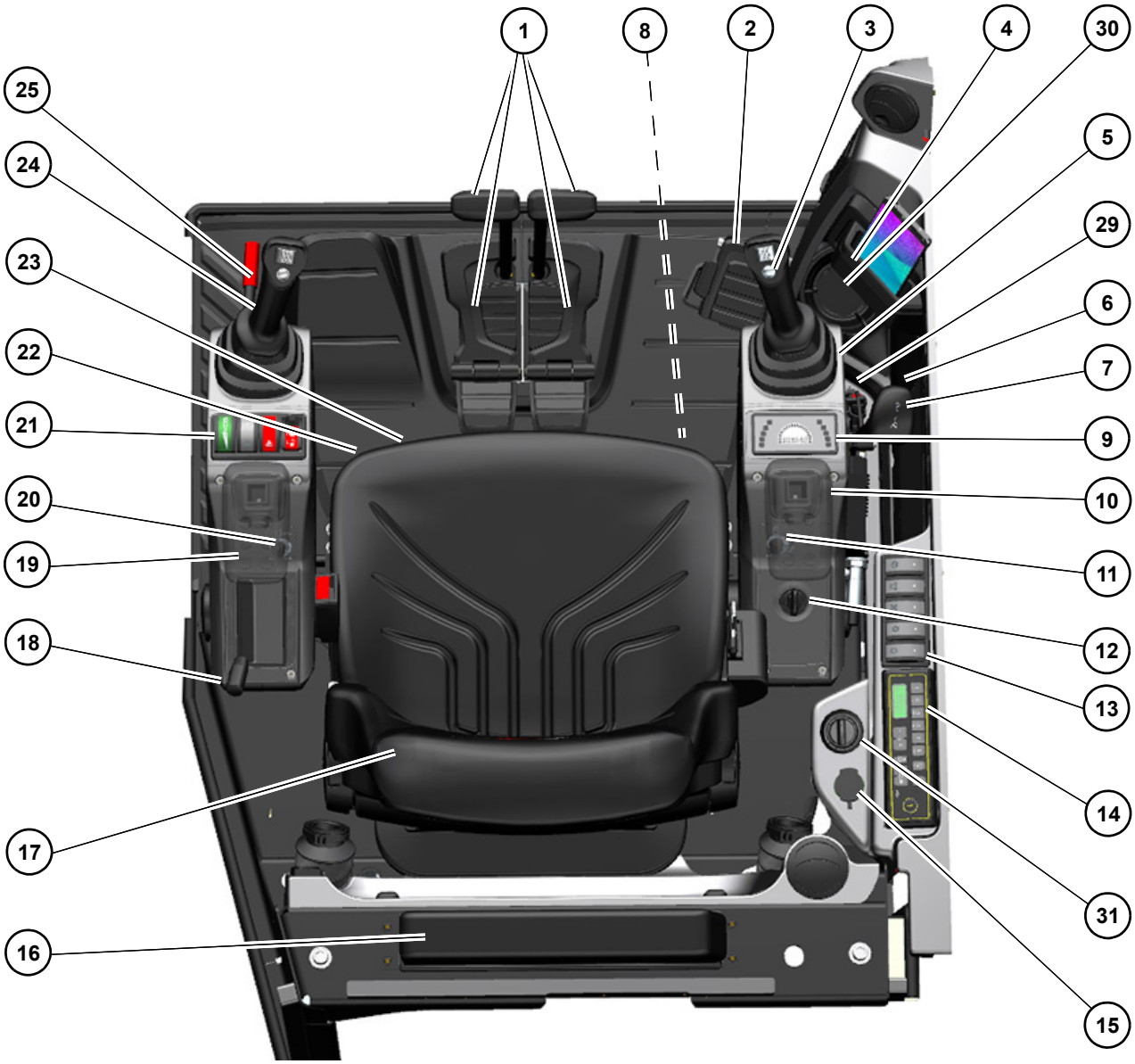


Fig. 111 Overview of control elements (3TNV88)

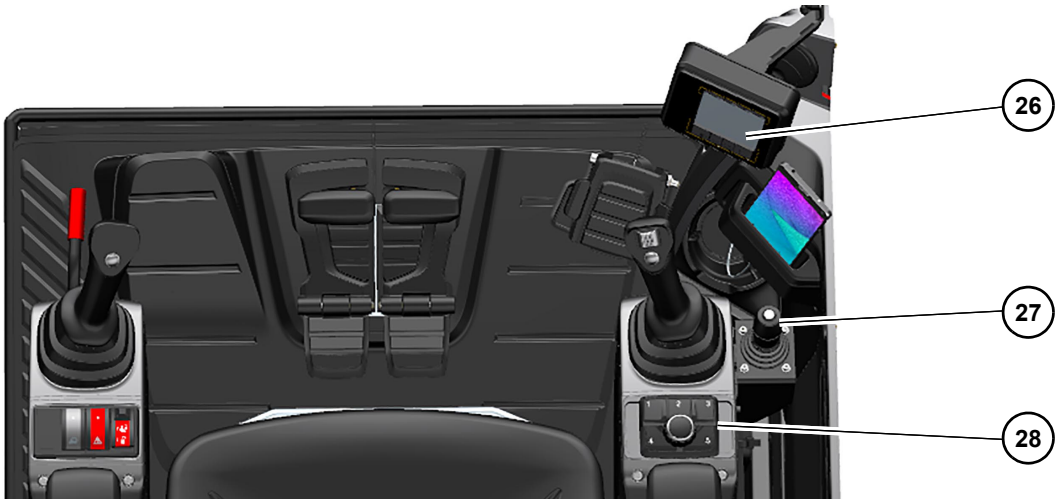


Fig. 111 Overview of control elements (3TNV88F)

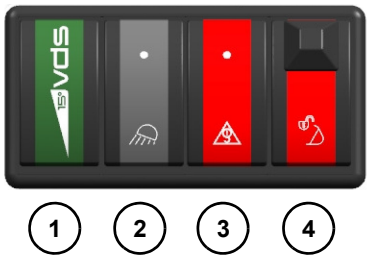
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	Description	See page
1	Accelerator pedals/drive levers	5-1
2	Boom swivel pedal	5-26
3	Horn	5-14
4	Cell phone compartment	--
5	Control lever on the right	--
6	Speed range selection	5-4
7	Stabilizer-blade lever	5-25
8	Temperature controller (cabin/version 1)	5-17
9	Display element	4-28
10	Right armrest	4-11
11	Oil flow AUX I rotary switch (proportional controls)	5-31
12	Ignition lock	4-38
13	Switch panel on the right	4-26
14	Radio (option – see operator's manual for radio)	--
15	Cigarette lighter (cabin)/12V connection (canopy)	4-22
16	Document box (option)	4-22
17	Operator seat	4-8
18	Gas lever (3TNV88F: manual throttle function via jog dial)	5-2
19	Armrest (left)	4-11
20	Oil flow AUX II rotary switch (proportional controls)	5-31
21	Switch panel on the left	4-26
22	Foot-operated push button for hydraulic quickhitch (option)	5-42
23	ISO/SAE changeover (option)	5-21
24	Control lever on the left	--
25	Control lever base	4-39
26	Multifunctional display 3TNV88F	4-28; 4-35
27	Dozer blade lever (swiveling dozer blade option)	5-25
28	Jog dial	4-27
29	Drinks holder	--
30	USB connection	4-22
31	Temperature controller (cabin/version 2)	5-17

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Operation – overview

Switch panel on the left



Switch panel on the right



Jog Dial control unit (3TNV88F)



Fig. 112 Control elements

Description		See page
1	Tilt the upper carriage (VDS/option)	*5-81*
2	Working lights	*5-13*
3	Safe load indicator (option)	*5-35*
4	Hydraulic quickhitch (option)	*5-41*
5	Window wiper/wash system (cabin)	*5-16*
6	Rotating beacon (option)	*5-15*
7	Blower (cabin)	*5-18*
8	Air conditioning (option)	*5-17*
9	Automatic engine speed setting	*5-5*
10	Jog dial control unit (3TNV88F)	*4-27*

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Jog dial (3TNV88F)



Fig. 113

Control button

Menu levels are selected (turn) and confirmed (press) using control button **A**.

After starting the engine, the control knob fulfills the function of a gas regulator.

Press the control knob to adjust the flow rate of the auxiliary hydraulics.

Switch between the **throttle** and **oil flow**: press the control knob.

Control element			Function	See page
F1			Displaying operating states	*4-33*
F2			Changing the engine operating mode directly	*5-3*
F3			Automatic engine speed setting	*5-5*
Menu button	Press briefly		• Selecting control circuits	*5-32*
			• Changing the engine operating mode	*5-3*
	Press and hold		• Selecting and configuring attachments	*5-32*
			• Stabilizer blade	*5-32*
			• Service menu/error messages	*8-5*
			• Adjusting the multi-functional display • Setting date and time	*4-35*
Return button			Returning to previous menu	--
Control button			Selecting menu items (turn) Confirming menu items (press)	--

Daily and total operating hours

Function	Push button
Change view	Press F1 briefly
Reset the daily operating hours	Press F1 longer

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4.3 Indicator lights and warning lights overview

Display element/multifunctional display[1]

The display element and the multi-functional display inform the operator about operating states, required maintenance procedures or any possible vehicle malfunctions.

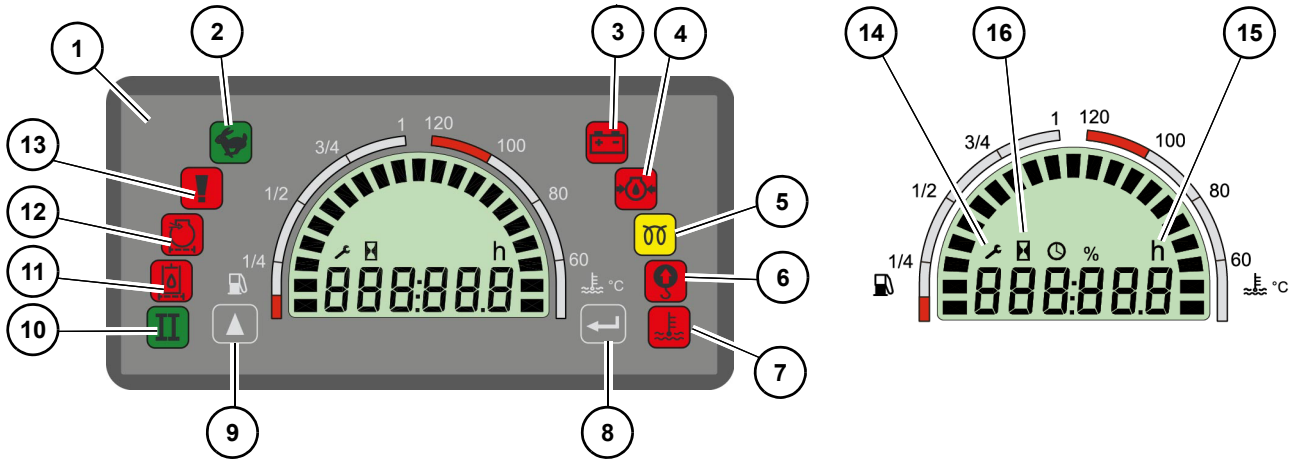


Fig. 114 Display element (3TNV88)

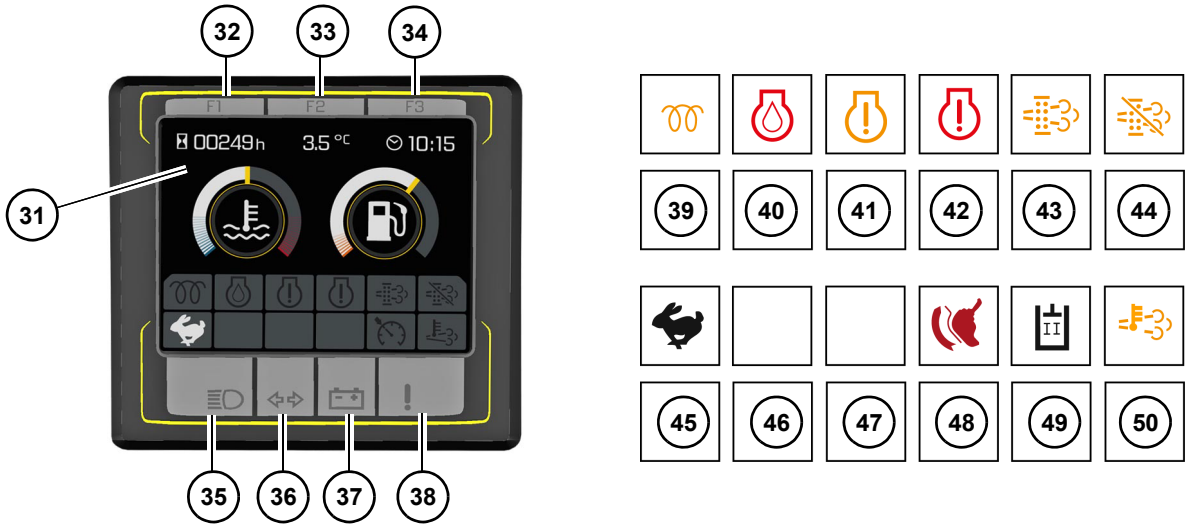


Fig. 114 Display element (3TNV88F)

Information

It may take a few seconds before a selected function is displayed.

Information

The indicator lights are tested when the starter is engaged and are illuminated for a few seconds.

1. The assignment of the indicator lights can vary depending on the equipment.

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3TNV88	3TNV88F	Symbol	Color	Description	
1	31	--	--	**Display element/multifunctional display**	*4-28*
2	45		--	**Speed range 1**	*5-4*
			--	**Speed range 2** **3TNV88:** Indicator light illuminates green when the speed 2 is active.	*5-4*
3	37		**Red**	**Charge indicator light**	*8-2*
4	40		**Red**	**Engine oil pressure**	*8-2*
5	39		**Yellow**	**Preheating**	*4-39*
6	--		**Red**	**Safe load indicator light**	*5-35*
7	--		**Red**	**Coolant temperature**	*8-2*
8	--		--	**For Wacker Neuson service center**	--
9	--		--	**Hour meter/maintenance meter changeover**	*4-34*
10	--		**Green**	**Not assigned**	--
11	--		**Red**	**Hydraulic oil filter monitoring**	*8-2*
12	--		**Red**	**Air filter monitoring**	*8-2*
13	--		**Red**	**Not assigned**	--
--	32	F1	--	**F1 (operating state indicator)**	*4-32*
14	--		--	**Maintenance meter**	*4-32*
15	--		--	**Daily hours of operation**	*4-32*
16	--		--	**Operating hours**	*4-32*
--	33	F2	--	**F2 (maintenance meter, engine operation mode)**	*4-32*
--	34	F3	--	**F3 (time, automatic engine speed setting)**	*4-32*

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3TNV88	3TNV88F	Symbol	Color	Description	
--	35		Blue	Not assigned	--
--	36		Green	Not assigned	--
--	38		Red	General vehicle malfunction	*8-1*
--	41		Yellow	Engine warning	*8-1*
--	42		Red	Engine stop	*8-1*
--	43		--	Not assigned	--
--	44		--	Not assigned	--
--	46	--	--	Not assigned	--
--	47	--	--	Not assigned	--
--	48		Red	Hydraulic functions locked	*4-39*
--			Red	Hydraulic functions active	*4-39*
--	49		--	Additional control circuit AUX II (option)	*5-30*
--	50		--	Not assigned	--

Information

The graphic symbols shown may deviate.

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Error symbols (3TNV88F)

If an error occurs, the following symbols are displayed for a few seconds in the multi-functional display.

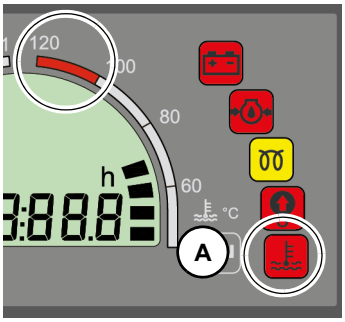
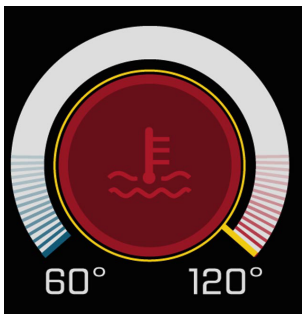
Error symbols are listed according to priority.

Symbol	Description	Symbol	Description
	**01 Engine stop (short indication)**		**05 Charge indicator light (short indication)**
	**02 General malfunction (short indication)**		**06 Hydraulic oil temperature (permanent indication)**
	**03 Engine oil pressure (short indication)**		**07 Hydraulic oil filter (short indication, appears again upon starting the engine)**
	**04 Engine malfunction (short indication)**	--	--
	**Hydraulic functions active**		**Hydraulic functions locked**

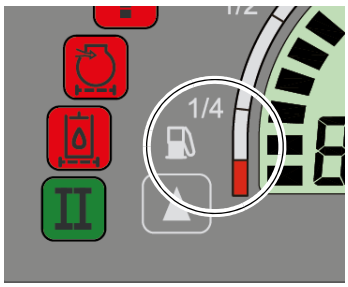
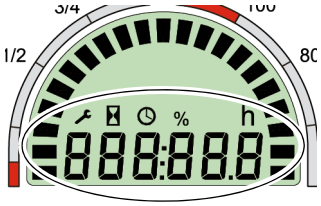
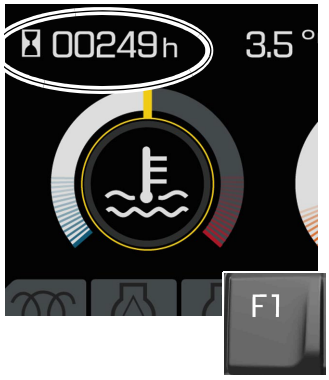
– see chapter “8.2 Malfunctions (display element/multi-functional display)” on page 8-2

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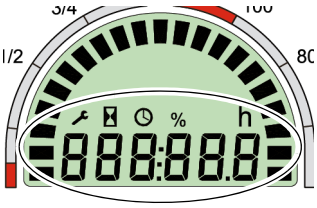
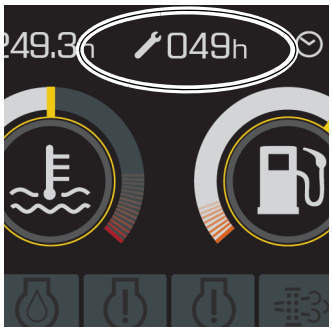
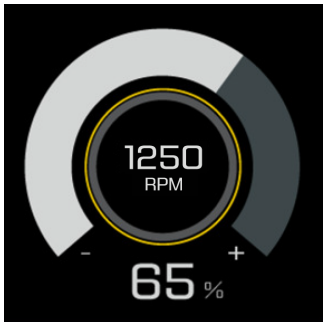
Status indicators

	Symbol	
3TNV88F		**Starter/engine start** • **A**: starting key in position **1** • **B**: engine starts
3TNV88F		**Engine operating mode** *– see chapter " Engine operating mode (only 3TNV88F)" on page 5-3*
3TNV88		**Coolant temperature** **3TNV88:**If the segments reach the red range, the indicator light **A** illuminates and the buzzer sounds.
3TNV88F		If the coolant temperature is too high the symbol shown on the left appears and the buzzer sounds (3TNV88F). **Measures (3TNV88/3TNV88F)** • Let the engine run at high idling speed without any load. • Wait until the temperature drops and the indicator light goes out. • Stop the engine. • Check the coolant level.

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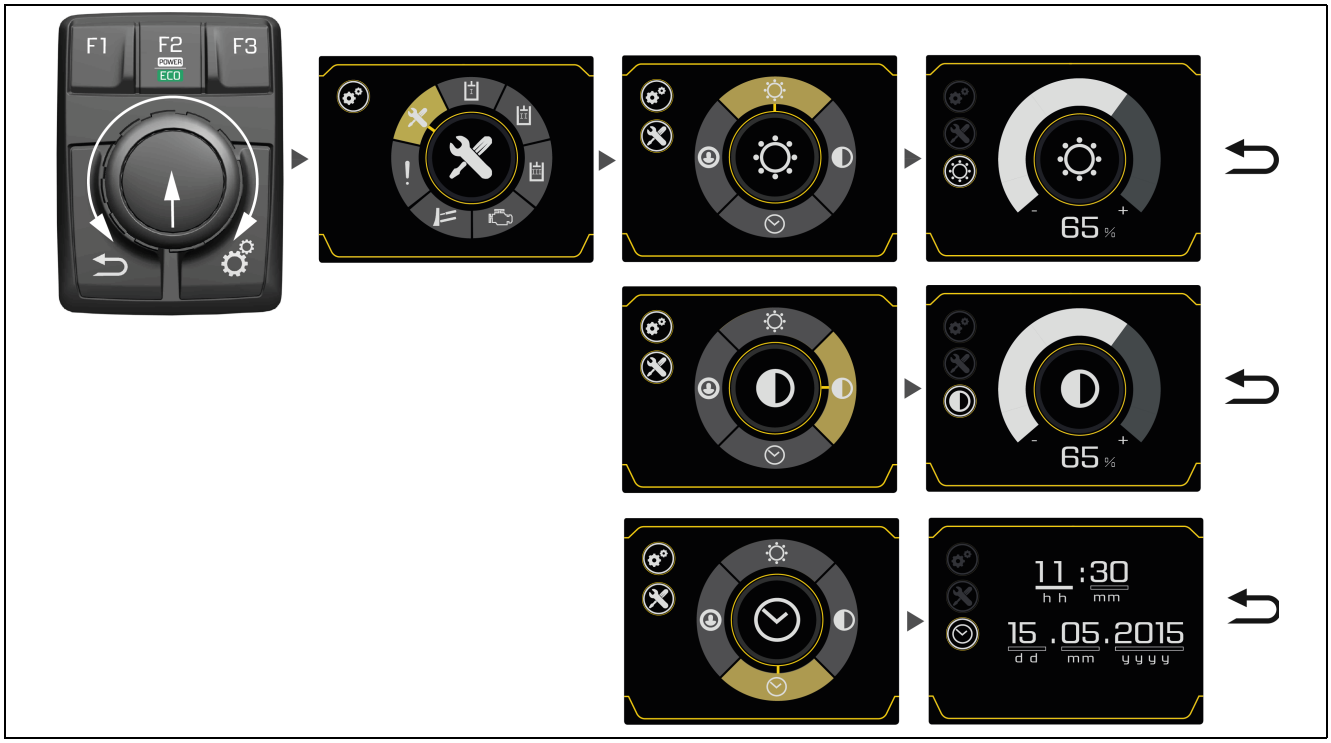
	Symbol	
3TNV88		**Fuel tank capacity** Refuel if the segments reach the red range.
3TNV88F		Refuel if the symbol shown on the left appears.
3TNV88		**Hour meter** Counts the engine operating hours with the engine running.
3TNV88F		**Operating states** Press **F1** to toggle between the operating state displays: • Operating hours • Daily hours of operation • Engine speed • Outside temperature (automatic air-conditioning option) • Hydraulic oil temperature • Time

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	Symbol	
3TNV88		**Maintenance meter** Counts the remaining engine operating hours down to the next maintenance work due. If less than 10 hours are displayed, the wrench symbol flashes.
3TNV88F		
3TNV88F		**Engine speed** This display appears when the manual throttle is used.
3TNV88F		**No function** This symbol appears when a control element without function is operated.
3TNV88		**Overload** The indicator light illuminates red and the buzzer sounds (3TNV88). The symbol shown on the left appears and the buzzer sounds (3TNV88F). The permissible load diagram values are exceeded. • Reduce the load until both the buzzer and the warning light go out – *see chapter " Lifting gear operation" on page 5-34*. When the safe load indicator is switched on, the symbol is illuminated and the buzzer sounds as a functional check.
3TNV88F		

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Adjusting the multi-functional display



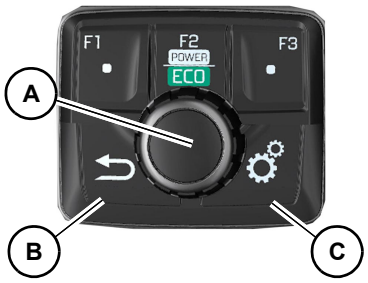


Fig. 115 Jog dial (3TNV88F)

Performing the adjustments

- Push button **C**: call the settings.
- Control knob **A**: select settings (turn) and confirm (press).
- Push button **B** (return): back to previous menu level.

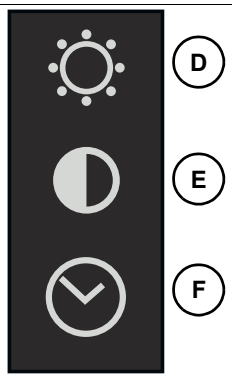


Fig. 116:

Symbols

D: Brightness

E: Contrast

F: Time/Date

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4.4 Preparatory work

Important information before putting the vehicle into operation

Perform a visual check before starting work:

- There must be no leaks.
- There must be no damaged or loose parts.
- Do not allow anyone to stay in the danger zone.

Before putting the vehicle into operation, the operator must familiarize himself with the position of the controls and instruments.

Only operate the vehicle from the seat with the seat belt fastened.

Before using the vehicle in work operation for the first time, Wacker Neuson recommends trying out the vehicle on open ground without any obstacles.

When using the vehicle, check the surroundings constantly in order to identify potential hazards in time.

Before starting work, ensure that all visual aids are clean, functional and adjusted in accordance with the instructions in this Operator's Manual.

The operator must follow the national and regional regulations.

Perform a **functional check of the control lever base**.

Perform a **functional check of the safe load indicator**.

Do not make any modifications that impair visibility. The vehicle does not meet the requirements for conformity and registration.

Observe the safety instructions *– see chapter "2.4 Operation" on page 2-4*.

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Requirements and information for the operating personnel

The vehicle may only be put into operation by authorized personnel that has been instructed – *see chapter “2.3 Conduct” on page 2-3*.

The operator must know and bear in mind the requirements and risks at the work place.

Perform daily maintenance according to the lubrication and maintenance plan
– *see chapter “7.2 Maintenance overview” on page 7-2*

Do not operate the vehicle if the standard protective equipment (for example the cabin) has been removed.

No clothes or parts of the body may protrude outside the vehicle during operation.

Putting into operation for the first time and running-in period

Before putting the vehicle into operation for the first time, check whether the equipment supplied with the vehicle is complete.

- Check the fluid levels according to chapter “**Maintenance**”.

Each vehicle is correctly adjusted and checked before it is delivered.

Handle the vehicle carefully during its first 50 operating hours.

- Do not load a cold engine.
- Warm up the vehicle at low engine speed and little load, do not warm it up at a standstill.
- Do not change engine speed abruptly.
- Avoid using the vehicle under heavy loads or at high speeds.
- Avoid abrupt acceleration, braking and changing travel direction.
- Do not run the engine at high speed for extended periods.
- Observe the maintenance plans – *see chapter “7.2 Maintenance overview” on page 7-2*.

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4.5 Starting and stopping the engine

Preparatory work

WARNING

Accident hazard due to unintentional operation of the vehicle!

Unintentional operation can cause serious injury or death.

► Only operate the vehicle from the seat with the seat belt fastened.

Set the manual throttle to the middle position if the engine is cold.

The starter cannot be actuated if the engine is already running (start repeat interlock).

Do not run the starter for more than 20 seconds.

Wait two minutes so the battery can recover and the starter does not overheat before trying again.

Information

Provide for sufficient ventilation when operating in enclosed areas.

Information

All controls must be within easy reach. You must be able to move the drive levers to their limit positions.

Ignition lock

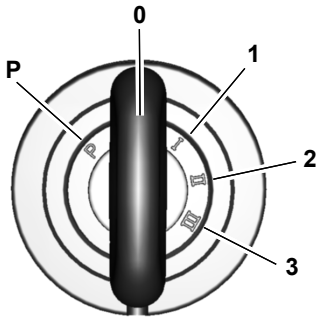


Fig. 117

Position	Function	
P	Park position	Not assigned
0	Stop position	Insert or remove the starting key
1	Machine travel position	All electric functions are enabled
2	Preheats the engine	Preheater active
3	Starts the engine	Starter is actuated

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Starting and stopping the engine

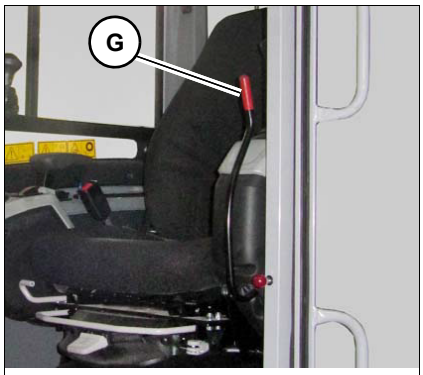


Fig. 118

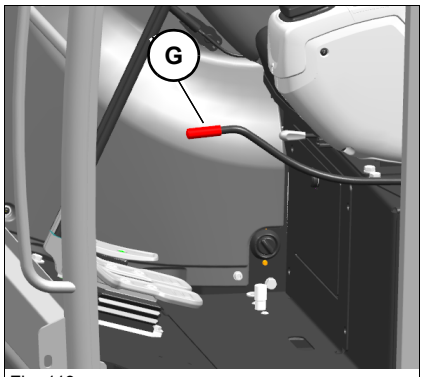


Fig. 119

Fold up the joystick base after shutting off **G** the engine.

Joystick base (3TNV88)	Effect
Raised	The engine can be started.
Lowered	The engine cannot be started.

Joystick base (3TNV88F)	Indication	Effect
Raised		The engine can be started
Lowered		The engine cannot be started

All hydraulic functions are locked if the control lever is raised with a running engine.

Functional check of the joystick base

Before starting work, perform a functional check of the control lever base.

1. Start the vehicle.
2. Fold the control lever base **G** down.
3. Perform vehicle travel on open terrain.
4. Secure the danger zone.
5. Stop the vehicle.
6. Raise the control lever base **G**.
7. Move all control levers and pedals in all directions.

➥ The selected elements do not move:
  ➥ Work may be performed with the vehicle.

➥ The selected elements move:
  ➥ Stop operation immediately.

Contact a Wacker Neuson service center and have the malfunction rectified.

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NOTICE

Possible damage if the engine is started again immediately after stopping it.

► Wait at least two minutes before starting the engine again.

NOTICE

Possible damage to preheater if the preheating system is operated too long.

► Do not preheat the engine for more than 20 seconds.

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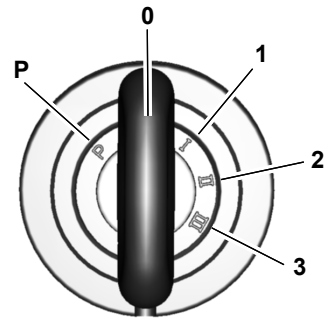


Fig. 120

1. Insert the starting key.
2. Turn the starting key to position **1**.
3. All control lamps light up for a few seconds.

➥ If an indicator light does not function, contact an authorized service center.

4. Turn and hold the starting key in position **2** until the indicator light for preheating **(E)** goes out.

Information

Contact a Wacker Neuson authorized service center if the indicator light pre-heat **(E)** does not go out even after 20 seconds.

➥ The indicator lights for **engine oil pressure (F)** and alternator charging (C) are illuminated.

5. Turn the starting key to position **3** until the engine runs.

➥ All indicator lights go out.

➥ If the engine does not start after 10 seconds:

6. Interrupt the start procedure and repeat it after two minutes.
   ➥ If the engine still does not start after a few tries, contact an authorized service center and have the error rectified.
7. Release the starting key as soon as the engine runs.

Information

The engine will not start unless the left-hand control lever base is raised.

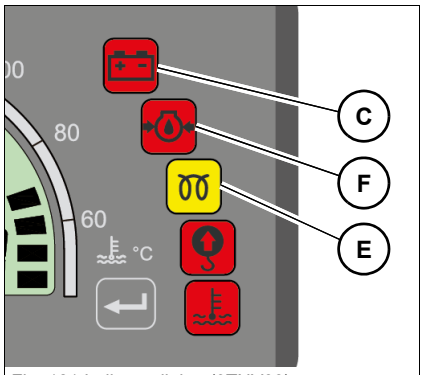


Fig. 121 Indicator lights (3TNV88)

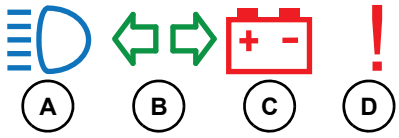




Fig. 122 Indicator lights (3TNV88F)

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Warm-up phase of vehicle

After the engine has started, allow it to warm up at slightly increased idling speed until it reach
es its operating temperature of about 80°C (176°F) (coolant).

However, do not let the machine warm up at standstill.

During the warm-up phase, check for unusual noise, exhaust color, leaks, malfunctions or damage.

In case of malfunctions, damage, or leaks:

Secure the vehicle, park it and find out the cause for the damage and have it repaired.

Information

Fold up the control lever base after shutting off **G** the engine.

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Starting aid

WARNING

Explosion hazard in case of incorrect handling of battery!

Incorrect battery handling can cause serious injury or death.

- ► Wear protective equipment.
- ► Fire, open flames and smoking is prohibited
- ► Do not jump start the engine if the battery is malfunctioning or frozen, or if the acid level is too low.

WARNING

Injury hazard due to rotating parts!

Rotating parts can cause serious injury or death.

- ► Open the engine cover only at engine standstill.

CAUTION

Burn hazard due to hot surfaces!

Can cause serious burns or death.

- ► Stop the engine and let it cool down.
- ► Wear protective equipment.

NOTICE

Possible damage due to electrical short circuit or over-voltage.

- ► The positive terminal of the starting battery must not be brought into contact with electrically conductive vehicle components.
- ► The vehicles must not touch each other during the starting aid.
- ► If the engine still does not start despite a starting aid, contact a Wacker Neuson service center.

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NOTICE

Possible damage due to wrong battery voltage.

► Only use batteries with the same voltage (12 V).

NOTICE

Possible damage to vehicle with empty battery due to voltage peaks.

NOTICE

Possible damage to battery jumper cables when placing them near rotating parts.

► Do not place the battery jumper cables near rotating parts.

Information

Use only authorized battery jumper cables which conform to national and regional safety requirements.

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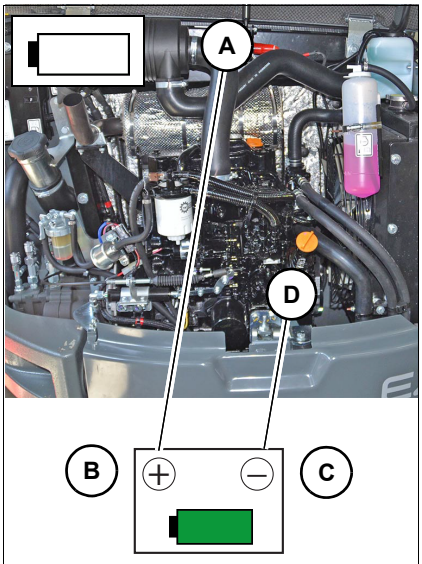
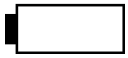


Fig. 123

Designations/symbols	Meaning
X	Machine with empty battery
Y	Vehicle with full battery
A	Positive/vehicle **X**
B	Positive/vehicle **Y**
C	Negative/vehicle **Y**
D	Negative/vehicle **X**
	Full battery
	Dead battery

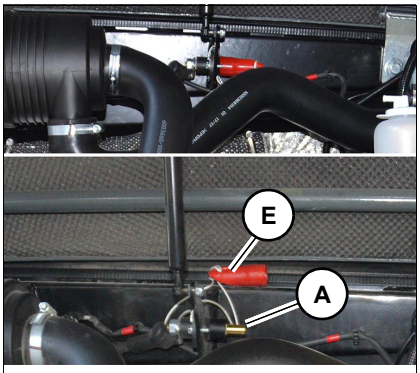


Fig. 124

1. Move vehicle **Y** close to machine **X** so that the length of the battery jumper cables is sufficient.
2. Stop the engine of vehicle **Y**.
3. Engine covers of both vehicles are open.
4. Remove the red cover **E**.
5. Connect the battery jumper cables in the following order: **A-B/C-D**.
6. Start the engine of vehicle **Y**.
7. Wait five minutes for the empty battery to be charged a little.
8. Start the engine of machine **X**.
9. Switch on the boom light of vehicle **X** in order to avoid voltage peaks and to protect the electronic system.
10. Disconnect the battery jumper cables in the following sequence: **D–C/B–A**.

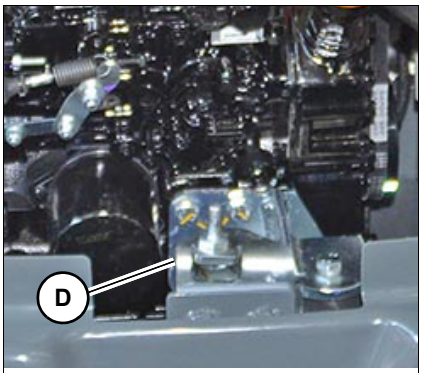


Fig. 125

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Low-load operation

NOTICE

Possible damage to the engine due to low-load operation.

► Run the engine at idling speed or at high engine speed at over 20% engine load.

Possible consequences of low-load operation are:

- Increased engine oil consumption.
- Dirt in engine due to engine oil in exhaust system.
- Blue smoke in exhaust gas.

Stopping the engine

NOTICE

Possible damage to the engine when it is stopped after running under high load.

► Operate the engine at idling. This avoids engine damage and increases the service life.

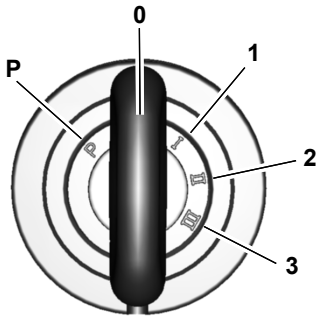


Fig. 126

1. Let the engine run at idling speed for five minutes without any load.
2. Turn the starting key to “**0**” and remove it.

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Battery master switch

NOTICE

Possible damage to the electronics due to improper actuation of the battery master switch.

► Do not operate the battery master switch with a running engine.

► Operate the battery master switch no sooner than two minutes after shutting down the engine.

Actuate the battery isolator switch:

- If the vehicle is parked for longer periods of time (e.g. over the weekend).
- If the vehicle is to be protected against unintentional taking into service.
- If required by national and regional provisions.

The battery master switch is located on the left in the engine compartment.

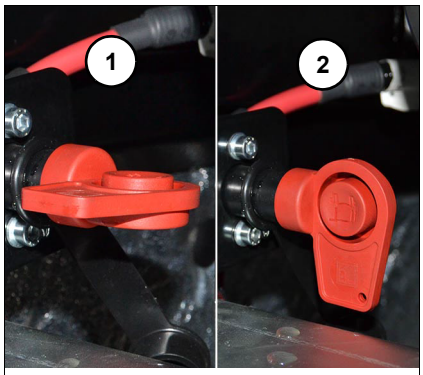


Fig. 127

Power supply	Key position
Connection	**1**
Interrupt	**2** (Remove key)

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Notes:

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5 Operation

5.1 Steering system

Movement	Drive levers/accelerator pedals
Steering to the left	
Steering to the right	
Rotation to the left	
Rotation to the right	

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5.2 Accelerator actuation

Manual throttle (3TNV88)

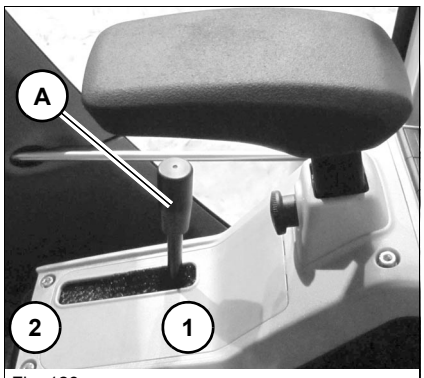


Fig. 128

Speed can be set continuously with throttle **A**.

Engine speed	Position
Idling speed	**1**
Maximum	**2**

Manual throttle (3TNV88F)



Fig. 129

Speed can be set easily using the control button **A** – *see chapter " Control button" on page 4-27*.

Engine speed	Position
Increase	Clockwise
Reduce	Anticlockwise

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Engine operating mode (only 3TNV88F)

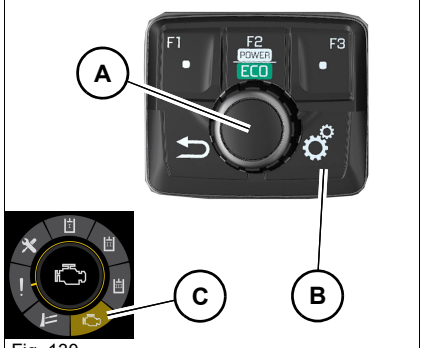


Fig. 130



Fig. 131

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Engine operating mode	Application
ECO	For powerful and fuel-efficient operation
POWER	Maximum power

Changing the engine operating mode directly

Press push button **F2**.

Presetting the engine operating mode

1. Press menu button **B**.
2. Press control button **A** to select menu item **Engine Operating Mode C**.
3. Press control button **A**.
4. Turn control button **A** to select the required operating mode (ECO/PWR).
5. Press control button **A**.

The engine starts up in the selected operating mode.

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Drive range selection (3TNV88)

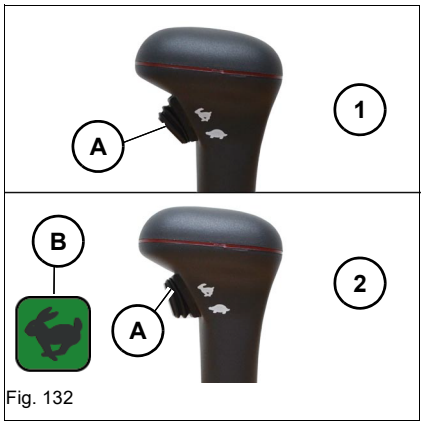


Fig. 132

The machine has two speed ranges that can be selected with the dozer blade lever.

1: Speed 1

2: Speed 2 (control lamp **B** appears in the display element)

Information

In speed range 2, owing to reduced tractive power one may experience jerky movements when turning.

Drive range selection (3TNV88F) (swiveling dozer blade option)

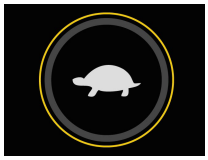
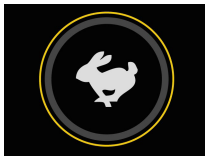


Fig. 133 Drive range selection 3TNV88F



Fig. 133a drive range selection 3TNV88F (swiveling dozer blade option)

The vehicle has two speed ranges that can be selected with push button **A** on the dozer blade lever.

Speed range selection	Push button	Indication
Speed range 1		
Speed range 1 (with swiveling dozer blade option)		
Speed range 2 (Auto 2-speed)		
Speed range 2 (Auto 2-Speed/with option of swiveling dozer blade)		

If speed range 2 is selected, the machine shifts to **Auto 2-Speed** mode.

The vehicle moves at higher speed.

Higher vehicle travel resistance (for example in curves): vehicle automatically shifts down to speed range 1.

Normal vehicle travel resistance: vehicle automatically shifts up to speed range 2.

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Automatic engine speed setting

If the hydraulic system is not operated for a few seconds, the diesel engine goes into idling speed

If the hydraulic system is operated, the diesel engine runs at the engine speed set with the manual throttle.

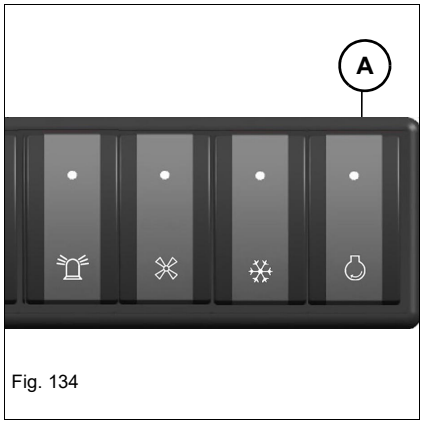


Fig. 134

3TNV88

The switch is located on the switch panel on the right.

Automatic engine speed setting	Function
ON	Press switch **A** down
OFF	Press switch **A** upward

3TNV88F

The automatic engine speed setting can be switched on and off using the touch button **F3** on the jog dial.

Automatic engine speed setting	Push button	Indication
On		
Off		--

Changing speed manually

3TNV88F

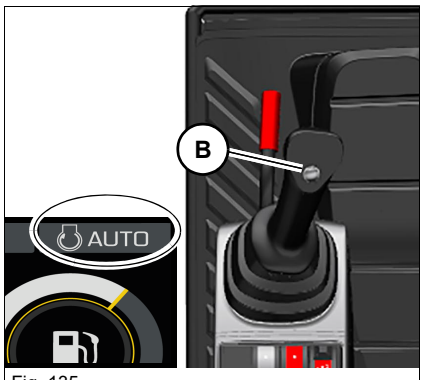


Fig. 135

Push button **B** on the left control lever makes it possible to toggle between the idling speed and the engine speed set with the manual throttle at any time.

The selected symbol flashes while the engine is in idling speed.

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5.3 Brakes

Hydraulic brake

The vehicle will slow down when the drive levers or accelerator pedals are released.

During downhill vehicle travel, the automatic hydraulic brake valves prevent the vehicle from moving faster than the permissible travel speed.

Information

Reduce the speed with the drive levers or accelerator pedals, and not with the throttle.

Mechanical brake

The stabilizer blade is used as a parking brake. Press the stabilizer blade against the ground.

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5.4 Machine travel

Machine travel position

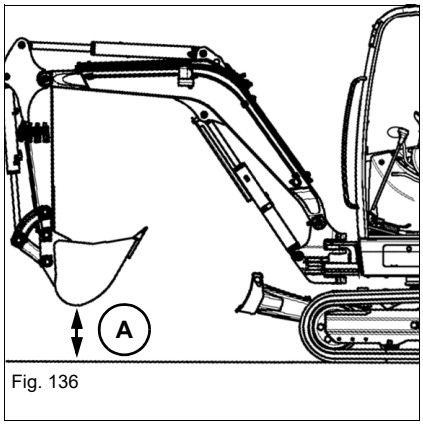


Fig. 136

Position the vehicle as shown.

Position the boom at the center and raise it off the ground.

- **A** = 20-30 cm (8-12 in)

Starting vehicle travel and stopping

WARNING

Accident hazard due to incorrect vehicle operation!

The vehicle moves in the opposite direction if the upper carriage is rotated by 180° and the drive levers are actuated.

Incorrect operation can cause serious injury and death.

► Slowly and carefully actuate the control levers.

WARNING

Accident hazard due to incorrectly rotated upper carriage!

If rotated incorrectly, the upper carriage blocks the visibility of the travel path. This may cause serious injury or death.

► Before starting vehicle travel on a construction site, align the upper carriage so that the operator has an unrestricted view of the travel path.

Starting vehicle travel

Operate the drive levers or accelerator pedals.

➥ The vehicle starts moving.

Stopping

Release the drive levers or accelerator pedals.

➥ The vehicle stops.

Information

The control lever base must be folded down in order to start vehicle travel.

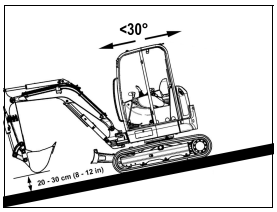
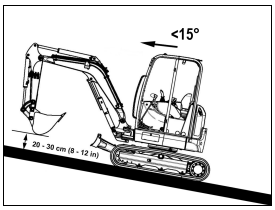
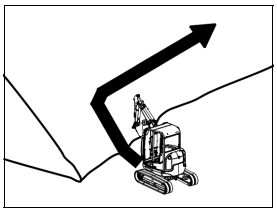
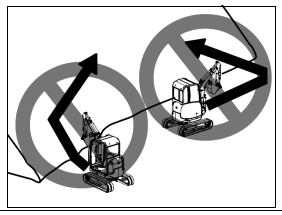
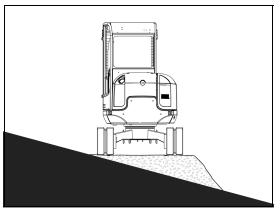
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Operating temperature range

Operate the vehicle only in the following ambient temperatures.

Engine	Temperature °C (°F)	
3TNV88-BPWN	-15 (5)	45 (113)
3TNV88F-EPWN/V (EU)	-15 (5)	40 (104)
3TNV88F-EPWN/V (non-EU)	-15 (5)	45 (113)

Application limits of the vehicle

Application	Description
	**Driving uphill and downhill (boom on the downhill side)** Allows up to a slope of 30°
	**Driving uphill (boom on the uphill side)** Allows up to a slope of 15°
	**Lateral slope travel** Allows up to a slope of 15°
	**Diagonal drive** Prohibited
	**Working with lateral inclinations** Only permitted on a horizontal, firm and level standing surface

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WARNING

Crushing hazard due to tipping over of vehicle!

A tipping vehicle can cause serious injury or death.

- ► Raise the boom 20 – 30 cm (8 – 12 in) off the ground and position it straight ahead at the center of the machine.
- ► In an emergency, lower the boom immediately to increase stability.
- ► Travel on slopes only on firm and level ground.
- ► Adapt the travel speed to the prevailing conditions.
- ► Pay attention to persons and obstacles.
- ► Adhere to the application limits of the vehicle.
- ► Perform uphill and downhill vehicle travel only in speed range 1.
- ► Never reverse downhill.
- ► Ensure that no parts of the body protrude outside the vehicle.
- ► Do not exceed the permissible payloads.
- ► Do not turn or swivel the upper carriage and the boom during downhill or uphill vehicle operation with a full attachment.
- ► Diagonal machine travel is prohibited.

Stones and the humidity in the upper layer of the ground can affect vehicle traction and stability.

The vehicle can slip sideways on gravel or loose, rocky soil. The stability of the vehicle can be reduced on rough terrain.

On soft ground, the vehicle sinks into it or the tracks dig into it. This increases the vehicle angle (maximum gradient angle and maximum lateral angle of inclination), and the vehicle can tip over.

If the engine dies as you perform uphill or downhill vehicle travel, immediately put the control levers to neutral position and restart the engine.

Observe under all circumstances during uphill or downhill travel:

- Keep the drive levers near the neutral position.
- Perform slow and smooth travel movements.
- Avoid sudden travel movements.
- Reduce the engine speed.

The vehicle can slip even on gentle slopes if it travels across grass, leaves, humid metal surfaces, frozen ground or ice.

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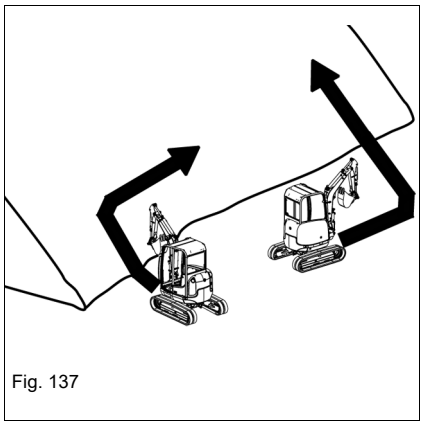


Fig. 137

Preparations for performing vehicle travel on slopes

Always perform uphill or downhill vehicle travel in a straight line.

If the position changes, do not exceed the application limits.

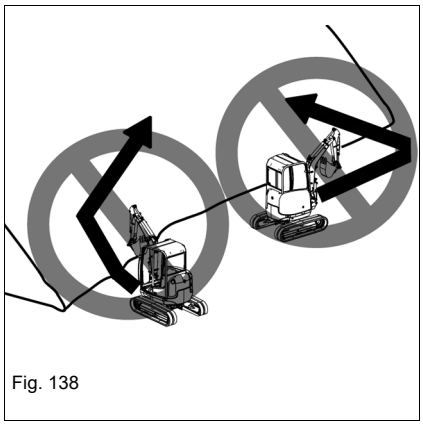


Fig. 138

Change position on level ground and then retract straight-ahead onto the slope.

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Machine travel on slopes

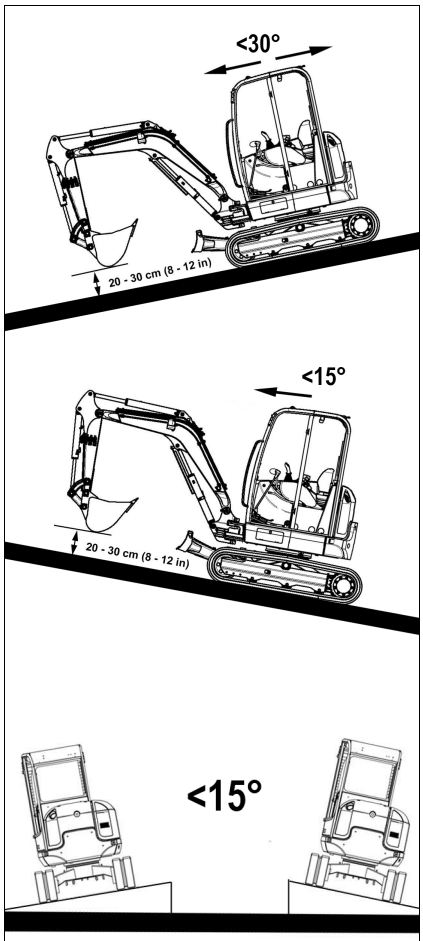


Fig. 139

Uphill and downhill travel (boom on downhill side)

- Raise the boom 20-30 cm (8-12 in) off the ground and align it at the center of the machine.
- Do not exceed the maximum angle of inclination of 30°.

Uphill travel (boom on uphill side)

- Raise the boom 20-30 cm (8-12 in) off the ground and align it at the center of the machine.
- Do not exceed the maximum angle of inclination at 15°.

Lateral slope travel

- Raise the boom 20-30 cm (8-12 in) off the ground and align it at the center of the machine.
- Do not perform machine travel on slopes with a lateral angle of inclination over 15°.

Working with lateral inclination

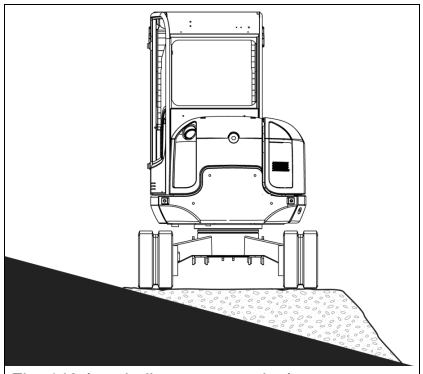


Fig. 140 (symbolic representation)

On lateral inclination, pile up material to create a horizontal, firm and level standing surface.

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Parking the machine

WARNING

Crushing hazard due to vehicle rolling away under its own weight after parking it!

Serious injury or death can be caused by not securing the vehicle.

► Lower the boom and the stabilizer blade to the ground.

► Secure the machine accordingly (for example with chocks).

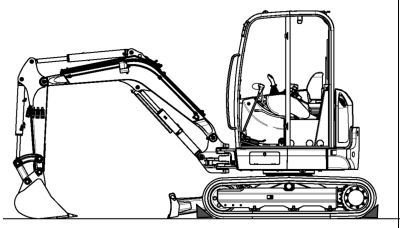


Fig. 141

1. Park the vehicle on firm, level, and horizontal ground.
2. Position the boom straight ahead at the center of the vehicle.
3. Lower the boom and the stabilizer blade to the ground.
4. Stop the engine.
5. Operate the control lever repeatedly to release the pressure in the hydraulic system.
6. Remove the starting key and carry it with you.
7. Raise the control lever base.
8. Close the windows and doors.
9. Close and lock all covers and doors.
10. Secure the vehicle with wheel chocks (see *Fig. 141*).

Information

In order to prevent the formation of condensation water, fill up the fuel tank nearly completely at the end of each working day.

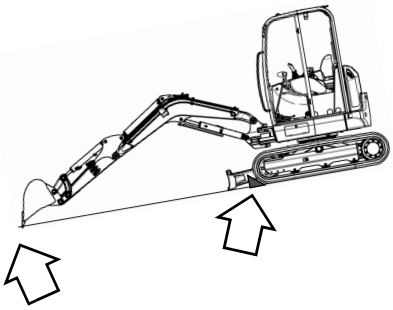


Fig. 142

Parking the vehicle on slopes

If parking the vehicle on a slope cannot be avoided, observe the following in addition:

- Position the boom on the downhill side of the vehicle and firmly press the attachment into the ground.
- Place stabilizer blade on the downhill side.
- Press the stabilizer blade against the ground.
- Secure the vehicle with wheel chocks (see *Fig. 142*).

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5.5 Differential lock

Not available.

5.6 Lights/signaling system

WARNING

Motorists can be blinded by bright lights on the job site!

Working lights can blind motorists. This can cause serious injury or death.

- ► Stop vehicle operation if motorists are blinded.
- ► Take up operation again only when sufficient illumination of the working area is ensured without blinding motorists.

Working lights

The switch is located on the left switch panel.

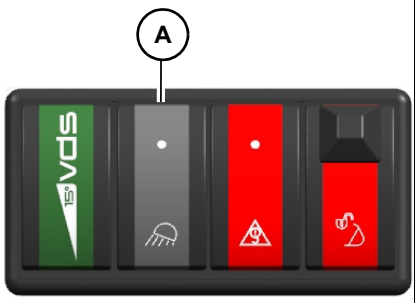


Fig. 143

Working lights	Operation
ON	Press switch **A** down
OFF	Press switch **A** upward

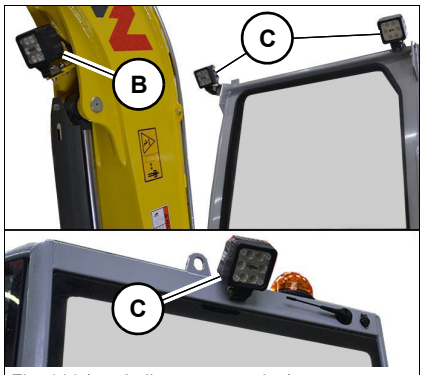


Fig. 144 (symbolic representation)

Position	Description
B	Boom light
C	Front and rear roof lights (option)

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Interior light



Fig. 145

Interior light	Operation
On	Press light to the left or right.
Off	Press the light to the center position.

Horn

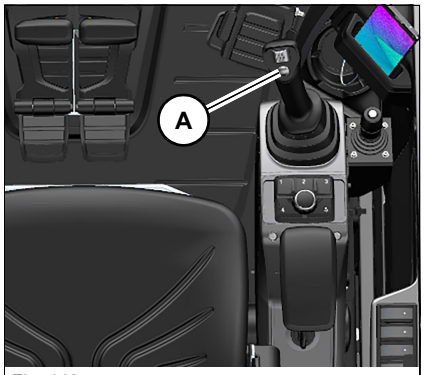


Fig. 146

Press button **A** on the right-hand control lever.

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Rotating beacon (option)

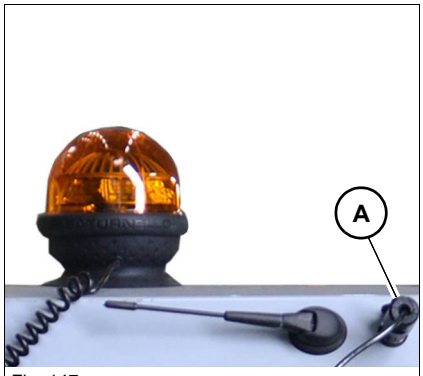


Fig. 147

The rotating beacon has a magnetic base and is attached to the cabin roof. The electric power supply has a 12-volt connection **A**.

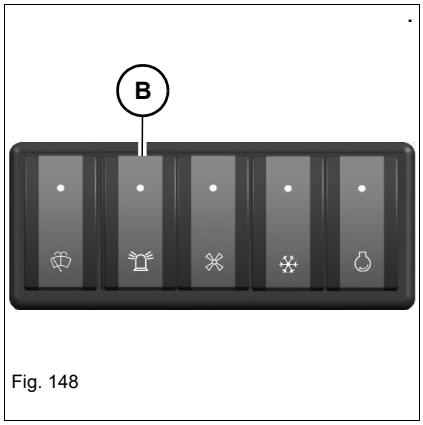


Fig. 148

The switch is located on the switch panel on the right.

Position	Function
On	Press switch **B** down
Off	Press switch **B** upward

Information

Observe the national and regional regulations.

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5.7 Wiper/wash system

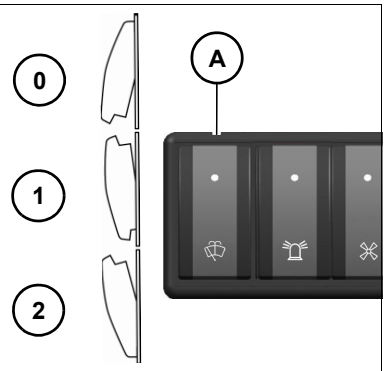


Fig. 149

The switch is located on the switch panel on the right.

Wiper/wash system	Operation
Wipers on	Press switch **A** into position **1**
Wipers off	Press switch **A** into position **0**
Spraying on	Press switch **A** into position **2** and hold
Spraying off	Release switch **A**

NOTICE

Damage to wiper if the front window is raised.

► Do not actuate the wipers if the front window is raised.

NOTICE

Damage to electric pump if the reservoir is empty.

► Do not actuate the washer system if the reservoir is empty.

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5.8 Heating, ventilation and air conditioning

CAUTION

Damage to health due to incorrect operation of air conditioning system.

Can cause health hazards.

► Do not direct the air vents directly at the face when the air conditioning system is switched on.

Temperature setting

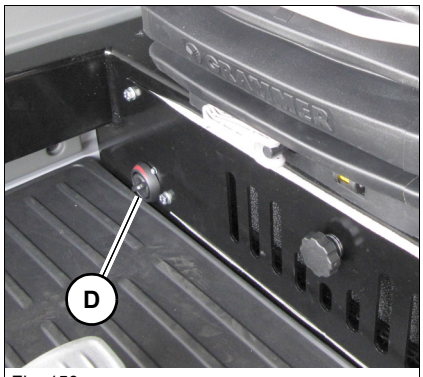


Fig. 150

The temperature controller is located on the right under the driver's seat (version 1) or next to the seat (version 2).

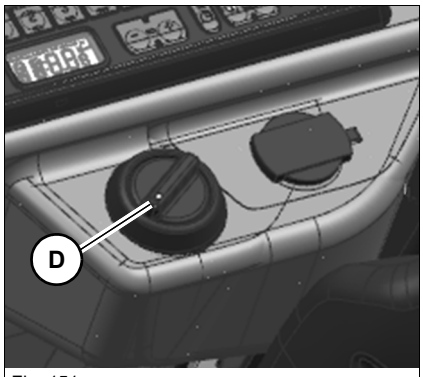


Fig. 151

Temperature	Operation
Higher	Turn the rotary control **D** towards red
Lower	Turn the rotary control **D** towards blue

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Fan

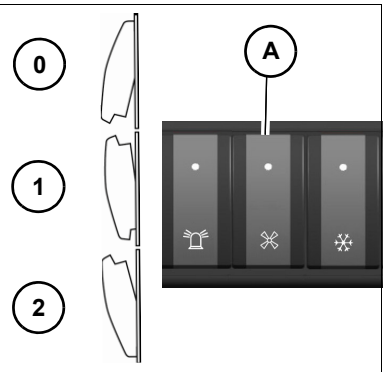


Fig. 152

The switch is located on the switch panel on the right.

Fan	Operation
Off	Press switch **A** into position **0**
1st range	Press switch **A** into position **1**
2nd range	Press switch **A** into position **2**

Recirculated air mode

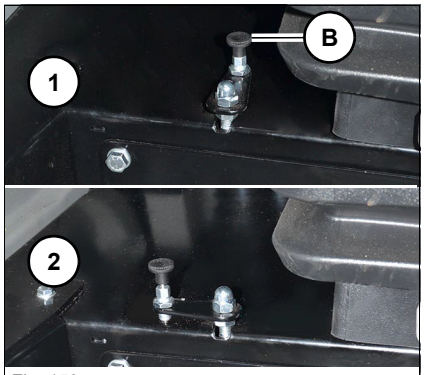


Fig. 153

The operation for the recirculated air mode is located to the right next to the operation.

Recirculated air mode	Operation
Recirculated air mode	Turn the lever to the position **1**.
Fresh-air mode	Pull the unlock **B** upwards and turn the lever to position **2**.

Information

In recirculated-air mode the windows and the doors must be closed. If the recirculated-air mode is used too long, the windows mist up. Switch to fresh air mode as soon as possible.

Air conditioning (option)

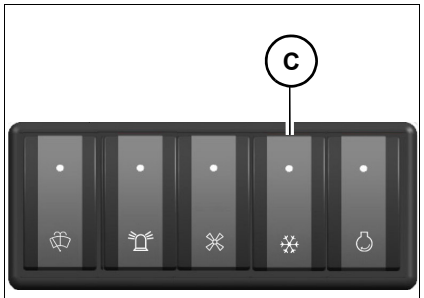


Fig. 154

The switch is located on the switch panel on the right.

Air conditioning	Operation
Off	Push switch **C** into position **0**
On	Push switch **C** into position **1**

Information

Let the air conditioning system run a few minutes several times a month to avoid damage to the air-conditioning compressor.

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Traveling signal (option)

A travel signal sounds as soon as at least one of the tracks moves.

WARNING

Accident hazard during forward/backward vehicle operation!

Danger of crushing that may lead to serious injuries or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Despite the traveling signal, the danger zone must also be monitored visually.
- ► If the travel signal does not sound, stop vehicle operation immediately and contact a Wacker Neuson service center. Follow the relevant national and regional regulations.

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5.9 Operating hydraulics

Basic control lever functions (ISO and SAE controls)

Control mode		ISO controls		SAE controls	
	Required function	Joysticks[1]		Control lever[1]	
		Left	Right	Left	Right
					
	Rotating the upper carriage to the left		--		--
	Rotating the upper carriage to the right		--		--
	Extend stick		--	--	
	Retract the stick		--	--	
	Lower the boom	--			--
	Raise the boom	--			--
	Tilt in the bucket	--		--	
	Tilt out the bucket	--		--	

1. The control levers shown are symbolic representations.

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ISO/SAE controls (option)

The standard equipment of the vehicle includes ISO controls. SAE controls are available as an option. This results in a different control lever operation.

WARNING

Accident hazard due to modified control mode!

Modified controls can cause incorrect operation, and serious injury or death.

- ► Before starting work, check the selected control type.
- ► Secure the wing nut on the changeover lever of the directional valve.
- ► Do not operate the machine with a defective wing nut. Contact a Wacker Neuson service center.

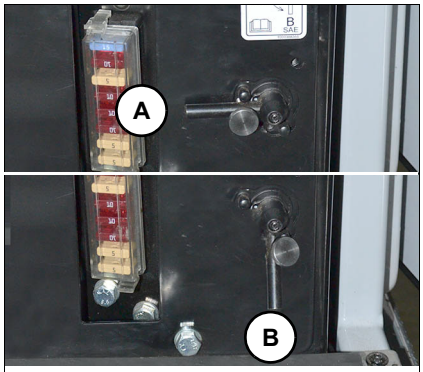


Fig. 155

The changeover valve is located at the left under the operator's seat.

Wiring diagram	Controls
A	ISO controls
B	SAE controls

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Rotating the upper carriage

WARNING

Crushing hazard due to rotating range of vehicle!

Persons in the rotation range of the vehicle can be seriously injured or killed.

► Do not allow anyone to stay in the danger zone.

NOTICE

Possible damage to vehicle when working in the immediate vicinity of walls, parts of buildings or other obstacles.

► Ensure that there are no obstacles is in the danger zone.

Information

As long as the hydraulic oil has not reached its operating temperature, the upper carriage can continue moving after releasing the control lever. Operate the control lever carefully in a cold operating state.

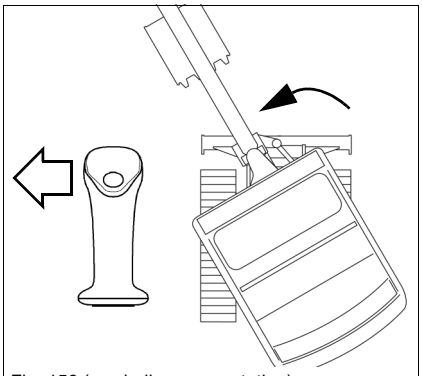


Fig. 156 (symbolic representation)

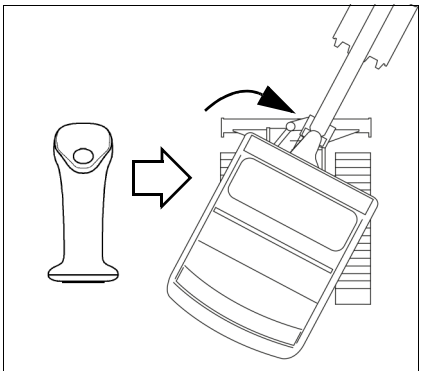


Fig. 157 (symbolic representation)

Rotating the upper carriage	Position
To the left	Push the control lever on the left to the left
To the right	Push the control lever on the left to the right

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Swivel unit brake

Automatic swivel unit brake

When the upper carriage is rotated, the swivel unit brake is enabled with a time delay to hold the upper carriage.

The swivel unit brake is disabled again if the upper carriage is rotated again.

Hydraulic swivel unit brake

Normal braking: release the control lever.

Maximum braking: press the control lever in the opposite direction until the upper carriage is at a standstill.

Functional check of swivel unit brake

Perform the functional check on a warm vehicle after work once a day.

If the vehicle is put into operation again after a standstill of more than two weeks, perform a functional check once **before starting work**.

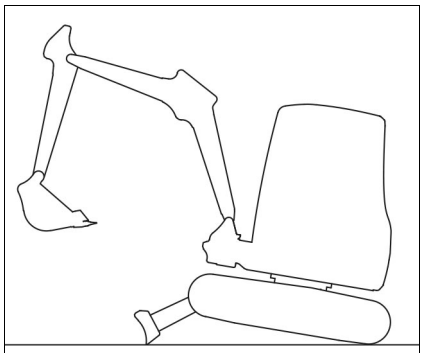


Fig. 158 (symbolic representation)

1. Park the vehicle on firm, level, and horizontal ground.
2. Raise the vehicle with the stabilizer blade as far as it will go.

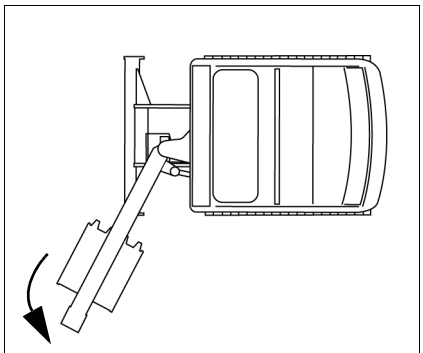


Fig. 159 (symbolic representation)

3. Swivel the boom to the left as far as it will go.

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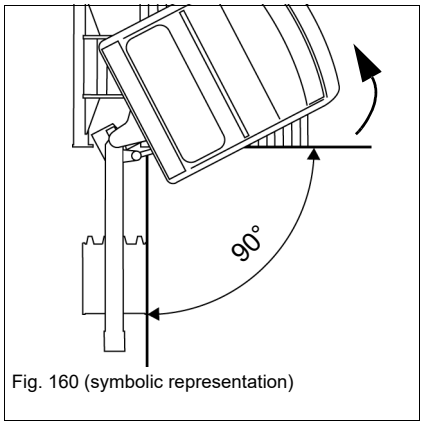


Fig. 160 (symbolic representation)

4. Turn the upper carriage so that the boom is 90° to the travel gear.

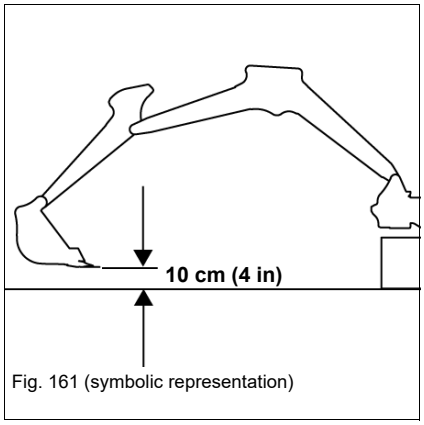


Fig. 161 (symbolic representation)

5. Position the boom as shown in *Fig. 161*.
6. Stop the engine, remove the starting key and carry it with you.
7. Raise the control lever base.
8. Wait one minute.

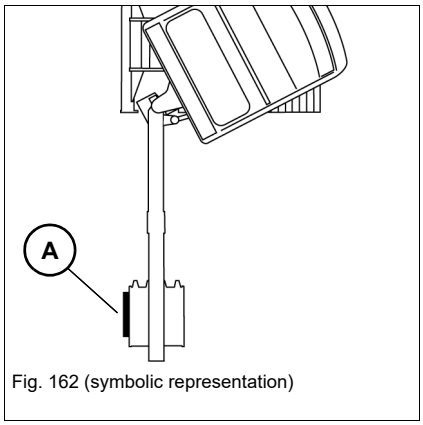


Fig. 162 (symbolic representation)

9. Put a measuring rod **A** against the attachment.
10. Wait one minute.

➥ If the attachment does not move from the measuring rod:
  ➥ Machine is ready for operation.

➥ If the attachment moves from the measuring rod:
  ➥ Stop operation immediately.
  ➥ Contact a Wacker Neuson service center and have the malfunction rectified.

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Dozer blade

WARNING

Crushing hazard due to unintentional actuation!

Unintentional actuation can cause serious injury or death.

- ► Raise the control lever base.
- ► Lower the stabilizer blade to the ground after the work shift.
- ► Do not allow anyone to stay in the danger zone.

NOTICE

Lowering the stabilizer blade too deeply into the ground can create increased resistance.

- ► Slightly raise the stabilizer blade. The clearance between the stabilizer blade and the ground should be about 1 cm (0.4 in).
- ► Check the stabilizer-blade position before performing vehicle travel.

Information

In order to achieve the best possible stability, lower the stabilizer blade.

The stabilizer blade is also used as a parking brake. Press the stabilizer blade against the ground.

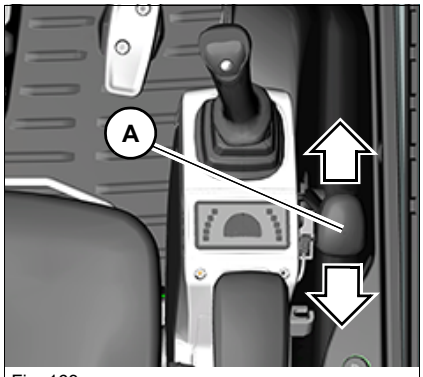


Fig. 163

Stabilizer-blade lever

Stabilizer blade	Position
Raise	Pull lever **A** backward
Lower	Push lever **A** forward

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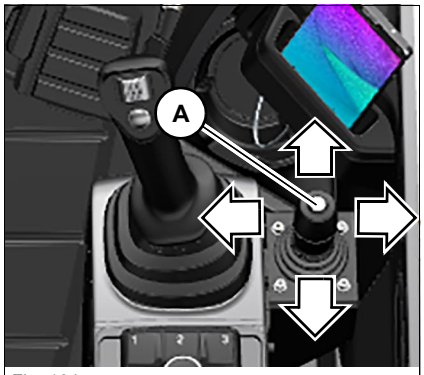


Fig. 164

Dozer blade lever (swiveling dozer blade option)

WARNING

Danger of accident due to activated floating position!

The dozer blade cannot support the vehicle, when the floating position is activated. This can cause serious injury or death.

► Deactivate the floating position before working with the boom.

Precise grading work can be carried out in the floating position.

Stabilizer blade	Position
Raise	Pull lever **A** backward
Lower	Push lever **A** forward
Swivel left	Push lever **A** to the left
Swivel right	Push lever **A** to the right
Enable the floating position	Push lever **A** all the way forward through the resistance. The lever must lock into place
Disable the floating position	Push lever **A** into the neutral position through the resistance

Swiveling the boom

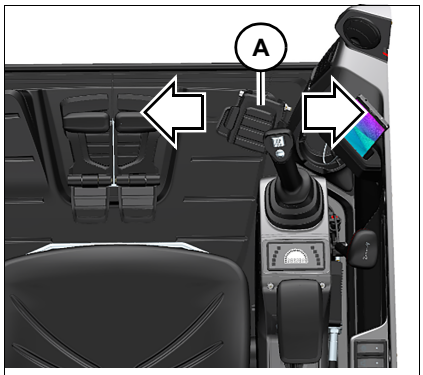


Fig. 165 Swiveling the boom

Fold the pedal cover forward.

Boom	Operation
Swivel to the left	Actuate pedal **A** to the left
Swivel to the right	Actuate pedal **A** to the right

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Hammer operation

Only hammer in the allocated work area and only with splinter protection (canopy) or closed front plate (cabin).

– *see chapter " Shatter protection (option)" on page 4-19*

The vehicle with canopy is not approved for demolition work according to EN 474-5. A front guard cannot be attached.

WARNING

Danger of piercing/penetration by objects from the front!

Work involving risk of piercing/penetrating by objects from the front can cause accidents with serious injury or death.

- ► During operation, all persons must stay clear of the job site of the vehicle.
- ► Do not position the vehicle under the workplace during demolition, since debris could fall onto the vehicle.
- ► Observe the mandatory limits of the work area.
- ► Do not hammer horizontally or upward.
- ► Only hammer with attached shatter protection or closed front window.

WARNING

Accident hazard due to tipping over of vehicle!

A tipping vehicle can cause serious injury or death.

- ► During operation, all persons must stay clear of the job site of the vehicle.
- ► Do not perform any demolition work under the vehicle. This could cause the vehicle to tip over.
- ► The vehicle can lose its balance and tip over if a hammer or other heavy attachment is used.
- ► Never turn, lower or set down the attachment abruptly.
- ► Do not extend or retract the boom abruptly.
- ► Do not use the impact force of the attachment to perform demolition work. Broken or falling pieces can cause serious injury.
- ► Use a hammer only at vehicle standstill.

Information

In combination with Powertilt, only use the smallest possible released hydraulic hammer.

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Working with a hydraulic hammer

NOTICE

In order to avoid damage to the vehicle or hydraulic hammer, observe the following points:

- ► Observe the Operator's Manual of the hydraulic hammer.
- ► Do not hammer horizontally or upward.
- ► Do not use the hammer to raise loads.
- ► Do not hit the hammer against rocks, concrete, etc.
- ► Do not hammer in the same spot uninterruptedly for more than 15 seconds.
- ► Do not raise the vehicle with the boom.
- ► Do not work with fully extended cylinders or arm system. Do not pivot the Powertilt unit beyond 30° during breaker operation, otherwise the load on the boom increases tremendously.
- ► Stop vehicle operation immediately if a hydraulic hose moves back and forth in an unusual manner. The pressure accumulator could be malfunctioning. Contact a Wacker Neuson service center and have the malfunction rectified immediately.
- ► Do not use the impact force of the attachment to perform demolition work. Broken or falling pieces can cause damage to the equipment.

Job site

Work range height **A**: 120 cm (47 in), **B**: 50 cm (20 in)

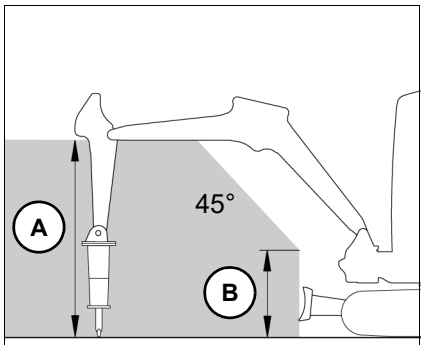


Fig. 166 (symbolic representation)

Figures 166 and 167 refer to work with a Wacker Neuson hydraulic hammer.

Working with another tool can result in a different work area.

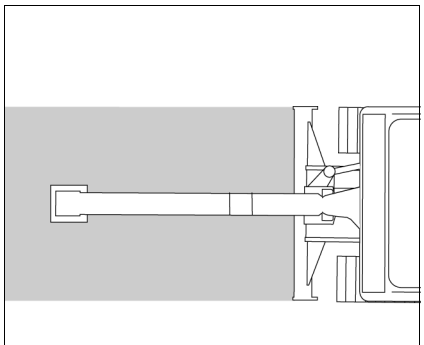


Fig. 167 (symbolic representation)

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Hammer return line

On the front right on the chassis is a ball-type cock for changing over between excavator and hammer operation.

NOTICE

Possible machine damage from incorrect lever position.

► The hammer operation is only possible via the auxiliary hydraulics (AUX I).

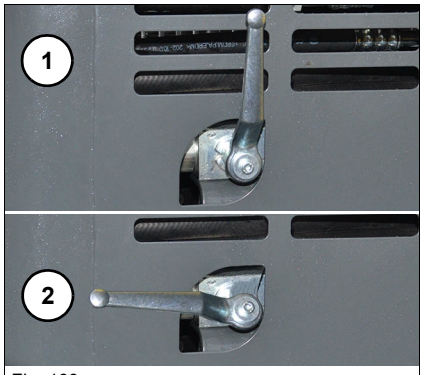


Fig. 168

Lever position	Function
1	Excavator operation
2	Hammer operation

Information

3TNV88: the full hydraulic power is always available in hammer operation.

Information

3TNV88F: Set the maximum discharge volume. *– see chapter “ Adjusting the starting point and maximum required flow rate” on page 5-33*.

Use the jog dial to select one of the hammer symbols **C** as an attachment.

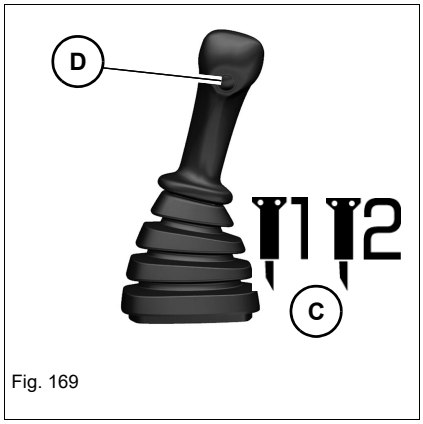


Fig. 169

Hammer operation	Position
On	Press and hold the button **D** in the rear on the right joystick
Off	Release the button **D**

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Additional control circuits

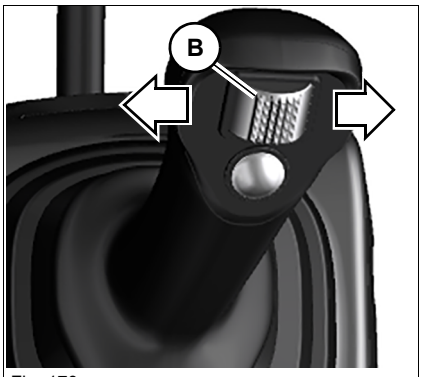


Fig. 170

AUX I

The auxiliary hydraulics system is operated with the right control lever.

Oil flow	Position
To the line on the left	Press switch **B** to the left
To the line on the right	Press switch **B** to the right

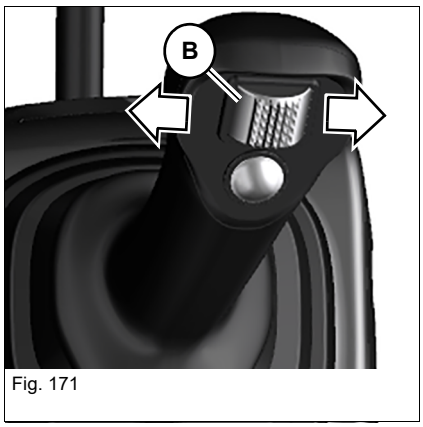


Fig. 171

AUX II (option)

The auxiliary hydraulics system is operated with the left control lever.

Oil flow	Position
To the line on the left	Press switch **B** to the left
To the line on the right	Press switch **B** to the right

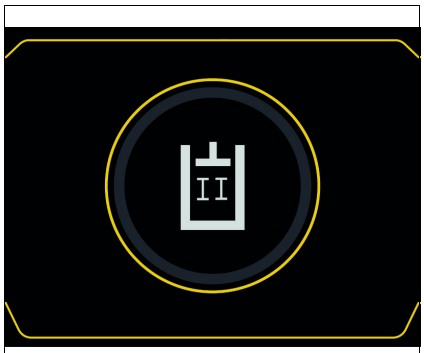


Fig. 172

3TNV88F: If the **AUX II** function is selected, the next symbol appears in the center of the display for a few seconds.

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Proportional controls (3TNV88)

The proportional controls allow to continuously adjust the oil flow for the attachment.

Additional control circuits

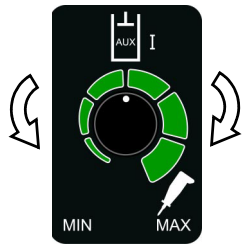


Fig. 173

AUX I

1. Turn the rotary switch on the right control lever base to the required position.

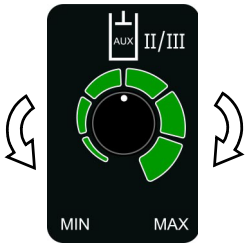


Fig. 174

AUX II and AUX III (option)

1. Turn the rotary switch on the control lever base on the left to the required position.

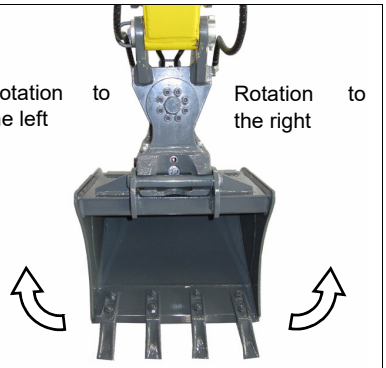


Fig. 175 (symbolic representation)

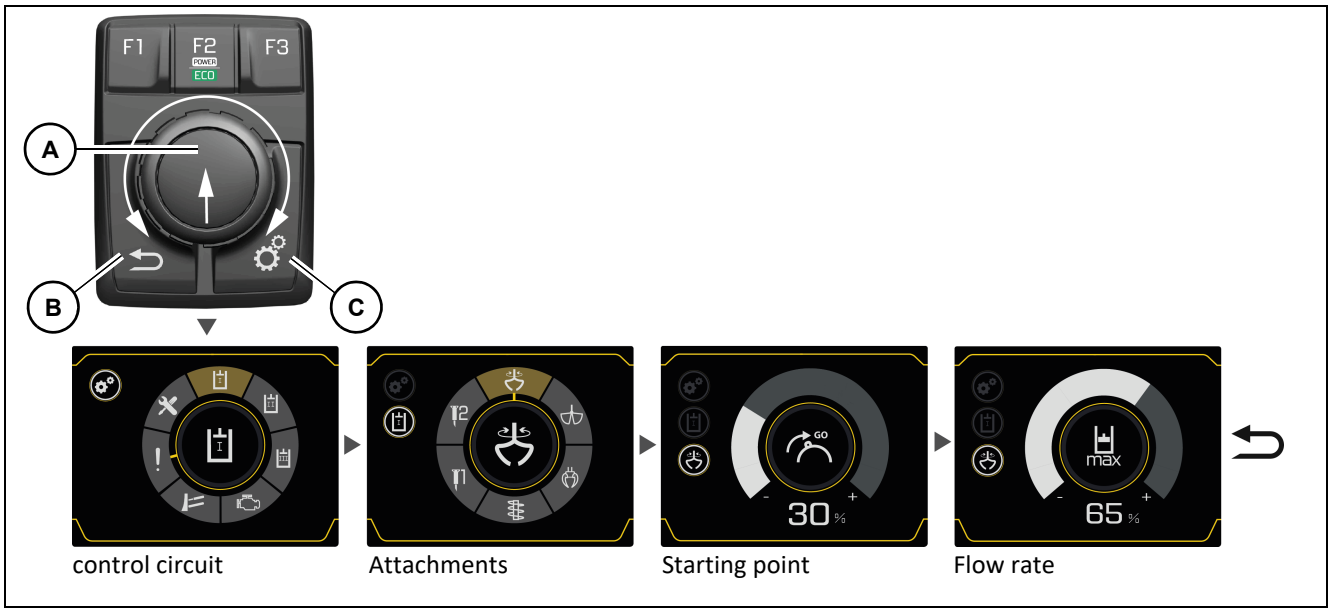
The auxiliary hydraulics system is operated with the left control lever.

Function[1]	Operation
Rotation to the left	Press switch **B** to the left
Rotation to the right	Press switch **B** to the right

1. Depending on the system used or the valid norm, the rotation of direction may differ.

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Proportional controls (3TNV88F)



Information

Example for AUX I. The operation for AUX II, AUX III and the dozer blade are identical.

Performing the adjustments

- Press push button **C** to call the settings.
- The settings are selected (turn) and confirmed (press) with adjustment button **A**.

Push button **B** (return) takes you back to the previous menu level.

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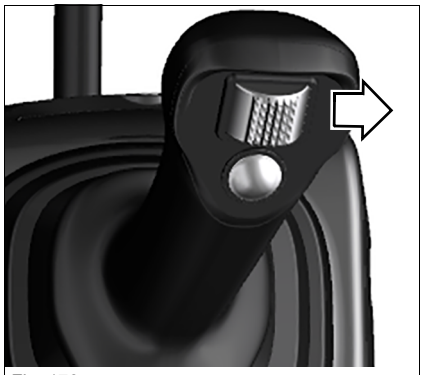


Fig. 176

Adjusting the starting point and maximum required flow rate

The starting point of the control lever switch and the maximum required flow rate can be configured according to the attachment and the work to be performed.

1. Press the switch to the position at which the attachment is supposed to start moving.

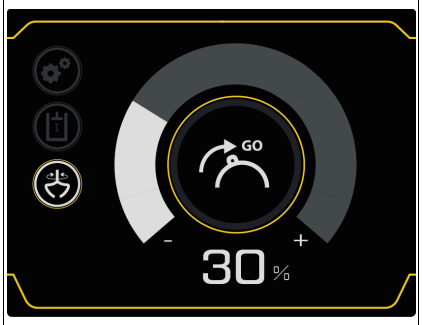


Fig. 177

2. Hold the switch and turn adjustment button **A** at the same time to select the starting point.
3. Press adjustment button **A** to confirm.

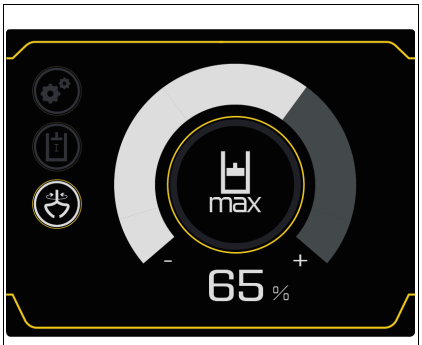


Fig. 178

4. Press the switch as far as it will go and hold it there.
5. Turn adjustment button **A** to select the maximum required flow rate.
6. Press adjustment button **A** to confirm.

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Lifting gear operation

Lifting gear applications are procedures involving raising, transporting and lowering loads with the help of lifting and fastening gear.

DANGER

Crushing hazard due to tipping over of vehicle!

The vehicle causes serious injury or death when it tips over.

- ► Do not exceed the weights indicated in the load diagrams.
- ► Subtract the weight of the attachment from the weight specified in the relevant load diagram.
- ► Use the vehicle for lifting gear applications only if the mandatory lifting gear and safety equipment is installed, functional and enabled.
- ► The subgrade must be horizontal, even, and have a high load-bearing capacity.
- ► Do not tiltthe upper carriage.

WARNING

Risk of vehicle tipping over due to failure to pay attention to the safe load indicator!

Serious injury or death can be caused by a vehicle tipping over.

- ► Reduce the load until both the buzzer and the indicator light on the display element go out.
- ► Observe the load diagrams.

WARNING

Accident hazard due to switched-off or malfunctioning safe load indicator!

Serious injury or death can be caused by a vehicle tipping over.

- ► Switch on the safe load indicator during lifting gear applications.
- ► Operate the vehicle only with an intact safe load indicator.

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NOTICE

Machine damage due to a vehicle tipping over if the weight in the load diagram is exceeded.

► Do not exceed the weights indicated in the load diagrams.

Safe load indicator

The safe load indicator alerts the operator visually and acoustically if the load on the boom is too high.

There are two versions:

- Overload warning device **basic** (option) / **advanced** (option)

Position	basic	advanced
Boom	Hose burst valve	Hose burst valve
Shovel arm	Hose burst valve	Hose burst valve
Stabilizer blade	--	Hose burst valve

The switch for activating and deactivating the safe load indicator is located on the switch panel on the left.

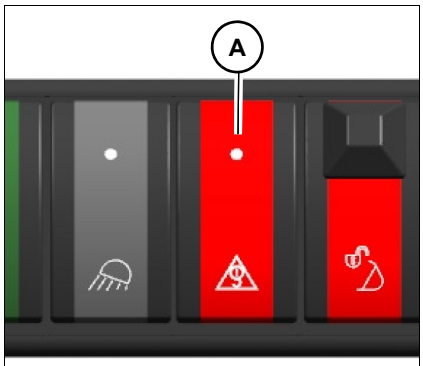


Fig. 179

Safe load indicator	3TNV88	3TNV88F
On		
Off	No symbol	No symbol

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Functional check of safe load indicator

Always perform a functional check of the safe load indicator before performing lifting gear applications.

1. Start the vehicle.
2. Perform vehicle travel on open terrain.
3. Secure the danger zone.
4. Stop the vehicle.
5. Switch on the safe load indicator.
6. Raise the boom as far as it will go and hold the control lever in this position.

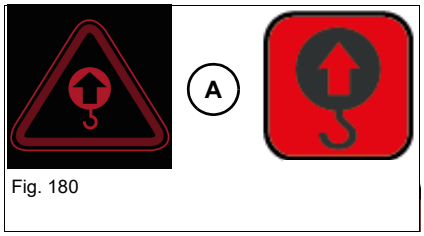


Fig. 180

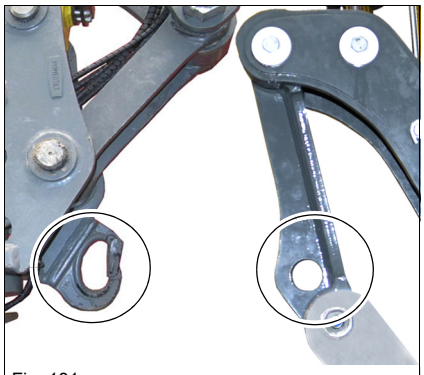
Warning devices	Result
The buzzer sounds and symbol **A** is displayed	The vehicle may be used for lifting gear applications.
Buzzer does not sound or symbol **A** is not displayed	The vehicle may not be used for lifting gear applications. Contact a Wacker Neuson service center.

Perform a functional check of the joystick base.

– see chapter " Functional check of the joystick base" on page 4-39

Only the following lifting gear may be used for lifting gear applications:

- Powertilt/quickhitch with load hook
- Joint rod with lifting eye


Fig. 181

When symbol **A** is displayed and the buzzer sounds:

- Reduce the load until the buzzer goes out and the symbol disappears.

Suitable equipment for fastening and securing loads must be available.

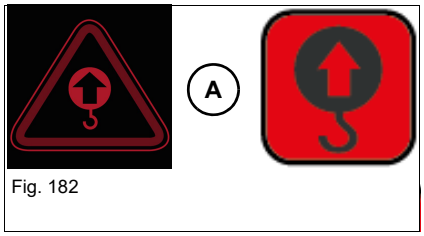


Fig. 182

https://truckmanualshub.com/

Lehnhoff mechanical quickhitch system (optional)

- The quick coupler system and the attachment support must be undamaged and clean.
- Store the Operator's Manual of the mechanical quick coupler system together with the Operator's Manual of the vehicle.
- The described operation does not apply to the face shovel. Contact an authorized workshop for face shovel operation.

WARNING

Crushing hazard when attachments are picked up!

If an attachment is not locked correctly, it can come off and cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

► During locking and unlocking procedures, make sure that hands and feet are not crushed.

► Only use undamaged attachments and quick coupler systems.

► Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times to check the secure locking.

► Only operate the vehicle with a safely locked attachment.

WARNING

Crushing hazard when attachments are removed!

If an attachment is not removed correctly, it can tip over and cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

► Lower the attachment to level and firm ground ensuring stability.

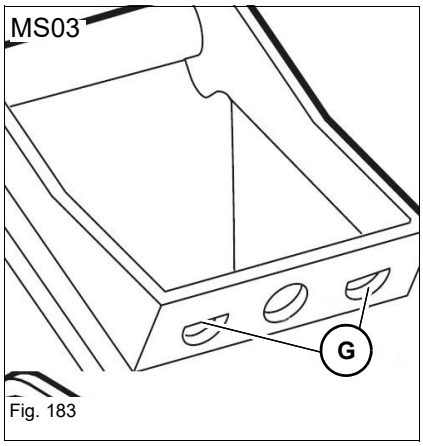


Fig. 183

Acceptance variants

ET35/EZ36: acceptance of MS03

G: Openings for quick coupler system bolts

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Picking up an attachment

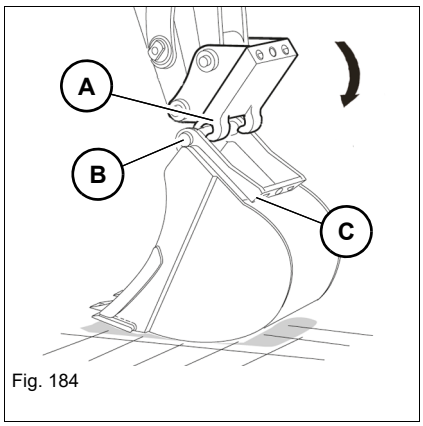


Fig. 184

1. Hook up the quick coupler system **A** in the attachment bolt **B**.
2. Slightly screw in the quick coupler system **A**, lift the shovel arm until the attachment is suspended about 30 cm (12 in) above the ground.
3. Extend the bucket cylinder so that the edge **C** of the attachment touches the quick coupler system.

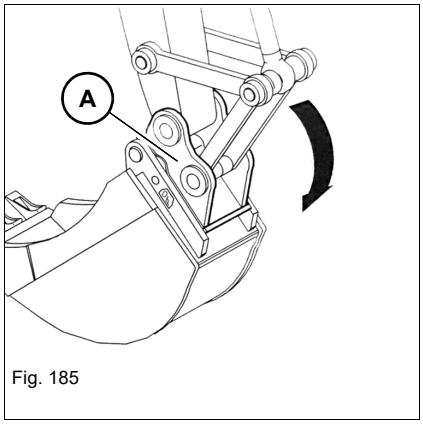


Fig. 185

4. Screw in the quick coupler system **A** until the attachment lies completely on the quick coupler system **A** due to its weight.
5. Shut off the engine and store the ignition switch key safely.

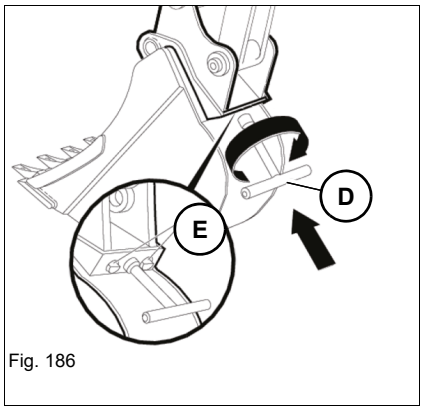


Fig. 186

6. Screw socket wrench **D** clockwise until the bolts **E** completely engage in the openings **G** of the quick coupler system **A**.
   ➥ The quick coupler system is locked.
7. Remove the socket wrench and perform a visual inspection.
8. Start the engine.

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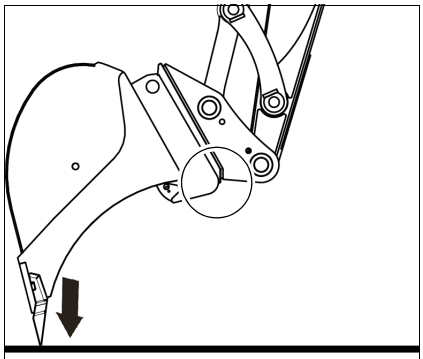


Fig. 187

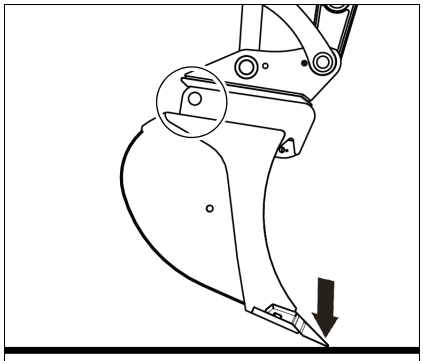


Fig. 188

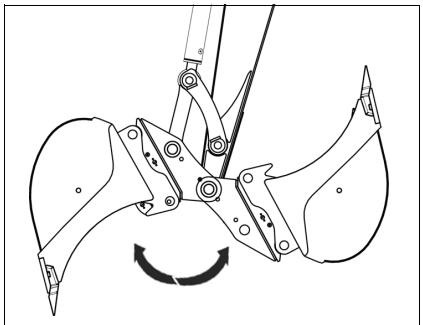


Fig. 189

9. Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times.
   ➥ The attachment may not detach from the quick coupler system in the process.

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Setting down an attachment

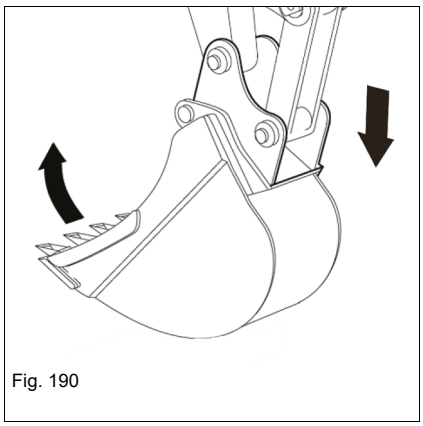


Fig. 190

1. Screw in the attachment and position it at 5–10 cm (2–4 in) above the ground.
2. Shut off the engine and store the ignition switch key safely.

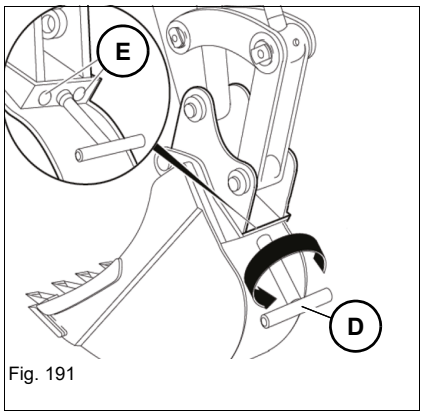


Fig. 191

3. Turn the socket wrench **D** counter-clockwise until the bolts **E** are completely retracted.
   ➥ The quick coupler system is unlocked.
4. Remove the socket wrench.
5. Start the engine.
6. Lower the attachment to level and firm ground ensuring stability.

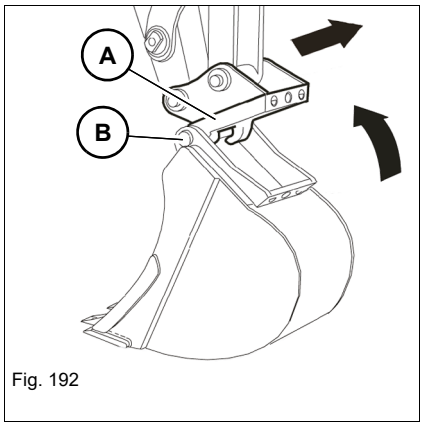


Fig. 192

7. Retract the bucket cylinder and quick coupler system **A** from the attachment bolt **B**.

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Preparation of HSWS (option)

The HSWS preparation is a hydraulic auxiliary control circuit attached to the vehicle boom that was designed, developed and released for the hydraulic quick coupler systems described in this operator's manual.

Wacker Neuson is not liable for injuries or damage if at least one of the following items is not complied with:

- Follow the operator's manual for the hydraulic quickhitch.
- Store the Operator’s Manual of the hydraulic quickhitch together with the Operator’s Manual of the vehicle.
- For non-released quickhitch systems, there may be differences in the operating functions or the operation of the vehicle. Observe the operator's manual of the quickhitch system or the attachment.

Nevertheless, should a non-released HSWS be used, the following points must also be observed:

- If required, modifications on the vehicle (for example additional adhesive labels) or the Operator’s Manual of the vehicle (if operation is different) must be made.
- The intended purpose of the vehicle may be restricted.
- Assembling a hydraulic quick coupler system that does not fit with the vehicle or its interface (e.g. pressure settings) may void the declaration of conformity of the vehicle. Contact a Wacker Neuson service center.
- Assembling a hydraulic quick coupler system to a vehicle that does not fit with the vehicle or its interface (e.g. pressure settings) may void the declaration of conformity of the hydraulic quick coupler. Contact a Wacker Neuson service center.

Hydraulic quickhitch operation

The vehicle could be equipped with two different versions for operating the hydraulic quickhitch system.

Version 1: Operation using switch, Foot-operated push button and dozer blade lever

Version 2: Operation using switch and button

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Hydraulic quickhitch system/Easy Lock (Version 1)

- Attend specific training before putting into operation. Training must be given by authorized technical personnel and must be understood by the operator.
- For safety reasons, the quickhitch must be operated with two control elements. This avoids opening the quickhitch unintentionally during work operation.
- The quick coupler system and the attachment support must be undamaged and clean.
- For more information, see **Easy Lock/Powertilt with Easy Lock** Operator's Manual.
- Store the **Easy Lock/Powertilt with Easy Lock** operator's manual together with the vehicle's operator's manual.

WARNING

Crushing hazard when attachments are picked up!

If an attachment is not locked correctly, it can come off and cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

► Only use undamaged attachments and quick coupler systems.

► Check pin **F** must be fully retracted. Otherwise repeat the lock cycle until check pin **F** is retracted.

► Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times to check the secure locking.

► Operate the vehicle only with a safely locked attachment.

WARNING

Crushing hazard when attachments are removed!

If an attachment is not removed correctly, it can tip over and cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

► Lower the attachment to level and firm ground ensuring stability.

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WARNING

Danger of crushing due to incorrect operation of the hydraulic quickhitch system!

For system-specific reasons, the quickhitch can also be operated with other hydraulic functions. This can cause serious injury or death.

► Operate the hydraulic quickhitch only with the function **Raise stabilizer blade**.

Picking up an attachment

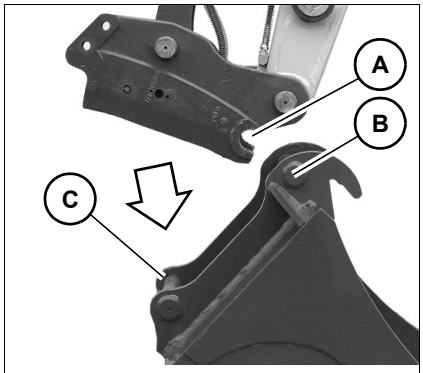


Fig. 193

1. Hook up the quick coupler system **A** in the bolts **B** of the attachment receptacle.
2. Extend the bucket cylinder so that pin **C** of the attachment touches the quickhitch.
3. Check whether the attachment touches the quick coupler system with the bolt **C**.
4. Move the attachment inward completely.

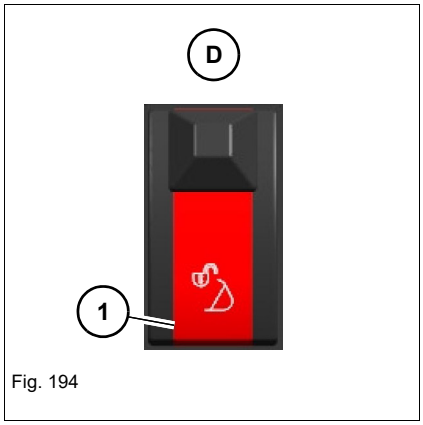


Fig. 194

5. Unlock switch **D** and press it to position **1**.
   ➥ The quickhitch is enabled and the buzzer sounds.



Fig. 195

The symbol **Hydraulic quickhitch enabled** appears and the buzzer sounds (3TNV88F).

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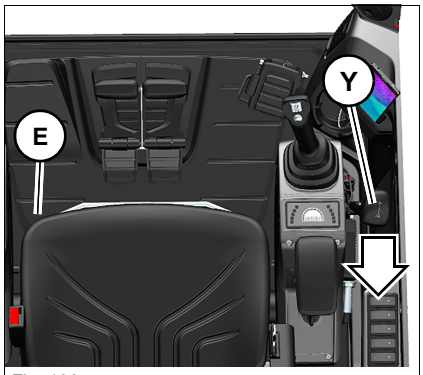


Fig. 196

6. Press and hold the foot-operated touch button **E** and at the same time pull back the **J** dozer blade lever.
   ➥ The quickhitch opens.



Fig. 197

The symbol **quickhitch open** appears (3TNV88F).

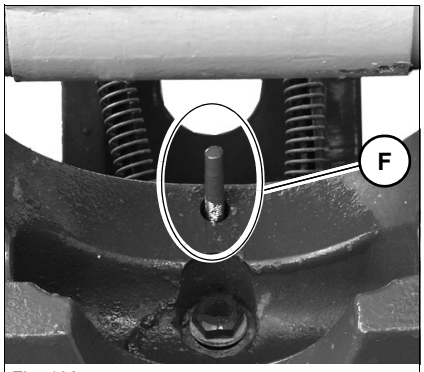


Fig. 198

➥ Check pin **F** must be fully extended.
➥ The attachment engages.

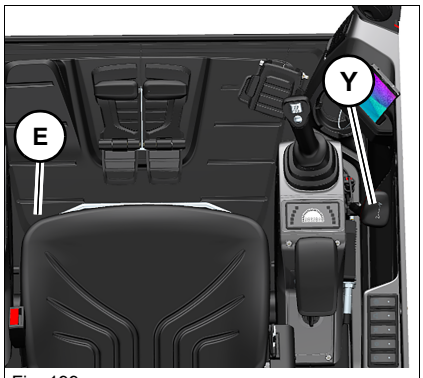


Fig. 199

7. Release the dozer blade lever **J** and foot-operated touch button **E**.
   ➥ The quickhitch closes.

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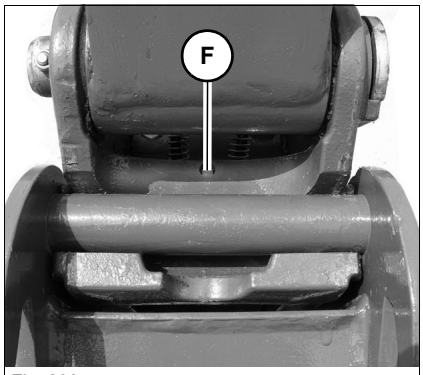


Fig. 200

➥ Check pin **F** must be fully retracted.

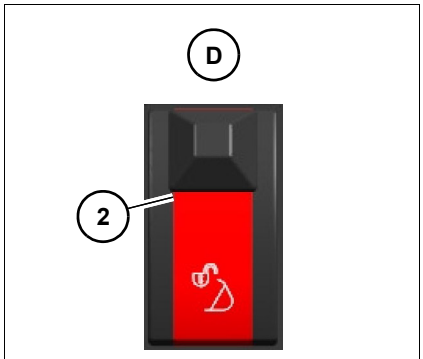


Fig. 201:

8. Press switch **D** to position **2**.
   ➥ The quickhitch is disabled and the buzzer does not sound any longer.

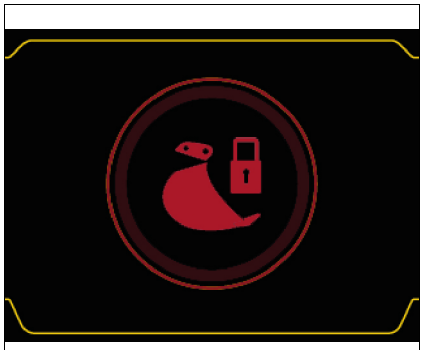


Fig. 202

The symbol **HSWS disabled** appears for a few seconds (3TNV88F).

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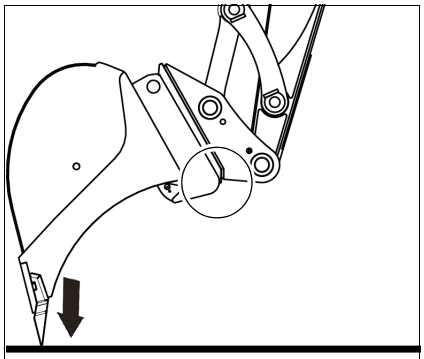


Fig. 203

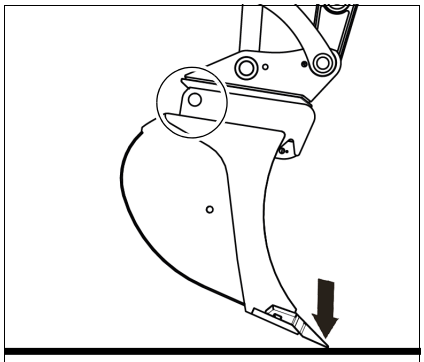


Fig. 204

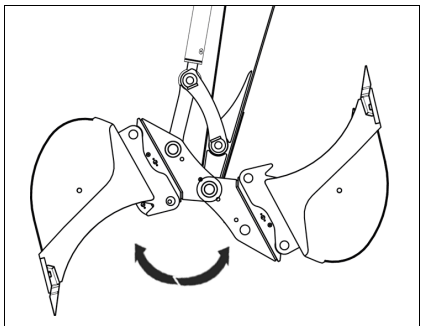


Fig. 205

9. Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times to check the secure locking.

➥ The attachment may not detach from the quick coupler system in the process.

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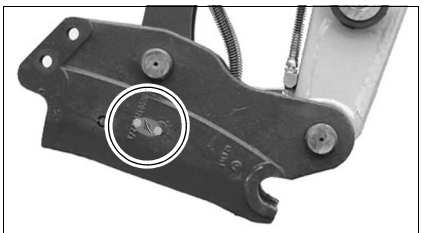


Fig. 206

Manual HSWS bolt lock

Depending on national provisions, the HSWS must also be manually locked according to the hydraulic locking process.

The locking or unlocking is located to the left on the quick coupler system.

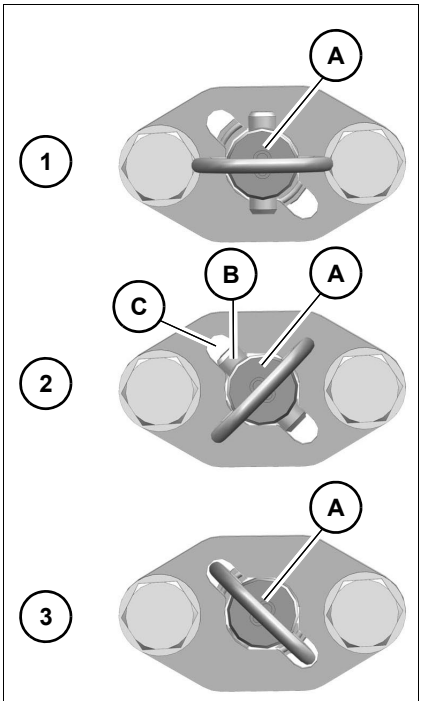


Fig. 207 (symbolic representation)

- Stop the engine and remove the starting key.
- Raise the control lever base.
- Rotate bolt **A** so that the pin **B** fits in the recess **C (2)**.
- Press in bolt **A** and turn until it is held in its position by spring **(3)**.
  ➥ The HSWS is also manually locked.

Information

Comply with national provisions.

Information

The bolt positions may deviate in their final position from the figures.

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Setting down an attachment

Manual HSWS bolt unlocking

Depending on national provisions, the HSWS must also be manually unlocked according to the hydraulic unlocking process.

The locking or unlocking is located to the left on the quick coupler system.

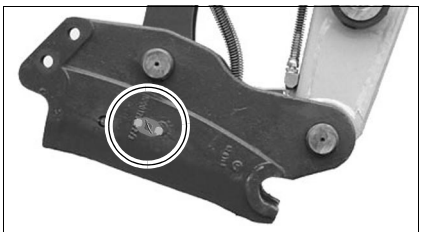


Fig. 208

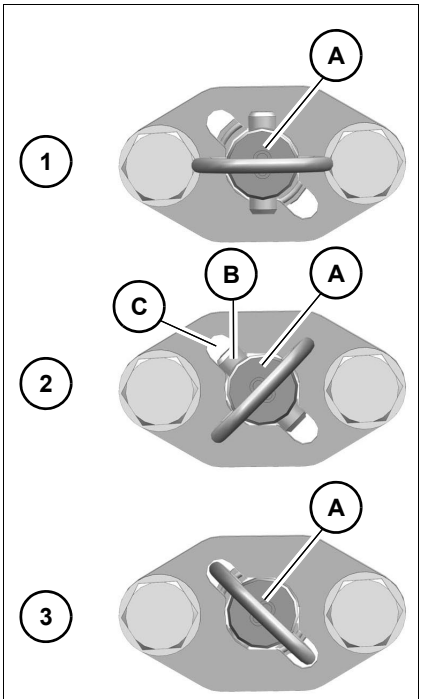


Fig. 209

- Stop the engine and remove the starting key.
- Raise the control lever base.
- Rotate bolt **A** so that the pin **B** fits in the recess **C (2)**.
- Pull out the bolt **A (1)**.
  - ➥ The HSWS is manually unlocked. The attachment is still hydraulically locked.

Information

Comply with national provisions.

Information

The bolt positions may deviate in their final position from the figures.

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Setting down an attachment



Fig. 210

1. Move the attachment inward completely and position it at 5–10 cm (2–4 in) above the ground.
2. Unlock switch **D** and press it to position **1**.
   ➥ The quickhitch is enabled and the buzzer sounds.



Fig. 211

The symbol **Hydraulic quickhitch enabled** appears and the buzzer sounds (3TNV88F).

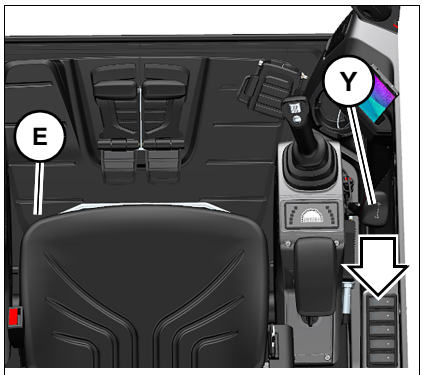


Fig. 212

3. Press and hold the foot-operated touch button **E** and at the same time pull back the **J** dozer blade lever.
   ➥ The quickhitch opens.



Fig. 213

The symbol **quickhitch open** appears (3TNV88F).

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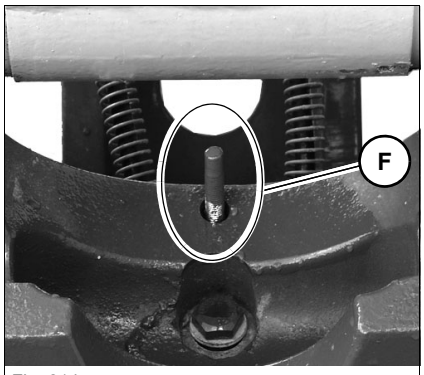


Fig. 214

➥ Check pin **F** must be fully extended.

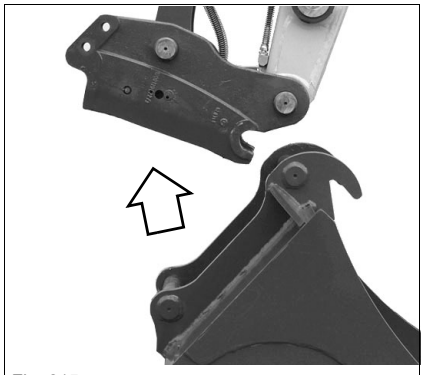


Fig. 215

4. Retract the bucket cylinder.
   ➥ The attachment is lowered to the ground.

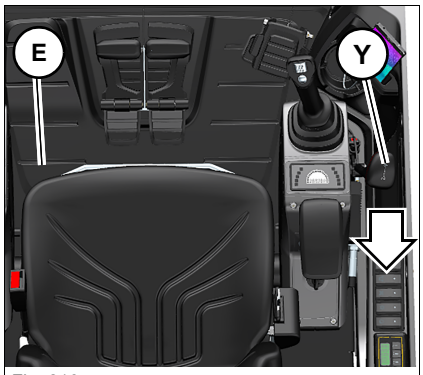


Fig. 216

5. Release the dozer blade lever **J** and foot-operated touch button **E**.
   ➥ The quickhitch closes.

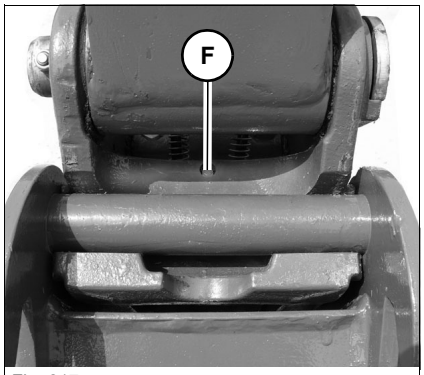


Fig. 217:

➥ Check pin **F** must be fully retracted.

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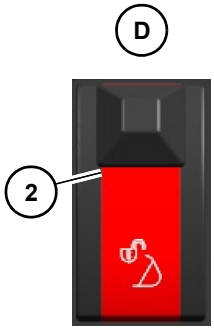


Fig. 218:

6. Press switch **D** to position **2**.
   ➥ The quickhitch is disabled and the buzzer does not sound any longer.

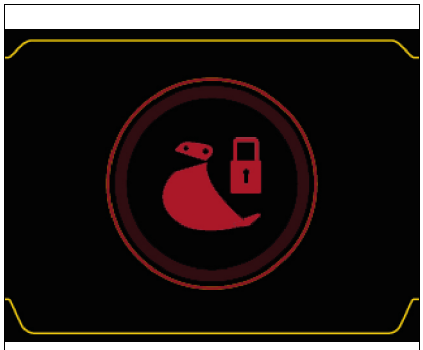


Fig. 219

The symbol **HSWS disabled** appears for a few seconds (3TNV88F).

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Hydraulic quickhitch system/Easy Lock (Version 2)

- Attend specific training before putting into operation. Training must be given by authorized technical personnel and must be understood by the operator.
- For safety reasons, the quickhitch must be operated with two control elements. This avoids opening the quickhitch unintentionally during work operation.
- The quick coupler system and the attachment support must be undamaged and clean.
- For more information, see **Easy Lock/Powertilt with Easy Lock** Operator’s Manual.
- Store the **Easy Lock/Powertilt with Easy Lock** operator's manual together with the vehicle's operator's manual.

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WARNING

Crushing hazard when attachments are picked up!

If an attachment is not locked correctly, it can come off and cause serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Only use undamaged attachments and quick coupler systems.
- ► Check pin **D** must be fully retracted. Otherwise repeat the lock cycle until check pin **D** is retracted.
- ► Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times to check the secure locking.
- ► Operate the vehicle only with a safely locked attachment.

WARNING

Crushing hazard when attachments are removed!

If an attachment is not removed correctly, it can tip over and cause serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Lower the attachment to level and firm ground ensuring stability.

Information

Between pressing switch **B** and button **C**, if more than 80 seconds pass, the symbols **HSWS activated** and **HSWS deactivated** appear alternately. The buzzer sounds in shorter intervals.

- ► Press switch **B** again and press push button **C** within 80 seconds.

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Picking up an attachment

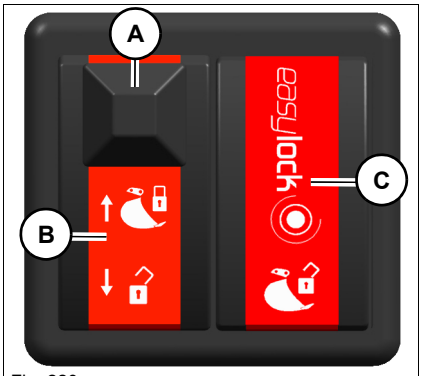


Fig. 220

1. Pull lock **A** down.
2. Press switch **B** down.


Fig. 221

➥ The symbol **Hydraulic quickhitch enabled** appears and the buzzer sounds (3TNV88F).


Fig. 222

3. Press button **C** within 80 seconds.
4. The quickhitch opens.

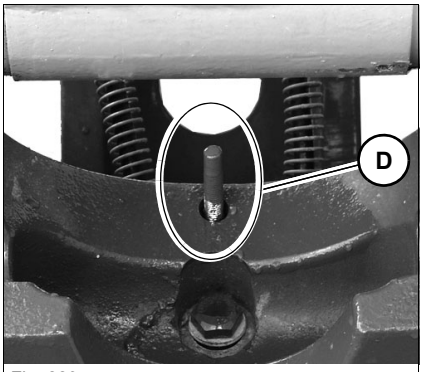


Fig. 223

➥ Check pin **D** must be fully extended.

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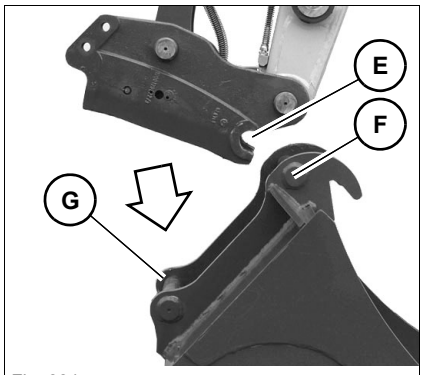


Fig. 224

5. Hook up the quick coupler system **E** in bolt **F** of the attachment receptacle.
6. Extend the bucket cylinder so that pin **G** of the attachment touches the quickhitch.
7. Check whether the attachment touches the quick coupler system with bolt **G**.
8. Move the attachment inward completely.


Fig. 225

9. Press switch **B** upward.

➥ The quickhitch closes.

➥ The symbol **Hydraulic quickhitch system disabled** appears for a few seconds and the buzzer does not sound any more (3TNV88F).

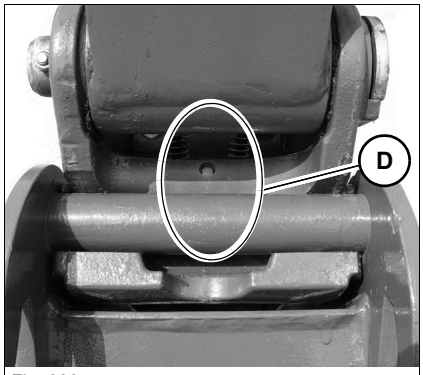


Fig. 226

➥ Check pin **D** must be fully retracted.

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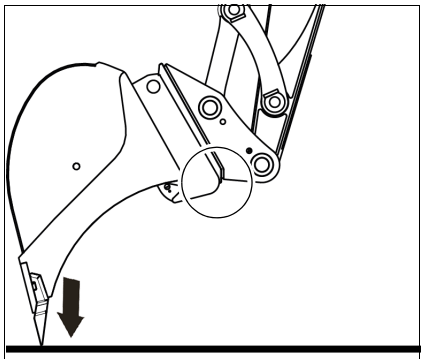


Fig. 227

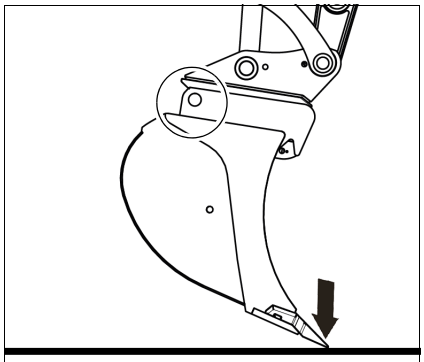


Fig. 228

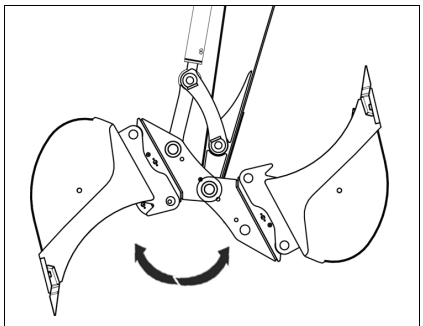


Fig. 229

10. Before starting any work and after every locking process, press the attachment to the ground and quickly move it back and forth over just over the ground a few times to check the secure locking.

➥ The attachment may not detach from the quick coupler system in the process.

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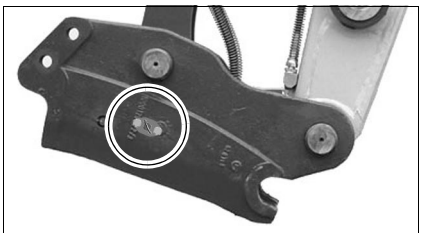


Fig. 230

Manual HSWS bolt lock

Depending on national provisions, the HSWS must also be manually locked according to the hydraulic locking process.

The locking or unlocking is located to the left on the quick coupler system.

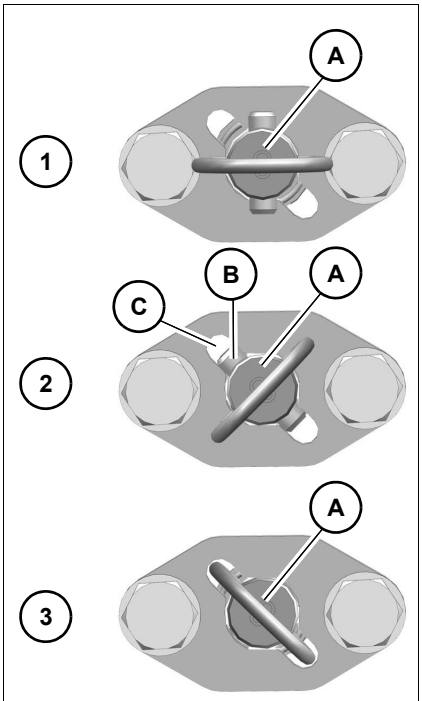


Fig. 231 (symbolic representation)

- Stop the engine and remove the starting key.
- Raise the control lever base.
- Rotate bolt **A** so that the pin **B** fits in the recess **C (2)**.
- Press in bolt **A** and turn until it is held in its position by spring **(3)**.
  ➥ The HSWS is also manually locked.

Information

Comply with national provisions.

Information

The bolt positions may deviate in their final position from the figures.

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Setting down an attachment

Manual HSWS bolt unlocking

Depending on national provisions, the HSWS must also be manually unlocked according to the hydraulic unlocking process.

The locking or unlocking is located to the left on the quick coupler system.

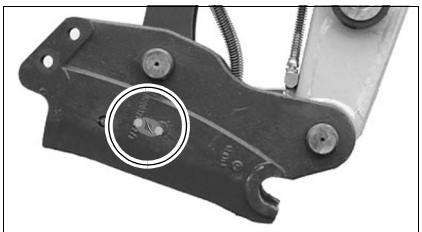


Fig. 232

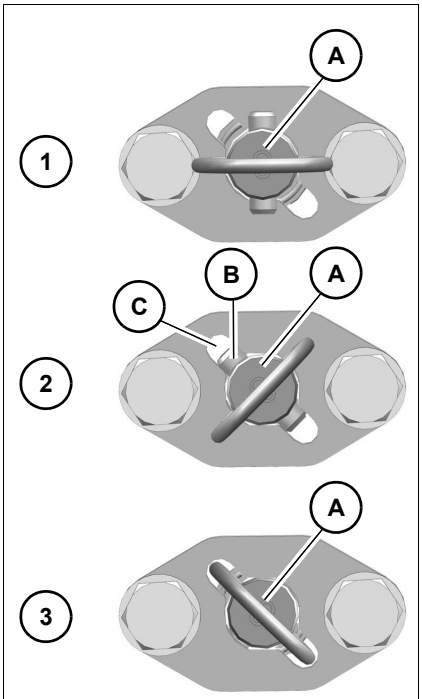


Fig. 233

- Stop the engine and remove the starting key.
- Raise the control lever base.
- Rotate bolt **A** so that the pin **B** fits in the recess **C (2)**.
- Pull out the bolt **A (1)**.
  - ➥ The HSWS is manually unlocked. The attachment is still hydraulically locked.

Information

Comply with national provisions.

Information

The bolt positions may deviate in their final position from the figures.

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Setting down an attachment

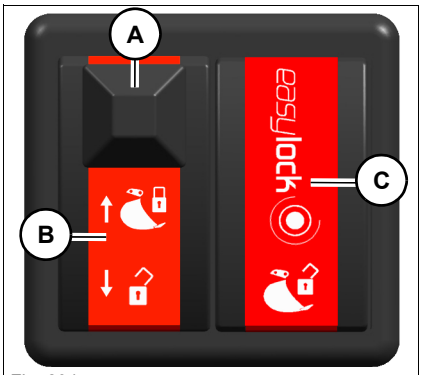


Fig. 234

1. Start engine and lower the control lever base.
2. Move the attachment inward completely and position it at 5–10 cm (2–4 in) above the ground.
3. Pull lock **A** down.
4. Press switch **B** down.


Fig. 235

➥ The symbol **Hydraulic quickhitch enabled** appears and the buzzer sounds (3TNV88F).


Fig. 236

5. Press button **C** within 80 seconds.

➥ The quickhitch opens.

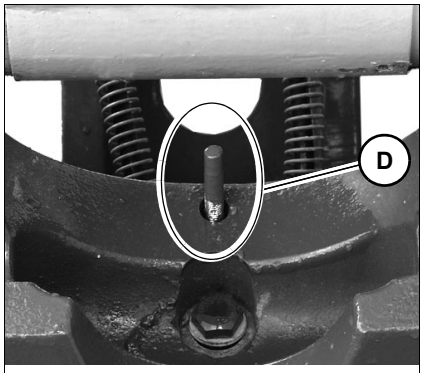


Fig. 237

➥ Check pin **D** must be fully extended.

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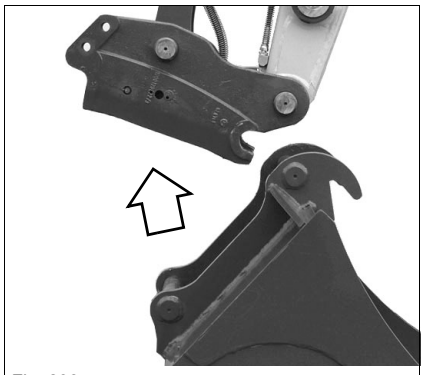


Fig. 238

6. Retract the bucket cylinder.
7. Set down the attachment.
8. Raise the boom.

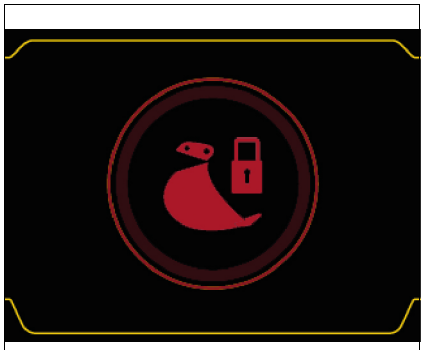


Fig. 239

9. Press switch **B** upward.

➥ The quickhitch closes.

10. The symbol **Hydraulic quickhitch system disabled** appears for a few seconds and the buzzer does not sound any more (3TNV88F).

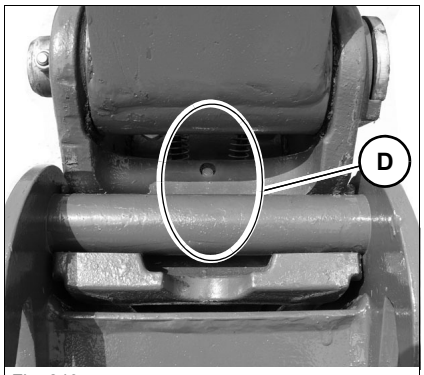


Fig. 240:

➥ Check pin **D** must be fully retracted.

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AUX V (option)



Fig. 241

The change-over takes place on the left and right of the stick.

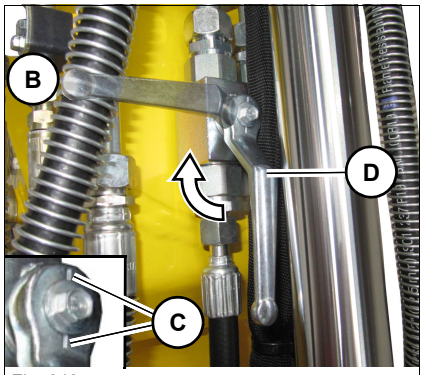


Fig. 242

Stopping grab operation:

1. Move both levers **D** on the ball-type cock to position **B**.
   ➥ Notch **C** indicates the flow direction.

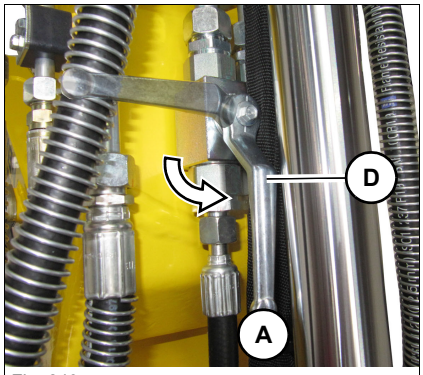


Fig. 243

Stopping bucket operation:

1. Move both levers **D** on the ball-type cock to position **A**.

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Connecting and disconnecting hydraulic couplings

1. Stop and park the vehicle. – *see chapter “ Preparing lubrication” on page 7-7*.
2. Position the boom straight ahead at the center of the vehicle.
3. Lower the stabilizer blade to the ground.
4. Turn the ignition key to position “**1**”.
5. Move the control lever or the pedal of the hydraulic circuit in all directions repeatedly.
6. Remove the starting key and carry it with you.

➥ The grab hose couplings can now be coupled and uncoupled from the couplings.

Hydraulic connections

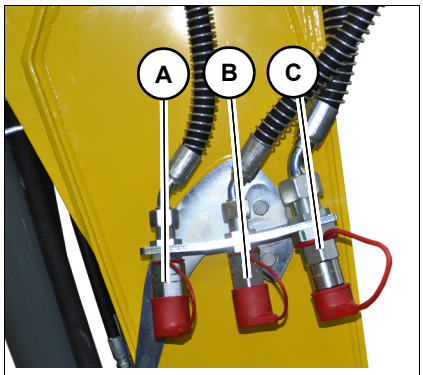


Fig. 244

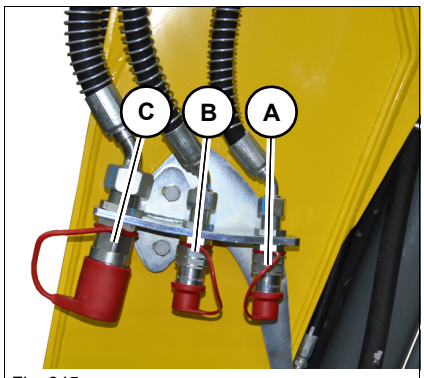


Fig. 245

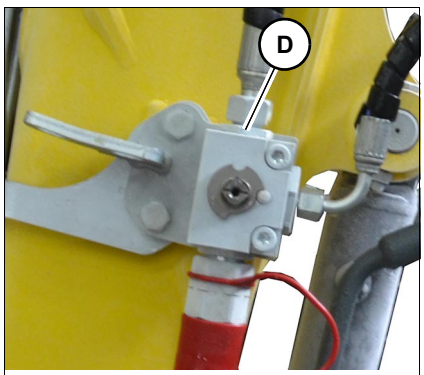


Fig. 246

Connec-tion	Stick (left/right)
A	AUX V (option)
B	AUX II or AUX III (option)
C	AUX I
D	Hydraulic thumb (option)

Information

Follow the instructions in the operator’s manual of the attachment manufacturer for connecting the hydraulics to the attachment.

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Hydraulic thumb control circuit (option)

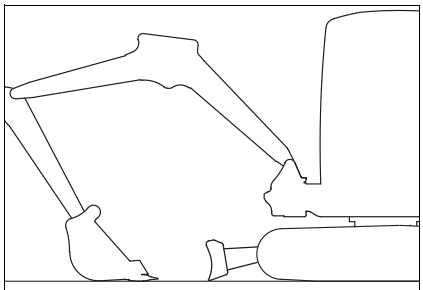


Fig. 247 (Symbol representation)

The change-over takes place on the left and right at the end of the stick.

Position the arm system straight ahead at the center of the vehicle (*Fig. 247*).

Lower the boom and the stabilizer blade to the ground.

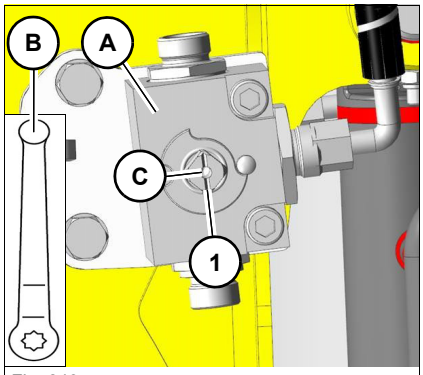


Fig. 248

Setting the hydraulic thumb:

Bring the ball-type cock **A** with lever **B** into the desired position to the left and right on the stick.

Position of the slot C	Operating
1	AUX I
2	Hydraulic thumb

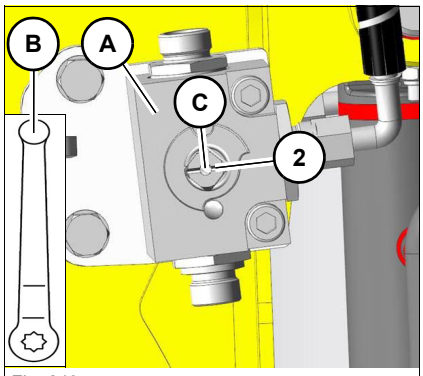


Fig. 249

Information

The lever must be removed before operation.

The operation is executed using the right joystick – *see chapter “ AUX I” on page 5-30*

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Load-retaining function

WARNING

Injury hazard due to fluid escaping under pressure!

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

► If a hose bursts, move the control elements to neutral position so that as little hydraulic oil as possible escapes.

WARNING

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

► If a hose bursts, move the control elements to neutral position so that as little hydraulic oil as possible escapes.

► Wear protective equipment.

Information

Hose burst valves are set at the factory and secured with seals. The correct functioning is no longer ensured and warranty is void if a seal is removed or if the hose burst valve is tampered with.

If a hose bursts, move the control lever or stabilizer blade lever to neutral.

- Overload warning device **basic** (option) / **advanced** (option)

Load-retaining function	basic	advanced
Boom	Hose burst valve	Hose burst valve
Shovel arm	Hose burst valve	Hose burst valve
Stabilizer blade	--	Hose burst valve

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Proceed as follows after a damage:

1. Stop the vehicle immediately.
2. Stop the engine.
3. Move the control lever or stabilizer blade lever to neutral.
4. Perform emergency lowering if possible – *see chapter "5.12 Emergency lowering" on page 5-79*
5. Raise the control lever base.
6. Remove the starting key and lock the cabin.
7. Secure the vehicle and the attachment.
8. Contact a Wacker Neuson service center and have the malfunction rectified.

Environment

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

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5.10 Attachments

Picking up

WARNING

Injury hazard due to fluid escaping under pressure!

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Release the pressure in th hydraulic system before connecting and disconnecting the attachment.
- ► Wear protective clothes.
- ► Always consult a doctor immediately, even if the wound seems insignificant. Hydraulic oil causes blood poisoning.

WARNING

Accident hazard when picking up attachments!

Picking up attachments incorrectly can cause serious injury or death.

- ► Wear protective equipment during installation of the connecting pins.
- ► Do not allow anyone to stay in the danger zone.
- ► Only use attachments that are in perfect condition.
- ► Set and adjust the boom to the correct position with the control levers.
- ► Align the fastening bores in the attachment with a mandrel to make it easier to insert the pin in the bores.
- ► Ensure correct locking with a rapid succession of stick and bucket movements as close as possible to the ground.
- ► Operate the vehicle only with a safely locked attachment

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Setting down

WARNING

Crushing hazard when attachments are removed!

If an attachment is not removed correctly, it can tip over and cause serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Lower the attachment to level and firm ground ensuring stability.
- ► Only remove the pins from the attachment if it is in a stable position.
- ► Lower the attachment to the ground without too much pressure, otherwise the resistance when removing the pins is too high.

The procedure of changing attachments is described below for a backhoe bucket.

Follow the special information when fitting or removing attachments with their own hydraulic functions (for example an offset bucket). Observe the Operator's Manual of the attachment.

Information

The hydraulic system of the vehicle is still pressurized even when the engine is not running. Due to the residual pressure, the hydraulic quick couplers can be removed but not installed back on again.

- ► Release the pressure.

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Release the pressure of the work hydraulics (3TNV88)

1. Stop the vehicle on firm, level, and horizontal ground.
2. Lower the attachment completely to the ground.
3. Lower the stabilizer blade to the ground.
4. Stop the engine.
5. Turn the starting key to position **1**.
6. Move the control lever or the pedal of the hydraulic circuit in all directions repeatedly.
   - ➥ The pressure reduces. This can be seen by the brief movement the hoses make as the pressure is released.
   - ➥ Uncouple the attachment immediately after the pressure has been released, otherwise pressure can be created again.

Pressure releases with proportional controls (option)

1. Park the machine on horizontal and level ground.
2. Lower the attachment completely to the ground.
3. Stop the engine.
4. Turn the starting key to position **1**.
   - ➥ Release the load only after you have engaged the starter and waited 2 seconds (otherwise if actuated too early, the characteristic curve is shifted and the load is not released).
5. Release the pressure on the auxiliary hydraulics or the 3rd control circuit by pressing the rocker switch connected with the left or right-side proportional joystick to the left and right.
   - ➥ The pressure reduces. This can be seen by the brief movement the hoses make as the pressure is released.
   - ➥ Uncouple the attachment immediately after the pressure has been released, otherwise pressure can be created again.

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Release the pressure of the work hydraulics (3TNV88F)

1. Stop the vehicle on firm, level, and horizontal ground.
2. Lower the attachment completely to the ground.
3. Lower the stabilizer blade to the ground.
4. Stop the engine.
5. Turn the starting key to position **1**.
6. Lower the control lever base.
7. Release the pressure:

➥ **Work hydraulics**: Move the control elements of the respective hydraulic circuit several times in all directions and hold each time as far as it will go for three seconds.

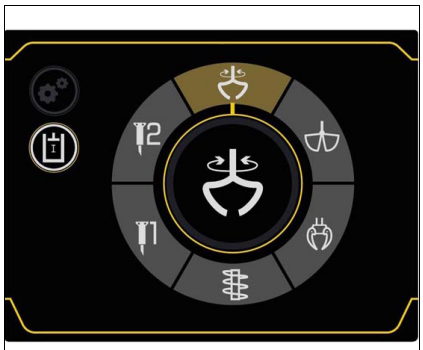


Fig. 250

➥ **AUX I**: ensure that the hammer return line is deactivated, for example. Select attachment **bucket**.

➥ Move the control element of the respective hydraulic circuit several times in all directions and hold each time as far as it will go for three seconds.



Fig. 251

➥ **AUX II**: ensure that AUX II is selected.

➥ Move the control element of the respective hydraulic circuit several times in all directions and hold each time as far as it will go for three seconds.

8. The pressure reduces. This can be seen by the brief movement the hoses make as the pressure is released.
9. Turn the starting key to position **0**.
10. Uncouple the attachment immediately after the pressure has been released, otherwise pressure can be created again.

Removed attachments with hydraulic connections must not be stored in sunlight to ensure pressure does not build in the lines.

Clean the hydraulic quick couplers before connecting to ensure dirt does not penetrate the hydraulic system.

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Re-equipping

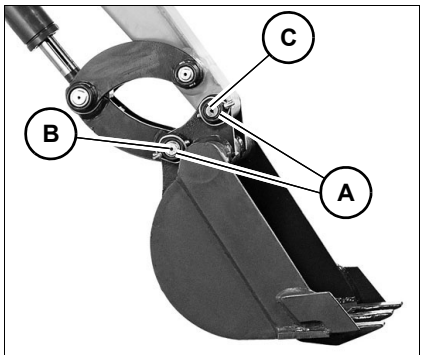


Fig. 252 (symbolic representation)

Removing

1. Lower the bucket to level ground with the flat side facing downward.
2. Stop the vehicle, stop the engine – *see chapter “ Preparing lubrication” on page 7-7*.
3. Remove linch pins **A**.
4. First remove pin **B**, and then pin **C**. Carefully expel pins that are stuck with a hammer and a brass punch.

If pin **C** is stuck:

1. Start the engine.
2. Slightly raise and lower the boom to take the load off the pin.
3. Stop and park the vehicle. Stop the engine. See “Preparing lubrication”.
4. Raise the control lever base.
5. Remove the starting key and carry it with you.

Information

Place the bucket only with minimum pressure on the ground as you remove the pins. The higher the pressure on the ground, the higher the resistance and the more difficult it is to remove the pins.

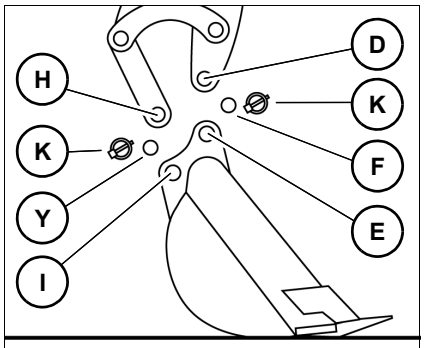


Fig. 253 (symbolic representation)

Mount

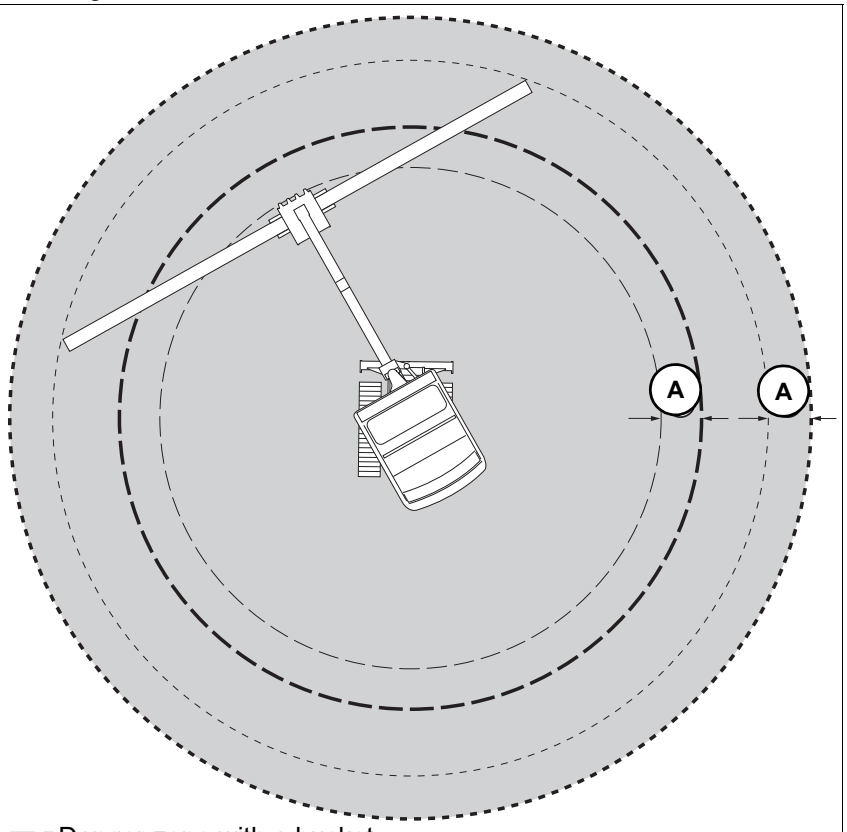
1. Install a bucket only if it is positioned on level ground with the flat side facing downward.
2. Stop the vehicle, stop the engine – *see chapter “ Preparing lubrication” on page 7-7*.
3. Apply grease to the pins and articulations before inserting them.
4. Start the engine.
5. Straighten the stick so that bores **D** and **E** are flush.
6. Stop the engine. Raise the control lever base.
7. Insert pin **F**.
8. Actuate the bucket cylinder until bores **H** and **I** are flush.
9. Stop the engine. Raise the control lever base.
10. Insert pin **J**.
11. Install linch pins **K**.

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5.11 Work operation

Danger zone

- The danger zone is the area in which persons are in danger due to the movements of the vehicle, attachment or load.
- The danger zone also includes the area that can be affected by falling material, equipment or by parts that are thrown out.
- The danger zone on a slope is different from the one on a level surface (secure the load) – *see chapter " Machine travel on slopes" on page 5-11*.
- Stop vehicle operation immediately if persons do not stay clear of the danger zone.
- Seal off the danger zone should it not be possible to keep a sufficient safety distance.
- Extend the danger zone sufficiently in the immediate vicinity of buildings, scaffolds or other elements of construction.



Danger zone with a bucket

Danger zone with a bucket and a safety distance of 1.5 m (59 in)

Danger zone with a grab (for example for picking up a pipe)

Danger zone with a grab and a safety distance of 1.5 m (59 in)

Safety distance of 1.5 m (59 in)

A

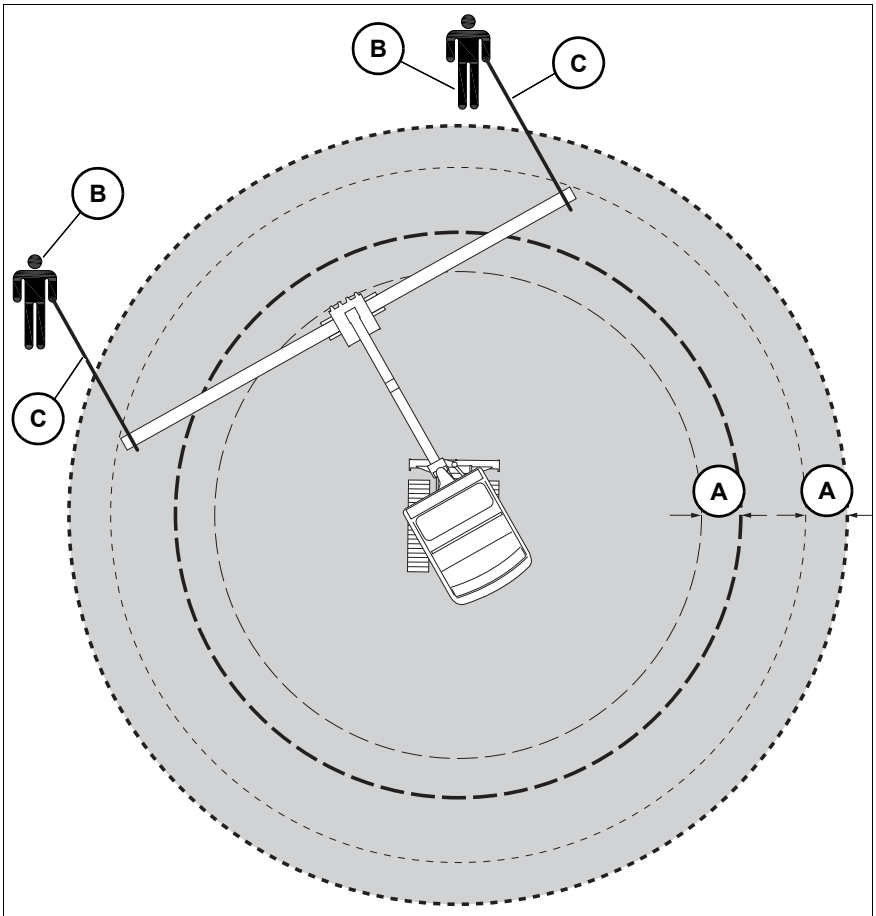
Fig. 254 (symbolic representation)

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Danger zone during lifting-gear applications

In lifting gear applications the load must be stabilized by slingers **(B)** with the help of ropes **(C)**.

Slingers must remain out of the danger zone – *see chapter " Lifting gear operation" on page 5-34*.



Danger zone with a bucket

Danger zone with a bucket and a safety distance of 1.5 m (59 in)

Danger zone with a grab (for example for picking up a pipe)

Danger zone with a grab and a safety distance of 1.5 m (59 in)

Safety distance of 1.5 m (59 in)

A

Fig. 255 (symbolic representation)

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Inadmissible work procedures

NOTICE

Inadmissible operation can damage the vehicle or the attachment.

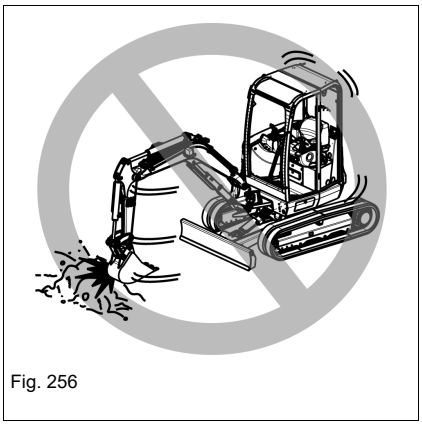


Fig. 256

Working with the swivel force

Do not use the swivel force of the upper carriage to tear down walls or to create level surfaces.

Do not ram the attachment into the ground when swiveling the upper carriage.

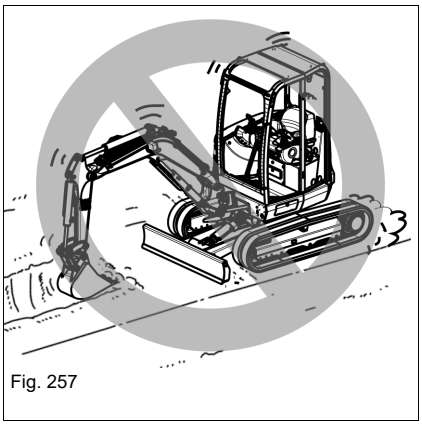


Fig. 257

Working with the drive force

Do not ram the attachment into ground or lower the boom during vehicle travel.

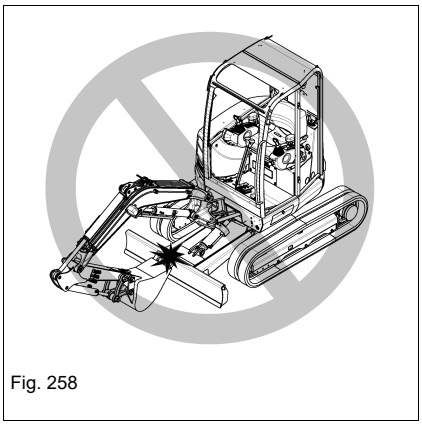


Fig. 258

Retracting the attachment

When retracting the attachment, ensure that it does not touch the stabilizer blade.

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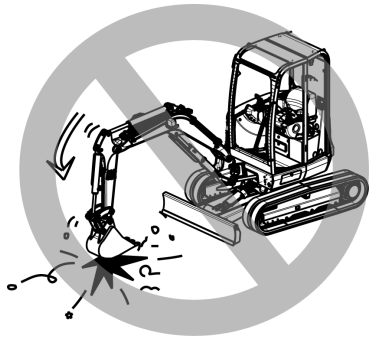


Fig. 259

Working with the falling force by lowering the attachment

Do not use the falling force of the attachment as a hoe, hammer or pile-driver.

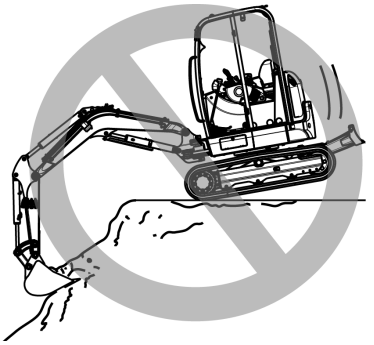


Fig. 260

Working with the falling force by lowering the vehicle

Do not use the dead weight of the vehicle for work.

Use the force of the hydraulic cylinders exclusively.

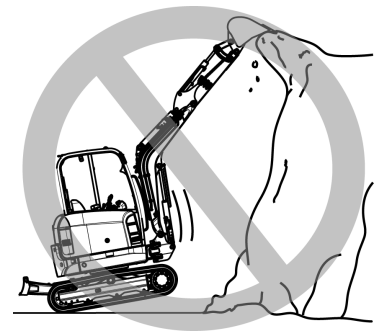


Fig. 261

Fully lowering the stabilizer blade

Apply the full weight of the vehicle over the entire width of the stabilizer blade when using it for stabilization.

Disable floating position (option).

Protecting the stabilizer legs/blade against shocks

The stabilizer blade or stabilizer blade cylinder can be damaged when the stabilizer blade hits against obstacles.

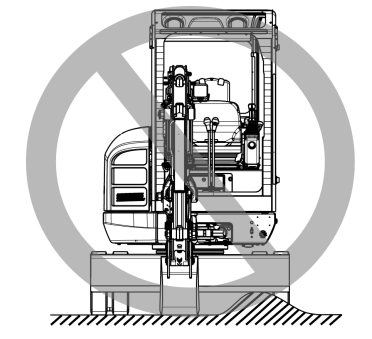


Fig. 262

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General information regarding work operation

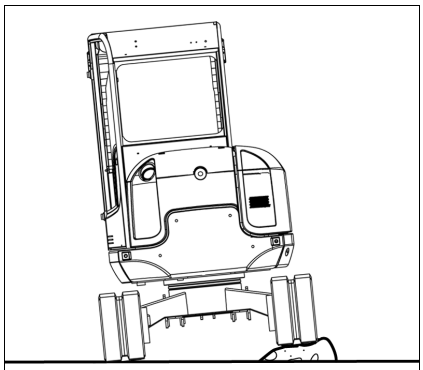


Fig. 263 (symbolic representation)

Machine travel

Performing vehicle travel over obstacles can put a heavy load on the undercarriage and cause damage. Avoid performing vehicle travel over obstacles if possible.

If it cannot be avoided, lower the boom to ground level and travel over the obstacle at low speed.

Traveling in speed range 2

Avoid starting vehicle travel and stopping abruptly as well as changing direction suddenly on rough terrain.

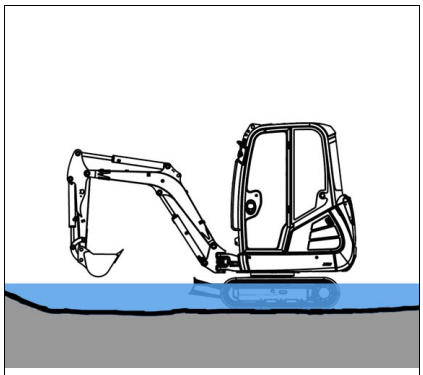


Fig. 264

Operation in water

Water must not reach any further than the upper edge of the tensioning wheel.

Lubricate lubrication points again that were immersed in water for a longer time in order to expel the old grease.

Do not immerse the live ring and upper carriage in the water.

Operation in salt water is prohibited.

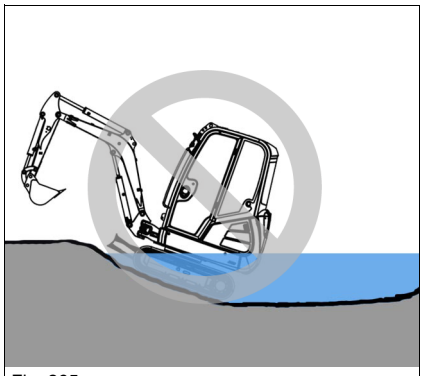


Fig. 265

Do not immerse the live ring and upper carriage in the water.

Operation near the sea

Clean the vehicle regularly when using it in a saline environment.

– *see chapter “7.5 Cleaning and maintenance” on page 7-21*.

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Working with the bucket

The following section describes work operations with the vehicle equipped with a backhoe bucket. The backhoe bucket is mainly used for earth-moving applications (digging, loosening, picking up and loading loose or solid material).

Place the stabilizer blade on the side you want to dig.

Disable floating position (option).

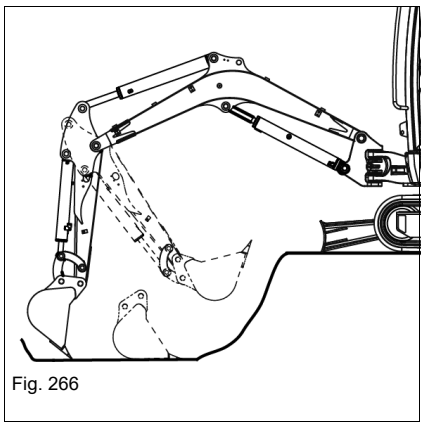


Fig. 266

Bucket position when digging

Perform long, level excavation movements with the stick and the bucket. The maximum excavation force is achieved at an angle of 80 to 120° between the boom and the stick.

1. Penetrate into the ground with the bucket.
2. Lower the stick and at the same time, position the bucket so that the flat lower side of the bucket is parallel with the ground.
3. Move the stick toward the vehicle and tilt in the bucket at the same time.

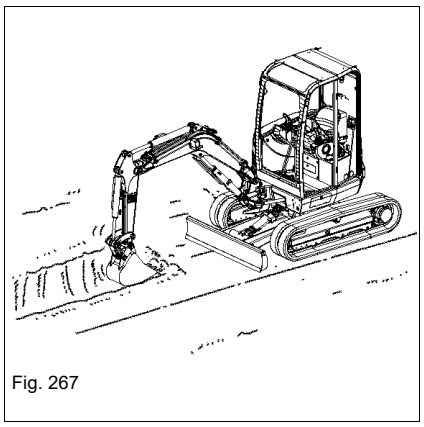


Fig. 267

Working alongside trenches

For a more efficient working method, install a suitable bucket and set the tracks parallel to the trench.

When digging wide trenches, dig the side sections first and then the middle section.

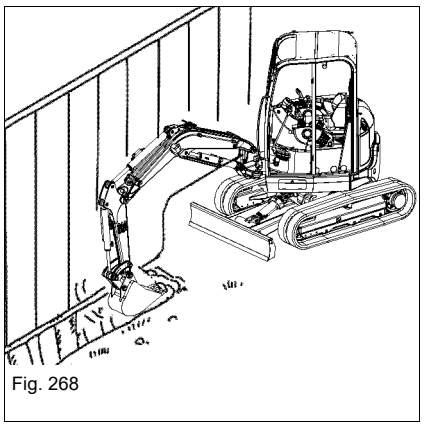


Fig. 268

For excavating laterally in tight spaces, turn the upper carriage and swivel the boom.

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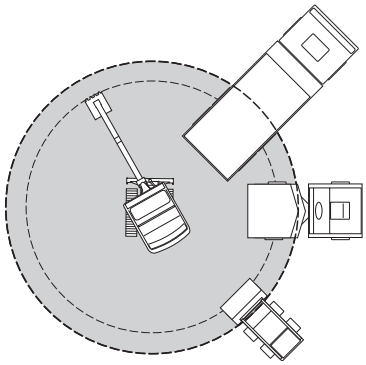


Fig. 269

Loading material

Notes on loading site dumpers:

- Position the site dumper so that its cabin is outside the danger zone of the excavator.
- The loading platform of the truck is loaded by starting at the rear end.
- Keep the swivel angle as small as possible.
- Raise the full bucket to dump height only as you rotate toward the site dumper.
- Tilt out dusty material with the wind behind you to keep the dust away from your eyes, air filters and fans.
- If possible, the site dumper and the working direction of the bucket should form an angle of 45°.

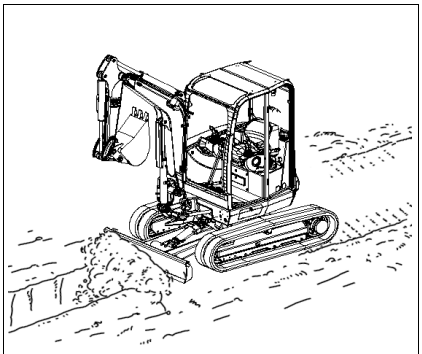


Fig. 270

Grading

The stabilizer blade is used for filling up trenches or grading the ground.

Lower the stabilizer blade to the ground for grading work.

Set the depth of the layer you want to remove with the stabilizer-blade lever.

➥ The vehicle must not be raised by lowering the stabilizer blade.

➥ Do not dig in the vehicle or let it sink in.

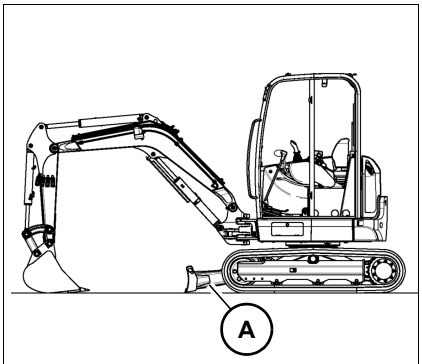


Fig. 271

Digging position

Place stabilizer blade **A** on the side you want to dig.

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Working on slopes

WARNING

Vehicle tipping hazard on slopes!

A tipping vehicle can cause serious injury or death.

► Secure slopes before beginning work. Pay attention to ground conditions, vehicle weight, etc.

► Stabilize the vehicle with the stabilizer blade during excavation work.

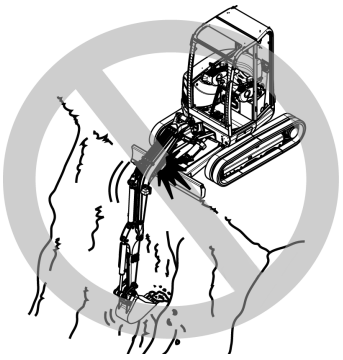


Fig. 272

NOTICE

Lifting arm cylinders can be damaged by improper operation.

► The piston rod must not touch the stabilizer blade.

Further **recommendations for digging**

When planning and performing digging work, Wacker Neuson recommends that you observe the following points:

- Exits from pits must be outside the digging line and as level as possible.
- Dig by removing adjacent strips if possible.
- Ensure that you can drive forward when driving out of the digging area with a fully loaded bucket.
- Perform transport trips downhill with loaded bucket in reverse operation.

Freeing the vehicle

If the vehicle gets stuck in the ground:

- Tilt out the bucket until the blade is vertical above the ground.
- Lower the boom all the way.
- Slowly tilt out the bucket.
  ➥ The vehicle is pushed backward.
- Reverse slowly.
- Repeat this procedure until the tracks reach firm ground.
- Reverse the vehicle away.

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5.12 Emergency lowering

WARNING

Crushing hazard during boom lowering!

Causes serious crushing or injury resulting in death.

- ► Do not allow anyone to stay in the danger zone.
- ► Stop vehicle operation immediately as soon as someone enters the danger zone.

Observe the following during emergency lowering:

1. Turn the ignition key to position “**1**”.
2. Lower the control lever base.
3. Lower the boom completely.
4. Return the joystick to neutral.

Information

Lower the boom immediately after stopping the engine.

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5.13 Options

Immobilizer (option)

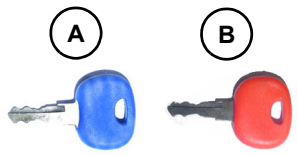


Fig. 273

A = starting key (blue)

For starting the vehicle. Scope of delivery includes 2 keys.

B = master key (red)

Information

Store the master key in a safe place. It can only be used for coding new starting keys.
A new immobilizer must be installed if the master key is lost.

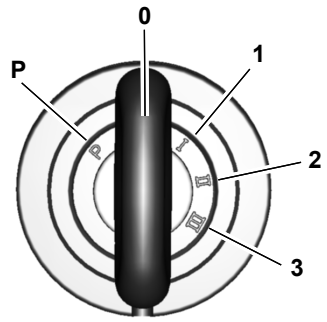


Fig. 274

Coding new starting keys

1. Insert master key **B** in the starter and turn it to position **1** for a maximum five seconds.
2. Remove master key **B**.
3. Keep master key **B** at least 50 cm (20 in) away from the starter.
4. Within 15 seconds, turn starting keys requiring coding to position **1** for at least one second.
5. Repeat step 4 if more starting keys require coding.
   ➥ With this, the coding of the starting keys is completed.

Coding can be performed for a maximum of 10 starting keys.

Information

The procedure is automatically canceled if no key requiring coding is detected by the system within 15 seconds.

Deleting coded keys

Deleting all coded keys is necessary whenever a coded key is lost.

The master key code is not deleted during deletion.

1. Insert master key **B** in the starter and turn it to position **1** for at least 20 seconds.
2. Code the starting keys.

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Tilt the upper carriage with VDS (Option)

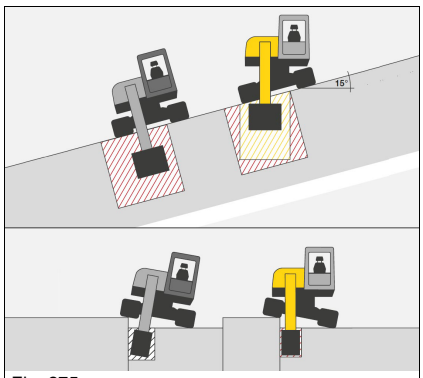


Fig. 275

VDS can be used to tilt the upper carriage by up to 15° so that vertical excavation can be carried out on uneven ground conditions.

WARNING

Injury hazard due to movements of the upper carriage!

Can cause serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Tilt upper carriage only on the uphill side of the vehicle.
- ► Only tilt the upper carriage on firm ground.
- ► Tilt the upper carriage only if the vehicle is at a standstill and if the attachment is empty.
- ► Carry out quiet and slow movements with the vehicle, the arm system and the attachments.
- ► Do not perform machine travel on slopes with a lateral angle of inclination over 10°.
- ► Do not perform vehicle travel on inclines or slopes steeper than 15°.
- ► Ensure that no parts of the body protrude outside the vehicle.
- ► Do not board or leave the vehicle if the upper carriage is inclined.

NOTICE

Tipping hazard of machine. Damage to the vehicle due to open doors and covers or collisions with walls or parts of buildings.

- ► Carry out quiet and slow movements with the vehicle, the arm system and the attachments.
- ► All doors and covers must be closed when tilting the machine.
- ► Only tilt the upper carriage on firm ground.
- ► Tilt the upper carriage only if the vehicle is at a standstill and if the attachment is empty.
- ► Do not perform machine travel on slopes with a lateral angle of inclination over 10°.
- ► Do not perform vehicle travel on inclines or slopes steeper than 15°.
- ► Tilt upper carriage only on the uphill side of the vehicle.
- ► Avoid collisions with walls or building parts.

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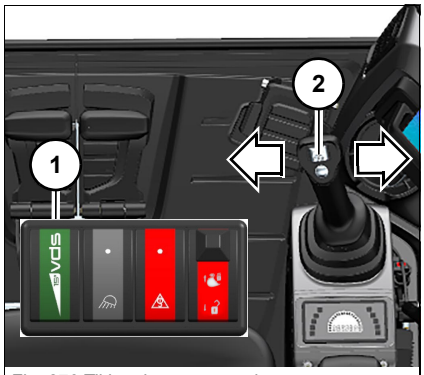


Fig. 276 Tilting the upper carriage

Raise the upper carriage:

1. Press and hold switch **1**.
2. Press control lever **2** to the right.
   ➥ The upper carriage lifts.
3. If the required tilt angle is reached, return joystick **2** to the neutral position and release switch **1**.

Lower the upper carriage:

1. Press and hold switch **1**.
2. Press control lever **2** to the left.
   ➥ The upper carriage lowers.
3. If the required tilt angle is reached, return joystick **2** to the neutral position and release switch **1**.

Shovel bucket operation

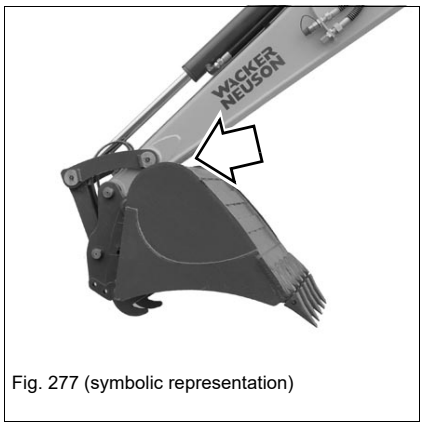


Fig. 277 (symbolic representation)

NOTICE

The stick can be damaged if it is hit by the bucket base.

► Do not tilt out the bucket completely if it is used as a shovel bucket.

Trailer operation

The vehicle is not certified for trailer operation!

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5.14 Immobilization and putting back into operation

The specified measures refer to putting the vehicle out of operation and back into operation after more than 30 days.

Putting out of operation temporarily

Store the vehicle indoors if possible.

If the machine has to be stored outdoors, place it on firm ground if possible (for example on concrete), and cover it with a watertight tarp to protect it against humidity.

1. Park the vehicle – *see "Parking the machine" on page 5-12*.
2. Clean the engine with a high-pressure cleaner in a suitable place – *see chapter "7.5 Cleaning and maintenance" on page 7-21*.
3. Check the vehicle for leaks and loose nuts, screws and connections.
4. Carefully clean and dry the entire vehicle.
5. Spray an anticorrosion agent onto bare metal parts of the machine (piston rods of hydraulic cylinders, for example).
6. Apply grease to all lubrication points.
7. Fill the fuel tank completely.
8. Check the hydraulic oil and coolant levels, and add hydraulic oil and coolant if necessary.
9. Remove the battery and store it in a safe place. Charge the battery and perform battery maintenance at regular intervals.
10. Set the fuel cock to **OFF**.
11. Close the air-intake openings of the air filter system and exhaust pipe.

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Putting back into operation

Information

If the vehicle was out of operation over a longer period of time without performing the specified steps, contact a Wacker Neuson service center before putting back into operation.

1. Perform a general visual check for damage on the electric cables, connectors, fuel lines, corrosion, etc. on the engine and diesel particulate filter.
2. Start the engine once a month to ensure optimal lubrication.
3. Remove anti-corrosion agents from bare metal parts.
4. Charge, install and connect the battery.
5. Open the air-intake openings of the air filter system and exhaust pipe.
6. Check the condition of the air filter elements and have them replaced by a Wacker Neuson service center if necessary.
7. Check the dust valve.
8. Bleed the fuel system.
9. Check the vehicle for leaks.
10. Lubricate the vehicle according to the lubrication plan.
11. Check all engine/vehicle fluids in the units or reservoirs, and add fluids if necessary.
12. If the vehicle was out of service for over 6 months, have the oil in the gearbox, engine, hydraulic oil reservoir and other units changed by a Wacker Neuson service center.
13. Have the hydraulic oil filters (pressure, return and breather filters), the engine oil filter and diesel filter (prefilter and main filter) by a Wacker Neuson service center if the vehicle was out of operation for over 6 months.
14. Switch on the starter and check whether there are any malfunctions.
    – see "Malfunctions" on page 8-1
    Contact an authorized service center and have the malfunction rectified.
15. Start the engine.
16. Let the engine run at idling speed at least 15 minutes without load.
17. Stop the engine.
18. Check the oil levels in all units and add oil if necessary.
19. Check the vehicle for leaks.
20. Start the engine and ensure that all functions and warning systems work correctly.

Avoid operation at maximum engine speed or load for more than an hour.

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5.15 Permanently putting out of operation

Disposal

All fluids, lubricants, material, etc., used on the vehicle are subject to specific regulations. Dispose of different materials and consumables separately and in an environmentally friendly manner.

Disposal may only be performed by a Wacker Neuson service center. Observe the national and regional regulations for disposal.

Environment

Do not allow environmentally damaging wastes to get into the ground or stretches of water and dispose of them in an environmentally friendly manner.

If the machine is no longer used according to its designated use, ensure that it is put out of operation and disposed of according to national and regional regulations.

- Machine disposal must be performed in accordance with state-of-the-art standards that apply at the time of disposal.

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Notes:

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6 Transportation

6.1 Towing the vehicle

WARNING

Accident hazard due to incorrect towing!

Incorrect towing can cause accidents and serious injury or death.

- ► Tow the machine away only from the immediate danger zone until it can be loaded.
- ► Only tow the vehicle using suitable towing equipment in connection with suitable towing facilities, such as towing hooks, eyes, etc.
- ► There must be nobody between the vehicles during towing. The lateral safety distance is equal to 1.5 times the length of the towing equipment.
- ► Do not tow the vehicle if it is stuck or on a slope. Load the vehicle.
- ► Wear protective equipment.
- ► Start vehicle travel and tow away slowly.

NOTICE

The vehicle can be damaged during towing.

- ► Tow the machine away only from the immediate danger zone until it can be loaded.
- ► Tow away the vehicle only if the engine is running and if the drive is functional.
- ► Do not tow the vehicle if it is stuck or on a slope. Load the vehicle.
- ► Only tow the vehicle using suitable towing equipment in connection with suitable towing facilities, such as towing hooks, eyes, etc.
- ► A tractor vehicle of the same weight category must be used as a minimum.
  In addition, the tractor vehicle must be equipped with a safe braking system and sufficient tractive power.

Information

The manufacturer’s warranty shall not apply to accidents or damage caused by loading or transporting.

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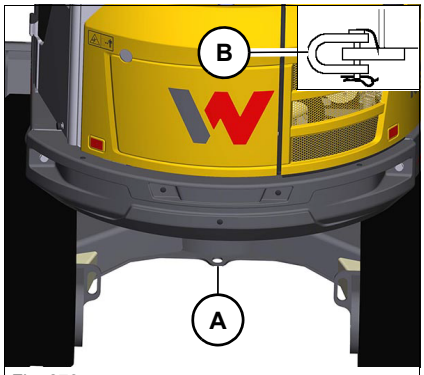


Fig. 278

1. *– see chapter “ Towing” on page 2-13*
2. Ensure that the vehicle can be towed safely.
3. Only use towing eye **A**.
4. Secure shackle **B** with the shackle pin and a lock pin.
5. Install slings of appropriate size on the shackle.
6. Start machine travel and tow away slowly.
7. Tow the vehicle only until it reaches a position from where it can be loaded.

Information

The manufacturer’s warranty shall not apply to accidents or damage caused by towing.

Using the towing eye **A** to pull another vehicle or to tow other equipment is prohibited.

6.2 Loading the vehicle

WARNING

Accident hazard due to incorrect loading!

Incorrect loading can cause accidents and serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Bear in mind the transport weight on the vehicle’s type label.
- ► Tie down the vehicle only at the indicated tie-down points.
- ► Observe the loading weight. Add the weight of subsequently installed accessories to the weight of the vehicle.

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Tie-down points



Fig. 279

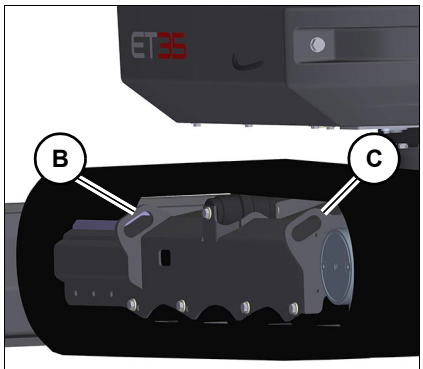


Fig. 280

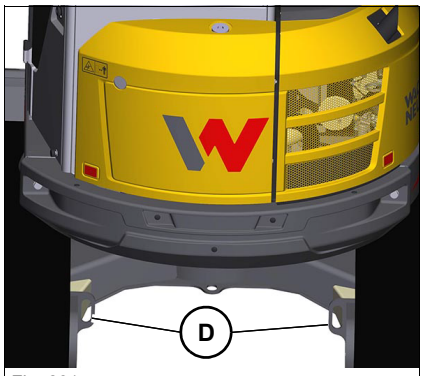


Fig. 281

Position		Quantity
A	Stabilizer blade	2
B	Front of travel gear	2
C	Rear of travel gear	2
D	Inside of travel gear	2

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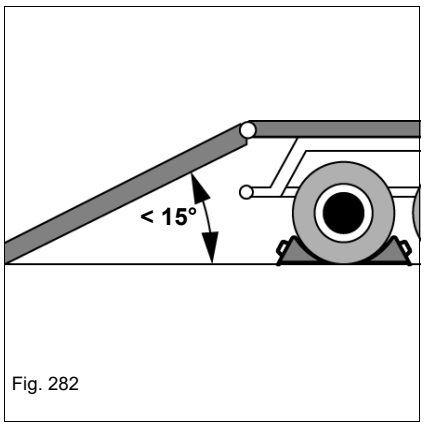


Fig. 282

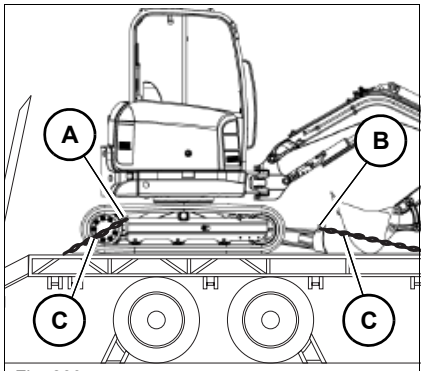


Fig. 283

Drive onto a transport vehicle

1. *– see chapter “ Transportation” on page 2-15*
2. Secure the transport vehicle with chocks to prevent it from rolling.
3. Install access ramps at the smallest possible angle. Do not exceed an angle of 15°.
4. Use access ramps and transport surfaces with an anti-skid surface only.
5. Ensure that the loading area is clear and access to it is not obstructed, for example by superstructures.
6. Start the engine.
7. Raise the boom and the stabilizer blade to avoid touching the access ramps.
8. Carefully drive the vehicle onto the middle of the transport vehicle.
9. Move the vehicle to transport position:
   - Position the boom straight ahead at the center of the vehicle.
   - Lower the boom and the stabilizer blade.
10. Stop the engine.
11. Raise the control lever base.
12. Remove the starting key and carry it with you.
13. Leave the cabin, close and lock all doors, windows and covers.
14. Firmly fasten the vehicle on the loading area with tie-downs **A** and **B** with slings **C** of appropriate size. Observe legal rules and regulations.

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Crane-lifting

WARNING

Accident hazard due to incorrect loading!

Incorrect loading can cause accidents and serious injury or death.

- ► Do not allow anyone to stay in the danger zone.
- ► Bear in mind the transport weight on the vehicle's type label.
- ► Observe the loading weight. Add the weight of subsequently installed accessories to the weight of the vehicle.
- ► The vehicle may only be raised with suitable lifting gear.

NOTICE

Possible damage to the vehicle due to incorrect loading.

- ► Bear in mind the transport weight on the vehicle's type label.
- ► Observe the loading weight. Add the weight of subsequently installed accessories to the weight of the vehicle.
- ► The vehicle may only be raised with suitable lifting gear.

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Lifting eyes

The vehicle must only be raised using the lifting eyes indicated below.



Fig. 284

Position		Quantity
A	Dozer blade left and right	2
B	Boom	2

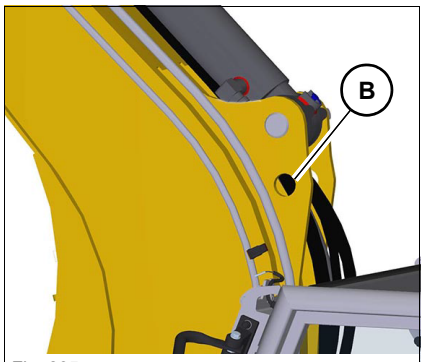


Fig. 285

Ensure that the lifting gear has the required lengths **L1** and **L2**

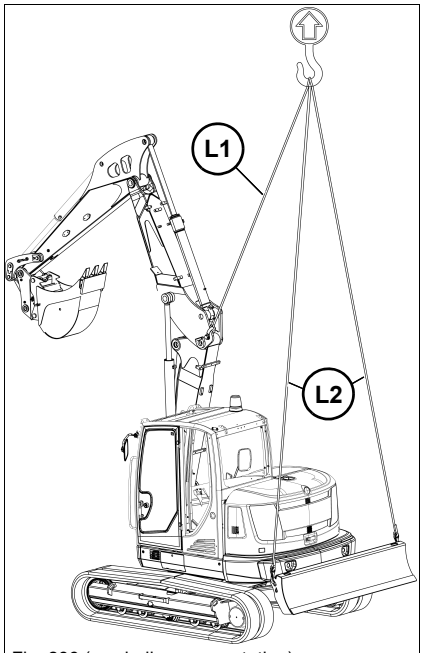


Fig. 286 (symbolic representation)

Boom	Length	Dimensions
Boom	**L1**	1500 mm (59 in)
	L2	3400 mm (11'-2")

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Loading process

1. Fit an empty bucket and lock it safely.
2. Remove all dirt from the vehicle.
3. Park the vehicle on firm, level, and horizontal ground.
4. Tilt in bucket.
5. Raise the loader unit completely.
6. Pull the stick toward the vehicle.
7. Disable the floating position with the swiveling dozer blade
8. Setting the swiveling dozer blade straight.
9. Raise the stabilizer blade completely.
10. Position the boom straight ahead at the center of the vehicle.
11. Rotate the upper carriage by 180° so that the stabilizer blade points to the rear.
12. Stop the engine.
13. Raise the control lever base.
14. Remove the starting key and carry it with you.
15. Safely store all loose objects.
16. Leave the cabin, close and lock all doors, windows and covers.
17. Attach slings on the lifting eyes.
18. Slowly raise the vehicle until there is no more contact with the ground.
19. Let the vehicle swing until it comes to rest.
20. If the vehicle balance, and the condition and position of the slings is correct, slowly raise the vehicle to the required height and load it.

6.3 Transporting the vehicle

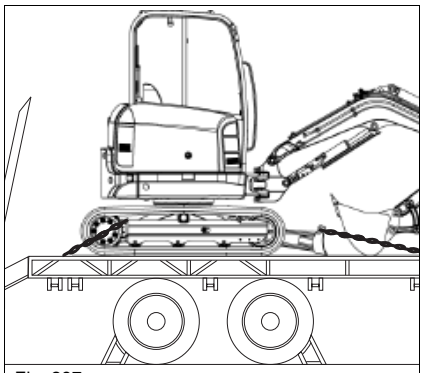


Fig. 287

1. The driver of the transport vehicle must observe the following before departure:
   - Permitted overall height, width and weight of the transport vehicle including the excavator.
   - The legal regulations of the countries where transport is to take place.
2. Close the exhaust pipe before transporting the vehicle through wet weather.

Information

The automatic swivel unit brake secures the upper carriage against rotation.

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Notes:

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7 Maintenance

7.1 Information on maintenance

- Maintenance and care significantly affect the functionality and service life of the vehicle.
- Daily and weekly maintenance work is to be performed by the driver in accordance with the maintenance plan.
- Maintenance with the note **authorized service center** must be performed only by the trained and qualified personnel of an authorized service center.
- Defective components must be repaired or replaced before putting the vehicle into operation. Safety-relevant components may only be repaired/replaced by an authorized service center.
- Observe all risk indications and safety instructions given in this Operator's Manual.
- Follow the maintenance and safety instructions given in the Operator's Manuals of the attachments.
- Wear protective equipment (for example hard hat, safety glasses, protective gloves, safety boots).
- Attach a warning label to the control elements (for example **"Machine being serviced, do not start"**).
- Park the vehicle – *see chapter " Preparing lubrication" on page 7-7*.
- In order to avoid damage to electronic components, do not perform welding work on the vehicle, add-on parts or tools.
- Contact a Wacker Neuson service center.

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7.2 Maintenance overview

Maintenance label

Maintenance that has to be performed by the operator is indicated on the maintenance label.

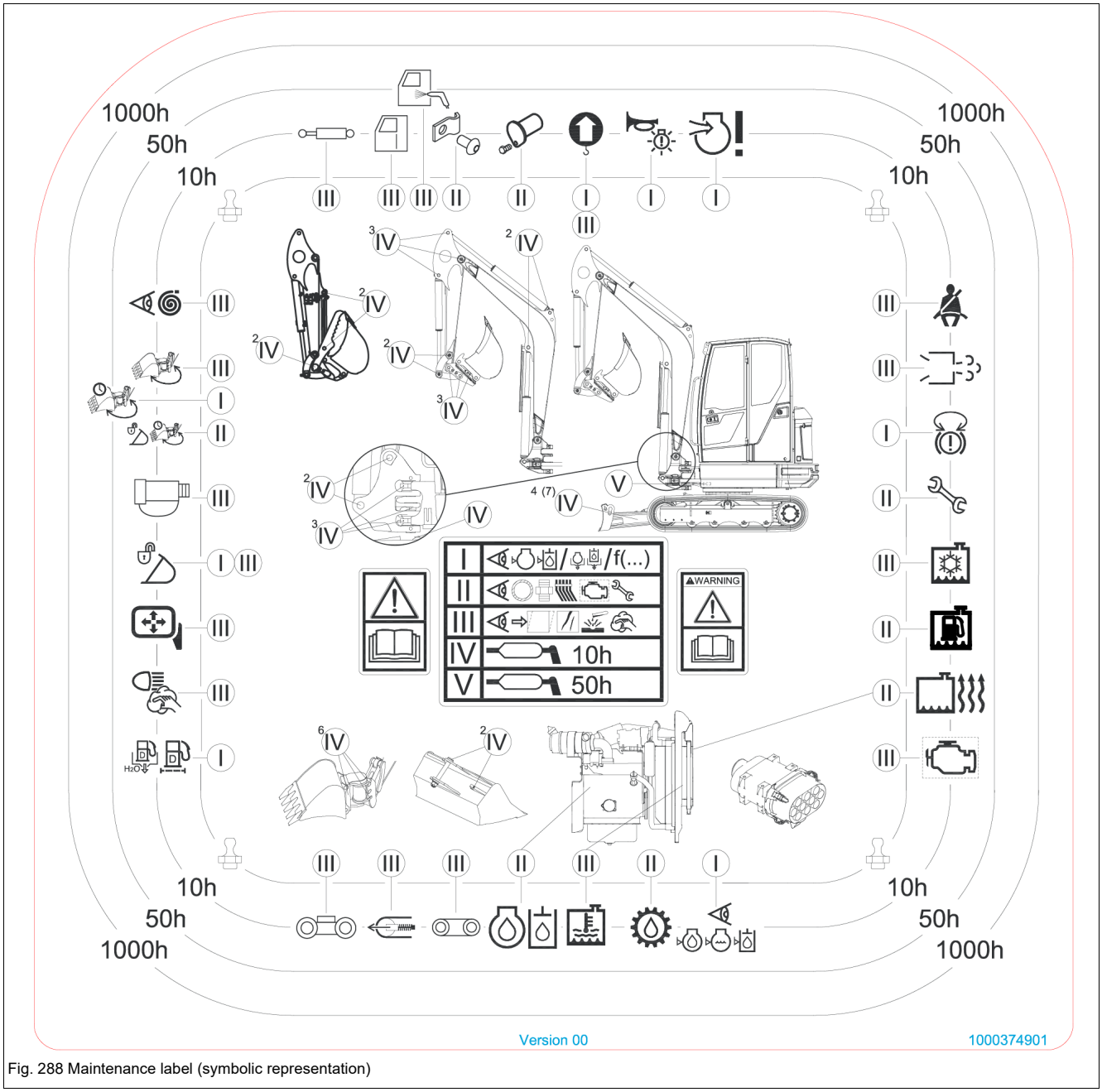


Fig. 288 Maintenance label (symbolic representation)

I = Top off and drain fluids, lubricants; Check vehicle functions.

II = Check wear parts, seals, hoses, and screw connections.

III = Check for damage, corrosion, and dirt.

IV = Lubricate daily after the work shift.

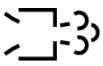
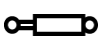
Superscript numbers, for example ^{2}: number of lubrication points

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Maintenance plan

Daily maintenance (operator)		
Symbol	**Inspection work** (Check the following fluids and lubricants, check the oil levels after a test run and add oil if necessary)	Page
	Check the fluids and lubricants (engine oil, engine coolant, hydraulic oil)	*7-32*; *7-34*; *7-39*
	Check the radiator and hydraulic oil cooler for dirt, clean them if necessary	*7-35*
	Check the fuel radiator for dirt, clean it if necessary	
	Lubricate the vehicle according to the lubrication schedule	*7-7*
	Check the dirt indicator on the air filter (3TNV88F)[1]	*7-36*
	Check the water separator (pre-filter) and fuel filter on sight glass; drain water if necessary	*7-28*
	Check the track tension and retension the tracks if necessary	*7-45*
	Check the engine air intake	*7-36*
	Check the pin locks	--
	Check line fixtures	--
	Check the indicator lights and acoustic warning devices	*4-28*; *5-19*
	Check the swivel unit brake for correct function	*5-23*
	Check the hydraulic couplings for dirt	--
	Check the threaded fittings of the protective structures (for example the cabin) for tightness[2]	--
	Clean the lights/light system, signaling systems	--
	Safe load indicator: check the acoustic warning system	*5-34*

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Daily maintenance (operator)		
	Hydraulic quickhitch (Easy Lock): check the acoustic warning system	*5-42*
	Lubricate the Powertilt according to the lubrication schedule	*7-11*
	Adjust the mirrors correctly, clean them and check them for damage, check the fastening screws and tighten them if necessary	--
	Check the condenser for dirt, clean it if necessary	*7-35*
--	Clean fresh-air and recirculated-air coarse filters with compressed air (heating, air conditioning)	*7-20*
	Leakage check	
	Check for tightness, leaks and chafing: pipes, flexible lines and screw connections of the following assemblies and components. Repair if necessary	Page
	Engine and hydraulic system	--
	Travel drive	--
	Cooling systems, heating, and hoses (visual check)	--
	Hydraulic quickhitch (Easy Lock) and Powertilt (hoses, valve)	--
	Visual check	
	Correct function; deformations, damage, surface cracks, wear and corrosion	Page
	Check the exhaust system for damage	--
	Check the insulating mats in the engine compartment for damage	--
	Check the cabin and protective structures for damage (for example the Front Guard, FOPS)	--
	Check the tracks for damage	--
	Check the travel gear for damage (for example the track rollers, insert rolling bearings)	--
	Check the piston rods of the cylinders for damage	--

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Daily maintenance (operator)		
	Check the seat belt for damage	--
	Check the hydraulic hoses for damage	--
	Check the load hook, joint rod and lifting eyes	--
	Check the hydraulic quickhitch (Easy Lock) for damage	--
	Check the Powertilt for damage	--
	Weekly maintenance (every 50 operating hours) (operator)	Page
	Check accesses and exits for dirt	--
	Change the air filter[1]	--
	Actuate the Powertilt swivel device in the limit positions in both flow directions for one minute each to rinse the system[3]	--
	Lubricate the vehicle according to the lubrication schedule	*7-7*
All steps for maintenance intervals once a day		--

1. Air filter replacement according to the dirt indicator, every 1000 o/h or once a year at the latest. Replace after 50 o/h when in extensive use in environments with acidic air, such as acid production facilities, steel and aluminum mills, chemical plants and other nonferrous-metal plants, independently of the dirt indicator; Contact an authorized service center.
2. Check the threaded fittings and corresponding components/assemblies visually or manually (without using tools) for tightness. Replace the threaded fitting in case of irregularities. Pay attention to adhesive connections as you do so.
3. Flush out the system to flush out contaminants. Repeat the procedure in the opposite flow direction.

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Only once after the first 50 operating hours (Wacker Neuson service center)	
Replace the hydraulic oil filter	--
Change the engine oil	--
Replacing the engine oil filter	--
Replace the gearbox oil (traveling drive)	--
Check V-belt condition and tension	--
Check the threaded fittings for tightness	--
Check labels and Operator's Manual for completeness and condition	--
Check the pressure of the primary pressure limiting valves (operating hydraulics)	--
All steps for maintenance once a day and once a week	--

Other maintenance intervals (Wacker Neuson service center):

- Every 500 operating hours or annually
- Every 1000 operating hours
- Every 1500 operating hours
- Every 2000 hours of operation or every two years
- Every 3000 operating hours or every 3 years

For additional details, contact a Wacker Neuson service center.

Information

Maintenance with the note **Wacker Neuson service center** must only be performed by the trained and qualified personnel of a Wacker Neuson service center.

Maintenance schedule of Lehnhoff mechanical quickhitch system

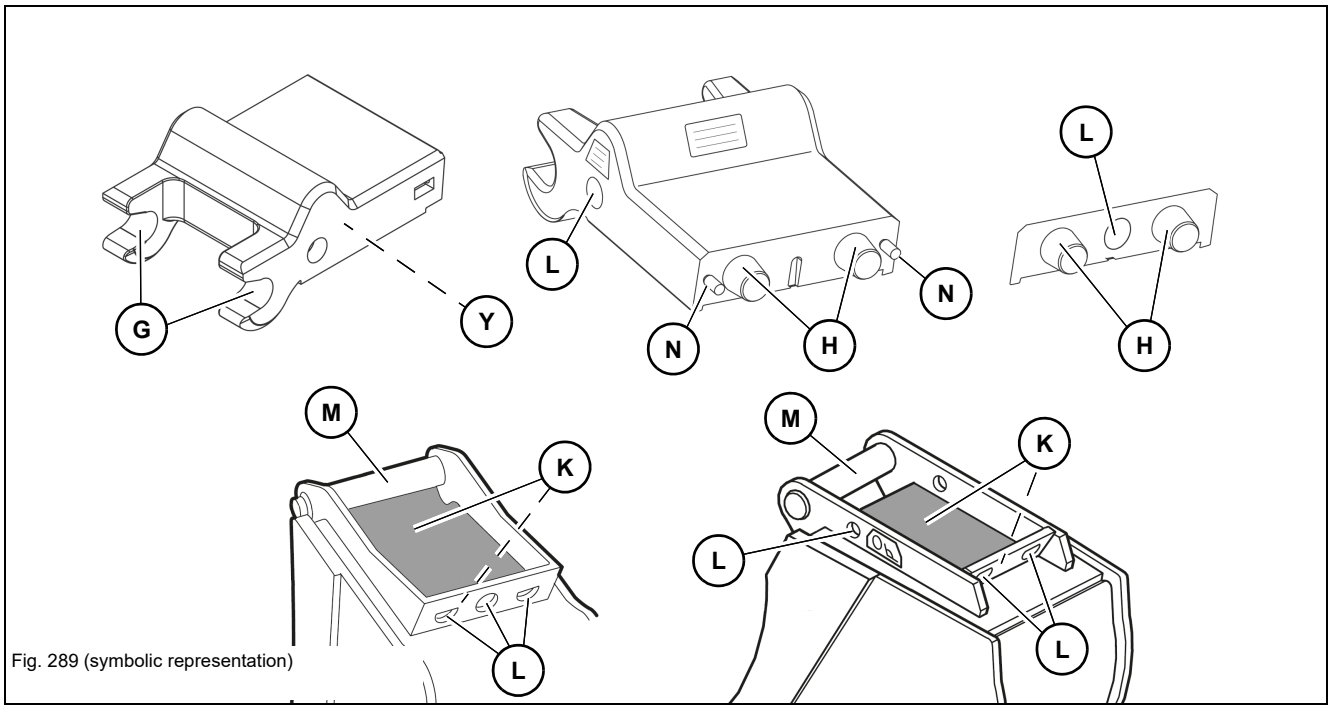


Fig. 289 (symbolic representation)

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Quickhitch maintenance MS03/MS08/MS10 (operator)		Interval[1]
Perform visual inspection of the quickhitch system	--	10 hours of operation/ daily
Clean bolt guide	G	50 hours of operation/ weekly
Clean the bolt contact surface	H	50 hours of operation/ weekly
Clean bottom side of the quick coupler system	Y	50 hours of operation/ weekly
Clean contact surfaces of the attachment	K	50 hours of operation/ weekly
Clean the opening for the socket wrench and bores of the attachment support	L	50 hours of operation/ weekly
Clean bolt attachment support	M	50 hours of operation/ weekly
Clean centering pins (only MS10)	N	50 hours of operation/ weekly

1. For time specifications: the first achieved time specification is decisive. If the situation requires it, perform maintenance if necessary, even if the maintenance interval has not yet been reached.

Other maintenance intervals (Wacker Neuson service center):

- Every 250 operating hours or semi-annually (MS03)
- Every 500 operating hours or annually (MS03)

For additional details, contact a Wacker Neuson service center.

Preparing lubrication

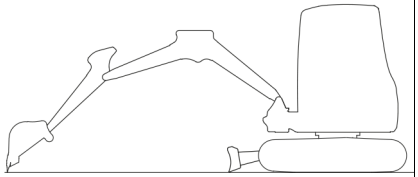


Fig. 290

1. Stop the vehicle on firm, level, and horizontal ground.
2. Position the boom straight ahead at the center of the vehicle.
3. Lower the boom and the stabilizer legs to the ground.
4. Stop the engine.
5. Operate the control lever repeatedly to release the pressure in the hydraulic system.
6. Raise the control lever base.
7. Remove the starting key and carry it with you.
8. Safely store all loose objects.
9. Close the windows and doors.
10. Close and lock all covers.
11. Attach a warning label to the control elements (for example **“Machine being serviced, do not start”**).

Wait at least 10 minutes after stopping the engine.

Information

Keep all lubrication points clean and remove any escaping grease.

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Boom/dozer blade

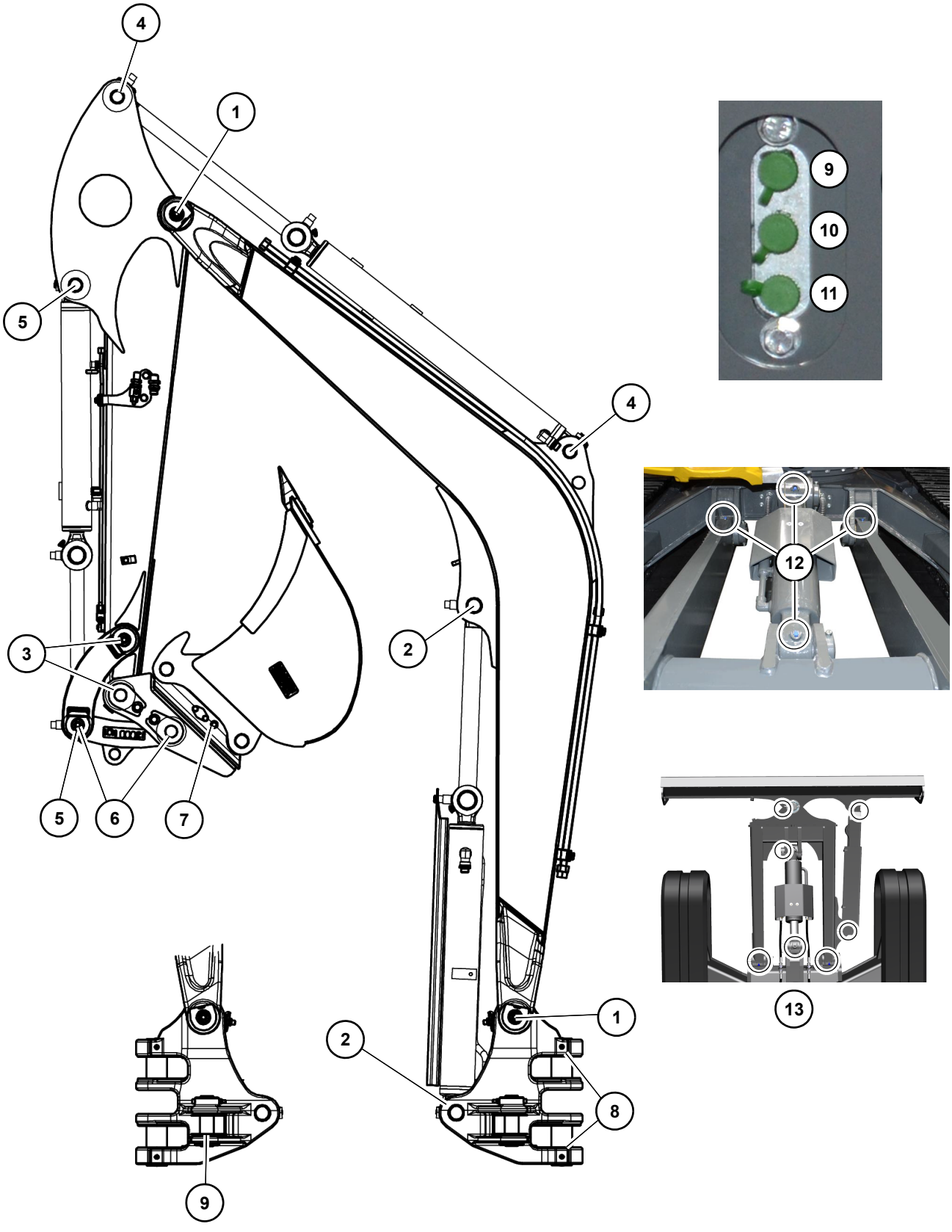


Fig. 291

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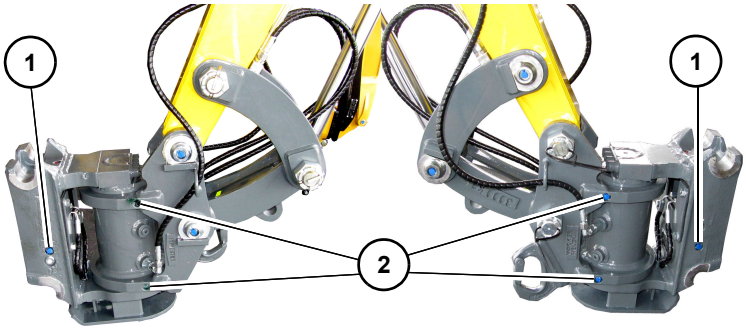
Position	Lubrication point[1]	Interval	Quantity
1	Boom	Daily	2
2	Boom cylinder	Daily	2
3	Shovel arm	Daily	2
4	Stick cylinder	Daily	2
5	Bucket cylinder	Daily	2
6	Joint rod	Daily	2
7	Easy Lock	Daily	2
8	Swiveling console	Daily	2
9	Swiveling cylinder	50 o/h	2
10	Teeth of live ring *– see chapter " Teeth of live ring" on page 7-13*	50 o/h	1
11	Live ring (ball bearing) *– see chapter " Live ring ball bearing" on page 7-12*	50 o/h	1
12	Stabilizer blade	Daily	4
13	Swiveling dozer blade	Daily	7

1. Lubrication on the pins or directly on the cylinders

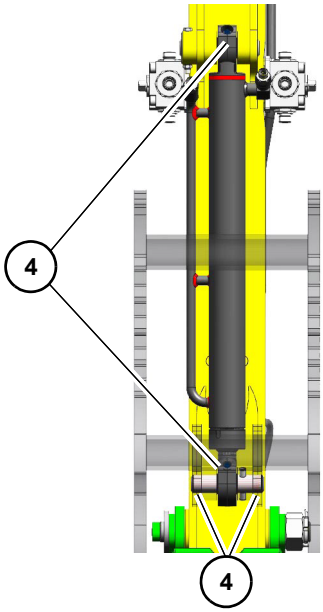
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Powertilt, hydraulic thumb, VDS

Powertilt with hydraulic Easy Lock quickhitch



Hydraulic thumb



VDS

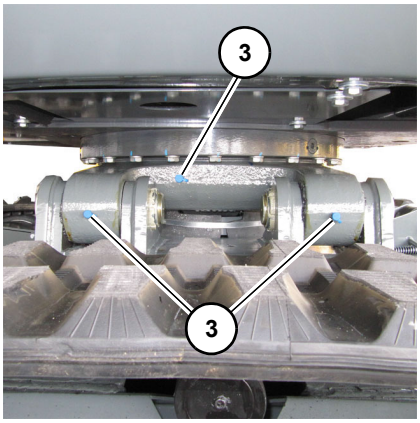


Fig. 292 (symbolic representation)

Position	Lubrication point	Interval	Quantity
1	Easy Lock	Every week[1]	2
	Easy Lock quickhitch	Every week	--
2	Powertilt	Daily[1;2]	4
3	VDS	Weekly[1]	3
4	Hydraulic thumb	Daily	4

1. Twice daily when used in water, after use in water apply grease, to remove all traces of water.
2. The number and position of the lubrication points could vary depending on the Powertilt model.

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Cabin/attachment mounts

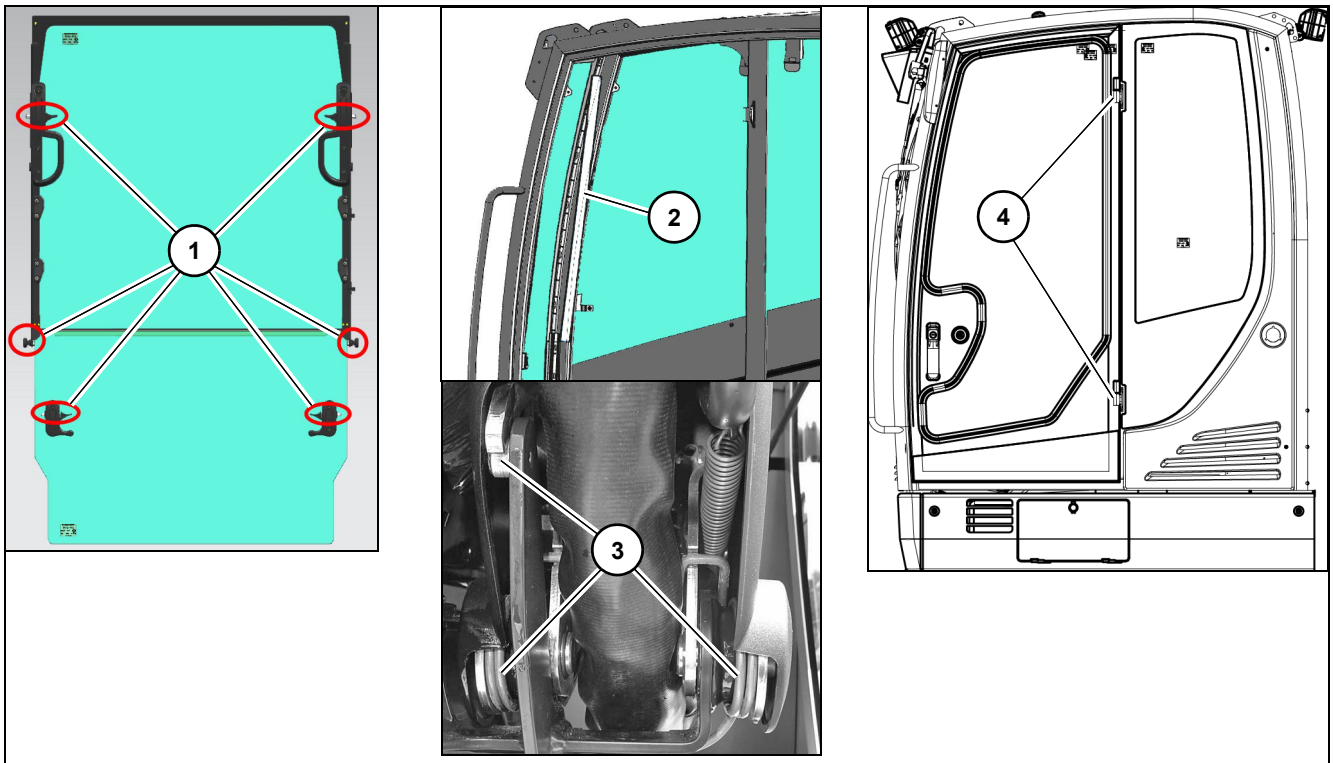


Fig. 293 (symbolic representation)

Position	Lubrication point	Interval	Quantity
1	Front window: pin, lock notches and locks	Every week	6
2	Windshield: guide rails	Every week	2
3	Control lever base *– see chapter “ Control lever base” on page 7-14*	Every week	3
4	Door hinges	Every week	2

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Live ring ball bearing

DANGER

Crushing hazard during lubrication!

Serious crushing hazard causing death or serious injury.

► No one must be in the danger zone during upper carriage rotation.

The lubrication points are located on the left side of the chassis.

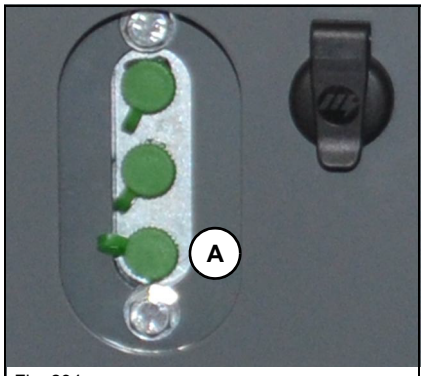


Fig. 294

1. Park the vehicle on firm, level, and horizontal ground.
2. Lower the boom and the stabilizer blade to the ground.
3. Stop the engine, remove the starting key and carry it with you.
4. Apply grease to lubrication point **A** with two strokes of the grease gun.

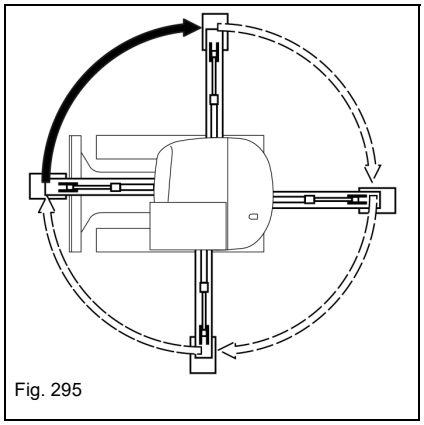


Fig. 295

5. Start the engine, raise the boom and the stabilizer blade.
6. Rotate the upper carriage by 90°.
7. Repeat steps 2–6 three times until the revolving upper carriage is back in its initial position.
8. Rotate the upper carriage several times by 360°.

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Teeth of live ring

DANGER

Crushing hazard during lubrication!

Serious crushing hazard causing death or serious injury.

► No one must be in the danger zone during upper carriage rotation.

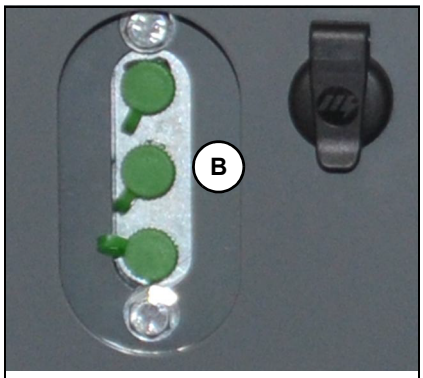


Fig. 296

The lubrication points are located on the left side of the chassis.

1. Lower the stabilizer blade to the ground.
2. Stop the engine, remove the starting key and carry it with you.
3. Apply grease to lubrication point **B** with five strokes of the grease gun.
4. Start the engine, raise the boom and the stabilizer blade.

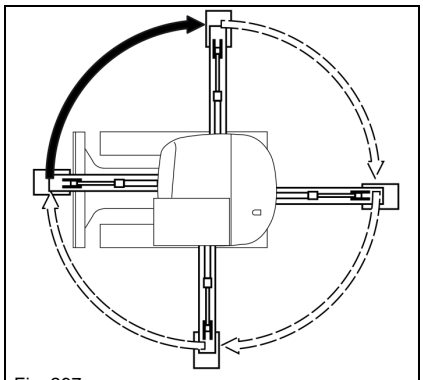


Fig. 297

5. Rotate the upper carriage by 90°.
6. Repeat steps 1 – 5 three times until the upper carriage is back in its initial position.

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Control lever base

CAUTION

Crushing hazard in the area of the moving parts of the control lever base!

Injury hazard due to crushing of parts of body.

► Stay clear (extremities, clothing) of the moving parts.

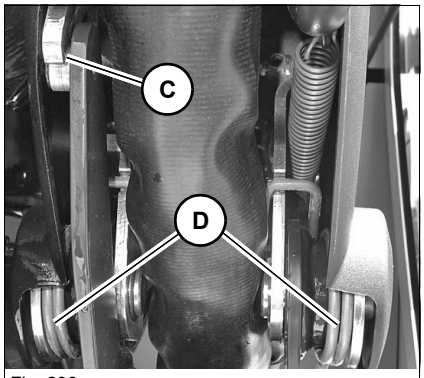


Fig. 298

1. Raise the control lever base.
2. Spray fluid grease onto the guide lever in the area of **C**.
3. Spray fluid grease on both sides **D** of the double spring.

Powertilt with Easy Lock – operation in water

- Apply grease to the lubrication points before using in water.
- After using in water, apply grease to the lubrication points to remove all water.

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7.3 Consumables

Application	Fluid/lubricant	Specification	Season/ Temperature	Capacities[1]
Engine	Diesel fuel[2, 3]	EN 590 (EU)[4]	Year-round[5]	44 liters (11.6 gal)
		ASTM D975 grade 1D S15 ASTM D975 grade 2D S15 (USA)[6]		
		BS 2869 class A1 BS 2869 class A2 (GB)[7]		
		GB252 (China)[8]		
	Coolant[9]	Distilled water and anti-freeze ASTM D6210	Year-round	5 liters (1.3 gal)[10]
	Engine oil[11]	API: CF/CF-4/CI-4 ACEA: E3/E4/5 JASO: DH-1	-20°C (-4°F) to +40°C (+104°F)[12]	6.7 liters (1.8 gal)
Hydraulic oil reservoir	Hydraulic oil	Eurolub HVLP 46[13]	Year-round[14]	61.5 liters (16.3 gal)
	Biodegradable hydraulic oil[15]	Panolin HLP Synth 46		
		BP Biohyd SE-S 46		
Washer system	Cleaning agent	Glass cleaner and anti-freeze	Year-round	1 liters (0.3 gal)
Grease nipples	Grease	KPF 2 K-20[16] ISO-L-X-BCEB 2[17]	Year-round	As required
Battery terminals	Acid-proof grease[18]	FINA Marson L2	Year-round	As required
Control lever base	Adhesive fluid grease	Förch S401	Year-round	As required

1. The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level.
   Capacities indicated are no system fills
2. 3TNV88-BPWN: In regions without exhaust gas regulations the engine may be operated with a sulfur content of up to 0.5% (= 5000 ppm).
3. 3TNV88F-EPWN: In regions without exhaust gas regulations the engine may be operated with a sulfur content of up to 0.1% (= 1000 ppm).
4. Sulfur content up to 0.0010% (= 10 ppm)
5. Summer or winter diesel depending on outside temperatures
6. Sulfur content up to 0.0015% (= 15 ppm)
7. Sulfur content up to 0.001% (= 10 ppm)
8. GB 20891-2014: Sulfur content up to 0.035% (= 350 ppm)
9. Factory filling; Do not mix coolant - observe the coolant compound table; Contact an authorized service center
10. System fills incl. hoses and diesel engine
11. Viscosity SAE 10W40 according to DIN 51511; for other temperatures – *see chapter " Engine oil types" on page 7-17*
12. Temperature guide values are dependent on the oil manufacturer
13. According to DIN 51524 section 3, ISO-VG 46
14. Depending on local conditions – *see chapter " Hydraulic oil types" on page 7-16*
15. Biodegradable hydraulic oil based on saturated synthetic esters with an iodine value of < 10, according to DIN 51524, section 3, HVLP, HEES
16. KPF 2 K-20 according to DIN 51502 lithium-saponified grease
17. ISO-L-X-BCEB 2 according to DIN ISO 6743-9, lithium-saponified grease
18. Standard acid-proof grease NGLI category 2

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Hydraulic oil types

Viscosity class	Ambient temperature			
	min. °C	min. °F	max. °C	max. °F
ISO VG32	-20	-4	30	86
ISO VG46	-5	23	40	104
ISO VG68	5	41	50	122

Replacement intervals

Replace the hydraulic oil and hydraulic oil filter depending on the percentage of hammer operation.

Percentage of hammer work	Hydraulic oil	Hydraulic oil filter
20%	800 o/h	300 o/h
40%	400 o/h	
60%	300 o/h	100 o/h
Over 80%	200 o/h	

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Important information regarding operation with biodegradable hydraulic oil

- Use only the biodegradable oils that have been tested and released by Wacker Neuson.
- Add only biodegradable oil of the same type. In order to avoid misunderstandings, attach a clear label to the hydraulic oil filler neck providing clear information regarding the type of oil currently used. The joint use of two different biodegradable oils can affect the quality of one of the oil types. Therefore ensure that the remaining amount of biodegradable oil complies with the national and regional regulations as you replace it. Observe the manufacturer's indications.
- Do not add mineral oil – the content of mineral oil should not exceed 2% of the system fill in order to avoid foaming problems and to ensure biological degradability.
- When running the vehicle with biodegradable oil, the same oil and filter replacement intervals are valid as for mineral oil.
- Always have the condensation water in the hydraulic oil reservoir drained by a Wacker Neuson service center before the cold season. The water content may not exceed 0.1% by weight.
- The instructions in this Operator's Manual concerning environmental protection are also valid for the use of biodegradable oil.
- Subsequent change from mineral oil to biodegradable oil may only be performed by a Wacker Neuson service center.

Engine oil types

Viscosity grade (SAE)	Ambient temperature			
	min. °C	min. °F	max. °C	max. °F
10W	-20	-4	10	50
20W	-10	14	10	50
10W30	-20	-4	30	86
15W40	-15	5	40	104
#20	0	32	20	68
#30	10	50	30	86
#40	20	68	40	104

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7.4 Maintenance accesses

WARNING

Injury hazard due to rotating parts!

Rotating parts can cause serious injury or death.

► Open the engine cover only at engine standstill.

CAUTION

Burn hazard due to hot surfaces!

Can cause serious burns or death.

► Stop the engine and let hot surfaces cool down.

► Wear protective equipment.

CAUTION

Injury hazard due to open maintenance accesses!

Can cause injury.

► Take care to avoid injuries when the maintenance access door is open.

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Opening the engine cover

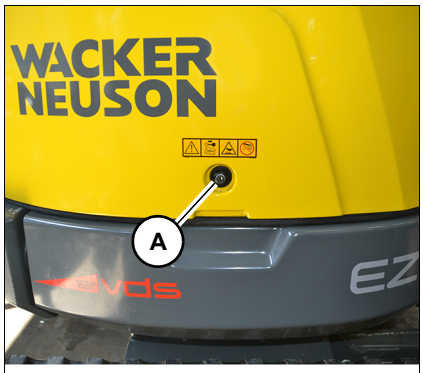


Fig. 299

1. Stop the vehicle, stop the engine – *see chapter “ Preparing lubrication” on page 7-7*.
2. Turn the starting key in lock **A** anticlockwise.
3. Press lock **A**.

The engine cover is supported by a gas strut with lock **B** (item **1**).

Close the engine cover

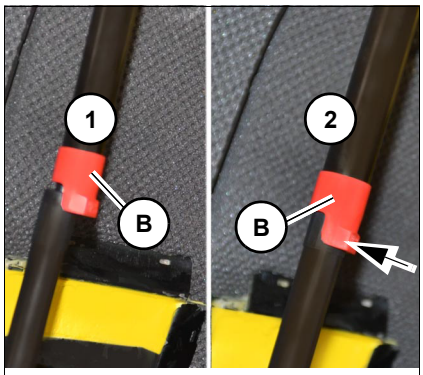


Fig. 300

1. Release lock **B** by applying slight pressure (position **2**).
2. Press down the engine cover.
3. Turn the starting key in lock **A** clockwise.

Fuse boxes

– see chapter “9.8 Electrical system” on page 9-3

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Toolbox



Fig. 301

You will find the vehicle tool kit in the toolbox to the left of the operator seat.

Cabin air filter

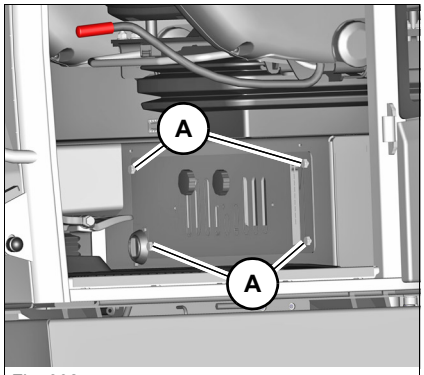


Fig. 302

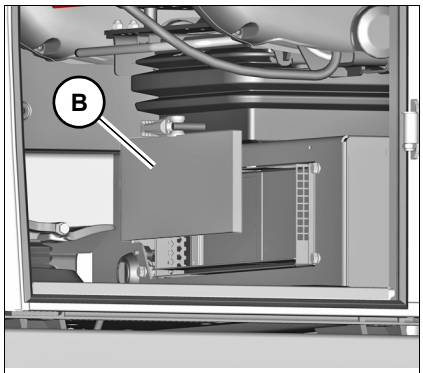


Fig. 303

1. Loosen screws **A** and remove cover.
2. Clean coarse filter **B** with compressed air daily.
3. Reinstall the cover and fasten it with screws **A**.

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7.5 Cleaning and maintenance

WARNING

Injury hazard due to rotating parts!

Rotating parts can cause serious injury or death.

► Open the engine cover only at engine standstill.

WARNING

Burn hazard due to hot surfaces!

Hot surfaces can cause serious burns or death.

► Stop the engine and let it cool down.

► Wear protective equipment.

CAUTION

Health hazard due to cleaning agents!

Cleaning agents can be harmful to health.

► Use only suitable cleaning agents.

► Ensure sufficient ventilation.

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NOTICE

Damage to rubber and electrical parts when cleaning with solvents.

Do not use solvents, benzine, or other aggressive chemicals.

NOTICE

Damage to electronics due to water jet.

- ► Electronic components (e.g. relays, displays) must not be cleaned with a high-pressure cleaner.
- ► Electric components (e.g. headlight, rotating beacons) must be at a distance of at least 50 cm (20 in) from the jet of the high-pressure cleaner.
- ► Dry electric components carefully with compressed air and apply contact spray to them.

Environment

In order to avoid damage to the environment, clean the vehicle only in wash bays and places authorized by the authorities.

Cleaning the vehicle is divided into three separate areas:

- Inside the cabin
- Exterior of the vehicle
- Engine compartment

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Washing solvents

- Ensure sufficient room ventilation.
- Wear suitable protective clothing.
- Do not use flammable liquids, such as gasoline or diesel.

Compressed air

- Work carefully.
- Wear safety glasses and protective clothing.
- Do not aim the compressed air at the skin or at other people.
- Do not use compressed air for cleaning your clothing.

High-pressure cleaner

- Cover electric parts.
- Do not point the water jet directly at electric parts and damping material.
- Cover the vent filter on the hydraulic oil reservoir and the filler caps for fuel, hydraulic oil, etc.
- Protect sensitive components from moisture:
  - Do not clean the engine compartment, engine components, electric components and damping material using a high-pressure cleaner.
  - Electrical components (for example alternator, control valves, connector plug at the wiring harness)
  - Control devices and seals
  - Air filter, exhaust etc.
  - Cover tank lock and filter
- Keep a safe distance from the labels.

Volatile and easily flammable anti-corrosion agents and sprays:

- Ensure sufficient room ventilation.
- Fire, open flames and smoking is prohibited.

Inside the cabin

Recommended aids:

- Vacuum cleaner
- Moist cloths
- Brush
- Water with mild soap solution

On the outside of the vehicle

Recommended aids:

- High-pressure cleaner
- Steam jet

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Engine compartment

1. Park the vehicle in a wash bay or place suitable for washing.
2. Stop the engine. *– see chapter " Preparing lubrication" on page 7-7*.
3. Clean the vehicle.

Seat belt

Always keep the seat belt clean, as coarse dirt can impair the proper functioning of the seat belt buckle.

Clean the seat belt (while it remains fitted in the vehicle) with a mild soap solution only. Do not use chemical agents as they can destroy the fabric.

Cleaning in a saline environment

1. Park the vehicle in a wash bay or place.
2. *– see chapter " Preparing lubrication" on page 7-7*.
3. Check the vehicle for salt deposits or corrosion. Have corrosion removed by a Wacker Neuson service center.
4. Clean the vehicle with a high-pressure cleaner. Clean the vehicle ensuring that there are no salt deposits in places that are difficult to access.
   Bear in mind the information on cleaning and maintenance.
5. Lubricate the vehicle according to the lubrication plan.
6. Allow the vehicle to dry and check it again for salt deposits.

Loose threaded fittings and attachments

Contact a Wacker Neuson service center.

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7.6 Lubrication work

– see chapter “ Preparing lubrication” on page 7-7

7.7 Fuel system

Important information regarding the fuel system

Information

In order to prevent the formation of condensation water, fill up the fuel tank nearly completely at the end of each working day.

Information

Do not run the fuel tank completely dry. Otherwise, air is drawn into the fuel system. This requires bleeding the fuel system.

Diesel fuel specification

NOTICE

Engine damage due to incorrect or dirty diesel fuel.

- ► Only use clean diesel fuel according to the **fluids and lubricants** list.
- ► Do not use any diesel fuel with additives.

– see "Consumables" on page 7-15

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Refueling

WARNING

Explosion hazard due to flammable fuel/air mixtures!

Fuels develop explosive and flammable mixtures with air that can cause serious burns or death.

- ► Fire, open flames and smoking is prohibited.
- ► Open tank lock carefully to release the pressure in the fuel tank.
- ► Keep the maintenance area clean.
- ► Do not refuel in closed rooms.
- ► Do not add gasoline to diesel fuel.
- ► Let the engine cool down.

CAUTION

Health hazard due to diesel fuel!

Diesel fuel and fuel vapors are harmful to health.

- ► Avoid contact with the skin, eyes and mouth.
- ► Seek medical attention immediately in case of accidents with diesel fuel.
- ► Wear protective equipment.

CAUTION

Fire hazard due to diesel fuel!

Diesel fuel gives off flammable vapors. This can cause injury.

- ► Fire, open flames and smoking is prohibited.
- ► Do not add gasoline to diesel fuel.

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CAUTION

Slipping/tripping hazard when refueling the vehicle!

Can cause injury.

► Use safety-oriented ladders for refueling the vehicle.

► Do not use vehicle parts or attachments as a climbing aid.

NOTICE

Do not refuel with cans in order to avoid dirt in the fuel.

Refueling with a stationary fuel pump

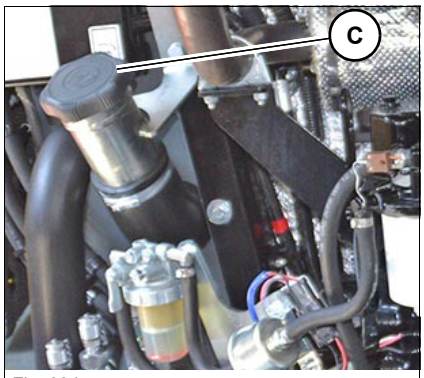


Fig. 304

The fuel tank is located under the engine cover.

1. Preparations – *see chapter “ Parking the machine” on page 5-12*.
2. Open the engine cover.
3. Open tank lock **C** carefully to release the pressure in the fuel tank.
4. Refuel the vehicle.
5. Close the filler cap.
6. Close and lock the engine cover.

Even the smallest particles of dirt can cause increased engine wear, malfunctions in the fuel system and reduced effectiveness of the fuel filters.

Refueling from barrels

If refueling from barrels cannot be avoided, note the following points:

- Barrels must neither be rolled nor tilted before refueling.
- Protect the suction pipe opening of the barrel pump with a fine-mesh screen.
- Immerse the suction pipe opening down to a max. 15 cm (6 in) above the bottom of the barrel.
- Only fill the tank using refueling aids (funnels or filler pipes) with an integral microfilmer.
- Keep all refueling containers clean.

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Fuel filter

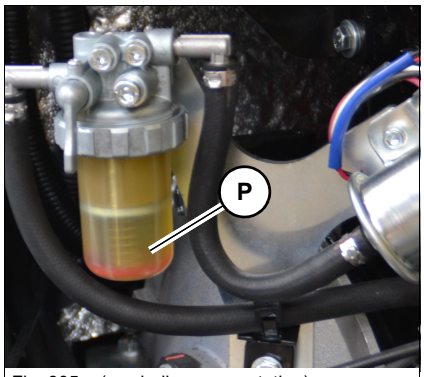


Fig. 305 (symbolic representation)

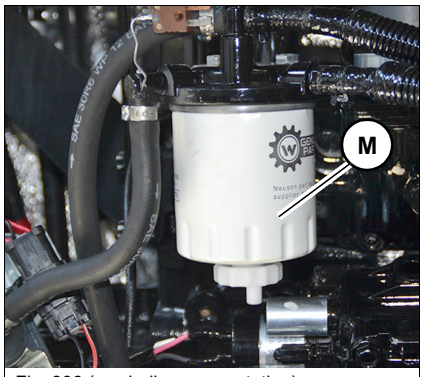


Fig. 306 (symbolic representation)

The fuel prefilter **P** and fuel main filter **M** are located in the engine compartment.

Both are equipped with a water separator.

Information

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

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Empty the water separator (prefilter)

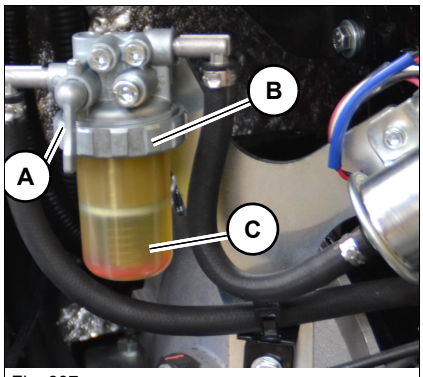


Fig. 307

1. Preparations – *see chapter " Parking the machine" on page 5-12*
2. Prepare a suitable container for collecting the fuel/water mixture.
3. Open the engine cover.
4. Turn ball-type cock **A** to the **OFF** mark.
   ➥ Fuel supply is interrupted.
5. Unscrew threaded ring **B**.
6. Collect the fuel/water mixture in the container.

NOTICE

Do not drain the red indicator ring **C** too.

7. Screw on the threaded ring **B**.
   ➥ The indicator ring is at the base of the water separator.
8. Turn ball-type cock **A** to the **ON** mark.
   ➥ Fuel supply is open.
9. Close the engine cover.

Empty the water separator (main filter)

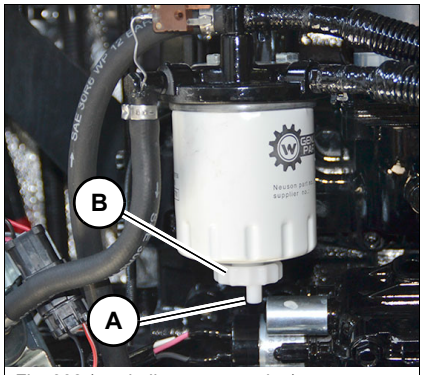


Fig. 308 (symbolic representation)

1. Preparations – *see chapter " Parking the machine" on page 5-12*.
2. Prepare a suitable container for collecting the fuel/water mixture.
3. Open the engine cover.
4. Connect a drain hose to connection **A**. Place the hose into a container on the ground.
5. Open screw **B**.
6. Collect the fuel/water mixture in a suitable container.
7. Close screw **B**.
8. Remove the hose.
9. Close and lock the engine cover.

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Bleeding the fuel system

Bleed the fuel system in the following cases:

- After removing and fitting the fuel filter, prefilter or the fuel lines back on again.
- If the vehicle is put into operation after having been out of operation for more than 30 days.

Bleed:

1. Raise the control lever base.
2. Remove the starting key and carry it with you.
3. Fill up and close the fuel tank.
4. Turn the starting key to the first position.
5. Wait about 5 minutes while the fuel system bleeds itself automatically.
6. Start the engine.

If the engine runs smoothly for a while and then stops, or if it does not run smoothly:

1. Stop the engine.
2. Raise the control lever base.
3. Remove the starting key and carry it with you.
4. Bleed the fuel system again as described above.
5. Check for leaks after starting the engine.
6. Have a Wacker Neuson service center perform a check if necessary.

Information

The fuel system can be bled automatically even if the engine is at operating temperature.

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7.8 Engine lubrication system

Important information regarding the engine lubrication system

NOTICE

Possible engine damage due to incorrect engine oil level.

► The oil level must be between the MIN and MAX marks.

NOTICE

Damage due to wrong engine oil.

► Use engine oil according to **Fluids and lubricants** list.

► Have the oil changed only by a Wacker Neuson service center.

NOTICE

Possible engine damage due to adding engine oil too quickly.

► Add the engine oil slowly so it can go down without entering the intake system.

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Checking the engine oil level

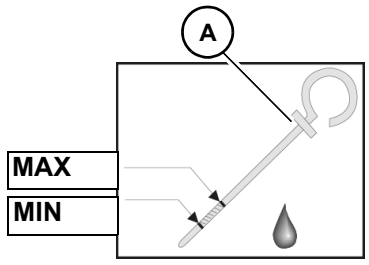


Fig. 309

1. Stop and park the vehicle. Stop the engine. – *see chapter " Preparing lubrication" on page 7-7*.
2. Wait for at least 10 minutes, until the oil has run into the oil sump completely
3. Open the engine cover.
4. Wipe the area around oil dipstick **A** with a lint-free cloth.

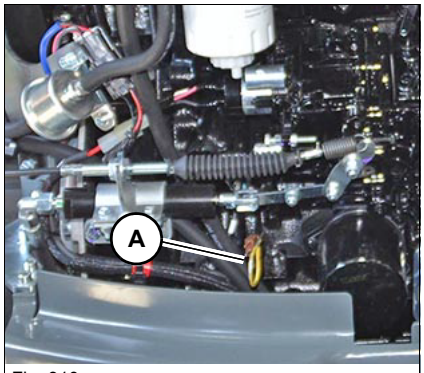


Fig. 310

5. Pull out oil-level dipstick **A** and wipe it with a lint-free cloth.
6. Slide in oil dipstick **A** completely.
7. Withdraw it and read off the oil level.
   - ➥ The oil level must be between the MIN and MAX marks.
   - ➥ Add engine oil if necessary.
8. Slide in oil dipstick **A** completely.
9. Close and lock the engine cover.

Adding engine oil

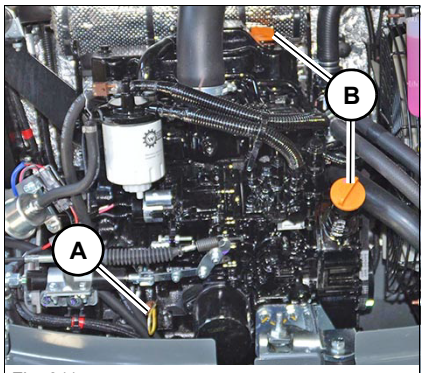


Fig. 311

1. Stop and park the vehicle. Stop the engine – *see chapter " Preparing lubrication" on page 7-7*.
2. Wait for at least 10 minutes, until the oil has run into the oil sump completely.
3. Open the engine cover.
4. Wipe the area around the sealing push-in cap with a lint-free cloth.
5. Open filler cap **B**.
6. Raise oil dipstick **A** slightly to allow any trapped air to escape.
7. Add engine oil.
8. Wait at least ten minutes.
9. Check the oil level.
10. Add oil if necessary and check the oil level again.
11. Close filler cap **B**.
12. Slide in oil dipstick **A** completely.
13. Close and lock the engine cover.

Environment

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

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7.9 Cooling system

Important information regarding the cooling system

The radiators are located on the right in the engine compartment.

WARNING

Poisoning hazard due to hazardous substances!

Contact with hazardous substances can cause serious injury or death.

- ► Wear protective equipment.
- ► Do not inhale or swallow coolant.
- ► Avoid contact of the coolant or antifreeze with the skin and eyes.

WARNING

Burn hazard due to coolant or antifreeze!

The coolant and antifreeze are easily flammable fluids that can cause serious burns or death if they are brought into contact with fire or open flames.

- ► Wear protective equipment.
- ► Only perform maintenance on an engine that has cooled down.
- ► Fire, open flames and smoking is prohibited.

WARNING

Burn hazard due to hot coolant!

At high temperatures, the cooling system is under pressure and can cause burning of the skin.

- ► Wear protective equipment.
- ► Let the engine cool down.
- ► Carefully open the radiator cap.

NOTICE

Possible engine damage due to wrong coolant.

- ► Observe the engine/vehicle fluid table or coolant compound table.

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NOTICE

Possible engine damage due to low coolant level.

► Check the coolant level once a day.

Information

Check the coolant level once a day before starting the engine.
Observe the coolant compound table

Check and refill the coolant

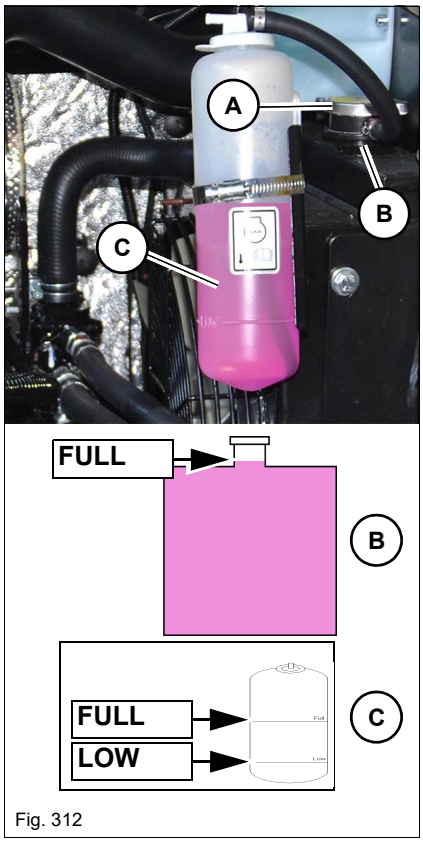


Fig. 312

1. Preparations – *see chapter " Parking the machine" on page 5-12*.
2. Carefully unscrew the filler cap **A**and release the pressure.
3. Check the coolant in the radiator **B**.
4. Refill the coolant until the coolant reaches the filler inlet of radiator **B**.
5. Tighten filler cap **A**.
6. Check the coolant level in the expansion tank **C**.
7. Refill the coolant until the coolant reaches the mark **FULL** in the expansion tank **C**.
8. Start the engine and let it warm up for about 5 – 10 minutes.
9. Stop the engine.
10. Remove the starting key and carry it with you.
11. Let the engine cool down.
12. Check the coolant level again.
13. If necessary, add coolant and repeat the procedure until the coolant level remains constant.
14. Close and lock the engine cover.

Information

Check the coolant level once a day before starting the engine.
Observe the coolant compound table.

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Clean the radiator

CAUTION

Burn hazard due to hot surfaces!

Hot radiators can cause burns.

- ► Stop the engine and let it cool down.
- ► Wear protective equipment.

NOTICE

Possible engine damage or damage to the hydraulic system from dirty radiator fins.

- ► Check and if necessary clean the radiator once a day.
- ► In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans.

NOTICE

Possible damage to radiator fins during cleaning.

- ► Keep a safe distance from the radiator during cleaning.
- ► Use oil-free compressed air (2 bar/29 psi max.) to clean.

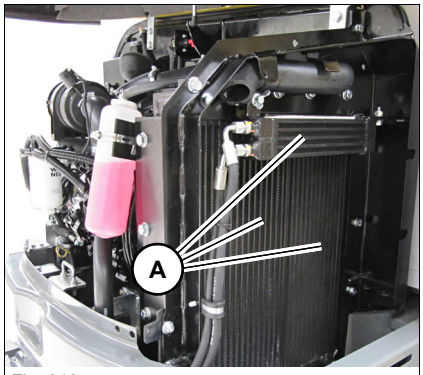


Fig. 313

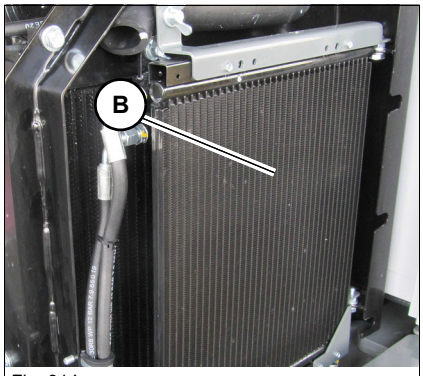


Fig. 314

The radiator **A** and the condenser **B** are located to the right in the engine compartment.

1. Stop and park the vehicle. Stop the engine. *– see chapter “ Preparing lubrication” on page 7-7*.
2. Open the engine cover.
3. Remove dust and other foreign bodies from the fins with compressed air.
4. Close and lock the engine cover.

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7.10 Air filter

Have maintenance performed only by a Wacker Neuson service center.

NOTICE

Possible engine damage due to intake of dirty air.

► Check the dirt indicator and air intake daily before commissioning.

Check dirt indicator (3TNV88F)

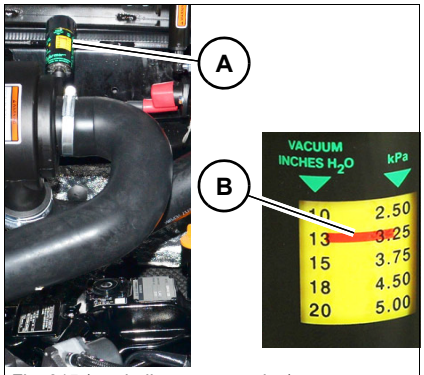


Fig. 315 (symbolic representation)

The dirt indicator **A** is located with the air filter.

If the mark **B** reaches the value described in the table, contact an authorized service center.

Sea level m (ft)	Value
Until 800 (2625)	5.00
From 800 (2625)	3.25

Checking the air intake



Fig. 316

1. Stop and park the vehicle. Stop the engine. – *see chapter “ Preparing lubrication” on page 7-7*.
2. Remove the starting key and carry it with you.
3. Check and if necessary clean ventilation grill **A**.

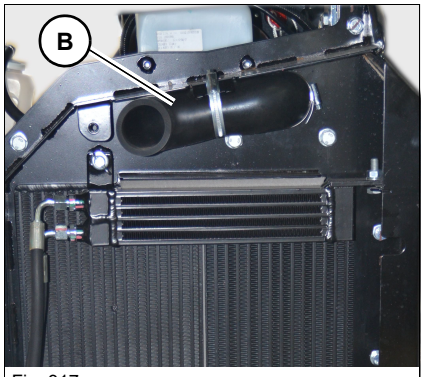


Fig. 317

4. Open the engine cover.
5. Check the air intake **B** and clean it if necessary.
6. Close and lock the engine cover.

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7.11 V-belt

V-belt tension may be checked and the V-belt re-tensioned only by a Wacker Neuson service center.

7.12 Hydraulic system

Important information on the hydraulic system

WARNING

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burning to the skin, serious injury or death.

- ► Release the pressure in the hydraulic system.
- ► Let the engine cool down.
- ► Wear protective equipment.

WARNING

Injury hazard due to fluid escaping under pressure!

Hydraulic oil escaping under pressure can penetrate the skin and cause serious injury or death.

- ► Do not operate the vehicle with leaking or damaged hydraulic system components.
- ► Open the breather filter carefully to slowly release the pressure inside the reservoir.
- ► Wear protective equipment. If hydraulic oil contacts the eye, flush immediately with clean water and seek medical treatment.
- ► Malfunctioning or leaking screw connections, hose connections and pressure lines must be immediately repaired by a Wacker Neuson service center. Search for hydraulic leaks with a piece of cardboard.
- ► Always consult a doctor immediately, even if the wound seems insignificant. Hydraulic oil causes blood poisoning.

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NOTICE

Damage due to wrong hydraulic oil.

- ► Only use hydraulic oil according to the **fluids and lubricants** list.
- ► Have the hydraulic oil only changed by an authorized service center.

NOTICE

Damage to hydraulic system due to incorrect hydraulic oil level.

- ► With a warm engine, the hydraulic oil must be about at the middle of the sight glass.
- ► Check the hydraulic oil level once a day.

NOTICE

Possible damage to hydraulic system due to dirty hydraulic oil.

- ► Always add hydraulic oil using the filling screen.
- ► If the hydraulic oil in the sight glass is cloudy, this indicates that water or air has penetrated the hydraulic system. Contact a Wacker Neuson service center.
- ► Contact a Wacker Neuson service center if the filter of the hydraulic system is dirty.

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Checking the hydraulic oil level

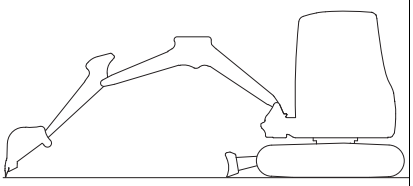


Fig. 318

1. Park the vehicle on firm, level, and horizontal ground.
2. Position the arm system straight ahead at the center of the vehicle (*Fig. 318*).
3. Lower the boom and the stabilizer blade to the ground.
4. Stop the engine.
5. Operate the control lever repeatedly to release the pressure in the hydraulic system.
6. Remove the starting key and carry it with you.



Fig. 319

7. Sight glass **A** is located at the rear of the vehicle.
8. Check the oil level on sight glass **A**.
   ➥ If the engine is warm, the oil level must be approximately at the middle of sight glass **A**.
9. Add hydraulic oil if the oil level is below this mark.

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Adding hydraulic oil

CAUTION

Slipping/tripping hazard when adding hydraulic oil!

Can cause injury.

- ► Use a safety-oriented ladder to add hydraulic oil.
- ► Do not use vehicle parts or attachments as a climbing aid.

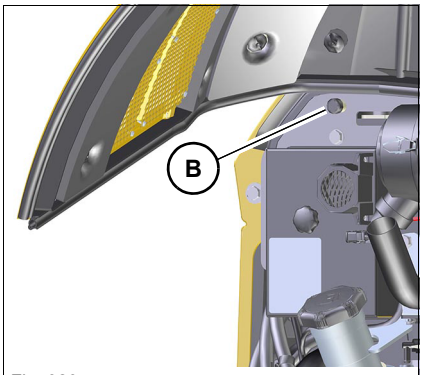


Fig. 320

1. Open reservoir ventilation **B** to release the pressure.
2. Open cover **C** slowly to release the pressure inside the hydraulic oil tank.
3. Remove cover **C**.
4. Add hydraulic oil up to the corresponding mark.
5. Check the hydraulic oil level on sight glass **A**.
6. Add if necessary and check again.
7. Screw in cover **C** tightly.

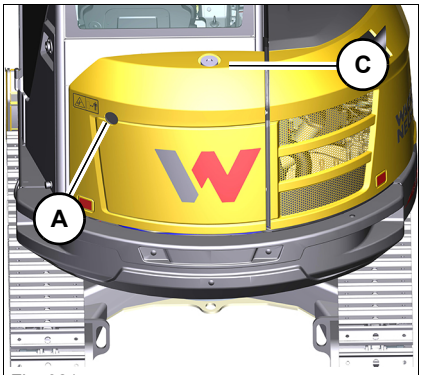


Fig. 321

Environment

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

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Checking the hydraulic system and hoses

Check the hydraulic system and hydraulic lines daily for leaks and general condition.

NOTICE

Damage to the hydraulic system due to leaks and damaged hydraulic lines.

- ► Leaks and damaged hydraulic lines must be immediately repaired at an authorized service center. This increases the operating safety of the vehicle and contributes to environmental protection.
- ► Do not operate the vehicle with leaking or damaged hydraulic lines.

Hydraulic hoses are subject to natural aging. Therefore, they must be checked regularly, even when there is no visible damage, which prevents safe operation.

Wacker Neuson recommends following schedule for checks:

Normal wear	12 months
Increased wear (longer operation duration, multi-shift operation, high outside temperatures, aggressive environmental conditions etc.)	6 months

Responsibility of checking hydraulic hose

The vehicle operator must decide the intervals at which the hydraulic hose has to be checked and the decision will be based on the actual work situation.

To do this, the vehicle operator must appoint a qualified person, who will check the hydraulic hoses. If there is noticeable damage, the hydraulic hose must be replaced immediately. Do not start the vehicle. The findings from this check must be retained in writing by the vehicle operator till the next scheduled check.

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Wacker Neuson recommends replacing the hydraulic hoses every six years from the manufacturing date.

Manufacturing date can be found on the hydraulic hose.

- Re-tighten leaking screw connections and hose connections only when the system is not under pressure. Release the pressure in the hydraulic system before working on lines under pressure.
- Do not weld or solder damaged or leaking pressure lines and screw connections, but have them replaced.
- Wear protective equipment.

Have a line replaced immediately if one of the following problems is detected:

- Damaged or leaky hydraulic seals.
- Worn or torn shells or uncovered reinforcement branches.
- Expanded shells in several positions.
- Entangled or crushed movable parts.
- Foreign bodies jammed or stuck in protective layers.

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7.13 Electrical system

Important information regarding the electrical system

Maintenance and repair work on the electrical system may be performed only by a Wacker Neuson service center!

- Malfunctioning components of the electrical system must be replaced by a Wacker Neuson service center.
- Light bulbs and fuses may be replaced by the operator.

Alternator

- Contact a Wacker Neuson service center if the alternator charge indicator light is malfunctioning.

WARNING

Injury hazard due to malfunctioning batteries!

Batteries give off explosive gases that can cause deflagrations if ignited.

- ► Wear protective equipment.
- ► Fire, open flames and smoking is prohibited.
- ► Do not jump start the engine if the battery is malfunctioning or frozen, or if the acid level is too low.
- ► Do not place conductive articles on the battery – risk of short circuit.

NOTICE

Possible damage to electrical components or engine electronics.

- ► Do not place conductive articles on the battery – risk of short circuit.
- ► Do not interrupt voltage-carrying circuits at the battery terminals because of the sparking hazard.
- ► Do not disconnect the battery while the engine is running.

Environment

Dispose of old batteries in an environmentally friendly manner.

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Fuses and relays

– see chapter “9.8 Electrical system” on page 9-3

Battery

The battery may be checked, disconnected, charged and replaced only by a Wacker Neuson service center.

7.14 Heating, ventilation and air conditioning system

Checking/changing the cabin air filter

Control: operator according to maintenance plan

Change: authorized service center according to maintenance plan

7.15 Washer system

Only use glass cleaner (with antifreeze if necessary) for refilling.

Checking the fluid level and adding fluid

CAUTION

Burn hazard due to hot surfaces!

Can cause serious burns or death.

- ► Stop the engine and let it cool down.
- ► Wear protective equipment.

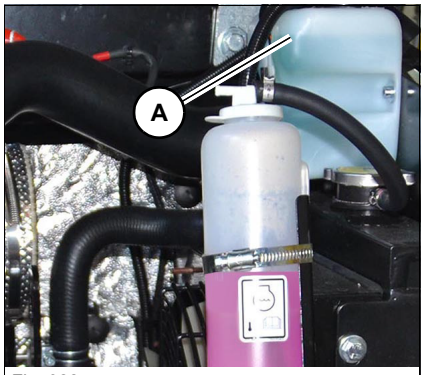


Fig. 322

Reservoir filler inlet **A** is located on the right under the engine cover.

1. Stop and park the vehicle. Stop the engine. – see chapter “ Preparing lubrication” on page 7-7.
2. Open the engine cover.
3. Check the fluid level in tank **A** and add fluid if necessary.
4. Close and lock the engine cover.

7.16 Travel drive

Have maintenance performed only by a Wacker Neuson service center.

7.17 Braking system

Have maintenance performed only by a Wacker Neuson service center.

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7.18 Tracks

WARNING

Crushing hazard during work under the vehicle!

Working under the tracks can cause serious injury or death.

► Do not allow anyone to stay in the danger zone.

Checking track tension

Rubber tracks

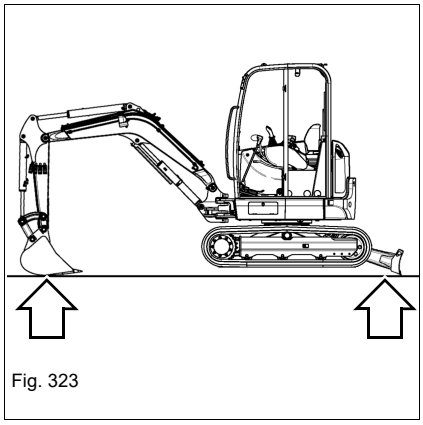


Fig. 323

1. Park the vehicle on firm, level, and horizontal ground.
2. Raise the vehicle evenly and horizontally by means of the boom and stabilizer blade.

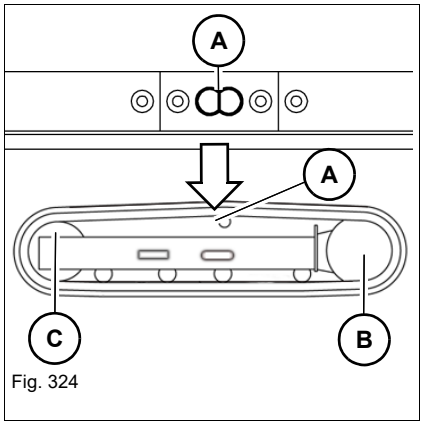


Fig. 324

3. Place the tracks so that mark **A** is in the middle between drive pinion **B** and track tension roller **C**.
4. Stop the engine.
5. Raise the control lever base.

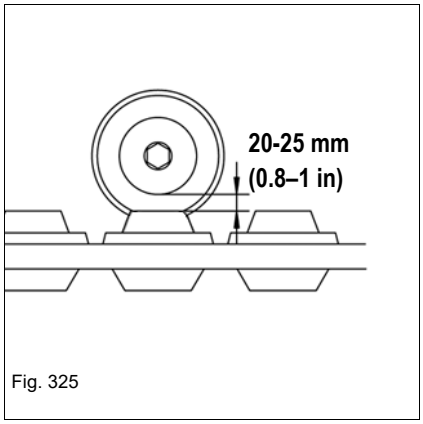


Fig. 325

6. Remove the starting key and carry it with you.
7. Adjust the track tension if the play between the track roller and the track is not 20 – 25 mm (0.8 – 1 in).

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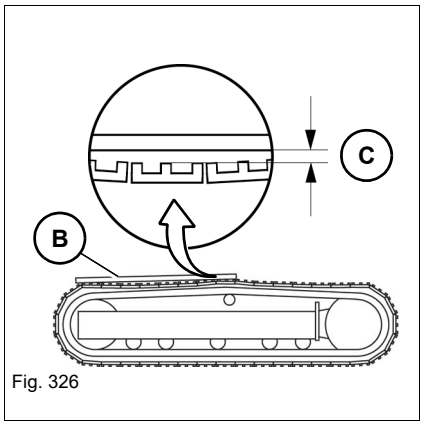


Fig. 326

Correcting track tension

Steel track (option)

Place a measuring rod **B** across the highest points of the track.

- Adjust the track tension if play **C** between the track roller and the track is not 20 - 25 mm (0.8 - 1 in).

WARNING

Injury hazard due to grease escaping under pressure!

Grease escaping under pressure can penetrate the skin and cause serious injury or death.

► Open the lubricating valve only very carefully and do not unscrew it more than one revolution.

► Wear protective equipment.

► Contact a Wacker Neuson service center if you are unable to reduce the track tension.

NOTICE

Possible damage to cylinders and tracks due to over-tightening.

► Tighten the tracks only up to the mandatory measuring distance.

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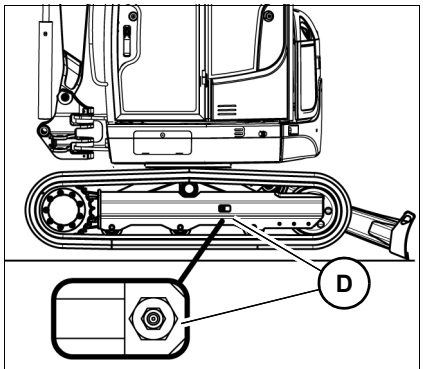


Fig. 327

Tightening the tracks

1. Park the vehicle on firm, level, and horizontal ground.
2. Raise the vehicle evenly and horizontally by means of the boom and stabilizer blade.
3. Stop the engine.
4. Pump grease with a grease gun through lubricating valve **D**.
5. Start the engine.
6. Lower the vehicle to the ground.
7. In order to check that the tension is correct:
   - Let it run at idling speed without any load
   - Slowly move the vehicle forward and reverse and switch it off again.
8. Check the track tension again.
   ➥ If it is not correct:
9. Repeat steps 2–9. Contact a Wacker Neuson service center if track tension still is too low after pumping in more grease.

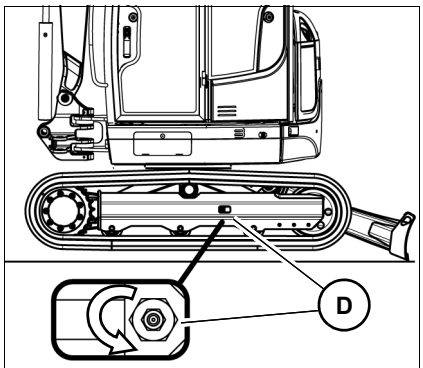


Fig. 328

Reducing tension

1. Place a suitable container underneath to collect the grease.
2. Slowly turn lubricating valve **D** a maximum of one revolution anticlockwise to release the grease.
   ➥ The grease flows out of the groove of the lubricating valve.
3. Re-tighten lubricating valve **D**.
4. In order to check that the tension is correct:
   - Lower the vehicle to the ground.
   - Start the engine.
   - Let it run at idling speed without any load, then slowly move the vehicle forward and reverse, then turn it off again. Raise the vehicle again by means of the boom and stabilizer blade.
5. Check the track tension again.
   ➥ If it is not correct:
6. Adjust again.

Environment

Use a suitable container to collect fluids and lubricants as they flow out and dispose of them in an environmentally friendly manner.

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7.19 Maintenance of attachments

Important information regarding maintenance of attachments

Correct maintenance and service is absolutely necessary for smooth and continuous operation, and for an increased service life of the attachments. Please observe the lubrication and maintenance instructions in the Operator's Manuals of the attachments.

7.20 Maintenance of options

Have a Wacker Neuson service center check all eyes regularly:

- Machine lifting eyes
- Attachment lifting eyes
- Attachment load hooks
- Tie-down points
- Towing eyes

Have eyes or load hooks with inadmissible wear, a defective spring mechanism, etc. immediately replaced by a Wacker Neuson service center.

7.21 Exhaust gas treatment

Not available.

7.22 Machine preservation

Each vehicle is partly preserved at the plant (for example in the engine compartment). Operation in an aggressive environment (for example salt deposits) is prohibited.

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8 Malfunctions

8.1 Diesel engine

Information
Troubleshooting may be performed only by a Wacker Neuson service center.

Engine and engine oil indicator lights (3TNV88F)

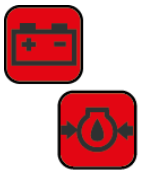
Engine warning	Engine stop	Oil pressure	Description
Yellow	Red	Red	Indicator light color
			
On	On	On	All warning and indicator lights illuminate for a few seconds if the starting key is turned to position 1. If the engine stop or oil pressure light does not illuminate, stop vehicle operation immediately and contact a Wacker Neuson service center.
Off	Off	Off	No malfunction.
On	Off	On	Low oil pressure (if the oil pressure indicator light illuminates during operation). Check the oil level and add oil if necessary – *see chapter “ Adding engine oil” on page 7-32*. If the malfunction is still indicated, stop the engine and contact a Wacker Neuson service center.

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8.2 Malfunctions (display element/multi-functional display)

Symbol (3TNV88)	Symbol (3TNV88F)	Description	See
--		**Engine stop** Stop the engine immediately. Contact a Wacker Neuson service center.	--
--		**General malfunction** Stop the engine immediately. Contact a Wacker Neuson service center.	--
		**Low Engine Oil Pressure** • Possible electric error. Stop the engine immediately. Contact a Wacker Neuson service center.	--
--		**Engine malfunction** Stop the engine immediately. Contact a Wacker Neuson service center.	--
		**Charge indicator light** • Possible battery, alternator or V-belt malfunction. **Note**: Increase the engine speed. The electrical system is in working order if the charge indicator light goes out after about one minute. If the malfunction is still indicated, stop the engine immediately and contact a Wacker Neuson service center.	--

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Symbol (3TNV88)	Symbol (3TNV88F)	Description	See
--		**Hydraulic oil temperature too high** Check the hydraulic oil level and add oil if necessary. Hydraulic oil cooler dirty; clean hydraulic oil cooler if necessary **Note**: If the malfunction is still indicated despite having cleaned hydraulic-oil radiator and added oil, stop the engine and contact a Wacker Neuson service center.	*7-39*, *7-35* *7-40*
		**Replace the hydraulic oil filter** Contact a Wacker Neuson service center.	--
	--	**Dirty air filter** Stop the engine immediately. Contact a Wacker Neuson service center.	--
	--	**Coolant temperature** Let the engine run at high idling speed without any load. Wait until the temperature drops and the indicator light goes out. Stop the engine. Check the coolant level.	--
	--	**Faulty indicator light** Stop the engine immediately. Contact a Wacker Neuson service center. **Note:** The indicator light illuminates when the starter is turned on and goes out as soon as the engine runs.	--

- Symbols are listed according to priority.
- Additionally an exclamation mark can appear in the display element or the multifunctional display and a buzzer can sound.

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Contact a Wacker Neuson service center in case of malfunctions or signs that are not listed in the following tables or that persist after maintenance has been performed correctly.

Malfunction/sign	Possible cause	Remedy	See
Engine does not start or is not easy to start	Empty fuel tank	Refueling	*7-26*
	Malfunctioning or empty battery	Replace the battery. Contact a service center.	--
	Malfunctioning fuse	Check the fuse	*9-5*
Engine starts, but does not run smoothly or faultless	Air in fuel system	Let the engine run	--
	Water in fuel system	Empty the water separator.	*7-28*
	Wrong diesel fuel	Observe the **fuel, lubricants, and coolants** list	*7-15*
Engine overheats	Engine oil level too low	Adding engine oil	*7-32*
	Dirty radiator fins	Cleaning the radiator	*7-35*
	Coolant level too low	Adding coolant	*7-34*
	Malfunctioning or insufficiently tightened V-belt	Contact a service center	--
Insufficient or no engine oil pressure	Engine oil level too low	Adding engine oil	*7-32*
Black engine smoke	Dirty air filter	Contact a Wacker Neuson service center	--
Blue engine smoke	Engine oil level too high	Contact a Wacker Neuson service center	--
Machine pulls to the right or left	Wrong track tension	Tighten tracks correctly	*7-45*
	Foreign bodies stuck in track	Remove foreign bodies	--
	Uneven wear of the tracks	Contact a Wacker Neuson service center	--
None of the hydraulic functions can be operated	Control lever base raised	Fold down the control lever base	*4-39*
The working light or horn does not work	Malfunctioning fuse	Check the fuse, check the fuse at the work light	*9-5*
Fan does not run	Malfunctioning fuse	Check the fuse	*9-5*
	Electrical fault	Contact a Wacker Neuson service center	--
Reduced or no cooling capacity	Not enough refrigerant in the system	Contact a Wacker Neuson service center	--
	Malfunctioning V-belt		
	Dirty condenser	Contact a Wacker Neuson service center	--
	Temperature controller set to heating	Set the temperature controller to cooling	*5-17*
	Dirty cabin air filter	Clean or replace the cabin air filter	*7-20*

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Malfunction/sign	Possible cause	Remedy	See
Reduced heating output or none at all	Malfunctioning thermostat	Contact a Wacker Neuson service center	--
	Temperature controller set to cooling	Set temperature controller to heating	*5-17*
	Dirty cabin air filter	Clean or replace the cabin air filter	*7-20*
Loss of refrigerant	Loose hose connection	Contact a Wacker Neuson service center	--
	Leak in system		
Very loud system	Malfunctioning V-belt	Contact a Wacker Neuson service center	--
	Damaged air conditioning compressor		
	Damaged fan motor		
Hydraulic system overheats	Dirty hydraulic oil radiator	Clean the hydraulic oil radiator	*7-35*
	Hydraulic oil level too low	Adding hydraulic oil	*7-40*
	Malfunctioning or insufficiently tightened V-belt	Contact a Wacker Neuson service center	--
The display element emits a continuous acoustic warning	The pressure switch of the safe load indicator is defective	Stop the engine. Contact a Wacker Neuson service center	--

Service menu/error messages

Observe the following if an error is displayed in the multi-functional display:

In case of serious errors, stop the vehicle immediately.

- Engine power is reduced.
- Stop and park the vehicle.
- Contact a Wacker Neuson service center and have the malfunction rectified.

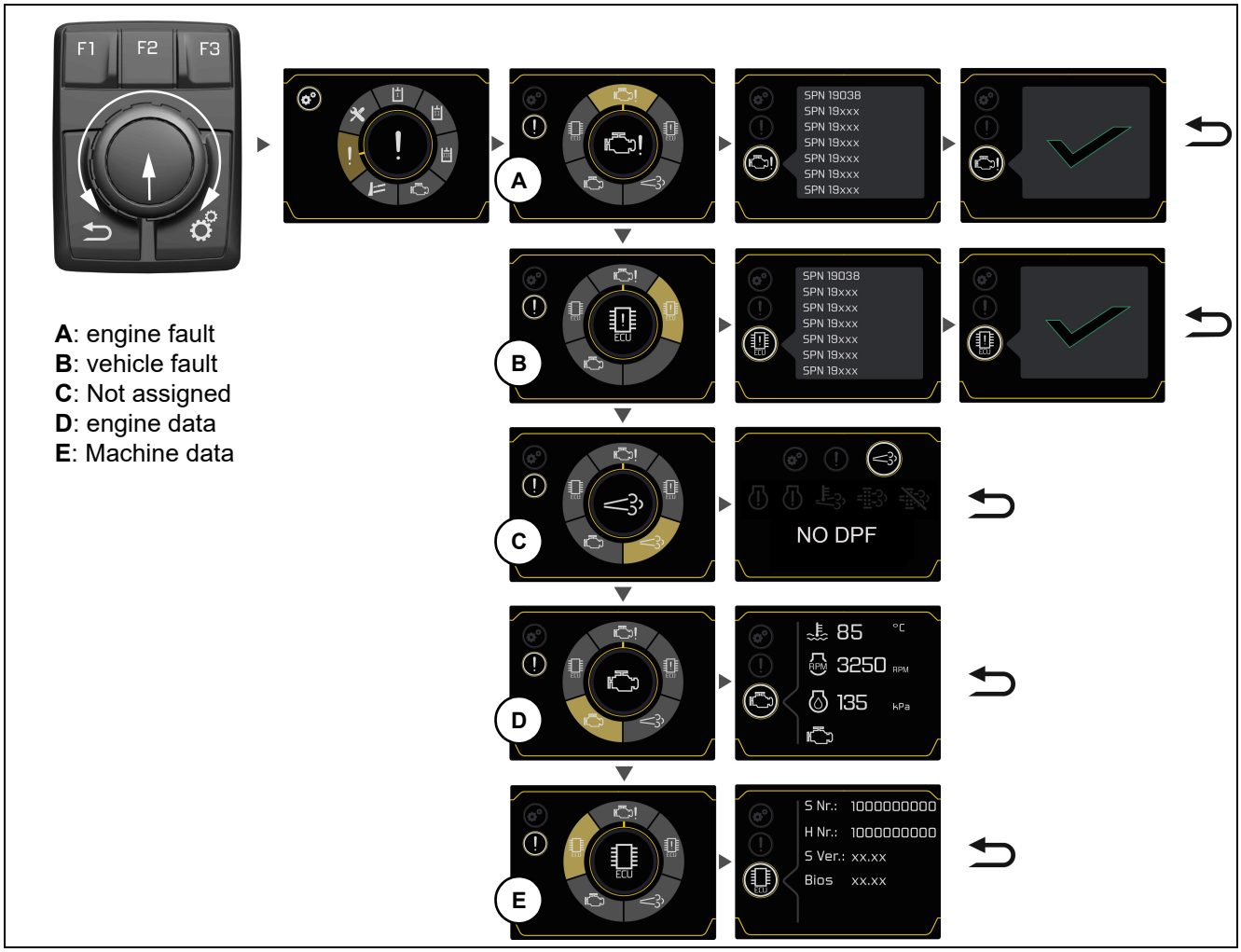
Machine travel and operation is possible in case of minor errors.

- Engine power is not reduced.
- Contact a Wacker Neuson service center and have the malfunction rectified.

Information

Any faults present appear in the multi-functional display for a few seconds after starting the engine.

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A: engine fault
B: vehicle fault
C: Not assigned
D: engine data
E: Machine data

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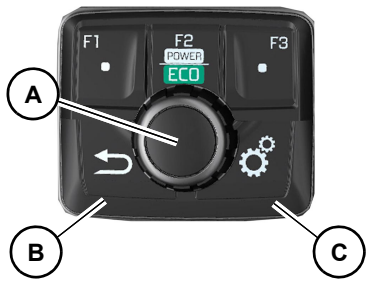


Fig. 329

Performing the adjustments

- Press push button **C** to call the settings.
- The settings are selected (turn) and confirmed (press) with adjustment button **A**.

Push button **B** (return) takes you back to the previous menu level.

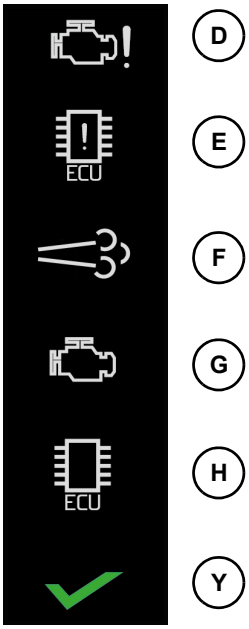


Fig. 330

Symbols

D: Engine fault

E: Vehicle fault

F: Not assigned

G: Engine data

H: Machine data

J: No faults

Push button **B** (return): back to previous menu.

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Notes:

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9 Technical data

9.1 Models and trade names

– see chapter " Model designations and trade names" on page 3-2

9.2 Engine

Engine[1]	ET35/EZ36	
Manufacturer	Yanmar	
Type	3TNV88-BPWN	3TNV88F-EPWN
		3TNV88F-EPWNV[2]
Design	Water-cooled 3-cylinder diesel engine	
Intake system	Naturally aspirated engine	
Fuel injection system	Direct	
Engine management	Mechanical	Electronic
Displacement	1642 cm³ (100.2 in^3)	
Nominal bore and stroke	88 x 90 mm (3.46 x 3.54 in)	
Rated output at rated speed	22.2 kW at 2400 min^{-1} (29.8 hp at 2400 rpm)	18.2 kW at 2400 min^{-1} (24.4 hp at 2400 rpm)
Engine power at preset maximum engine speed		
ECO	--	17.8 kW at 2400 min^{-1} (23.9 hp at 2400 rpm)
PWR	--	18.2 kW at 2400 min^{-1} (24.4 hp at 2400 rpm)
Max. torque	107 Nm at 1440 min^{-1} (78.9 ft.lbs at 1440 rpm)	87.8 Nm at 1400 min^{-1} (64.8 ft.lbs at 1400 rpm)
Max. engine speed without load	2500 min^{-1}(rpm)	2430 rpm
Max. engine speed without load (ECO)	--	2200 min^{-1}(rpm)
Max. engine speed without load (PWR)	2500 min^{-1}(rpm)	2430 rpm
Lower idling speed	1100 rpm	1200 min^{-1}(rpm)
Preheating system	Glow plugs	
Pre-heating time	15 s	Automatic
Exhaust Aftertreatment	--	
Exhaust values according to	EU Stage III A	EU Stage V[2] EPA Tier IV final

1. Output values can vary by +/- 5%.
2. Valid for diesel engines with production date starting 2019

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9.3 Traveling drive

	ET35/EZ36
Travel drive	Axial piston motor

9.4 Brake

– see chapter “5.3 Brakes” on page 5-6

9.5 Tracks

ET35

Type	Width mm (in)	Ground pressure kg/cm^2 (lbs/in^2)	Ground clearance mm (in)	Ground clearance/ VDS mm (in)
Rubber	300 (12)	0,40 (5.7)	251 (10)	224 (9)
Steel		0,41 (5.8)		

EZ36

Type	Width mm (in)	Ground pressure kg/cm^2 (lbs/in^2)	Ground clearance mm (in)	Ground clearance/ VDS mm (in)
Rubber	300 (12)	0,41 (5.8)	251 (10)	224 (9)
Steel		0,43 (6.1)		

9.6 Steering system

– see chapter “5.1 Steering system” on page 5-1

9.7 Operating hydraulics

	ET35/EZ36
Max. operating pressure	240 ±5 bar (3481 ±72 psi)
Hydraulic oil reservoir	61.5 liter (16.25 gal)
Output (3TNV88)	120 l/min (32 gal/min)
Output (3TNV88F)	117 l/min (31 gal/min)
Filter	Return filter
Swivel range of upper carriage	360°
Rotation speed of upper carriage	9.5 rpm

Maximum speed

	ET35/EZ36
Speed range 1	2.7 km/h (1.7 mph)
Speed range 2	4.8 km/h (3 mph)

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9.8 Electrical system

WARNING

Fire hazard in case of incorrect handling of electric components!

Can cause serious injury or death.

- ► Use only specified fuses.
- ► Do not repair or bypass fuses.
- ► If a replaced fuse is blown again directly, do not put the vehicle into operation and contact a Wacker Neuson service center.

NOTICE

Explosion hazard in case of incorrect handling of fuses.

- ► Use only specified fuses.
- ► Do not repair or bypass fuses.
- ► If a replaced fuse is blown again directly, do not put the vehicle into operation and contact a Wacker Neuson service center.

Electrical components

	ET35/EZ36
Alternator	12 V/55 A
Starter	12 V/1.7 kW (2.3 hp)
Battery (according to DIN EN 50342, DIN IEC 60095-2)	12 V/70 Ah

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Main fuse box

The main fuse box **A** is located on the left in the engine compartment.

1. Opening:

1. Stop and park the vehicle. Stop the engine
   – *see chapter “ Parking the machine” on page 5-12*.
2. Open the engine cover.
3. Loosen screw **B** and remove the cover.

Closing:

1. Install the cover and tighten screw **B**.

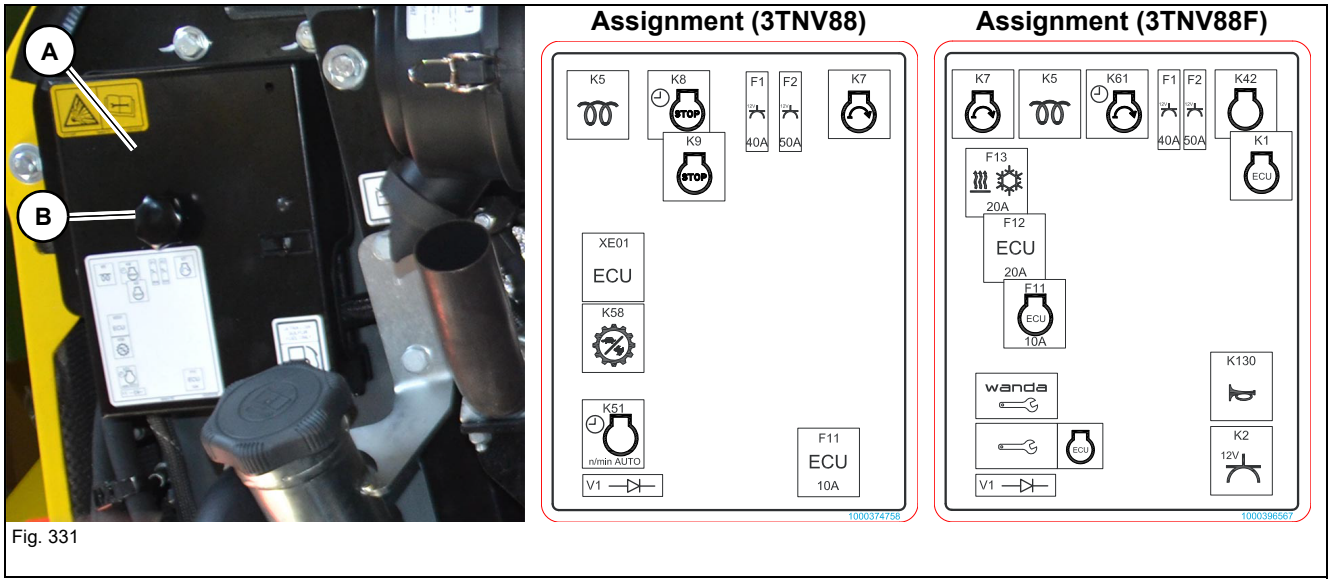


Fig. 331

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Cabin fuse box

The cabin fuse box is located on the left of the operator seat.

Opening:

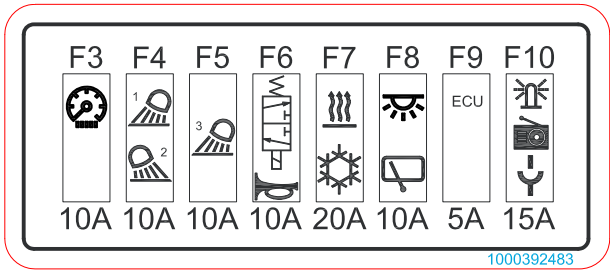
1. Stop and park the vehicle. Stop the engine
   – see chapter “ Preparing lubrication” on page 7-7.
2. Remove the cover **C**.

Closing:

1. Install the cover **C**.



Assignment (3TNV88)



Assignment (3TNV88F)

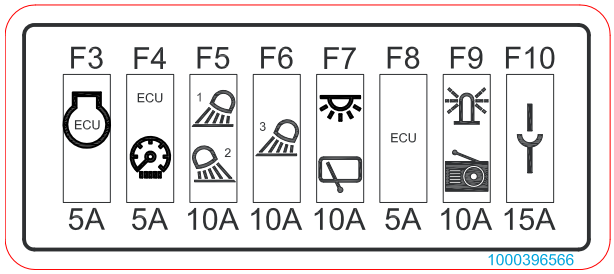


Fig. 332

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Fuse	Ampere	Relays	3TNV88
F001	40	K005, K007, K009	Pre-heat, starting relay, cut-off solenoid relay
F002	50	--	Ignition lock
F003	10	K008	Cut-off solenoid time lag relay, flow pump, indicating instrument
F004	10	--	Boom light, rear roof light
F005	10	--	Front roof lights
F006	10	K058	Speed range 2, valves, horn, proportional auxiliary hydraulics (AUXI), 3rd control circuit proportional (AUX II)
F007	20	K051	Heating, air conditioning, driving signal, automatic speed control time lag relay
F008	10	--	Interior light, wiper
F009	5	--	Machine control unit
F010	15	--	12 V connection, rotating beacon, radio
F011	10	--	Machine control unit (VDS/HSWS)
Fuse	**Ampere**	**Relays**	**3TNV88F**
F001	40	K005, K007	Pre-heating, starting relay
F002	50	--	Ignition lock
F003	5	K042, K061	Relay (engine), flow pump, start lock switching relay
F004	5	--	Control elements, display, drive signal
F005	10	--	Boom light, rear roof light
F006	10	--	Front roof lights
F007	10	K130	Horn, interior light, window wiper
F008	5	--	Machine control unit
F009	10	--	Cigarette lighter, rotating beacon, radio
F010	15	--	12 V connection
F011	10	K001	Engine control unit, main relay (engine)
F012	20	--	Machine control unit
F013	20	--	Heating, air conditioning
V1	--	--	Diode
	--	--	only for authorized service center

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Illuminants

	ET35/EZ36	
Boom light	Halogen lamp	12 V/55 W H3
	LED[1]	--
Front roof lights	Halogen lamp	12 V/55 W H3
Front/rear roof lights	LED[1]	--
Interior light	Festoon lamp	12V/5W
Rotating beacon	LED[1]	--

1. LED bulbs cannot be replaced.

Powertilt (option)

Type	ET35/EZ36
Swiveling range	about 180°

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9.9 Tightening torques

General tightening torques

Property class	8.8	10.9	12.9	8.8	10.9
Screw dimensions	Screws according to DIN 912, DIN 931, DIN 933, etc.			Screws according to DIN 7984	
	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)
M5	5,5 (4)	8 (6)	10 (7)	5 (4)	7 (5)
M6	10 (7)	14 (10)	17 (13)	8,5 (6)	12 (9)
M8	25 (18)	35 (26)	42 (31)	20 (15)	30 (22)
M10	45 (33)	65 (48)	80 (59)	40 (30)	59 (44)
M12	87 (64)	110 (81)	147 (108)	69 (51)	100 (74)
M14	135 (100)	180 (133)	230 (170)	110 (81)	160 (118)
M16	210 (155)	275 (203)	350 (258)	170 (125)	250 (184)
M18	280 (207)	410 (302)	480 (354)	245 (181)	345 (254)
M20	410 (302)	570 (420)	690 (509)	340 (251)	490 (361)
M22	550 (406)	780 (575)	930 (686)	460 (339)	660 (487)
M24	710 (524)	1000 (738)	1190 (878)	590 (435)	840 (620)
M27	1040 (767)	1480 (1092)	1770 (1305)	870 (642)	1250 (922)
M30	1420 (1047)	2010 (1482)	2400 (1770)	1200 (885)	1700 (1254)

Tightening torques/fine-pitch thread					
Property class	8.8	10.9	12.9	8.8	10.9
Screw dimensions	Screws according to DIN 912, DIN 931, DIN 933, etc.			Screws according to DIN 7984	
	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)	Nm (ft.lbs.)
M8X1.0	25 (18)	37 (28)	43 (32)	22 (16)	32 (24)
M10X1.0	50 (37)	75 (55)	88 (65)	43 (32)	65 (48)
M10X1.25	49 (36)	71 (52)	83 (61)	42 (31)	62 (46)
M12X1.25	87 (64)	130 (96)	150 (111)	75 (55)	110 (81)
M12X1.5	83 (61)	125 (92)	145 (107)	72 (53)	105 (77)
M14X1.5	135 (100)	200 (148)	235 (173)	120 (89)	175 (129)
M16X1.5	210 (155)	310 (229)	360 (266)	180 (133)	265 (195)
M18X1.5	315 (232)	450 (332)	530 (391)	270 (199)	385 (284)
M20X1.5	440 (325)	630 (465)	730 (538)	375 (277)	530 (391)
M22X1.5	590 (435)	840 (620)	980 (723)	500 (369)	710 (524)
M24X2.0	740 (546)	1070 (789)	1250 (922)	630 (465)	900 (664)
M27X2.0	1100 (811)	1550 (1143)	1800 (1328)	920 (679)	1300 (959)
M30X2.0	1500 (1106)	2150 (1586)	2500 (1844)	1300 (959)	1850 (1364)

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9.10 Coolant

Compound table

Outside temperature[1]	Distilled water	Coolant[2]
Up to °C (°F)	% by volume	% by volume
-30 (-22)	50	50

1. Use the 1:1 concentration for warm outside temperatures, too, to ensure protection against corrosion, cavitation, and deposits.
2. Do not mix the coolant with other coolants.

9.11 Noise emissions

	ET35/EZ36 (3TNV88)	ET35/EZ36 (3TNV88F)[1]
Sound power level (measured) LwA[2]	95 dB (A)	94 dB (A)
Sound power level (guaranteed) LwA[1]	95 dB (A)	94 dB (A)

1. Valid for 3TNV88F (EU)
2. According to ISO 6395 (EC Directives 2000/14/EC and 2005/88/EC)

Information

Measurements performed on asphalted surface.

9.12 Vibrations

Vibrations[1]	
Effective acceleration value for the upper extremities of the body (hand-arm vibration)	< Trigger value < 2.5 m/s^2
Effective acceleration value for the body (whole-body vibration)	< 0.5 m/s^2

1. Uncertainty of measurement as per DIN EN 474-1:2014-03

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9.13 Weights

ET35 canopy	Transport weight[1] kg (lbs)	Operating weight[2] kg (lbs)
Short stick, rubber track	3364 (7415)	3553 (7834)
EZ36 canopy	**Transport weight[1] kg (lbs)**	**Operating weight[2] kg (lbs)**
Short stick, rubber track	3529 (7779)	3718 (8197)

1. Transport weight: basic vehicle (one-piece boom, short stick, rubber tracks) + 10% fuel tank capacity
2. Operating weight: basic machine + full fuel tank + backhoe bucket (500 mm/20 in) + user (75 kg/165 lbs).

Information

Weight indications can vary by +/- 2%.

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Determining the loading weight

The basis for calculating the loading weight is the shipping weight indicated on the vehicle nameplate. Add subsequently installed options and attachments (e.g. bucket, Easy Lock, breaker console) to the shipping weight. Add fuel depending on the tank capacity.

Option[1]	ET35 kg (lbs)	EZ36 kg (lbs)
VDS travel gear	233 (514)	260 (573)
Extra weight	153 (337)	153 (337)
Steel tracks 300 mm	122 (269)	122 (269)
Swiveling dozer blade	100 (220)	100 (220)
Cab	68 (151)	68 (151)
Hydraulic thumb	59 (130)	59 (130)
Air conditioning	52 (116)	52 (116)
Front Guard	33 (73)	33 (73)
Safe load indicator + load hook	21 (46)	21 (46)
Long stick	16 (36)	16 (36)
3rd control circuit with proportional controls	11 (25)	11 (25)
Preparing the Powertilt	11 (25)	11 (25)
Quickhitch-ready	10 (22)	10 (22)
Attachments	*– see chapter “ Technical data of attachments” on page 9-13*	
Full fuel tank	36 (79)	

1. The weight indications for options exclusively refer to Wacker Neuson original accessories.

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Fields of application and use of attachments

WARNING

Accident hazard due to unauthorized attachments!

If unauthorized attachments are used, the vehicle can tip over, which can lead to serious injury or death.

► Only use attachments released by Wacker Neuson.

NOTICE

Machine can be damaged due to unreleased attachments.

► Only use the attachments specified in the table.

Compare the weight of the attachment and its maximum payload with the indications in the relevant lift capacity table or load diagram. Never exceed the maximum payload stated in the lift capacity table or load diagram.

Information

Please refer to the Operator's Manual and maintenance manual of the attachment manufacturer for operating and maintenance instructions for attachments such as hammers, grabs, hydraulic quickhitches, etc.

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Technical data of attachments

The specified weights are exemplary and only serve as a guide. The actual weight may be lower or higher. In order to determine the actual weight, the attachment must be weighed.

Not all attachments are available for every vehicle.

There may be additional bucket widths that are not specified in this operator's manual.

Only use attachments released by Wacker Neuson. For more information, contact a Wacker Neuson sales partner.

Observe the national and regional regulations.

Vehicle class 3-5 tonnes		
Bucket	**Width mm (in)**	**Weight kg (lbs)**
Bucket	300 (12)	60-80 (135-180)
	400 (16)	65-110 (145-245)
	500 (20)	75-125 (170-280)
	600 (24)	85-160 (190-355)
	700 (28)	95-190 (210-420)
	800 (31)	105-190 (235-420)
Ditch cleaning bucket	1000 (39)	95-120 (210-235)
	1200 (47)	110-135 (245-300)
	1400 (55)	120-150 (235-335)
Offset bucket	850 (33)	145-170 (320-375)
	1000 (39)	150-180 (335-400)
	1200 (47)	155-190 (345-420)

Accessories of the vehicle class 3-5 tonnes	**Weight kg (lbs)**
Consoles (Easy Lock, Lehnhoff system, etc.)	30-60 (70-135)
Hydraulic hammer	150-260 (335-575)
Powertilt (consoles; with Easy Lock etc.)	70-150 (155-335)

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Excavator forces

ET35/EZ36	Easy Lock	High Power Bucket[1]
Max. tearout force (short stick)	19.2 kN (4316 lbf)	21.1 kN (4743 lbf)
Max. tearout force (long stick)	17.2 kN (3867 lbf)	18.7 kN (4204 lbf)
Max. breakout force (at bucket tooth)[2]	24.2 kN (5440 lbf)	31.7 kN (7126 lbf)
Max. breakout force (at bucket edge)[3]	25.8 kN (5800 lbf)	35 kN (7868 lbf)

1. Special backhoe bucket for high digging forces
2. According to DIN 24086
3. According to ISO 6015

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9.14 Lift capacity/load

Safety instructions lift capacity tables

Observe the values of the lift capacity tables in normal operation (for example excavating).

Observe the values of the load diagrams in lifting gear applications.

DANGER

Crushing hazard due to tipping over of vehicle!

The vehicle causes serious injury or death when it tips over.

- ► The weight of the attachment and load must be subtracted from the weight specified in the corresponding column in the table.
- ► Pay attention to the density of the load.
- ► Do not exceed the weights indicated in the lift capacity tables.

NOTICE

If the weight is exceeded, there is a risk of damage to property if the machine tips over.

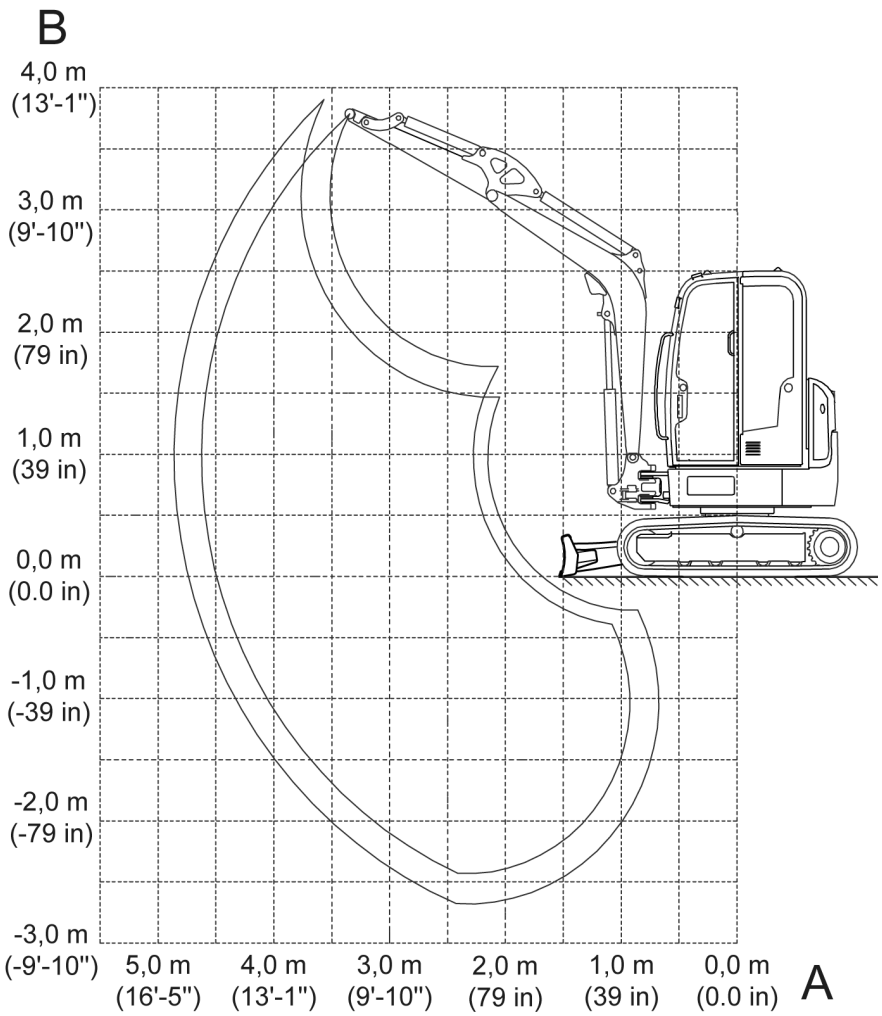
- ► Do not exceed the weights indicated in the load diagrams.

Information

The indications are only approximate values. Uneven ground or poor ground conditions affect vehicle stability. The operator must take these influences into account.

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Legend



Description	Explanation
A	Reach from live ring center
B	Load hook height
max	Authorized lift capacity with horizontal boom
I	Vehicle in travel direction, front dozer blade, dozer blade down, loss of dozer blade contact with ground
II	Vehicle 90° to travel direction, dozer blade up
III	Vehicle in travel direction, front dozer blade, dozer blade up, loss of front axle contact with ground
IV	Vehicle in travel direction, rear dozer blade, dozer blade up, loss of front axle contact with ground

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All table values are specified in kg (lbs), in horizontal position on firm and level ground without bucket or attachment (for example a hammer).

The vehicle’s lift capacity is restricted by the settings of the pressure limiting valves, the hydraulic output and the hydraulic system’s stabilizing features.

Neither 75% of the static tilt load nor 87% of the hydraulic lift capacity is exceeded.

Calculation basis according to ISO 10567

Setting pressure on boom cylinder:

ET35: 24,000 kPA (3481 psi)

EZ36: 24,000 kPA (3481 psi)

The lift capacity applies to vehicles under the following conditions:

- Lubricants and engine/vehicle fluids at the mandatory levels
- Full fuel tank
- Machine at operating temperature
- Operator weight 75 kg (165 lbs)

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Lift capacity tables ET35

01 Rubber track/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	738	738	738	738
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,627)	(1,627)	(1,627)	(1,627)
3 m	-	-	-	-	654	654	654	654	-	-	-	-	738	577	624	714
(9' - 10")	-	-	-	-	(1,443)	(1,443)	(1,443)	(1,443)	-	-	-	-	(1,626)	(1,272)	(1,376)	(1,574)
2 m	1065	1065	1065	1065	829	829	829	829	758	541	586	672	761	478	517	596
(6' - 7")	(2,348)	(2,348)	(2,348)	(2,348)	(1,828)	(1,828)	(1,828)	(1,828)	(1,672)	(1,193)	(1,291)	(1,482)	(1,677)	(1,054)	(1,140)	(1,314)
1 m	2041	1411	1582	1809	1108	787	859	985	851	522	566	653	794	444	481	557
(3' - 3")	(4,500)	(3,112)	(3,487)	(3,990)	(2,443)	(1,735)	(1,895)	(2,172)	(1,875)	(1,151)	(1,248)	(1,440)	(1,752)	(980)	(1,061)	(1,228)
0 m	2233	1363	1530	1758	1292	750	822	947	920	507	550	637	835	454	492	571
(0' - 0")	(4,923)	(3,005)	(3,374)	(3,877)	(2,848)	(1,654)	(1,812)	(2,089)	(2,028)	(1,117)	(1,213)	(1,404)	(1,841)	(1,001)	(1,086)	(1,259)
-1 m	2042	1369	1536	1764	1276	742	813	939	-	-	-	-	877	521	566	655
-(3' - 3")	(4,502)	(3,018)	(3,388)	(3,890)	(2,814)	(1,636)	(1,792)	(2,069)	-	-	-	-	(1,934)	(1,148)	(1,247)	(1,444)
-2 m	1510	1406	1510	1510	912	766	838	912	-	-	-	-	886	754	824	886
-(6' - 7")	(3,330)	(3,100)	(3,330)	(3,330)	(2,011)	(1,690)	(1,848)	(2,011)	-	-	-	-	(1,953)	(1,662)	(1,817)	(1,953)

02 Rubber track/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	588	588	588	588	-	-	-	-	669	669	669	669
(13' - 1")	-	-	-	-	(1,297)	(1,297)	(1,297)	(1,297)	-	-	-	-	(1,475)	(1,475)	(1,475)	(1,475)
3 m	-	-	-	-	721	721	721	721	650	549	594	650	672	514	556	639
(9' - 10")	-	-	-	-	(1,590)	(1,590)	(1,590)	(1,590)	(1,434)	(1,211)	(1,310)	(1,434)	(1,482)	(1,134)	(1,227)	(1,409)
2 m	-	-	-	-	726	726	726	726	689	539	583	670	697	433	469	543
(6' - 7")	-	-	-	-	(1,600)	(1,600)	(1,600)	(1,600)	(1,520)	(1,188)	(1,286)	(1,477)	(1,537)	(955)	(1,034)	(1,197)
1 m	1797	1435	1607	1797	1020	786	859	985	798	516	560	647	730	404	438	510
(3' - 3")	(3,963)	(3,164)	(3,544)	(3,963)	(2,250)	(1,734)	(1,894)	(2,171)	(1,759)	(1,138)	(1,236)	(1,427)	(1,609)	(891)	(967)	(1,124)
0 m	2206	1347	1515	1743	1245	741	813	938	891	496	540	627	769	411	446	519
(0' - 0")	(4,865)	(2,971)	(3,340)	(3,842)	(2,745)	(1,634)	(1,792)	(2,069)	(1,965)	(1,095)	(1,191)	(1,382)	(1,697)	(905)	(983)	(1,145)
-1 m	2115	1341	1508	1736	1283	726	797	922	881	490	534	621	813	462	503	585
-(3' - 3")	(4,663)	(2,958)	(3,326)	(3,829)	(2,830)	(1,600)	(1,757)	(2,034)	(1,943)	(1,081)	(1,177)	(1,369)	(1,792)	(1,020)	(1,109)	(1,290)
-2 m	1692	1371	1540	1692	1055	740	811	937	-	-	-	-	843	626	683	790
-(6' - 7")	(3,731)	(3,024)	(3,396)	(3,731)	(2,326)	(1,631)	(1,789)	(2,066)	-	-	-	-	(1,859)	(1,381)	(1,507)	(1,742)

03 Rubber track/additional weight/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	738	738	738	738
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,627)	(1,627)	(1,627)	(1,627)
3 m	-	-	-	-	654	654	654	654	-	-	-	-	738	646	697	738
(9' - 10")	-	-	-	-	(1,443)	(1,443)	(1,443)	(1,443)	-	-	-	-	(1,626)	(1,424)	(1,537)	(1,626)
2 m	1065	1065	1065	1065	829	829	829	829	758	607	656	742	761	538	581	659
(6' - 7")	(2,348)	(2,348)	(2,348)	(2,348)	(1,828)	(1,828)	(1,828)	(1,828)	(1,672)	(1,339)	(1,446)	(1,637)	(1,677)	(1,187)	(1,280)	(1,454)
1 m	2041	1582	1769	1996	1108	882	962	1087	851	588	636	723	794	502	542	618
(3' - 3")	(4,500)	(3,489)	(3,901)	(4,402)	(2,443)	(1,946)	(2,121)	(2,397)	(1,875)	(1,298)	(1,403)	(1,594)	(1,752)	(1,107)	(1,196)	(1,363)
0 m	2233	1534	1718	1945	1292	846	924	1049	920	573	620	707	835	514	556	634
(0' - 0")	(4,923)	(3,382)	(3,788)	(4,289)	(2,848)	(1,865)	(2,037)	(2,313)	(2,028)	(1,263)	(1,368)	(1,559)	(1,841)	(1,133)	(1,226)	(1,398)
-1 m	2042	1540	1724	1951	1276	837	915	1040	-	-	-	-	877	589	638	727
-(3' - 3")	(4,502)	(3,395)	(3,802)	(4,302)	(2,814)	(1,846)	(2,018)	(2,294)	-	-	-	-	(1,934)	(1,298)	(1,407)	(1,602)
-2 m	1510	1510	1510	1510	912	862	912	912	-	-	-	-	886	848	886	886
-(6' - 7")	(3,330)	(3,330)	(3,330)	(3,330)	(2,011)	(1,900)	(2,011)	(2,011)	-	-	-	-	(1,953)	(1,869)	(1,953)	(1,953)

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04 Rubber track/additional weight/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	588	588	588	588	-	-	-	-	669	669	669	669
(13' - 1")	-	-	-	-	(1,297)	(1,297)	(1,297)	(1,297)	-	-	-	-	(1,475)	(1,475)	(1,475)	(1,475)
3 m	-	-	-	-	721	721	721	721	650	615	650	650	672	578	623	672
(9' - 10")	-	-	-	-	(1,590)	(1,590)	(1,590)	(1,590)	(1,434)	(1,357)	(1,434)	(1,434)	(1,482)	(1,273)	(1,375)	(1,482)
2 m	-	-	-	-	726	726	726	726	689	605	654	689	697	489	529	602
(6' - 7")	-	-	-	-	(1,600)	(1,600)	(1,600)	(1,600)	(1,520)	(1,334)	(1,441)	(1,520)	(1,537)	(1,079)	(1,166)	(1,328)
1 m	1797	1606	1795	1797	1020	882	961	1020	798	583	631	717	730	459	496	567
(3' - 3")	(3,963)	(3,540)	(3,958)	(3,963)	(2,250)	(1,944)	(2,120)	(2,250)	(1,759)	(1,284)	(1,391)	(1,581)	(1,609)	(1,011)	(1,094)	(1,250)
0 m	2206	1518	1702	1929	1245	837	915	1040	891	563	610	697	769	467	505	579
(0' - 0")	(4,865)	(3,348)	(3,754)	(4,254)	(2,745)	(1,845)	(2,018)	(2,294)	(1,965)	(1,241)	(1,346)	(1,537)	(1,697)	(1,029)	(1,114)	(1,276)
-1 m	2115	1512	1696	1923	1283	821	899	1024	881	557	604	691	813	525	569	651
-(3' - 3")	(4,663)	(3,335)	(3,740)	(4,241)	(2,830)	(1,811)	(1,982)	(2,258)	(1,943)	(1,227)	(1,332)	(1,523)	(1,792)	(1,158)	(1,255)	(1,435)
-2 m	1692	1542	1692	1692	1055	835	914	1039	-	-	-	-	843	707	770	843
-(6' - 7")	(3,731)	(3,400)	(3,731)	(3,731)	(2,326)	(1,842)	(2,014)	(2,291)	-	-	-	-	(1,859)	(1,560)	(1,698)	(1,859)

05 Steel track/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	738	738	738	738
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,627)	(1,627)	(1,627)	(1,627)
3 m	-	-	-	-	654	654	654	654	-	-	-	-	738	598	648	738
(9' - 10")	-	-	-	-	(1,443)	(1,443)	(1,443)	(1,443)	-	-	-	-	(1,626)	(1,319)	(1,428)	(1,626)
2 m	1065	1065	1065	1065	829	829	829	829	758	562	608	695	761	496	538	616
(6' - 7")	(2,348)	(2,348)	(2,348)	(2,348)	(1,828)	(1,828)	(1,828)	(1,828)	(1,672)	(1,238)	(1,341)	(1,532)	(1,677)	(1,094)	(1,185)	(1,359)
1 m	2041	1464	1643	1870	1108	816	893	1018	851	543	589	676	794	462	501	577
(3' - 3")	(4,500)	(3,228)	(3,622)	(4,123)	(2,443)	(1,800)	(1,968)	(2,245)	(1,875)	(1,196)	(1,299)	(1,490)	(1,752)	(1,019)	(1,105)	(1,272)
0 m	2233	1415	1591	1819	1292	780	855	980	920	527	573	660	835	472	513	591
(0' - 0")	(4,923)	(3,121)	(3,509)	(4,010)	(2,848)	(1,719)	(1,885)	(2,162)	(2,028)	(1,162)	(1,263)	(1,454)	(1,841)	(1,042)	(1,131)	(1,304)
-1 m	2042	1421	1597	1825	1276	771	846	972	-	-	-	-	877	542	589	678
-(3' - 3")	(4,502)	(3,134)	(3,522)	(4,024)	(2,814)	(1,700)	(1,866)	(2,142)	-	-	-	-	(1,934)	(1,194)	(1,299)	(1,495)
-2 m	1510	1458	1510	1510	912	796	872	912	-	-	-	-	886	783	857	886
-(6' - 7")	(3,330)	(3,215)	(3,330)	(3,330)	(2,011)	(1,755)	(1,922)	(2,011)	-	-	-	-	(1,953)	(1,726)	(1,889)	(1,953)

06 Steel track/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	588	588	588	588	-	-	-	-	669	669	669	669
(13' - 1")	-	-	-	-	(1,297)	(1,297)	(1,297)	(1,297)	-	-	-	-	(1,475)	(1,475)	(1,475)	(1,475)
3 m	-	-	-	-	721	721	721	721	650	570	617	650	672	534	578	661
(9' - 10")	-	-	-	-	(1,590)	(1,590)	(1,590)	(1,590)	(1,434)	(1,256)	(1,360)	(1,434)	(1,482)	(1,177)	(1,275)	(1,457)
2 m	-	-	-	-	726	726	726	726	689	559	606	689	697	450	488	562
(6' - 7")	-	-	-	-	(1,600)	(1,600)	(1,600)	(1,600)	(1,520)	(1,233)	(1,337)	(1,520)	(1,537)	(993)	(1,077)	(1,239)
1 m	1797	1487	1668	1797	1020	816	892	1018	798	537	583	670	730	421	457	528
(3' - 3")	(3,963)	(3,279)	(3,678)	(3,963)	(2,250)	(1,798)	(1,968)	(2,244)	(1,759)	(1,183)	(1,286)	(1,477)	(1,609)	(928)	(1,008)	(1,165)
0 m	2206	1400	1576	1803	1245	771	846	971	891	517	563	650	769	428	465	539
(0' - 0")	(4,865)	(3,087)	(3,474)	(3,976)	(2,745)	(1,699)	(1,865)	(2,142)	(1,965)	(1,140)	(1,241)	(1,432)	(1,697)	(944)	(1,026)	(1,188)
-1 m	2115	1394	1569	1797	1283	755	830	955	881	511	557	643	813	482	525	606
-(3' - 3")	(4,663)	(3,074)	(3,461)	(3,962)	(2,830)	(1,665)	(1,830)	(2,107)	(1,943)	(1,126)	(1,228)	(1,419)	(1,792)	(1,062)	(1,157)	(1,337)
-2 m	1692	1424	1601	1692	1055	769	845	970	-	-	-	-	843	651	712	818
-(6' - 7")	(3,731)	(3,139)	(3,530)	(3,731)	(2,326)	(1,696)	(1,862)	(2,139)	-	-	-	-	(1,859)	(1,436)	(1,569)	(1,803)

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07 Steel track/additional weight/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	738	738	738	738
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,627)	(1,627)	(1,627)	(1,627)
3 m	-	-	-	-	654	654	654	654	-	-	-	-	738	667	721	738
(9' - 10")	-	-	-	-	(1,443)	(1,443)	(1,443)	(1,443)	-	-	-	-	(1,626)	(1,471)	(1,589)	(1,626)
2 m	1065	1065	1065	1065	829	829	829	829	758	628	679	758	761	557	601	680
(6' - 7")	(2,348)	(2,348)	(2,348)	(2,348)	(1,828)	(1,828)	(1,828)	(1,828)	(1,672)	(1,384)	(1,496)	(1,672)	(1,677)	(1,227)	(1,326)	(1,499)
1 m	2041	1635	1830	2041	1108	912	995	1108	851	609	659	746	794	520	562	638
(3' - 3")	(4,500)	(3,605)	(4,036)	(4,500)	(2,443)	(2,010)	(2,194)	(2,443)	(1,875)	(1,342)	(1,454)	(1,644)	(1,752)	(1,147)	(1,240)	(1,406)
0 m	2233	1586	1779	2005	1292	875	957	1082	920	593	643	730	835	532	576	655
(0' - 0")	(4,923)	(3,498)	(3,923)	(4,422)	(2,848)	(1,930)	(2,111)	(2,386)	(2,028)	(1,308)	(1,418)	(1,609)	(1,841)	(1,174)	(1,271)	(1,443)
-1 m	2042	1592	1785	2012	1276	867	948	1073	-	-	-	-	877	610	661	750
-(3' - 3")	(4,502)	(3,510)	(3,936)	(4,436)	(2,814)	(1,911)	(2,091)	(2,367)	-	-	-	-	(1,934)	(1,344)	(1,458)	(1,654)
-2 m	1510	1510	1510	1510	912	891	912	912	-	-	-	-	886	876	886	886
-(6' - 7")	(3,330)	(3,330)	(3,330)	(3,330)	(2,011)	(1,965)	(2,011)	(2,011)	-	-	-	-	(1,953)	(1,933)	(1,953)	(1,953)

08 Steel track/additional weight/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	588	588	588	588	-	-	-	-	669	669	669	669
(13' - 1")	-	-	-	-	(1,297)	(1,297)	(1,297)	(1,297)	-	-	-	-	(1,475)	(1,475)	(1,475)	(1,475)
3 m	-	-	-	-	721	721	721	721	650	636	650	650	672	597	645	672
(9' - 10")	-	-	-	-	(1,590)	(1,590)	(1,590)	(1,590)	(1,434)	(1,402)	(1,434)	(1,434)	(1,482)	(1,316)	(1,423)	(1,482)
2 m	-	-	-	-	726	726	726	726	689	625	676	689	697	507	548	621
(6' - 7")	-	-	-	-	(1,600)	(1,600)	(1,600)	(1,600)	(1,520)	(1,379)	(1,492)	(1,520)	(1,537)	(1,117)	(1,208)	(1,370)
1 m	1797	1658	1797	1797	1020	911	995	1020	798	603	654	740	730	475	515	586
(3' - 3")	(3,963)	(3,656)	(3,963)	(3,963)	(2,250)	(2,009)	(2,193)	(2,250)	(1,759)	(1,329)	(1,441)	(1,631)	(1,609)	(1,048)	(1,135)	(1,291)
0 m	2206	1571	1763	1990	1245	866	948	1073	891	583	633	720	769	484	525	598
(0' - 0")	(4,865)	(3,463)	(3,888)	(4,388)	(2,745)	(1,910)	(2,091)	(2,367)	(1,965)	(1,286)	(1,396)	(1,587)	(1,697)	(1,067)	(1,157)	(1,318)
-1 m	2115	1565	1757	1984	1283	850	932	1057	881	577	627	713	813	544	591	672
-(3' - 3")	(4,663)	(3,450)	(3,875)	(4,374)	(2,830)	(1,875)	(2,055)	(2,331)	(1,943)	(1,272)	(1,383)	(1,573)	(1,792)	(1,200)	(1,303)	(1,483)
-2 m	1692	1595	1692	1692	1055	865	947	1055	-	-	-	-	843	732	798	843
-(6' - 7")	(3,731)	(3,516)	(3,731)	(3,731)	(2,326)	(1,906)	(2,088)	(2,326)	-	-	-	-	(1,859)	(1,614)	(1,760)	(1,859)

09 Rubber track/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	698	698	698	698	-	-	-	-	713	713	713	713
(13' - 1")	-	-	-	-	(1,540)	(1,540)	(1,540)	(1,540)	-	-	-	-	(1,572)	(1,572)	(1,572)	(1,572)
3 m	-	-	-	-	640	640	640	640	-	-	-	-	716	585	641	716
(9' - 10")	-	-	-	-	(1,412)	(1,412)	(1,412)	(1,412)	-	-	-	-	(1,578)	(1,289)	(1,414)	(1,578)
2 m	1106	1106	1106	1106	823	823	823	823	740	559	614	694	739	491	539	612
(6' - 7")	(2,439)	(2,439)	(2,439)	(2,439)	(1,815)	(1,815)	(1,815)	(1,815)	(1,632)	(1,233)	(1,354)	(1,531)	(1,630)	(1,082)	(1,188)	(1,349)
1 m	2022	1452	1651	1863	1093	811	899	1015	831	540	594	675	772	460	506	577
(3' - 3")	(4,459)	(3,202)	(3,641)	(4,107)	(2,410)	(1,788)	(1,982)	(2,239)	(1,833)	(1,191)	(1,310)	(1,488)	(1,703)	(1,015)	(1,117)	(1,272)
0 m	2156	1412	1609	1821	1151	776	863	980	892	525	579	660	812	474	523	596
(0' - 0")	(4,755)	(3,114)	(3,548)	(4,014)	(2,538)	(1,712)	(1,903)	(2,161)	(1,967)	(1,158)	(1,277)	(1,455)	(1,791)	(1,046)	(1,152)	(1,314)
-1 m	1951	1420	1618	1829	1224	770	857	973	-	-	-	-	852	550	607	691
-(3' - 3")	(4,302)	(3,132)	(3,567)	(4,033)	(2,700)	(1,698)	(1,889)	(2,146)	-	-	-	-	(1,879)	(1,213)	(1,339)	(1,524)
-2 m	1395	1395	1395	1395	-	-	-	-	-	-	-	-	853	823	853	853
-(6' - 7")	(3,075)	(3,075)	(3,075)	(3,075)	-	-	-	-	-	-	-	-	(1,880)	(1,816)	(1,880)	(1,880)

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10 Rubber track/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	555	555	555	555	-	-	-	-	642	642	642	642
(13' - 1")	-	-	-	-	(1,224)	(1,224)	(1,224)	(1,224)	-	-	-	-	(1,415)	(1,415)	(1,415)	(1,415)
3 m	-	-	-	-	537	537	537	537	628	569	624	628	653	522	573	649
(9' - 10")	-	-	-	-	(1,185)	(1,185)	(1,185)	(1,185)	(1,384)	(1,254)	(1,376)	(1,384)	(1,439)	(1,152)	(1,265)	(1,432)
2 m	-	-	-	-	724	724	724	724	675	556	611	675	677	446	490	558
(6' - 7")	-	-	-	-	(1,596)	(1,596)	(1,596)	(1,596)	(1,488)	(1,227)	(1,348)	(1,488)	(1,493)	(983)	(1,080)	(1,231)
1 m	1804	1472	1673	1804	1011	809	898	1011	782	534	588	669	710	419	462	528
(3' - 3")	(3,977)	(3,245)	(3,689)	(3,977)	(2,229)	(1,785)	(1,979)	(2,229)	(1,723)	(1,177)	(1,297)	(1,475)	(1,565)	(924)	(1,018)	(1,164)
0 m	2142	1395	1592	1803	1216	767	854	970	867	515	569	649	748	429	474	542
(0' - 0")	(4,723)	(3,076)	(3,510)	(3,976)	(2,681)	(1,691)	(1,882)	(2,140)	(1,912)	(1,135)	(1,254)	(1,432)	(1,650)	(947)	(1,045)	(1,196)
-1 m	2028	1392	1589	1801	1237	753	840	957	843	510	564	645	790	488	539	617
-(3' - 3")	(4,472)	(3,070)	(3,504)	(3,970)	(2,727)	(1,661)	(1,852)	(2,109)	(1,859)	(1,125)	(1,244)	(1,422)	(1,742)	(1,076)	(1,189)	(1,359)
-2 m	1585	1425	1585	1585	982	771	858	974	-	-	-	-	816	676	750	816
-(6' - 7")	(3,495)	(3,143)	(3,495)	(3,495)	(2,166)	(1,700)	(1,891)	(2,149)	-	-	-	-	(1,800)	(1,491)	(1,653)	(1,800)

11 Rubber track/additional weight/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	698	698	698	698	-	-	-	-	713	713	713	713
(13' - 1")	-	-	-	-	(1,540)	(1,540)	(1,540)	(1,540)	-	-	-	-	(1,572)	(1,572)	(1,572)	(1,572)
3 m	-	-	-	-	640	640	640	640	-	-	-	-	716	652	713	716
(9' - 10")	-	-	-	-	(1,412)	(1,412)	(1,412)	(1,412)	-	-	-	-	(1,578)	(1,438)	(1,572)	(1,578)
2 m	1106	1106	1106	1106	823	823	823	823	740	625	684	740	739	551	602	675
(6' - 7")	(2,439)	(2,439)	(2,439)	(2,439)	(1,815)	(1,815)	(1,815)	(1,815)	(1,632)	(1,379)	(1,509)	(1,632)	(1,630)	(1,214)	(1,328)	(1,488)
1 m	2022	1623	1839	2022	1093	906	1001	1093	831	606	665	745	772	518	568	638
(3' - 3")	(4,459)	(3,578)	(4,055)	(4,459)	(2,410)	(1,998)	(2,207)	(2,410)	(1,833)	(1,337)	(1,465)	(1,642)	(1,703)	(1,143)	(1,252)	(1,407)
0 m	2156	1583	1797	2007	1151	872	965	1082	892	591	649	730	812	535	587	660
(0' - 0")	(4,755)	(3,490)	(3,962)	(4,426)	(2,538)	(1,923)	(2,129)	(2,385)	(1,967)	(1,304)	(1,432)	(1,609)	(1,791)	(1,179)	(1,293)	(1,455)
-1 m	1951	1591	1805	1951	1224	866	959	1075	-	-	-	-	852	619	681	764
-(3' - 3")	(4,302)	(3,508)	(3,981)	(4,302)	(2,700)	(1,909)	(2,114)	(2,371)	-	-	-	-	(1,879)	(1,366)	(1,501)	(1,686)
-2 m	1395	1395	1395	1395	-	-	-	-	-	-	-	-	853	853	853	853
-(6' - 7")	(3,075)	(3,075)	(3,075)	(3,075)	-	-	-	-	-	-	-	-	(1,880)	(1,880)	(1,880)	(1,880)

12 Rubber track/additional weight/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	555	555	555	555	-	-	-	-	642	642	642	642
(13' - 1")	-	-	-	-	(1,224)	(1,224)	(1,224)	(1,224)	-	-	-	-	(1,415)	(1,415)	(1,415)	(1,415)
3 m	-	-	-	-	537	537	537	537	628	628	628	628	653	585	640	653
(9' - 10")	-	-	-	-	(1,185)	(1,185)	(1,185)	(1,185)	(1,384)	(1,384)	(1,384)	(1,384)	(1,439)	(1,290)	(1,410)	(1,439)
2 m	-	-	-	-	724	724	724	724	675	623	675	675	677	502	549	617
(6' - 7")	-	-	-	-	(1,596)	(1,596)	(1,596)	(1,596)	(1,488)	(1,373)	(1,488)	(1,488)	(1,493)	(1,106)	(1,211)	(1,361)
1 m	1804	1642	1804	1804	1011	905	1000	1011	782	600	659	739	710	474	519	585
(3' - 3")	(3,977)	(3,621)	(3,977)	(3,977)	(2,229)	(1,995)	(2,205)	(2,229)	(1,723)	(1,323)	(1,452)	(1,629)	(1,565)	(1,045)	(1,145)	(1,291)
0 m	2142	1566	1780	1990	1216	862	956	1072	867	581	639	719	748	486	533	602
(0' - 0")	(4,723)	(3,453)	(3,924)	(4,388)	(2,681)	(1,901)	(2,108)	(2,364)	(1,912)	(1,281)	(1,409)	(1,586)	(1,650)	(1,071)	(1,176)	(1,327)
-1 m	2028	1563	1777	1987	1237	849	942	1059	843	576	634	715	790	552	607	684
-(3' - 3")	(4,472)	(3,447)	(3,918)	(4,382)	(2,727)	(1,872)	(2,078)	(2,334)	(1,859)	(1,271)	(1,399)	(1,576)	(1,742)	(1,216)	(1,338)	(1,507)
-2 m	1585	1585	1585	1585	982	866	960	982	-	-	-	-	816	760	816	816
-(6' - 7")	(3,495)	(3,495)	(3,495)	(3,495)	(2,166)	(1,910)	(2,117)	(2,166)	-	-	-	-	(1,800)	(1,676)	(1,800)	(1,800)

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13 Steel track/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	698	698	698	698	-	-	-	-	713	713	713	713
(13' - 1")	-	-	-	-	(1,540)	(1,540)	(1,540)	(1,540)	-	-	-	-	(1,572)	(1,572)	(1,572)	(1,572)
3 m	-	-	-	-	640	640	640	640	-	-	-	-	716	605	665	716
(9' - 10")	-	-	-	-	(1,412)	(1,412)	(1,412)	(1,412)	-	-	-	-	(1,578)	(1,335)	(1,465)	(1,578)
2 m	1106	1106	1106	1106	823	823	823	823	740	580	637	717	739	509	559	632
(6' - 7")	(2,439)	(2,439)	(2,439)	(2,439)	(1,815)	(1,815)	(1,815)	(1,815)	(1,632)	(1,278)	(1,404)	(1,581)	(1,630)	(1,123)	(1,234)	(1,394)
1 m	2022	1504	1712	1923	1093	840	932	1048	831	560	617	698	772	478	526	597
(3' - 3")	(4,459)	(3,317)	(3,776)	(4,241)	(2,410)	(1,853)	(2,055)	(2,312)	(1,833)	(1,235)	(1,361)	(1,538)	(1,703)	(1,055)	(1,161)	(1,316)
0 m	2156	1465	1670	1881	1151	806	896	1013	892	545	602	682	812	493	543	617
(0' - 0")	(4,755)	(3,230)	(3,683)	(4,148)	(2,538)	(1,777)	(1,977)	(2,233)	(1,967)	(1,203)	(1,327)	(1,505)	(1,791)	(1,087)	(1,198)	(1,360)
-1 m	1951	1473	1679	1890	1224	799	890	1006	-	-	-	-	852	572	631	715
-(3' - 3")	(4,302)	(3,247)	(3,701)	(4,167)	(2,700)	(1,763)	(1,962)	(2,219)	-	-	-	-	(1,879)	(1,260)	(1,392)	(1,577)
-2 m	1395	1395	1395	1395	-	-	-	-	-	-	-	-	853	853	853	853
-(6' - 7")	(3,075)	(3,075)	(3,075)	(3,075)	-	-	-	-	-	-	-	-	(1,880)	(1,880)	(1,880)	(1,880)

14 Steel track/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	555	555	555	555	-	-	-	-	642	642	642	642
(13' - 1")	-	-	-	-	(1,224)	(1,224)	(1,224)	(1,224)	-	-	-	-	(1,415)	(1,415)	(1,415)	(1,415)
3 m	-	-	-	-	537	537	537	537	628	589	628	628	653	542	595	653
(9' - 10")	-	-	-	-	(1,185)	(1,185)	(1,185)	(1,185)	(1,384)	(1,299)	(1,384)	(1,384)	(1,439)	(1,194)	(1,312)	(1,439)
2 m	-	-	-	-	724	724	724	724	675	577	634	675	677	463	509	577
(6' - 7")	-	-	-	-	(1,596)	(1,596)	(1,596)	(1,596)	(1,488)	(1,272)	(1,399)	(1,488)	(1,493)	(1,021)	(1,123)	(1,273)
1 m	1804	1524	1734	1804	1011	839	931	1011	782	554	611	692	710	436	481	547
(3' - 3")	(3,977)	(3,360)	(3,823)	(3,977)	(2,229)	(1,850)	(2,053)	(2,229)	(1,723)	(1,222)	(1,347)	(1,525)	(1,565)	(961)	(1,060)	(1,205)
0 m	2142	1447	1653	1864	1216	796	887	1003	867	535	592	672	748	447	493	562
(0' - 0")	(4,723)	(3,192)	(3,644)	(4,110)	(2,681)	(1,755)	(1,956)	(2,212)	(1,912)	(1,180)	(1,304)	(1,482)	(1,650)	(985)	(1,087)	(1,238)
-1 m	2028	1445	1650	1861	1237	783	873	990	843	531	587	667	790	508	561	638
-(3' - 3")	(4,472)	(3,186)	(3,638)	(4,104)	(2,727)	(1,726)	(1,925)	(2,182)	(1,859)	(1,170)	(1,294)	(1,472)	(1,742)	(1,119)	(1,238)	(1,407)
-2 m	1585	1478	1585	1585	982	800	891	982	-	-	-	-	816	702	779	816
-(6' - 7")	(3,495)	(3,259)	(3,495)	(3,495)	(2,166)	(1,764)	(1,965)	(2,166)	-	-	-	-	(1,800)	(1,548)	(1,717)	(1,800)

15 Steel track/additional weight/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	698	698	698	698	-	-	-	-	713	713	713	713
(13' - 1")	-	-	-	-	(1,540)	(1,540)	(1,540)	(1,540)	-	-	-	-	(1,572)	(1,572)	(1,572)	(1,572)
3 m	-	-	-	-	640	640	640	640	-	-	-	-	716	673	716	716
(9' - 10")	-	-	-	-	(1,412)	(1,412)	(1,412)	(1,412)	-	-	-	-	(1,578)	(1,484)	(1,578)	(1,578)
2 m	1106	1106	1106	1106	823	823	823	823	740	646	707	740	739	569	623	695
(6' - 7")	(2,439)	(2,439)	(2,439)	(2,439)	(1,815)	(1,815)	(1,815)	(1,815)	(1,632)	(1,424)	(1,559)	(1,632)	(1,630)	(1,255)	(1,373)	(1,533)
1 m	2022	1675	1900	2022	1093	936	1034	1093	831	627	687	768	772	536	588	658
(3' - 3")	(4,459)	(3,694)	(4,190)	(4,459)	(2,410)	(2,063)	(2,280)	(2,410)	(1,833)	(1,382)	(1,516)	(1,693)	(1,703)	(1,183)	(1,296)	(1,451)
0 m	2156	1635	1858	2068	1151	901	999	1115	892	612	672	752	812	553	607	680
(0' - 0")	(4,755)	(3,606)	(4,097)	(4,560)	(2,538)	(1,987)	(2,202)	(2,458)	(1,967)	(1,349)	(1,482)	(1,659)	(1,791)	(1,220)	(1,339)	(1,500)
-1 m	1951	1644	1866	1951	1224	895	992	1108	-	-	-	-	852	641	704	788
-(3' - 3")	(4,302)	(3,624)	(4,115)	(4,302)	(2,700)	(1,973)	(2,188)	(2,444)	-	-	-	-	(1,879)	(1,413)	(1,553)	(1,738)
-2 m	1395	1395	1395	1395	-	-	-	-	-	-	-	-	853	853	853	853
-(6' - 7")	(3,075)	(3,075)	(3,075)	(3,075)	-	-	-	-	-	-	-	-	(1,880)	(1,880)	(1,880)	(1,880)

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16 Steel track/additional weight/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	555	555	555	555	-	-	-	-	642	642	642	642
(13' - 1")	-	-	-	-	(1,224)	(1,224)	(1,224)	(1,224)	-	-	-	-	(1,415)	(1,415)	(1,415)	(1,415)
3 m	-	-	-	-	537	537	537	537	628	628	628	628	653	604	653	653
(9' - 10")	-	-	-	-	(1,185)	(1,185)	(1,185)	(1,185)	(1,384)	(1,384)	(1,384)	(1,384)	(1,439)	(1,332)	(1,439)	(1,439)
2 m	-	-	-	-	724	724	724	724	675	643	675	675	677	519	569	637
(6' - 7")	-	-	-	-	(1,596)	(1,596)	(1,596)	(1,596)	(1,488)	(1,418)	(1,488)	(1,488)	(1,493)	(1,144)	(1,254)	(1,404)
1 m	1804	1695	1804	1804	1011	934	1011	1011	782	620	681	762	710	490	538	604
(3' - 3")	(3,977)	(3,737)	(3,977)	(3,977)	(2,229)	(2,060)	(2,229)	(2,229)	(1,723)	(1,368)	(1,502)	(1,679)	(1,565)	(1,081)	(1,187)	(1,332)
0 m	2142	1618	1841	2051	1216	892	989	1105	867	601	662	742	748	503	553	621
(0' - 0")	(4,723)	(3,568)	(4,058)	(4,521)	(2,681)	(1,966)	(2,181)	(2,437)	(1,912)	(1,326)	(1,459)	(1,636)	(1,650)	(1,110)	(1,219)	(1,370)
-1 m	2028	1616	1838	2028	1237	878	975	1092	843	597	657	738	790	571	628	705
-(3' - 3")	(4,472)	(3,563)	(4,052)	(4,472)	(2,727)	(1,937)	(2,151)	(2,407)	(1,859)	(1,316)	(1,449)	(1,626)	(1,742)	(1,259)	(1,386)	(1,555)
-2 m	1585	1585	1585	1585	982	896	982	982	-	-	-	-	816	786	816	816
-(6' - 7")	(3,495)	(3,495)	(3,495)	(3,495)	(2,166)	(1,975)	(2,166)	(2,166)	-	-	-	-	(1,800)	(1,733)	(1,800)	(1,800)

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Lift capacity tables EZ36

17 Rubber track/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	679	679	679	679	-	-	-	-	725	725	725	725
(13' - 1")	-	-	-	-	(1,498)	(1,498)	(1,498)	(1,498)	-	-	-	-	(1,599)	(1,599)	(1,599)	(1,599)
3 m	-	-	-	-	621	621	621	621	708	531	524	611	707	494	487	569
(9' - 10")	-	-	-	-	(1,370)	(1,370)	(1,370)	(1,370)	(1,561)	(1,171)	(1,155)	(1,347)	(1,560)	(1,089)	(1,073)	(1,254)
2 m	1171	1171	1171	1171	847	816	807	847	752	520	512	599	747	419	413	487
(6' - 7")	(2,581)	(2,581)	(2,581)	(2,581)	(1,867)	(1,800)	(1,779)	(1,867)	(1,659)	(1,147)	(1,130)	(1,322)	(1,647)	(925)	(910)	(1,074)
1 m	-	-	-	-	1200	752	743	869	874	496	489	576	780	389	383	454
(3' - 3")	-	-	-	-	(2,646)	(1,659)	(1,638)	(1,916)	(1,928)	(1,094)	(1,078)	(1,269)	(1,720)	(859)	(844)	(1,002)
0 m	2555	1329	1317	1546	1411	712	702	829	966	477	470	557	820	397	390	464
(0' - 0")	(5,634)	(2,930)	(2,904)	(3,409)	(3,112)	(1,570)	(1,549)	(1,827)	(2,130)	(1,052)	(1,036)	(1,227)	(1,808)	(875)	(860)	(1,023)
-1 m	2289	1340	1328	1557	1384	705	695	821	925	474	467	554	862	453	446	529
-(3' - 3")	(5,047)	(2,954)	(2,929)	(3,434)	(3,051)	(1,554)	(1,532)	(1,810)	(2,040)	(1,046)	(1,029)	(1,221)	(1,900)	(999)	(982)	(1,166)
-2 m	1661	1379	1368	1597	1032	727	717	843	-	-	-	-	870	646	637	749
-(6' - 7")	(3,663)	(3,041)	(3,016)	(3,521)	(2,275)	(1,603)	(1,581)	(1,859)	-	-	-	-	(1,918)	(1,425)	(1,405)	(1,652)

18 Rubber track/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	651	641	633	651
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,435)	(1,413)	(1,395)	(1,435)
3 m	-	-	-	-	-	-	-	-	614	533	526	613	660	451	444	521
(9' - 10")	-	-	-	-	-	-	-	-	(1,354)	(1,175)	(1,159)	(1,351)	(1,455)	(993)	(978)	(1,150)
2 m	-	-	-	-	728	728	728	728	681	518	510	597	684	380	373	443
(6' - 7")	-	-	-	-	(1,604)	(1,604)	(1,604)	(1,604)	(1,502)	(1,141)	(1,125)	(1,317)	(1,508)	(837)	(823)	(976)
1 m	2260	1376	1365	1594	1097	753	743	869	818	491	483	570	716	353	347	414
(3' - 3")	(4,982)	(3,034)	(3,009)	(3,514)	(2,419)	(1,660)	(1,639)	(1,917)	(1,803)	(1,082)	(1,065)	(1,257)	(1,580)	(779)	(765)	(914)
0 m	2600	1304	1292	1521	1361	703	693	819	933	467	460	547	755	358	352	421
(0' - 0")	(5,733)	(2,876)	(2,849)	(3,355)	(3,002)	(1,549)	(1,528)	(1,806)	(2,058)	(1,030)	(1,013)	(1,205)	(1,665)	(789)	(775)	(928)
-1 m	2412	1308	1296	1525	1395	687	677	804	943	459	451	538	798	402	395	472
-(3' - 3")	(5,318)	(2,884)	(2,857)	(3,363)	(3,077)	(1,516)	(1,494)	(1,772)	(2,079)	(1,011)	(994)	(1,186)	(1,759)	(886)	(870)	(1,040)
-2 m	1889	1342	1330	1559	1155	702	692	818	-	-	-	-	827	539	530	629
-(6' - 7")	(4,166)	(2,958)	(2,933)	(3,438)	(2,547)	(1,547)	(1,525)	(1,803)	-	-	-	-	(1,825)	(1,188)	(1,170)	(1,386)

19 Rubber track/additional weight/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	679	679	679	679	-	-	-	-	725	725	725	725
(13' - 1")	-	-	-	-	(1,498)	(1,498)	(1,498)	(1,498)	-	-	-	-	(1,599)	(1,599)	(1,599)	(1,599)
3 m	-	-	-	-	621	621	621	621	708	592	586	672	707	551	545	627
(9' - 10")	-	-	-	-	(1,370)	(1,370)	(1,370)	(1,370)	(1,561)	(1,306)	(1,291)	(1,482)	(1,560)	(1,216)	(1,202)	(1,382)
2 m	1171	1171	1171	1171	847	847	847	847	752	581	574	661	747	472	465	539
(6' - 7")	(2,581)	(2,581)	(2,581)	(2,581)	(1,867)	(1,867)	(1,867)	(1,867)	(1,659)	(1,281)	(1,266)	(1,458)	(1,647)	(1,040)	(1,026)	(1,189)
1 m	-	-	-	-	1200	841	833	958	874	557	551	637	780	440	434	505
(3' - 3")	-	-	-	-	(2,646)	(1,855)	(1,836)	(2,113)	(1,928)	(1,229)	(1,214)	(1,405)	(1,720)	(969)	(956)	(1,113)
0 m	2555	1491	1482	1710	1411	801	792	918	966	538	531	618	820	449	443	516
(0' - 0")	(5,634)	(3,288)	(3,268)	(3,771)	(3,112)	(1,766)	(1,747)	(2,025)	(2,130)	(1,187)	(1,172)	(1,363)	(1,808)	(989)	(976)	(1,138)
-1 m	2289	1502	1493	1722	1384	793	785	910	925	535	528	615	862	511	505	588
-(3' - 3")	(5,047)	(3,313)	(3,293)	(3,796)	(3,051)	(1,750)	(1,730)	(2,008)	(2,040)	(1,180)	(1,165)	(1,356)	(1,900)	(1,127)	(1,113)	(1,295)
-2 m	1661	1542	1533	1661	1032	816	807	933	-	-	-	-	870	725	717	829
-(6' - 7")	(3,663)	(3,399)	(3,381)	(3,663)	(2,275)	(1,799)	(1,780)	(2,057)	-	-	-	-	(1,918)	(1,599)	(1,581)	(1,828)

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20 Rubber track/additional weight/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	651	651	651	651
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,435)	(1,435)	(1,435)	(1,435)
3 m	-	-	-	-	-	-	-	-	614	594	587	614	660	505	499	576
(9' - 10")	-	-	-	-	-	-	-	-	(1,354)	(1,310)	(1,295)	(1,354)	(1,455)	(1,114)	(1,100)	(1,271)
2 m	-	-	-	-	728	728	728	728	681	579	572	659	684	428	423	492
(6' - 7")	-	-	-	-	(1,604)	(1,604)	(1,604)	(1,604)	(1,502)	(1,276)	(1,261)	(1,452)	(1,508)	(945)	(932)	(1,085)
1 m	2260	1538	1530	1758	1097	842	833	959	818	552	545	632	716	401	395	462
(3' - 3")	(4,982)	(3,392)	(3,373)	(3,876)	(2,419)	(1,856)	(1,837)	(2,115)	(1,803)	(1,216)	(1,201)	(1,393)	(1,580)	(883)	(870)	(1,019)
0 m	2600	1467	1457	1686	1361	791	783	909	933	528	521	608	755	407	401	470
(0' - 0")	(5,733)	(3,234)	(3,213)	(3,717)	(3,002)	(1,745)	(1,726)	(2,003)	(2,058)	(1,165)	(1,150)	(1,341)	(1,665)	(897)	(884)	(1,036)
-1 m	2412	1470	1461	1689	1395	776	767	893	943	520	513	600	798	456	449	526
-(3' - 3")	(5,318)	(3,242)	(3,222)	(3,725)	(3,077)	(1,712)	(1,692)	(1,970)	(2,079)	(1,146)	(1,131)	(1,322)	(1,759)	(1,005)	(991)	(1,160)
-2 m	1889	1504	1495	1723	1155	790	782	907	-	-	-	-	827	608	600	698
-(6' - 7")	(4,166)	(3,316)	(3,297)	(3,800)	(2,547)	(1,743)	(1,724)	(2,001)	-	-	-	-	(1,825)	(1,340)	(1,323)	(1,539)

21 Steel track/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	679	679	679	679	-	-	-	-	725	725	725	725
(13' - 1")	-	-	-	-	(1,498)	(1,498)	(1,498)	(1,498)	-	-	-	-	(1,599)	(1,599)	(1,599)	(1,599)
3 m	-	-	-	-	621	621	621	621	708	554	547	633	707	515	508	590
(9' - 10")	-	-	-	-	(1,370)	(1,370)	(1,370)	(1,370)	(1,561)	(1,221)	(1,205)	(1,397)	(1,560)	(1,135)	(1,120)	(1,301)
2 m	1171	1171	1171	1171	847	847	840	847	752	542	535	622	747	439	432	506
(6' - 7")	(2,581)	(2,581)	(2,581)	(2,581)	(1,867)	(1,867)	(1,852)	(1,867)	(1,659)	(1,196)	(1,180)	(1,372)	(1,647)	(967)	(953)	(1,116)
1 m	-	-	-	-	1200	785	776	902	874	519	512	598	780	408	402	473
(3' - 3")	-	-	-	-	(2,646)	(1,731)	(1,711)	(1,989)	(1,928)	(1,144)	(1,128)	(1,319)	(1,720)	(899)	(886)	(1,043)
0 m	2555	1388	1378	1607	1411	745	736	862	966	500	492	579	820	416	409	483
(0' - 0")	(5,634)	(3,061)	(3,038)	(3,542)	(3,112)	(1,642)	(1,622)	(1,900)	(2,130)	(1,102)	(1,086)	(1,277)	(1,808)	(917)	(903)	(1,065)
-1 m	2289	1399	1389	1618	1384	737	728	854	925	497	489	576	862	474	467	550
-(3' - 3")	(5,047)	(3,086)	(3,063)	(3,567)	(3,051)	(1,625)	(1,605)	(1,883)	(2,040)	(1,095)	(1,079)	(1,271)	(1,900)	(1,046)	(1,030)	(1,213)
-2 m	1661	1439	1429	1657	1032	759	750	876	-	-	-	-	870	675	667	779
-(6' - 7")	(3,663)	(3,172)	(3,151)	(3,655)	(2,275)	(1,675)	(1,655)	(1,932)	-	-	-	-	(1,918)	(1,489)	(1,470)	(1,717)

22 Steel track/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	651	651	651	651
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,435)	(1,435)	(1,435)	(1,435)
3 m	-	-	-	-	-	-	-	-	614	555	548	614	660	471	464	542
(9' - 10")	-	-	-	-	-	-	-	-	(1,354)	(1,225)	(1,209)	(1,354)	(1,455)	(1,038)	(1,023)	(1,194)
2 m	-	-	-	-	728	728	728	728	681	540	533	620	684	397	391	461
(6' - 7")	-	-	-	-	(1,604)	(1,604)	(1,604)	(1,604)	(1,502)	(1,191)	(1,175)	(1,367)	(1,508)	(876)	(863)	(1,016)
1 m	2260	1435	1426	1654	1097	785	777	902	818	513	506	593	716	371	365	432
(3' - 3")	(4,982)	(3,165)	(3,144)	(3,647)	(2,419)	(1,732)	(1,712)	(1,990)	(1,803)	(1,131)	(1,115)	(1,307)	(1,580)	(817)	(804)	(952)
0 m	2600	1364	1353	1582	1361	735	726	852	933	490	482	569	755	376	370	439
(0' - 0")	(5,733)	(3,007)	(2,984)	(3,488)	(3,002)	(1,621)	(1,601)	(1,879)	(2,058)	(1,080)	(1,064)	(1,255)	(1,665)	(829)	(815)	(968)
-1 m	2412	1367	1357	1586	1395	720	711	837	943	481	474	561	798	421	415	492
-(3' - 3")	(5,318)	(3,015)	(2,992)	(3,496)	(3,077)	(1,587)	(1,567)	(1,845)	(2,079)	(1,061)	(1,045)	(1,236)	(1,759)	(929)	(915)	(1,084)
-2 m	1889	1401	1391	1620	1155	734	725	851	-	-	-	-	827	564	556	654
-(6' - 7")	(4,166)	(3,090)	(3,067)	(3,571)	(2,547)	(1,619)	(1,599)	(1,876)	-	-	-	-	(1,825)	(1,244)	(1,226)	(1,442)

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23 Steel track/additional weight/short stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	679	679	679	679	-	-	-	-	725	725	725	725
(13' - 1")	-	-	-	-	(1,498)	(1,498)	(1,498)	(1,498)	-	-	-	-	(1,599)	(1,599)	(1,599)	(1,599)
3 m	-	-	-	-	621	621	621	621	708	615	608	695	707	573	566	648
(9' - 10")	-	-	-	-	(1,370)	(1,370)	(1,370)	(1,370)	(1,561)	(1,355)	(1,341)	(1,532)	(1,560)	(1,263)	(1,249)	(1,429)
2 m	1171	1171	1171	1171	847	847	847	847	752	604	597	684	747	491	485	559
(6' - 7")	(2,581)	(2,581)	(2,581)	(2,581)	(1,867)	(1,867)	(1,867)	(1,867)	(1,659)	(1,331)	(1,317)	(1,508)	(1,647)	(1,082)	(1,069)	(1,232)
1 m	-	-	-	-	1200	874	866	991	874	580	573	660	780	458	452	524
(3' - 3")	-	-	-	-	(2,646)	(1,927)	(1,909)	(2,186)	(1,928)	(1,279)	(1,264)	(1,455)	(1,720)	(1,010)	(997)	(1,155)
0 m	2555	1551	1543	1771	1411	834	826	951	966	561	554	641	820	468	462	535
(0' - 0")	(5,634)	(3,419)	(3,402)	(3,905)	(3,112)	(1,838)	(1,820)	(2,097)	(2,130)	(1,237)	(1,222)	(1,413)	(1,808)	(1,031)	(1,018)	(1,181)
-1 m	2289	1562	1554	1782	1384	826	818	943	925	558	551	638	862	533	526	609
-(3' - 3")	(5,047)	(3,444)	(3,427)	(3,929)	(3,051)	(1,821)	(1,803)	(2,080)	(2,040)	(1,230)	(1,215)	(1,406)	(1,900)	(1,175)	(1,161)	(1,343)
-2 m	1661	1601	1594	1661	1032	848	840	966	-	-	-	-	870	754	747	858
-(6' - 7")	(3,663)	(3,531)	(3,515)	(3,663)	(2,275)	(1,871)	(1,853)	(2,130)	-	-	-	-	(1,918)	(1,663)	(1,646)	(1,893)

24 Steel track/additional weight/long stick

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	651	651	651	651
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,435)	(1,435)	(1,435)	(1,435)
3 m	-	-	-	-	-	-	-	-	614	614	610	614	660	525	519	597
(9' - 10")	-	-	-	-	-	-	-	-	(1,354)	(1,354)	(1,346)	(1,354)	(1,455)	(1,158)	(1,145)	(1,315)
2 m	-	-	-	-	728	728	728	728	681	601	595	681	684	446	441	510
(6' - 7")	-	-	-	-	(1,604)	(1,604)	(1,604)	(1,604)	(1,502)	(1,326)	(1,312)	(1,502)	(1,508)	(984)	(972)	(1,125)
1 m	2260	1598	1591	1818	1097	874	867	992	818	574	568	654	716	418	412	480
(3' - 3")	(4,982)	(3,523)	(3,508)	(4,010)	(2,419)	(1,928)	(1,911)	(2,187)	(1,803)	(1,266)	(1,252)	(1,443)	(1,580)	(921)	(909)	(1,058)
0 m	2600	1526	1518	1746	1361	824	816	942	933	551	544	631	755	425	419	488
(0' - 0")	(5,733)	(3,365)	(3,348)	(3,850)	(3,002)	(1,817)	(1,799)	(2,076)	(2,058)	(1,214)	(1,200)	(1,391)	(1,665)	(936)	(924)	(1,076)
-1 m	2412	1530	1522	1750	1395	809	801	926	943	542	536	622	798	475	469	546
-(3' - 3")	(5,318)	(3,373)	(3,356)	(3,858)	(3,077)	(1,783)	(1,765)	(2,042)	(2,079)	(1,195)	(1,181)	(1,372)	(1,759)	(1,048)	(1,035)	(1,204)
-2 m	1889	1564	1556	1784	1155	823	815	940	-	-	-	-	827	633	626	724
-(6' - 7")	(4,166)	(3,448)	(3,432)	(3,934)	(2,547)	(1,815)	(1,797)	(2,074)	-	-	-	-	(1,825)	(1,396)	(1,380)	(1,595)

25 Rubber track/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	646	646	646	646	-	-	-	-	710	710	710	710
(13' - 1")	-	-	-	-	(1,424)	(1,424)	(1,424)	(1,424)	-	-	-	-	(1,566)	(1,566)	(1,566)	(1,566)
3 m	-	-	-	-	619	619	619	619	-	-	-	-	713	547	541	621
(9' - 10")	-	-	-	-	(1,365)	(1,365)	(1,365)	(1,365)	-	-	-	-	(1,572)	(1,207)	(1,192)	(1,370)
2 m	1321	1321	1321	1321	858	858	858	858	748	573	566	651	736	462	456	528
(6' - 7")	(2,912)	(2,912)	(2,912)	(2,912)	(1,892)	(1,892)	(1,892)	(1,892)	(1,648)	(1,263)	(1,248)	(1,434)	(1,623)	(1,019)	(1,005)	(1,163)
1 m	-	-	-	-	1203	827	818	941	869	549	542	627	769	434	428	497
(3' - 3")	-	-	-	-	(2,653)	(1,824)	(1,804)	(2,075)	(1,915)	(1,212)	(1,196)	(1,382)	(1,696)	(957)	(943)	(1,097)
0 m	2496	1475	1465	1687	1392	791	781	904	952	532	524	609	810	447	440	513
(0' - 0")	(5,503)	(3,252)	(3,230)	(3,721)	(3,070)	(1,743)	(1,723)	(1,994)	(2,100)	(1,172)	(1,156)	(1,343)	(1,785)	(985)	(971)	(1,130)
-1 m	2215	1487	1478	1700	1346	785	776	899	893	530	523	608	849	515	507	590
-(3' - 3")	(4,884)	(3,280)	(3,258)	(3,749)	(2,969)	(1,731)	(1,711)	(1,982)	(1,970)	(1,170)	(1,153)	(1,340)	(1,872)	(1,135)	(1,119)	(1,300)
-2 m	1554	1530	1520	1554	953	811	802	925	-	-	-	-	849	753	744	849
-(6' - 7")	(3,426)	(3,373)	(3,352)	(3,426)	(2,101)	(1,788)	(1,768)	(2,039)	-	-	-	-	(1,873)	(1,661)	(1,642)	(1,873)

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26 Rubber track/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	639	639	639	639
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,409)	(1,409)	(1,409)	(1,409)
3 m	-	-	-	-	-	-	-	-	604	587	580	604	650	490	484	559
(9' - 10")	-	-	-	-	-	-	-	-	(1,332)	(1,294)	(1,279)	(1,332)	(1,434)	(1,081)	(1,067)	(1,232)
2 m	-	-	-	-	741	741	741	741	679	570	563	648	675	420	414	481
(6' - 7")	-	-	-	-	(1,634)	(1,634)	(1,634)	(1,634)	(1,496)	(1,258)	(1,242)	(1,429)	(1,487)	(926)	(913)	(1,062)
1 m	2296	1507	1497	1720	1106	827	818	941	814	543	536	621	707	395	389	455
(3' - 3")	(5,062)	(3,323)	(3,302)	(3,793)	(2,438)	(1,824)	(1,804)	(2,074)	(1,796)	(1,198)	(1,182)	(1,369)	(1,559)	(872)	(859)	(1,003)
0 m	2548	1449	1439	1662	1348	780	771	894	923	521	514	599	746	404	398	466
(0' - 0")	(5,619)	(3,195)	(3,173)	(3,664)	(2,973)	(1,721)	(1,700)	(1,971)	(2,035)	(1,149)	(1,133)	(1,320)	(1,644)	(892)	(878)	(1,028)
-1 m	2341	1455	1445	1668	1363	768	758	881	919	514	507	592	787	457	451	527
-(3' - 3")	(5,163)	(3,209)	(3,186)	(3,678)	(3,006)	(1,693)	(1,672)	(1,943)	(2,027)	(1,134)	(1,118)	(1,305)	(1,736)	(1,009)	(994)	(1,161)
-2 m	1792	1492	1482	1705	1096	784	775	898	-	-	-	-	813	624	616	715
-(6' - 7")	(3,952)	(3,289)	(3,267)	(3,759)	(2,418)	(1,730)	(1,709)	(1,980)	-	-	-	-	(1,793)	(1,377)	(1,359)	(1,576)

27 Rubber track/additional weight/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	646	646	646	646	-	-	-	-	710	710	710	710
(13' - 1")	-	-	-	-	(1,424)	(1,424)	(1,424)	(1,424)	-	-	-	-	(1,566)	(1,566)	(1,566)	(1,566)
3 m	-	-	-	-	619	619	619	619	-	-	-	-	713	606	599	680
(9' - 10")	-	-	-	-	(1,365)	(1,365)	(1,365)	(1,365)	-	-	-	-	(1,572)	(1,336)	(1,322)	(1,499)
2 m	1321	1321	1321	1321	858	858	858	858	748	634	628	712	736	514	508	580
(6' - 7")	(2,912)	(2,912)	(2,912)	(2,912)	(1,892)	(1,892)	(1,892)	(1,892)	(1,648)	(1,398)	(1,384)	(1,570)	(1,623)	(1,133)	(1,120)	(1,278)
1 m	-	-	-	-	1203	916	908	1031	869	611	604	689	769	484	479	548
(3' - 3")	-	-	-	-	(2,653)	(2,020)	(2,003)	(2,273)	(1,915)	(1,346)	(1,332)	(1,518)	(1,696)	(1,068)	(1,055)	(1,208)
0 m	2496	1637	1630	1852	1392	879	871	994	952	593	586	671	810	499	493	565
(0' - 0")	(5,503)	(3,610)	(3,594)	(4,083)	(3,070)	(1,939)	(1,921)	(2,191)	(2,100)	(1,307)	(1,292)	(1,479)	(1,785)	(1,100)	(1,087)	(1,246)
-1 m	2215	1650	1643	1865	1346	874	866	988	893	592	585	669	849	574	567	649
-(3' - 3")	(4,884)	(3,638)	(3,622)	(4,111)	(2,969)	(1,927)	(1,909)	(2,179)	(1,970)	(1,304)	(1,290)	(1,476)	(1,872)	(1,265)	(1,251)	(1,432)
-2 m	1554	1554	1554	1554	953	900	892	953	-	-	-	-	849	836	828	849
-(6' - 7")	(3,426)	(3,426)	(3,426)	(3,426)	(2,101)	(1,984)	(1,967)	(2,101)	-	-	-	-	(1,873)	(1,843)	(1,826)	(1,873)

28 Rubber track/additional weight/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	639	639	639	639
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,409)	(1,409)	(1,409)	(1,409)
3 m	-	-	-	-	-	-	-	-	604	604	604	604	650	544	538	613
(9' - 10")	-	-	-	-	-	-	-	-	(1,332)	(1,332)	(1,332)	(1,332)	(1,434)	(1,200)	(1,187)	(1,351)
2 m	-	-	-	-	741	741	741	741	679	631	625	679	675	469	463	530
(6' - 7")	-	-	-	-	(1,634)	(1,634)	(1,634)	(1,634)	(1,496)	(1,392)	(1,378)	(1,496)	(1,487)	(1,034)	(1,021)	(1,170)
1 m	2296	1669	1663	1884	1106	916	908	1030	814	605	598	683	707	443	437	503
(3' - 3")	(5,062)	(3,681)	(3,666)	(4,155)	(2,438)	(2,019)	(2,002)	(2,272)	(1,796)	(1,333)	(1,319)	(1,505)	(1,559)	(976)	(964)	(1,109)
0 m	2548	1611	1604	1826	1348	869	861	983	923	582	576	660	746	453	448	515
(0' - 0")	(5,619)	(3,553)	(3,537)	(4,026)	(2,973)	(1,916)	(1,899)	(2,169)	(2,035)	(1,284)	(1,270)	(1,456)	(1,644)	(1000)	(987)	(1,136)
-1 m	2341	1618	1610	1832	1363	857	848	971	919	575	569	653	787	512	506	582
-(3' - 3")	(5,163)	(3,567)	(3,551)	(4,040)	(3,006)	(1,889)	(1,871)	(2,141)	(2,027)	(1,269)	(1,254)	(1,440)	(1,736)	(1,129)	(1,116)	(1,283)
-2 m	1792	1654	1647	1792	1096	873	865	988	-	-	-	-	813	696	688	787
-(6' - 7")	(3,952)	(3,647)	(3,632)	(3,952)	(2,418)	(1,925)	(1,908)	(2,178)	-	-	-	-	(1,793)	(1,534)	(1,518)	(1,735)

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29 Steel track/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	646	646	646	646	-	-	-	-	710	710	710	710
(13' - 1")	-	-	-	-	(1,424)	(1,424)	(1,424)	(1,424)	-	-	-	-	(1,566)	(1,566)	(1,566)	(1,566)
3 m	-	-	-	-	619	619	619	619	-	-	-	-	713	569	562	643
(9' - 10")	-	-	-	-	(1,365)	(1,365)	(1,365)	(1,365)	-	-	-	-	(1,572)	(1,254)	(1,240)	(1,418)
2 m	1321	1321	1321	1321	858	858	858	858	748	595	589	673	736	481	475	547
(6' - 7")	(2,912)	(2,912)	(2,912)	(2,912)	(1,892)	(1,892)	(1,892)	(1,892)	(1,648)	(1,313)	(1,298)	(1,484)	(1,623)	(1,061)	(1,048)	(1,206)
1 m	-	-	-	-	1203	860	852	974	869	572	565	650	769	453	447	516
(3' - 3")	-	-	-	-	(2,653)	(1,896)	(1,878)	(2,148)	(1,915)	(1,261)	(1,246)	(1,432)	(1,696)	(998)	(985)	(1,138)
0 m	2496	1534	1526	1748	1392	823	815	937	952	554	547	632	810	466	460	532
(0' - 0")	(5,503)	(3,383)	(3,364)	(3,854)	(3,070)	(1,815)	(1,796)	(2,067)	(2,100)	(1,222)	(1,206)	(1,393)	(1,785)	(1,027)	(1,014)	(1,173)
-1 m	2215	1547	1539	1761	1346	818	809	932	893	553	546	631	849	536	530	612
-(3' - 3")	(4,884)	(3,411)	(3,392)	(3,883)	(2,969)	(1,803)	(1,784)	(2,055)	(1,970)	(1,219)	(1,204)	(1,390)	(1,872)	(1,182)	(1,168)	(1,349)
-2 m	1554	1554	1554	1554	953	844	835	953	-	-	-	-	849	783	775	849
-(6' - 7")	(3,426)	(3,426)	(3,426)	(3,426)	(2,101)	(1,860)	(1,841)	(2,101)	-	-	-	-	(1,873)	(1,728)	(1,710)	(1,873)

30 Steel track/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	639	639	639	639
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,409)	(1,409)	(1,409)	(1,409)
3 m	-	-	-	-	-	-	-	-	604	604	603	604	650	510	504	579
(9' - 10")	-	-	-	-	-	-	-	-	(1,332)	(1,332)	(1,329)	(1,332)	(1,434)	(1,125)	(1,111)	(1,276)
2 m	-	-	-	-	741	741	741	741	679	593	586	671	675	438	432	500
(6' - 7")	-	-	-	-	(1,634)	(1,634)	(1,634)	(1,634)	(1,496)	(1,307)	(1,292)	(1,479)	(1,487)	(966)	(953)	(1,101)
1 m	2296	1566	1558	1781	1106	860	851	974	814	566	559	644	707	413	407	473
(3' - 3")	(5,062)	(3,454)	(3,436)	(3,926)	(2,438)	(1,895)	(1,877)	(2,147)	(1,796)	(1,248)	(1,233)	(1,419)	(1,559)	(910)	(898)	(1,042)
0 m	2548	1509	1500	1722	1348	813	804	927	923	544	537	621	746	422	416	484
(0' - 0")	(5,619)	(3,326)	(3,307)	(3,798)	(2,973)	(1,792)	(1,774)	(2,044)	(2,035)	(1,199)	(1,184)	(1,370)	(1,644)	(931)	(918)	(1,068)
-1 m	2341	1515	1506	1728	1363	800	792	914	919	537	530	614	787	478	471	547
-(3' - 3")	(5,163)	(3,340)	(3,321)	(3,811)	(3,006)	(1,764)	(1,746)	(2,016)	(2,027)	(1,183)	(1,168)	(1,355)	(1,736)	(1,053)	(1,039)	(1,206)
-2 m	1792	1551	1543	1765	1096	817	808	931	-	-	-	-	813	650	643	741
-(6' - 7")	(3,952)	(3,420)	(3,402)	(3,892)	(2,418)	(1,801)	(1,783)	(2,053)	-	-	-	-	(1,793)	(1,434)	(1,418)	(1,635)

31 Steel track/additional weight/short stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	646	646	646	646	-	-	-	-	710	710	710	710
(13' - 1")	-	-	-	-	(1,424)	(1,424)	(1,424)	(1,424)	-	-	-	-	(1,566)	(1,566)	(1,566)	(1,566)
3 m	-	-	-	-	619	619	619	619	-	-	-	-	713	627	621	702
(9' - 10")	-	-	-	-	(1,365)	(1,365)	(1,365)	(1,365)	-	-	-	-	(1,572)	(1,383)	(1,370)	(1,547)
2 m	1321	1321	1321	1321	858	858	858	858	748	657	650	735	736	533	527	599
(6' - 7")	(2,912)	(2,912)	(2,912)	(2,912)	(1,892)	(1,892)	(1,892)	(1,892)	(1,648)	(1,448)	(1,434)	(1,620)	(1,623)	(1,175)	(1,163)	(1,321)
1 m	-	-	-	-	1203	949	942	1064	869	633	627	711	769	503	497	567
(3' - 3")	-	-	-	-	(2,653)	(2,092)	(2,076)	(2,345)	(1,915)	(1,396)	(1,382)	(1,568)	(1,696)	(1,109)	(1,097)	(1,249)
0 m	2496	1697	1691	1912	1392	912	905	1027	952	615	609	693	810	518	512	585
(0' - 0")	(5,503)	(3,741)	(3,728)	(4,217)	(3,070)	(2,011)	(1,995)	(2,264)	(2,100)	(1,356)	(1,343)	(1,529)	(1,785)	(1,142)	(1,130)	(1,289)
-1 m	2215	1709	1704	1925	1346	907	899	1021	893	614	608	692	849	596	589	671
-(3' - 3")	(4,884)	(3,769)	(3,757)	(4,245)	(2,969)	(1,999)	(1,983)	(2,252)	(1,970)	(1,354)	(1,340)	(1,526)	(1,872)	(1,313)	(1,300)	(1,480)
-2 m	1554	1554	1554	1554	953	932	925	953	-	-	-	-	849	849	849	849
-(6' - 7")	(3,426)	(3,426)	(3,426)	(3,426)	(2,101)	(2,056)	(2,040)	(2,101)	-	-	-	-	(1,873)	(1,873)	(1,873)	(1,873)

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32 Steel track/additional weight/long stick/VDS

A / B	2 m (6' - 7")				3 m (9' - 10")				4 m (13' - 1")				max			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
4 m	-	-	-	-	-	-	-	-	-	-	-	-	639	639	639	639
(13' - 1")	-	-	-	-	-	-	-	-	-	-	-	-	(1,409)	(1,409)	(1,409)	(1,409)
3 m	-	-	-	-	-	-	-	-	604	604	604	604	650	564	558	633
(9' - 10")	-	-	-	-	-	-	-	-	(1,332)	(1,332)	(1,332)	(1,332)	(1,434)	(1,244)	(1,231)	(1,395)
2 m	-	-	-	-	741	741	741	741	679	654	648	679	675	487	481	549
(6' - 7")	-	-	-	-	(1,634)	(1,634)	(1,634)	(1,634)	(1,496)	(1,442)	(1,429)	(1,496)	(1,487)	(1,073)	(1,061)	(1,209)
1 m	2296	1729	1724	1945	1106	948	941	1063	814	627	621	705	707	460	455	520
(3' - 3")	(5,062)	(3,812)	(3,800)	(4,288)	(2,438)	(2,091)	(2,075)	(2,345)	(1,796)	(1,382)	(1,369)	(1,555)	(1,559)	(1,015)	(1,003)	(1,147)
0 m	2548	1671	1665	1887	1348	902	894	1016	923	605	599	683	746	471	466	534
(0' - 0")	(5,619)	(3,685)	(3,672)	(4,160)	(2,973)	(1,988)	(1,972)	(2,241)	(2,035)	(1,334)	(1,320)	(1,506)	(1,644)	(1,039)	(1,027)	(1,177)
-1 m	2341	1677	1671	1893	1363	889	882	1004	919	598	592	676	787	532	526	602
-(3' - 3")	(5,163)	(3,698)	(3,685)	(4,174)	(3,006)	(1,960)	(1,944)	(2,213)	(2,027)	(1,318)	(1,304)	(1,490)	(1,736)	(1,174)	(1,161)	(1,327)
-2 m	1792	1713	1708	1792	1096	906	898	1021	-	-	-	-	813	722	715	813
-(6' - 7")	(3,952)	(3,778)	(3,766)	(3,952)	(2,418)	(1,997)	(1,981)	(2,250)	-	-	-	-	(1,793)	(1,591)	(1,576)	(1,793)

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Safety instructions load diagrams

Observe the values of the load diagrams in lifting gear applications.

DANGER

Crushing hazard due to tipping over of vehicle!

The vehicle causes serious injury or death when it tips over.

- ► Do not exceed the weights indicated in the load diagrams.
- ► Subtract the weight of the attachment from the weight specified in the relevant load diagram.
- ► Use the vehicle for lifting gear applications only if the mandatory lifting gear and safety equipment is installed, functional and enabled.
- ► The boom must be straight towards the cab - see *Fig. 333*

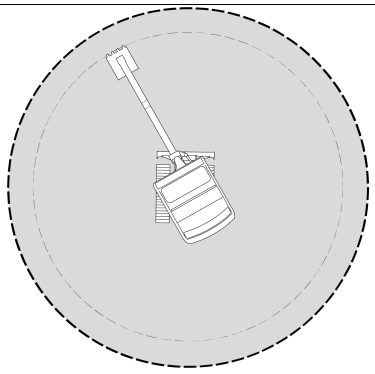


Fig. 333

NOTICE

If the weight is exceeded, there is a risk of damage to property if the machine tips over.

- ► Do not exceed the weights indicated in the load diagrams.

Information

The indications are only approximate values. Attachments, uneven ground and soft or bad ground conditions affect the vehicle's stability, and thus the weight and mass it can handle. The operator must take these influences into account.

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Legend

Description	Explanation
X	Reach from live ring center
Z	Load hook height in the respective range
max	Authorized lift capacity with horizontal boom
L	Stick short/long

Authorized lift capacity applies to entire swiveling range of 360°.

All table indications in kg (lbs.) and horizontal position on firm and level ground without bucket or exchangeable attachment.

The vehicle's lift capacity is restricted by the settings of the pressure limiting valves, the hydraulic output and the hydraulic system's stabilizing features.

Neither 75% of the static tilt load nor 87% of the hydraulic lift capacity is exceeded.

Calculation basis: according to ISO 10567.

ET35: 24,000 kPA (3481 psi)

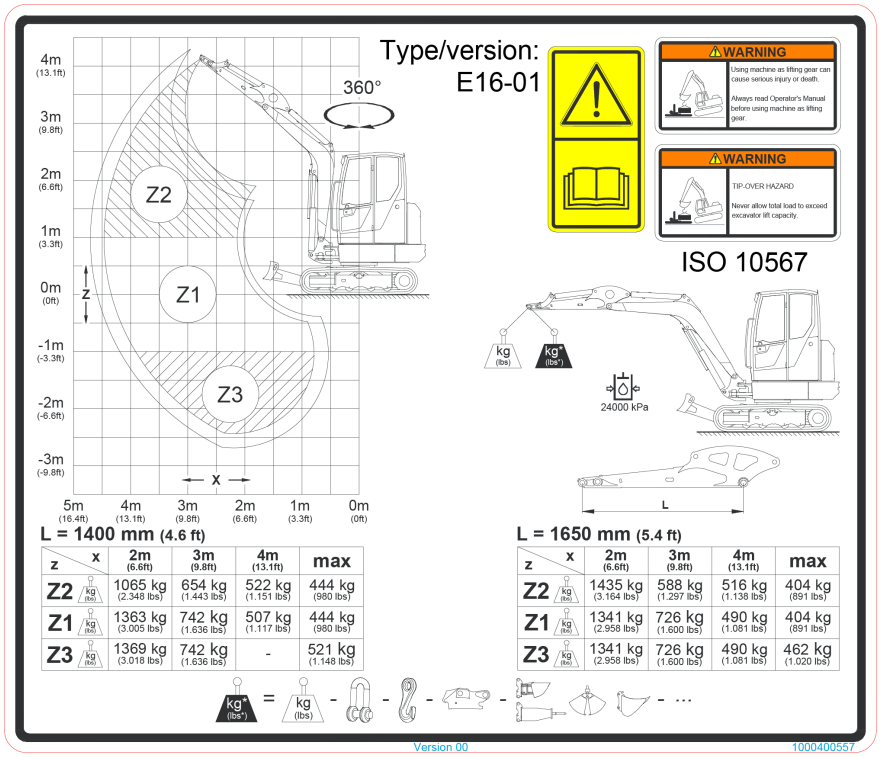
EZ36: 24,000 kPA (3481 psi)

Lift capacities apply to vehicles under the following conditions:

- Lubricants and engine/vehicle fluids at the mandatory levels
- Full fuel tank
- Machine at operating temperature
- Operator weight 75 kg (165 lbs.)

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ET35: Cabin or canopy



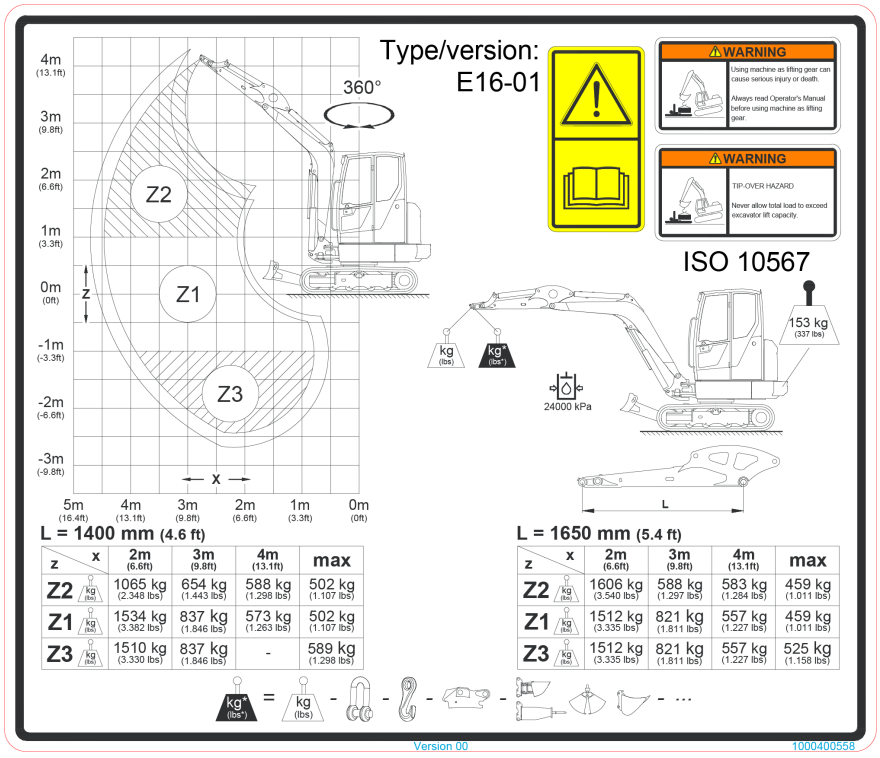
L = 1400 mm (4.6 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1065 kg (2.348 lbs)	654 kg (1.443 lbs)	522 kg (1.151 lbs)	444 kg (980 lbs)
Z1	1363 kg (3.005 lbs)	742 kg (1.636 lbs)	507 kg (1.117 lbs)	444 kg (980 lbs)
Z3	1369 kg (3.018 lbs)	742 kg (1.636 lbs)	-	521 kg (1.148 lbs)

L = 1650 mm (5.4 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1435 kg (3.164 lbs)	588 kg (1.297 lbs)	516 kg (1.138 lbs)	404 kg (891 lbs)
Z1	1341 kg (2.958 lbs)	726 kg (1.600 lbs)	490 kg (1.081 lbs)	404 kg (891 lbs)
Z3	1341 kg (2.958 lbs)	726 kg (1.600 lbs)	490 kg (1.081 lbs)	462 kg (1.020 lbs)

ET35: Cabin or canopy/additional weight



L = 1400 mm (4.6 ft)

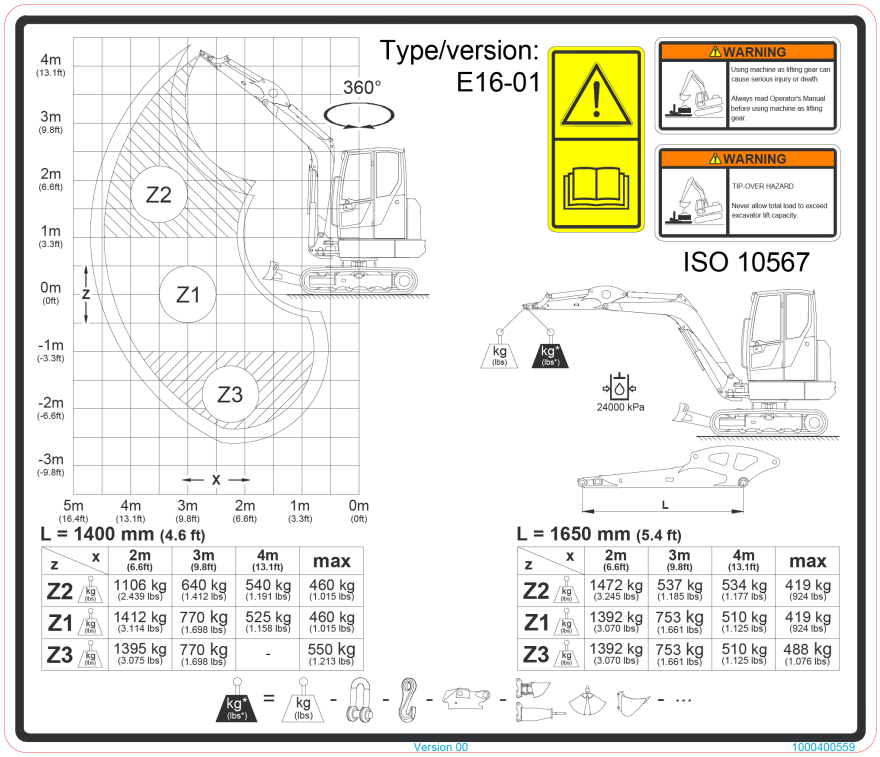
z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1065 kg (2.348 lbs)	654 kg (1.443 lbs)	588 kg (1.298 lbs)	502 kg (1.107 lbs)
Z1	1534 kg (3.382 lbs)	837 kg (1.846 lbs)	573 kg (1.263 lbs)	502 kg (1.107 lbs)
Z3	1510 kg (3.330 lbs)	837 kg (1.846 lbs)	-	589 kg (1.298 lbs)

L = 1650 mm (5.4 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1606 kg (3.540 lbs)	588 kg (1.297 lbs)	583 kg (1.284 lbs)	459 kg (1.011 lbs)
Z1	1512 kg (3.335 lbs)	821 kg (1.811 lbs)	557 kg (1.227 lbs)	459 kg (1.011 lbs)
Z3	1512 kg (3.335 lbs)	821 kg (1.811 lbs)	557 kg (1.227 lbs)	525 kg (1.158 lbs)

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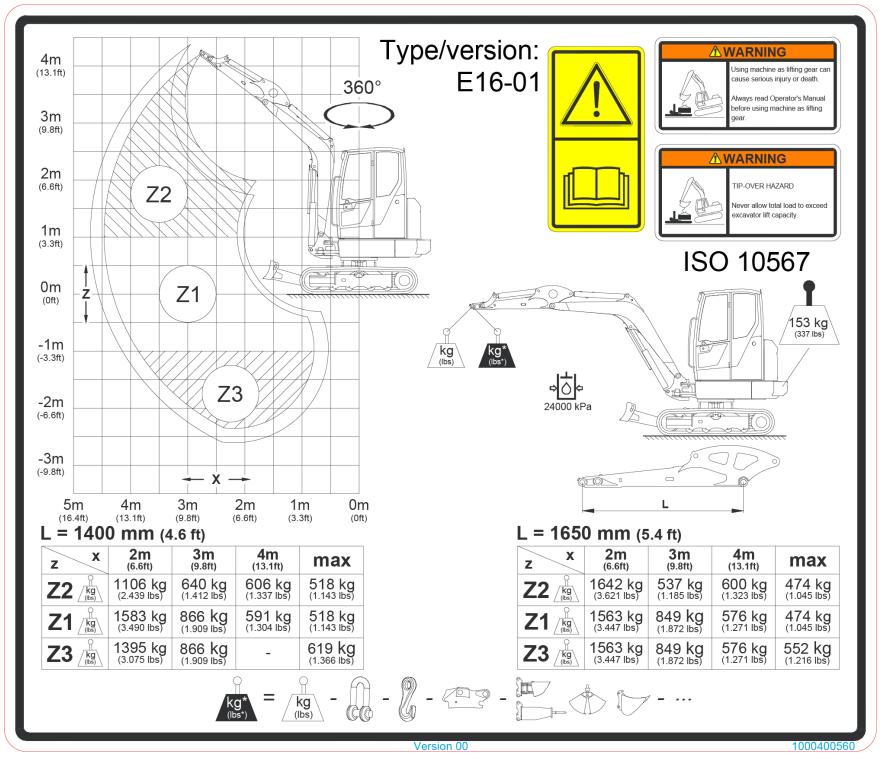
ET35: Cabin or canopy/VDS



z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1106 kg (2.439 lbs)	640 kg (1.412 lbs)	540 kg (1.191 lbs)	460 kg (1.015 lbs)
Z1	1412 kg (3.114 lbs)	770 kg (1.698 lbs)	525 kg (1.158 lbs)	460 kg (1.015 lbs)
Z3	1395 kg (3.075 lbs)	770 kg (1.698 lbs)	-	550 kg (1.213 lbs)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1472 kg (3.245 lbs)	537 kg (1.185 lbs)	534 kg (1.177 lbs)	419 kg (924 lbs)
Z1	1392 kg (3.070 lbs)	753 kg (1.661 lbs)	510 kg (1.125 lbs)	419 kg (924 lbs)
Z3	1392 kg (3.070 lbs)	753 kg (1.661 lbs)	510 kg (1.125 lbs)	488 kg (1.076 lbs)

ET35: Cabin or canopy/additional weight/VDS

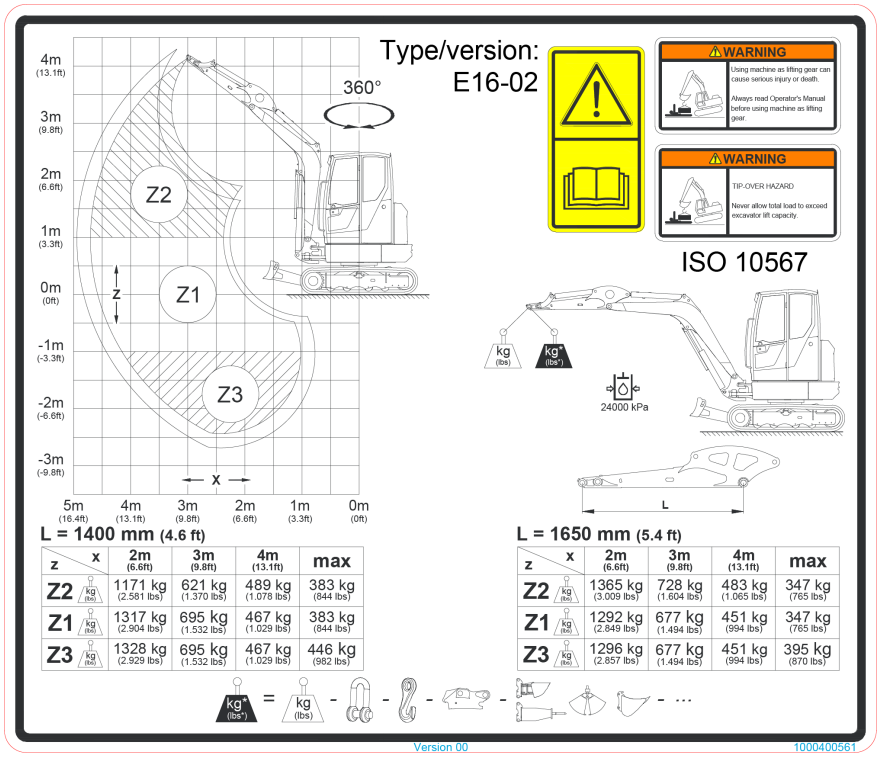


z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1106 kg (2.439 lbs)	640 kg (1.412 lbs)	606 kg (1.337 lbs)	518 kg (1.143 lbs)
Z1	1583 kg (3.490 lbs)	866 kg (1.909 lbs)	591 kg (1.304 lbs)	518 kg (1.143 lbs)
Z3	1395 kg (3.075 lbs)	866 kg (1.909 lbs)	-	619 kg (1.366 lbs)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1642 kg (3.621 lbs)	537 kg (1.185 lbs)	600 kg (1.323 lbs)	474 kg (1.045 lbs)
Z1	1563 kg (3.447 lbs)	849 kg (1.872 lbs)	576 kg (1.271 lbs)	474 kg (1.045 lbs)
Z3	1563 kg (3.447 lbs)	849 kg (1.872 lbs)	576 kg (1.271 lbs)	552 kg (1.216 lbs)

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EZ36: Cabin or canopy



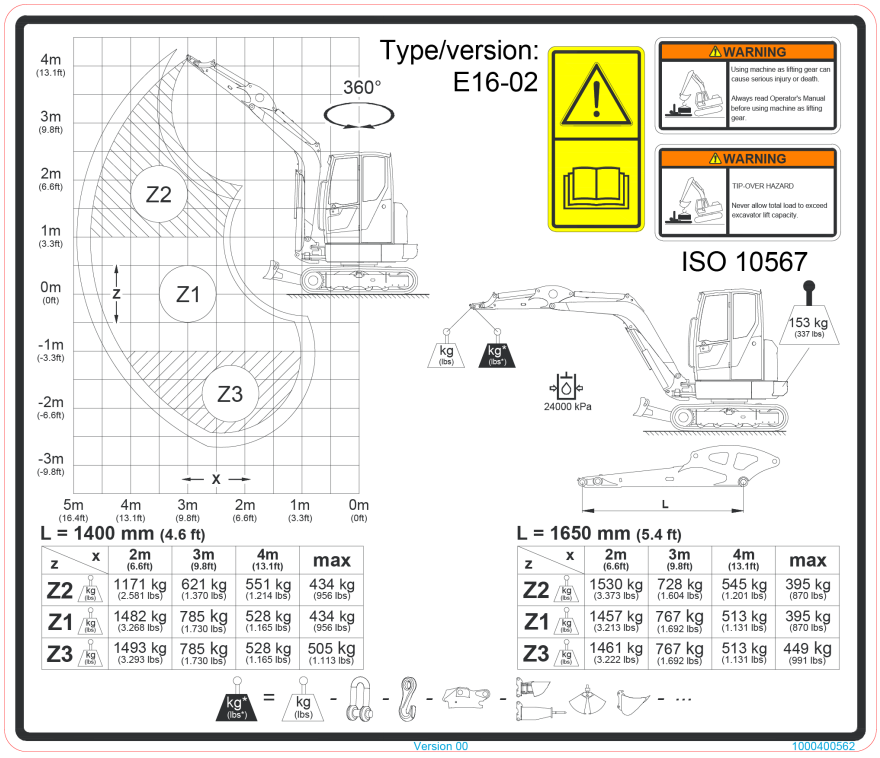
L = 1400 mm (4.6 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1171 kg (2.581 lbs)	621 kg (1.370 lbs)	489 kg (1.078 lbs)	383 kg (844 lbs)
Z1	1317 kg (2.904 lbs)	695 kg (1.532 lbs)	467 kg (1.029 lbs)	383 kg (844 lbs)
Z3	1328 kg (2.929 lbs)	695 kg (1.532 lbs)	467 kg (1.029 lbs)	446 kg (982 lbs)

L = 1650 mm (5.4 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1365 kg (3.009 lbs)	728 kg (1.604 lbs)	483 kg (1.065 lbs)	347 kg (765 lbs)
Z1	1292 kg (2.849 lbs)	677 kg (1.494 lbs)	451 kg (994 lbs)	347 kg (765 lbs)
Z3	1296 kg (2.857 lbs)	677 kg (1.494 lbs)	451 kg (994 lbs)	395 kg (870 lbs)

EZ36: Cabin or canopy/additional weight



L = 1400 mm (4.6 ft)

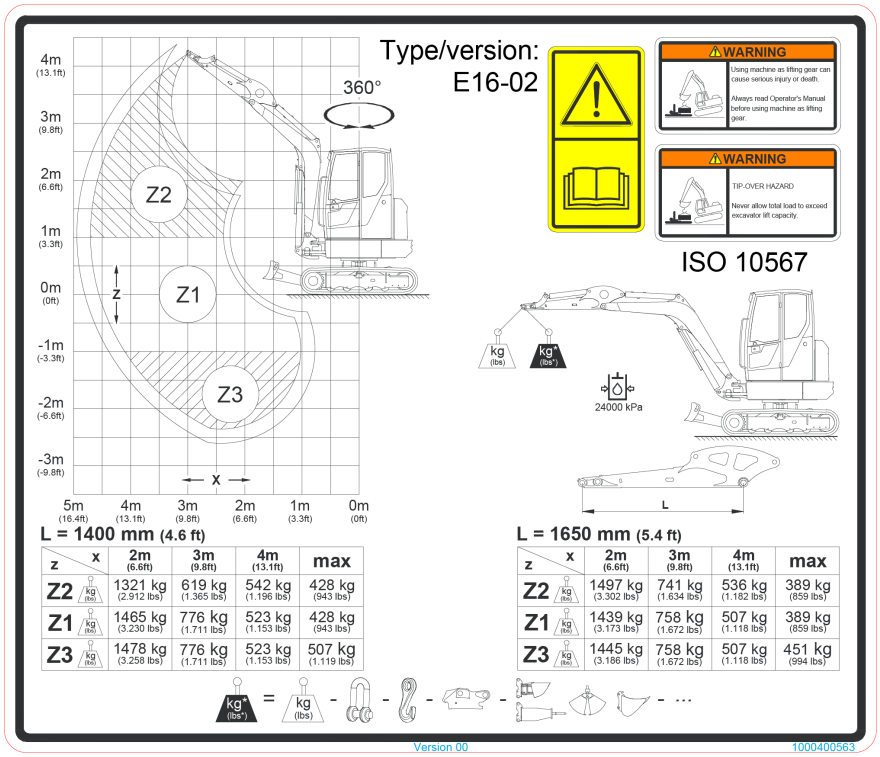
z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1171 kg (2.581 lbs)	621 kg (1.370 lbs)	551 kg (1.214 lbs)	434 kg (956 lbs)
Z1	1482 kg (3.268 lbs)	785 kg (1.730 lbs)	528 kg (1.165 lbs)	434 kg (956 lbs)
Z3	1493 kg (3.293 lbs)	785 kg (1.730 lbs)	528 kg (1.165 lbs)	505 kg (1.113 lbs)

L = 1650 mm (5.4 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1530 kg (3.373 lbs)	728 kg (1.604 lbs)	545 kg (1.201 lbs)	395 kg (870 lbs)
Z1	1457 kg (3.213 lbs)	767 kg (1.692 lbs)	513 kg (1.131 lbs)	395 kg (870 lbs)
Z3	1461 kg (3.222 lbs)	767 kg (1.692 lbs)	513 kg (1.131 lbs)	449 kg (991 lbs)

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EZ36: Cabin or canopy/VDS



L = 1400 mm (4.6 ft)

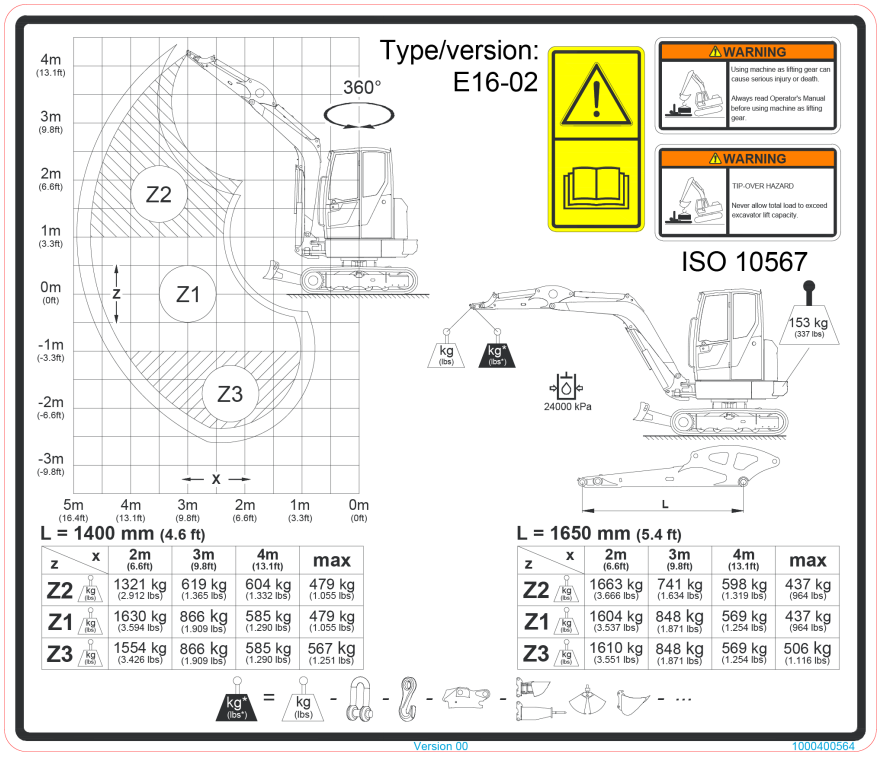
z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1321 kg (2.912 lbs)	619 kg (1.365 lbs)	542 kg (1.196 lbs)	428 kg (943 lbs)
Z1	1465 kg (3.230 lbs)	776 kg (1.711 lbs)	523 kg (1.153 lbs)	428 kg (943 lbs)
Z3	1478 kg (3.258 lbs)	776 kg (1.711 lbs)	523 kg (1.153 lbs)	507 kg (1.119 lbs)

L = 1650 mm (5.4 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1497 kg (3.302 lbs)	741 kg (1.634 lbs)	536 kg (1.182 lbs)	389 kg (859 lbs)
Z1	1439 kg (3.173 lbs)	758 kg (1.672 lbs)	507 kg (1.118 lbs)	389 kg (859 lbs)
Z3	1445 kg (3.186 lbs)	758 kg (1.672 lbs)	507 kg (1.118 lbs)	451 kg (994 lbs)

kg* (lbs*) = kg (lbs) - - - - ...

EZ36: Cabin or canopy/additional weight/VDS



L = 1400 mm (4.6 ft)

z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1321 kg (2.912 lbs)	619 kg (1.365 lbs)	604 kg (1.332 lbs)	479 kg (1.055 lbs)
Z1	1630 kg (3.594 lbs)	866 kg (1.909 lbs)	585 kg (1.290 lbs)	479 kg (1.055 lbs)
Z3	1554 kg (3.426 lbs)	866 kg (1.909 lbs)	585 kg (1.290 lbs)	567 kg (1.251 lbs)

L = 1650 mm (5.4 ft)

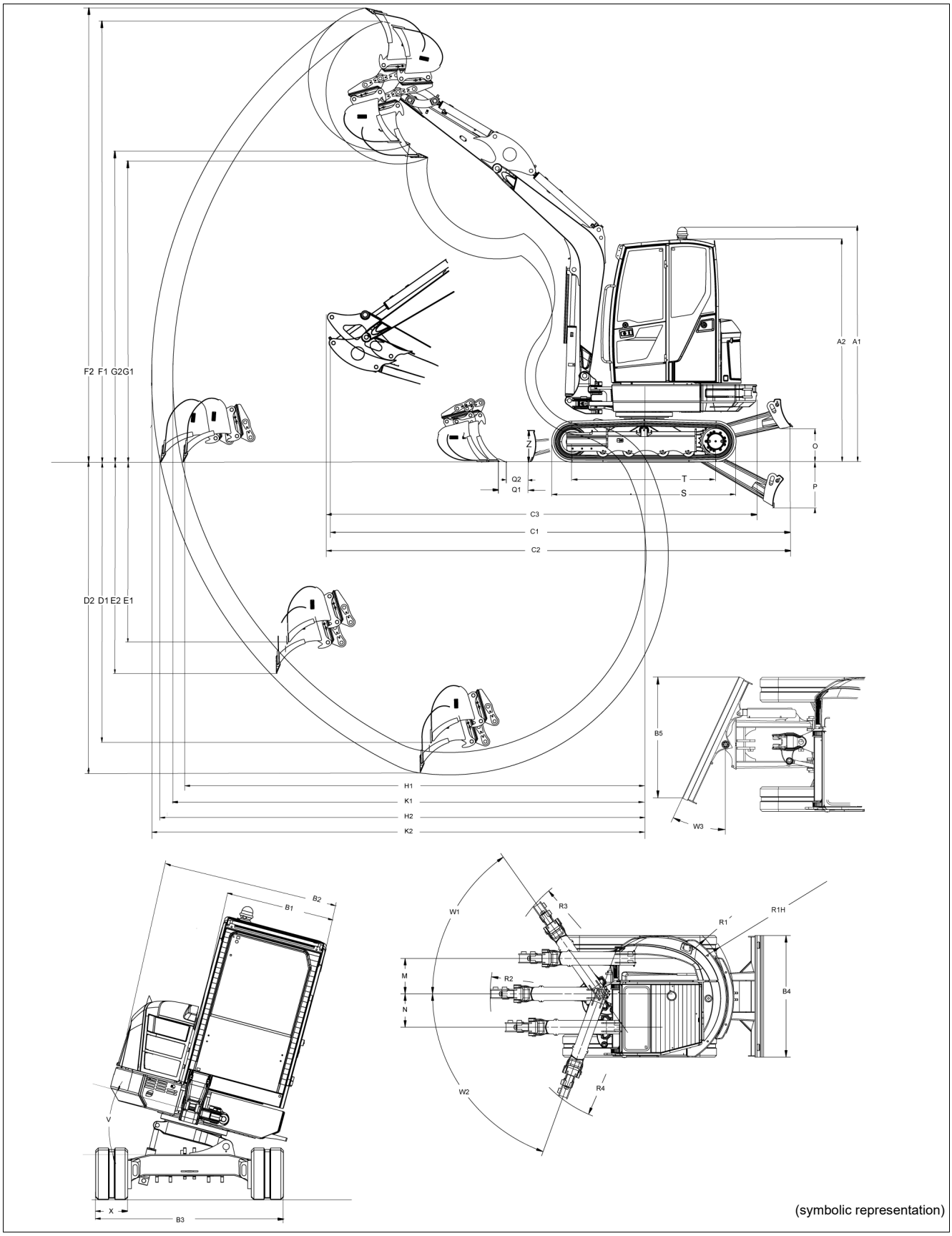
z \ x	2m (6.6ft)	3m (9.8ft)	4m (13.1ft)	max
Z2	1663 kg (3.666 lbs)	741 kg (1.634 lbs)	598 kg (1.319 lbs)	437 kg (964 lbs)
Z1	1604 kg (3.537 lbs)	848 kg (1.871 lbs)	569 kg (1.254 lbs)	437 kg (964 lbs)
Z3	1610 kg (3.551 lbs)	848 kg (1.871 lbs)	569 kg (1.254 lbs)	506 kg (1.116 lbs)

kg* (lbs*) = kg (lbs) - - - - ...

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9.15 Dimensions

ET35



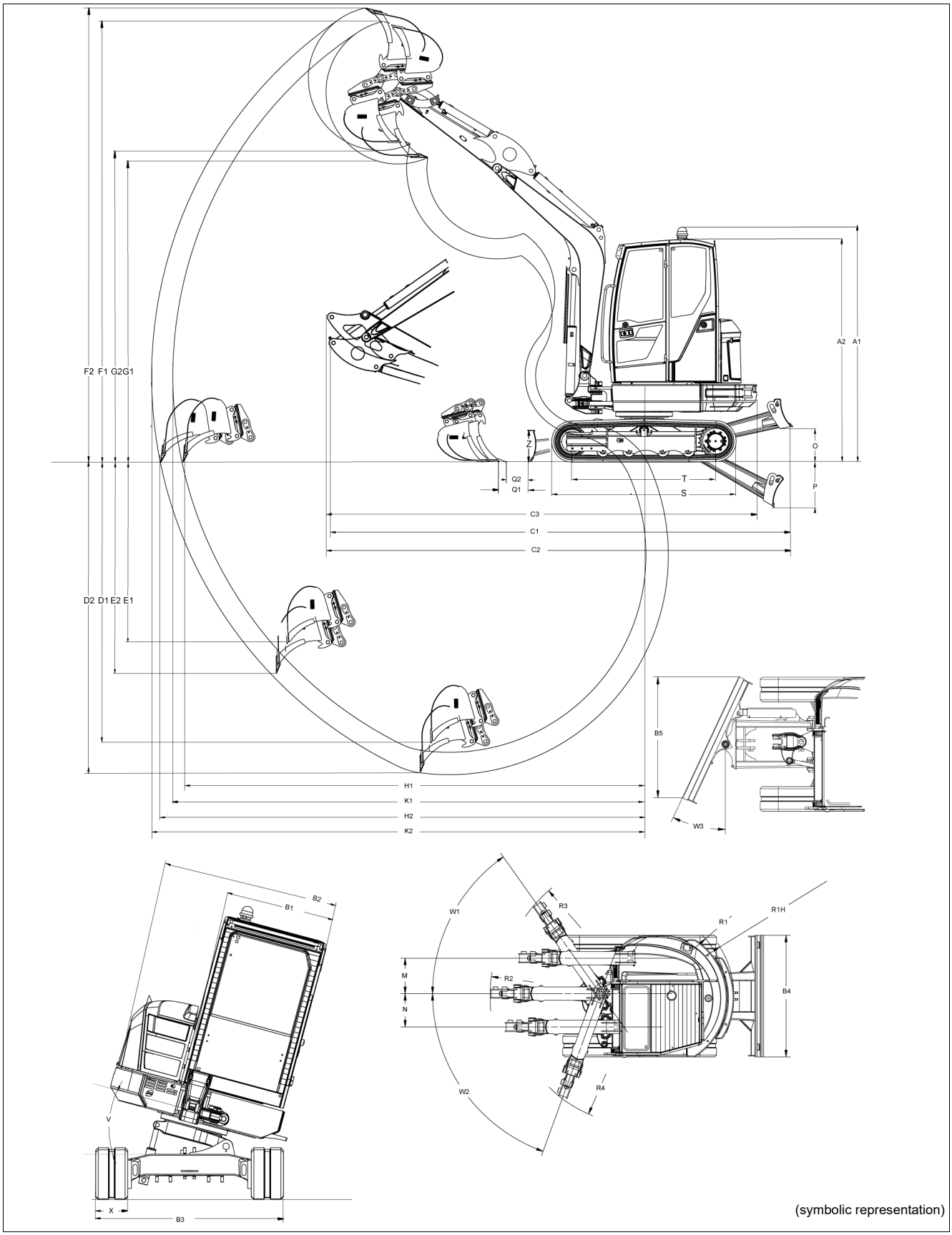
(symbolic representation)

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	ET35	Base travel gear dimensions mm (in)	VDS dimensions mm (in)
A1	Height with rotating beacon	2630 (8‘-8“)	2711 (8‘-11“)
A2	Height	2491 (8-2“)	2573 (8‘-5“)
B1	Cabin width	980 (39)	980 (39)
B2	Upper carriage width	1630 (64)	1630 (64)
	Wide superstructure, step folded down	--	1700 (67)
B3	Travel gear width	1630 (64)	1630 (64)
B4	Stabilizer blade width	1630 (64)	1630 (64)
B5	Dozer blade width (swiveling)	1474 (58)	--
C1	Transport length with stabilizer blade (short stick)	5268 (17‘-3“)	5252 (17‘-3“)
C2	Transport length with stabilizer blade (long stick)	5268 (17‘-3“)	5271 (17‘-4“)
C3	Transport length without dozer blade (long stick)	4773 (15‘-8“)	4780 (15‘-8“)
D1	Max. digging depth (short stick)	3245 (10‘-8“)	3166 (10‘-5“)
D2	Max. digging depth (long stick)	3497 (11‘-6“)	3416 (11‘-2“)
E1	Max. vertical digging depth (short stick)	2120 (83)	2042 (80)
E2	Max. vertical digging depth (long stick)	2360 (93)	2279 (90)
F1	Max. digging height (short stick)	4929 (16‘-2“)	5010 (16‘-5“)
F2	Max. digging height (long stick)	5082 (16‘-8“)	5163 (16‘-11“)
G1	Max. tilt-out height (short stick)	3337 (10‘-11“)	3417 (11‘-3“)
G2	Max. tilt-out height (long stick)	3489 (11‘-5“)	3570 (11‘-9“)
H1	Max. reach at ground level (short stick)	5158 (16‘-11“)	5143 (16‘-10“)
H2	Max. reach at ground level (long stick)	5408 (17‘-9“)	5393 (17‘-8“)
K1	Max. digging radius (short stick)	5270 (17‘-3“)	5270 (17‘-3“)
K2	Max. digging radius (long stick)	5507 (18‘-1“)	5507 (18‘-1“)
M	Max. boom displacement to bucket center (right side)	476 (19)	476 (19)
N	Max. boom displacement to bucket center (left side)	447 (18)	447 (18)
O	Max. lift height of stabilizer blade over ground	393 (15)	393 (15)
P	Max. scraping depth of stabilizer blade below ground surface	505 (20)	505 (20)
Q1	Distance between bucket and stabilizer blade (short stick)	135 (5)	135 (5)
Q2	Distance between bucket and stabilizer blade (long stick)	15 (0.6)	15 (0.6)
R1	Min. tail end swiveling radius	1168 (46)	1168 (46)
R1H	Min. tail end swiveling radius with additional weight	1260 (50)	1260 (50)
R2	Boom swivel radius (center)	2008 (79)	2008 (79)
R3	Boom swivel radius (right)	1870 (74)	1870 (74)
R4	Boom swivel radius (left)	1725 (68)	1725 (68)
S	Total running gear length	2062 (81)	2062 (81)
T	Running gear length (Turas front idler)	1604 (63)	1604 (63)
V	VDS tilt angle	--	15°
W1/2	Max. tilting angle of boom to the right/left	55°/70°	55°/70°
W3	Max. swivel angle of the dozer blade (swiveling)	25°	--
X	Track width	300 (12)	300 (12)
Z	Stabilizer blade height	357 (14)	357 (14)

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EZ36



(symbolic representation)

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	EZ36	Base travel gear dimensions mm (in)	VDS dimensions mm (in)
A1	Height with rotating beacon	2630 (8‘-8“)	2711 (8‘-11“)
A2	Height	2491 (8‘-2“)	2573 (8‘-5“)
B1	Cabin width	980 (39)	980 (39)
B2	Upper carriage width	1630 (64)	1630 (64)
B3	Travel gear width	1750 (69)	1750 (69)
B4	Stabilizer blade width	1750 (69)	1750 (69)
B5	Dozer blade width (swiveling)	1474 (58)	--
C1	Transport length with stabilizer blade (short stick)	5503 (18‘-1“)	5489 (18‘-0“)
C2	Transport length with stabilizer blade (long stick)	5503 (18‘-1“)	5508 (18‘-1“)
C3	Transport length without dozer blade (long stick)	4878 (16‘-0“)	4881 (16‘-0“)
D1	Max. digging depth (short stick)	3247 (10‘-8“)	3172 (10‘-5“)
D2	Max. digging depth (long stick)	3497 (11‘-6“)	3422 (11‘-2“)
E1	Max. vertical digging depth (short stick)	2123 (84)	2048 (81)
E2	Max. vertical digging depth (long stick)	2360 (93)	2285 (90)
F1	Max. digging height (short stick)	4925 (16‘-2“)	5004 (16‘-5“)
F2	Max. digging height (long stick)	5082 (16‘-8“)	5157 (16‘-11“)
G1	Max. tilt-out height (short stick)	3336 (10‘-11“)	3411 (11‘-3“)
G2	Max. tilt-out height (long stick)	3489 (11‘-5“)	3564 (11‘-8“)
H1	Max. reach at ground level (short stick)	5391 (17‘-8“)	5378 (17‘-8“)
H2	Max. reach at ground level (long stick)	5641 (18‘-6“)	5629 (18‘-6“)
K1	Max. digging radius (short stick)	5506 (18‘-1“)	5506 (18‘-1“))
K2	Max. digging radius (long stick)	5743 (18‘-10“)	5743 (18‘-10“)
M	Max. boom displacement to bucket center (right side)	680 (27)	680 (27)
N	Max. boom displacement to bucket center (left side)	650 (26)	650 (26)
O	Max. lift height of stabilizer blade over ground	393 (15)	393 (15)
P	Max. scraping depth of stabilizer blade below ground surface	505 (20)	505 (20)
Q1	Distance between bucket and stabilizer blade (short stick)	370 (15)	369 (15)
Q2	Distance between bucket and stabilizer blade (long stick)	250 (10)	249 (10)
R1	Min. tail end swiveling radius	933 (37)	933 (37)
R1H	Min. tail end swiveling radius with additional weight	1025 (40)	1025 (40)
R2	Boom swivel radius (center)	2245 (88)	2245 (88)
R3	Boom swivel radius (right)	2073 (82)	2073 (82)
R4	Boom swivel radius (left)	1863 (73)	1863 (73)
S	Total running gear length	2062 (81)	2062 (81)
T	Running gear length (Turas front idler)	1604 (63)	1604 (63)
V	VDS tilt angle	--	15°
W1	Max. tilting angle of boom to the right	55°	55°
W2	Max. tilting angle of boom to the left	70°	70°
W3	Max. swivel angle of the dozer blade (swiveling right, left)	25°	--
X	Track width	300 (12)	300 (12)
Z	Stabilizer blade height	357 (14)	357 (14)

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Notes:

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COMPACT EXCAVATOR

www.aem.org

SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL



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Acknowledgment

We wish to acknowledge the contributions of the members of AEM's Compact Loader/Compact Excavator Council to the preparation of this Safety Manual.

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Revised 05/03, 09/10

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Foreword

This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of the machine and to suggest possible ways of dealing with these conditions. This manual is **NOT** a substitute for the compact excavator manufacturer's operator manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the worksite or in the service area. The manufacturer has no direct control over equipment application, operation, inspection or maintenance. Therefore, it is **YOUR** responsibility to use safe work practices in these areas.

The information provided in this manual supplements the specific information about the machine that is contained in the manufacturer's manual(s). Other information that may affect the safe operation of the machine may be contained on safety signs or in insurance requirements, employer's safety and training programs, safety codes, local, state/provincial and federal laws, rules and regulations.



Read And Understand Manuals Before Operating

IMPORTANT! Before you operate the compact excavator, make sure you have the manufacturer's manual(s) for this machine and all attachments. If the manufacturer's manuals are missing, obtain replacement manuals from your employer, equipment dealer or directly from the manufacturer. Keep this safety manual and the manufacturer's manuals with the machine at all times. Read and understand all manuals.

Safety videos and other training resources are available from some manufacturers. Operators are encouraged to periodically review the safety video.

Safety Alerts

Symbol

This Safety Alert Symbol means: **"ATTENTION! STAY ALERT! YOUR SAFETY IS INVOLVED!"**



The Safety Alert Symbol identifies important safety messages on equipment, safety signs, in manuals or elsewhere. When you see this symbol, be alert to the possibility of death or personal injury. Carefully read the message that follows and inform other operators. Follow instructions in the safety message.

Signal Words

Signal words are distinctive words that will typically be found on safety signs on the compact excavator and other worksite equipment. These words may also be found in this manual and the manufacturer's manuals. These words are intended to alert the operator to a hazard and the degree of severity of the hazard.

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

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

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

NOTICE indicates a property damage message.

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One-Call First



Call Before You Dig
Dial 811 (USA only)



888-258-0808
(USA and Canada)

Call

Before starting any digging project, contact the local One-Call service by dialing 811 (USA only) to have underground utilities located. A One-Call referral number, **1-888-258-0808**, is also available for both USA and Canada.

One-Call will notify participating utility companies that you intend to dig. You must also call utility companies that do not participate in the One-Call service.

Always inspect the jobsite for evidence of unmarked utilities and contact others if necessary.

Plan The Work

Be aware of the lead time for marking the work area. This time may vary from state to state and county to county. If you do not locate utilities, you may have an accident or suffer injuries, cause service interruptions, damage the environment or experience job delays.

Dig

Most utilities mark their underground facilities using American Public Works Association (APWA) underground color codes. Verify marks before digging.

In the United States, OSHA Standard 29 CFR 1926.651 requires that the estimated location of underground utilities be determined before beginning an excavation. When actual excavation approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. Other OSHA regulations may also apply to the jobsite.

A Word To The User/Operator

It is **YOUR** responsibility to read and understand the safety manual and the manufacturer's manuals before operating this machine. This safety manual takes you step by step through the working day.

Graphics have been provided to help you understand the text.

IMPORTANT: This manual covers safe practices for Compact Excavators. If the machine is equipped with special attachments, read the manufacturer's operator and safety manuals pertaining to those attachments before using them.



Read And Understand All Safety Signs

Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. Study this manual and the manufacturer's manuals for the specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written only for compact excavators.

Contact the manufacturer of the equipment to answer any questions about safe operation that remain after studying the manufacturer's manual(s) and this safety manual.

Practice all other usual and customary safe working precautions and remember:

SAFE OPERATION IS UP TO YOU!

YOU CAN PREVENT DEATH OR SERIOUS INJURY CAUSED BY UNSAFE WORK PRACTICES!

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Follow A Safety Program

Be Alert!

Know where to get assistance. Know where to find and how to use a first aid kit and fire extinguisher/fire suppression system.

Be Aware!

Take advantage of training programs offered.

Be Careful!

Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity of the operator with the machine or attachment, drugs, and alcohol to name a few. You can prevent death or serious injury caused by unsafe work practices.

For your safety and the safety of others, encourage fellow workers to act safely.



For Safe Operation

You must be a qualified and authorized operator for safe operation of this machine. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation of the compact excavator—and know the safety rules and regulations for the worksite. It is a good safety practice to point out and explain safety signs and practices and ensure others understand the importance of following these instructions.

WARNING! Drugs and alcohol affect an operator's alertness and coordination and the operator's ability to safely operate the equipment. **Never operate the compact excavator while impaired by use of alcohol or drugs. Never knowingly allow the operation of this machine when operator alertness or coordination is impaired.** An operator taking prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder the ability to safely operate this equipment.

Follow A Safety Program

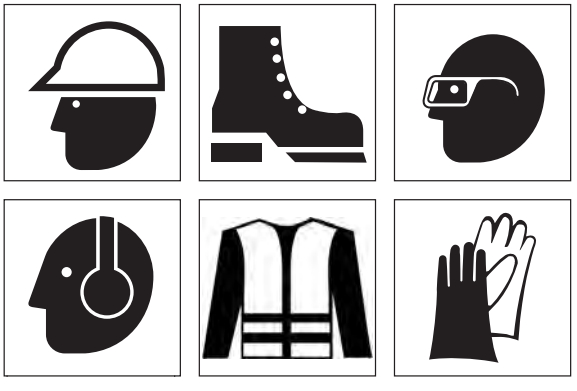
Protect Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:
— Hard hat
— Safety boots with non-slip soles
— Safety glasses, goggles or face shield
— Heavy-duty gloves
— Hearing protection
— Reflective or high-visibility clothing
— Wet weather gear
— Respirator or filter mask

Wear whatever is needed to protect yourself—do not take chances.





WARNING! Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Restrain long hair. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

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Follow A Safety Program

Know The Rules

Most employers have rules governing operation and maintenance of equipment. Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about the rules you will be expected to obey.

The Occupational Safety and Health Administration (OSHA) enforces federal laws within the United States that apply to the safe operation, application and maintenance of equipment on a worksite. It is the employer's responsibility to comply with these laws. A federal representative may periodically inspect a worksite to see that these laws are being followed.

There may also be local, state/provincial, federal laws or international regulations that apply to this equipment and its use, along with specific worksite or employer rules. It is important that you know and comply with all applicable laws and rules, including those requiring operator training and certification.



Know And Understand Rules Of Operation

Follow A Safety Program

Some Rules You Must Work By

— Know the limitations and operating characteristics of the compact excavator. Do not overload it.
— Always wear the seat belt, if equipped. If the compact excavator is equipped with a foldable TOPS/ROPS, do not fasten the seat belt when the TOPS/ROPS is in the down position.
— Always have all shields and guards properly installed before operating the machine.
— Inspect the machine and all attachments before each use as specified by the manufacturer and your employer. Ensure the attachment is properly installed. (See page 17, **Quick-coupling Device Safety**.)
— Only use parts and attachments that are approved by the original equipment manufacturer.
— Never modify or remove any part of the equipment (except for service—then make sure it is replaced).
— Read and understand all safety signs installed on the machine.
— Know the location of other personnel and machines and make sure they are a safe distance from the machine.
— Know the worksite. Be aware of possible hazards that you may encounter.

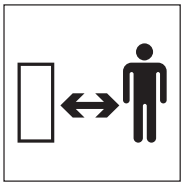


Know Machine Limitations And Operating Characteristics



Inspect The Machine Before Each Workday





Be Aware Of Worksite Hazards, Keep Bystanders Away

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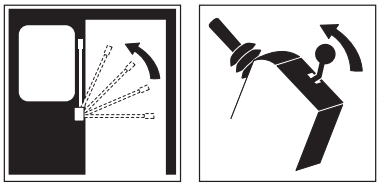
Follow A Safety Program

— Always look in the direction of machine or boom movement. Drive facing the travel direction whenever possible.
— Make sure you understand the rules covering traffic at the worksite. Know what all signs, flags and markings mean.
— Understand hand, flag, horn, whistle, siren and bell signals, if used at the worksite.
— Know when to use lights, turn signals, flashers and horns, if equipped.
— Do not allow riders.
— Keep hands and feet on controls when operating.
— Never lift or swing a load or attachment over anyone.
— Whenever you leave the machine, lower the excavator blade, bucket or other attachments to the ground. Stop the engine. Cycle the hydraulic controls, including auxiliary hydraulic control, to relieve trapped pressure. Engage control lock if equipped, and remove the ignition key. (See page 39, **Machine Shutdown**.)
— When transporting the compact excavator on a trailer, follow the manufacturer's instructions for loading, tying down and unloading the compact excavator.







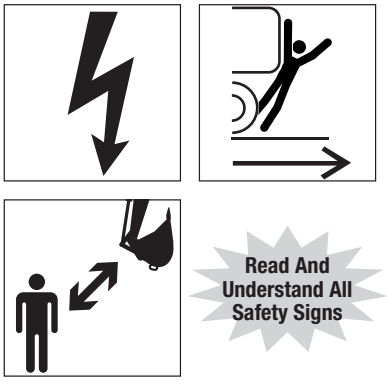


Follow A Safety Program

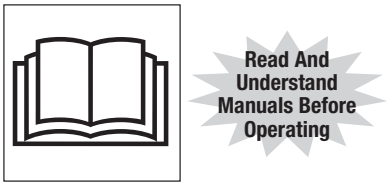
Know The Equipment

Read and understand the DANGER, WARNING, CAUTION and NOTICE safety signs and other informational signs found on the compact excavator and in the manufacturer's operator manual. Ask your supervisor to explain any information you do not understand. Failure to obey safety instructions could result in death or serious injury.

Make sure all the manufacturer's protective structures, guards, shields, screens and panels are in good repair, in place and securely fastened. Damaged, missing or weakened safety components can create a hazardous situation for you as the operator. **Never** remove or modify any safety components on the compact excavator. The excavator can be operated temporarily with a foldable TOPS/ROPS lowered for access through height-restricted openings. Do not fasten the seat belt when the TOPS/ROPS is in the down position.



Know the following about this compact excavator and all attachments.
— Function, purpose and use of controls
— The functions of all gauges, lights, dials, switches
— Slope and uneven terrain capabilities and proper operation – never operate on a slope with a foldable TOPS/ROPS in the down position.
— Braking and steering characteristics
— Turning radius and clearances
— How to quickly stop equipment in an emergency



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Prepare For Safe Operation

Check And Use All Available Protective And Safety Devices

Keep all protective devices in place and tightly fastened. Make certain all guards, screens and panels, manufacturer's operator manuals, and safety signs are installed on the machine and legible as supplied by the manufacturer. See that each item is securely in place and in operating condition.

The machine may be equipped with:

— A seat belt or other type of restraint
— Control locking device
— Safety signs
— Access and egress system (i.e., grab handles, handrails) and protective covers
— Travel alarm and back-up alarm
— Falling object guard structure (FOGS), falling object protective structure (FOPS), roll-over protective structure (ROPS)/tip-over protective structure (TOPS)
— Guards
— Special enclosures or accessories required for task or worksite conditions
— Operator protective structure (OPS) – side, front and rear shields, screens and doors
— Warning lights and devices
— Alternate exits
— Mirrors
— Fire extinguisher
— First aid kit
— Windshield wipers and washers
— Window defroster
— Operating lights
— Horn

Know which devices are required for protection during your specific operation and use them. The excavator can be operated temporarily with the TOPS/ROPS lowered for access through height restricted openings. Do not fasten the seat belt when the TOPS/ROPS is in the down position.

WARNING! NEVER remove or modify safety equipment. Operating a machine without a protective structure (TOPS/ROPS, FOGS/FOPS or OPS) could result in death or serious injury. (See page 44, **Protective Structure Safety**.)



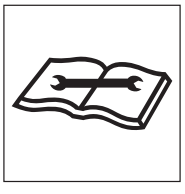
Follow A Checklist

Prepare For Safe Operation

Check The Machine

Before you begin the workday, inspect the machine and have all systems in good operational condition. Do not operate the machine until all problems are corrected.

— Perform daily and periodic service procedures as instructed by the equipment manufacturer.
— Check that no safety switches or interlocks have been bypassed and that no warning tags have been placed on the machine.
— Check that safety signs, special instructions, lift capacity charts and operator manuals are legible and in the proper location.
— Check condition and operation of the seat belt and its mounts, if equipped.
— Make sure that the foldable TOPS/ROPS, if equipped, is properly secured in the raised position.
— Check condition and operation of the attachment quick-coupling device, if equipped. Perform daily cleaning and maintenance following the manufacturer's instructions. (See page 17, **Quick-coupling Device Safety**.)
— Inspect steps, guardrails, platforms and handholds for damage or loose parts.



Maintain Machine



Check Manuals And Safety Signs



Check Seat Belt And Its Mounts



Check That TOPS/ROPS Is Raised And Properly Secured

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Prepare For Safe Operation

— Check the fuel and hydraulic systems. Have leaks repaired and fill to proper level.
— Check all exposed hydraulic components for leaks, routing problems or damage. Report worn or damaged components.

WARNING! Diesel fuel and hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. **Use a piece of cardboard or wood to find leaks, not your hand. Wear a face shield or safety goggles for eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury. (See page 46, **Hydraulic System Hazards**.)

— Check the cooling system.

WARNING! Prevent possible injury from explosive release of hot fluids. **Allow the radiator to cool before checking the fluid level**. (See page 45, **Cooling System Hazards.**)

— Keep radiators and coolers clean and free of oil, grease, dirt, debris and moisture.
— Make sure all doors, guards and covers are in place and secured properly.



Prepare For Safe Operation

Check The Machine (continued)

— Check the tracks for broken or damaged pins, bushings, and other parts.
— Check the tracks for proper tension adjustment according to manufacturer's instructions.
— Check the tracks for damage or wear. Replace badly worn or damaged tracks.
— Check the slew/swing brake for proper operation.
— Inspect working and other lights for proper operation.
— Inspect boom, arm and attachment for wear and damage.
— Make sure fire extinguishers are fully charged and in good working order.

Check Attachment And Coupler Installation

When changing buckets or installing attachments, follow the manufacturer's instructions for proper maintenance and coupling. Make sure all connectors are securely fastened. Tighten all bolts, nuts and screws to torques recommended.

Check the attachment coupler and the attachment for wear and hydraulic leaks before coupling the attachment.

Before operating, ensure that quick-coupler pins or wedges are fully engaged and visibly locked to the attachment.

WARNING! Avoid possible crushing injury. **Failure to properly secure the attachment to the machine coupler can allow the attachment to come off and could result in death or serious injury.** (See page 17, **Quick-coupling Device Safety**.)

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Prepare For Safe Operation

Quick-coupling Device Safety

Before using a quick-coupling device you must know and understand proper installation, maintenance and operation.

WARNING! Failure to read and follow manufacturer's instructions for the correct operation and maintenance of the quick-coupler can allow the attachment to come off and cause death or serious injury.

Protect yourself from injury:
- — Install and maintain equipment, attachments and their operating systems according to manufacturers' instructions.
- — Securely latch attachments before work begins.
- — Follow the manufacturer's instructions for using positive locks on quick-coupling equipment.
- — Make frequent visual inspections of quick-coupling systems—especially after changing attachments.
- — Always check for interference limits of the coupler or tool with the carrier before operating.

Do not operate the machine if:
- — there exists an incompatibility among components.
- — there are broken, damaged or badly worn components.
- — the lock/secure feature of the quick-coupler is impaired.
- — the engaging lever or device is not fully engaged in a lock/secure condition.



Read And Understand Manuals Before Operating

WARNING! A quick-coupler that is not properly locked/secured could result in death or serious injury. **Perform all steps to lock/secure the device.** The steps to confirm that the device is properly locked/secured may include any or all of the following:
- — Manually installing a locking pin, actuating a lever or other device.
- — Movement of the attached work tool to confirm its engaged lock/secure condition.
- — A visual check of the components as instructed by the quick-coupler manufacturer.

WARNING! A quick-coupler that is disengaged when the attachment is in an unstable position could result in death or serious injury. **Place the attachment in a stable position, as instructed by the manufacturer, whenever coupling or uncoupling the attachment.**

Prepare For Safe Operation

Clean Up

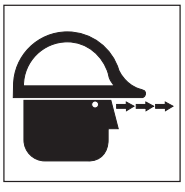
Clean windshields, mirrors and all lights. Use water and a clean cloth. Know and follow the manufacturer's recommendations for using cleaning agents other than clean water on polycarbonate glazing.

Clean out the operator's area. Steps and handholds must be clean and functional. Oil, grass, leaves, needles, snow, ice or mud in these areas can cause you to slip and fall.

Clean your boots before getting on the machine.

Clean out trash and debris buildup promptly, especially in the engine compartment, the battery box, around exhaust components, under the machine and around rotating components.

Remove all loose personal items or other objects from the operator's compartment. Secure these items in a fixed tool box or remove them from the machine. Do not store any flammable material such as ether/cold-start fluid or oily rags in the operator's compartment.



Maintain Vision – Clean Up



Avoid Falls – Clean Slippery Surfaces



Avoid Fire – Clean Out Debris



Put Away Tools And Loose Items

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Prepare For Safe Operation

Check The Work Area

Know—beforehand—as much about the worksite as possible. Locate all ground workers near the worksite and make sure clothing worn is easily seen. Be aware of weather conditions that can affect visibility, ground stability and traction.

Check for:
- Location of steep slopes, slide areas, drop-offs and overhangs
- Adequate traction on slopes
- Traffic locations and movement
- Thick dust, smoke and fog
- Soil conditions—look for signs of instability such as cracks or settlement
- Standing water and marshy areas
- Rocks and stumps
- Holes, obstructions, mud or ice
- Location of open trenches
- Exact location of any buried and/or overhead electrical, gas, telephone, water, sewer or other utility lines

Have the utility company mark, shut off or relocate the utility before you begin working.

Know the location and work plan for other machines on the worksite.

Correct unsafe conditions. Avoid operating in problem areas that cannot be corrected.

When operating the machine inside a building, know what clearances you will encounter—overhead, doorway, aisles, etc. Also, know the weight limitations of floors and ramps. Make sure there is sufficient ventilation for inside operation.



Walk Around The Worksite



Be Seen – Wear Visible Clothing

Prepare For Safe Operation

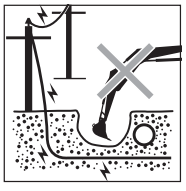
Check The Work Area (continued)

Know the exact location of electrical, telephone, gas or other utility lines. (See page 5, **One-Call First**.)

DANGER! Death or serious injury will result from touching or being near a machine that is in contact with or near an energized electrical source. **Never approach power lines with any part of the machine or load unless all local, state/provincial and federal (OSHA) required safety precautions have been taken.** Use extreme caution because high voltage sources can arc without contact.

When working near power lines, you must assume all lines are energized.

Maintain a safe distance from all utilities.
(See page 31, **Utilities—Overhead And Underground**.)



Locate All Utilities, Maintain A Safe Distance

Use Caution When Fueling

IMPORTANT! Always use approved fuel containers and dispensing equipment.

Fuels are flammable, so observe these practices to reduce the possibility of a serious accident.
- Shut off engine and ignition during refueling.
- Always ground the fuel nozzle against the filler neck to avoid sparks.
- Keep sparks and open flames away from fuel.
- Do not use a cell phone or two-way radio while fueling or handling fuel—they could cause sparks.
- Do not smoke while refueling or when handling fuel containers.
- Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.

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Prepare For Safe Operation

Mount And Dismount Properly

When you enter or leave the machine:

— Maintain a three-point contact with the machine. Three-point contact is defined as maintaining contact with at least one hand and two feet, or two hands and one foot, at all times.
— Face the machine when either mounting or dismounting.
— Use handholds, handrails, ladders or steps (as provided).
— The upperstructure and undercarriage must be oriented to align the access system.
— Never use control levers as handholds.
— Never step on foot controls when entering or leaving.
— Clean your boots and wipe your hands before mounting or dismounting.
— Never jump on or off the machine.
— Never attempt to mount or dismount a moving machine.
— Never mount or dismount while carrying tools or objects that prevent three-point contact.







Start Safely

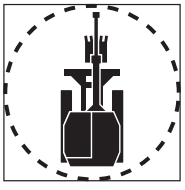
Look Out For Others

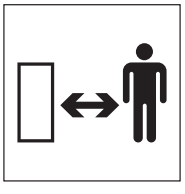
Before starting, walk completely around the machine operating area. Make sure no one is under it, on it or close to it. Do not start the engine until everyone is clear of the operating area.

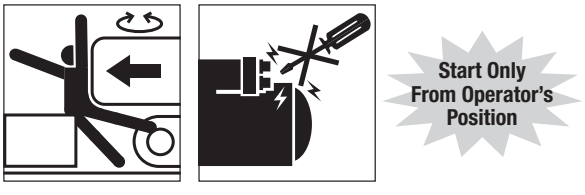
Starting The Engine

Do not start the engine or move any of the controls if there is a “DO NOT OPERATE” or similar warning tag attached to the start switch or controls. Check with your supervisor.

WARNING! Start the engine only from the operator’s seat. Never attempt to start the engine by shorting across starter terminals or reaching for the key from outside the cab. This could result in the machine moving suddenly and unexpectedly and cause death or serious injury.







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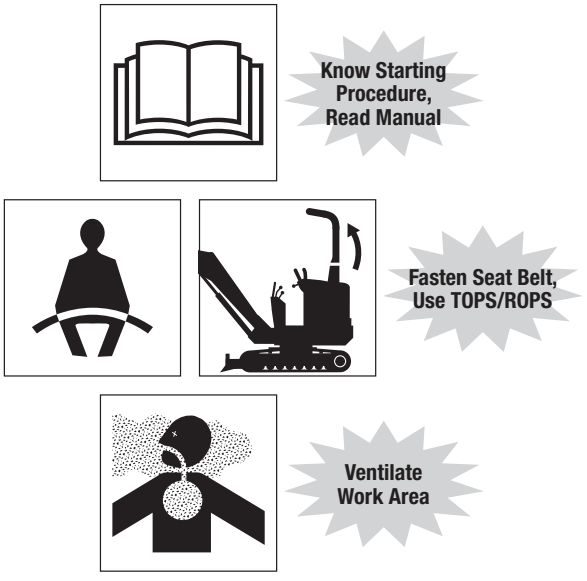
Start Safely

Know the exact starting procedures for this machine. See the manufacturer's manual(s) for starting procedures.

— Clear the area of all persons.
— Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
— Familiarize yourself with warning devices, gauges and operating controls.
— Close or secure the cab door, if equipped.
— Fasten the seat belt, if equipped. If the compact excavator is equipped with a foldable TOPS/ROPS, do not fasten the seat belt when the TOPS/ROPS is in the down position.
— Put all controls, including those for auxiliary equipment, in the neutral/park position.
— Activate controls by releasing the control lock, if equipped.
— Start the engine following the instructions in the manufacturer's manual(s).

If it is necessary to run the engine or operate the machine within an enclosed area, be sure there is adequate ventilation.

WARNING! Never operate any type of engine without proper ventilation—exhaust fumes can kill.



Start Safely

Starting Aids

Do not use ether/cold-start fluid if the engine is equipped with glow plugs or intake manifold preheater.

Ether/cold-start fluid is HIGHLY FLAMMABLE. Before using it, always read the instructions on the ether/cold-start fluid container and the instructions in the manufacturer's manual(s). **Do not** carry loose cans of starting fluid on the machine while operating.

If booster cables are used, follow the instructions in the manufacturer's manual(s). The operator must be in the operator's seat when boost-starting the engine so that the machine will be under control when the engine starts. Boost-starting is a two-person operation. A battery explosion or a run-away machine could result from improper starting procedures.

Never boost-start a frozen battery. (See page 48, **Avoid Battery Explosion**.)

After Starting The Engine

Observe gauges, instruments, and warning lights to ensure that they are functioning and their readings are within the operating range.

With the control levers or joysticks in neutral, test engine speed control.

Run An Operating Check

Do not use a machine that is not in proper operating condition. It is the **operator's responsibility** to check the condition of all systems, and to run the check in a safe area.

WARNING! Do not allow anyone to stand within the operating work radius of the machine and load. Contact with moving parts of the compact excavator or load can cause death or serious injury.



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Start Safely

Test All Controls

Follow the manufacturer's recommended warm-up procedures and bring all machine systems to operating temperature.

Machines come equipped with various control configurations, patterns and operating modes. Some have selectable or configurable controls that allow operation to suit personal preferences or specific applications. Make sure that you know which control pattern has been selected and understand how the machine will operate.

Make sure the engine is operating correctly. Operate each machine control to check all functions.

Check for possible interference between the attachment and the cab and operate appropriately.

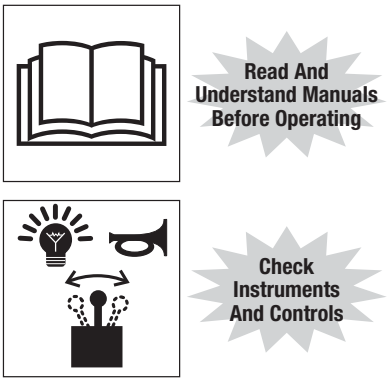
Make sure the attachment quick-coupling device (if equipped) is operating properly, fully engaged and visibly locked. (See page 17, **Quick-coupling Device Safety**.)

Check the blade location before traveling. When the blade is in the rear, operate the steering levers in the opposite direction as when the blade is in the front. See the machine manufacturer's manual.

Operate the control(s) to ensure correct operation in forward, neutral and reverse.

Test steering—right and left—while moving slowly.

WARNING! Prevent possible injury from loss of control. **Know and understand the selected control pattern and operating mode before operating. Be certain you can control speed, direction, braking and boom motion before operating the machine.**



Operate Safely

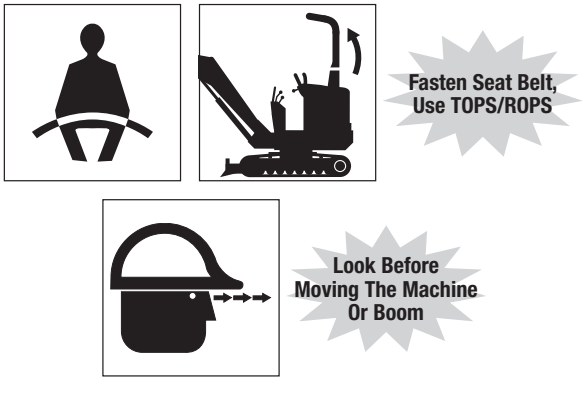
Remember

— Stay in the operator's seat, with the seat belt fastened, if equipped. If the compact excavator is equipped with a foldable TOPS/ROPS, do not fasten the seat belt when the TOPS/ROPS is in the down position.
— Understand the machine's limitations. Be in control of the machine at all times.
— Assure yourself that the work area is clear of all bystanders and other machines. Stop the machine immediately if anyone approaches.
— If a failure that causes loss of control occurs, stop all machine motion as quickly as possible. Shut the machine down and remove the key. Correct or report the problem immediately.

Remember The Other Person

WARNING! Never allow an untrained or unqualified person to operate this machine. Handled improperly, this machine could cause death or serious injury.

Do not allow anyone within the operating work radius of the compact excavator.



Never use a bucket or other attachment as a work platform or personnel carrier.

WARNING! Prevent possible injury from fall or runover. The compact excavator is a one-person machine. **NEVER PERMIT RIDERS.**

Always look around before you travel or move the boom. Look in the direction of machine movement.

Awareness on your part can prevent accidents.

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Operate Safely

Traveling On The Worksite

Know and understand the worksite traffic flow patterns and obey signalmen, road signs and flagmen.

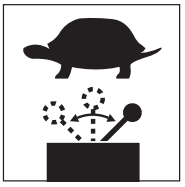
Check blade location before traveling. When blade is positioned to the rear, operate the steering levers in the opposite direction as when the blade is in the front.

The retractable track frame, if equipped, should be extended for traveling on the worksite. The track frame can be retracted to access narrow areas. Read and know manufacturer's instructions before operation.

Know the maximum height and width of the machine. Do not obstruct your vision when traveling. Always look in the direction of travel. Drive facing the travel direction when possible.

Operate the controls smoothly and slowly. Rapid and jerky movement of the controls can cause loss of both machine stability and control of the load.

When moving the machine, watch that enough clearance is available on both sides and above the boom and cab. Be especially careful to allow extra clearance on uneven ground.



Operate Controls Smoothly And Slowly



Know Weight Limits

Check for hazards or obstructions before entering an underpass or other area with restricted clearance. Check height and side clearances.

WARNING! Avoid possible injury. The weight of the machine may cause the ground, dock, ramp or floor to give way, causing loss of control, fall or tipover. **Know weight limits and stay clear of the edges of excavations and drop-offs.** Failure to know and observe weight limits and use caution could result in death or serious injury.

Operate Safely

Traveling On The Worksite (continued)

Make sure all surfaces will support the weight of the machine.

Do not cross ditches, creeks or wet draws without an adequate fill or bridge crossing.

Match travel speed to the traffic, weather and ground conditions. Take it slow and easy when traveling. Travel cautiously over rough or slippery ground and on slopes. Reduce speed when travelling over a rise.

Always give the right of way to loaded machines. Maintain a safe distance from other machines.

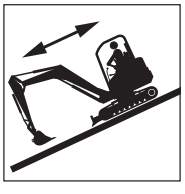
If you encounter a blind corner, stop and then proceed with caution.

Avoid traveling over obstacles (logs, tree stumps, rough terrain, ditches, curbs, railroad tracks) whenever possible. If you must cross an obstacle, do so slowly and with caution.

Avoid steep slopes or unstable surfaces. If it is necessary to travel on a slope, follow manufacturer's specific instructions. When on a slope, keep the boom centered and attachment as low and as close to the machine as possible. Proceed with extreme caution. Do not drive **ACROSS** a steep slope under any circumstances. Drive straight up and down a slope.



Travel Slowly Over Rough, Hazardous Terrain



Drive Straight Up And Down – NOT ACROSS – Steep Slopes

Avoid turning on a slope. If it is necessary, use extreme caution and make the turn **WIDE and SLOW** with the boom centered and attachment as low and as close to the machine as possible.

Avoid sudden movement of the travel controls.

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Operate Safely

Safety Precautions

Never reach into the compact excavator and attempt to operate the controls from outside the cab.

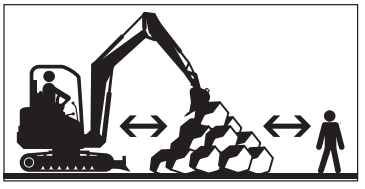
Before starting to excavate, set up safety barriers to the sides and rear area of the swing pattern to prevent anyone from walking into the working area.

Read and know manufacturer's instructions before operation.

Make sure you are aware of personnel or machines that may be hidden in blind spots on the worksite, such as piles or stacks of material.

Make sure the machine has sufficient clearance from other machines or material on the worksite to prevent contact during machine or attachment movement.

WARNING! Prevent death or serious injury. **Never lift, move or swing a load over any person or any machine cab.**





Know and use the hand signals required for particular jobs. Know who has the responsibility for signaling. Take signals from one person only.

Do not operate during storms with high winds or lightning strikes. Do not mount or dismount during a period of lightning strikes. If you are on the machine, stay on it. Warn others to stay clear of the machine in case of a lightning strike.

Operate Safely

Load Lifting

Consult the rated lift capacity chart. Do not overload this machine. Know the exact lifting capacity of the machine as equipped. Make sure you have and know how to use a current lift capacity chart for the machine. Changing conditions such as slopes, wind, ice, mud, soft ground, type of load or the weight of attachments will affect the capacity and operating characteristics of the machine.

Consult your lift chart. Lifting and handling loads over the end of the machine, rather than over either side, will improve the lifting performance of the machine.

The retractable track frame, if equipped, should be fully extended for increased lifting performance.

Attach loads only to the manufacturer's designated lifting points, if equipped.

If equipped, keep blade lowered for increased lifting performance. If ground is soft, place pads or timbers under the blade.

Operate the controls smoothly and slowly. Rapid and jerky movement of the controls can cause loss of both machine stability and control of the load.



When lifting, be sure the load is properly balanced. Move slowly so the load does not sway or swing around. Use a tag line for control.

If tracks or blade leave the ground, slowly lower the load to return the machine to the ground. Do not drop the load suddenly, because this can lead to loss of control.

Do not exceed rated lift capacity. Excessive load can cause tipping or loss of control.

Carry the load/attachment low and as close to the machine as possible. You must allow for movement in all directions. Be careful to maintain clearance of the attachment and load from the cab.

Keep all guards in place and windows closed or locked open. Keep cab doors closed or otherwise secured, if equipped.

Never leave the operator's seat with a load suspended. (See page 39, **Machine Shutdown.**)

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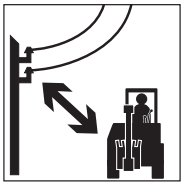
Operate Safely

Utilities – Overhead And Underground

DANGER! Electrocution or serious injury will result from CONTACTING or APPROACHING power lines or apparatus. Maintain Minimum Approach Distance. (See chart.)

DANGER! Death or serious injury will result from touching or being near a machine that is in contact with or near an energized electrical source. **Never approach power lines with any part of the machine or load unless all local, state/provincial and federal (OSHA) required safety precautions have been taken.** Use extreme caution because high voltage sources can arc without contact.

REQUIRED CLEARANCE FOR OPERATION NEAR HIGH VOLTAGE POWER LINES		
Normal Voltage, kV (Phase to Phase)	Minimum Approach Distance [Note (1)] ft	(m)
to 50	10	(3.0)
Over 50 to 200	15	(4.6)
Over 200 to 350	20	(6.1)
Over 350 to 500	25	(7.6)
Over 500 to 750	35	(10.7)
Over 750 to 1,000	45	(13.7)
NOTE: (1) Environmental conditions such as fog, smoke or precipitation may require increased clearances.		



Maintain Minimum Approach Distance



Stay Clear Of Energized Equipment

Check overhead clearances. If possible, have power to the lines de-energized and visibly grounded. If not possible, request a signal person for guidance to maintain at least the Minimum Approach Distance. (See chart.)

If the machine or load contacts an energized line, stay in the machine and attempt to break contact. Warn others to stay away from the machine. If machine catches fire and you are forced to leave, jump clear of the machine with both feet together and hop or shuffle away. **DO NOT** touch machine and ground at the same time.

Operate Safely

Locate All Underground Utilities

Confirm that One-Call has been contacted. Confirm that any utilities not subscribing to One-Call have been contacted. Confirm that the site has been marked or cleared. (See page 5, **One-Call First**.)

Obtain all information pertaining to the locate request, including the One-Call confirmation code or ticket number. If the facility owner has provided a locate sketch, obtain a copy. Review any engineering drawings provided by utilities. This information should be retained.

Personally verify One-Call utility marks. There are variations from state to state.

Take a copy of the locate sketch to the job site. Confirm all of the locates. Review the site for signs of unmarked utilities. These signs may include pedestals, pole risers, meters, trench lines, manhole covers, sewer drain outlets, etc. Review not only the immediate area, but also the perimeter of the area for utility markers.

Additionally, the area should be swept by an experienced operator using a device to locate utilities and large metal objects.

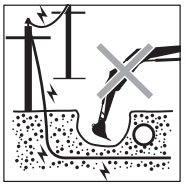
Any inconsistencies with line locations or any inaccurate locates must be resolved.

When excavating near underground services, expose the service by hand-digging or by using soft excavation, such as vacuum excavation, if permitted by local utilities.

When gas lines are present on the site, do not smoke or do anything to cause a spark in the vicinity of a gas line.

Make plans to restrict working area access—with cones and tape, barriers, warning signs, fences, etc.—until the job is complete.

Make certain that you are in compliance with all local, state/provincial, national and other requirements and regulations, including those regarding open excavations, or “potholes.”



Locate All Utilities, Maintain A Safe Distance

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Operate Safely

Trenching Safety Precautions

Follow the worksite plan for proper construction of the trench. Check with your supervisor if you are unsure of correct trench construction or if operating conditions change.

Stay alert to changes in soil conditions. Trench collapse is hazardous to all workers in the area and could cause the machine to slide into the trench.

Keep heavy loads and equipment as far from the trench as possible.

Keep spoil and stored materials such as pipe at least two feet from the edge of the trench.

Keep personnel away from the equipment and attachments.

Never swing a load or attachment over anyone.

Do not undercut the machine.

WARNING! Do not dig under the machine or blade. A resulting cave-in could cause death or serious injury.

WARNING! Avoid possible death or serious injury from trench wall collapse. **Before backfilling, see the manufacturer's manual for any specific instructions. Do not get too close to the edge of the cut.** The weight of the machine plus the fill could cause the trench wall to collapse.



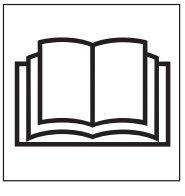
Keep Personnel Away From Equipment And Attachments

Operate Safely

Slope And Uneven Terrain Operation

Compact excavator stability and load capacity are greatly reduced on slopes. Ensure the operation can be done safely. Prevent overturns and maintain stability control:

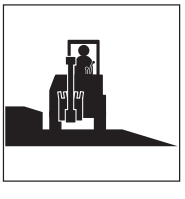
- Use machines equipped with TOPS/ROPS and a seat belt. Make sure folding TOPS/ROPS is raised and locked in place—always use the seat belt.
- The retractable track frame, if equipped, should be extended for operating on slopes or uneven terrain. Read and know manufacturer's instructions before operation.
- Review the manufacturer's manual for specific instructions and limitations, including those for proper operation of alternate/emergency exits.
- Avoid extremely steep slope operation.
- Keep machine movements slow and smooth.
- Level the working area and machine as much as possible.
- Avoid working with the tracks across a slope. This will reduce stability and increase the tendency of the machine to slide. Position the machine with the tracks running up and down the slope—blade downhill and lowered.
- Avoid slippery ground conditions.



Always Check Manuals For Specific Instructions



Fasten Seat Belt, Use TOPS/ROPS



Level The Work Area If Possible

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Operate Safely

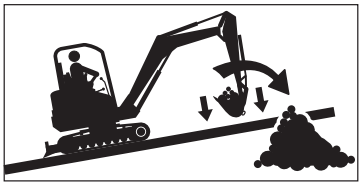
— Travel straight up and down the slope with the attachment low and close to the machine. Do not move the boom while travelling.
— Avoid swinging to the downhill side of a slope. Always keep the boom and attachment as low and close to the machine as possible.

If the machine begins to tip, roll or slide, stay in the machine with the seat belt securely fastened. Lower the attachment immediately. Hold on firmly and brace your feet on the floor. Lean away from the point of impact.

When operating the compact excavator on a slope, swing to the uphill side to dump load, if possible. If downhill dumping is necessary, swing only as far as required to dump the bucket. Use extreme caution. Always drop spoil a sufficient distance from a trench to prevent cave-ins.

If possible, avoid working with the tracks across a slope.

Before moving the machine, raise the blade sufficiently to clear the ground, and then drive the machine forward or backward as required. Lower the blade to level the machine.



Swing Load Uphill When On A Slope

Operate Safely

Hazardous Conditions

When working in hazardous areas, be extremely alert.

Always consult the manufacturer's operator manual for specific instructions.

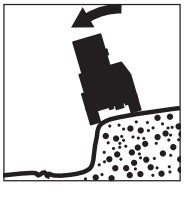
Extreme caution is required when working near the edge of an excavation. Keep the machine a safe distance away from the edge. Avoid undercutting.

WARNING! Never undercut a high bank. The edges could collapse or a slide could occur, resulting in death or serious injury.

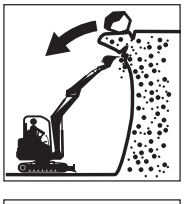
Work the jobsite in a manner that avoids creating overhangs or the need to be on top of banks or slopes. Never operate the machine close to the edge of an overhang or stockpile.

Extreme caution should be used when working along the top of banks and slopes. Keep as far back from the edge as possible. Level the area if possible. Keep the machine tracks perpendicular to the edge so that if part of the edge collapses, the machine can be moved back.

Immediately move the machine back at any indication the edge may be unstable.



Use Caution – Stay Safely Away From Bank Or Excavation Edge



Never Undercut A High Bank

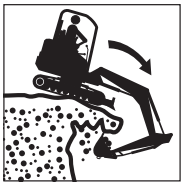


Operate Perpendicular To Banks – Stay Back From The Edge

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Operate Safely

WARNING! Do not dig under the machine. A cave-in could result and the machine could fall into the excavation, resulting in death or serious injury.



Use Caution Near Excavation Edge – Do Not Undercut Machine

Avoid Silica Dust

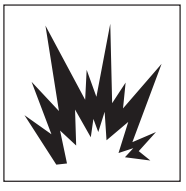
Cutting or drilling concrete or rock containing quartz may result in exposure to silica dust. **Do not exceed Permissible Exposure Limits (PEL) to silica dust as determined by OSHA or other worksite rules and regulations.** Use a respirator, water spray or other means to control dust. Silica dust can cause lung disease and is known to cause cancer.



Avoid Silica Dust

Operation In Flammable/Explosive Atmosphere

WARNING! Avoid possible death or serious injury. **Never operate an excavator in these areas. Use of these excavators in explosive atmospheres can result in fires and explosions, causing death or serious injury.**



Do Not Operate In Explosive/Flammable Atmosphere

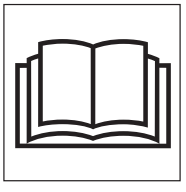
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Operate Safely

Towing

Many compact excavators may not be towed. Refer to the manufacturer's manual(s) for specific towing instructions.

Never straddle a tow line or stand near a tow line under tension.



Consult Manufacturer's Manual Before Towing

Parking

Park the machine in a designated area out of traffic, preferably on level ground. (See page 39, **Machine Shutdown**.)

If freezing conditions are expected, the tracks should be first cleared of mud and dirt and the machine parked on planks or suitable debris.

Public roads are not suitable for parking. If the machine is disabled or you must park on a public road, barricade and mark the machine according to local and worksite regulations.

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Shut Down Safely

Machine Shutdown

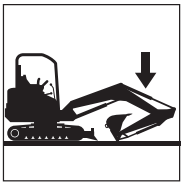
Properly shutting down a compact excavator can help prevent accidents when the machine is left unattended. Shut down the excavator following the specific procedures in the manufacturer's operator manual.

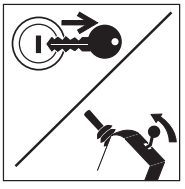
A typical list includes:
— Stop the machine.
— Make sure the area around the machine is clear of personnel.
— Slew the machine to align the upperstructure with the undercarriage, if possible.
— Return controls to neutral, including the auxiliary hydraulic controls.
— Lower the attachment and blade to the ground with slight down-pressure.
— Idle engine for a short cool-down period.
— Stop the engine.
— Cycle all hydraulic controls to relieve system pressure.
— Engage the control locking device, if equipped.
— Remove ignition key.
— Block the tracks if on a slope or incline.
— Check for and clean out trash build-up, especially in the engine compartment, battery box, around exhaust components, in confined spaces, under the machine and around rotating components.

Safe Dismounting

Never dismount from moving equipment. Observe proper shutdown practices before dismounting. Check for slippery steps and handholds.

Dismount carefully using three-point contact facing the machine. (See page 21, **Mount And Dismount Properly**.)





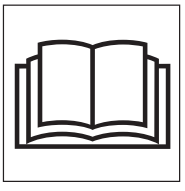
Load And Unload The Machine Safely

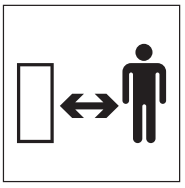
Loading And Unloading For Transport

All machines are not loaded in the same way, and the procedures given in the manufacturer's manual(s) should always be followed.

Some precautions apply to all machines:
— Keep bystanders away.
— Wear the seat belt, if equipped.
— If the compact excavator is equipped with a foldable TOPS/ROPS, make sure it is properly secured in the raised position.
— Place transport vehicle on a firm, level surface.
— Block or support the rear of the trailer.
— Secure the parking brake and block transport vehicle so it cannot move.
— Use ramps with slip-resistant surfaces, adequate size and strength, low angle (15 degrees or less) and proper height.
— Keep trailer bed and ramps clear of mud, oil, ice, snow, leaves and other debris.
— Position the attachment to the front of the machine.
— Drive forward up the ramps, raising the blade high enough for clearance.
— Cover or remove any SMV (Slow-Moving Vehicle) emblem.
— Secure the cab door, attachment and accessories in the transport position.
— Engage upperstructure slew lock, if equipped.
— Chain and block the excavator securely for transport. Refer to the manufacturer's operator manual for tie-down procedures.

Measure the transport height and width of the loaded machine to avoid overhead and width obstructions. Make sure clearance flags, all lights and warning signs are in place and visible.

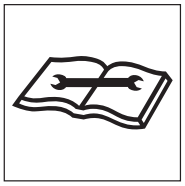




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Perform Maintenance Safely

Maintain Equipment



Be sure to maintain equipment according to manufacturer's instructions. Regularly check the operation of the protective and safety devices.

Do not perform any work on the compact excavator unless you are authorized and qualified to do so.

If you have been authorized to maintain the equipment, **read the operator, maintenance and service manuals.** Study the instructions, check the lubrication charts and examine all the instruction messages on the machine. Maintenance can be dangerous unless performed properly. Be sure you have the necessary skill, information, tools and equipment to do the job correctly.

If adjustments must be made with the engine running, always work as a 2-person team with one person sitting in the operator's seat while the other works on the machine.

IMPORTANT! Do not modify equipment or add components not approved by the manufacturer. Use parts, lubricants and service techniques recommended by the manufacturer.

Protect Yourself

Wear personal protective clothing and Personal Protective Equipment (PPE) issued to you or called for by job conditions.

You may need:
— Hard hat
— Safety boots with non-slip soles
— Safety glasses, goggles or face shield
— Apron and heavy-duty gloves
— Hearing protection
— Welding helmet or goggles
— Respirator or filter mask

Wear whatever is needed to protect yourself—do not take chances.

Perform Maintenance Safely

WARNING! Prevent death or serious injury from entanglement. **Do not wear loose clothing or accessories. Restrain long hair. Stay away from all rotating components when the engine is running.** Contact with or entanglement in rotating or moving parts could result in death or serious injury.

Wear a rubber apron and rubber gloves when working with corrosives. Wear gloves and safety shoes when handling wooden blocks, wire rope or sharp-edged metal.

Always use safety glasses, goggles or a face shield. They provide eye protection from fluids under pressure, during grinding and while servicing batteries. Protection is also needed from flying debris, liquids and loose material produced by equipment, tools and pressurized air/water/oil/fuel.

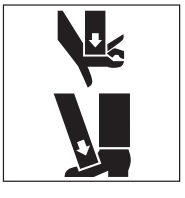
Wear a face shield when you disassemble spring-loaded components or work with battery acids. Wear a welding helmet or goggles with a shaded filter when you weld or cut with a torch.

Do not sand, grind, flame-cut, braze or weld without an approved respirator or appropriate ventilation. If welding is required on the machine, refer to the manufacturer's manuals or consult the equipment dealer for proper procedures. Make sure all flammable material is cleared from the area.

Keep pockets free of all objects that could fall out and drop into machinery.

Handle tools and heavy parts sensibly, with regard for yourself and other persons. Lower items—do not drop them.





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Perform Maintenance Safely

Prepare The Work Area

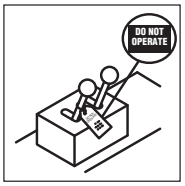
— Position the compact excavator in a level area out of the way of other working equipment.
— Make sure there is adequate light, ventilation and clearance.
— Remove oil, grease, ice and snow or water to eliminate any slippery surfaces.
— Clean around the machine and work area to minimize contamination. Clean up oil or fuel spills promptly and dispose of the material properly.

Prepare The Machine

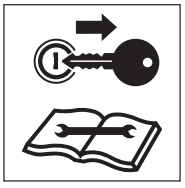
— Attach a “DO NOT OPERATE” warning tag to the control levers and remove the ignition key if the machine should not be started.
— Block the tracks.
— Release all hydraulic, water and air pressure. Lower, lock or block all hydraulically supported components.

WARNING! Disconnecting or loosening any hydraulic component or a part failure can cause unsupported equipment to drop. **Do not go under or near raised equipment unless supported by a manufacturer-approved support device(s).** Death or serious injury could result from falling equipment.

— Remove only guards or covers that provide access to the area being serviced. Replace all guards and covers when work is complete.



Use Warning Tags



Remove Key And Read Maintenance Manual



Use Approved Support Device

Perform Maintenance Safely

Use Approved Ventilation

If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.

WARNING! Prevent possible injury. **Never work on machinery with the engine running unless instructed by the manufacturer’s manuals for specific service.**

WARNING! Never operate any type of engine without approved ventilation—EXHAUST FUMES CAN KILL.



Ventilate Work Area

Use Jacks And Hoists Carefully

If you must work beneath raised equipment, use solid wood blocks, jack-stands or other rigid and stable supports. Never use concrete blocks. When using jacks or hoists, always be sure they are adequately supported and of adequate capacity.

Make sure the hoists or jacks you use are in good repair. Never use jacks with cracked, bent or twisted parts. Never use frayed, twisted or pinched cables. Never use bent, worn or distorted hooks.

Protective Structure Safety

Do not remove or modify a protective structure (TOPS/ROPS, FOGS/FOPS OPS) except for service. Reinstall with manufacturer-approved fasteners before further machine operation.

Replace a damaged protective structure. Refer to the manufacturer’s manual for specific instructions and inspection requirements.

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Perform Maintenance Safely

Common Maintenance Safety Practices

Fuel Hazards

IMPORTANT! Always use approved fuel containers and dispensing equipment.

Fuels are flammable, so observe these practices to reduce the possibility of a serious accident.
- — Shut off engine and ignition before refueling.
- — Always ground the fuel nozzle against the filler neck to avoid sparks.
- — Keep sparks and open flames away from fuel.
- — Do not use a cell phone or two-way radio while fueling or handling fuel—they could cause sparks.
- — Do not smoke while refueling or when handling fuel containers.
- — Do not cut or weld on or near fuel lines, tanks or containers.
- — Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.

Always use a nonflammable solvent when you clean parts. Do not use gasoline, diesel fuel or other flammable fluids.

Store all flammable fluids and materials away from work areas in suitable containers, per local regulations.

Cooling System Hazards

Liquid cooling systems build up pressure as the liquid gets hot, so **use extreme caution** before removing the radiator or tank cap. Be sure to:
- — Stop the engine and wait for the system to cool.
- — Wear protective clothing and safety glasses.
- — Turn the radiator or tank cap slowly to the first stop to allow the pressure to escape before removing the cap completely.



Perform Maintenance Safely

Hydraulic System Hazards

The hydraulic system is under pressure whenever the engine is running and may hold pressure even after the engine is shut off. Cycle all hydraulic controls, including auxiliary controls, after the engine is shut down to relieve trapped pressure in the lines.

During inspection of the hydraulic system:
- — Wait for fluid to cool before disconnecting the lines. Hot hydraulic fluid can cause SEVERE BURNS.
- — **Do not** use your hand to check for leaks.
- — Wear appropriate eye protection. Hydraulic fluid can cause permanent eye injury.

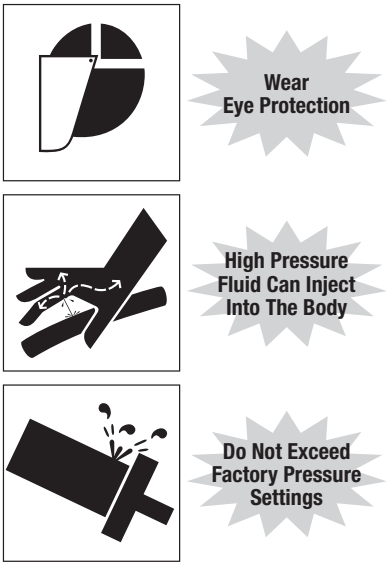
WARNING! Diesel fuel and hydraulic fluid under pressure can penetrate the skin or eyes and cause serious injury, blindness or death. Fluid leaks under pressure may not be visible. **Use a piece of cardboard or wood to find leaks, not your hand. Wear a face shield or safety goggles for eye protection.** If fluid is injected into the skin, it must be removed within a few hours by medical personnel familiar with this type of injury.

When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually.

Never reset any relief valve in the hydraulic system to a pressure higher than recommended by the manufacturer.

Follow manufacturer's instructions when taking oil samples.

Do not permit an open flame around the hydraulic system.



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Perform Maintenance Safely

Electrical System Hazards

Before working on the electrical system, disconnect the battery cable(s).

— Remove the battery negative (-) cable(s) first.
— When reconnecting the battery, connect the battery negative (-) cable(s) last.

Battery electrolyte contains acid, which is a POISON and can cause SEVERE CHEMICAL BURNS.

Avoid Injury

— Wear a face shield to prevent electrolyte contact with your eyes.
— Wear chemical-resistant gloves and clothing to keep electrolyte off your skin and regular clothing.

WARNING! Electrolyte will damage eyes or skin on contact. **Always wear a face shield to avoid getting electrolyte in eyes.** If electrolyte contacts eyes, flush immediately with clean water and get medical attention. **Wear rubber gloves and protective clothing to keep electrolyte off skin.** If electrolyte contacts exposed skin or clothing, wash off immediately with clean water.

If electrolyte is ingested, seek MEDICAL ATTENTION IMMEDIATELY. NEVER give fluids that would induce vomiting.



Perform Maintenance Safely

Avoid Battery Explosion

WARNING! Avoid possible death or serious injury from explosion. Lead-acid batteries produce extremely explosive gases, especially when being charged. **Keep arcs, sparks, flames and lighted tobacco away.**

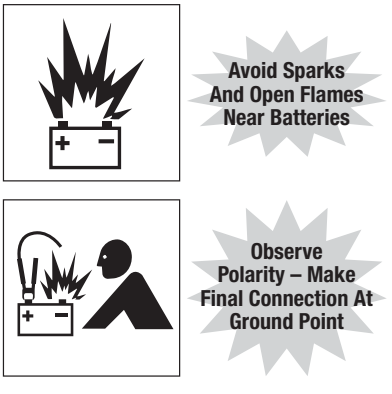
— **Do not** smoke near batteries.
— Check battery cables for worn or damaged insulation.
— Keep arcs, sparks and open flames away from batteries.
— Provide adequate ventilation.

Never check the battery by placing a metal object across the battery posts; the resulting spark could cause an explosion.

WARNING! Avoid possible death or serious injury from battery explosion. **Do not charge a battery or boost-start the engine if the battery is frozen. Warm to 60°F (15.5°C) or the battery may explode.**

Safety rules during battery boost-starting:

— Follow the instructions for proper “battery boost-starting” as specified in the manufacturer’s manual.
— Be sure the machines are not touching.
— Observe the polarity of the batteries and connections.
— Make the final cable connection to the engine or the ground point farthest from the battery and away from fuel lines. Never make the final connection at the starter or dead battery—sparks may ignite the explosive gases present at the battery.
— When disconnecting cables after boost-starting, remove the cables in reverse order of connection (i.e., final connection first).



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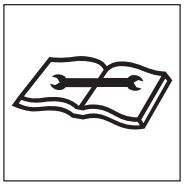
Perform Maintenance Safely

Track Maintenance And Adjustment

Check the tracks daily because the stability of the compact excavator can be dramatically affected by damage to tracks.

Check for:
— Damage or wear
— Correct tension according to manufacturer's instructions
— Proper lubrication of track rollers and idlers—refer to the manufacturer's manuals.

Track tension is important for good performance, reducing excessive track wear and preventing the tracks from coming off. Track and roller wear varies with working conditions and soil conditions. Special tools and procedures may be needed to check or adjust track tension. Follow manufacturer's specific service procedure(s) when removing and installing tracks.





WARNING! Track tensioning systems have compressed springs or pressurized fluid (oil or grease). Improperly releasing track tension forces can result in death or serious injury. **Always follow the manufacturer's warnings and instructions for track adjustment and other maintenance and servicing procedures.**

WARNING! Avoid possible death or serious injury. **Never strike or pound on track tension springs.** They may be under very high compression and could shatter explosively.

Perform Maintenance Safely

Complete Service And Repairs Before Machine Is Released

Tighten all bolts, fittings and connections to torques specified by the manufacturer.

Clean or replace all damaged, missing or painted-over signs, plates and decals that cannot be read.

Inspect and install all guards, covers and shields after servicing. Replace or repair any damaged parts. Refill and recharge pressure systems only with manufacturer-approved or recommended fluids.

Check readiness of fire extinguishers, if so equipped. Do not paint over or otherwise interfere with fire detectors or fire extinguisher access points.

Follow the instructions in the manufacturer's manual(s) for proper service of any fire suppression equipment on the machine.

Air conditioning service is limited to approved service personnel. Refer to the manufacturer's manual(s).



Start the engine and check for leaks. (See page 46, **Hydraulic System Hazards**.) Operate all controls to make sure the machine is functioning properly. Test the machine if necessary. After testing, shut down and check the work you performed. Are there any missing cotter pins, washers, locknuts, etc.? Recheck all fluid levels before releasing the compact excavator for operation.

All parts should be inspected during repair and replaced if worn, cracked or damaged. Excessively worn or damaged parts can fail and cause death or injury.

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Final Word To The User

You have just finished reading the AEM Compact Excavator Safety Manual. It is impossible for this manual to cover every safety situation you may encounter on a daily basis. Knowledge of these safety precautions and your application to the basic rules of safety will help to build good judgment in all situations. Our objective is to help you develop, establish and maintain good safety habits to make operating a Compact Excavator easier and safer for you.

This manual is another in a series on the safe operation of machinery published by AEM.
Many pictorials in this safety manual can be found and downloaded at http://pictorials.aem.org.
For additional publications visit our website at www.safetymaterials.org.

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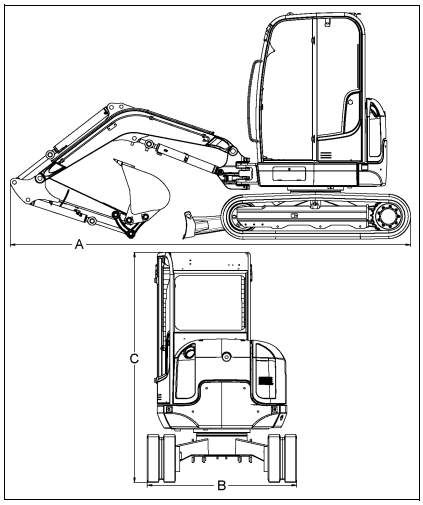
e-mail safetymaterials@aem.org
www.aem.org

FORM CE-1009
Printed in U.S.A.

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Information

The shipping document describes several basic settings and functions of the vehicle. The vehicle operator's manual contains further important safety instructions. The operator must familiarize themselves with all instructions and notices before commissioning the vehicle and adhere to them. The vehicle operator's manual must be completely read before commissioning the vehicle.

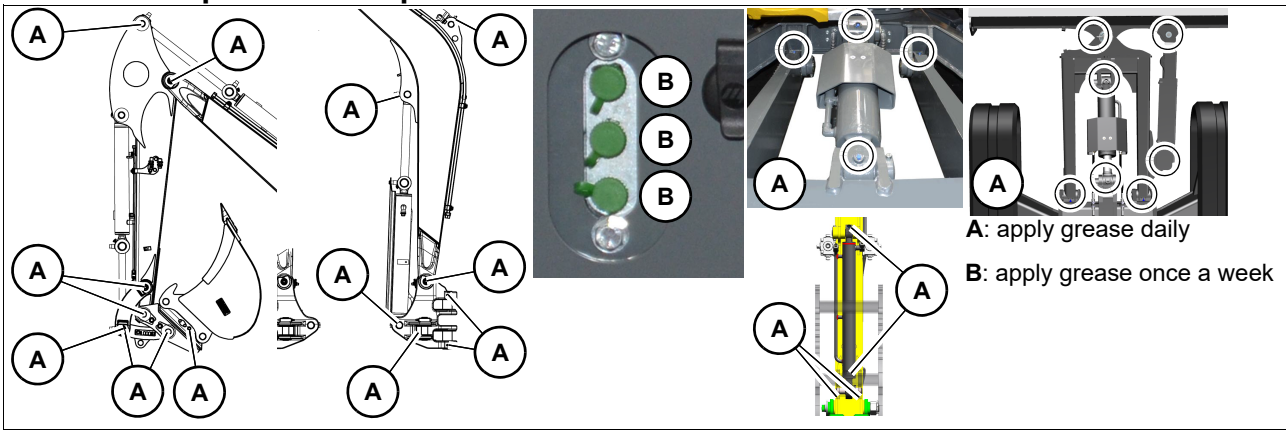


Dimensions		
A	Length with long stick (ET35)	4780 mm (15'-8")
	Length with long stick (EZ36)	4881 mm (16'-0")
B	Width (ET35)	1630 mm (64 in)
	Width (EZ36)	1750 mm (69 in)
C	Height	2491 mm (8'-2")

Weight	ET35	EZ36
Transport weight[1]	3364 kg (7415 lbs)	3529 kg (7779 lbs)
Operating weight[2]	3553 kg (7834 lbs)	3718 kg (8197 lbs)
Cab option	+ 68 kg (151 lbs)	
Full fuel tank	+ 36 kg (79 lbs)	

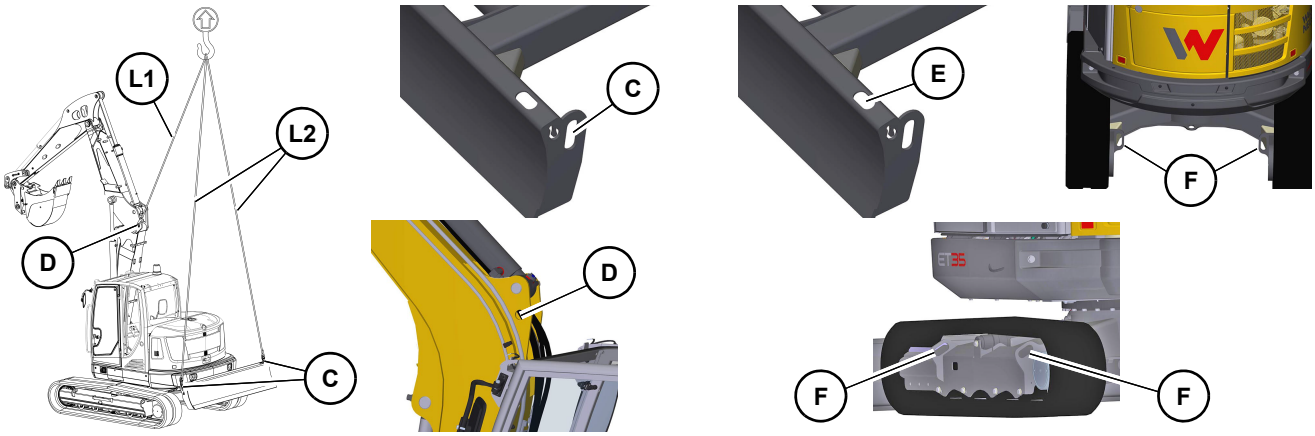
1. Transport weight: basic vehicle + 10% fuel tank capacity
2. Operating weight: basic machine + full fuel tank + bucket (500 mm/20 in) + operator (75 kg/165 lbs)

Lubrication points/transport



A: apply grease daily

B: apply grease once a week

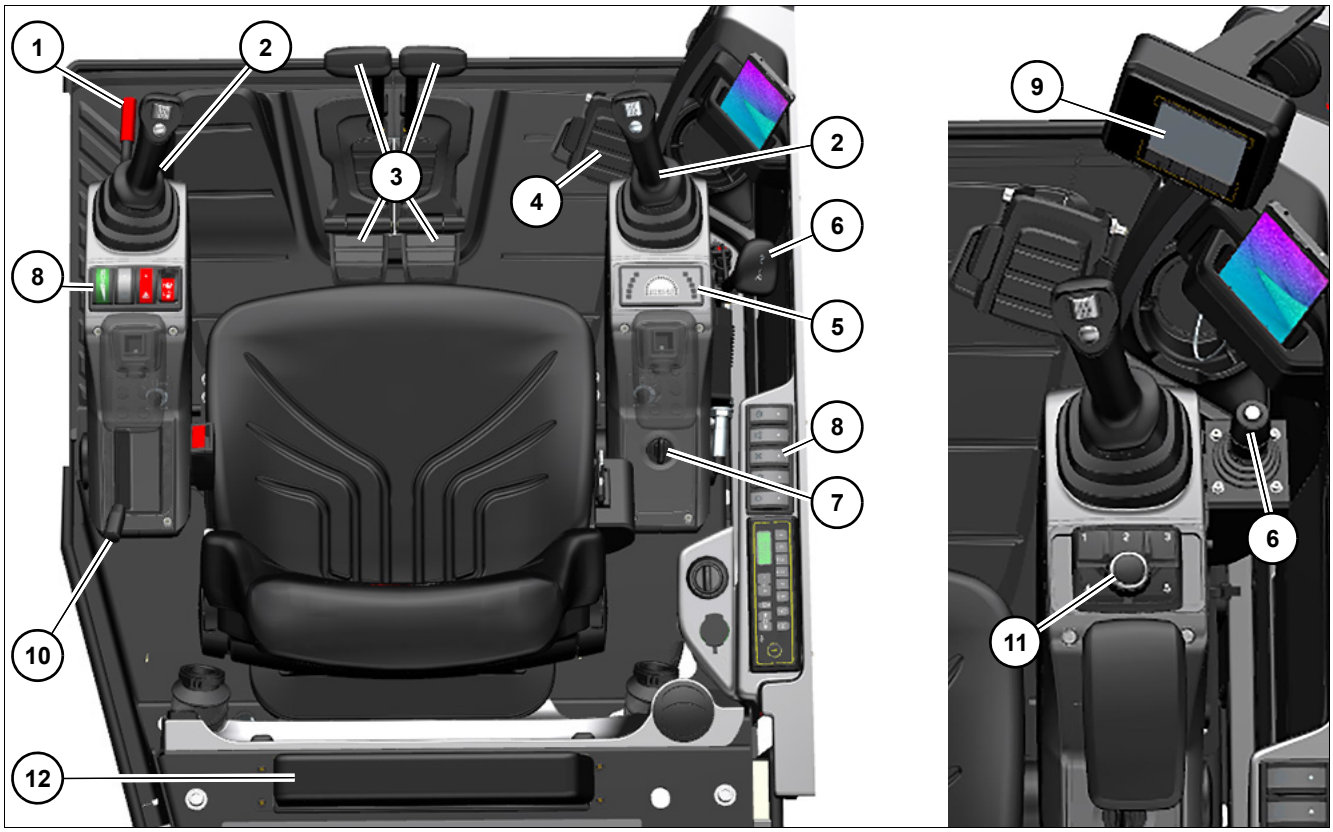


L1: 1500 mm (59 in)
L2: 3400 mm (11‘-2“)

C: dozer blade lifting lugs (2)
D: boom lifting lug (1)
E: dozer blade lashing eyes (2)
F: travel gear lashing eyes (6)

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Brief overview of operation



Control elements	
1	Control lever base
2	Control lever left/right
3	Drive levers/accelerator pedals
4	Boom swivel pedal
5	Display element tier III
6	Stabilizer-blade lever
7	Ignition lock
8	Switch panel/button panel
9	Multifunctional display tier IV (option)
10	Manual throttle tier III
11	Jog dial/manual throttle tier IV (option)
12	Document box (option)

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Technical data, dimensions and weights are only given as an indication. Responsibility for errors or omissions not accepted.

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Wacker Neuson Linz GmbH

Flughafenstraße 7

A-4063 Hörsching

Austria

https://truckmanualshub.com/



Wacker Neuson Linz GmbH
Flughafenstraße 7
A-4063 Hörsching

Phone: +43 (0) 7221 63000
Fax: +43 (0) 7221 63000-2200
E-mail: office.linz@wackerneuson.com
www.wackerneuson.com

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