

User manual

STONE AND SORTING GRAB

SG03 | SG06 | SG09 | SG12 | SG19 | SG26 | SG33



Article 9000296 | Version 1.7



Preface

Dear Customer,
Thank you for choosing a product from engcon.

engcon is the market leader in tiltrotators and tools for excavators. We represent innovation, knowledge and experience, and we develop our products with a focus on the customer's needs. Please visit our website for contact information and details about the rest of our product range.

www.engcon.com

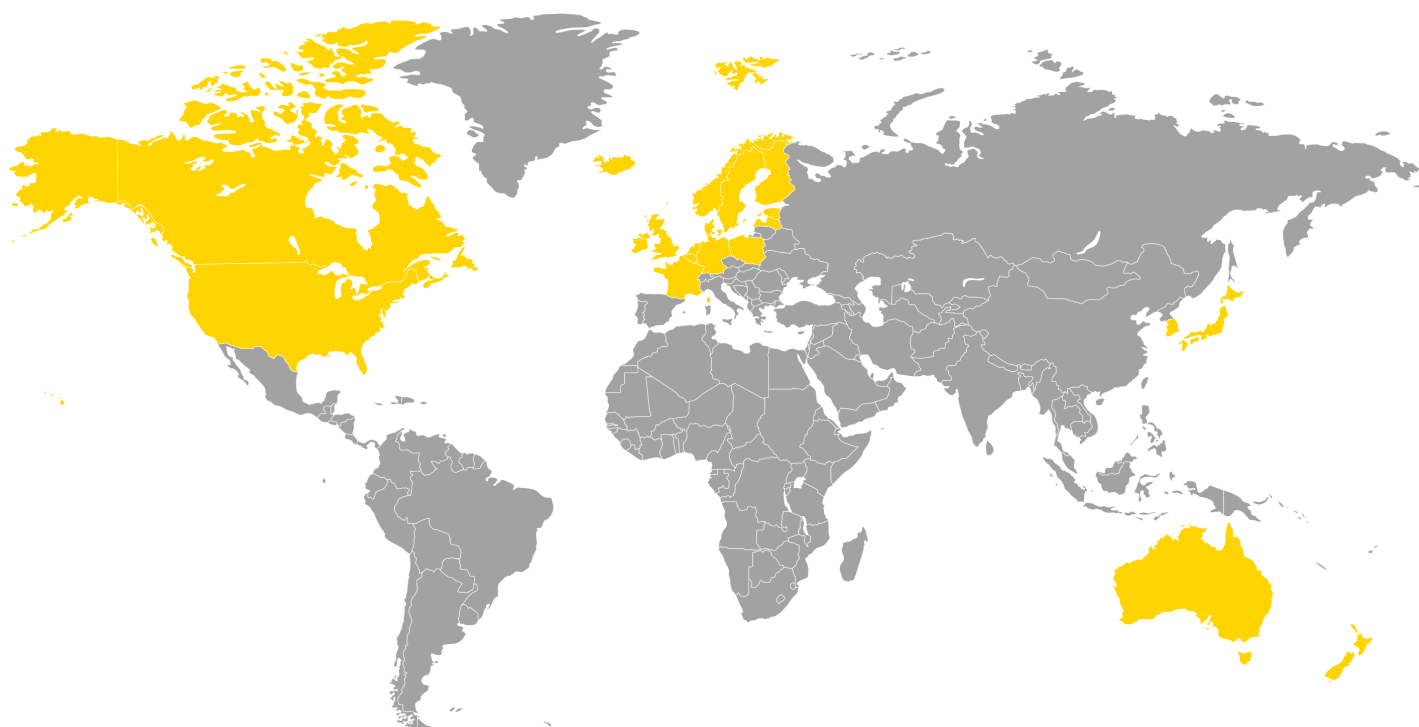


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1. Introduction

1.1. General

This user manual contains important information about your product's functions and characteristics, and how to use it in the best way. Before you begin using the product, it is important that you read and understand the content of these instructions, especially the sections that address safety.

In addition to these instructions, you must study and understand the applicable safety information for the relevant base machine as well as any other equipment involved.

The user manual is supplied with supplementary documentation providing more detailed descriptions of the installation, fitting, operation and maintenance of control systems and custom modifications for your specific product.

Information, images, illustrations and specifications used in the instructions are based on product information that was available at the time of going to press. Images and illustrations used in the instructions are typical examples and not intended to be exact depictions of various parts of the product. We reserve the right to make changes without prior notice.

Always store the user manual together with any other supplementary information in a safe manner and such that it is always available.

1.2. Scrapping and recycling

engcon makes constant efforts to reduce its environmental impact. engcon's products comprise at least 99 per cent recyclable material. All assembly and service work must take place in compliance with legislation and ordinances governing the environment, health and occupational safety. This refers to all work with residual materials including handling, storage and processing. To prevent contamination of soil and water, spillages must be avoided. Should a spillage occur, it must be dealt with.

Hazardous waste may only be disposed of by those authorised to do so. All waste produced must be disposed of in compliance with applicable legislation and ordinances:

- Metal and plastics to be recycled.
- Hydraulic hoses are normally used for energy recovery (sort as hazardous waste).
- Oils and greases are normally used for energy recovery (sort as hazardous waste).
- Electronic components to be recycled for materials (sort as hazardous waste).
- Packaging to be sorted at source and recycled for materials.
- Paper to be sorted at source and recycled for materials.

If in doubt, contact the environmental manager at engcon.

1.3. Warranty

This product was designed, dimensioned and manufactured by engcon. It is forbidden to modify, alter or convert this product such that it no longer corresponds to the manufacturer's specifications. When replacing parts or making repairs, contact an authorized workshop.

Warranty: One (1) year providing the product has not been subjected to abuse or other abnormal operation.

1.4. Technical support and spare parts

Contact information for support and spare parts can be found at www.engcon.com.

1.5. Product approval

1.5.1. EU Declaration of Conformity

Manufacturer: engcon Nordic AB - Industricentragatan 4, 833 93 Strömsund, Sweden

THE OBJECT OF THE DECLARATION DESCRIBED BELOW CONFORMS WITH

Directive: Machinery Directive 2006/42/EU.

Type designation:

| | |
|--------------------|-------------------------|
| Part no: | Serial No: |
| Max jacking point: | Max hydraulic pressure: |
| Date: | Other: |

Harmonised standards

SS-EN ISO 12100:2010

SS-EN 474-1:2006+A5:2018

SS-EN 474-5:2006+A3:2013

The standards and regulatory directives have been applied and the product complies with the requirements for CE marking.

This declaration and engcon's warranties will cease to be valid immediately if spare parts other than engcon original spare parts are used, or if any changes or other interventions are made without engcon's permission.

SIGNED FOR AND ON BEHALF OF



Krister Blomgren – Signatory, engcon Nordic AB
Strömsund, 2023-04-26

Qualified person authorised to compile the technical documentation:

Fredrik Jonsson, Head of R&D, engcon AB

2. Safety

2.1. General

It is important that you read and understand all warnings prior to installation work on this product or before you use it and any accessories supplied. The warning texts highlight potential risks and describe how to avoid them. The following warning levels are used in this user manual:

**DANGER**

Indicates that an accident will occur if the regulation is not followed. Risk of personal injury or death.

**WARNING**

Indicates that an accident may occur if the regulation is not followed. Risk of personal injury or death.

**CAUTION**

Indicates that an accident may occur if the regulation is not followed. Risk of personal injury.

IMPORTANT

Indicates that an accident may occur if the regulation is not followed. Risk of damage to property, process or the surroundings.

REMARKS

Specifies additional information that may make performance or understanding of specific operations easier.

3. Design and function

3.1. General

engcon's stone and sorting grab is perfectly suitable for sorting waste. The tool has a bolt-on gate/attachment point that allows the attachment points to be changed easily when necessary.



DANGER

Do not exceed tipping load limits. The weight of the product and the increased reach may impair stability. Risk of personal injury and damage to property.

3.2. EC-Oil

engcon's system for more efficient tool changes. It provides the ability to switch hydraulic tools without leaving the cab. The system is designed for maximum reliability in harsh environments. It is a fully hydraulic system that handles the connection of tools under full system pressure.

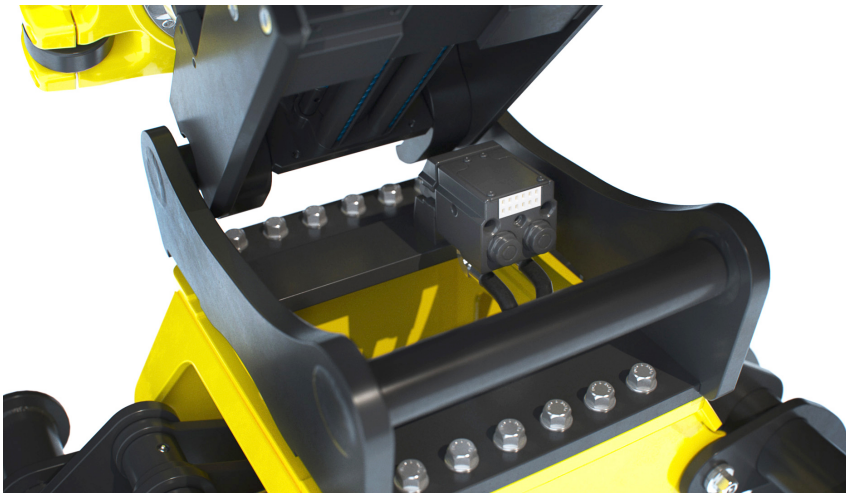


Figure 1.

4. Installation

It is important to check the necessary additional documentation before installation. At time of delivery, your product and supplementary documentation are as far as possible adapted to your base machine.



WARNING

Never attempt to increase the maximum capacity of the equipment by modifications not approved by the supplier. Risk of personal injury and damage to property.



WARNING

If you have any doubts concerning the safety aspects of your knowledge, the equipment or work, contact a dealer or engcon Nordic AB. Incorrect installation affect safety.



WARNING

Welding is not permitted. It can have a negative impact on safety. Risk of personal injury and damage to property. For welding, contact your dealer or engcon Nordic AB.



WARNING

Beware of moving parts. A lack of awareness may lead to crush injuries. Risk of personal injury.

IMPORTANT

Ensure miscibility with the base machine's hydraulic oil prior to installation. If you are in any doubt, contact your lubricant supplier. An incorrect mixture could damage hydraulic components.

4.1. Identification

Check that your product's rating plate matches the information on the EC Declaration of Conformity. If there is any deviation, contact the supplier before you begin initial installation.

The rating plate is located on the stone and sorting grab's yellow body.

Rating plate content:

Type designation
Serial number
Year of manufacture
Weight
Max hydraulic pressure
Max machine weight



Figure 2.

4.2. Mechanical

If the product is installed on a machine hitch, tiltrotator or rotator, use the user manual for connecting tools.

**DANGER**

Do not exceed tipping load limits. The weight of the product and the increased reach may impair stability. Risk of personal injury and damage to property.

**WARNING**

If you have any doubts concerning the safety aspects of your knowledge, the equipment or work, contact a dealer or engcon Nordic AB. Incorrect installation affect safety.

4.3. Electrical and hydraulics

Installing hydraulic hoses

1. Make sure the tool is level and resting stably.
2. Connect the base machine's machine hitch/tiltrotator to the tool.
3. Stop the engine and depressurise the base machine's hydraulic outlet by operating the tool's functions.



WARNING
The hydraulic system must be de-pressurised before work on the system is begun. Risk of personal injury and damage to property.

4. Connect the hydraulic hoses to the base machine's hydraulic outlets. Make sure the correct hydraulic outlets are used.



Figure 3.

4.4. On completion

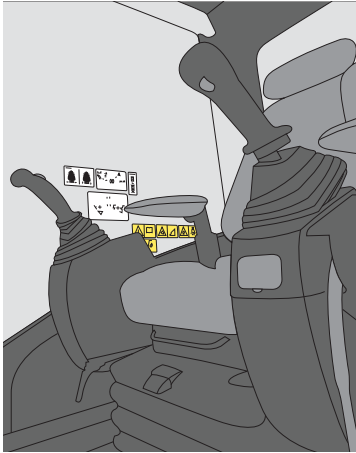


Figure 4.

Affix the warning decal supplied in a conspicuous place that does not distract the operator.



WARNING

Replace damaged or illegible signs and decals before using the machine. Risk of personal injury and damage to property.

2. Carry out function checks:

- Run all the tool functions a few times to remove any air from the system. Important for preventing uncontrolled movement.
- Make sure the tool operates when the hydraulics are running.
- Check that the hoses are not subjected to pinching, cutting or stretching.

5. Operation

5.1. Before and during use

Check your base machine manufacturer's recommendations for calculating tipping loads, and be sure to include the increased weight and reach the product entails.

Open and close the grab using the regular controls in the base machine.

**DANGER**

Do not exceed tipping load limits. The weight of the product and the increased reach may impair stability. Risk of personal injury and damage to property.

Before using your product, remove the yellow protective covers from the EC-Oil block.



If your product is equipped with a rotator, there are instructions for the rotator section in the tiltrotator user manual.

The grab is not designed for lifting with chains, straps or similar.

**WARNING**

Use dedicated lifting equipment when lifting objects. Risk of personal injury and damage to property.

The grab is equipped with a pressure accumulator. Be aware of the risks with pressurised devices.

**WARNING**

The hydraulic system must be de-pressurised before work on the system is begun. Risk of personal injury and damage to property.

**WARNING**

Be aware of your surroundings when working with the grab, as material can become loose and be thrown clear. Risk of personal injury and damage to property.

**WARNING**

Take care when handling long objects. Take dynamic load and the extended risk area into account. Risk of personal injury and damage to property.

**WARNING**

Always make sure of a good grip when lifting objects.
Risk of personal injury and damage to property.

**WARNING**

Do not leave the base machine with the tool raised.
Risk of personal injury and damage to property.

IMPORTANT

Check the base machine's specified max capacity. Any use of the product in excess of base machine max capacity may damage the machine.

6. Maintenance

6.1. General

Intervals for greasing and inspections to be performed by the user:

- Daily, carried out on all configurations before the machine is put into use for the working day.
- Every 16 operating hours, grease according to the lubrication schedule.



If your product is equipped with a rotator, there are instructions for the rotator section in the tiltrotator user manual.



DANGER

Check the attachment points regularly and be alert for the formation of cracks. Risk of personal injury and damage to property.



WARNING

Make sure that service and maintenance is carried out according to the manufacturer's recommendations. Inadequate maintenance may cause defects on the base machine and its equipment.



WARNING

When changing hoses, only hoses with press couplings may be used. Screw connections may not be used. Risk of personal injury and damage to property.

IMPORTANT

Review the personal and environmental risks of hydraulic oil and grease by reading the safety data sheets for the hydraulic oil and grease in use. Risk of personal injury and damage to surroundings.

IMPORTANT

Be sure to keep your product clean. Inadequate cleaning can cause damage to your equipment.

6.2. Daily inspections

The grab is equipped with a pressure accumulator.



WARNING

Be aware of the risks with pressurised devices. Risk of personal injury.



WARNING

Avoid contact with hydraulic oil. Risk of burns.



WARNING

Never use your hands to search for leaks in the hydraulic system. Use the necessary protective equipment. Pressurised hydraulic oil can penetrate the skin. Risk of personal injury.



WARNING

Beware of moving parts. A lack of awareness may lead to crush injuries. Risk of personal injury.



WARNING

The hydraulic system must be de-pressurised before work on the system is begun. Risk of personal injury and damage to property.

Check daily:

- No damage or cracks are present.
- Warning decals are present and legible.
- Check that the tool is properly attached to the quick hitch/machine hitch.
- There are no hydraulic leaks.
- Check that the product is clean. Clean the product. Be very sure to clean the hydraulic components.
- That divisible bolted joints are tightened. If any bolted joint is loose, tighten it according to 6.5. Tightening torque

**WARNING**

Always make sure the latches protrude as specified for the quick hitch concerned. The tool may only be used if locking is correctly completed.

**WARNING**

Welding is not permitted. It can have a negative impact on safety. Risk of personal injury and damage to property. For welding, contact your dealer or engcon Nordic AB.

**WARNING**

Replace damaged or illegible signs and decals before using the machine. Risk of personal injury and damage to property.

6.3. Special maintenance

6.3.1. EC-Oil

Cleaning

- Clean oil connections, electrical connectors, grease connections and dirt guards before and after use in order to avoid oil or grease leakage and safeguard EC-Oil function.
- If oil or grease leakage occurs despite cleaning, we recommend face seal replacement.
- Clean electrical connectors daily and spray with water repellent.

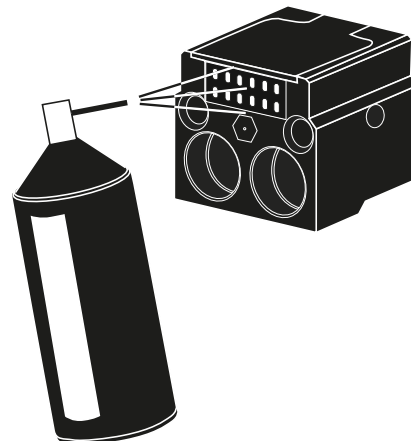


Figure 5.

Guard

During transport and extended layups, use the protection supplied on the EC-Oil block.



Figure 6.

6.3.2. Expander pin

The information in this section makes sure the expander pins are properly installed and that the system is detachable in connection with service or joint bearing changes.

6.3.2.1. Recommended tightening and retightening torque

Torque recommendation

Screws

| Unit | M12 | M14 | M16 | M20 | M24 | M30 | M36 | M42 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| (Nm) | 70 | 115 | 175 | 350 | 500 | 600 | 700 | 900 |

Table 1.

Nuts: Standard height

| Unit | M12 | M14 | M16 | M20 | M24 | M30 | M36 | M42 |
|------|-----|-----|-----|-----|-----|-----|-----|-----|
| (Nm) | 65 | 115 | 175 | 250 | 350 | 500 | 600 | 700 |

Table 2.

Check tightening torque during scheduled maintenance Set the recommended torque according to Table 1. and Table 2. . Apply torque to the torque wrench until the set the value is achieved.

Retightening

Retightening the expander pins is crucial for successful installation.

Grease the joint between the expander pin and the attachment. We recommend grease with 3-5% molybdenum sulphide to minimize shaft wear and increase the load-bearing capacity of the hinge.

Retightening intervals

Operating hours

- After 1 hour
- After 3 hours

- After 10 hours or 1 day*
- After 40 hours or 4 days*

* If no additional torque is added when retightening the pins, the installation is successful.

If the expander sleeves have not bedded in after one week's operation, contact your dealer.

6.3.2.2. Removal

1. Unscrew the fasteners on both sides and remove any washers.
2. Tap the shaft body until the sleeve on the impact side releases. Use a pipe as a drift between the hammer and the shaft to prevent damage to the threads. Make sure the pipe is not touching the sleeve, and that its internal diameter is slightly larger than the thread.
3. Remove the sleeves and the shaft.

6.3.2.3. Before installation

Do not try to install the expander pins with the wrong sleeve size or the pins will not work.

- Make sure there is no structural damage present (e.g. broken or severely deformed lugs) that could affect attachment point alignment. If damage is present, the system may not function as expected.
- Repair any damage.
- Check maximum and minimum wear in the attachment lug hole to make sure you have the correct size expander sleeve for each side of the shaft. Each sleeve expands max 2 mm. If maximum wear exceeds this value, contact your dealer to order a suitable oversize sleeve.
- Visually inspect the attachment lug hole. Remove any sharp edges and other unevenness. If the difference between maximum and minimum wear is greater than 1.5 mm, the hole must be drilled out or ground so that ovality is less than 1.5 mm.

$$\text{MAX} - \text{MIN} < 1.5 \text{ mm}$$

In the case of extreme wear, contact your dealer.

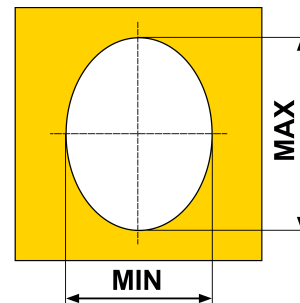


Figure 7.

6.3.2.4. Installation

1. Grease the shaft and expander sleeves with bearing grease to make installation easier. Start by installing the shaft body, followed by the sleeves, washers and fasteners. Take care not to damage the threads or the conical parts in the expander pins.
2. Centre (*normal*) or position (*inset versions*) the shaft in the correct position and then tighten the fasteners by hand.
3. See Table 1. and Table 2. before tightening the pins. Measure the pins or check the delivery note to ascertain fastener thread sizes. Tighten the expander pins alternately to the recommended torque to achieve even installation.

The sleeve must always protrude to ensure expansion. The washer (or fastener, for variants without washers) must never come into contact with the end of the shaft body or attachment lug. Should this occur, go to section 6.3.2.2. Removal and follow the instructions under step 2. If the washer on either side comes into contact with the attachment point lug or the end of the shaft body, the sleeve is the wrong size. The expander pins must then be fitted with oversize sleeves.

4. Grease the joint with 3-5% molybdenum sulphide grease before putting the machine into operation. Regular greasing extends the service life of the expander pins.

5. Start the base machine and move the joint back and forth. Retighten to the recommended torque. This process makes sure the sleeves bed in.

6.4. Lubricate every 16 operating hours

engcon recommends greasing at 16 hour intervals. See chapter 6.4.2. Lubrication, stone and sorting grab.

When working in water, the lubrication interval is reduced to 8 hours.



If your product is equipped with a rotator, there are instructions for the rotator section in the tiltrotator user manual.

6.4.1. Grease recommendation

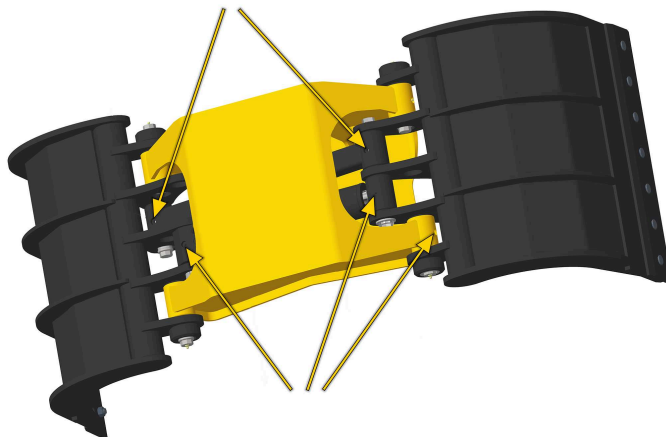
The tiltrotator's worm gear is factory filled with the recommended lithium-based universal grease (NLGI 2). This grease is often miscible with other greases of similar type.

Always check with your dealer to ensure miscibility. The use of inferior grease categories will lead to increased consumption.

6.4.2. Lubrication, stone and sorting grab

The arrows show the location of the grease nipples.

Grease quantity: 3-4 pump strokes per nipple.



6.5. Tightening torque

Bolts and threaded holes must be thoroughly clean and the threads oiled.

Top bracket

| Type | Dimension | Quality | Quantity | Torque |
|------|-----------|---------|----------|--------|
| SG03 | M16 | 8.8 | 8 | 197 Nm |
| SG06 | M16 | 8.8 | 12 | 197 Nm |
| SG09 | M16 | 8.8 | 12 | 197 Nm |
| SG12 | M16 | 8.8 | 12 | 197 Nm |
| SG19 | M16 | 8.8 | 12 | 197 Nm |
| SG26 | M16 | 8.8 | 12 | 197 Nm |
| SG33 | M24 | 8.8 | 16 | 665 Nm |

Table 3.

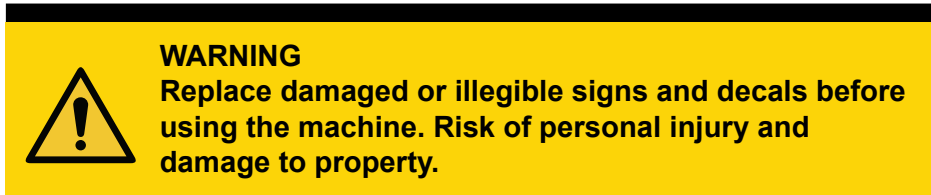
EC-Oil hydraulic connectors

| Fastener | Dimension | Quantity | Torque |
|-------------------------|-----------|----------|--------|
| Hydraulic connector ECO | ECO40-80 | 2 | 60 Nm |

Table 4.

7. Decals

Machine instructions, decals and warning signs must be kept clearly legible. Contact your supplier to order replacements.



7.1. Warning decals

7.1.1. Warning decals in cab

The decals are usually placed to the right of the operator in clearly visible locations.

7.1.1.1. 9000157



Figure 8. Warning decal to the right of operator.

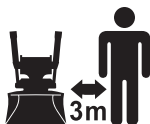
7.1.2. Symbol legend



Take care when handling long objects. Bear in mind inertia and the extended risk area when handling long objects.



Falling material hazard. Never stand under or pass beneath a raised tool.



Keep clear. Moving and rotating equipment. Hazard zone 10 feet.



Crushing hazard. Stay clear of moving parts.



Tipping hazard. Never exceed the base machine's approved tipping load.



Suspended load hazard. Stay clear of suspended loads.



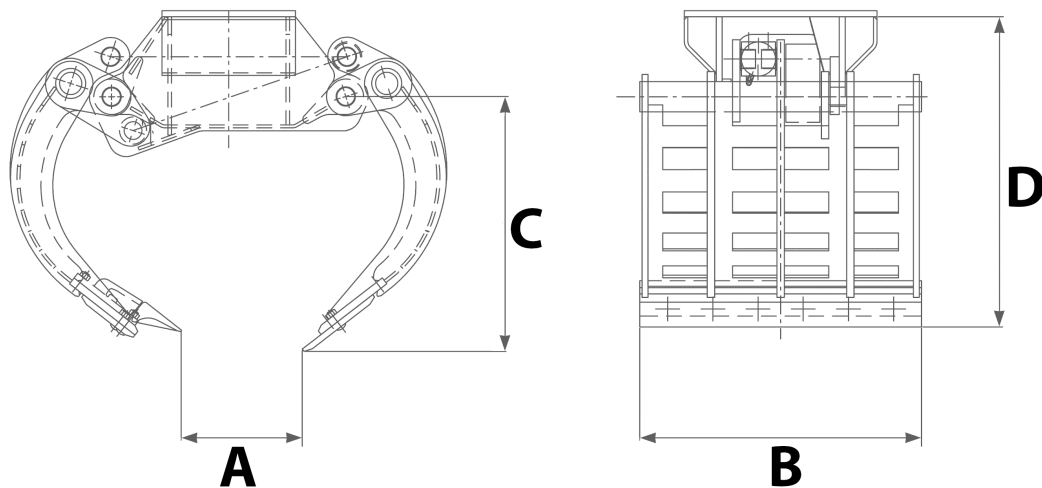
Important to subtract tiltrotator weight when calculating lifts.



Read and understand the user manual before operating this machinery.

8. Technical data

8.1. Stone and sorting grab



| Description | | SG03 | SG06 | SG09 | SG12 | SG19 | SG26 | SG33 |
|---------------------------------|----------------|---------|--------------|--------------|--------------|--------------|--------------|--------------|
| Max grab width (A) | mm | 750 | 1110 | 1365 | 1660 | 1790 | 1990 | 2575 |
| Min grab width (A) | mm | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cutting width (B) | mm | 400 | 505 | 628 | 715 | 860 | 860 | 1170 |
| Jaw length (C) | mm | 490 | 460 | 539 | 680 | 790 | 870 | 1180 |
| Height (D) | mm | 550 | 580 | 748 | 790 | 960 | 1070 | 1360 |
| Volume, with side plates | l | 42 | 83 | 137 | 220 | 336 | 420 | 930 |
| Gripping force | kN | 5.7 | 8.7 | 14 | 15 | 19 | 25 | 45 |
| Max hydraulic pressure | MPa | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| Weight | kg* | 108 | 180 | 268 | 425 | 646 | 755 | 1400 |
| Grab area | m ² | 0.12 | 0.17 | 0.24 | 0.34 | 0.42 | 0.52 | 0.85 |
| Recommended machine weight | tonnes | 1.5 - 3 | 3-6 | 6-9 | 10-12 | 12-19 | 18-26 | 24-33 |
| Recommended tiltrotator/rotator | | EC02 | EC204, EC206 | EC206, EC209 | EC209, EC214 | EC214, EC219 | EC219, EC226 | EC226, EC233 |

Table 5. *Depending on attachment

9. Glossary

9.1. Designations

| Term | Description |
|------------------------|---|
| Base machine | The machine carrying the equipment concerned. Excavator or backhoe loader. |
| EC-Oil | Automatic oil connection system for changing hydraulic tools from the cab. See section 3.2. EC-Oil. |
| EC-Oil block H (Hitch) | Located in the machine or in the quick hitch. |
| EC-Oil block T (Top) | Located on the upper section of the hydraulic tool and/or the tiltrotator. |
| Dynamic load | Swinging/hanging load |
| Machine hitch | Quick hitch mounted directly on the excavator's stick |
| Quick hitch | The part of the tiltrotator that connects to the bucket or other tool. |
| Tipping load | Specifies the maximum weight the excavator is able to lift without tipping forward. |

9.2. Abbreviations

| Term | Description |
|------|-------------------------|
| SG | Stone and sorting grab. |

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