

Zato

Recycling Solutions



# SAFETY, OPERATION AND MAINTENANCE MANUAL

## CAYMAN

DEMOLITION SHEAR FCE II SERIES



[www.zatoshredder.com](http://www.zatoshredder.com)



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# 1 IDENTIFICATION DATA

## 1.1 IDENTIFICATION DATA OF THE MANUFACTURER

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## 1.2 ATTACHMENT IDENTIFICATION DATA


The identification plate (**Fig. 1 on page 7**) of the attachment is glued on the attachment itself and is made of aluminium. The information is stamped onto it.




Fig. 1 Attachment identification plate

| Reference | Information                      | Data             |
|-----------|----------------------------------|------------------|
| 1         | Manufacturer Logo                | /                |
| 2         | Manufacturer Contact Information | /                |
| 3         | CE Marking                       | /                |
| 4         | Product type                     | DEMOLITION SHEAR |
| 5         | Model                            | CAYMAN           |
| 6         | Serial number                    |                  |
| 7         | Year of manufacture              |                  |

**Tab. 1** Attachment identification plate

|   |  |
|---|--|
|  | <b>Do not</b> remove the identification plate and/or replace it with other plates. |
|---|--|

|   |   |
|---|---|
|  | <b>Should the identification plate be accidentally damaged, detached, or should the manufacturer's seal simply come off, the customer must inform the manufacturer.</b> |
|---|---|

The components that make up the attachment are built in compliance with the accident prevention standards in force.

Customers must ask competent bodies for any "legal accident prevention approval certifications," at their own expense.

### 1.3 DOCUMENT IDENTIFICATION DATA

|                                     |  |
|-------------------------------------|--|
| <b>Type of document</b>             | User instructions or, equivalently, Installation, Operating and Maintenance Manual |
| <b>Supplied with the attachment</b> | DEMOLITION SHEAR   |
| <b>Model</b>                        | CAYMAN   |
| <b>Edition</b>                      | 09/05/2017   |
| <b>Version</b>                      | 01   |
| <b>Revision</b>                     | 00   |



# 2 GENERAL INFORMATION

## 2.1 LIST OF SUPPLIED DOCUMENTATION

---

The following documents are provided together with this Manual:

- EC declaration of incorporation;
- hydraulic motor manual;
- hydraulic diagram;
- spare parts catalogue.

After the attachment is installed at the customer's premises, the following documents are provided in hard copy:

- notification of document delivery, once this Manual and the documents accompanying the Manual itself are handed over;
- test report, if test results are positive,

and they are to be considered an essential part of the documents accompanying the Manual.

## 2.2 INTELLECTUAL PROPERTY RIGHTS

---

All the information, drawings, diagrams and whatever else is contained in this Manual and the accompanying documentation are confidential.

No part of such information can be reproduced or communicated to third parties without prior authorisation from the Manufacturer, who is its exclusive owner.

The only person authorised to use these documents is the Customer to whom the Manual is supplied as an essential part of the attachment, for the sole purpose of properly carrying out all the operations relative to the various life cycle phases of the attachment itself.

## 2.3 PURPOSE OF THE MANUAL

---

This Manual is an essential part of the attachment and is intended for anyone operating the latter or interacting with its users.

This Manual aims to provide all the necessary information to:

- quickly identify all the parts making up the attachment;
- define the tasks, duties and operating limits of the various users;
- execute all the intended operations correctly prior to using, servicing, and scrapping the attachment;
- guarantee the health and safety of the personnel who operate on the attachment in various capacities;
- make sure that the attachment works efficiently.

The Manufacturer is considered relieved from all civil or criminal liability resulting from failure to comply with the instructions contained in this Manual.

## 2.4 USING THE MANUAL

---

This Manual must be thoroughly read in its entirety before carrying out any operations on the attachment.

When in doubt regarding the proper interpretation of the instructions provided in this Manual, contact the Manufacturer for all the necessary explanations.

This Manual must be kept with care throughout the attachment life span and must always accompany it when transferred, for any reason, to other users.

This Manual must be kept near the attachment in a place that is easily accessible and known to all users; it must be handled with care so as not to damage it, no pages must be removed and its contents must not be modified in any way.

This Manual must be kept in a weatherproof place and protected from heat, humidity and corrosive agents.

## 2.5 CONSULTING THE MANUAL

---

The information in the Manual is organised in:

- chapters
- sub-chapters
- paragraphs
- sub-paragraphs

and can be traced easily by consulting the Table of Contents at the beginning of the Manual.

### 2.5.1 Graphical conventions

The text in **bold** indicates important information.

Chapters are numbered progressively starting from 1.

The numbering of sub-chapters is structured as follows:

<chapter number><.><sub-chapter number> [example 1.1 or 2.10].

The numbering of the paragraphs is structured as follows:

<chapter number><.><sub-chapter number><.><paragraph number> [example: 1.1.1 or 2.2.10].

The numbering of sub-paragraphs is structured as follows:

<chapter number><.><sub-chapter number><.><paragraph number><.><sub-paragraph number> [example: 1.1.1.1 or 2.2.2.10].

The figures are numbered progressively starting from 1.

References to figures are indicated using the number that identifies a figure in bold (E.g. **Fig. 1**) and if need be, a letter or a number or both that identify the component described in the figure. The identification references of the figure and of the component can also be used at the same time (E.g. **A - Fig. 1** or **1 - Fig. 1** or **A1 - Fig. 1** or **1A - Fig. 1**).

The tables are numbered progressively starting from 1.




The references to the tables are indicated using the number that identifies the figure in bold (E.g. **Tab. 1**).

For the sake of clarity, some figures show incomplete layouts, parts of the attachment without protection systems and/or with guards removed. However, the figures have general validity.

The attachment must always be used with the mechanical and electrical protection systems mounted and properly working.










## 2.5.2 Using the symbols

The following graphic symbols have been used in this Manual to attract the attention of users so that the attachment is used correctly and safely:

|   |   |
|---|---|
|  | The symbol is used to indicate hazardous situations for people, or that may damage the attachment or affect its efficiency. |
|  | The symbol is used to indicate prohibited operations.   |
|  | The symbol is used to call the attention to especially important information.   |

The graphic symbols listed below are also used in this Manual to indicate the Personal Protective Equipment [PPE] that is to be used during the various operations.

The symbol of each device will be indicated whenever a particular operation described in this Manual requires its use.

|   |  |
|---|--|
|    | It is mandatory to wear <b>protective gloves</b> when performing the relevant operations.                    |
|    | It is mandatory to wear <b>protective boots</b> when performing the relevant operations.                     |
|   | It is mandatory to wear <b>protective clothing</b> when performing the relevant operations.                  |
|  | It is mandatory to wear <b>protective earmuffs</b> when performing the relevant operations.                  |
|  | It is mandatory to wear <b>protective goggles</b> when performing the relevant operations.                   |
|  | It is mandatory to wear a <b>protective mask</b> when performing the relevant operations.                    |
|  | It is mandatory to wear a <b>protective full-face mask</b> [shield] when performing the relevant operations. |
|  | It is mandatory to wear a <b>protective helmet</b> when performing the relevant operations.                  |
|  | It is mandatory to use <b>fall arrest devices</b> [harness] when performing relevant operations.             |

## 2.5.3 Definitions and glossary

### WORKER

Customer or Manufacturer personnel who are authorised to operate the attachment in various capacities.

### WORK AREA

Area near the attachment to which the Worker has free access.

Access to this area, on the other hand, is prohibited to all people not authorised to operate on the attachment.

### MAINTENANCE

Combination of periodic scheduled operations with the purpose of maintaining the excavator operational in all its aspects as a result of the wear inherent to use.

### EXPOSED PERSON

Any person who is completely or partly in a danger zone.

### PICTOGRAM

Graphic illustration printed on stickers regarding hazards or rules.

### PROTECTION SYSTEMS

Components of the attachment used to protect people from risks related to attachment operation. Any failure or malfunction of these components can jeopardise the health and safety of people.

Protection systems include:

- fixed guards;
- mobile guards;
- active or passive safety devices.

### PROTECTION SYSTEMS: FIXED GUARDS [CASING]

Components of the attachment used specifically to provide protection by means of a physical barrier and kept in place permanently or by means of fixing elements which can only be removed with adequate tools.

### PROTECTION SYSTEMS: MOBILE GUARDS

Components of the attachment used specifically to ensure protection by means of a physical barrier and usually connected mechanically to the fixed structure of the attachment through constraints which give a certain degree of freedom [usually hinges or runners] to allow for their being opened without the use of tools.

### PROTECTION SYSTEMS: ACTIVE SAFETY DEVICES

Components of the attachment used to provide protection without requiring workers to intervene [e.g. safety micro switches, pressure valves, etc.].

### PROTECTION SYSTEMS: PASSIVE SAFETY DEVICES

Components used to provide protection and ensure an active, informed intervention of the workers [e.g. emergency stop button].

## RESIDUAL RISK

Danger that has not been possible to eliminate or reduce sufficiently through the design or protection techniques.

## IMPROPER USE

Use of the machine in a way other than that indicated in the user instructions, but which can derive from easily foreseeable human behaviour. The Manual specifies certain foreseeable improper behaviour.

## INTENDED USE

Using the machine in compliance with the information provided in the user instructions.

## DANGER ZONE

Any area inside and/or near the attachment, where the presence of a person is a risk to his/her health and safety.

## CONTROL AREA

Area in which the Operator can control the attachment cyclical functions, using the specific control panels.

### 2.5.3.1 Specific definitions and glossary

---

#### STOP

An operation done voluntarily by the Operator to interrupt a process that is underway.

#### ATTACHMENT

Mechanical element that works only paired with an excavator that supplies the driving force.

#### UPPER JAW

Mobile part that is driven by the cylinder and carries out the work of the attachment.

#### BYPASS

Bypassing an obstacle; in this Manual, it is intended as hydraulic oil seeping through the chamber gaskets.

#### CYLINDER

Hydraulic jack that exerts cutting/crushing force.

#### JAW

Stationary part used to grip the scrap to be reduced.

#### GUIDE BLADE

Hardened steel plate that establishes the width of the cutting inlet.

#### MAIN BLADE

Hardened, tempered steel plate equipped with cutting profiles, installed on the frame and upper jaw of the shears. It can turn and is interchangeable with the others.

#### RAZOR BLADE

Hardened steel plate opposite the upper jaw that establishes the gap of the cutting inlet.

#### MACHINE

Excavator on which the attachment is installed.

#### DRIVE SURFACE

Contact surface between the clutch spring pad and the upper jaw of the attachment.

#### THREADED TIP BLADE

End installed on the upper jaw, equipped with a cutting profile and threaded holes.

#### SPOT-FACED TIP BLADE

End installed on the upper jaw, equipped with a cutting profile and housings for cylindrical screws.

#### LINKAGE CONNECTION

Flange equipped with perforated plates that connect the excavator arm to the attachment.

#### SHIM

Steel plate to position between the housing and the blade to adjust its position.

#### WEAR

This is intended as a state of the component that compromises its operation: in the case of blades, it is when the edge is completely rounded, while for the teeth of the pulveriser, it is when the point that penetrates the concrete material is obviously reduced.

#### SPEED VALVE

Device that distributes oil flows within the cylinder to even out the opening and closing speed, directing the flow coming out of the smaller chamber towards the bigger one.

| Unit of measure | Description            |
|-----------------|------------------------|
| m               | Metre                  |
| cm              | Centimetre             |
| mm              | Millimetre             |
| g               | Gram                   |
| kg              | Kilogram               |
| t               | Tonne                  |
| N               | Newton                 |
| l               | Litre                  |
| A               | Ampere                 |
| V               | Volt                   |
| kV              | Kilovolt               |
| W               | Watt                   |
| kW              | Kilowatt               |
| Hz              | Hertz                  |
| kHz             | Kilohertz              |
| rpm             | Revolutions per minute |
| °C              | Degrees centigrade     |
| °               | Angular degrees        |
| %               | Percentage             |
| Bar             | Pressure               |
| min             | Minute                 |
| h               | Hour                   |

Tab. 2 Unit of measure





## 2.6 UPDATING THE MANUAL

Following changes in the attachment construction, should the Manual require updating, the Manufacturer will strive to provide the Customer with:

- ▶ a revision of the Manual that will, for all intents and purposes, replace the previous one, if said construction changes result in a significant change to attachment components and/or operation;
- ▶ a Manual revision annex to integrate into the accompanying documents, if said construction changes result in a non-significant change to attachment components and/or operation.

## 2.7 RECIPIENTS OF THE MANUAL AND TASKS

This Manual is intended for the following professional figures:

|   |   |
|---|---|
|  | <p><b>MANAGER</b></p> <p>Personnel of the Customer, in charge of making sure that all the intended attachment operations are carried out correctly, in compliance with the instructions provided in this Manual and the machine manual, as well as with general safety regulations. For a detailed description of the responsibilities, refer to <b>“3.4 General regulations - Responsibilities” on page 21.</b></p>          |
|  | <p><b>OPERATOR</b></p> <p>Personnel of the Customer, who performs tasks regarding normal machine and attachment use according to the instructions provided in <b>“3.4 General regulations - Responsibilities” on page 21</b> and in the machine manual.</p>   |
|  | <p><b>QUALIFIED TECHNICIAN</b></p> <p>Personnel made available by the Customer, having the technical-professional requisites to perform specialist operations in the various phases of the machine and attachment life cycle, in compliance with the instructions in this Manual and in the machine manual, as well as with general safety regulations. The specialisation required will be indicated for each operation.</p> |
|  | <p><b>MANUFACTURER'S TECHNICIAN</b></p> <p>Personnel employed or authorised by the Manufacturer, having the technical-professional requisites to perform specialist operations which require in-depth knowledge of the attachment and how it operates.</p>  |

## 2.8 GENERAL WARNINGS

### 2.8.1 Customer's responsibilities

Unless specific contractual conditions are implemented, the Customer must:

- ▶ adequately train their personnel who will be required to operate on the attachment for various reasons as indicated in **“3.1 General regulations - Personnel training” on page 20;**
- ▶ verify that the consignment matches the order specifications upon delivery;
- ▶ provide an appropriate hydraulic system on the machine, compatible with the hydraulic features of the attachment reported in **“4.7.1 Hydraulic features” on page 30;**
- ▶ provide adequate attachment lifting and handling equipment;
- ▶ check consistency between machine dimensions (barycentre position, stabilising moment) and attachment dimensions reported in **“4.7 Specifications” on page 30.**
- ▶ provide carbon dioxide and powder fire extinguishers near the work area;
- ▶ set up an "out-of-service" sign during maintenance and attachment downtime, which indicates that the attachment is not running and forbids unauthorised people from using the attachment;
- ▶ guarantee the availability of the tools, consumables and lubricants required to correctly carry out all the activities specified in this Manual;
- ▶ organise the disposal of the packaging material in compliance with the regulations in force in the Country where the attachment is installed and used;
- ▶ forbid access to people not involved with the work and operations of the various phases of the attachment life cycle;



The Manufacturer will be relieved from all civil or criminal liability resulting from failure to comply with the general safety regulations in force in the Country where the attachment is installed and used.

## 2.8.2 Requesting Technical Assistance

The Technical Assistance Service of the Manufacturer is available for the Customer for:

- clarifications and information;
- intervention at the Customer's premises and specialised technicians being dispatched;
- spare parts being sent;
- copies of this Manual being sent.

To request technical assistance, the Customer must contact the Manufacturer directly by referring to **“1.1 Identification data of the Manufacturer” on page 7.**

To allow the Manufacturer to identify the attachment, the following must be provided:

- product type;
- model;
- serial number.

## 2.8.3 Requesting Spare Parts

The Customer must always use original spare parts supplied by the Manufacturer.

The request is to be forwarded to the Manufacturer as described in **“2.8.2 Requesting Technical Assistance” on page 17.**

The Manufacturer will not be held liable for any damage caused to people, property or any other accidents as a result of any spare parts not being supplied by the Manufacturer of the attachment.

Parts to be replaced must be disassembled and assembled according to the instructions provided by the Manufacturer.

## 2.8.4 Requesting Structural Modifications



**It is strictly forbidden** to modify the attachment without written authorisation from the Manufacturer.

Customers must contact the Manufacturer directly in writing to request modifications they wish to make on the attachment for any reason whatsoever, citing the model and serial number of the attachment and the reasons for the modifications.

The changes must be authorised in writing by the Manufacturer and if approved, only carried out by personnel assigned or authorised by the Manufacturer.

Unauthorised tampering with the attachment or part of it relieves the Manufacturer from any civil or criminal liability and renders the warranty null and void.

The Manufacturer reserves the right to modify any attachment feature without notice and without having to implement these changes on attachments that have already been sold and installed.

## 2.8.5 Warranty and forfeiture conditions

The Manufacturer guarantees its attachments and its components to be free of manufacturing or material defects for **12 months** of operation from the date the testing was accepted and, in any case, no more than 30 days after attachment delivery, unless otherwise agreed upon with the Manufacturer.

The Manufacturer guarantees components designed and manufactured by other suppliers in accordance with the terms and conditions provided by the said suppliers to the Manufacturer. The warranty on these components is automatically valid once the Customer accepts the warranty terms and conditions of the attachment.

The warranty shall not cover any tools and other consumables provided by the Manufacturer together with the attachment, all components subject to wear and tear [such as filters, gaskets, nozzles, lubricants, etc.], or any aesthetic parts.

If the attachment is assembled, secured and/or installed by the Customer without prior written authorisation from the Manufacturer, the latter disclaims all liability for damage caused to property, people or the attachment itself.

Manufacturing and material defects must be reported to the Manufacturer no later than eight [8] days after being noted, via email or fax.

The warranty is specifically recognised after a discretionary and incontestable assessment by the Manufacturer and is limited to repairing or replacing the merchandise under the Manufacturer's unquestionable discretion.

The Customer has no right to reimbursement for damages and/or an extension of the established warranty duration and/or suspension of payments due and/or termination of the contract in question in the event of malfunction, that is, defective operation of the merchandise under contract, whatever the cause, extent, and duration may be, likewise should the Manufacturer be late in supplying the spare parts, that is, repair operations. The spare parts replaced under warranty during machine repair remain the property of the Manufacturer.

In any case, any expenses incurred for shipping/transporting parts and/or for the Manufacturer's personnel to travel to the Customer's premises shall be borne by the Customer.

The components replaced during the warranty period will be returned to the Manufacturer. The replaced parts will remain the property of the Manufacturer.

Replaced components or the attachment itself must be returned EXW [ex works], even while under warranty, in accordance with the international regulations based on Incoterms in force.

Should any replacements or repairs be carried out under warranty, these shall be covered by a new twelve [12] month warranty starting from their date of completion, or for the duration agreed upon when placing the order. This will not entail a warranty renewal of parts that have not been replaced or repaired.

Should abnormalities, malfunctions and/or any presumably dangerous situations not described in this Manual arise, the Customer must immediately contact the Manufacturer.

The warranty is only valid if the attachment has been used in full compliance with the provisions and instructions contained in this Manual. As such, the warranty is valid:

- if the attachment is used to cut / demolish permitted materials;
- if the limits of use regarding the machine arm loading capacity and its stabilising mass are followed;
- if routine maintenance operations are carried out with the indicated frequency and methods, using original spare parts and entrusting the work to qualified personnel;
- if special maintenance operations are carried out promptly when needed;
- if proper lighting is provided for night work or in closed environments.



The warranty is not valid:

- for any modifications, replacements, repairs not described in the Manual or tampering by the Customer or third parties;
- if the safety devices are tampered with or removed except when specifically specified;
- if accessories not supplied or tested by the Manufacturer are installed on the attachment;
- if the operating limits stipulated in **“4.5.2 Operating limits” on page 29** are not complied with;
- if the attachment is installed by the Customer or third parties without following the installation procedures described in this Manual;
- for any damage due to exceptional events (lightning, floods, earthquakes, etc.).

Any damages to the machine are excluded from the warranty.

## Damages

The Manufacturer is directly liable for damages caused exclusively by issues deriving from its own design.

No compensation is foreseen for alleged damages due to lost production as a result of the system being stopped while waiting for repairs, regardless of these being under warranty or against payment.

# 3 GENERAL SAFETY REGULATIONS

## 3.1 GENERAL REGULATIONS - PERSONNEL TRAINING

---

The Customer is responsible for providing their personnel with the necessary training in the following areas:

- health and safety risks related to the activities carried out within one's company;
- measures taken and devices used to prevent accidents and protect the health and safety of the workers;
- specific risks that workers are exposed to related to tasks carried out, safety regulations and relevant company provisions;
- general accident prevention regulations stipulated by European Directives [89/391/EEC] and by regulations in force in the Country where the attachment is installed and used;
- procedures regarding first aid, use of fire fighting equipment and worker evacuation.

The Customer is responsible for having their personnel attend specific training on attachment use provided by the Manufacturer prior to using the attachment.

The Customer is responsible for providing their personnel with the necessary instructions on the content of this Manual.

The Customer is responsible for identifying people within the company who should be trained, considering the following minimum requirements:

- sufficient general and technical knowledge to understand the relevant contents of the Manual;
- capability of understanding the symbols, pictograms, drawings, diagrams and video messages;
- knowledge of the main hygienic and accident-prevention regulations;
- knowledge of the behavioural regulations in case of emergency.

The Customer is responsible for verifying that the level of learning reached is suitable for the task assigned.

The Customer is responsible for verifying that the instructions contained in this Manual become standard procedures for all operations performed on the attachment.

Personnel training must be updated according to new risks arising related to variations in the configuration and use of the attachment.

## 3.2 GENERAL REGULATIONS - SAFETY OF WORKPLACES

---

All European Directives [89/391/EEC, 89/656/EEC, 89/686/EEC] must be applied in the workplace together with the regulations in force in the Country where the attachment is installed and used, which set forth protective measures for the health and safety of workers and for environmental protection, such as:

- hygienic measures;
- collective protection measures;
- measures to use Personal Protective Equipment [PPE];
- measures required in the emergency plan in case of first aid, fire, earthquake and evacuation of workers in case of other types of danger;
- measures to use warning and safety signs;
- waste disposal measures.

Together with these measures to protect the health and safety of the workers and protect the environment, the requirements and guidelines stipulated in this Manual must be applied.

### 3.3 GENERAL REGULATIONS - WORK AREA

---

The work area and the surrounding area must be kept as clear as possible of any objects that could get in the way and impede access to fire fighting and first aid personnel, should they need to intervene in the event of an emergency.

For operations in the attachment internal areas, use auxiliary lighting devices as required, as long as they do not become a source of additional risk.

Access to the work area must be forbidden to unauthorised personnel. This prohibition must also be highlighted by specific signs.

Adequate fire fighting equipment must be available near the work area and adequately marked.

### 3.4 GENERAL REGULATIONS - RESPONSIBILITIES

---

#### MANAGER

The Manager has the following duties:

- assign tasks to the Operators considering their skills and health conditions;
- provide suitable Personal Protective Equipment [PPE] and replace any damaged, expired or obsolete equipment;
- ensure the Operators comply with company safety regulations and requirements;
- identify any effects deriving from the deterioration of the health conditions of Operators related to the duration of the work shift [such as fatigue, distraction, etc.];
- ensure Operator training is repeated regularly according to the evolution of risks and any change in attachment configuration, as well as in relation to the new legislative framework;
- ensure the various attachment operations are carried out by the intended professionals;
- see to eliminating all faults reported by the Operators concerning attachment operation and the conditions of the work area;
- verify that Operators use the attachment properly following the instructions provided in this Manual.


#### OPERATOR

The Operator has the following duties:

- comply with the requirements stipulated by the Manager;
- use the attachment, devices, tools, lubricants and other consumables according to the requirements provided in this Manual;
- strictly comply with the guidelines on the signs and labels applied on the machine and in the work area;
- always wear the work clothes provided and the indicated Personal Protective Equipment in the various circumstances;
- ensure no outsider goes near the machine or its controls;
- inform the Manager of any malfunction in the operation of the attachment or safety devices;
- inform the Manager of any problems concerning the work area.


### 3.5 GENERAL REGULATIONS - PROHIBITIONS


The following prohibitions apply for all workers.

|   |  |
|---|--|
|  | <ul style="list-style-type: none"><li><b>Do not</b> use the attachment for any purpose other than its intended use.</li><li><b>Do not</b> use the attachment in environmental conditions other than those specified.</li><li><b>Do not</b> use the attachment in locations with an explosive atmosphere or fire hazard.</li><li><b>Do not</b> use accessories, tools, lubricants and other consumables other than those specified.</li><li><b>Do not</b> modify the attachment without authorisation from the Manufacturer.</li><li><b>Do not</b> use the attachment in any configuration other than what is authorised.</li><li><b>Do not</b> remove, tamper with, disable or bypass the safety equipment except when expressly specified.</li><li><b>Do not</b> remove the pictograms applied to the attachment or make them illegible.</li><li><b>Do not</b> climb onto the attachment.</li><li><b>Do not</b> use the attachment and its protection devices as work surfaces.</li><li><b>Do not</b> carry out repairs, adjustments, cleaning, lubrication or maintenance on any moving part.</li><li><b>Do not</b> carry out repairs, adjustments, cleaning, lubrication or maintenance on any pressurised part.</li><li><b>Do not</b> keep flammable material such as petrol, solvents, gas cylinders, etc. near the attachment.</li></ul> |
|---|--|

### 3.6 EMERGENCY REGULATIONS IN CASE OF FIRE

If the fire is not extinguished immediately pay attention to possible leakage of air, water, oil or warming fluids. If the machine and the attachment are equipped with pressurised tanks and tubes, exposure to flames for an extended period of time can cause them to explode; therefore, pay the utmost attention not to be hit by the fluid they contain.




|   |   |
|---|---|
|  | <p><b>Carbon dioxide and powder fire extinguishers must be provided near the work area. Prevent possible fires by making sure there are no oils, solvents, rags, etc. on the machine and attachment.</b></p> <p><b>Powder fire extinguishers cause serious damage to the machine. Only use them if absolutely necessary. Do not use them on electric parts or parts which could be accidentally live.</b></p> <p><b>When using carbon dioxide fire extinguishers, the fire fighting personnel (at least 2 people) must use suitable protective gloves and self contained breathing apparatus.</b></p> |
|---|---|

|   |  |
|---|--|
|  | <p>The use of fire extinguishers must be regulated by a label.</p> |
|---|--|

### 3.7 STANDARDS FOR LUBRICANT USE

---

The hygiene regulations below refer to how lubricants are to be used.

|   |   |
|---|---|
|  | <p><b>Before using the lubricant, refer to the relevant safety sheet.</b></p> <p><b>Keep lubricants out of the reach of people who are not authorised to handle them.</b></p> <p><b>Store lubricants in suitable containers.</b></p> <p><b>If a lubricant spills: absorb with sand or other absorbent granular substances, collect it and take it to an appropriate waste disposal site.</b></p> <p><b>In case of contact with the eyes, flush thoroughly with water for 15 minutes. If the irritation persists, seek medical attention.</b></p> <p><b>If swallowed, do not induce vomiting, seek medical attention.</b></p> <p><b>In case of contact with the skin, wash thoroughly with water and soap.</b></p> |
|  | <p><b>Do not</b> store lubricants and chemicals in open or unlabelled containers.</p> <p><b>Do not</b> mix different or unknown lubricants, nor used with unused lubricants.</p>  |
|  | <p>When handling lubricants and chemicals, it is mandatory to wear <b>protective gloves</b>.</p>  |

# 4 DESCRIPTION OF THE PRODUCT

## 4.1 GENERAL DESCRIPTION

For the following description, refer to **Fig. 2 on page 24**.

The attachment **(1)** is built out of sturdy electro-welded structural work using special high-resistance steel and wear-resistant steel.

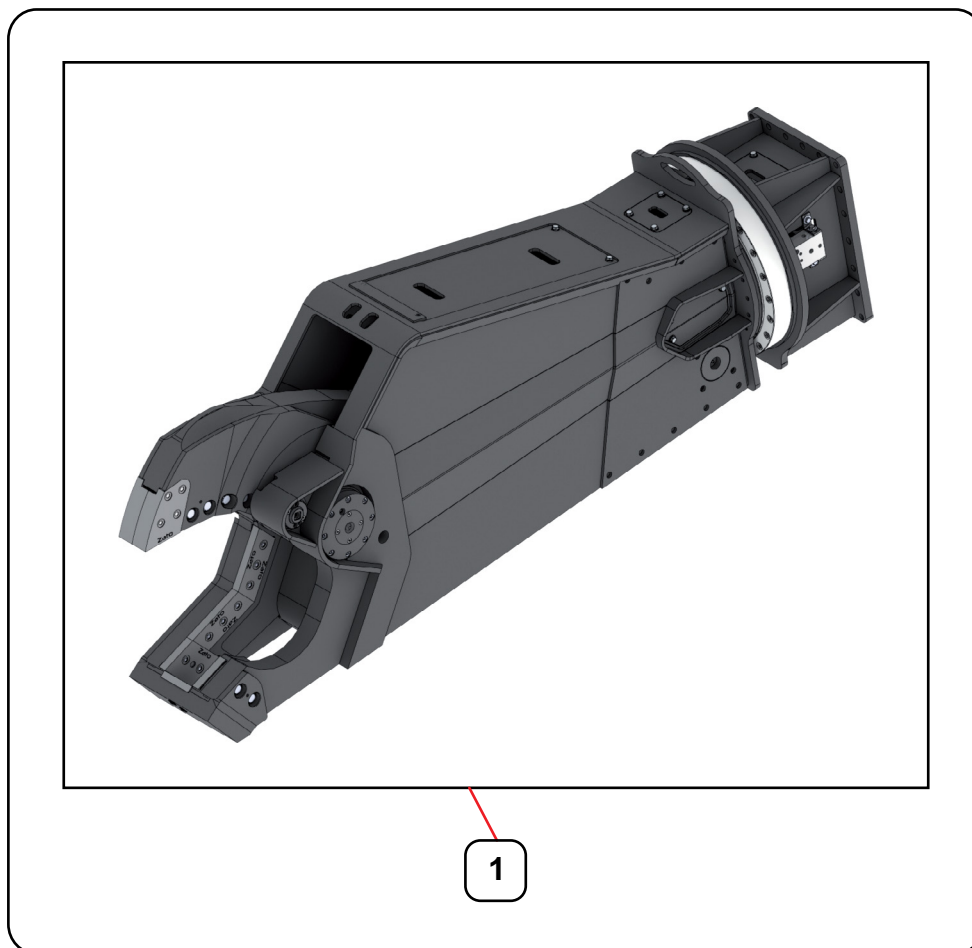
The attachment is available in the following models:

- ▶ FCE06R-II,
- ▶ FCE10R-II,
- ▶ FCE20R-II,
- ▶ FCE30R-II,
- ▶ FCE40R-II,
- ▶ FCE50R-II,
- ▶ FCE70R-II,
- ▶ FCE90R-II

which differ for their specifications.



Refer to **“4.7 Specifications” on page 30** for the specifications of the various attachment models.



**Fig. 2** General description

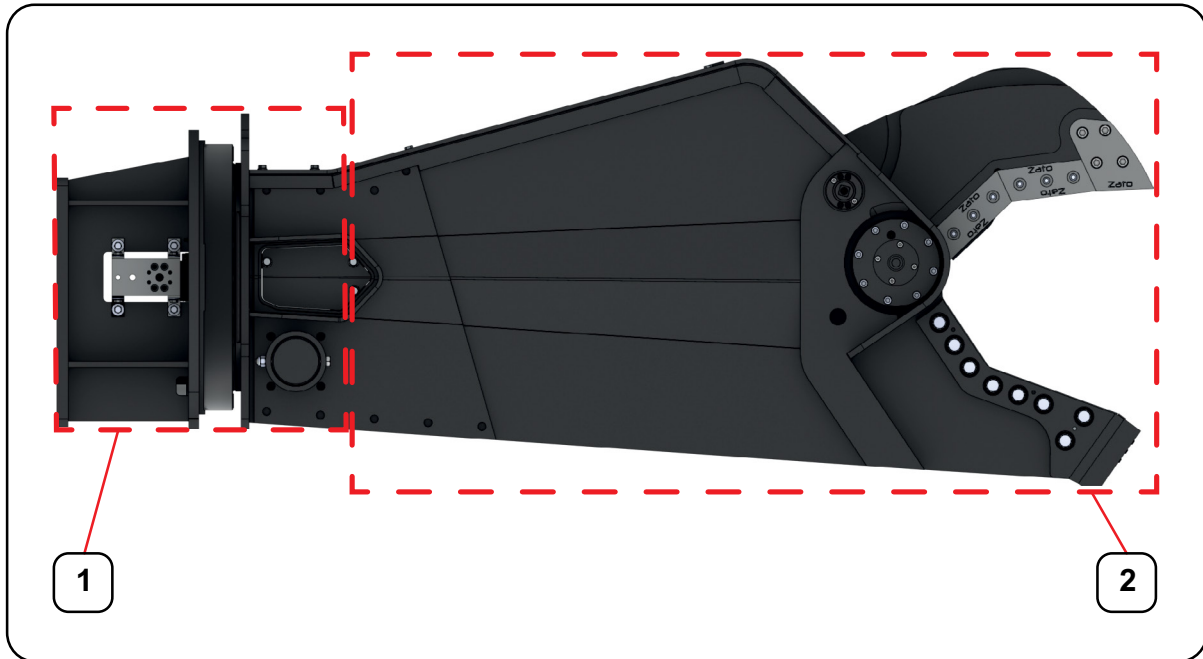


## 4.2 MAIN COMPONENTS

For the following description, refer to **Fig. 3 on page 25**.

The main components of the attachment are:

- ▶ rotating head **[1]**
- ▶ shears **[2]**



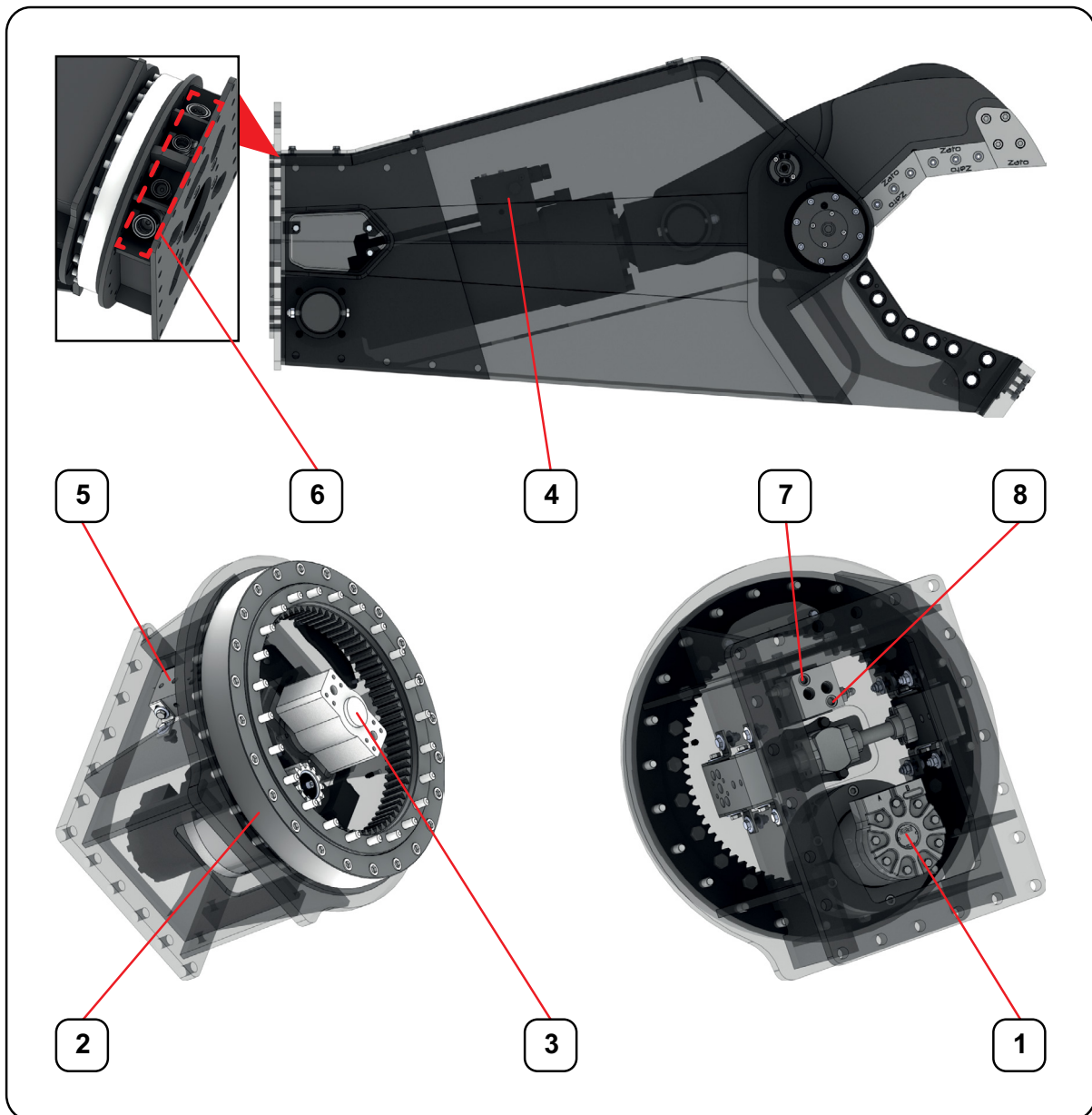
**Fig. 3** Main components

## 4.2.1 Rotating head

For the following description, refer to **Fig. 4 on page 26**.

The rotating head includes:

- ▶ hydraulic motor **[1]**;
- ▶ slewing ring **[2]**;
- ▶ swivel hydraulic coupling **[3]**;
- ▶ speed valve **[4]**;
- ▶ hydraulic connection system consisting, alternately, of:
  - flow regulator manifold blocks **[5]** on both sides of the attachment;
  - no. 4 quick-release manifolds **[6]**;
- ▶ safety valve **[7]**;
- ▶ overcentre valve **[8]**.



**Fig. 4** Rotating head

## 4.2.2 Shears

For the following description, refer to **Fig. 5 on page 27**.

The shears include:

- high-resistance steel structure **[1]**;
- upper jaw **[2]**;
- jaw **[3]**;
- no. 2 clutches **[4]** on both sides of the attachment;
- central pin **[5]** with end flange **[5A]**;
- no. 4 main blades **[6]** with blade shims **[6A]**;
- no. 2 guide blades **[7]** with blade shims **[7A]** and centring plugs **[7B]**;
- razor blade **[8]**;
- spot-faced tip blade **[9]**;
- threaded tip blade **[10]**;
- hydraulic cylinder **[11]**.

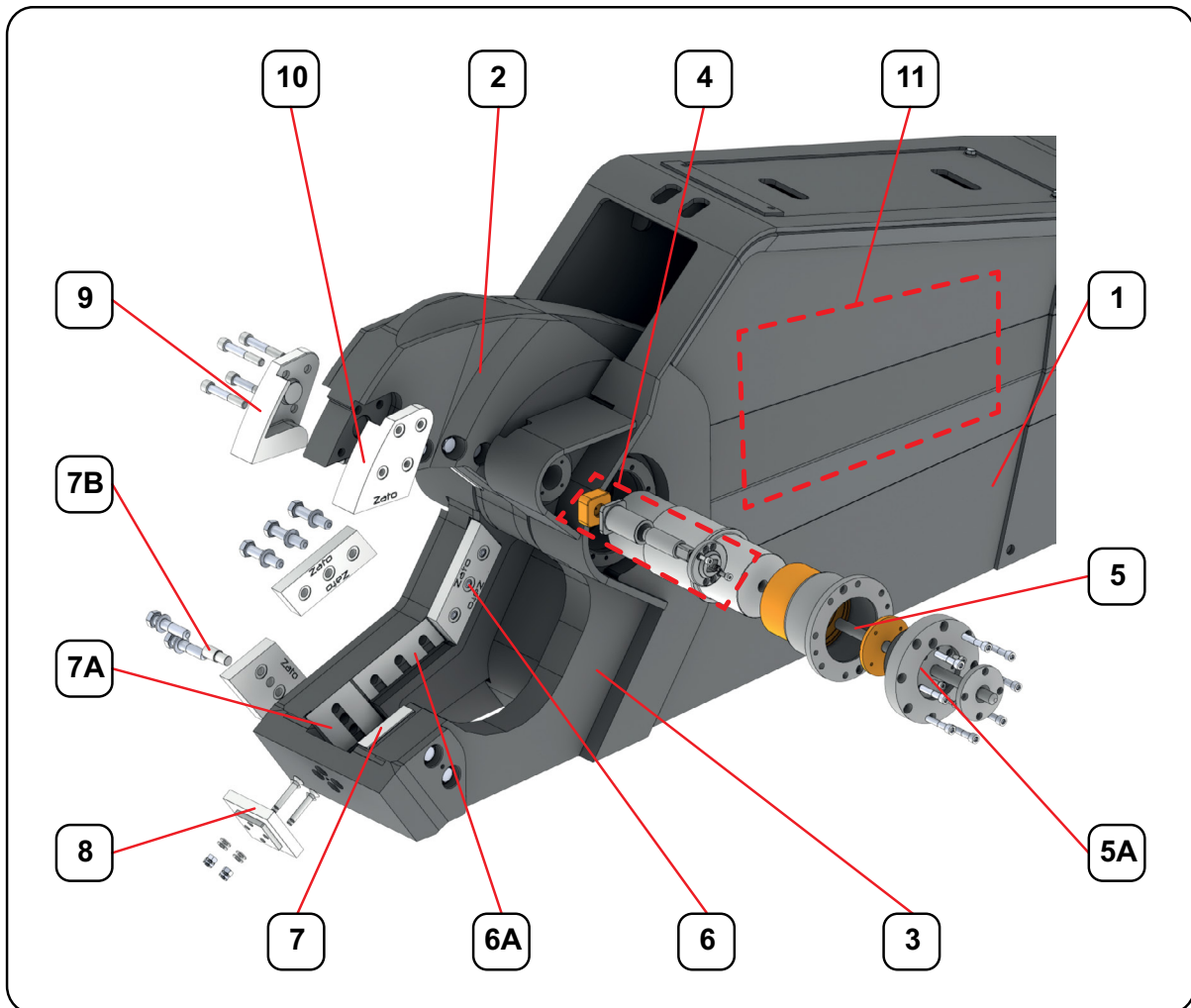


Fig. 5 Shears

## 4.3 EQUIPMENT

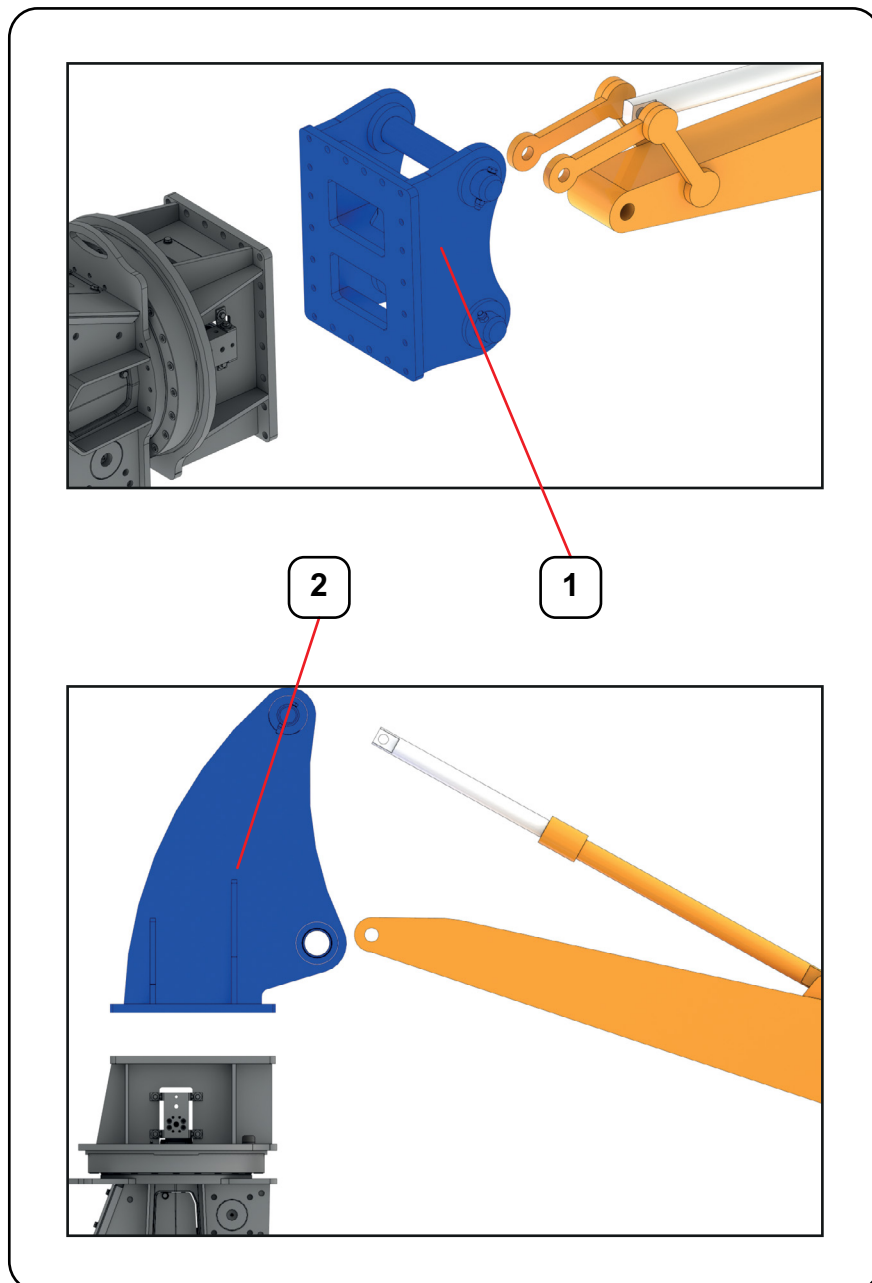
For the following description, refer to **Fig. 6 on page 28**.

The attachment is supplied alternatively with:

- bucket position linkage connection **[1]** with bolts to mechanically connect the attachment to the machine [bucket position];
- arm position linkage connection **[2]** with bolts to mechanically connect the attachment to the machine [arm position].



The linkage connection is specifically supplied by the Manufacturer based on which machine the attachment will be installed on.



**Fig. 6** Equipment

## 4.4 GENERAL OPERATING PRINCIPLES

The shears rotate by 360° on the slewing ring via the hydraulic motor in the rotating unit, which is integrated into the machine arm, secured via the linkage connection. The linear movement of the cylinder shaft, driven by the machine's hydraulic pressure, causes the upper jaw of the shears to rotate on the central pin.

## 4.5 INTENDED USE

The equipment is intended for demolition work and shearing of structural elements, as shown in the following table.

| Intended use        | Allowed material |
|---------------------|------------------|
| Shearing<br>Cutting | Ferrous material |

Tab. 3 Intended uses

### 4.5.1 Number of workers

1 Only **Operator** is required to use the attachment.

Depending on the type of work to be done, a **second Operator** on the ground may be necessary. This is up to the Customer's discretion and is the Customer's **exclusive** responsibility.



**If there is an Operator on the ground, he/she must stand at least 25m from the machine's range of action during all the operations.**

### 4.5.2 Operating limits

The attachment must be used following:


- ▶ the specifications reported in **"4.7 Specifications" on page 30**;
- ▶ the specifications reported in the documents accompanying this Manual.



**If the attachment is supplied together with the machine, please refer to the operating limits indicated in the Installation, Use and Maintenance Manual of the machine itself.**


## 4.6 IMPROPER USE

Any use of the attachment other than what is described in “4.5 Intended use” on page 29 must be authorised in advance in writing by the Manufacturer.

|   |   |
|---|---|
|  | <p><b>Do not</b> use the attachment for processes that are not permitted by the regulations in force in the Country where the machine is installed and used.</p> <p><b>Do not</b> hit the attachment on the ground.</p> <p><b>Do not</b> use the attachment as a pivot to rotate the machine.</p> <p><b>Do not</b> use the attachment to lift people, things, and/or animals.</p> <p><b>Do not</b> tear and/or pull structures or things that should be cut.</p> <p><b>Do not</b> push and/or hammer any type of structure.</p> <p><b>Do not</b> shear/cut tempered or hardened steel material.</p> <p><b>Do not</b> cut structural elements with shapes or dimensions such to pose a hazard in terms of the possible movements generated on the part or structure.</p> |
|---|---|

## 4.7 SPECIFICATIONS


### 4.7.1 Hydraulic features

|  |   |
|--|---|
|  | <p><b>Using the attachment with oil flows exceeding the indicated intervals can damage the attachment itself.</b></p> |
|--|---|

The hydraulic features of the attachment by model are shown in the table below.

| Model     | Operating pressure [cutting] | Operating pressure [rotation] | Recommended capacity [cutting] | Recommended capacity [rotation] |
|-----------|------------------------------|-------------------------------|--------------------------------|---------------------------------|
| FCE06R-II | 350 bar [max]                | 100 bar                       | 100 - 150 l/min                | 28 l/min                        |
| FCE10R-II | 350 bar [max]                | 100 bar                       | 150 - 180 l/min                | 25 l/min                        |
| FCE20R-II | 350 - 380 bar                | 100 bar                       | 150 - 180 l/min                | 28 l/min                        |
| FCE30R-II | 350 - 380 bar                | 100 bar                       | 200 - 250 l/min                | 28 l/min                        |
| FCE40R-II | 350 - 380 bar                | 110 bar                       | 250 - 300 l/min                | 28 l/min                        |
| FCE50R-II | 350 - 380 bar                | 110 bar                       | 350 - 400 l/min                | 45 l/min                        |
| FCE70R-II | 350 - 380 bar                | 140 bar                       | 550 - 600 l/min                | 50 l/min                        |
| FCE90R-II | 350 - 380 bar                | 160 bar                       | 650 - 700 l/min                | 60 l/min                        |

Tab. 4 Hydraulic features

|   |  |
|---|--|
|  | <p>Using the attachment with oil flows below the indicated intervals affects the attachment performance.</p> |
|---|--|

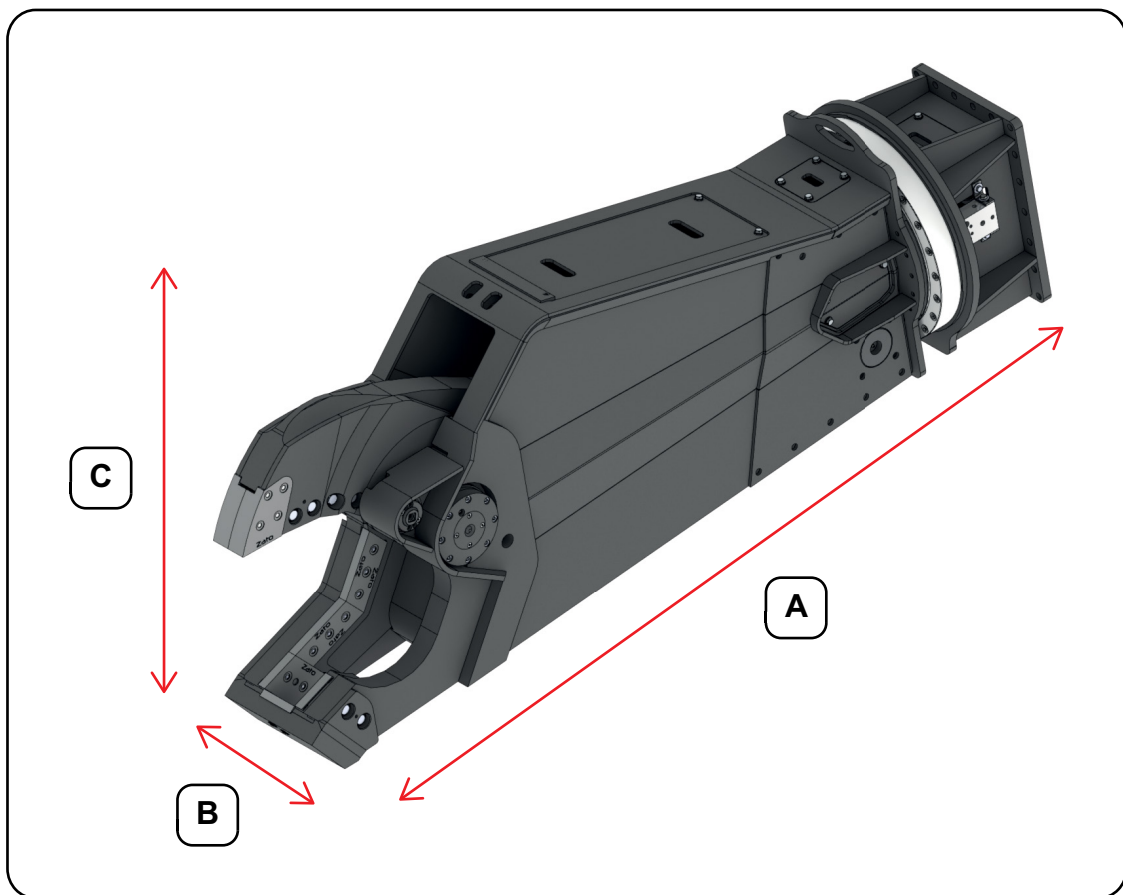
## 4.7.2 Overall dimensions

Refer to **Fig. 7 on page 31**, unless otherwise specified.

The overall dimensions of the attachment by model are shown in the table below.

| Model     | A        | B        | C        |
|-----------|----------|----------|----------|
| FCE06R-II | 1,620 mm | 420 mm   | 660 mm   |
| FCE10R-II | 1,920 mm | 570 mm   | 835 mm   |
| FCE20R-II | 2,610 mm | 710 mm   | 1,027 mm |
| FCE30R-II | 2,960 mm | 760 mm   | 1,165 mm |
| FCE40R-II | 3,390 mm | 830 mm   | 1,395 mm |
| FCE50R-II | 3,785 mm | 1,000 mm | 1,500 mm |
| FCE70R-II | 4,110 mm | 1,070 mm | 1,050 mm |
| FCE90R-II | 4,479 mm | 1,140 mm | 1,782 mm |

**Tab. 5** Overall dimensions



**Fig. 7** Overall dimensions

### 4.7.3 Weights

The weight of the attachment by model is shown in the table below.

| Model [set] | Weight   |
|-------------|----------|
| FCE06R-II   | 630 kg   |
| FCE10R-II   | 1,140 kg |
| FCE20R-II   | 2,100 kg |
| FCE30R-II   | 2,900 kg |
| FCE40R-II   | 4,250 kg |
| FCE50R-II   | 5,650 kg |
| FCE70R-II   | 7,630 kg |
| FCE90R-II   | 9,500 kg |

Tab. 6 Weights

### 4.7.4 Machine features

The minimum machine weights in relation to the attachment to be installed and the installation position are shown in the table below.

The minimum machine weights refer to operating conditions:

- on a horizontal surface;
- on a solid surface.

| Model     | Machine weight [arm position] | Machine weight [bucket position] |
|-----------|-------------------------------|----------------------------------|
| FCE06R-II | 4 t                           | 6 t                              |
| FCE10R-II | 7 t                           | 12 t                             |
| FCE20R-II | 12 t                          | 19 t                             |
| FCE30R-II | 19 t                          | 28 t                             |
| FCE40R-II | 26 t                          | 40 t                             |
| FCE50R-II | 35 t                          | 60 t                             |
| FCE70R-II | 43 t                          | 75 t                             |
| FCE90R-II | 60 t                          | 105 t                            |

Tab. 7 Minimum machine weights



The Manufacturer is available to provide professional advice to choose the best machine on which the attachment must be installed.



## 4.8 NOISE EMISSION

The attachment was designed and built to reduce the sound power level at its source.



Factors which determine the exposure level which workers are subjected to include the duration of exposure, the characteristics of the workplace and other sources of noise; in particular, the material being demolished could generate considerable peaks of noise. The extent cannot be established, as it can vary considerably depending on the material being processed.

**The sound emission level produced by the attachment during the measurement period was < 70 dB(A) and, in any case, was less than the noise emitted by the machine.**

Any abnormal noise is a sign of mechanical trouble; in this case, perform full and thorough maintenance by referring to “**7 Maintenance instructions**” on page 59. If problems persist, contact the Manufacturer.

To ensure compliance with the noise level it is important to:

- ▶ periodically check the tightness of the fasteners and, if necessary, tighten or replace them;
- ▶ periodically lubricate the attachment components that require it;
- ▶ perform maintenance according to the schedule.



If the noise level exceeds 80 dB[A] **protective earmuffs** are mandatory.

## 4.9 OTHER EMISSION

During operation, the machine may generate vibrations that can be transmitted to the attachment. Refer to the machine manual.

### 4.10 CONSUMABLES

The Customer must procure the following consumable materials, if required by maintenance operations:

- ▶ lubricants;
- ▶ all the parts subject to wear.



**The Manufacturer will not be held liable for damage to persons, animals or objects caused by use of materials other than those indicated.**

### 4.11 PRODUCTION AND ELIMINATION OF WASTE MATERIALS

Special waste, such as used oil, may be produced during attachment maintenance. All special waste must be disposed of in compliance with regulations in force in the Country where the attachment is installed and used.



Elimination of special waste is the responsibility of the Manager who must contact Firms authorised and specialised in processing and disposing of special waste.



**Do not** throw away waste materials, especially spent oil and lubricating grease and ancillary material used for cleaning [for example cloths] in sewers [through sinks, tanks, etc.] or in the environment [in streams or on the ground].

These products and materials must be collected in specific containers and stored to be delivered to authorised Collection Centres.

## 4.12 ENVIRONMENTAL CONDITIONS REQUIRED FOR OPERATION

The attachment is designed and built to operate in environments with temperatures ranging between -20°C and +40°C.

## 4.13 ENVIRONMENTAL CONDITIONS REQUIRED FOR STORAGE

If necessary, the attachment must be stored in a covered and dry environment, with the following characteristics:

- Temperature ranging between -20°C and +40°C;
- maximum humidity equal to 90%;

Moreover, the attachment must be completely protected from even unexpected jets of water.



In the event of storage in environments with elevated salinity, the cutting surfaces must be cleaned, referencing **“7.2.1 Cleaning” on page 60**. The frequency is at the Customer’s discretion.

## 4.14 DESCRIPTION OF RESIDUAL RISKS

Pursuant to EU Directive 2006/42/EC, the danger zones are listed below together with the residual risks which cannot be eliminated without compromising the functionality of the attachment.



**Further information on the residual risks is found in the documentation provided with the machines and in the machine manual.**

### General requirements



It is mandatory to use:

- **protective gloves,**
- **protective shoes,**
- **protective clothes**

for the phases before use, use and maintenance of the attachment.

For the following description, refer to **Fig. 8 on page 35**.

All danger zones where there is a residual risk are indicated with a numerical reference on the attachment.



### **Danger zone 1**

**Exposed person:** Operator.

**Stage:** work cycle.

**Nature of the risk:** impact, crushing, shearing of limbs, projected debris.

### Specific requirements



**Do not** stand less than 25m from the attachment during the work cycle.

|  |   |
|--|---|
|  | <p><b>Danger zone 2</b></p> <p><b>Exposed person:</b> Mechanical Technician.</p> <p><b>Stage:</b> maintenance.</p> <p><b>Nature of the risk:</b> contact with hot surfaces.</p> |
|--|---|

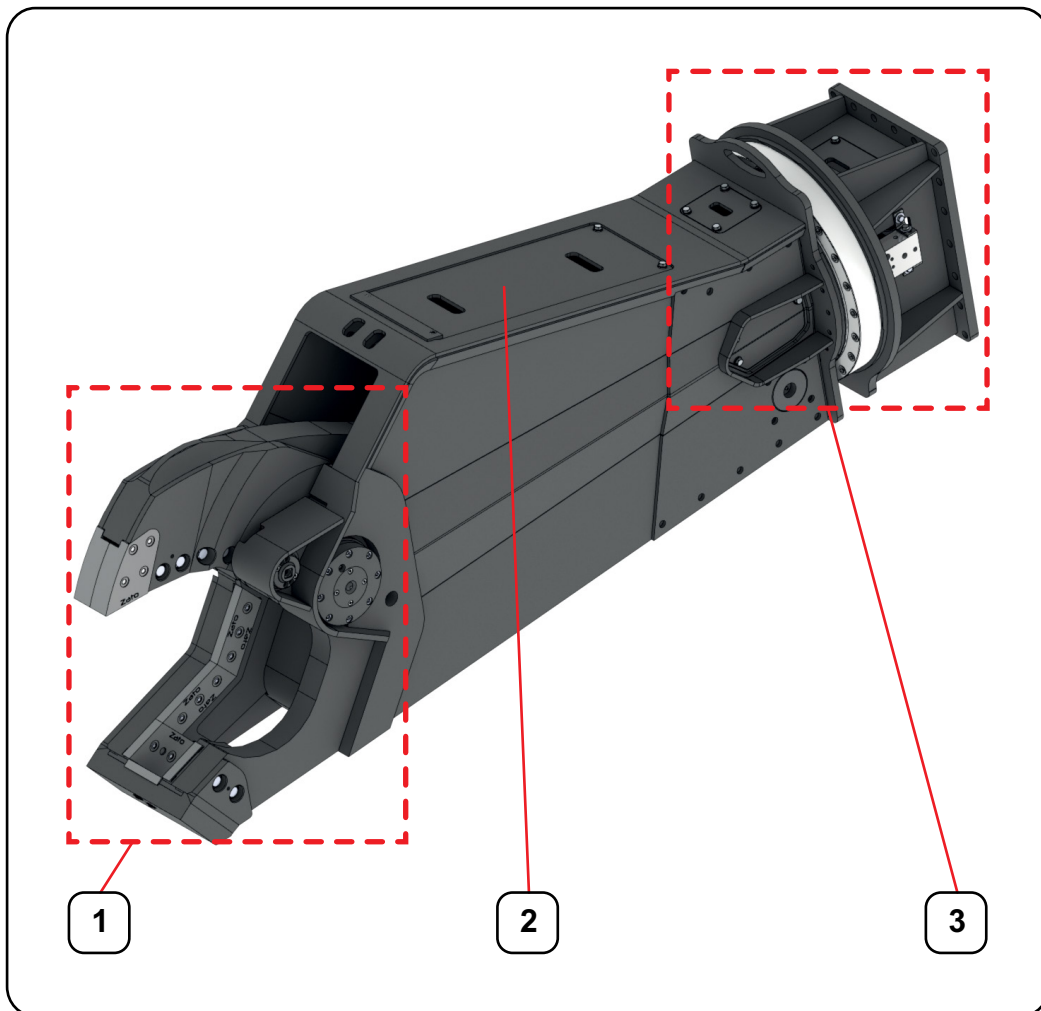
**Specific requirements**

Wait for the attachment to cool down before servicing it.

|  |   |
|--|---|
|  | <p><b>Danger zone 3</b></p> <p><b>Exposed person:</b> Mechanical Technician.</p> <p><b>Stage:</b> maintenance.</p> <p><b>Nature of the risk:</b> contact with liquids under pressure.</p> |
|--|---|

**Specific requirements**

Bleed all the residual pressure before servicing the attachment.



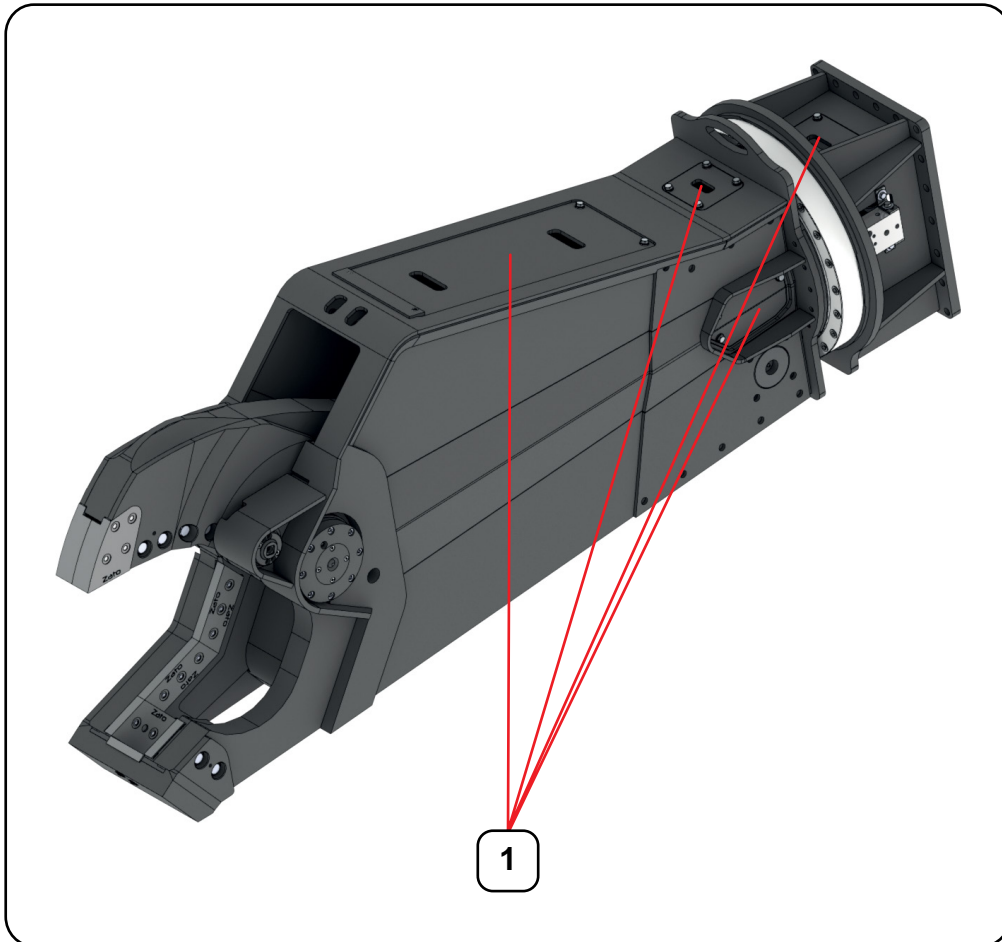
**Fig. 8** Residual risks

## 4.15 PROTECTION SYSTEMS

For the following description, refer to **Fig. 9 on page 36**.

The machine is equipped with the following protection systems:

- fixed guards **[1]**, protecting the moving parts.





**Fig. 9** Protection systems

## 4.16 INFORMATION AND WARNINGS APPLIED

The attachment is equipped with safety signs composed of adhesive labels (pictograms) bearing information and warnings.








These labels do not substitute the information contained in this manual, nor may they be considered to be sole and sufficient instructions.

|   |   |
|---|---|
|  | <p>The Manager must make sure the labels applied to the attachment are kept in perfect conditions. At the first sign of deterioration, they must be replaced immediately, making the request to the Manufacture according to the procedure described in <b>"2.8.3 Requesting Spare Parts"</b> on page 17.</p> |
|---|---|

|   |   |
|---|---|
|  | <p><b>Do not</b> remove, damage or make the safety signs applied to the attachment illegible.</p> |
|---|---|

Refer to **Fig. 10 on page 38**, unless otherwise specified.

The information and warnings applied on the attachment are shown in the table below.

| Pictogram   | Description  | Position                       |
|---|--|--------------------------------|
|    | Danger of crushing upper limbs.  | <b>1</b>                       |
|    | Danger of cutting upper limbs.   | <b>1</b>                       |
|  | Risk of contact with hot surfaces.   | <b>2</b>                       |
|  | Danger of liquids under pressure being ejected.  | <b>3</b>                       |
|  | Warning to keep at least 25m away from the machine and attachment during operation.            | <b>4</b>                       |
|  | Obligation to read the Manual thoroughly before carrying out any operations on the attachment. | <b>5</b>                       |
|   |  | <b>6</b>                       |
|   |  | <b>7</b>                       |
|   |  | <b>8</b>                       |
|  | Indication of the lifting point.   | <b>2A - Fig. 11 on page 40</b> |

**Tab. 8** Information and warnings applied

The Customer must set up an "out-of-service" sign during maintenance and attachment downtime, which indicates that the attachment is not running and forbids unauthorised people from using the attachment.

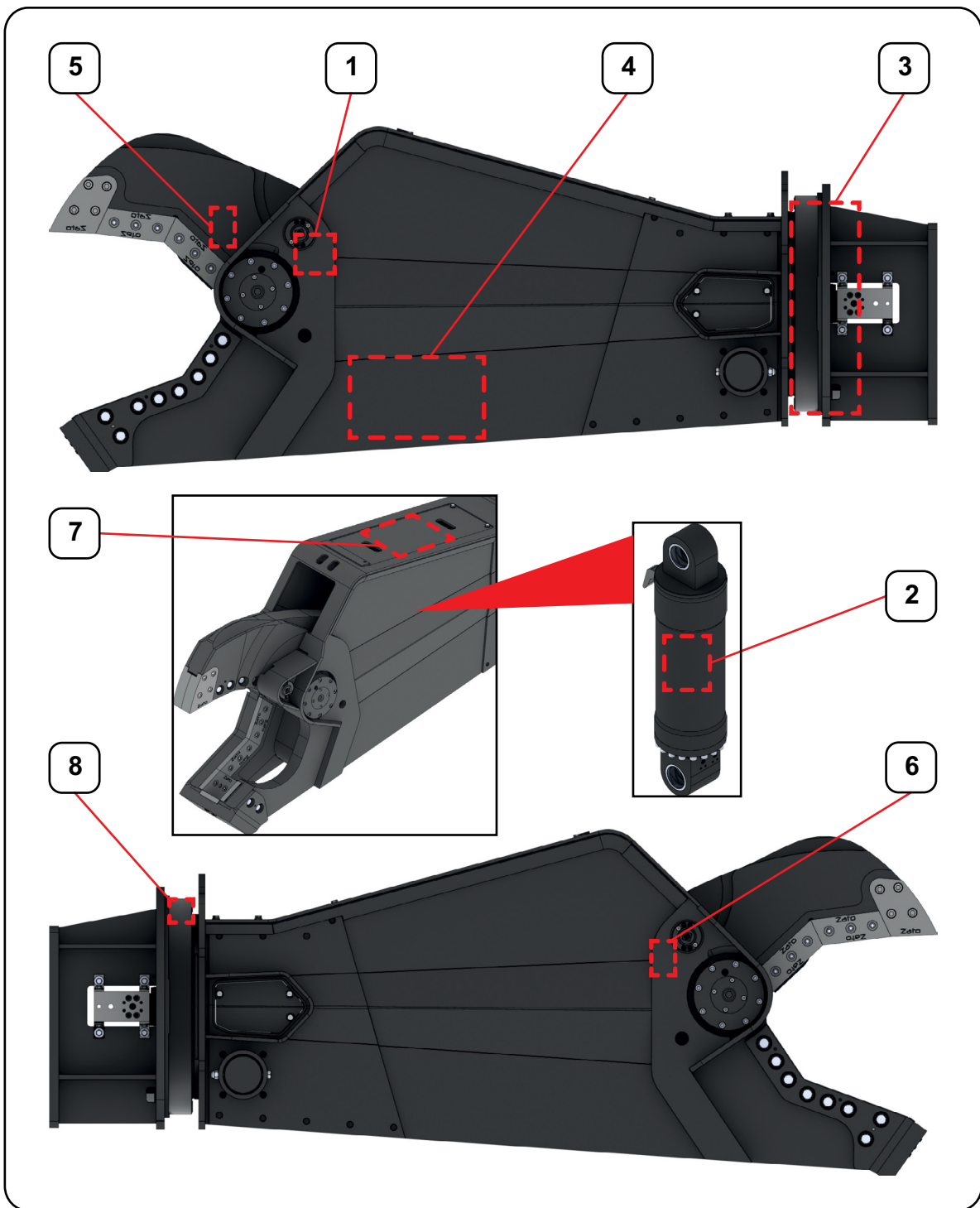


Fig. 10 Information and warnings applied

# 5 INSTRUCTIONS FOR PHASES PRIOR TO USE

## 5.1 TRANSPORTATION, HANDLING AND POSITIONING

### 5.1.1 Indications for transportation

The transport methods are agreed upon with the Customer when placing the order.

The Manufacturer disclaims any liability for damage or removal of parts that should occur when the attachment is transported.






### 5.1.2 Precautions to be taken upon reception of the attachment

Upon receiving the attachment, the Customer must make sure that:

- ▶ the packaging is intact;
- ▶ the supply corresponds with the order specifications;
- ▶ there is no obvious damage.

Should one of the above abnormalities be found, contact the Manufacturer.

### 5.1.3 Handling and positioning instructions

|   |  |
|---|--|
|  | All handling and positioning operations are the responsibility of <b>n. 2 Personnel in charge of Handling</b> , who have been properly instructed regarding the use of lifting and handling equipment and have the related license. During initial installation, handling and positioning operations are carried out under the supervision of the Manufacturer's Technicians.  |
|  | <b>RISK OF IMPACT AND CRUSHING</b><br>When lifting, all the surrounding area is to be considered a <b>danger zone</b> .<br><b>Ensure there are no exposed persons.</b>   |
|  | <b>RISK OF OVERTURNING</b><br>As long as the load is not completely lifted, check whether it is properly balanced.<br><b>Make sure the weight is well balanced and that the load is always kept in a perfectly upright position.</b><br>The lifting operation must be carried out continuously without jerks or pauses and without making the lifted component swing.<br><b>Lift the load enough for it to move.</b> |
|  | <b>Instructions on handling and positioning the attachment must only be given by the Handling Operator.</b>  |
|  | <b>Do not</b> stand under suspended loads.<br><b>Do not</b> overturn the load.   |



It is mandatory to use:



- **protective gloves,**



- **protective shoes,**

- **protective helmet**

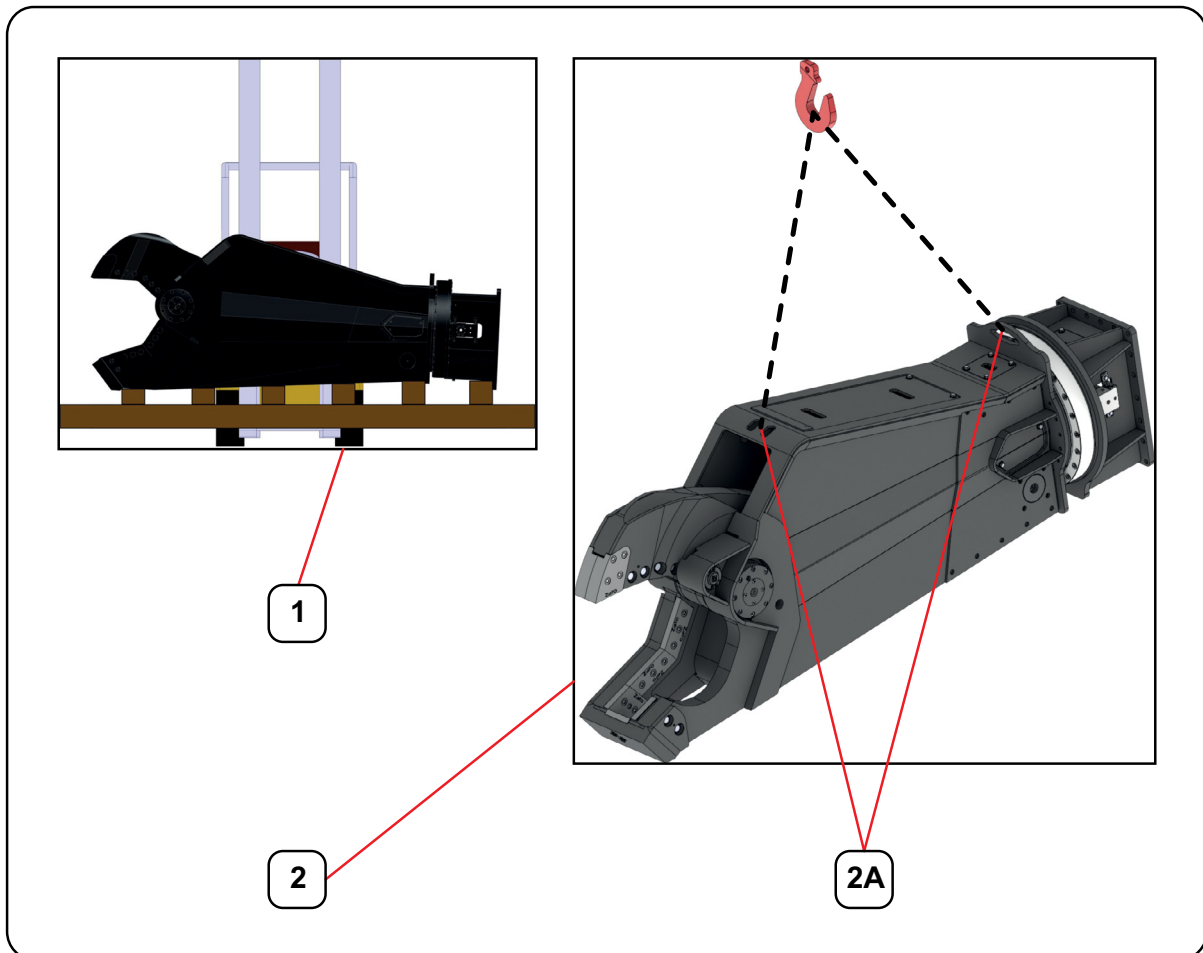
for handling and positioning operations.

The attachment (**Fig. 11 on page 40**) can be handled:

- ▶ by using a forklift **[1]**, if positioned on a pallet;
- ▶ by using a crane or machinery with a similar function **[2]**. In other cases, by using the specific lifting points **[2A]**.



The lifting points are indicated on the attachment via self-adhesive labels. Refer to **"4.16 Information and warnings applied"** on page 37.




**Fig. 11** Handling and positioning




While handling and positioning the attachment, the following directions are mandatory:


- ▶ prohibit access to unauthorised people;
- ▶ move away from loads before lifting and lowering them;
- ▶ make sure there is a clear and safe area to move quickly into if the load is about to fall;
- ▶ forbid other equipment from circulating within the installation area to prevent accidental impacts with protruding parts;
- ▶ if necessary, guide the load during the lifting stage and use suitable equipment to keep at a safe distance from the lifted part or component.
- ▶ only use lifting equipment with a suitable capacity;
- ▶ use certified ropes and hooks;
- ▶ do not use the lifting points to add further loads to the attachment.

The Customer is responsible for providing lifting equipment to handle and position the attachment.

|   |  |
|---|--|
|  | <p>The equipment used (ropes, chains, forklift truck, etc.) must comply with the regulations in force in the country where the attachment is installed and used and approved for lifting and handling the attachment, by considering:</p> <ul style="list-style-type: none"><li>- the shape and dimensions;</li><li>- the weight and distribution (centre of gravity);</li><li>- the intended coupling points.</li></ul> <p>Avoid impacts and/or pressure on the protruding parts and namely on the guards and controls, if any.</p> |
|---|--|

|   |   |
|---|---|
|  | <p>With regards to using ropes and/or chains:</p> <ul style="list-style-type: none"><li>- before use, check the condition of the ropes and/or chains and, if necessary, have them replaced;</li><li>- follow the instructions provided by the manufacturer of the ropes and/or chains;</li><li>- do not use ropes and/or chains without the relevant label bearing the capacity data.</li></ul> |
|---|---|

As the sling angle (**1 - Fig. 12 on page 42**) of the ropes increases, the pulling capacity of the ropes themselves decreases. Refer to **Fig. 12 on page 42** and the following table to assess the pull required for lifting.

|   |  |
|---|--|
|  | <p><b>Do not</b> use the ropes with a sling angle greater than 120°.</p> |
|---|--|

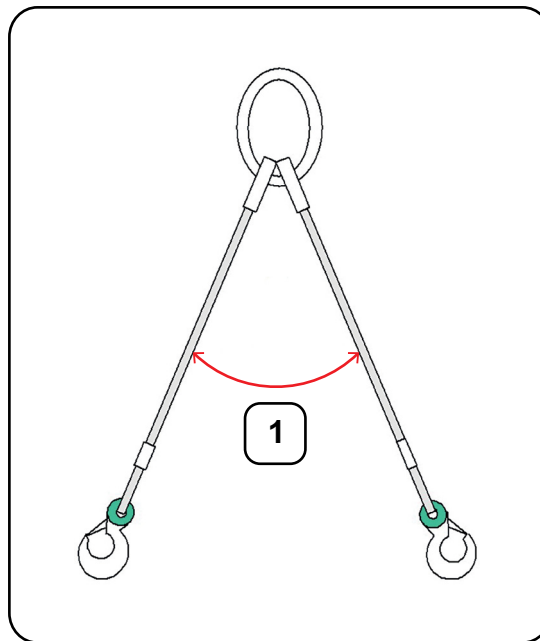


Fig. 12 Rope pull percentage reduction depending on the sling angle

| Sling angle [1] | Percentage reduction of rope pull |
|-----------------|-----------------------------------|
| 0°              | 100%                              |
| 60°             | 86%                               |
| 90°             | 71%                               |
| 120°            | 53%                               |

Tab. 9 Rope pull percentage reduction depending on the sling angle

## 5.2 UNPACKING AND DISPOSING OF PACKAGING MATERIALS

Customers are responsible for disposing of packaging material and must follow the regulations in force in the Country where the attachment is installed and used.

Packaging methods depend on the transport method agreed upon when the order was placed. Refer to that agreed on when placing the order.



The unpacking operations must be carried out by a **Handling Operator**.

To unpack the attachment, perform the following operations in order:

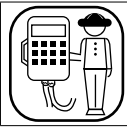
1. remove the packaging;
2. check the integrity of the attachment components;
3. if present, remove the fastening elements.



Should any damage and/or defects be noted on the attachment after removing the packaging, contact the Manufacturer.

## 5.3 ASSEMBLY

The attachment is supplied assembled.



Attachment installation is the responsibility of **2 Operators**.



**A second operator on the ground is mandatory during attachment installation.**  
**Metal shavings or debris may be projected when connection pins are hit; keep a safe distance away when the pins are removed and installed.**



**Do not** use pins and shims unless supplied by the Manufacturer.



The Manufacturer carries out specific training for the Operators indicated by the Customer who will be using the attachment.



It is mandatory to wear:  
 - **protective gloves,**  
 - **protective shoes,**  
 - **protective clothes,**  
 - **protective goggles,**  
 - **protective helmet**  
 to install the attachment.

Installation operations include:

- ▶ mechanically connecting the attachment to the machine;
- ▶ hydraulically connecting the attachment to the machine.



Refer to the machine manual for the operations on the machine indicated below.

### 5.4.1 **Mechanically connecting the attachment to the machine**



**The attachment must be installed without other attachments already mounted (bucket, etc.).**

**RISK OF OVERTURNING**

The attachment can be installed on the machine bucket position or arm position, causing an increase in the overturning moment at the foot of the machine; as such, the weight of the machine must be carefully assessed before installation.

Refer to **“4.7.4 Machine features” on page 32** for the minimum weight of the machine on which the attachment will be installed.



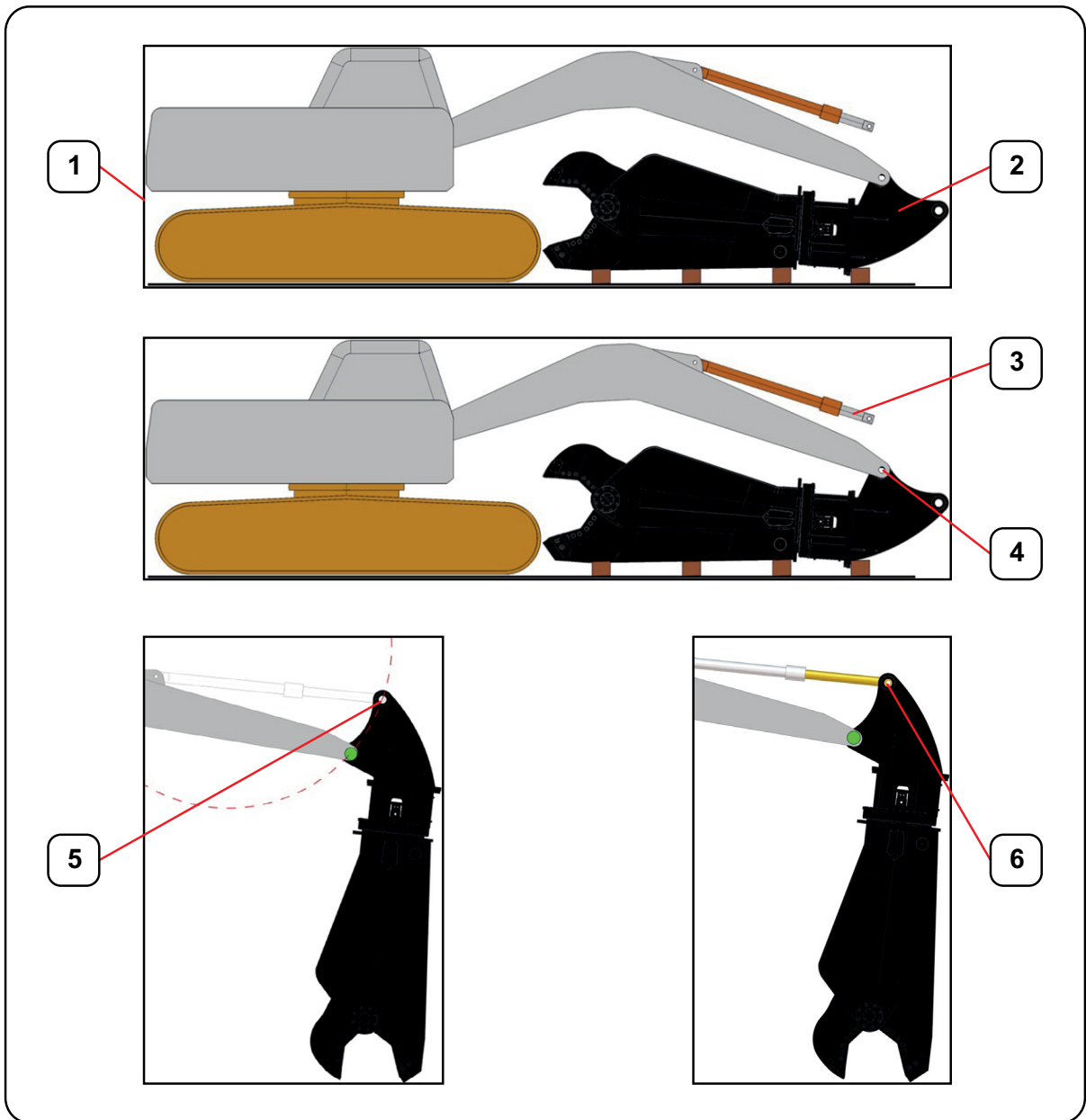
**Do not** remove and insert the pins with the attachment in positions other than the ones reported in **1- Fig. 13 on page 45** and **1- Fig. 14 on page 47**.

## Mechanically connecting the attachment to the machine (arm position)

For the following description, refer to **Fig. 13 on page 45**.

To mechanically connect the attachment to the machine, carry out the operations below in the following order:

1. position the attachment as indicated in **(1)**, referring to **“5.1.3 Handling and positioning instructions” on page 39**:
  - perfectly horizontally;
  - on a solid surface;
  - with the shears facing the operating position;
2. remove the bucket from the machine, referring to the machine’s manual;
3. remove the bucket arm from the machine, referring to the machine’s manual;
4. connect the linkage connection **(2)** to the attachment by using the specific bolts;
5. retract the machine cylinder shaft **(3)** (arm position) completely;
6. align the machine arm hole with the first hole **(4)** on the linkage connection;
7. connect the machine arm and the linkage connection by using the corresponding pin;
8. secure the pin, using the corresponding locking screw;
9. gently lift the machine arm, rotating the attachment until the second hole **(5)** on the linkage connection is in the range of the cylinder shaft;
10. extract the cylinder shaft until the second hole on the linkage connection aligns with the shaft hole **(6)**;
11. insert the corresponding pin;
12. secure the pin by using the corresponding locking screw.



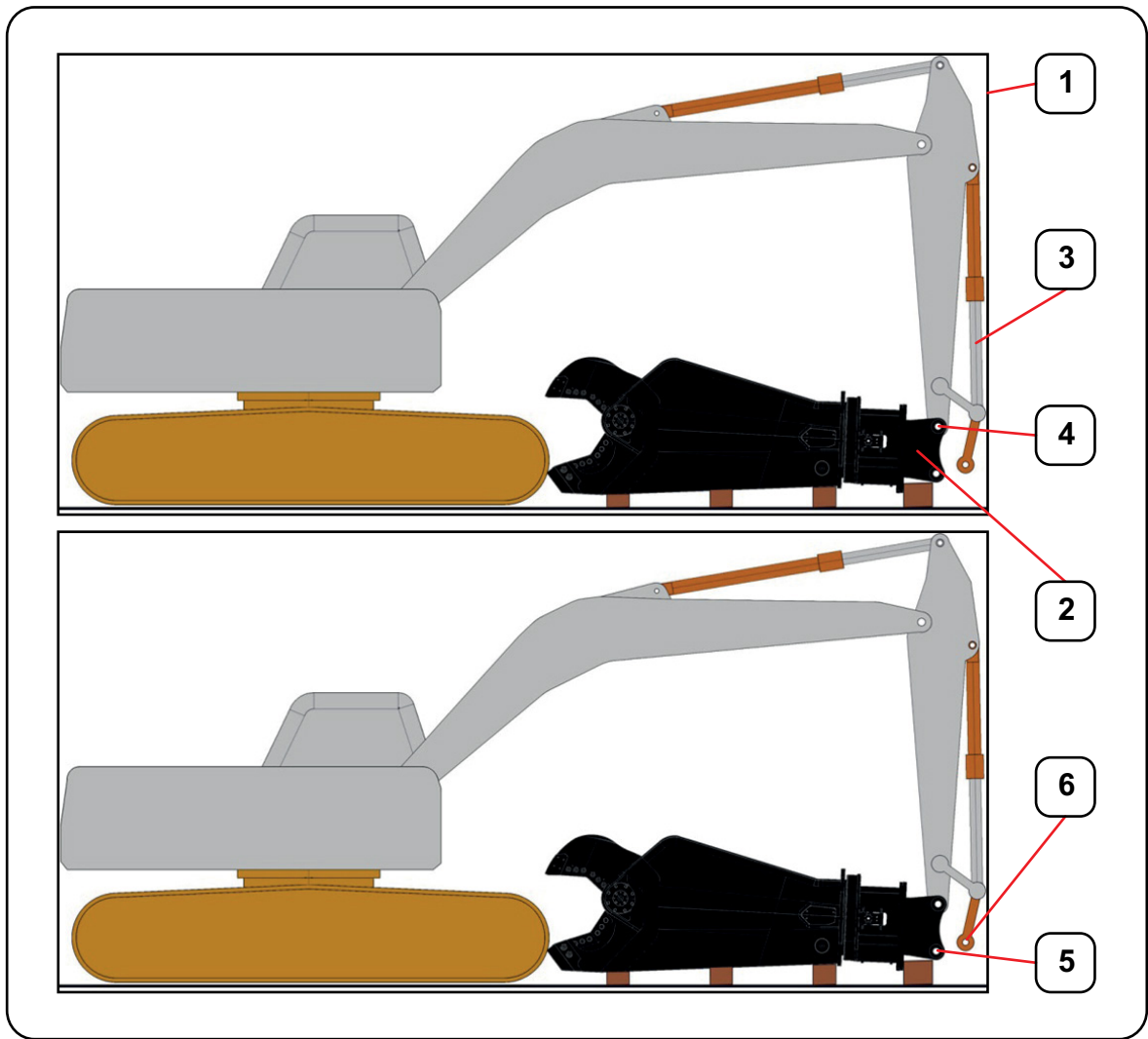
**Fig. 13** Mechanically connecting the attachment to the machine [arm position]

## Mechanically connecting the attachment to the machine (bucket position)

For the following description, refer to **Fig. 14 on page 47**.

To mechanically connect the attachment to the machine, carry out the operations below in the following order:

1. position the attachment as indicated in **[1]**, referring to **“5.1.3 Handling and positioning instructions” on page 39**:
  - perfectly horizontally;
  - on a solid surface;
  - with the shears facing the operating position;
2. remove the bucket from the machine, referring to the machine’s manual;
3. connect the linkage connection **[2]** to the attachment by using the specific bolts;
4. retract the machine cylinder shaft **[3]** [bucket position] completely;
5. align the machine arm hole with the first hole **[4]** on the linkage connection;
6. connect the machine arm and the linkage by using the corresponding pin;
7. secure the pin, using the corresponding locking screw;
8. gently lift the machine arm, rotating the attachment until the second hole **[5]** on the linkage connection is in the range of the cylinder shaft;
9. extract the cylinder shaft until the second hole on the linkage connection aligns with the shaft hole **[6]**;
10. insert the corresponding pin;
11. secure the pin by using the corresponding locking screw.



**Fig. 14** Mechanically connecting the attachment to the machine [bucket position]

## 5.4.2 Hydraulically connecting the attachment to the machine



**Tighten all the hydraulic connections before pressurising the oil.**

**The oil must be pressurised when the attachment is upright. Otherwise air bubbles can form in the speed valve, which might prevent the upper jaw from opening.**

Before hydraulically connecting the attachment to the machine, make sure the following rules are followed:

- ▶ the machine controls that move the shears must be unmistakably identified;
- ▶ The hydraulic flows generated by the machine's hydraulic system must be compatible with the indications in **"4.7.1 Hydraulic features" on page 30**;
- ▶ the attachment must function if, and only if, the machine is on;
- ▶ when the machine is switched off, the hydraulic flow towards the attachment must stop;
- ▶ the machine hydraulic system must not have pressure accumulator tanks, so as to prevent the attachment from moving unexpectedly;
- ▶ simply switching on the machine must not result in the attachment moving at all.

The hydraulic connection is differentiated according to the type of hydraulic connection system.

For a hydraulic connection by means of flow regulation blocks refer to **"5.4.2.1 Hydraulic connection by means of flow regulation blocks" on page 48**.

For a hydraulic connection by means of quick-release hydraulic manifolds refer to **"5.4.2.2 Hydraulic connection by means of quick-release hydraulic manifolds" on page 51**.

### 5.4.2.1 Hydraulic connection by means of flow regulation blocks

---

A hydraulic connection by means of flow regulation blocks is differentiated according to the presence or absence of the drainage line.



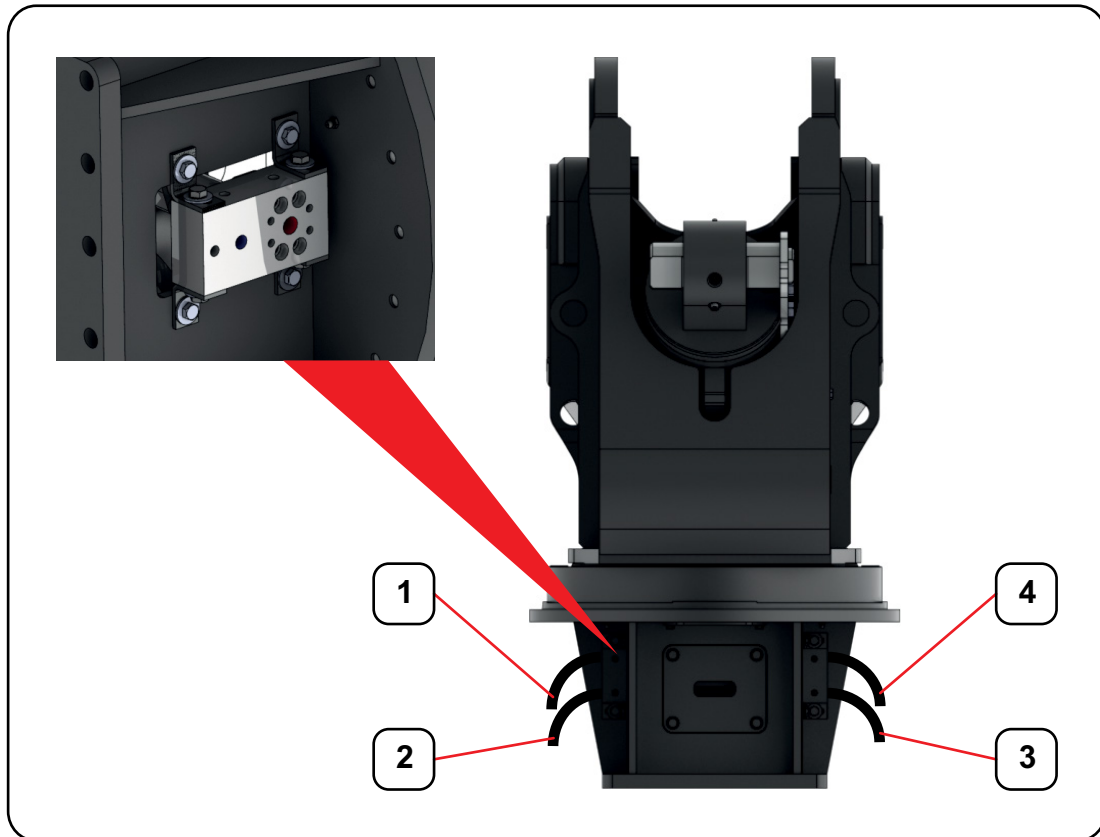
## Hydraulic connection by means of flow regulation blocks without drainage

Refer to **Fig. 15 on page 49**.

Connect the attachment to the machine hydraulically by referring to the following table.

| Reference | Tube function              | Connection           |
|-----------|----------------------------|----------------------|
| <b>1</b>  | Machine pump discharge     | SAE 6000 3/4" FLANGE |
| <b>2</b>  | Machine rotation discharge | 3/8" G BSP           |
| <b>3</b>  | Machine rotation delivery  | 3/8" G BSP           |
| <b>4</b>  | Machine pump delivery      | SAE 6000 3/4" FLANGE |

**Tab. 10** Hydraulic connection by means of flow regulation blocks without drainage



**Fig. 15** Hydraulic connection by means of flow regulation blocks without drainage

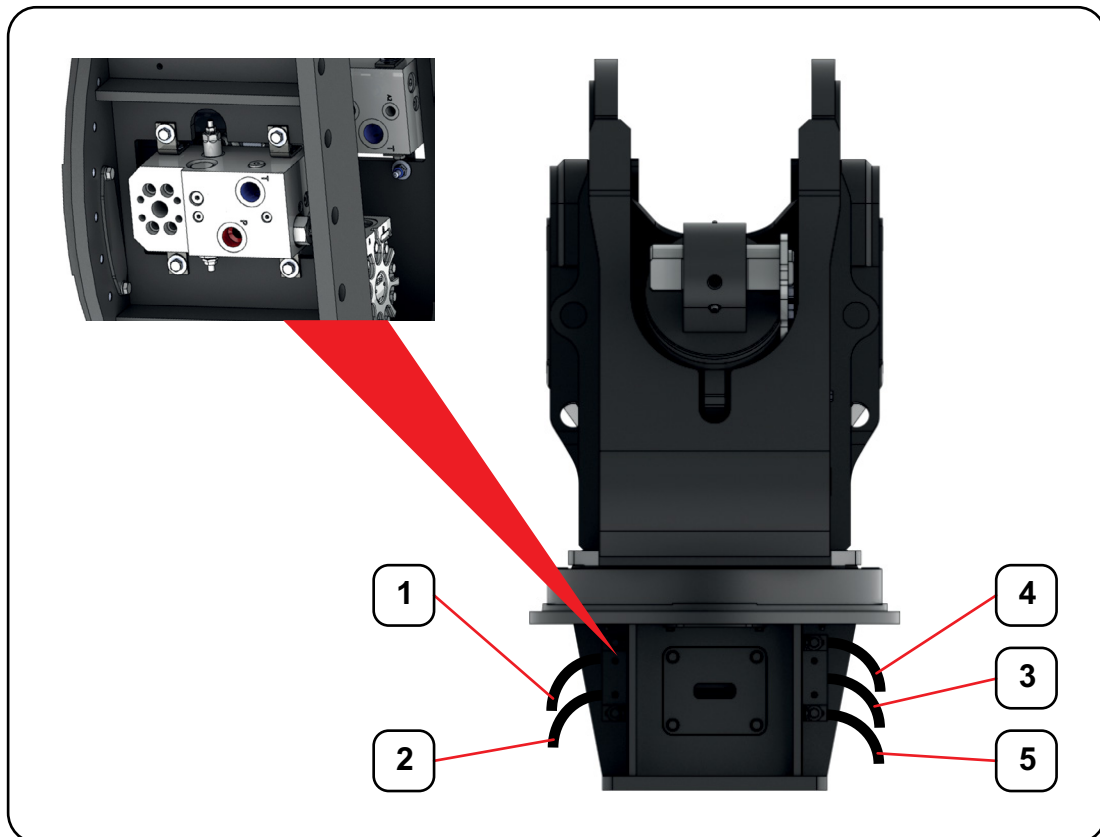
## Hydraulic connection by means of flow regulation blocks with drainage

Refer to **Fig. 16 on page 50**.

Connect the attachment to the machine hydraulically by referring to the following table.

| Reference | Tube function                      | Models               | Connection                             |
|-----------|------------------------------------|----------------------|--|
| <b>1</b>  | Machine pump discharge             | FCE30R-II, FCE40R-II | FLANGE 3/4" SAE 6000 1"                |
|           |                                    | FCE50R-II, FCE90R-II | FCE70R-II, FLANGE 3/4" SAE 6000 1" 1/2 |
| <b>2</b>  | Machine rotation discharge         | FCE30R-II, FCE40R-II | 1" G BSP                               |
|           |                                    | FCE50R-II, FCE90R-II |  |
| <b>3</b>  | Machine rotation delivery          | FCE30R-II, FCE40R-II | 1" G BSP                               |
|           |                                    | FCE50R-II, FCE90R-II |  |
| <b>4</b>  | Machine pump delivery              | FCE30R-II, FCE40R-II | FLANGE 3/4" SAE 6000 1"                |
|           |                                    | FCE50R-II, FCE90R-II | FCE70R-II, FLANGE 3/4" SAE 6000 1" 1/2 |
| <b>5</b>  | Machine rotation oil drainage line | FCE30R-II, FCE40R-II | 1" G BSP                               |
|           |                                    | FCE50R-II, FCE90R-II |  |

**Tab. 11** Hydraulic connection by means of flow regulation blocks with drainage



**Fig. 16** Hydraulic connection by means of flow regulation blocks with drainage

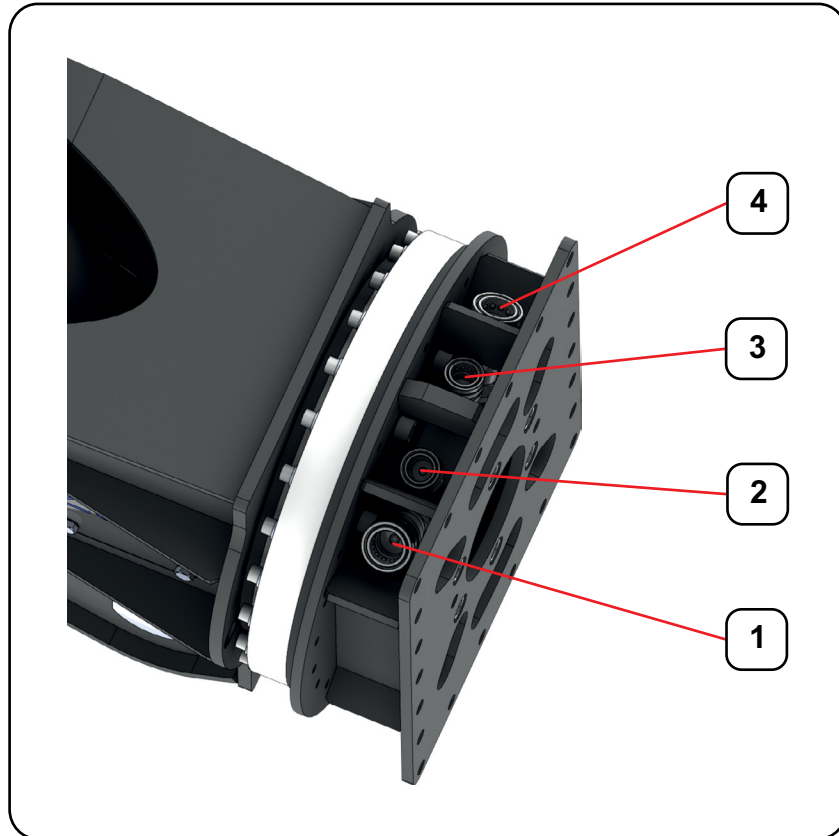
### 5.4.2.2 Hydraulic connection by means of quick-release hydraulic manifolds

Refer to **Fig. 17 on page 51**.

Connect the attachment to the machine hydraulically by referring to the following table.

| Reference | Tube function              | Connection |
|-----------|----------------------------|------------|
| <b>1</b>  | Machine pump discharge     | 3/4" G BSP |
| <b>2</b>  | Machine rotation discharge | 1/2" G BSP |
| <b>3</b>  | Machine rotation delivery  | 1/2" G BSP |
| <b>4</b>  | Machine pump delivery      | 3/4" G BSP |

**Tab. 12** Hydraulic connection by means of quick-release hydraulic manifolds




**Fig. 17** Hydraulic connection by means of quick-release hydraulic manifolds

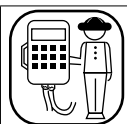
## 5.5 PREPARATION FOR COMMISSIONING

### 5.5.1 Preliminary lubrication

The attachment is supplied with its components already lubricated.

### 5.5.2 Testing

|   |  |
|---|--|
|  | Testing is done at the <b>Manufacturer's</b> premises. |
|---|--|



The first start-up operations must be carried out by an **Operator**.



It is mandatory to use:

- **protective gloves**,



- **protective shoes**

to perform the following operations.

For the following description, refer to **Fig. 18 on page 53**.

Perform the following operations in order for the first start-up:

1. make sure the pins **[1]** are:
  - 1.1. secured;
  - 1.2. greased;
2. check that the blades are clean and clear of debris;
3. make sure the screws and bolts of the shears are tightened correctly by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.
4. switch on the machine;
5. set the minimum machine motor speed;
6. partially run the cylinder 6 times **[2]** about 100 mm in both directions;
7. check the machine oil level;
8. if necessary, top it up in order to reach the right oil level;
9. run the cylinder completely until maximum oil pressure is reached;
10. make sure the upper jaw **[3]** opens/closes unhindered;
11. make sure there are no oil leaks along the entire hydraulic line.

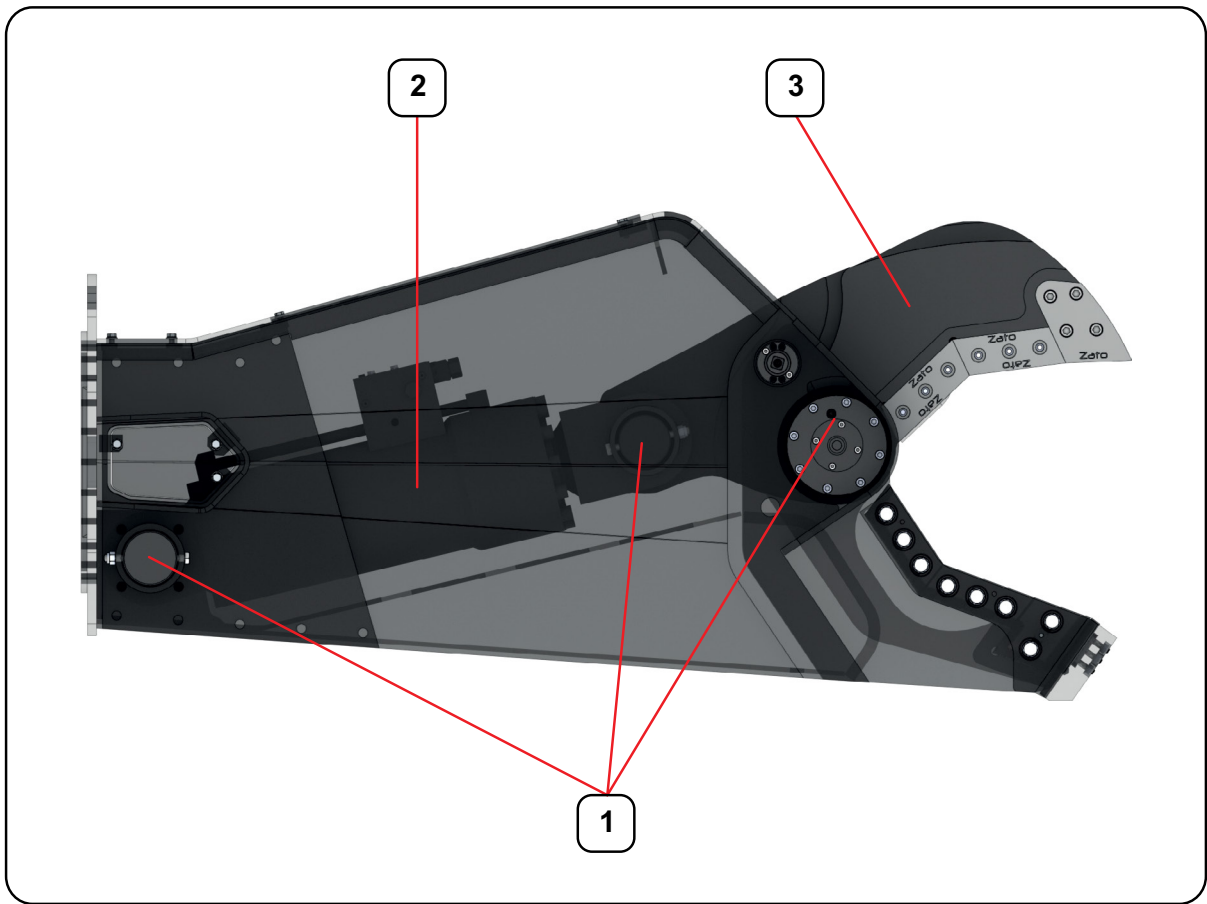


Fig. 18 First start-up

## 5.7 DOWNTIME

### 5.7.1 Instructions for downtime








The operations described below regarding downtime are the responsibility of **2 Operators**, unless otherwise specified.



**A second operator on the ground is mandatory during downtime operations.**




**Do not** remove and insert attachment connecting pins on the machine with the attachment in positions other than the one indicated in **Fig. 19 on page 55**.

|   |                               |
|---|-------------------------------|
|   | It is mandatory to wear:      |
|  | - <b>protective gloves,</b>   |
|  | - <b>protective shoes,</b>    |
|  | - <b>protective clothing,</b> |
|  | - <b>protective goggles,</b>  |
|   | - <b>protective helmet</b>    |
|   | for downtime operations.      |

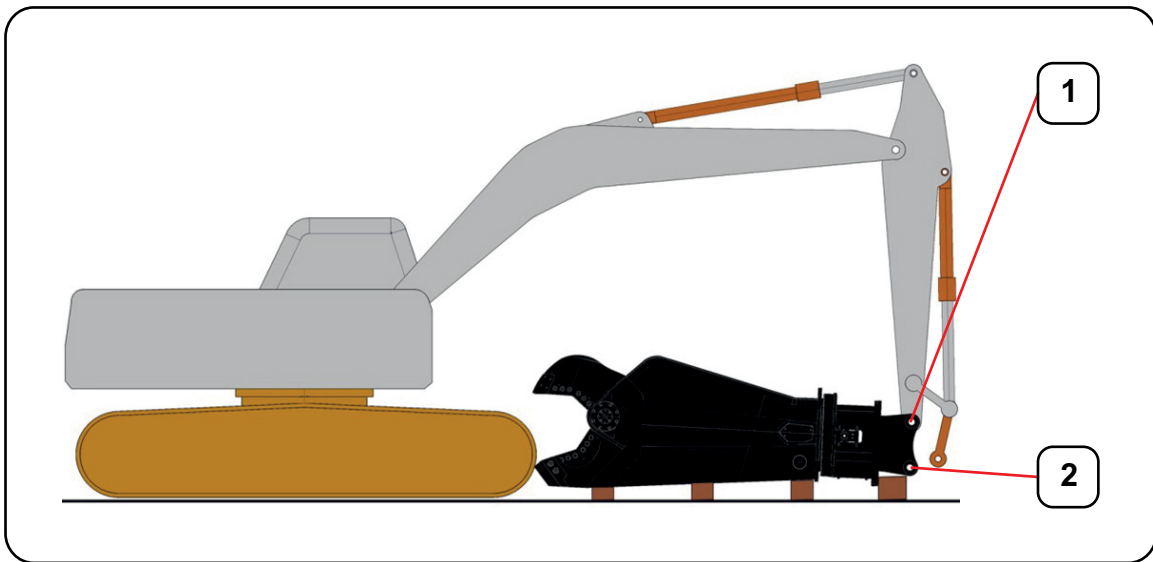
For the following description, refer to **Fig. 19 on page 55**.

Perform the following operations in order if the attachment is not used for over **a month**:

1. position the attachment on the ground:
  - perfectly horizontally;
  - on a solid surface;
  - with the upper jaw and the jaw facing the operating position;
2. switch the machine off;
3. let the hydraulic system cool down to ambient temperature;
4. loosen the hydraulic couplings with caution;
5. disconnect the machine hydraulic tubes from the hydraulic manifolds of the attachment;
6. close all the hydraulic tubes;
7. switch on the machine;
8. remove the pin locking screw **[1]**;
9. gently hit the free head of the pin by using a suitable hammer until it comes out completely;

|   |   |
|---|---|
|  | If the pin is hard to remove, activate the machine arm to better align the holes. |
|---|---|

10. remove the pin locking screw **[2]**;
11. gently hit the free head of the pin by using a suitable hammer until it comes out completely;
12. gently move the machine arm away from the attachment;
13. clean the attachment, refer to **“7.2.1 Cleaning” on page 60**;



**Fig. 19** Downtime instructions

### 5.7.2 Storage during downtime

Refer to **“4.13 Environmental conditions required for storage” on page 34** for storage during downtime.


### 5.7.3 Restarting after downtime


There are no specific restarting operations after downtime.


Refer to **“5.4 Installation” on page 43**.

# 6 OPERATING INSTRUCTIONS


## 6.1 SAFETY MEASURES TO BE IMPLEMENTED FOR USE

|   |  |
|---|--|
|  | <p>It is mandatory to wear:</p> <ul style="list-style-type: none"><li>- <b>protective gloves,</b></li><li>- <b>protective shoes,</b></li><li>- <b>protective clothing,</b></li><li>- <b>protective goggles,</b></li><li>- <b>protective helmet</b></li></ul> <p>to use the attachment.</p> |
|---|--|

|   |   |
|---|---|
|  | <p><b>ONLY Operators are allowed during attachment use; NO unauthorised personnel are allowed.</b></p> <p><b>The downtime cab must be equipped with safety glass and protective grates, as debris might be projected.</b></p> <p><b>If the blades vibrate while the attachment is being used, check for debris in the blade housings.</b></p> |
|---|---|

|   |   |
|---|---|
|  | <p><b>Do not</b> touch moving parts during attachment operation.</p> <p><b>Do not</b> use the attachment above the driver's cab.</p> <p><b>Do not</b> use the attachment to transport demolition scraps.</p> <p><b>Do not</b> shear/cut material when the machine is moving.</p> <p><b>Do not</b> leave objects or tools on work stations or near the attachment.</p> <p><b>Do not</b> use the attachment without the original protective systems.</p> <p><b>Do not</b> use the attachment if the glass on the machine cab is damaged or missing.</p> <p><b>Do not</b> use the attachment with the upper jaw lowered to tear down buildings or structures.</p> <p><b>Do not</b> get any closer than 5m from power lines with any part of the attachment or the machine.</p> |
|---|---|

## 6.2 USING THE ATTACHMENT

|   |   |
|---|---|
|  | <p>The attachment must be used by an <b>Operator</b>, unless otherwise specified.</p> |
|---|---|

Using the attachment includes:

1. preliminary checks;
2. work cycle;
3. end of work shift.




## 6.2.1 Preliminary checks

Whenever the attachment is used, first check the clearance between:

- the upper jaw blades and the jaw blades, refer to **“7.2.2.5 Checks on the shears” on page 64**;
- the tips and the razor blade, refer to **“7.2.2.5 Checks on the shears” on page 64**.

## 6.2.2 Work cycle

|   |  |
|---|--|
|  | <p><b>RISK OF OVERTURNING</b></p> <p><b>Overloading the attachment can cause the machine to overturn.</b></p> <p><b>Should scraps need to be lifted during the work cycle, use the shortest possible sling and lift the load only for as long as strictly necessary.</b></p> |
|---|--|

During the work cycle, it is important to carefully evaluate the machine overall stability, refer to **“4.7.4 Machine features” on page 32**.

Depending on the position of the end of the machine arm, the machine itself is subject to overturning moments in different directions and to various extents.

### Longitudinal overturning moment

If operating on yielding surfaces (soft soil, mud, etc.) or sloping terrain, the longitudinal overturning moment **(Fig. 20 on page 57)** increases at the foot of the machine, thereby reducing its capacity at the attachment linking point.

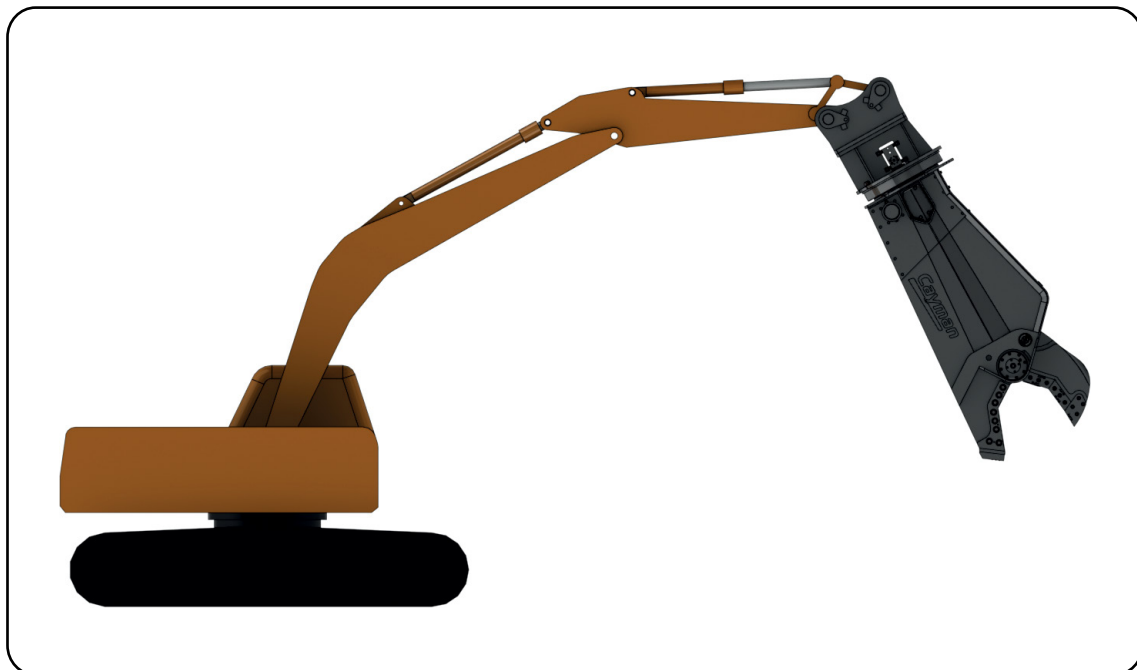
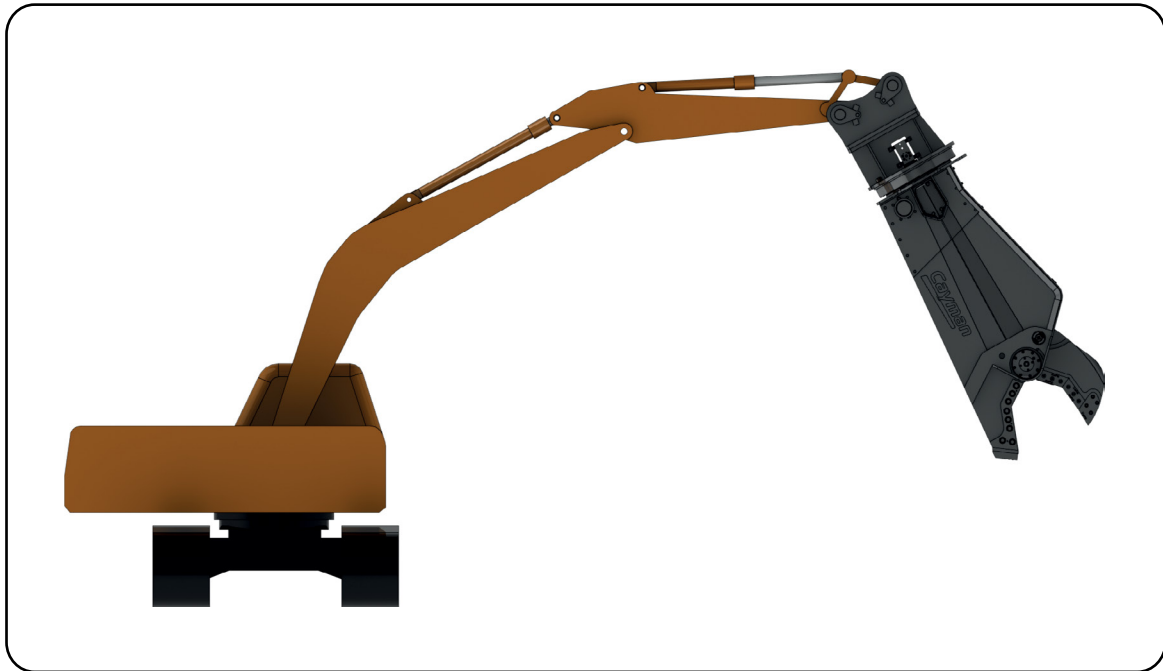


Fig. 20 Longitudinal overturning moment

### Orthogonal overturning moment

If operating with the machine arm positioned at right angles in relation the machine track axis, the orthogonal overturning moment **(Fig. 21 on page 58)** increases at the foot of the machine, thereby reducing its capacity at the attachment linking point.



**Fig. 21** Orthogonal overturning moment


### 6.2.3 End of work shift

At the end of the work shift, carry out the following operations:

1. position the attachment on the ground;
2. switch the machine off;
3. check the oil pressure, referring to the machine manual;
4. depressurise the machine oil tank, referring to the machine manual;
5. repeatedly activate the machine control levers in all directions to eliminate residual pressure.


# 7 MAINTENANCE INSTRUCTIONS





The safety of the attachment and of the operators also depends on complying with the maintenance times and methods.


|   |   |
|---|---|
|  | <b>If it is not possible to complete one of the following operations, see “7.4 Troubleshooting” on page 88.</b> |
|---|---|

|   |  |
|---|--|
|  | <b>Do not carry out maintenance while the attachment and the machine on which it is installed are operating.</b> |
|---|--|

## 7.1 SAFETY MEASURES TO BE IMPLEMENTED FOR MAINTENANCE

|   |  |
|---|--|
|  | <p><b>Machine maintenance must be performed exclusively by qualified personnel, as specified for each operation to be performed.</b></p> <p><b>Before performing maintenance, it is mandatory to place the attachment in maintenance status according to the following instructions, unless otherwise explicitly indicated.</b></p> <p><b>Use the Personal Protective Equipment (PPE) when indicated in the operations to be performed.</b></p> <p><b>Refer to the safety data sheet of the lubricants and/or chemicals before using them.</b></p> <p><b>Hydraulic oil is toxic and can seriously harm people if it comes into contact with skin and/or eyes.</b></p> <p><b>Failure, even in part, to follow the instructions in this manual and its accompanying documents for maintenance on the machine voids the contractually defined warranty and relieves the Manufacturer of any and all liability for damage and injury caused by the attachment.</b></p> |
|---|--|

|  |  |
|--|--|
| <br><br><br> | <p>It is mandatory to wear:</p> <ul style="list-style-type: none"><li>- <b>protective gloves,</b></li><li>- <b>protective non-slip shoes,</b></li><li>- <b>protective clothes,</b></li><li>- <b>protective goggles</b></li></ul> <p>to perform maintenance on the attachment.</p> <p>Further PPE may be specified for specific operations.</p> |
|--|--|

|   |   |
|---|---|
|  | <b>Do not</b> carry out manual operations on the attachment when the machine is on. |
|---|---|

Before any maintenance operation that does not require upper jaw movement, put appropriately sized blocks of wood between the jaw and upper jaw to prevent the upper jaw from closing accidentally.

### 7.1.1 Maintenance status

To set the attachment in **maintenance status**, perform the following operations in order:

1. switch the machine off;
2. take the key out of the machine ignition;
3. put the key in a safe place;
4. put up a "Maintenance in progress" sign near the machine and the attachment.

When maintenance has been completed, take the attachment out of **maintenance status**. To take the attachment out of **maintenance status**, perform the following operations in order:

1. make sure that any replaced parts and tools used have been removed from the machine and the attachment;
2. check that all the guards and protection devices possibly dismantled during the operation have been put back in place and properly adjusted, and make sure they work correctly;
3. remove the "Maintenance in progress" sign from the attachment.

## 7.2 MAINTENANCE CLASSIFICATION


---

Maintenance is divided into:

- routine, which includes the operations set out and dealt with in this Manual;
- special, which includes the maintenance operations not set out or dealt with in this Manual.

Routine maintenance entails:

- cleaning;
- preventive maintenance, which includes all operations to be performed periodically so as to ensure correct attachment operation and efficiency and prevent components from being worn;
- corrective maintenance, which includes all operations to be performed so as to restore correct attachment operation following a component malfunction or breakage/wear.

|  |  |
|--|--|
|  | <p><b>Further information on maintenance operations is found in the accompanying documentation supplied.</b></p> <p><b>For maintenance frequency, consider the lesser value of the two periods and the number of working hours recommended between one intervention and another.</b></p> |
|--|--|


For cleaning, refer to **"7.2.1 Cleaning" on page 60**.

For preventive maintenance, refer to **"7.2.2 Preventive maintenance" on page 61**.


For corrective maintenance, refer to **"7.2.3 Corrective maintenance" on page 71**.

For special maintenance operations, refer to **"7.2.4 Special maintenance" on page 85**.

### 7.2.1 Cleaning

|   |   |
|---|---|
|  | Cleaning operations must be carried out by an <b>Operator</b> . |
|---|---|

|   |   |
|---|---|
|  | <b>All cleaning operations must be done with the machine off.</b> |
|---|---|

|   |  |
|---|--|
|  | <b>Do not</b> use chemicals [such as solvents, etc.] for cleaning.<br><b>Do not</b> use compressed air for cleaning. |
|---|--|

|   |   |
|---|---|
|  | It is mandatory to use:<br>- <b>protective mask</b><br>to clean the attachment. |
|---|---|

Cleaning requires generally cleaning the attachment and the cutting surfaces **weekly** or, if there is evident dirt build-up, using:

- a metal brush for the cutting surfaces;

- rag;
- brush.

## 7.2.2 Preventive maintenance



Preventive maintenance operations must be carried out by a **Mechanical Technician**, unless otherwise indicated.

Preventive maintenance jobs include:

- general attachment checks [refer to “**7.2.2.1 General attachment checks**” on page 61];
- cylinder checks [refer to “**7.2.2.2 Hydraulic cylinder checks**” on page 62];
- swivel hydraulic coupling checks [refer to “**7.2.2.3 Swivel hydraulic coupling checks**” on page 62];
- clutch checks [refer to “**7.2.2.4 Clutch checks**” on page 62];
- shears checks [refer to “**7.2.2.5 Checks on the shears**” on page 64];
- attachment greasing [refer to “**7.2.2.6 Greasing the attachment**” on page 68];
- hydraulic motor maintenance [refer to “**7.2.2.7 Hydraulic motor maintenance**” on page 69];
- check to ensure the slewing ring bolts are tightened correctly [refer to “**7.2.2.8 Check to ensure the slewing ring bolts are tightened correctly**” on page 69];
- replacement of the slewing ring bolts [refer to “**7.2.2.9 Slewing ring bolts replacement**” on page 69];
- speed valve checks [refer to “**7.2.2.10 Speed valve checks**” on page 69].

### 7.2.2.1 General attachment checks

The general attachment checks include:

- visually checking the structure on a **daily** basis;
- checking the hydraulic system on a **daily** basis;
- checking the screws on the fixed guards to ensure they are tightened correctly on a **weekly** basis;
- checking the screws of the hydraulic tube flanges to ensure they are tightened correctly on a **weekly** basis;
- visually checking the plates and pictograms on a **monthly** basis.

#### Visual check of the structure

When visually inspecting the structure, make sure there are no cracks in the attachment structure.

#### Checking the hydraulic system

To check the hydraulic system, perform the following operations in order:

1. make sure the hydraulic system tubes and fittings are intact;
2. if you find damage or leaks, replace the damaged component.

#### Checking proper screw tightness on the fixed guards

To check proper screw tightness on the fixed guards, refer to “**7.2.2.11 How to make sure the blade screws and bolts are tightened properly**” on page 70.

### Checking proper screw tightness on the hydraulic tube flanges

To check proper screw tightness on the hydraulic tube flanges, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### Visual check on the plate and pictograms

To visually check the plates and pictograms, make sure the ones applied to the attachment are:

- present;
- intact;
- legible.

### 7.2.2.2 Hydraulic cylinder checks

---

The checks on the hydraulic cylinder include:

- checking the shaft output area on a **daily** basis;
- checking the hydraulic cylinder head screws on a **monthly** basis;

#### Checking the shaft output area

To check the shaft output area, make sure there are no oil leaks in the shaft output area.

#### Checking the hydraulic cylinder head screws

To check the hydraulic cylinder head screws, perform the operations below in the following order:

1. make sure the hydraulic cylinder head closing screws are intact;
2. make sure the hydraulic cylinder head closing screws are tightened properly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### 7.2.2.3 Swivel hydraulic coupling checks

---

The checks on the swivel hydraulic coupling include:

- visually checking the swivel hydraulic coupling on a **daily** basis;
- making sure the screws locking the rotor onto the stator are tightened properly on a **weekly** basis.

#### Swivel hydraulic coupling visual check

To visually check the swivel hydraulic coupling, make sure there are no oil leaks in the swivel hydraulic coupling.

#### Making sure the screws locking the rotor onto the stator are tightened properly

To make sure the screws locking the rotor onto the stator are tightened properly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### 7.2.2.4 Clutch checks

---

The clutch checks include:

- checking the correct tightening of the clutch screws every **16 hours** of operation;
- checking the state of wear of the clutch spring pad on a **weekly** basis.

### Checking the correct tightening of clutch screws

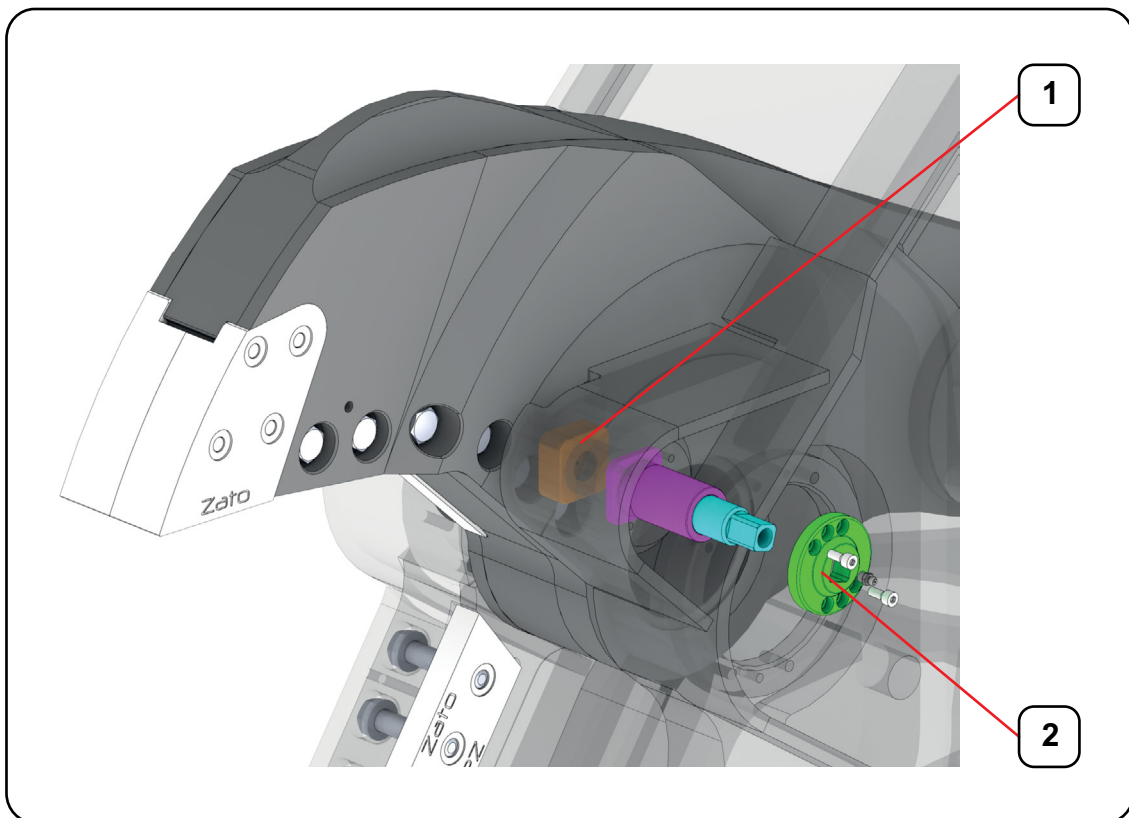
To check the clutch screws are tightened correctly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### Checking the state of wear of the clutch spring pad

For the following description, refer to **Fig. 22 on page 63.**

To verify the state of wear of the clutch spring pad, carry out the operations below on each clutch in the following order:

1. open/close the upper jaw until the spring pad **[1]** is approximately halfway of the upper jaw rubbing surface;
2. remove the fastening screws of the flange **[2]**;
3. remove the flange;
4. remove any grease from the surface of the spring pad;
5. verify that the distance between the spring pad and the surface of the upper jaw is equal to around 0.2 mm;
6. if the distance between the spring pad and the upper jaw surface is greater than 0.2 mm, adjust the clutch by referring to ;
7. insert the flange;
8. secure the flange by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**



**Fig. 22** Checking the state of wear of the clutch spring pad

Checks on the shears include:

- ▶ making sure the blade screws and bolts are tightened properly on a **daily** basis;
- ▶ checking the blade and upper jaw cutting profile radius on a **daily** basis;
- ▶ checking the clearance between the main upper jaw blades and the main jaw blades on a **daily** basis;
- ▶ checking clearance between the upper jaws and the razor blade on a **daily** basis;
- ▶ making sure the central pin and end flange screws and bolts are tightened properly on a **weekly** basis.


### Making sure the blade screws and bolts are tightened properly

|   |   |
|---|---|
|  | <p><b>RISK OF BURNS</b></p> <p><b>Before making sure the blade screws and bolts are intact and tightened properly, wait for the blades to cool down to ambient temperature.</b></p> |
|---|---|

Perform the following operations in order to make sure the blade screws and bolts are intact and tightened properly:

1. make sure the blade screws and bolts are intact;
2. if there are damaged screws and/or bolts, replace them;
3. make sure the screws and bolts are tightened properly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### Checking the blade and upper jaw cutting profile radius

|   |   |
|---|---|
|  | <p>Checking the blade and upper jaw cutting profile radius requires:</p> <ul style="list-style-type: none"><li>- a test template.</li></ul> |
|---|---|

To check the blade and upper jaw cutting profile radius for each blade and upper jaw, perform the operations below in the following order:

1. measure the blade/upper jaw cutting profile radius by using a test template;
2. if the blade cutter profile radius is greater than 3 mm and there are other non-worn sides of the blade available, rotate the blade by referring to **“7.2.3.2 Rotating the main blades” on page 73;**
3. if the blade cutter profile radius is greater than 3 mm and there are no other non-worn sides of the blade available, replace the blade by referring to **“7.2.3.3 Replacing the main blades” on page 74;**
4. if the upper jaw cutter profile radius is greater than 3 mm, replace the upper jaw by referring to **“7.2.3.10 Replacing the upper jaws” on page 84.**



## Checking the clearance between the main upper jaw blades and the main jaw blades

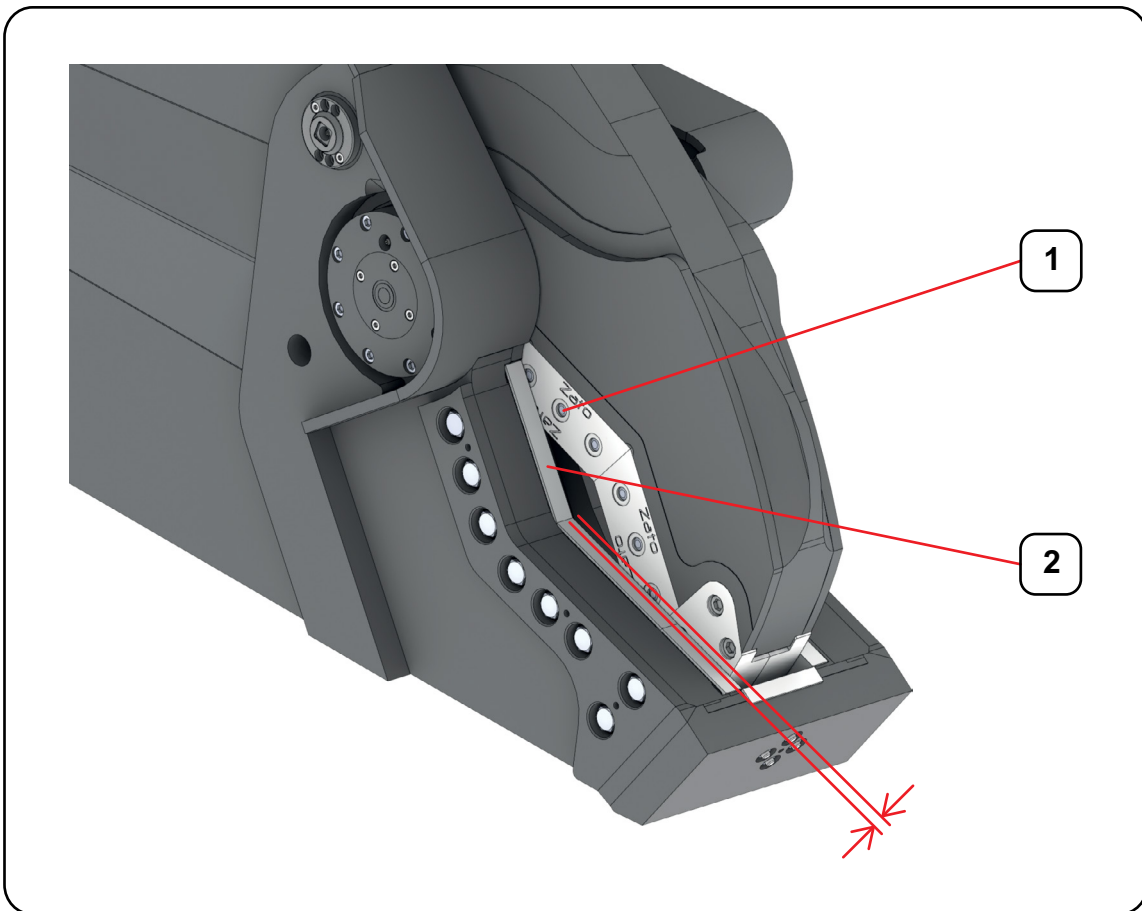


Checking the clearance between the main upper jaw blades and the main jaw blades requires:  
- a thickness gauge.

For the following description, refer to **Fig. 23 on page 65**.

To check clearance between the main upper jaw blades and the main jaw blades, perform the operations below in the following order:

1. open/close the upper jaw to reach the position indicated in **Fig. 23 on page 65**;
2. measure the distance between the main upper jaw blades **[1]** and the main jaw blades **[2]**, using a thickness gauge as indicated in **Fig. 23 on page 65**;
3. if the distance exceeds 0.5 mm in at least one point:
  - 3.1. adjust the main jaw blades by referring to **“7.2.3.4 Adjusting the main blades on the jaw” on page 76**;
  - 3.2. repeat the measurement in point 2;
  - 3.3. if the distance still exceeds 0.5 mm in at least one point, replace the blades by referring to **“7.2.3.3 Replacing the main blades” on page 74**;



**Fig. 23** Checking the clearance between the main upper jaw blades and the main jaw blades

## Checking the clearance between the upper jaw and the razor blade

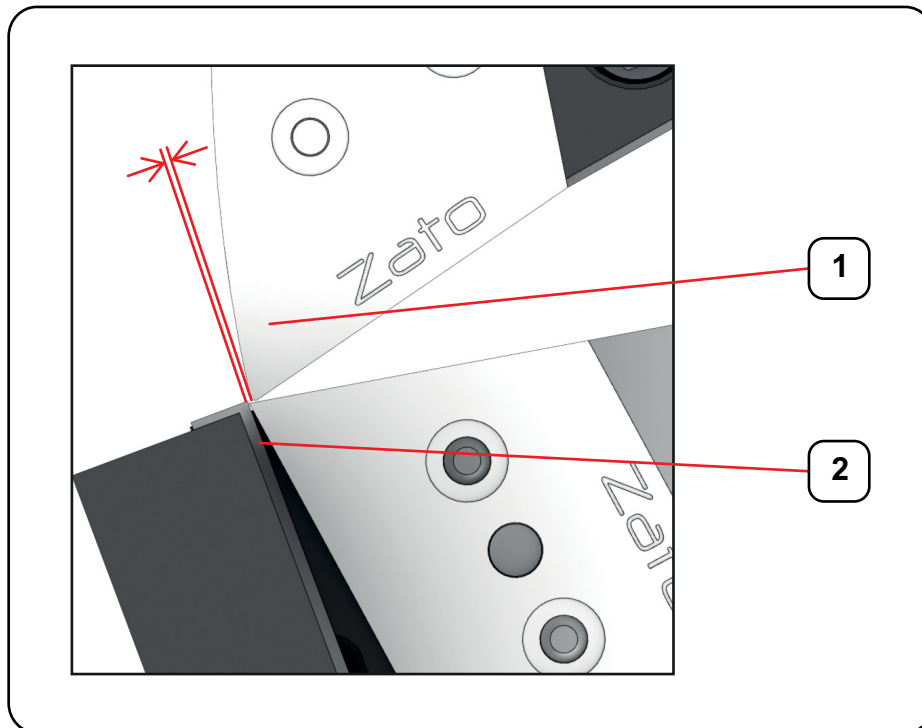


Checking the clearance between the upper jaws and the razor blade requires:  
- a thickness gauge.

For the following description, refer to **Fig. 24 on page 66**.

To check the clearance between the upper jaws and the razor blade, perform the operations below in the following order:

1. open/close the upper jaw to reach the position indicated in **Fig. 24 on page 66**;
2. measure the distance between the end of the upper jaws **[1]** and the razor blade **[2]**, using a thickness gauge as indicated in **Fig. 24 on page 66**;
3. if the distance exceeds 2 mm in at least one point, depending on the degree of wear on the upper jaws and razor blade:
  - replace the upper jaws, refer to **"7.2.3.10 Replacing the upper jaws"** on page 84;
  - Replace the razor blade, refer to **"7.2.3.6 Replacing the razor blade"** on page 79.



**Fig. 24** Checking the clearance between the upper jaw and the razor blade

## Checking the clearance between the upper jaws and the guide blades

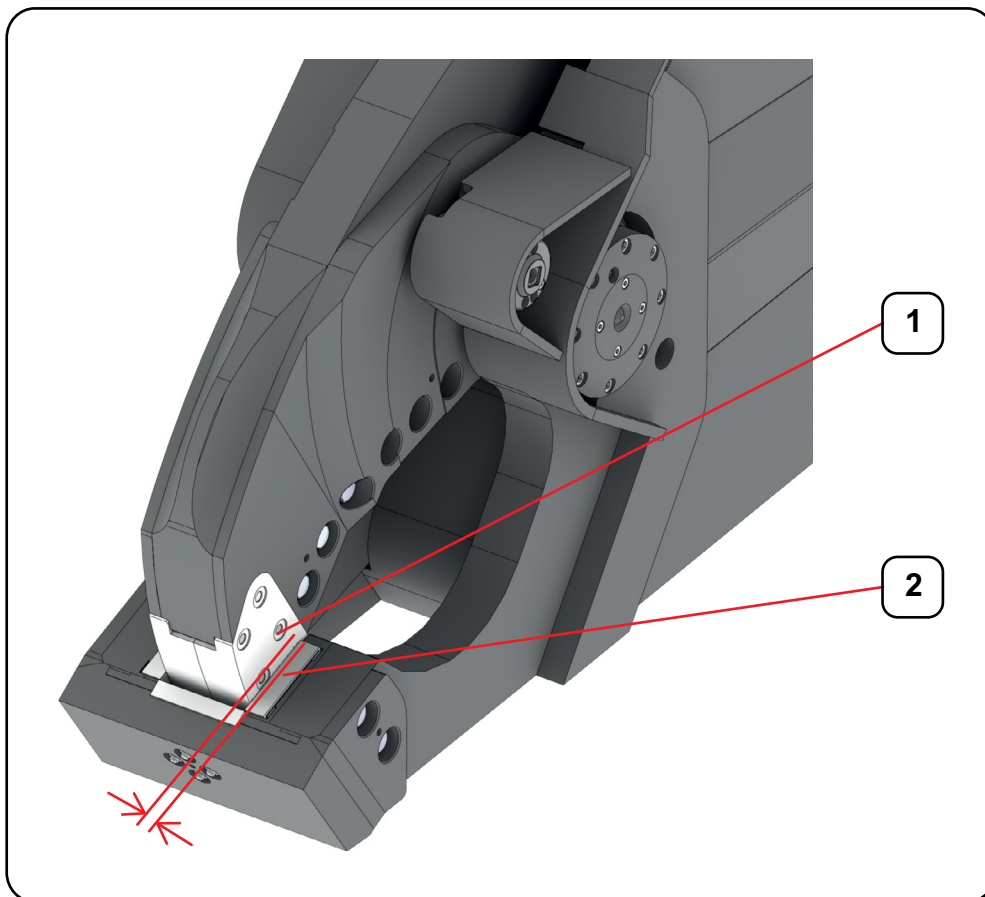


Checking the clearance between the upper jaws and the guide blades requires:  
- a thickness gauge.

For the following description, refer to **Fig. 25 on page 67**.

To check the clearance between the upper jaws and the guide blades, perform the operations below in the following order:

1. open/close the upper jaw to reach the position indicated in **Fig. 25 on page 67**;
2. measure the distance between the upper jaws **[1]** and the guide blades **[2]** using a thickness gauge, as indicated in **Fig. 25 on page 67**;
3. slowly raise and lower the upper jaw to make sure the distance stays constant;
4. if the distance exceeds 0.2 mm in at least one point, adjust the guide blades by referring to **“7.2.3.9 Adjusting the guide blades” on page 83**;
5. if the distance still exceeds 0.2 mm in at least one point, depending on the degree of wear on the upper jaws and guide blades:
  - replace the upper jaws, refer to **“7.2.3.10 Replacing the upper jaws” on page 84**;
  - replace the guide blades, refer to **“7.2.3.8 Replacing the guide blades” on page 82**.



**Fig. 25** Checking the clearance between the tip blades and the guide blades

## Making sure the central pin and end flange screws and bolts are tightened properly

To make sure the central pin and end flange screws and bolts are tightened properly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.

|   |   |
|---|---|
|  | <b>Attachment greasing operations must be done after having allowed the attachment to cool down to ambient temperature.</b> |
|---|---|

|   |  |
|---|--|
|  | <p>Greasing the attachment requires:</p> <ul style="list-style-type: none"> <li>- a grease pump;</li> <li>- AGIP GR MU/EP grease.</li> </ul> |
|---|--|

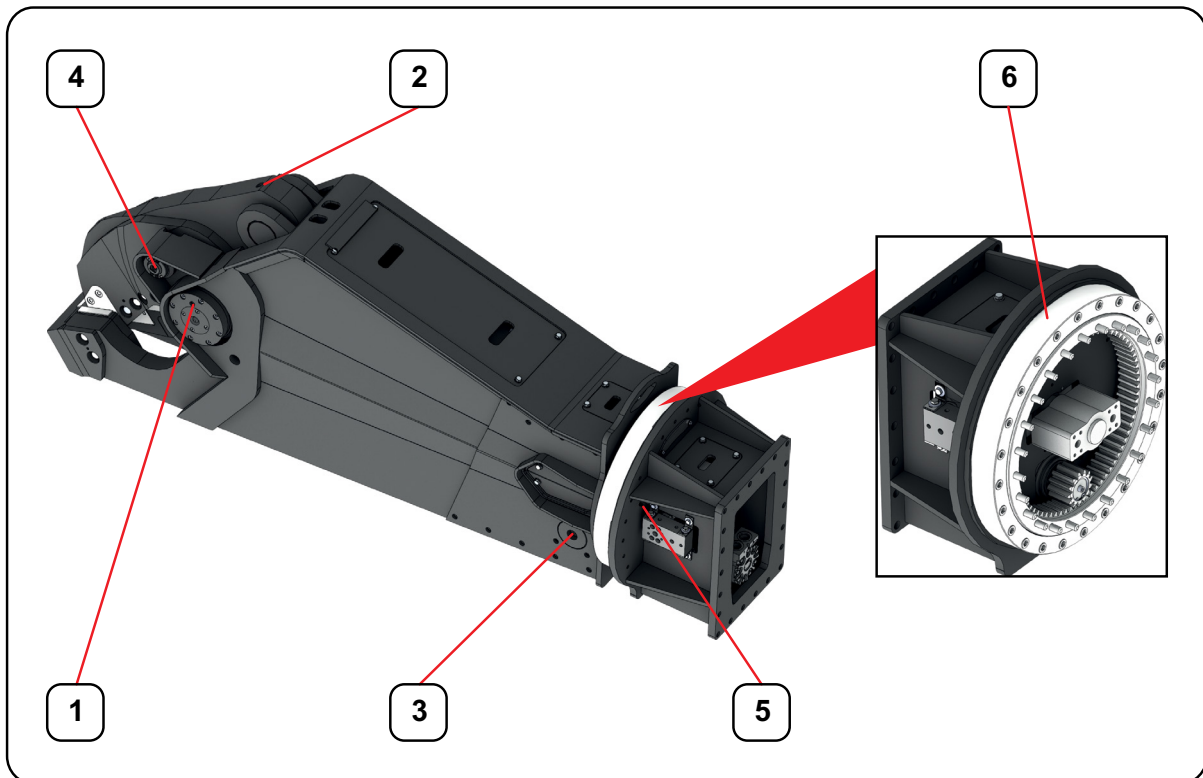
The greasing points are indicated by decals with the words "GRASSO-GREASE" or because they are coloured red.

Refer to **Fig. 26 on page 68**.

The table below contains information regarding the greasing points, frequency and number of pumps.

| Reference | Greasing point                | Frequency (hours of operation) | No. pumps                                      |
|-----------|-------------------------------|--------------------------------|--|
| 1         | Central pin                   | 8                              | 3  |
| 2         | Hydraulic cylinder front pin  | 8                              | 3  |
| 3         | Hydraulic cylinder rear pin   | 8                              | 3  |
| 4         | Clutches                      | 8                              | 3 on grease nipples<br>3 on the drive surfaces |
| 5         | Slewing ring crown and pinion | 20                             | 4  |
| 6         | Slewing ring bearings         | 40                             | 3  |

**Tab. 13** Greasing the attachment



**Fig. 26** Greasing the attachment

## 7.2.2.7 Hydraulic motor maintenance

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Hydraulic motor maintenance includes:

- ▶ checking the oil **every 250 hours** of operation;
- ▶ changing the oil **after the first 50 hours** of operation, then on an **annual** basis.

### Checking the oil

To check the oil, refer to the supplied hydraulic motor manual.

### Changing the oil

To change the oil, refer to the supplied hydraulic motor manual.

## 7.2.2.8 Check to ensure the slewing ring bolts are tightened correctly

---

The check to ensure the slewing ring bolts are tightened correctly must be carried out on a **monthly** basis.

To check the slewing ring bolts are tightened correctly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**];

## 7.2.2.9 Slewing ring bolts replacement

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**Before replacing the bolts, thoroughly clean the through holes, the screws and their nuts in order to remove dirt, grease, and oil that would compromise their seal.**

The slewing ring bolts must be replaced on a **biannual** basis.

To replace the slewing ring bolts, replace the bolts and tighten them, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.

## 7.2.2.10 Speed valve checks

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Speed valve checks include:

- ▶ checking the fastening screws are tightened correctly on a **monthly** basis;
- ▶ checking the state of the speed valve on a **biannual** basis.

### Checking the fastening screws are tightened correctly

To ensure the fastening screws are tightened correctly, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.

### Checking the state of the speed valve



The state of the speed valve must be checked by a **Technician of the Manufacturer or authorised by it**.

### 7.2.2.11 How to make sure the blade screws and bolts are tightened properly

|  |   |
|--|---|
|  | <b>Should loose bolts be found too often, contact the Manufacturer.</b>   |
|  | <p><b>Do not</b> use nuts and bolts made of material different from the original material or with different characteristics.</p> <p><b>Do not</b> break the bolts by tightening them with a torque wrench; this could break the wrench or throw off its calibration. When using a torque multiplier with a torque wrench, incorrect wrench settings are multiplied by the set ratio.</p>  |
|  | <p>To ensure the correct tightening of the screws and bolts, or to periodically check tightness, only use a suitably rated torque wrench, after having carefully read the instructions provided with the wrench.</p> <p>Torque wrenches must be calibrated annually.</p> <p>Tightened bolts stretch, with a corresponding decrease in resistance, which compromises the hold of the bolts themselves. As such, all bolts can only be tightened twice, after which they need to be replaced.</p> |

Proper screw and bolt tightening is fundamental for the connection to work safely.

An over-tightened joint may, in fact, cause permanent plastic deformation that affects the solidity of the connection.

An under-tightened joint can cause subsidence due to fatigue, loosening and relative sliding of the joined parts and consequent cutting of the bolt, vibrations and shaking of the joined parts.

Bolts must be tightened correctly by rotating the nut and not the screw head.

The table below shows the correct tightening torque values for screws and bolts.

| Type              | Class 8.8 | Class 10.9 | Class 12.9 |
|-------------------|-----------|------------|------------|
| <b>M6 x 1</b>     | 10.4 Nm   | 15.3 Nm    | 17.9 Nm    |
| <b>M8 x 1.25</b>  | 25 Nm     | 37 Nm      | 44 Nm      |
| <b>M10 x 1.5</b>  | 50 Nm     | 73 Nm      | 86 Nm      |
| <b>M12 x 1.75</b> | 86 Nm     | 127 Nm     | 148 Nm     |
| <b>M14 x 2</b>    | 137 Nm    | 201 Nm     | 235 Nm     |
| <b>M16 x 2</b>    | 214 Nm    | 314 Nm     | 366 Nm     |
| <b>M18 x 2.5</b>  | 305 Nm    | 435 Nm     | 509 Nm     |
| <b>M20 x 2.5</b>  | 432 Nm    | 615 Nm     | 719 Nm     |
| <b>M24 x 3</b>    | 744 Nm    | 1,060 Nm   | 1,240 Nm   |
| <b>M27 x 3</b>    | 1,100 Nm  | 1,570 Nm   | 1,840 Nm   |
| <b>M30 x 3.5</b>  | 1,500 Nm  | 2,130 Nm   | 2,500 Nm   |

**Tab. 14** Tightening torque values

## 7.2.3 Corrective maintenance



Corrective maintenance operations must be carried out by a **Mechanical Technician**, unless otherwise specified.



**Before replacing the bolts, thoroughly clean the through holes, the screws and their nuts in order to remove dirt, grease, and oil that would compromise their seal.**



**Do not** use pins and shims unless supplied by the Manufacturer.

Corrective maintenance work includes:

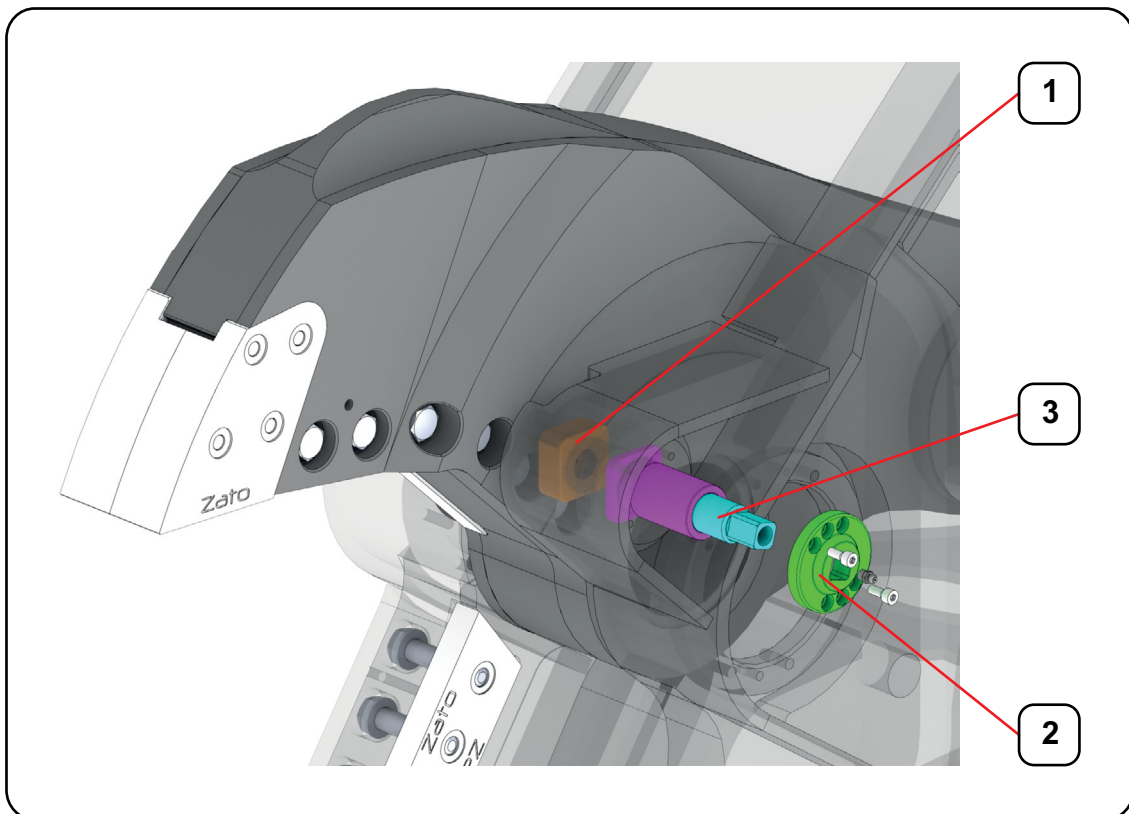
- ▶ adjusting the clutches [refer to **“7.2.3.1 Adjusting the clutch”** on page 72];
- ▶ rotating the main blades [refer to **“7.2.3.2 Rotating the main blades”** on page 73];
- ▶ replacing the main blades [refer to **“7.2.3.3 Replacing the main blades”** on page 74];
- ▶ adjusting the main jaw blades [refer to **“7.2.3.4 Adjusting the main blades on the jaw”** on page 76];
- ▶ rotating the razor blade [refer to **“7.2.3.5 Rotating the razor blade”** on page 77];
- ▶ replacing the razor blade [refer to **“7.2.3.6 Replacing the razor blade”** on page 79];
- ▶ rotating the guide blades [refer to **“7.2.3.7 Rotating the guide blades”** on page 80];
- ▶ replacing the guide blades [refer to **“7.2.3.8 Replacing the guide blades”** on page 82];
- ▶ adjusting the guide blades [refer to **“7.2.3.9 Adjusting the guide blades”** on page 83];
- ▶ replacing the upper jaws [refer to **“7.2.3.10 Replacing the upper jaws”** on page 84];

### 7.2.3.1 Adjusting the clutch

For the following description, refer to **Fig. 27 on page 72**.

To adjust the clutch, perform the operations below on each clutch to be adjusted in the following order:

1. open/close the upper jaw until the spring pad **[1]** is approximately halfway of the upper jaw rubbing surface;
2. remove the fastening screws of the flange **[2]**;
3. remove the flange;
4. Turn the spindle **[3]** clockwise to push the spring pad against the upper jaw, until the clearance between the spring pad and the upper jaw is 0.2 mm;
5. insert the flange;
6. secure the flange by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.



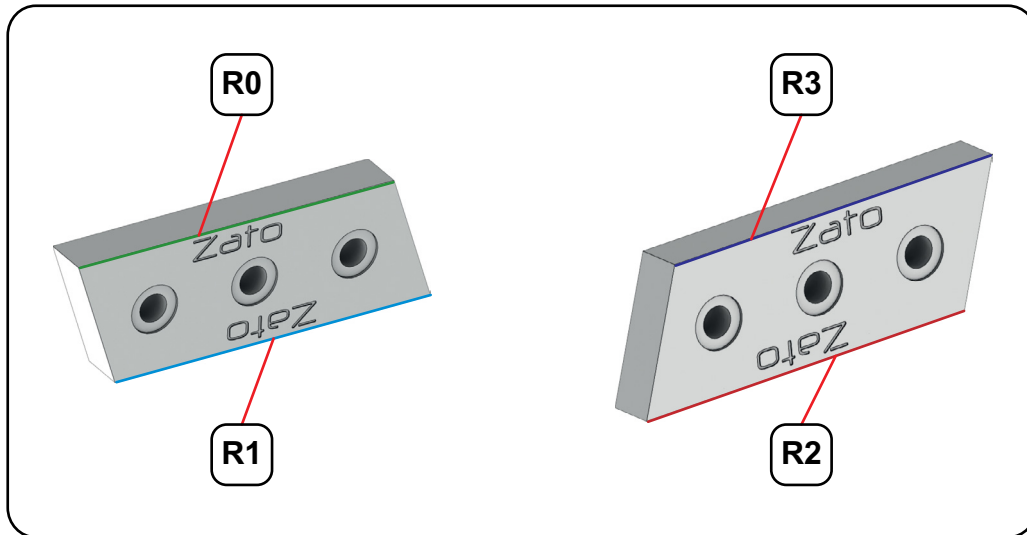
**Fig. 27** Adjusting the clutch



### 7.2.3.2 Rotating the main blades

Each blade is equipped with 4 cutting profiles (**Fig. 28 on page 73**):

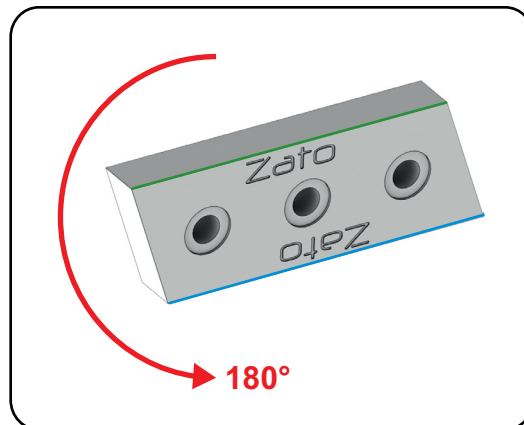
- R0;
- R1;
- R2;
- R3.



**Fig. 28** Main blade cutting profiles

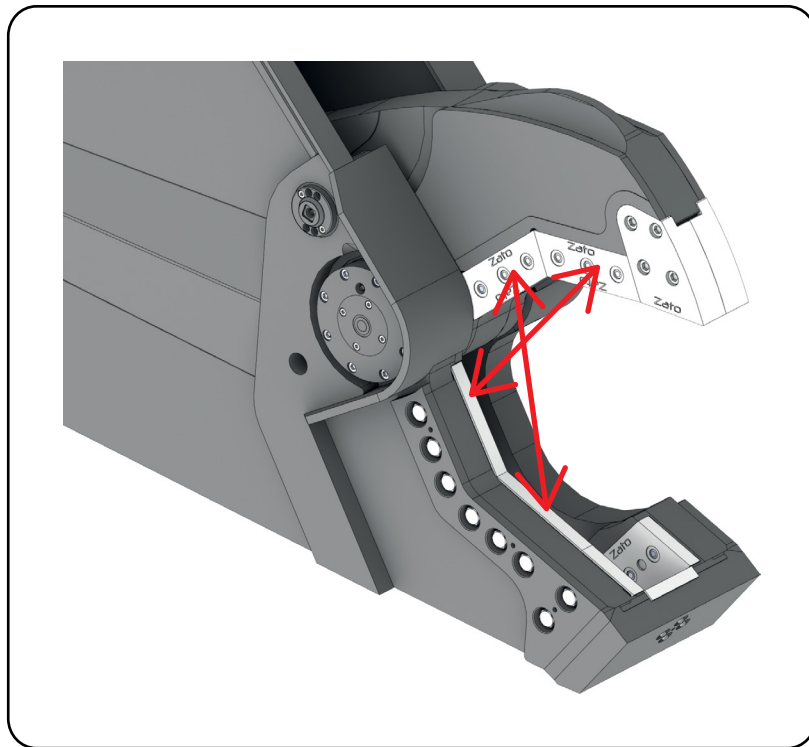
The main blades can be rotated **three times** and require:

- the first time (**Fig. 29 on page 73**), rotating each blade in its housing by 180° (going from cutting profile R0 to R1);



**Fig. 29** Rotating the main blade

- ▶ the second time (**Fig. 30 on page 74**), inverting each jaw blade with the blade in the housing opposite the upper jaw and vice versa [going from cutting profile R1 to R2];



**Fig. 30** inverting the blade of the upper jaw and main jaw

- ▶ the third time (**Fig. 29 on page 73**), further rotating each blade in its housing by 180° [going from cutting profile R2 to R3].



**Every 2 blade rotations, replace the blade fastening screws to ensure the threading holds.**

To rotate the main blades, perform the operations below in the following order:

1. remove the fastening screws on the main blades;
2. remove the main blades;
3. rotate/invert them as described above;
4. secure the main blades by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;

### 7.2.3.3 Replacing the main blades



Replacing the main blades may require a:  
- a dowel pin.

For the following description, refer to **Fig. 31 on page 75**.

To replace the main blades, perform the operations below in the following order:

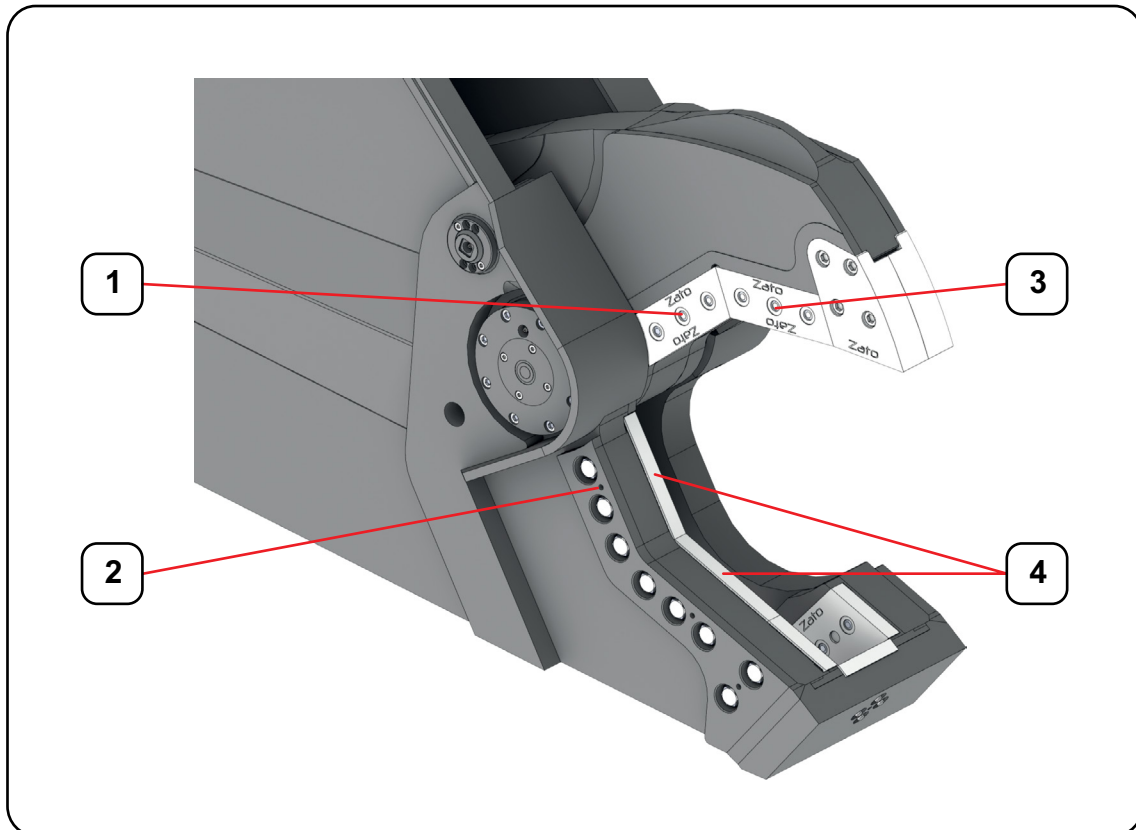
1. remove the fastening screws on the primary blade **[1]** of the upper jaw;
2. remove the primary blade on the upper jaw;



If the primary blade on the upper jaw is stuck in its housing, insert a dowel pin in one of the 2 holes on the blade face **[2]** to release it.

3. remove the fastening screws on the secondary blade **[3]** of the upper jaw;
4. remove the secondary blade on the upper jaw;

5. remove the fastening screws on the 2 main blades (4) of the jaw;
6. remove the 2 main blades of the jaw;
7. clean the housing of the main blades by referring to “7.2.1 Cleaning” on page 60;
8. put in the new main blades in reverse order;
9. secure the main blades by referring to “7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70;
10. check the clearance between the main upper jaw blades and the main jaw blades, refer to “7.2.2.5 Checks on the shears” on page 64.



**Fig. 31** Replacing the main blades

### 7.2.3.4 Adjusting the main blades on the jaw



Adjusting the main blades on the jaw requires:  
- shims.

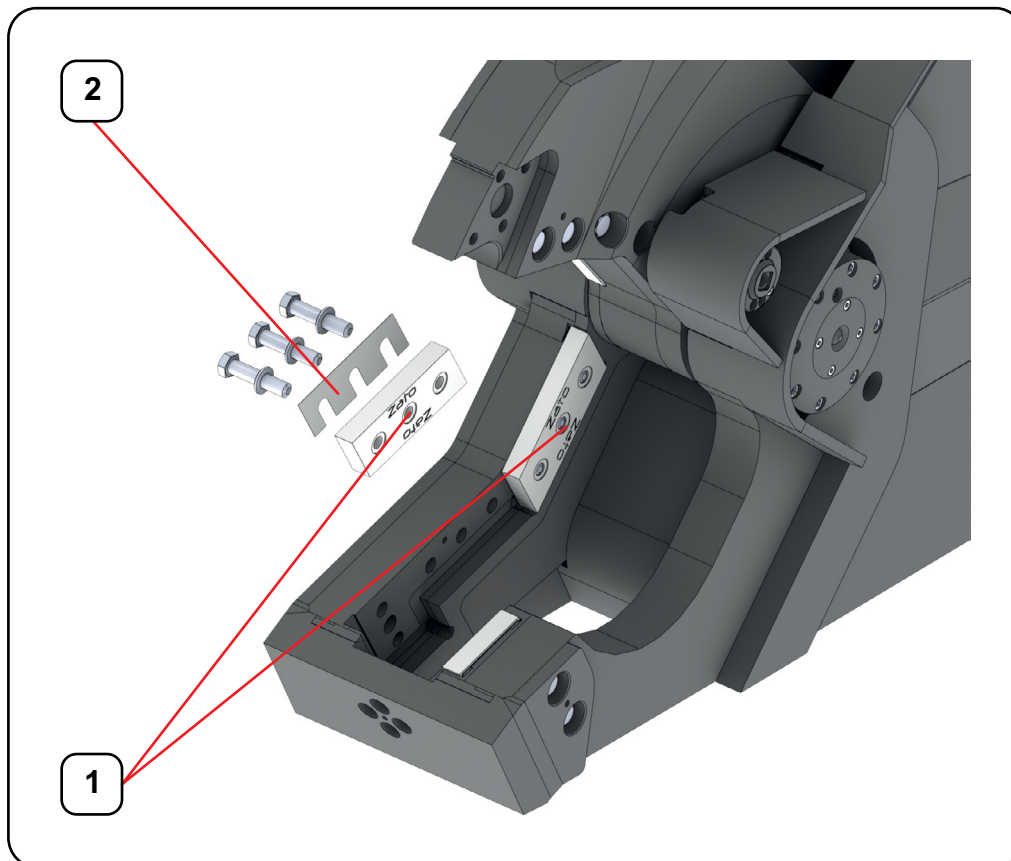


**Do not** adjust the 2 main blades on the upper jaw by using shims.

For the following description, refer to **Fig. 32 on page 76**.

To adjust the main blades of the jaw, for each main blade **[1]**, perform the operations below in the following order:

1. remove the fastening screws on the main blade;
2. remove the main blade;
3. put/remove the shim[s] **[2]** into/from the main blade housing;
4. put in the main blade;
5. secure the main blade by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
6. check the clearance between the main upper jaw blades and the main jaw blades, refer to **“7.2.2.5 Checks on the shears” on page 64**.

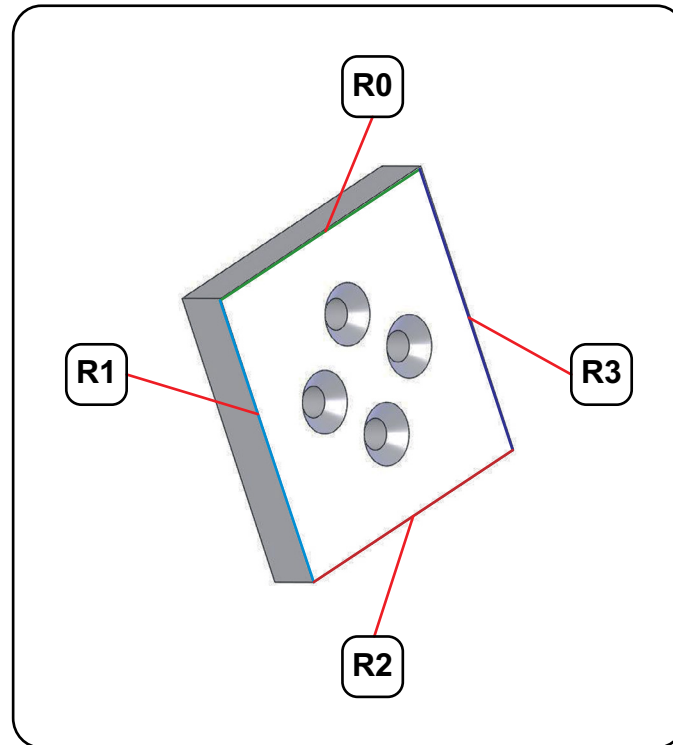


**Fig. 32** Adjusting the main blades on the jaw

### 7.2.3.5 Rotating the razor blade

The razor blade is equipped with 4 cutting profiles **[Fig. 33 on page 77]**:

- ▶ **R0**;
- ▶ **R1**;
- ▶ **R2**;
- ▶ **R3**.



**Fig. 33** Razor blade cutting profiles

The razor blade **[Fig. 34 on page 78]** can be rotated **3 times** and requires, each time, rotating the blade in its housing by 90°.



Subsequent rotations must be done in the same direction as the previous one.



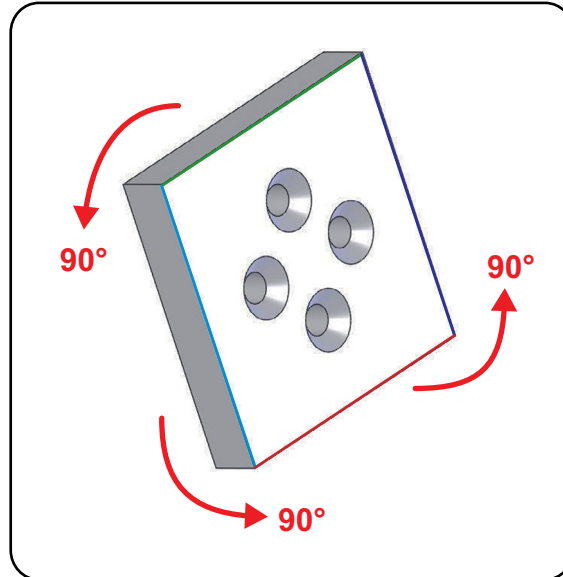
**Every 2 blade rotations, replace the blade fastening screws to ensure the threading holds.**

For the following description, refer to **Fig. 34 on page 78**.

To rotate the razor blades, perform the following operations in order:

1. remove the fastening screws on the 2 guide blades;
2. remove the centring plugs on the guide blades;
3. remove the guide blades;
4. remove the fastening screws on the razor blade;
5. remove the razor blade;

6. rotate the razor blade as indicated in **Fig. 34 on page 78**;
7. put in the razor blade;
8. secure the razor blade, referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
9. put in the guide blades;
10. insert the centring plugs on the guide blades;
11. secure the guide blades, referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.



**Fig. 34** Rotating the razor blade

### 7.2.3.6 Replacing the razor blade

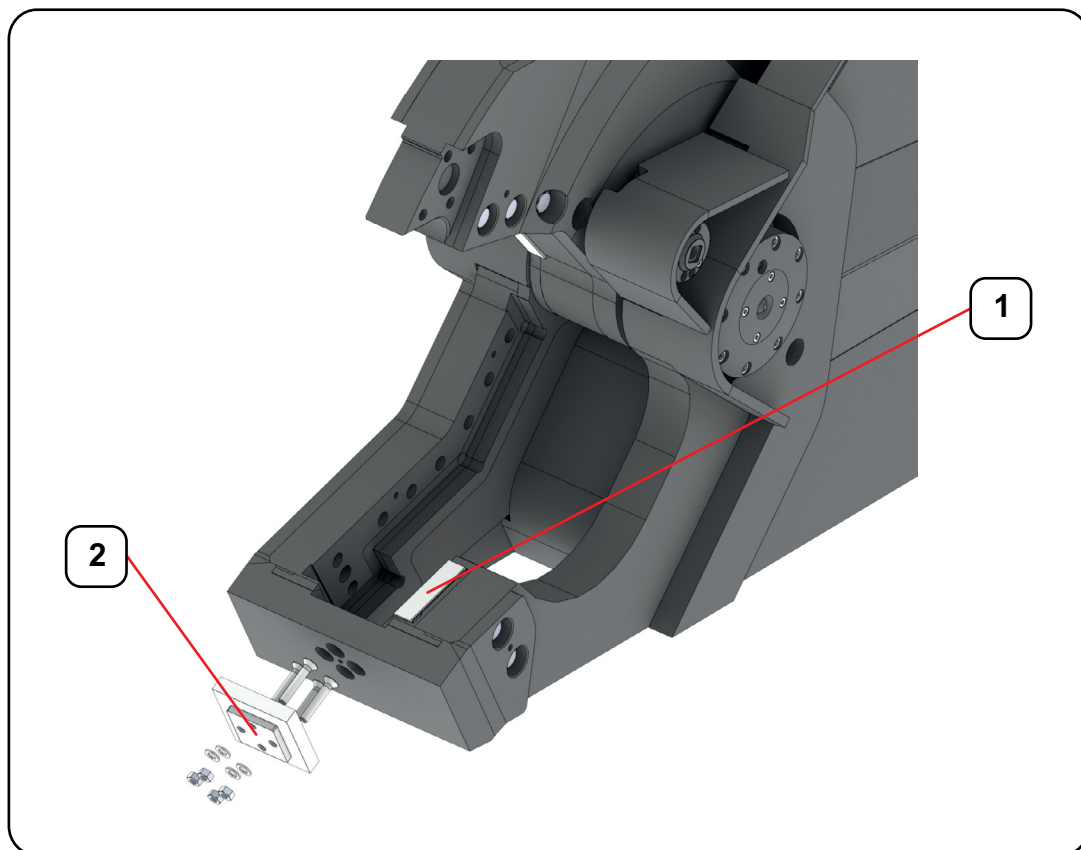


To replace the razor blade you must have:  
- a dowel pin.

For the following description, refer to **Fig. 35 on page 79**.

To replace the razor blade, perform the operations below in the following order:

1. remove the fastening screws on the 2 guide blades **[1]**;
2. insert the dowel pin in the blade face holes of the guide blades;
3. pinch the dowel pin to remove the centring pins and guide blades;
4. remove the fastening screws on the razor blade **[2]**;
5. remove the razor blade;
6. clean the razor blade housing by referring to **“7.2.1 Cleaning” on page 60**.
7. put in the new razor blade;
8. secure the razor blade by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
9. put in the guide blades;
10. insert the centring plugs on the guide blades;
11. secure the guide blades by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
12. check the clearance between the upper jaws and the razor blade by referring to **“7.2.2.5 Checks on the shears” on page 64**.



**Fig. 35** Replacing the razor blade

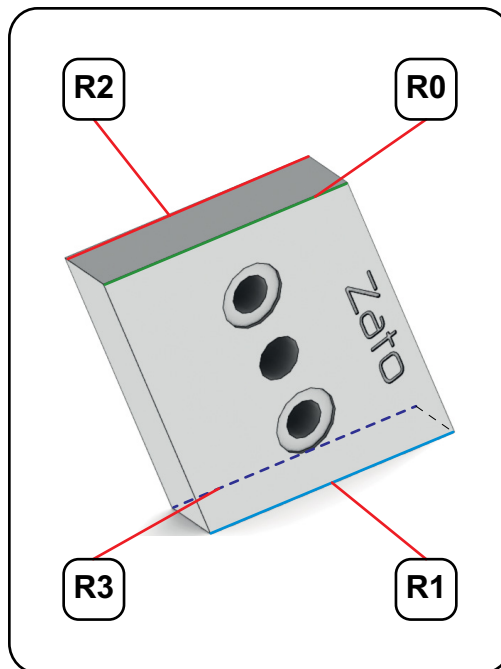
### 7.2.3.7 Rotating the guide blades



Rotating the guide blades requires:  
- a dowel pin.

Each guide blade is equipped with 4 cutting profiles (**Fig. 36 on page 80**):

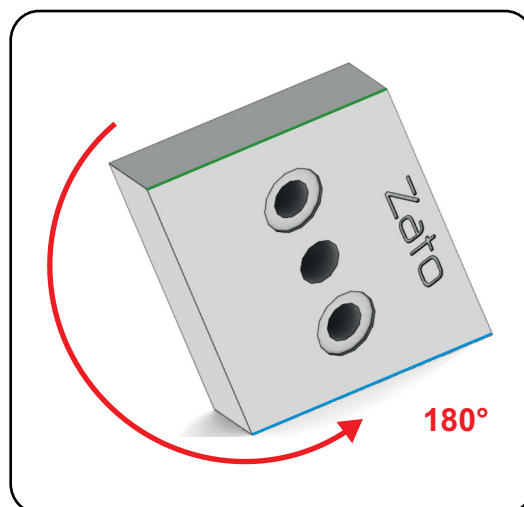
- **R0**;
- **R1**;
- **R2**;
- **R3**.



**Fig. 36** Guide blade cutting profiles

The guide blades can be rotated **3 times** and require:

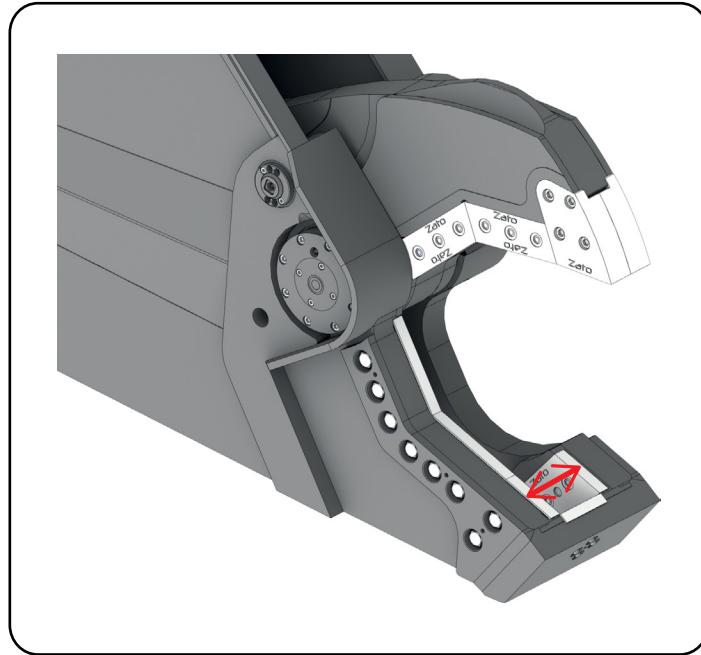
- the first time (**Fig. 37 on page 80**), rotating each blade in its housing by 180° [going from cutting profile R0 to R1];



**Fig. 37** Rotating the guide blade



- ▶ the second time **(Fig. 38 on page 81)**, inverting the guide blade [going from cutting profile R1 to R2].



**Fig. 38** Inverting the guide blades



**Every 2 blade rotations, replace the blade fastening screws to ensure the threading holds.**

- ▶ the third time **(Fig. 37 on page 80)**, further rotating each blade in its housing by 180° [going from cutting profile R2 to R3].

To rotate the guide blades, perform the operations below in the following order:

1. remove the fastening screws on the guide blades;
2. insert the dowel pin in the blade face holes of the guide blades;
3. pinch the dowel pin to remove the centring pins and guide blades;
4. rotate/invert them as described above;
5. insert the centring plugs on the guide blades;
6. secure the guide blades, referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70.**

### 7.2.3.8 Replacing the guide blades

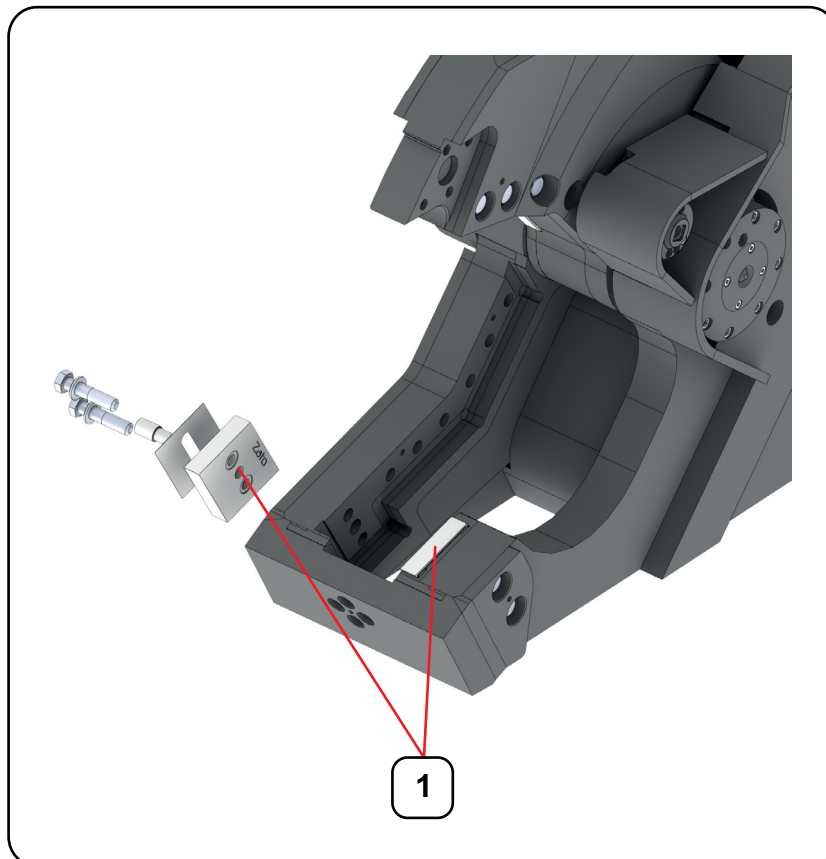


Replacing the guide blades requires:  
- a dowel pin.

For the following description, refer to **Fig. 39 on page 82**.

To replace the guide blades, perform the operations below in the following order:

1. remove the fastening screws on the 2 guide blades **(1)**;
2. insert the dowel pin in the blade face holes of the guide blades;
3. pinch the dowel pin to remove the centring pins and guide blades;
4. remove the guide blades;
5. clean the housing of the guide blades, referring to **“7.2.1 Cleaning” on page 60**;
6. put in the new guide blades;
7. insert the centring plugs on the guide blades;
8. secure the guide blades by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
9. check clearance between the upper jaws and the guide blades by referring to **“7.2.2.5 Checks on the shears” on page 64**.



**Fig. 39** Replacing the guide blades

### 7.2.3.9 Adjusting the guide blades



To adjust the guide blades, it is **mandatory** to use at most 2 shims per blade.

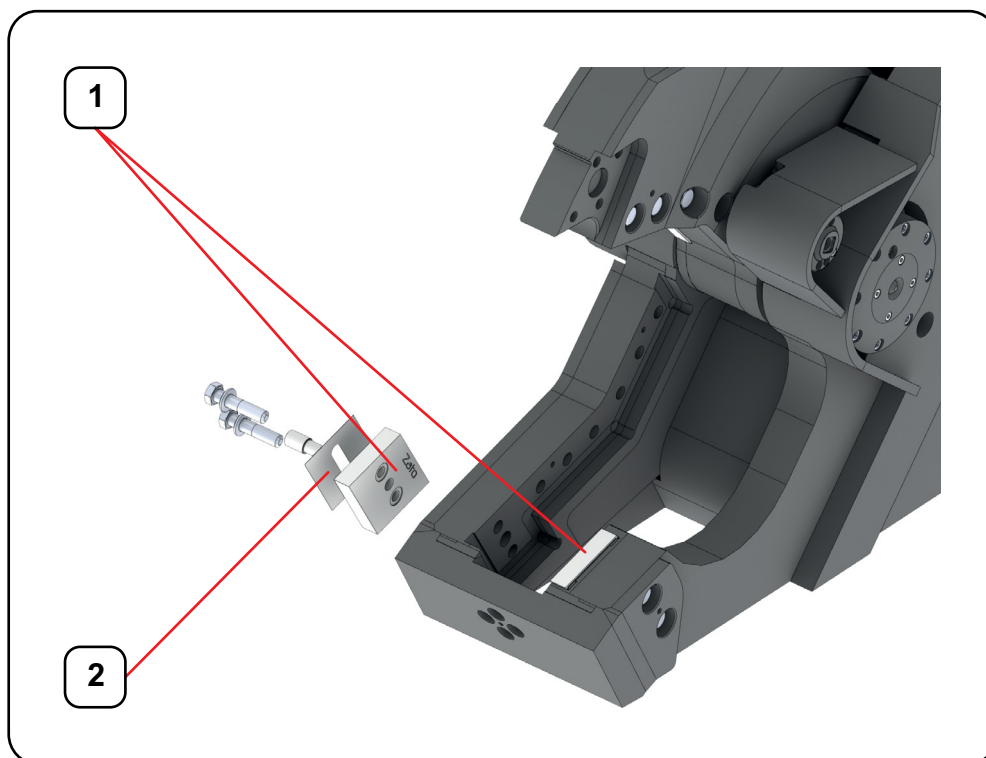


Adjusting the guide blades requires:  
- shims.

For the following description, refer to **Fig. 40 on page 83**.

To adjust the guide blades, for each guide blade **(1)**, perform the operations below in the following order:

1. remove the fastening screws on the guide blade;
2. insert the dowel pin in the blade face hole of the guide blades;
3. pinch the dowel pin to remove the centring pin;
4. put/remove the shim[s] **(2)** into/from the guide blade housing;
5. put in the guide blade;
6. insert the centring pin;
7. secure the guide blade by referring to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**.
8. check clearance between the upper jaws and the guide blades by referring to **“7.2.2.5 Checks on the shears” on page 64**.



**Fig. 40** Adjusting the guide blades



**The upper jaws must be replaced in pairs.**



Replacing the upper jaws requires:

- a thickness gauge;
- a light source.

For the following description refer to **Fig. 41 on page 85**.

To replace the upper jaws, perform the operations below in the following order:

1. remove the fixing screws on the upper jaws **(1)**;
2. remove the upper jaws;
3. remove any residue from the upper jaw housings by referring to **“7.2.1 Cleaning” on page 60**;
4. put in the new upper jaws by pushing them by the lower **(2)** and inner **(3)** surfaces;
5. put in the upper jaw fastening screws;
6. tighten the fastening screws with a torque value equal to 1/3 the final value, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
7. measure the distance between the inner faces of the upper jaws **(4)**, using a thickness gauge;
8. make sure the distance between the inner faces of the upper jaws ranges from 0.05mm to 0.5mm;
9. if the distance does not fall within the range, contact the Manufacturer;
10. if the distance falls within the range, tighten the fastening screws with the final torque value, refer to **“7.2.2.11 How to make sure the blade screws and bolts are tightened properly” on page 70**;
11. check clearance between the upper jaws and the guide blades by referring to **“7.2.2.5 Checks on the shears” on page 64**.

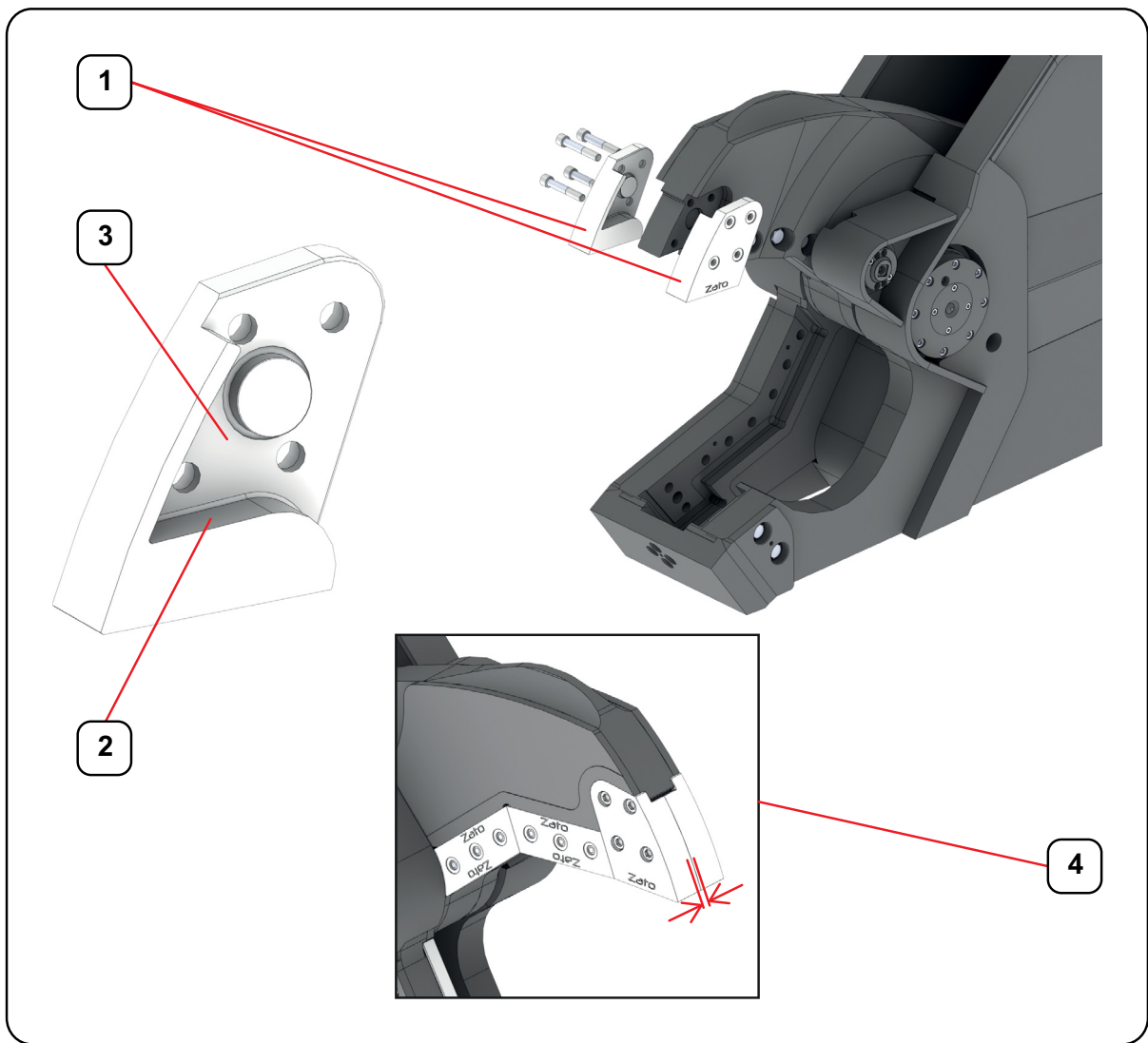


Fig. 41 Replacing the upper jaws

## 7.2.4 Special maintenance




Special maintenance must be performed by a **Technician employed or authorised by the Manufacturer** and includes all maintenance interventions on the attachment not dealt with in this Manual.

In particular, contact the Manufacturer in case of attachment malfunctions that are not described or cannot be eliminated by following the instructions provided in **“7.4 Troubleshooting” on page 88**.

## 7.3 SUMMARISED TABLE OF MAINTENANCE FREQUENCY

To correctly and safely use the attachment, the maintenance operations listed in the table below must be carried out according to the specified frequency.

 The maintenance work is listed in the table in descending order of frequency, considering 8 hours of work of the attachment, 5 days a week.

| Components    | Type of operation  | Frequency                   | Reference  |
|---------------|--|-----------------------------|--|
| Attachment    | Visual check of the structure  | Daily                       | <b>"7.2.2.1 General attachment checks" on page 61</b>        |
| Attachment    | Checking the hydraulic system  | Daily                       | <b>"7.2.2.1 General attachment checks" on page 61</b>        |
| Rotating head | Checking the hydraulic cylinder shaft output area                                | Daily                       | <b>"7.2.2.2 Hydraulic cylinder checks" on page 62</b>        |
| Rotating head | Swivel hydraulic coupling visual check   | Daily                       | <b>"7.2.2.3 Swivel hydraulic coupling checks" on page 62</b> |
| Shears        | Making sure the blade screws and bolts are tightened properly                    | Daily                       | <b>"7.2.2.5 Checks on the shears" on page 64</b>             |
| Shears        | Checking the blade and upper jaw cutting profile radius                          | Daily                       | <b>"7.2.2.5 Checks on the shears" on page 64</b>             |
| Shears        | Checking the clearance between the main upper jaw blades and the main jaw blades | Daily                       | <b>"7.2.2.5 Checks on the shears" on page 64</b>             |
| Shears        | Checking the clearance between the upper jaw and the razor blade                 | Daily                       | <b>"7.2.2.5 Checks on the shears" on page 64</b>             |
| Shears        | Greasing the central pin   | Every 8 hours of operation  | <b>"7.2.2.6 Greasing the attachment" on page 68</b>          |
| Rotating head | Greasing the hydraulic cylinder front pin  | Every 8 hours of operation  | <b>"7.2.2.6 Greasing the attachment" on page 68</b>          |
| Rotating head | Greasing the hydraulic cylinder rear pin   | Every 8 hours of operation  | <b>"7.2.2.6 Greasing the attachment" on page 68</b>          |
| Shears        | Greasing the clutches  | Every 8 hours of operation  | <b>"7.2.2.6 Greasing the attachment" on page 68</b>          |
| Shears        | Checking the correct tightening of clutch screws                                 | Every 16 hours of operation | <b>"7.2.2.4 Clutch checks" on page 62</b>                    |

| Components    | Type of operation  | Frequency                             | Reference  |
|---------------|--|---------------------------------------|--|
| Rotating head | Greasing the slewing ring crown and pinion   | Every 20 hours of operation           | <b>"7.2.2.6 Greasing the attachment" on page 68</b>  |
| Attachment    | Cleaning   | Weekly                                | <b>"7.2.1 Cleaning" on page 60</b>   |
| Attachment    | Checking proper screw tightness on the fixed guards  | Weekly                                | <b>"7.2.2.1 General attachment checks" on page 61</b>                                      |
| Attachment    | Checking proper screw tightness on the hydraulic tube flanges  | Weekly                                | <b>"7.2.2.1 General attachment checks" on page 61</b>                                      |
| Attachment    | Visual check on the plates and pictograms  | Weekly                                | <b>"7.2.2.1 General attachment checks" on page 61</b>                                      |
| Rotating head | Making sure the screws locking the rotor onto the stator of the swivel hydraulic coupling are tightened properly | Weekly                                | <b>"7.2.2.3 Swivel hydraulic coupling checks" on page 62</b>                               |
| Shears        | Verification of the state of wear of the spring pad  | Weekly                                | <b>"7.2.2.4 Clutch checks" on page 62</b>  |
| Shears        | Making sure the central pin and end flange screws and bolts are tightened properly                               | Weekly                                | <b>"7.2.2.5 Checks on the shears" on page 64</b>   |
| Rotating head | Greasing the slewing ring bearing  | Every 40 hours of operation           | <b>"7.2.2.6 Greasing the attachment" on page 68</b>  |
| Rotating head | Changing the hydraulic motor oil   | After the first 50 hours of operation | <b>"7.2.2.7 Hydraulic motor maintenance" on page 69</b>                                    |
| Rotating head | Checking the hydraulic cylinder head screws  | Monthly                               | <b>"7.2.2.2 Hydraulic cylinder checks" on page 62</b>                                      |
| Rotating head | Check to ensure the slewing ring bolts are tightened correctly   | Monthly                               | <b>"7.2.2.8 Check to ensure the slewing ring bolts are tightened correctly" on page 69</b> |
| Rotating head | Checking the fastening screws of the speed valve to ensure they are tightened correctly                          | Monthly                               | <b>"7.2.2.10 Speed valve checks" on page 69</b>  |
| Rotating head | Checking the hydraulic motor oil   | Every 250 hours of operation          | <b>"7.2.2.7 Hydraulic motor maintenance" on page 69</b>                                    |

| Components    | Type of operation                     | Frequency  | Reference  |
|---------------|---------------------------------------|------------|--|
| Rotating head | Changing the hydraulic motor oil      | Yearly     | <b>"7.2.2.7 Hydraulic motor maintenance" on page 69</b>    |
| Rotating head | Slewing ring bolts replacement        | Biannually | <b>"7.2.2.9 Slewing ring bolts replacement" on page 69</b> |
| Rotating head | Checking the state of the speed valve | Biannually | <b>"7.2.2.10 Speed valve checks" on page 69</b>            |

**Tab. 15** Maintenance frequency summary

## 7.4 TROUBLESHOOTING

Should problems arise on the attachment, resolve them by referring to the table below.

For any potential problem envisaged on the equipment, the table below shows:

- ▶ the cause that generated it;
- ▶ the solution required to resolve it;
- ▶ the qualification required to implement the solution.

| Problem                    | Cause   | Solution   | Qualification required    |
|----------------------------|---|--|---------------------------|
| No power to the upper jaw. | The machine is not sending maximum pressure to the attachment hydraulic system.     | Check the machine hydraulic pressure, refer to the machine manual; | Mechanical Technician     |
|                            | The speed valve is not calibrated properly.   | Replace the speed valve.   | Manufacturer's Technician |
|                            | The hydraulic cylinder is bypassing internally.                                     | Replace the hydraulic cylinder gaskets.                            | Manufacturer's Technician |
|                            | The swivel hydraulic coupling of the attachment is bypassing internally.            | Replace the swivel hydraulic coupling gaskets.                     | Manufacturer's Technician |
|                            | There is dirt in the oil of the hydraulic system [due to quick couplings or other]. | Repeatedly run the upper jaw opening/closing cycles.               | Operator                  |



| Problem   | Cause  | Solution  | Qualification required     |
|---|--|---|----------------------------|
| The attachment does not cut the material.   | The material dimensions exceed the attachment capacity.                    | Contact the Manufacturer for information on the attachment cutting capacity.  | Mechanical Technician      |
|   | The main blades are excessively worn.                                      | Replace the main blades, refer to <b>"7.2.3.3 Replacing the main blades" on page 74;</b>                                    | Mechanical Technician      |
|   | There is excessive clearance between the blades.                           | Check the clearance between the blades, refer to <b>"7.2.2.5 Checks on the shears" on page 64.</b>                          | Mechanical Technician      |
|   | There is excessive counter-pressure on the hydraulic cylinder return side. | Check the main control valve of the machine by referring to the machine's manual.   | Mechanical Technician      |
| The attachment does not perforate the material.                                       | The razor blade is excessively worn.                                       | Replace the razor blade, refer to <b>"7.2.3.6 Replacing the razor blade" on page 79.</b>                                    | Mechanical Technician      |
| The upper jaw speed is less than the parameters originally set or is moving in jerks. | The speed valve is not working properly.                                   | Replace the speed valve.  | Manufacturer's Technician. |
|   | The oil flows coming from the machine are irregular.                       | Check the flow rates of the machine by referring to its manual;   | Mechanical Technician      |
| The material gets stuck in the jaw of the attachment.                                 | There is excessive clearance between the blades.                           | Check the clearance between the blades, refer to <b>"7.2.2.5 Checks on the shears" on page 64.</b>                          | Mechanical Technician      |
|   | The main blades are excessively worn.                                      | Replace the main blades, refer to <b>"7.2.3.3 Replacing the main blades" on page 74;</b>                                    | Mechanical Technician      |
|   | The upper jaws are excessively worn.                                       | Replace the upper jaws by referring to <b>"7.2.3.10 Replacing the upper jaws" on page 84;</b>                               | Mechanical Technician      |
|   | There is excessive clearance between the upper jaws and the guide blades.  | Check the clearance between the upper jaws and the guide blades, refer to <b>"7.2.2.5 Checks on the shears" on page 64.</b> | Mechanical Technician      |

| Problem   | Cause   | Solution  | Qualification required     |
|---|---|---|----------------------------|
| The speed of the upper jaw is less than the set parameters only in one direction, while the speed in the opposite direction is correct. | There is counter-pressure on the hydraulic cylinder return side.                  | Check the main control valve of the machine by referring to the machine's manual.   | Mechanical Technician      |
|   | The speed valve is not working properly.  | Replace the speed valve.  | Manufacturer's Technician. |
| The attachment does not rotate.   | The machine is not sending the right pressure to the attachment hydraulic system. | Adjust the pressure from the machine by referring to its manual;  | Mechanical Technician      |
|   | The hydraulic motor is broken.  | Replace the hydraulic motor.  | Manufacturer's Technician. |
|   | The rotation control valve is broken.   | Replace the control valve.  | Manufacturer's Technician. |
|   | The rotation control valve is not calibrated properly.                            | Adjust the control valve.   | Manufacturer's Technician. |
|   | The hydraulic tubes are not connected or they are connected incorrectly.          | Check and properly connect the hydraulic tubes to the rotating head by referring to <b>"5.4.2 Hydraulically connecting the attachment to the machine"</b> on page 48. | Operator                   |
| The attachment rotation speed is abnormal in one of the two directions.   | The oil flow from the machine is incorrect either on the delivery or return line. | Adjust the oil flow from the machine by referring to its manual and check whether there are any leaking hydraulic tubes.  | Mechanical Technician      |
|   | The direction control valve is broken.  | Replace the direction valve unit.   | Manufacturer's Technician. |
|   | The safety valve is not working properly.   | Set the safety valve properly.  | Manufacturer's Technician. |
| There are vibrations during rotation.   | The oil flow from the machine is too low or too high.                             | Adjust the oil flow from the machine by referring to its manual;  | Mechanical Technician      |
|   | The set pressure is too high.   | Check and set the pressure on the flow regulation valves.   | Manufacturer's Technician. |
|   | The hydraulic motor is not working properly or is broken.                         | Check and, if necessary, replace the hydraulic motor.   | Manufacturer's Technician. |

Tab. 16 Troubleshooting

# 8 INSTRUCTIONS FOR DEMOLITION AND DISPOSAL



Demolition and waste disposal must be carried out by **Companies qualified for Recovery, Recycling and Waste Disposal**, with employ personnel with suitable technical-professional requirements and PPE.



**It is forbidden** to deliver substances that are harmful and/or deemed to be hazardous in the environment.



Before scrapping and disposing of the attachment, proceed as follows:

- disconnect the attachment from all mains power supplies;
- clean the attachment as described in **“7.2.1 Cleaning” on page 60**;

When the attachment is to be scrapped, authorised personnel must separate the materials by type and send the individual parts to waste collection centres in accordance with the regulations in force in the Country where the attachment is installed and used.

The attachment essentially consists of components made with the following materials:

- metal [iron and steel].

Special process waste produced during attachment operation and/or special waste, such as used oil and filters replaced during maintenance, must be sent to separate waste collection centres in accordance with the regulations in force in the Country where the attachment is installed and used.

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