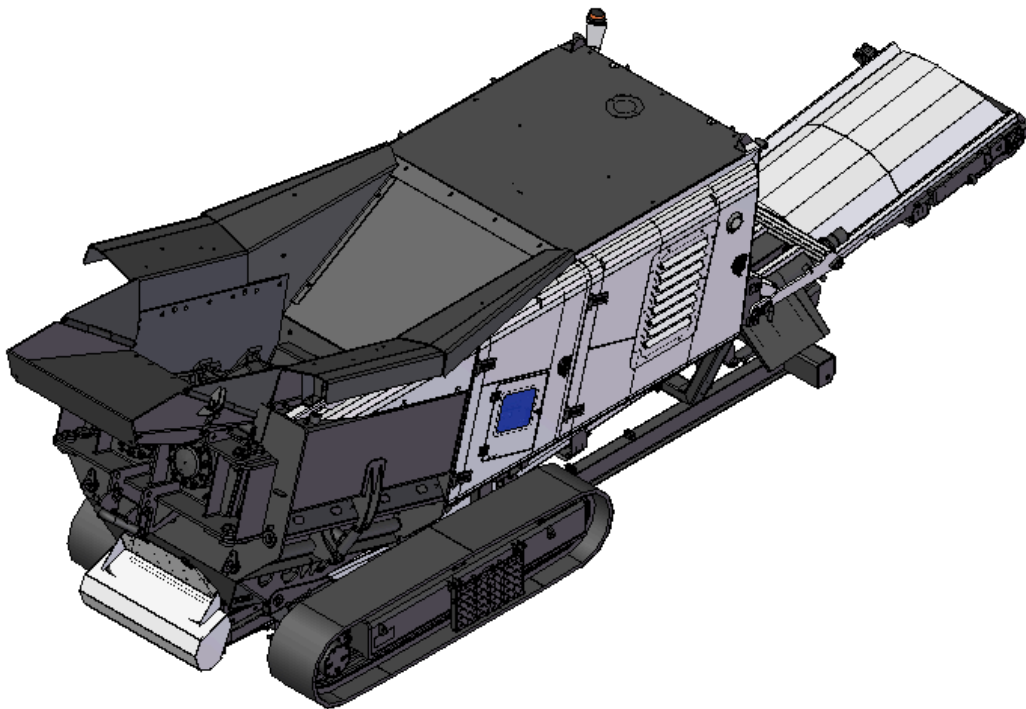




# Use and Maintenance Manual

## ARK SH-60



Serial number: [Titolo]

Date: 11/09/2023

Use and Maintenance Manual Translated from the Original Language in Italian

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## 1. Introduction

### 1.1 Instructions

**For whom** These instructions are intended for managers, transporters, installers, operators and technicians of the SH-60. The instructions must be available to this group of people.

**Objective** These instructions primarily help to ensure the safety of all persons working with or on this machine. The main objective is to avoid personal injury.

Read and learn the instructions before working with or on this machine.

If any doubts or questions arise, contact your supervisors, dealers or the manufacturer.

The instructions will help you to correctly operate and maintain the machine. You will also find instructions in this manual on how to use the machine economically and in an environmentally friendly manner.

**Summary** The table of contents is structured as follows:

1. Introduction
2. Safety
3. Description
4. Transport
5. Preparation for use
6. Use
7. Technical Information
8. Maintenance work
9. Decommissioning and Disposal


**Identification** For clear identification of the instructions, the following are indicated on each page:

1

Machine type in the header

2

Edition number in the footer

  
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**Einleitung**  
*Die Anleitung*

1

KROKODILE

**1.1**

<b>Kapitel</b>	<p><b>Aufbau und Konzept</b></p> <p>Der Inhalt der vorliegenden Anleitung gliedert sich in verschiedene Kapitel.</p> <p>Die Aufteilung trägt der einschlägigen Gesetzgebung sowie den unterschiedlichen Betriebsphasen bzw. hierfür vorgesehenen Personengruppen Rechnung.</p> <p>Betriebsphasen und Personengruppen sind eindeutig definiert und werden in der vorliegenden Anleitung benannt.</p> <p>Die benannten Personengruppen werden aufgrund ihrer Ausbildung bzw. Befugnisse unterschieden.</p>
<b>Kapitel Sicherheit</b>	<p>Das Kapitel Sicherheit ist von grundlegender Bedeutung.</p> <p>Das Kapitel Sicherheit trägt der einschlägigen Gesetzgebung sowie den unterschiedlichen Kapiteln bzw. möglicherweise auftretenden Situationen Rechnung.</p> <p>Darüber hinaus wird das Kapitel Sicherheit um die Ergebnisse der im Einzelfall durchgeführten Gefahrenanalyse und der darauffolgenden Risikobewertung erweitert.</p> <p>Das Kapitel Sicherheit muss von allen Personen und Personengruppen, die an oder mit der Anlage arbeiten gelesen und verstanden und die enthaltenen Informationen und Gebote beachtet werden.</p>
<b>Kapitel Beschreibung</b>	<p>Das Kapitel Beschreibung ist von grundlegender Bedeutung.</p> <p>Das Kapitel Beschreibung erklärt die Anlage von Grund auf.</p> <p>Alle weiteren Kapitel bauen auf der Kenntnis der in Kapitel Beschreibung gegebenen Informationen auf.</p> <p>Das Kapitel Beschreibung ist gegliedert nach den Baugruppen der Anlage.</p> <p>Das Studium/ die Kenntnis der hier gegebenen Informationen sind Voraussetzung einen gefahrlosen und wirtschaftlichen Betrieb.</p>
<b>Tätigkeitskapitel</b>	<p>Transport, Montage, Betrieb und Demontage sind sogenannte "Tätigkeitskapitel".</p> <p>Die Systematik des Aufbaus aller Tätigkeitskapitel ist gleich:</p> <p><b>Sicherheit</b></p> <p>Sicherheit ist der erste Abschnitt eines jeden Tätigkeitskapitels.</p> <p>Zunächst wird entsprechend der Ergebnisse der im Einzelfall durchgeführten Gefahrenanalyse und darauffolgenden Risikobewertung auf verbleibende Restrisiken hingewiesen.</p> <p>Entsprechend dem Kapitel werden die spezifischen Texte aus Kapitel Sicherheit zitiert.</p> <p>Befugte Personen, einzuweisende Personen, persönliche Schutzausrüstung sowie vorherrschende Gefahrenbereiche werden benannt.</p>

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## 1.1.1

**Structure and concept**

**Chapter** The table of contents of these instructions is structured in several chapters.

The division takes into account the legislation in force as well as the different operational steps and the groups of persons envisaged for this purpose.

The operational steps and groups of persons are clearly defined and named in these instructions.

The groups of persons are differentiated according to their training and authorisation.

**Safety Chapter** The Safety chapter is very important.

The Safety chapter takes into account the legislation in force as well as the different chapters and possible situations that may arise.

Likewise, the Safety chapter is expanded by the results of the risk analysis and their subsequent assessment and the remaining residual risks.

The Safety chapter must have been read and understood by all persons and groups of persons working with or on the machine and the information and orders must be observed.

**Description Chapter** The Description chapter is very important.

The Description chapter explains the machine in detail.

All other chapters are based on the information in the Description chapter.

The Description chapter is subdivided according to the construction units of the machine.

The study or knowledge of the information provided is a prerequisite for safe and economical operation.

**Activity chapters** Transport, Installation, Use and Dismantling are so-called "Activity Chapters".

The structure of all activity chapters is identical:

**Safety**

Safety is the first section of each activity chapter.

First, a warning is given of the remaining residual risks, according to the results of the risk analysis and the subsequent assessment.

Specific texts from the Safety chapter are mentioned.

Authorised persons, persons to be instructed, personal protective clothing as well as the predominant danger zones are named.

**Activity**

Activity is carried out according to a **traffic light** pattern:

⚠ Requirements	
	Designates <b>conditions</b> , <b>status</b> and <b>preparatory work</b> that must be carried out or performed in order to achieve the objective.

⚠ Objective	
	Names the objective to be achieved by the procedure.

## Procedure

Names the procedure that is to be carried out to achieve the stated objective.

**Annex chapter**      The Annex chapter contains further information.  
Additional information may be: Manufacturer's documentation, drawings, circuit diagrams, sheets etc.

**Chapter Without content**      “Chapter without content” means that the documentation present sets this chapter aside, depending on which group of people you belong to.

The operator's task is only to operate the machine. It is not his/her task to transport, install/uninstall, perform maintenance, etc. He/she normally does not have the required experience, professional training or authorisation.

There are instructions for all named activities and for authorised groups of persons:

- Transport instructions
- Assembly instructions
- Maintenance instructions
- Repair instructions

### 1.1.2 Symbols used



#### **Information**

Indicates information regarding the use of this machine.  
 The information should make it easier to use this machine.



#### **Press button**

This symbol is used when you need to press a button or click a key.



#### **Visual check**

Visual checks are used to determine visible damage and help to protect people and the environment from hazards and prevent other material damage.



#### **Acoustic check**

Acoustic checks are used to determine abnormal noises and help to detect damage over time.



#### **Visual leakage check**

Visual leakage checks help to detect leaks over time and prevent downtimes due to machine faults.

These help safeguard resources and avoid environmental damage.

### 1.1.3 Definitions used

<b>Hazard</b>	A potential source of injury or damage to health.
<b>Danger zone</b>	Any zone within and/or around machinery in which a person is subject to a risk to his health or safety.
<b>Risk</b>	A combination of the probability and the degree of an injury or damage to health that can arise in a hazardous situation.
<b>Intended use</b>	The use of machinery in accordance with the information provided in the instructions for use.
<b>Reasonably foreseeable misuse</b>	The use of machinery in a way not intended in the instructions for use, but which may result from readily predictable human behaviour.



**1.1.4****Additional documents**

- |                                   |   |
|-----------------------------------|---|
| <b>Manufacturer documentation</b> | <ul style="list-style-type: none"><li>- CE Declaration of Conformity</li><li>- Spare parts manual</li><li>- Maintenance instructions</li><li>- Electrical system diagram</li><li>- Hydraulic system diagram</li></ul> |
| <b>Supplier documentation</b>     | <ul style="list-style-type: none"><li>- Propulsion engine</li><li>- Magnetic belt</li><li>- Radio remote control</li></ul>  |

## **1.2 The machine**

**Conformity** With SH-60, you have purchased a product that has achieved a level of safety and technological development that is among the most advanced.

With our CE Declaration of Conformity, included in the “Annex” chapter, we confirm that the SH-60 meets the essential health and safety requirements of the relevant EC Machinery Directive.

**Intended use** This machine is designed to crush various types of material. The maximum size indicated must not be exceeded. The permissible material and the maximum size are specified.

The machine must be placed on flat, solid subsoil with sufficient grip and bearing capacity.

If you need to process materials that are not listed below, please contact your dealer or the manufacturer's technical department.

Only reliable, authorised, trained and instructed persons may work on or with this machine.

Only use the machine if it is in perfect working order and in accordance with its intended use, observing the safety instructions and the manual! Immediately rectify any faults which could impair safety!

Intended use also includes observing the safety procedures and instructions described in this manual.

Incorrect use is prohibited!

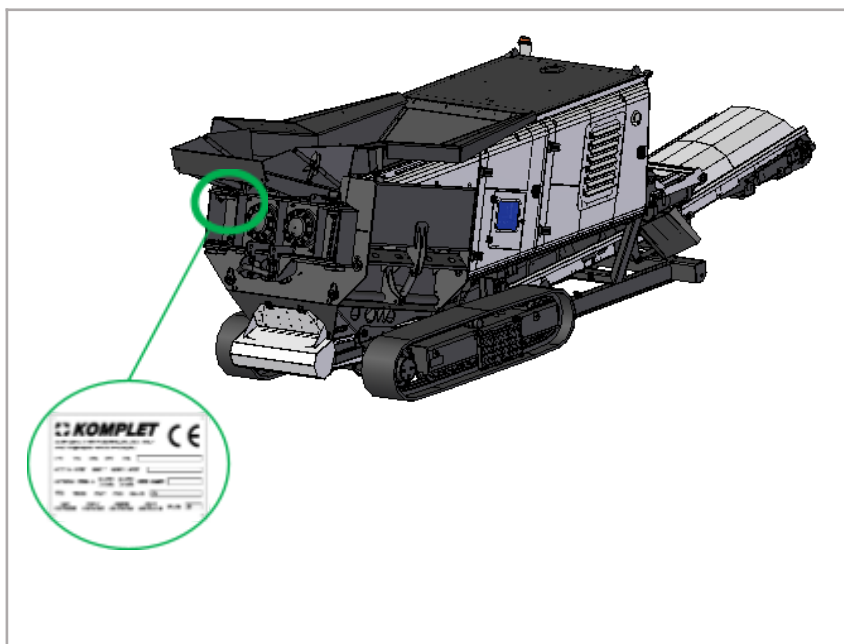
**Reasonably foreseeable misuse**

The following are considered to be misuse:



- Loading and processing of material that is not permissible.
- Loading and processing of material that is permissible but exceeds the maximum size.
- Working with or on the machine without permission or training.
- Working with or on the machine when not all EMERGENCY STOP devices are complete and fully operational.
- Do not move the machine with the tracks if it is in the working phase or position.
- Working with or on the machine when not all protective devices are fully operational.
- Working with or on the machine when not all the alarm devices are complete and fully operational.

<b>Permissible material</b>	<p>Only the following materials can be loaded and processed with this machine.</p> <ul style="list-style-type: none"><li>● Asphalt</li><li>● Rubble</li><li>● Cement</li><li>● Natural stones</li><li>● Bricks</li><li>● Ceramics</li><li>● Railway sleepers</li><li>● Wood</li><li>● Green waste</li><li>● Bulky waste</li></ul>
<b>Maximum size</b>	<p>The maximum size allowed: -</p>
<b>Modifications or changes</b>	<p>Modifications or changes to the machine are prohibited and entail the exclusion of the manufacturer's liability if personal injury or damage to property occurs as a result.</p> <p>The validity of the CE Declaration of Conformity according to the Machinery Directive 2006/42/EC shall also cease.</p> <p>Use of a modified machine within the scope of the aforementioned directive is inadmissible and prohibited. The manager is responsible for this.</p>
<b>Signs</b>	<p>The SH-60 must be marked for different purposes according to the requirements of the machinery directive.</p> <p>It must be ensured that the machine signs are complete and in legible conditions.</p> <p>A list with the machine signs and their positions can be found in the chapter "3 Description" in the paragraph "3.7 Signs".</p>

**Rating plate** The rating plate is riveted to the plant frame on the rear left-hand side.



Use the rating plate to check whether you have valid documentation for the machine.

 <b>KOMPLET</b>										
<small>KOMPLET SPA Via Antonelli, 49 60012 - TRECASTELLI - (AN) - ITALY</small> <small>e-mail: info@komplet.it web-site: www.komplet.it</small>										
TIPO	TYPE	TYPE	TIPO	TYPE						
MODELLO	MODEL	MODELE	MODELO	MODEL						
MATRICOLA	SERIAL No	NUMERO DE SERIE	NUMERO DE SERIE	SERIENNUMMER						
PESO	WEIGHT	POIDS	PESO	GEWICHT	Kg					
ANNO COSTRUZIONE	YEAR OF MANUFACTURE	ANNEE DE CONSTRUCTION	ANO DE CONSTRUCCION	BALLJAHR	20					

## 1.3 Work

### 1.3.1

#### Qualified personnel

**Select personnel** All work with and on the machine must be carried out by reliable, authorised, trained and instructed personnel.

**Minimum legal age** Age limits must be complied with as per regulations.

**Groups of people** Different groups of people work on the machine, taking into account the operating phases of the machine.

With regard to the SH-60, these groups are divided into:

- Transporters
- Installers
- Operators
- Technicians

**Clarifying competences** Explain the limits of their competence and authorisation to the different groups of people.

	Transporters	Installers	Operators	Technicians
Transport	X			
Preparation and loading works		X		
Inspection		X	X	X
Use			X	
Troubleshooting		X	(X)	X
Maintenance		X		X
Repairs				X
Dismantling and Disposal		X		

**Instruct personnel** In particular, personnel must be instructed in the risks and possible dangers involved in using this machine.

### 1.3.2 Due diligence

**Employ qualified personnel** Persons working on this machine must be qualified according to their activities and must be trained (see previous section). The manager is responsible for ensuring that appropriate personnel are employed, applying the relevant instructions and checks.

**Wear protective clothing** In particular, personnel working with this machine must wear protective and properly fitted clothing (EN/ANSI approved) at all times. The manager is responsible for ensuring that protective clothing is worn, applying the relevant instructions and checks.

**Take the site into account** All local regulations, all possible safety rules for accident prevention and environmental protection must be added to these instructions. Behave according to the existing conditions on site and according to the instructions.

**Maintain order** Keep the workplace in order. The manager is responsible for ensuring that the workplace is clean and tidy, applying the relevant instructions and checks.

**Read the instructions** Read and understand all instructions before working with or on this machine.  
Read, understand and follow the indications in the instructions or manuals delivered with the machine.  
The manager is responsible for ensuring understanding of the contents of this manual and for applying the relevant instructions and checks.

**Only use the machine if it is in perfect working order** Only use the machine if it is in perfect working order in accordance with its intended use, in compliance with the safety instructions and after carrying out the described work steps. The manager is responsible for ensuring that the machine is in perfect working order, following the relevant instructions and checks.

**Check the danger zone** Talk a walk around the machine before starting the engine. Make sure that nobody and nothing is in the danger zone. Do not start the machine as long as people, objects or obstacles are in the danger zone.  
There are different danger zones depending on the various activities carried out on the machine.  
An overview of the danger zones can be found in the "Safety" chapter. The existing danger zones according to the operating phase or activity can be found at the beginning of each specific chapter.

**Report defects and damage**

The operator is responsible for reporting changes or damage to the machine to the manager. The same applies to changes in the operating behaviour of the machine as well as any unsafe working conditions.

The machine must be stopped immediately if any safety-related operating faults or faults in the machine's behaviour are noted.

<b>Report defects and damage</b>	<p>The manager is responsible for rectifying defects and damage immediately.</p> <p>Worn, damaged or broken parts, leaking hoses, damaged cables or connectors must be replaced or repaired immediately.</p> <p>Repair components only after approval.</p>
<b>Check the protective and safety devices</b>	<p>Only use the machine when all protective and safety devices (cladding, EMERGENCY STOP buttons, limit switches, soundproofing devices, exhaust system) have been installed correctly and are fully operational.</p> <p>If preparation, maintenance or repair work requires the dismantling of protective or safety devices, these must be reinstalled and checked immediately after work has been completed.</p> <p>Never modify a protective or safety device or create a bridge.</p>
<b>Follow the disengagement procedure</b>	<p>There must be no material in the machine before you switch it off.</p> <p>In an emergency, switch off the machine using one of the EMERGENCY STOP buttons.</p> <p>Do not use the EMERGENCY STOP buttons or lines for a regular machine stop.</p>

### **1.3.3 Behaviour in the event of faults**

<b>Malfunction</b>	<p>In the event of a malfunction, stop and secure the machine immediately.</p> <p>Eliminate any malfunction immediately!</p>
<b>EMERGENCY STOP</b>	<p>If the malfunction cannot be eliminated from the control station, press the EMERGENCY STOP button.</p>
<b>Lock and mark</b>	<p>If there is no malfunction that can be cleared quickly, disengage the machine with the main switch. Lock the main switch and remove the key. Mark the machine with a warning sign.</p>



**1.3.4****Maintenance and service work****Use original parts**

Original parts and accessories are specially designed for the machine.

Parts and accessories that are not supplied by the manufacturer have not been tested and approved by the manufacturer. The assembly and use of these products may alter the characteristics of the machine as defined by the construction and may also compromise safety.

It must be considered that the manufacturer or supplier parts are often subjected to particular production and supply standards. We only offer replacement parts that are equipped with the latest technology and comply with the applicable standards.

Our warranty applies exclusively to original spare parts supplied by us.

We explicitly warn that we accept no liability for spare parts and accessories not supplied by us.

**Employ  
specialised personnel**

The manager of the machine is responsible for ensuring that the specific skills of the person/s hired are in accordance with the current state of the art and professional training.

**Environmental protection**

We take environmental protection seriously. Even during machine design and production, we as a manufacturer have paid particular attention to the economical use of resources and the elimination of pollutants. We comply with legal guidelines.

**Exemption from liability**

Damage caused by using non-original parts and accessories or by incorrect assembly or replacement of original parts and accessories; in this case the manufacturer accepts no liability.

## 2. Safety

### 2.1 Introduction

#### 2.1.1

#### Personal protective clothing

Wear protective and properly fitted clothing (EN/ANSI approved) at all times

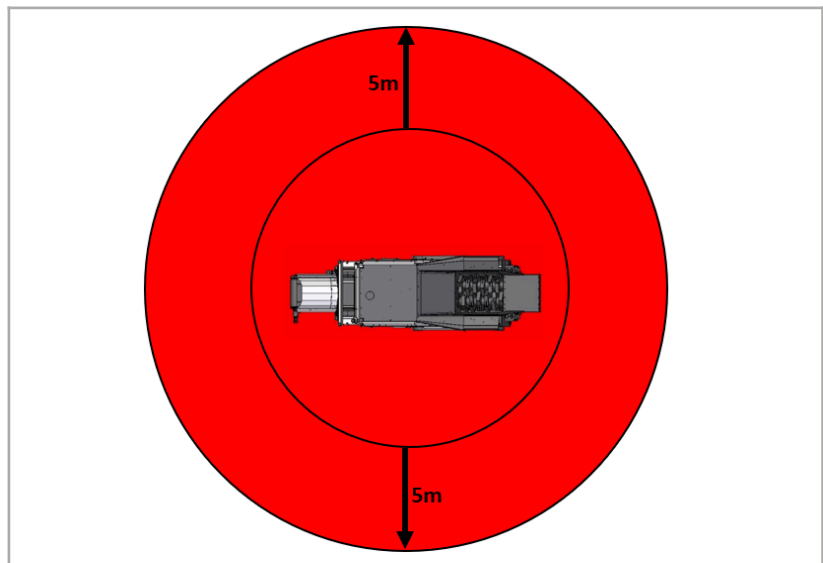
		
Wear protective clothing	Wear safety footwear	Wear a safety helmet
		
Wear high visibility clothing	Wear safety gloves	Wear hearing protection
		
Wear safety goggles		

**2.1.2****Danger zones**

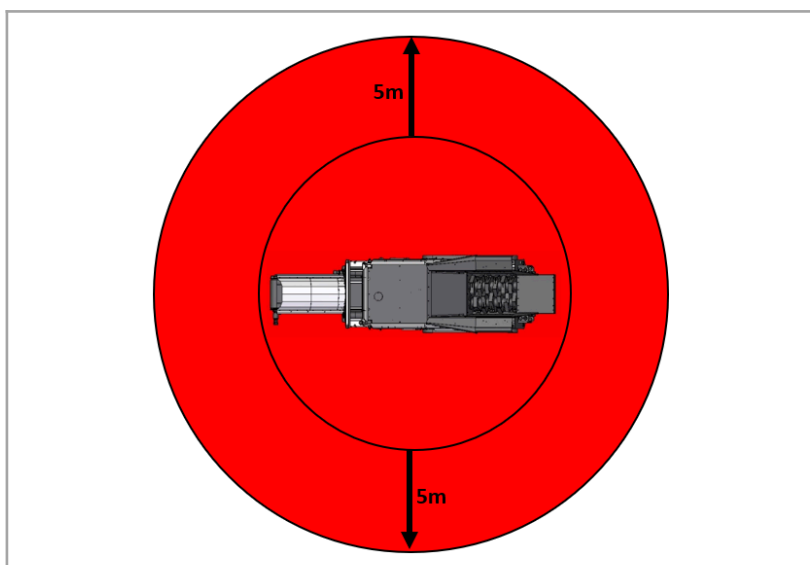
The danger zone is the environment around the machine in which people can be reached by the movement of equipment, work devices and its accessories or by swinging loads, falling loads or falling work equipment.

**Danger zone during transport**

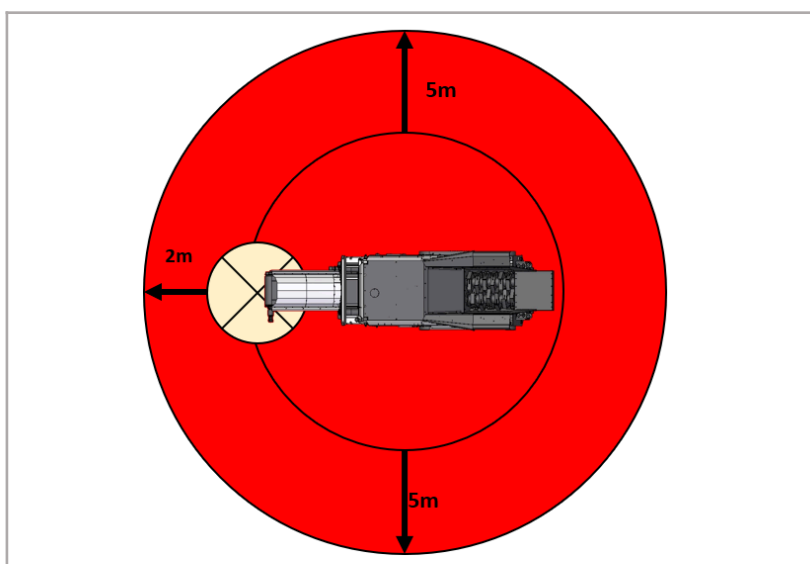
- 5m around the radius of machine rotation
- On the machine
- Under the machine
- In the machine

**Danger zone during preparation**

- 5m around the radius of machine rotation
- On the machine
- Under the machine
- In the machine


**Danger zone during  
use**

- 5m around the machine
- Around material discharge: 2 m
- On the machine
- Under the machine
- In the machine
- The loading area of the machine around the supply unit must be taken into account and marked!


**Lock and mark**

For the safety of people at certain stages of operation, the machine must be locked and marked to prevent any danger from which it may come.

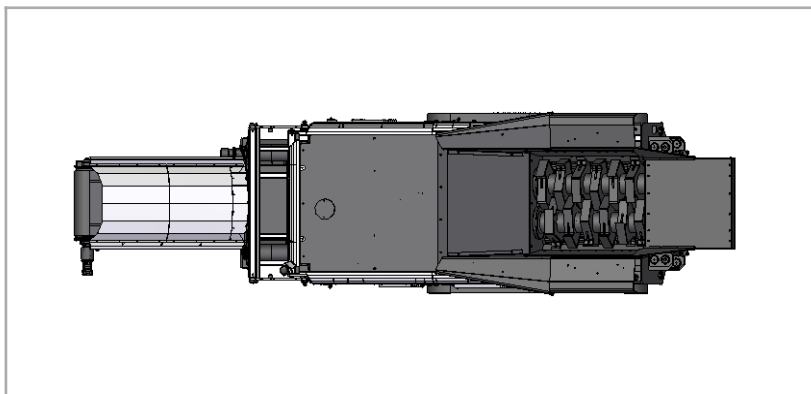


There is no danger zone as long as the machine remains locked.

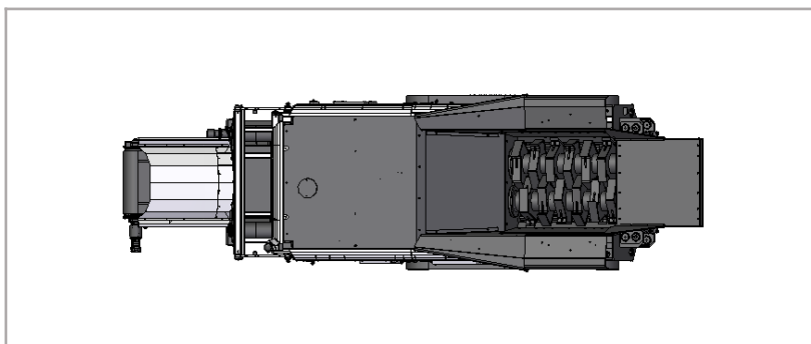
- Stop the machine properly.
- Remove the ignition key and keep it with you.
- Disconnect the machine from the power supply using the battery disconnecter.
- Press the EMERGENCY STOP button.
- Authorised personnel (installers or maintenance personnel) must check that no material remains on the machine which could be a hazard if it falls unexpectedly.
- Fix the plate with the information for locking.

**Locked machine danger zone -  
working position**

There is no danger zone as long as the machine remains locked.

**Locked machine danger zone -  
transport position**

There is no danger zone as long as the machine remains blocked.



## 2.1.3

## Warnings, safety signs and marking

The manufacturer must mark the machine in accordance with the machinery directive, which contains the essential health and safety requirements in Annex I. For this machine, warnings, safety signs and markings have been used as described in the following sections of this manual.

The warnings and safety signs must be followed to avoid any danger of personal injury or even death.

Standard UNI EN ISO 7010 establishes the rescue, prohibition, order, warning and safety signals in case of fire.

The safety signs comply with harmonised standard EN 61310 - Part 2: "Safety of machinery, signs and manoeuvring" or Directive 2007/30/EC: "Minimum requirements for the provision of safety and/or health signs at work".




In addition, the hazard indications in accordance with ISO 3864-2 have been used: "Graphical symbols - Safety colours and safety signs-Part 2": as a basis for safety signs on the products used, to reinforce the statements of the safety indications.


## Warnings in instructions

The following terms or symbols are used in this manual to mark data of particular importance.



The symbol here to the side is the safety symbol. Wherever you see one of these symbols on the machine or in the instructions, special attention is required. Indicates orders and prohibitions to prevent injury to persons or damage to machines.

● Hazard	
	Signifies a <b>situation of imminent danger</b> . If the hazardous situation is not avoided, it will <b>result in serious or even fatal injury</b> .
● Caution	
	Signifies a <b>hazardous situation</b> . If the hazardous situation is not avoided, it may <b>result in serious or even fatal injury</b> .
▲ Caution	
	Names the objective to be achieved by the procedure.
Procedure	

	<p>Indicates orders and prohibitions to prevent damage to machines.</p> <p><b>Economical</b>, or rather <b>environmentally friendly</b>, <b>operation</b> is also possible by observing the warning.</p>
---	--

**Safety signs**  
**On the machine**












Standard UNI EN ISO 7010 establishes the rescue, prohibition, order, warning and safety signals in case of fire.

The safety signs applied on this machine according to UNI EN ISO 7010 are classified as follows:

- Danger signs
- Prohibition signs
- Obligation signs



**Danger signs** Warning signs indicate and display sources of danger.

		
Hazard	Risk of an obstacle on the ground	Slipping hazard
		
Danger of falling with height difference	Danger of falling materials	Crushing hazard from above
		
Crushing hazard	Danger of rotating parts in motion	Belt drive hazard
		
Danger of hydraulic oil leakage under high pressure	Danger of crushing hands	



**Prohibition signs**      Prohibition signs indicate and display prohibitions.

 No access	 Altering the status of the switch is prohibited	 No access for pacemaker wearers
 No smoking or open flames	 No smoking	 Do not drink: water not potable

**Obligation signs** Obligation signs indicate and display obligations.

		
General obligation	Read and comply with instructions	
		
Wear protective clothing	Wear safety footwear	Wear a safety helmet
		
Wear high visibility clothing	Wear safety gloves	Wear hearing protection
		
Wear safety goggles		

## 2.2 Basic principle, intended use

- This machine has been designed according to the latest technology and recognised safety rules. Using this machine may however be dangerous and may endanger the health and life of the user or third parties or even damage the machine itself.
- Only use the machine if it is in perfect working order and in accordance with its intended use, observing the safety instructions and the manual! Immediately rectify any faults which could impair safety!
- This machine is designed exclusively for crushing the materials mentioned in the manual. Any other or different use is considered non-compliant. The manufacturer is not responsible for any resulting damage. The operator shall assume all risks. Intended use includes carefully reading the instructions described in this manual and observing the inspection and maintenance procedures.

## 2.3 Organisational measures

- These instructions must be present wherever the machine works (in the toolbox or in a special container)!
- In addition to these instructions, the general applications and other binding regulations for accident prevention and environmental protection must be observed and instructed! These may include, for example, the handling of hazardous substances or the provision of/wearing of personal protective clothing or traffic regulations.
- In addition, the manager must add indications on monitoring and reporting obligations to the instructions to take account of specificities, e.g. work organisation, operating procedures, personnel employed.
- Before starting work, the personnel assigned to the tasks to be carried out on the machine must have read the instructions, especially the safety chapter. It is too late if they read it during operation. This applies in particular to personnel who occasionally work on the machine, e.g. during installation, maintenance.
- Occasionally check whether personnel observe the safety instructions and hazard warnings while working, with the manual in mind!
- Personnel may not enter the machine with long hair, loose clothing or jewellery, including rings. Doing so creates a risk of serious injury, e.g. entanglement or entrapment.
- Wear personal protective clothing where appropriate or required by regulations!
- Observe all safety and warning notices on the machine.
- All safety and warning notices attached to the machine must always be kept legible!
- In the event of significant changes to the machine or its functioning, stop the machine immediately and inform the responsible personnel of the malfunction.
- Do not carry out any modifications, conversions or applications on the machine that could impair its safety without prior permission from the supplier! The same applies to the assembly and adjustment of safety devices and valves as well as to the welding of supporting elements.
- Spare parts must meet the technical requirements specified by the manufacturer. This is always guaranteed by original spare parts.
- Flexible hydraulic hoses must be replaced at the specified or appropriate intervals, even if safety-relevant defects are not noticeable.
- Observe the prescribed or specified intervals for periodic inspections/checks!
- Appropriate equipment is required for carrying out maintenance work.
- Make the location and function of the fire extinguisher known!
- Observe fire detectors and fire extinguishing systems!

## 2.4 Selection and qualification of personnel; basic obligations

- Work on the machine may only be carried out by reliable personnel. Observe the minimum legal age!
- Only employ qualified and trained personnel, clearly define the responsibilities of the personnel for preparation, operation, maintenance and repair!
- Ensure that only authorised personnel work with the machine!
- Define the responsibility - handler - taking into account the traffic regulations - and give him/her the opportunity to refuse instructions from third parties, which are not in accordance with the safety regulations.
- Personnel who are to be taught, trained or given general training may only work with the machine under the permanent supervision of an experienced person!
- Only experienced or trained personnel may work on the electrical system of the machine under the supervision of an experienced electrician and in accordance with the rules of the specific technology.
- Work on the chassis, brake systems and steering equipment may only be carried out by trained personnel!
- Work on hydraulic systems may only be carried out by personnel with specific knowledge and experience in the hydraulics sector!

## **2.5 Safety warnings for certain operational phases**

### **Normal operation**

- Any dangerous procedure is forbidden!
- Before starting work, familiarise yourself with the working environment. The working environment includes, for example, obstacles in the working and traffic area, soil grip and bearing capacity and site safety on public roads.
- Take the necessary measures so that the machine is only used under safe and functional conditions! Only use the machine if all protective and safety equipment is available and functional, e.g. detachable protective devices, emergency stop devices, soundproofing and suction devices!
- The machine must be checked for damage or defects at least once per shift! Inform the person in charge immediately of any changes that have occurred (including operation)! Stop the machine immediately and secure it if necessary!
- In the event of a malfunction, stop and secure the machine immediately! Eliminate any malfunction immediately!
- Only start the machine from the control station!
- Observe the switching on and off procedures and indicators according to the instructions!
- Before switching on and starting the machine, make sure that nobody is in danger.
- Before setting the machine in motion and starting work, check the functionality of the brakes, steering, signalling devices and lighting machine!
- Before moving the machine, check that the accessories are securely stored.
- When driving on public roads, streets or squares, always observe the traffic regulations and, if necessary, place the machine in an acceptable condition for traffic rights.
- Always turn on the lights if visibility is obstructed or if it is dark.
- Passengers may only ride in the seats for accompanying persons.
- Always keep a proper distance when driving through tunnels, bridges, overhead lines, etc.!
- Always keep a safe distance from embankments and slopes!
- Procedures that endanger the stability of the machine are forbidden!
- Do not drive on slopes in a crosswise direction; always position equipment and loads at the lowest points, especially when driving downhill!
- When driving on a slope, always adapt your speed to the environmental conditions! Never shift into a lower gear while on a slope but before!
- When leaving the control station, make sure that the machine is secured and cannot be used by unauthorised persons!



**Special work to be carried out  
while the machine is in use,  
repair work and troubleshooting  
during the work cycle; disposal  
of materials**

- Comply with the activities and intervals for adjustment, maintenance and inspection prescribed in the instructions, including instructions for the replacement of parts/components! These activities may only be carried out by experienced personnel.
- Inform operators before carrying out special or maintenance activities! Appoint a supervisor!
- For all activities involving the operation, production adjustment, restructuring or regulation of the machine and its safety equipment such as inspection, maintenance and repair, the switching on and off procedures according to the instructions and repair instructions must be observed!
- If necessary, fully secure the maintenance area!
- If the machine is switched off during maintenance and repair work, it must be secured against unintentional switching on again: - Close the main control device and remove the key/ or attach a warning sign on the main switch.
- Only carry out maintenance and repair work if the machine is on an even and solid surface in order to prevent it from sliding or overturning!
- When replacing individual parts and construction units, these must be anchored and secured on lifting gear in order to avoid any danger. Only use suitable and technically appropriate lifting gear and lifting equipment with sufficient load-bearing capacity! Do not work or stand under suspended loads!
- Only instruct qualified personnel to lift loads and operate the crane! The signaller must be within the machine operator's field of vision or be able to communicate verbally.
- When assembling in an elevated position, use the intended means of access and platforms or other safety-compliant devices. Do not use machine parts as climbing aids!
- Fall arrest devices must be worn when carrying out maintenance work at a higher height! Remove dirt, grease, snow and ice from all handles, footboards, railings, pedestals, platforms and stairs!
- Before commencing maintenance/repair work, the machine, in particular the connections and screws, must be cleared of grease, fuel or cleaning agents! Do not use aggressive cleaning agents! Use non-fibrous cloths!
- Before cleaning the machine with water or a steam jet (high-pressure cleaner) or other cleaning agents, all openings where water/steam/cleaning agents may not enter must be plugged/sealed for safety and/or operational reasons. Engines and electrical panels are particularly at risk.
- After cleaning, completely remove the protective covers!

- After cleaning, check all fuel, engine oil and hydraulic oil lines for leaks, loose screw connections, chafing points or damage! Rectify any defects immediately.
- Loose screw connections must always be tightened when carrying out maintenance and repair work!
- If preparation, maintenance or repair work requires the dismantling of protective or safety devices, these must be reinstalled and checked immediately after work has been completed.
- Ensure that the disposal of substances and auxiliary materials as well as spare parts is safe and environmentally friendly.

**Transport and towing,  
recommissioning**

- Always follow the instructions when towing, loading and transporting.
- When towing the machine, observe the prescribed transport position, permissible speed and route.
- Only use transport and lifting equipment with sufficient load-bearing capacity.
- Follow the instructions in the manual when putting the machine back into operation.

## 2.6 Warnings for specific types of danger

### Electrical energy

- Only use original fuses with the prescribed electrical current! Switch off the machine immediately in the event of electrical disturbances!
- Keep the machine at an appropriate distance from overhead power lines! The equipment must not be approached when working in the vicinity of overhead power lines. Risk of death! Inform yourself regarding the safe distances to be observed!
- After touching power lines: - Do not leave the machine - Leave the danger zone with the machine - Warn people in the area not to approach or touch the machine - Have the power disconnected - Only leave the machine when the damaged line has been safely disconnected from the power supply!
- Only experienced or trained personnel may work on the electrical system of the machine under the supervision of an experienced electrician and in accordance with the rules of the specific technology.
- Machine parts which are subject to inspection, maintenance and repair work must be disconnected from the power supply as prescribed. First check whether these parts are actually de-energized, then earth them, short-circuit them and isolate adjacent live parts!
- The machine's electrical equipment must be inspected/checked periodically. Defects such as loose connections and scorched cables must be rectified immediately.
- If work is to be carried out on live parts, call in a second person who can operate the emergency stop switch or the main switch in an emergency. Fence off the work area with a red-white chain and affix a warning sign. Use only voltage-insulated tools!
- When working on high-voltage components, connect the power cable to earth after switching off the voltage and short-circuit components, e.g. capacitors, using an earth bar.

### Gas, dust, steam, smoke

- Only operate combustion engines and fuel-driven heating systems in sufficiently ventilated rooms! Ensure that sufficient ventilation is provided before starting up in enclosed spaces. Observe the regulations applicable for the respective place of use!
- Welding, soldering and grinding work on the machine require explicit approval. Performing these works involve a risk of fire and explosion!
- Before welding, soldering or grinding, clean the machine and the surrounding area of any dust and flammable materials and ensure adequate ventilation. Risk of explosion!

**Hydraulic system,  
pneumatic system**

- Work on hydraulic systems may only be carried out by personnel with specific knowledge and experience in the hydraulics sector!
- Always use a piece of cardboard to check for any leaks in hydraulic pipes. Never use bare hands. Hydraulic fluids under pressure can penetrate the skin. Hydraulic fluid that penetrates the skin can cause gangrene. Hydraulic oil that has penetrated the skin must be surgically removed!
- Regularly check all pipes, hoses and screw connections for visible leaks and damage! Rectify damage immediately! Leaking oil can cause injuries and fires.
- Before work is carried out, delivery systems and piping (hydraulic system, compressed air) must be depressurised before they are opened, in accordance with the unit's instructions..
- Lay and install hydraulic and pneumatic lines correctly. Do not mix up the fittings! The reinforcement, length and quality of the hoses must correspond to the requirements

**Noise**

- Soundproofing devices on the machine must be in an active position during operation.
- Wear prescribed personal hearing protection!

**Oils, greases and other  
chemicals**

- Product safety regulations must be observed when handling oils, greases and other chemicals!
- Take care when handling hot consumables. Danger of burning and scalding!

### 3. Description

#### 3.1 Machine concept

##### Features

The machine in question, called "SH-60", has been designed and built taking into account the needs related to the recycling of materials from demolition and renovation work in the building industry, marble waste and concrete waste. Within the limits of the machine's technical specifications, these materials are crushed and significantly reduced in size to facilitate the recycling process. The machine can therefore be used directly on site or, depending on requirements, can be used to process previously stored waste materials.

**It is the responsibility of the user to ensure the correct treatment and disposal of waste as well as the correct storage and transport of waste. We accept no liability for the disposal of unsuitable materials through the SH-60 or for which this type of recycling is not permitted by law.**

The SH-60 does not require a permanent operator because, once the machine has been started, it automatically carries out material crushing operations.

The engine is started by means of the ignition key on the control panel.

Material loading can be carried out with a compact loader, feeding belts or other loading devices.

The crushed material is then automatically discharged from the discharge belt at the front of the machine.

Main features of the machine:

- High level of safety
- Total mobility
- Fast installation
- Low operating costs
- High added value

##### Safety

Standard-compliant design and consideration of the current state of the art are the basis for the safety of persons handling the machine and for avoiding any hazards that may arise from the machine itself.

Procedures for transport, installation, operation and maintenance are also taken into account even in the event of improper use of the machine. The manufacturer's safety concept for this machine does not stop there. Where there are risks, these are eliminated and reduced by means of appropriate protective measures. Persons responsible for operating the machine must be reformed of any residual risks. Information on residual risks is prescribed in these instructions at the beginning of each section.



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<b>Mobility</b>	The size and weight of the machine allow it to be transported by a trailer to the place of use, which means it can be transported at low cost and no permit is required for road transport. Robust crawler tracks with radio remote control provide total mobility on the construction site.
<b>Preparation times</b>	Sophisticated technology with hydraulically controlled assembly and disassembly functions guarantee short set-up times. This makes work on sites with small quantities of bulk material worthwhile.
<b>Operating costs</b>	One of the qualities of this machine is its low operating costs. Robust, economical drive motors, an efficient hydraulic system and the need for only one operator ensure that operating costs remain under control. An extensive dealer network with professional technical support and the use of original parts are other factors for a good operating result.
<b>Added value</b>	A prerequisite for high added value in the preparation of mineral compositions is efficient and precise classification with low operating and maintenance costs. The concept of the SH-60 is the basis. Observe the specifications in the instructions and achieve maximum added value.

## **3.2 Material**

### **3.2.1**

#### **Permissible material**

Only the following materials can be loaded and processed with this machine.

- Asphalt
- Rubble
- Cement
- Natural stones
- Bricks
- Ceramics
- Railway sleepers
- Wood
- Green waste
- Bulky waste

### **3.2.2**

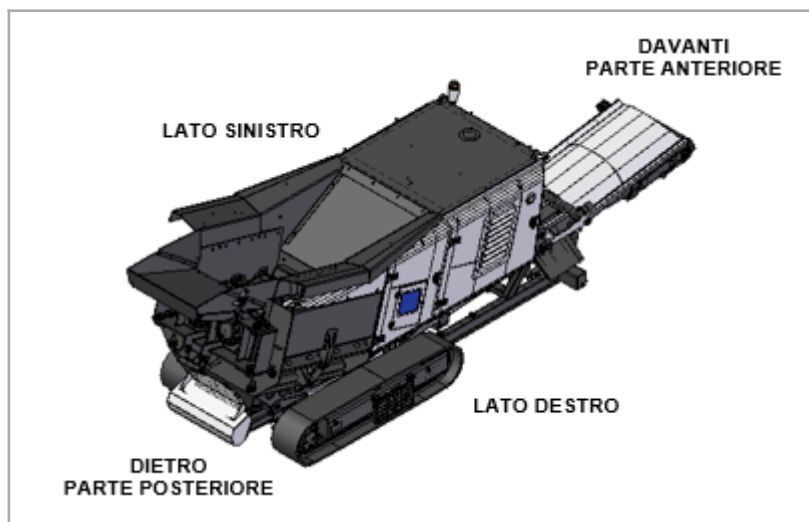
#### **Prohibited material**

Any material not listed above is considered prohibited and cannot be processed with this machine.

If you need to process materials that are not listed below, please contact your dealer or the manufacturer's technical department.



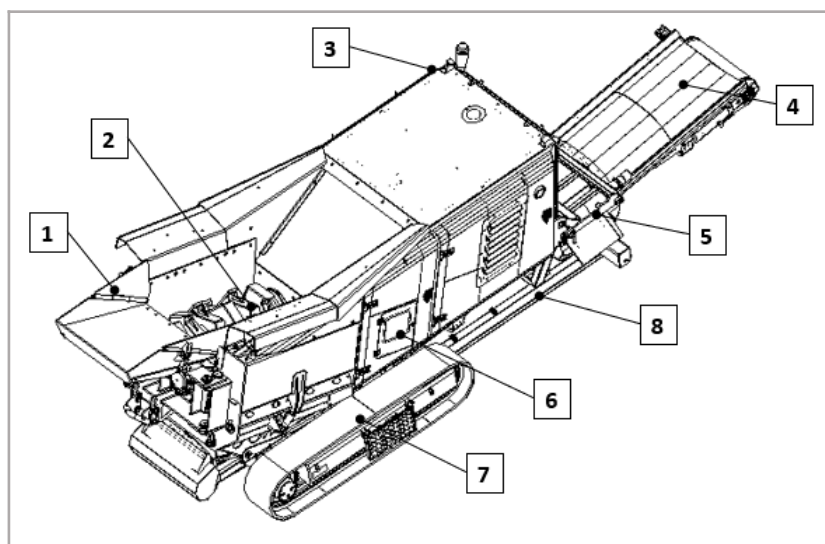
### 3.3 Orientation



The direction of observation is always in the direction of material flow: from the hopper to the discharge conveyor.

The feeder (hopper) is located at the rear of the machine.  
The discharge belt is located at the front of the machine.

### 3.4 Construction units



1	Hopper
2	Crusher
3	Drive unit
4	Discharge belt
5	Magnetic sorter
6	Control panel
7	Undercarriage crawler
8	Structure

### 3.5 Protective devices

Protective devices on the machine serve as protection against hazards.

Protective devices must be complete, intact and secured in accordance with regulations.

The machine is equipped with a number of protective devices to ensure safe operation. Below is a list of the main components:

- Emergency “STOP” push-button on the right and left of the machine
- Emergency “STOP” push-button on the radio remote control
- Emergency “STOP” push-button on the wired remote control
- Battery disconnecter
- External covers (Bonnets, protective guards)

#### 3.5.1

#### **EMERGENCY STOP button on the machine**





Left-hand side emergency button



Right-hand side emergency button

The machine has 2 EMERGENCY STOP buttons, one on the right-hand side and the other on the left-hand side.

The EMERGENCY STOP buttons installed on the sides of the machine stop all components of the machine, including the diesel engine.

### 3.5.2

#### **EMERGENCY STOP button on the radio remote control**

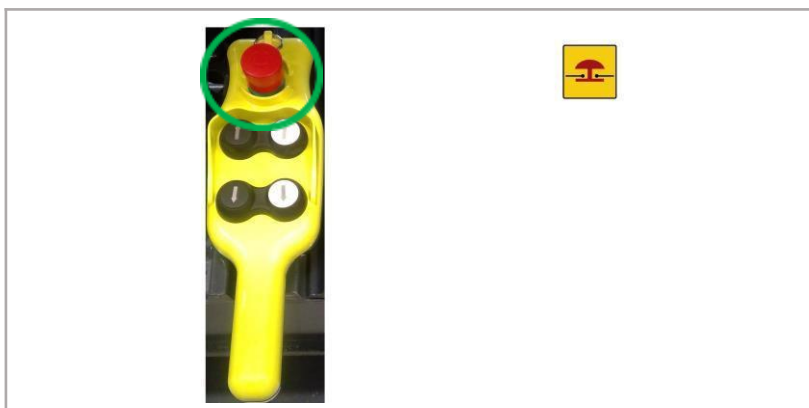


The machine has another EMERGENCY STOP button installed on the radio remote control.

The EMERGENCY STOP button on the radio remote control stops all machine functions except the diesel engine, which remains on.

### 3.5.3

#### **EMERGENCY STOP button on the wired remote control**

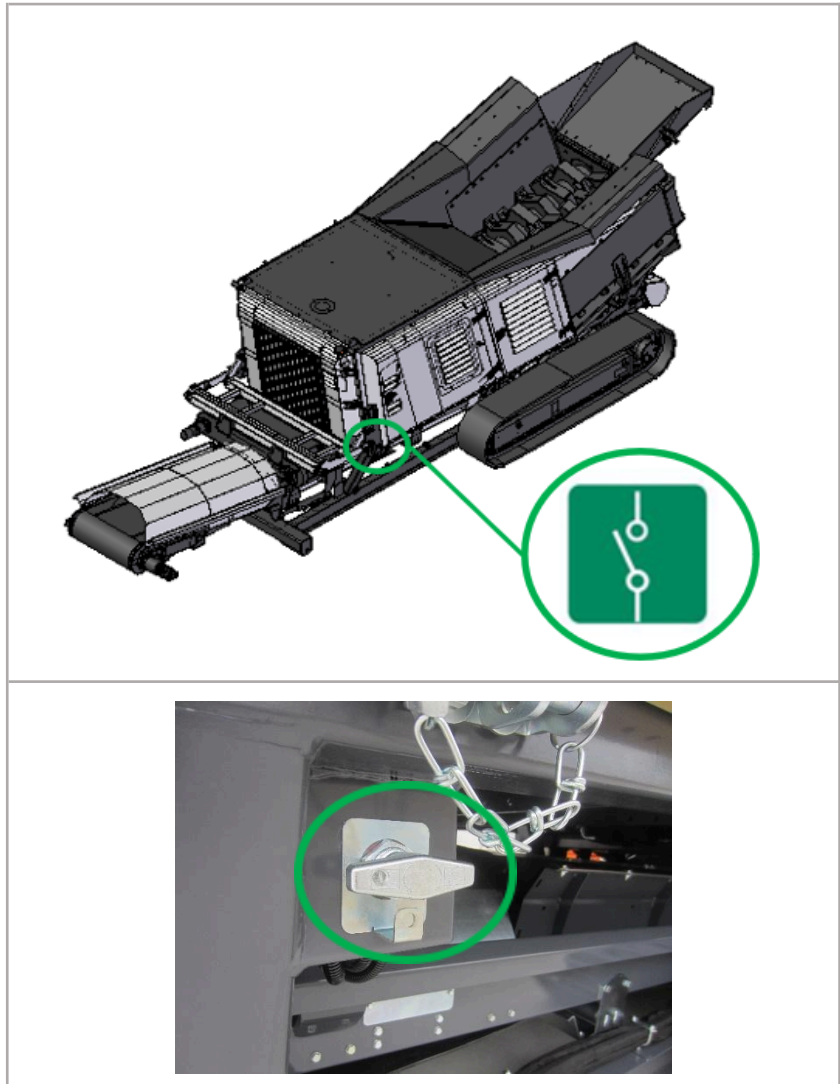


The machine has another EMERGENCY STOP button installed on the wired remote control.

The EMERGENCY STOP button on the wired remote control stop all components of the machine, including the diesel engine.

## 3.5.4

## Battery disconnecter



The machine has a lockable battery disconnecter for safe maintenance operations.

The disconnecter directly disconnects the battery positive and consequently the electrical system, preventing the control panel from being switched on and ensuring that the machine cannot be started.

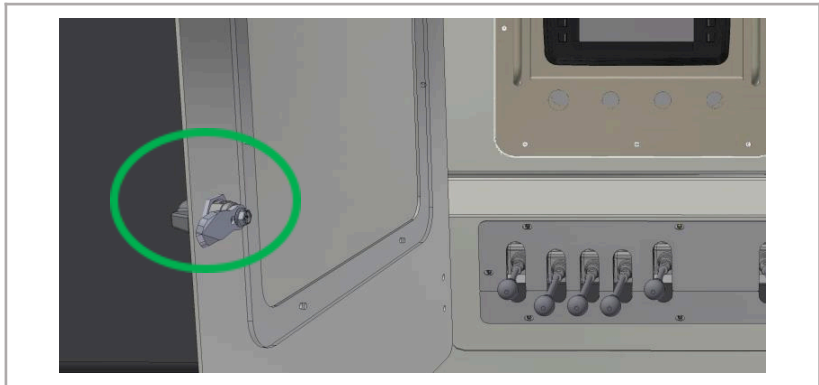
The battery disconnecter is located on the left side of the machine.

**Warning****Damage to electronic components**

Damage to electronic components may occur when the electrical system is disconnected from the battery after the machine is turned off.

- ☐ After switching off the system, wait at least 180 seconds before disconnecting the electrical system from the battery.



**3.5.5****Protection against unauthorised use**

As protection against unauthorised use, the control panel is located behind a lockable door.

Lock this door when leaving the machine.

**3.5.6****External covers**

The SH-60 is equipped with a range of external protective covers and bonnets that are an integral part of the safety measures taken for the safety of the operator.

Removing these covers or working without covers or with damaged covers can be extremely dangerous for the safety of the operator.

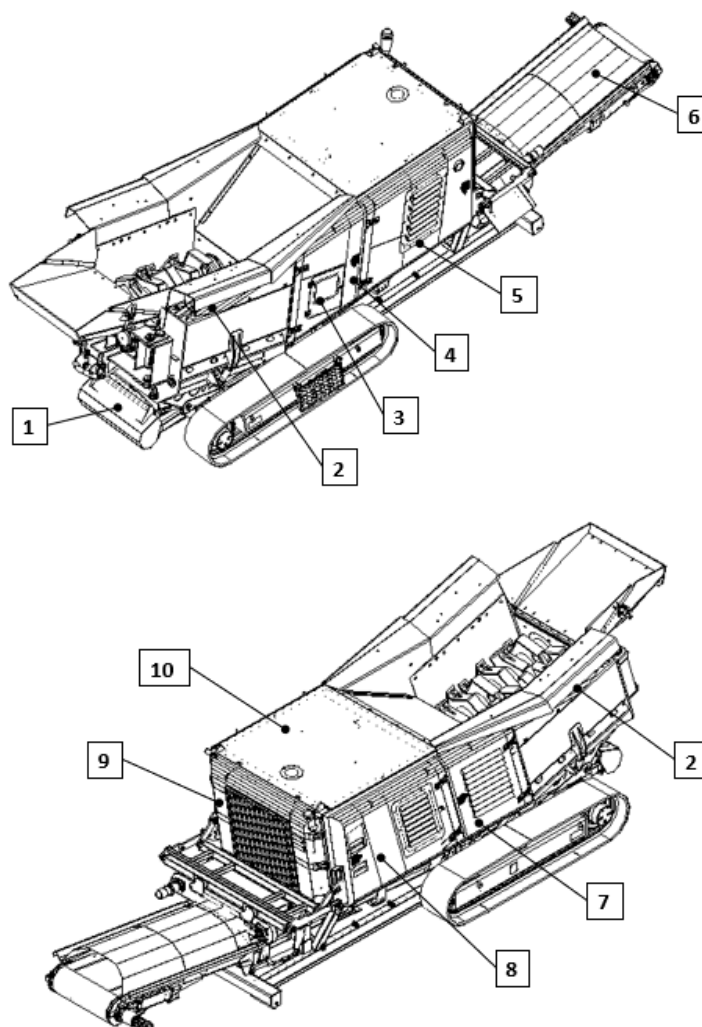
The machine covers serve as protection against injury and noise. Covers also protect the machine from dirt and weathering.

The covers must be complete, undamaged and closed.

Lock the doors/bonnets when leaving the machine.

Repair or replace any damaged or missing covers immediately.

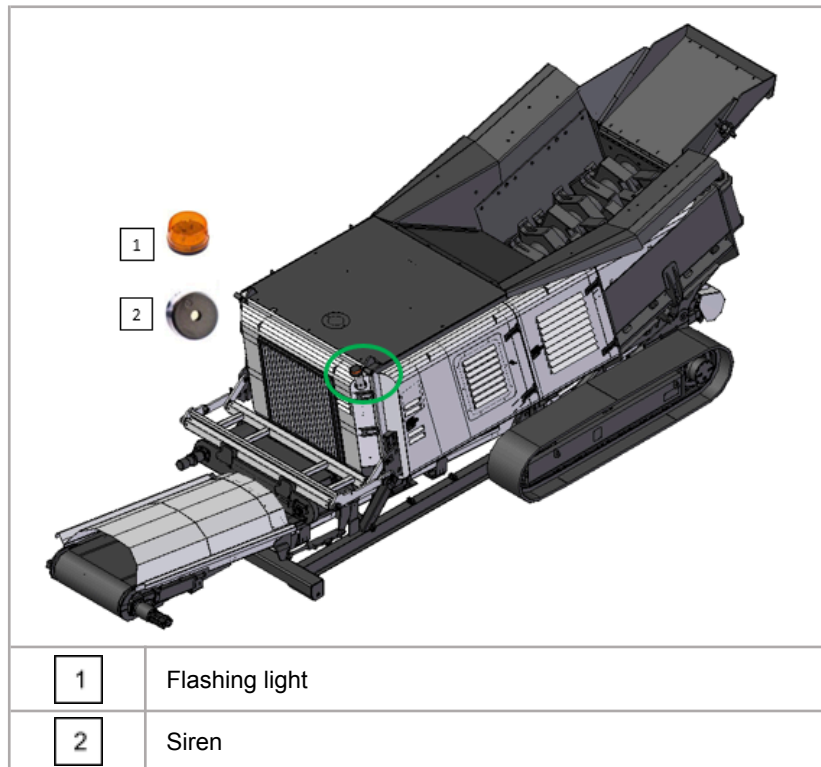
The main machine covers are shown below:



1	Discharge belt guard
2	Side shredder guard
3	Control panel door
4	Control unit door
5	Engine catalyst unit door
6	Dust protection
7	Shredder motor door
8	Drive unit door
9	Radiator guard
10	Upper drive unit guard




### 3.6 Alarm devices




The SH-60 is equipped with a light and sound signal indicating its operating status, errors, etc.

The signal is located at the top left.

- The siren activates before engine start-up.
- The flashing light activates at engine start-up.
- The siren activates at crawler track movement.
- The siren activates when one of the emergency buttons is activated.
- The siren activates at wired remote control connection.
- The siren activates during operation when the fuel level is low.

Warning	
	Machine users must be informed and trained in order to distinguish and recognise the meaning of the different alarms/lights when they come into operation.

• Caution	
	When no sound is heard while moving, <b>STOP</b> the machine immediately and search for the cause of the fault and resolve it. Continuing to work with faults or faulty protective devices could be seriously dangerous.














3.7 Signs

The machine is equipped with adhesive labels and pictograms indicating hazardous situations when the machine is in operation.  
Be careful when using the SH-60.

The machine poses some residual risks that it has not been possible to eliminate due to the functions it must perform.  
Labels or pictograms have been placed on the machine to remind you of general precautions and to highlight residual risks. These pictograms are placed near the risk areas.  
These labels play an essential role in safe operation of the machine. If one of these labels is removed or becomes illegible, ask your dealer to replace it.

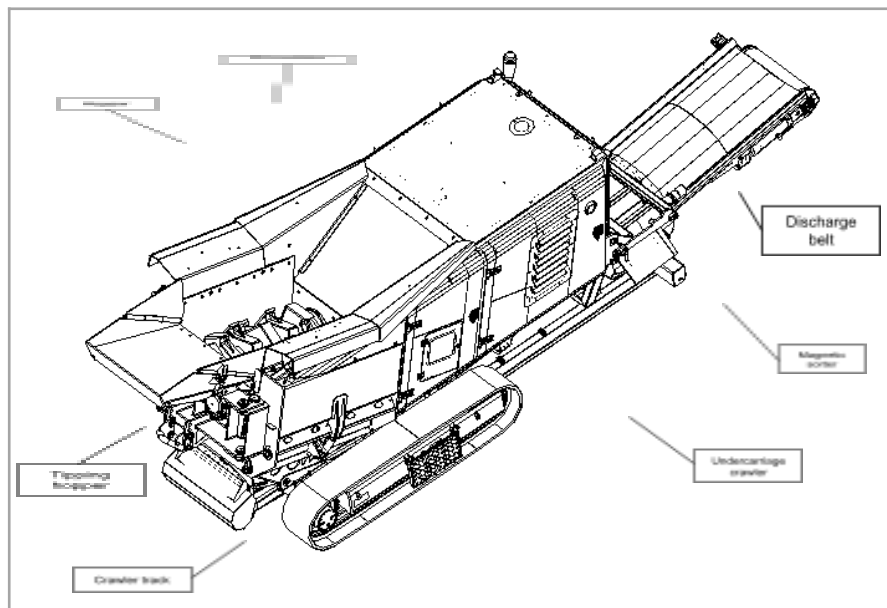
The pictograms installed on the machine are shown below:

   		<b>Warning!</b> Read this manual carefully before using the machine.
		Possibility of moving parts.
		Risk of crushing hands.
		Risk of ejecting objects.
		Always wear a helmet and safety clothing.
		Magnetic field and no access to pacemaker wearers label.
		EMERGENCY pictogram.                      BUTTON



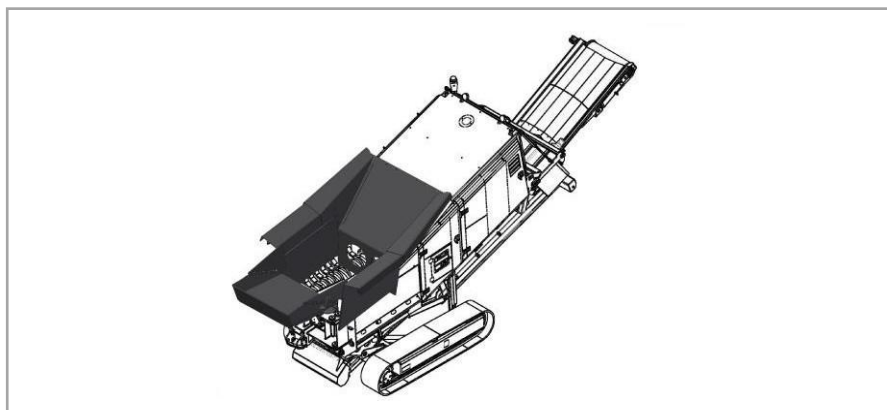
Lubrication point label.

### 3.8 Description



#### 3.8.1

#### Loading hopper



The material is loaded into the hopper with an excavator or mechanical shovels.

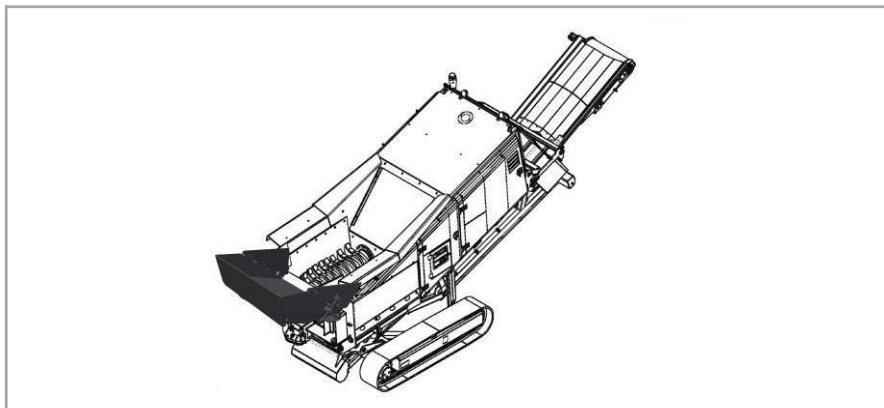
There is also the possibility of direct loading via a front-mounted system.

The hopper is large in size. The inclined sides ensure constant material flow and prevent material build-up.

Hopper features:

- Low loading height
- Favourable loading dimensions
- Inclined walls
- Front tipping part

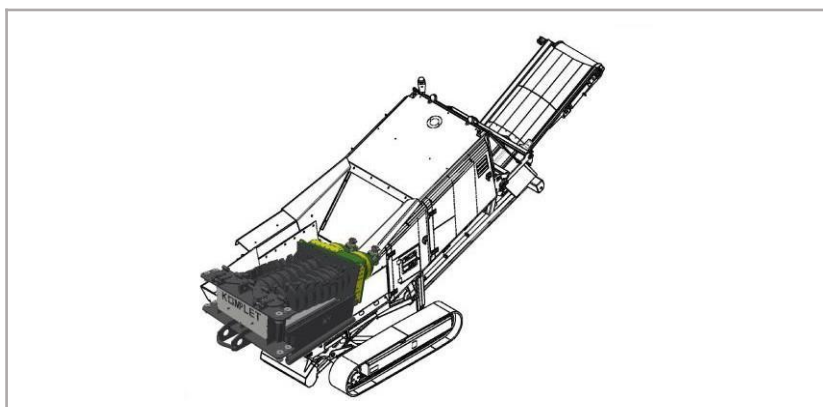
### Tipping hopper



The front of the hopper is tilted by a hydraulic system (tipping hopper). This aids the feeding of material.

### 3.8.2

### Shredder



The shredder consists of two shafts that are driven by two hydraulic motors.

The shredding process is carried out in two stages.

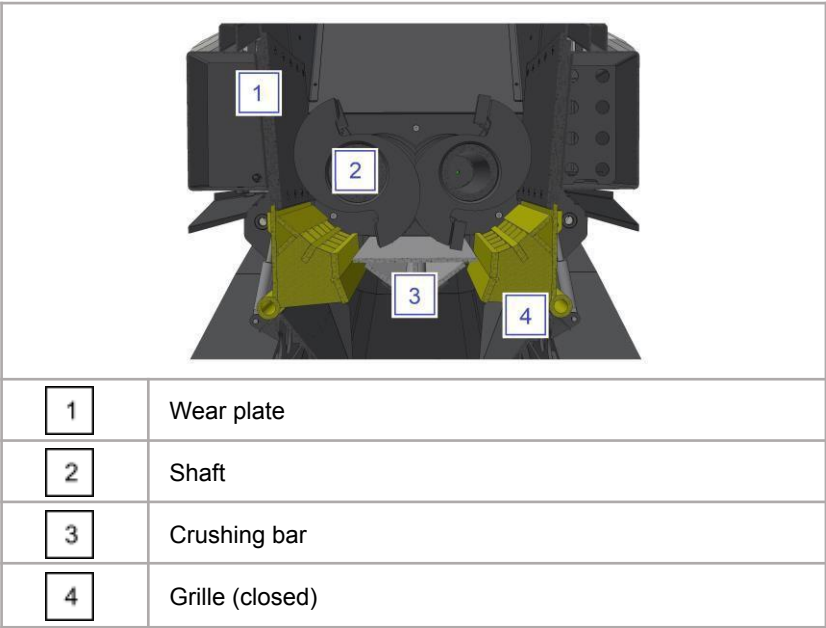
The use of the special shafts and the geometry of the tools allows large, solid pieces to be processed in a first stage.

In a second stage, the material is shredded to final size.

Shredder features:

- Revolutions and direction of each shaft are adjustable
- Two-stage shredding process
- Easy shaft replacement
- Configurable shafts
- Various grilles

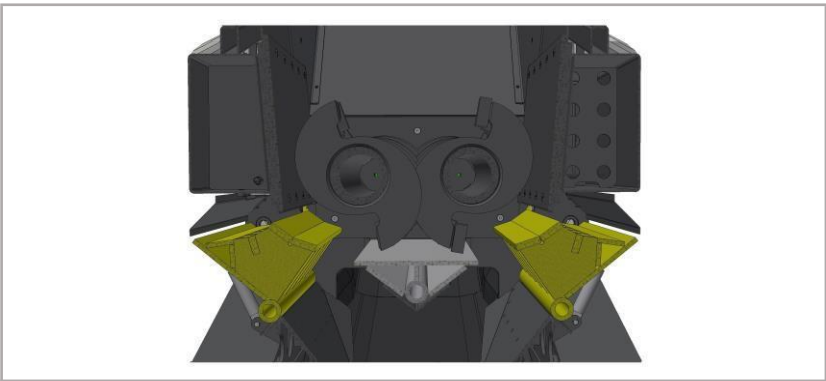
Crushing chamber



**Wear plates** To protect the plant, the crushing chamber is lined with wear plates.  
The wear plates are subject to wear. Worn plates are easy to replace.

**Crushing bar** The dragged and pre-crushed material is finely crushed between the shafts and the crushing bar.

**Grilles** The grilles or the span of the mounted grilles define the product size.  
The grilles can be opened hydraulically in order to clear the crushing chamber or remove blockages.



Grilles (open)

### Grille position

It is possible to work with open or closed grids depending on the individual applications.

## Warning

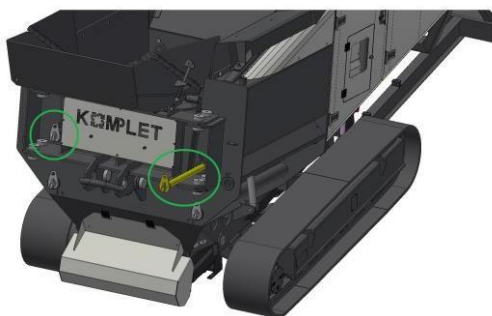


### Damage to machine components

If the shafts are not in the zero point, machine components can be damaged.

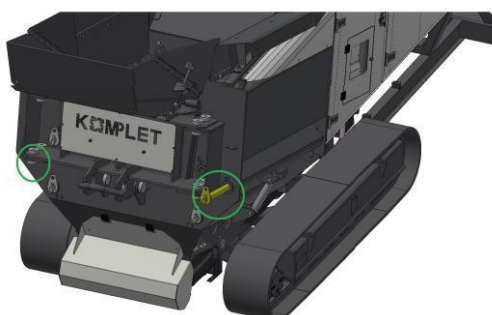
- ☐ The shafts must be turned to the zero point before opening or closing the grilles.
- ☐ Before opening or closing the grilles, the respective fixing pins must be removed.
- ☐ The grille fixing pins must be fitted before working with this plant.

### Closed grille locking pins



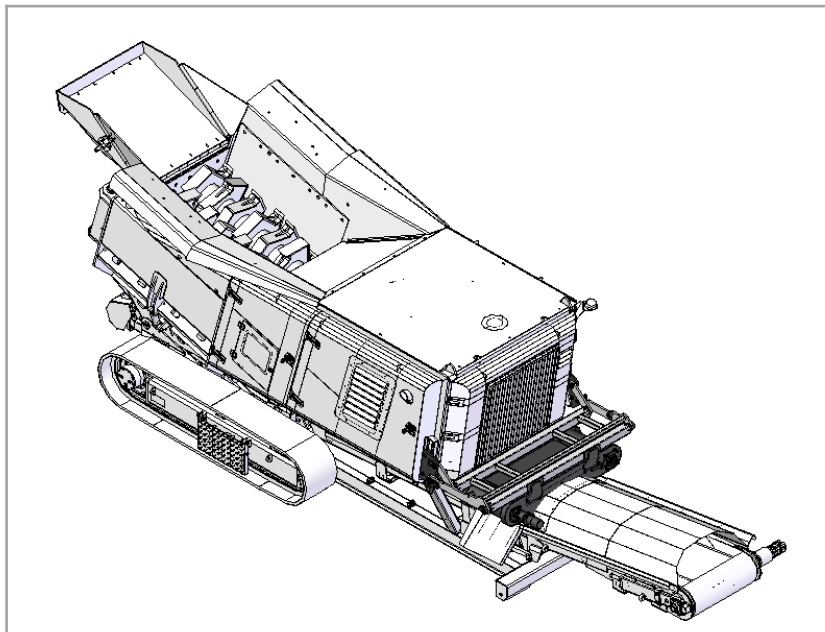
We recommend the use of closed grilles for crushing aggregate.

### Open grille locking pins



We recommend the use of open grilles for crushing wood.



**3.8.3****Magnetic sorter**

The magnetic sorter is located behind the drive unit directly above the discharge belt.

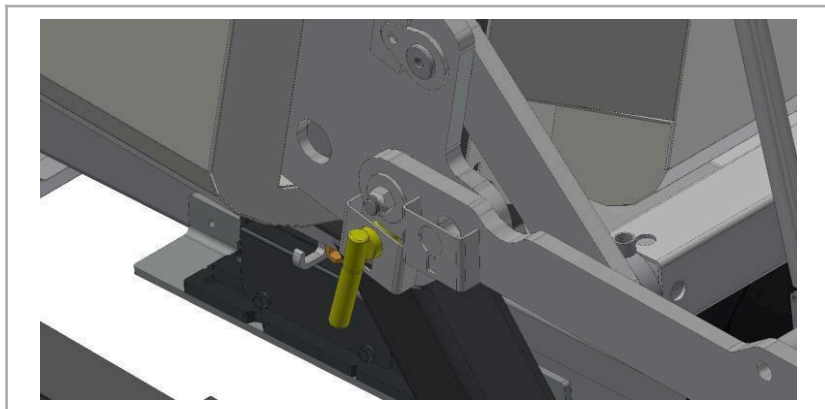
For operation, the magnetic sorter is opened hydraulically with the help of the corresponding control lever on the plant control - closed for transport.

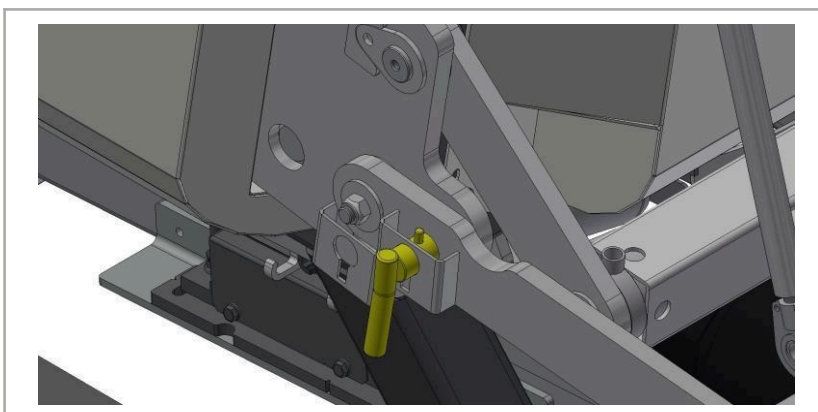
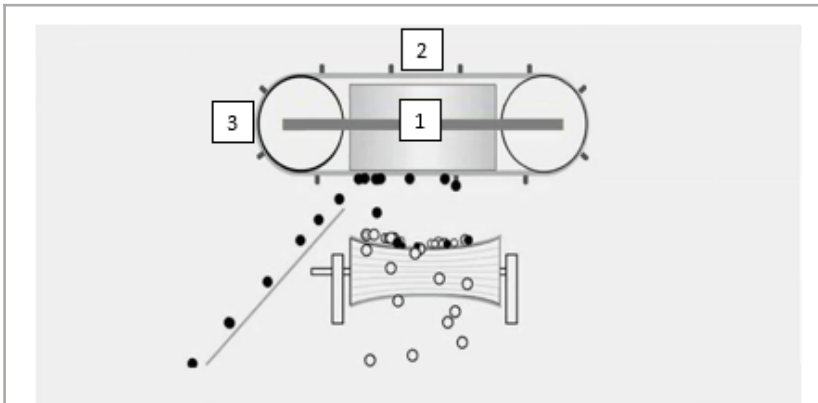
Before the magnetic sorter can be opened/closed, the locking pin must be inserted in the corresponding position.

It is driven by a hydraulic motor.

The distance of the magnetic sorter from the discharge conveyor can be adjusted hydraulically via the corresponding control lever on the plant control.

Before modifying the distance of the magnetic sorter, the locking pin must be inserted in the corresponding position.

**Open / close position locking pin**

**Lift / lower position locking pin**

**Structure and operation**


1	Permanent magnet
2	Belt
3	Belt drums

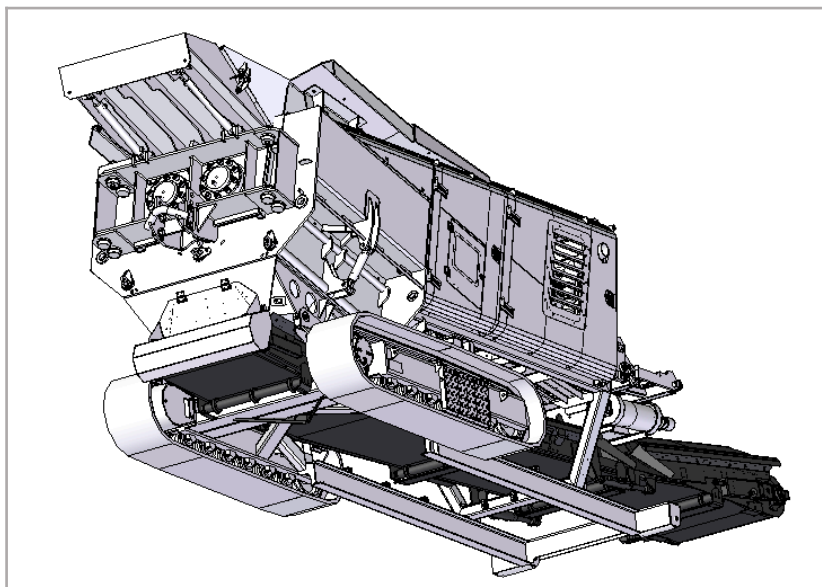
The magnet consists of a belt that rotates around a permanent magnet.

The permanent magnet separates the iron from the crushed material. The belt transports the iron pieces next to the machine.

**⚠ Caution**


The magnetic field generated by the machine may affect wearers of pacemakers, prostheses or other electrical devices.

Pacemaker and/or prosthesis wearers are prohibited from entering the magnetic belt area.

**3.8.4****Discharge belt**

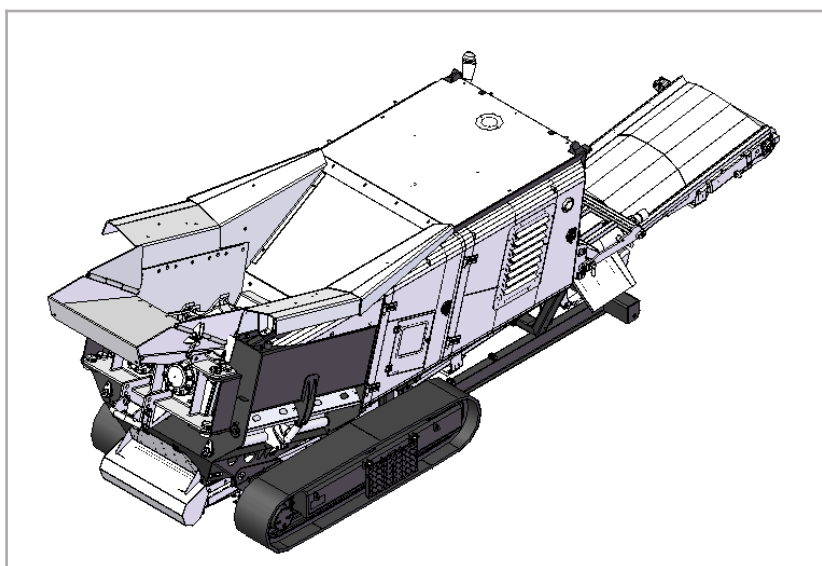
The discharge belt is located under the shafts and transports the crushed material to storage or for further use.

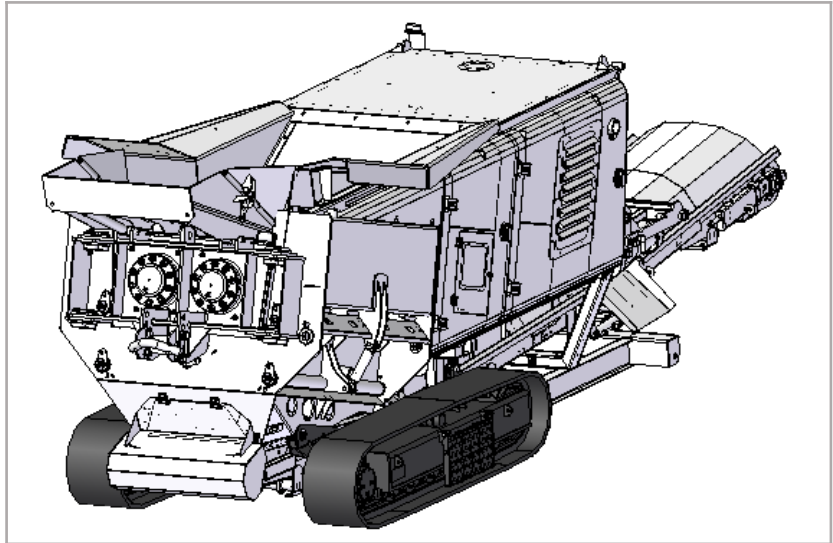
It is driven by a hydraulic motor.

The hydraulic motor revs can be set and thus the feed rate can be adjusted.

**3.8.5****Undercarriage crawler**

A robustly constructed frame supports the feeder, shredder, drive unit, magnetic sorter, discharge conveyor and tracks.

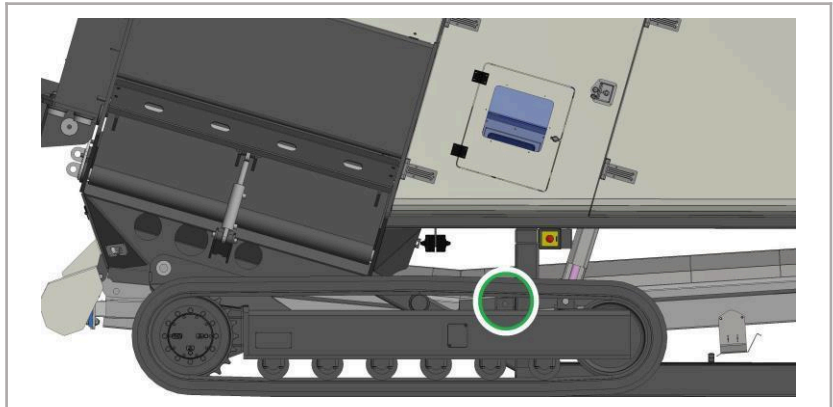


**Crawler tracks**

The undercarriage crawler is equipped with two tracks mounted on the base chassis.

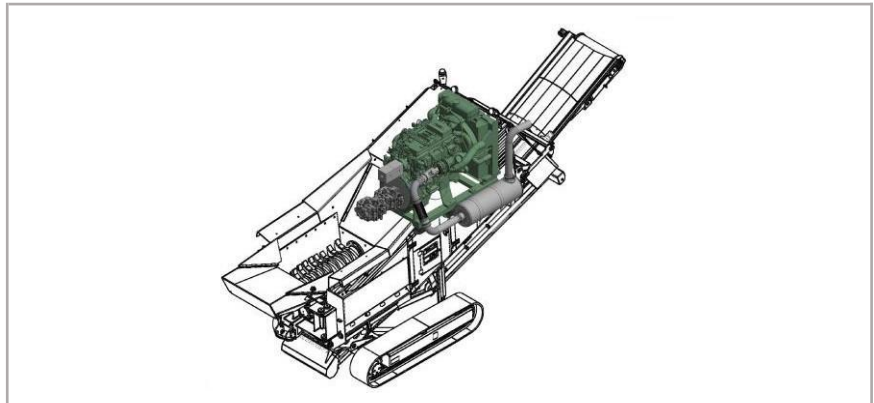
It is driven by a hydraulic motor for each track.

The crawler tracks are controlled by radio remote control.

**Locking pin**

The locking pin locks the frame in the transport position.

Insert the locking pin before lifting or transporting the machine with the lifting hook.

**3.8.6****Drive unit**

The drive unit of the SH-60 is mounted on the frame under the feeder.

The drive unit is fully covered, soundproofed and equipped with two lockable bonnets.

Large access bonnets on both sides facilitate checks and maintenance work.

The drive unit comprises a diesel engine, a hydraulic system and an electrical system.

**Components**


- Diesel engine
- Hydraulic system
- Electrical system

**Warning****Additional documents**

The information provided is for the operator.

- ☐ Further information or information for other groups of persons can be found in the manufacturer's reference documents.

## Diesel engine

Warning	
	<p><b>Additional documents</b></p> <p>The information provided is for the operator.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Further information or information for other groups of persons can be found in the manufacturer's reference documents.</li> </ul>

### Exhaust gas purification system

The machine's diesel engine is equipped with an exhaust gas purification system from the engine manufacturer in accordance with legal requirements.

The diesel engine exhaust system contains a particle filter that filters out soot from the engine's exhaust gases. This filter becomes clogged during operation.

To avoid damage to the engine and to maintain its full performance, the particle filter must be burnt from time to time.

This task is performed by regeneration.

In the system control, the menu screen shows when regeneration is required.

To do this, start regeneration in the menu functions.

### Particle filter regeneration




As soon as particle filter regeneration is required, it is shown in the control display.

### Particle filter regeneration OFF



If particle filter regeneration has to be postponed until a later time, e.g. due to the existing work situation, regeneration can be interrupted.

Warning	
	<p>If the warning that particle filter regeneration is necessary is not observed, performance is reduced and the engine becomes damaged.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Observe the warning.</li> <li><input type="checkbox"/> Perform regeneration.</li> <li><input type="checkbox"/> Comply with the manufacturer's instructions.</li> </ul>


### Refuelling pump

The system is equipped with an electric refuelling pump.

The refuelling pump is located behind the engine compartment on the left-hand side of the machine.

The filling pump is controlled via the machine control display.


**Hydraulic system**

Warning	
	<b>Additional documents</b> The information provided is for the operator. <input type="checkbox"/> Further information or information for other groups of persons can be found in the manufacturer's reference documents.

**Components**

- Hydraulic tank
- Hydraulic pump
- Hydraulic valves
- Hydraulic motors
- Hydraulic cylinders

**Electrical system**

Warning	
	<b>Additional documents</b> The information provided is for the operator. <input type="checkbox"/> Further information or information for other groups of persons can be found in the manufacturer's reference documents.

In the electrical system of the SH-60, a distinction is made between the on-board network and voltage circuits of external equipment.

**On-board network**

- Starter battery
- Battery disconnecter
- Starter motor
- Alternator
- Consumer units

**External device voltage circuits**

- Radio remote control

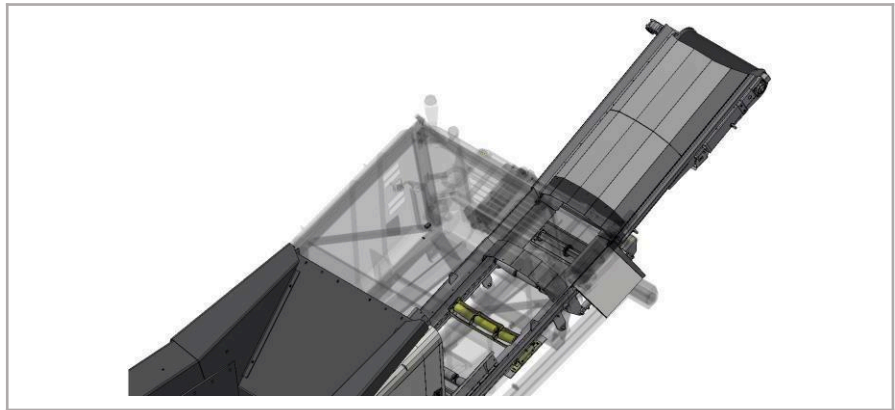
### 3.8.7

## Additional equipment and accessories

On request, the following accessories are available as additional equipment:

- Weighing system
- Dust protection system
- Low beam headlights

### Weighing system



## Warning



### Additional documents

The information provided is for the operator.

- ☐ Further information or information for other groups of persons can be found in the manufacturer's reference documents.

### Electronic control

The electronic control unit of the weighing system is located on the right-hand side of the machine above the control panel, behind the soundproof door.

### Mechanical control and relief roller

The mechanical control unit and the relief roller are mounted on the structure of the discharge belt.

### Dust protection system

Upon request, the dust protection system is available as additional equipment.

For this purpose, a water pipe with nozzles is mounted at the outlet of the shredder.

The fine mist from the nozzles keeps the dust down and prevents it from spreading into the surrounding area.

The system is powered by means of an external water connection.





## Lights

### Low beam headlights



Low beam headlights are available as an optional extra.

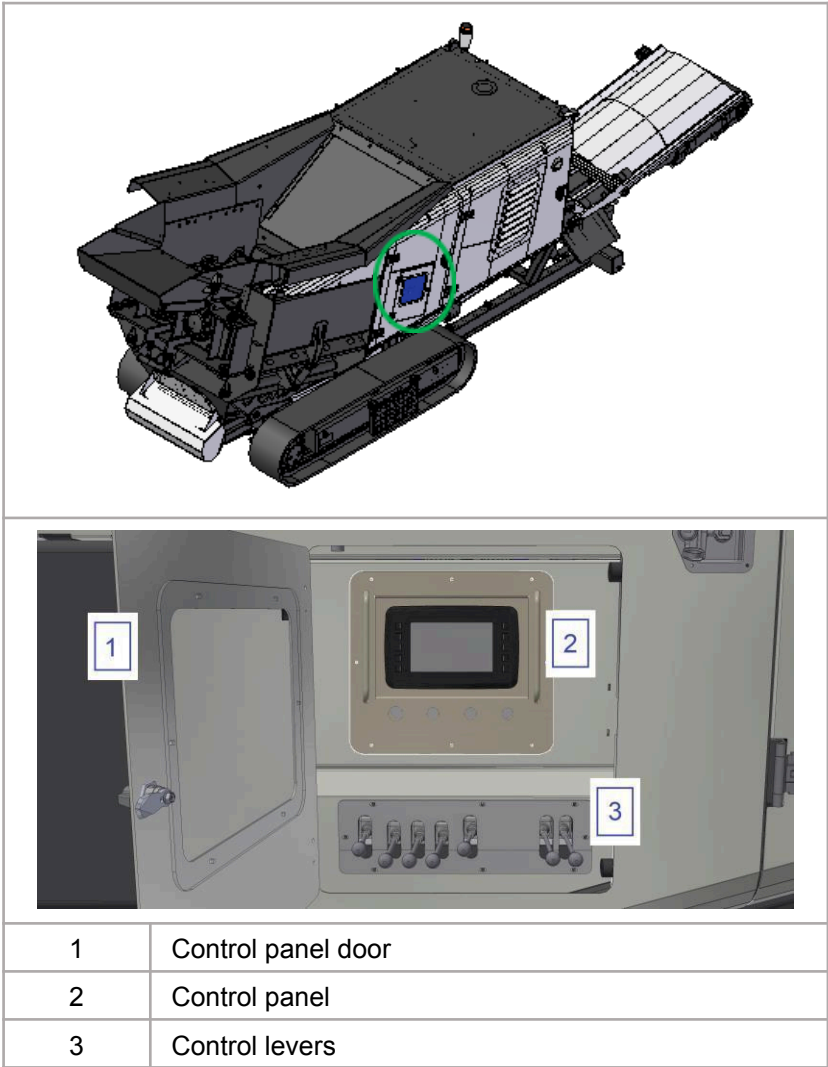
Switch on the lights when visibility is inadequate during crawler track movement.

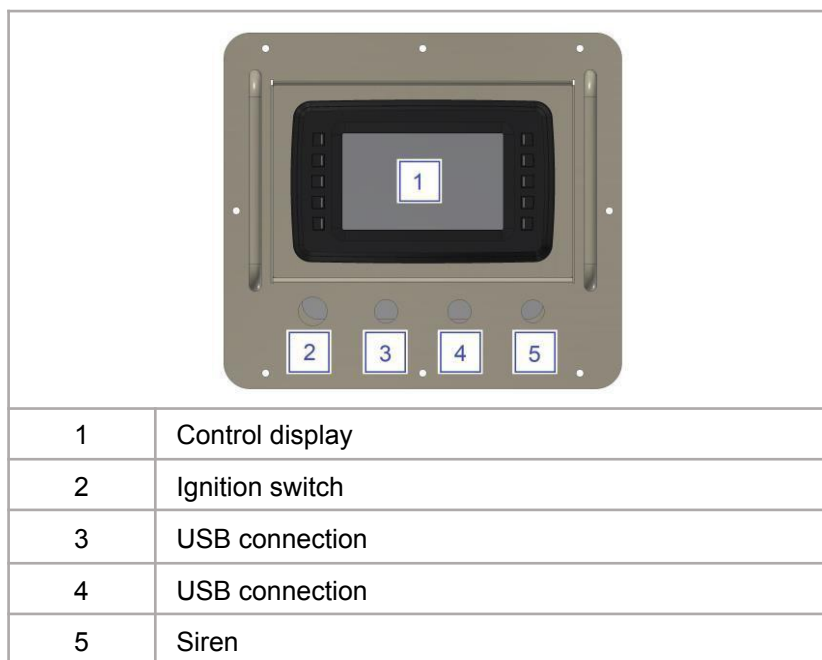
Switch the lights on and off using the control display.

The two headlights, which illuminate the path at the front (conveyor belt direction), are fixed above the engine compartment.

3.9 Controls

The machine controls are located on the right side of the machine.



**3.9.1**
**Control panel**

**Control display**


### Function keys

The function keys are used to navigate through the available menu screens and to select the desired option or control command.

**Press and release** Function key 1x is pressed for navigation and selection.

**Press and hold** For movement control (preparation functions, opening adjustment, etc.) the function key is pressed and held for as long as the movement is to be active.

When the function key is released, the movement stops.

**Press the function key multiple times** When changing revolutions, speeds, flow rates, etc., the function key is pressed multiple times.





Each time the function key is pressed, the revolutions, speeds, flow rates, etc., are increased or decreased by one step.

### Screens

The descriptions of the various screens on the touchscreen are given below.


#### Start Screen



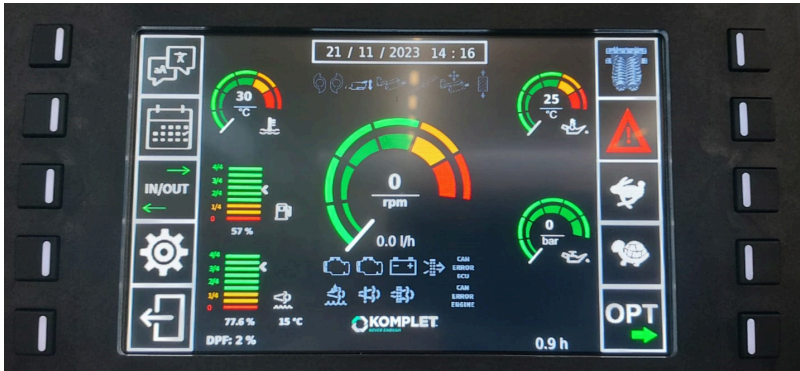
	Error Messages
	Main Menu
	Radio Remote Control Mode ON
	Radio Remote Control Mode OFF










Error Messages





















	Emergency stop activated
	CAN - ECU communication
	CAN - Engine communication
	Clogged Air Filter
	Return to the Start Screen











Main Menu indicators












	Date and Time
	Shafts in service
	Tipping Hopper in service
	Magnetic Sorter in service
	Discharge Belt in service
	Magnet UP / DOWN
	Crawler Tracks in service
	Cooling Water Temperature [°C]
	Motor Oil Temperature [°C]

	Engine revs [rpm]
	Diesel Tank Content [%]
	Urea Tank Content [%]
	Urea Temperature [°C]
	Motor Oil Pressure [bar]
	Engine Warnings
	Engine Error
	Alternator
	Clogged Air Filter
	CAN - ECU communication
	Urea Quantity
	Urea Quality
	Urea Function
	Urea Quantity
	Regeneration Necessary
	Automatic Regeneration Deactivated
	Hydraulic Oil Temperature [°C]
	CAN - Engine communication

**Main Menu Functions**


	Language Selection
	Date and Time
	Input and Output Signals, Radio Remote Control pages
	Parameters (password-protected)
	Return to the Start Screen
	Shredder Menu
	Error Messages
	Increase Motor RPM
	Decrease Motor RPM
	Browse (Advanced Functions)

**Main Menu  
Advanced Functions**

	Browse (advanced functions)
	Fast Feeding
	Slow Feeding
	Lights ON / OFF
	Dust Protection System ON / OFF
	Refuelling pump ON / OFF
	Radiator Fan Inversion
	FAP Regeneration (Particle Filter)- OFF
	FAP Regeneration (Particle Filter)- AUTOMATIC








Language Selection  
Menu







	Italian
	English
	Return to the Start Screen
	Spanish
	French
	German

**Date and Time  
Menu**






	Selection
	Forward
	Back
	Return to the Start Screen
	Save

**Input Signals  
Screen**


	ON
	OFF
	Return to the Start Screen
	Go to the Output Signals Screen



Output Signals  
Screen












	ON
	OFF
	Return to the Start Screen
	Go to the Radio Remote Control Screen

Radio Remote Control  
Screen












	Return to the Start Screen
	Go to the Input Signals Screen

**Shredder  
Menu**


	Automatic Operation
	Test Mode Operation
	Asynchronous Operation
	Return to the Start Screen
	Wood Processing
	Cement Processing
	Mixed Waste Processing
	Custom Processing
	Main Menu

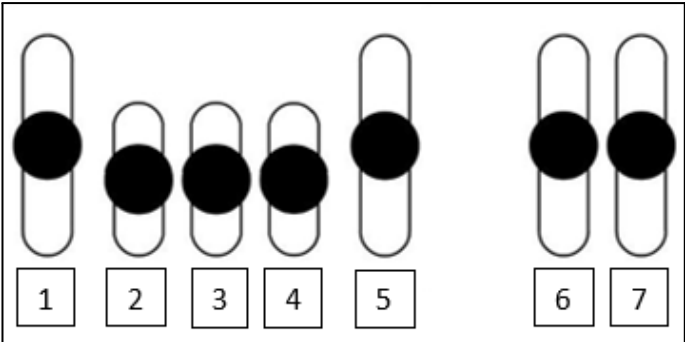
**Operation Menu  
Test Mode**


	Reverse Left Shaft
	Left Shaft ON/ OFF
	Increase Motor RPM
	Decrease Motor RPM
	Return to the Start Screen

	Reverse Right Shaft
	Right Shaft ON / OFF
	Discharge Belt ON / OFF
	Magnet ON / OFF

3.9.2

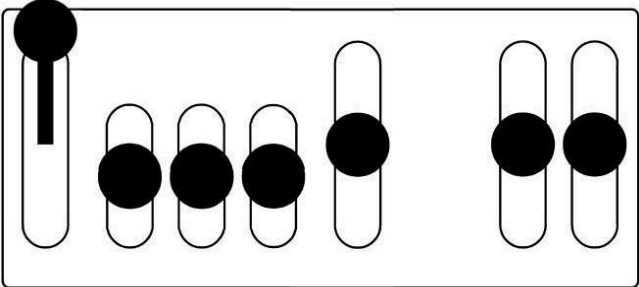
Control levers



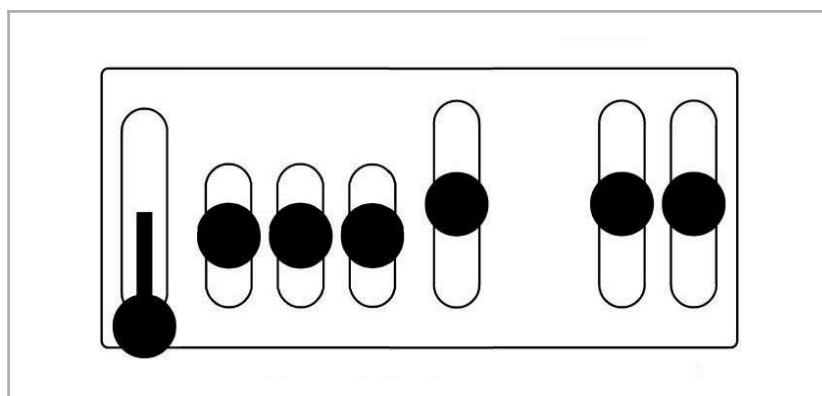
The diagram shows seven control levers, each consisting of a vertical oval frame with a black circular knob in the center. The levers are numbered 1 through 7 in small boxes below them. Levers 1, 2, 3, 4, and 5 are arranged in a row. Levers 6 and 7 are arranged in a row to the right of lever 5.

1	Tipping hopper
2	Grilles
3	Machine
4	Discharge belt
5	Magnet
6	Tracks on the left
7	Tracks on the right

Raising the tipping hopper



The diagram shows the control levers 1 through 7. Lever 1, the tipping hopper, is shown in a raised position with its black knob at the top of the oval frame. The other levers (2-7) are in their default positions with knobs in the center.

**Lowering the tipping hopper**

## Warning

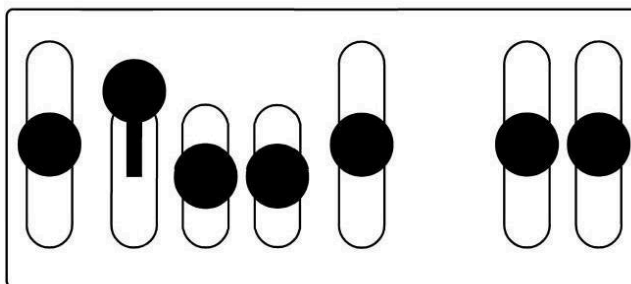


### Damage to machine components

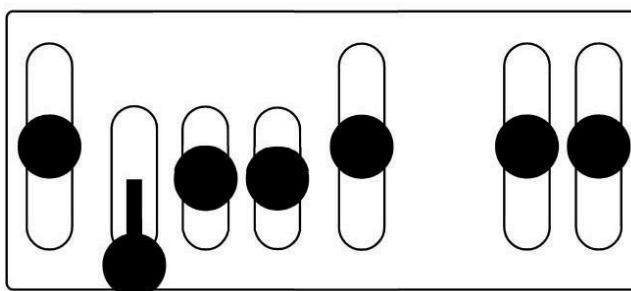
If the shafts are not in the zero point, machine components can be damaged.

- ☐ The shafts must be turned to the zero point before opening or closing the grilles.
- ☐ Before opening or closing the grilles, the respective fixing pins must be removed.
- ☐ The grille fixing pins must be fitted before working with this machine.
- ☐ Further information or information for other groups of persons can be found in the manufacturer's reference documents.

### Closing the grid

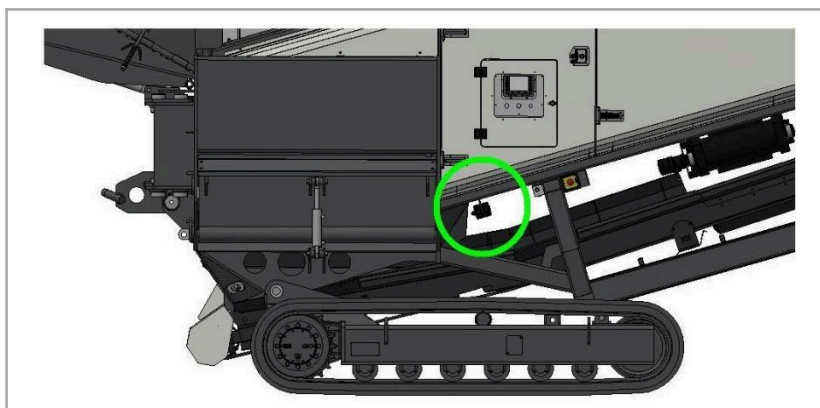


### Opening the grid



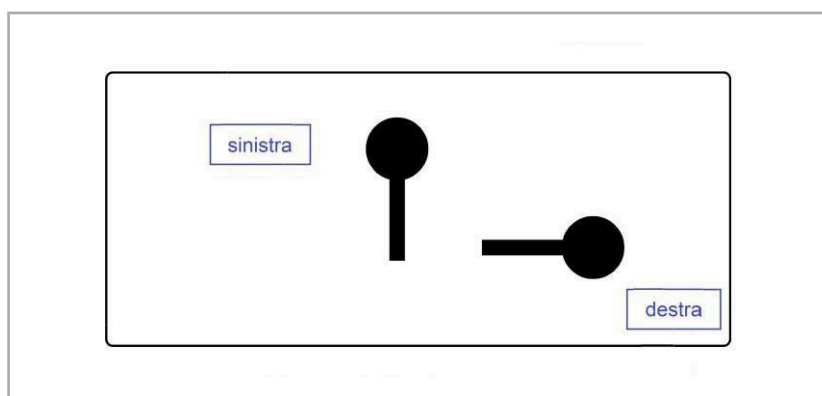
A product of 0 to 80 mm can be obtained with the grilles closed.

A product of 0 to 100 / 150 mm can be obtained with the grilles open.

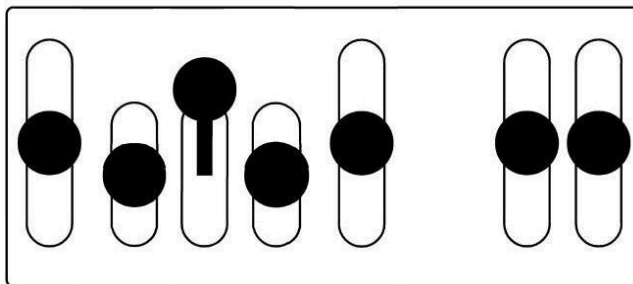
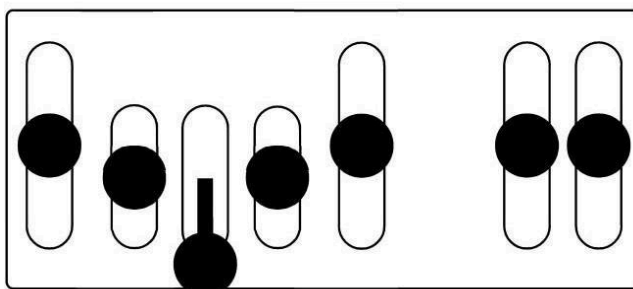
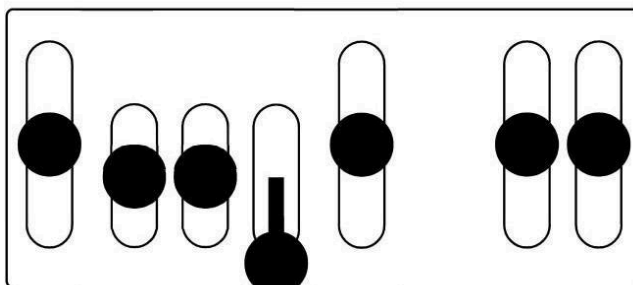
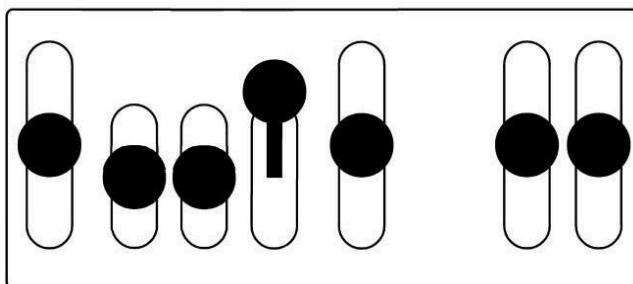
**Left/right grid switching lever**

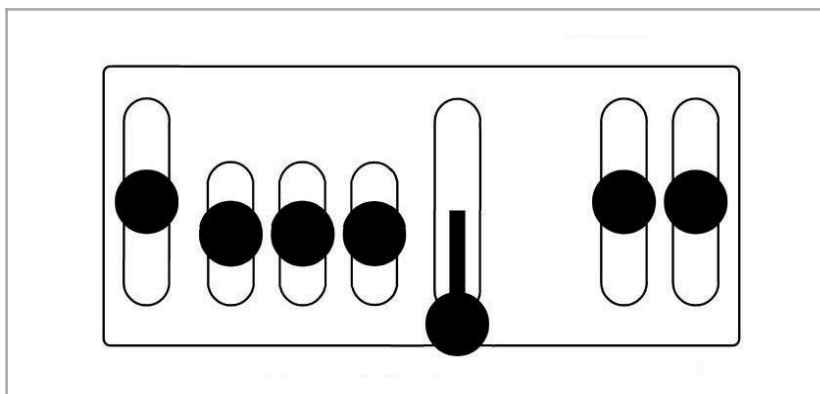
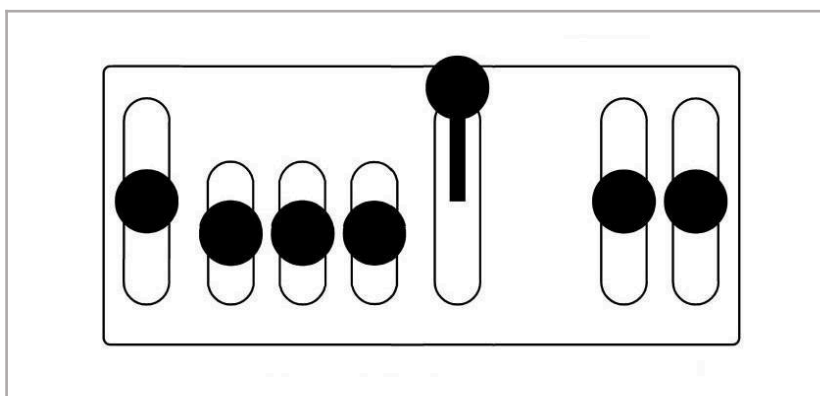
The grid switching lever is located on the right-hand side below the control panel.

The grid switching lever is used to select the opening or closing of the left or right grille.





**Lifting the machine****Lowering the machine****Opening the discharge belt****Closing the discharge belt**

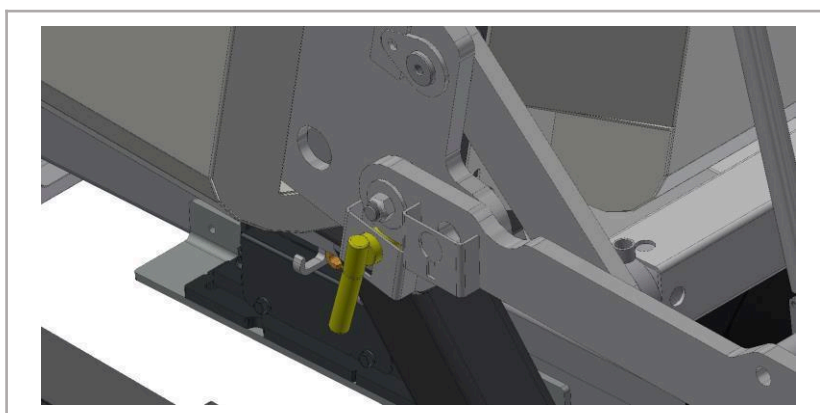
**Opening the magnetic sorter**

**Closing the magnetic sorter**


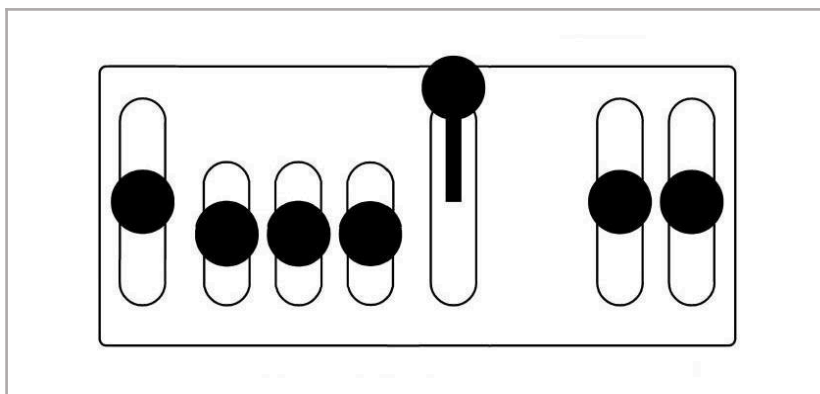
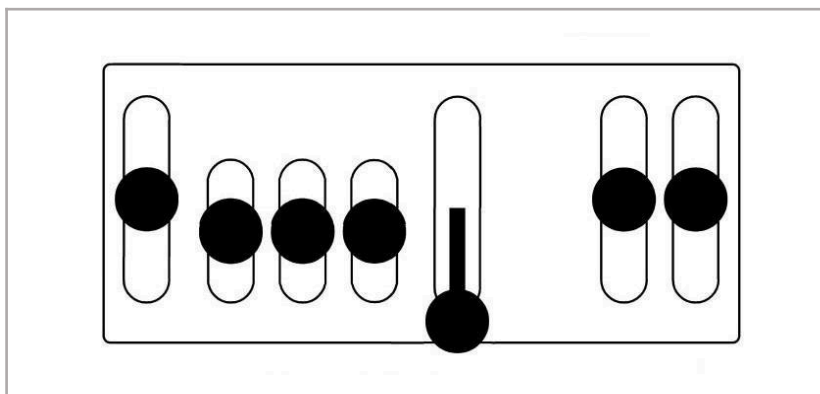
## Warning


**Damage to machine components**

If the locking pin for the magnetic sorter is in the wrong position, machine components can become damaged.

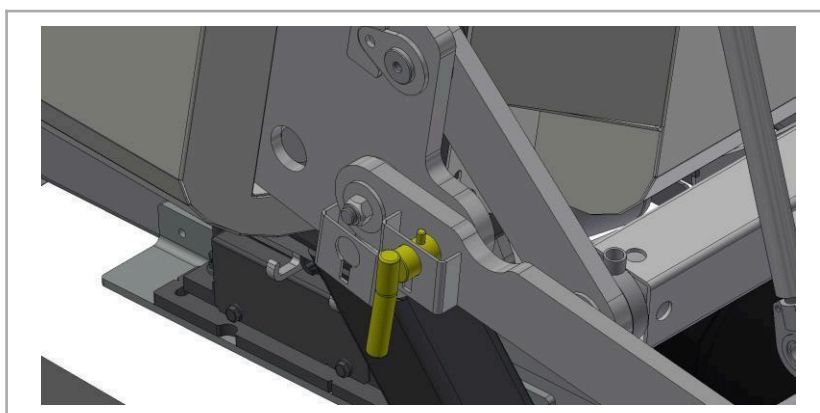
- ☐ Before operating the magnetic sorter control lever, ensure that the locking pin is screwed in the intended position.

**Open / close position locking pin**


**Lifting the magnetic sorter****Lowering the magnetic sorter****Warning****Damage to machine components**

If the locking pin for the magnetic sorter is in the wrong position, machine components can become damaged.

- ☐ Before operating the magnetic sorter control lever, ensure that the locking pin is screwed in the intended position.

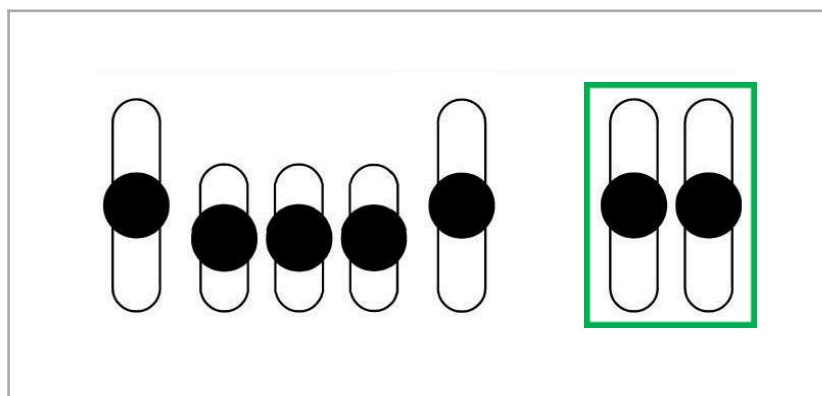
**Open / close position locking pin**

**Track control lever  
(in case of emergency)**

If the control display, wired remote control and radio remote control fail, the machine can be moved with the help of the emergency control levers.

These levers may only be operated by ARK personnel and only under emergency conditions.

These levers only allow forward/backward movement of the machine.


**⚠ Caution**

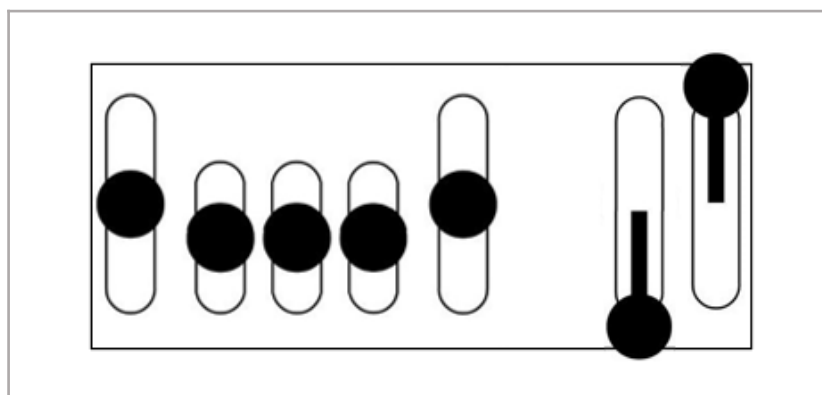

The emergency control represents a particular danger, as the operator is in the danger zone at the time of use.

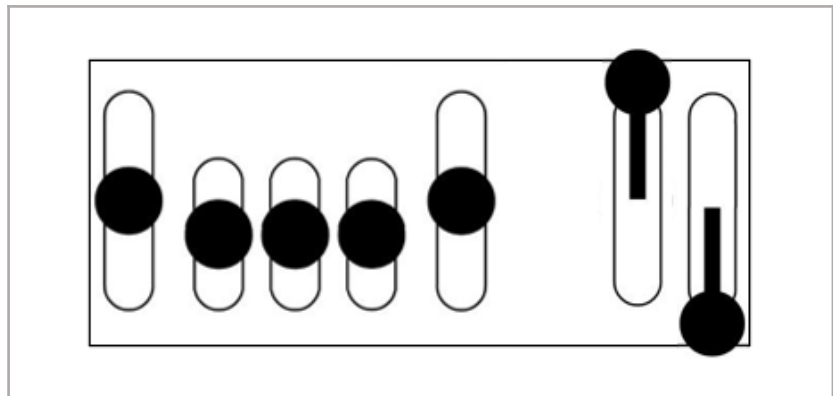
The emergency control levers may only be used in absolute emergency situations and only by ARK personnel.

**Track control lever  
(in case of emergency)**

To move (advance/retract) the machine's tracks, one lever must be pushed up and the other down at the same time.

- Machine advance: raise the right lever and lower the left lever.
- Machine retract: raise the left lever and lower the right lever.

**Machine advancing**


**Machine retracting****⚠ Hazard**

Operating the tracks or the discharge belt using the emergency control levers is prohibited.

These levers may only be used in absolute emergency situations and only by ARK personnel.

**⚠ Caution**

**Risk of being crushed or run over by the crawler tracks.**

**Risk of serious or fatal injury!**

- ☐ Only authorised or personnel trained by ARK (in case of emergency) may operate the crawler track levers, observing all instructions in the manual.
- ☐ Wear prescribed personal protective clothing.
- ☐ Make sure that nobody is in the danger zone.
- ☐ Make sure that there are no objects or obstacles in the danger zone.
- ☐ Make sure that nobody enters the danger zone.
- ☐ Make sure that you are at an adequate distance to allow safe movement of the crawler tracks.
- ☐ When operating the levers, you must keep a safe distance and avoid leaving any part of your body near the crawler tracks to ensure safe manoeuvring.

### 3.9.3

### Radio remote control

The radio remote control is used to operate the machine and consists of a transmitter unit and a receiver unit.

For the sake of clarity, the transmitter unit is called the radio remote control, as the operator normally only has to deal with the transmitter unit.

#### Functions

- Crawler track check
- Raising/lowering the tipping hopper
- Raising/lowering the magnetic sorter

The EMERGENCY STOP button on the radio remote control stops all machine functions except the diesel engine, which remains on.



## Warning

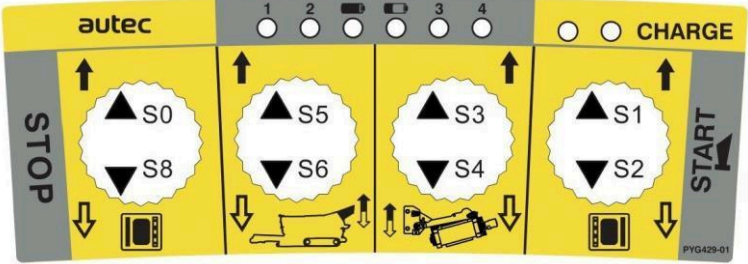










#### Additional documents




The information provided is for the operator.

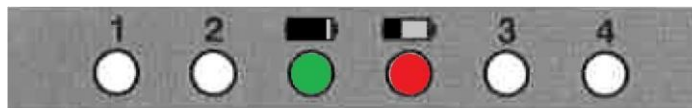
- ☐ Further information or information for other groups of persons can be found in the manufacturer's reference documents.

Control elements

	
	Tracks on the left
	Forward
	Back
	Tipping hopper UP/DOWN
	Magnetic sorter UP/DOWN
	Lift
	Lower
	Tracks on the right

Charge indicators

	
	Green warning light on: Battery charged
	Red warning light on: Battery charging

**Operation indicators**


Green warning light



Red warning light

**Green operation indicators**

**Red warning light off**

Transmitter switched off.

**Continuous warning light**

No radio connection.

**Sequence: 2xflashes, 1xpause**

Connection field exited for more than 20 seconds.

**Sequence: 3xflashes, 1xpause**

Transmitter not communicating with receiver.

**Fast flashing**

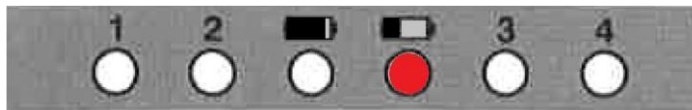
Transmitter and receiver not communicating. Commands can only be transmitted after pressing the START button.

**Slow flashing**

Commands can be transmitted.



### Red operation indicators



<b>Red warning light off</b>	Transmitted working correctly.
<b>Continuous warning light</b>	EMERGENCY STOP button pressed or defective.
<b>Warning light flashes 2 times during engine start-up</b>	At least one of the controls is activated or defective.
<b>Warning light flashes 3 times during engine start-up</b>	Low battery charge.
<b>Continuous warning light for 2 seconds during engine start-up</b>	Transmitted not working correctly.
<b>Slow flashing</b>	Battery charge less than 2 hours.
<b>Fast flashing</b>	Battery charge less than 10 minutes.
<b>Switching on the radio remote control</b>	<ol style="list-style-type: none"> <li><b>1. Comply with safety regulations.</b></li> <li><b>2. Switch on the radio remote control.</b> <ul style="list-style-type: none"> <li>Press the green "START" button until the "BATTERY LEVEL" lights on the radio remote control switch on.</li> <li>Slow flashing operation indicator. Commands can be transmitted.</li> <li>The siren is activated. The machine is ready for service.</li> </ul> </li> <li><b>3. Check emergency button operation.</b> <ul style="list-style-type: none"> <li>Press the emergency button.</li> <li>Operation indicator off. Transmitter switched off. The commands cannot be transmitted.</li> </ul> </li> </ol>
<b>Switching off the radio remote control</b>	<ol style="list-style-type: none"> <li><b>1. Switch off the radio remote control.</b> <ul style="list-style-type: none"> <li>Press the EMERGENCY STOP button on the radio remote control.</li> </ul> </li> </ol>

This will stop the processing on the machine while the motor will remain running at minimum.

**Safety shut-down**

The machine shuts down for safety reasons in the following cases:

- Loss of radio connection.
- Insufficient battery charge.
- Radio remote control failure.

**Checking the radio remote control safety stop**

- Exit connection range.
- Operation indicator flashes 2x, 1x pause, and flashes 2x again.
- Connection field exited for more than 20 seconds. The commands cannot be transmitted.

### ⚠ Caution


**Danger due to malfunction of the radio remote control unit**

Risk of serious or fatal injury!

In addition, there is a risk of environmental and machine damage as well as material damage in general.

- ☐ Only use the radio remote control after STOP button operation has been checked.
- ☐ Only use the radio remote control when the safety stop of the remote control itself has been checked.

**Battery operation**

The radio remote control has a battery for operation that can be charged using a charging cable supplied by the manufacturer.

The battery provides a service life of more than 16 hours at an ambient temperature of 20°C. Lower temperatures reduce the battery life.

If the service life falls to less than 2 hours, the radio remote control indicates this with the corresponding flashing LED.

**Charging the radio remote control**

To recharge the radio remote control, connect the recharging cable supplied.

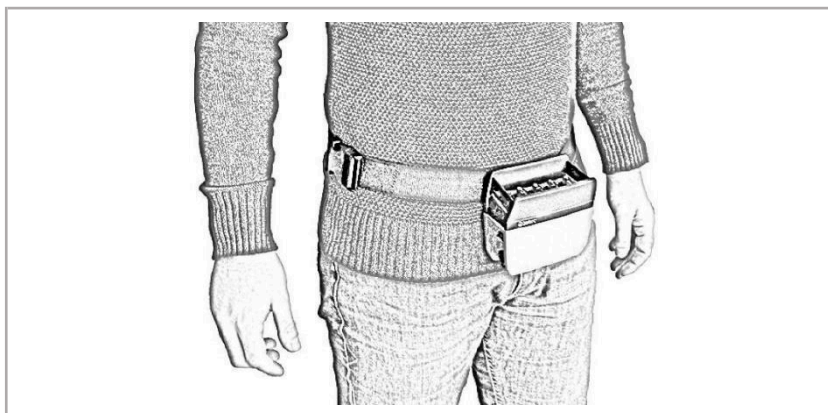
Do not use the radio remote control while it is charging.





**Using the radio remote control**

For safe use, the radio remote control must be fixed to the waist with a belt.

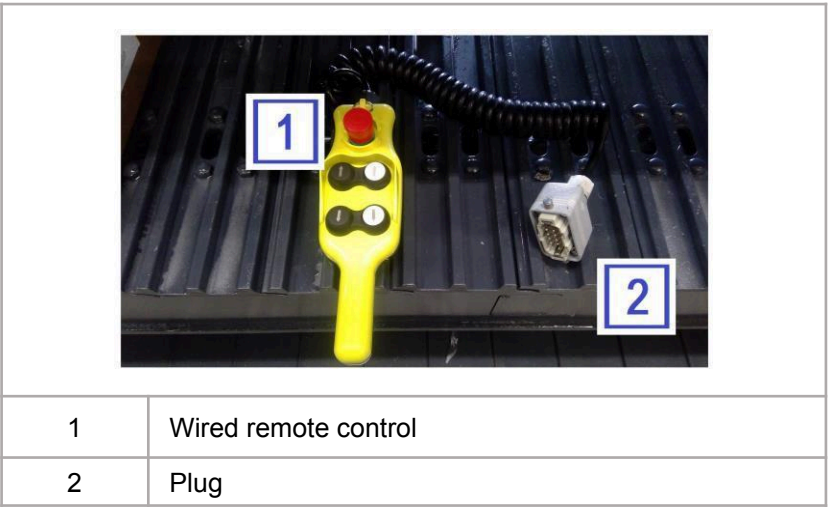
**People with pacemakers**


The radio remote control complies with current regulations and can be used without problem by persons with pacemakers.

However, a **minimum distance of 15 cm** must be maintained between the pacemaker and radio remote control.

3.9.4

Wired remote control



Warning	
	<p><b>Additional documents</b></p> <p>The information provided is for the operator.</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Further information or information for other groups of persons can be found in the manufacturer's reference documents.</li></ul>

**Connector**      The connector for the wired remote control charging cable is located on the rear right-hand side.



**Dummy plug**      Make sure the plug is inserted correctly into the connector during normal operation.

**If the dummy plug is missing, the system behaves as if the EMERGENCY STOP was pressed.**

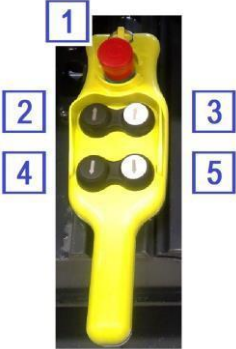
The machine cannot be started.  
An error message is emitted.

- Functions**
- The wired remote control is used to control the crawler tracks in an emergency (flat battery or radio remote control malfunction).

The wired remote control is fitted with a plug for connection to the machine.

The tracks can be moved using the buttons found on the wired remote control as described below.

Control elements



1	EMERGENCY STOP
2	Left track, forward
3	Right belt, forward
4	Left track, backward
5	Right belt, backward



To operate the tracks with the wired remote control, the radio remote control must be switched off on the control display.



- Wired remote control connection**
1. Comply with safety regulations.
  2. Remove the dummy plug from the wired remote control connector.



- Keep the dummy plug in a safe place.

**3. Connect the wired remote control.**

**4. Switch on the ignition.**

- Turn the ignition key to the first position.
- The control display switches on.
- The control starts.
- The start screen appears.



**5. Deactivate radio remote control mode.**

- Press the function key.









Radio remote control mode OFF



## 4. Transport

### 4.1 Safety during transport




<b>⚠ Hazard</b>	
	<p><b>Imminent danger</b> <b>Risk of serious or fatal injury!</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Always make sure you know where the nearest EMERGENCY STOP button is located.</li> <li><input type="checkbox"/> In the event of imminent danger, press the EMERGENCY STOP button.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to exceeding transport height.</b> <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Before choosing the transport vehicle, determine the total height of the transport (height of the transport vehicle + height of the machine).</li> <li><input type="checkbox"/> The reduced height of the machine can be achieved by lowering or dismantling machine components.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to improper transport of the machine.</b> <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Transport according to the relevant directives!</li> <li><input type="checkbox"/> Transport in accordance with the manual!</li> <li><input type="checkbox"/> The transporter is responsible for ensuring that the transport complies with the applicable regulations. Above all, the transporter must respect the maximum permissible load and its securing.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to improper loading and discharge of the machine.</b> <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only authorised or trained personnel can unload the machine, observing all the instructions in the manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>

<b>⚠ Caution</b>	
	<p><b>Danger of falling unsecured material, objects or machine parts.</b></p> <p><b>Unsecured material, objects or machine parts may fall during transportation and strike persons. This creates a risk of contusions, trauma and fractures.</b></p> <p>In addition, there is a risk of machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that there is no material in the hopper, crusher or conveyors.</li> <li><input type="checkbox"/> Thoroughly clean the machine of material residue, including the crawler tracks.</li> <li><input type="checkbox"/> Make sure that no material, objects or machine parts remain unsecured and that all parts are secured in accordance with transport regulations.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Risk when entering or standing in the danger zone.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as general material damage if objects or obstacles are left in the danger zone.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that there are no objects or obstacles in the danger zone.</li> <li><input type="checkbox"/> Clear the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> </ul>

**Transport and towing,  
recommissioning**

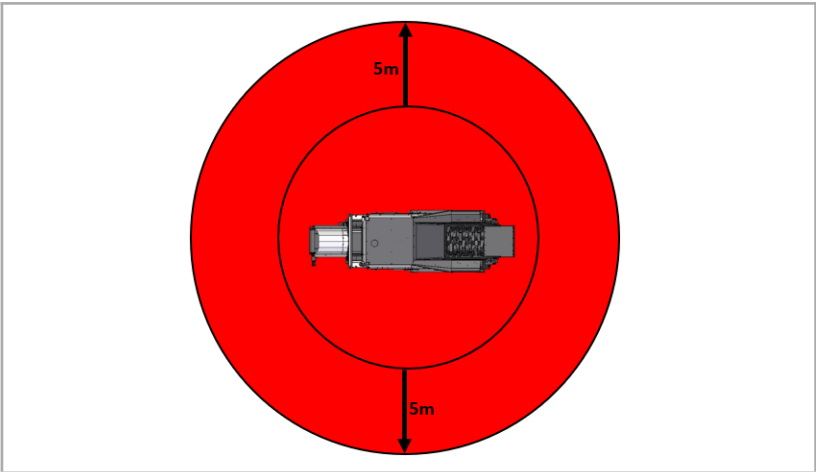
- Always follow the instructions when towing, loading and transporting.
- When towing the machine, observe the prescribed transport position, permissible speed and route.
- Only use transport and lifting equipment with sufficient load-bearing capacity.
- Follow the instructions in the manual when putting the machine back into operation.

**Personal protective clothing**      The personal protective clothing mentioned below must be worn when loading and unloading the machine.

		
Wear protective clothing	Wear safety footwear	Wear a safety helmet
		
Wear high visibility clothing	Wear safety gloves	

**Danger zone during transport**

- 5m around the radius of machine rotation
- On the machine
- Under the machine
- In the machine



**Group of authorised persons**      Only installers trained in accordance with the manufacturer's instructions are authorised to unload or load the machine.

**Persons to be instructed**

Persons who do not have the prescribed qualification must be instructed.

Persons must be instructed in particular in:

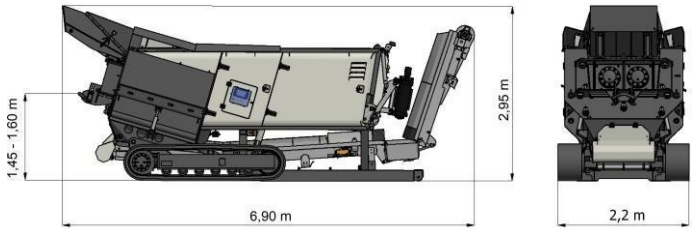
- Safety
- Personal protective clothing
- Danger zones
- EMERGENCY STOP devices
- Construction units
- Control panel
- Radio remote control
- Motor start-up
- Crawler track movement

A corresponding description can be found in paragraph "1.3.1 Qualified personnel".

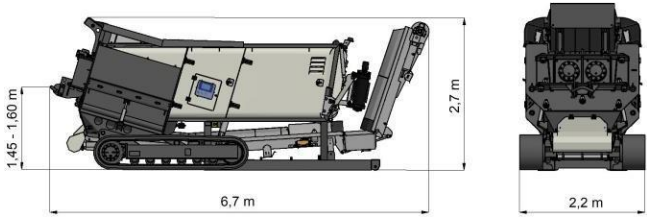
4.2 Transport data

**Machine weight** 14,000 kg  
The weight of the machine is distributed over both chassis tracks.

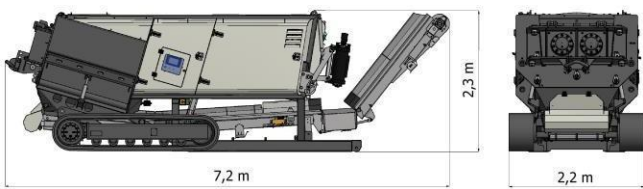
Dimensions in transport position

	
Length	6.90 m
Width	2.20 m
Height	2.95 m
Outer carriage	2.20 m
Carriage	1.40 m
Track width	0.40 m
Track bearing length	2.15 m

Dimensions in transport position (without tipping hopper)

	
Length	6.70 m
Width	2.20 m
Height	2.70 m
Outer carriage	2.20 m

Container transport dimensions

	
Length	7.20 m
Width	2.20 m
Height	2.30 m

---

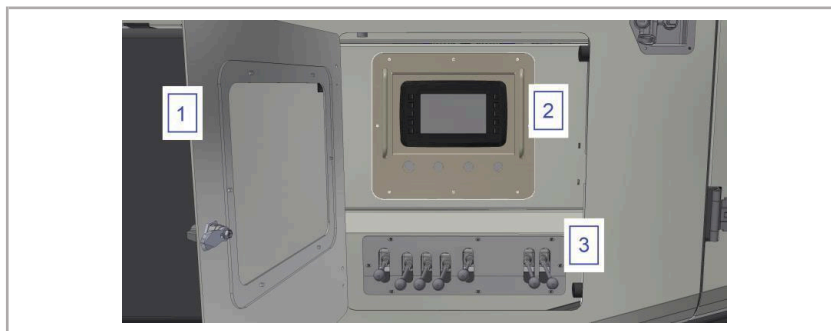
Outer carriage	2.20 m
----------------	--------

### 4.3 Preparing for transport

The machine is prepared for service or transport with the help of preparation functions.

The preparation functions include:

- Lower the machine in the transport position.
- Close the magnetic sorter.
- Close the discharge belt.

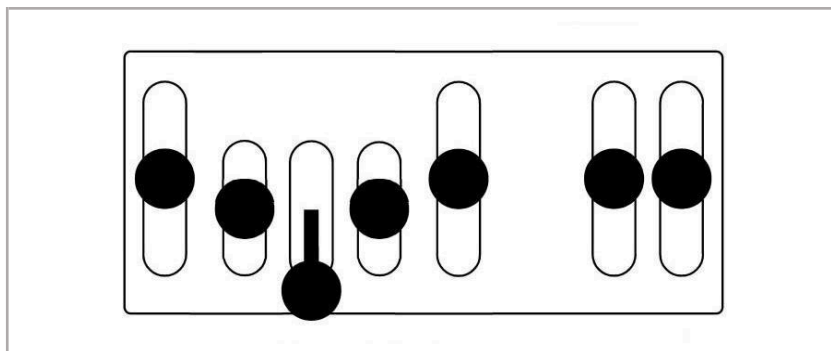


The preparation functions are controlled by means of the control levers (3) on the machine control.

#### Lowering the machine

Lower the machine before lifting it with the lifting hook or transporting it by lorry or container.

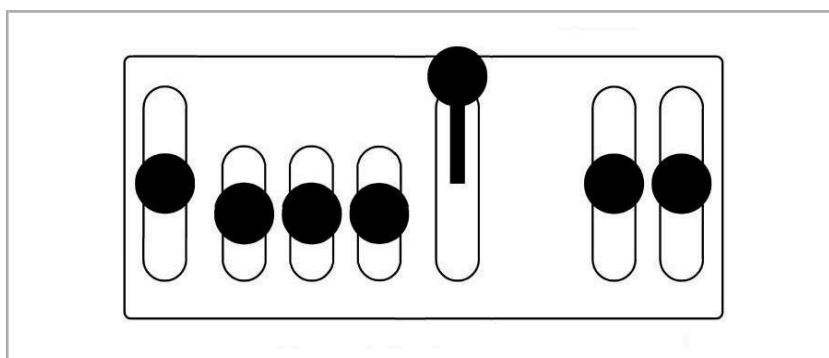
- Move the control lever downward.
- The machine is lowered.



#### Closing the magnetic sorter

Close the sorter before lifting or transporting the machine.

- Move the control lever upward.
- The magnetic sorter closes.

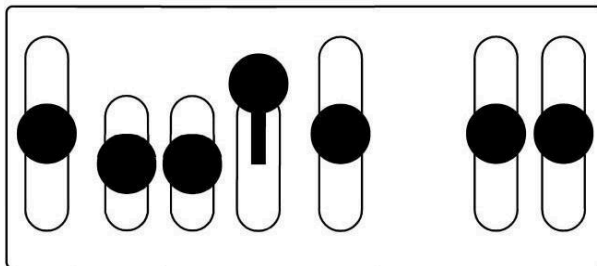




**Closing the discharge belt**

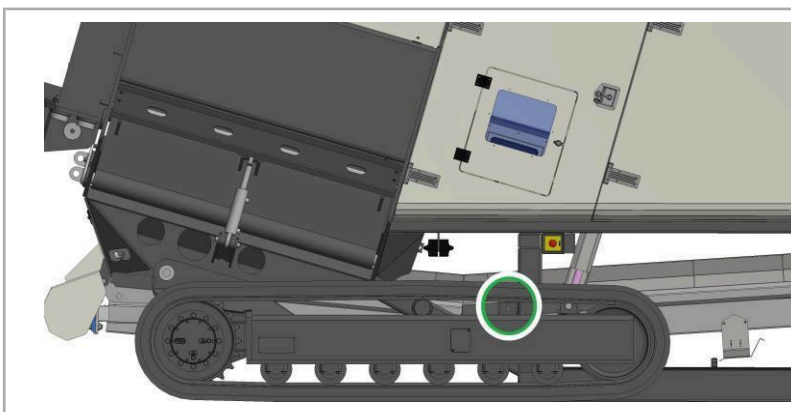
Close the discharge belt before lifting or transporting the machine.

- Move the control lever upward.
- The discharge belt closes.

**Locking pin**

The locking pin locks the frame in the transport position.

Insert the locking pin before lifting or transporting the machine with the lifting hook.

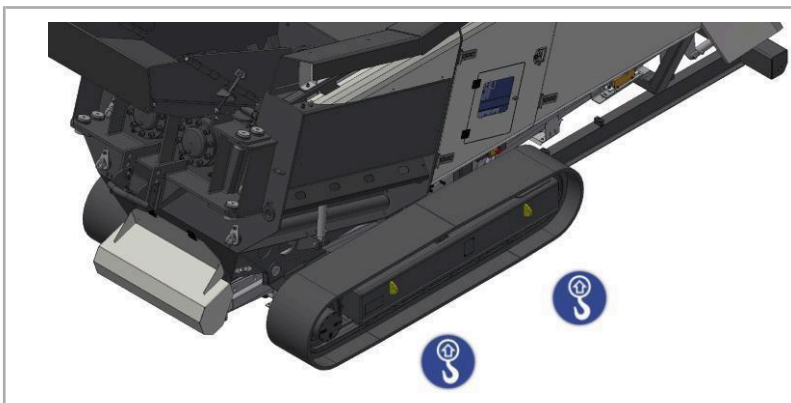
**Anchor and fixing points**

The machine must be securely fastened for transport at the anchor points with suitable and compliant equipment.

The machine has a total of 4 anchor points (2 on each side), which are marked.

The fixing points are marked.

The transporter is responsible for the correct securing of the load.





#### 4.4 Loading/unloading with lifting hook

##### **Caution**



Take great care when loading and unloading; make sure that no other person approaches the machine during these operations and use ropes of a suitable length and capacity when lifting the machine.

##### **Caution**



**Danger of loads or objects falling.**

**Risk of serious and fatal injury!**

If the machine is loaded with a crane, there is a risk of being hit by falling loads.

- ☐ When loading, do not enter or work in the danger zone indicated!

##### **Caution**



**Danger of swinging loads.**

**Risk of serious and fatal injury!**

If the machine is loaded with a crane, there is a risk of being hit by swinging loads.

- ☐ When loading, do not enter or work in the danger zone indicated!

##### **Caution**



Loading and unloading must always be carried out by qualified, authorised and specially trained personnel.

##### **Caution**



Place wooden chocks in front of and behind the lorry tyres to prevent any movement.

Secure the machine to the lorry body using ropes or straps. Use the same points for fixing as for lifting.

##### **Requirements**

- ☐ Machine in the transport position
- ☐ Engine off.

##### **Objective**

- ☐ Machine hooked by means of a lifting hook.
- ☐ Machine loaded on the transport vehicle.
- ☐ Machine secured on the transport vehicle.

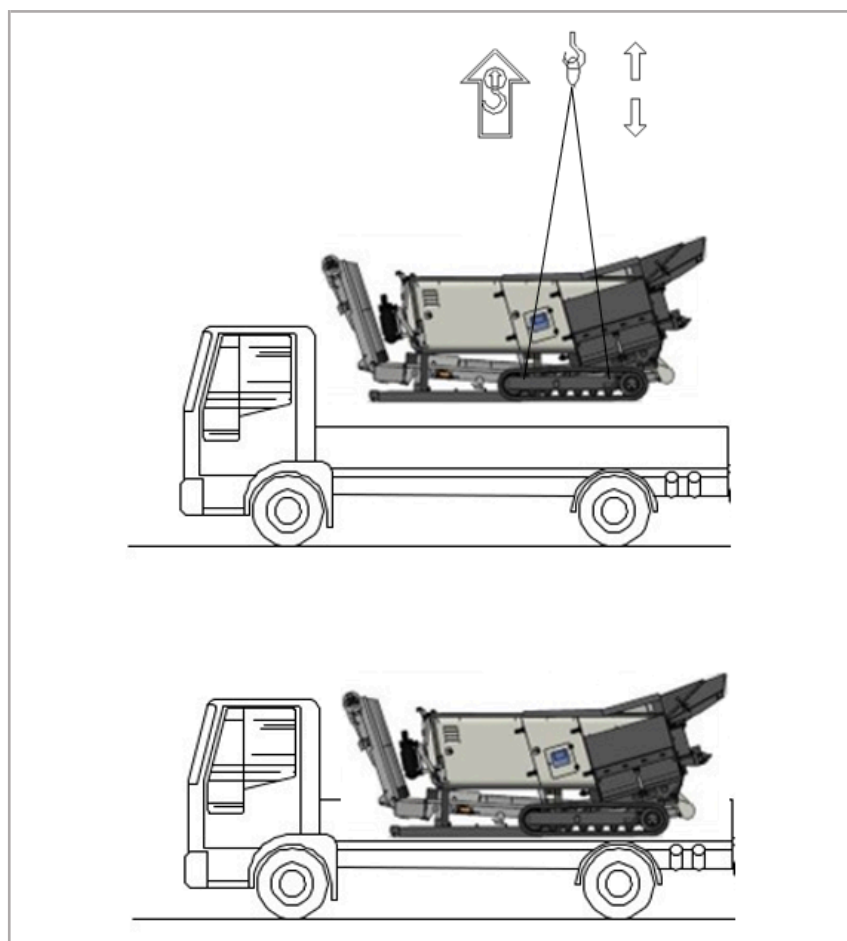
## Procedure

- |  |  |
|--|--|
|  | <ul style="list-style-type: none"><li><input type="checkbox"/> <b>Comply with safety regulations.</b></li><li><input type="checkbox"/> <b>Loading the machine using the lifting hook</b></li></ul> |
|--|--|






The lifting points on the undercarriage can be used when loading or unloading the machine in and from a lorry, ensuring that the lifting gear and ropes are of adequate strength for the weight to be lifted to allow for safe machine raising and lowering.

- Make sure that the truck has the parking brake on and fit chocks to the tyres to prevent any slippage when loading/unloading.
- Lower the machine in the transport position
- Make sure that the locking pin is correctly inserted before lifting or transporting the machine with the lifting hook.
  
- Hook the rope hooks correctly on the 4 lifting points marked on the undercarriage of the machine. Make sure that all hooks are fitted with safety locks.
- When loading or unloading the SH-60, the operator must always maintain a safe distance from the machine to avoid any involvement in the event of overturning.
- Always make sure that there are no other people near the machine during loading and unloading.
- Take care to secure the machine on the truck with ropes or straps so that it cannot move during transport. All anchor and fixing points are marked.
- Only use the marked anchor and fixing points.

Refer to the paragraphs "4.1 Safety during transport" and "4.3 Preparing for transport".



## 4.5 Loading/Unloading using crawler tracks

<b>⚠ Caution</b>	
	<p><b>Risk of being crushed or run over by the crawler tracks.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>There is a risk of dragging, crushing and overturning present when moving the machine with the crawler tracks.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> When operating the crawler tracks, do not enter or work in the danger zone indicated!</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of being run over by the machine.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Being on the machine when it is moving with the tracks is always prohibited!</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention to the paragraph “4.1 Safety during transport”</b> at the beginning of this chapter.</p>
<b>Warning</b>	
	<p><b>Machine raised.</b></p> <p><b>The machine must not be moved with the tracks</b> if in lowered position for transport and the frame touches the ground.</p> <p><b>Lift the machine using the hydraulic cylinders before moving it with the tracks so that the chassis does not touch the ground.</b></p>
<b>⚠ Caution</b>	
	<p><b>Danger of machine overturning.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only drive on inclined planes and sloping paths according to the maximum inclinations specified.</li> </ul>
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Machine in the transport position.</li> </ul>
<b>⚠ Objective</b>	

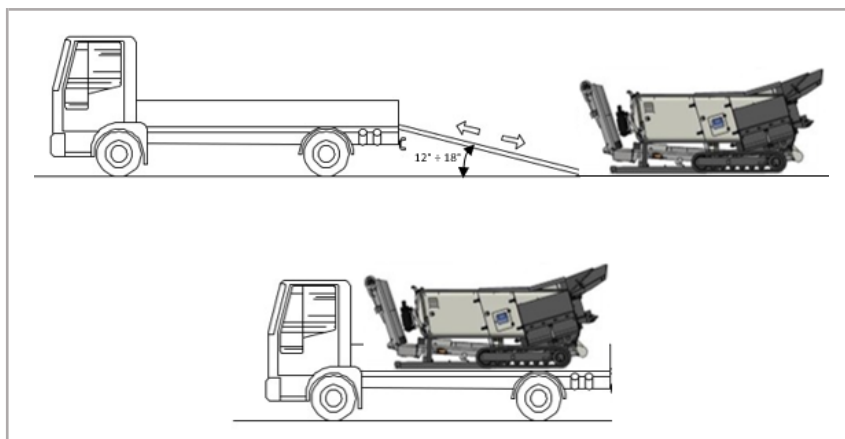
	<ul style="list-style-type: none"><li><input type="checkbox"/> <b>Machine loaded on the transport vehicle.</b></li><li><input type="checkbox"/> <b>Machine secured on the transport vehicle.</b></li></ul>
--	--

## Procedure

Proceed as follows when loading/unloading the machine using the crawler tracks:

- 1. Comply with safety regulations.**
- 2. Disconnect the transport stops.**
- 3. Start the engine.**
  - Turn the ignition key to the second position.
  - Keep the key turned until the engine starts.
  - See paragraph “5.7 Machine start-up procedure”.
- 4. Lift the machine to the working position.**
  - Move the control lever upward
  - See paragraph “4.3 Preparing for transport”.
- 5. Make sure that nobody is in the danger zone.**
  - Choose the correct position with a full view.
- 6. Switch on the radio remote control.**
  - See paragraph “3.9.3 Radio remote control”.
- 7. Slowly load/unload the machine.**
  - Activate the track levers present on the radio remote control.
  - See paragraph “3.9.3 Radio remote control” and “5.11 Placement in the working position”.
- 8. Switch off the radio remote control.**
  - Press the emergency push-button and disable the radio remote control from the display.
- 9. Switch off the engine.**
  - Turn the ignition key to the left
- 10. Secure the machine as prescribed.**
  - Anchor and secure the machine correctly on the lorry.  
Refer to the paragraph “4.3 Preparing for transport”.





Chutes can be used to load or unload the machine into and from a lorry, and these can be anchored to the body of the lorry.

The length of the chute must be such that it forms an angle of 12°-15° with the ground and the ramp must be at least 4 times longer than the height of the truck bed. The chute must be at least 1.2 times wider than the tracks (480 mm).

- Please pay the utmost attention when choosing and placing chutes on the lorry body; ensure that they are properly secured and that there is no possibility of slipping during loading and unloading.
- Make sure that the truck has the parking brake on and fit chocks to the tyres to prevent any slippage when loading/unloading.
- In winter, first warm up the engine and the hydraulic system before loading/unloading via tracks.
- When loading or unloading the SH-60, the operator must always maintain a safe distance from the machine to avoid any involvement in the event of overturning.
- Always make sure that there are no other people near the machine during loading and unloading.
- Take care to secure the machine on the truck with ropes or straps so that it cannot move during transport.

## 4.6 Container transport

### ⚠ Caution



**Risk of being crushed or run over by the crawler tracks.**

**Risk of serious or fatal injury!**

There is a risk of dragging, crushing and overturning present when moving the machine with the crawler tracks.

- ☐ When operating the crawler tracks, do not enter or work in the danger zone indicated!

### ⚠ Caution



**Danger of being run over by the machine.**

**Risk of serious or fatal injury!**

- ☐ Being on the machine when it is moving with the tracks is always prohibited!

### Warning



Read and understand **all instructions** before working with this machine.

Pay **particular attention to the paragraph “4.1 Safety during transport”** at the beginning of this chapter.

### Warning

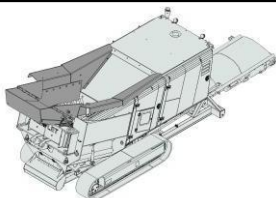


**Machine raised.**

**The machine must not be moved with the tracks** if in lowered position for transport and the frame touches the ground.

**Lift the machine using the hydraulic cylinders before moving it with the tracks so that the chassis does not touch the ground.**

### Disassembly for container transport



- ☐ Parts of the hopper must be removed for transport in containers.
- ☐ The flashing light must be lowered for transport in containers.

### ⚠ Caution

**Danger of machine overturning.**

Risk of serious or fatal injury!

In addition, there is a risk of environmental and machine damage as well as material damage in general.

- ☐ Only drive on inclined planes and sloping paths according to the maximum inclinations specified.

**⚠ Requirements**

- |  |  |
|--|--|
|  | <ul style="list-style-type: none"><li><input type="checkbox"/> Hopper removed.</li><li><input type="checkbox"/> Flashing light lowered.</li><li><input type="checkbox"/> Discharge conveyor opened.</li><li><input type="checkbox"/> Engine off.</li></ul> |
|--|--|

**⚠ Objective**





- |  |   |
|--|---|
|  | <ul style="list-style-type: none"><li><input type="checkbox"/> Machine loaded in the container.</li><li><input type="checkbox"/> Machine secure in the container for transport.</li></ul> |
|--|---|





**Procedure**

1. Comply with safety regulations.
2. Dismantle the tipping hopper.
3. Load the machine using crawler tracks.
  - Activate the track levers present on the radio remote control.
  - See paragraph “3.9.3 Radio remote control” and “5.11 Placement in the working position”.
4. Secure the machine as prescribed.
  - Only use the marked anchor and fixing points.  
Refer to the paragraph “4.3 Preparing for transport”.

## 5. Preparation for use

### 5.1 Safety during installation and use

<b>⚠ Caution</b>	
	<p><b>Danger due to improper installation and use of the machine.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only authorised or trained personnel can prepare the machine, observing all the instructions in this manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Risk when entering or standing in the danger zone.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as general material damage if objects or obstacles are left in the danger zone.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that there are no objects or obstacles in the danger zone.</li> <li><input type="checkbox"/> Clear the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to system being unattended.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Never leave the machine unattended while in service.</li> <li><input type="checkbox"/> Switch off the motorised machine components.</li> <li><input type="checkbox"/> Isolate the on-board power supply via the battery disconnecter.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Risk of being crushed or run over by the crawler tracks.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>There is a risk of dragging, crushing and overturning present when moving the machine with the crawler tracks.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> When operating the crawler tracks, do not enter or work in the danger zone indicated!</li> </ul>

<b>⚠ Caution</b>	
	<p><b>Danger of machine overturning.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general when the machine overturns.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The machine must be installed and moved on solid ground with sufficient grip and bearing capacity.</li> <li><input type="checkbox"/> Do not place the machine at a higher level than the ground, e.g. on boulders etc.</li> <li><input type="checkbox"/> Maintain a sufficient safety distance from quarries and slopes to prevent the machine from overturning or slipping.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of moving machine components.</b></p> <p><b>There is a risk of contusions, crushing, amputation, trauma and fractures when opening or closing the extraction belts.</b></p> <p>In addition, there is a risk of machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> <li><input type="checkbox"/> Only move machine components using the appropriate controls/levers.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of falling.</b></p> <p><b>Risk of contusions, trauma and fractures in the event of a fall from or onto the machine.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only climb onto the machine when the engine is switched off and the restart device is locked.</li> <li><input type="checkbox"/> Only use stable and approved means of access (ladders, platforms, etc.).</li> </ul>
<b>Warning</b>	
	<p>Before preparing the machine, remove all objects that are on the machine or have been stored for transport.</p>

**Group of  
authorised persons**

Only installers/operators trained in accordance with the manufacturer's instructions are authorised to install and operate the machine.

Assembly work and installation of the SH-60 should be carried out by customer service.

The manufacturer and supplier will not be liable for damage caused by improper assembly or installation.

**Persons to be instructed**

Persons who do not have the prescribed qualification must be instructed.

Persons must be instructed in particular in:

- Safety
- Personal protective clothing
- Danger zones
- Machine description
- EMERGENCY STOP devices
- Protective devices
- Alarm devices
- Controls
- Fault indicators
- Checks before starting
- Machine start-up
- Preparing for work
- Material loading
- Shut-down
- Emergency stop
- Restart after an emergency stop

A corresponding description can be found in paragraph “1.3.1 Qualified personnel”.

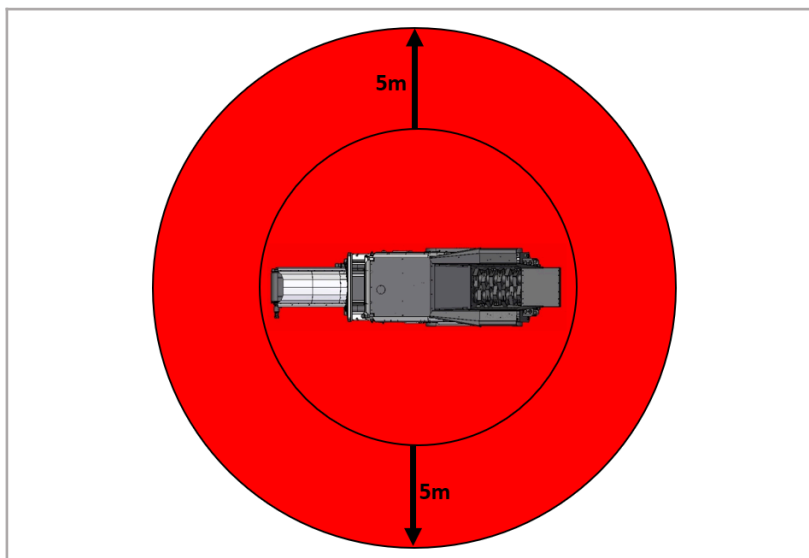
**Personal protective clothing**

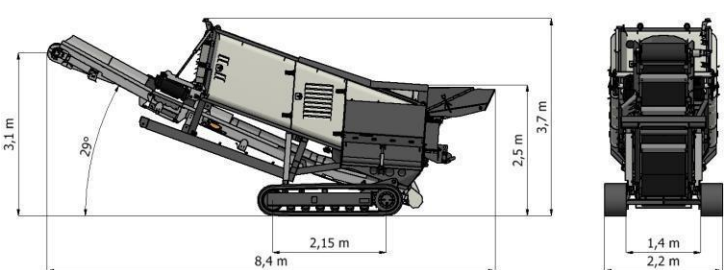
The personal protective clothing mentioned below must be worn when loading and unloading the machine.

		
<p>Wear protective clothing</p>	<p>Wear safety footwear</p>	<p>Wear a safety helmet</p>
		
<p>Wear high visibility clothing</p>	<p>Wear safety gloves</p>	

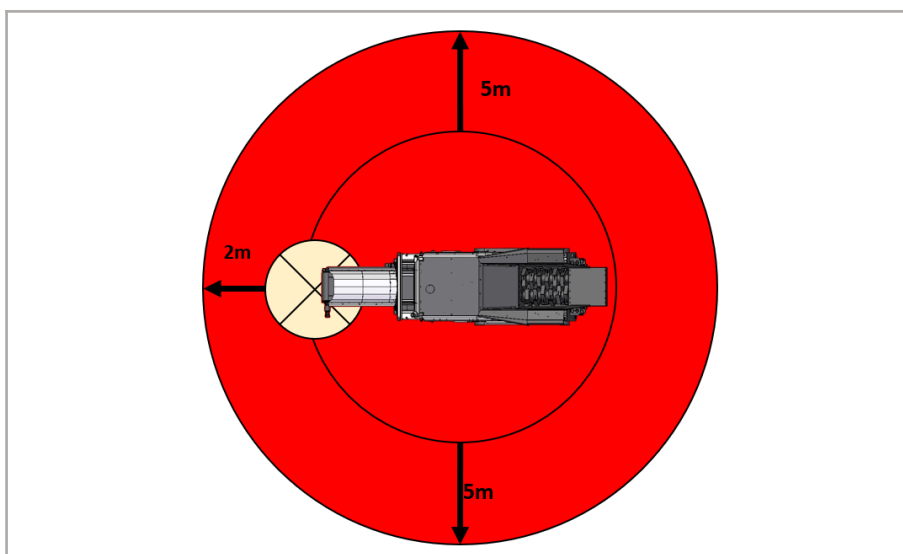
**Danger zone during preparation**

- 5m around the radius of machine rotation
- On the machine
- Under the machine
- In the machine


**5.2 Overall dimensions in working condition**
**Dimensions in working position**

	
Length	2.15 m
Width	2.2 m
Height	3.7 m



**Danger zone during use**

- 5m around the machine
- Around material discharge: 2 m
- On the machine
- Under the machine
- In the machine
- The loading area of the machine around the supply unit must be taken into account and marked!

**Warning**

More space is required for operation.

Space is needed to load the machine safely (e.g. with an excavator) as well as to unload it (space for storing material and special handling devices, e.g. with mechanical shovels).

### 5.3 Characteristics of the installation site

**Load-bearing capacity  
installation site**

The load-bearing capacity of the installation site must be statically checked before unloading the SH-60.

The ground at the chosen installation site must have sufficient load-bearing capacity and permissible ground pressure.

The following values must be taken into account:

**Machine weight**

14,000 kg

**Flatness**

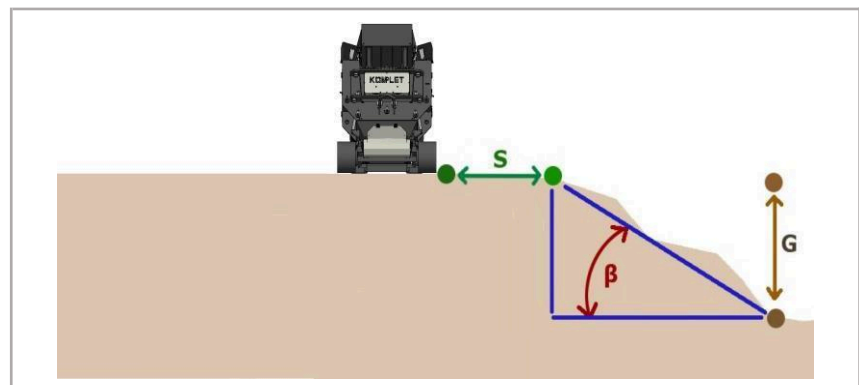
The chosen installation site must be flat. It should be borne in mind that a slightly inclined position of the machine has a negative effect on wear and performance.

If necessary, level the ground with a mechanical shovel.

**Stability**

The SH-60 must be installed in such a way that it can be loaded with weights according to its intended use. It must never be overloaded. The machine must be sufficiently stable during all phases of operation.

**Safety distance and slope  
angle**



On construction sites, it is very important to maintain the necessary safety distances to quarries, cellars and slopes and the like. These are laid down in DIN 4124. However, these are the approximate rules:

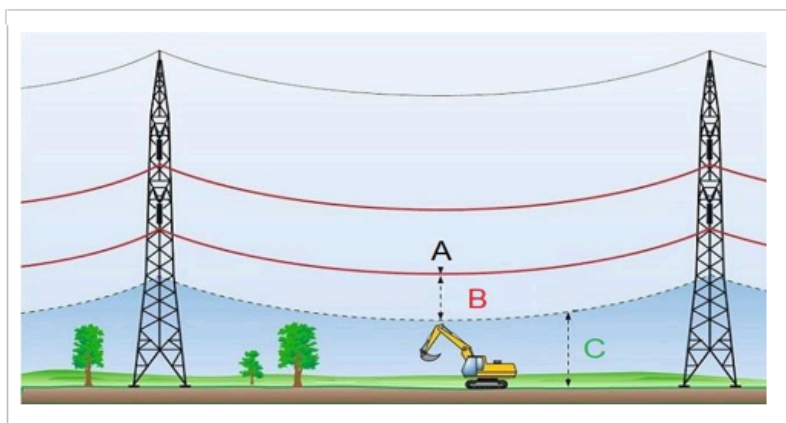
- 1 m safety distance up to 12.0 t total weight
- 2 m safety distance from 12.0 t to 40 t

On cultivated land the safety distance (S) must be the length of the quarry depth (G), on backfilled land the safety distance (S) must be twice the length of the quarry depth (G).

These values do not apply in all situations, as it depends on the nature of the ground on site and the angle of slope if the machine is likely to sink.

The following slope angles may not be exceeded without a stability test.

- 80° in the case of rock
- 60° in the case of hard or semi-hard ground
- 45° in the case of soft or non-hard ground

**Safety distance from power lines**

<b>A</b>	Punto più basso della linea elettrica
<b>B</b>	Distanza minima
<b>C</b>	Altezza di lavoro massima

**Minimum distance from power lines**

1 metre	up to 1 KV
3 metres	from over 1 to 110 KV
4 metres	from over 110 to 220 KV
5 metres	from over 220 to 380 KV
Over 5 metres	Voltage unknown

**5.4 Secure the work area**

Preparation and use of the machine must comply with the applicable national safety regulations and the instructions given in this manual. The machine manager is responsible for this.

If danger zones are created due to site conditions and safety distances, they must be secured by the manager in accordance with EN ISO 13857.

The manager must ensure that all hazards from material rejected by the machine and machines working in this area are assessed and must secure the area.




Before starting the machine, the manager must ensure that there are no persons in the danger zone of the machine.

**5.5 Measures to be taken after long stops**

**Check the chassis**

Before transporting or moving the machine, check the tracks or wheels, tyres and axle.

## 5.6 Checks before starting

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention to the paragraph “5.1 Safety during installation and use”</b> at the beginning of this chapter.</p>
⚠ Caution	
	<p><b>Danger due to machine damage or malfunctions. Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only start the machine when the checks before starting have been carried out.</li> </ul>
⚠ Caution	
	<p><b>During operation, make sure that the machine is resting on level ground and that the tracks are fully engaged in the ground. Never operate the machine if it is not in a level position. This may impair correct operation of the crusher and conveyors.</b></p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Works carried out according to the maintenance plan (every 10 hours or daily).</b></li> <li><input type="checkbox"/> <b>Works carried out according to maintenance plans.</b> Compare hourly meter and maintenance protocols!</li> <li><input type="checkbox"/> <b>Complaints, defects etc. eliminated.</b> Compare completed maintenance protocols and repair reports!</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Visible damage has been checked.</b></li> <li><input type="checkbox"/> <b>Protective devices are complete, intact and correctly secured.</b></li> </ul>
Procedure	

Once you have reached the work site and unloaded the machine, make sure that the work site has been defined by appropriate signs, if no, do so.

Ensure that the machine is correctly level and that the crawler tracks are fully on the ground.

Before starting the machine, it is advisable to carry out the following checks:

1. **Comply with safety regulations.**
2. **Check that there is no visible damage to the machine.**
  - (Walk around the machine and check it thoroughly!)
  - Take note of the damage.
  - Report damage and have it repaired.
3. **Check the battery conditions and the integrity of the remote control.**
  - Press the green START button to start the radio remote control.
  - Check the battery charge level indicator lights on the radio remote control unit. Charge the battery if it is low.
4. **Check the EMERGENCY STOP devices on the machine and on the radio remote control.**
  - Check they are all present.
  - Check that all individual EMERGENCY STOP buttons have shut down the machine.



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**5. Check the protective devices.**

- Check they are all present.
- Check conditions.
- Replace missing or damaged devices.
- Check for proper fastening.
- Fix loose protective devices.

**6. Check the alarm devices.**

- Check they are all present.
- Check functionality.

**7. Check signs.**

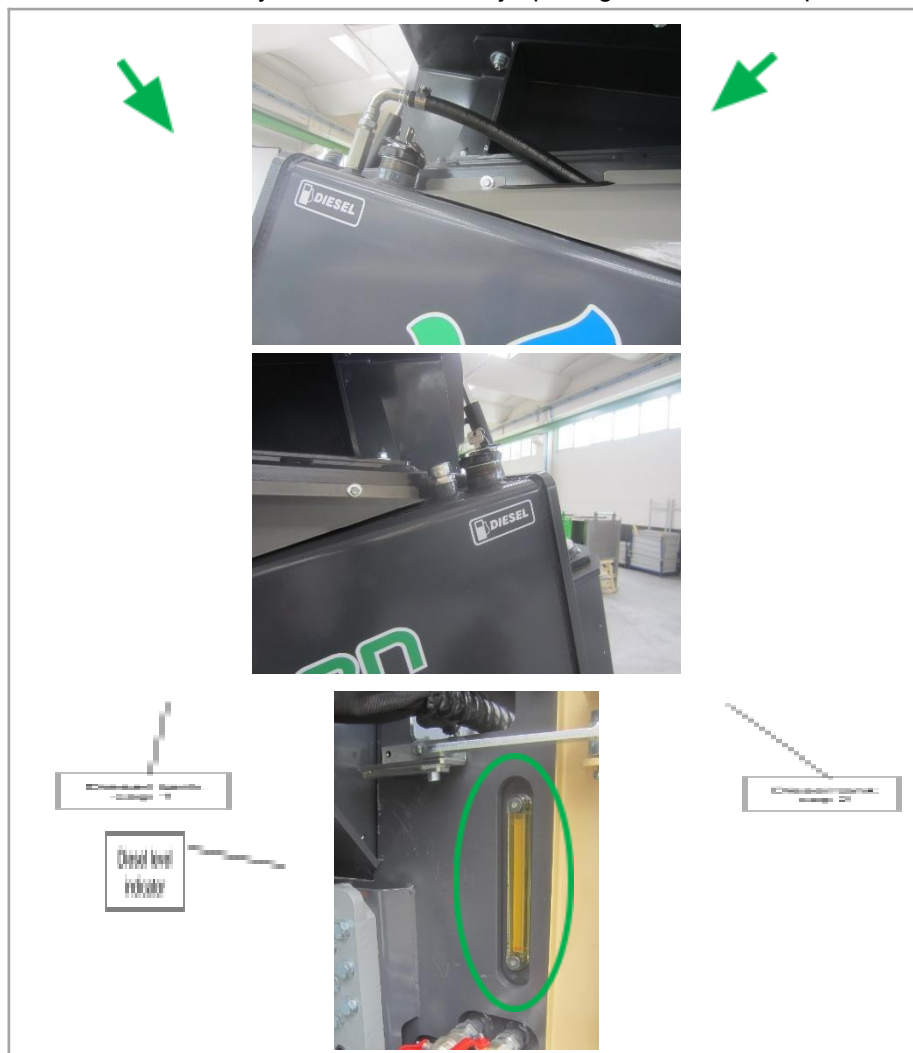
- Check they are all present.
- Check conditions.
- Replace missing or damaged signs.
- Check legibility.
- Clean dirty signs.

Before starting the machine, carry out all the checks and check personally that the machine is in perfect working order. In particular it is advisable to:

- Check the fuel level.
- Check the motor oil level.
- Check the hydraulic oil level.
- Check the track tension.
- Check that all guards are fitted and fully functional.

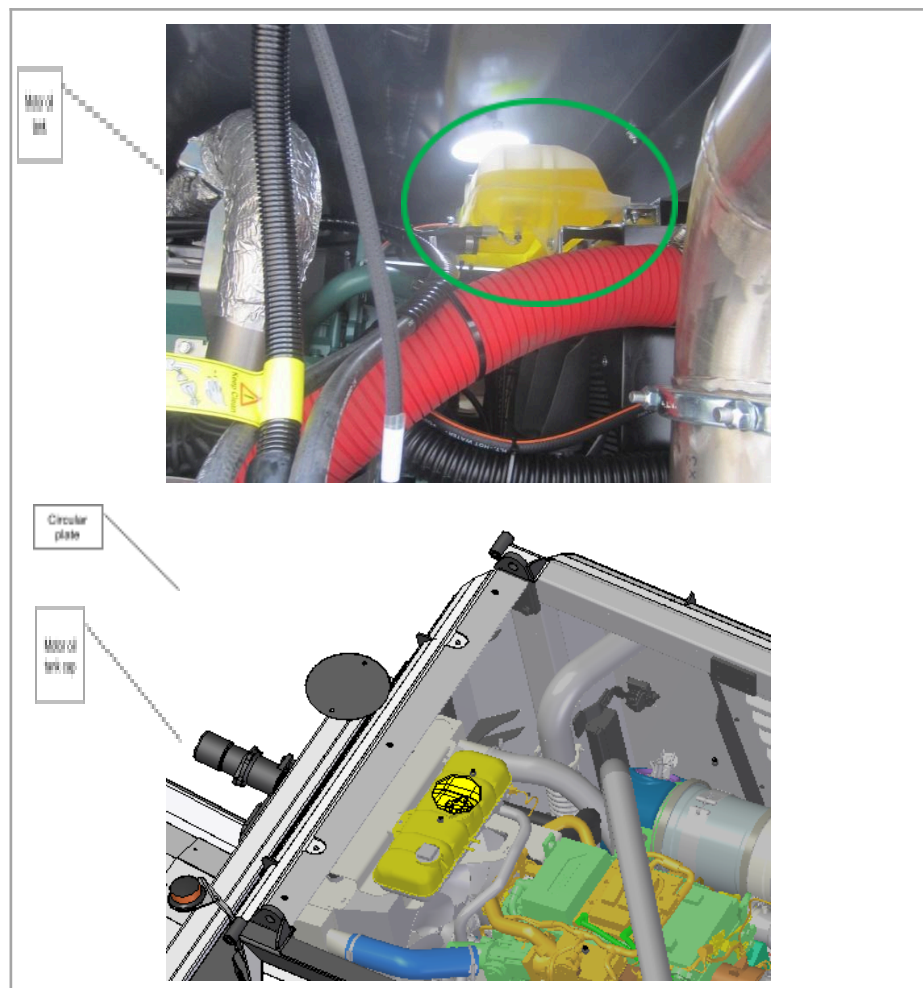
**Fuel level check**

- Position the machine in a flat, safe place.
- Open the shredder motor door on the rear left side.
- Check that the fuel reaches the upper limit of the level indicator.
- If necessary, fill the fuel tanks by opening their marked caps.


**Engine oil level check**

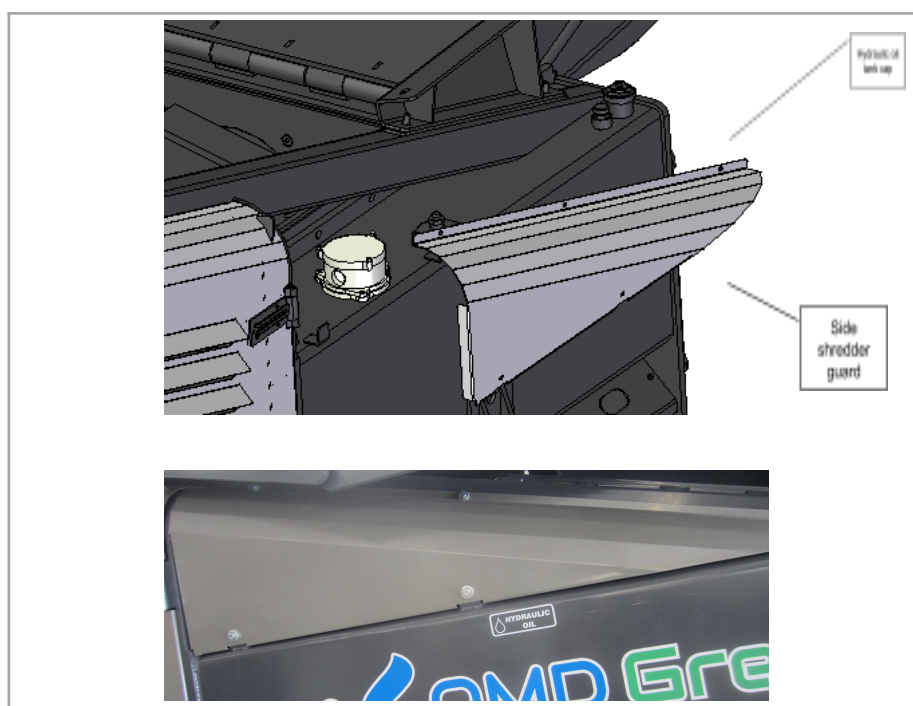
- Position the machine in a flat, safe place.
- Make sure that the engine has been off for at least one hour.
- Open the drive unit door on the rear left side.
- Check the oil level in the transparent tank.
- If necessary, refill the tank by opening the accessible cap, unscrewing the circular plate of the drive unit top guard.
- For further details, see the propulsion motor manual supplied.



**Hydraulic oil level check**



- Position the machine in a flat, safe place.
- Open the shredder motor door on the rear left side.
- Check that the oil reaches the upper limit on the level indicator outside the hydraulic motor. If not, top up the level.
- The hydraulic oil is filled by removing the left side guard of the shredder and opening the marked cap.
- For further details, see the hydraulic system manual provided.



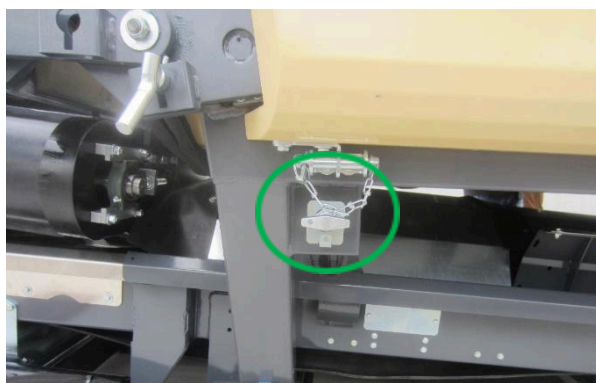
**Track tension check**

To check that the track tension is adequate, apply pressure of approximately 10 kg to the top of the track and check that track deflection does not exceed 10-20 mm. If not, reset the correct tension.

## 5.7 Machine start-up procedure

<b>⚠ Caution</b>	
	<p><b>Danger of moving machine components.</b>  <b>Risk of crushing and serious or fatal injury!</b>            In addition, there is a risk of machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> <li><input type="checkbox"/> Only move machine components using the appropriate controls.</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.            Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Machine at work.</b></li> <li><input type="checkbox"/> <b>Engine on.</b></li> <li><input type="checkbox"/> <b>Radio remote control on.</b></li> <li><input type="checkbox"/> <b>Checks before starting made.</b></li> <li><input type="checkbox"/> <b>Inspection and works carried out according to the maintenance plan (every 10 hours or daily).</b></li> <li><input type="checkbox"/> <b>Complaints eliminated.</b></li> </ul>
<b>⚠ Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Machine in the working position</b></li> <li><input type="checkbox"/> <b>Machine started up and ready for service.</b></li> </ul>
<b>Procedure</b>	

1. **Comply with safety regulations.**
2. **Connect the battery isolator.**
  - Turn the selector from the vertical “OFF” position to the horizontal “ON” position.

**3. Switch on the ignition.**

- Turn the ignition key to the first position.
- The control display switches on.
- The control starts.
- The start screen appears.

**4. Read the error messages.**

- Existing errors are shown at the top of the control display.

**Warning**



To avoid damage to the machine or malfunctions during operation, eliminate displayed faults.

**5. Start the engine.**

- Turn the ignition key to the second position.
- Keep the key turned until the engine starts.

## Warning



There are two emergency buttons, one on the right-hand side of the machine and another on the left-hand side.

Check that the emergency buttons are not pressed after turning the ignition key.

If pressed, they must be released by turning them counter-clockwise.



## **5.8 Machine stop and shut-down procedure**

### **5.8.1**

#### **Machine stop**

- 1. Comply with safety regulations.**
- 2. Disable automatic machining**
  - Activate the emergency push-button on the machine.
  - See paragraph “3.9 Controls”.
- 3. Wait until the shredder, discharge belt, magnetic sorter and engine are completely stopped.**



### **5.8.2**

#### **Machine shut-down**

- 1. Disconnect the ignition.**
  - Turn the ignition key counter-clockwise.
- 2. Wait for all the machine components and engine to come to a complete stop.**
- 3. Disconnect the battery isolator.**
  - Turn the selector from the horizontal “ON” position to the vertical “OFF” position.





## 5.9 EMERGENCY STOP

<b>⚠ Caution</b>	
	<p><b>Danger of emergency, imminent danger, machine failure.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Press the nearest EMERGENCY STOP.</li> <li><input type="checkbox"/> If necessary initiate rescue measures.</li> <li><input type="checkbox"/> Inform superiors.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of emergency, imminent danger, machine failure.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Disconnect the electrical panel.</li> <li><input type="checkbox"/> Disconnect the machine power plug.</li> <li><input type="checkbox"/> Restart the machine only after a professional has rectified the fault.</li> </ul>








## 5.10 Restart after an EMERGENCY STOP

⚠ Caution	
	<p><b>Restart after EMERGENCY STOP: Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Restart the machine only after a professional has rectified the fault.</li> </ul>
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> EMERGENCY STOP danger eliminated.</li> <li><input type="checkbox"/> No material in the machine.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Machine started up and ready for service.</li> </ul>
Procedure	

1. Comply with safety regulations.
2. Start up the machine.
  - See paragraph “5.7 Machine start-up procedure”.
3. Read the resolve the error messages, if any.
  - Eliminate alarms by resolving anomalies. See paragraph “3.9.1 Control panel”.

## 5.11 Placement in the working position



<b>⚠ Caution</b>	
	<p><b>Risk of being crushed or run over by the crawler tracks.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <p>There is a risk of dragging, crushing and overturning present when moving the machine with the crawler tracks.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> When operating the crawler tracks, do not enter or work in the danger zone indicated!</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of being run over by the machine.</b></p> <p><b>Risk of serious or fatal injury!</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Being on the machine when it is moving with the tracks is always prohibited!</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger of moving machine components.</b></p> <p><b>There is a risk of contusions, crushing, amputation, trauma and fractures when opening or closing the belts.</b></p> <p>In addition, there is a risk of machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> <li><input type="checkbox"/> Only move machine components using the appropriate controls.</li> </ul>
<b>Warning</b>	
	<p><b>Machine raised.</b></p> <p><b>The machine must not be moved with the tracks</b> if in lowered position for transport and the frame touches the ground.</p> <p><b>Lift the machine using the hydraulic cylinders before moving it with the tracks so that the chassis does not touch the ground.</b></p>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph <b>“5.1 Safety during installation and use”</b>.</p>
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Machine started up</b></li> <li><input type="checkbox"/> <b>Radio remote control mode activated.</b></li> </ul>

	<input type="checkbox"/> <b>No material in the machine.</b>
<b>⚠ Objective</b>	
	<input type="checkbox"/> <b>Machine in the working position</b>
<b>Procedure</b>	


1. **Comply with safety regulations.**
2. **Start up the machine.**
  - See paragraph "5.7 Machine start-up procedure".
3. **Lift the machine to the working position.**
  - See paragraph "5.12 Preparing for service".
4. **Make sure that nobody is in the danger zone.**
  - Choose a position with a full view.
5. **Slowly move the machine with the tracks.**
  - Activate the track levers present on the radio remote control.
  - See paragraph "3.9.3 Radio remote control".
6. **Set the track speed from the display.**
  - Press the hare button on the display to increase the track speed.
  - Press the turtle button on the display to lower the track speed.
  - See paragraph "3.9.1 Control panel".

## 5.11.1


**Moving on inclined planes and sloping paths**

 <b>Caution</b>	
	<p><b>Danger of machine overturning.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <p><input type="checkbox"/> Only drive on inclined planes and sloping paths according to the maximum inclinations specified.</p>

**Maximum inclination**

	
Maximum inclination plate permitted	12°
Maximum allowed inclination	18°

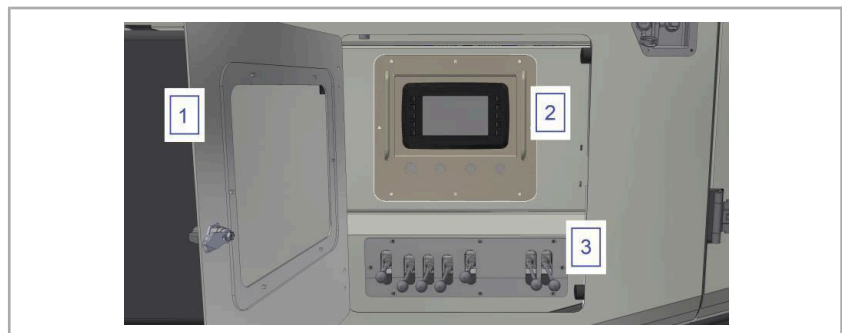
## 5.12 Preparing for service

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
⚠ Requirements	
	<input type="checkbox"/> <b>No one and no objects in the danger zone.</b> <input type="checkbox"/> <b>Engine on</b>
⚠ Objective	
	<input type="checkbox"/> <b>The machine is ready for service.</b>

The machine is prepared for service with the help of preparation functions.

The preparation functions include:

- Lift the machine to the working position.
- Open the magnetic sorter.
- Open the discharge belt.

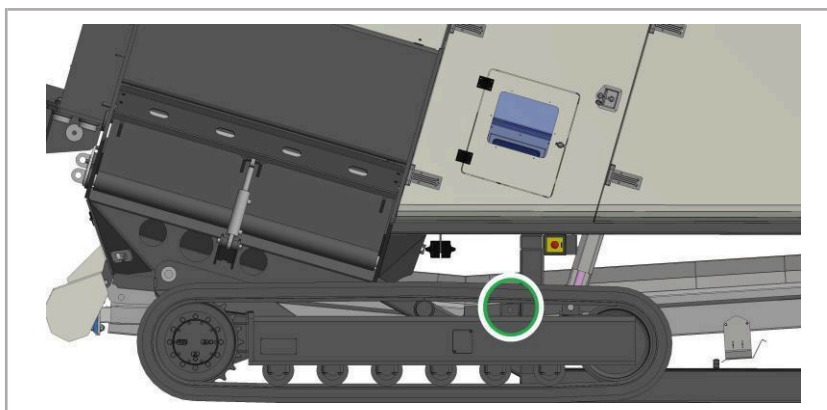


The preparation functions are controlled by means of the control levers (3) on the machine control.

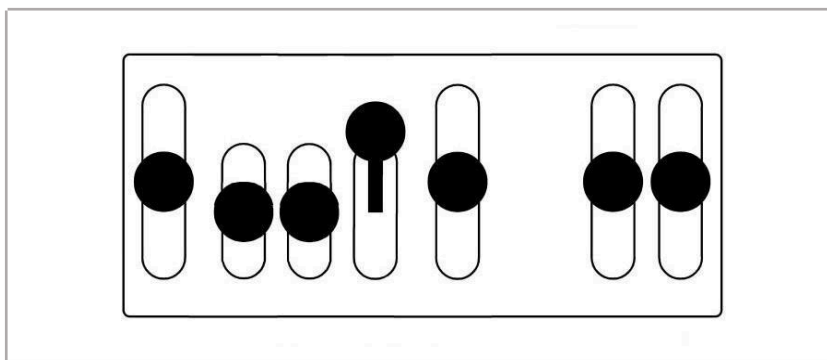
### Lifting the machine

Lift the machine to the working position before putting it into service.

- Dismantle the frame locking pin.

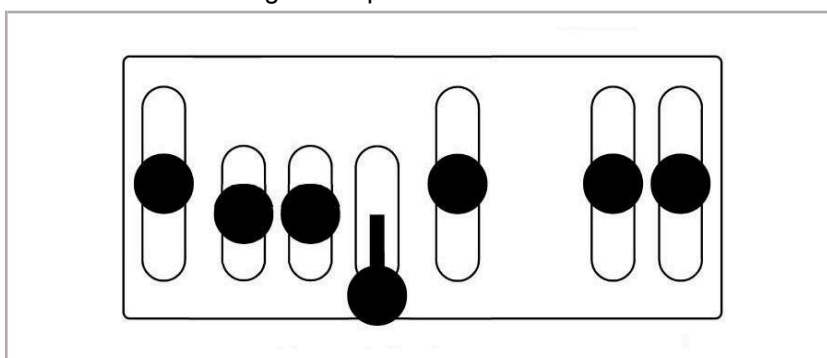


- Move the control lever upward.
- The machine is lifted.


**Opening the discharge belt**

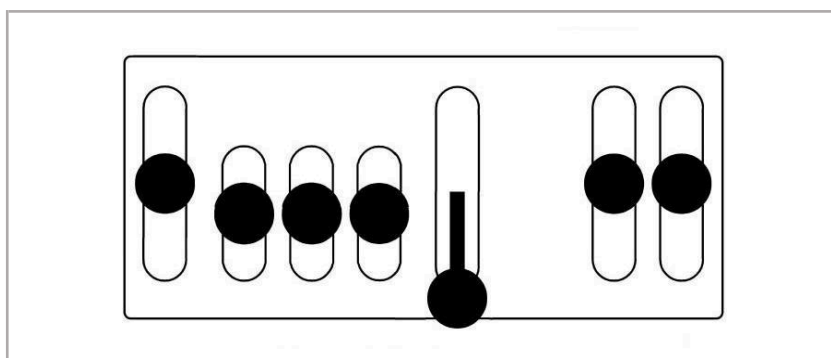
Open the discharge belt before putting the machine into service.

- Move the control lever downward.
- The discharge belt opens.


**Opening the magnetic sorter**

Open the sorter before putting the machine into service.

- Move the control lever downward.
- The magnetic sorter opens.





## 6. Use

### 6.1 Preparing for use



When using these instructions, normal use means **automatic** operation.

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Caution	
	<p><b>Danger of moving machine components.</b>  <b>Risk of crushing and serious or fatal injury!</b>  <b>There is a risk of contusions, crushing, amputation, trauma and fractures when opening or closing the belts.</b></p> <p>In addition, there is a risk of machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Make sure that nobody is in the danger zone.</li> <li><input type="checkbox"/> Make sure that nobody enters the danger zone.</li> <li><input type="checkbox"/> Only move machine components using the appropriate controls.</li> <li><input type="checkbox"/> On days when the air temperature is below 5°C, leave the machine running at idle for 15 minutes to allow the hydraulic oil to reach its operating temperature.</li> <li><input type="checkbox"/> On days when the air temperature is above 5°C, leave the machine running at idle for 5 minutes to allow the hydraulic oil to reach its operating temperature.</li> </ul>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>No one and no objects in the danger zone.</b></li> <li><input type="checkbox"/> <b>Machine on.</b></li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Machine started up and ready for service.</b></li> <li><input type="checkbox"/> <b>Machine lifted in the working position.</b></li> <li><input type="checkbox"/> <b>Discharge conveyor opened.</b></li> <li><input type="checkbox"/> <b>Magnetic sorter open.</b></li> </ul>



## Procedure

1. **Comply with safety regulations.**
2. **Machine positioning.**
  - See paragraph “5.11 Placement in the working position”.
3. **Start up the machine.**
  - See paragraph “5.7 Machine start-up procedure”.
4. **Prepare the machine for service.**
  - See paragraph “5.12 Preparing for service”

### **Caution**



Always remember to open the discharge belt and the magnetic sorter (belts in fully open position) before starting the shredder to prevent clogging of the material.

### **Machine conditions**



- ☐ The machine is ready to be started up in “Automatic Operation”.

## 6.2 Automatic operation with the radio remote control




Normally the machine is operated in **automatic synchronous mode**.

- ☐ **Synchronous operation** - Both shafts turn at the same speed.

### 6.2.1

### Start-up

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
⚠ Requirements	
	<input type="checkbox"/> Engine on. <input type="checkbox"/> Radio remote control mode activated. <input type="checkbox"/> Radio remote control on.
⚠ Objective	
	<input type="checkbox"/> Machine started up in automatic mode and ready for service.
Procedure	

6. Comply with safety regulations.

7. **Activate radio remote control.**

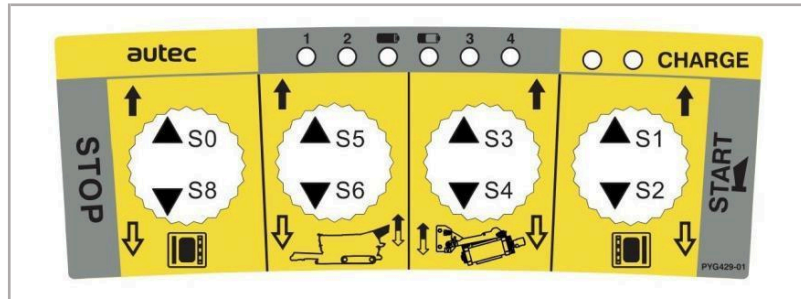


To activate automatic operation on the radio remote control, the radio remote control must be activated on the control display.



- Activate radio remote control mode.
- Activate the radio remote control transmitter.

#### 8. Start automatic operation.




- Press and hold the START button and simultaneously press the two central levers forward.



#### 9. The plant starts in fully automatic operation.


- The engine adjusts to operating speed.
- The discharge belt starts.
- The magnetic sorter starts.
- The shredder starts.

#### 10. Special programs can be selected for different feed materials (WOOD - CEMENT - WASTE).

Machine conditions	
	<input type="checkbox"/> The machine is ready for material loading. Refer to the paragraph "6.7 Material loading".

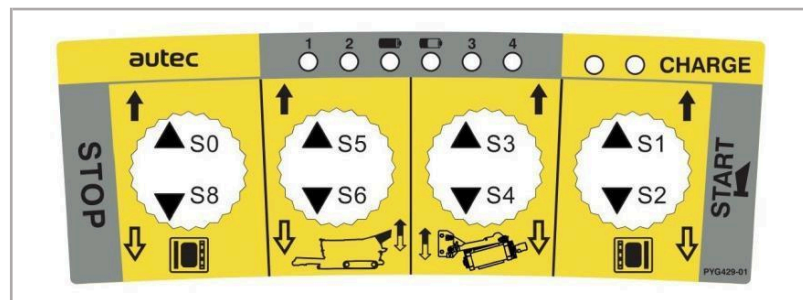
## 6.2.2


## Tipping hopper

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
Requirements	
	<input type="checkbox"/> Engine on. <input type="checkbox"/> Radio remote control mode activated. <input type="checkbox"/> Radio remote control on.
Objective	
	<input type="checkbox"/> Tipping hopper lifted / lowered.
Procedure	

Lifting the tipping hopper with  
radio remote control

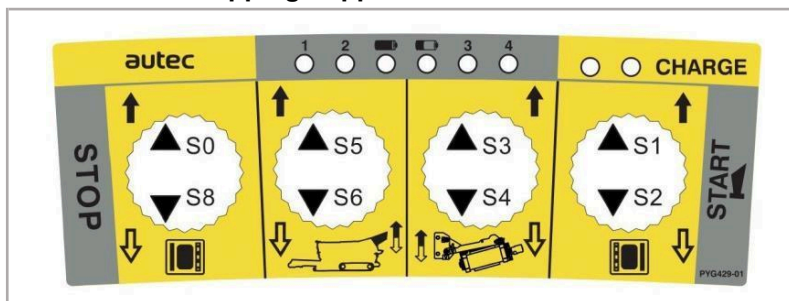
1. Comply with safety regulations.
2. Lifting the tipping hopper.



- Move the HOPPER lever to the LIFT position.  

- Hold the lever in place for as long as the movement is to be active.  
 When the lever is released, the movement stops.

**Lowering the tipping hopper  
with radio remote control**

1. Comply with safety regulations.
2. Lower the tipping hopper.



- Move the HOPPER lever to the LOWER position.




- Hold the lever in place for as long as the movement is to be active.

When the lever is released, the movement stops.

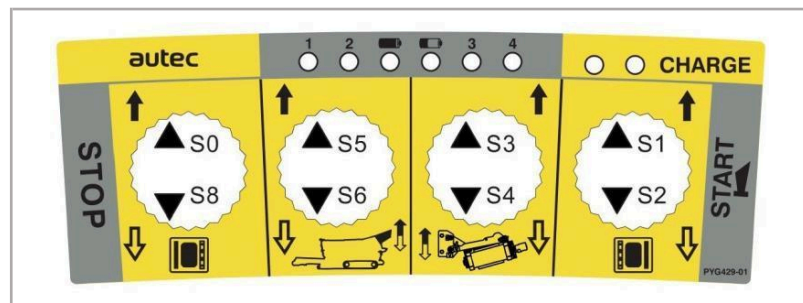
## 6.2.3


## Magnetic sorter

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<input type="checkbox"/> Engine on. <input type="checkbox"/> Radio remote control mode activated. <input type="checkbox"/> Radio remote control on.
⚠ Objective	
	<input type="checkbox"/> Magnetic sorter lifted / lowered.
Procedure	

Lifting the magnetic sorter  
with the radio remote control

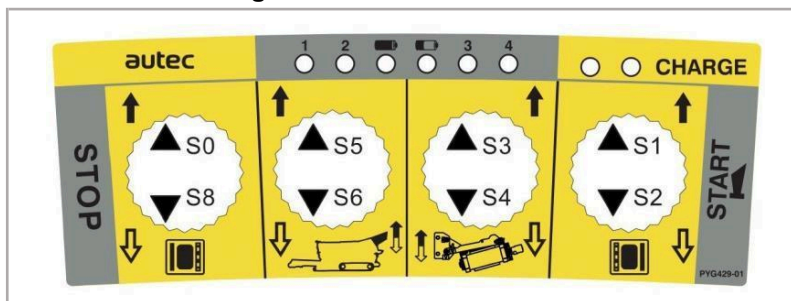
1. Comply with safety regulations.
2. Lift the magnetic sorter.




- Move the MAGNETIC SORTER lever to the LIFT position. 
- Hold the lever in place for as long as the movement is to be active.  
When the lever is released, the movement stops.

**Lowering the magnetic sorter  
with the radio remote control**

1. Comply with safety regulations.
2. Lower the magnetic sorter.




- Move the MAGNETIC SORTER lever to the LOWER position. 
- Hold the lever in place for as long as the movement is to be active.

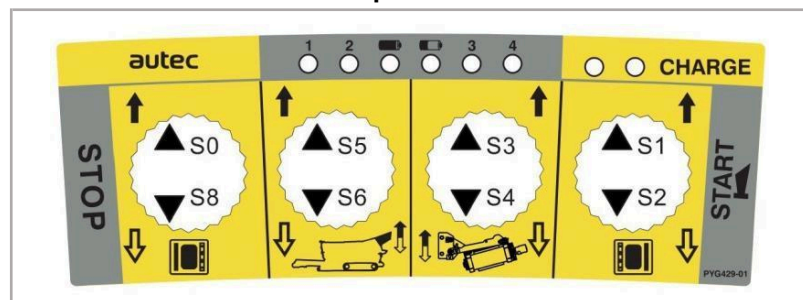
When the lever is released, the movement stops.



## 6.2.4

## Shut-down

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Run the machine until it is completely empty.</li> <li><input type="checkbox"/> No material in the machine.</li> <li><input type="checkbox"/> Radio remote control mode activated.</li> <li><input type="checkbox"/> Radio remote control on.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Automatic operation deactivated.</li> </ul>
Procedure	

1. Comply with safety regulations.
2. Deactivate automatic operation.



- Press and hold the START button and move two central levers back.  
3. Automatic operation deactivates.
    - The shredder stops.
    - The discharge belt stops.
    - The magnetic sorter stops.
    - The engine returns to no-load operating speed.



Automatic operation can be switched off by pressing the **EMERGENCY STOP** button on the radio remote control.





### 6.3 Automatic operation with the plant control

#### **Caution**



**Danger of material ejection and falling from the machine.**  
**This creates a risk of contusions, trauma and fractures.**

- ☐ System loading must be suspended as long as the machine is controlled by the plant control.



Normally the machine is operated in **automatic synchronous mode**.

- ☐ **Synchronous operation** - Both shafts turn at the same speed.



To activate automatic operation on the control display, the radio remote control must be deactivated on the control display.



#### 6.3.1

#### Start-up

#### **Warning**



Read and understand **all instructions** before working with this machine.  
 Pay **particular attention** to the paragraph “5.1 Safety during installation and use”.

#### **Requirements**

- ☐ **Radio remote control deactivated on the control display.**


#### **Objective**

- ☐ Machine started up in automatic mode and ready for service.

## Procedure


1. Comply with safety regulations.
2. Start the engine.
  - See paragraph “5.7 Machine start-up procedure”.
3. Allow the engine to idle for a few minutes.
  - Idling = 800 rpm.
4. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

5. Select Shredder Menu.



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

**6. Select the Automatic operation menu item.**



- Press the “Automatic operation” function key.
- A green border lights up on the “Automatic Operation” symbol.


AUTO

**7. The plant starts in fully automatic operation.**

- The engine adjusts to operating speed.
- The discharge belt starts.
- The magnetic sorter starts.
- The shredder starts.


**8. Special programs can be selected for different feed materials (WOOD - CEMENT – WASTE - CUSTOM).**

**NOTE:** If the display suffers overheating due to direct solar radiation, it could go into protection by turning off, but in this case the set functions and the automatic cycle itself remain active and you can continue working normally.

Machine conditions	
	<input type="checkbox"/> The machine is ready for material loading. Refer to the paragraph “6.7 Material loading”.

6.3.2

Tipping hopper

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
⚠ Requirements	
	<input type="checkbox"/> Engine on. <input type="checkbox"/> Radio remote control mode deactivated.
⚠ Objective	
	<input type="checkbox"/> Tipping hopper lifted / lowered.
Procedure	

Lifting the tipping hopper with  
the control lever

1. Comply with safety regulations.
2. Lifting the tipping hopper.



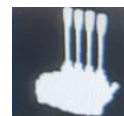
Selecting the button to go back to the page:




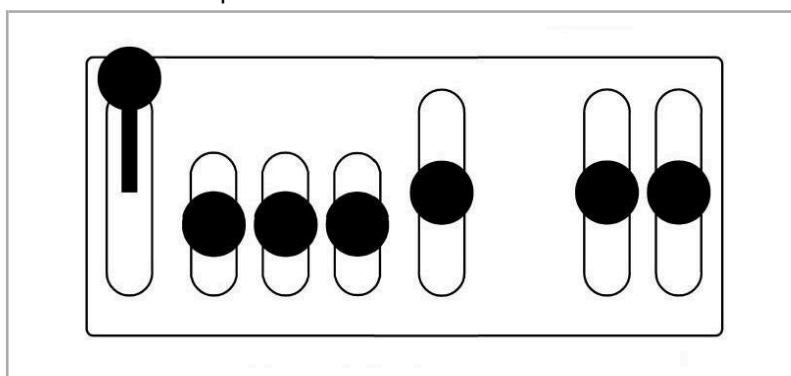
Keeping the automatic program active, go and press button



n. times until the following image appears on the display:



Hold down the button connected to the icon  and at the same time operate the lever indicated below:



- Move the control lever upward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.

**Lowering the tipping hopper  
with the control lever**

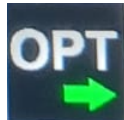
1. Comply with safety regulations.
2. Lifting the tipping hopper.



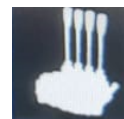
Selecting the button to go back to the page:



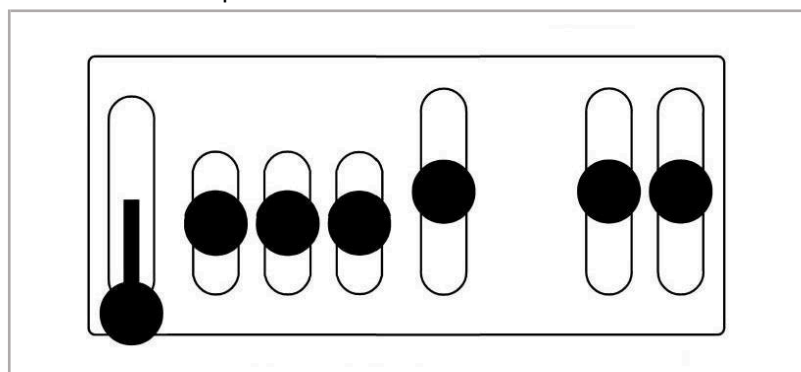
Keeping the automatic program active, go and press button



n. times until the following image appears on the display:



Hold down the button connected to the icon and at the same time operate the lever indicated below:




- Move the control lever downward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.

### 6.3.3

### Magnetic sorter

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control mode activated.</li> <li><input type="checkbox"/> Radio remote control on.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Magnetic sorter lifted / lowered.</li> </ul>
Procedure	

Lifting the magnetic sorter  
with the control lever

1. Comply with safety regulations.
2. Lifting the tipping hopper.

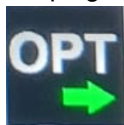


Selecting the button to go back to the page:

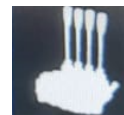




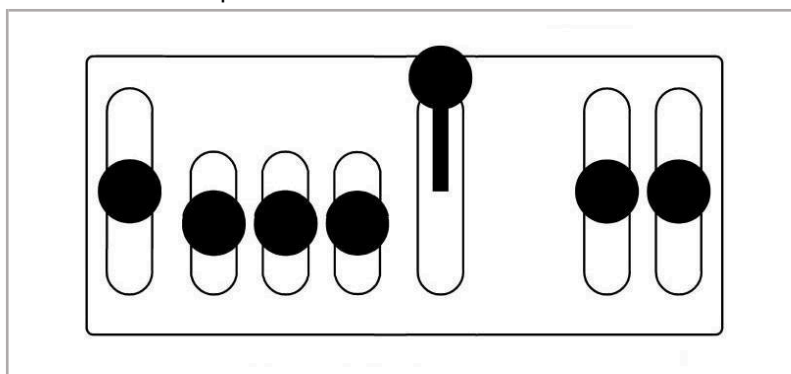
Keeping the automatic program active, go and press button



n. times until the following image appears on the display:

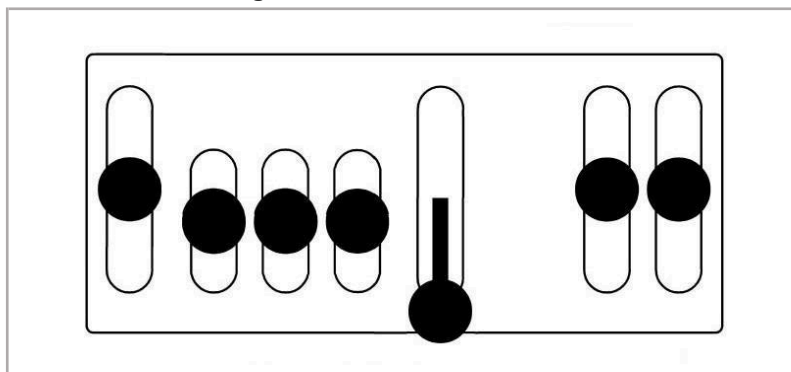


Hold down the button connected to the icon and at the same time operate the lever indicated below:



- Move the control lever upward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.


**Lowering the magnetic sorter  
with the control lever****1. Comply with safety regulations.****2. Lower the magnetic sorter.**

- Move the control lever downward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.

## 6.3.4


## Shut-down

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Run the machine until it is completely empty.</li> <li><input type="checkbox"/> No material in the machine.</li> <li><input type="checkbox"/> Radio remote control mode deactivated.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Automatic operation deactivated.</li> </ul>
Procedure	

1. Comply with safety regulations.


2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


3. Select Shredder Menu.



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

#### 4. Select the “Automatic operation” menu item.



- Press the automatic operation function key. 
- No green border lights up on the “Automatic Operation” symbol.

**AUTO**

#### 5. Automatic operation deactivates.

- The shredder stops.
- The discharge belt stops.
- The magnetic sorter stops.
- The engine returns to no-load operating speed.

## 6.4 Synchronous Operation

### ⚠ Caution



**Danger of material ejection and falling from the machine.  
This creates a risk of contusions, trauma and fractures.**

- ☐ System loading must be suspended as long as the machine is controlled by the plant control.

### ⚠ Caution



**Danger of material ejection and falling from the machine.  
This creates a risk of contusions, trauma and fractures.**

- ☐ Stop machine loading.
- ☐ Only authorised or trained personnel can perform this operation, observing all the instructions in the manual.
- ☐ Wear prescribed personal protective clothing.

### Warning



Read and understand **all instructions** before working with this machine.

Pay **particular attention** to the paragraph “5.1 Safety during installation and use”.

### ⚠ Requirements

- ☐ Engine on.
- ☐ Magnetic sorter on.
- ☐ Discharge conveyor on.
- ☐ Shredder on.
- ☐ Radio remote control deactivated on the control display.

### ⚠ Objective

- ☐ Asynchronous operation activated.



Using these instructions, **synchronous operation** means that the shafts rotate at the **same speed**.


- ☐ Asynchronous operation - Both shafts rotate at different speeds from each other.

## Procedure

1. Comply with safety regulations.



## 2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

## 3. Select the “Synchronous operation” menu item.



- Press the “Synchronous/asynchronous operation” function key. 
- An EQUALITY sign and the character “SYNC” appear on the symbol. 

Synchronous operation is deactivated when asynchronous operation is activated.

## 6.5 Asynchronous operation

### ⚠ Caution



**Danger of material ejection and falling from the machine.  
This creates a risk of contusions, trauma and fractures.**

- ☐ System loading must be suspended as long as the machine is controlled by the plant control.

### ⚠ Caution



**Danger of material ejection and falling from the machine.  
This creates a risk of contusions, trauma and fractures.**

- ☐ Stop machine loading.
- ☐ Only authorised or trained personnel can perform this operation, observing all the instructions in the manual.
- ☐ Wear prescribed personal protective clothing.

### Warning



Read and understand **all instructions** before working with this machine.

Pay **particular attention** to the paragraph “5.1 Safety during installation and use”.

### ⚠ Requirements

- ☐ Engine on.
- ☐ Magnetic sorter on.
- ☐ Discharge conveyor on.
- ☐ Shredder on.
- ☐ Radio remote control deactivated on the control display.

### ⚠ Objective

- ☐ Asynchronous operation activated.



Using these instructions, **asynchronous operation** means that the shafts rotate at a **different speed**.

- ☐ Asynchronous operation - One shaft turns at twice the speed of the other.

**Both shafts change speed after 40 seconds.**


## Procedure

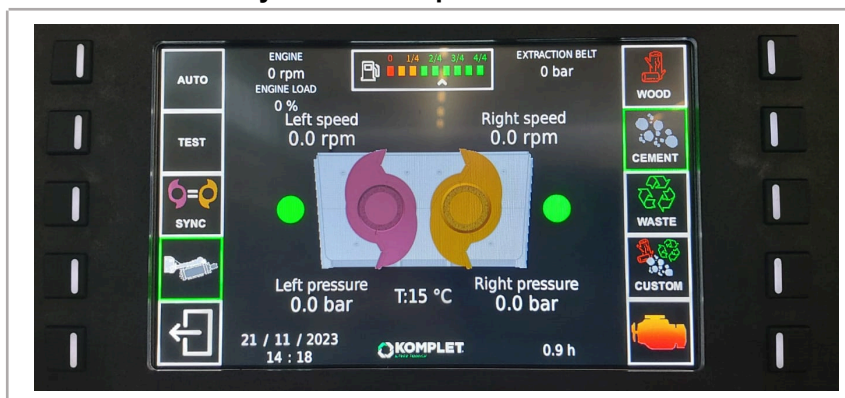
1. Comply with safety regulations.





**2. Select Main Menu.**

- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

**3. Select the “Asynchronous operation” menu item.**

- Press the “Asynchronous operation” function key. 
- A crossed-out EQUALITY sign and the character “ASYNC” appear on the symbol. 

Asynchronous operation is deactivated when synchronous operation is activated.

## 6.6 Test Mode Operation

### **Caution**



**Danger of material ejection and falling from the machine.  
This creates a risk of contusions, trauma and fractures.**

- ☐ System loading must be suspended as long as the machine is controlled by in Test Mode.



**Test Mode operation** is used to check that the machine is operating correctly with no load (without material) or release the machine stuck in the machine.

#### Features

- In Test Mode, individual machine components can be switched on and off manually.
- The opening can be adjusted using the advanced functions.
- The preparation functions can be found in the advanced functions.

### **Machine conditions**





- ☐ **The machine is now ready to run the feeder, crusher, magnetic belt and discharge belt function check or to be started up in “automatic operation”.**

**Refer to the paragraphs “6.2 Automatic operation with the radio remote control” and “6.3 Automatic operation with the plant control”.**


## 6.6.1

## RPM

⚠ Caution	
	<p><b>Danger of material ejection and falling from the machine.</b> <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> RPM increased / reduced.</li> </ul>
Procedure	


- Increase motor RPM
1. Comply with safety regulations.
  2. Select Main Menu.




- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.



**3. Select Shredder Menu.**

- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

**4. Select Test Mode menu.**

- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.


**5. Select the “Increase RPM” function.**

- Press the “Increase motor RPM” function key. 

**Reduce motor RPM**    1. **Comply with safety regulations.**


2. **Select Main Menu.**



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


3. **Select Shredder Menu.**



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

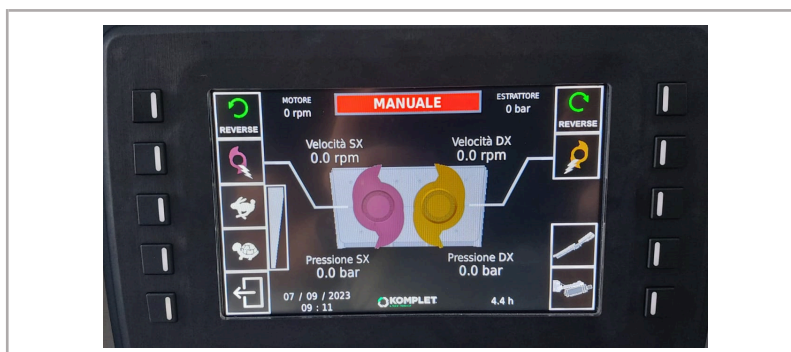
4. **Select Test Mode menu.**



- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.



5. Select the “Reduce RPM” function.





- Press the “Reduce motor RPM” function key. 



## 6.6.2


## Discharge belt

⚠ Caution	
	<p><b>Danger of material ejection and falling from the machine.</b> <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Discharge belt on / off.</li> </ul>
Procedure	

Discharge belt start-up 1. Comply with safety regulations.


2. Select Main Menu.

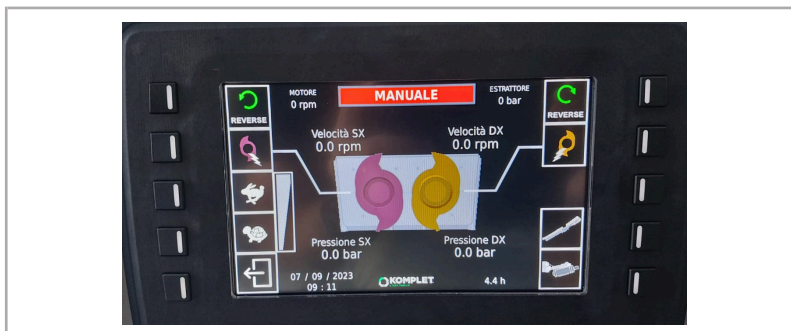



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

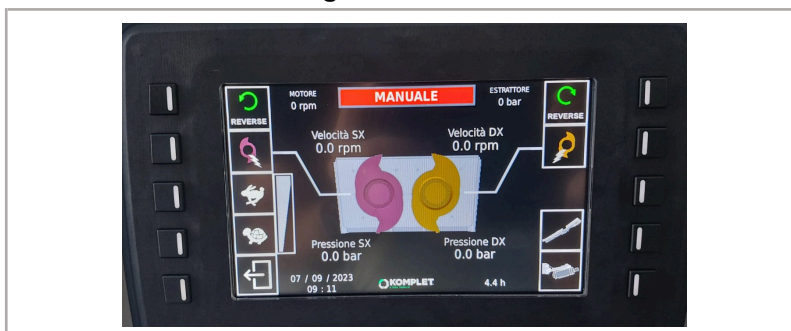




**3. Select Shredder Menu.**

- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

**4. Select Test Mode menu.**

- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.


**5. Select the “Discharge belt” function.**

- Press the “Discharge Belt” function key. 
  - A green border lights up on the “Discharge belt” symbol. 
- The discharge conveyor is on.

**Discharge belt shut-down**    1. **Comply with safety regulations.**


2. **Select Main Menu.**



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


3. **Select Shredder Menu.**



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.



4. **Select Test Mode menu.**



- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.





**5. Select the “Discharge belt” function.**

- Press the “Discharge Belt” function key. 
- No green border lights up on the “Discharge belt” symbol. 

The discharge conveyor is off.

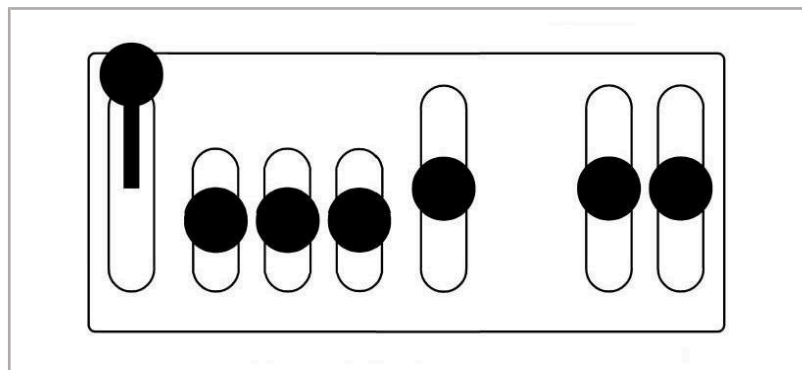
## 6.6.3

## Tipping hopper

<b>⚠ Caution</b>	
	<b>Danger of material ejection and falling from the machine.</b> <b>This creates a risk of contusions, trauma and fractures.</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
<b>Warning</b>	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
<b>⚠ Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Tipping hopper lifted / lowered.</li> </ul>
<b>Procedure</b>	

Lifting the tipping hopper with  
the control lever

1. Comply with safety regulations.
2. Lifting the tipping hopper.

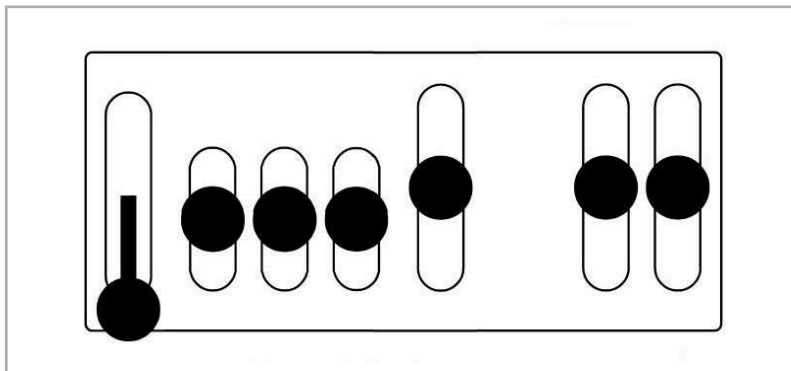


- Move the control lever upward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.

**Lowering the tipping hopper  
with the control lever**

1. **Comply with safety regulations.**
2. **Lower the tipping hopper.**





- Move the control lever downward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.



## 6.6.4


## Magnetic sorter

⚠ Caution	
	<p><b>Danger of material ejection and falling from the machine.</b> <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Magnetic sorter on / off.</li> <li><input type="checkbox"/> Magnetic sorter lifted / lowered.</li> </ul>
Procedure	

Magnetic sorter start-up


1. Comply with safety regulations.
2. Select Main Menu.




- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.





**3. Select Shredder Menu.**

- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

**4. Select Test Mode menu.**

- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.

**5. Select the “Magnetic sorter” function.**

- Press the “Magnetic sorter” function key. 
  - A green border lights up on the “Magnetic sorter” symbol. 
- The magnetic sorter is on.




**Magnetic sorter shut-down**

1. Comply with safety regulations.


2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


3. Select Shredder Menu.



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

4. Select Test Mode menu.





- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.



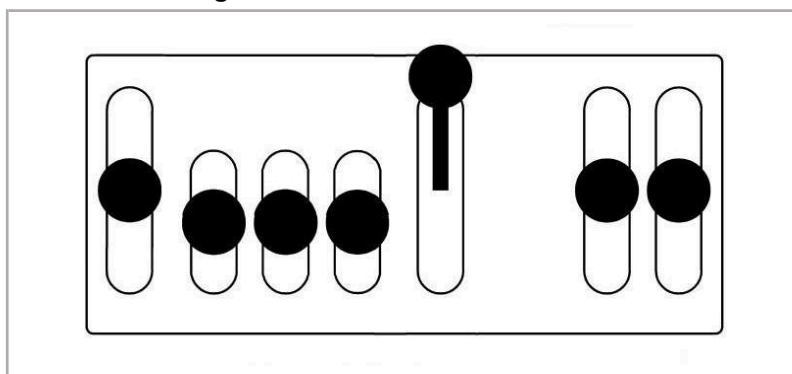
## 5. Select the “Magnetic sorter” function.



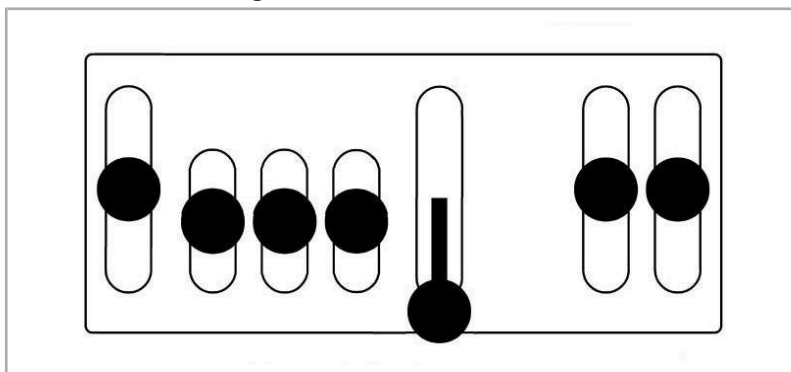
- Press the “Magnetic sorter” function key. 
  - No green border lights up on the “Magnetic sorter” symbol. 
- The magnetic sorter is off.

Lifting the magnetic sorter  
with the control lever

1. Comply with safety regulations.
2. Lift the magnetic sorter.



- Move the control lever upward.
  - Hold the control lever in place for as long as the movement is to be active.
- When the control lever is released, the movement stops.

**Lowering the magnetic sorter  
with the control lever****1. Comply with safety regulations.****2. Lower the magnetic sorter.**



- Move the control lever downward.
- Hold the control lever in place for as long as the movement is to be active.

When the control lever is released, the movement stops.




## 6.6.5

## Shafts

⚠ Caution	
	<p><b>Danger of material ejection and falling from the machine.</b> <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Shafts activated.</li> </ul>
Procedure	


- Activate the shafts
1. Comply with safety regulations.
  2. Select Main Menu.




- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.




**3. Select Shredder Menu.**

- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.


**4. Select Test Mode menu.**

- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.

**5. Select the “Shaft” function.**



- Press and hold the “Left Shaft ON / OFF” function key. 
- Hold the function button down for as long as the movement is to be active.  
When the function key is released, the movement stops.



- Press and hold the “Right Shaft ON / OFF” function key. 
- Hold the function button down for as long as the movement is to be active.  
When the function key is released, the movement stops.

## 6.6.6


## Direction of shaft rotation

⚠ <b>Caution</b>	
	<p><b>Danger of material ejection and falling from the machine.</b>  <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Before starting work with the control panel, machine loading must be interrupted.</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
⚠ <b>Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
⚠ <b>Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> The shafts turn in the reverse direction of rotation.</li> </ul>
<b>Procedure</b>	

Reverse the direction of shaft rotation

1. Comply with safety regulations.
2. Select Main Menu.




- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.




### 3. Select Shredder Menu.



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.




### 4. Select Test Mode menu.



- Press the “Test Mode operation” function key. 
- The screen goes to “Test Mode Operation”.

### 5. Select the “Reverse operation” function.





- Press the “Reverse left shaft” function key. 
- The symbol arrow reverses.  
The shaft reverses. 
- Press the “Reverse right shaft” function key. 



- 
- The symbol arrow reverses.  
The shaft reverses.



## 6.7 Material loading


<b>⚠ Caution</b>	
	<p><b>Danger of material ejection and falling from the machine.</b>  <b>This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Do not access the danger zone.</li> <li><input type="checkbox"/> Only authorised or trained personnel can perform this operation, observing all the instructions in the manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph <b>“5.1 Safety during installation and use”</b>.</p>
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Engine on.</b></li> <li><input type="checkbox"/> <b>Magnetic sorter, discharge belt and shredder on.</b></li> </ul>
<b>⚠ Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Material loading hopper.</b></li> </ul>
<b>Procedure</b>	

**1. Comply with safety regulations.**

**2. Loading material**

The material can be loaded into the hopper with an excavator or mechanical shovels.

There is also the possibility of direct loading via a front-mounted system.



<b>⚠ Caution</b>	
	<p><b>To ensure proper machine operation, never load the hopper before starting the magnetic sorter, discharge belt and shredder, as the material will clog it and it will be impossible to start the machine.</b></p>
<b>Warning</b>	

**Correct material loading**

Production depends on correct feeding.

- ☐ Load material into the front of the hopper.
- ☐ Load the material continuously.

## 6.8 Processing programs

<b>⚠ Caution</b>	
	<p><b>Danger of material ejection and falling from the machine. This creates a risk of contusions, trauma and fractures.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Stop machine loading.</li> <li><input type="checkbox"/> Only authorised or trained personnel can perform this operation, observing all the instructions in the manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention to the paragraph “5.1 Safety during installation and use”</b>.</p>
<b>⚠ Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Engine on.</b></li> <li><input type="checkbox"/> <b>Magnetic sorter on.</b></li> <li><input type="checkbox"/> <b>Discharge conveyor on.</b></li> <li><input type="checkbox"/> <b>Shredder on.</b></li> <li><input type="checkbox"/> <b>Radio remote control mode deactivated.</b></li> </ul>
<b>⚠ Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Desired processing program selected.</b></li> </ul>



A special program can be selected for processing depending on the feed material.

For each program, the shafts run through a cycle with defined shaft speeds and shaft RPM, thus ensuring an economical shredding process.

If the machine is started in automatic operation, the shafts work in synchronous operation. This applies to all special wood and rubble processing programs.

The processing program for mixed waste, on the other hand, starts with the shafts in asynchronous operation.


However, the operator can choose between synchronous and asynchronous operation at any time.

## Procedure

1. **Comply with safety regulations.**


## 2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.




## 3. Select “Shredder menu”.



- Press the “Shredder” function key. 
- The screen goes to the Shredder Menu.

## 4. Select the desired processing program.



- ☐ Wood processing 
- ☐ Cement processing 
- ☐ Mixed waste processing 
- Press the function key of the desired machining program.



- 
- A green border lights up on the symbol of the desired machining program.  
The desired machining program is activated.

**6.8.1**
**Wood and green waste processing**




Shafts with a special geometry are available for wood processing.

Please contact the manufacturer or your dealer for further information.


**Start-up**



- Press the “Wood” function key. 
- A green border lights up on the “Wood” symbol. 

**To deactivate**



- Press the “Wood” function key. 
- No green border lights up on the “Wood” symbol. 

**6.8.2**
**Quarry and rubble processing**

**Start-up**

- Press the “Cement” function key. 
- A green border lights up on the “Cement” symbol. 

**To deactivate**



- Press the “Cement” function key. 
- No green border lights up on the “Cement” symbol. 







**6.8.3**
**Waste processing**

**Start-up**

- Press the “Waste” function key. 
- A green border lights up on the “Waste” symbol. 


**To deactivate**

- Press the “Waste” function key. 
- No green border lights up on the “Waste” symbol. 

## 6.9 Menu functions

### 6.9.1


### Crawler tracks

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.</p>
Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine on.</li> <li><input type="checkbox"/> Radio remote control deactivated on the control display.</li> </ul>
Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Slow / fast feeding on.</li> </ul>
Procedure	

#### Slow feeding start-up

1. Comply with safety regulations.
2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


3. Select the “Crawler tracks” function.



- Press the “Browse (advanced functions)” function key.



#### 4. Select the “Slow feeding” function.

- Press the “Slow feeding” function key. 
- A green border lights up on the “Slow feeding” symbol.




Slow feeding is activated.

#### Fast feeding start-up

1. Comply with safety regulations.
2. Select Main Menu.



- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.


#### 3. Select the “Crawler tracks” function.



- Press the “Browse (advanced functions)” function key.



#### 4. Select the “Slow feeding” function.


- Press the “Fast feeding” function key. 
- A green border lights up on the “Fast feeding” symbol.



Fast feeding is activated.

## 6.9.2


## Low beam headlights

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
⚠ Requirements	
	<input type="checkbox"/> Start-up on.
⚠ Objective	
	<input type="checkbox"/> Lights on / off.
Procedure	

## Lights start-up


1. Comply with safety regulations.
2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

3. Select the “Lights” function.



- Press the “Browse (advanced functions)” function key 2 times. 


#### 4. Switch on the lights.

- Press the “Lights” function key. 
- A green border lights up on the “Lights” symbol.   
The lights are on.

#### Lights shut-down


1. Comply with safety regulations.
2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

#### 3. Select the “Crawler tracks” function.



- Press the “Browse (advanced functions)” function key 2 times. 

#### 4. Switch off the lights.


- Press the “Lights” function key. 
- No green border lights up on the “Lights” symbol.   
The lights are off.





## 6.9.3


## Dust protection system

Warning	
	Read and understand <b>all instructions</b> before working with this machine. Pay <b>particular attention</b> to the paragraph “5.1 Safety during installation and use”.
Requirements	
	<input type="checkbox"/> Dust protection system connected to the water supply. <input type="checkbox"/> Engine on
Objective	
	<input type="checkbox"/> Dust protection system on / off.
Procedure	

Dust protection system  
start-up


1. Comply with safety regulations.
2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

3. Select the “Dust protection system” function.



- Press the “Browse (advanced functions)” function key 2 times. 


#### 4. Start up the Dust protection system.

- Press the “Dust protection system” function key. 
- A green border lights up on the “Dust protection system” symbol.   
The dust protection system is on.

#### Dust protection system shut-down


1. Comply with safety regulations.
2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

3. Select the “Crawler tracks” function.





- Press the “Browse (advanced functions)” function key 2 times. 

#### 4. Switch off the dust protection system.

- Press the “Dust protection system” function key. 
- No green border lights up on the “Dust protection system” symbol.   
The dust protection system is off.

## 6.9.4

## Refuelling pump

⚠ <b>Caution</b>	
	<p><b>Danger due to the handling of hazardous substances.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as general material damage if objects or obstacles are left in the danger zone.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Wear protective clothing.</li> <li><input type="checkbox"/> Make sure that the relevant safety data sheet according to Regulation (EC) No 1907/2006 Annex II. is at hand.</li> <li><input type="checkbox"/> Observe the directions in the safety data sheet.</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention</b> to the paragraph <b>“5.1 Safety during installation and use”</b>.</p>
⚠ <b>Requirements</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Start-up on.</b></li> <li><input type="checkbox"/> <b>Refuelling pump connected.</b></li> </ul>
⚠ <b>Objective</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Refuelling pump on / off.</b></li> </ul>
<b>Procedure</b>	

## Refuelling pump start-up

1. Comply with safety regulations.
2. Select Main Menu.




- Press the “Main Menu” function key. 



- The screen goes to the Main Menu.

### 3. Select the “Refuelling Pump” function.



- Press the “Browse (advanced functions)” function key 3 times. 

### 4. Switch on the refuelling pump.


- Press the “Refuelling pump” function key. 
  - A green border lights up on the “Refuelling pump” symbol. 
- The refuelling pump is on.

## Refuelling pump shut-down

### 1. Comply with safety regulations.


### 2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

### 3. Select the “Refuelling Pump” function.



- Press the “Browse (advanced functions)” function key 3 times. 



#### 4. Switch off the refuelling pump.

- Press the “Refuelling pump” function key. 
- No green border lights up on the “Refuelling pump” symbol.   
The refuelling pump is off.

## 6.9.5


## Particle filter

## Start up the regeneration cycle


Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention to the paragraph “5.1 Safety during installation and use”</b>.</p>
Warning	
	<p><b>Additional documents</b></p> <p>The information provided is for the operator.</p> <ul style="list-style-type: none"> <li>□ Further information or information for other groups of persons can be found in the manufacturer's reference documents.</li> </ul>
Requirements	
	<ul style="list-style-type: none"> <li>□ Engine on.</li> <li>□ Plant out of service.</li> </ul>
Objective	
	<ul style="list-style-type: none"> <li>□ Regeneration cycle started.</li> <li>□ Particle filter cleaned at the end of the regeneration cycle performed in full.</li> </ul>
Procedure	

1. Comply with safety regulations.
2. Select Main Menu.





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

**3. Select the “Regeneration cycle” function.**

- Press the “Browse (advanced functions)” function key 4 times. 




**4. Start up the regeneration cycle.**

- Press the “Automatic regeneration” function key. 
- A green border lights up on the “Automatic regeneration” symbol. 

Automatic regeneration of the exhaust gas cleaning system is activated.




## Interrupt the regeneration cycle

Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p>Pay <b>particular attention to the paragraph “5.1 Safety during installation and use”</b>.</p>
Warning	
	<p><b>Additional documents</b></p> <p>The information provided is for the operator.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Further information or information for other groups of persons can be found in the manufacturer's reference documents.</li> </ul>
Warning	
	<p>If the warning that particle filter regeneration is necessary is not observed, performance is reduced and the engine becomes damaged.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Observe the warning.</li> <li><input type="checkbox"/> Perform regeneration.</li> <li><input type="checkbox"/> Comply with the manufacturer's instructions.</li> </ul>
⚠ Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Regeneration cycle started.</b></li> </ul>
⚠ Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Regeneration cycle interrupted.</b></li> </ul>
Procedure	


1. **Comply with safety regulations.**
2. **Select Main Menu.**





- Press the “Main Menu” function key. 
- The screen goes to the Main Menu.

3. **Select the “Regeneration cycle” function.**



- Press the “Browse (advanced functions)” function key 4 times. 

4. **Interrupt the regeneration cycle.**

- Press the “Regeneration cycle OFF” function key. 
- A green border lights up on the “Automatic regeneration deactivated” symbol.   
Automatic regeneration of the exhaust gas cleaning system is deactivated.

## 6.10 Grille position



A product of 0 to 80 mm can be obtained with the grilles closed.

A product of 0 to 100 / 150 mm can be obtained with the grilles open.

### Warning



#### Damage to shafts

The machine shafts can become damaged when the grilles are opening or closing .

- ☐ **The shafts must be turned to the zero position before opening or closing the grilles.**

### 6.10.1

### Opening the grilles

### Warning



Read and understand **all instructions** before working with this machine.

- ☐ Pay **particular attention to the paragraph “5.1 Safety during installation and use”**.

### Warning



#### Fix the grilles with their respective pins.

The grille fixing pins must be fitted before processing with this plant.

- ☐ Before opening or closing the grilles, the respective fixing pins must be removed.
- ☐ The grille fixing pins must be fitted before working with this machine.

### ⚠ Requirements

- ☐ Engine off.
- ☐ **EMERGENCY STOP** button pressed.
- ☐ Machine locked and marked.

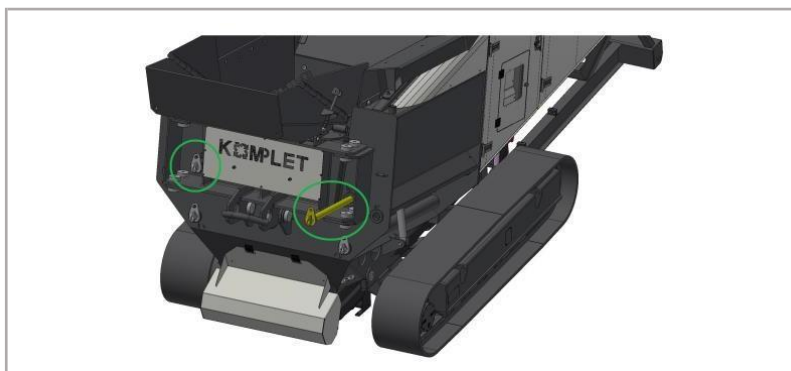
### ⚠ Objective

- ☐ Grilles open.

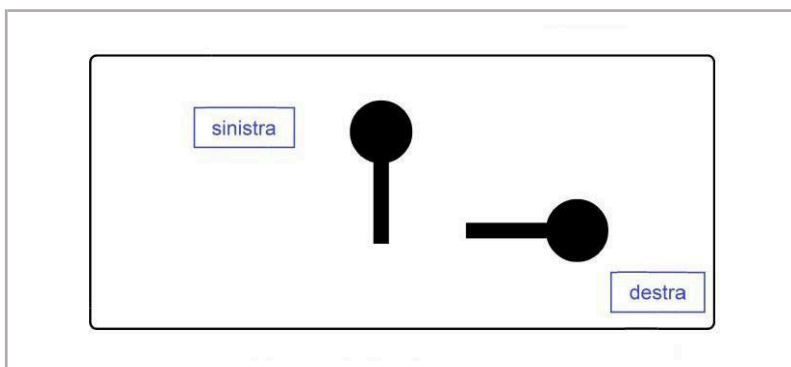
### Procedure

1. Comply with safety regulations.

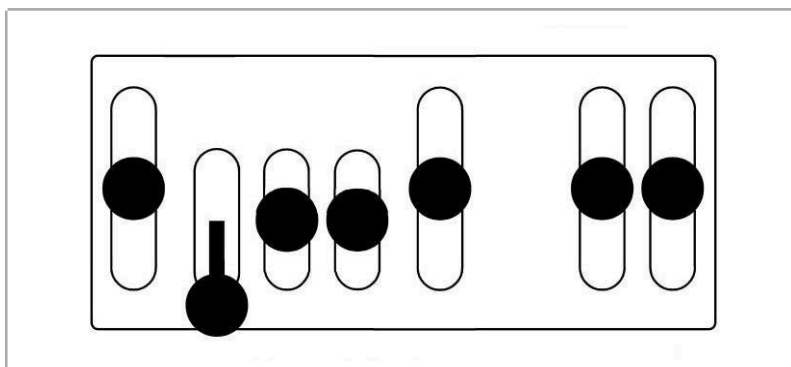


**2. Remove the grille fixing pins.****3. Open the right grille.**

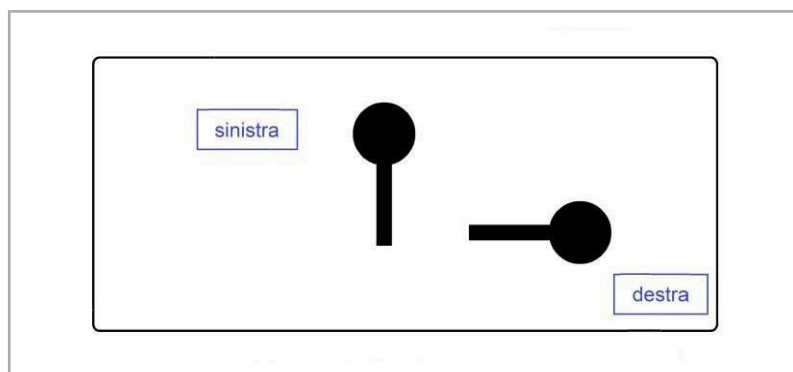
- Position the switching grille on the right grille.



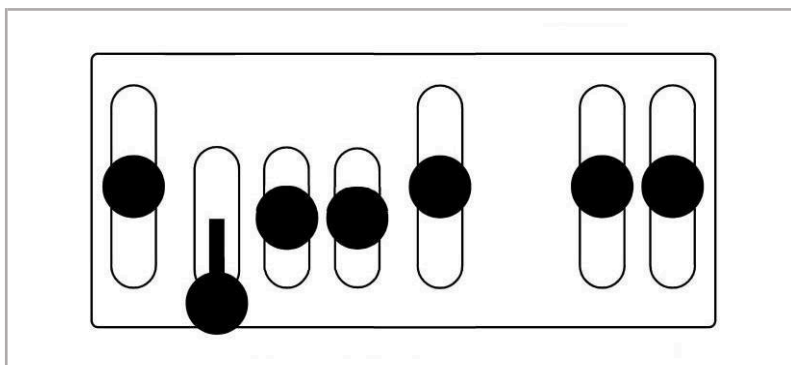
- Move the control lever downward.

**4. Open the right grille.**

- Position the switching grille on the left grille.



- Move the control lever downward.





**5. Insert the grille fixing pins**

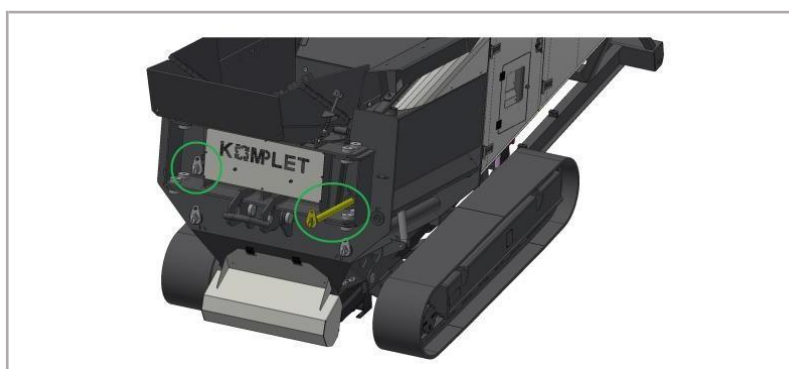


## 6.10.2

## Closing the grilles

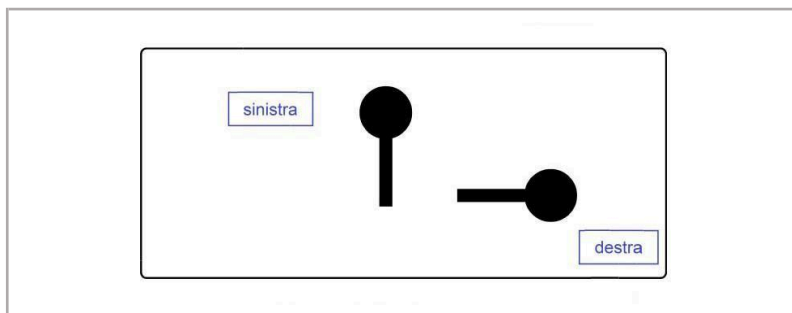
Warning	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Pay <b>particular attention to the paragraph “5.1 Safety during installation and use”</b>.</li> </ul>
Warning	
	<p><b>Fix the grilles with their respective pins.</b></p> <p>The grille fixing pins must be fitted before processing with this plant.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Before opening or closing the grilles, the respective fixing pins must be removed.</li> <li><input type="checkbox"/> The grille fixing pins must be fitted before working with this machine.</li> </ul>
Requirements	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Engine off.</li> <li><input type="checkbox"/> <b>EMERGENCY STOP</b> button pressed.</li> <li><input type="checkbox"/> Machine locked and marked.</li> </ul>
Objective	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grilles closed.</li> </ul>
Procedure	

1. Comply with safety regulations.
2. Remove the grille fixing pins.

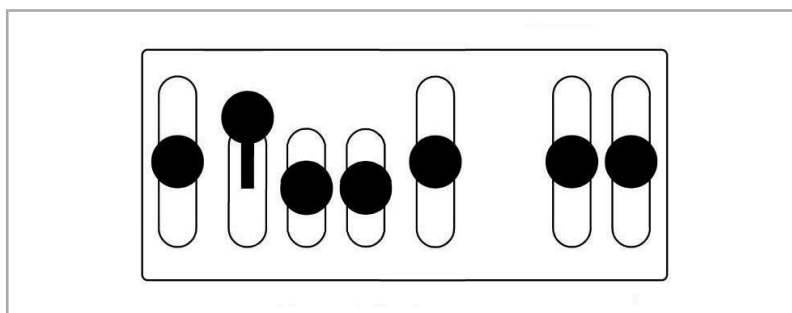


3. Close the right grille.
  - Position the switching grille on the right grille.



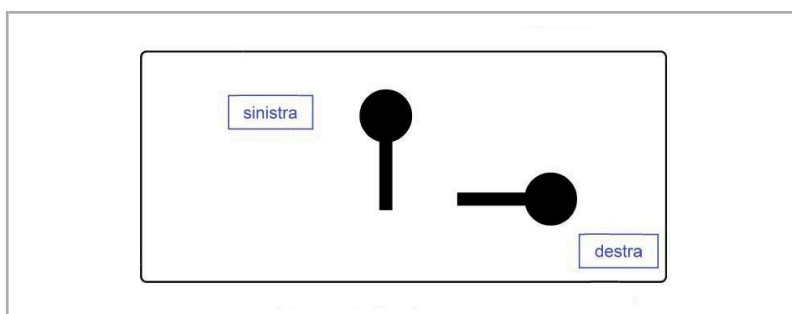


- Move the control lever upward.

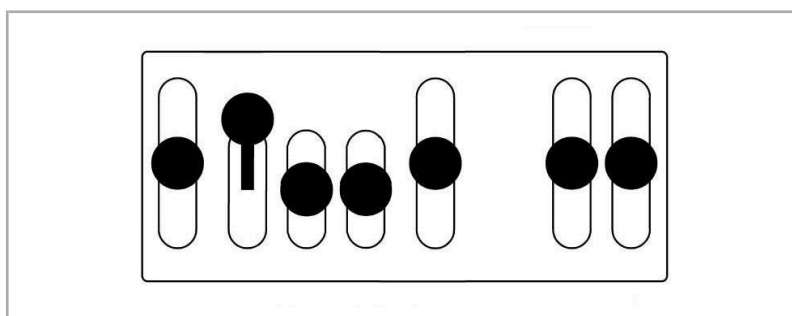


**4. Close the left grille.**

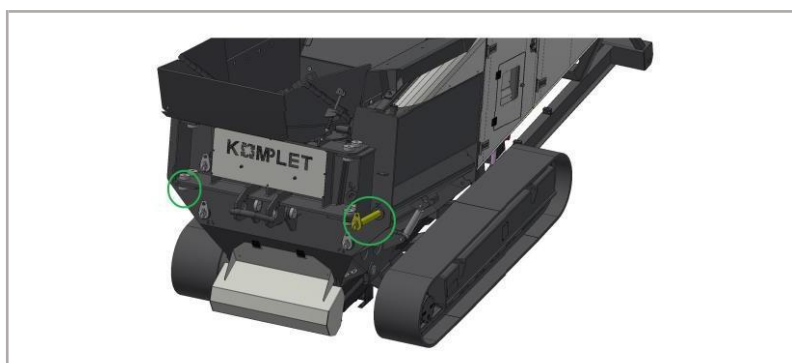
- Position the switching grille on the left grille.



- Move the control lever upward.



**5. Insert the grille fixing pins**



## 6.11 Intended use

The SH-60 is able to crush any kind of material permitted according to this manual. However, it is important to observe certain rules in order to keep the crusher perfectly efficient.

- Read the instructions in this manual carefully before using the machine. Familiarise yourself with the correct use of the machine and its controls.
- Only use the machine for the purpose for which it was designed, i.e. crushing materials permitted in this manual. Any other use may be harmful and may damage the machine.
- Although the machine does not require a permanent operator, never allow the machine to be used by anyone who is not familiar with the instructions in this manual.
- Since the machine does not require a permanent operator to operate it, never leave it unattended during work sessions. Please note that the owner or user is responsible for any accidents or risks caused to third parties or their property.
- Make sure that the work area is sufficiently clear to allow the machine to be loaded safely. The work area must be marked off with signs and not accessible to unauthorised persons.
- Ensure that the machine is horizontal and that the crawler tracks are fully on the ground.
- Position the machine in a stable position and make sure that all moving parts are correctly secured.
- Before starting to load the hopper, remember to start the discharge belt, magnetic sorter and shredder.
- Be careful not to overload the crusher. An excessive amount of material may clog it.
- Always wear protective work clothes, safety helmets and safety goggles.
- **Always ensure that the machine rests on level ground when working and that the crawler tracks adhere fully. Never work if the machine is tilted, as this may impair the proper functioning of the shredder and the belts.**

### ⚠ Caution



**Pressurised fluids:** the hydraulic system can reach pressures in excess of 200 bar when the machine is in operation. Damage to connections or hoses can cause high-pressure hydraulic oil to leak out. Always wear protective clothing and safety goggles and gloves. Use cardboard close to the hoses to check for an oil leak. Do not touch the part, even if you are wearing protective clothing.

### ⚠ Caution



**Shearing or crushing hands:** all moving parts (belts and rollers) can constitute a source of danger during work phases. Despite the protective devices fitted to the machine, it is important to always act with caution and avoid bringing parts of the body into contact with moving parts. Always wear protective clothing and avoid clothing that could get caught in moving parts of the machine.

## 6.12 Improper use

- Never allow unauthorised persons to operate or use the SH-60.
- Although the machine does not require a permanent operator, never allow the machine to be used by anyone who is not familiar with the instructions in this manual.
- Never neglect routine checks that guarantee correct machine operation.
- Never use the machine with guards or covers deteriorated or missing, as this may compromise the operator's safety.
- Never operate the machine with the bonnets and doors open or the guards removed.
- Please note that the owner or user is responsible for any accidents or risks caused to third parties or their property.
- **Pay attention to and check the type of material to be crushed; it must belong to the category of non-hazardous waste according to articles 31 and 33 of Legal decree no. 22 of 5/2/97.**
- Use of the machine for the disposal or recycling of substances or materials that do not belong to the category described above is prohibited (asbestos cement/Eternit, asbestos or other polluting or dangerous substances).
- Operating the tracks or the discharge belt using the emergency control levers is strictly prohibited. These levers may only be used in absolute emergency situations and only by ARK personnel.

## 7. Technical Information

### 7.1 Machine

**Manufacturer** KOMPLET spa via Antonelli 49,  
60012 TRECASTELLI (AN)  
www.komplet.it  
+39 - 071 - 6609823  
info@komplet.it.

**Type** Double shaft shredder

**Model** SH-60

**Machine serial number**

**Edition number**

### 7.2 Dimensions and weights

**Machine weight** 14,000 kg  
The weight of the machine is distributed over both chassis tracks.

<b>Transport</b>	Length	6.90	m
	Width	2.20	m
	Height	2.95	m

<b>Use</b>	Length	8.15	m
	Width	2.05	m
	Height	3.45	m

### 7.3 Performance data

Power supply unit	Loading surface	3.5	m³
	Loading height	2.55	m
	Hopper volume	2	m³
	Material loaded	<ul style="list-style-type: none"><li>• Topsoil</li><li>• Rubble</li><li>• Cement</li><li>• Natural stones</li><li>• Bricks</li><li>• Ceramics</li><li>• Railway sleepers</li><li>• Household waste</li><li>• Bulky waste</li></ul>	
Crushing unit	Type	Double shaft shredder	
	Dimensions	1500 mm X 1200 mm	
Magnet	Type	Permanent magnet	
Discharge belt	Type	Hydraulically driven and foldable transport conveyor for transport	
	Drive unit	Hydraulic motor	
Discharge height	Ferrous material	1.45 m	
	Product	2.20 m	
Propulsion engine	Type	VOLVO Penta TAD582VE	
	Model	4-cylinder turbo-charged diesel engine	
	Cylinder capacity	5100 cc	
	Power	160 kW at 2000 rpm	
	Fuel preparation	Common Rail injection	
	Emission category	EU Stage V	
	No load operation	900 rpm	
Control panel	Type	Use with a single operator	
	Crawler tracks	Controlled via radio remote control	
	Preparation	Hydraulically on the machine with the control lever	

	Use	In automatic with the control panel
<b>Mobility</b>	Overland	Transport by lorry or with hook does not require a permit
	On site	Unlimited mobility thanks to efficient crawler tracks
	Crawler track speed	km/h

#### 7.4 Lubricant table

OIL TYPE			
	DEUTZ	WARM CLIMATE	COLD CLIMATE
MOTOR OIL	15W40		
HYDRAULIC OIL	ISO 46	HDZ 68	HDZ 32
RADIATOR LIQUID	VOLVO VCS YELLOW OR ORANGE	Consult the engine manual and contact ARK for further information. When refuelling, the fluid must always be of the same colour and nature as the fluid in the machine. NEVER MIX LIQUIDS OF A DIFFERENT COLOUR OR NATURE.	
CRAWLER TRACKS	85W 140		
SHAFT REDUCTION GEARS (60L)	ISO 150		
GREASE TYPE			
GENERAL BEARINGS	GREASE LX EP 2		
SHREDDING SHAFTS	GREASE LX EP 2		

## 7.5 Noise data

The SH-60 has been tested for noise emissions in accordance with Directive 2006/42/EC.

The maximum recorded sound pressure is 87 dB(A).

The rules used for sound recordings are:

UNI EN ISO 11201/2010



UNI EN ISO 11204/2010

The sound power level emitted by the machine is:

**87 dB(A)**





The standard used to determine the sound power is EN ISO 3744.

Warning	
	Please wear hearing protection.
Warning	
	<b>Additional documents</b> <input type="checkbox"/> Further data and information can be found in the documents attached to this manual.

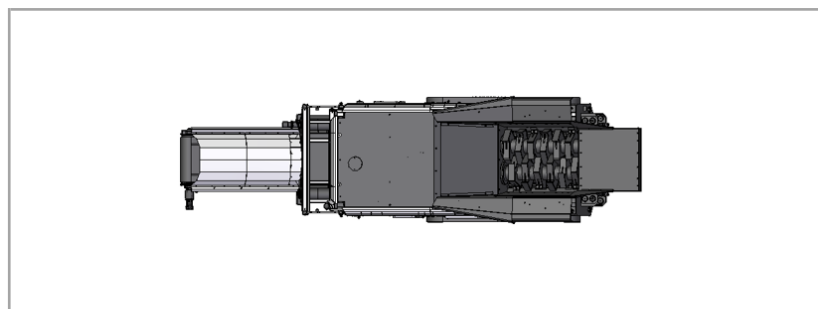



## 8. Maintenance work

### 8.1 Safety during maintenance

<b>⚠ Caution</b>	
	<p><b>Danger due to improper maintenance of the machine.</b> <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Only authorised persons may service the machine in accordance with the instructions in this manual.</li><li><input type="checkbox"/> Wear prescribed personal protective clothing.</li></ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to unintentional start-up of the machine.</b> <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Lock the machine against unintentional start-up (<b>Disconnect the electrical panel and disconnect the power plug</b>).</li><li><input type="checkbox"/> Mark the machine with a “maintenance work” warning sign (<b>Mark the machine</b>).</li></ul>

**Danger zone: machine locked**    There is no danger zone as long as the machine remains locked.



<b>Warning</b>	
	<p>There are <b>specific types of danger</b> present on the machine and its units even if there is no danger zone when the machine is locked <b>during maintenance</b>. Warnings for specific types of danger can be found in the <b>Safety Chapter</b>.</p>

**Group of authorised persons** Only installers/maintenance personnel trained in accordance with the manufacturer's instructions are authorised for machine maintenance.

We recommend that maintenance work on the SH-60 be carried out by ARK customer service.

The manufacturer/supplier will not be liable for damage caused by improper maintenance.

**Persons to be instructed** Persons who do not have the prescribed qualification must be instructed.

Persons must be instructed in particular in:

- Safety
- Personal protective clothing
- Danger zones
- Machine description
- EMERGENCY STOP devices
- Protective devices
- Alarm devices
- Fault indicators
- Checks before starting
- Motor start-up
- Preparing for work

A corresponding description can be found in paragraph "1.3.1 Qualified personnel".

**Personal protective clothing** The personal protective clothing mentioned below must be worn when performing maintenance on the machine.





Wear high visibility  
clothing



Wear safety gloves



Wear safety  
goggles

## 8.2 Terminology

<b>Maintenance</b>	The combination of all technical and administrative measures as well as management measures during the life cycle of a piece of equipment (technical unit) for the preservation of a functional state or for restoring the original state, thus it can fulfil the required function. The definitions, inspection, maintenance and repair work, constitute the generic term "maintenance".
<b>Inspection</b>	Measures for the assessment and evaluation of the current state of a piece of equipment, including the identification of the causes of wear or damage and the derivation of the necessary consequences for future use.
<b>Maintenance work</b>	Measures for maintaining the nominal condition of equipment. Cleaning, lubrication, periodic replacement of filters, topping up or replacement of operating fluids keep the machine in optimum condition.
<b>Repairs</b>	<p>Measures to restore a piece of equipment to its nominal condition, for example by replacing worn or defective parts with specific spare parts.</p> <p>Specific spare parts are those that correspond to the manufacturer's pre-defined specifications.</p>
<b>Checks</b>	After repairing any component or part of the machine, check its functioning, checking the safety-related operating data with test cycles and make any necessary adjustments.

### 8.3 Maintenance rules

Correct maintenance is essential to protect the function and value of the machine. Functional and operational failures are avoided by correct and regular maintenance. Doing so can help maintain the capacity and profitability of the machine. Correct maintenance protects the environment.

#### **Lubrication, topping up and draining of operating fluids**

For lubrication, follow the lubrication plan and the prescribed instructions.

Be sure to observe the following points:

- Filling and draining seals must be cleaned before they are opened and care must be taken to ensure that no dirt enters inside.
- Do not use fibrous cloths or iron straw to clean lubricant containers or lubrication points.
- Do not use petroleum or liquids containing benzene as fuel to clean lubricant containers or lubrication points. Liquid washing oil must be used.
- Drain fluids (engine oil, hydraulic oil, etc.) when the machine is at operating temperature.
- Only use fluids with the prescribed specifications.
- Do not mix fluids.
- Dispose of fluids as prescribed and in an environmentally friendly manner.

#### **Cleaning**

Deposits of material are created during operation, even if the machine is working properly. These are mainly dust but also residues of fine screened material or material friction. The machine must be regularly cleaned of these deposits.

Use suitable aids such as brooms, brushes, poles, etc.

**Maintenance intervals**

In this manual, maintenance intervals are given in operating hours. Below is a conversion table at periodic intervals, valid for one shift.

Hours	Occasionally
8	Every day
50	Every week
160	Every month
500	Every three months
1000	Every six months
2000	Annually
6000	After 3 years

## 8.4 Tank capacity and operating fluids

<b>Tank capacity</b>	Fuel	350	L
	Engine oil	16	L
	Coolant	26	L
	Hydraulic oil	120	L

**Operating fluids**

The following table contains the recommended operating fluids for the respective units. Operating fluids are specified with the product name. Equivalent products from other manufacturers are permitted.

Fuel	Prescribed by the manufacturer
Engine oil	Prescribed by the manufacturer
Hydraulic oil (up to 30°C)	ISO 46
Lubricating grease	LX-EP-2
Crawler track transmission oil	ISO 150

## 8.5 Inspection and maintenance

In order to ensure perfect working efficiency in safe conditions, it is important to carry out regular checks and maintenance operations that reduce running costs and extend the life of the machine be carried out regularly.

Then there are the working positions for machine inspection and maintenance, subdivided into operating hours performed as well as the respective interval, to be performed by the machine operator him/herself.

The maintenance plan establishes intervals within which checks and maintenance work must be carried out.

Please note that the maintenance schedule is influenced by specific operating situations. If the machine operates under particularly adverse and difficult conditions, it is advisable to set shorter intervals

### Warning



The maintenance plan **does not replace servicing**, which must be carried out every 50, 500, 1000, 2000 and 6000 operating hours by an **authorised service technician**.

#### Propulsion engine

Information on servicing the propulsion engine can be found in the engine manufacturer's documentation which is supplied with the machine.

ARK recommends that service work on the drive motor be carried out by a specialist company authorised by the propulsion engine manufacturer.

The manufacturer/supplier will not be liable for damage caused by improper maintenance.

### Warning






The maintenance plan does not replace servicing of the propulsion engine, which must be carried out **by a specialised company authorised by the manufacturer**.

## 8.5.1

**Maintenance plans**

Every 8 hours of operation or daily

<b>⚠ Caution</b>	
	<p><b>Danger due to improper maintenance of the machine.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only authorised persons may service the machine in accordance with the instructions in this manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to unintentional start-up of the machine.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Lock the machine against unintentional start-up (<b>Lock the machine</b>).</li> <li><input type="checkbox"/> Mark the machine with a “maintenance work” warning sign (<b>Mark the machine</b>).</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p><b>Pay particular attention to the safety section</b> at the beginning of this chapter.</p>



**CRUSHING PLANT**

(Walk around the machine and check it thoroughly!)

- ☐ 1 Check that there is no visible damage on the entire machine.
- ☐ 2 Check the EMERGENCY STOP devices.
- ☐ 3 Check the protective devices.
- ☐ 4 Check signs.
- ☐ 5 Elimination of material accumulations.

**DRIVE UNIT****Propulsion engine**

See propulsion engine documentation.

- ☐ 6 Motor oil level check.
- ☐ 7 Check the fuel level.
- ☐ 8 Check the coolant level.
- ☐ 9 Check the screen indicating that the air filter is clogged.
- ☐ 10 Drain the fuel filter.

**Hydraulic system**

- ☐ 11 Check the hydraulic system for leaks.
  - Pumps
  - Hoses
  - Connections
  - Valves
  - Engines
- ☐ 12 Check the hydraulic oil level.

**Electrical system**

- ☐ 13 Check the warning lights on the control panel.
- ☐ 14 Check error messages on the control display.
- ☐ 15 Check the battery charge of the radio remote control.
- ☐ 16 Check the radio remote control charging cable.

**Notes****Time/Date/Name**

- ☐ The above activities have been performed.

Remarks

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Every 50 hours of operation or weekly

**⚠ Caution****Danger due to improper maintenance of the machine.****Risk of serious or fatal injury!**

In addition, there is a risk of environmental and machine damage as well as material damage in general.

- ☐ Only authorised persons may service the machine in accordance with the instructions in this manual.
- ☐ Wear prescribed personal protective clothing.

**⚠ Caution****Danger due to unintentional start-up of the machine.****Risk of serious or fatal injury!**


In addition, there is a risk of environmental and machine damage as well as material damage in general.

- ☐ Lock the machine against unintentional start-up (**Lock the machine**).
- ☐ Mark the machine with a “maintenance work” warning sign (**Mark the machine**).

**Warning**

Read and understand **all instructions** before working with this machine.

**Pay particular attention to the safety section** at the beginning of this chapter.




☐ Works performed according to the lubrication plan.☐ Carry out the daily maintenance plan operations.**CRUSHING UNIT**☐ 1 Check the shafts**DRIVE UNIT**  
**Propulsion engine** See propulsion engine documentation.☐ 2 Check the belts.☐ 3 Clean the motor radiator.**Hydraulic system**☐ 4 Clean the hydraulic system radiator.**Electrical system**☐ 5 Check the acid level in the starter battery.**MAGNETIC SORTER**☐ 6 Check the oil level in the gearbox.**DISCHARGE BELT**☐ 6 Check the oil level in the gearbox.**CRAWLER TRACKS**☐ 6 Check the oil level in the gearbox.**Notes****Time/Date/Name**☐ The above activities have been performed.☐ Works performed according to the lubrication plan.

Remarks

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## 8.5.2

## Lubrication plans

<b>⚠ Caution</b>	
	<p><b>Danger due to improper maintenance of the machine.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Only authorised persons may service the machine in accordance with the instructions in this manual.</li> <li><input type="checkbox"/> Wear prescribed personal protective clothing.</li> </ul>
<b>⚠ Caution</b>	
	<p><b>Danger due to unintentional start-up of the machine.</b>  <b>Risk of serious or fatal injury!</b></p> <p>In addition, there is a risk of environmental and machine damage as well as material damage in general.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Lock the machine against unintentional start-up (<b>Lock the machine</b>).</li> <li><input type="checkbox"/> Mark the machine with a “maintenance work” warning sign (<b>Mark the machine</b>).</li> </ul>
<b>Warning</b>	
	<p>Read and understand <b>all instructions</b> before working with this machine.</p> <p><b>Pay particular attention to the safety section</b> at the beginning of this chapter.</p>

Every 8 hours of operation or daily

<b>GREASING LOG</b>		
<b>MAINTENANCE AREA</b>	<b>FREQUENCY</b>	<b>QUANTITY</b>
Extraction belt rollers	8 hours	4 grams
Magnetic belt	8 hours	4 grams
Shredding shafts	8 hours	15 grams
Engine radiator fan	8 hours	4 grams

Every 50 hours of operation or weekly

GREASING LOG		
MAINTENANCE AREA	FREQUENCY	QUANTITY
Cylinders	50 hours	4 grams
Crawler tracks	If necessary	

**CRUSHING UNIT**

<input type="checkbox"/>	1	Crusher bearing	10 g - 5 grease strokes	LX-EP-2
<input type="checkbox"/>	2	Crusher bearing	10 g - 5 grease strokes	LX-EP-2
<input type="checkbox"/>	3	Crusher bearing	10 g - 5 grease strokes	LX-EP-2
<input type="checkbox"/>	4	Crusher bearing	10 g - 5 grease strokes	LX-EP-2
<input type="checkbox"/>	5	Crusher drive bearing	10 g - 5 grease strokes	

**MAGNETIC SORTER**

<input type="checkbox"/>	6	Return drum bearings	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	7	Return drum bearings	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	8	Engine drum bearing	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	9	Engine drum bearing	4 g - 2 grease strokes	LX-EP-2

**DISCHARGE BELT**

<input type="checkbox"/>	10	Return drum bearings	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	11	Return drum bearings	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	12	Engine drum bearing	4 g - 2 grease strokes	LX-EP-2
<input type="checkbox"/>	13	Engine drum bearing	4 g - 2 grease strokes	LX-EP-2

Notes on works carried out

Name/Date

- ☐ The above activities have been performed.

Remarks

**8.5.3**
**Preloads and tightening torques**

The table shows the recommended maximum preloads and tightening torques for metric coarse thread.

**Recommended Maximum Bolt Loads and Torque Values (Metric Coarse Threads)**

	3.6		5.6		6.9		8.8		10.9		12.9		A/F
mm	Newtons	N.m	Newtons	N.m	Newtons	N.m	Newtons	N.m	Newtons	N.m	Newtons	N.m	mm
2	284	0.12	378	0.16	731	0.31	863	0.37	1216	0.52	1461	0.63	4
3	726	0.44	966	0.59	1863	1.13	2206	1.34	3109	1.88	3727	2.26	5.5
4	1255	1.00	1677	1.34	3226	2.60	3825	3.04	5374	4.31	6453	5.15	7
5	2059	1.96	2736	2.65	5286	5.10	6257	6.03	8806	8.48	10591	10.20	8
6	2903	3.43	3864	4.51	7453	8.73	8836	10.30	12405	14.71	14906	17.65	10
8	5315	8.24	7090	10.79	13680	21.57	16230	25.50	22751	35.30	27360	42.17	13
10	8473	16.7	11278	21.57	21771	42.17	25791	50.01	36284	70.61	43541	85.32	17
12	12356	28.4	16475	38.25	31773	73.55	37657	87.28	52956	122.60	63547	147.10	19
16	23340	69.6	31087	93.16	60016	178.50	71196	210.80	100027	299.10	120131	357.90	24
20	36481	135	48641	180	93849	384.1	111305	411.9	156415	578.6	187796	696.3	30
24	52563	230	70019	308.9	135331	598.2	160338	711.0	225552	1000	270662	1196	36
30	84043	466	112286	622.7	215745	1206	255952	1422	359902	2010	432471	2403	46
36	123073	814	164261	1089	316753	2099	374612	2481	527595	3491	432526	4197	55
42	169164	1304	225552	1746	435413	3364	515827	3991	725688	5609	870826	6727	65



**8.6 Maintenance plan**

Maintenance area	Frequency					
	Every 8 hours	First 100 hours	200 hours	Every 500 hours	Every 1000 hours	2000 hours
<b>Hydraulic system</b>						
Hydraulic Oil	●			■	■	■
Hydraulic oil return filter	■	■	■	■	■	■
High pressure filter		■	■	■	■	■
Shredder pump filter		■	■	■		
Tank vent	●	■	■	■	■	■
Oil bath pre-filter (replace when necessary)	●	■	■	■	■	■
<b>VOLVO Engine</b> (see engine manual for general maintenance)						
Engine oil	●					
Diesel filter				■		
Engine oil filter				■		
Air filter	●	■ ■	■	■		
Radiator liquid	●					
Engine belt				●		■
Belt tensioning	●		●	■		■
ADB filter cartridges						■
Reduction Gear Oil	●	■			■	■

Check / Top up	●
Replacement	■

**Warning**

**IMPORTANT**

The maintenance schedule is to be considered as indicative and it is always advisable to refer to the engine use and maintenance manual.

Routine maintenance may vary according to the use of the machine and therefore the schedule indicated is to be considered indicative.

Only the end user can determine the correct maintenance intervals by observing the working conditions and analysing the machine components and parameters.

Routine maintenance includes a daily check of hydraulic, electrical and engine components, all machine fixings (bolts, fittings, etc.) and other main machine components.

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## 9. Decommissioning and disposal

The SH-60 does not require any special precautions for storage. However, if it is not to be used for a long period of time (more than 30 days), we recommend that you follow the instructions below:

- Perform thorough cleaning of the machine to avoid hazards during the various operations.
- Store the machine in a dry, safe place. If no closed location is available, thoroughly cover the machine with a tarp.
- Grease the pins and moving parts.
- Disconnect the batteries, located inside the engine compartment, by means of the lockable disconnecter.

Once the machine has been prepared for being taken out of service, seal off the perimeter around the machine so that it cannot be a source of danger to persons. Affix "OUT OF SERVICE" warning signs on the control panel in a way that they are immediately and easily visible.

The machine must be taken out of service by expert personnel trained for this activity in full compliance with the laws and regulations in force in the country where the machine is installed.

When disposing of the machine, some basic rules must be followed:

- All plastic, rubber and non-metallic parts, greasy oils etc. must be disposed of via the appropriate collection entities.
- The remaining metal parts must be dismantled and delivered to the appropriate demolition companies.

Machine disposal must be carried out by experienced and trained personnel, if possible by appointing specialist companies authorised for this purpose and in any case in compliance with the law on the disposal of solid industrial waste.