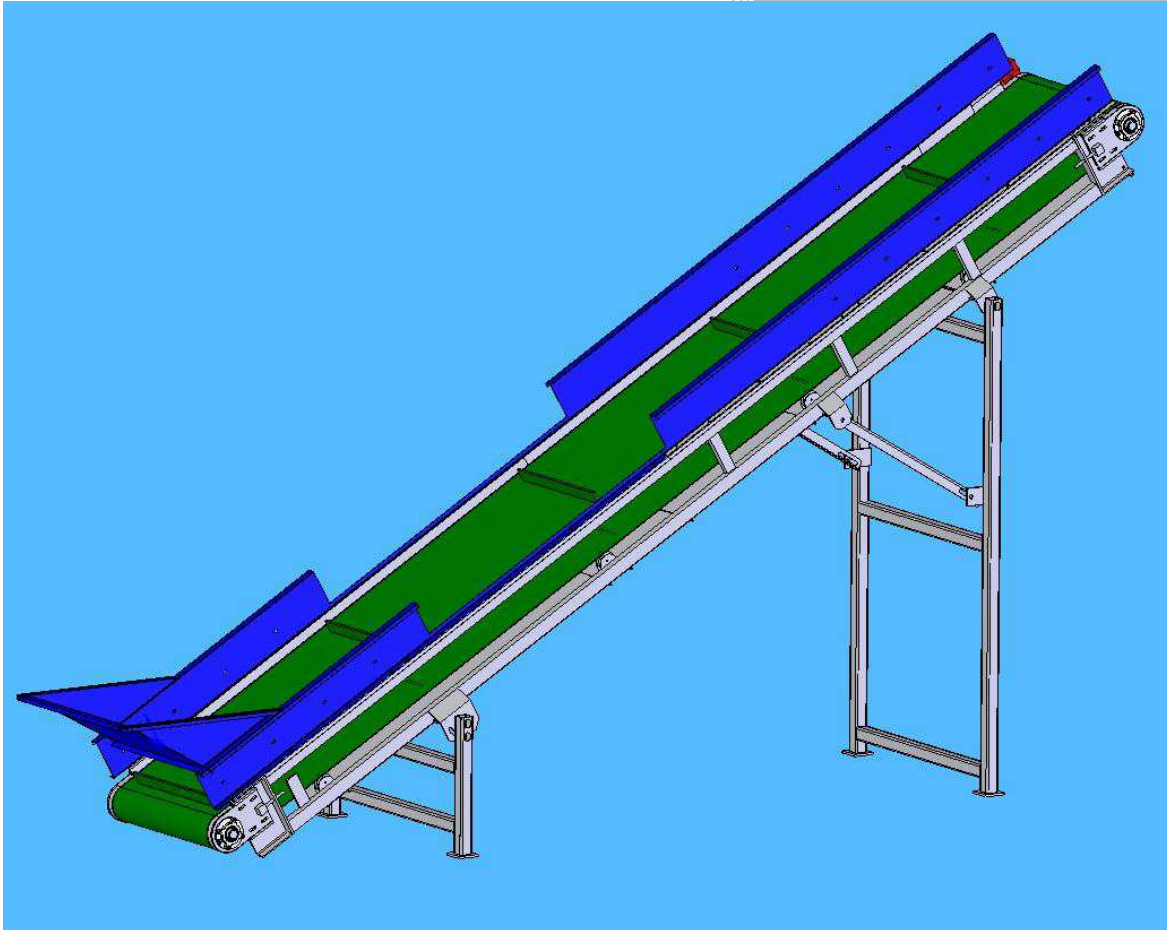


2016

Manual Conveyor Standard



Zerma Machinery & Recycling
Technology (Shanghai) Co., Ltd

5 Xinjie Rd XinQiao, Township Ind.
Park, Songjiang Shanghai (China)
Zip: 201612
Phone: +86 21 57645573
Fax: +86 21 57646766
www.zerma.com



ZERMA

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1 INFORMATION ON THIS INSTRUCTION MANUAL

Author: ZERMA Machinery & Recycling Technology

No part of this operation manual may be reproduced, distributed or used in any shape or form, stored in a data processing system or translated into another language without written permission.

This operation manual serves to help you to get to know your machine and how to make use of its application possibilities in accordance with the regulations.

The operation manual contains important information on how to operate the machine safely, correctly and economically. Following this advice will help you to avoid danger, minimize repair costs and down times and to increase the reliability and durability of the machine.

Before you begin to work on and with the machine, please read the operation manual thoroughly. Only after you have read and understood the contents of this operation manual may you begin work on and with the machine. Keep this operation manual at the application site for future reference.

References to chapters, plans and other documents as well as key markings are written in *italics*.

↓ Instructions on handling are marked in this way.

The machine is designed in modular system and offers a wide spectrum of variations to do justice to your expectations.

This operation manual is divided into three parts:

1. Part A: Information of the basic machine.
2. Part B: Plans, operation manuals for systems from other manufacturers etc.

Should you wish to order further operation manuals, please quote the machine number.

We wish you every success with your new machine!



2 TECHNICAL DATA

An assembly drawing is drawn up for each particular customer and together with the rating (name) plates of the conveyor, forms the basis for the order and technical specifications. The assembly drawing and packing list are integral parts of the operating manual and contains the specifications for

1. Gear motor
2. Conveyor
3. Support elements
And optional extras (if any) or notes specific to a particular order

Please refer to the packing list delivered with the machine

3 GENERAL INFORMATION

3.1 Copyright

ZERMA Machinery and Recycling Technology (Shanghai) Co. Ltd. holds the copyright for these operation instructions, entrusted to the owner of the conveyor for his personal use. This contains technical instructions and drawings which are not be copied complete or in part, distributed or used for reasons of unauthorized competition or for informing others.

3.2 Application

The conveyor is designed for transport a certain material. It was designed especially for the application which is specified in the order. The user is responsible for consequences resulting from incorrect operation: This will lead to the loss of the warranty as well as any compensation claims.

3.3 Safety

The conveyor has been constructed in accordance to the general standards of technology and is fitted with safety devices to prevent accidents that could endanger the life or health of the operator. The company operating the unit is responsible for the compliance to the safety regulations. We recommend staff training courses at regular intervals subsequent to initial training during commissioning.

3.4 Inspection of goods

The goods must be inspected by the purchaser to ensure that the delivery is complete and free from damage during transport. In the event of any queries Zerma must be informed with regard to missing items or transport damage. In the event of actual transport damage, written notification including photographs should be made and sent to the transport company as well as sent to Zerma immediately after delivery.

4 GENERAL SAFETY ADVICE

4.1 Safe operation of the machine

The machine is built according to the state of the art and recognised safety regulations.

It is equipped with protective devices; however there is still the threat of danger in case of incorrect conduct or misuse:

- for the health of the operator and that of other persons,
- for the machine,
- for the environment,
- for material assets belonging to the company and the operator.

All persons involved in:

- transportation and storage,
- start-up and shutdown,
- operation,
- setting and fitting
- maintenance and waste disposal...

of the machine must carefully read and take note of the following advice. However, not only does the general safety advice listed in this chapter need to be observed, but also the safety advice which is added specifically in the other chapters.

Failure to heed this safety advice can lead to loss of all compensation claims.

Furthermore, the existing rules and regulations for the prevention of accidents as well as in house company working, operational and safety regulations have to be observed.

4.2 Use in accordance with the regulations

The operational safety of the delivered machine is only guaranteed for use in accordance with the regulations! This regulation use is only achieved if the following points are observed and fulfilled.

Manufacturing process and transport material

The conveyor is suitable exclusively for the transport of material, which corresponds to the agreed customer-specific specifications in all points (see *Contract of sale*).

Any other work or design will differ from the specified requirements. Zerma Machinery & Recycling Technology will not be held responsible. The specified requirements also include all information found in the owner's manual such as maintenance and service.

Any change in the specifications or requirements must be brought to the attention of Zerma.

Connection of the Emergency Stop button

The machine may only be operated with the installed Emergency Stop buttons. In case no Emergency Stop buttons have been installed, an Emergency Stop button must be mounted on the control cabinet.

Miscellaneous:

- The working conditions and instructions specified in this operation manual must be adhered to.
- The machine is not suitable for operation in an explosive environment.
- Faults, which can impair safety, are to be reported immediately and eliminated by a trained and skilled specialist.
- The machine may only be used in the industrial application range.

General Requirements Safety Information

- The service and maintenance in this owner's manual must be performed on a regular basis.
- The machine is not designed for operation in a volatile environment.
- Faults that could be a safety hazard must be reported immediately and repaired by experienced personal.
- The machine must only be installed in an industrial type building.



Known uses not in accordance with the regulations

- Never transport materials, which do not correspond to the agreed customer-specific specifications. If this occurs, there could be a danger to persons and the possibility of the machine being damaged.
- Never ride conveyors.
- Never transport materials, with extreme sizes so that they can roll back or fall down.
- Never transport materials that are hotter than 60°C (except a heat-resistant belt was part of the delivery).
- Never transport adherent materials.
- Never transport oil, grease or acid with a standard belt.
- Never overload conveyors.

Informal Safety Requirements

The owner's manual should always be located near the machine. New excerpts or additions to the owners' manual must always be inserted to include any safety requirements or environmental requirements.

All safety or caution signs must be visible and easy to read.



4.3 Liability and Responsibility

The General Conditions of Sale and Delivery apply. These conditions apply no later than the end of the contract. Liability and or responsibility to seller do not apply to the following;

- Equipment is not properly used for its specific application.
- Non-conforming installation, commissioning or service of the machines.
- Operation of the equipment without proper safety guards.
- Non-conformance to the directions of the owners' manual regarding transport, storage, installation, commissioning or servicing the equipment.
- Any designs alterations on the machine.
- Any changes on the program logic which can alter the machine operation or electrical function.
- Changes in the logic function.
- Improper maintenance or servicing of the machines that can lead to extraordinary wear.
- Improper servicing of equipment
- Spontaneous crashes caused by foreign objects falling into the machine or acts of God

We honour a 6 month guarantee valid after delivery under the conditions that originally delivery or original parts from ZERMA Machinery & Recycling Technology are used or accepted for use in accordance with our owners manual.

Otherwise the guarantee will be considered invalid. Excluded are wear and tear parts such as drive belts, bearings, etc.



4.4 Structural changes, spare parts, accessories

For reasons of safety, remodelling and/or modifications to the machine, in particular to the electrical devices, are only permissible by arrangement with the manufacturer!

Replace faulty parts immediately. Only use original spare parts or spare parts from other manufacturers, which correspond to the original spare parts with regards to function, stress and safety. This applies in particular for reasons of EMC (electro-magnetic compatibility) for electrical components.

The use of unsuitable parts can impair resistance to relays and increase the emission of relays!

If parts are replaced which are relevant for safety, they must be checked afterwards for proper function.

Only use accessories, which have been approved by the manufacturer. Use of accessories can change how the machine works. You must therefore observe the additional advice for your work and your safety. Read *Part B: Accessories*, before you commission the machine.

4.5 Operation manuals from other manufacturers

Integrated in the machine are systems from other manufacturers. When working on or with these systems, please observe the advice in the operation manuals from the respective manufacturer. These operation manuals are enclosed with the machine documentation.

4.6 Noise levels and noise control measures

The noise level of the conveyor does not exceed 80 dB (A).
For some special applications, this noise level can be higher.
In order not to exceed the noise level of 85 dB (A) is the purchaser required to provide soundproofing.

The noise level can be affected by foundation static or dynamic, or additional equipment. Therefore it is necessary to actually determine if the noise level is directly coming from the machine or accessory equipment.



CAUTION

The user or purchaser is responsible for compliance with the instructions and procedures!

4.7 Work stations

During normal operation, the work station is the station at the feeding of the transport material.

For maintenance work, the whole area around the machine is at your disposal.

4.8 Remaining risks

The machine is constructed so that you are able to operate it safely. Structurally non-avoidable dangers are prevented as well as possible by the protective devices. A certain remaining risk does however always remain! Being aware of these remaining risks of the machine will help you to structure your work more safely and in so doing to avoid accidents.

To avoid danger, please observe in addition the specific safety advice in the individual chapters.

4.8.1 Mechanical dangers

| | |
|-------------------------------|--|
| Type of danger: | Danger of crushing by heavy parts falling down or falling over. |
| Activity: | Unloading, assembling and transporting the machine or machine components. |
| Possible consequences: | Serious injury could result. |
| Preventative measures: | Wear personal protective gear. Follow the instructions in this <i>Operation manual</i> . |

| | |
|-------------------------------|--|
| Type of danger: | Danger of crushing in the area of drive-, idling- and support rollers when conveyor is running. |
| Activity: | All works. |
| Possible consequences: | Serious injury, particularly to hands and fingers can result. |
| Preventative measures: | These areas are safeguarded with sheet metal. Don't remove them. Follow the instructions in this <i>Operation manual</i> . |

| | |
|-------------------------------|--|
| Type of danger: | Tripping over cables and other objects lying around. |
| Activity: | All activities. |
| Possible consequences: | Serious injury can result. |
| Preventative measures: | Lay cables in accordance with the regulations. Keep work station clean and tidy. |

| | |
|-------------------------------|---|
| Type of danger: | Danger of pulling in caused by the running belt. |
| Activity: | All activities. |
| Possible consequences: | Hair, jewellery etc. can be pulled into the machine. Serious injury can result. |
| Preventative measures: | Never dismount any protective devices. |

4.8.2 Electrical dangers

| | |
|-------------------------------|---|
| Danger: | Direct or indirect contact with live parts in the terminal box. |
| Activity: | Maintenance work, start-up. |
| Possible consequences: | Serious injury or death. |
| Preventative measures: | <p>Only trained electricians may carry out all work on the electrical equipment.</p> <p>If work is necessary on parts, which conduct dangerous voltage, a second person should be called in who can break the power supply in case of emergency.</p> <p>The yellow-marked lines conduct voltage even when the machine is switched off (main switch to 0).</p> <p>Only use original safety fuses with stipulated intensity of current.</p> <p>Faulty electrical components must be replaced immediately.</p> <p>If faults occur in the electrical energy supply, switch machine off immediately.</p> <p>The terminal box must be locked during operation. Before opening the terminal box: Main switch to 0.</p> |

4.8.3 Dangers caused by the control system

| | |
|-------------------------------|--|
| Type of danger: | Danger caused by failure of the Emergency Stop function. |
| Activity: | All activities. |
| Possible consequences: | Serious injury or death. |
| Preventative measures: | It must be guaranteed that failure of an Emergency Stop button is displayed and leads to an immediate stop of the machine. |

4.8.4 Thermal dangers

| | |
|-------------------------------|--|
| Type of danger: | Danger of fire caused by transporting hot materials. |
| Activity: | Transport material. |
| Possible consequences: | Serious injury or death can result. |
| Preventative measures: | <p>Only transport material which corresponds to the agreed customer-specific specifications in all points.</p> <p>Never transport material hotter than 60°C.</p> |

4.8.5 Dangers caused by noise

| | |
|-------------------------------|--|
| Type of danger: | Damage to hearing. |
| Activity: | All activities. |
| Possible consequences: | Diminished hearing, headaches, impaired balance, and deterioration of concentration. |
| Preventative measures: | Reduce noise emissions by taking suitable measures. Wear ear protection. |

4.8.6 Dangers caused by vibration

| | |
|-------------------------------|---|
| Type of danger: | Instability of the conveyor caused by vibration. |
| Activity: | All activities. |
| Possible consequences: | Serious injury can result. |
| Preventative measures: | Install the machine according to the instructions of this <i>Operation manual</i> and the <i>Assembly drawing</i> . |

| | |
|-------------------------------|---|
| Type of danger: | Loosening of screw mountings caused by vibration. |
| Activity: | All activities. |
| Possible consequences: | Serious injury can result. |
| Preventative measures: | Check the screw mountings regularly according to the instructions in this manual. |

4.8.7 Dangers caused by materials and substances

| | |
|-------------------------------|--|
| Type of danger: | Inhalation of dust. |
| Activity: | All activities. |
| Possible consequences: | Diseases of the respiratory tract etc. |
| Preventative measures: | Wear breathing equipment if necessary. When cleaning the conveyor do not blow out dust, use suction instead. |

4.8.8 Danger caused by manipulation of the protective devices

| | |
|-------------------------------|--|
| Type of danger: | Danger of crushing. |
| Activity: | All activities. |
| Possible consequences: | Serious injury can result. |
| Preventative measures: | Never make the protective devices ineffective. Check the protective devices regularly for proper functioning according to the specifications given in this manual. |

4.9 Protective devices

The machine may under no circumstances be operated without these protective devices or with faulty or manipulated protective devices. Never dismount any sheet metal covers.

4.9.1 Safety cover bottom and side

Illustration:
Conveyor belt bottom
side



The conveyor belt bottom is completely covered with sheet metals, to prevent crushing of hands and fingers.

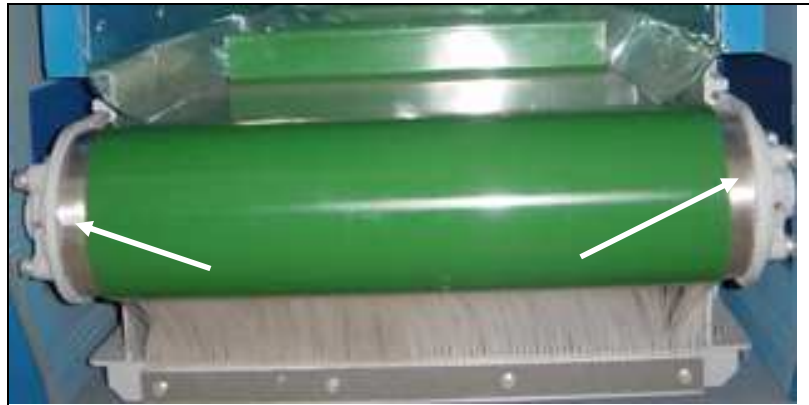
Illustration:
Side cover



4.9.2 Safety cover for drive and idling rollers

Illustration:

Safety cover



The drive and idling rollers are either completely covered, or the gaps are covered with sheet metal.

Illustration:

Safety cover



4.9.3 Splash guard

In the case that the conveyor is equipped with a soundproof tunnel, the opening is provided with a splash guard.

Illustration:
Tunnel splash guard



Attention:

Fixation of the splash guard curtains must be checked every month.

4.9.4 Safety markings

Safety markings are attached to the machine. If one of these markings becomes detached or is no longer recognisable, it must be replaced. You can order new markings at specialist shops or from Zerma.



4.10 Authorized persons

Only authorized personnel may carry out work on the machine.
Observe the legally permissible minimum age!

As a basic rule, only persons who have received training on the machine may operate the machine.

Personnel, who are still to be trained or receive instruction on the machine, may only work on the machine under constant supervision by an experienced person.

The company operating the machine must make the operation manual accessible to the machine user and ensure that he has read and understood it. Only then may he put the machine into operation.

Responsibility for the different jobs on the machine must be clearly established and adhered to. There must be no unclear areas of authority, as this could endanger the safety of the machine user.

If several persons work on the machine, a detailed division of workstations should be set up.

Only trained electricians may carry out all work on the electrical equipment.

Only authorized specialist personnel may eliminate faults on the control system.

On all work related to installation, only trained specialist personnel having received instruction on the machine might carry out fitting and maintenance of the machine.

The operator must make sure that only authorized personnel work on the machine. The operator is responsible for the safety of third persons in the working area of the machine.

4.11 Personal protective gear

Wear close-fitting clothing. Jewellery and hair must be worn so that they cannot be pulled into the machine by moving parts.

The following protective gear must be worn when carrying out the following tasks:

| | Safety helmet | Safety boots | Safety gloves | Safety goggles | Ear muffs |
|--------------------------|----------------------|---------------------|----------------------|-----------------------|------------------|
| Unloading machine. | x | x | x | | |
| Connecting machine. | | x | | | |
| Operation. | | x | x | x | x |
| Cleaning. | | x | x | x | |
| Maintenance of bearings. | | x | | | |
| Belt replacement. | | x | x | | |

If necessary, protect yourself with breathing equipment before inhaling substances harmful to the health.

4.12 Safety measures at the application site

Requirements at the application site: see chapter *Initial Start-up*. The machine must be erected horizontally on a horizontal surface and in a stable manner.

Ensure by means of appropriate in house orders and controls that the environment of the work station is always clean and clear of obstructions.

4.13 Fire fighting agents

In the case of fire, disconnect the power supply of the machine or pull out the mains plug. Extinguish the fire from a distance of several meters using a fire extinguisher suitable for the machine and the grinding material.

4.14 Cleaning agents

Only use suitable cleaning agents to clean the machine and in doing so, the advice of the manufacturer is to be heeded. Please be aware that unsuitable cleaning agents (e.g. thinners) can damage the paint of the machine as well as the cables and plastic parts.

4.15 Conduct in case of an emergency

The machine may only be operated with the installed Emergency Stop buttons. An Emergency Stop button must be mounted onto the control cabinet, the second onto the grinding material in feed.

Emergency Stop:

- ↓ In case of emergency, immediately press one of the *Emergency Stop buttons*.



CAUTION



The EMERGENCY STOP must be activated in all situations whereby injury or damage could result!



Reoperation:



- ↓ Eliminate cause of Emergency Stop.
 - ↓ Unlock *EMERGENCY STOP BUTTON*.
 - ↓ Acknowledge fault.
- The machine is now ready for operation again.

4.16 Classification of specific safety advice

The specific safety advices in the following chapters of this operation manual are classified as follows:

|  DANGER | |
|---|---|
|  | Indicates an immediately threatening danger. If you do not take avoiding action, death or serious injury will result. |

|  WARNING | |
|--|---|
|  | Indicates a possibly dangerous situation. If you do not take avoiding action, death or serious injury could result. |

|  CAUTION | |
|--|--|
|  | Indicates a possibly dangerous situation. If you do not take avoiding action, slight or minor injury could result. |

This safety advice refers to the remaining risks for certain working steps and helps you to work safely with the machine. In addition to the safety advice above, there are also the hint and the tip.

HINT



Indicates a possibly harmful situation. If you do not take avoiding action, the machine could be damaged.

TIP



Indicates application tips and other particularly useful information.

5 DESCRIPTION OF THE MACHINE

5.1 Material in feed

The conveyor belt is equipped with an in feed hopper.
A rubber cover prevents falling out of material on the backside of the conveyor.

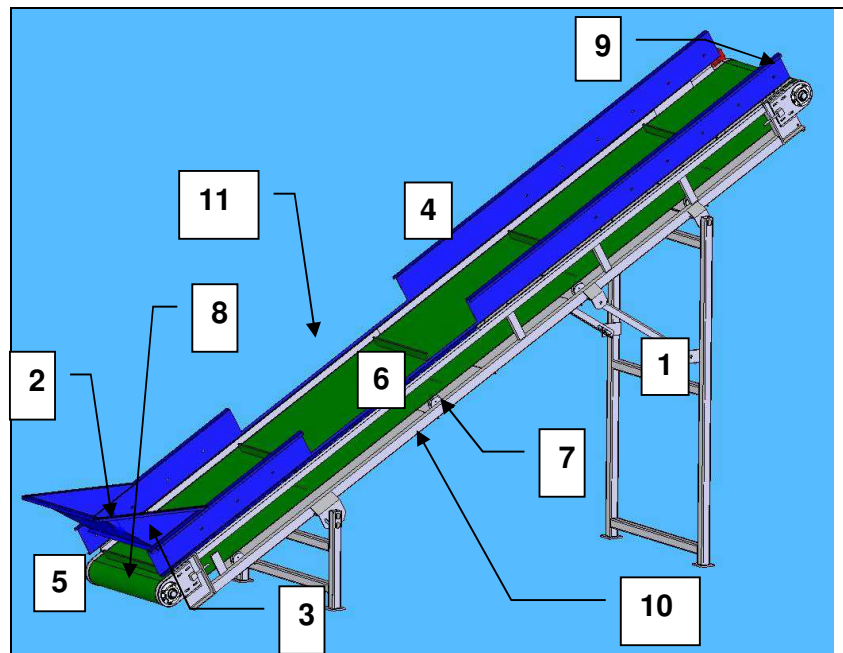
Illustration:
Hopper with rubber cover



5.2 Basic conveyor

Illustration:

- (1) Foot
- (2) Drive motor
- (3) Hopper
- (4) Sidewall
- (5) Safety cover
- (6) Belt
- (7) Support roller
- (8) Drive roller
- (9) Idling roller
- (10) Frame
- (11) Free zone for OBM



The conveyor consists of the main frame, the side walls, an in feed hopper and the belt. It is mounted on height adjustable feet. The belt is driven by means of a worm gear motor with hollow shaft, which is mounted direct on the drive roller. It is fixed with a torque arm and a screw holds it on the shaft.

Illustration:
Drive Motor and torque
arm



Illustration:
Fixing screw on the shaft



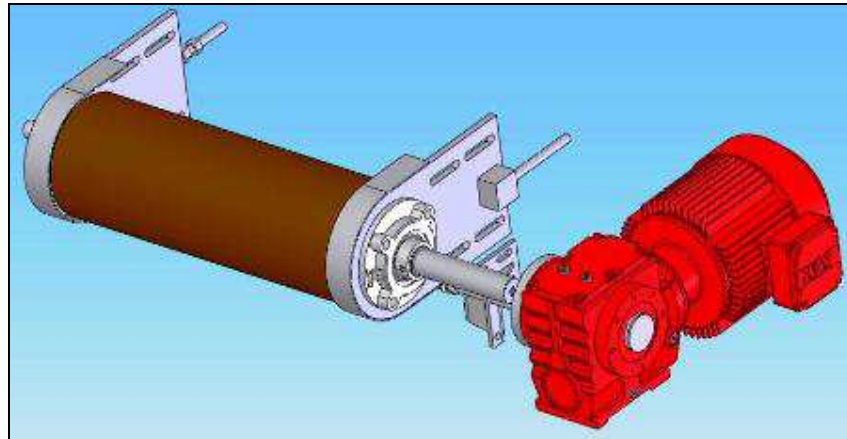
Please observe the operation manual from the manufacturer!

5.3 Drive and idling roller

The drive and idling rollers are arranged on flange bearings, which are connected to a tension station.

The drive roller is coated with rubber for a better power transmission.

Illustration:
Drive roller



The tension station is mounted on the frame. With this station the belt running can be adjusted.

Illustration:
Idling roller tension
station with flange
bearing



6 INITIAL STARTUP

6.1 General Advice

All work related to start-up may only be carried out by trained specialist personnel.

Check the machine for possible transportation damage or other damage. Should you determine damage, have this confirmed by the freight company and please report this to us in writing immediately after delivery. When starting up for the first time and after setting up ready for service, you must carry out the necessary checks according to the chapter *Machine Check prior to Initial Start-up*.




6.2 Requirements at the application site

The site of application for the machine must exhibit the following features:

- Enclosed space.
- The ground must exhibit sufficient load-bearing capacity (you can find the machine weight in the *Chapter Technical Data*). The unevenness of the ground surface may not exceed 5 mm.
- The machine must be freely accessible from all sides.
- There must be sufficient room available for operating and service personnel.
- Spatial requirements: see *Assembly drawing*.
- Vibration-free environment.
- The application site must be well-lit.
- The machine may not be exposed to direct radiation caused by radiators or the sun.
- Room temperature: +5° to +40°C
- Relative atmospheric humidity according to DIN 40040:
15 to 70 % (indoor)
By humidity levels higher than 70 %, apply anticorrosive agent to the metallic-finished machine parts. Insulation for the tropics is also necessary.
- The machine may not be operated within range of static discharges or strong magnetic fields as this could lead to faults in the machine control system.



6.3 Unloading and installing the machine

The machine or the machine components are packed so that they will arrive to you safely. To see how the machine is packed or should be packed, please see the *Packing plan*. For unloading the packaged machine or machine components you may use a suitable crane or forklift.

|  WARNING | |
|--|---|
|  | Suspended load. Falling loads can cause serious injury or death. Only use a crane or a forklift which is suitable for the weight and the dimensions of the load. |
|  | Also use a suitable stopping means and pay attention to the gravity centre location. Do not step under the suspended load. Wear a safety helmet in addition to your basic protective gear. |

- ↓ After unloading, remove the packaging material and all transportation safety devices.
Normally the conveyor will be delivered as one part. Only the feet have to be assembled. Please mount these at the site of application using the mounting screws sent with the delivery exactly in accordance with the data given in the *Assembly drawing*.

6.4 Electrical connection

|  WARNING | |
|--|---|
|  | Dangerous voltage. Touching live parts can lead to serious injury or death. All work which relates to the electricity of the machine may only be carried out by trained electricians. Observe the currently effective EMC regulations. |

Voltage, current, frequency and protection are marked on the *Type plate*. The voltage tolerance is $\pm 10\%$.

- ↓ For machines which have not been pre-wired by ZERMA, the electrical connection is to be carried out in accordance with the enclosed *Wiring diagram* in the terminal box.
When doing this, the regulations of the local electricity authority are to be adhered to. The cable cross section required is to be determined according to the rated capacity of the units.

WARNING



When operating specific equipment caution must be taken to prevent electrical shock. Installation, service, alterations and or modifications must only be done by qualified personal and with high regard for safety. Not conforming to the requirements could result in bodily injury, death or costly damage.

HINT



Alterations to the wiring diagrams from ZERMA require our approval. Failure to do this will exclude all guarantee claims.

The wiring schematics are located in the control panel in the event that the control panel is a part of the delivery.

Connection of Emergency Stop button

The machine may only be operated with installed Emergency Stop buttons. In the case that no Emergency Stop buttons have been installed at the factory, an Emergency Stop button must be installed at the control cabinet, the second at the material in feed.

Checking the rotational direction

Rotational direction of the motors must be checked before initial start-up (see chapter of same name). The steps prior to this check must be completed.

- ↓ Switch the machine on and then immediately off again (see **Error! Reference source not found.** and **Error! Reference source not found.**).
- ↓ Observe whether the discharge air fan in the drive motor is rotating in the direction of the direction arrow.

HINT



If running in the wrong direction, reconnect the motor connection immediately. Damage to the machine will result from operation in the wrong direction.

6.5 Machine check prior to initial start-up

| Check | See chapter |
|---|---|
| 1. Check mounting screws of bearings and motor torque arm | <i>Maintenance</i> |
| 2. Search the conveyor for foreign matter or tools | <i>Cleaning the conveyor</i> |
| 3. Check that the <i>Emergency Stop buttons</i> are unlocked. | |
| 4. Check all safety devices for proper functioning. | <i>Checking the protective devices.</i> |
| 5. Switch on machine for a short time and check rotational direction. The rotational direction can be seen at the discharge air fan of the drive motor (observe running direction arrow). | <i>Electrical connection.</i> |
| 6. Allow machine to run for approx. 10 minutes without transport material. | |
| 7. Check if the belt runs in the middle. | <i>Adjust belt</i> |

7 OPERATION

**Have you read and understood the operation manual, in particular the safety advice in the Chapter four?
You may not operate the machine until you have done so!**

TIP



Should faults occur during work with the machine, please observe the advice in the chapter Troubleshooting.




Machine checks before switching on the machine

| Check | See |
|--|---|
| 1. The conveyor is free of foreign matter. | <i>Cleaning conveyor</i> |
| 2. All safety devices are checked and operative. | <i>Checking the protective devices.</i> |

8 MAINTENANCE

8.1 Safety advice

Trained specialist personnel may only carry out work included within the framework of maintenance.
Carry out the maintenance work within the specified time and document this. The machine will thank you for this by providing high reliability.

|  WARNING | |
|--|--|
|  | Danger caused by electrical voltage and starting the machine during maintenance work. Mortal danger. |
|  | Therefore, as a basic rule when carrying out maintenance work: Main switch to 0, safeguard using padlock and attach a warning sign. |

8.2 Maintenance plan

The tasks for maintenance work are described in detail in this chapter.

| Maintenance work | Oh = Operation hours | | |
|---|--|-------------|--------------|
| | Every 7 Oh | Every 35 Oh | If necessary |
| Check protective devices for proper functioning. | x | | |
| Clean machine. | | x | |
| Check if material inside the belt | x | | |
| Check straight run of the belt | | x | |
| Check the main bearings (bearing clearance, lubricant renewal). | | | x |
| Lubricant replacement, lubricant renewal | See <i>Lubrication intervals</i>: | | |
| Check belt tension force and condition. | | X | |
| Check all screws of the machine for a tight fit. | | X | |
| Check wearing parts. | | X | |

Yearly maintenance



The purpose of yearly maintenance of the machine is primarily to check the general condition of the machine and to arrange for the supply of any necessary replacement parts in good time. A service engineer from ZERMA Machinery & Recycling technology can also carry this out on request.

8.3 Checking the protective devices

For this, see also the chapter *Protective devices*.

Check the safety devices for:

- Stipulated condition,
- Stipulated location,
- Safe mounting,
- Stipulated function.



|  WARNING | |
|--|---|
|  | <p>Danger due to non-functioning protective devices. Serious injury or death can result.</p> <ul style="list-style-type: none">• Eliminate all defects before you put the machine into operation!• If defects occur during operation, stop the machine immediately and eliminate the defects!• Do not change or remove any protective devices. Do not put any protective devices out of action by modifying them. |

8.4 Cleaning the machine

From time to time it is necessary to clean inside the conveyor belt.

Proceed as follows:

- ↓ Open side covers
- ↓ Open bottom covers
- ↓ Don't open the support rollers on the bottom

| | |
|---|---|
|  | WARNING |
|  | Inhalation of dust which is dangerous to the health. This can result in injury to the respiratory tract. Never blow out the material residue, use suction instead. Wear breathing protection if necessary. |

- ↓ Pre-clean the inside of the conveyor belt using a hand brush.
- ↓ Suck up the remaining material residue using a suitable suction device.
- ↓ Check the support rollers for proper functioning
- ↓ Put back all covers and tighten them carefully
- ↓ Machine can be started again

8.5 Adjusting the belt

Normally the belt run is adjusted at Zerma. If the belt doesn't run in the middle, it has to be adjusted. Otherwise the belt could be damaged.

Illustration:
Belt adjustment
Idling roller

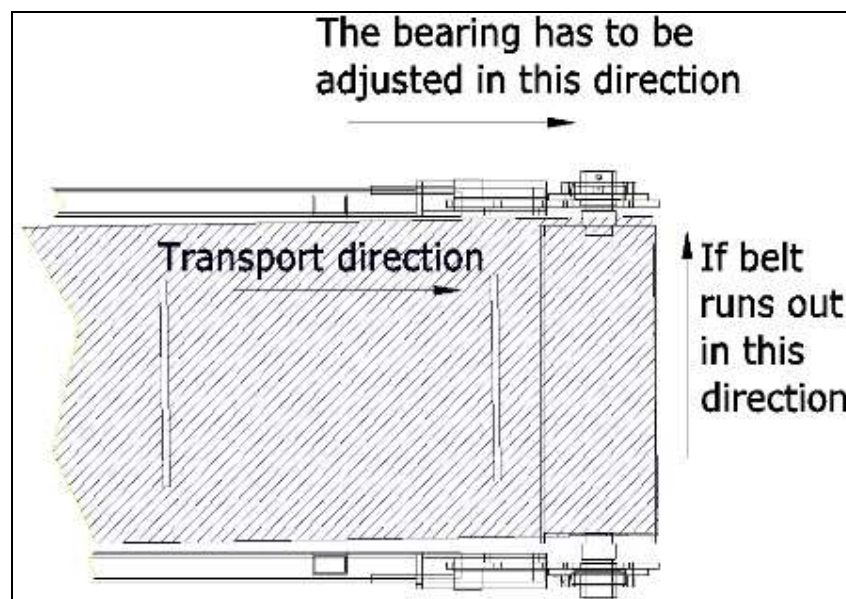
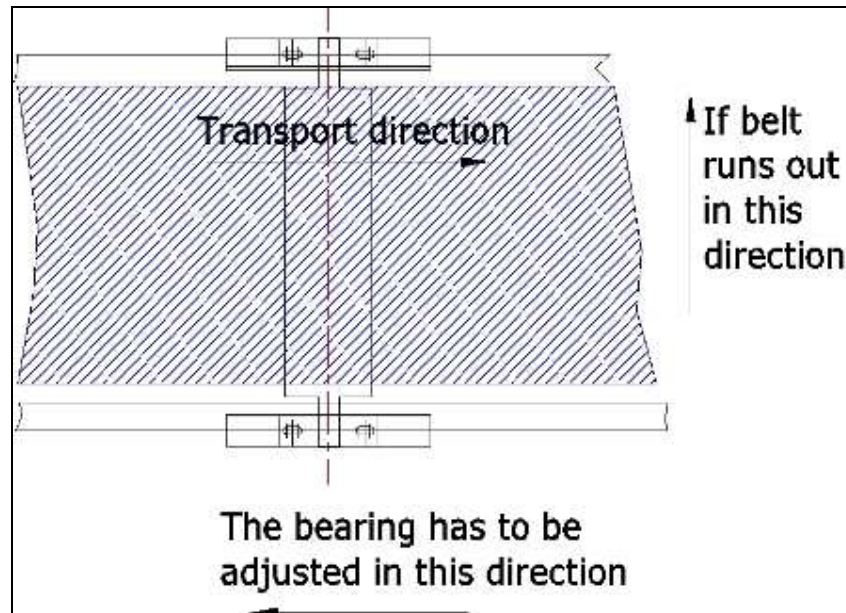


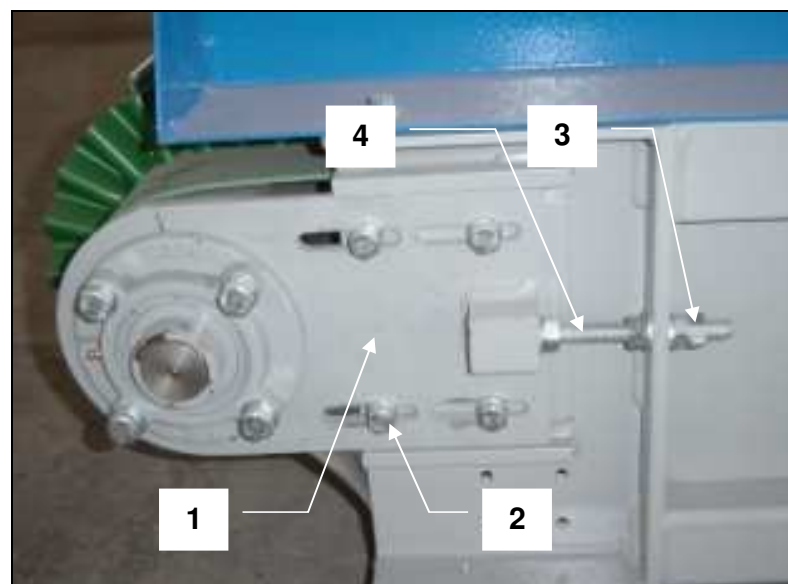
Illustration:
Belt adjustment
Idling roller angled area



To adjust the belt proceed as follows:

- ↓ Loose the tension station fixing screws lightly.
- ↓ Open the counter nut.
- ↓ Move tension station in the required direction.
- ↓ Work slowly, the belt need some time to move in the right position; one turn of the nut could be already enough.
- ↓ Let belt running for some time without material and check that it is running in the middle
- ↓ Check the straight run again when transport material.
- ↓ Tighten all bolts and nuts.

Illustration:
(1) Tension station
(2) Fixing screws
(3) Counter nut
(4) Threaded spindle



8.6 Tension force of the belt

The tension force of the belt will be adjusted at ZERMA. But after some operation time, it can be necessary to re-tension the belt, e. g. when the drive roller slips through the belt. If this case happens, the belt has to be tensioned.

Tension the belt on the non-driven idling roller. Do this uniformly in small steps on both sides of the roller, so that the belt cannot run out of the middle.

HINT



Only tension the belt so that the roller is able to take the belt.

Over tensioning of the belt can lead to bearing damage on the rollers and to a complete breakdown of the machine.

8.7 Replacing the main bearings

The main bearings of the machine are dimensioned so that a bearing replacement is only necessary in exceptional cases. Dismounting and mounting of the bearings requires specialist knowledge and a careful working method. Therefore, in addition to the following advice, please observe the instructions given in the installation manual of the bearing manufacturer.

8.7.1 Dismounting the main bearings

To dismount the bearings proceed as follows:

- ↓ Release the tension of the belt

Illustration:
Direction for release
tension



- ↓ Dismount the bearing fixing screws
- ↓ Dismount the bearing

8.7.2 Mounting the main bearing

To mount the bearings proceed as follows:

- ↓ Before mounting, clean the bearing surfaces and the shaft surfaces thoroughly and grease lightly.
- ↓ Attach the bearing with the bearing housing to the rotor axis.

HINT



- During mounting, the mounting forces must always engage into the inner ring, otherwise the roller bodies will be damaged.
- The hardened bearing rings are sensitive to impact stress. For this reason, never hit directly on the rings with the hammer, use instead preferably a brass arbor or better still a striking bushing (piping piece) made from a soft material. The inner diameter of the striking bushing should be only slightly larger than the diameter of the bearing base.
- The bearing is then pushed onto the shaft using light blows. When doing this, the force of pressure must be evenly distributed on the circumference of the bearing ring.

- ↓ Fix bearing
- ↓ Adjust belt
- ↓ Carry out a test run.
- ↓ Check if the belt runs in the middle
- ↓ Adjust belt again if necessary

8.8 Lubricating the main bearings

An important requirement for high operational safety and long service life of the arrangement of bearings is the correct lubricant supply. Every ZERMA machine is greased and checked in test runs before delivery.



HINT

Unsuitable lubricant, lubricant deficiency, excessive lubrication or impurities in the lubricant lead to overheating and thus extreme wear of the bearings.

8.8.1 Lubrication intervals:

| Shift operation | Replace lubricant | Check |
|------------------------|-------------------|---------|
| One shift operation: | every 18 months | monthly |
| Two shift operation: | every 9 months | monthly |
| Three shift operation: | every 6 months | monthly |

8.8.2 Check lubricant quality

You can judge whether the lubricant needs to be replaced by checking for the following features:

- change in consistency,
- discolouration,
- degree of soiling.

8.8.3 Replacing or refilling lubricant



HINT

- Fill the bearings uniformly with grease, so that all operating surfaces are well greased.
- For the rotor bearings, a lubricant quantity of one third to a maximum of half of the bearing volume per bearing is required. If too much grease is filled in, the lubricant will become unusable as a result of excessive temperature.
- Only one type of grease may be used, mixing different types of grease is not allowed. The bearings have been filled at the factory with lithium base saponification roller bearing grease F3.
- To find out which lubricants from which manufacturers you can use, look in the *List of lubricants*.

Refilling lubricant

The grease reaches through the circulating grooves and bores via lubrication nipples into the interior of the bearing.

Illustration:
Grease nipple



8.8.4 List of lubricants

| Country of manufacture / manufacturer | Roller bearing grease |
|--|---|
| ARAL | ARAL Grease HL 3 |
| BP | BP ENERGREASE LS 3 |
| CASTROL | CASTROL SPHEEROL AP 3 |
| ESSO | Beacon 3 |
| FUCHS | FUCHS Grease 1200 FUCHS Grease FWA 220 |
| SHELL | SHELL Alvania Grease 3 |
| MOBIL-OIL | MOBILUX 3 |
| WISURA | WISURA Liba L 3 |
| Zeller & Gmelin | ZET GE Grease M 50 |
| FAG | FAG L 71 |
| ANTAR Petroles de l'Atlantique | ROLEXA |
| Holland, Beverol | Beverol Multi Purpose Grease |
| Italy, Agip | AGIP Grease 33 FD |
| Swede, NYNÄS | Nynäs FI 3-42 |

8.9 Change gear motor

- ↓ Remove all material from the belt.
- ↓ Switch off machine.
- ↓ Hang on gear motor.
- ↓ Dismount fixing bolt on the shaft.
- ↓ Dismount torque arm fixing bolt.
- ↓ Take out motor.

Please refer to the operation manual of the manufacturer.

Illustration:
Drive Motor and torque
arm



Illustration:
Fixing screw on the shaft



8.10 Replacing rollers

8.10.1 Replacing drive roller

- ↓ Remove the gear motor
- ↓ Release the tension of the belt
- ↓ Dismount the tension stations you don't need to remove the bearings from the tension station.
- ↓ Take out roller to the side.
- ↓ Put in new roller.
- ↓ Mount tension stations together with the bearings.
- ↓ Tension the belt.
- ↓ Adjust the belt.

8.10.2 Replacing idling roller

- ↓ Release the tension of the belt
- ↓ Dismount the tension stations you don't need to remove the bearings from the tension station.
- ↓ Take out roller to the side.
- ↓ Put in new roller.
- ↓ Mount tension stations together with the bearings.
- ↓ Tension the belt.
- ↓ Adjust the belt.

8.10.3 Replacing idling roller angled area

- ↓ Release the tension of the belt.
- ↓ Remove the bottom covers and support rollers.
- ↓ Remove the bearings from the shaft.
- ↓ Take out roller to the bottom
- ↓ Put in new roller.
- ↓ Mount bearings.
- ↓ Tension the belt.
- ↓ Adjust the belt.
- ↓ Mount the bottom cover and support rollers.

8.10.4 Replacing support rollers

- ↓ Open the bolts of the sheet metal where the support rollers are mounted on.
- ↓ Take out whole unit to the bottom
- ↓ Mount new support rollers.

8.11 Replacing the belt

- ↓ Remove all material from the belt.
- ↓ Switch off machine.
- ↓ Release the tension of the belt.
- ↓ Remove the bottom covers and support rollers.
- ↓ Remove all side walls and hopper.
- ↓ Take out belt to the side, beginning on the drive side.
- ↓ Put in new belt.
- ↓ Tension the belt.
- ↓ Fix sidewalls.
- ↓ Fix support rollers and covers.
- ↓ Run the conveyor.
- ↓ Adjust the belt.

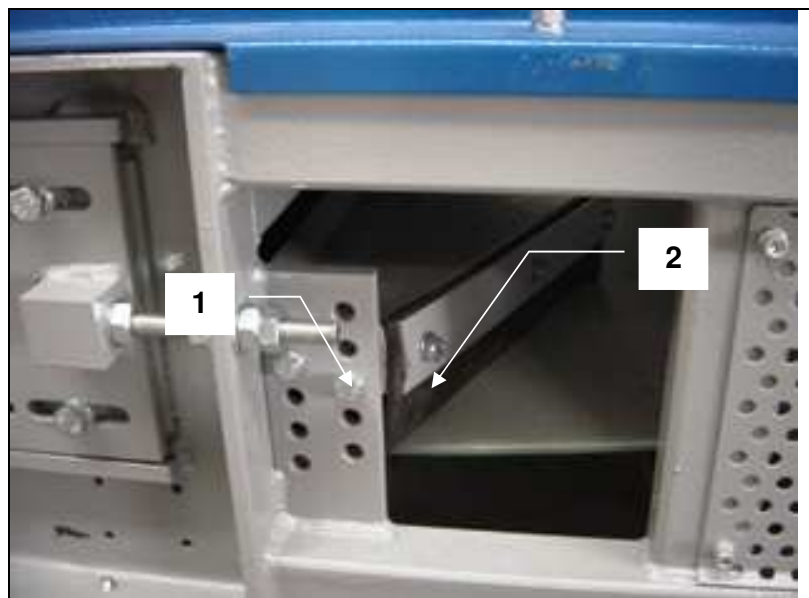
8.12 Adjust/replace scraper.

On the bottom of the conveyor, a scraper is mounted to prevent that material can go in between the roller and the belt. Therefore it is height adjustable.

This scraper has to be checked from time to time for proper functioning.

Illustration:

- (1) Scraper fixing screws
- (2) Scraper



- ↓ Remove the fixing bolts.
- ↓ Adjust or replace scraper.

9 TROUBLESHOOTING

9.1 Conveyor does not start

| No. | Possible causes | Remedy required |
|------------|--------------------------------------|---|
| 9.1.1 | Too much transport material. | Reduce transport material. |
| 9.1.2 | Gear motor broken | Replace gear motor. |
| 9.1.3 | Emergency stop switch not activated. | Check emergency stop switch. |
| 9.1.4 | Main and control fuses. | Replace fuse. |
| 9.1.5 | Star delta connection. | Correct wiring on motor. |
| 9.1.6 | Motor protection switches off. | Check motor relay for correct setting and increase if necessary. |
| 9.1.7 | Star delta time relay. | Correct time. |
| 9.1.8 | Current failure. | Check limit switch for defective contact. Check electrical connection, if necessary tighten limit switch. |
| 9.1.9 | Fuse too small. | Fit larger fuse. Only after consulting the service department of ZERMA. |

9.2 Belt stops during operation

| No. | Possible causes | Remedy required |
|------------|---|---|
| 9.2.1 | Belt tension not enough. Roller slips through belt. | Tension belt. |
| 9.2.2 | Rubber coating on drive roller worn out. | Renew rubber coating. |
| 9.2.3 | Motor fuse switches off - red indicator. | Reduce transport material, correct setting, replace fuse. |

9.3 Current consumption of motor too high

| No. | Possible causes | Remedy required |
|------------|--|----------------------------|
| 9.3.1 | Too much material on belt. | Reduce transport material. |
| 9.3.2 | Belt touches sidewall.(brake action) | Adjust belt. |
| 9.3.3 | The PVC covers of the sidewalls are tightened too strong thus slowing down the belt. | Move them up. |
| 9.3.4 | Belt tension too strong. | Release tension. |
| 9.3.5 | Too much material in the belt running back area. | Clean machine. |

9.4 Bearings too hot

| No. | Possible causes | Remedy required |
|------------|-----------------------------|---------------------------------------|
| 9.4.1 | Too much grease in bearing. | Reduce amount of grease. |
| 9.4.2 | Belt tension too strong. | Reduce tension. |
| 9.4.3 | Bearing damage. | Check bearings, replace if necessary. |
| 9.4.4 | No grease in bearing. | Lubricate bearing. |

9.5 Too many material in the belt run back area

| No. | Possible causes | Remedy required |
|------------|--|------------------------|
| 9.5.1 | Rubber of scraper worn out. | Replace rubber. |
| 9.5.2 | Scraper doesn't touch belt. | Adjust scraper |
| 9.5.3 | Brush on top of the conveyor worn out. | Replace brush |

10 STORAGE, DISPOSAL, TRANSPORTATION

10.1 Storage



Clean the machine. Preserve all polished metal surfaces using a suitable rust preventing agent. Store the machine in an enclosed, dry place. Cover the machine completely with a plastic sheet.




10.2 Disposal



Protect the environment.

The disposal of machines, machine components and process materials is partially subject to legal controls. More detailed information is given at the relevant administrative authority (e.g. regional and national Water Conservation Bureau and Environmental Protection Agencies). Only deposit the material to be disposed of at authorized drop-off points.

10.3 Transportation

|  WARNING | |
|--|---|
|  | <p>Suspended load. Falling loads can cause serious injury or death. Only use a crane or forklift truck, which is suitable for the weight and dimensions of the loads.</p> |
|  | <p>Also use suitable stopping means and pay attention to the gravity centre location. Do not step under the suspended load. Wear a protective helmet in addition to your basic protective gear.</p> |

11 CUSTOMER SERVICE AND SPARE PARTS ORDERS



Should problems occur during operation of the machine or if you have general questions about the machine which this operation manual cannot answer, please do not hesitate to contact us. We would be pleased to help you further in order to solve your problem as quickly as possible.

You can identify the spare parts you require using the spare parts list. Please quote the following information when making your order so that we can deliver the spare parts to you quickly:

- Company name and address.
- Contact person.
- Machine type.
- Machine number.
- Piece number of the spare part.
- Spare part reference.
- Subject number.
- Order quantity.

ZERMA
Machinery & Recycling Technology
(Shanghai) Co., Ltd.
5 Xinjie Rd XinQiao Township Ind.Park
Songjiang Shanghai 201612, China

Tel: 0086-21-57645573

Fax: 0086-21-57646766

E-Mail: info@zerma.com

Internet: <http://www.zerma.com>



TIP

The easiest way to order your spare parts is to copy the spare parts list and to fill in the order amount after the respective spare part.



12 SPARE PARTS LIST CY STRAIGHT

Please refer to the packing list delivered with the machine



13 CLARIFICATION FOR PERSONAL TRAINING

This is to certify that I have attended an in company training for service and operation of the granulator and understand all safety regulations. Further to this I have read and understand the owners' manual.

| City | Date | Printed name | Signature |
|-------------|-------------|---------------------|------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |



14 ELECTRICAL CONNECTION

The machine should be wired by a qualified electrician.

Please refer to the wiring diagram.



15 ADDITION

Documentation Main Drive Conveyor
Delivery documentation

ATTENTION:

The wiring schematics are located in the control panel in the event that the control panel is a part of the delivery