



### Technical Data:

Type	ZZ 150 HE
Machine Number	1.0150.4490
Order Number	238193
Year of Construction	2018

## 3-D Forced Flow Mixer

Remark:

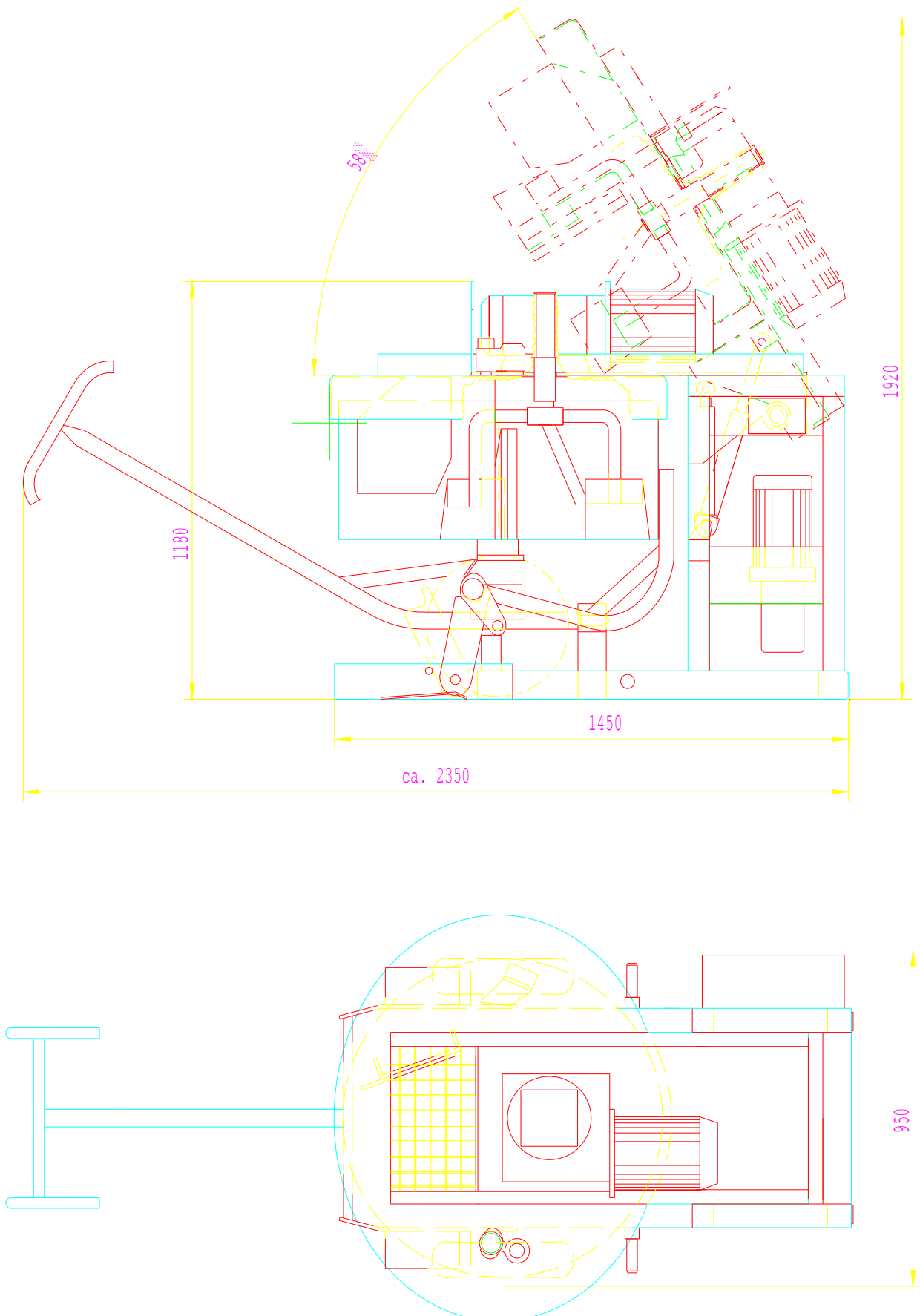
Chapter 50 010-00 000-00 000

**Zyklus 3-D Forced Flow Mixer Type ZZ 150 HE**  
with transportable mixing pan (Simplex trolley)



The ZZ 150 HE can be shifted within the building site. For this the mixer must be raised for example with a forklift. The at the right side axes serve the admission for the wheels for the transport. The wheels of the simplex trolley will be taken and fixed on the axes and protected.

Overview drawing ZZ 150 HE



## 3-D Forced Flow Mixer

Chapter 50 010-00 000-00 000

Remark:

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# Manufacturer's Declaration

## 3-D Forced Flow Mixer

Remark:

according to EC Recommendation for Machinery 2006/42/EG

We hereby declare that the following product

Description: Zyklus 3-D Forced Flow Mixer  
Type: ZZ 150 HE  
Machine code. 1.0150.4490  
Order no. 238193

Application: Mixing and homogenizing of different  
mixing goods for dry and wet mixtures  
is intended for installation for machinery

### **This product may not be used or put into operation until**

- it has been established that the machinery in which it is to be installed complies with the provision of the EC Machinery Guidelines as stated in MSV, BGBL. 306/1994
- the complete machinery complies to the Guidelines 2006/42/EG.

Harmonised Standards applied, especially: DIN EN ISO 12100, German Laws for Prevention of Accidents and General Technical Rules.

The product may only be used for the intended purpose and in the technical design agreed. In case these purposes are modified without our permission this declaration is not valid anymore.

Pemat Mischtechnik GmbH  
Thomas Stahl  
Director



Freisbach, 1st January 2018

## ZZ 150 HE 3-D Forced Flow Mixers - Description

Chapter 50 010-0 010-1 200

Remark:

Mixing performance is based on the uniflow system. The offset mixing star rotates synchronously with the mixing pan thus producing high levels of shearing effect and kinetic energy release. Due to the high relative velocity of the batch a homogeneous mixture is quickly achieved. Statically mounted mixing tools on the gear arm effect a horizontal and vertical stirrance within the batch.

A wall scraper continuously removes batch residues from the pan wall and deposits this back into the batch flow stream.

The pressure of the batch against the wall and the bottom of the mixing pan, produced by the mixing tools, makes the mixing pan turn co-currently without any extra drive. This rotation can be supported – if necessary – by an additional pan drive.

In order to intensify the mixing process, we could supply high speed agitators (as an option).

Areas of application and examples:

- All sorts of concrete (lightweight, fibre, fine, polymer, mortar, plaster) concrete and artificial stones, exposed aggregate concrete, paving slabs, roof tiles, precast concrete parts such as coloured U-, L- and manhole stones, windows and door lintels, prefabricated garages or for special applications: Internal/external concrete pipes, crane counterbalance weights, machine tool beds, spacer blocks for reinforced concrete
- Ready mix, Adhesives for tiles
- Floorings, Industrial or sportsground flooring
- Refractory and ceramic compounds, Furnace linings, Commodity goods (flow pots), Expanded clay, porcelain, roof tiles
- Glass compounds
- Accumulator fillings
- Abrasives
- Foundry sand
- Insulating materials
- Cold bitumen and asphalt
- Fillers
- Chemical products, Artificial fertilisers, adhesives
- Waste treatment, Binding of dust with cement for disposal or recycling

Mixing processes:

- Dry mixing
- Damp mixing
- Wet mixing
- Mixing liquid additives to solids
- Introducing steam or foam
- Homogenising
- Emulsifying
- Stirring
- Kneading
- Mixing with changing material consistencies
- Mixing batches with varying densities
- Mixing materials with different grain sizes
- Mixing materials with different ratio of components
- Multi-phase mixing

## ZZ 150 HE 3-D Forced Flow Mixers - Description

Remark:

### Operational features of ZZ 150 HE:

When switched on (electrically), the mixing star cannot rotate as long as the gear arm is in the raised (loading) position. After loading, the gear arm is lowered to the closed position following which the mixing star is actuated by an integrated proximity switch.

On raising the gear arm, the mixing star stops automatically. Raising and lowering are done manually. Raising and lowering are done hydraulically. All operations are acted by push buttons or selector switch.

Design and operation are in accordance with German "safety at work" regulations. The mixer can be modified to meet special requirements.

### Design of the stationary mixer with transportable mixing pan (Simplex trolley):

- The mixing pan is connected firmly with a chassis and can also be used as a transport container.
- Visual checking during mixing is possible through an inspection cover on the gear arm.

### Technical Data:

#### ZZ 150 HE 3-D Forced Flow Mixers

Model range	ZZ 150 HE
Batch capacity / ltr.	150
Max. dry change ltr./kg	170/240
Mixing pan diameter / mm	900
Mixing pan height / mm	392
Mixing pan design	mobile
Gear arm movement	hydraulic
Drive performance mixing star / kW	4
Drive performance hydraulics / kW	1,1
Voltage V	400 V / 50 Hz
Safety fuse A	16
Approx. weight kg	600

### Special equipment for ZZ 150 HE 3-D Forced Flow Mixer

Agitator

Power	4 KW
Voltage	400 / 690 V
Frequency	50 Hz
Drive speed	1435 U/min
Protection type	IP 55

Remark:

### 1 General Signs, Prohibitive Signs and Warning Signs

#### 1.1 Signs and Their signification

Following signs are used in the manuals for to mark special advices and information:

<b>Danger</b>	<b>indicates an immediate danger. If is not heeded, serious or fatal injuries will result.</b>
<b>Warning</b>	<b>indicates a possible danger. If is not heeded, serious or fatal injuries may result.</b>
<b>Caution</b>	<b>indicates a possible danger. If is not heeded, minor injuries may result.</b>
<b>Attention</b>	<b>indicates a possible harmful situation. If is not heeded, the product or an object is in vicinity may be damaged.</b>
<b>Important</b>	<b>indicates tips and other useful information. It does not indicate a dangerous or harmful situation.</b>

### 2 Generals

- The ZZ 150 HE has been built with state-of-the-art technology according to the recognised safety regulations. Nevertheless, its use may result in physical dangers to the operator or third parties, as well as damage to the machine and other material goods.
- Therefore, it is necessary to exercise utmost caution when using this machine!
- Only use the ZZ 150 HE when it is in proper working condition, taking the necessary safety measures and following the instructions in the operating manual! Malfunctions which may impair safety are to be eliminated immediately!

### 3 Range of application, proper use

- This machine is designed exclusively for mixing and/or homogenising solid, powdered, paste-like and liquid materials with a particle size of up to 35 mm.
- The dry filling quantity is approx. 170 L, for example about 150 L of fresh concrete. The filling height may not exceed approx. 265 mm. These specifications depend to a large degree on the material to be mixed and may therefore differ from those given above.
- Any other use of the machine, such as crushing hard objects, mixing explosive materials or operating the mixer in potentially explosive areas is not allowed.
- The manufacturer accepts no responsibility for damage resulting therefrom. The firm using the machine is solely responsible.
- Depending on the components to be mixed, more that 70 dB(A) might occur. In this case use adequate ear protection
- Proper use also includes following the instructions in the operating manual and observing the inspection and maintenance requirements.
- The use of the mixer in the USA and Canada is forbidden.

### 4 Organisational measures

- Always keep the operating manual close at hand on the site of application of the ZZ 150 HE
- In addition to the operating manual, observe and instruct others to apply generally valid legal and otherwise binding regulations regarding accident prevention and environmental protection.
- Observe all safety instructions and danger warnings on the ZZ 150 HE They must be kept in a legible condition!
- In the case of potentially hazardous changes in the ZZ 150 HE or its operating performance, shut down the machine immediately and alert the responsible parties to the malfunctions!
- Do not undertake any modifications, extensions or alterations to the ZZ 150 HE without the permission of the manufacturer! This also applies for installation and adjustment of the safety devices and valves, as well as any welding on load-bearing parts.
- Replacement parts must satisfy the technical requirements put forth by the manufacturer. This is guaranteed, for example, by the use of original replacement parts.
- This operating manual is intended to help you get to know your machine and to take proper advantage of its capabilities.



Remark:

- Proper use and maintenance of the mixer precludes dangers, decreases repair costs, upholds the reliability and increases the service life of your ZZ 150 HE.

### 5 Personnel selection and qualifications; basic responsibilities.

- Only trained personnel should be employed, and the responsibilities for operation, set-up, servicing and maintenance should be clearly delegated.
- When several people are working simultaneously on the mixer or in its immediate vicinity, make sure no one is endangered by the operating procedures (for example, clearly announce each operating procedure before it is undertaken).
- Work on the electric and hydraulic device of the mixer may only be carried out by trained electric and hydraulic technicians according to legal regulations.

### 6 Safety instructions for specific operating phases

**Caution:**

**Do not undertake any unsafe working procedures!**

- Only operate the ZZ 150 HE when all protective devices and safety-related devices, such as detachable protective devices and emergency stop devices, are present and functional! This also applies to suction and ventilation devices and noise protection devices, if present. Take all possible measures to ensure that the mixer is always operated in a functional state (for example, make a checklist before each workday).
- Check the mixer at least once a day for visible signs of damage or defects. In the case of malfunctions on the ZZ 150 HE such as failure of the drives or the hydraulic system, immediately shut down the mixer and secure it against unauthorised start-up (for example, with warning signs)! Have defects eliminated immediately by the personnel responsible!
- During all work involving operation, production fitting, re-equipping or adjustment of the ZZ 150 HE and its safety-related devices, as well as inspection, maintenance and repair, follow the activation and deactivation procedures and instructions for maintenance work from the operating manual!
- Remove oil, motor fuel, and detergent from machines, especially at junctions and screw connections, at the beginning of the maintenance or repair work! Do not use abrasive cleaners! Use only non-fibre cloths! Dispose of operating and auxiliary materials (for example, hydraulic oil) and replacement parts in a safe, environmentally sound manner!
- Each time before switching on the ZZ 150 HE, make sure that no one will be endangered by starting the machine (for example, only persons operating the machine should be in the vicinity of the mixer).
- If maintenance and repair work is to be carried out, inform the personnel operating the mixer in advance, so that the mixer is not inadvertently activated during this time. Clearly announce when the mixer can be operated again.

**Note:**

**Do not make any modifications to the electric control unit or, if present, to the programmable control systems.**

**Note**

**Pull the mains plug out during idle periods**

- Only perform welding, burning and sanding work when this is expressly permitted by the manufacturer, or allow the manufacturer to carry out such work. There is a danger of burning, explosion and/or poisoning. .

### 7 Instructions regarding particular types of danger

#### 7.1 Electrical energy

- If there is a malfunction in the electrical energy supply, turn off the mixer immediately, pull out the mains plug and/or turn off the fuse for the current supply to the mixer! Work on electrical systems or operating equipment may only be performed by an electrical technician according to appropriate regulations.

#### 7.2 Hydraulic system

- Work on the hydraulic system may only be carried out by persons with special knowledge and experience in the field of hydraulics!
- Check the hydraulic lines, hydraulic unit, cylinders and screw connections regularly for leaks and visible damage! Eliminate defects immediately! Spurting oil can lead to injuries and fires!

Remark:

- Depressurise the hydraulic lines which are to be opened before beginning repair work, this means all cylinders must be retracted! Then release the screw connections carefully, collect and dispose of leaking oil.
- Observe the prescribed changing intervals for hydraulic oils and components (for example, hoses).

### 7.3 Transportable mixers

- When unloading, only use lifts, load suspension devices and transport vehicles with sufficient carrying force! The weight of the mixer is found on the type plate.
- Determine qualified instructor for the lifting process.
- Secure the load. Use appropriate limit stops!
- Before starting up the machine again, remove the lifting and securing devices according to regulations! Parts removed for purposes of transport are to be carefully re-attached and secured before starting up the machine!
- Even for minor location changes, the gear arm is to be closed and the machine or system disconnected from every external energy source!
- Before re-starting the machine, reconnect it to the mains according to operating instructions.

**Attention**

**For transport, the gear arm must be in the closed position**



Remark:

### 1 Delivery

- If not stated in our acknowledgement of order the transport must be made by the client.
- The plant components generally are shipped pre-assembled and suitable for transport.
- After the parts arrive at site, the shipment must be controlled immediately and compared with the delivery note.
- If some problems arise or if the shipment is not complete please contact our transport department. We recommend to store the small parts and hardware of a certain value in a lockable room or stock in order to avoid extra costs or delays of the assembly. Please store the parts suitable to the single assembly steps!
- If special permits are required for the transport (oversized goods), please organise early

### 2 First steps at site

- Observe the Regulations of Preventions of Accidents
- An accurate and proper assembly is essential for a later proper operation. The assembly should be done by Pemat or under supervision of a skilled Pemat engineer fitter.
- If the assembly is done by client please appoint only skilled specialists who are experienced enough in erecting and operating mixing plants.
- For damaged or faults which are caused by improper assembly we do not assume any responsibility.
- Even completely pre-assembled plants may cause faults if not installed correctly.
- Little damages at the finish painting caused by transport and assembly must be corrected immediately after the assembly is complete.
- Foundations must be done from authorised companies only. They must be finished and able to carry load stressable. This is essential for a punctual beginning of the assembly. Dimensions of foundations, loads, distances and heights generally are stated:

### 3 Recommendations for the Assembly

- Control the heights and position of the foundations already when they are to be produced.
- The signification, the quality and dimension of preparation of the assembly depends on the size of the plant. In case the assembly is done by Pemat there will be an inspection of the site and a meeting about the course of the assembly.
- Generally following requirements must be fulfilled prior to starting the assembly:
  - The site must be available even with heavy trucks (good roads and parking).
  - Enough place for storage and handling of the discharging trucks and mounting vehicles, reasonable and secure accommodation for our assembly staff (for longer assembly periods).
  - The client must appoint one person responsible for the assembly.
  - Assembly cranes, pulleys, ropes, truck cranes with enough lifting power a hook height.
  - Electric cables (for sites) with the required diameter and fuses near by the assembly place (400 V and 230 V).
  - If required there must be a satisfactory illumination at site.
  - When existing supports, columns, carrier, roof constructions or existing house constructions are used make sure that they are suitable to additional load. Check the static requirements.
- Modifications and amplifications to above mentioned requirements may be possible depending on the extent and mode of the assembly.

### 4 Assembly Drawings - Drawings

- For the assembly of the plant following documentation is made to your disposal: General drawings, project drawings, list of parts, operation manuals and spare part list.
- The correct way for assembly and the main dimensions can be seen at the above mentioned drawings.

Remark:

### 5 Course of the assembly

- The mixer must be always installed in horizontal position. With possible inclinations or unevenness appropriate documents between mixer frameworks and support construction are to be inserted.
- Mixers set up, align and with foundation anchorage and/or mixer stage bolt.

### 6 Connection to Power Network by client

- Only a legally authorised company is allowed to create the required power lines for the machine and to connect the machine to the power including correct grounding. The user of the plant must give the related order to the chosen company.
- Always observe the general rules for electric works
- Always observe the different systems of protections!
- Observe the correct direction of revolution of the drives!
- Layout the electric cabling according to the circuit diagram.
- The mixer is according to standard wired on terminal box (if agreed in the confirmation of order not expressly different one).

Remark:

**Protect every motor with an own motor protective switch.**

- All machine parts in enterprise take. See appropriate chapters.
- The machine parts are lubricated after the lubrication plan and/or filled up with oil.

Attention:

**After all works are accurately executed, the skip hoist is installed properly and ready for production!**

Remark:

### 1 Important instructions

- Lubricate the mixer before initial operation, especially after a long idle period
- Always ensure that no one is endangered by starting the machine, especially when several persons are working simultaneously with the mixer. Thus, when you want to swing up the gear arm, for example, make sure no one is in its immediate vicinity. During cleaning and maintenance work, make sure that no one can start the ZZ 150 HE without authorisation, until all tasks have been completed and the mixer is once again in working condition (for example turn off and lock main switch).

**Danger: Always pull the power plug.**

- Devices prevent the intervention with rotary mixing device in the pan. Never start running the mixer without these devices.
- Only mix liquid, powdered, paste-like and solid materials!! Do not put any hard objects with a particle size larger than 30 mm, such as rocks or pieces of metal, into the mixer.

**Danger: Never reach into the plate when the mixing device is rotating.**

### 2 Starting and mixing

- Place the mixer on a stable, even surface. An electrical technician should connect the mixer to the mains.
- Make sure: of the correct positioning of the Simplex trolley; the emergency switch being pulled out
- Only then the mixer can be switched on by actuating S1. By actuating switch S4, the mixer is switched off. The mixer can be deactivated by pressing the EMERGENCY STOP or switching off the main switch (see chapter "Electric circuit")
- Raising and lowering of the gear arm are effected by push buttons. When raising the gear arm the mixing star (and the high speed agitator- if present) is automatically switched off and when lowering automatically actuated by an integrated proximity switch.
- The mixer cannot be actuated if the gear arm is raised or without positioned Simplex trolley.
- Check the correct rotating direction of the mixing star (it must turn clockwise – following the arrow on the mixing pan cover). If it turns into the wrong direction change by means of the phase inverter.

Remark:

### 1 Cleaning

Before cleaning, switch off the ZZ 150 HE at the main switch and secure it against unauthorised re-activation (for example, lock the main switch). The main plug must be pulled out and removed. The ZZ 150 HE is to be cleaned at least after each workday. Cleaning can be done with a water jet, as long as the adherent mixing material has not yet hardened.

#### Attention:

**Do not spray electrical parts with water!**

Caution when cleaning with compressed air! Small parts may suddenly come loose, wear safety goggles!

The following components must be thoroughly cleaned:

- Mixing pan
- All mixing tools
- External frame (especially movable parts and adjusting devices)
- Safety instructions and devices on the ZZ 150 HE
- If present: All dumping devices, for example charger or filler neck

If individual parts cannot be sufficiently cleaned with a water jet, despite regular and thorough cleaning, the dirt must be carefully removed (chipping parts; mixing tools made from wear-resistant casting are impact-sensitive).

During operation, falling dirt can destroy your mixtures as well as the mixer.

### 2 Adjustment work

As the result of considerable strain during mixing, the mixing tools are subject to wear, for example. It is therefore necessary to check and adjust individual parts at regular intervals.' Optimal mixing results are obtained and perfect functioning of the mixer is guaranteed only when the ZZ 150 HE is correctly adjusted.

#### 2.1 Adjusting the gear arm

A definite gap must be maintained between the mixing star and the base of the pan, otherwise deposits on the base of the mixing pan may result.

Inspection is carried out as follows:

- Lower the gear arm and switch off all geared mixing tools.
- Rotate the mixing pan
- If no scratching sounds or only light scratching sounds are heard, the adjustment is correct.
- Then check if mixing material is deposited on the base of the pan during mixing, especially within the circular path of the mixing star. If this is the case, the gear arm is set too high.

Adjust with the adjusting screws located outside on the gear arm. Normally, the gear arm is adjusted in response to the wear of the mixing star blades, which means it must be lowered. To do this, loosen the counternuts on the adjusting screws. The screw must then be fastened (seen from above, clockwise), until the mixing star knives are just barely above the bottom surface.

Intermittent scratching sounds are acceptable, as long as they do not become continuous. Ensure that both screws are evenly adjusted, since otherwise the gear arm will not be horizontal.

Finally, re-tighten the counternuts, without turning the adjusting screws.

It is essential to note the wear on the mixing star blades. If the lower edges of the blades reach the lower edges of the holding plates, the gear arm can no longer be adjusted. Replace the blades at this point, at the latest. Only thereafter may the gear arm be correctly readjusted.

Before restarting, check the height setting of the wall scraper.

After adjustment has been done, observe whether mixing material collects at the bottom during operation and is not mixed. Readjust if necessary.



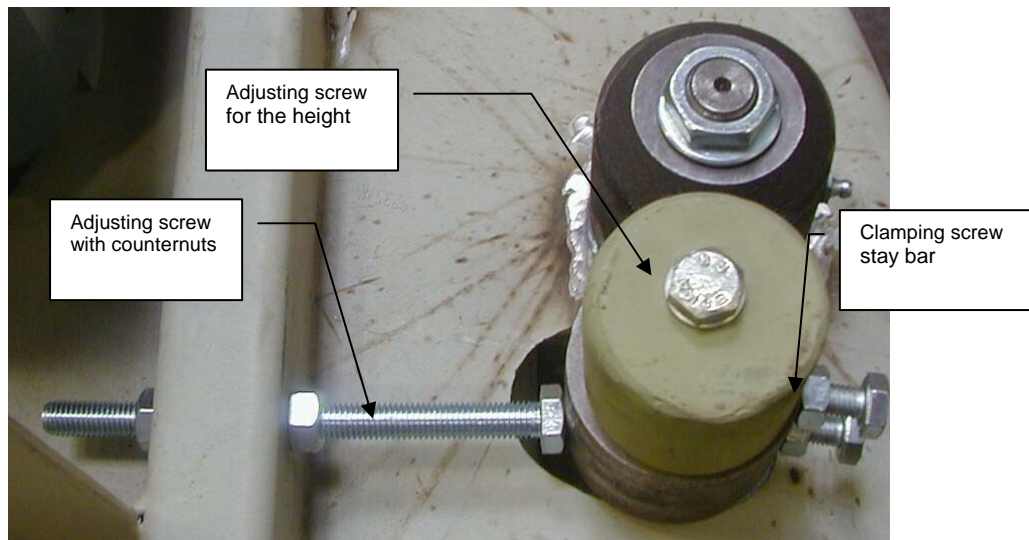
Remark:

### 2.2 Adjusting the wall scraper

The wall scraper is mounted on the gear arm and is pressed against a limit stop with an extension spring. This limit stop is also the adjusting screw, the position of which determines how tightly the scraper presses against the wall of the mixing pan.

The wall scraper is correctly adjusted when no mixing material adheres to the pan wall and in the corner where the wall meets the base.

If this is not the case, either the scraper plate is worn out and must be replaced, or the wall scraper is incorrectly adjusted, i.e. it is too far from the wall to strip the mixing material.



When the scraper is incorrectly adjusted, proceed as follows:

- Release the counter nut on the adjusting screw.
- When the screw is screwed in, that is clockwise, the scraper is pressed more strongly against the wall. When the pan is rotating and the mixing tools are switched off, turn the screw slowly, until light scratching sounds can be heard. The strip should just barely touch the pan wall.
- Re-tighten the counter nut, without turning the screw.

The height of the wall scraper can also be adjusted.

This adjustment must always be made when unmixed material remains in the corner of the mixing plate (base-wall corner), when the gear arm is adjusted or when a scraper plate is worn out.

Inspection is carried out as follows:

- Extend the gear arm, switch off the mixer and secure against unintentional reactivation (for example, lock main switch). Carefully remove mixing material deposits in the corner of the mixing pan and lower the gear arm. The lower edge of the wearing plate must be located approx. 2 mm over the lower edge of the mixing star knives. To adjust, loosen the two clamping screws. Turning the adjusting screw (vertical in the holding rod of the scraper) anti-clockwise (seen from above) lowers the scraper. If the scraper is not lowered automatically, it must be pulled down manually.
- Re-tighten all screws, connect the mixer only rotate the mixing pan and check the adjustment. The scraper plate may not be pressed strongly against the pan base, nor may it be too far away from it.

#### Note:

**During mixing, the performed adjustment should be checked and, if necessary, corrected. If, nonetheless, mixing material deposits form which cannot be stripped away, the scraper plate may be worn out.**

Remark:

### 2.3 Adjusting the revolving shovel

If necessary, the revolving shovel can be adjusted in accordance with the mixing material and quantity. The stronger it is set against the stream, the more intensively the mixing material is turned. A stronger braking force is also applied to the pan. Therefore, it is important to observe that the mixing material is optimally agitated, without applying an undue braking force to the mixing pan.

To adjust, remove the revolving shovel and fasten it in the desired position



Remark:

### 1 Basic inspection

What	When/How often	What to do
Check the machine for visible external defects + operating performance	Daily	Eliminate defects immediately
Check oil circulation cylinder and pump for leaks	Weekly, even if no defects are visible	<ul style="list-style-type: none"> <li>- Eliminate defects immediately</li> <li>- Replace hydraulic lines and screw connections at regular intervals even if no defects are visible</li> </ul>
Check electrical system for loose connection or worn through cables	Regularly	Eliminate defects immediately
Safety devices	After each repair and maintenance task in which devices were removed	
Check pan base, shell and mixing device for wear and firm attachment	Daily during cleaning	<ul style="list-style-type: none"> <li>- Immediately tighten loose working parts,</li> <li>- Replace worn parts</li> </ul>
Adjusting the wall scraper	After adjusting or replacing the plate otherwise weekly	
Replace wall scraper wearing plates or mixing blades	When the tip is worn, or when the lower edge of the blades reaches the holding plates	<ul style="list-style-type: none"> <li>- Loosen screws</li> <li>- Replace plates</li> </ul>
Replace revolving shovel	When mixing material is not sufficiently returned	Loosen screws and replace revolving shovel
Gear arm adjustment	After replacing mixing tools otherwise weekly	
Agitator knives and cover disk	In the case of wear. If the seal is worn it must be immediately replaced. Otherwise material can be thrown into the ball bearing and destroy it.	<ul style="list-style-type: none"> <li>- Loosen screws at the lower end of the shaft</li> <li>- Remove blades and separators by pulling downwards</li> <li>- Loosen screws and replace seal</li> </ul>

Remark:

### 2 Lubrication

#### 2.1 General

With hand pump

Where	When
Wall scraper	At least one a week
Gear arm pivot	Each workday
Mixing plate carriage bearing	In case of stiffness
Hydraulic cylinder gear arm	Each workday
Agitator (if present)	In case of loss

#### 2.2 Lubrication points

Wall scraper:



Gear arm pivot:



Hydraulic cylinder gear arm:



Remark:

### 2.3 Capacity for the mixing star drive

ÖLFÜLLMENGE [cm <sup>3</sup> ] CAPACITY [cm <sup>3</sup> ] QUANTITE DE LUBRIFIANT [cm <sup>3</sup> ]														
Bauform	Flanschführung Flange mounted Exécution à bride													
Mounting position	Dreistufig à trois trains d'engrenages quadruple reduction									triple reduction vierstufig à quatre trains d'engrenages				
Position de montage	9012	9022	9032	9042	9052	9062	9082	9086	9092	9013	9023	9033	9043	9053
B5	1.900	2.600	5.200	9.700	16.500	27.500	54.000	78.000	130.000	2.300	3.000	5.700	10.200	18.000
B5 I	700	1.300	1.900	3.600	7.500	12.000	21.000	36.000	40.000	1.200	2.400	2.700	5.700	12.500
B5 II	2.400	4.200	7.300	11.500	23.500	38.500	80.000	118.000	175.000	3.000	5.300	8.500	14.700	26.500
B5 III	1.900	3.500	6.400	11.400	20.000	33.000	66.000	91.000	154.000	2.200	3.800	6.900	11.400	21.000
V1	1.200	2.000	3.300	6.500	11.500	19.000	38.000	53.000	82.000	1.400	2.200	3.600	6.600	13.000
V3	1.700	2.800	5.100	8.200	18.000	26.000	52.000	76.000	91.000	1.900	3.100	5.600	9.600	17.000
Bauform	Aufsteckausführung Shaft mounted Exécution à arbre creux													
Mounting position	dreistufig à trois trains d'engrenages quadruple reduction									triple reduction vierstufig à quatre trains d'engrenages				
Position de montage	9012	9022	9032	9042	9052	9062	9082	9086	9092	9013	9023	9033	9043	9053
H1	700	1.300	1.900	3.600	7.500	12.000	21.000	36.000	40.000	1.200	2.400	2.700	5.700	12.500
H2	1.900	3.500	6.400	11.400	20.000	33.000	66.000	91.000	154.000	2.200	3.800	6.900	11.400	21.000
H3	2.400	4.200	7.300	11.500	23.500	38.500	80.000	118.000	175.000	3.000	5.300	8.500	14.700	26.500
H4	1.900	2.600	5.200	9.700	16.500	27.500	54.000	78.000	130.000	2.300	3.000	5.700	10.200	18.000
H5	1.200	2.000	3.300	6.500	11.500	19.000	38.000	53.000	82.000	1.400	2.200	3.600	6.600	13.000
H6	1.700	2.800	5.100	8.200	18.000	26.000	52.000	76.000	91.000	1.900	3.100	5.600	9.600	17.000

Remark: Standard lubricant for the gearboxes is mineral-oil.

Remark: Filling quantities are approx. figures. Oil level must be checked according to the oil-level plugs

### 2.4 Recommendations

**Indication:**  
Ce tableau présente les lubrifiants comparables des différents fabricants. Si l'on respecte les critères de viscosité et le type de lubrifiant, on peut utiliser n'importe quelle marque d'huile après ne vidange. Afin de pouvoir garantir un bon fonctionnement de nos réducteurs, veuillez nous consulter avant de remplacer un lubrifiant par un autre possédant des caractéristiques différentes de viscosité et de type.

**Note:**  
This table lists compatible lubricants of different suppliers. Within the same viscosity class and type of lubricant the supplier can be chosen freely. In case you change the viscosity class resp. the type of lubricant you should contact us in advance as otherwise we cannot assure the proper function of our drive and the warranty becomes void.

**Hinweis:**  
Diese Tabelle stellt vergleichbare Schmierstoffe unterschiedlicher Hersteller dar. Innerhalb einer Viskosität und Schmierstoffsorte kann der Öhersteller gewechselt werden. Beim Wechsel der Viskosität bzw. der Schmierstoffsorte muß Rücksprache mit uns gehalten werden, da sonst keine Gewährleistung für die Funktionstüchtigkeit unserer Getriebe übernommen werden kann.

Schmierstoffart Type of lubricant Type de lubrifiant		Umgebungstemp. Ambient temp. Temp. ambiante	ASAL	BP	Castrol	DEA	LEPO	FUCHS	KALDRA	Mobil	Optinol	Shell	Tribol
Mineralöl Mineral oil Huile minérale	Schneckengetriebe 0 ... 40°C ISO VG 680	0 ... 40°C	Degol BG 680 Degol BG 680 plus	Alpha SP 680	Falcon CLP 680	Renolin CLP 680 Plus	Küboril GEM 1-680	Mobilgear: - 636 - XMP 680	Optigear BM 680	Shell Omala 680	Tribol 1100/680		
	ISO VG 220 -5 ... 40°C (normal)	-5 ... 40°C	Degol BG 220 BG 220 plus	Alpha SP 220 Alpha MW220 Alpha MAX 220	Falcon CLP 220	Renolin CLP 220 Plus	Küboril GEM 1-220	Mobilgear: 630 Mobilgear XMP 220	Optigear BM 220	Shell Omala 220	Tribol 1100 / 220		
	ISO VG 100 -15 ... 25°C	-15 ... 25°C	Degol BG 100 BG 100 plus	Alpha SP 100 Alpha MW 100 Alpha MAX 100	Spartan EP 100	Renolin CLP 100 Plus	Küboril GEM 1-100	Mobilgear: - 627 - XMP 110	Optigear BM 100	Shell Omala 100	Tribol 1100 / 100		
	ISO VG 15 -45 ... -15°C *	-45 ... -15°C *	Vitamol 1010	Hyspan AWS 15 Hyspan SP 15 Hyspan ZZ 15	Uniwis J13	Renolin B 15 HVI	Isolox MT 30 rot	Mobil DTE 11 M	Ultra 10	Shell Tellus T 15	Tribol 943 AW 22		
Synthetisches Öl Synthetic oil Huile synthétique	Schneckengetriebe -5 ... 60°C ISO VG 680	-5 ... 60°C	Degol GS 680	Energol SG-XP 680	---	Renolin PG 680	Kübersynth GH-6-680	Glygoyle HE 680	Optiflex A 680	Shell Tivela S 680	Tribol 800 / 680		
	ISO VG 220 -25 ... 80°C *	-25 ... 80°C *	Degol GS 220	Energol SG-XP 220	Polydea PGLP 220	Renolin PG 220	Kübersynth GH-6-220	Glygoyle HE 220	Optiflex A 220	Shell Tivela WB Tivela S 220	Tribol 800/220		
Biologisch abbaubares Öl Biodegradable oil	Schneckengetriebe -5 ... 40°C	-5 ... 40°C	---	---	---	Plantogear CLP 680	---	---	---	---	---	---	---
Huiles biodegradables	ISO VG 220 -5 ... 40°C	-5 ... 40°C	Degol BAB 220	Biogear SE 220	Ergon ELP 220	Plantogear CLP 220	Küberbio GM2-220	---	Optisynth BS 220	---	Tribol BioTop 1418 / 220		
Lebensmittel- verträgliches Öl <sup>1)</sup> Food-grad oil <sup>1)</sup> Huiles pour environnement alimentaire <sup>1)</sup>	Schneckengetriebe -5 ... 40°C	-5 ... 40°C	---	---	---	Beh-Ray No-Tox Synt Worm Gear Oil 680	Küberoil 4 UH1-680 Kübersynth UH1 6-680	---	Optiflex GT 680	Shell Cassida Fluid GL680	Tribol FoodProof 1800 / 680		
	ISO VG 220 -25 ... 40°C	-25 ... 40°C	Eural Gear 220	Vitalube GS 220	---	Beh-Ray No-Tox Gear Oil 90	Küberoil 4 UH1-220	Mobil DTE FM 220	Optiflex GT 220	Shell Cassida Fluid GL220	Tribol FoodProof 1810 / 220 oder 1800 / 220		
Synth. Fließfett Synth. fluid Graisse fluide synthétique	-25 ... 60°C	-25 ... 60°C	Aralub BAB EP0	Energol GSF	Fließfett S 420	Renolit LX-PG 00	Kübersynth GE 46-1200 Kübersynth UH1 14-1600 <sup>1)</sup>	Glygoyle Grease 00	Obeon UF 00	Tivela Comp. A Tivela GL 00	Tribol 800 / 1000		

## Lubrication and maintenance plan

Remark:

This table lists compatible lubricants of different suppliers. Within the same viscosity class and type of lubricant the supplier can be chosen freely. In case you change the viscosity class resp. the type of lubricant you should contact us in advance as otherwise we cannot assure the proper function of the drive and the warranty becomes void.

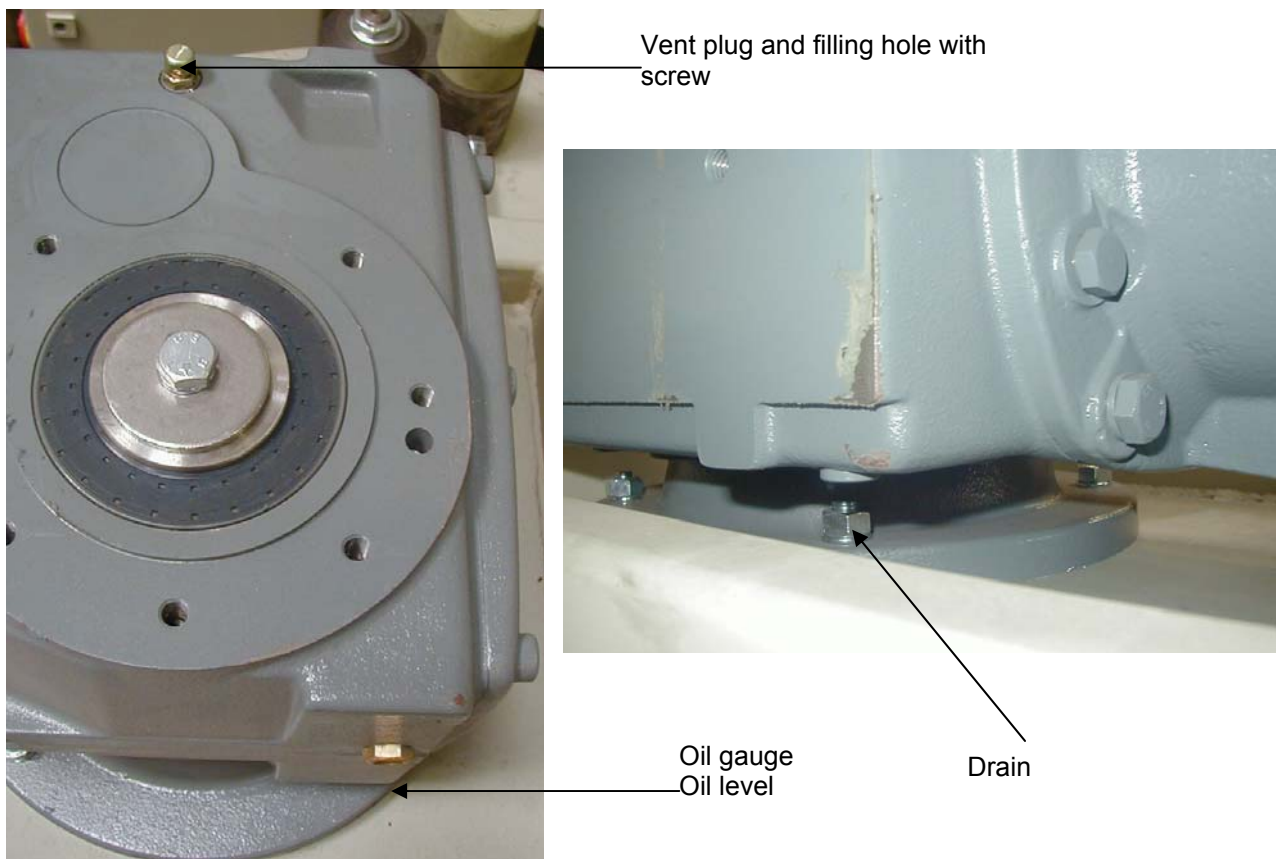
**Remark:** With ambient temperatures below  $-30^{\circ}\text{C}$  and above approx.  $+60^{\circ}\text{C}$  shaft sealing rings of a special material quality must be used!

### 3 Maintenance

#### 3.1 Maintenance of the mixing star drive

**Remark:** Prior to any maintenance work, always disconnect the mixer from the power supply and against unauthorized operation

**Remark:** In addition to the Original Manual of the supplier please pay attention to the following information:



Filling quantity approx. 5,1 litres up to mid oil gauge, decisive is the oil level visible in the oil gauge (type of the gear: 9032, design H6)

#### 3.2 Maintenance of the gearbox

- Regular oil state control
- Change the oil each 10.000 working hours or at least after two years.
- Double terms if synthetic products are used
- Shortening of the intervals with extreme conditions (high humidity, hostile environment and high temperature variations).
- Connection of the lubricant change with a thorough cleaning of the gearbox.



## Lubrication and maintenance plan

Remark:






**Remark:** Never mix different synthetic lubricants together, nor with mineral lubricants! This is also valid for the disposal.

### 3.3 Maintenance of the hydraulic aggregate



Drain plug,  
Oil level

1. Oil level – during the first time of operation check daily, later weekly:  
Remove venting screw (= drain plug). The oil level is correct if oil is visible or can be touched with finger tip (All cylinders must be retracted)
2. Oil change - at least after 2000 working hours:  
Detach unit, remove drain plug and drain the oil completely. Detach the tank and clean the unit and the tank, especially the filter. For assembly proceed vice versa. Check oil level (approx. 2 litres) When filling use filters  $\leq 25 \mu\text{m}$ . Observe the following recommendations.

Öltemperaturbereich *	Kennzeichnung nach DIN 51502					
-20 – +40° C	HLP (D) 22	AGIP ARNICA 22, AGIP OSO/D 22	Aral Vitam GF 22 Aral Vitam DE 22	BP Energol HLP 22 BP Energol HLP-D 22	Castrol Hyspin AWS 22, Castrol Hyspin SP 22	NUTO H 22, HLPD-OEL 22
-10 – +55° C	HLP (D) 32	AGIP OSO 32, AGIP OSO/D 46	Aral Vitam GF 32 Aral Vitam DE 32	BP Energol HLP 32 BP Energol HLP-D 32	Castrol Hyspin AWS 32, Castrol Vano HDX, Castrol Hyspin SP 32	NUTO H 32, HLPD-OEL 32
$\pm 0$ – +70° C	HLP (D) 46	AGIP OSO 46, AGIP OSO/D 46	Aral Vitam GF 46 Aral Vitam DE 46	BP Energol HLP 46 BP Energol HLP-D 46	Castrol Hyspin AWS 46, Castrol Vano HDX, Castrol Hyspin SP 46	NUTO H 46, HLPD-OEL 46
+10 – > +70° C Höchstemperatur: Abhängig von den Bauteilen der Hydrauliksteuerung (Dichtungen, Werkstoffe usw.)	HLP (D) 100	AGIP OSO 100	Aral Vitam GF 100	BP Energol HLP 100	Castrol Hyspin AWS 100, Castrol Hyspin SP 100	NUTO H 100
-15 – +60° C	HV 46	AGIP ARNICA 46	Aral Vitam HF 46 Aral Vitam VF 46	BP Bartran HV 46	Castrol Hyspin AWH 46, Castrol Vano HDX	UNIMS N 46

Remark:

- Hydraulic screw connections, hoses and lines are to be examined at least once weekly
- The description of the motor could be transferred on the motor of the hydraulic aggregate.

## Disturbances recognise and eliminate

Remark:

The most common malfunctions, and corrective measures to quickly restore the functioning of your machine, are shown here.

**Danger:** In the case of malfunctions in the electrical system: **Switch off the machine immediately, pull out the mains plug and secure the mixer against unauthorised access (for example, with warning signs). Inform an electrical technician.**

Malfunction	Cause	Correction
Machine does not start	<ul style="list-style-type: none"> <li>- No electrical connection or</li> <li>- Electrical system malfunction</li> </ul>	Inform an electrician replace main fuse Observe safety instructions.
Individual drives do not start	<ul style="list-style-type: none"> <li>- Corresponding fuses burnt out or</li> <li>- Motor defective</li> </ul>	<ul style="list-style-type: none"> <li>- Check the action of movable parts.</li> <li>- Check motor (connection)</li> </ul>
Drive fuses constantly fail	<ul style="list-style-type: none"> <li>- Motors are overloaded or</li> <li>- Motor connection defect</li> </ul>	<ul style="list-style-type: none"> <li>- Use less mixing material</li> <li>- Check the action of movable</li> </ul>
Hydraulic system runs, but nothing moves	<ul style="list-style-type: none"> <li>- Insufficient pressure is built up or</li> <li>- Oil level in tank too low</li> <li>- Hydraulic pump / unit defective</li> <li>- Integrated proximity switch is defect</li> </ul>	<ul style="list-style-type: none"> <li>- Check pressure (manometer)</li> <li>- Adjust pressure control valve (only a qualified technician may do this)</li> <li>- Top up hydraulic oil</li> <li>- Replace defective parts</li> </ul>
Gear arm does not move downward	<ul style="list-style-type: none"> <li>- Pipe-brake safety device has been activated</li> <li>- Leakage in hydraulic system</li> </ul>	<ul style="list-style-type: none"> <li>- Move arm upwards, then downwards</li> <li>- Check pipelines for leaks</li> </ul>
Mixing star or agitator does not switch on and off automatically	<ul style="list-style-type: none"> <li>- Proximity switch defective or misadjust</li> <li>- Electrical system malfunction</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust or reset switch</li> <li>- Check control unit (electrical technician)</li> </ul>



## Gear arm

Remark:

The ZZ 150 HE is a stationary mixer.

The basic components of the mixer are the frame, which contains the pivoting gear arm and transportable mixing pan (Simplex trolley).

The static and dynamic mixing tools and the high speed agitator (special equipment) are located on the hydraulic pivoting gear arm.

The gear arm is pivoted upward hydraulically in order to fill and remove the mixing pan, and also for servicing and cleaning the tools.

When the gear arm is raised, all geared mixing tools are automatically switched off and cannot be switched on again. The tools are not reactivated until the arm is lowered. In addition, the gear arm cannot be lowered as long as the mixing pan is not in the mixing position. When the arm is raised the mixing star is automatically switched off by an integrated proximity switch. The mixing star is actuated when the gear arm is being lowered to the closed position.

**Attention:**                    **For transport, the gear arm must be in the closed position.**

## Mixing pan

Remark:

The ZZ 150 HE is a stationary mixer.

The basic components of the mixer are the frame, which contains the pivoting gear arm and transportable mixing pan (Simplex trolley).

The rotation of the mixing pan is effected – co-currently with the mixing star – by the coupling effect of the material.

The mixing pan rests on a bearing turntable being installed on the Simplex trolley. The Simplex trolley can be removed and re-installed as well as transported. Discharging of the pan is effected by raising the handle and tilting the pan over the skids.

**Note:**                      **Wheels pressure 3,5 bar**



## Mixing tools

Chapter 50 010-0 000-0 000

Remark:

### 1 Mixing star

The mixing star has four mixing arms, onto which the wearing plated of the mixing blades are screwed. It is attached to the gear shaft and is directly run at 60 rpm.

### 2 Wall scraper

The wall scraper is for cleaning the pan casing during the mixing process. In the process, any mixing material adhering to the sides is scraped off and returned to the mixing star. The wall scraper is attached to the gear arm on movable bearings, so that the limit stop on the pan wall can be adjusted. The height of the wearing plate can also be adjusted by adjusting the height of the entire wall scraper.

### 3 Revolving shovel

The revolving shovel effects a vertical rearrangement of the mixing material. It is firmly bolted on the gear arm.

The various bore-holes allow the revolving shovel to be positioned more or less strongly against the stream of mixing material. If the revolving shovel is positioned more strongly against the stream of the mixing materials, the mixing material is mixed more intensely, but a stronger braking force is applied.

Therefore, the revolving shovel should be adjusted in such a way that it mixes well, according to the type and quantity of the mixing material, but the pan is not strongly braked by jams.

### 4 Separating shovel

The separating shovel returns the upper part of the batch to the mixing star. The shovel is firmly installed.

### 5 High speed agitator (special equipment)

The supplementary agitator is especially appropriate for difficult mixing, for example for rapidly dispersing humidity or mixing material which tends to clump. It can considerably reduce mixing time.

Since the effect of an agitator also depends on the material to be mixed, it is recommended that you consult the mixer manufacturer before installation.

**Attention:** Each mixing tools must be regularly cleaned, checked and replaced according to maintenance instructions.

## Hydraulic device

Remark:

Upward and downward pivoting of the gear arm are effected by a hydraulic compact unit.

When the hydraulic pump is switched on by actuating push button "gear arm up", the cylinder is extended and the gear arm is raised.

Without current, the valve is closed so that it is possible to stop pivoting at any time by releasing the bush button "gear arm down" is actuated, only the circulation valve is opened so that the gear arm may sink of its own accord.

## Electric circuit

Remark:

In order to start the mixer, the simplex trolley must be in the mixing position and the EMERGENCY STOP switch must be pulled out. Switch on switch S1 = "mixer on" and lower the gear arm by actuating S3 (↓ = Gear arm down), i.e. the mixing star starts automatically. By actuating S4 = 0 the mixer is switched off.

By actuating S2 (↑ = Gear arm up) the gear arm can be raised following which the mixing star is switched off and cannot be switched on as long as the gear arm is in the raises position.

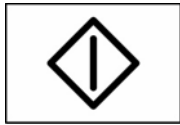
The mixer can be deactivated by pressing the EMERGENCY STOP or switching off the main switch.

Before putting into operation for the check the correct rotating direction of the mixing star (it must turn clockwise – seen from above). If it turns into the wrong direction change by means of the phase inverter.

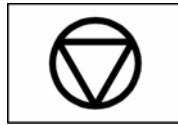
## Electric circuit

Remark:

### Labelling:



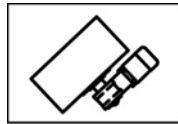
Control unit "ON"



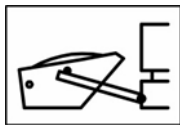
Control unit "OFF"



Gear arm "UP"  
Gear arm "DOWN"



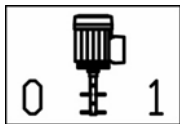
Mixing pan "LIFT"  
Mixing pan "LOWER"



Charger "UP"  
Charger "DOWN"



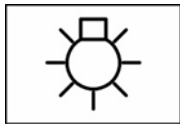
Accessory drive "ON"  
Accessory drive "OFF"



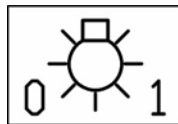
Agitator "ON"  
Agitator "OFF"



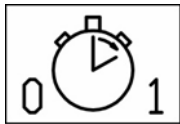
Display speed control  
agitator



Light "ON"  
button



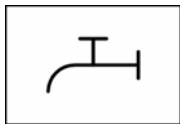
Light "ON"  
Light "OFF"  
selection switch



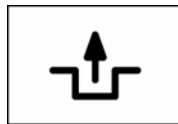
Mixing time "ON"  
Mixing time "OFF"



Display mixing time



Display  
Water dosage



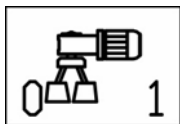
Safety button  
Two-hand-operation



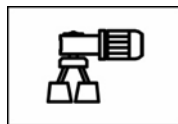
Earth conductor  
missing



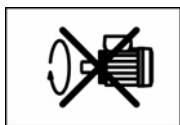
Fault  
Motor



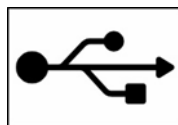
From size ZK 375  
mixing star "ON"  
mixing star "OFF"



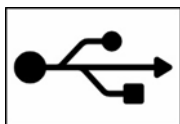
Display speed control  
agitator



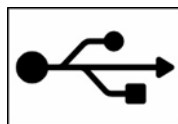
Motor "OFF"



Interface  
"USB"



Interface  
"Ethernet"



Interface  
"Firewire"

## Mixing star drive

Remark:

- Caution:** It is presumed that fundamental project work as well as all work with regard to transport, assembly, installation, starting-up, maintenance and repair is performed by qualified personnel or supervised by skilled labour taking overall responsibility. Make absolutely sure that no voltage is applied at all while work is being done on the geared motor. Drive must also be secured against switching on.
- Caution:** Any deviation from normal operating conditions (increased power consumption, temperature, vibrations, noise etc.) or warning signals by monitoring equipment suggest malfunction. Inform the responsible maintenance personnel at once to prevent the trouble from getting worse and causing, directly or indirectly, serious physical injury or material damage.
- Note:** In case of doubt disconnect the machine immediately!

### 1 Preparing and performing installation

- Lifting device on the drive are designed to carry the drive weight
- The foundation (base) should be of adequate size and vibration-proof
- Install gear unit or geared motor rigid and brakeless
- Ensure sufficient ventilation
- Make use of tapped hole (DIN-EN 332) to suit fastening to the shaft end
- Avoid shocks on shafts (bearing damage!)
- Preferably use flexible coupling between output shaft and driven machine
- Fit output elements to shaft end or secure feather key before starting the motor
- Use torque arm with rubber buffer on shaft mounting gearboxes

### 2 Connection of motor

- Connect motor according to diagram
- Make sure that mains voltage/frequency are in accordance with nameplate information
- Make secure protective conductor connection
- If motor is running in reverse direction, interchange two phases
- Close unused cable entrances holes and the box itself in a dust- and watertight manner
- Install protective switches to prevent overload and phase failure
- Set motor protection switch to nominal current
- Wiring diagrams on the last page

### 3 Starting up

- Check position of oil-level plug with help of mounting position tables in applicable catalogue
- Check oil-level
- Prior to starting-up, remove vent plug from vent screw if necessary
- If not specified otherwise, first oil filling as is shown in list of lubricants
- Air-cooled motors are designed for ambient temperatures between  $-20^{\circ}\text{C}$  and  $+40^{\circ}\text{C}$  and for installation at altitudes a 1000 m above M.S.L.
- Their use in hazardous areas is prohibited unless they are expressly intended for such use (follow additional instructions)

### 4 Maintenance Motor

- Remove dust deposit (overheating)
- Dismount anti-friction bearings for cleaning and refill with grease
- Ensure that the bearing cage is packed to about 1/3 with grease, distribute evenly
- Select proper type of lubrication grease from following table.

## Mixing star drive

Remark:

### 5 Maintenance Gearbox

- Regular oil level check
- Change lubricant every 10.000 working hours or after two years at the latest
- Combine the lubricant change with thorough cleaning of gear unit.
- Lubricant changing intervals will be twice as long if synthetic products are used
- Extreme working conditions (high air humidity, aggressive media and large temperature variations) call for reduced lubricant changing intervals
- **Synthetic and mineral lubricants must be not mixed either for filling or for disposal**

### 6 Mounting positions

	FLANSCHAUSFÜHRUNG	FLANGE MOUNTED	EXECUTION A BRIDE
Bild Figure Figure			
	B5	B5 I	B5 II *
Bild Figure Figure			
	B5 III	V1	V3

Symbole:  
Symboles:  
Symboles:

Entlüftung  
Vent plug  
Event

Ölablaß  
Drain plug  
Vidange

Ölstand  
Oil level  
Niveau d'huile

Befestigung  
Mounting surface  
Fixation



## Mixing star drive

Remark:

### AUFSTECKAUSFÜHRUNG

### SHAFT MOUNTED DESIGN EXECUTION A ARBRE CREUX

Bild Figure Figure			
	H1	H2	H3 *
Bild Figure Figure			
	H4	H5	H6

Symbole:  
Symboles:  
Symboles:

▽ Entlüftung  
Vent plug  
Event

■ Ölablaß  
Drain plug  
Vidange

▼ Ölstand  
Oil level  
Niveau  
d'huile

\* Bauformen H3 mit Ölausgleichsbehälter (siehe Katalog G1000)

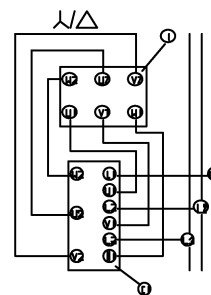
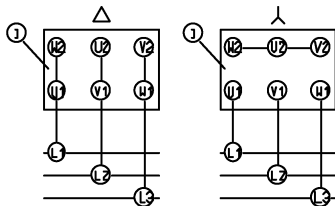
\* Mounting position H3 with lubricant expansion unit (see catalogue G1000)

\* Position de montage H3 avec réservoir de compensation de niveau d'huile (voir catalogue G1000)

## 7 Wiring diagrams

### Schaltbilder / Wiring diagrams / Schémas de branchement

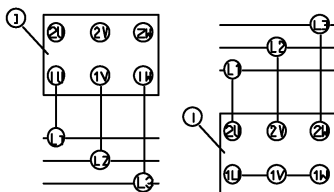
Drehstrom-Motor mit Kurzschlußanker  
Three phase squirrel-cage motor  
Moteur triphasé à cage d'écuréull



I) Klemmbrett  
Terminal board  
Plaque à bornes

II) Schalter  
Switch  
Démarreur

Drehstrom-Motor mit Kurzschlußanker, in Dahlander-Schaltung  
Three phase squirrel-cage motor, Dahlander connection  
Moteur triphasé à cage d'écuréull, couplage Dahlander

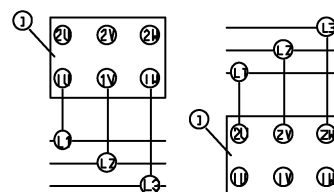


niedrige  
low  
inférieure

- Drehzahl  
- speed  
- vitesse

- hohe  
- high  
- supérieure

Drehstrom-Motor, polumschaltbar, zwei getrennte Wicklungen  
Three phase motor, polechanging, two separate windings, two speeds  
Moteur triphasé à commutation de pôles, deux bobinages séparés, deux vitesses

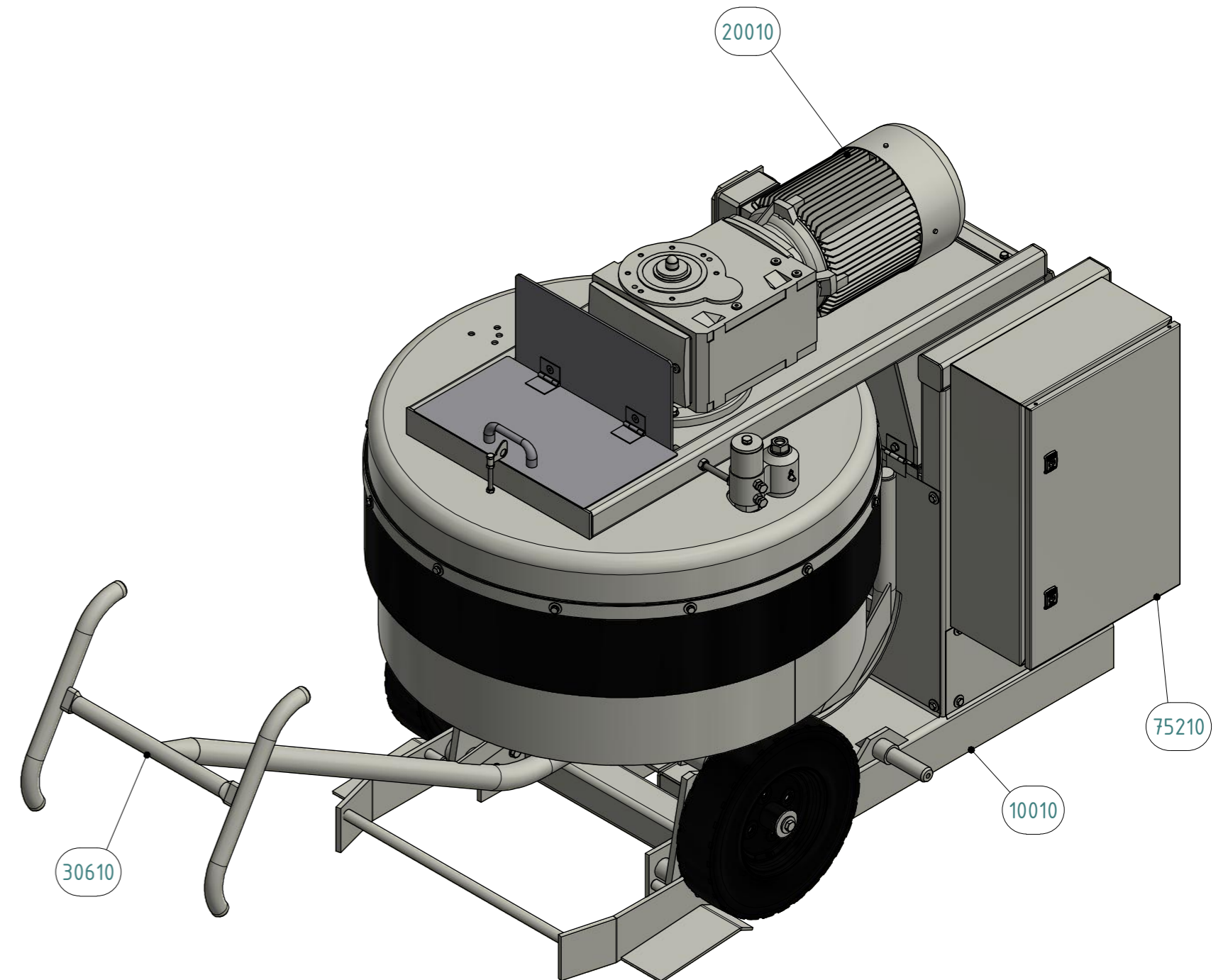
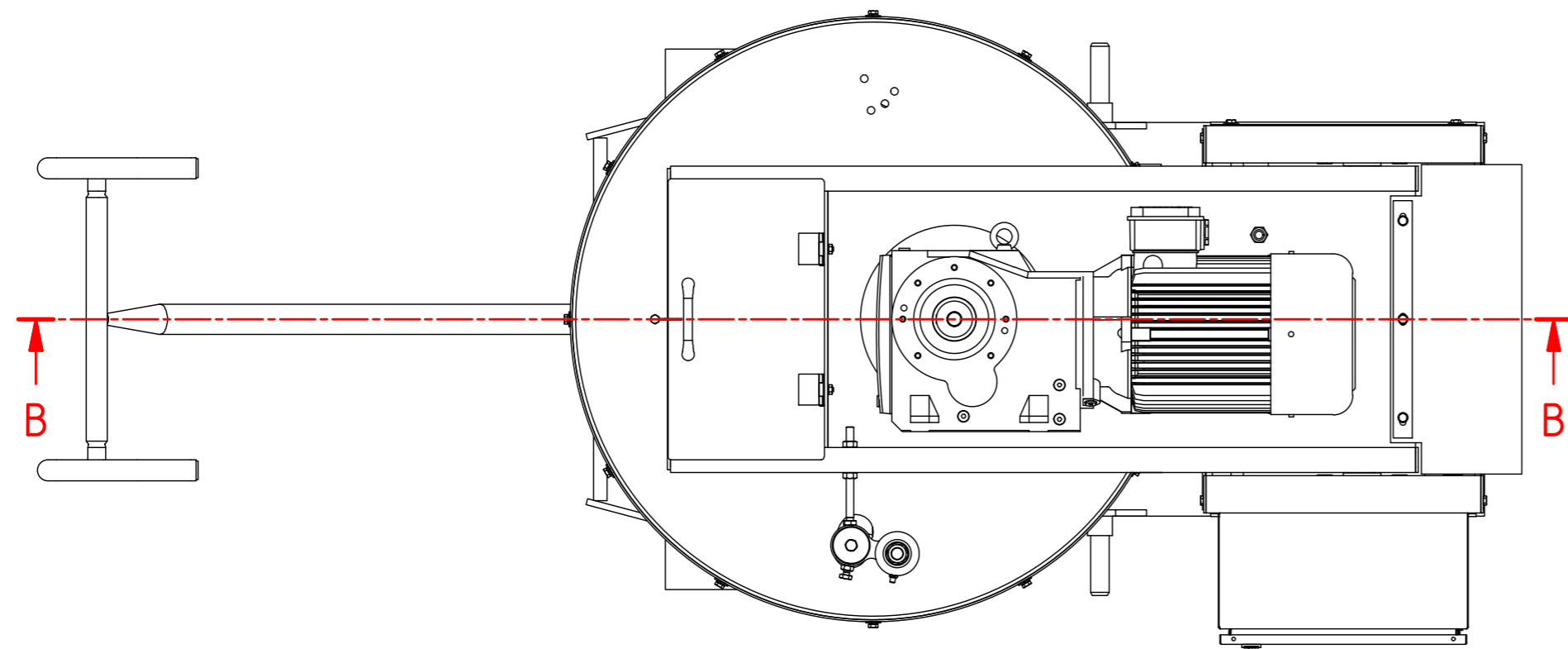
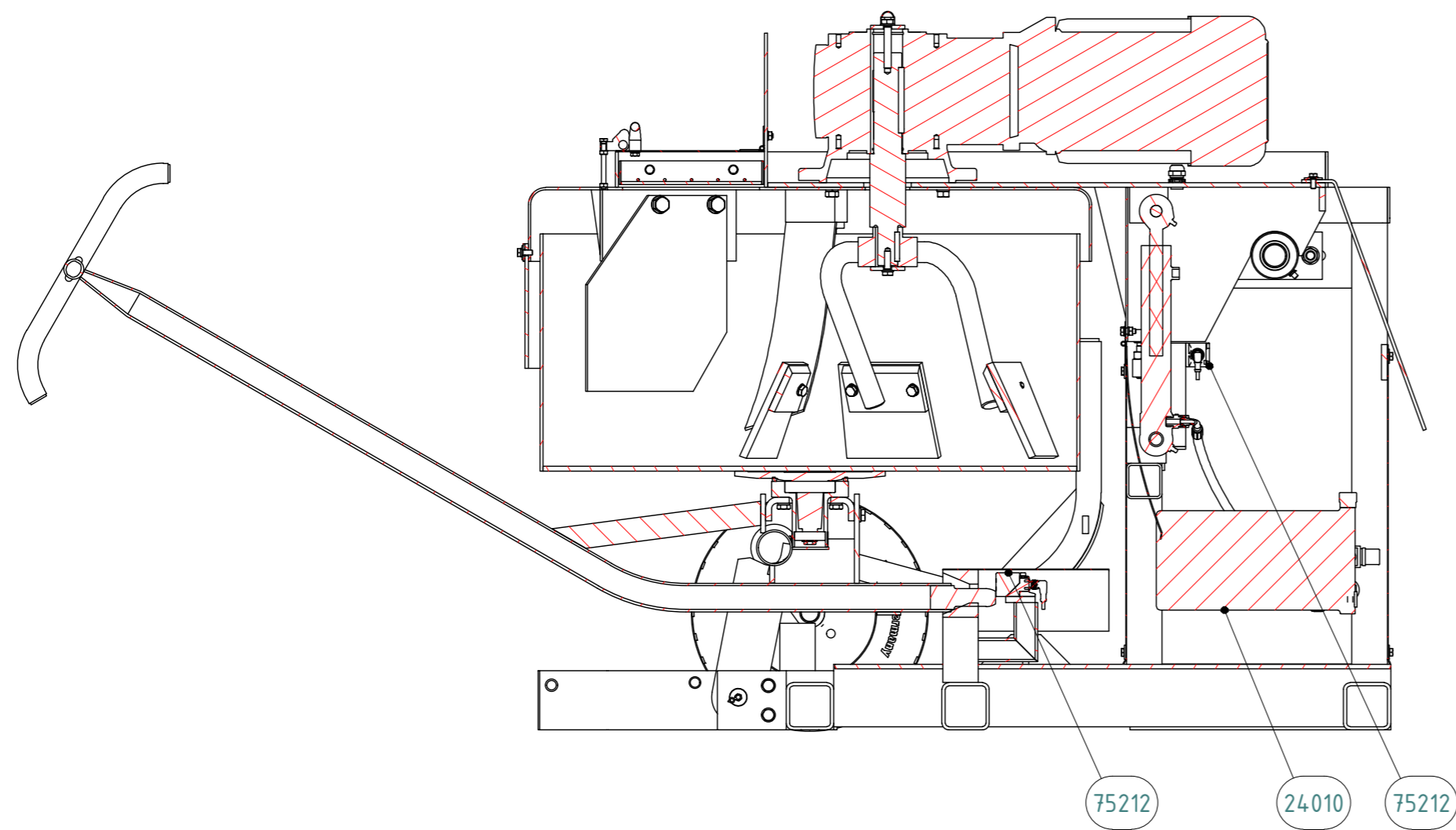


niedrige  
low  
inférieure

- Drehzahl  
- speed  
- vitesse

- hohe  
- high  
- supérieure

B-B ( 1 : 10 )



		Entstanden aus:		Ersetzt durch:		Ersatz für:				
		Halbzeug:		Norm:		Werkstoff:		Art.Nr. Halbzeug:		
		Datum		Name		Bezeichnung:				
		Gezeichnet 13.03.2017		wolf		Testing				
		Bearbeitet				ZZ 150				
		Gewicht 650,000 kg								
		Allgemeintoleranz: DIN ISO 2768-mK				Artikelnummer:				
		Schutzvermerk nach DIN 34 beachten				1.0150.4490				
						Maßstab:				
						1 : 10				
						Format:				
						A2				
						1 von 1				
Status	Änderungen	Datum	Name	EDV-Nr.: K:\DWG\Inventor\Zyklos\Kundenänderungen\ZZ 150\1.0150.4490_Testing\1.0150.4490.iam						