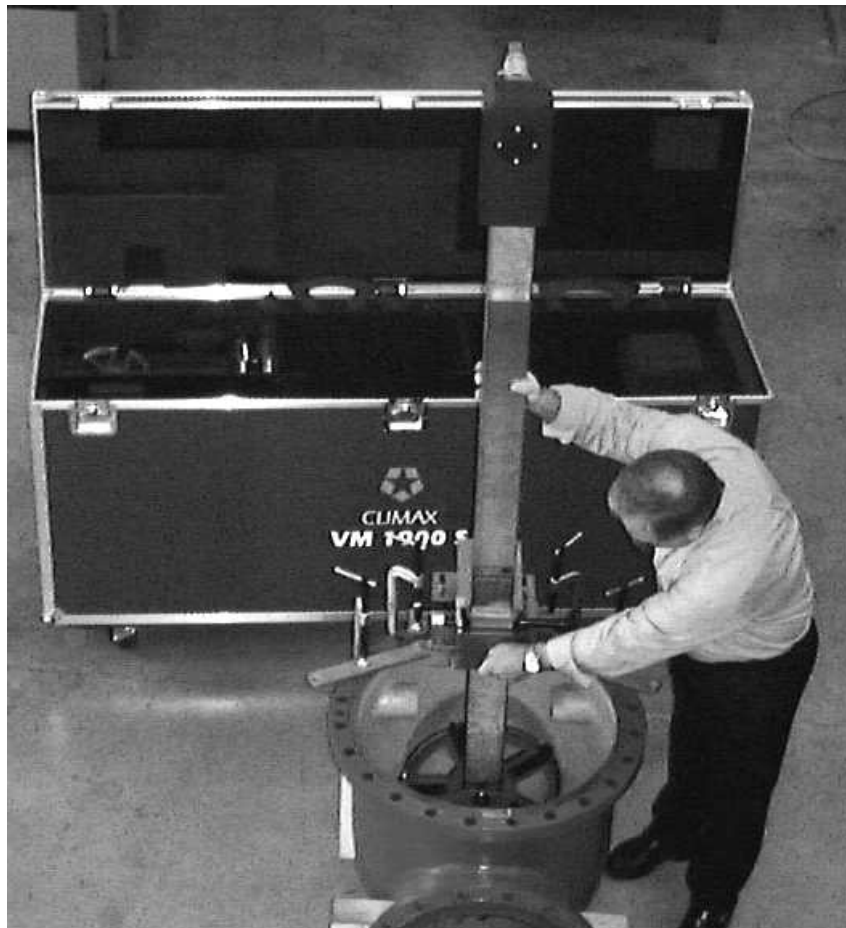


# CE VM1700S- 1900S

## GATE VALVE GRINDING AND LAPPING MACHINE OPERATING MANUAL ORIGINAL INSTRUCTIONS



 **CLIMAX**  
Portable Machining & Welding Systems



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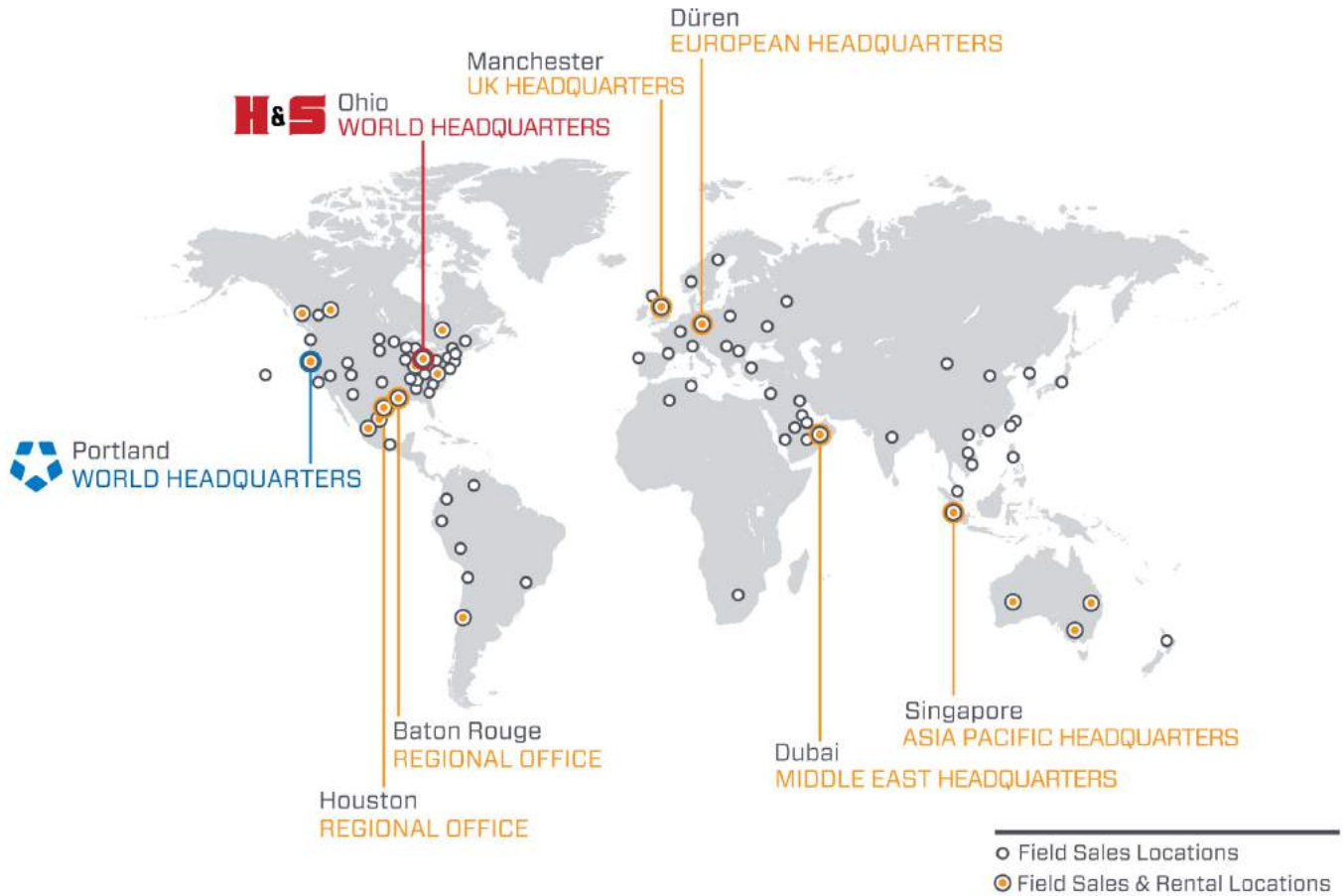
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# CE DOCUMENTATION

## EC-Declaration of Conformity

according to Appendix II A of the European Machinery Directive (89/392/EC)

The manufacturer: **CLIMAX GmbH**  
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**D-52353 Düren**

hereby declares that the **Gate Valve Grinding Machine Model VM1700**  
 machine described below  
 year of construction: **2011**

complies with the health and safety protection requirements of the following EC-directives:

- Machine directive 89/392/EC  
(last change by directive 93/68/EC)
- Low voltage directive 73/23/EC  
(last change by directive 93/68/EC)
- Directive for electromagnetic compatibility 89/336/EC  
(last change by directive 93/97/EC)

### *Harmonised standards used*

DIN EN 292 Part 1 Part 2	Safety requirements of machines; Basic terms, standard design rules; Technical rules and specifications
DIN EN 294	Safety distance to dangerous areas for upper sections of the body
DIN EN 349	Minimum distance to avoid squeezing of body sections
DIN EN 60204 Part 1	Safety requirements of machines, electrical equipment of machines, general requirements

**This declaration is void if changes are made to the construction of the machine which affect the technical specifications and prescribed use as indicated in the operator's manual, i.e. which essentially change the machine!**

Düren, 20.05.2008



Willi Saric , Managing Director

---

# LIMITED WARRANTY

CLIMAX Portable Machine Tools, Inc. (hereafter referred to as “CLIMAX”) warrants that all new machines are free from defects in materials and workmanship. This warranty is available to the original purchaser for a period of one year after delivery. If the original purchaser finds any defect in materials or workmanship within the warranty period, the original purchaser should contact its factory representative and return the entire machine, shipping prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective machine at no charge and will return the machine with shipping prepaid.

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These warranties do not apply to the following:

- Damage after the date of shipment not caused by defects in materials or workmanship
- Damage caused by improper or inadequate machine maintenance
- Damage caused by unauthorized machine modification or repair
- Damage caused by machine abuse
- Damage caused by using the machine beyond its rated capacity

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## ***About this manual***

CLIMAX provides the contents of this manual in good faith as a guideline to the operator. CLIMAX cannot guarantee that the information contained in this manual is correct for applications other than the application described in this manual. Product specifications are subject to change without notice.

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# 1 INTRODUCTION

IN THIS CHAPTER:

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1.3 GENERAL SAFETY PRECAUTIONS - - - - - 2  
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1.6 RISK ASSESSMENT CHECKLIST - - - - - 5

---

## 1.1 HOW TO USE THIS MANUAL

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the VM1700S-1900S.

The first page of each chapter includes a summary of the chapter contents to help you locate specific information. The appendices contain supplemental product information to aid in setup, operation, and maintenance tasks.

Read this entire manual to familiarize yourself with the VM1700S-1900S before attempting to set it up or operate it.

---

## 1.2 SAFETY ALERTS

Pay careful attention to the safety alerts printed throughout this manual. Safety alerts will call your attention to specific hazardous situations that may be encountered when operating this machine.

Examples of safety alerts used in this manual are defined here<sup>1</sup>:



indicates a hazardous situation which, if not avoided, **WILL** result in death or severe injury.



indicates a hazardous situation which, if not avoided, **COULD** result in death or severe injury.

---

1. For more information on safety alerts, refer to *ANSI/NEMA Z535.6-2011, Product safety Information in Product Manuals, Instructions, and Other Collateral Materials*.

---

 **CAUTION**

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE**

indicates a hazardous situation which, if not avoided, could result in property damage, equipment failure, or undesired work results.

---

## 1.3 GENERAL SAFETY PRECAUTIONS

CLIMAX leads the way in promoting the safe use of portable machine tools and valve testers. Safety is a joint effort. You, the end user, must do your part by being aware of your work environment and closely following the operating procedures and safety precautions contained in this manual, as well as your employer's safety guidelines.

Observe the following safety precautions when operating or working around the machine.

**Training** – Before operating this or any machine tool, you should receive instruction from a qualified trainer. Contact CLIMAX for machine-specific training information.

**Risk assessment** – Working with and around this machine poses risks to your safety. You, the end user, are responsible for conducting a risk assessment of each job site before setting up and operating this machine.

**Intended use** – Use this machine in accordance with the instructions and precautions in this manual. Do not use this machine for any purpose other than its intended use as described in this manual.

**Personal protective equipment** – Always wear appropriate personal protective gear when operating this or any other machine tool. Flame-resistant clothing with long sleeves and legs is recommended when operating the machine. Hot chips from the workpiece may burn or cut bare skin.

**Work area** – Keep the work area around the machine clear of clutter. Restrain cords and hoses connected to the machine. Keep other cords and hoses away from the work area.

**Lifting** – Many CLIMAX machine components are very heavy. Whenever possible, lift the machine or its components using proper hoisting equipment and rigging. Always use designated lifting points on the machine. Follow lifting instructions in the setup procedures of this manual.

**Lock-out/tag-out** – Lock-out and tag-out the machine before performing maintenance.

**Moving parts** – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other injuries. Except for stationary operating controls, avoid contact with moving parts by hands or tools during machine operation. Remove gloves and secure hair, clothing, jewelry, and pocket items to prevent them from becoming entangled in moving parts.

**Sharp edges** – Cutting tools and workpieces have sharp edges that can easily cut skin. Wear protective gloves and exercise caution when handling a cutting tool or workpiece.

**Hot surfaces** – During operation, motors, pumps, HPUs, and cutting tools can generate enough heat to cause severe burns. Pay attention to hot surface labels, and avoid contact with bare skin until the machine has cooled.

## 1.4 MACHINE-SPECIFIC SAFETY PRECAUTIONS

**Eye hazard** – This machine produces metal chips during operation. Always wear eye protection when operating the machine.

**Sound level** – This machine produces potentially harmful sound levels. Hearing protection is required when operating this machine or working around it. During testing, the machine produced the sound levels<sup>1</sup> listed in Table 1-1.

TABLE 1-1. SOUND LEVELS

	Motor
Typical A-weighted sound pressure level	> 85 dBA
The noise level when working can exceed	85 dBA
Hand-arm-vibration typically less than	10 m/s <sup>2</sup>

**Hazardous environments** – Do not operate the machine in environments where potentially explosive materials, toxic chemicals, or radiation may be present.

**Machine mounting** – Do not operate the machine unless mounted to a workpiece in accordance with this manual. If mounting the machine in an overhead or vertical position, do not remove hoist rigging until the machine is mounted to the workpiece in accordance with this manual.

1. Machine sound testing was conducted in accordance with European Harmonized Standards EN ISO 3744:2010 and EN 11201:2010.

---

## 1.5 RISK ASSESSMENT AND HAZARD MITIGATION

The Gate Valve Grinder Model VM 1700(S) respectively VM1900(S) was designed and built on the basis of a risk analysis and under consideration of all relevant harmonised standards as well as further national standards and technical specifications. The machine thus conforms to the current level of technology and guarantees the highest possible degree of safety.

This level of safety can only be achieved in practice if all necessary measures are observed in dealing with the machine. It is therefore part of the duty of care of the machine's operator to plan these measures and check that they are correctly executed.

In particular, the operator must ensure that:

- the Gate Valve Grinder is only used as prescribed (see Section 2.1 on page 7)
- the Gate Valve Grinder is operated only in a fault-free, operational condition and in particular the safety devices are regularly checked to ensure that they function as stipulated.
- any necessary protective equipment for the operating, maintenance and repair personnel is available and is used
- the operating manual is always legible and is available in full at the Gate Valve Grinder's location
- the machine is operated, maintained and repaired only by sufficiently qualified and authorised personnel
- these personnel are regularly instructed in all matters relating to occupational safety and environmental protection and are familiar with the operating manual and in particular the safety instructions it contains
- all safety instructions and warnings on the Gate Valve Grinder are visible and legible and are not removed.

Portable Machine Tools are designed for on-site machining applications. They typically attach directly to the workpiece itself, or to an adjacent structure, and achieve their rigidity from the structure to which it is attached. The design intent is that the Portable Machine Tool and the structure to which it is attached become one complete machine during the material-removal process.

The operator must perform an overall review and on-site risk assessment of the intended application. Due to the unique nature of portable machining applications, identifying one or more hazards that must be addressed is typical.

When performing the on-site risk assessment, it is important to consider the Portable Machine Tool and the workpiece as a whole.



## 1.6 RISK ASSESSMENT CHECKLIST

The following checklist is not intended to be an all inclusive list of things to watch out for when setting up and operating this Portable Machine Tool. However, these checklists are typical of the types of risks the assembler and operator should consider. Use these checklists as part of your risk assessment:

**TABLE 1-2. RISK ASSESSMENT CHECKLIST BEFORE SET-UP**

<b>Before set-up</b>	
<input type="checkbox"/>	I took note of all the warning labels on the machine.
<input type="checkbox"/>	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
<input type="checkbox"/>	I considered the need for personnel safety guarding and installed any necessary guards.
<input type="checkbox"/>	I read the machine assembly instructions (Section 3).
<input type="checkbox"/>	I created a lift plan, including identifying the proper rigging, for each of the setup lifts required during the setup of the support structure and machine.
<input type="checkbox"/>	I located the fall paths involved in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall path.
<input type="checkbox"/>	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
<input type="checkbox"/>	I evaluated and mitigated any other potential risks specific to my work area.

**TABLE 1-3. RISK ASSESSMENT CHECKLIST AFTER SET-UP**

<b>After set-up</b>	
<input type="checkbox"/>	I checked that the machine is safely installed (according to Section 3) and the potential fall path is clear. If the machine is installed at an elevated position, I checked that the machine is safeguarded against falling.
<input type="checkbox"/>	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
<input type="checkbox"/>	I planned for containment of any chips or swarf produced by the machine.
<input type="checkbox"/>	I followed the required maintenance checklist (Section 5.1).
<input type="checkbox"/>	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
<input type="checkbox"/>	I checked that all affected personnel understand and are clear of the danger zone.
<input type="checkbox"/>	I evaluated and mitigated any other potential risks specific to my work area.

---

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## 2 OVERVIEW

### IN THIS CHAPTER:

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### 2.1 FEATURES AND COMPONENTS

The gate valve grinding and lapping machine, Model VM 1700(S), respectively VM1900(S) (in the following called Gate Valve Grinder) is specifically designed for grinding and lapping (with the extension ...S for grinding only) of gate valve seats, size DN 200 – DN 700, respectively to DN 1000.

The specifications in Section 2.2 on page 10 and all other technical data must be met. In addition, Section 1.5 on page 4, Section 4 on page 27, and Section 5 on page 37 must be followed to ensure a safe operation of the Gate Valve Grinder.

Any faults during the warranty period will be recovered according to CLIMAX's terms of warranty. Excluded are damages due to dismantling the machine by customer's maintenance personnel. Damages attributable to normal wear and tear, overload or improper handling will be excluded from warranty.

This operating manual is not an extension of CLIMAX' General Conditions of Sale. Not all accessories are included in the basic scope of supply. Options are also described. For instance, the basic machine includes an electric or a pneumatic drive system. Optionally, the machine can be delivered with electric and pneumatic drive system. However, both drive systems are described in this operating manual.

There is a description for lapping of valves in this operating manual. However, for machines with the extension ...S, lapping equipment is not in the scope of supply.

#### CAUTION

The Gate Valve Grinder is only to be used as prescribed. If the Gate Valve Grinder is not used accordingly, safe operation is not guaranteed.

Any danger to the life and health of people and all damage to the Gate Valve Grinder resulting from use not as prescribed will be customer's responsibility.

Any modifications of the Gate Valve Grinder made by the customer will be at his own responsibility. This applies especially for any changes that will not comply with the safety requirements of the Gate Valve Grinder.

Principle components are shown in Figure 2-1 and identified in Table 2-1:

**TABLE 2-1. COMPONENTS**

Position	Component
1	Drive Motor
2	Gear box
3	Machine arm
4	Drive shaft with ball joint
5	Tools (grinding and lapping tools)
6	Tilting adapter

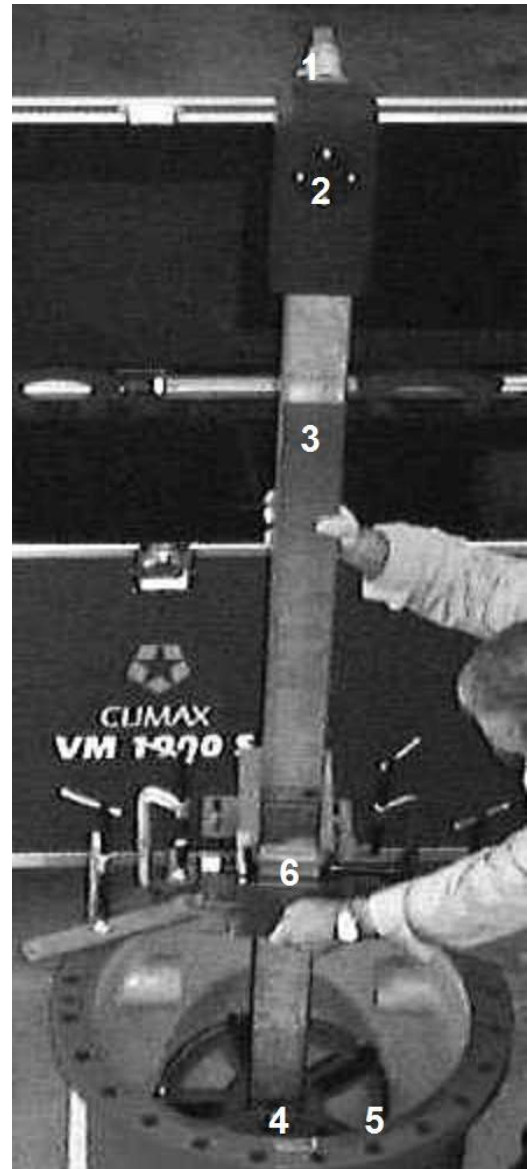
The Gate Valve Grinder is driven by an electric or a pneumatic motor, which is mounted to the upper gear housing. Both drives are adapted to the machine by means of a mounting flange with clamping screw. Therefore, depending on the application, the Gate Valve Grinder can be delivered with electric and pneumatic drive unit. The machine arm connects the gear drive with the machine spindle. During operation, the machine spindle is driven by a chain drive system. The tools are adapted to the machine spindle by means of a drive shaft with ball joint and a self-aligning coupling. This ensures that the tools are automatically aligned during machine operation.

Planet grinding and lapping wheels (referred to as “planet grinding wheels” hereafter) are used as tools.

The planet grinding wheels consist of the following:

- a ball joint for self-alignment of planet wheels
- a planet wheel
- planet arms with integrated spindle-bearing system
- grinding or lapping discs to put onto the planet arms
- abrasives for grinding (for lapping operation, a lapping paste is used instead of abrasives)

Each planet grinding wheel covers a wide working range. To adjust the wheel to the machining diameter, the planet arms can be moved into the planet wheel guides. The planet arms are clamped with a one-screw quick clamping system.



**FIGURE 2-1. COMPONENTS WITH PNEUMATIC DRIVE MOTOR**

The abrasives are put onto the grinding discs which are mounted to the planet arms. This system ensures a quick change from grinding with abrasives to CBN-grinding discs or to lapping discs.

Prior to the machining operation, the Gate Valve Grinder has to be mounted to the gate valve body by means of a tilting adapter with clamping elements (included in the basic scope of supply). With this tilting adapter, the machine can easily be set up and centred to the valve seat. In addition, it enables the operator to take the machine system out to change the abrasives without dismantling the tilting adapter with clamping elements.

The machine configuration with electric drive motor is started with the trigger button. The machine spindle is rotating as long as the trigger button is being pushed. For permanent operation, the trigger button can be locked.

The spindle speed can be adjusted at the top of the electric drive motor.

The machine configuration with pneumatic drive is started by pushing the red safety button of the maintenance unit. This maintenance unit is available as an option or it can be supplied by the customer.

To increase the speed range, the electric drive motor is equipped with a 2-stage mechanically switching gear.

Due to the fact that the pneumatic drive motor has already a wide range of adjustment, an additional gear system is not necessary.

The Gate Valve Grinder and accessories are delivered in high-quality, moveable workshop trolley with foam inlet for safe transportation and storage.

---

## 2.2 SPECIFICATIONS

TABLE 2-2. SPECIFICATIONS

Unit	Specification
<b>Machining Data</b>	
Machining range VM1700	DN 200 – DN 700 (VM1700)
Machining range VM1900	DN 200 – DN 1000 (optional DN 1200)
Submerging depth VM1700	1000 mm
Submerging depth VM1900	1400 mm
Maximum speed (electric / pneumatic)	370 U/min / 250 U/min
<b>Power requirements</b>	
Connection (electric/pneumatic)	230 V – 50 Hz / 12 l/s – 6.3 bar
Drive power (electric/pneumatic)	685 W (at 1010 W P <sub>aut</sub> ) / 550 W
<b>Weights</b>	
Basic machine without tools	31 kg (68.3 lbs)
Weight of machine case	230 kg (507 lbs)

 **CAUTION**

Before using the Gate Valve Grinder, make sure that the data of the power source match the values in Table 2-2.

Different voltages can result into non-repairable damage to the Globe Valve Grinder.

Pneumatic drives may only be operated with filtered and lubricated air. Failure to observe can result into non-repairable damage to the Gate Valve Grinder.

## 3 SETUP

### IN THIS CHAPTER:

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This section describes the setup and assembly procedures for the VM1700S-1900S gate valve grinding and lapping machine.

### 3.1 RECEIPT AND INSPECTION

Your CLIMAX product was inspected and tested prior to shipment, and packaged for normal shipment conditions. CLIMAX does not guarantee the condition of your machine upon delivery.

When you receive your CLIMAX product, perform the following receipt checks:

1. Inspect the shipping containers for damage.
2. Check the contents of the shipping containers against the included invoice to make sure that all components have been shipped.
3. Inspect all components for damage.

Contact CLIMAX immediately to report damaged or missing components.

#### NOTICE

Keep the shipping container and all packing materials for future storage and shipping of the machine.

The machine ships from CLIMAX with a heavy coating of LPS 3. The recommended cleaner is LPS PreSolve Orange Degreaser. All parts must be cleaned before use.

The machine and accessories are delivered in a high-quality, durable movable workshop trolley with foam inlet for safe transportation and storage (see photo 3.0.0.1) The workshop trolley is equipped with pockets for major machine components as well as a separate case for machine accessories (see Figure 3-1 on page 12 and Figure 3-2 on page 13). The case or the trolley confirms to the scope of supply the customer ordered.

---

To avoid that the machine arrives on site in incomplete condition, the cases should always be checked prior to transportation. It is crucial to check that the case contains a sufficient amount of abrasives to ensure an uninterrupted operation.

To protect the equipment, the cases should always be locked during transportation. To avoid an uncontrolled opening of the case, the locks are firmly tightened. It is recommended to push the case's cover down to get the case easily opened.

Even if the case provides a perfect protection of the equipment, any shocks and collisions should be avoided.

The weight of the cases should not be underestimated, therefore the cases are to be secured during transportation to avoid any harm to people or damage to other equipment by parts falling out of the case.

Especially during work at high levels, all parts are to be secured against dropping. This is also important for parts that are not directly used for the operation.

### **TIP:**

The case should always be closed and secured against dropping.

After transportation, check all parts for visible damages before connecting the machine to power supply again.

### **CAUTION**

Do not put your hand through the holes of the Planet Wheels when putting a Planet Wheel into the Case. There is the danger of shearing or injuring the Hand.



FIGURE 3-1. MACHINE CASE (VM1900S SHOWN)



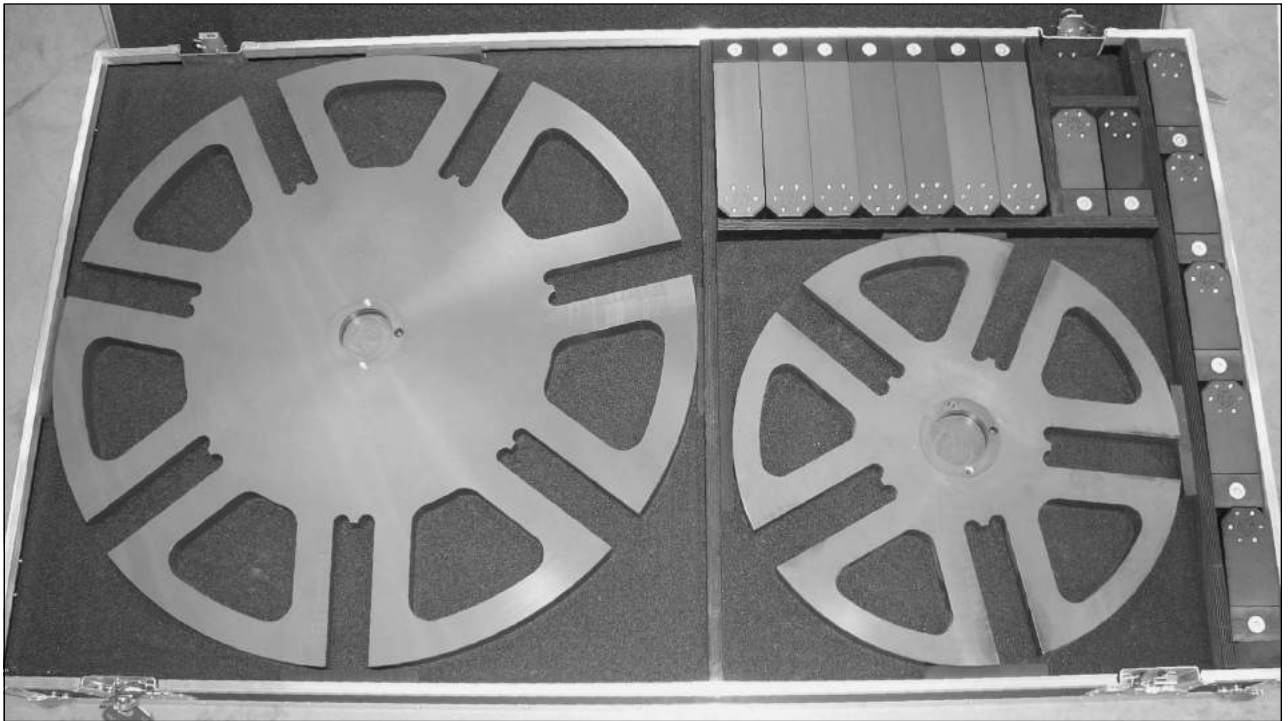


FIGURE 3-2. ACCESSORY CASE (VM1900S SHOWN)

## 3.2 SELECTING TOOLS AND PREPARATION

For all screws being used as connecting elements, the following maximum torque must be observed:

Socket head screw according to DIN 912, Quality 8.8:

- M4, wrench size 3 mm: 1,8 Nm
- M5, wrench size 4 mm: 3,5 Nm
- M8, wrench size 6 mm: 15 Nm

Countersunk screw according to DIN 7991, Quality 8.8:

- M4, wrench size 2,5 mm: 1,8 Nm
- M5, wrench size 3 mm: 3,5 Nm
- M10, wrench size 6 mm: 30 Nm

### **CAUTION**

All screws with visible damages have to be changed immediately. If disregarded, damaged screws can only be unscrewed with extreme effort and parts of the machine might be damaged.

---

### 3.2.1 Selecting tools

Select the tool size according to application (working diameter, width of seat). To assure a definite rotation of the grinding discs, the planet arms should be adjusted that the pitch circle of the grinding discs (centre point of grinding discs) is smaller than the inner diameter of the valve seat to be ground.

Selection of proper tool components according to Table 3-1:

- Planet wheel of applicable size
- Planet arms of applicable size
- Grinding discs (no need if spindle diameter 30 mm [planet arm II and III] or 50 mm [planet arm X] is sufficient)
- abrasives (size and grain according to application) – no need for lapping operation and grinding operation with CBN-grinding discs
- proper screws

The basic scope of supply includes the following grinding discs:

- 5 pcs. grinding discs, diameter 50 mm (4 mm thick)
- 5 pcs. CBN-grinding discs, diameter 50 mm (detectable by CBN-coating)
- 5 pcs. lapping discs, diameter 80 mm (6 mm thick, black colour)

Additionally for machines with the optionally lapping accessories (VM1700):

- 5 pcs. lapping discs, diameter 30 mm (5 mm thick, cast iron)
- 5 pcs. lapping discs, diameter 50 mm (5 mm thick, cast iron)
- 5 pcs. lapping discs, diameter 80 mm (7 mm thick, cast iron)

Additionally for machine VM1900S

- 2 pcs. CBN-grinding discs
- 2 pcs. grinding discs diameter 80 mm (6 mm thick, black colour)

Additionally for machines with the optionally Lapping Accessories (VM1900):

- 2 pcs. lapping discs, diameter 50 mm (5 mm thick, cast iron)
- 2 pcs. lapping discs, diameter 80 mm (7 mm thick, cast iron)

#### **CAUTION**

Make sure that always proper grinding discs are being used, otherwise the machine or the valve body can be damaged.

If grinding discs are used for lapping operation, they will be damaged.

If already used lapping discs are utilised for grinding operation, the required accuracy cannot be guaranteed and the valve seat might be damaged.

TABLE 3-1. MACHINING DIAMETERS FOR PLANET WHEELS DN 80–DN 600

Planet arms [Typ]	Grinding discs [mm]	Diameter of planet wheel [mm]							
		220		380		X540		X820 (Option)	
		min	max	min	max	min	max	min	max
<b>II</b>	<b>30</b>	<b>220</b>	<b>310</b>	<b>380</b>	<b>460</b>				
	<b>50</b>	<b>240</b>	<b>330</b>	<b>380</b>	<b>480</b>				
<b>III</b>	<b>30</b>	<b>330</b>	<b>400</b>	<b>410</b>	<b>550</b>				
	<b>50</b>	<b>350</b>	<b>400</b>	<b>430</b>	<b>550</b>				
<b>X</b> <b>Black</b>	<b>50</b>					<b>540</b>	<b>780</b>	<b>820</b>	<b>1060</b>
	<b>80</b>					<b>570</b>	<b>810</b>	<b>830</b>	<b>1090</b>
(Option)									
<b>XI</b> <b>Grey</b> <i>275mm long</i>	<b>50</b>							<b>1030</b>	<b>1270</b>
	<b>80</b>							<b>1060</b>	<b>1300</b>
(Option)									
<b>XII</b> <b>Grey</b> <i>375mm long</i>	<b>50</b>					<b>970</b>	<b>1210</b>	<b>1230</b>	<b>1490</b>
	<b>80</b>					<b>1000</b>	<b>1240</b>	<b>1260</b>	<b>1520</b>

The diameters mentioned above are valid for recommended combinations and ranges. However, in some cases it is possible to extend the grinding range.

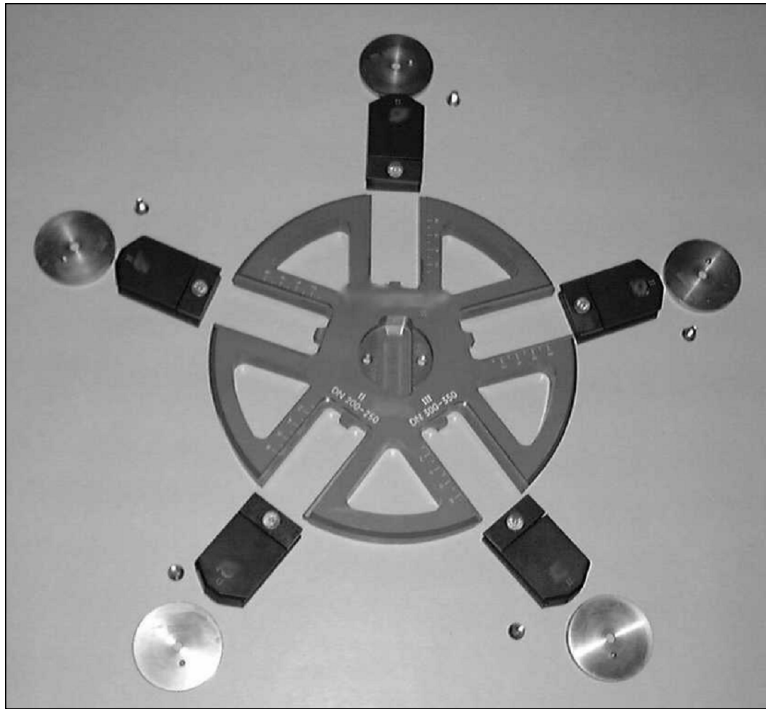


FIGURE 3-3. TOOL COMPONENTS FOR PLANET GRINDING WHEEL (AS SHOWN WITH PLANET WHEEL DIA. 220)

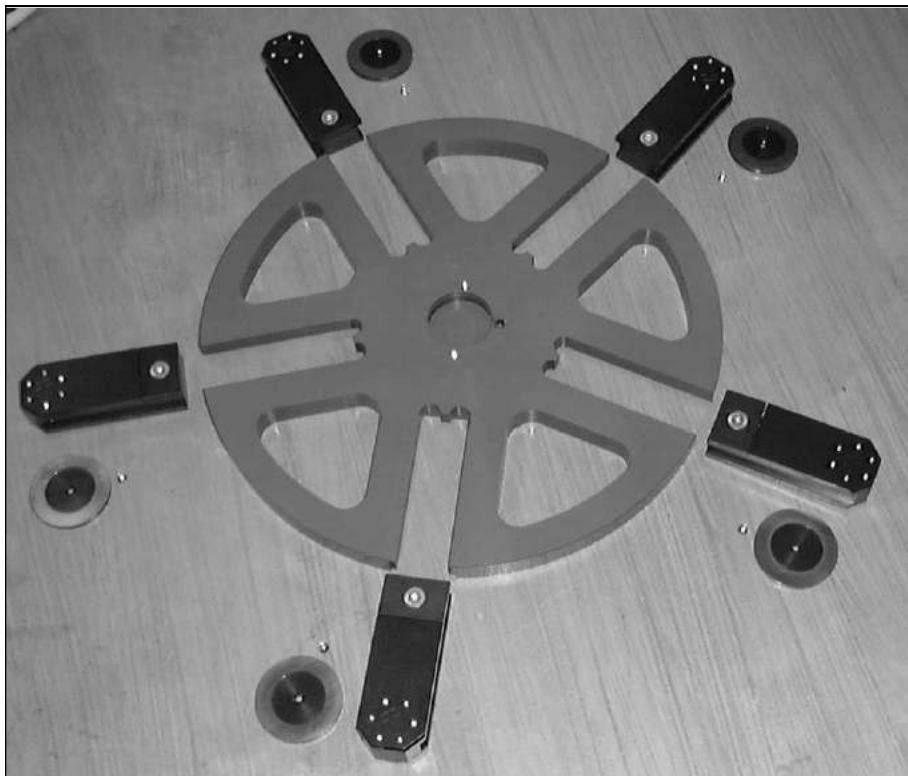


FIGURE 3-4. TOOL COMPONENTS FOR PLANET GRINDING WHEEL (AS SHOWN DIA. X540)

### 3.2.2 Preparing tools

If necessary, cleaning of grinding discs with oil-free cleaning fluid (i.e. lacquer thinner)

Putting abrasives onto grinding discs (not applicable for lapping operation and grinding with CBN-grinding discs)

Assembly of selected tool components (according to Figure 3-5), observe applicable torque for screws (if too low, components get loose, if too high, screw might be damaged):

- Put grinding discs onto grinding spindles of planet arms by using counter sunk screws M5x8-8.8-Zn according to DIN 79. Make sure that the pin for transmitting the torque is locked. All mating surfaces have to be cleaned prior to the assembly, otherwise the accuracy will be influenced
- Move planet arms into the guides on the planet wheel. Also here, all mating surfaces have to be clean
- Planet arms are positioned and clamped onto planet wheel by means of the counter sunk screws mentioned above. A scale is provided to position the planet arms on each guide. To assure a definite rotation of the grinding discs, the pitch circle of the discs should be smaller than the inner diameter of the seat to be ground.

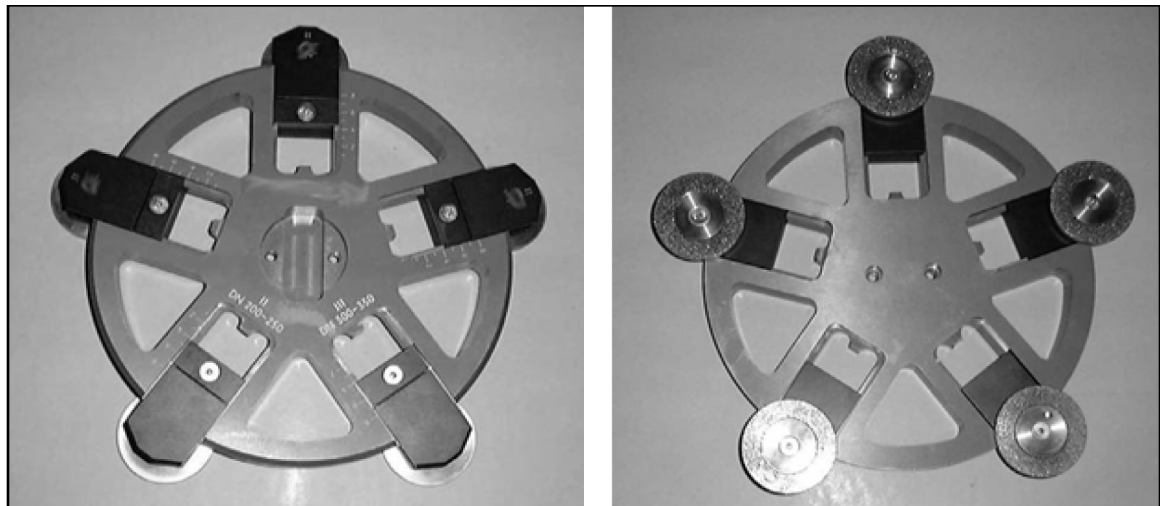


FIGURE 3-5. PLANET GRINDING WHEEL DIAMETER 220, COMPLETELY ASSEMBLED

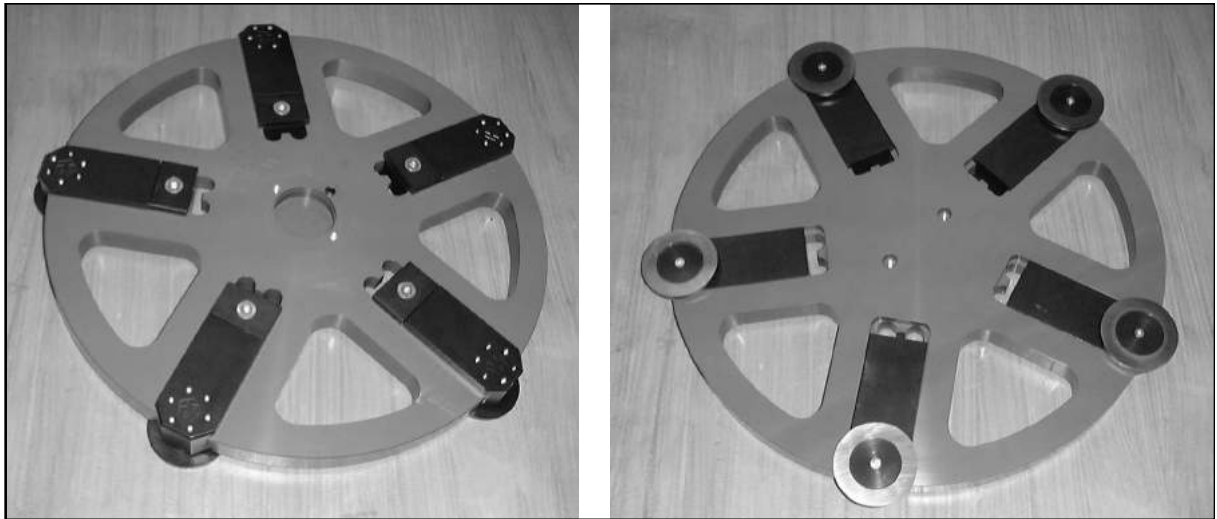


FIGURE 3-6. PLANET GRINDING WHEEL DIAMETER X540, COMPLETELY ASSEMBLED

### 3.3 MOUNTING THE TILTING ADAPTER ONTO A VALVE BODY

Select all clamping elements for mounting the base plate:

- tilting adapter
- base plate
- forged steel C-clamps (4 pieces)
- clamping pads L=100 mm (2 pieces)
- clamping pads L=300 mm (2 pieces)
- socket head screws M10 x 20-8.8-Zn according to DIN 912 (8 pieces)
- washers  $\text{\O} 10,5$ -140HV-Zn according to DIN 433 (8 pieces)

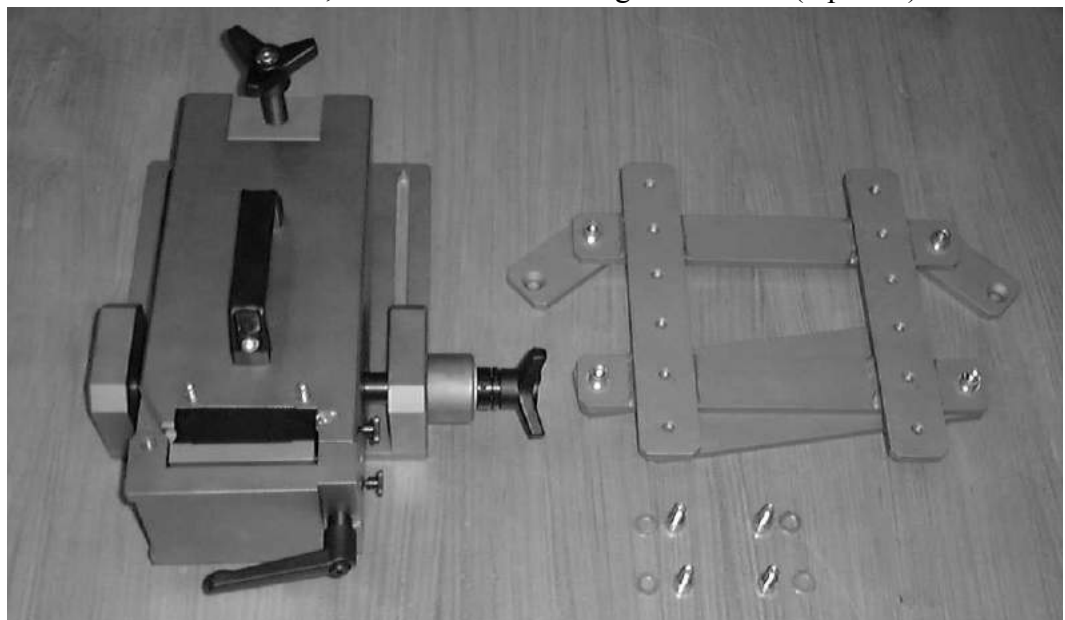


FIGURE 3-7. TILTING ADAPTER WITH BASE PLATE AND STANDARD CLAMPING ELEMENTS

If the top flange of the valve body has a raised sealing surface, use clamping pads with 90° countersunk hole at the end to avoid any damage to the sealing during clamping (according to Figure 3-8).

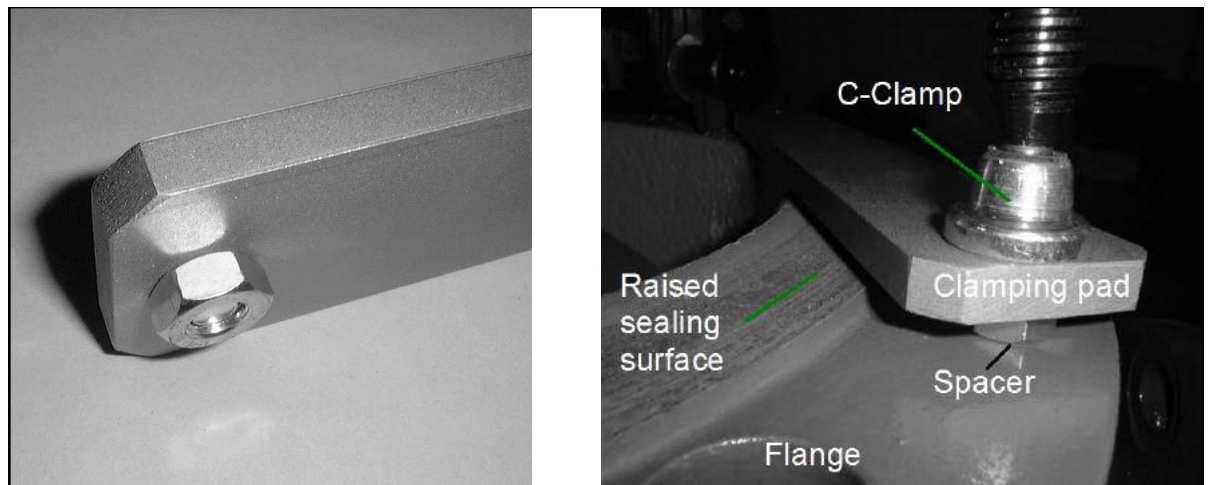


FIGURE 3-8. CLAMPING PADS WITH SPACERS

1. Connect the clamping pads to the base plate by using socket head screws M10 x 20-8.8-Zn according to DIN 912 and washers Ø 10,5-140HV-Zn according to DIN 433.

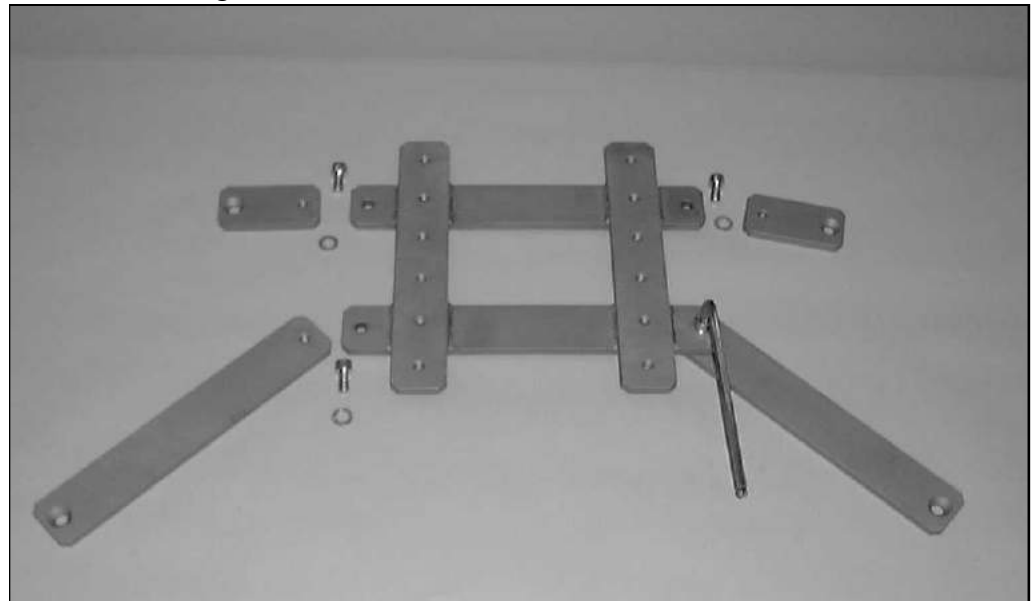


FIGURE 3-9. CONNECTING CLAMPING PADS TO BASE PLATE

2. Connect the base plate to the flange of the gate valve body.
3. Connecting tilting adapter onto base plate using 4 socket head screws M10 x 20-8.8-Zn according to DIN 912 with washers Ø 10,5-140HV-Zn according to DIN 433. Make sure that the location for the machine arm is approximately in centreline to the valve seat.



FIGURE 3-10. C-CLAMPS MOUNTING THE BASE TO THE FLANGE

### TIP:

For higher rigidity, it is recommended to leave one empty tap hole between the connecting screws.

### CAUTION

Make sure that the location for the machine arm is positioned to leave enough space between the machine arm and the rotating tool to avoid any collision.

For higher rigidity, always leave one empty tap hole between the connecting screws of the tilting adapter.

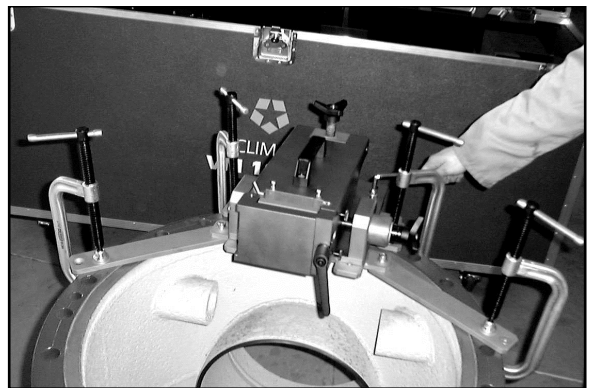


FIGURE 3-11. TILTING ADAPTER AND BASE PLATE MOUNTED TO VALVE BODY

After mounting the tilting adapter onto the valve body, make sure that all screws are securely tightened.

## 3.4 MACHINE ASSEMBLY

### 3.4.1 Mounting the bracket

After the tooling and the mounting system are prepared, the machine is taken out of the case.



Assemble the bracket and locate the bracket on the machine arm according to the submerging depth required. The machine spindle has to be on centre with the valve seat. Prior to locating the bracket measure the distance from the center of the seat to top of tilting adapter.

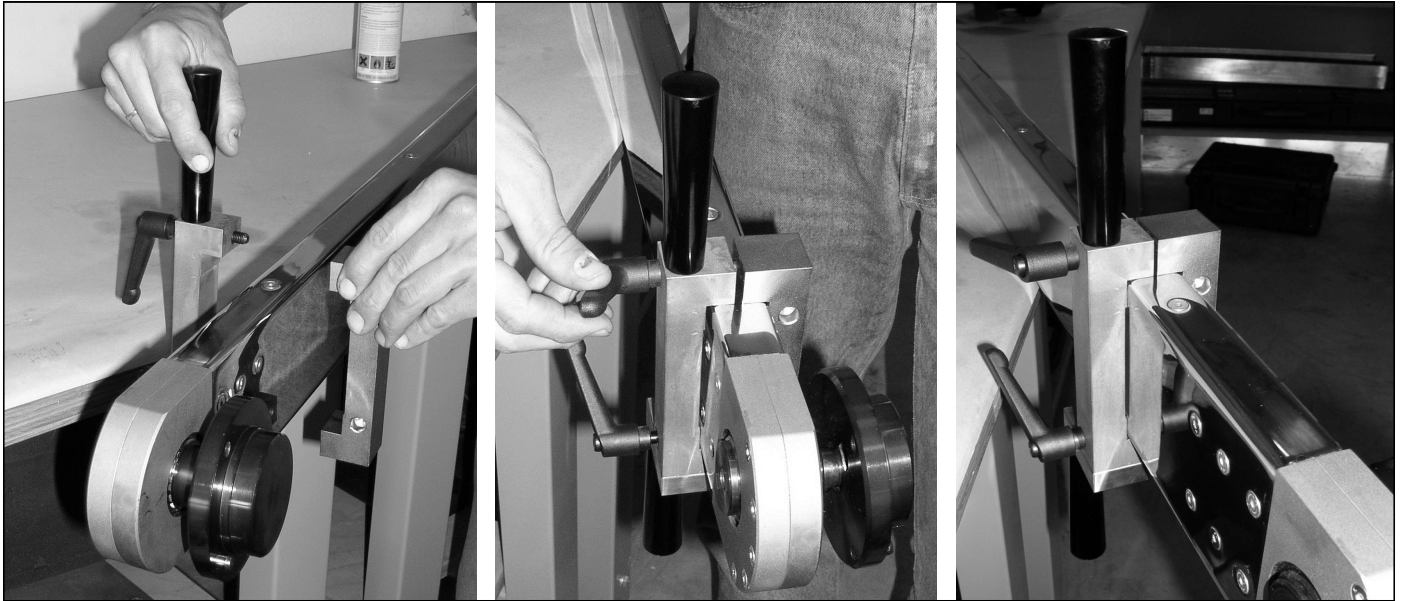


FIGURE 3-12. BRACKET ASSEMBLED ON THE MACHINE ARM

### 3.4.2 Mounting the drive shaft with ball joint

For using planet wheels 220 or 380 locate the drive shaft with ball joint type 15 (small one) into machine spindle.

For planet wheel X540 or X820 use ball joint type 25 (large one).

- When locating drive shaft with ball joint into the spindle the key has to be oriented properly. The ball joint coupling has to be located on the side with the machine drive.
- Secure the drive shaft in the machine spindle by using the washer dia 36x6.4x4 and the counter sunk screw DIN 7991-M6x16-8.8-Zn.

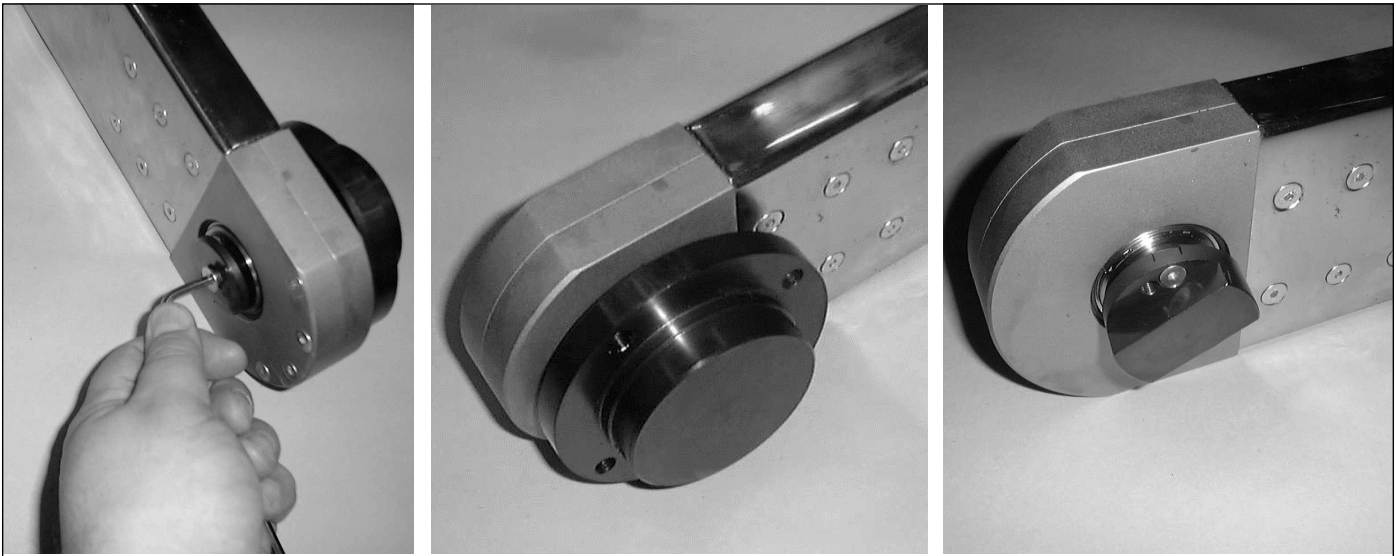


FIGURE 3-13. MOUNTING THE DRIVE SHAFT WITH BALL JOINT TYPE 15 AND TYPE 25

In some cases it might be required to mount the machinearm with the drive system in opposite direction. In this case just turn the bracket 180° and locate the drive shaft accordingly.

**⚠ CAUTION**

After the tooling is adapted, check for collision at low speed prior to operation.

### 3.4.3 Adapting the planet wheel

The already prepared planet wheel (see ) is adapted to the ball joint coupling using two socket head screws.

For planet wheel 220 and 380 use socket screws M5x12 according to DIN 912.

For planet wheel X540 and X820 use socket head screws M8x30 according to DIN 912. When adapting the planet wheel X540 and X820 to the ball joint coupling make sure that the pin for torque transmission is located properly. Otherwise the planet wheel can be damaged.



FIGURE 3-14. ADAPTING THE PLANET WHEEL TO BALL JOINT COUPLING

### 3.4.4 Locating and aligning the machine in the tilting adapter

1. Open the flap of the tilting adapter.
2. Place the machine arm with the bracket and the two ball locations into the tilting adapter.



**FIGURE 3-15. LOCATING THE MACHINE ARM INTO THE TILTING ADAPTER**

3. Close the flap and clamp the machine arm. If additional height adjustment of the machine arm is required take the machine arm out of the tilting adapter, readjust the bracket and replace the machine arm again.

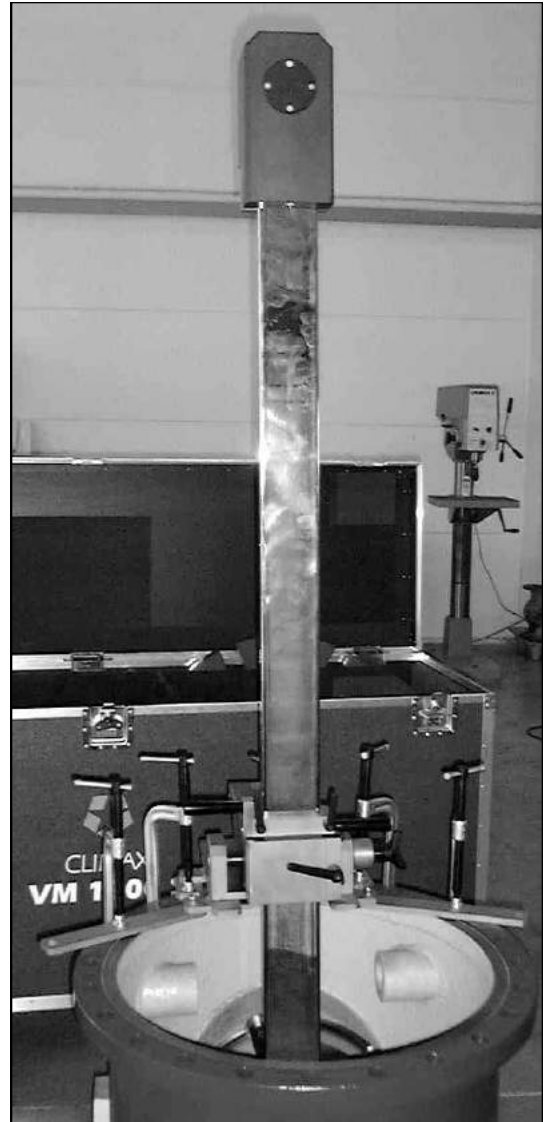


FIGURE 3-16. MACHINE ARM IN CLAMPED POSITION

To avoid any backlash in the machine arm clamping mechanism two adjust screws are provided. To eliminate the backlash loosen the flap slightly, adjust the backlash and clamp the machine arm again.

Check that whenever the machine arm is taken out of the tilting adapter, the backlash adjustment system is opened to ensure easy relocating of machine arm (for example, when changing the abrasives).

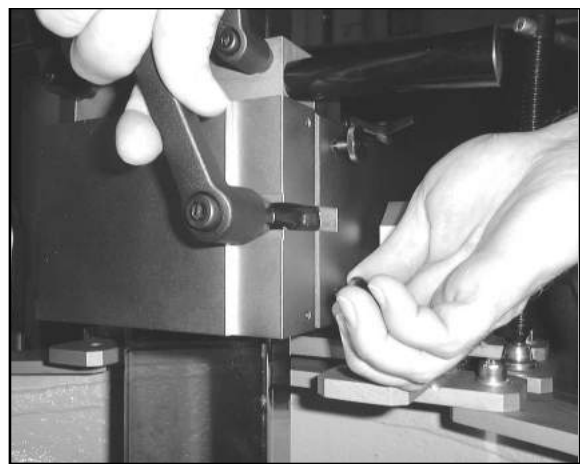


FIGURE 3-17. ADJUSTING THE BACKLASH OF THE CLAMPING OF THE TILTING ADAPTER

## CAUTION

When placing the machine arm into the tilting adapter, hold it by hand to avoid slipping. The machine arm is protected against slipping when the bracket is locked and resting in the ball locations.

The machine can be centred horizontally by means of the adjustment mechanism of the tilting adapter.

After the machine is completely assembled, make sure that all screws and levers are securely tightened.

Then, connect the machine to the power supply.

## NOTICE

For machines with an electric drive motor, check that the trigger button is in unlocked position before connecting to the power supply.

For machines with a pneumatic drive, check that the red safety button of the maintenance unit is pushed down to avoid any uncontrolled movement of the machine.

## CAUTION

Machines with a pneumatic drive may not be used without maintenance unit (filter and oil lubricator).

The air supply line must offer a minimum pressure of 6,3 bar to the maintenance unit.

The air supply must be free from humidity and particles to protect the unit from damage.

All supply lines must be provided for the air pressure and volume requirements.

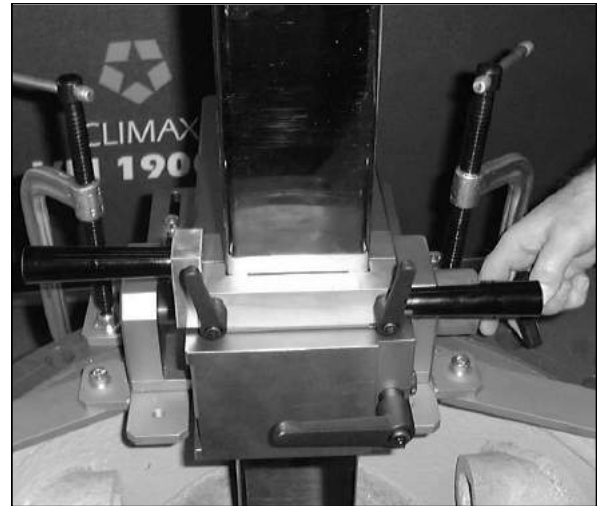


FIGURE 3-18. CENTERING THE MACHINE ARM

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# 4 OPERATION

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## 4.1 PRE-OPERATION CHECKS

Do the following checks before operating the machine:

1. Complete the risk assessment checklist in Table 1-3 on page 5.
2. Check that the work area is clear of non-essential personnel and equipment.
3. Check that the machine control/observation area will not be in the path of hot flying chips during machine operation.
4. Check the machine is securely mounted to the workpiece.
5. Check that air hoses are routed and secured to avoid tripping, entanglement, damage from hot chips, or other damage should an air hose or connection fail.
6. Check the tool condition and sharpness.
7. On the PCU, check that the oil drip rate is set to 6 drips per minute.
8. Check all hand tools are removed from inside the machine and the work area.

## 4.2 OPERATION



### **WARNING**

Do not reach with hands or other sections of the body into rotating tools. Wear eye protection glasses during grinding and lapping operation.

---

**⚠ CAUTION**

Make sure that always proper grinding discs are being used, otherwise the machine or the valve body can be damaged:

If grinding discs are used for lapping operation, they will be damaged.

If already used lapping discs are utilised for grinding operation, the required accuracy cannot be guaranteed and the valve seat might be damaged.

The grinding pressure is applied with the star knob of the tilting adapter. For best performance, the grinding pressure should not be too high or too low. If the grinding pressure is too high, it might result in heat creation at the grinding disc and the abrasive might shear off. If grinding pressure is too low, it could result in low performance. To get the perfect grinding pressure, please consider diagram 4.5.0.2. This diagram shows the grinding pressure resulting from the torque



FIGURE 4-1. APPLIANCE OF GRINDING PRESSURE AT STAR KNOB OF TILTING ADAPTER



applied to the star knob of the tilting adapter. The different lines are standing for the submerging depth. The diagram gives the values for pre-setting the pressure and it shows that the torque at the star knob is fairly low since the ratio of the tilting table is very high.

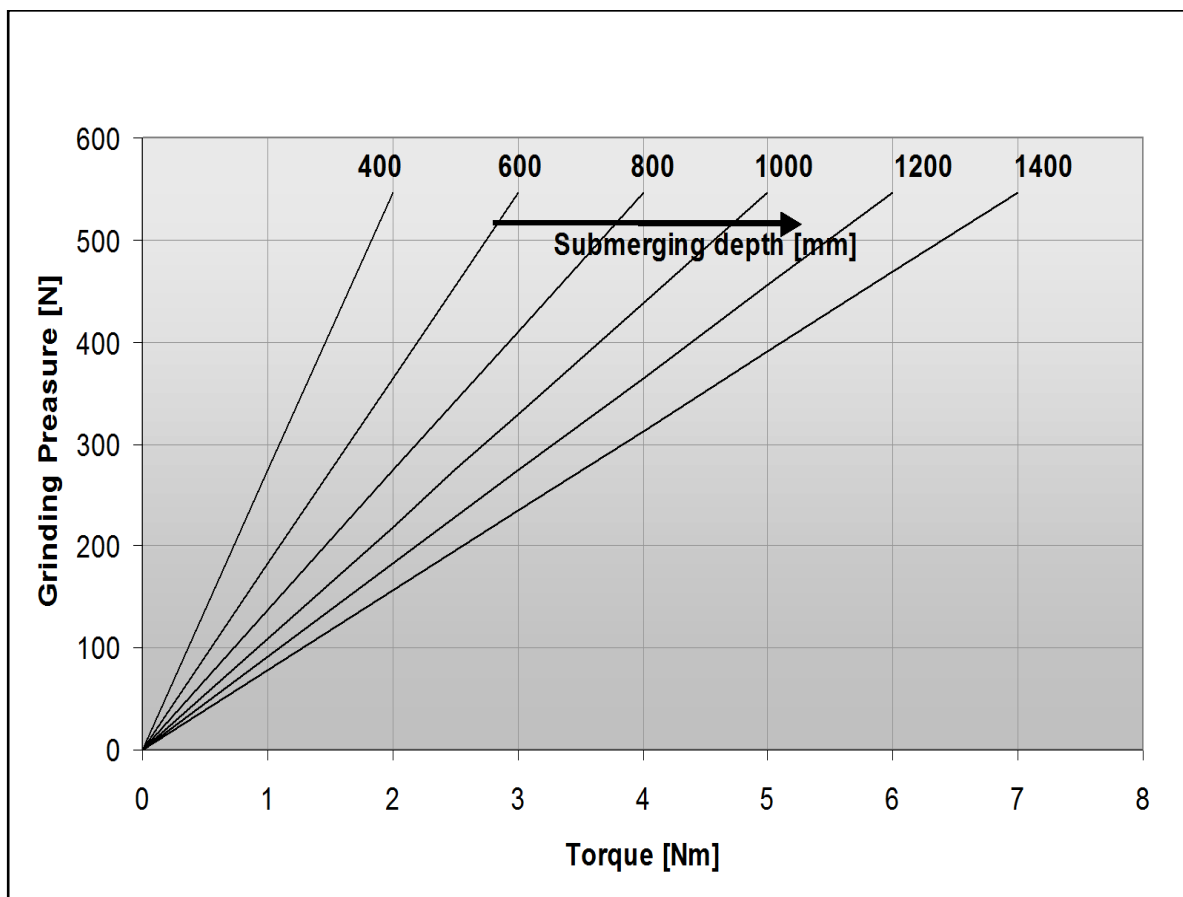


FIGURE 4-2. GRINDING PRESSURE IN RELATION TO THE TORQUE AT THE STAR KNOB OF THE TILTING ADAPTER

### CAUTION

If the grinding pressure is too high, it might result in damage of the machine.

#### **Electric drive motor**

Push the trigger button and adjust the speed on top of the drive motor. For permanent speed, the trigger button can be locked at the bottom of the handle. After locking, the trigger button can be released and the machine keeps running. In addition, it is possible to select the direction of the rotation (cw, ccw). It is always recommended to use the clockwise direction, because only in clockwise direction, the machine can reach its maximum speed (white arrow points to the top). On top of the electric drive motor, the direction of the rotation is indicated by two diodes

(“R” means clockwise). The electric drive motor is equipped with an additional 2-stage mechanically switching gear. The switch for the mechanical gear is located on the bottom side of the electric drive motor. The switch is marked with a turtle and a rabbit. The turtle means high ratio (maximum speed = 245 rpm, high torque). The rabbit means low ratio (max. speed = 700 rpm, lower torque).

The speeds marked on the electric drive housing indicate the speed of the electric drive motor itself and not the speed of the valve grinder’s spindle. To get the spindle speed of the valve grinder, these figures have to be divided by 5,4.

The electric drive motor also has a switch for a percussion drill function. This switch is located at the side of the electric drive housing. However, for the general function of the valve grinder, this switch and its function is not required.

The machine should always run in drilling mode (symbol = drill) and never in percussion drill function (symbol = hammer).

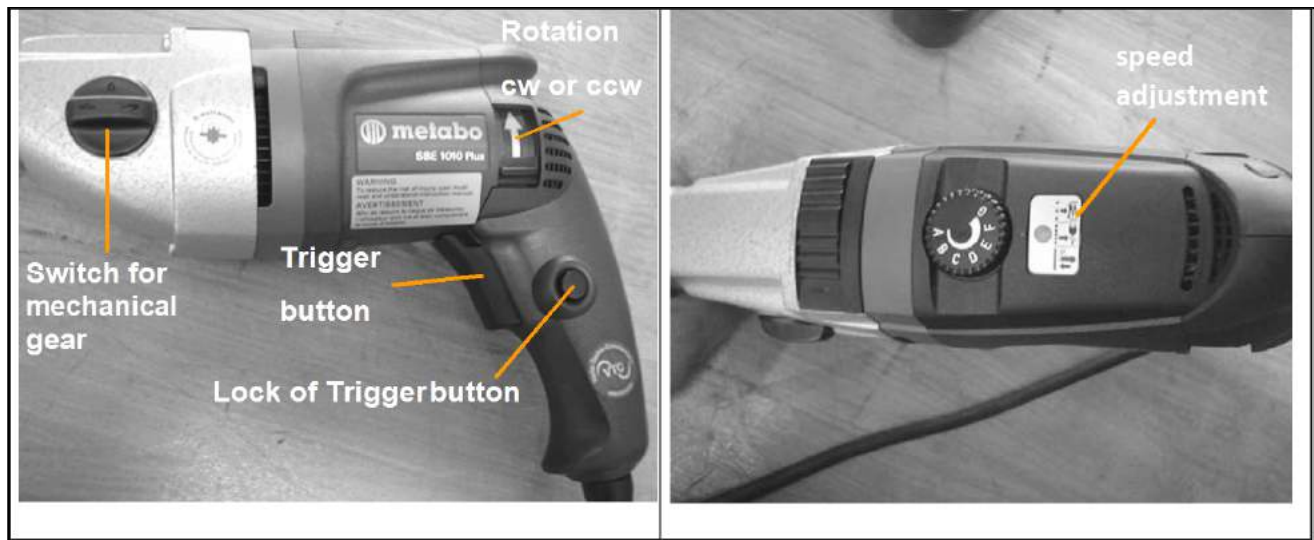


FIGURE 4-3. OPERATING BUTTONS OF ELECTRIC DRIVE MOTOR

### ***Pneumatic drive motor (operating with the optional maintenance unit)***

The spindle speed is activated by pushing the red safety button of the maintenance unit to its upper position. The speed can be adjusted by the regulating knob on the maintenance unit. The operating pressure is indicated at the gauge on the maintenance unit. If customer is using his own maintenance unit, the operation might be different, however, the basic operating buttons should be provided.

### **⚠ CAUTION**

The operating pressure of the machine is 6,3 bar. Higher pressure can result in damaging the machine and therefore, it is not applicable.

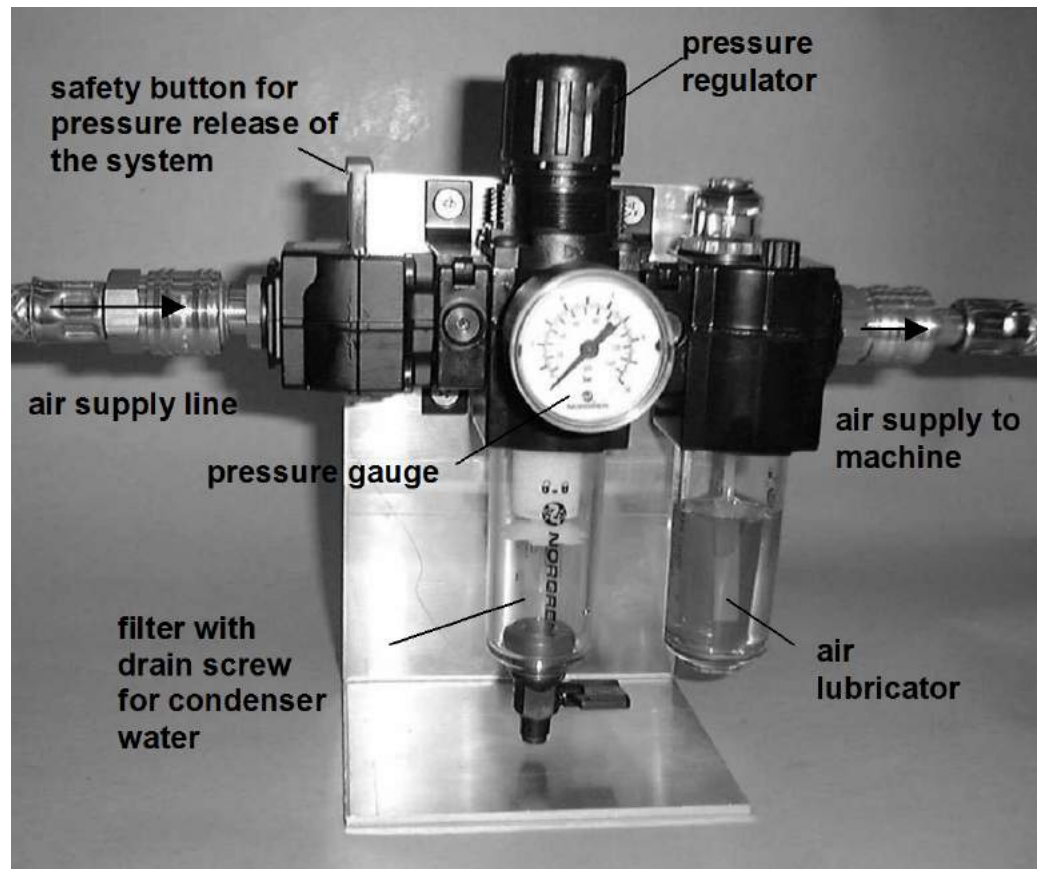


FIGURE 4-4. MAINTENANCE UNIT WITH OPERATING BUTTONS FOR PNEUMATIC DRIVE (OPTIONAL)

### CAUTION

Never operate the pneumatic drive without maintenance unit with lubricator and filter. The lubricator must always be filled with oil.

The air supply line must always offer an air pressure of 6,3 bar to the maintenance unit. The air supplied to the maintenance unit must be free from humidity and other particles to protect the machine against damages.

All air supply lines, fittings etc. must be provided according to the air pressure and volume requirements.

The grinding pressure can be adjusted during machining operation as required.

For lapping operation, make sure that sufficient lapping paste is put onto the surface to be machined.

For grinding operation, make sure that the abrasive is still in proper condition. Always change abrasives in time, as otherwise it might result in the following:

- Poor performance: wasted time

- 
- Overproportional heat creation: shearing off the abrasives and damaging the valve seat
- 

## 4.3 CHANGE OF ABRASIVES

### **CAUTION**

Stop the machine with trigger button (electric drive) or with red safety button on maintenance unit (pneumatic drive) and interrupt the power supply.

1. Release grinding pressure. To release grinding pressure, use the star knob of the tilting adapter.
2. Disconnect machine from power supply.
3. Hold the machine arm and open the flap of the tilting adapter.
4. Take the machine arm with the bracket out of the ball locations.

### **CAUTION**

Be careful - avoid any collision between tool and valve body.

5. Put the machine arm into a stable position to change the abrasive.
6. Change the abrasive.
7. Put the machine back into position, adjust grinding pressure and go on with the grinding operation (in the reverse order of these steps).

---

## 4.4 CHANGE OF DRIVE MOTOR

### **CAUTION**

The valve grinder may only be used with the original drive motors delivered with the machine. Otherwise, due to higher speeds and torque or wrong mechanical connections, the machine can be damaged and it may result into harm to the operator.

#### 4.4.1 Change of mounted drive motor

After release of the clamping screw, the drive can be pulled off. With the electric drive motor, there is an additional adapter bushing in the drive flange bore (dia. 43 mm / 48 mm). This bushing has to be removed for mounting the pneumatic drive motor.

After the drive motor is taken out of the machine, the coupling can be disconnected. This step is unnecessary when the machine is delivered with electric and pneumatic drive motor since both drives are prepared with a coupling.

Since the electric drive motor offers a rotation in both directions, the coupling is secured with an additional left-hand threaded screw. To disconnect the coupling, this screw has to be taken off first (high torque required, since the screw is secured with glue).

For a machine with pneumatic drive, this screw is not provided since the drive only rotates in clockwise direction. To take the coupling off, the motor spindle has to be blocked with a fixed spanner (size 19 mm).



FIGURE 4-5. CHANGE OF MOUNTED DRIVE MOTOR (STANDARD AIR MOTOR SHOWN)

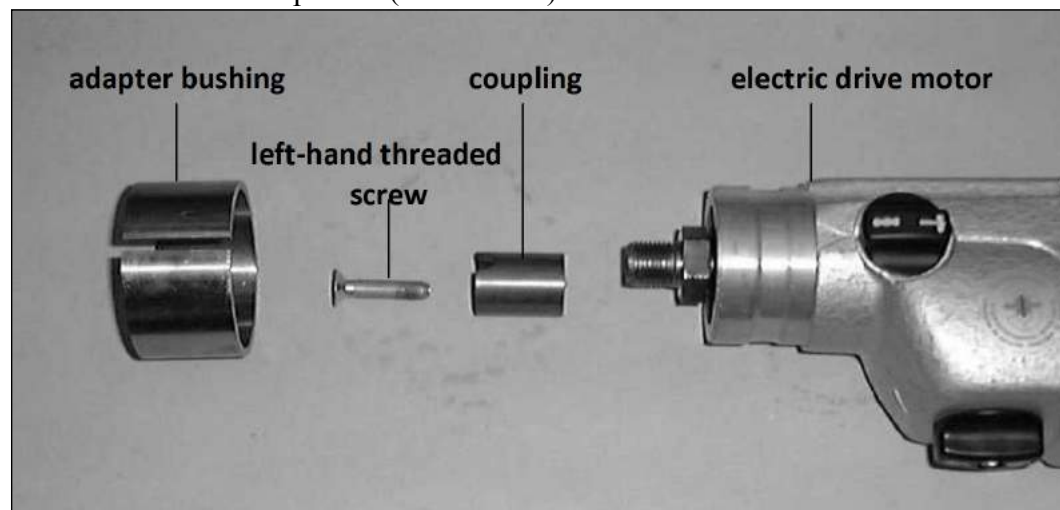


FIGURE 4-6. DISCONNECTION OF COUPLING

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## 4.4.2 Mounting of new drive motor

To mount a new drive motor, the coupling has to be connected to the ½" – 20 UNF-2A thread of the motor spindle. Due to the fact that the electric drive motor offers spindle rotation in both directions, the coupling has to be secured with a left-hand threaded screw (see Figure 4-6 on page 33). If the machine is delivered with electric and pneumatic drive, this step is unnecessary since both drives are prepared with couplings.

After connection of the coupling, the electric drive can be moved into the drive flange by using the adapter bushing. For pneumatic drive motors, this bushing is unnecessary since the pneumatic drive directly fits into the drive flange bore. Make sure that the coupling of the drive motors engage the drive pin inside the gear. This is achieved when the shaft of the electric drive is completely moved into the drive flange. The distance between the drive flange and the upper end of the silver coloured housing of the pneumatic motor is 125 mm.

---

## 4.5 CENTERING CHUCK FOR VERTICAL GRINDING (OPTIONAL)

In addition or as an option, the machine can be delivered with a 3-jaw centring chuck (assembly of chuck see manual of chuck). The centring chuck is not recommended and designed for vertical grinding or for grinding over head.

Prior to the adaptation of the tooling, the machine arm has to be put into the centre bore of the chuck (dia. 50 mm) and clamped. Then, the tooling can be adapted to the machine spindle.

Together with the 3-jaw centring chuck, the machine is mounted onto the valve body by using the

3-jaw clamping mechanism. Then you have to secure the housing of the centring chuck mechanical, so that it cannot rotate, if the chuck becomes loose during the operation. To adjust the machine arm to the submerging depths required, the arm is unclamped and manually moved into the valve body until the grinding tool touches the valve seat. The grinding pressure is manually set and the machine arm is clamped. The machine is ready for operation.

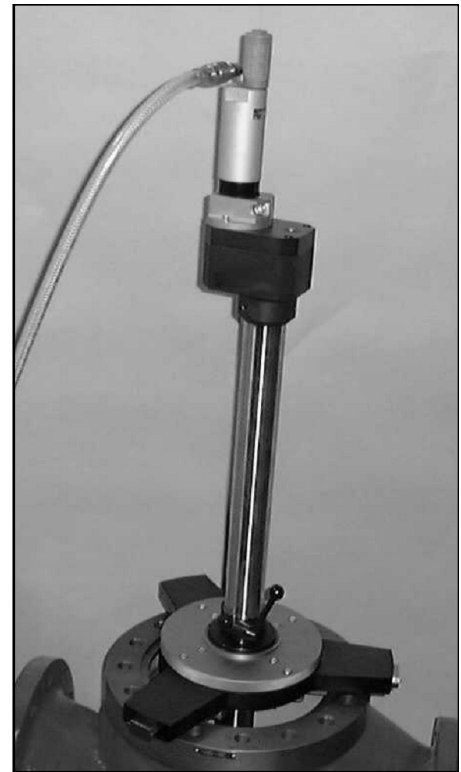


FIGURE 4-7. 3-JAW CENTRING CHUCK (OPTIONAL)

To change the abrasives, the grinding pressure has to be released and after unclamping the 3-jaw centring chuck, the machine including chuck can be taken out of the valve body. After changing the abrasives, the machine can be relocated as described before.

## 4.6 CONICAL SEATS (OPTIONAL)

**Weight balancer for VM2000 with conical grinding wheels (VM2000C)**

**Handle (340-53K-012)**  
The handle is provided for torque support and for applying grinding pressure manually.

The submerging depth is preset by using the clamp collar (340-53K-021). The spring (340-53K-021) is provided for machine weight compensation and for slow and controlled infeed of the grinding cone into the valve seat.

The force required to push the grinding cone into the seat, depends on the preset distance between the seat and the grinding cone. The closer the distance, the lower the force required. For fine adjustment of the distance and the resulting infeed force, additional set-screws (340-53K-025), are provided.

**Centering chuck**  
The quil clamp of the centering chuck may not be tightened. This quil clamp is only provided for axial guidance of the machine air.

**Grinding adapter (340-51S-N03)**  
The grinding adapter will slide onto the machine air from below and it will be connected with a center bolt. Make sure that the two locating pins for torque support are engaged.

The clamp collar located above the grinding adapter is provided for torque support.

By setting the clamp collar the axial stroke of the internal spring system can be adjusted or depending on the application it can be completely eliminated.

Part No.	Part Name	QTY	Rev.	Notes
340-53K-012	Handle	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-025	Set-screws	2	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
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340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
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340-51S-N03	Grinding adapter	1	1.0	
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340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
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340-51S-N03	Grinding adapter	1	1.0	
340-53K-021	Center bolt	1	1.0	
340-53K-021	Spring	1	1.0	
340-53K-021	Clamp collar	1	1.0	
340-53K-021	Centering chuck	1	1.0	
340-53K-021	Grinding chuck	1	1.0	
340-53K-012	Grinding wheel	1	1.0	
340-51S-N03	Grinding adapter	1		



# 5 MAINTENANCE

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 5.3 LUBRICATING THE PNEUMATIC DRIVE MOTOR - - - - - 39  
 5.4 MAINTENANCE TASKS - - - - - 39  
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## 5.1 MAINTENANCE CHECKLIST

 **CAUTION**

Cleaning, lubricating and general maintenance may only be performed by authorised and trained personnel. All safety regulations have to be observed.

Disregard of safety regulations may result in danger of life and health of persons.

Before performing any service work, disconnect the machine from the power supply line (electric and pneumatic) to avoid any danger to the life and health of persons due to uncontrolled rotation of the tools.

The machine should be protected to switching it on again (protection against third persons). The connection to the power should always be with the person who is performing the service work.

Make sure that all machine parts have cooled down to room temperature.

**NOTICE**

Clean the operating area and remove any lubrication fluids or similar substances in suitable containers for environmental protection.

It is recommended to perform preventative maintenance to the machine as described in Table 5-1 and according to the pneumatic and electric drive manufacturers' operating manuals.

---

Alternatively, the machine can be sent to CLIMAX for proper maintenance.

Under normal circumstances and proper handling the maintenance as described in Table 5-1 is sufficient.

Under unfavourable circumstances, such as rough operation or operation under harmful environmental conditions (high temperature, high humidity, etc.) the inspection period should be shorter.

Table 5-1 lists maintenance intervals and tasks

**TABLE 5-1. MAINTENANCE INTERVALS AND TASKS**

<b>Interval</b>	<b>Task</b>
<b>Before each use</b>	Lubricate ball joint coupling with Molykote or Unimoly G82
	Check machine for visible damages
	Check power supply lines for visible damages
	Check maintenance unit (with pneumatic drive)
	Check ventilating slots of electric drive motor
<b>After 150 operating hours, for following inspections every 300 operating hours</b>	Clamping and lubrication of pneumatic drive gear
<b>Every 500 operating hours or every year</b>	Lubrication of drive chain
	Lubrication of upper gear

---

## **5.2 LUBRICATING THE MACHINE MODULES**

Most of the machine components are maintenance-free.

The gear of the electric drive is lubricated for life-time, i.e. there is no need of additional lubrication.

The gear of the pneumatic drive motor has to be disassembled and cleaned after 150 working hours and then be lubricated with Bosch-special grease. This procedure has to be repeated every 300 working hours. This service is offered by CLIMAX.

The drive chain integrated in the machine arm and the upper gear has to be inspected every 500 working hours (after 1 year at the latest). For this inspection, the cover of the upper gear has to be removed and the gears as well as the chain have to be thoroughly lubricated with Tunap Tunfluid HT 2200. After replacing the cover, the drive chain tension has to be adjusted.

We recommend to have this service done by the manufacturer due to the experience required.

In case of a rattling noise coming out of the machine arm, most likely the drive chain is not sufficient anymore. To adjust the tension of the drive chain, untie the screws of the machine arm clamping plate 20T-004 and adjust the tension by means of the adjusting screw 20N-023.

After every half rotation of the adjusting screw, check if the noise disappears. After adjusting the tension of the drive chain, tighten the screws of the clamping plate. After this procedure has been repeated several times, the chain will be stretched to its limits and it has to be changed.

Prior to every machine operation, the ball joint coupling of the machine spindle should be lubricated with grease Molykote or Unimoly GL82 (Klüber).

After each operation, it is recommended to clean the machine and to check it for visible damages.

---

## 5.3 LUBRICATING THE PNEUMATIC DRIVE MOTOR

The lubrication of the pneumatic drive motor is a loss lubrication.

Make sure that the lubricator of the maintenance unit is always filled with oil. Use any oil according to the manufacturer's manual.

In addition, make sure that the pneumatic drive motor is always operated with clean air. Check the filter on the maintenance unit regularly.

Drain condenser water is required.

---

## 5.4 MAINTENANCE TASKS

Maintenance tasks are described in the following sections.

### 5.4.1 Electrical tasks

#### **CAUTION**

All work on the machine's electrical equipment must be carried out by trained electrical specialists.

Electrical equipment must be checked regularly! Loose connections must be made secure.

Damaged wires or cables must be replaced immediately.

Never clean electrical apparatus with water or similar liquids.

---

## 5.4.2 Pneumatic equipment tasks

### **CAUTION**

All work on the machine's pneumatic equipment must be carried out by trained pneumatic specialists!

Before any service and maintenance work, the pressure has to be released.

Disconnection of lines under pressure should only be done with adequate tooling and according to all safety regulations that apply.

All hoses should be changed according to the preventative maintenance regulations even if there are no visible damages (observe the manufacturer's recommendations).

Before start-up and service or maintenance work:

- Check that all bolt connections for tightness
- Check that all covers, filters etc. are in place

After service and maintenance work and before putting the machine into operation again, check that:

- All objects and other material, which are/is not required for operation of the machine must be removed from the machine's operating area.
- All liquids that might appear are removed
- All safety devices of the machine are properly working.

---

## 5.5 TROUBLESHOOTING

If the machine cannot be started or if there are any malfunctions during operation, the operator must inform qualified maintenance personnel immediately.

### **CAUTION**

The operator must inform the supervisor and should never try to resolve any problem on the electrical equipment on their own.

To avoid any danger to life and health of person due to electrical short circuit: All work on the machine's electrical equipment must be carried out by trained electrical specialists only. The operator may only resolve faults resulting from wrong operation or lag of maintenance.

During all work on the machine, the electrical power supply line must be disconnected to avoid any danger to the life and health of people due to uncontrolled rotation of machine spindle.

To solve mechanical faults, a complete part list and assembly drawing is supplied with the operator's manual in Appendix A.

**TABLE 5-2. TROUBLESHOOTING FOR POSSIBLE FAULTS**

Possible fault	Operating or maintenance error	Recovery of fault
<b>Machine does not start</b>	Power supply line is not connected	Make sure that power supply line is plugged in.
	Default in power source	Check the energy source (fuses, plugs, connections, air pressure, etc.).
	Only for the electric drive: the machine is overloaded. The heat protection is activated.	Let the machine cool down. As soon as the heat protection of the electric drive is deactivated, let the machine run at high speed to cool down through its ventilating system. Clean the ventilating slots if necessary.
	Only for the pneumatic drive: the machine has been run in cool environment and the supply lines are iced.	De-ice the supply lines.
<b>Grinding pressure cannot be activated</b>	Tilting adapter is not firmly connected to the base plate.	Tighten connecting screws of tilting adapter.
<b>Machine vibration during operation</b>	Grinding pressure exceeds 500 N.	Reduce grinding pressure.
<b>Unusual noise (rattling in machine arm)</b>	Pretension of drive chain is insufficient	Adjust tension of drive chain (see Section 5.2 on page 38).

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## 6 STORAGE AND SHIPPING

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## 6.1 STORAGE

Proper storage of the gate valve grinding and lapping machine will extend its usefulness and prevent undue damage.

Before storing, do the following:

1. Clean the machine with solvent to remove grease, metal chips, and moisture.
2. Drain all liquids from the pneumatic conditioning unit.

Store the gate valve grinding and lapping machine in its original shipping container. Keep all packing materials for repackaging the machine.

### 6.1.1 Short-term storage

Do the following for short-term storage (three months or less):

1. Retract the tool head from the workpiece.
2. Remove the tooling.
3. Remove hoses.
4. Remove the machine from the workpiece.
5. Clean the machine to remove dirt, grease, metal chips, and moisture.
6. Spray all unpainted surfaces with LPS-2 to prevent corrosion.
7. Store the gate valve grinding and lapping machine in its original shipping box.

### 6.1.2 Long-term storage

Do the following for long-term storage (longer than three months):

1. Follow the short-term storage instructions, but use LPS-3 instead of LPS-2.
2. Add a desiccant pouch to the shipping container. Replace according to manufacturer instructions.
3. Store the shipping container in an environment out of direct sunlight with temperature < 70°F (21°C) and humidity < 50%.

---

## **6.2 SHIPPING**

The gate valve grinding and lapping machine can be shipped in its original shipping container.

---

## **6.3 DECOMMISSIONING**

To decommission the gate valve grinding and lapping machine before disposal, remove the drive assembly from the RDU and dispose of the drive assembly separately from the rest of the machine components. Refer to Appendix A for component assembly information.



# APPENDIX A ASSEMBLY DRAWINGS

The general design of the machine is shown in the assembly drawings as enclosed.

For ordering any spare part, please always mention position and part number.

Also for the universal clamping device and the tooling, you will find part lists as enclosed. However, since these items are clearly described in the manual, an additional assembly drawing is not required.

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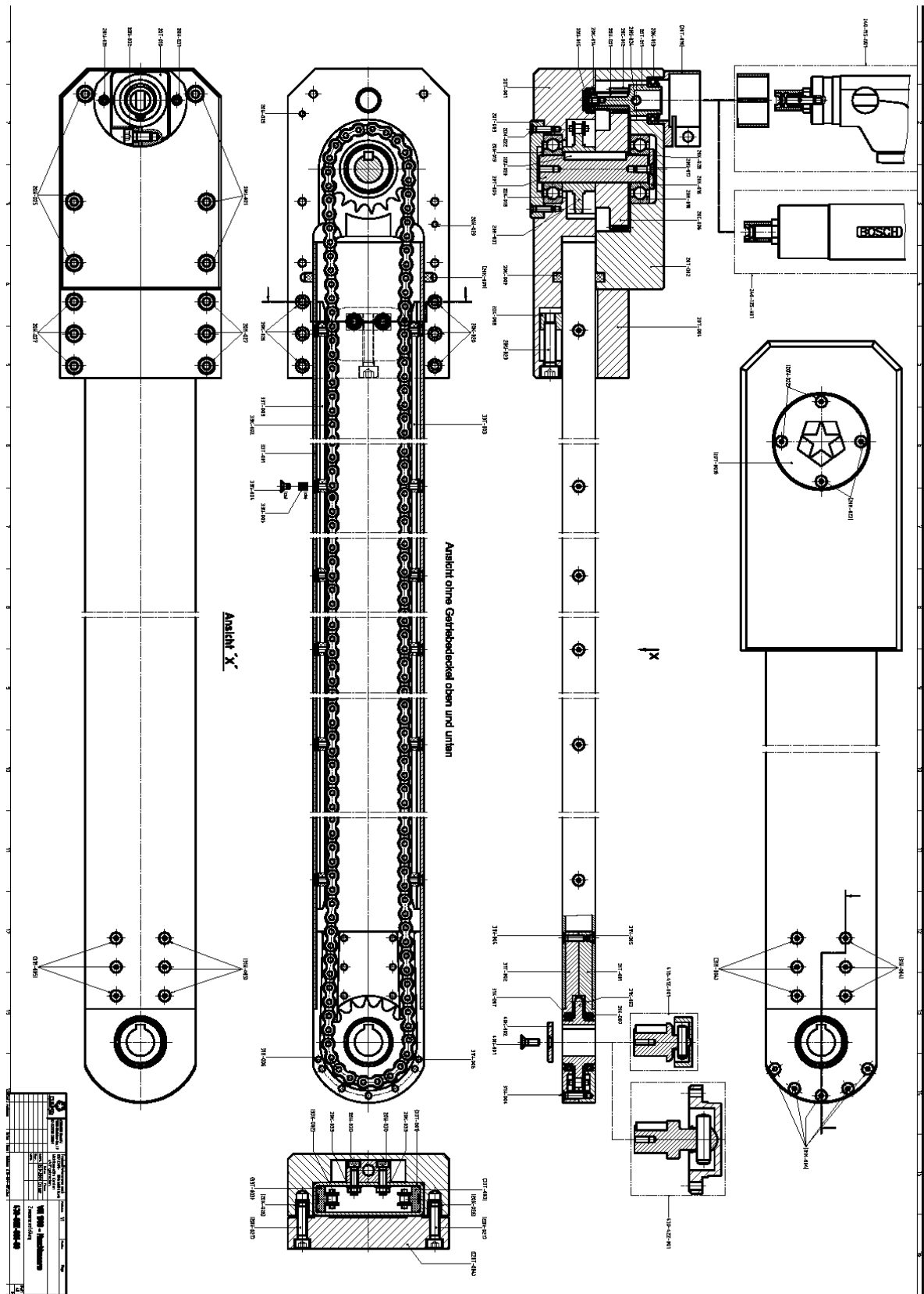
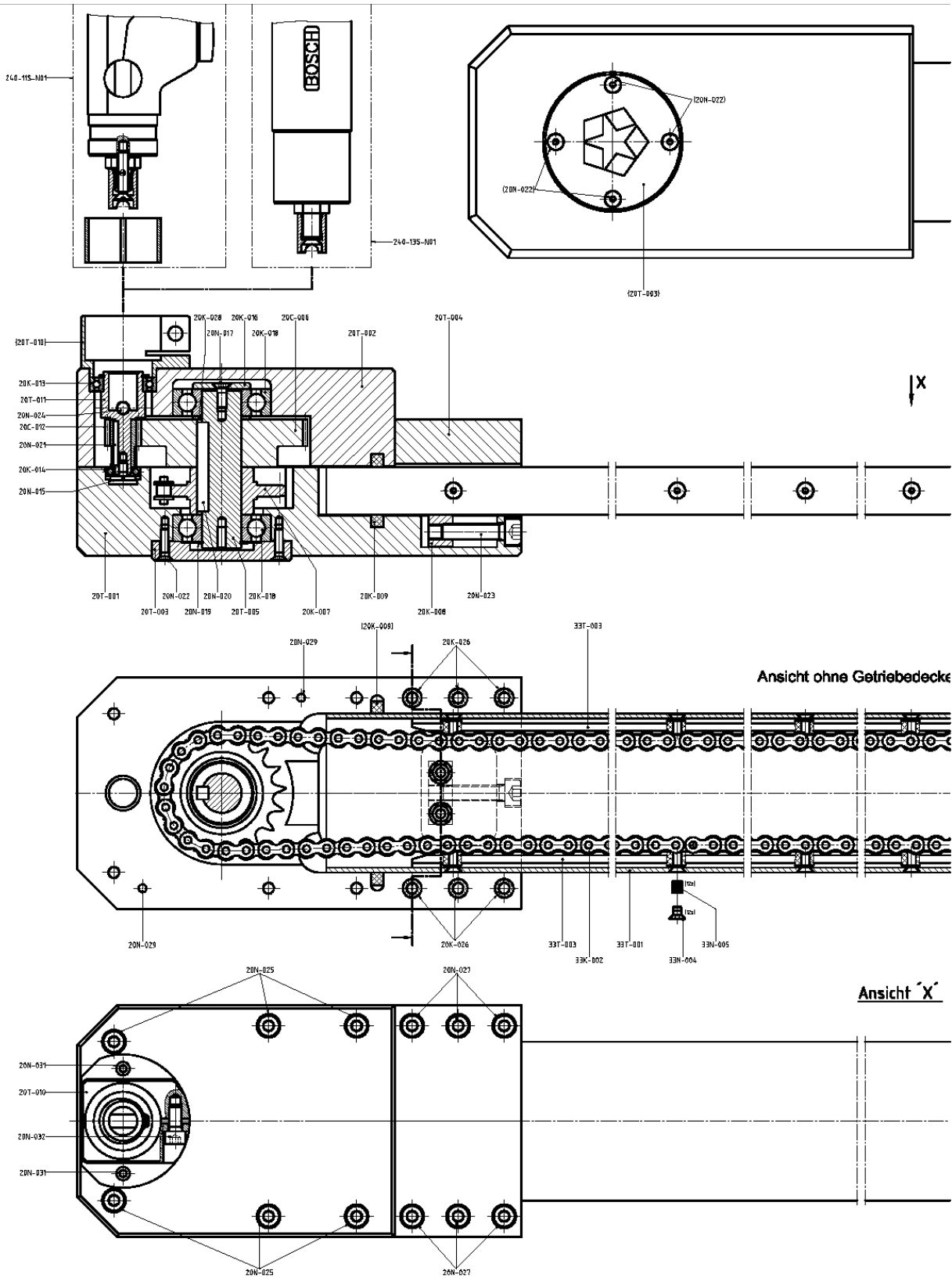
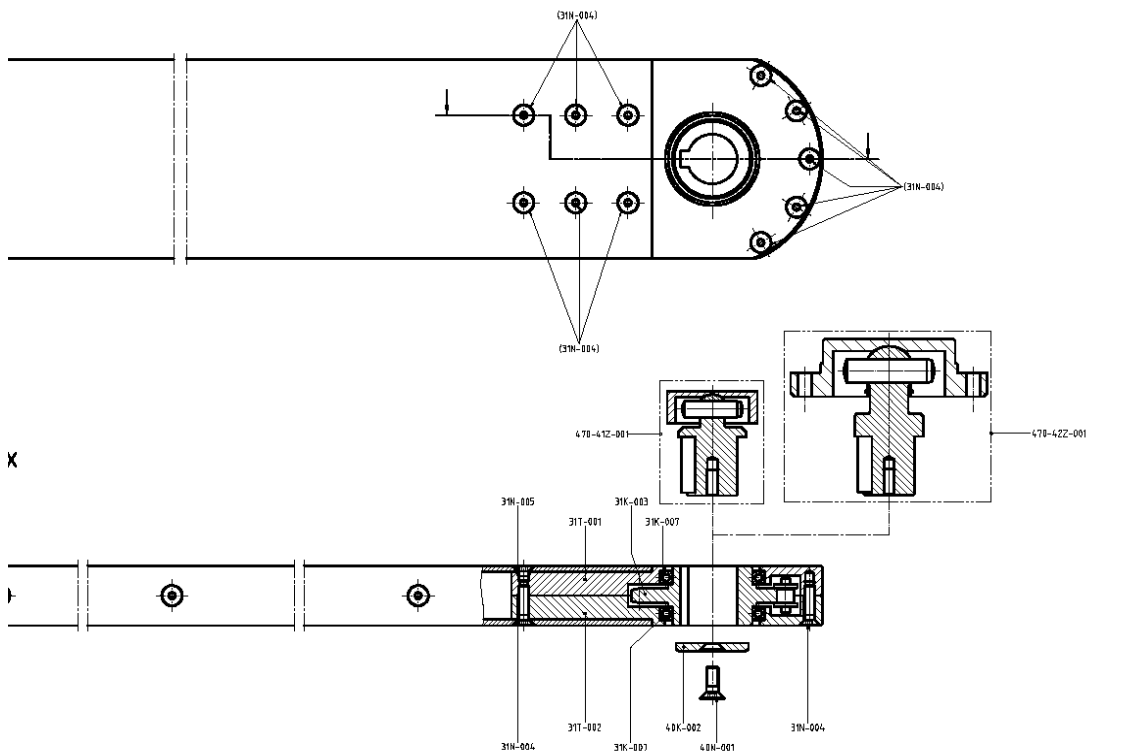
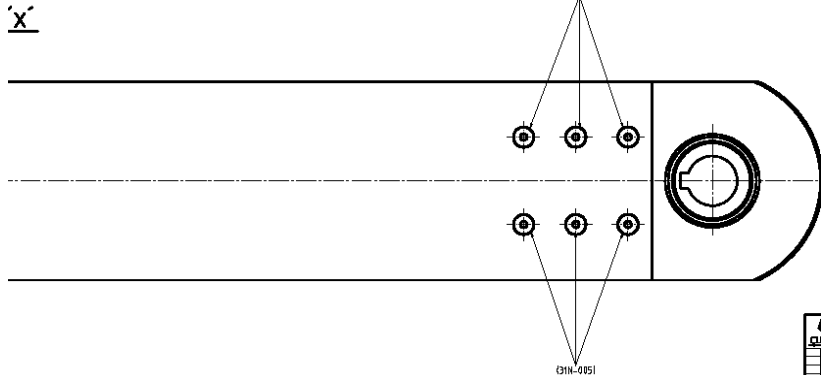
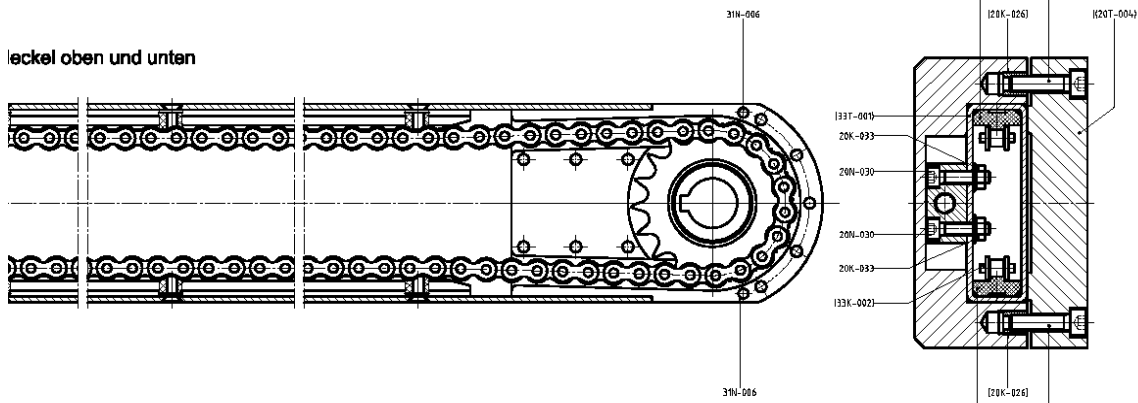


FIGURE A-1. ASSEMBLY

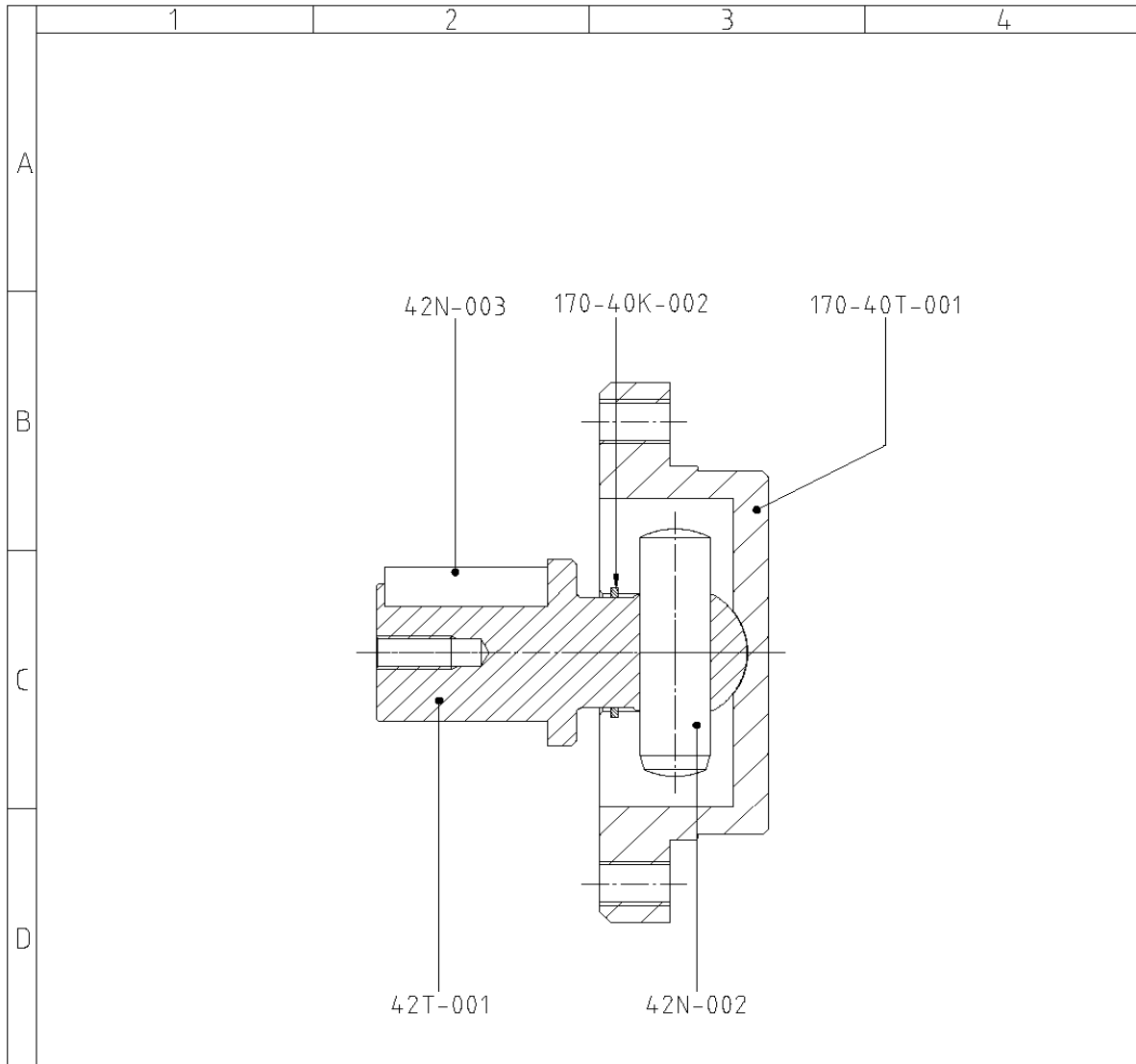





leckerl oben und unten



	DaimlerChrysler Mercedes-Benz Daimler	Freigeblieben nach ISO 9001 - Nachweis über Nachprüfung im Kunden und Lieferanten	Zeichn.-Nr. 51 Seite 1 von 1
	Datum: 03.10.2000 Zeichner: Bearb.: Prüfer:	<b>VM 1900 - Maschinenarm</b> Zusammenstellung <b>470-007-001-00</b>	



	<b>CLIMAX GmbH</b> Willi-Bleicher-Str. 11 D-52353 Düren	Freimaßtoleranzen nach ISO 2768- (f/fein (m)/mittel (kgrob Nichtbemaßte Kanten x45° gebrochen.		Maßstab 1:1	Position 42Z-001Menge
		Datum	Name	Kugelkupplung 25 VM-1700 Zusammenstellung	
Bearb. 19.10.2000	Cramer				
Gepr.					
Norm					
470-42Z-001-00				Blatt A4	Bl
Zust.	Änderung	Datum	Name	Dateiname 470-42Z-001.dwg	

Stkliste / Part list #:		470 - 10 S - N01 - 00	Datum / Date: 17.07.1999
Ersteller / Creator:		Werheid	
Zeichnungszusammenstellung(en):		470-00Z-001-00	
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #	Benennung Description
S	1	240 - 11 S - N01	Elektroantrieb
S	1	240 - 13 S - N01	Druckluftantrieb Stab
S	1	240 - 14 S - N01	Wartungseinheit (Option)
S	1	240 - 15 S - N01	Elektroantrieb USA
S	1	470 - 16 S - N01	Druckluftmotor mit Ex-Schutz Zertifikat

FIGURE A-2. 470-10S-N01-00 DRIVE MOTOR

Stkliste / Part list #:			240 - 11 S - N01 - 00	Datum / Date: 01.06.1999
Ersteller / Creator:			Werheid	
Zeichnung / Cross section #:				
Pos.	Menge		Stücklisten-, Teile #	Benennung
Item	Qantity		Assy or Part #	Description
001	1		240 - 11 K - 001	Antriebsmaschine / Motor Metabo Sb E 1000/2-R+L Signal
002	1	x	240 - 11 T - 002	Reduzierhülse / Bushing Elektro Metabo
003	1		240 - 11 N - 003	Senkkopfschraube / Screw M6 x 30 - 8.8 -LH
004	1	x	240 - 11 T - 004	Kupplungsstück / Coupling

FIGURE A-3. 240-11S-N01-00 ELECTRIC DRIVE 220V

<b>Stkliste / Part list #:</b>		240 - 13 S - N01 - 00		<b>Datum / Date:</b> 01.06.1999
<b>Ersteller / Creator:</b>		Werheid		
<b>Zeichnung / Cross section #:</b>				
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #		Benennung Description
001	1	240 - 13 K -	001	Druckluftantrieb / Air Motor Bosch Stab
002	1	240 - 13 K -	002	Winkelstück / Fitting (90 grad, innen/außen, 1/2")
003	1	240 - 13 K -	003	Stecker / Fitting (Rectus Type 26)
004	1	240 - 13 K -	004	Anschlußschlauch kompl. 2 m / Hose assy 2 m
005	1	x 240 - 13 T -	005	Kupplungsstück / Coupling

FIGURE A-4. 240-13S-N01-00 PNEUMATIC DRIVE



<b>Stkliste / Part list #:</b>		240 - 15 S - N01 - 00				<b>Datum / Date: 01.06.1999</b>	
<b>Ersteller / Creator:</b>		Werheid					
<b>Zeichnung / Cross section #:</b>							
Pos. Item	Menge Quantity		Stücklisten-, Teile # Assy or Part #			Benennung Description	
001	1		240	- 15	K - 001	Antriebsmaschine / Motor Metabo Sb E 1000/2-R+L Signal 115	
002	1	x	240	- 15	T - 002	Reduzierhülse / Bushing Elektro Metabo	
003	1		240	- 15	N - 003	Senkkopfschraube / Screw M6 x 30 - 8.8 -LH	
004	1	x	240	- 15	T - 004	Kupplungsstück / Coupling	

FIGURE A-5. 240-15S-N01-00 ELECTRIC DRIVE 110V

Stkliste / Part list #: 470 - 16 S - N01 - 00				Datum / Date: 17.07.1999			
Ersteller / Creator:		Werheid					
Zeichnungszusammenstellung(en):				470-00Z-001-00			
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #	Benennung Description				
001	1	470 - 16 K - 001	Druckluftmotor MRD55-650				
002	1	470 - 16 T - 002	Motorflansch				
003	1	470 - 16 T - 003	Wellenadapter				
004	1	470 - 16 N - 004	GewindestiftM5x12mm				
005	1	4701 - 16 T - 005	Paß feder 5x5x18				

FIGURE A-6. 470-16S-N01-00 AIR DRIVE WITH EX CERTIFICATE

Stkliste / Part list #:		470 - 20 S - N01 - 00				Datum / Date: 17.07.1999	
Ersteller / Creator:		Werheid					
Zeichnungszusammenstellung(en):				470-00Z-001-00			
Pos. Item	Menge Quantity		Stücklisten-, Teile # Assy or Part #			Benennung Description	
L01	1		240	-	20	S	- L01 Antriebswelle
001	1		470	-	20	T	- 001 Getriebegehäuse oben
002	1		470	-	20	T	- 002 Getriebedeckel oben
003	1		470	-	20	T	- 003 Lagerdeckel oben
004	1		470	-	20	T	- 004 Klemmplatte für Rohr
005	1		470	-	20	T	- 005 Abtriebswelle oben
006	1		470	-	20	C	- 006 Stirnrad für Abtrieb
007	1		470	-	20	K	- 007 Kettenritzel für DIN 8187 - 08B -1
008	1		470	-	20	T	- 008 Spannklötz
010	1	x	470	-	20	T	- 010 Motorflansch
016	1		470	-	20	K	- 016 Vorlegescheibe
017	1		470	-	20	N	- 017 Senkschraube M6 x 16 - 8.8 - Zn
018	2		470	-	20	K	- 018 RiKuLa 6305-2RS
020	1		470	-	20	N	- 020 Paßfeder A8 x 7 x56
022	4		470	-	20	N	- 022 Senkschraube M5 x 20 - 8.8 - Zn
023	1		470	-	20	N	- 023 Innensechskantschraube M10 x 40 - 8.8 Zn
025	6		470	-	20	N	- 025 Innensechskantschraube M8 x 65 - 8.8 Zn
026	6		470	-	20	K	- 026 Gewindeeinsatz Keen Sert M12/M8x1,25
027	6		470	-	20	N	- 027 Innensechskantschraube M8 x 30 - 8.8 Zn
028	1		470	-	20	K	- 028 Stützscheibe
029	2		470	-	20	N	- 029 Paßstift DIN EN 28734-5m6x12
030	2		470	-	20	N	- 030 Innensechskantschraube M6 x 25 - 8.8 -Zn
031	2		470	-	20	N	- 031 Innensechskantschraube M5 x 20 - 8.8 Zn
032	1		470	-	20	N	- 032 Innensechskantschraube M8 x 16 - 8.8 Zn
033	2		470	-	20	K	- 033 Selbstsichernde Mutter SERPRESS - M6
034	1		470	-	20	K	- 034 Rohrabdichtung O-Ring 334,7 x 8,6

FIGURE A-7. 470-20S-N01-00 UPPER GEAR BOX

<b>Stkliste / Part list #:</b> 470 - 30 S - N01 - 00		<b>Datum / Date:</b> 17.07.1999	
<b>Ersteller / Creator:</b> Werheid			
<b>Zeichnungszusammenstellung(en):</b>		470-00Z-001-00	
<b>Pos.</b>	<b>Menge</b>	<b>Stücklisten-, Teile #</b>	<b>Benennung</b>
<b>Item</b>	<b>Quantity</b>	<b>Assy or Part #</b>	<b>Description</b>
S	1	470 - 31 S - N01	Allgemeine Teile incl. Getriebe unten
S	1	470 - 32 S - N01	Maschinenrohr T = 1000
S	1	470 - 33 S - N01	Maschinenrohr T = 1400

FIGURE A-8. 470-30S-N01-00 MACHINE ARM

<b>Stkliste / Part list #:</b>			470 - 31 S - N01 - 00					<b>Datum / Date: 17.07.1999</b>	
<b>Ersteller / Creator:</b>			Werheid						
<b>Zeichnungszusammenstellung(en):</b>						470-00Z-001-00			
Pos. Item	Menge Quantity		Stücklisten-, Teile # Assy or Part #	Benennung Description					
001	1		470 - 31 T - 001	Getriebegehäuse 1 unten					
002	1		470 - 31 T - 002	Getriebegehäuse 2 unten					
003	1	x	470 - 31 K - 003	Kettenritzel unten					
004	11		470 - 31 N - 004	Senkschraube M5 x 20 - 8.8 Zn					
005	6		470 - 31 N - 005	Senkschraube M5 x 8 - 8.8 Zn					
006	2		470 - 31 N - 006	Paßstift DIN EN 28734-5m6x12					
007	2		470 - 31 K - 007	RiKuLa 61808 - 2RS1					

FIGURE A-9. 470-31S-N01-00 MACHINE ARM GENERAL PARTS

Stkliste / Part list #:				470 - 33 S - N01 - 00	Datum / Date: 17.07.1999	
Ersteller / Creator:		Werheid				
Zeichnungszusammenstellung(en):				470-00Z-001-00		
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #			Benennung Description	
001	1	470 - 33	T	- 001	Tauchrohr (geschliffen, gebürstet, vernickelt)	
002	1	470 - 33	K	- 002	Kette 08 B-1	
003	2	470 - 33	T	- 003	Kettenführung	
004	12	470 - 33	N	- 004	Senkschraube M5x8	
005	12	470 - 33	N	- 005	Gewindeeinsetzung Filtec SLM5 x 0,8 AC 7,5 (oder Heli Coil)	

FIGURE A-10. 470-33S-N01-00 MACHINE ARM T=1400

Stkliste / Part list #:		470 - 40 S - N01 - 00				Datum / Date: 17.07.1999			
Ersteller / Creator:		Werheid							
Zeichnungszusammenstellung(en):		470-00Z-001-00							
Pos.	Menge	Stücklisten-, Teile #				Benennung			
Item	Quantity	Assy or Part #				Description			
S	1	470 - 41 S - N01				Kugelumkupplung 15			
S	1	470 - 42 S - N01				Kugelumkupplung 25			
001	1	470 - 40 N - 001				Senkschraube M6 x 16 - 8.8 Zn			
002	1	470 - 40 K - 002				Vorlegescheibe GN184 x 36			

FIGURE A-11. 470-40S-N01-00 BALL JOINT COUPLING

Zeichnungszusammenstellung(en):			470-00Z-001-00				
Pos.	Menge		Stücklisten-, Teile #				Benennung
Item	Quantity		Assy or Part #				Description
S	1		170	-	10	S - N01	Kugelkupplung Typ 15
001	1		470	-	41	T - 001	Kugeldorn Typ 15
002	1		470	-	41	N - 002	Zylinderstift DIN EN 28734-A-8m6 x 30 -St
003	1		470	-	41	N - 003	Paßfeder A8x7x28
004	2		470	-	41	N - 004	Sechskantschrauben M5x12-8.8-Zn

FIGURE A-12. 470-41S-N01-00 TYP 15



<b>Stkliste / Part list #:</b> 170 - 10 S - N01 - 00		<b>Datum / Date:</b> 20.09.1999			
<b>Ersteller / Creator:</b> Werheid					
<b>Zeichnung / Cross section #:</b>					
Pos. / Item	Menge / Quantity	Stücklisten-, Teile # / Assy or Part #			Benennung / Description
001	1	170	- 10 T	- 001	Kugelkupplung / Ball coupling 15
002	1	170	- 10 T	- 002	Halteklauē / Clamping pad
003	1	170	- 10 N	- 003	Senkschraube / Screw M4 x 6 - 8.8 Zn
004	2	170	- 10 N	- 004	Innensechskantschraube / Screw M5x12

FIGURE A-13. 170-10S-N01-00

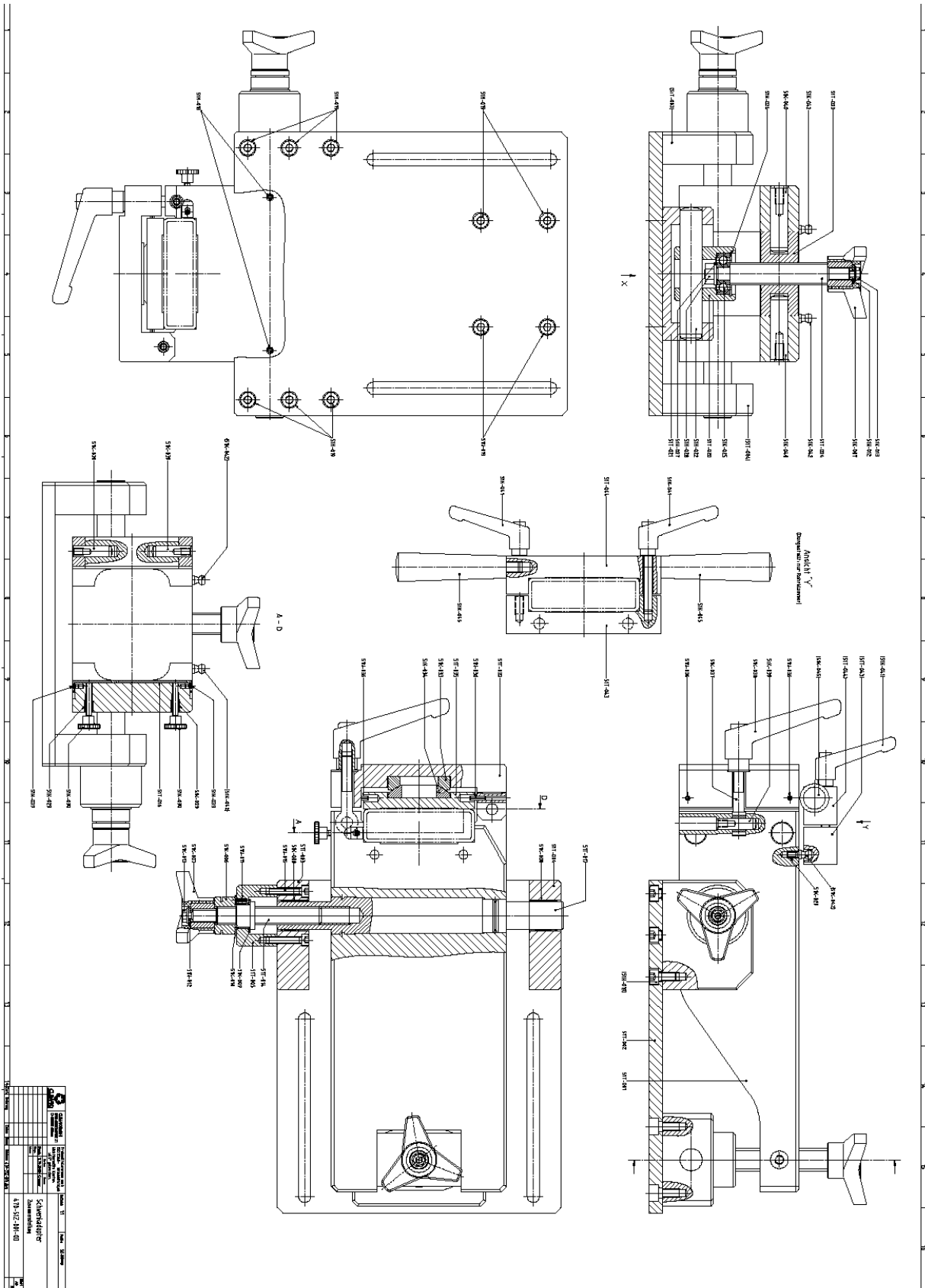
Stkliste / Part list #:		470 - 42 S - N01 - 00			Datum / Date: 17.07.1999		
Ersteller / Creator:		Werheid					
Zeichnungszusammenstellung(en):		470-00Z-001-00					
Pos.	Menge	Stücklisten-, Teile #			Benennung		
Item	Qantity	Assy or Part #			Description		
S	1	170 - 40 S - N01			Kugelkupplung Typ 25		
001	1	470 - 42 T - 001			Kugeldorn Typ 25		
002	1	470 - 42 N - 002			Zylinderstift DIN EN - A-12m6 x 45 -St		
003	1	470 - 42 N - 003			Paßfeder A8x7x28		
004	2	470 - 42 N - 004			Sechskantschrauben M8x30-8.8-Zn		

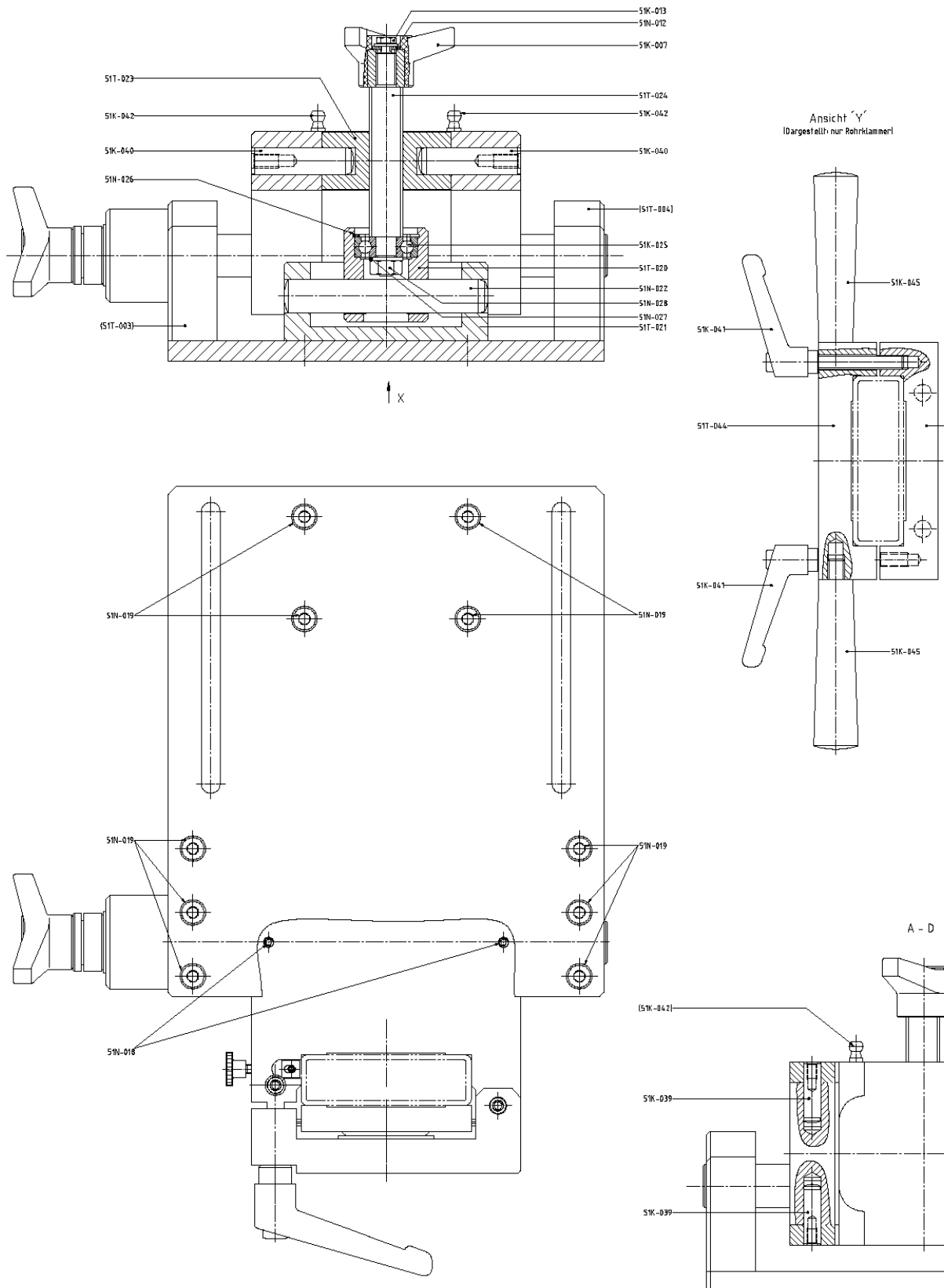
FIGURE A-14. 470-42S-N01-00 TYP 25

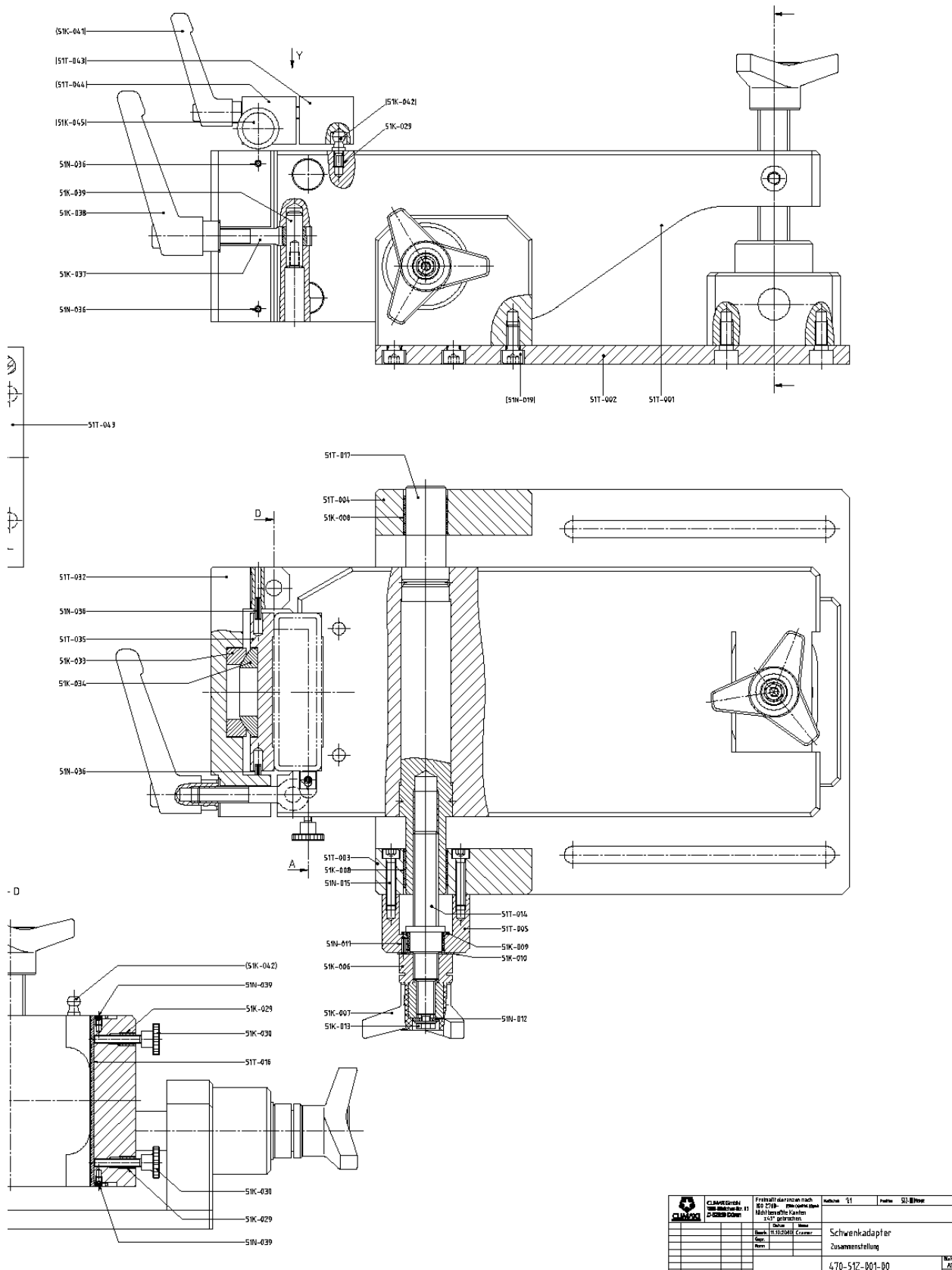
<b>Stkliste / Part list #:</b>		<b>170 - 40 S - N01 - 00</b>	<b>Datum / Date:</b>	<b>20.09.1999</b>
<b>Ersteller / Creator:</b>		<b>Werheid</b>		
<b>Zeichnung / Cross section #:</b>				
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #	Benennung Description	
001	1	170 - 40 T - 001	Kugelkupplung 25	
002	1	170 - 40 T - 002	Klemmstück	
003	1	170 - 40 N - 003	Senkschraube DIN7991-M6x30-8.8-Zn	
004	1	170 - 40 N - 004	Gewindestift DIN914-M6x10-45H	

FIGURE A-15. 170-40S-N01-00

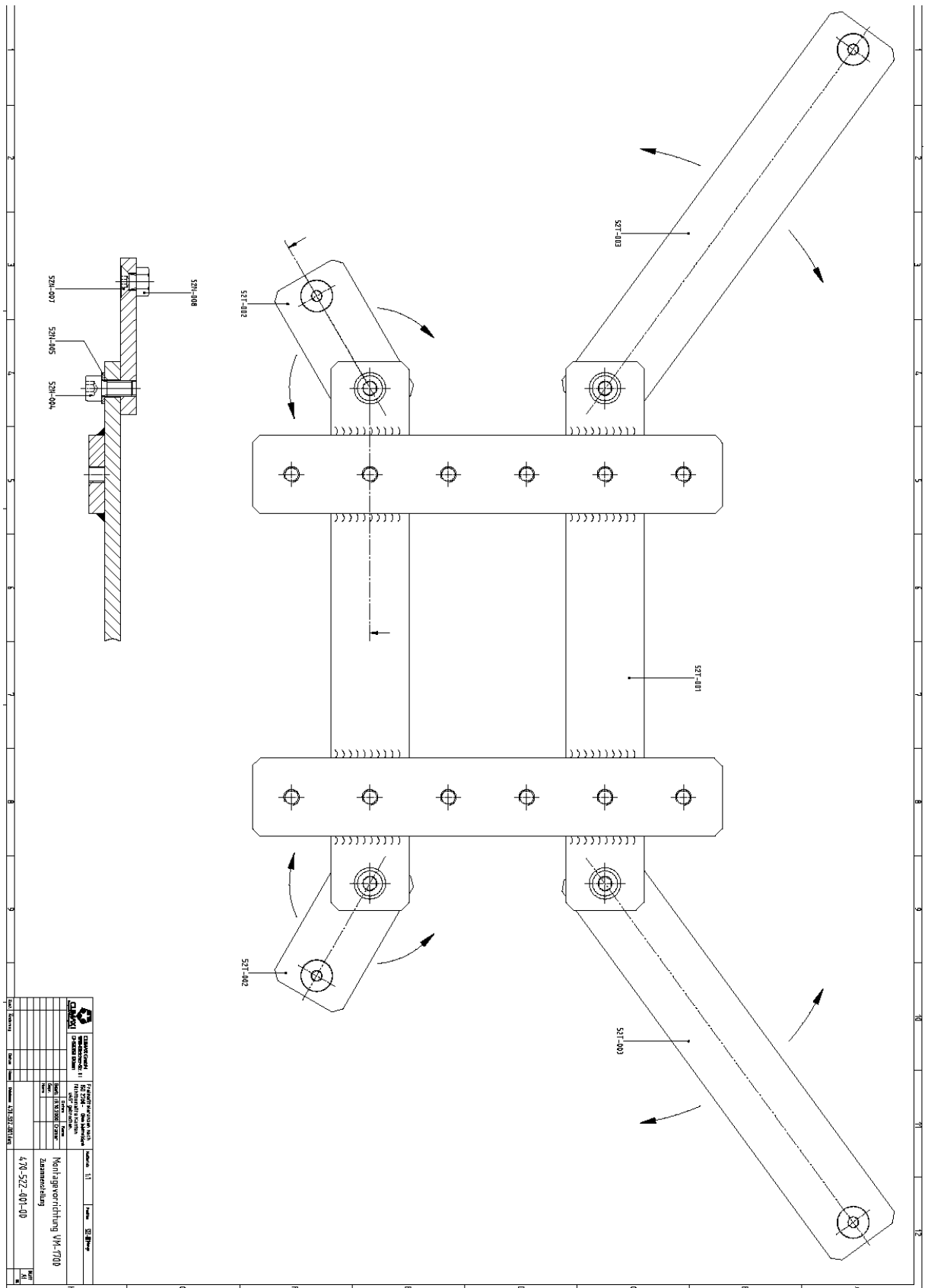
# Mounting system







	CLAAS Group 470-512-001-00	Freistellgerätschaft nach BS 2788 - 1900000000 Multi-Service System 24/7 gerätschaft	Methode 01	Partno: 51.0100
	Baujahr: 1900000000 Gepr.: Rev.:	Schwenkadapter Zusammenstellung		
			470-512-001-00	NG1 AB



100% Recycled Paper 100% Recycled Paper 100% Recycled Paper	100% Recycled Paper 100% Recycled Paper 100% Recycled Paper
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100% Recycled Paper 100% Recycled Paper 100% Recycled Paper	100% Recycled Paper 100% Recycled Paper 100% Recycled Paper

Stkliste / Part list #:				470 - 50 S - N01 - 00				Datum / Date: 17.07.1999			
Ersteller / Creator:				Werheid							
Zeichnungszusammenstellung(en):						470-00Z-001-00					
Pos.	Menge	Stücklisten-, Teile #				Benennung					
Item	Qantity	Assy or Part #				Description					
S	1	470 - 51 S - N01				Schwenkadapter					
S	1	470 - 52 S - N01				Flanschbefestigung					

FIGURE A-16. 470-50S-N01-00 MOUNTING SYSTEM




Stkliste / Part list #:		470 - 51 S - N01 - 00			Datum / Date: 17.07.1999	
Ersteller / Creator:		Werheid				
Zeichnungszusammenstellung(en):		470-00Z-001-00				
Pos. Item	Menge Qty	Stücklisten-, Teile # Assy or Part #			Benennung Description	
L01	1	470 - 51 S -	L01	Adapter BG [Pos. 1 - 40 , Pos. 42]		
L02		470 - 51 S -	L02	Rohrklammer BG [Pos. 41, 43, 44, 45]		
001	1	470 - 51 T -	001	Schwenkkörper		
002	1	470 - 51 T -	002	Grundplatte		
003	1	470 - 51 T -	003	Lagerbock		
004	1	470 - 51 T -	004	Lagerbock 2		
005	1	470 - 51 T -	005	Gehäuse für Seitenverstellung		
006	2	470 - 51 K -	006	Spieth Stellmutter MSR 16 x 1,5		
007	2	470 - 51 K -	007	Dreisterngriff GN 5330-80-M12-D		
008	2	470 - 51 K -	008	Gleitbuchse 2525 DU		
009	1	470 - 51 K -	009	Bundbuchse BB 2012 DU		
010	1	470 - 51 K -	010	Anlaufscheibe WC 18 DU		
011	1	470 - 51 N -	011	Spannstift 3 x 10		
012	2	470 - 51 N -	012	U-Scheibe 6,4		
013	2	470 - 51 K -	013	Selbstsichernde Mutter Serpress M6		
014	1	470 - 51 T -	014	Spindel Seitenverstellung		
015	4	470 - 51 N -	015	Innensechskantschraube M6x30-8.8-Zn		
016	1	470 - 51 T -	016	Andrückblech		
017	1	470 - 51 T -	017	Schwenkachse		
018	2	470 - 51 N -	018	Gewindestift M6x10		
019	10	470 - 51 N -	019	Innensechskantschraube M8x16-8.8-Zn		
020	1	470 - 51 T -	020	Lagerbüchse		
021	1	470 - 51 T -	021	Lagerbock hinten		
022	1	470 - 51 N -	022	Paßstift 20m6x120		
023	1	470 - 51 T -	023	Gewindeklotz		
024	1	470 - 51 T -	024	Verstellspindel hinten		
025	1	470 - 51 K -	025	RiKuLa 6301-2RS1		
026	1	470 - 51 N -	026	Sicherungsring Bohrung 37x1,5		
027	1	470 - 51 N -	027	U-Scheibe 10,5		
028	1	470 - 51 N -	028	Sechskantmutter M10		
029	4	470 - 51 K -	029	Keen Sert M5/M8		
030	2	470 - 51 K -	030	Hohe Rändelschraube M5-30		
031	1	470 - 51 N -	031	Gewindestift M4x6		
032	1	470 - 51 T -	032	Klappe		
033	1	470 - 51 K -	033	Kugelpfanne Form D (35x56)		
034	1	470 - 51 K -	034	Kugelscheibe Form C (31x56)		
035	1	470 - 51 T -	035	Druckplatte		
036	4	470 - 51 N -	036	Spannstift 4x16		
037	1	470 - 51 C -	037	Augenschraube B-M10x60-8.8		
038	1	470 - 51 K -	038	Verstellbarer Klemmhebel GN 300-92-M10-SW		
039	3	470 - 51 K -	039	Zylinderstift mit Innengewinde 10x36		
040	2	470 - 51 K -	040	Zylinderstift mit Innengewinde 16x60		
041	2	470 - 51 K -	041	Verstellbarer Klemmhebel GN 300-63-M8-50-SW		
042	2	470 - 51 K -	042	Kugelzapfen für Winkelgelenke		
043	1	470 - 51 T -	043	Klammer Unterteil		
044	1	470 - 51 T -	044	Klammer Oberteil		
045	1	470 - 51 T -	045	Lasche		
046	2	470 - 51 K -	046	Fester Konusgriff GN 203-26-M10		

FIGURE A-17. 470-51S-N01-00 TILTING ADAPTER

Stkliste / Part list #:		470 - 52 S - N01 - 00	Datum / Date: 17.07.1999	
Ersteller / Creator:		Werheid		
Zeichnungszusammenstellung(en):		470-00Z-001-00		
Pos. Item	Menge Quantity	Stücklisten-, Teile # Assy or Part #	Benennung Description	
001	1	470 - 52 T - 001	Montageplatte	
002	2	470 - 52 T - 002	Lasche 100	
003	2	470 - 52 T - 003	Lasche 300	
004	8	470 - 52 N - 004	Innensechskantschraube M 10x20-8.8-Zn	
005	8	470 - 52 N - 005	U-Scheibe 10,5	
006	4	470 - 52 K - 006	C-Schraubzwinde VC 6	
007	4	470 - 52 N - 007	Senkschraube M10x16-8.8-Zn	
008	4	470 - 52 N - 008	Sechskantmutter M10	

FIGURE A-18. 470-52S-N01-00 FLANGE SETUP

## Tooling

<b>List of Abrasives / Schleifmittelliste (05/2003)</b>				
<i>Diameter</i> <i>Durchmesser</i> [mm]	<i>Part Number / Artikelnummer</i>			
	<i>Grain / Körnung</i>			
	100 or/bzw. 80	500	1000	
<b>Quantity 25 Pieces / Stückzahl 25</b>				
20	-	140-22C-001	140-32C-001	
25	-	140-22C-002	140-32C-002	
30/0 *	140-12C-003	140-22C-003	140-32C-003	
30	-	140-22C-004	140-32C-004	
35	-	140-22C-005	140-32C-005	
40	-	140-22C-006	140-32C-006	
45	-	140-22C-007	140-32C-007	
50/0 *	140-12C-020	140-22C-020	140-32C-020	
50	140-12C-008	140-22C-008	140-32C-008	
55	140-12C-009	140-22C-009	140-32C-009	
60	-	140-22C-010	140-32C-010	
65	140-12C-011	140-22C-011	140-32C-011	
73	140-12C-012	140-22C-012	140-32C-012	
80/0 *	140-12C-021	140-22C-021	140-32C-021	
80	140-12C-013	140-22C-013	140-32C-013	
85	140-12C-014	140-22C-014	140-32C-014	
90	140-12C-015	140-22C-015	140-32C-015	
100	140-12C-016	140-22C-016	140-32C-016	
105	140-12C-017	140-22C-017	140-32C-017	
110	140-12C-018	140-22C-018	140-32C-018	
120	140-12C-019	140-22C-019	140-32C-019	
<b>Quantity 50 Pieces / Stückzahl 50</b>				
73	-	140-23C-012	140-33C-012	
80	-	140-23C-013	140-33C-013	
85	-	140-23C-014	140-33C-014	
90	-	140-23C-015	140-33C-015	
100	-	140-23C-016	140-33C-016	
105	-	140-23C-017	140-33C-017	
110	-	140-23C-018	140-33C-018	
120	-	140-23C-019	140-33C-019	
Segment S1/95	140-15C-001	140-25C-001	140-35C-001	
Segment S2/115	140-15C-002	140-25C-002	140-35C-002	
Segment S3/165	140-15C-003	140-25C-003	140-35C-003	
Segment S4/270	140-15C-004	140-25C-004	140-35C-004	
<b>Quantity 100 Pieces / Stückzahl 100</b>				
20	140-14C-001	140-24C-001	140-34C-001	
25	140-14C-002	140-24C-002	140-34C-002	
30/0 *	140-14C-003	140-24C-003	140-34C-003	
30	140-14C-004	140-24C-004	140-34C-004	
35	140-14C-005	140-24C-005	140-34C-005	
40	140-14C-006	140-24C-006	140-34C-006	
45	140-14C-007	140-24C-007	140-34C-007	
50/0 *	140-14C-020	140-24C-020	140-34C-020	
50	140-14C-008	140-24C-008	140-34C-008	
55	140-14C-009	140-24C-009	140-34C-009	
60	140-14C-010	140-24C-010	140-34C-010	
65	140-14C-011	140-24C-011	140-34C-011	
80/0 *	140-14C-021	140-24C-021	140-34C-021	
80	140-14C-013	140-24C-013	-	
<b>CBN Grinding Discs / CBN Schleifscheiben</b>				
50 **	110-33S-N01	( Grain B252 / Körnung B252 )		
80 **	110-34S-N01	( Grain B252 / Körnung B252 )		
<b>Lapping Discs / Läppscheiben</b>				
30 **	110-41S-N01	( CastIron / Gussscheiben )		
50 **	110-42S-N01	( CastIron / Gussscheiben )		
80 **	110-43S-N01	( CastIron / Gussscheiben )		

\* For planet grinding wheels only / Nur für Planetenschleifscheiben  
 \*\* One set can consist of 3, 5 or 7 pieces so you have to order the relevant quantity  
 Ein Satz kann aus 3, 5 oder 7 Stück bestehen, deshalb bestellen Sie die benötigte Anzahl

FIGURE A-19. LIST OF ABRASIVES

Stkliste / Part list #:		470 - 70 S - N01 - 00	Datum / Date: 17.07.1999
Ersteller / Creator:		Werheid	
Zeichnungszusammenstellung(en):		470-00Z-001-00	
Pos. / Item	Menge / Quantity	Stücklisten-, Teile # / Assy or Part #	Benennung / Description
S	1	470 - 71 S - N01	Planetenschleifscheiben DN 200 ... DN 500
S	1	470 - 72 S - N01	Planetenschleifscheiben DN 500 ... DN 700
S	1	470 - 73 S - N01	Erweiterung DN 700 ... DN 1000
S	1	470 - 74 S - N01	Erweiterung Läppen DN 200 ... DN 700
S	1	470 - 75 S - N01	Erweiterung Läppen DN 700 ... DN 1000
S	1	470 - 76 S - N01	Erweiterung von DN1000 auf DN1200
S	1	470 - 77 S - N01	Erweiterung DN80 - DN200
S	1	470 - 78 S - N01	Erweiterung auf von DN1000 auf DN1400

FIGURE A-20. 470-70S-N01-00 TOOLING

Stückliste Nr.: **470 - 71 S - N01 - 00**

Erstelldatum: 21.09.2000

Ersteller: Werheid

Zeichnungszusammenstellung(en): 470-00Z-001-00

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
S	5		110 - 22 S - N01	Arm II
S	5		110 - 23 S - N01	Arm III
S	5		110 - 31 S - N01	Vorsatzscheiben Schleifen konventionell 50
S	5		110 - 32 S - N01	Vorsatzscheiben Schleifen konventionell 80
S	5		110 - 33 S - N01	Vorsatzscheiben Schleifen CBN 50
001	1	x	470 - 71 T - 001	Planetenscheibe, D=220
002	1	x	470 - 71 T - 002	Planetenscheibe, D=380

FIGURE A-21. 470-71S-N01-00 PLANET WHEELS DN 200 ... DN 500

Stückliste Nr.: 470 - 72 S - N01 - 00

Erstelldatum: 21.09.2000

Ersteller: Werheid

Zeichnungszusammenstellung(en): 470-00Z-001-00

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
S	5		120 - 21 S - N01	Planetenarm X
001	1	x	470 - 72 T - 001	Planetenscheibe D=540 groß
002	1	x	470 - 72 T - 002	Zentrierbuchse

FIGURE A-22. 470-72S-N01-00 PLANET WHEELS DN 500 ... DN 700

Stückliste Nr.: 470 - 76 S - N01 - 00

Erstelldatum: 21.09.2000

Ersteller: Werheid

Zeichnungszusammenstellung(en): 470-00Z-001-00

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
001	7		120 - 22 S - N01	Planetarm XI

FIGURE A-23. 470-76S-N01-00 EXTENSION FROM DN1000 TO DN1200





**Stückliste Nr.: 470 - 80 S - N01 - 00**

**Erstelldatum: 21.09.2000**

**Ersteller: Werheid**

**Zeichnungszusammenstellung(en): 470-00Z-001-00**

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
S	1		240 - 81 S - N01	Schleifmittel Planetenscheiben (d=30, d=50)
S	1		240 - 84 S - N01	Schleifmittel Planetenscheiben (d=80)
S	1		240 - 83 S - N01	Läppmittel

FIGURE A-25. 470-80S-N01-00 ABRASIVES

Stückliste Nr.: 240 - 81 S - N01 - 00

Erstelldatum: 01.06.1999

Ersteller: Werheid

Zeichnungszusammenstellung(en): \_\_\_\_\_

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
001	2		240 - 81 C - 001	Schleifmittel D50/20 K100 / 100St
002	1		240 - 81 C - 002	Schleifmittel D50/20 K500 / 100St
003	2		240 - 81 C - 003	Schleifmittel D30/0 K100 / 100St
004	1		240 - 81 C - 004	Schleifmittel D30/0 K500 / 100 ST

FIGURE A-26. 240-81S-N01-00 ABRASIVES VM 2350

Stückliste Nr.: 240 - 84 S - N01 - 00

Erstelldatum: 01.06.1999

Ersteller: Werheid

Zeichnungszusammenstellung(en): \_\_\_\_\_

Pos.	Menge Anz.	Mehr- ver- wend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung
001	2		240 - 84 C - 001	Schleifmittel D80/0 K100 / 100St
002	1		240 - 84 C - 002	Schleifmittel D80/0 K500 / 100St

FIGURE A-27. 240-84S-N01-00 ABRASIVES VM 2500

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 **CLIMAX**

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 **BORTECH**  **CALDER** **H&S** **TOOL**