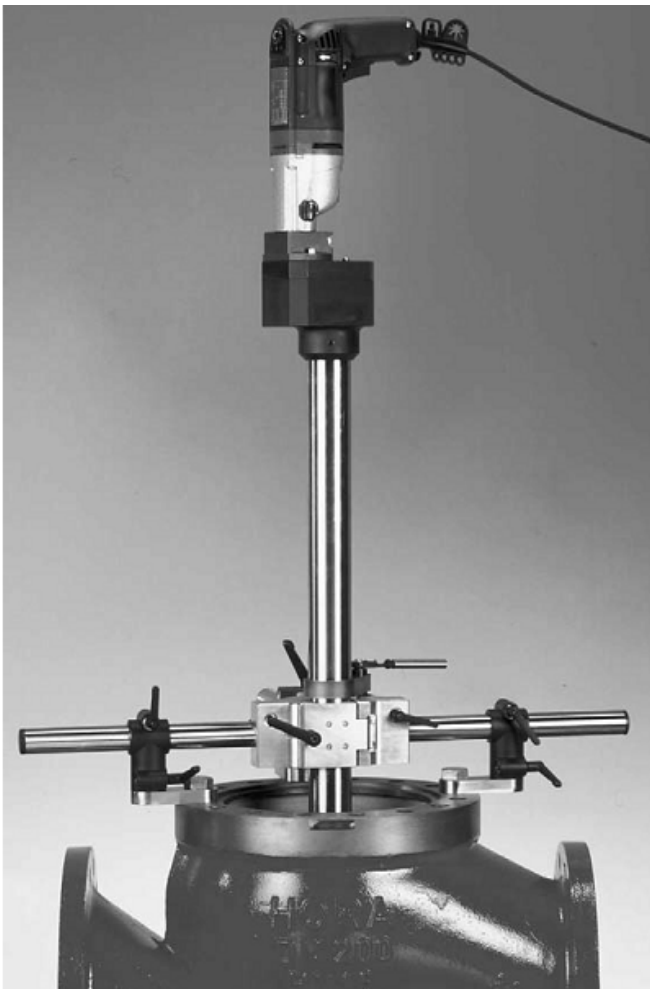
CE

VM2350-2500-2600S,C

GLOBE VALVE GRINDING AND LAPPING MACHINE

OPERATING MANUAL

ORIGINAL INSTRUCTIONS



CLIMAX
Portable Machining & Welding Systems

P/N 89817
May 2017
Revision 1

CLIMAX | BORTECH CALDER H&S TOOL

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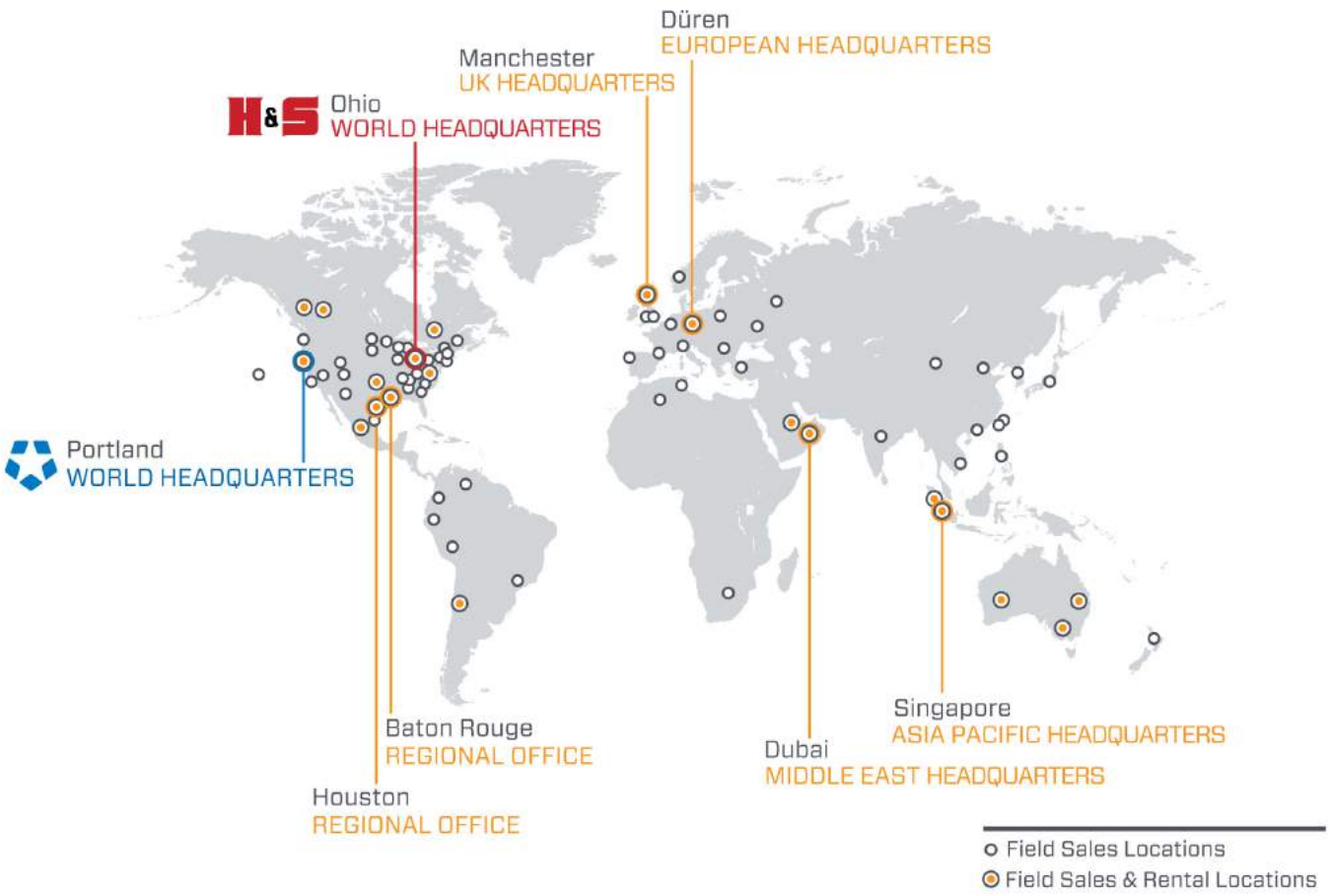

CE DOCUMENTATION

1.4 CE-Declaration of Conformity

according to Machinery Directive 2006/42/EG, Appendix IIA

The manufacturer:	**CLIMAX GmbH** **Am Langen Graben 8** **D-52353 Düren / Germany**
hereby declares that the machine described below:	**Gate Valve Grinding Machine** **Modell VM 2350(S), VM2500(S), VM2600(S)** **Maschine-No.: 240-1032**
year of construction:	**2010**

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

- Machine directive 2006/42/EG
- Low voltage directive 2006/95/EG
- Directive for electromagnetic compatibility 2004/108/EG

Harmonised standards used

DIN EN 792-8:2001+A1:2008	Hand-held non electric power tools - Safety requirements – Part 8: Sanders and Polishers
DIN EN ISO 14121-1	Safety of Machinery – Risk assessment – Part 1: Principles
DIN EN 349:1993+A1:2008	Minimum distance to avoid squeezing of body sections

Person that provides the data:

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Düren, 20.03.2009

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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.

CLIMAX warrants that all parts are free from defects in materials and workmanship, and that all labor has been performed properly. This warranty is available to the customer purchasing parts or labor for a period of 90 days after delivery of the part or repaired machine or 180 days on used machines and components. If the customer purchasing parts or labor finds any defect in materials or workmanship within the warranty period, the purchaser should contact its factory representative and return the part or repaired machine, shipping pre-paid, to the factory. CLIMAX will, at its option, either repair or replace the defective part and/ or correct any defect in the labor performed, both at no charge, and return the part or repaired machine shipping prepaid.

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

All other warranties, express or implied, including without limitation the warranties of merchantability and fitness for a particular purpose are disclaimed and excluded.

Terms of sale

Be sure to review the terms of sale which appear on the reverse side of your invoice. These terms control and limit your rights with respect to the goods purchased from CLIMAX.

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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1.2 Safety alerts - - - 1
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1.1 How to use this manual

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the VM2350-2500-2600S,C.

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 VM2350-2500-2600S,C 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[1]:

DANGER

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

WARNING

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.

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.

1.5 RISK ASSESSMENT AND HAZARD MITIGATION

The Globe Valve Grinder 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 Globe Valve Grinder is only used as prescribed (cf. chapter "Product Description")
- the Globe 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 Globe 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 Globe 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 1-1. RISK ASSESSMENT CHECKLIST BEFORE SET-UP

	Before set-up
☐	I took note of all the warning labels on the machine.
☐	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
☐	I considered the need for personnel safety guarding and installed any necessary guards.
☐	I read the machine assembly instructions (Section 3).
☐	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.
☐	I located the fall paths involved in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall path.
☐	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

TABLE 1-2. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After set-up
☐	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.
☐	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
☐	I planned for containment of any chips or swarf produced by the machine.
☐	I followed the required maintenance checklist (Section 5.1).
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
☐	I checked that all affected personnel understand and are clear of the danger zone.
☐	I evaluated and mitigated any other potential risks specific to my work area.

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2 OVERVIEW

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2.4 SPECIFICATIONS - - - - 11
2.5 ITEMS REQUIRED BUT NOT SUPPLIED - - - - 12

2.1 FEATURES AND COMPONENTS

The globe valve grinding and lapping machine (in the following called Globe Valve Grinder) is specifically designed for grinding and lapping of globe valve seats, size DN 80 – DN 600, with different optional equipment.

The specifications in Section 2.2 on page 10 and all other technical data must be met. In addition, the safety, operating, and maintenance instructions in Section 1, Section 4, and Section 5 must be met to ensure a safe operation of the Globe 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's 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.

⚠ CAUTION

The Globe Valve Grinder is only to be used as prescribed. If the Globe Valve Grinder is not used accordingly, a safe operation is not guaranteed.
Any danger to the life and health of people and all damage to the Globe Valve Grinder resulting from use not as prescribed will be customer's responsibility.
Any modifications of the Globe 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 Globe Valve Grinder.

Principle components are shown in and identified in :

TABLE 2-1. COMPONENTS

Position	Component
1	Drive Motor
2	Gear
3	Machine arm
4	Drive shaft with ball joint (not shown)
5	Tools (grinding and lapping tools) (not shown)
6	Universal clamping device

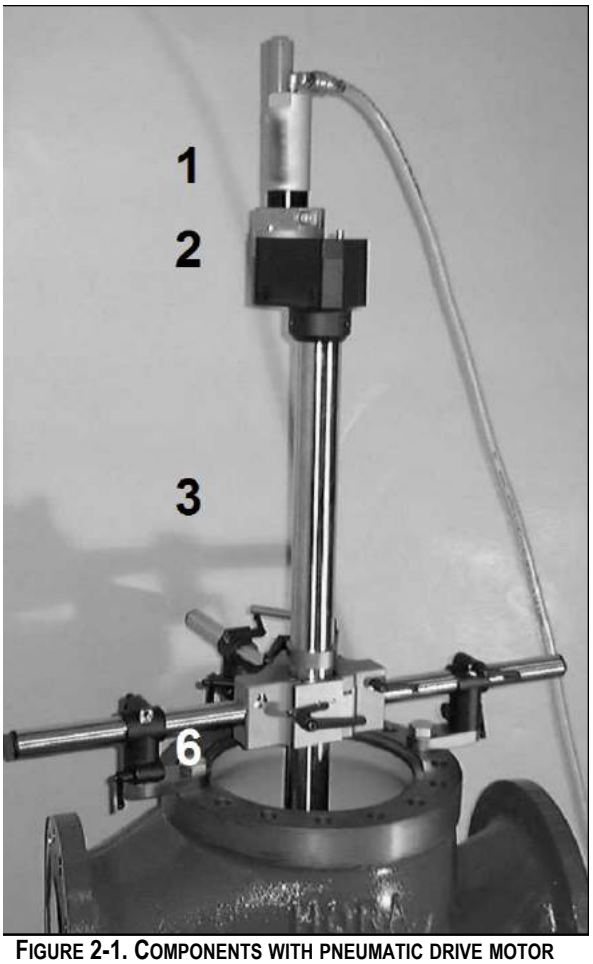

FIGURE 2-1. COMPONENTS WITH PNEUMATIC DRIVE MOTOR

The Globe 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 drive flange with clamping screw. Therefore, depending on the application, the Globe 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 rotating. The tools are adapted to the machine spindle by means of a self-aligning coupling with ball joint. This ensures that the tools are automatically aligned during machine operation.

An indicator for the grinding pressure is integrated in the upper gear housing.

Planet grinding and lapping wheels (in the following called planet grinding wheels) are used as tools.

The planet grinding wheels consist of:

- a coupling with 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 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 one screw quick clamping system.

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 Globe Valve Grinder has to be mounted to the globe valve body by means of an universal clamping device (included in basic scope of supply). With this clamping device, 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 universal clamping device.

A 3-jaw-centring-chuck is available as an option.

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 Globe Valve Grinder and accessories are delivered in high-quality, durable carrying cases with foam inlet for safe transportation and storage.

2.2 SPECIFICATIONS

TABLE 2-2. SUB-COMPONENT MASS

Unit	Specification
Machining Data	
Machining range VM2350	DN80 – DN350
Machining range VM2500	DN80 – DN500
Machining range VM2600	DN80 – DN600
Submerging depth VM2350	600 mm
Submerging depth VM2500, VM2600	800 mm
Maximum speed (electric / pneumatic)	700 U/min / 190 U/min
Power requirements	
Connection (electric/pneumatic)	230 V – 50 Hz / 12 l/s – 6.3 bar
Drive power (electric/pneumatic)	685 W (at 1010 W P_{auf})/ 550 W
Weights	
Basic machine without tools	13 kg
Weight of machine case	35 kg
Weight of accessory case VM2350	19 kg
Weight of accessory case VM2500	32 kg
Weight of accessory case VM2600	45 kg

⚠ CAUTION

Before using the Globe Valve Grinder make sure that the data of the power source match the values given above.

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

3 SETUP

IN THIS CHAPTER:

3.1 Receipt and inspection - 13
3.2 Lifting and rigging - 15
3.3 Machine assembly - 16
3.4 Machine configuration - 17

This section describes the setup and assembly procedures for the VM2350-2500-2600S,C globe 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 high-quality, durable carrying cases with foam inlet for safe transportation and storage (see Figure 3-1 on page 12 and Figure 3-2 on page 13).

To avoid that the machine arrives on site in incomplete condition, the cases should always be checked prior to transportation. It is very important 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.

FIGURE 3-1. MACHINE CASE INCLUDING ELECTRIC AND PNEUMATIC DRIVE WITH MAINTENANCE UNIT (VM2350 OPTIONS SHOWN

)

FIGURE 3-2. ACCESSORY CASE WITH UNIVERSAL CLAMPING DEVICE (HERE VM2350)

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4 OPERATION

IN THIS CHAPTER:

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4.2 Operation modes - - - 15
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4.3.1 Start the machine - - - 15
4.3.2 Stop the machine - - - 15
4.3.3 Adjust the machine settings - - - 15

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 Selection of tools and preparation

For all screws being used as connecting elements, the following max. 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

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

⚠ 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.

4.2.1 Selection of tools

Select 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 4.1.1.1:

- Planet wheel of applicable size
- Planet arms of applicable size
- Grinding discs (no need if spindle diameter 30 mm 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, steel)
- 5 pcs. CBN-grinding discs, diameter 50 mm (detectable by CBN-coating)
- 5 pcs. lapping discs, diameter 30 mm (5 mm thick, cast iron)
- 5 pcs. lapping discs, diameter 50 mm (5 mm thick, cast iron)

Additionally for the VM 2500 and VM2600:

- 5 pcs. grinding discs, diameter 80 mm (6 mm thick, steel)
- 5 pcs. lapping discs, diameter 80 mm (6 mm thick, cast iron)

For machines with the additional "…S" (only grinding) there are no lapping disks included in the scope of supply.

⚠ 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 4-1. MAXIMUM MACHINING DIAMETERS FOR PLANET WHEELS DN 80–DN 600

Planet arms [Typ]	Grinding discs [mm]	Diameter of planet wheel [mm]							
		100		135		220		380 (VM2500 and VM2600)	
		min	max	min	max	min	max	min	max
I length 30 mm	30	*101*	*136*	*136*	*172*				
	50	*121*	*156*	*156*	*192*				
II length 60 mm	30			*192*	*222*	*220*	*310*	*380*	*460*
	50			*212*	*242*	*240*	*330*	*380*	*480*
	80			*242*	*272*	*270*	*360*	*380*	*510*
III length 115 mm	30					*330*	*400*	*410*	*550*
	50					*350*	*400*	*430*	*550*
	80					*380*	*400*	*450*	*550*
IV length 190 mm (VM2600 only)	50							*560*	*670*
	80							*580*	*700*

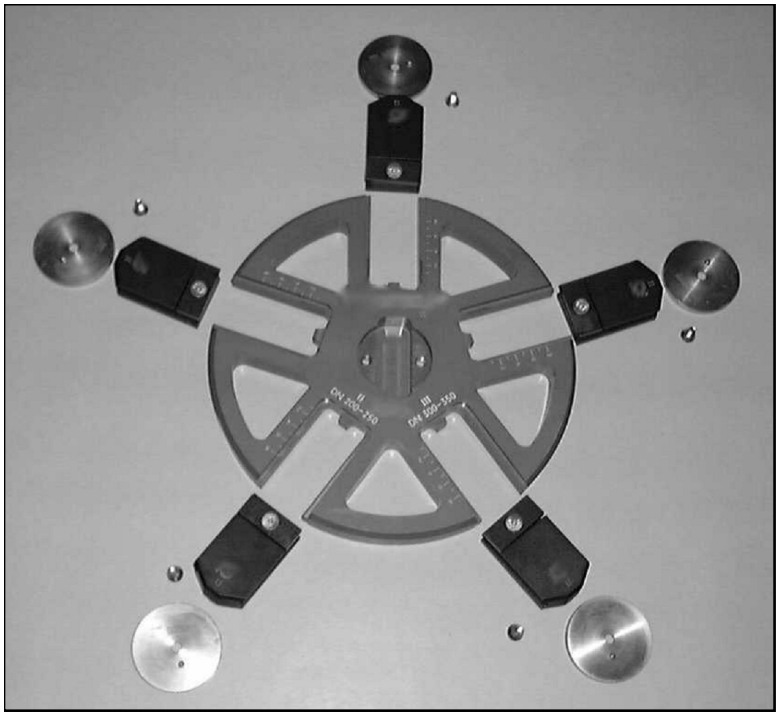

FIGURE 4-1. TOOL COMPONENTS FOR PLANET GRINDING WHEEL (AS SHOWN WITH PLANET WHEEL DIA. 220 MM, PLANET ARMS SIZE II, CBN-GRINDING DISCS DIA. 50 MM)

4.2.2 Preparation of 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 photo 4.1.2.1), 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 (planet arm Type I has 2 screws). 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.

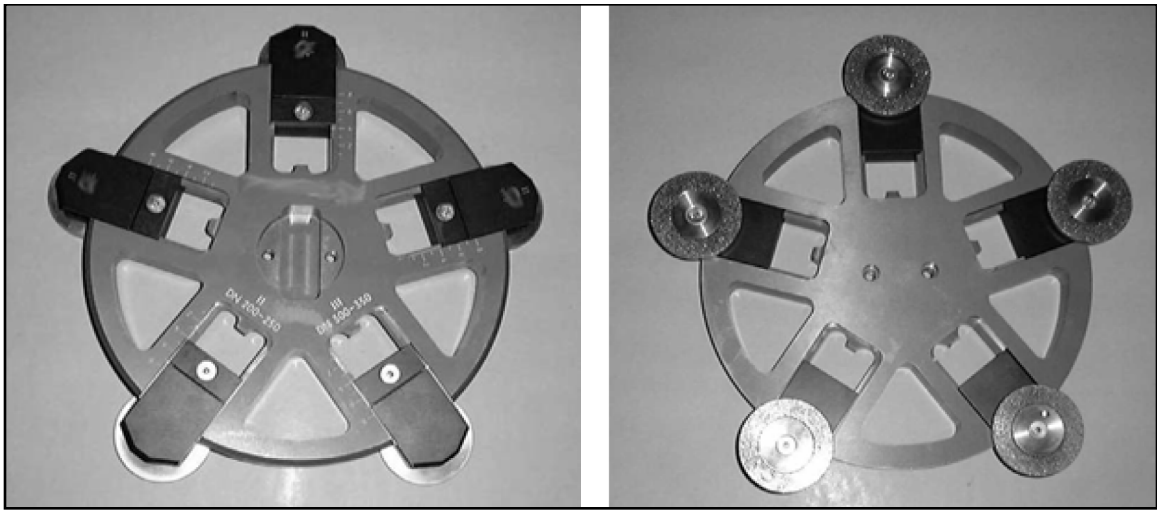

FIGURE 4-2. PLANET GRINDING WHEEL ASSEMBLED

4.3 ASSEMBLYING THE UNIVERSAL CLAMPING DEVICE

Do the following to assemble the universal clamping device with the components in the accessory case:

1. Remove the center module from the accessory case.

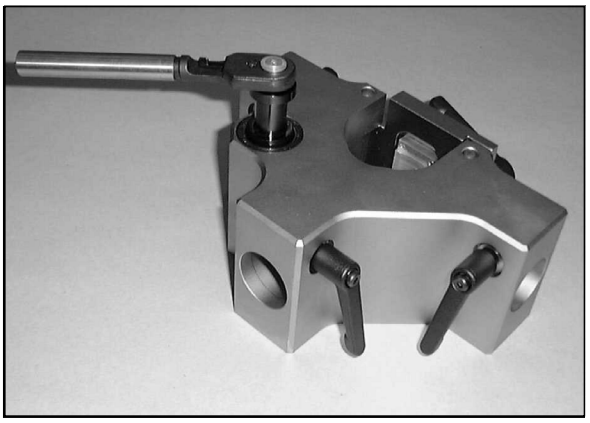

FIGURE 4-3. CENTER MODULE OF UNIVERSAL CLAMPING DEVICE

2. Put the three support pipes into the centre module (end of pipe with the white plugs). Make sure that the clamping pads in the bores are aligned. Clamp the support pipes by means of the clamping levers. The support pipes are properly installed when the remaining length is approximately 265 mm (for VM2350) and 420 mm (for VM2500 and VM2600).

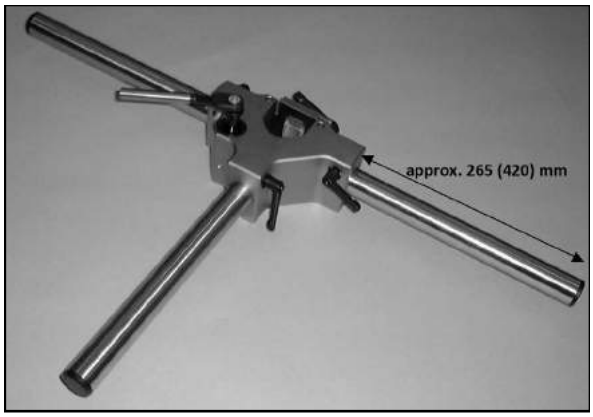

FIGURE 4-4. ASSEMBLY OF SUPPORT PIPES IN CENTRE MODULE

3. Move angular clamps onto support pipes. Locate the angular clamps according to the approximate clamping diameter. The pocket bores of the clamps are orientated downwards.

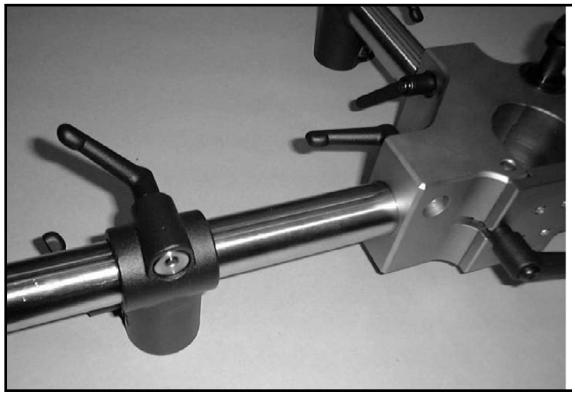

FIGURE 4-5. ASSEMBLY OF ANGULAR CLAMPS ONTO THE SUPPORT PIPES

4. The clamping shoes are located into the pocket bores of the angular clamp and locked.

FIGURE 4-6. ASSEMBLY OF CLAMPING SHOES INTO ANGULAR CLAMPS

TIP:

The clamping device can be adjusted to the valve body flange diameter by rotating the clamping shoes and moving the angular clamps. Make sure that the alignment of the clamping device is symmetric to guarantee a centricity of the machine to the valve seat.

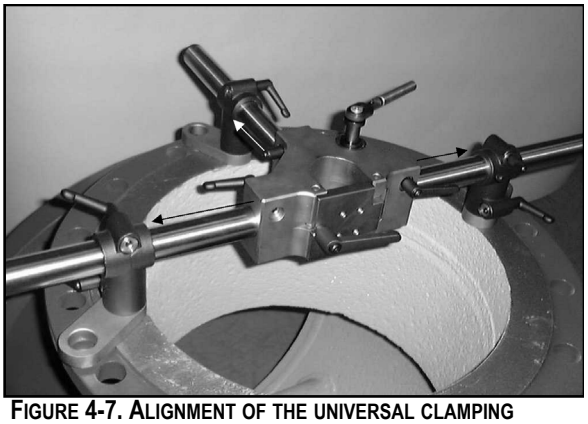

FIGURE 4-7. ALIGNMENT OF THE UNIVERSAL CLAMPING DEVICE

4.4 MOUNTING THE UNIVERSAL CLAMPING DEVICE ONTO A VALVE BODY

The mounting of the universal clamping device onto the valve body depends on the application. The different types of application are:

- Valve bodies with / without flange but with holes or threads (direct mounting)
- Valve bodies with flange (mounting with forged steel clamps)
- Valve bodies without flange (mounting with collar band system)

4.4.1 Direct mounting

For flanges with holes or threads, the universal mounting device can be bolted directly to the valve body. The clamping shoes have holes of dia. 25 mm for bolt mounting.

NOTICE

After mounting the universal clamping device to the valve body, make sure that all levers and screws are securely tightened.

FIGURE 4-8. MOUNTING OF CLAMPING SHOES WITH BOLTS

4.4.2 Mounting with clamps

The scope of supply includes three (3) forged steel clamps for flange mounting.

NOTICE

After mounting the universal clamping device to the valve body, make sure that all levers and screws are securely tightened.

FIGURE 4-9. MOUNTING OF CLAMPING SHOES BY MEANS OF FORGED STEEL CLAMPS

4.4.3 Mounting with collar and mounting system

The standard scope of supply also includes a collar band mounting system for locating the machine onto valve bodies without flange.

In this case, the collar band shafts are bolted to the clamping shoes by means of socket head screws M12 x 35 according to DIN 912 (use washers dia. 13 x 35 x 5 mm, contained in standard scope of supply).

The universal clamping device should be mounted with the collar band shafts resting onto the upper rim of the valve body.

On the bottom end of the collar band shafts, two set screws are provided to support the collar band shaft against the valve body.

FIGURE 4-10. MOUNTING OF UNIVERSAL CLAMPING DEVICE TO A VALVE BODY WITHOUT FLANGE BY MEANS OF COLLAR BAND SHAFTS (COLLAR BAND IS NOT SHOWN)

In this connection, the angular clamps should be slightly loose to ensure that the collar band shafts are resting against the valve body. After tightening the collar band, the angular clamps are securely clamped.

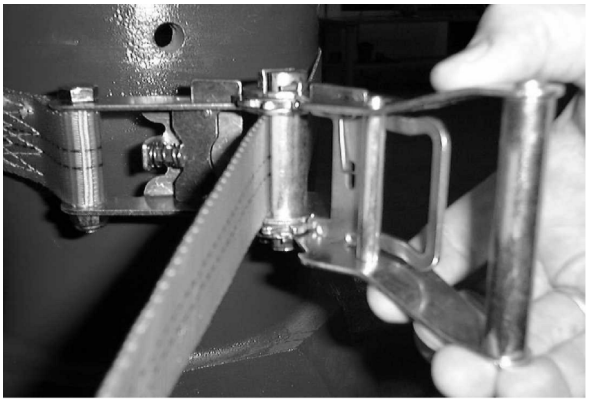

FIGURE 4-11. POSITIONING OF COLLAR BAND INTO FASTENING SYSTEM

After the band is located around the valve body and the collar band shafts, it is securely fastened. On the bottom of the collar band shafts, a raised surface is provided to avoid the collar band from slipping.

The collar band locks automatically and fixates the universal clamping device to the valve body.

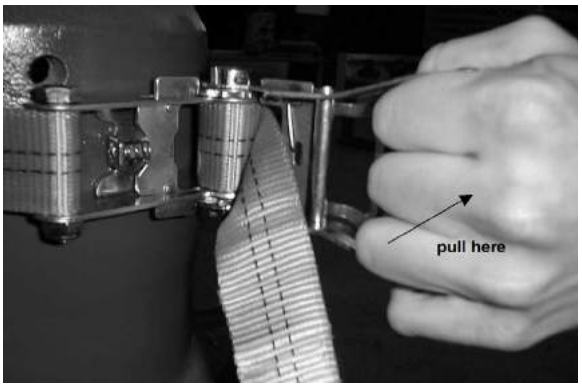

FIGURE 4-12. FASTENING OF THE COLLAR BAND

Before operation, all levers must be tightened.

After operation, the collar band mounting system can be opened by pulling the lever of the collar band lock mechanism. The collar band can easily be removed by pulling.

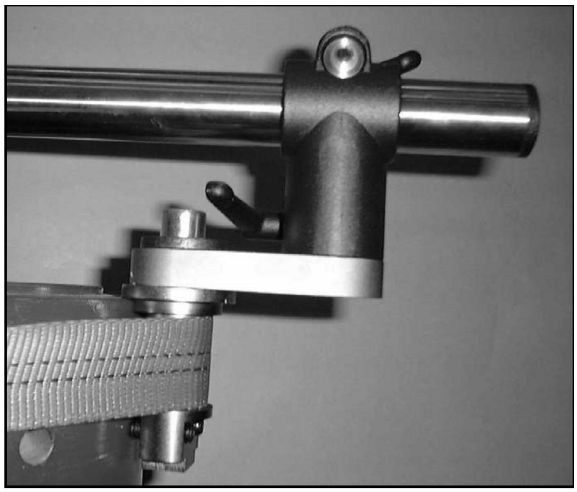

FIGURE 4-13. MOUNTING OF UNIVERSAL CLAMPING DEVICE WITH COLLAR BAND MOUNTING SYSTEM

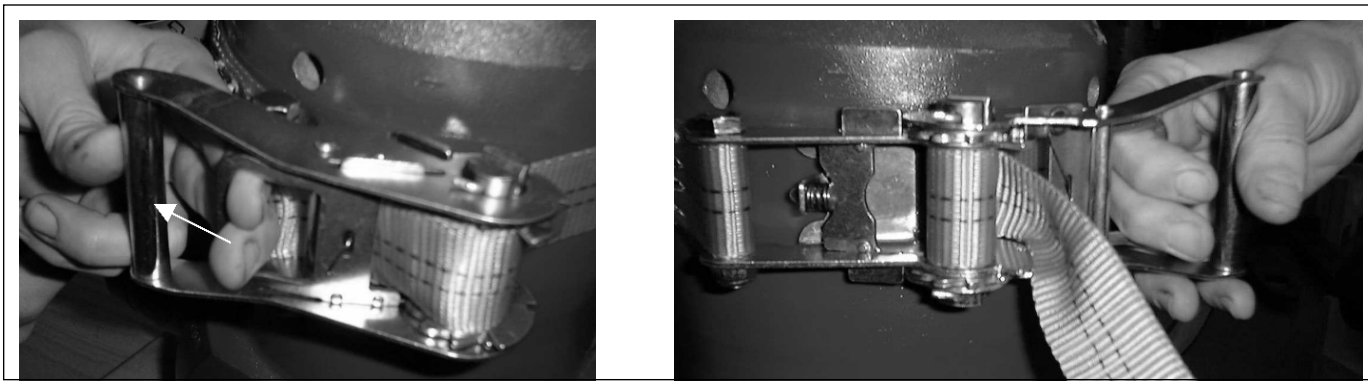

FIGURE 4-14. UNLOCKING THE COLLAR BAND

After mounting the universal clamping device to the valve body, make sure that all levers and screws are securely tightened.

4.5 PREPARING THE MACHINE

After the tooling and the universal clamping device are prepared, the machine is taken out of the case.

First of all, the bracket is mounted to the machine arm and locked according to the approximate submerging depth.

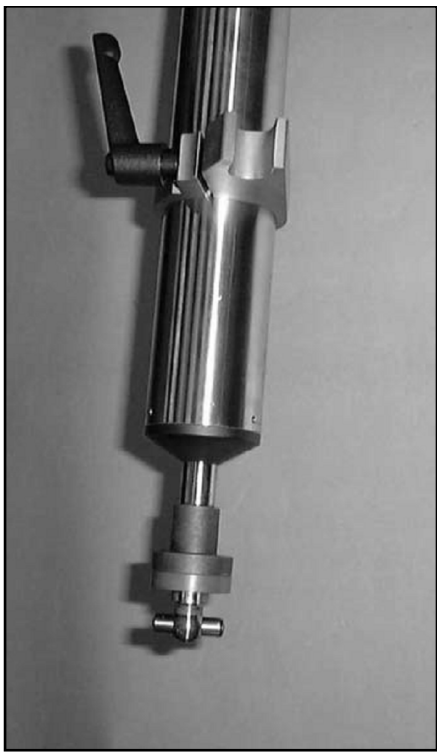

FIGURE 4-15. MOUNTING OF BRACKET

4.5.1 Adaptating the planet wheel dia. 100 mm or dia. 135 mm

Planet wheels dia. 100 mm or dia. 135 mm can directly be adapted to the machine spindle. After the set screw of the planet wheel is released (1 – 2 rotations), the planet wheel can be engaged to the ball joint of the machine spindle and the set screw can be tightened again. The planet wheel is safely adapted to the machine spindle. Prior to operation, the ball joint of the machine spindle has to be lubricated with grease (i.e. Molykote or Unimoly or similar).

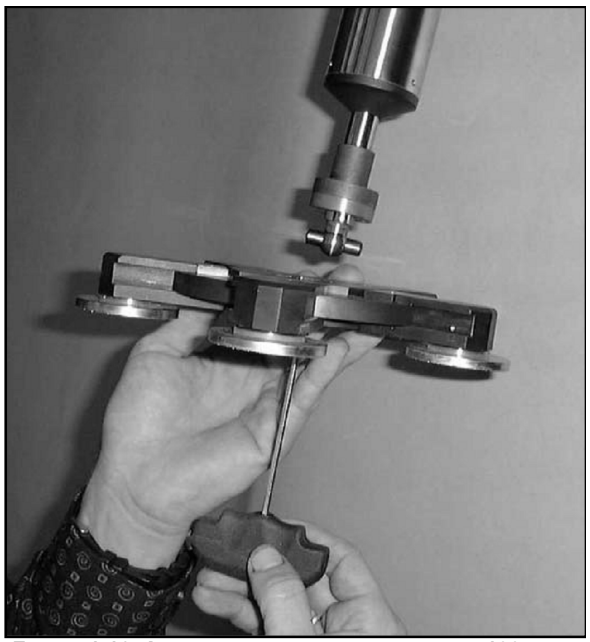

FIGURE 4-16. ADAPTATION OF PLANET WHEEL DIA. 100 MM OR DIA. 135 MM

4.5.2 Adaptation of planet wheel dia. 220 mm or bigger

In case a grinding wheel dia. 220 mm or bigger is used, a ball joint coupling has to be mounted to the machine spindle first. After the set screw of the ball joint coupling is released (1 – 2 rotations), the coupling can be engaged to the machine spindle. Prior to operation, the ball joint of the machine has to be lubricated with grease (i.e. Molykote or Unimoly or similar).

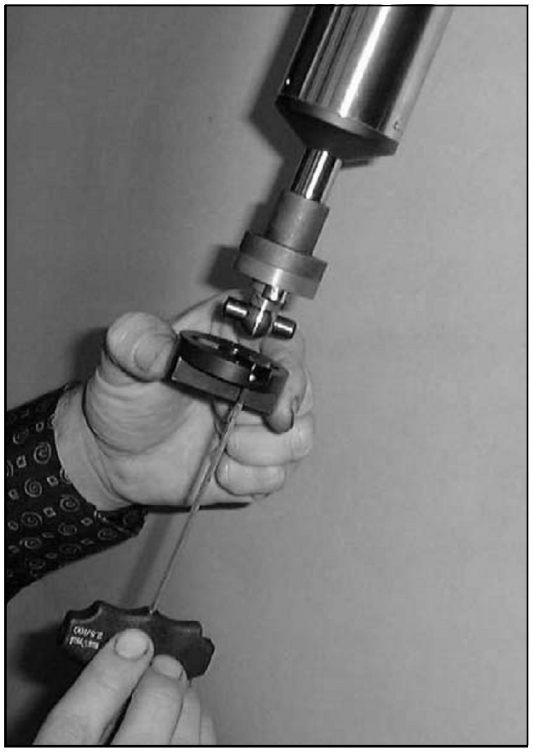

FIGURE 4-17. MOUNTING OF BALL JOINT COUPLING TO MACHINE SPINDLE

After this, the prepared planet wheel can be adapted to the ball joint coupling with two socket head screws M5 x 12 according to DIN 912.

FIGURE 4-18. ADAPTATION OF PLANET WHEEL TO BALL JOINT COUPLING

4.5.3 Locating the machine to universal clamping device

First of all, the flap of the centre module has to be opened and the in-feed device has to be adjusted into its upper position by means of its ratchet.

Then, the machine arm is located into the centre module of the universal clamping device. Be sure that the bracket will engage into the in-feed mechanism. For easy handling, unclamp the bracket as soon as it has contacted the in-feed mechanism.

⚠ CAUTION

When locating the machine into the universal clamping device, it has to be firmly held by hand to avoid slipping. The machine is secured against slipping when the bracket is clamped and located in the in- feed mechanism. In addition, the flap on the centre module has to be locked.

FIGURE 4-19. LOCATING THE MACHINE INTO THE UNIVERSAL CLAMPING DEVICE

Close the flap and lock it. The flap should not clamp the machine arm yet. While the machine arm is being held by hand the bracket can be unclamped and the machine arm can be lowered into the valve body to its working position.

Connect the machine to the power supply.

⚠ CAUTION

All cables and hoses for the machine power supply have to be covered or installed in such manner that no person can stumble.

Before connecting the machine to the power supply, check all cables and hoses for damages.

For grinding and lapping operation, always wear eye protection glasses.

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

⚠ CAUTION

Machines with pneumatic drive may not be used without maintenance unit (filter and air 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.

4.6 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.

The indicator for the grinding pressure is located on top of the upper gear housing. The relating figures are shown in Figure 4-20.

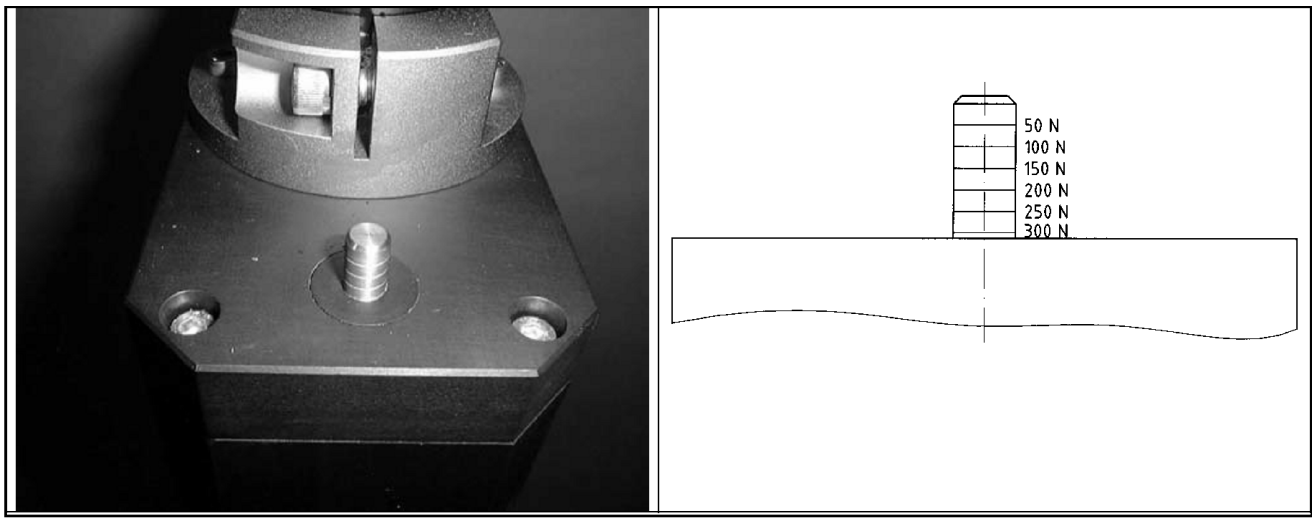

FIGURE 4-20. INDICATOR FOR GRINDING PRESSURE

Before operation, please adjust the grinding pressure according to the application. To do so, make sure that the flap of the centre module is not clamping the machine arm. The machine arm should only be guided and with the ratchet of the in-feed mechanism, the machine arm can be moved downwards to adjust the required grinding pressure. The grinding pressure is indicated on top of the upper gear housing (see 4.5.0.1.). After setting the grinding pressure, the machine arm is clamped with the flap of the centre module.

Electric drive motor

Push 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 max. 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 (max. 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 3.6.

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).

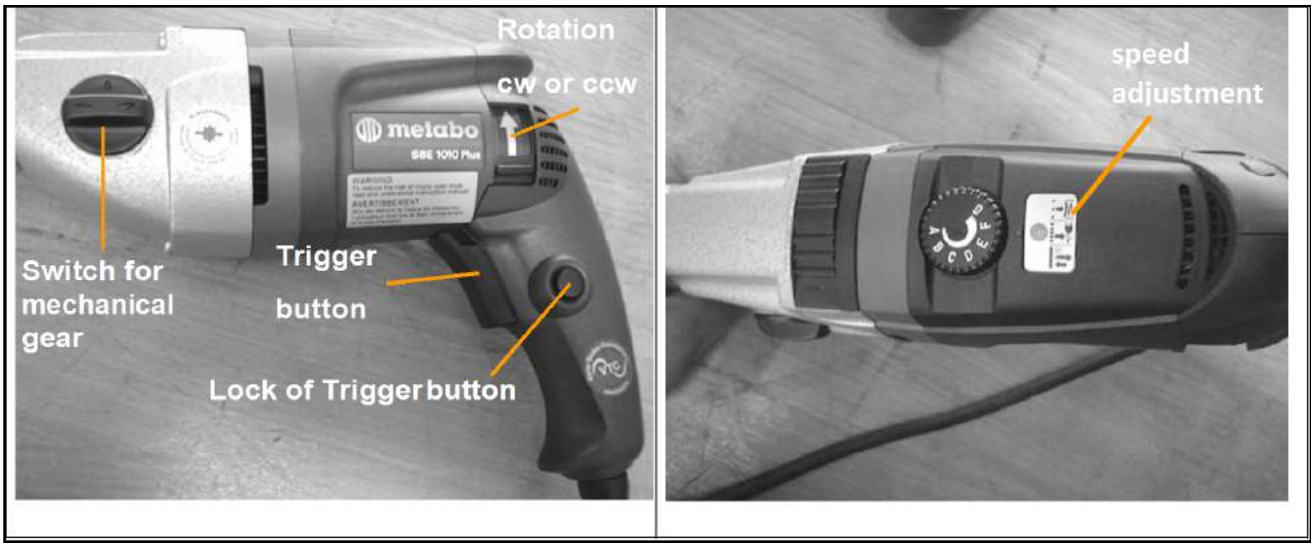

FIGURE 4-21. OPERATING BUTTONS OF ELECTRIC DRIVE MOTOR

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.

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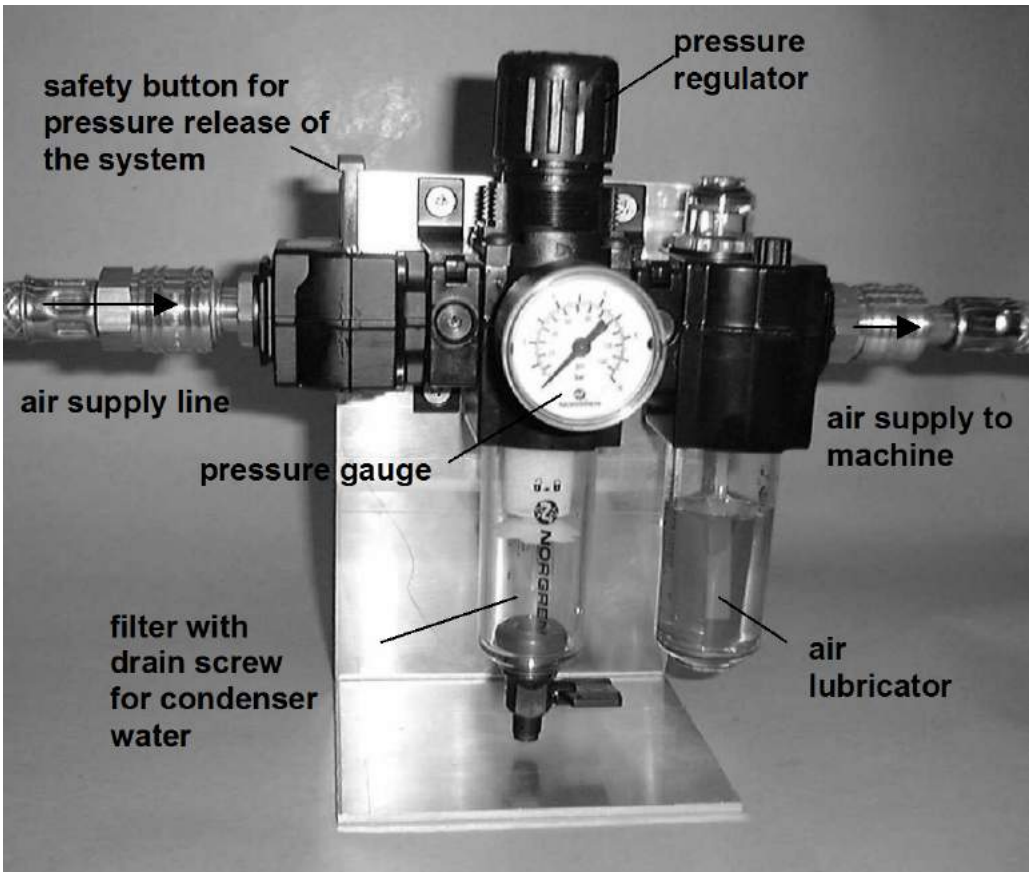


FIGURE 4-22. MAINTENANCE UNIT WITH OPERATING BUTTONS FOR PNEUMATIC DRIVE (OPTIONAL)

⚠ 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 adjustment of grinding pressure, the flap of the centre module should be slightly untied. The grinding pressure can be adjusted with the ratchet of the in-feed mechanism. The grinding pressure is indicated on top of the upper gear housing

(see 4.5.0.1). After adjustment of grinding pressure, the flap of the centre module has to be tightened again.

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, otherwise it might result into poor performance:

- Poor performance: wasted time
- Overproportional heat creation: shearing off the abrasives and damaging the valve seat

4.7 CHANGE OF ABRASIVES

- Stop the machine with trigger button (electric drive) or with red safety button on maintenance unit (pneumatic drive) and interrupt the power supply.
- Release grinding pressure. To release grinding pressure, untie the flap of the centre module and move machine arm up by using the ratchet of the in-feed mechanism until the indicator on top of the upper gear housing does not indicate any grinding pressure anymore.
- Disconnect machine from power supply
- Hold machine arm and open the flap of the centre module
- Move the machine arm to the side and take the bracket out of the in-feed mechanism
- Move machine arm up until the planet wheel can be taken out of the valve body
- Change the abrasive
- Put machine back into position, adjust grinding pressure and go on with the grinding operation (steps vice versa as described above)

4.8 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.

4.8.1 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.

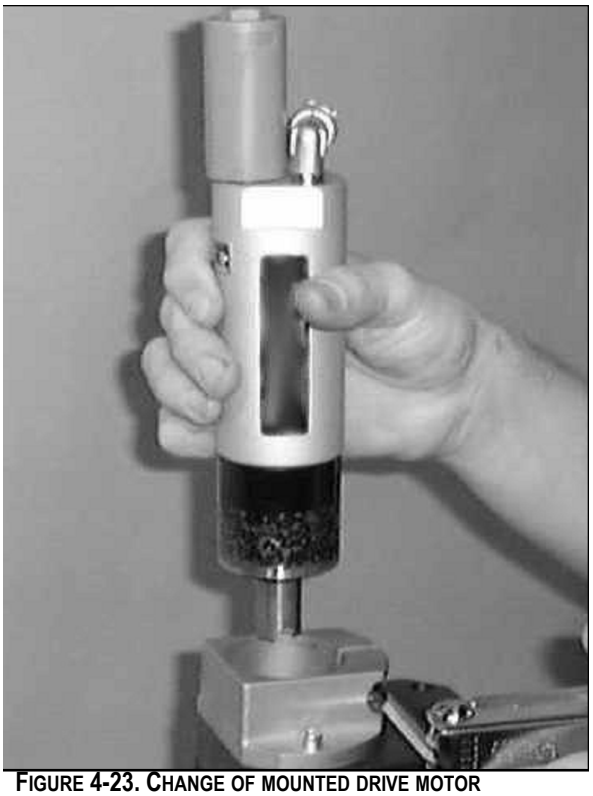


FIGURE 4-23. CHANGE OF MOUNTED DRIVE MOTOR

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).

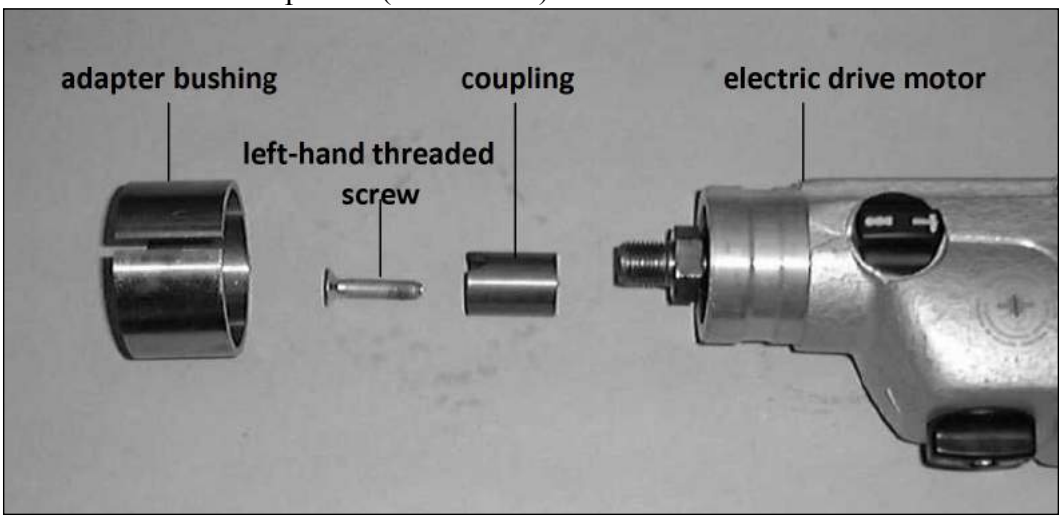


FIGURE 4-24. DISCONNECTION OF COUPLING

4.8.2 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 4.7.1.2). 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.

4.9 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.

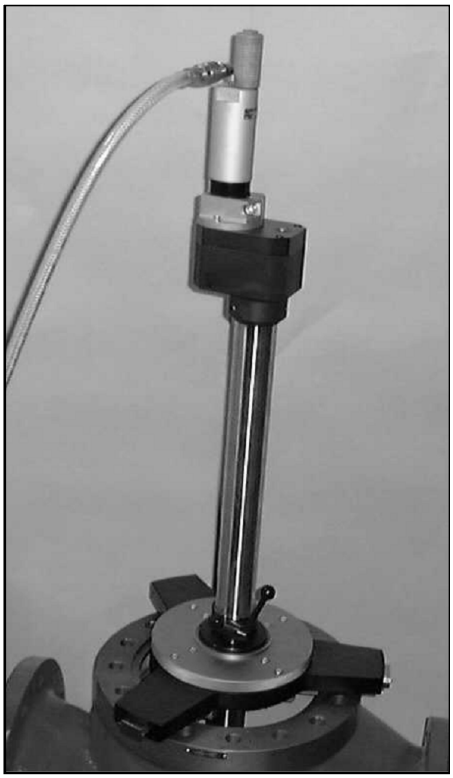
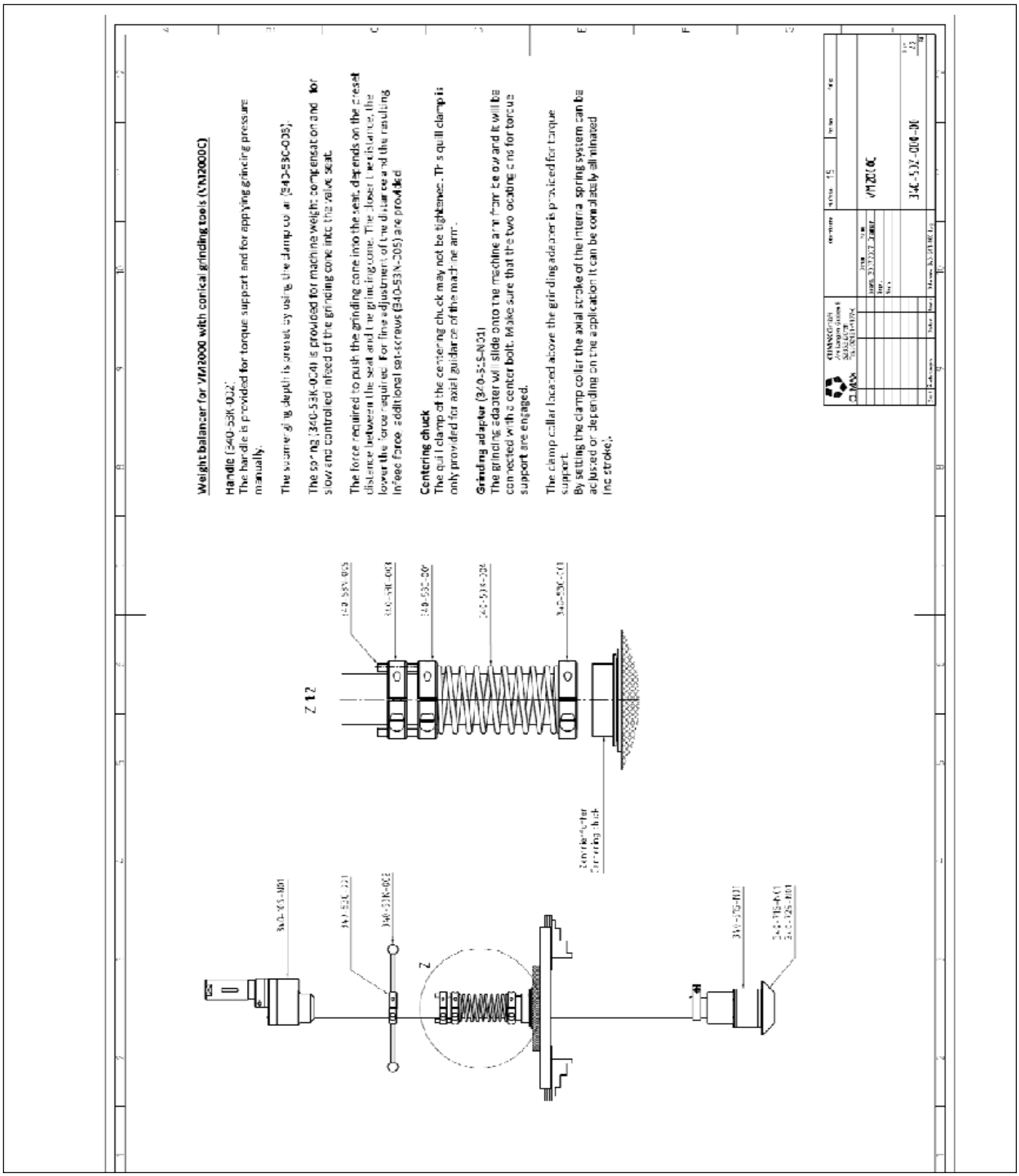


FIGURE 4-25. 3-JAW CENTRING CHUCK (OPTIONAL)

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.

4.10 CONICAL SEATS (OPTIONAL)



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5 MAINTENANCE

IN THIS CHAPTER:

5.1 MAINTENANCE CHECKLIST - 19
5.2 APPROVED LUBRICANTS - 19
5.3 MAINTENANCE TASKS - 20

5.1 MAINTENANCE CHECKLIST

CAUTION

Before performing the service work the machine has to be disconnected from the power supply line (electric and pneumatic) and it 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.

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

Interval	Task
Before each use	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

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task
After 150 operating hours, for following inspections every 300 operating hours	Clamping and lubrication of pneumatic drive gear
Every 1000 operating hours or every 2 years at the latest	Lubrication of ant-friction spline shaft
	Lubrication of upper gear

⚠ 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.

For all maintenance work, the machine has to be disconnected from power supply line!

All lubrication fluids have to be disposed in suitable containers.

⚠ CAUTION

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

5.2 LUBRICANTS

5.2.1 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 integrated anti-friction spline shaft has to be inspected every 1000 working hours or every 2 years at the latest. For the inspection of the spline shaft, the bottom cover and the outer pipe of the machine arm have to be removed (prior to disassembly, remove tool location).

The next step is to remove the set screw (31N–007) on the bottom end of the drive shaft. The grease for lubricating the spline shaft has to be pressed through the tap hole of the set screw until it leaks out on the bottom end of the spline shaft bushing.

For lubrication, please use special grease type Klüber 46MR401.

After lubricating the spline shaft, put the set screw in and secure it with glue. Then, assemble the outer pipe of the machine arm as well as the bottom cover.

For the maintenance of the upper gear, the gear housing has to be opened. To do so, please remove socket head screw (20N – 019) and the cover of the gear housing. Lubricate the gear with special grease type Klüber Mikrolube GB0. Prior to closing the housing, put sealing paste onto the cover mating surface.

It is recommended to have this service done by CLIMAX due to the experience required.

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

5.2.2 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 SAE 10.

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.

5.3 MAINTENANCE TASKS

5.3.1 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.

Maintenance tasks are described in the following sections.

5.3.2 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 manufacturer's recommendations!)

Before start-up and service or maintenance work:

- check all bolt connections for tightness
- make sure that all covers, filters etc. are in place

After service and maintenance work and before putting the machine into operation again, make sure 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.

5.4 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
Machine does not start	Power supply line is not connected	Make sure that power supply line is plugged in
	Default in power source	Check energy source (fuses, plugs, connections, air pressure, etc.)
	Only for the electric drive: Machine 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: Machine has been run in cool environment and the supply lines are iced.	De-ice the supply lines.
Grinding pressure cannot be activated	Bracket is not clamped on machine arm	Bracket must be clamped.
Machine vibration during operation	Grinding pressure exceeds 300 N (working range of spring) i.e. the indicator for grinding pressure is already right down its fixed stop	Make sure that grinding pressure does not exceed 300 N.

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6 STORAGE AND SHIPPING

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6.1.1 Short-term storage - - - 21
6.1.2 Long-term storage - - - 21
6.2 Shipping - - - 22
6.3 Decommissioning - - - 22

6.1 Storage

Proper storage of the globe 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 globe 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 globe 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 < 70ºF (21ºC) and humidity < 50%.

6.2 SHIPPING

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

6.3 DECOMMISSIONING

To decommission the globe valve grinding and lapping machine prior to 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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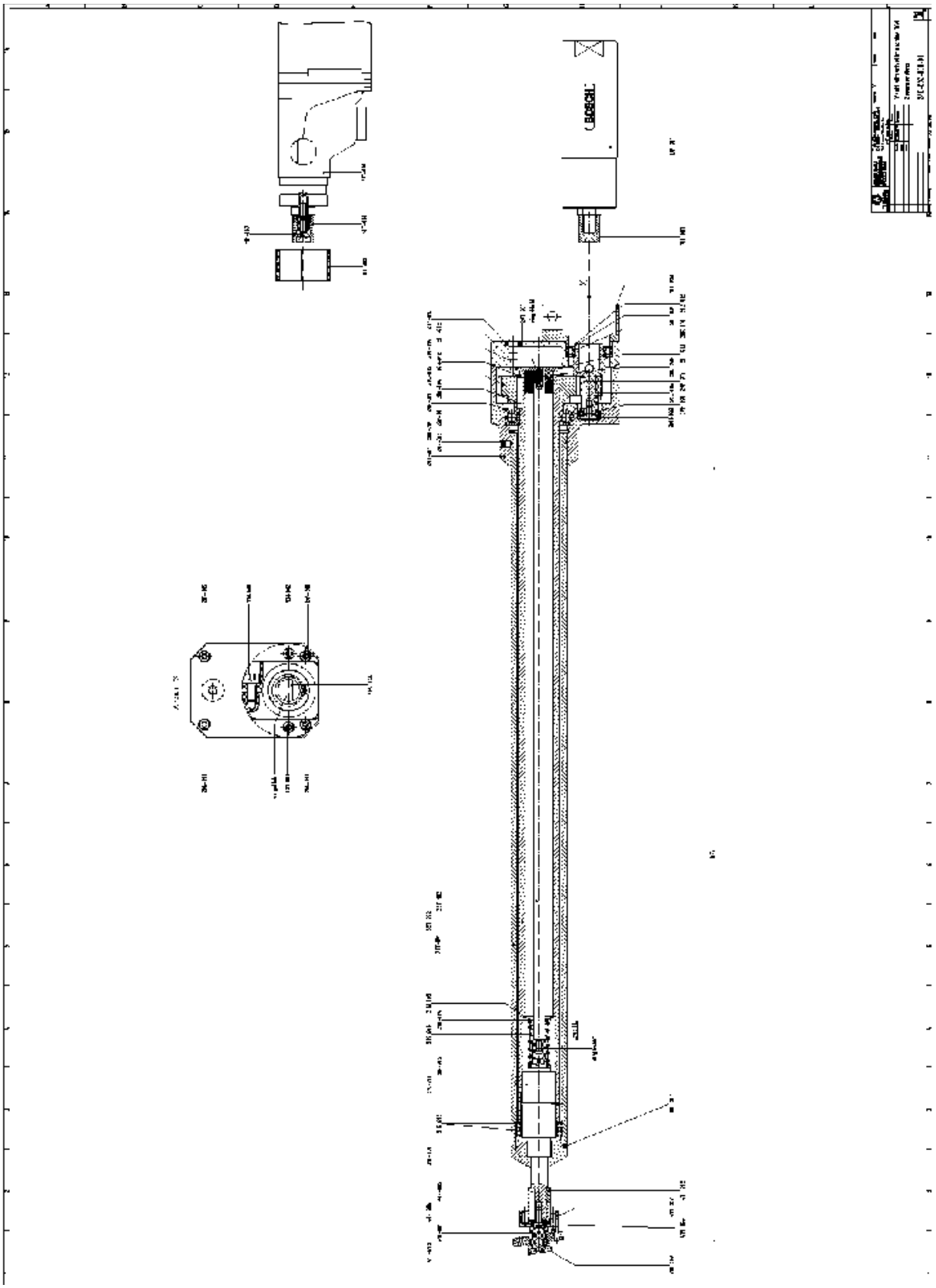
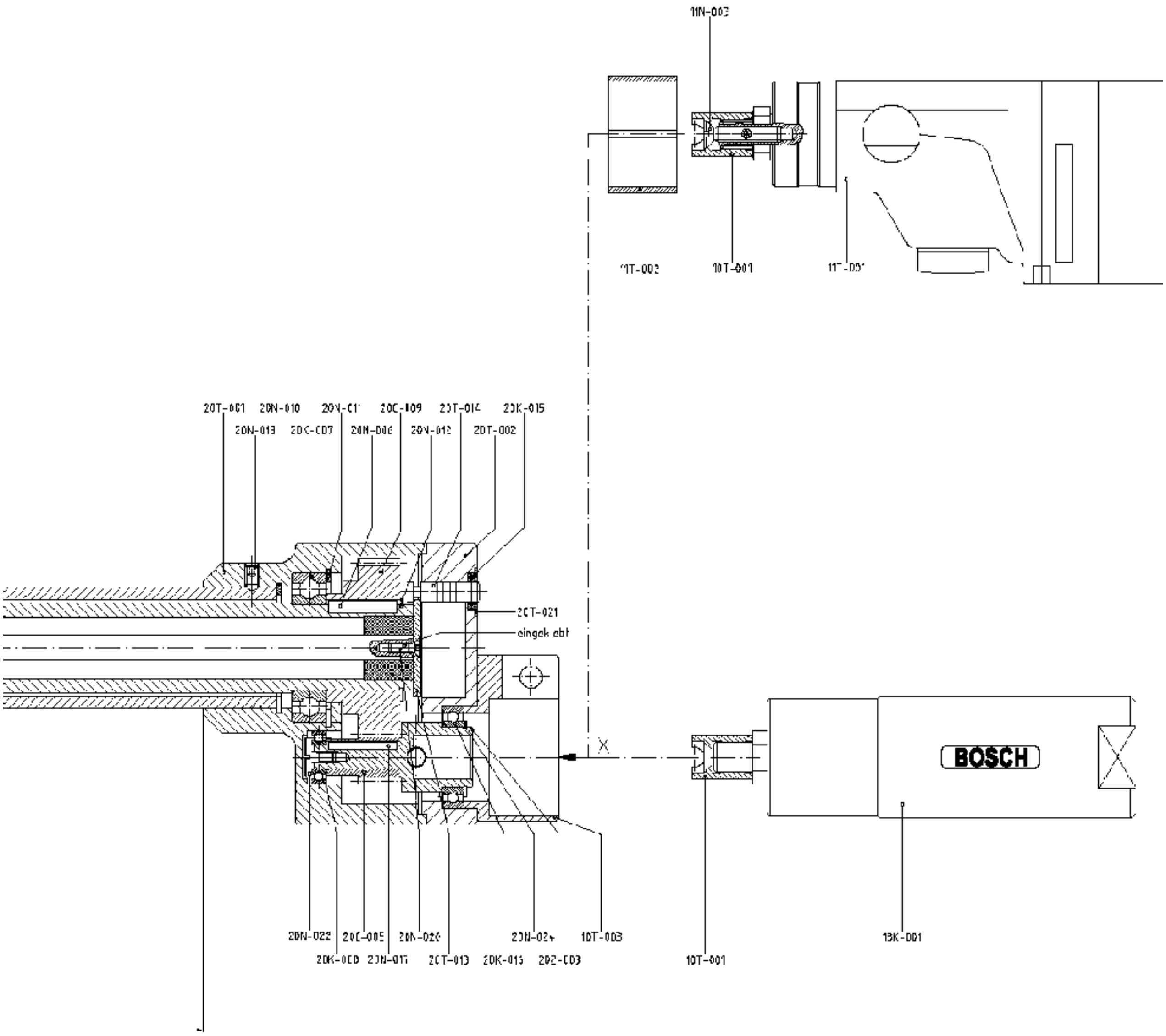


FIGURE A-1. ASSEMBLY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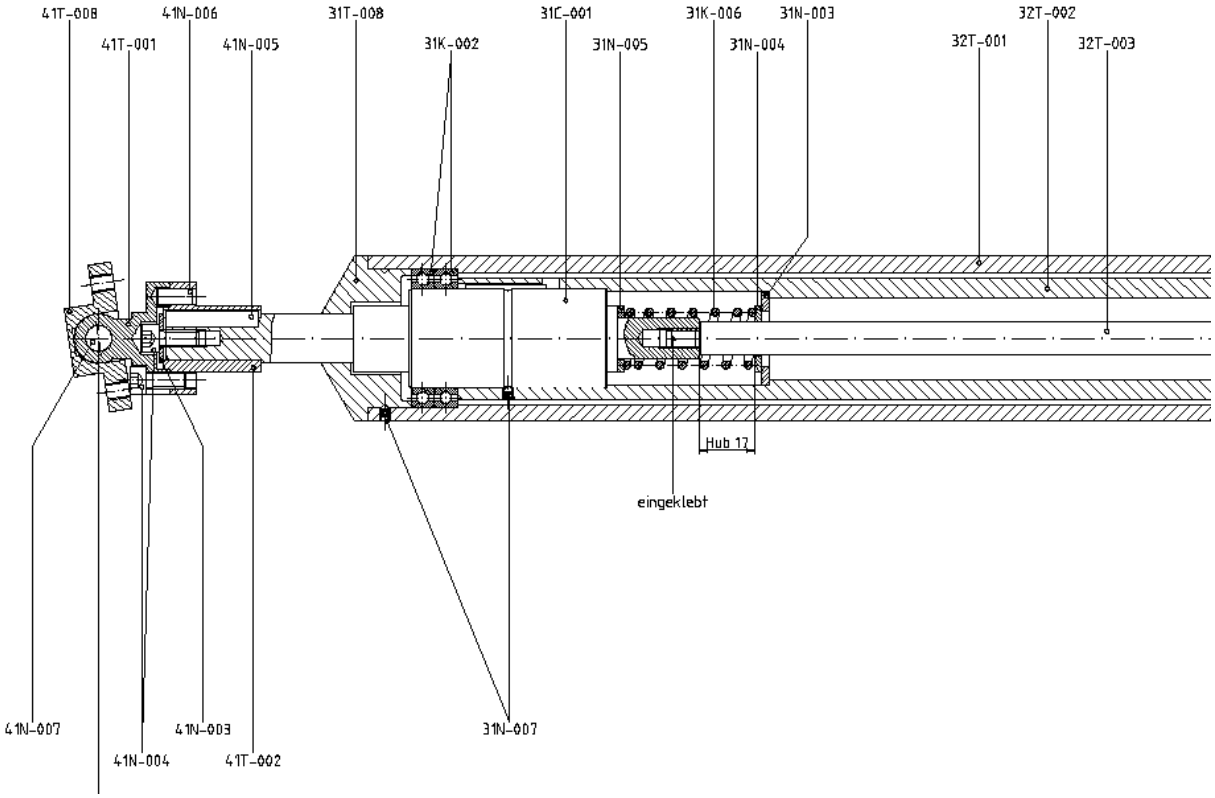
10T-001
20N-010
20N-013
20T-002
eingek abt
X
BOSCH
20N-022
20C-005
10T-003
10T-001
13K-001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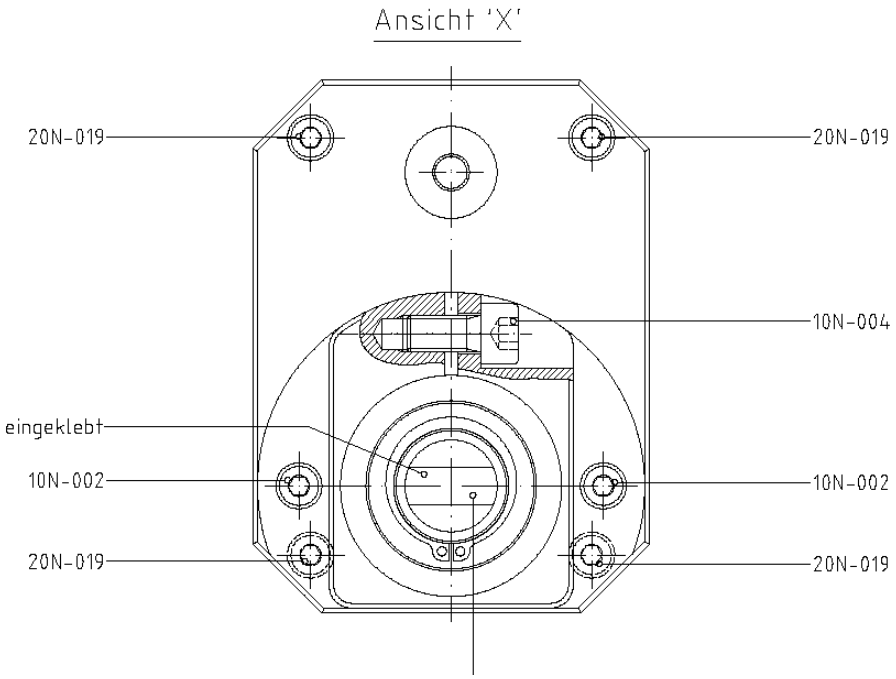
41N-006
41T-001
41N-005
31T-008
31K-002
31C-001
31K-006
31N-003
31N-005
31N-004
32T-002
32T-001
32T-003
Hub 17
eingeklebt
41N-007
41N-004
41N-003
41T-002
31N-007


Ansicht 'X'
20N-019
20N-019
10N-004
eingeklebt
10N-002
10N-002
20N-019
20N-019

Stkliste / Part list #: 240 - 10 S - N01 - 00 **Datum / Date: 01.06.1999**

Ersteller / Creator: Werheid

Zeichnung / Cross section #:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	1		240 - 11 S - N01	Elektroantrieb
S	1		240 - 12 S - N01	Druckluftantrieb Pistolengriff
S	1		240 - 13 S - N01	Druckluftantrieb Stab
S	1		240 - 14 S - N01	Wartungseinheit (Option)
S	1		240 - 15 S - N01	Elektroantrieb USA
~~001~~	~~1~~	~~x~~	~~240~~ - ~~10~~ ~~T~~ - ~~001~~	~~Kupplungsstück~~
002	2		240 - 10 N - 002	Innensechskantschraube M5 x 20 - 8.8
003	1	x	240 - 10 T - 003	Motorflansch
004	1		240 - 10 N - 004	Innensechskantschraube M8 x 16 - 8.8

FIGURE A-2. 240-10S-N01-00 BASIC MACHINE

Stkliste / Part list #: **240 - 11 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung 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

Stkliste / Part list #: **240 - 13 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		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, 1/4")
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
006			240 - 13 K - 006	Rectus Kupplung Typ 26 3/8" (Lieferumfang Wartungseinh.)
007			240 - 13 K - 007	Ersatzteil: Druckanzeige
008			240 - 13 K - 008	Ersatzteil: Regler

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

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Stkliste / Part list #: **240 - 15 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	1		240 - 15 K - 001	Antriebsmaschine / Motor Metabo Sb E 1000/2-R+L Signal 115 V
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 115V

Stkliste / Part list #: **240 - 20 S - N01 - 00** **Datum / Date: 01.**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
L01	1		240 - 20 S - L01	Antriebswelle BG [Pos: 3,4,5,8,16,17,22,24]
001	1		240 - 20 T - 001	Getriebegehäuse
002	1		240 - 20 T - 002	Getriebedeckel
003	*1*	*x*	*240 - 20 T - 003*	*Antriebswelle*
004	*1*		*240 - 20 N - 004*	*Paßstift DIN EN 28734-8m6x30-B*
005	*1*	*x*	*240 - 20 C - 005*	*Antriebsritzel z=13, m=1,5*
006	1		240 - 20 N - 006	Paßfeder A5 x 5 x 28
007	1		240 - 20 K - 007	Rillenkugellager 6007 2RSR
008	*1*		*240 - 20 K - 008*	*Rillenkugellager 61900 2RSR*
009	1		240 - 20 C - 009	Zahnrad z=47, m=1,5
010	1		240 - 20 N - 010	Sicherungsring 50 x 2
011	1		240 - 20 N - 011	Sicherungsring 62 x 2
012	1		240 - 20 N - 012	Sicherungsring 35 x 1,5
013	1		240 - 20 T - 013	Mitnahmering
014	1		240 - 20 T - 014	Anzeigestift
015	1		240 - 20 K - 015	Filzring 16 x 8 x 3
016	*1*		*240 - 20 K - 016*	*Rillenkugellager 61905 2RS1*
017	*1*		*240 - 20 N - 017*	*Paßfeder A3 x 3 x 28*
018	3		240 - 20 N - 018	Gewindestift M6 x 10
019	4		240 - 20 N - 019	Innensechskantschraube M5 x 20
020	1		240 - 20 N - 020	Senkschraube M4 x 12
021	1		240 - 20 T - 021	Deckscheibe
022	*1*		*240 - 20 N - 022*	*Flachkopfschraube mit Schlitz M5 x 8 - 8.8*
~~023~~	~~1~~		~~240 - 20 N - 023~~	~~Sicherungsring 42 x 1,75~~
024	*1*		*240 - 20 N - 024*	*Sicherungsring 25 x 1,2*

FIGURE A-6. 240-20S-N01-00 GEAR

Stkliste / Part list #: **240 - 31 S - N01 - 00** Datum / Date: 01.06.1999

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	1		240 - 31 C - 001	Kugelkeilwelle
002	2		240 - 31 K - 002	Rillenkugellager 61806-2RS1
003	1		240 - 31 N - 003	U-Scheibe 17
004	1		240 - 31 N - 004	U-Scheibe A - 10,5
005	1		240 - 31 N - 005	U-Scheibe 13
006	1		240 - 31 K - 006	Druckfeder
007	4		240 - 31 N - 007	Gewindestift M3 x 4
008	1		240 - 31 T - 008	Verschlußkappe

FIGURE A-7. 240-31S-N01-00 MACHINE ARM

Stkliste / Part list #: **240 - 32 S - N01 - 00** Datum / Date: 01.06.1999

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	1		240 - 32 C - 001	Tauchrohr Kolbenr. geschliffen, hartverchromt, geschl. f7
002	1		240 - 32 T - 002	Antriebsrohr nahtloses Stahlrohr (BK)
003	1		240 - 32 T - 003	Schubübertragungsstange blanker Rundstahl h11

FIGURE A-8. 240-32S-N01-00 OUTER PIPE AND DRIVE SHAFT L=600

Stkliste / Part list #: **240 - 33 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	1		240 - 33 C - 001	Tauchrohr Kolbenr. geschliffen, hartverchromt, geschl. f7
002	1		240 - 33 T - 002	Antriebsrohr nahtloses Stahlrohr (BK)
003	1		240 - 33 T - 003	Schubübertragungsstange blanker Rundstahl h11

FIGURE A-9. 240-33S-N01-00 OUTER PIPE AND DRIVE SHAFT L=800

Stkliste / Part list #: **240 - 41 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	1		170 - 10 S - N01	Kugelkalotte Typ 15
001	1		240 - 41 T - 001	Kugeladapter
002	1		240 - 41 T - 002	Zwischenstück
003	1		240 - 41 N - 003	Karosseriescheibe 5,3 x 15
004	3		240 - 41 N - 004	Zylinderschraube mit Innensechskant M5 x 16 - 8.8
005	1		240 - 41 N - 005	Paßfeder A5 x 5 x 28
006	2		240 - 41 N - 006	Zylinderstift A-5 x 12 - St
007	1		240 - 41 N - 007	Zylinderstift B-8 x 30 - St

FIGURE A-10. 240-41S-N01-00 BALL JOINT COUPLING TYPE 15

Stkliste / Part list #: **170 - 10 S - N01 - 00** **Datum / Date: 20.09.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	1		170 - 10 T - 001	Kugelkupplung / Ball coupling 15
002	1		170 - 10 T - 002	Halteklaue / 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-11. 170-10S-N01-00 BALL JOINT COUPLING TYPE 15 (GENERAL)

Stkliste / Part list #: **240 - 51 S - N01 - 00** Datum / Date: 01.06.1999

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
L01	1		240 - 51 S - L01	Mittelstück [Pos: 1 - 20,21(3Stk),23(3Stk),24]
L02	3		240 - 51 S - L02	Gestängeklemmfuß [Pos: 21(6Stk),23(6Stk),27]
L03	3		240 - 51 S - L03	Aufspannrohr [Pos: 22,25,26]
001	*1*		*240 - 51 T - 001*	*Maschinenaufnahme*
002	*1*		*240 - 51 T - 002*	*Verstellspindel*
003	*1*		*240 - 51 K - 003*	*Wellendichtring 22x32x7 BA-NBR*
004	*1*		*240 - 51 K - 004*	*Gleitbuchse 2225 DU*
005	*1*		*240 - 51 T - 005*	*Rundmutter*
006	*1*		*240 - 51 N - 006*	*Gewindestift M6 x 10 - St*
007	*1*		*240 - 51 N - 007*	*U-Scheibe 8,4 - 140HV - Zn*
008	*1*		*240 - 51 N - 008*	*Sicherungsring 8 x 0,8*
009	*1*		*240 - 51 K - 009*	*Lamellenstopfen GPN 320 GL 30 schwarz*
010	*1*		*240 - 51 K - 010*	*Ratsche Größe R 00 (Fa. Bilz), Länge ca. 130*
011	*1*		*240 - 51 K - 011*	*Ratscheneinsatz Vierkant 8 mm*
012	*1*		*240 - 51 N - 012*	*U-Scheibe 6,4 - 140HV - Zn*
013	*1*		*240 - 51 N - 013*	*Senkschraube M4 x 12 - 8.8 Zn*
014	*1*		*240 - 51 T - 014*	*Verschlußklappe*
015	*1*		*240 - 51 T - 015*	*Druckstück*
016	*4*		*240 - 51 N - 016*	*Innensechskantschraube M3 x 8 - 8.8 Zn*
017	*1*		*240 - 51 N - 017*	*Zylinderstift gehärtert 8m6 x 70*
018	*1*		*240 - 51 K - 018*	*Verst. Spannhebel*
019	*1*		*240 - 51 C - 019*	*Augenschraube M6 x 40 - 8.8*
020	*1*		*240 - 51 N - 020*	*Zylinderstift gehärtert 8m6 x 70*
021	*9*		*240 - 51 K - 021*	*Klemmenkeil für ET-Klemmstücke (Bohrung)*
022	*3*		*240 - 51 K - 022*	*Aufspannrohr 30 x 295*
023	*9*		*240 - 51 K - 023*	*Verst. Spannhebel*
024	*3*		*240 - 51 C - 024*	*Klemmenkeil für ET-Klemmstücke (Gewinde)*
025	*3*		*240 - 51 K - 025*	*Verschlußstopfen V-Type GPN 300 V 21 natur*
026	*3*		*240 - 51 K - 026*	*Lamellenstopfen GPN 320 GL 30 schwarz*
027	*3*		*240 - 51 K - 027*	*Winkelklemmstück W-ET 30/Tiefschwarz ohne Hebel*
028	1		240 - 51 T - 028	Rohrklammer
029	1		240 - 51 K - 029	Verst. Spannhebel

FIGURE A-12. 240-51S-N01-00 UNIVERSAL CLAMPING DEVICE

Stkliste / Part list #: **240 - 52 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	3		240 - 52 T - 001	Spannfuß Flansch
002	3		240 - 52 K - 002	C-Schraubzwinge

FIGURE A-13. 240-52S-N01-00 STANDARD MOUNTING SYSTEM

Stkliste / Part list #: **240 - 53 S - N01 - 00** Datum / Date: 01.06.1999

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
001	3		240 - 53 T - 001	Aufspannbolzen Rohrbefestigung
002	3		240 - 53 K - 002	U-Scheibe 13 (13x35x5)
003	3		240 - 53 N - 003	Innensechskantschraube M12 x 35 - 8.8 Zn
004	6		240 - 53 K - 004	Kugelspannschraube M8 - 25 - V
005	1		240 - 53 K - 005	Ratschen-Zurrgurt 2000 daN, 4m

FIGURE A-14. 240-53S-N01-00 COLLAR BAND MOUNTING SYSTEM

Stkliste / Part list #: **240 - 54 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	1		240 - 51 S - L01	Mittelstück
S	3		240 - 51 S - L02	Gestängeklemmfuß
001	3		240 - 54 C - 001	Aufspannrohre L=450

FIGURE A-15. 240-54S-N01-00 UNIVERSAL CLAMPING DEVICE VM2500, VM2600

Tooling

Teileliste für Planetenschleif- und Läppwerkzeuge
Partlist for Planet Grinding and Lapping Tools

Zeichn. Nr.: 110-00E-N01
Drawing No: 110-00E-N01

Planetenscheiben Planet Wheels ø [mm]	P/N	Kugelkalotte Ball Joint Coupling P/N	Schrauben der Kugelkalotte Screws for Ball Joint Coupling According to DIN912	Halteklaue Clamping Pad P/N	Schraube der Halteklaue Screw of Clamping Pad According to DIN7991
100	110-10T-001	integrated	-	110-11T-001	M5x10-8.8
135	110-10T-002	integrated	-	110-11T-001	M5x10-8.8
220	110-10T-003	170-10S-N01	M5x12-8.8	170-10T-002	M4x8-8.8
380	110-10T-004	170-10S-N01	M5x12-8.8	170-10T-002	M4x8-8.8

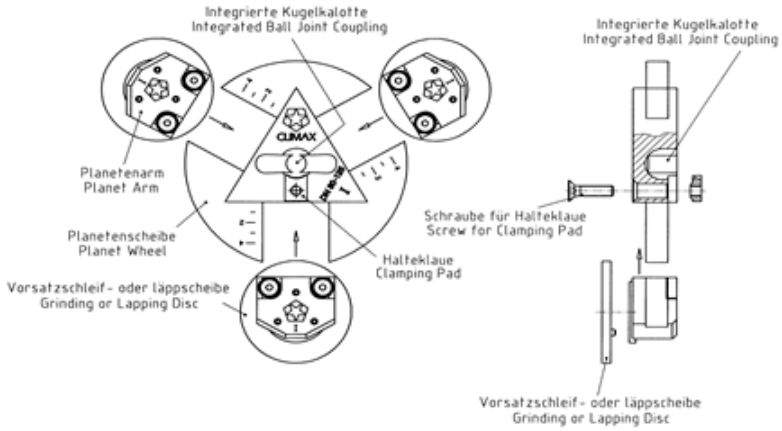
Standard-Planetenarme Standard Planet Arms			Planetenarme mit geneigter Spindel Planet Arms with tilted Spindles	
Planetenarm Planet Arm Type	Länge Length [mm]	P/N	Planetenarm 3° Planet Arms 3° P/N	Planetenarm 5° Planet Arms 5° P/N
I	30	110-21S-N01		
II	60	110-22S-N01	110-51S-N01	110-61S-N01
III	115	110-23S-N01	110-52S-N01	110-62S-N01
IV	190	110-24S-N01		

Vorsatzschleifscheiben Grinding Discs ø [mm]	P/N
50	110-31S-N01
80	110-32S-N01
50 CBN coated	110-33S-N01
80 CBN coated	110-34S-N01

Vorsatzläppscheiben Lapping Discs ø [mm]	P/N
30	110-41S-N01
50	110-42S-N01
80	110-43S-N01

Planetenscheiben ø 100 und 135

Planet Wheels dia 100 and 135

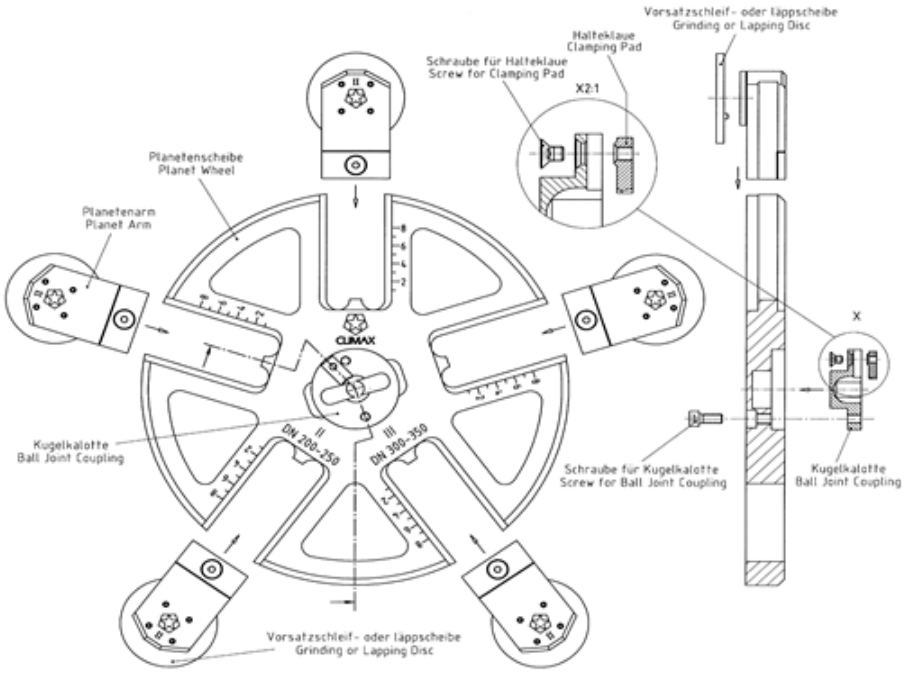


gezeigt:
Planetscheibe ø 100
(ø 135 besitzt 5 Stk. Planetenarme)

here shown:
Planetwheel dia 100
(dia 135 consists of 5 pcs.of Planet Arms)

Planetenscheiben ø 220 und 380

Planet Wheels dia 220 and 380



Diameter Durchmesser [mm]	Part Number / Artikelnummer Grain / Körnung 100 or /bzw. 80	500	1000	
Quantity 25 Pieces / Stückzahl 25				
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	
Quantity 50 Pieces / Stückzahl 50				
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	
Quantity 100 Pieces / Stückzahl 100				
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	-	
CBN Grinding Discs / CBN Schleifscheiben				
50 **	110-33S-N01	(Grain B252 / *Körnung B252*)		
80 **	110-34S-N01	(Grain B252 / *Körnung B252*)		
Lapping Discs / Läppscheiben				
30 **	110-41S-N01	(Cast Iron / *Gussscheiben*)		
50 **	110-42S-N01	(Cast Iron / *Gussscheiben*)		
80 **	110-43S-N01	(Cast Iron / *Gussscheiben*)		

* Für 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-16. LIST OF ABRASIVES

Stkliste / Part list #: 240 - 71 S - N01 - 00 Datum / Date: 01.06.1999

Ersteller / Creator: Werheid

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	2		110 - 11 S - N01	Allg. Teile Planetenscheiben k / General parts planet tooling
S	1		110 - 20 S - N01	Planetenarme / Planet arms
S	5		110 - 31 S - N01	Vorsatzscheiben Schleifen konventionell / Grinding disc 50
S	5		110 - 33 S - N01	Vorsatzscheiben Schleifen / Grinding disc CBN 50
S	5		110 - 41 S - N01	Vorsatzscheiben Läppen / Lapping disc 30
S	5		110 - 42 S - N01	Vorsatzscheiben Läppen / Lapping disc 50
001	1	x	240 - 71 T - 001	Planetenscheibe k, / Planet wheel D=100
002	1	x	240 - 71 T - 002	Planetenscheibe k, / Planet wheel D=135
003	1	x	240 - 71 T - 003	Planetenscheibe / Planet wheel D=220

FIGURE A-17. 240-71S-N01-00 PLANET WHEELS DN 80 ... DN 350

Stkliste / Part list #: **240 - 73 S - N01 - 00** **Datum / Date: 01.06.1999**

Ersteller / Creator: **Werheid**

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	5		110 - 32 S - N01	Vorsatzscheiben Schleifen / Grinding disc 80
S	5		110 - 43 S - N01	Vorsatzscheiben Läppen / Lapping disc 80
001	1	x	240 - 73 T - 001	Planetenscheibe / Planet wheel D=380

FIGURE A-18. 240-73S-N01-00 PLANET WHEELS DN 400 ... DN 500

Stkliste / Part list #: 240 - 75 S - N01 - 00 Datum / Date: 01.06.1999

Ersteller / Creator: Werheid

Zeichnung / Cross section#:

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	5		110 - 32 S - N01	Vorsatzscheiben Schleifen 80
001	1	x	240 - 75 T - 001	Planetenscheibe D=380

FIGURE A-19. 240-75S-N01-00 PLANET WHEELS DN 500 ... DN 600

Stkliste / Part list #: **110 - 20 S - N01 - 02** Datum / Date: 27.05.1999

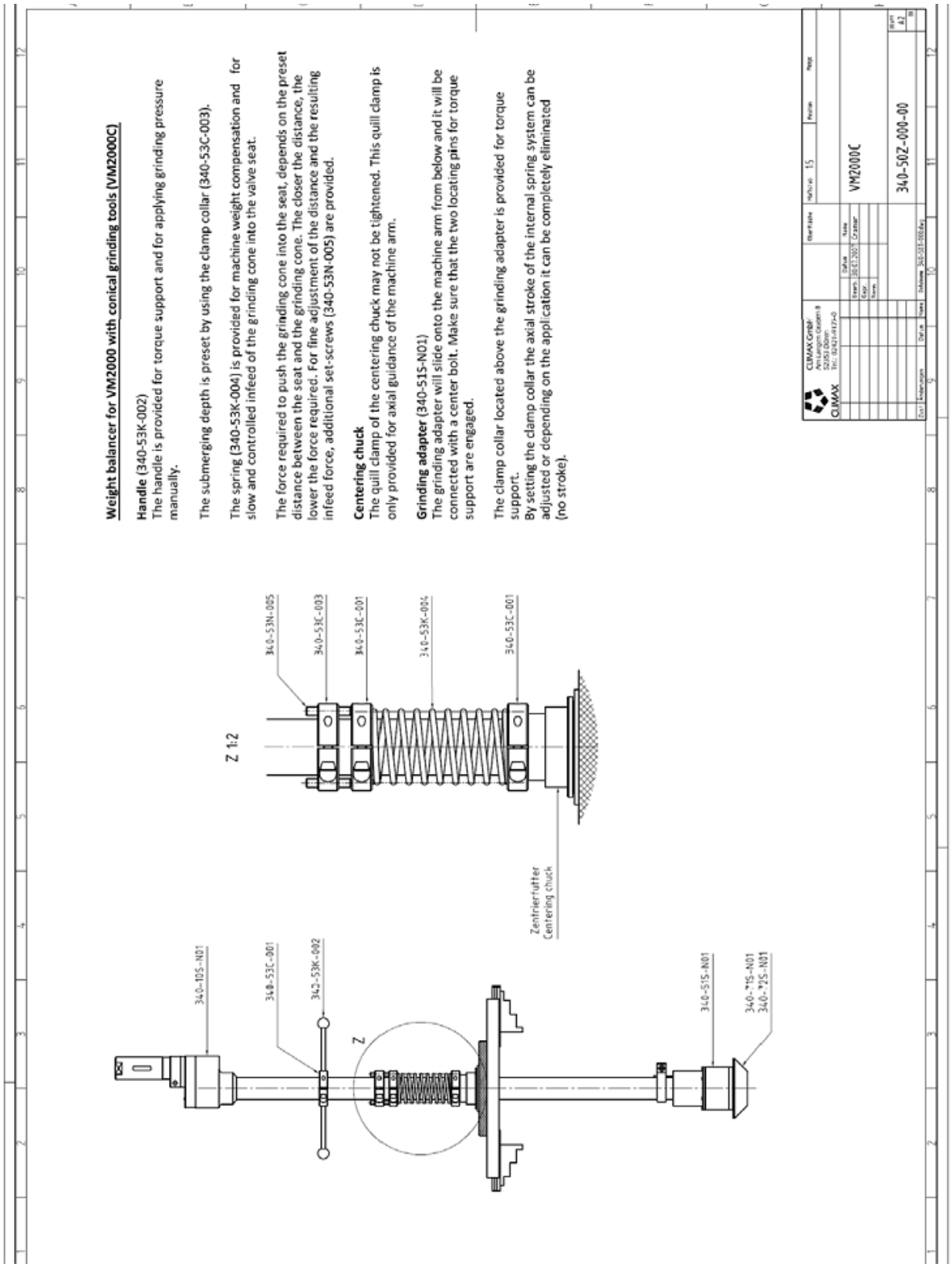
Ersteller / Creator: *Werheid*

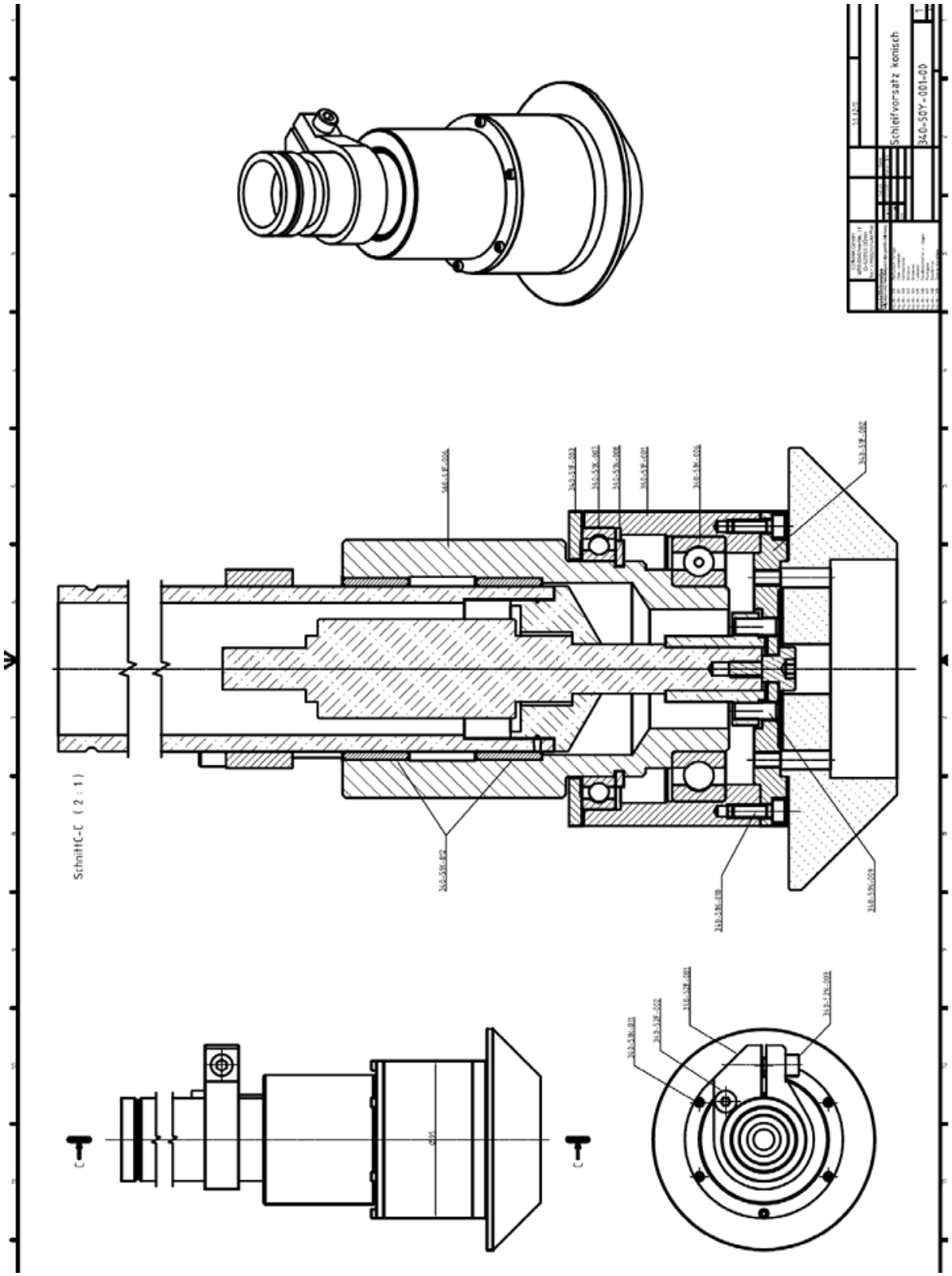
Zeichnung / Cross section #: 110-21Z-001, 110-22Z-001, 110-23Z-001

Pos. Item	Menge Qantity		Stücklisten-, Teile # Assy or Part #	Benennung Description
S	1		110 - 21 S - N01	Arm I / Planet arm I, l=30mm
S	1		110 - 22 S - N01	Arm II / Planet arm II, l=60mm
S	1		110 - 23 S - N01	Arm III / Planet arm III, l=115mm
S	1		110 - 24 S - N01	Arm IV / Planet arm IV, l=190mm

FIGURE A-20. 110-20S-N01-02 PLANET ARMS

Information for VM2350C




Schleifvorsatz konisch
340-507-001-00
Schnitt C-C (2 : 1)

Stückliste Nr.: 340 - 51 S - N01 - 00 **Erstelldatum *Date*:** 22.03.2007 **Benennung:** Vorsatz konische Sitze

Ersteller: Werheid **Maschine *Machine*:** VM2350C

Zeichnungszusammenstellung(en): 340-50Y-N01

Pos. *Item*	Menge *Quantity*	Mehr-verwend.	Artikelnummer *Part or List No*	Benennung *Description*
001	1		340 - 51 F - 001	Lagerbuchse / *bushing*
002	1		340 - 51 F - 002	Kegelflansch / *flange*
003	1		340 - 51 F - 003	Haltering / *support ring*
004	1		340 - 51 F - 004	Aufnahme Gleitlager / *main bushing*
005	1		340 - 51 D - 005	Halteschraube / *screw*
006	1		340 - 51 K - 006	Rikula 6010-2RS / *radial ball bearing*
007	1		340 - 51 K - 007	Rikula 61813-2RS / *radial ball bearing*
008	1		340 - 51 N - 008	Sicherungsring DIN 471 - 65 x 2,5 / *snap ring*
009	2		340 - 51 N - 009	Zylinderstift ISO 2338 5h6 x 14 / *pin*
010	6		340 - 51 N - 010	Zylinderschraube DIN 912-M4x12-8.8Zn / *screw*
011	6		340 - 51 N - 011	Zylinderschraube DIN 912-M3x8-8.8Zn / *screw*
012	2		340 - 51 K - 012	Führungsbuchse DU 50x55x20 / *bearing*

Stückliste Nr.: 340 - 52 S - N01 - 00 **Erstelldatum *Date*:** 22.03.2007 **Benennung:** Federaktivierung

Ersteller: Werheid **Maschine *Machine*:** VM2350C

Zeichnungszusammenstellung(en): 340-50Y-N01

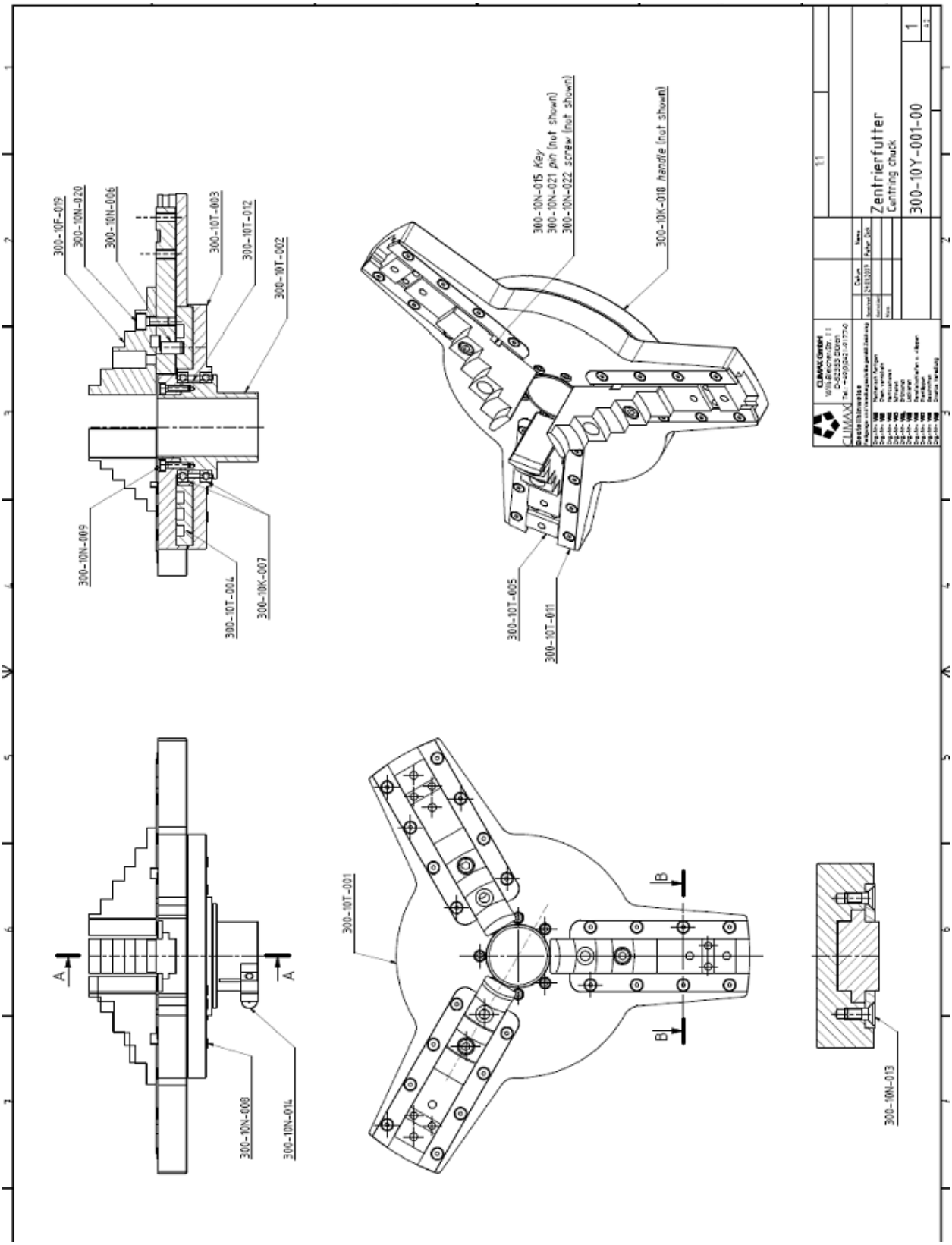
Pos. *Item*	Menge *Quantity*	Mehr-verwend.	Artikelnummer *Part or List No*	Benennung *Description*
001	1		340 - 52 F - 001	Rohrklammer
002	1		340 - 52 F - 002	Halteschraube Rohrklammer
003	1		340 - 52 N - 003	Zylinderschraube DIN 912 - M8 x 30 -8.8 Zn

Stückliste Nr.: 340 - 53 S - N01 - 00 **Erstelldatum *Date*:** 22.03.2007 **Benennung:** Zusatzhaltegriff

Ersteller: Werheid **Maschine *Machine*:** VM2350C

Zeichnungszusammenstellung(en): 340-50Y-N01

Pos. *Item*	Menge *Quantity*	Mehr-verwend.	Artikelnummer *Part or List No*	Benennung *Description*
001	3		340 - 53 C - 001	Geteilter Klemmring modifiziert
002	2		340 - 53 K - 002	Griffstange
003	1		340 - 53 C - 003	Vorspannring
004	1		340 - 53 K - 004	Druckfeder VD-340
005	2		340 - 53 N - 005	Gewindestift M8x40-45H


300-10F-013
300-10N-020
300-10N-006
300-10T-003
300-10T-012
300-10T-002
300-10N-009
300-10T-004
300-10K-007
300-10N-015 Key
300-10N-021 pin (not shown)
300-10N-022 screw (not shown)
300-10K-018 handle (not shown)
300-10T-005
300-10T-011
Zentrierfutter
Centring chuck
300-10Y-001-00
300-10T-001
A
A
B
B
300-10N-008
300-10N-014
300-10N-013

Stückliste Nr.: 300 - 10 S - N01 - 00 **Erstelldatum: 15.07.1999** **Benennung: Zentrierfutter / Centering Chuck**

Ersteller: Werheid **Maschinentyp: VM2000**

Zeichnungszusammenstellung(en): 300-10Z-001-00

Pos.	Menge Anz.	Mehr-verwend.	Stückliste Zeichnung Artikelnummer	Benennung Bezeichnung	Werkstoff DIN			Bemerkung Ursprung bei Mehrverwendung Note
001	1		300 - 10 T - 001	Futterkörper / *Body*				
002	1		300 - 10 T - 002	Klemmstück / *Clamp*				
003	1		300 - 10 T - 003	Zahnrad-Aufnahme / *spiral gear adaption*				
004	1		300 - 10 T - 004	Spiralzahnrad / *spiral gear*				
005	1 set		300 - 10 T - 005	Grundschieber / *base bracket*				
006	3		300 - 10 N - 006	Zylinderstift gehärtet / *pin*		A 10 m6 x 20		
007	2		300 - 10 K - 007	RiKuLa 61815 - 2RS1 / *radial ball bearing*				
008	8		300 - 10 N - 008	Innensechskantschrauben / *screw*		M5 x 12 - 8.8 Zn		
009	8		300 - 10 N - 009	Innensechskantschrauben / *srew*		M5 x 20 - 8.8 Zn		
010	3		300 - 10 T - 010	Aufsatzbacken / *clamping bracket*				
011	3x2pcs		300 - 10 T - 011	Deckleiste / *top guide*				
012	1		300 - 10 T - 012	Distanzbüchse / *bushing*				
013	24		300 - 10 N - 013	Senkschrauben / *screw*		M5 x 12 - 8.8 Zn		
014	1		300 - 10 N - 014	Innensechskantschraube / *screw*		M8x25-8.8		
015	3		300 - 10 N - 015	Passfeder / *key*				
016	1		300 - 10 T - 016	Koffereinlage / *case inlay*				
017	1		300 - 10 K - 017	Koffer / *carrying case*				
018	2		300 - 10 K - 018	Zylinderknopf GN 599 - 14 - M6 - 9 / *handle*				GN 599 - 14 - M6 - 9
019	3		300 - 10 F - 019	Aufsatzbacke 5-stufig / *clamping bracket 5-steps*				
020	3		300 - 10 N - 020	Innensechskantschraube / screw		M8x20-8.8-Zn		
021	3		300 - 10 N - 021	Zylinderstift gehärtet / *pin*		A 6 m6 x 20		
022	3		300 - 10 N - 022	Innensechskantschraube / screw		M4x8-8.8-Zn		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