

BB-86

**Instruction manual
English (EN)**

**Unit for precise sleeve
counterbore operations**



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Safety Regulations



For safe operation of this electro-magnetic device, please pay close attention to the safety notices whenever these warning symbols are shown.

We would like to inform you about potential dangers which may occur. It is therefore imperative that you read the following instructions carefully, and proceed accordingly.

- ⚠ DO NOT use the device in a dusty, humid or explosive environment => Danger of short circuit!
- ⚠ The BB-86 must not be used with an open handgrip!
- ⚠ DO NOT bypass or tape-over the handgrip tumbler-switch because this can be very dangerous!
- ⚠ Safety goggles or approved eye protection and must be worn during setup and working with the unit! Persons with long hair must also wear a hairnet!
- ⚠ There is a risk of injury by the cutting bit which is attached to the rotating spindle!
- ⚠ Unplug the device before working on electronic components!
- ⚠ In all cases, repairs to the tool are only allowed to be performed by the local MIRA-dealer or the manufacturer => (MINELLI Corporation)!
- ⚠ Only use genuine MIRA spare parts, which are listed in the respective instruction manual!
- ⚠ DO NOT touch the electric circuits of the device. Contact with these circuits can be life threatening!
- ⚠ Modification of the electric elements of this device could cause severe damage!
- ⚠ Repairs of the BB-86 can be performed ONLY by authorised personnel or the MINELLI Corporation.

Safety guidelines for the BB-86

The following safety guidelines must be observed during every step when working with this device. This includes set-up, during the processing of the counterbores and when performing maintenance or repairs. Disregard for these guidelines is an incorrect use of the device.

Grounding of the device

The device must be properly grounded to prevent electrical shock. Therefore, the ground-clamp must be connected to the ground of the main circuit.

Do not use in an explosive environment!

The use of the device in an explosive environment (i.e. flammable gases, vapours or dust) may induce the ignition of these materials and is strictly prohibited.

ATTENTION!

1. To avoid the risk of partial overheating, the device must not be used in a dusty or steamy atmosphere.
2. The device must not be used in a wet environment. In addition the device must not be exposed to rain or dew. This may induce an electric arc between electronic elements in the device.
3. Service and maintenance of the unit by authorised personnel only. Servicing the electronic components of the device is dangerous because there can be a high risk of an electric shock. Components can continue to hold a latent electrical charge for a short time after the device has been switched off. Before beginning service-operations on the device, make sure that the capacitors of the device have been discharged and do not hold any latent electrical charge. It is prohibited to work on the connectors of the device if the device is connected to an electric power source. In addition, operating the device without a mechanical shut-off switch or fuse in the power supply is strictly forbidden.
4. Service and adjustment operations must always be performed by a minimum of 2 people. In an emergency, there must be a person that can cut off the electric circuit to administer first aid.
5. This device must not be used for emergency or safety tests.
6. Any contact with the electric circuits must be avoided. During the operation of the device, any contact with these circuits can be life threatening. In addition, the device can be damaged by careless contact with sensitive elements.
7. To avoid further risks, you must receive permission from the manufacturer, MINELLI Corporation, if you want to add, change, replace and/or manipulate any parts of the device by yourself.
8. If any repair or replacement work needs to be performed, the BB-86 must always be disconnected from the electrical outlet. For information about service and repair, please read the respective chapters in the Instruction manual.

Basic Safety Guidelines

Important information about the instruction manual

- A thorough knowledge and understanding of the basic safety guidelines and safety regulations (shown on page 2) are key conditions for the safe operation of this device.
- This instruction manual contains important guidelines how to safely use this device.
- All persons who use this device must carefully follow the steps as outlined in this instruction manual.
- In addition, local regulations related to safety and accident prevention must also be followed.

Responsibility of the tool owner

The tool owner will only allow employees to use the tool if they:

- have an intimate understanding of the basic guidelines for working safety and accident prevention.
- have been instructed about the proper device application.
- have read and understood the safety guidelines and warning notices in the instruction manual.

In addition, the tool owner will follow up with tool users at regular intervals to ensure tool safety awareness.

Responsibility of the employees

The employees who use the device must commit to the following before they begin using the tool:

- that they will observe the basic safety guidelines for work safety and accident prevention.
- that they have read, understood, and signed the safety guidelines and warning notices in the instruction manual.

Operating risks

The devices, BB-86, BB-86 Giant and BB-86 Mini, have been developed based on the latest state-of-the-art technology, and were manufactured in accordance with the governing safety regulations. However, it is possible by using these devices that some risks could appear for the user or third persons if the devices are not operated according to the MIRA instruction manual, or if they are misused. These tools should be used only:

- for its designated use.
- in good working order.

Breakdowns or malfunctions need to be corrected immediately if they deviate from the safety guidelines.

Conventional utilisation

The MIRA BB-86 device is designed exclusively for processing sleeve counterbores on combustion engines, and is not intended for any other use. The Minelli Corporation will not be liable for damages which occur from unintended uses.

The intended utilisation also includes the following points:

- the user must comply with all the safety guidelines shown in the instruction manual, and
- the device owner must keep a record of the service work performed on the device.

Warranty and liability

Warranty issues are described in MIRA's terms of sales and return policy conditions, and are an integral part of any sales contract between MIRA and the customer. Warranty and liability claims are void if the injuries or damages resulted from any of the following causes:

- Non-designated use of the device
- Incorrect mounting and operation
- Failure to follow the guidelines in the instruction manual with regard to the transport, storage, assembly, initial start-up operation and servicing of the device
- Unauthorized manipulation of the device
- Unauthorized alteration of the BB-86 (for example: modifications to the magnetic plate or switches, mechanical components, electrical components or circuitry)
- Poor monitoring of the device components which are wear out
- Incorrectly executed repairs
- Unforeseen disasters by external-material influence and force majeure

Symbols and advisory notations

The following symbols and descriptions are used to emphasize safety risks in this instruction manual:



Warning notice – General danger: Indicates a potentially dangerous situation which can result in minor to severe injuries including death if the safety guidelines are not followed.



Warning notice – Danger of an electrical shock: Indicates a dangerous situation which can result in an electrical shock and severe burns or death if the safety guidelines are not followed.



Warning notice – Danger of pinching fingers and hands: Indicates a potentially dangerous situation which can result in minor to severe injuries to fingers and hands if the safety guidelines are not followed.



Info – notice: Shows Information and/or comments which are important for the appropriate use of the machine and its functionality.



Application – notice: Shows accessories and additional application features of the machine.

Organisational provisions

- The operator must ensure the required safety-equipment is set-up properly.
- All safety devices must be checked at regular intervals.

Protection-apparatus

- Before initial start-up of the device, all protection-apparatus must be correctly installed and functioning.
- Protection devices may be removed only
 - after shutdown and
 - after steps have been taken to prevent the device from re-starting
- Replacement of protection-devices by the operator must be installed in accordance with the regulations.

Informative safety provisions

- The instruction manual must be always kept together with the device.
- In addition to the instruction manual, local regulations covering accident prevention and pollution control must also be observed.
- All safety and warning signs on the device must be kept in a readable condition.

Training of the users

- Only persons who have been instructed and properly trained may use the BB-86.
- All users must be fully trained with all aspects of the device including how to mount, start-up, handle, service, and repair the BB-86.
- Beginners may only work with the BB-86 under the supervision of an experienced user.

Device- magnet and switches

- Do not manipulate the magnetic plate and do not modify the switches under any circumstances.
- Only trained users are allowed to work with the BB-86 device.

Safety provisions in the standard mode

- All protection apparatus must be absolutely functioning whenever the device is in operation.
- Before switching-on the device, the operator must make sure that nobody is exposed to any risks when the device is started.
- The device should be checked for external damage and that it is functioning safely at least one time during each shift.

Risks of electrical power

- Service work conducted on the electrical supply must be done by an expert (i.e. Certified Electrician, etc.)
- Inspection of the electrical components of the device must be performed at regular intervals. Loose connections and damaged cables/wires must be repaired immediately.
- If it is necessary to do work on electric components, a second person must be present who can remove the power cord from the main power outlet in case of an emergency.

Especially dangerous areas

- The magnetic base of the BB-86 poses a risk of pinching fingers and hands when clamping down on the motor block surface. Exercise caution when activating the magnet.
- The rotary cutting bit has very sharp and jagged edges and can cause severe lacerations or others injures. Exercise caution when processing the counterbore sleeves!
- The BB-86, BB-86 Giant and BB-86 Mini have rotating machine parts which present a risk for (long) hair, hands and fingers. Wear suitable personal safety protection equipment (e.g. hairnet, gloves etc.).

Leaking of hazardous dust and vapours

- During the processing of the counterbore sleeve, metal dust, particles, and vapour from the cutting oil can occur. These fine particles can irritate and injure the lungs and eyes. Wear suitable personal safety protection equipment (e.g. safety goggles, mask etc.). Ensure sufficient ventilation during processing. For added safety, an eyeflushing device should be available.

Service and repairs, trouble shooting

- All users must be informed about imminent service and repairs for the device.
- All of the device's pre- or post- switched machine parts and operating mediums, e.g. electricity, must be disengaged to prevent accidental start-up.
- Whenever inspection, service, or repair work is done, the device must be disconnected from the main power supply and the main switch must be locked to prevent unexpected re-starting.
 - Lock and remove the key from the main power switch, if possible.
 - Attach a sign to the device indicating the device cannot be switched on.
- Larger devices must be carefully mounted and secured on lifting gears during replacement.
- Check loosened screw connections for a compact seat.
- Upon completion of the service work, the safety apparatus of the device must be checked and verified.

Constructive modifications on the BB-86

- It is forbidden to add components or make modifications to the device without written authorisation from the manufacturer, Minelli Corp. (MIRA®). This also applies to welded components.
- All constructive modifications require a written approval from the Minelli Corp. (MIRA®) Switzerland
- Faulty device parts may only be replaced by original replacement parts.
- Only use original genuine MIRA® replacement parts.
 - By using replacement parts from third party suppliers, there is no guarantee that the parts are constructed for the required operational demands and the required safety functions.

Cleaning of the BB-86 and disposal of wastes

- Waste materials and by-products must be correctly handled and removed especially when:
 - working on greasy systems- and devices
 - cleaning with solvents
- The external surface of the BB-86 must be cleaned on a regular basis with a dry flannel cloth. Only use industrial cleaner if the device is necessary polluted
- Further cleaning per grade of using and grade of pollution of the device.
- The packaging material used to ship the BB-86 must be disposed of correctly in the respective waste container and/or according to local environmental regulations!

Noise emission of the device

- The sound pressure level emitted by the BB-86, BB-86 Giant and BB-86 Mini, is rated at 30dB(A)
- When the BB-86 is used in combination with the Vario Drive System, there is a sound pressure level up to 70dB(A) emitted from the Vario Drive.

Safety advisory for transporting the device

- When transporting the BB-86, the device must be shipped in the original carrying case that it arrived in when it was delivered from the Minelli Corporation.
- The BB-86 must be protected against damages by the transportation company.
- Typical transportation damages such as dropping or crushing can be avoided by appropriately packing and securing the shipment.
- The MINELLI Corporation will not be liable for inadequate precautions to secure the shipment.

Copyright ©

The exclusive copyright of this instruction manual belongs to the MINELLI Corporation (MIRA).

This instruction manual is provided to the operator and his personnel.

Minelli Corporation
MIRA Division
Mattenstrasse 3
8330 Pfäffikon ZH
Switzerland CH

For the provided technical documentation see the authorised person in chapter „Declaration of conformity” on page 9

Non-liability

The BB-86 turning device for sleeve counterbore procedures may only be operated according to the Operating Instructions. The manufacturer refuses to accept any liability for accidents and damages caused by incorrect operation. He also refuses any liability for unintended use of the device.

Warranty

In case of manufacturing or material defects, Minelli Corporation will replace the defective part or parts at no charge, within 24 months of the date of purchase. No further claims will be covered under the warranty. Defective parts must be returned along with proof of purchase. The warranty does not cover any subsequent damage caused by these defective parts. The warranty does not cover unprofessional handling, the use of incorrect electronic parts or deliberate damage, nor does it cover shipping and packing costs.

Declaration of conformity BB-86 Standard

MINELLI

Minelli AG
 Mattenstrasse 3
 8330 Pfäffikon ZH
 Schweiz / Switzerland
 www.minelli.ch
 sales@minelli.ch

Konformitätserklärung
Déclaration de conformité
Declaration of conformity
Dichiarazione di Conformità

Wir/Nous/We/Noi,

Minelli AG
Mattenstrasse 3
CH-8330 Pfäffikon ZH

erklären in alleiniger Verantwortung, dass das Produkt
déclarons de notre seule responsabilité que le produit
 bearing sole responsibility, hereby declare that the product
 dichiariamo sotto la nostra sola e completa responsabilità che il prodotto

Beschreibung des Produkts
 BB-86
Description du produit
 BB-86
Description of product
 BB-86
Descrizione del Prodotto
 BB-86
Typenreihe/ Série type / Type Series/ Serie Tipo
 865

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt:

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 referred to by this declaration is in conformity with the following standards or normative documents:
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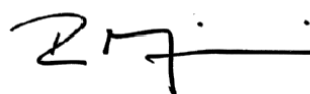
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 EN 61000-3-3:13
 EN 61000-6-2:05
 EN 61000-6-3:07 + A1:11
 EN 62233:08

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 2014/35/UE: Direttiva bassa tensione

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Reto Minelli (CEO/Geschäftsführer)
L'administrateur délégué
 General Manager
 Amministratore delegato

Declaration of conformity BB-86 Mini

MINELLI[®]

Minelli AG
 Mattenstrasse 3
 8330 Pfäffikon ZH
 Schweiz / Switzerland
 www.minelli.ch
 sales@minelli.ch

Konformitätserklärung
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déclarons de notre seule responsabilité que le produit
 bearing sole responsibility, hereby declare that the product
 dichiariamo sotto la nostra sola e completa responsabilità che il prodotto

Beschreibung des Produkts
 BB-86 Mini
Description du produit
BB-86 Mini
Description of product
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 BB-86 Mini
Typenreihe/ Série type / Type Series/ Serie Tipo
 0609

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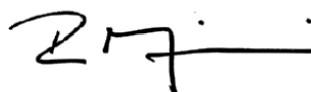
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Pfäffikon ZH, 18.07.2023



Reto Minelli (CEO/Geschäftsführer)
L'administrateur délégué
General Manager
Amministratore delegato

Declaration of conformity BB-86 Giant

MINELLI®

Minelli AG
 Mattenstrasse 3
 8330 Pfäffikon ZH
 Schweiz / Switzerland
 www.minelli.ch
 sales@minelli.ch

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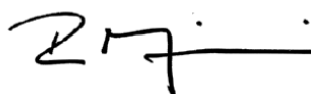
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Reto Minelli (CEO/Geschäftsführer)
L'administrateur délégué
 General Manager
 Amministratore delegato

BB-86 Sleeve counterbore tooling

After a diesel engine block has been re-surfaced, the height of the counterbores must be re-adapted to the size of the liner rims, minus the amount of the protrusion. Also in the case of leaking liners, the counterbores must be refaced, preferably on the vehicle, without having to remove the engine. The portable MIRA BB-unit performs both applications in a simple, quick and extremely precise operation. Figure 2



Figure 2



Figure 1



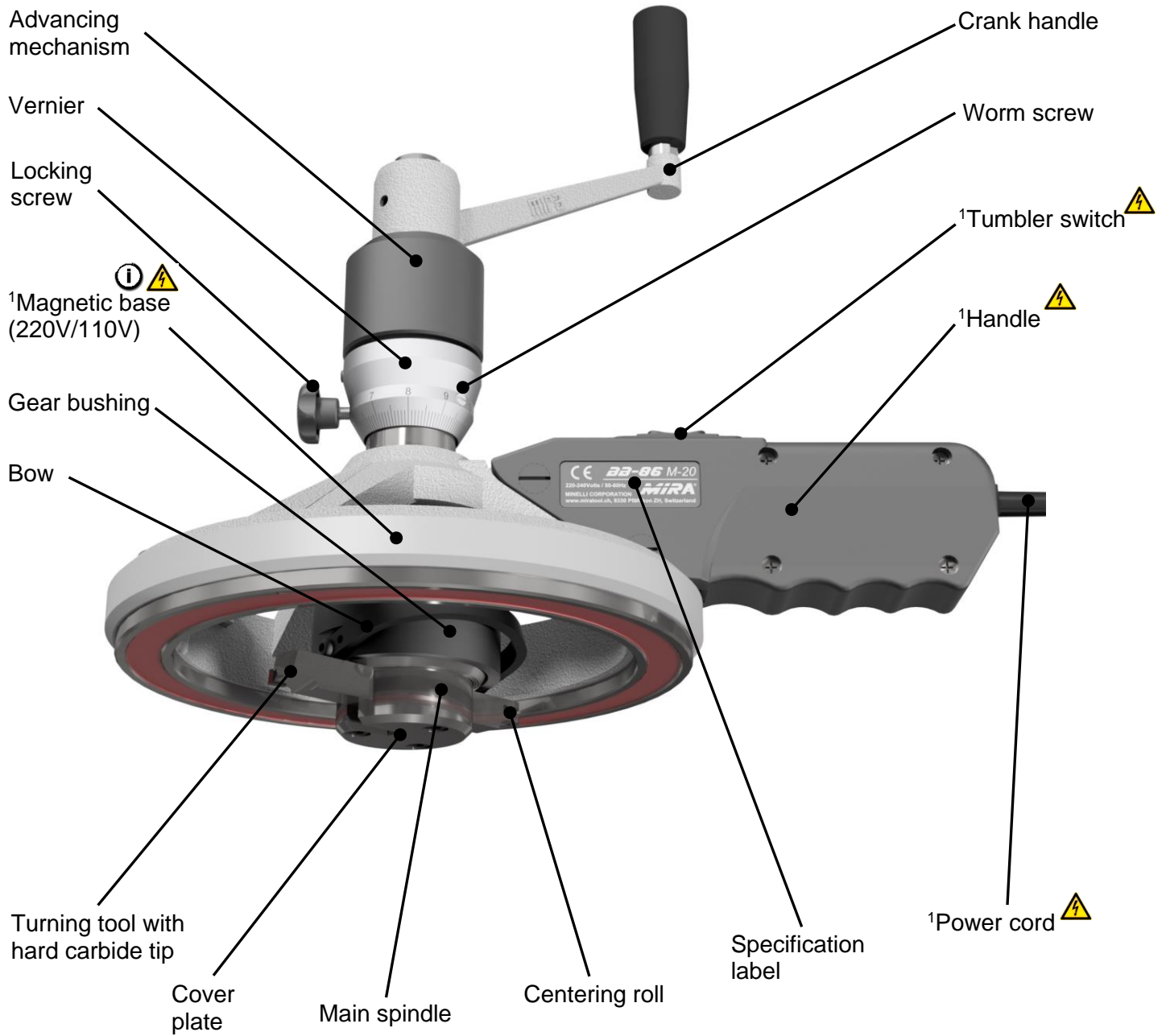
Figure 3

Processing of counterbore seats

The MIRA BB-device is simple to operate and the procedure is very fast and precise. After insertion of the correct cutting tool, the device is placed onto the clean cylinderblock surface. The centering is done by means of a roller device which is on the backside of the cutting tool, and guides the cross feed. A powerful electro-magnet holds the device firmly in place. Figure 1 and Figure 3

The exact depth of the tool is set on the micrometric vertical feed. By turning the handle and simultaneously holding the crossfeed ring with the other hand, the carbide tip tool advances horizontally and cuts the counterbore to its exact depth.

1 Description of parts



i It is recommended that the magnetic base be deactivated when the device is not in use.

⚡ **1** To avoid accidents from an electrical shock, unplug the power cord from the electrical outlet first! After that, repairs can be safely performed on the electrical components.

2 Performance system of the BB-86 unit

The BB-86 Standard as well as the BB-86 Giant are made for processing counterbore sleeves, and offer the following features and functions:

Mini

Standard

Giant



1. Electro-magnetic base BB-86:

- Attaches directly onto the engine block (See page 22)
- or onto the intercostal plate (See page 28)
- or onto the MIRA Repair ring (See page 36)



Figure 4

2. Tumbler switch

Pos. 1 } Magnet on
ON-Position

Pos. 0 } Magnet off (Residual magnetism remains)
(Mid-position) } Figure 4

Pos. 2 } Polarity is reversed
(short tap) } (Removes any residual magnetic field from the engine block)



Figure 5

3. Vertical feed with advancing mechanism
Adjusts the depth of the turning tool. Figure 5

Vernier is adjustable to 0 (See step 14 on page 25)
1 Revolution = 1mm
1 Graduation mark = 0.01mm (1/100mm)

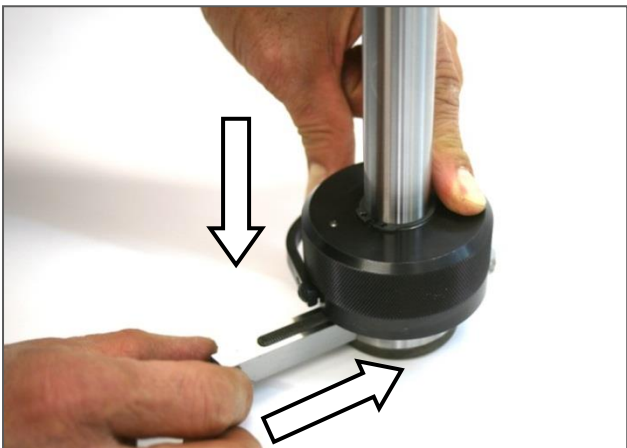


Figure 6

4. Bow

For inserting, removing and quick setting of the turning tool. Figure 6 and Figure 7



Figure 7



Figure 8

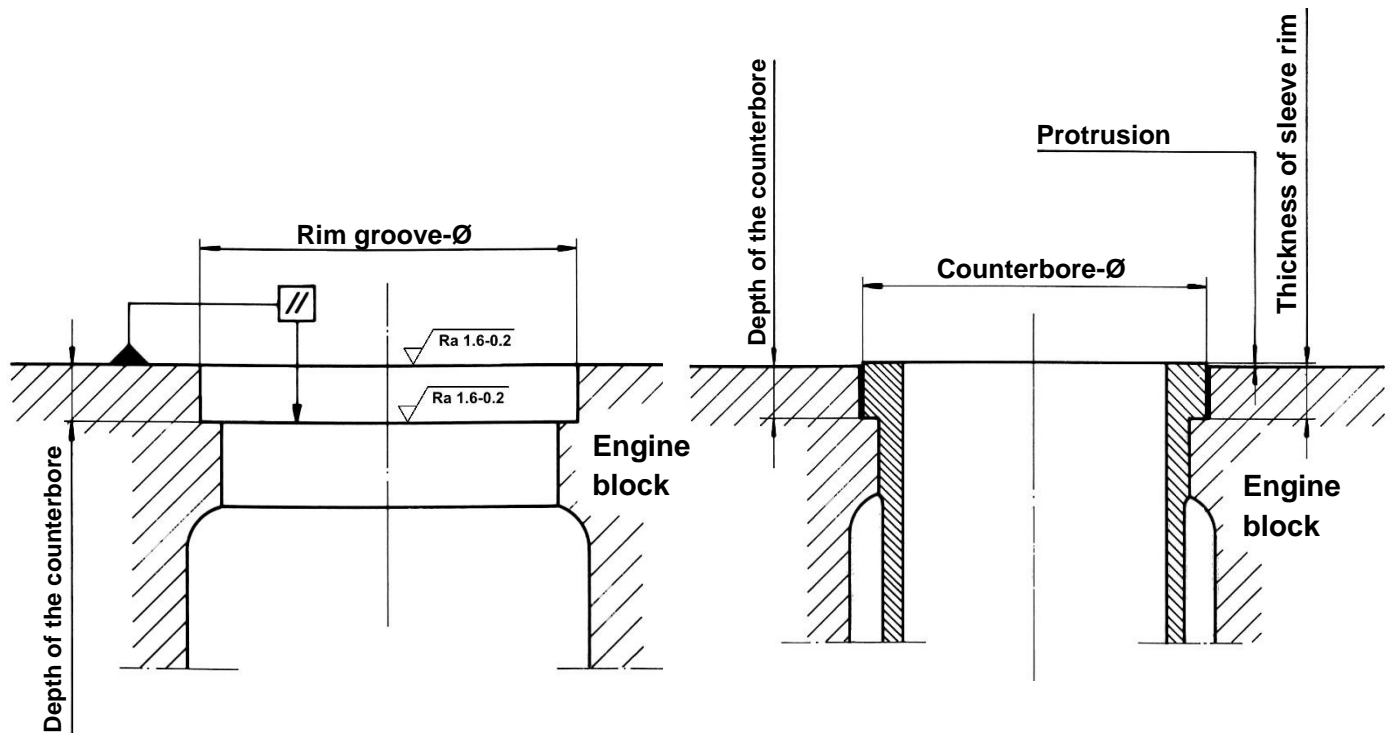
5. Horizontal feed with gear bushing

By firmly holding the gear bushing and simultaneously turning the crank handle, a horizontal feed of **0.15mm** per revolution is achieved by means of a planetary gear and a plano-thread. A reduced cross feed speed can be obtained by pressing the fingers against the gear bushing. Figure 8

3 Working method

This picture shows the important working surfaces. These are the sealing surface of the block and the sealing and bearing surface of the sleeve collar.

Depending on the specifications of the engine manufacturer, the inserted sleeve can be protruding or recessed.

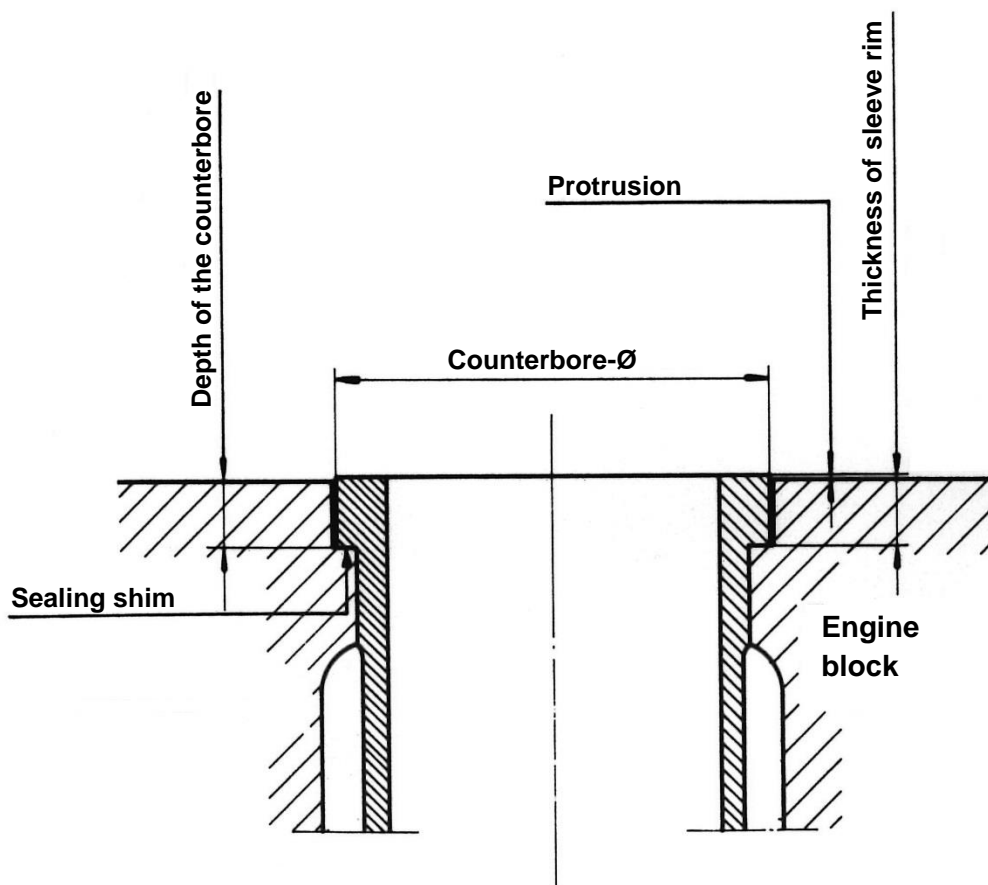


3.1 Example A

This example applies to a dismantled engine where the block has been re-surfaced and new sleeves have been inserted. In this case, the counterbore depth will have been reduced by the re-surfacing of the block, and needs to be adjusted. Proceed as follows: Clean the sleeves and accurately measure the collar thickness of each sleeve with the micrometer. Write the measurement onto each sleeve, and number them in accordance with the cylinder. Subtract the amount of the protrusion specified by the manufacturer from the collar thickness and write the result onto the surface of the block of each counterbore.

There are 2 different methods for working with the tool:

1. If the same turning tool is frequently used, it is recommended that the vernier be set to 0 (See step 14 on page 25). This can be accomplished after centering of the unit by means of the advancing mechanism. The required depth can be set and blocked in this position. Now the proper surfacing of the seat can be started (see „Turning tools and their application“ on page 18).
2. If the same turning tool is not used everytime, there is no advantage to be gained by setting the vernier to 0. In this case proceed as follows: for each counterbore, the existing depth must be measured and compared with the nominal value and the difference must be written down. After centering of the unit, the tip of the turning tool must be set above the seat at the precise location where the measurement was taken. By slightly turning the crank handle and simultaneously advancing the vertical feed, the turning tool will come in contact with the seat (see steps 11 and 12 on the pages 24 and 25). Thereafter, the turning tool needs to be pushed back into the free area with the hard metal tip positioned just above of the counterbore seat. Following that, the previously measured depth difference needs to be set. Finally, the advancing mechanism locking screw must be blocked and then the seat surfacing can be started.



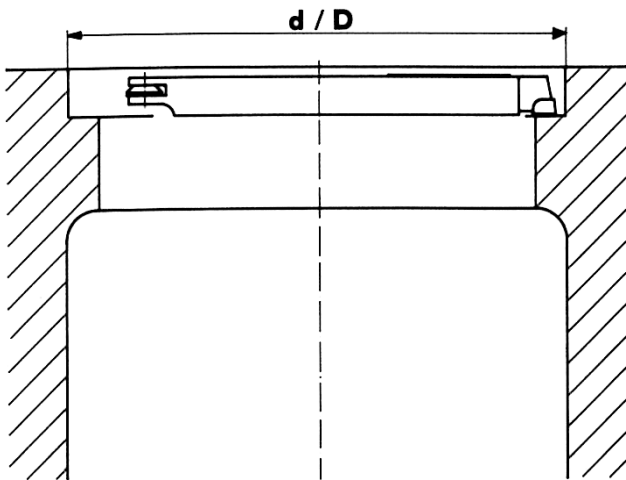
3.2 Example B

If an engine is only partially dismantled or only one counterbore needs work, the situation changes. In such a case the block is not re-surfaced. Instead, the leaky sleeve has to be replaced by an oversized sleeve, or a sealing sheet needs to be applied to the standard sleeve. The correct counterbore depth must be determined by either the thickness of the sealing sheet, or the oversized collar.

If only one counterbore needs to be repaired, a repair centering ring is available to simplify the procedure. The repair centering ring compensates for the protrusion of the neighboring sleeves (see „Special accessories“ on page 36). The picture shows the important surfaces to be worked on. These include the sealing surface for the cylinderhead and also the sealing and bearing surface for the sleeve collar. The sleeve should be set according to the specifications of the engine manufacturer. The sleeve can be recessed instead of protruding.

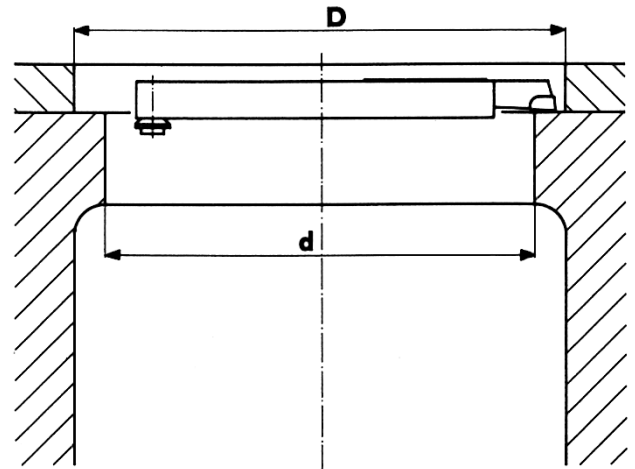
4 Turning tools and their application

Standard counterbore seat turning tool



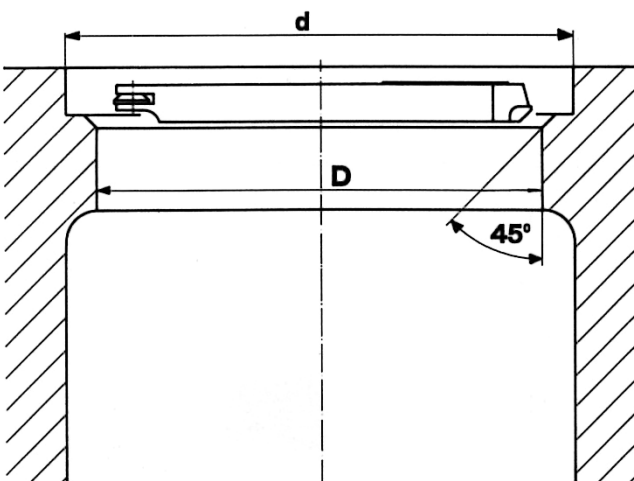
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-85	73-86	67-86	
MB-86	85-104	77-104	
MB-87	97-126	87-126	
MB-88	123-160	111-160	
MB-89	158-194	146-196	
MB-90*	192-224	178-224	

Turning tool for engines with intercoastal plate or with interrupted counterbore wall



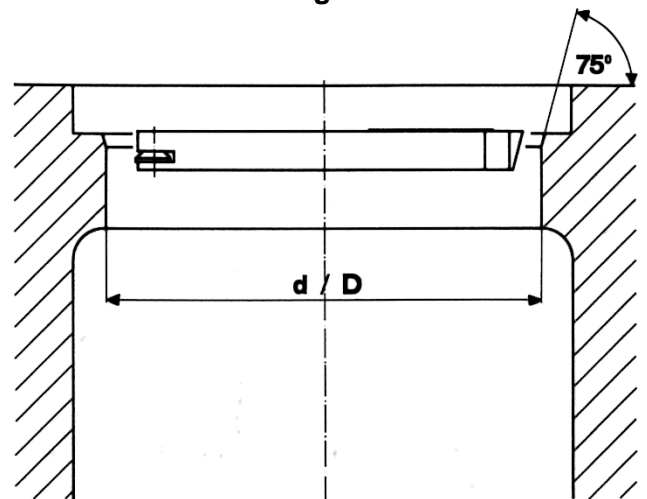
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-136	105-130	105-130	
MB-137	130-160	130-174	CAT 3304, 3306, D343
MB-138	160-190	160-200	CAT D379, D398, D399
MB-139	190-220	190-240	CAT 3500-3508

Chamfering tool 45°



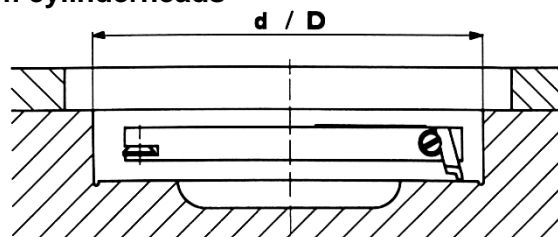
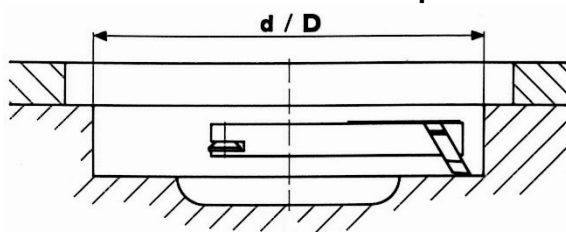
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-96	73-84	59-84	
MB-97	84-102	70-102	
MB-98	95-122	81-122	
MB-99	123-158	109-154	

Chamfering tool 75°



Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-100	98-126	98-126	
MB-101	120-164	120-164	
MB-102	152-192	152-192	

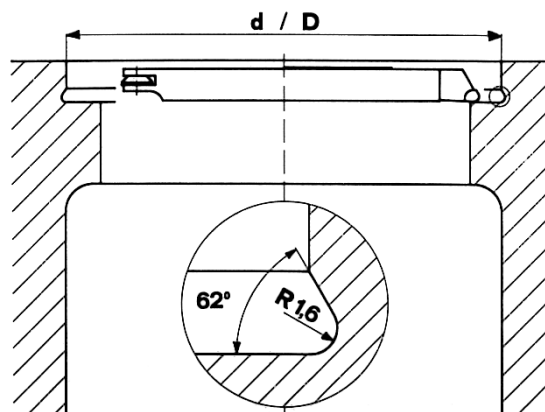
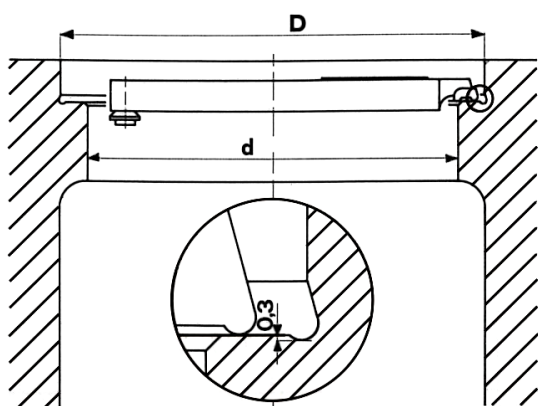
Special tools for aluminium cylinderheads



Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-92	90-124	84-124	Deutz, Daf, Güldner
MB-93	73-88	67-88	VW, Porsche

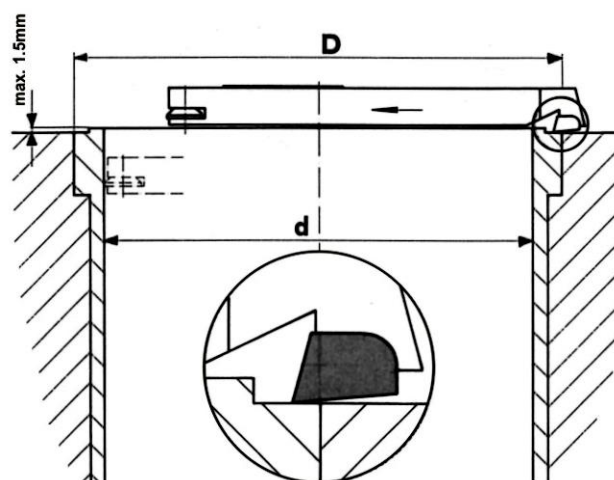
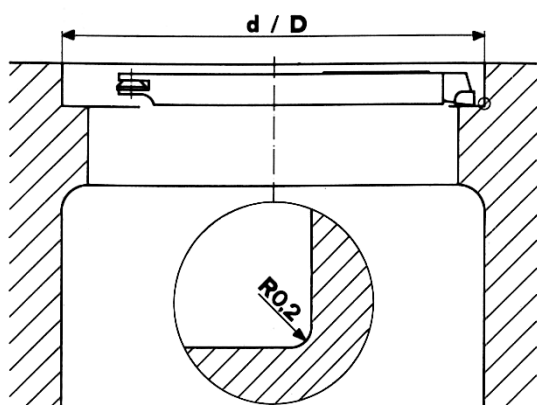
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-91/1	120-150	154-150	Deutz
MB-108	106-122	100-122	KHD

**Special tools for counterbore seat
corresponding to construction specifications**



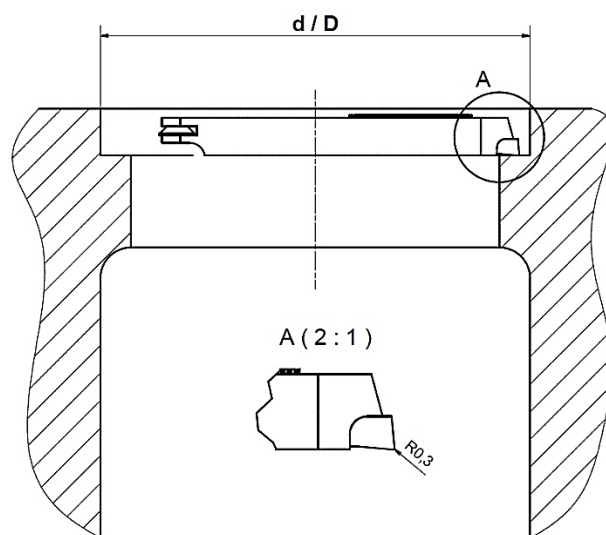
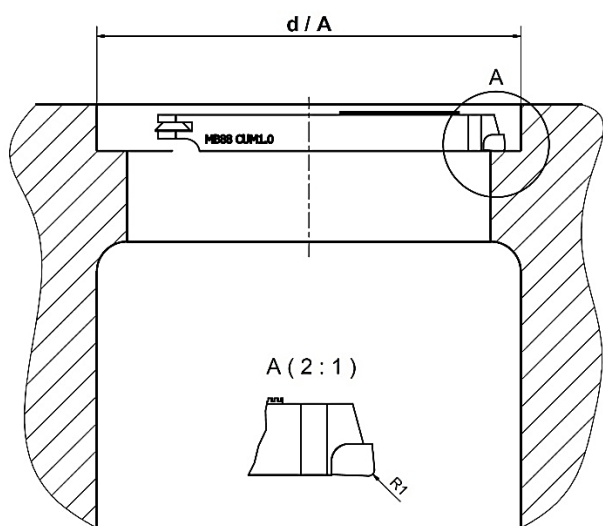
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-113	127-158	127-166	Saurer

Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-119	158-194	144-194	Henschel 1516



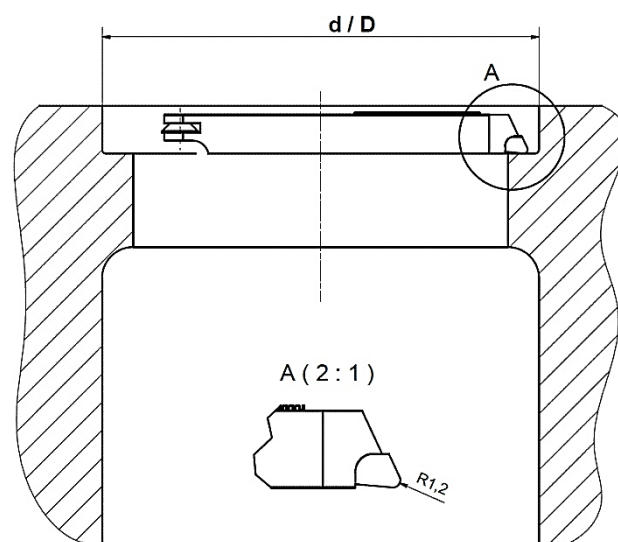
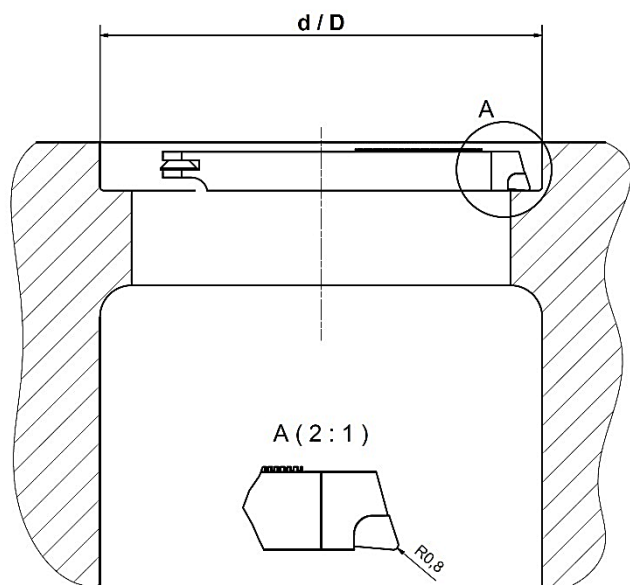
Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-88AD	130-166	122-166	Mercedes

Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB-94	123-150	123-154	Mercedes
MB-109	114-146	114-146	Perkins



Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB88CUM1.0	123-160	111-160	Cummins

Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB88DAF0.3	123-160	111-160	DAF



Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB88DAF0.8	123-160	111-160	DAF, Paccar

(For Paccar engine MX 11)

Order-No.:	Center-Ø d (mm)	Working-Ø D (mm)	Remarks
MB88DAF1.2	123-160	111-160	DAF, Paccar

(For Paccar engine MX 13)

5 Working process

For perfect results, the following points are essential:

- The unit must be well grounded
- The unit must be clean
- The set up area must be absolutely clean



WARNING!

The BB turning tool has sharp and pointed edges and must be handled carefully.

In addition, the magnetic base poses a risk of pinching hands or fingers if they are caught between the activated magnetic base and the motor block surface!

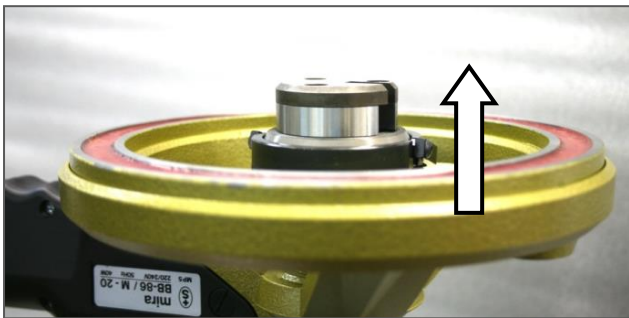


Figure 9

1. In order to insert the turning tool into the channel of the main spindle, the advancing mechanism must be advanced (loosen locking screw) until the upper side of the main spindle extends past the magnetic base. Figure 9

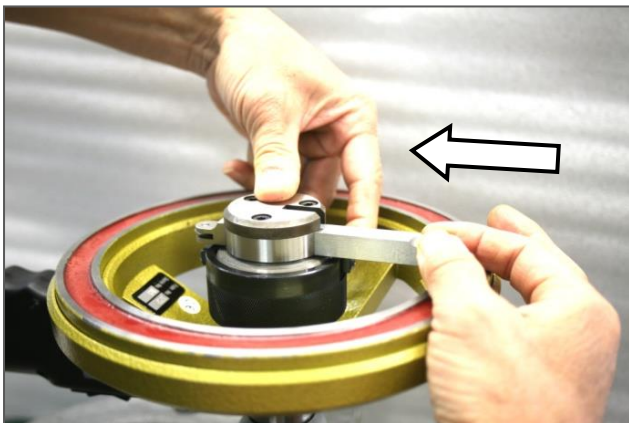


Figure 10

2. Push the bow and insert the turning tool with the thread on the upper side, so that the centering roll stays on the side of the main spindle which is marked with "R". Figure 10



Figure 11

3. Attach the crank handle and tighten the worm screw. Figure 11



Figure 12

- Using both hands, place the unit on top of the cleaned set up area (the handle is positioned to left in this example). Connect the power cord to an electrical outlet. Figure 12

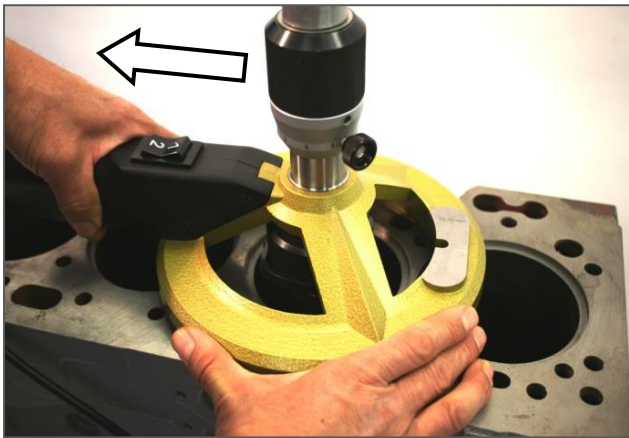


Figure 13

- Place the unit slightly off center to the counterbore. The greater distance to the center of the unit should be on the opposite side of the handle. Figure 13

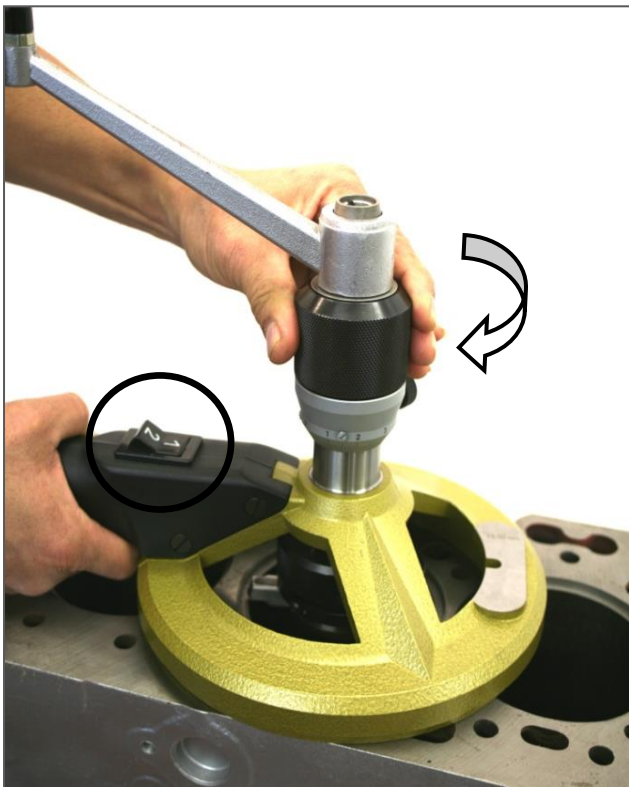


Figure 14

- Move the switch to position 1. Raise the main spindle by means of the vertical advancing mechanism until the cutting edge is above the counterbore seat, lock slightly. Figure 14

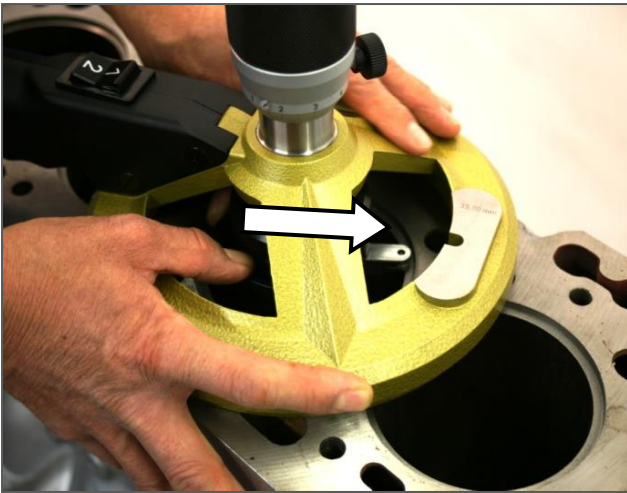


Figure 15

7. Push the bow and place the centering roller against the counterbore wall at the point where the centering distance is the largest. Release the bow and move the tumbler switch to the center position. Figure 15



Figure 16

8. To center the unit, hold the gear bushing with 2 fingers and turn the crank handle clockwise.

The unit will now move off center with every revolution. This off-center movement will decrease and finally stop as the centering roller moves back and forth against the center of the unit. Figure 16

Attention: Release the gear bushing when the centering roller makes light contact with the entire circumference of the counterbore wall.

If the centering roller loses contact with the counterbore wall, the tool can be moved to the opposite side by again holding the gear bushing and turning the handle counter-clockwise until the unit is again moving off center.

If in the meantime a residual magnetism has been lost, it must be re-established (tumbler switch to position "1", then back to the mid-position). The centering procedure can now be repeated.



Figure 17

9. After the device has been perfectly centered, set the tumbler switch to position "1".

Check: After the magnet has been engaged, the crank handle must turn freely and the centering roller should make light contact with the entire circumference of the counterbore wall. Figure 17

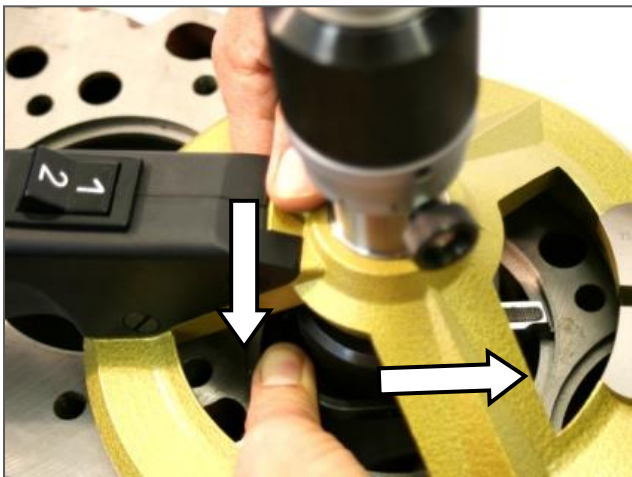


Figure 18

10. The cutting bit of the turning tool can now be moved into position on top of the counterbore seat by pushing down on the bow. Figure 18



Figure 19

11. Loosen the locking screw then slowly turn the crank handle while simultaneously turning the advancing mechanism (both clockwise) until the turning tool contacts the seat. If the depth has been previously measured at a certain point, then you must also make contact at the same point by slightly turning the handle. Now tighten the locking screw slightly. Figure 19



Figure 20

12. Push the bow and return the turning tool to the free space with the hard metal tip positioned just above the counterbore. Figure 20



Figure 21

13. Loosen the locking screw and set the correct depth by using the advancing mechanism. Reblock the locking screw. Figure 21



WARNING!

When performing the following steps, metal fragments and dust can occur. This can be hazardous to the eyes and the skin.

Wear personal safety protection equipment during the entire process of machining the counterbores! (E.g. safety goggles, etc.)



Figure 22

14. Depending on the working method (as described under Example A), the vernier can be set to 0. For this purpose, the turning tool must be brought into contact with the sealing surface of the engine block. Then, the locking screw of the advancing mechanism and the worm screw of the vernier must be loosened with an Allen wrench.

The vernier can now be set to the mark on the guide. The micrometer graduation on the vernier shows the actual depth of the turning tool bit. Whenever the turning tool is replaced, this 0-setting must be repeated. Figure 22



Figure 23

- When refacing the counterbore seat, turn the crank handle clockwise. At the same time, hold the gear bushing. This will result in a horizontal feed of **0.15mm** per revolution. Turn the crank handle more carefully when the carbide tip approaches the wall and let the gear bushing slip partially between your fingers. This permits you to stop turning as soon as the carbide tip touches the wall. Figure 23

ATTENTION:
Do not turn the crank handle backwards, otherwise the hard metal tip might break.

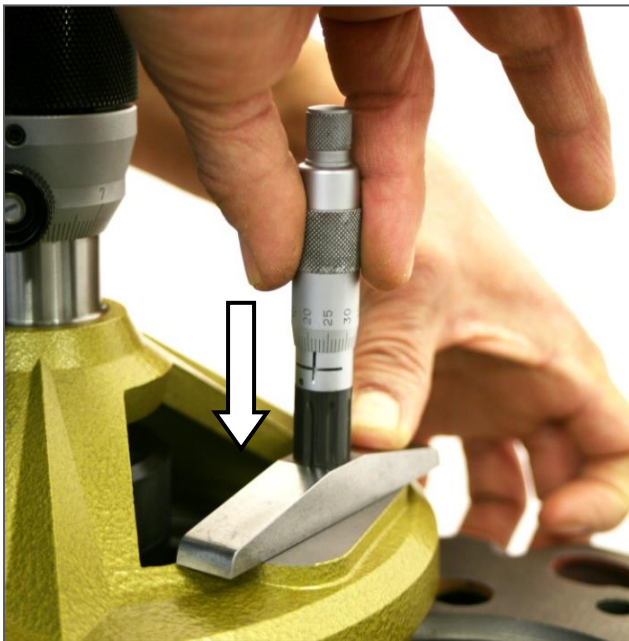


Figure 24

- The measuring level on the magnetic base allows the counterbore depth to be checked without removing the unit. Figure 24

The level height above the engine surface is:

BB-86 Standard	35.00mm (1.378 In)
BB-86 Mini	35.00mm (1.378 In)
BB-86 Giant	32.00mm (1.259 In)

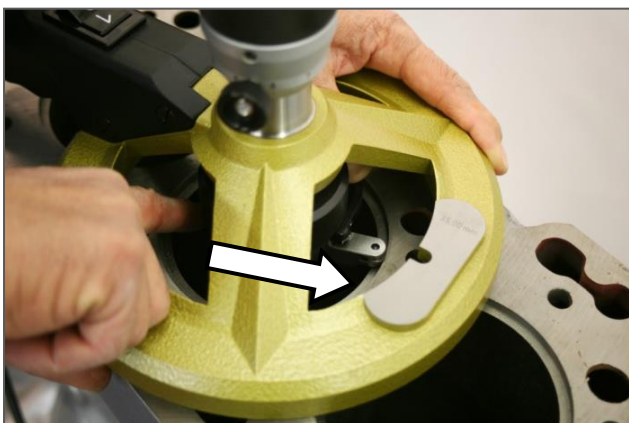


Figure 25

- Press the bow downwards and push the turning tool until the centering roller touches the counterbore wall. This step enables a rough centering of the unit on the next counterbore. Figure 25



Figure 26

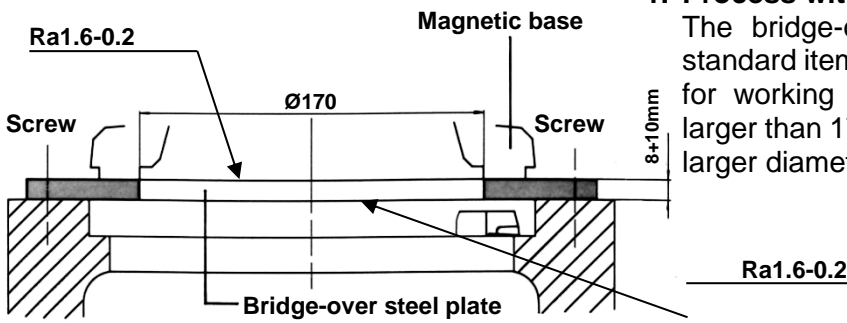
18. Move the tumbler switch to position „2“, then back to the middle position. Then remove the unit with both hands. Figure 26



Figure 27

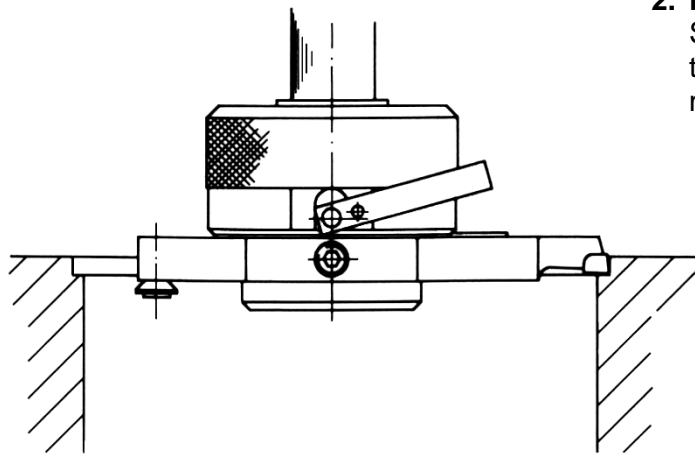
19. Clean the metal particles from the device and place it onto the clean surface above the next counterbore. Figure 27

6 Special applications



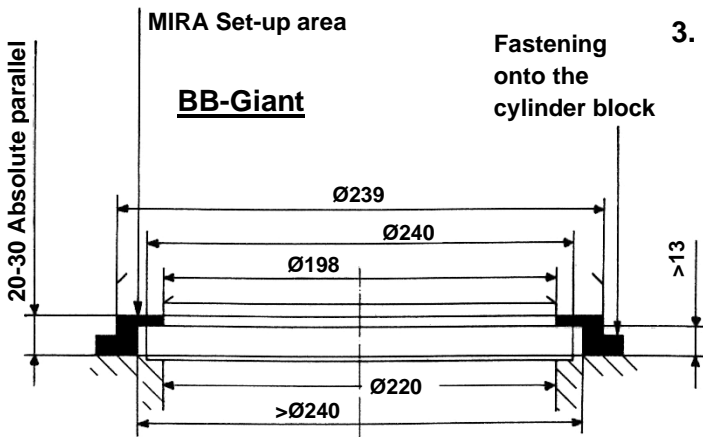
1. Process with screwed-on intercostal steel plate

The bridge-over steel plate is not available as a standard item. It is specifically custom made. It is used for working on counterbores that have a diameter larger than 170mm with the BB-Standard unit or with a larger diameter than 198mm with the BB-Giant unit.



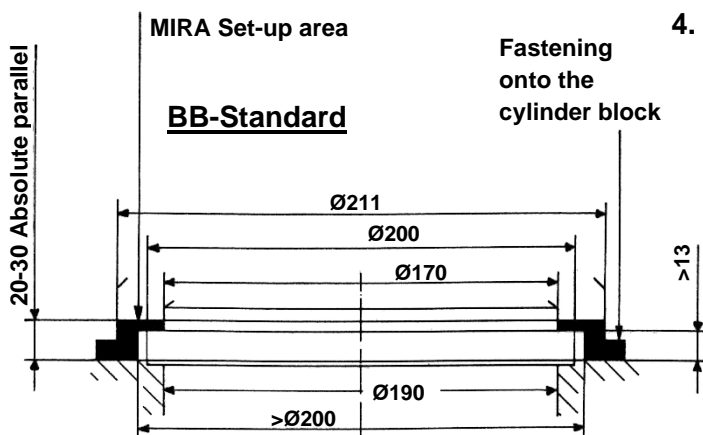
2. Preparation of a counterbore seat for a dry sleeve

Set the correct diameter and fix the pressure bolt for the turning tool, then proceed by using the advancing mechanism.



3. Process with screwed-on intercostal

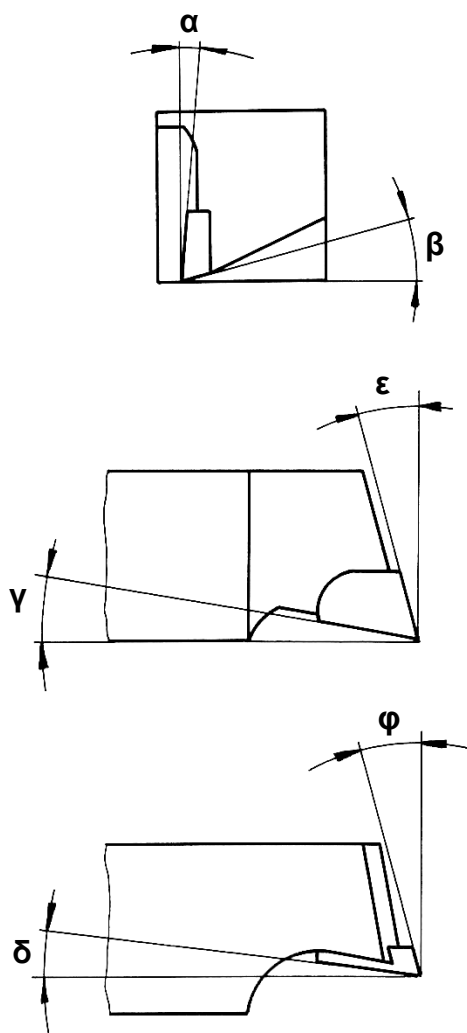
The bridge-over steel plate is not available as a standard item. It is specifically custom made. It is for use on Caterpillar engine blocks from type 3500 to 3508.



4. Process with BB-Giant unit or with Standard unit on screwed-on intercostal steel plate

The bridge-over steel plate is not available as a standard item. It is specifically custom made. It is for use on Caterpillar engine block types: D353, D379, D398, and D399.

7 Service and maintenance



7.1 Grinding of the turning tools

Angle specifications							
Tool type MB	α	β	γ	δ	ϵ	ϕ	r
85, 86, 87, 88, 98, 90	0°	2°	2°	0°	5°	5°	
88 AD	5°	5°	1°	2°	0°	5°	
94, 109	0°	2°	2°	0°	5°	3°	
96, 97, 98, 99	0°	5°	0°	0°	0°	0°	
100, 101, 102	0°	0°	0°	0°	0°	5°	
113	0°	5°	-	0°	20°	5°	
136, 137, 138, 139	0°	2°	2°	0°	5°	5°	
119	5°	2°	2°	2°	28°	5°	
88 DAF0.3	0°	2°	5°	0°	5°	5°	0.3
88 DAF0.8	0°	2°	5°	0°	18°	5°	0.8
88 DAF1.2	0°	2°	5°	0°	25°	5°	1.2
88 CUM1.0	0°	2°	2°	0°	5°	5°	1



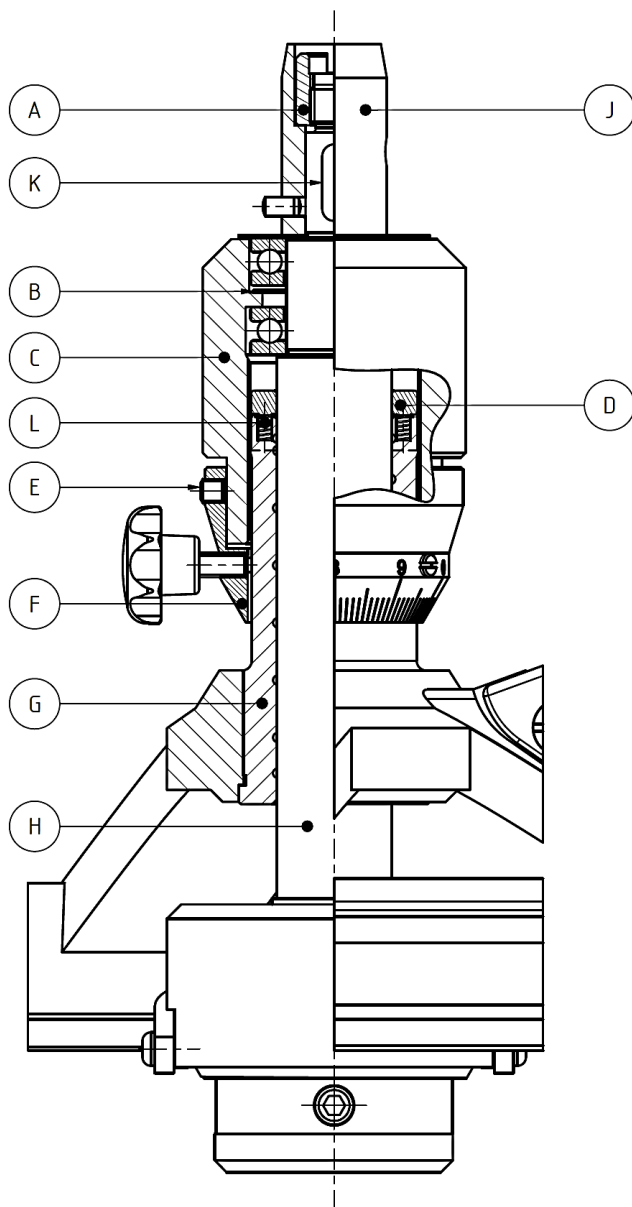
Figure 28

7.2 Quick precision check

- E.g.; after dropping down (crashing) of the unit.

Periodically perform a quick check to ensure the precision of the device. Place the BB upside down and turn the unit by means of the power cord. The magnetic base should not have more than **0,025mm** variance in the height. Figure 28

7.3 Lubrication of the main spindle and the advancing mechanism



Annual service:

1. Remove the vernier (F) from the advancing mechanism (loosen worm screw (E)), but leave it on the spindle guide (G).
2. Loosen special nut (A) and remove adapter or crank handle (J). After removing the key (K), the main spindle (H) can be pulled down completely.
3. Slowly screw the advancing mechanism upward (C). Be careful that none of the parts from the spring-loaded threaded ring (D) get lost.
4. Clean all parts and lubricate them.
5. When screwing on the advancing mechanism (C), be sure the threaded ring (D) is being fixed again in the same position. When reaching the guide (G) with the threaded ring (D), press down the advancing mechanism (C) in order to reduce the play of the springs (L) to zero.
6. When placing the main spindle (H), be sure the compensating spring (B) is properly fixed.

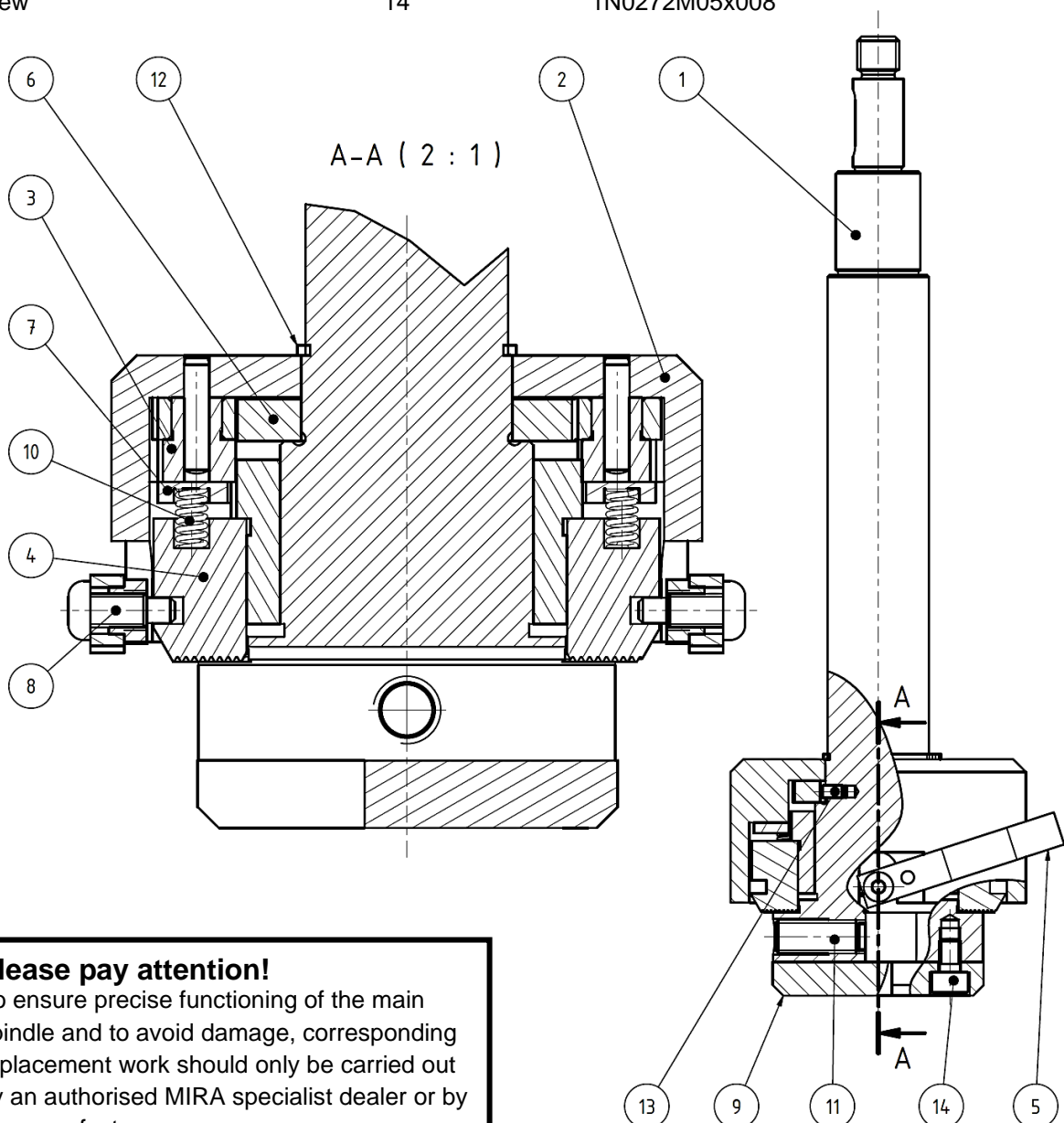
8 Spare parts BB-86 main spindle

When ordering spare parts, the serial- and the manufacturing number of the units must always be indicated.

Spare parts valid with Serial-No.: 865 and 0609

from manufacturing-No.: 6000<

Description	Pos.	Part-No.:
Main spindle	1	18051.3.2351
Gear bushing	2	18041.4.2352
Gear wheel complete	3	18041.4.1361
Advancing device	4	18041.4.2357
Bow	5	18041.4.2354
Driving gear wheel	6	18041.4.1087
Gliding ring	7	18041.4.2353
Lifting bow screw	8	18041.4.2358
Cover plate	9	18041.4.1148
Compression spring	10	1MDF18
Pressure bolt	11	1MDB08/20
Retaining ring	12	1N0818A24
Dowel pin h6	13	1N085803x006
Inhex screw	14	1N0272M05x008



Please pay attention!

To ensure precise functioning of the main spindle and to avoid damage, corresponding replacement work should only be carried out by an authorised MIRA specialist dealer or by the manufacturer.

9 Spare parts BB-86 units

(BB-86 Standard, BB-86 Mini and BB-86 Giant with mains voltage 230 / 110VAC and 50 / 60Hz)

When ordering spare parts, the serial- and the manufacturing number of the units must always be indicated.

Spare parts valid with Serial-No.: 865 and 0609

from manufacturing-No.: 6000<

Description	Pos.	Part-No.:
Magnetic base 230V M-20 (BB-86 standard)	*1	18042.2.1301A
Magnetic base 110V M-10 (BB-86 standard)	*2	18042.2.1301B
Main spindle assembly	3	18042.3.2390
Cover disk	4	18042.4.2325
Crank handle	5	10142.3.2457
Adapter	6	18042.4.2474
Special nut	7	18042.4.2473
Advancing device	8	18042.4.2323
Threaded ring	9	18042.4.2322
Vernier	10	18042.4.2324
Handle left complete	11	18042.2.1230A
Handle right	12	18042.2.1230B
Current protection	13	18052.4.2459
Cover plate	14	18052.4.2480
Handle screw	15	18042.4.1240
Cover screw	16	18042.4.1241
Switch plate	17	10141.1.5292
Tumbler switch	18	10142.3.3802
Electronic cartridge	19	10142.2.2966
Mains lead CH	*20	18042.4.1363A
Mains lead Schuko	*21	18042.4.1363B
Mains lead USA	*22	18042.4.1363C
Type plate M-20	*23	18042.4.2781A
Type plate M-10	*24	18042.4.2781B
Factory label	25	18052.4.3021A
Joint protection	26	10142.4.2934
Key	30	1N087005x05x16
PT screw 3.5x20	31	1N13576KA35x020
Setscrew	32	1N1406M04x020
Setscrew slotted, Polyamide	33	1N1073M05x006
Sheet metal screw	34	1N0995M2.9x6.5
Spring ring M4	35	1N0762M04
Washer	36	1N0566M04
Hex nut, brass	37	1N0505M04
Inhex screw slotted	38	1N0330M2.5x006
Setscrew	39	1N0024M05x004
Locking screw	40	1NH6336M5KU
Compression spring	41	1MDF03
Compensating spring	42	1MAS24.5
Grooved axial ball bearing	43	1LAR20
Clip	44	1EKM04
Cable ties	45	1EKB02.2
Earth symbol	46	1EEZ04
Strain relief clip	47	1EZB01

Description	Pos.	Part-No.:
Magnetic base 230V MD-20 (BB-86 Mini)	*90	18042.2.5079
Magnetic base 110V MD-10 (BB-86 Mini)	*91	18042.2.6741
Type plate MD-20 (BB-86 Mini)	*92	18042.4.5084A
Type plate MD-10 (BB-86 Mini)	*93	18042.4.5084B
Magnetic base 230V MG-20(BB-86 Giant)	*94	18042.2.1422A
Magnetic base 110V MG-10 (BB-86 Giant)	*95	18042.2.1422B
Type plate MG-20 (BB-86 Giant)	*96	18042.4.2777A
Type plate MG-10 (BB-86 Giant)	*97	18042.4.2777B
Short crank handle	98	18032.4.2479
Handle grip M10	99	10141.4.1242
Setscrew	100	1N0024M06x006

(The following items are not visible on the assembly drawing:)

BB-86 wooden case	27	18062.2.2573
Allen key 3.0mm	28	1WIS3.0
Allen key 2.5mm	29	1WIS2.5
Instruction manual DE	*48	1PBA03a
Instruction manual EN	*49	1PBA03b
Instruction manual ES	*50	1PBA03c
Cardboard for palett shippment	*51	1VKS01
Cardboard for single shippment	*52	1VKS09

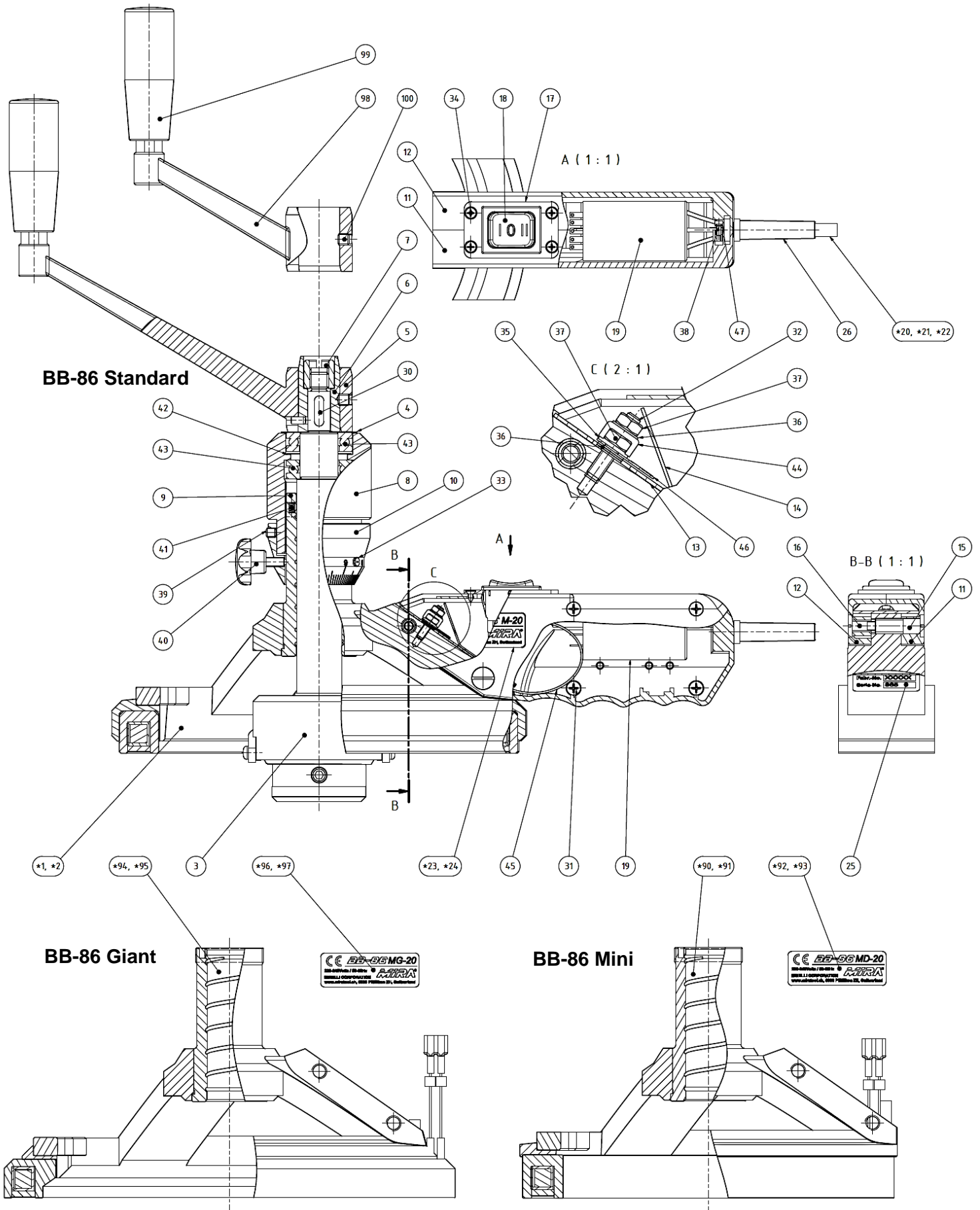


Special accessories

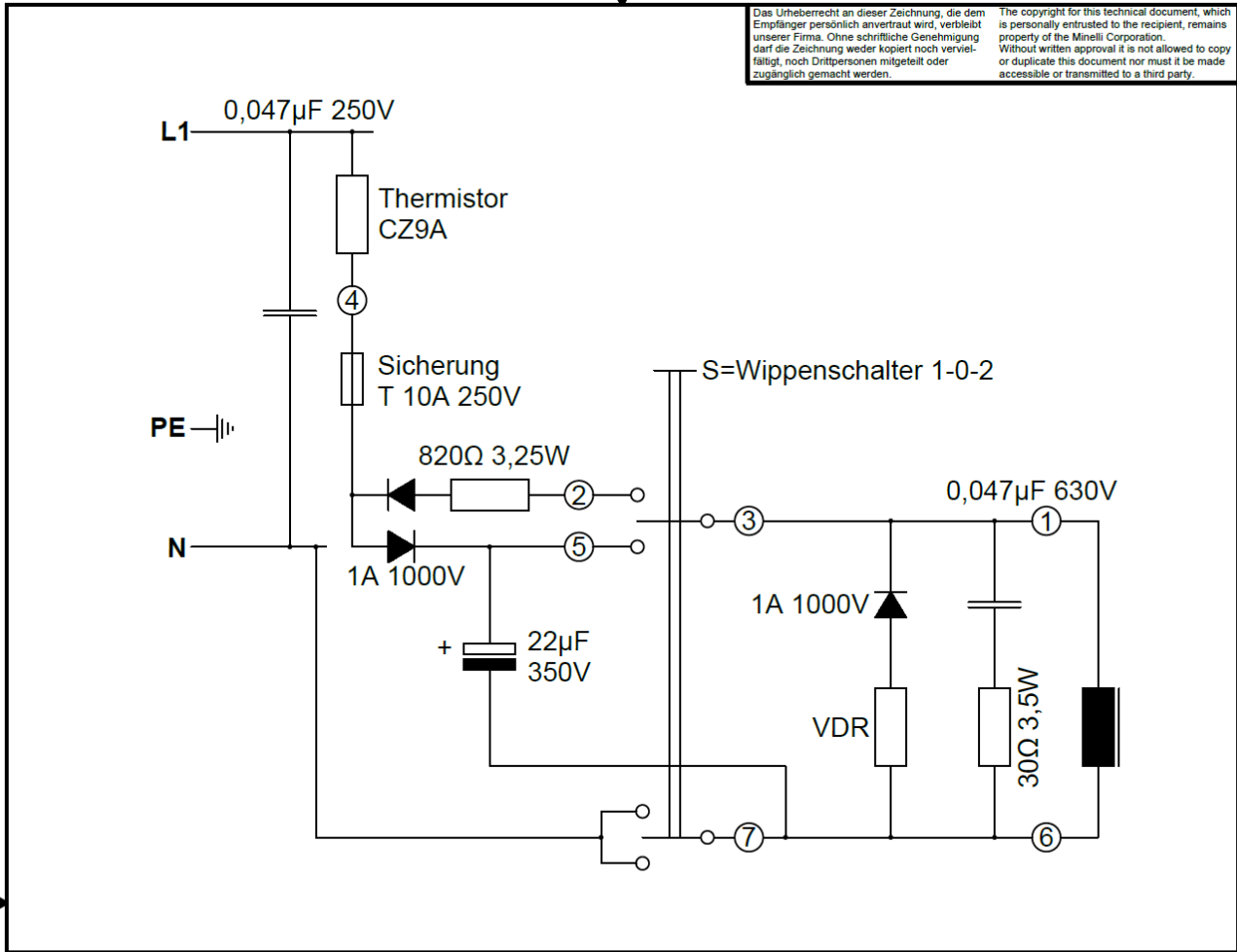
See page 36

10 Assembly drawing BB-86 units

(BB-86 Standard, BB-86 Mini and BB-86 Giant with mains voltage 230 / 110VAC and 50 / 60Hz)



11 Schematic diagram



Das Urheberrecht an dieser Zeichnung, die dem Empfänger persönlich anvertraut wird, verbleibt unserer Firma. Ohne schriftliche Genehmigung darf die Zeichnung weder kopiert noch vervielfältigt, noch Dritten mitgeteilt oder zugänglich gemacht werden.

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MIRA Gerätevarianten

MIRA Gerät	Netzspannung	Widerstand (Magnetspule)
VG20	230VAC	6000Wi ~ 3000Ω
VG20	110VAC	3160Wi ~ 800Ω
BB-86 M20	230VAC	2800Wi ~ 1900Ω
BB-86 M10	110VAC	2390Wi ~ 1100Ω
BB-86 Giant MG20	230VAC	2850Wi ~ 2000Ω
BB-86 Giant MG10	110VAC	2240Wi ~ 1100Ω
BB-86 Mini MD20	230VAC	3000Wi ~ 1960Ω
BB-86 Mini MD10	110VAC	n/a
VG85 / 91 / 96 / VGX-21	230VAC	4400Wi ~ 2160Ω
VG85 / 91 / 96 / VGX-21	110VAC	2700Wi ~ 750Ω

MINELLI® CH-8330 Pfäffikon ZH		Masstab 1:1	---	0.00kg	---
			Werkstoff	Gewicht kg.	Zusammenst. Nr.
8		Datum	BB-86, VGX-21		
7		Gezeichnet	25.11.2019 OBA		
6		Kontrolliert	17.02.2020 OBA		
5		Norm	Elektroschema allgemein		
4					
3					
2		DIN ISO 5456 (DIN 6: links FR)	10152.4.1203		rev. 1
1					A4
Status	Änderungen	Datum	Name	Minelli Zeichnungskopf: rev. 1.0	

12 Special accessories

MIRA tooling equipment for the BB-86 series is available on the [MIRA Webshop](#):
(See below a few equipment possibilities)



Figure 29

1. Sealing groove cutting sets for cylinderheads

For deep counterbore seat applications to a maximum depth of 220mm. Compatible with all BB-86 devices (Standard, Mini, Giant). Figure 29

Description

BB-Extension with toolbox
BB-Extension complete
MB-tooling bridge complete
Clamping lid with dowel pins
Toolbox complete
Allen key ball headed SW4

Order-No.:

101550.2.6259
101550.2.6241
101550.2.6250
101550.2.6245
101550.2.6256
1KSS00402



Figure 30

2. Short crank handle

Enables the processing of the counterbore seats in the furthest back position of a fixed position engine. Figure 30

Description

Short crank handle
Handle grip M10
Setscrew

Pos.

98
99
100

Order-No.:

18032.4.2479
10141.4.1242
1N0024M06x006



Figure 31

3. Repair ring

Enables the processing of the counterbore seats in a fixed position engine. Only the defective sleeve needs to be removed. Figure 31

Description

Repair ring
Dowel pin Ø6x14

Order-No.:

18031.2.2042
1N085706x014



Notes

A series of horizontal dotted lines spanning the width of the page, intended for handwritten notes.



Manufacturer and worldwide distributor:

MINELLI CORPORATION
Mattenstrasse 3
8330 Pfäffikon ZH
Switzerland

www.miratool.ch

Your local distributor: