



HOLLFELDER
CUTTING TOOLS

Special tooling for customer applications



HOLLFELDER - CUTTING TOOLS

Your competent partner in the area of metal chip removal.

At our two company locations in Nuremberg und Zorbau (Germany) we design and manufacture precision tooling for highest quality demands on most modern CNC-turning / milling / grinding and EDM machines.

All activities in our enterprise are based on our corporate quality and environmental policy and aim to contribute to a permanent increase in our customers productivity while observing all applicable legal and governmental regulations.

Additionally we strive to achieve a leading position in our sector with our products and services and to continuously improve this position by means of a high level of quality as well as an adequate environmental policy.

All processes in our enterprise are mainly based on our customers demands and are always supervised by the management team and adapted to the changing general conditions by continuous improvement processes (CIP). In order to achieve our targets we maintain a certificated quality and environmental system according to DIN EN ISO 9001 : 2009 and DIN EN ISO 14001.

The perfect composition of highly qualified staff and most modern production methods constitutes the basis for fully developed products on a high quality standard.

The easy handling and the adjustability of our milling cutters are the basis for savings in the area of tool presetting as well as for achieving tight tolerances.

Our standard program constitutes the basis for a huge number of innovative special tooling solutions which get used and appreciated at our customers globally. In many cases it is the customers specific solution which opens up the full potential of our tooling systems and thus contributes to savings and an increase in productivity.

We would be pleased to assist you in selecting the right tooling solution for your specific application and to stay on your side as your competent partner from the start of process planning until the effective use of our tools.

**Call us, we will also meet your requirement
... precise ... flexible ... innovative.
We always appreciate your confidence in us.**



Headquarters Nuremberg



Location Zorbau



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Individual and economic solutions
require the utmost competence.

A reliable partner

HOLLFELDER - CUTTING TOOLS

has achieved a leading position as a reliable partner in the metal cutting industry. Innovative tooling solutions in standard tools as well as in tools made to customers specifications constitute the basis for cost optimised production.

Competence

Individual solutions for complex machining problems, tailor-made to the individual requirements are part of the self-image of our technicians and engineers. With a high qualification and an innovative thinking combined with a lot of experience, we design and manufacture in close contact with our customers tooling systems of highest precision for the μm -accurate machining of complex contours.

Profitability

HOLLFELDER - CUTTING TOOLS offers profitable solutions.

The easy adjustment of our tools reduces non-productive times. We achieve a reduction in machining times due to our intelligent combined tools, the high number of effective teeth and the selection of the optimal cutting grade. The advantages are the utmost flexibility, productivity and certainty in process.

Our service

Depending on the technical requirements we analyse the machining processes and suggest tooling solutions which satisfy the high demands of our customers. With the proven tooling solutions of **HOLLFELDER- CUTTING TOOLS** our customers use highly precise and reliable systems which have achieved an excellent reputation worldwide.

Our service spectrum includes among others:

- machining tests in our premises
- trainings for user also at our customers premises
- complete CAD-layouts according to customer specifications
- technical support

Individual and economic solutions
require the utmost competence.



Our targets...

... are to steadily increase the efficiency of our precision tools as well as their operational possibilities. Thus our customers are leading obtain a competitive advantage due to the more efficient production with a high certainty in process.



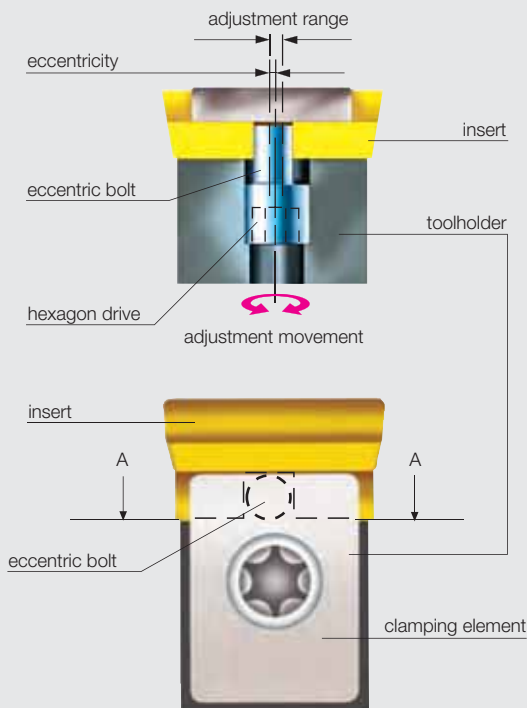
Adjustment systems

Function

The adjustment systems in the tools constitute the basis for highly precise production results in the most different materials. They are the basis for innovative tooling designs which contribute enormously to the productivity of our customers. The application is simple and saves time.

Eccentric bolt adjustment

cut A-A

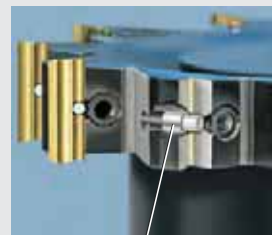


The eccentric bolt adjustment system offers a lot of design possibilities based on its open style.

For instance the periphery of the milling cutters can be provided with an extremely high number of inserts and thus extremely high feed rates can be achieved. Based on the embedded eccentric bolt and the stable clamping element the system shows special strength in the area of deep and precise face grooving applications. The design of the clamping system doesn't require any support on the side of the pocket seat which leads to

the fact that a triangular treatment is possible.

By means of a slot in the insert, it can be adjusted radially or axially depending on its position in the tool body. The insert can be adjusted in 2 directions. Also with this clamping / adjustment systems the inserts remain clamped during adjustment.



eccentric bolt

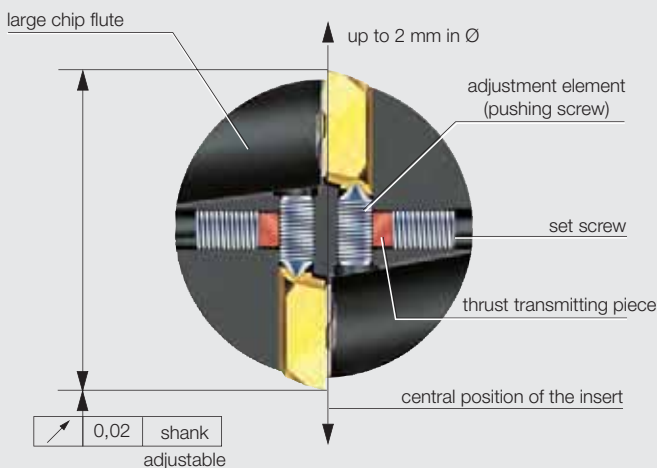


clamping element

adjustment key (hex key)

to operate the eccentric bolt

Radial screw adjustment



This adjustment system is characterised by a large range of adjustment and its robust design. Its main area of usage are machining operations with tolerances ≥ 0.05 and frequently changing machining diameters.

Adjustment systems

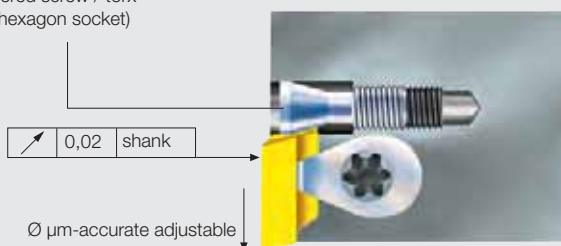
Function

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Adjustment with tapered screw from the front and the top

Adjustment element
(tapered screw / torx
or hexagon socket)

Adjustment from the front



The adjustment with tapered screw is an adjustment system of utmost flexibility which offers a solution in nearly every application making use of the possibility to adjust either in front or at the top.

Whereas in single-step tools adjustment in front is preferably used, it's the adjustment at the top which renders many advantages for multi-step tools.

Both types feature μm-accurate adjustment without releasing the clamping of the inserts.

Adjustment from the top



Micro-adjustment

The micro-adjustment can be considered as the logical next step in the development of the tapered screw adjustment from the front. A built-in adjustment cartridge in the holder enables the user to achieve an extremely precise adjustment of the machining measures when using inserts of the product ranges W 2850.... and W 3570.... . This adjustment cartridge can be integrated from bore diameter 14 mm. The advantageous relation - 1 turn of screw \triangleq 0,02 mm adjustment range of machining diameter - results in an extremely precise adjustment



1 revolution \triangleq 0,02 mm in \emptyset



directly in the machining center without any additional devices. Particularly in uninterrupted processes such as serial production of automotive parts, the wear of the insert can easily be compensated by use of the micro-adjustment. This type of adjustment system offers advantages also for the machining of highly precise single-item production parts as the **adjustment process does not require the direct exchange of the tool.**

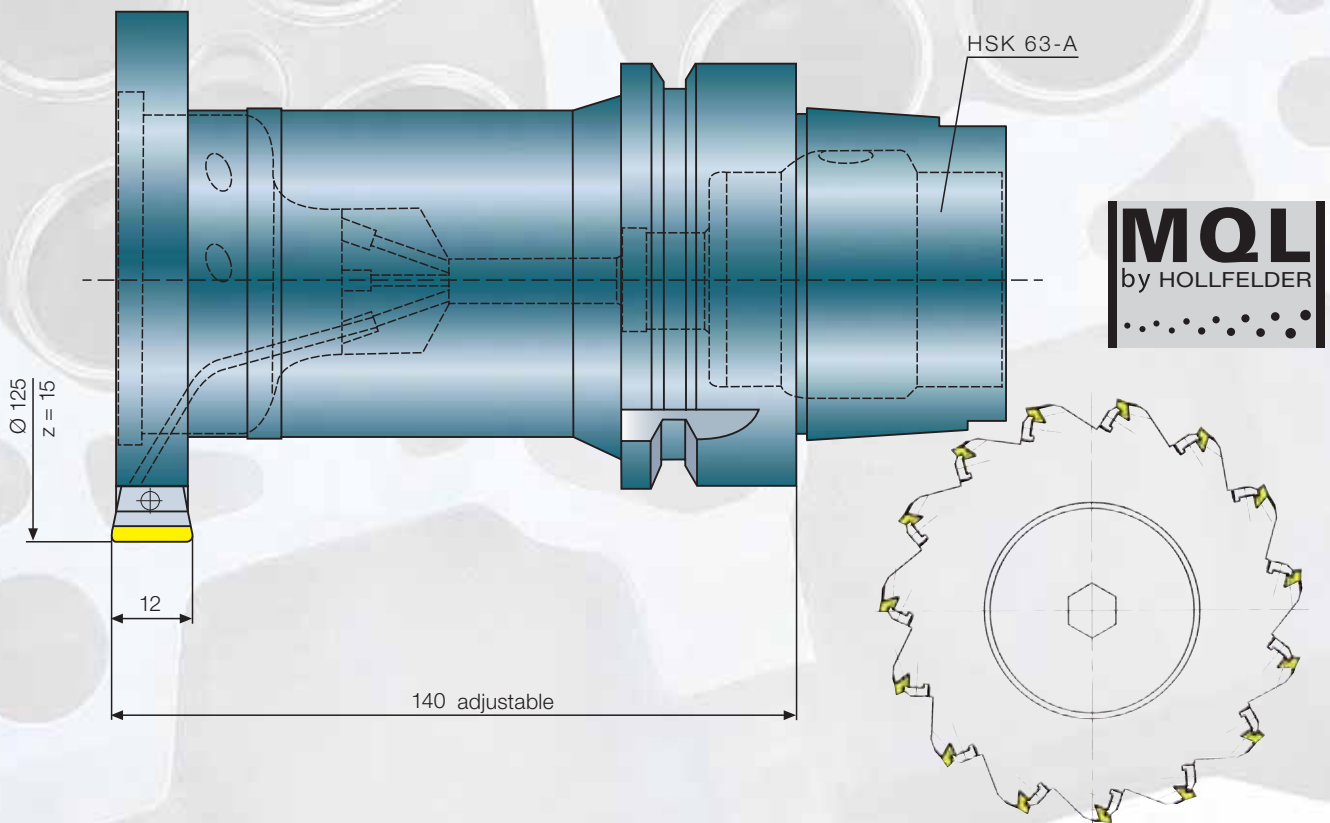
Cylinder head



Cylinder head

Cylinder head faces

Pre-milling of cylinder head faces. All inserts adjustable.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Cylinder head car

(DIN)  G Al Si 12 Cu

Monoblock milling cutter

15

standard

PCD

3.900

9.936

22.356

0,15

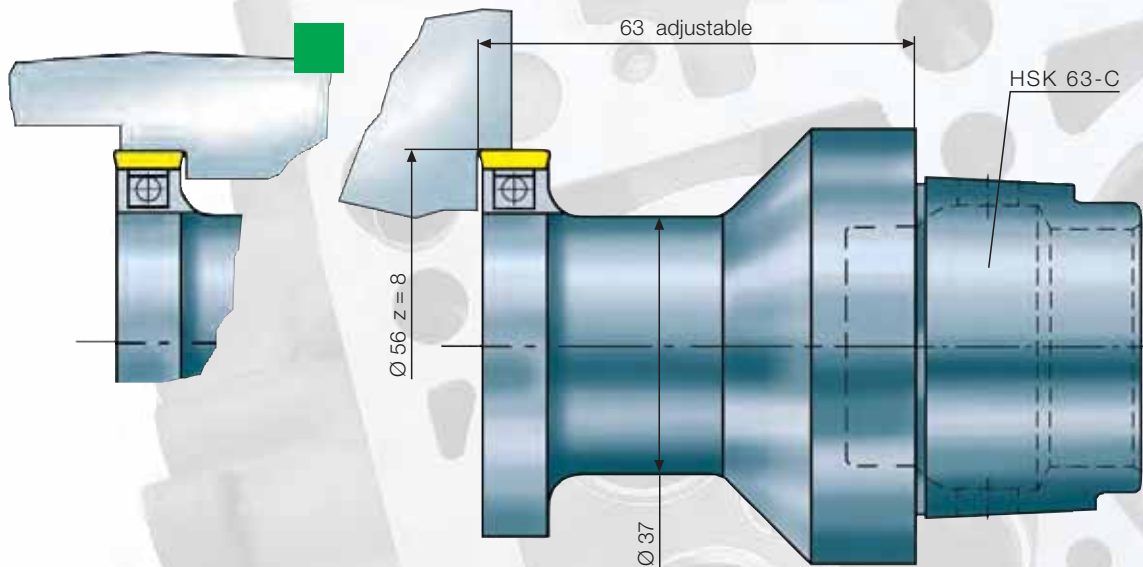
~ 4

MQL

H Cylinder head

Various milling applications

Milling in undercut is possible. All inserts μm -accurate adjustable.



Workpiece

Material

Cylinder head car

(DIN) ■ Al Si 9 Cu

Tool

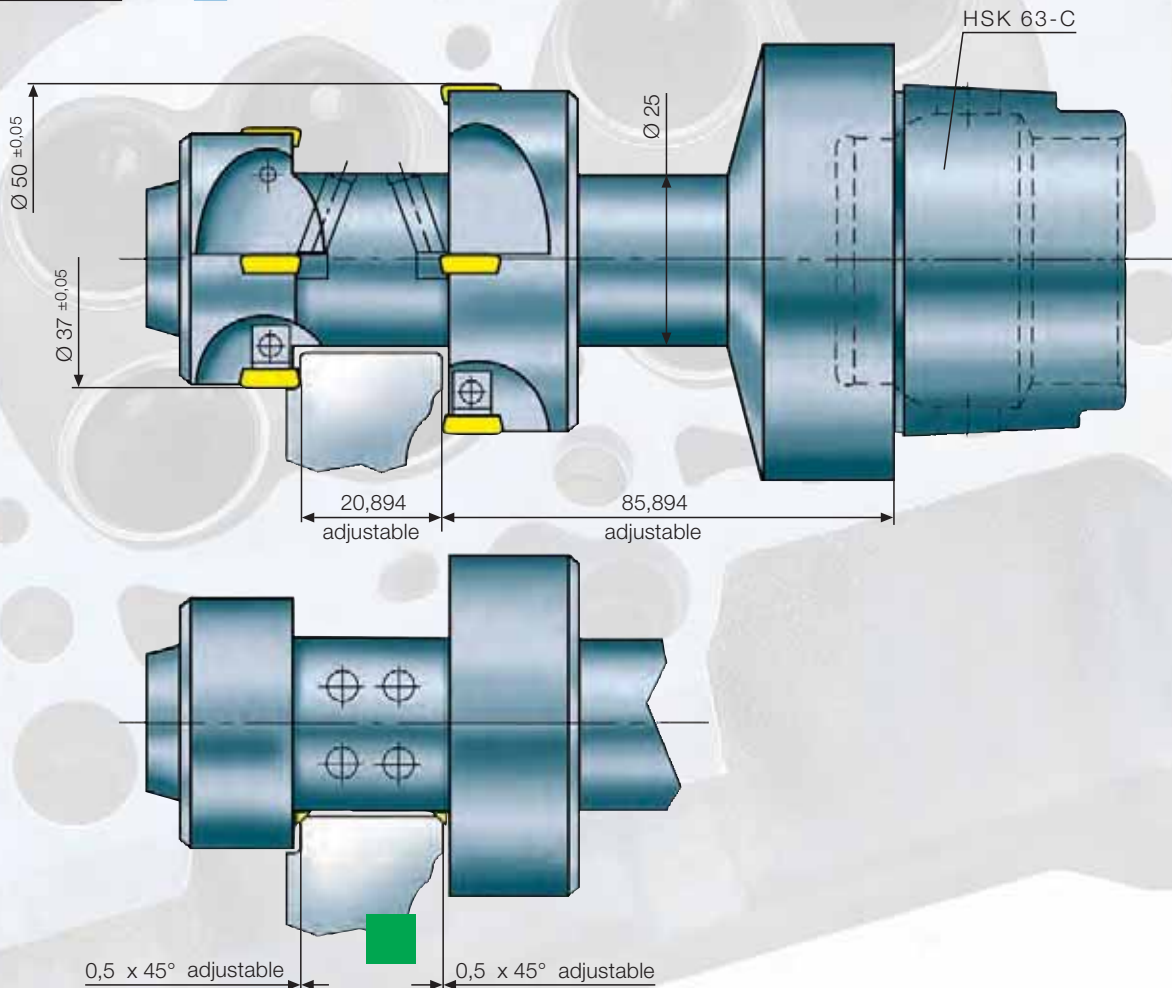
Milling cutter

| | | | |
|-----------------------|-------------------|---------------------|---------------------|
| Number of teeth | | | 8 |
| Insert | | | standard |
| Cutting grade | | PCD | K10 |
| Cutting speed | m/min | -3.165 | -1.000 |
| Number of revolutions | min ⁻¹ | 18.000 | 5.686 |
| Feed rate | mm/min | 25.920 | 8.190 |
| Feed rate per tooth | mm | 0,18 | 0,18 |
| Depth of cut | mm | ~ 5 | ~ 5 |
| Coolant | | yes, internal | yes, internal |
| Surface finish | | R _Z 8-10 | R _Z 8-10 |

Cylinder head

Bearing width

Gang milling cutter to mill the bearing width with chamfering.
Bearing width and chamfer sizes μm -accurate adjustable.



Workpiece

Material

Cylinder head car

(DIN)  GK Al Si 7 Mg

Tool

Gang milling cutter

Number of teeth

2 x 4

Insert

according to customer specification

Cutting grade

PCD

Cutting speed

m/min

1.200

Number of revolutions

min⁻¹

7.643

Feed rate

mm/min

3.057

Feed rate per tooth

mm

0,1

Depth of cut

mm

2,5

Coolant

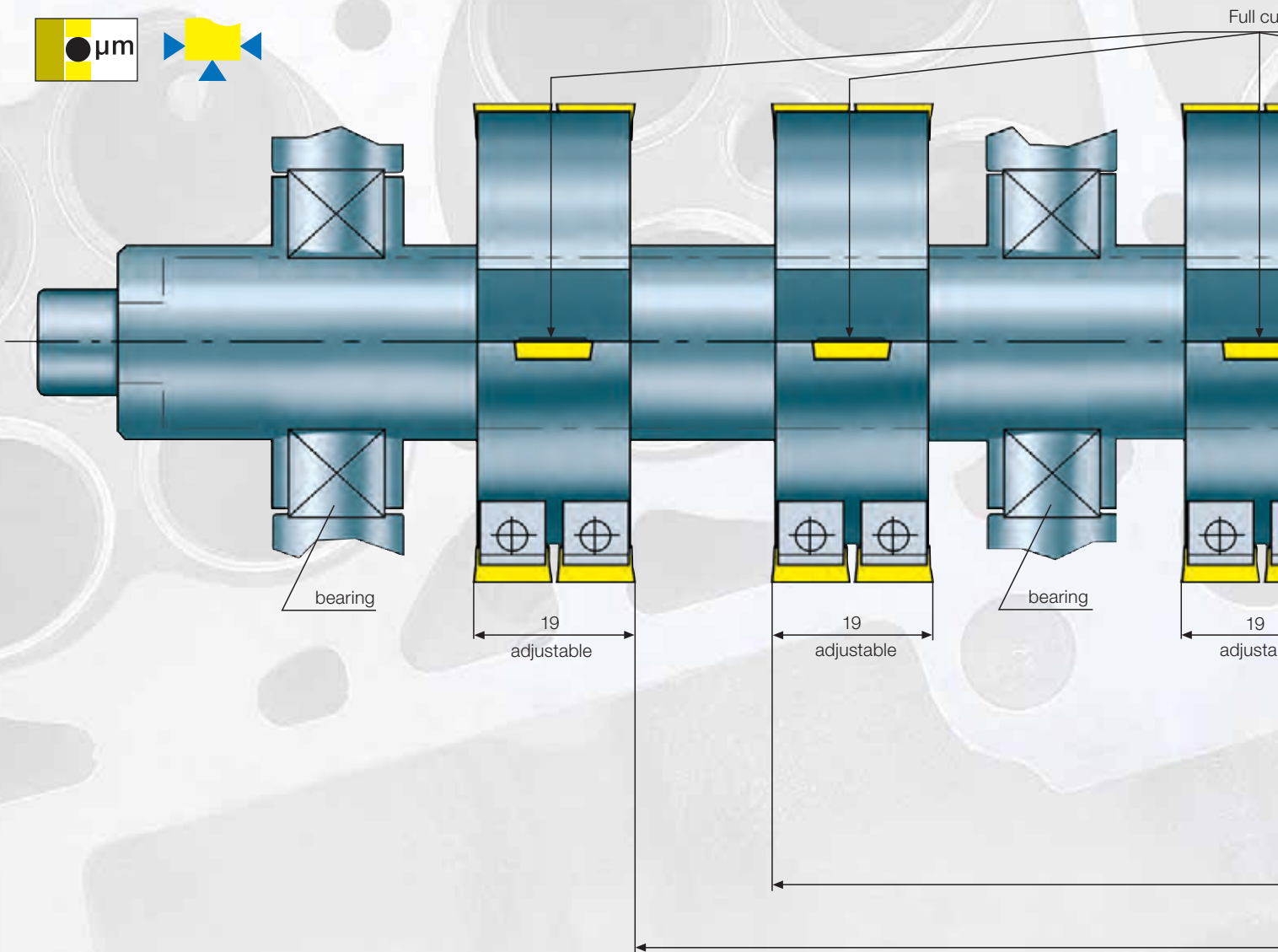
yes, internal

H Cylinder head

Clearance cut of bearing seats/thrust bearing

Clearance milling.

Face run-out and milling cutters are adjustable towards each other.



Workpiece

Material

Cylinder head car

(DIN) ■ G - Al Si 9 Cu

Tool

Gang milling cutter

Number of teeth

effective 2 each

Insert

according to customer specification

Cutting grade

PCD

Cutting speed

m/min

735

Number of revolutions

min⁻¹

4.000

Feed rate

mm/min

1.200

Feed rate per tooth

mm

0,15

Depth of cut

mm

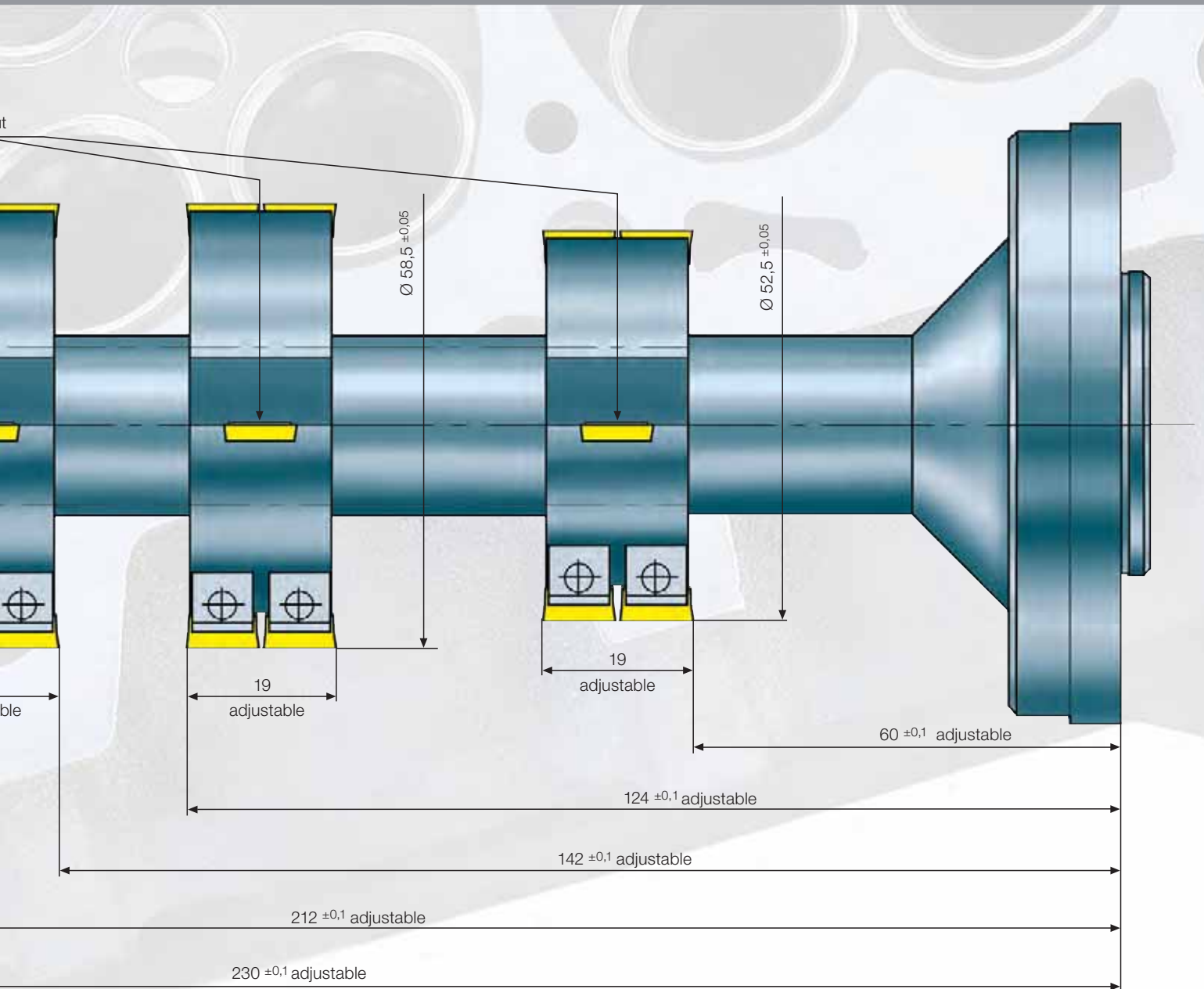
~ 2

Coolant

yes, internal

Cylinder head

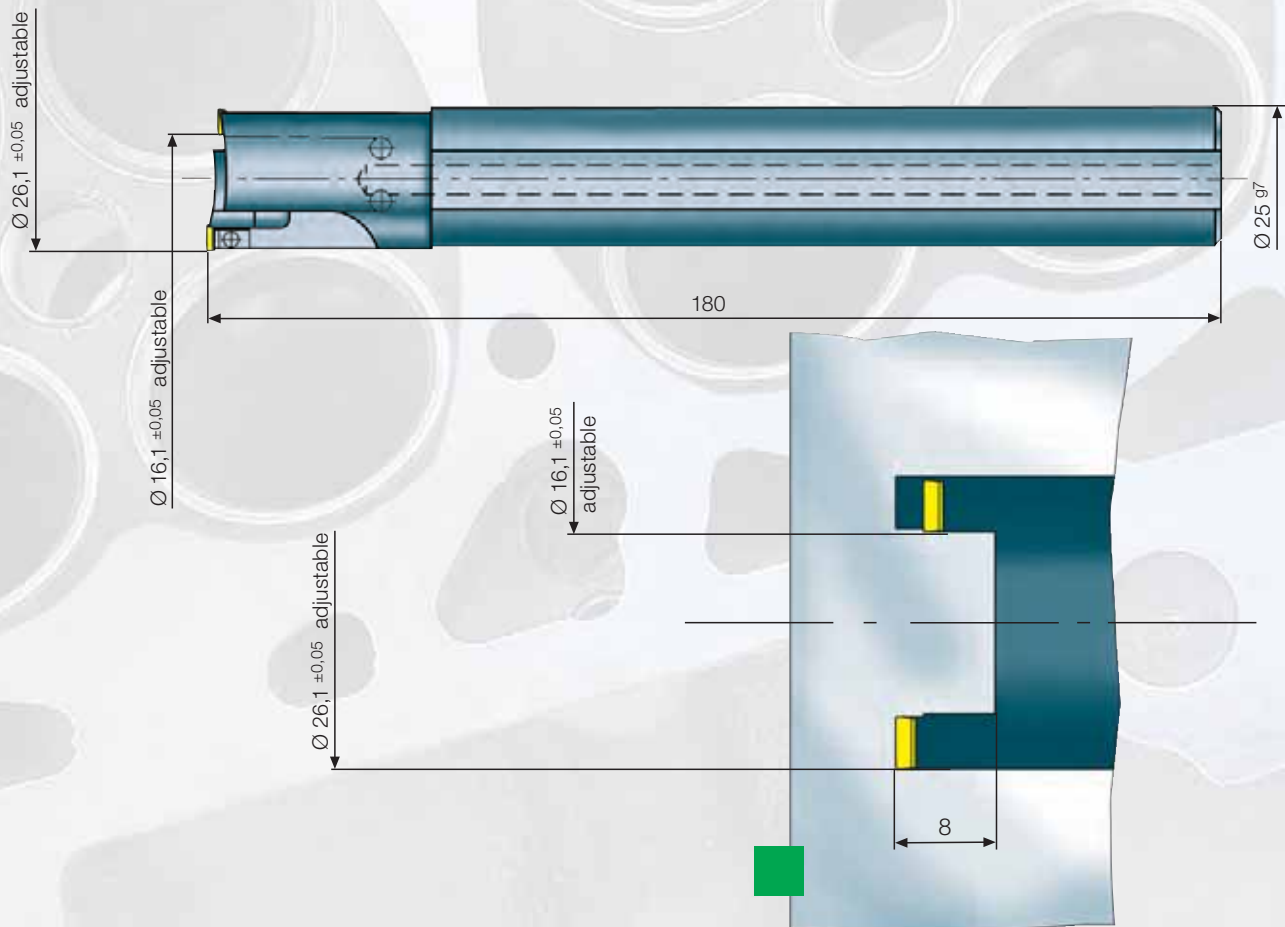
Clearance cut of bearing seats/thrust bearing



Cylinder head

Spring seat

Face grooving tool. Inserts adjustable in diameter.



Workpiece

Material

Cylinder head motorbike

(DIN)  GK Al Si 10 Mg Cu

Tool

Plunging tool

Number of teeth

effective 1

Insert

according to customer specification

Cutting grade

PCD / K10

Cutting speed m/min

860

Number of revolutions min⁻¹

10.500

Feed rate mm/min

840

Feed rate per tooth mm

0,08

Depth of cut mm

8 full cut

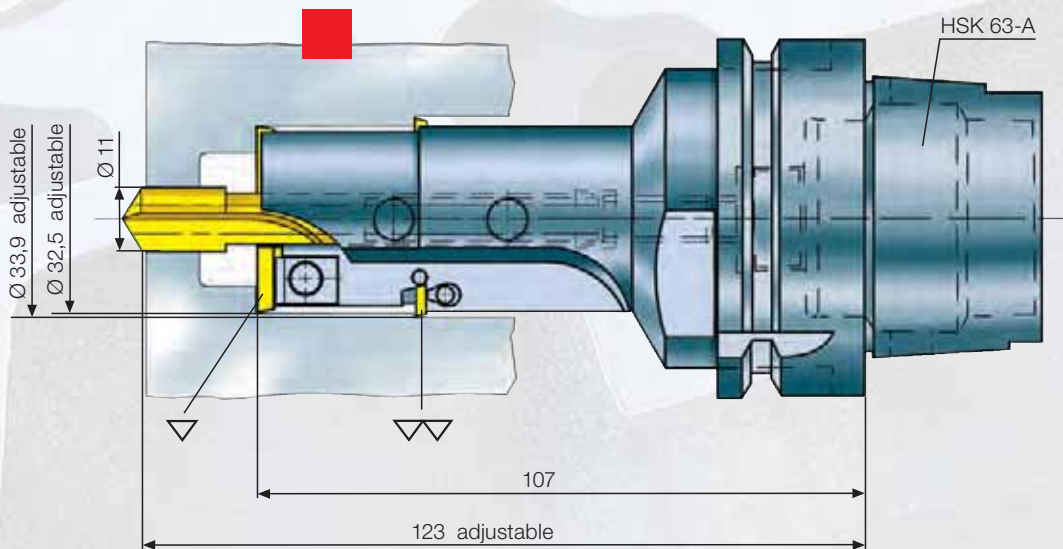
Coolant


yes, internal

Cylinder head

Spring seat

Drilling and fineboring of the spring seat.
Length of drill adjustable. Fineboring diameters adjustable.

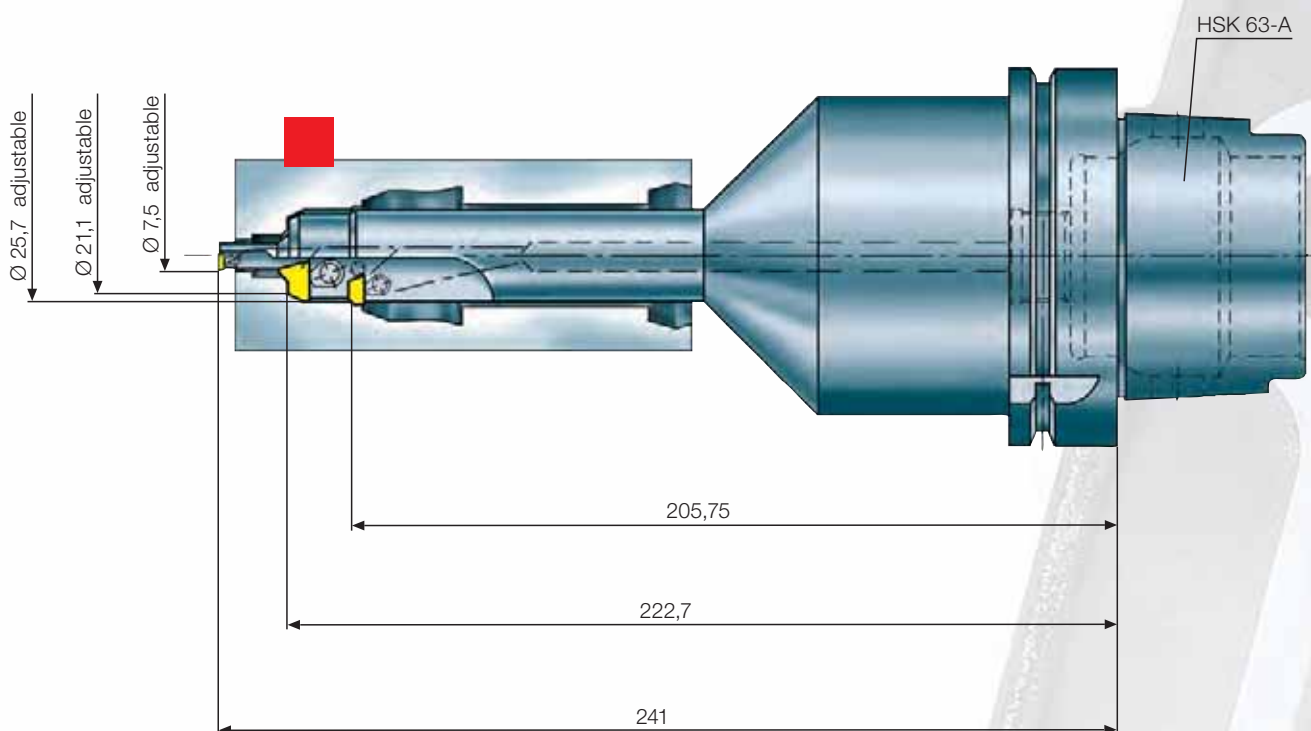


| Workpiece | | Cylinder head |
|-----------------------|-------------------|---|
| Material | | (DIN)  GG 25 |
| Tool | | Multistep-fineboring tool |
| Number of teeth | | 2 per Ø |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | (Ø 11) 88 / (Ø 33,9) 258 |
| Number of revolutions | min ⁻¹ | 2.424 |
| Feed rate | mm/min | 340 |
| Feed rate per tooth | mm | 0,07 |
| Depth of cut | mm | -5 |
| Coolant | | yes, internal |

H Cylinder head

Spark plug bore

Pre-machining. Form inserts for special profile.
All inserts adjustable.



Workpiece

Material

Cylinder head

(DIN) ■ GG - Cr

Tool

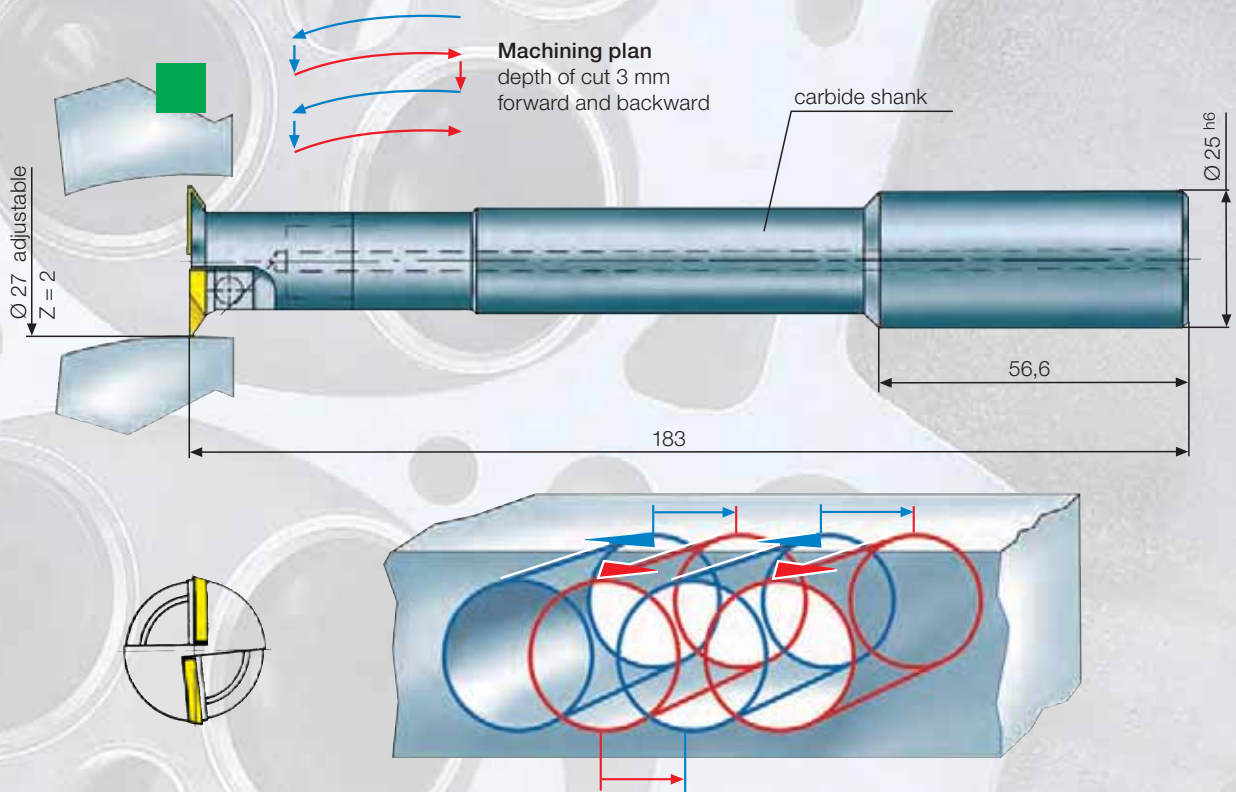
Multistep fineboring tool

| | | |
|-----------------------|-------------------|---|
| Number of teeth | | effective 1 |
| Insert | | standard and acc. to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 220 |
| Number of revolutions | min ⁻¹ | 2.725 |
| Feed rate | mm/min | 191 |
| Feed rate per tooth | mm | 0,07 |
| Depth of cut | mm | 0,2 - 0,8 |
| Coolant | | yes, internal |

Cylinder head

Induction port

Machining of induction port on a 5 axis MC.



Workpiece

Material

Cylinder head car

(DIN)  Al Si 10

Tool

Induction port milling tool

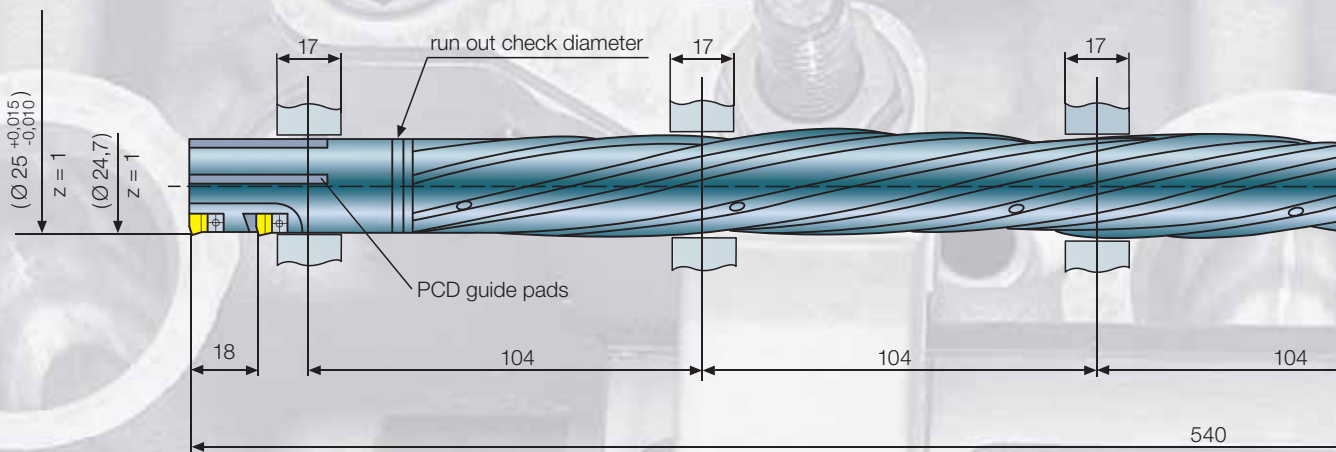
| | | |
|-----------------------|-------------------|-------------------------------------|
| Number of teeth | | 2 |
| Insert | | according to customer specification |
| Cutting grade | | PCD |
| Cutting speed | m/min | 1.357 |
| Number of revolutions | min ⁻¹ | 16.000 |
| Feed rate | mm/min | 11.200 |
| Feed rate per tooth | mm | 0,35 |
| Depth of cut | mm | 3 forward and backward |
| Coolant | | yes, internal |

H Cylinder head

Camshaft boring



Fineboring tool with twisted carbide guide component and guide pads.



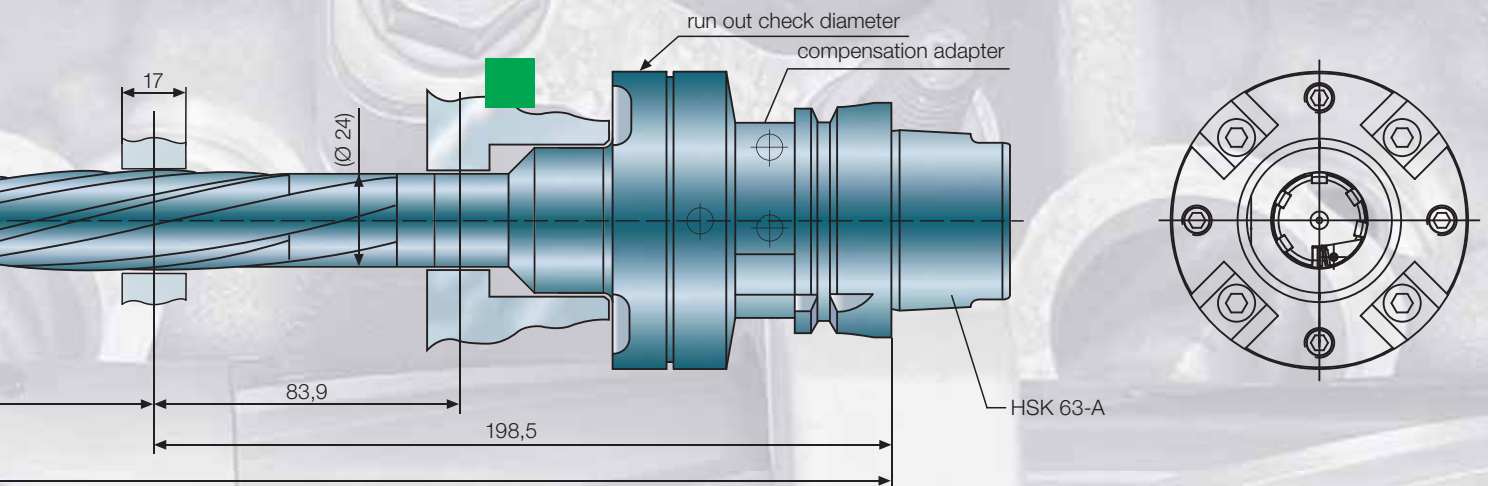
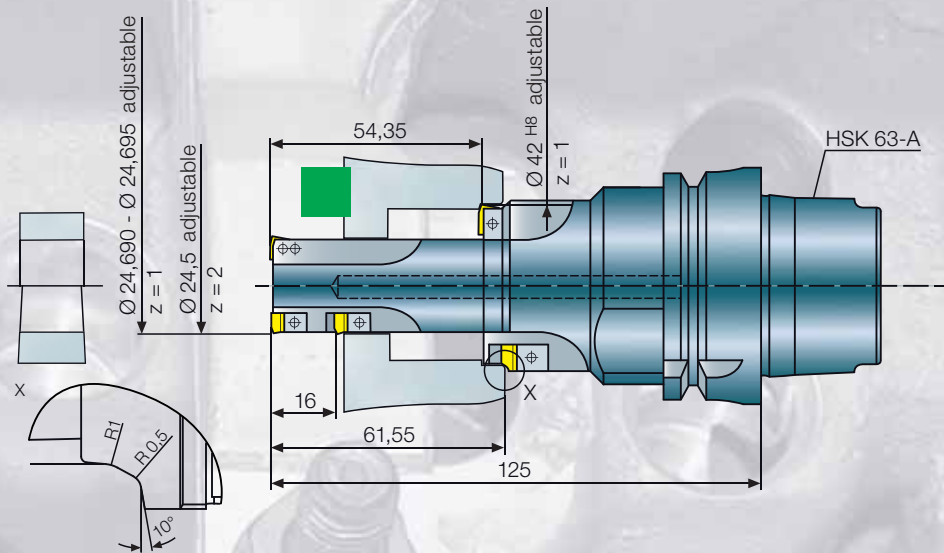
| Workpiece | | Pilot tool |
|-----------------------|-------------------|---|
| Material | | Cylinder head (DIN) ■ Al Si 9 |
| Tool | | Multistep-fineboring tool |
| Number of teeth | | 2 / 1 / 1 / 1 |
| Insert | | according to customer specification |
| Cutting grade | | PCD |
| Cutting speed | m/min | 600 |
| Number of revolutions | min ⁻¹ | 7.350 |
| Feed rate | mm/min | 1.470 / 735 > z 1 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | 0,35 |
| Coolant | | yes, internal |

Cylinder head

Camshaft boring



Pilot tool



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

m/min

min⁻¹

mm/min

mm

mm

Finishing tool

Cylinder head

(DIN) ■ Al Si 9

Fineboring tool

1 / 1

standard

PCD

300

3.670

367

0,1

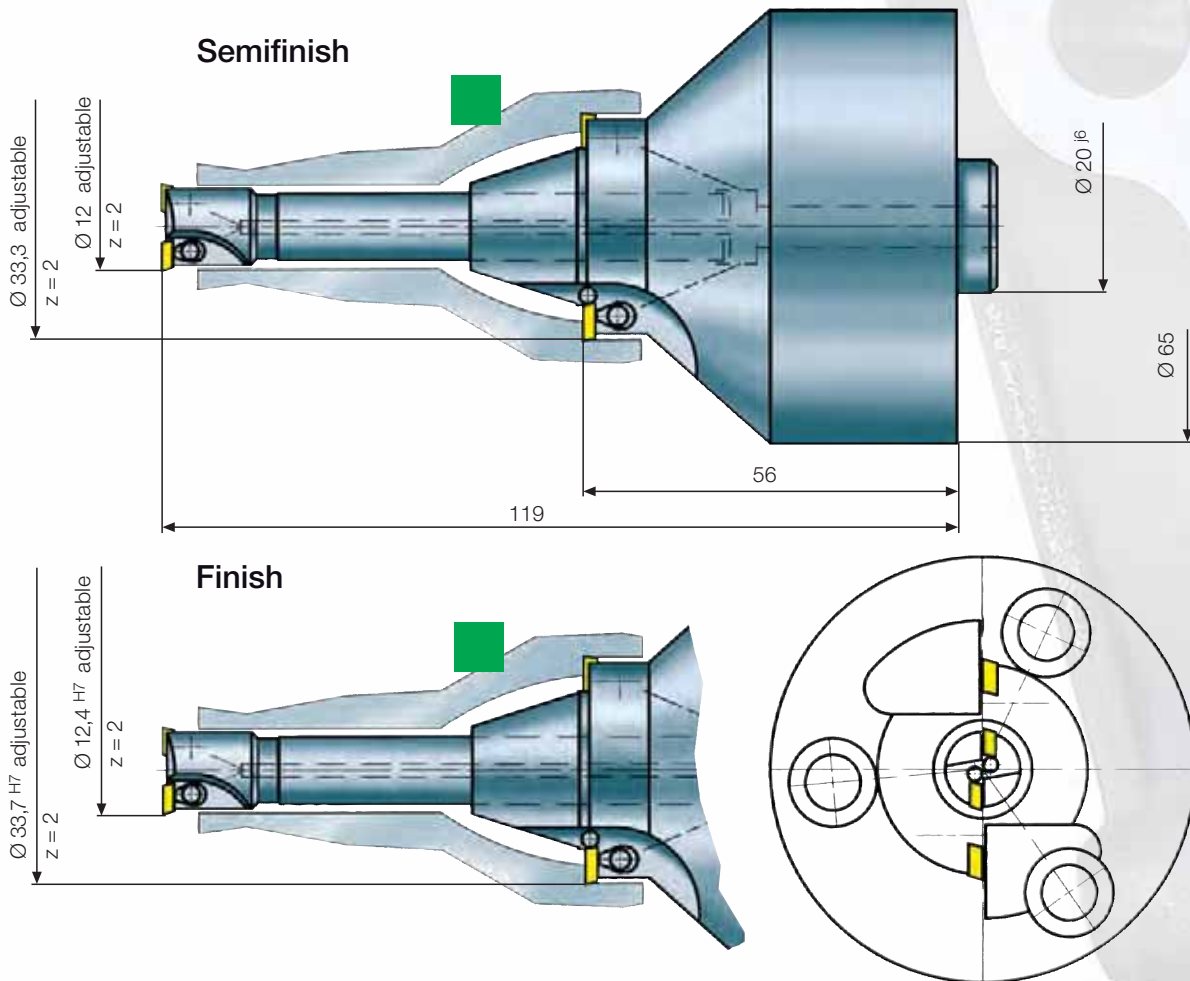
0,15

yes, internal

H Cylinder head

Valve seat

Valve seat machining.

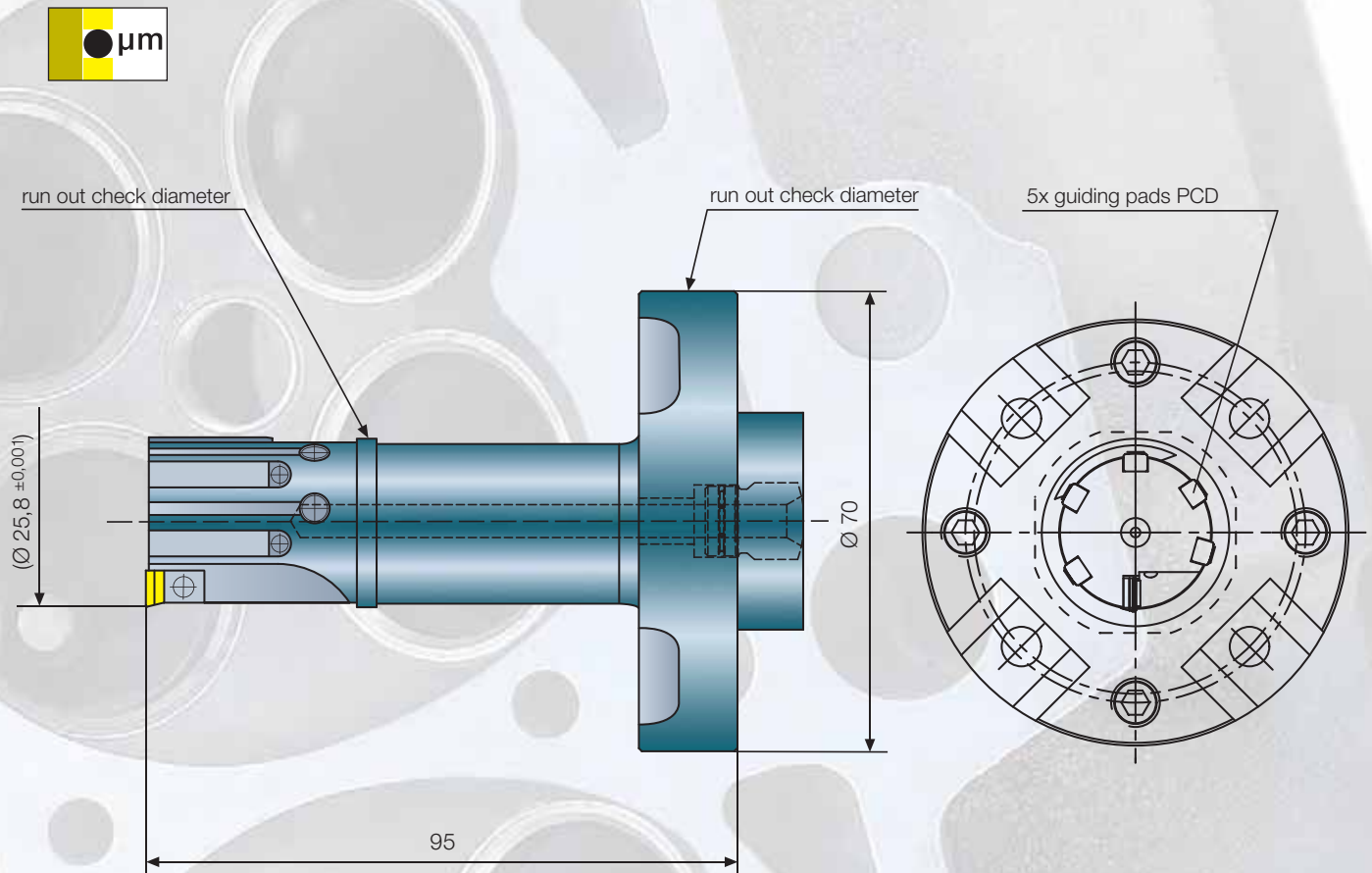


| | | Semifinish | Finish |
|-----------------------|-------------------|----------------------------------|----------------------------------|
| Workpiece | | Cylinder head car | Cylinder head car |
| Material | | (DIN) ■ Al Si 6 Cu 4 | (DIN) ■ Al Si 6 Cu 4 |
| Tool | | Multistep-fineboring tool | Multistep-fineboring tool |
| Number of teeth | | 2 / 2 | 2 / 2 |
| Insert | | standard | standard |
| Cutting grade | | PCD | PCD |
| Cutting speed | m/min | (Ø 12) 390 | (Ø 12,4) 350 |
| Number of revolutions | min ⁻¹ | 10.350 | 8.989 |
| Feed rate | mm/min | 2.900 | 1.798 |
| Feed rate per tooth | mm | 0,14 | 0,1 |
| Depth of cut | mm | 0,5 | 0,2 |
| Coolant | | yes, internal | yes, internal |

Cylinder head

Axial grooving

Fine machining with PCD guide pads.



Workpiece

Material

Cylinder head

■ Al

Tool

Reaming tool

Number of teeth

1

Insert

standard

Cutting grade

PCD

Cutting speed

m/min

800

Number of revolutions

min⁻¹

9.795

Feed rate

mm/min

980

Feed rate per tooth

mm

0,1

Depth of cut

mm

0,3

Coolant

yes, internal

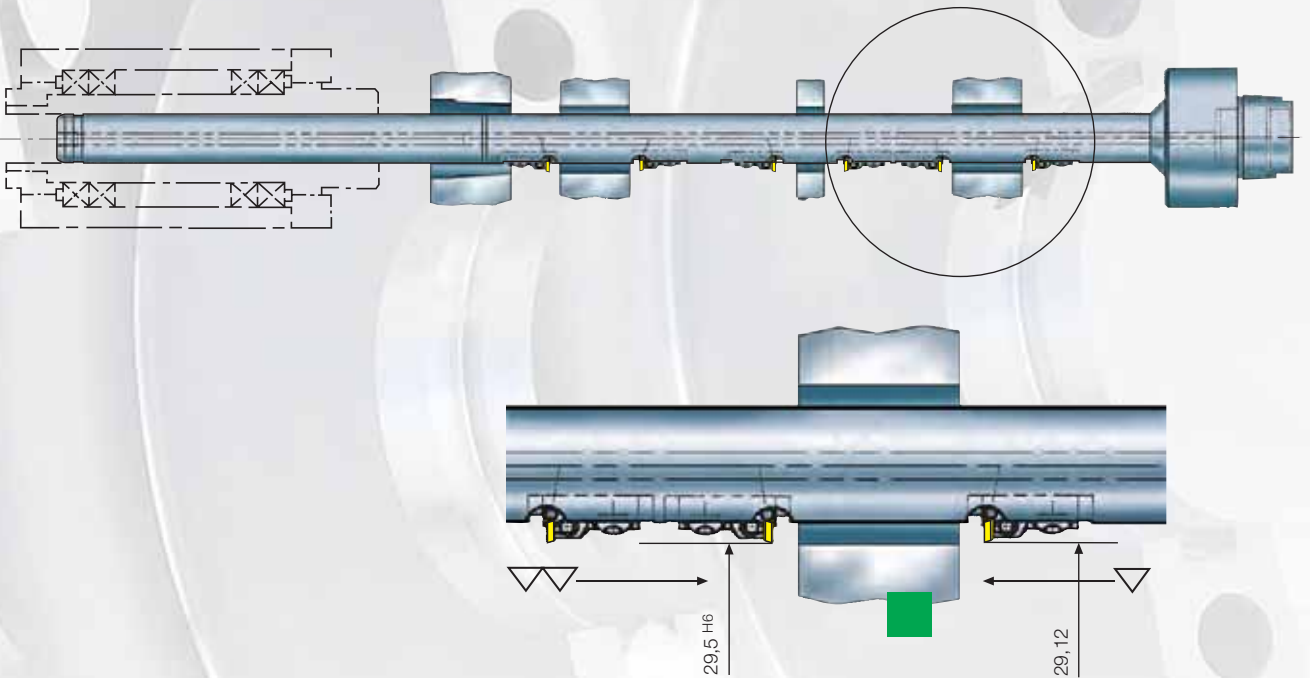
Cylinder crankcase



Cylinder crankcase

Balance shaft bore

Rough and finish machining, reverse bearing, 3 journals.
All inserts adjustable.



Workpiece

Material

Cylinder crankcase car

(DIN)  Al Si 9 Cu 3

Tool

Line boring with cartridges

Number of teeth

3x ▽ 3x ▽▽ 6 effective 1

Insert

standard

Cutting grade

PCD

Cutting speed

m/min

280

Number of revolutions

min⁻¹

3.022

Feed rate

mm/min

362 / 242

Feed rate per tooth

mm

(roughing) 0,12

Feed rate per tooth

mm

(finishing) 0,08

Depth of cut

mm

0,5

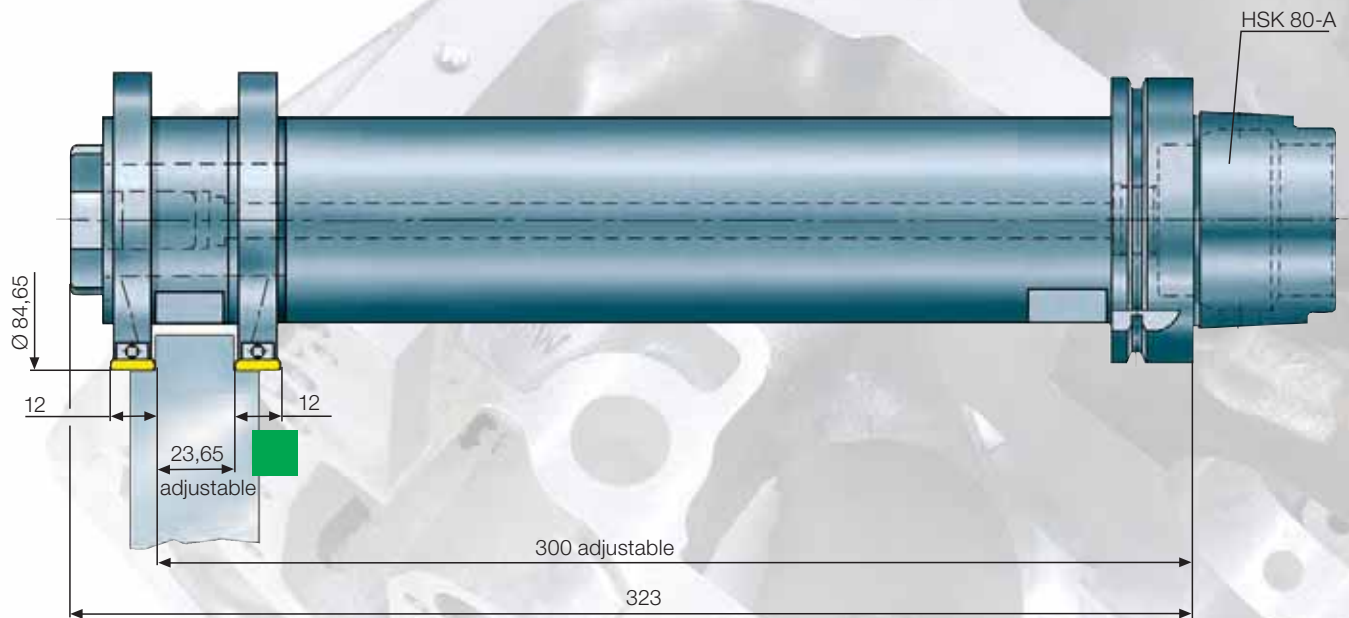
Coolant

yes, internal

H Cylinder crankcase

Bearing width

Milling of the bearing width. Width adjustable.



Workpiece

Material

Cylinder crankcase car
(DIN) ■ GK - Al Si 17 Cu 4 Mg

Tool

Gang milling cutter

Number of teeth

2 x 7

Insert

standard

Cutting grade

PCD

Cutting speed

m/min

780

Number of revolutions

min⁻¹

2.922

Feed rate

mm/min

2.864

Feed rate per tooth

mm

0,14

Depth of cut

mm

2

Coolant

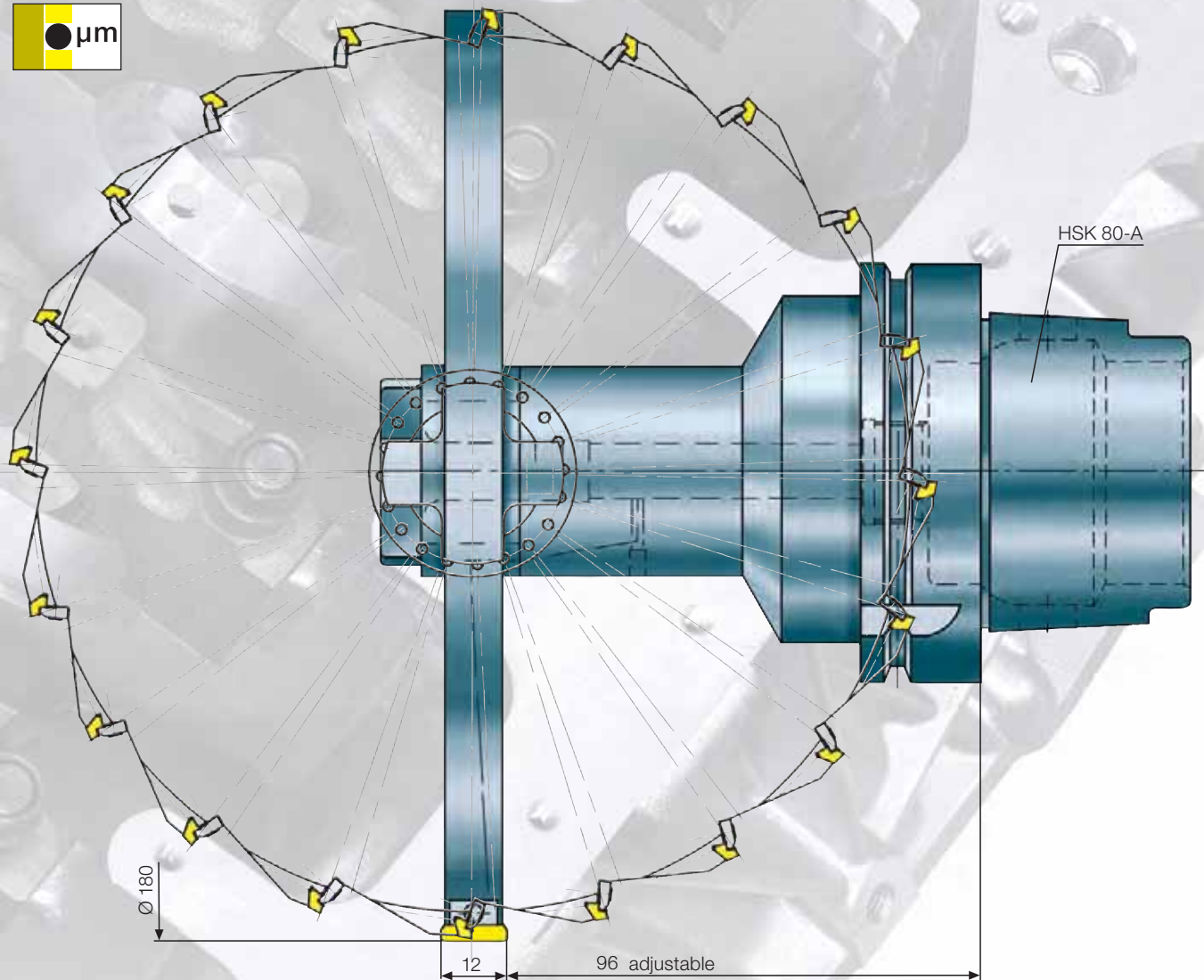
yes, internal

Cylinder crankcase

Bearing clearance



Milling of the bearing clearance. Face run-out adjustable.



Workpiece

Material

Crankcase car

(DIN) ■ GK - Al Si 17 Cu 4 Mg

Tool

Side milling cutter

Number of teeth

20

Insert

according to customer specification

Cutting grade

PCD

Cutting speed

m/min

850

Number of revolutions

min⁻¹

1.504

Feed rate

mm/min

4.210

Feed rate per tooth

mm

0,14

Depth of cut

mm

-5

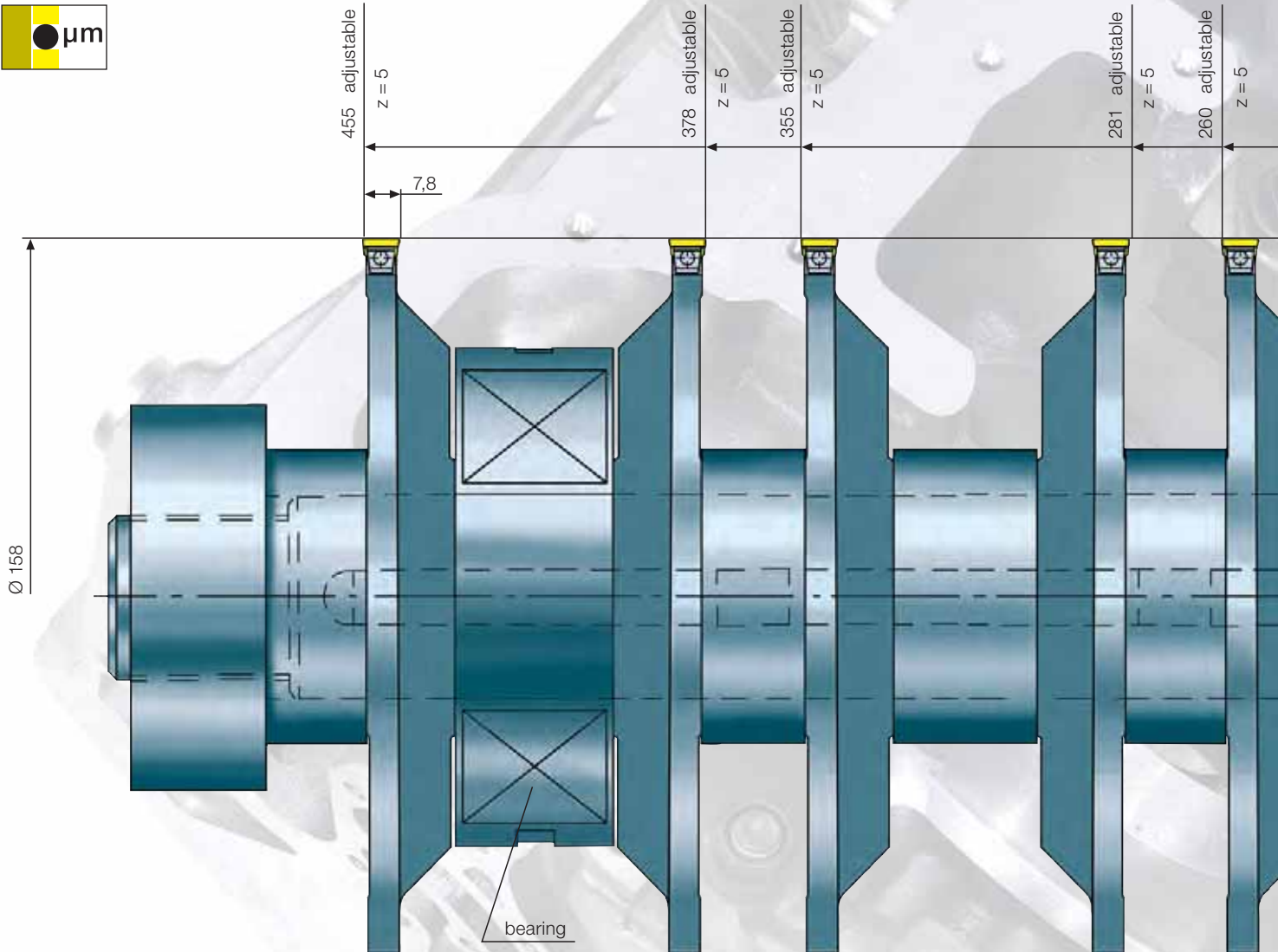
Coolant

yes, internal

H Cylinder crankcase

Bearing width

Milling of the bearing width.
Face run-out and milling cutters adjustable to each other.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Cylinder crankcase

(DIN) ■ GD - Al Si 9

Gang milling cutter

5 per cutter

standard

PCD / K10

500

1.008

353

0,07

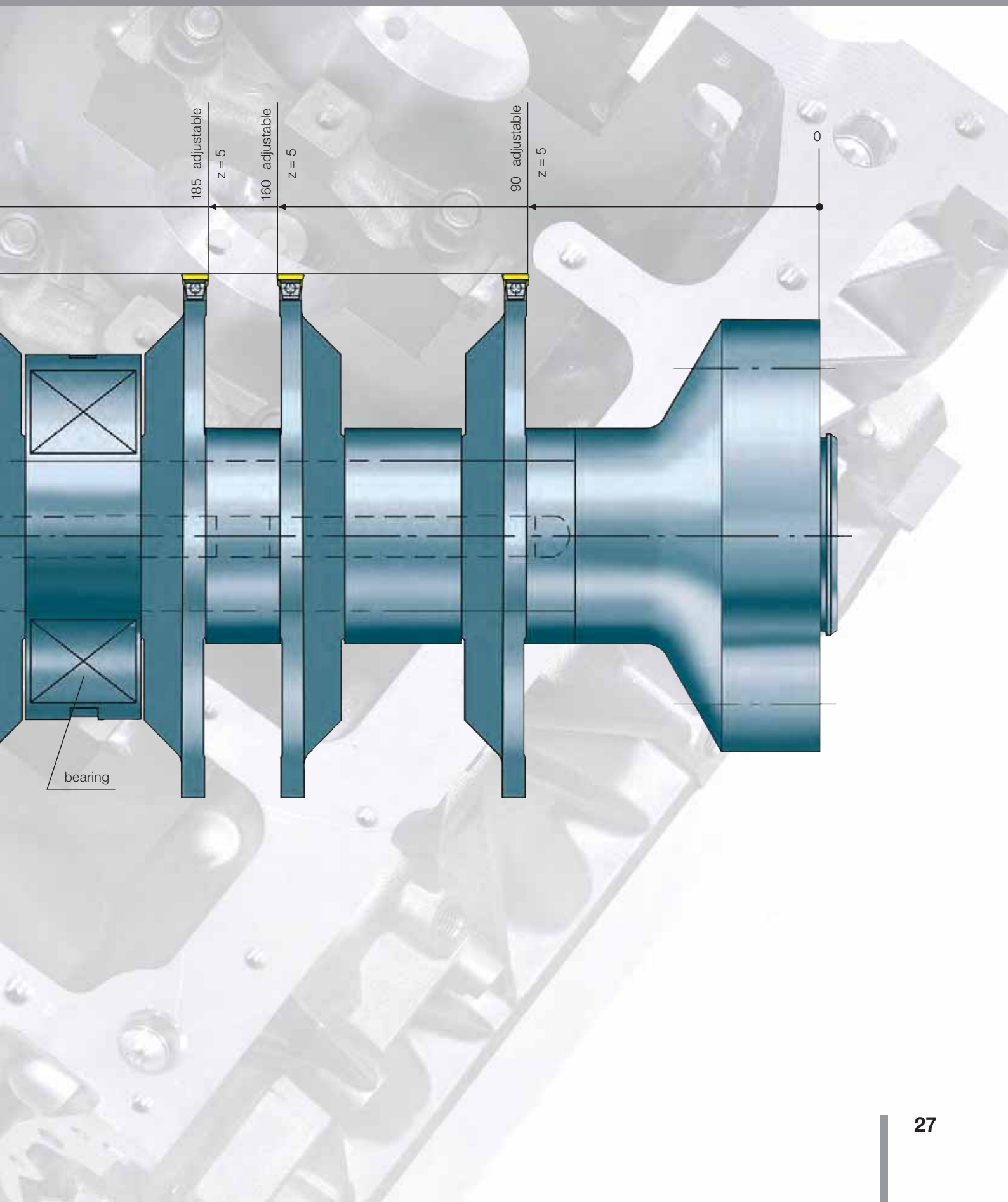
-5

yes, external

Cylinder crankcase



Bearing width

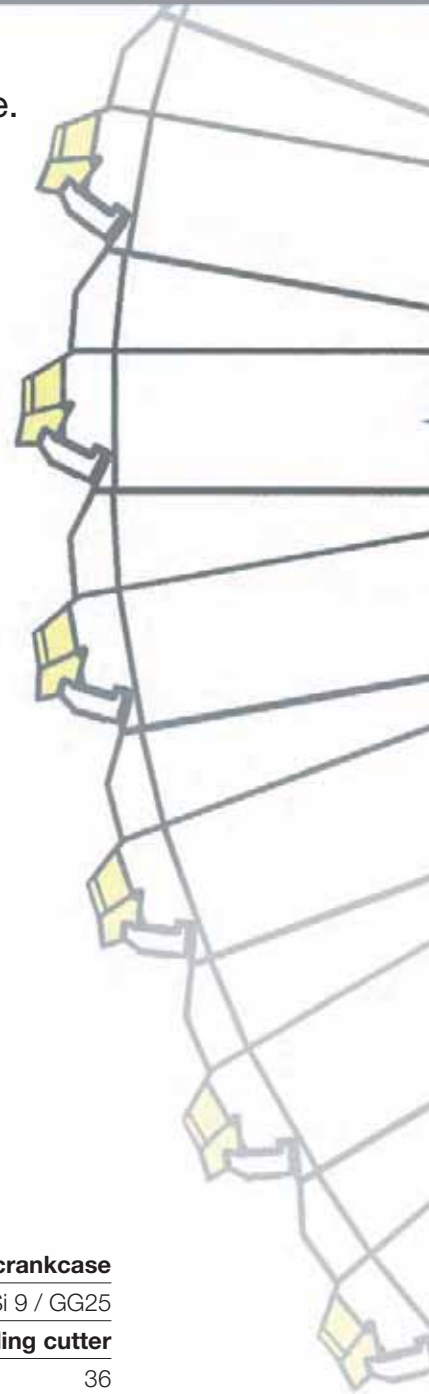
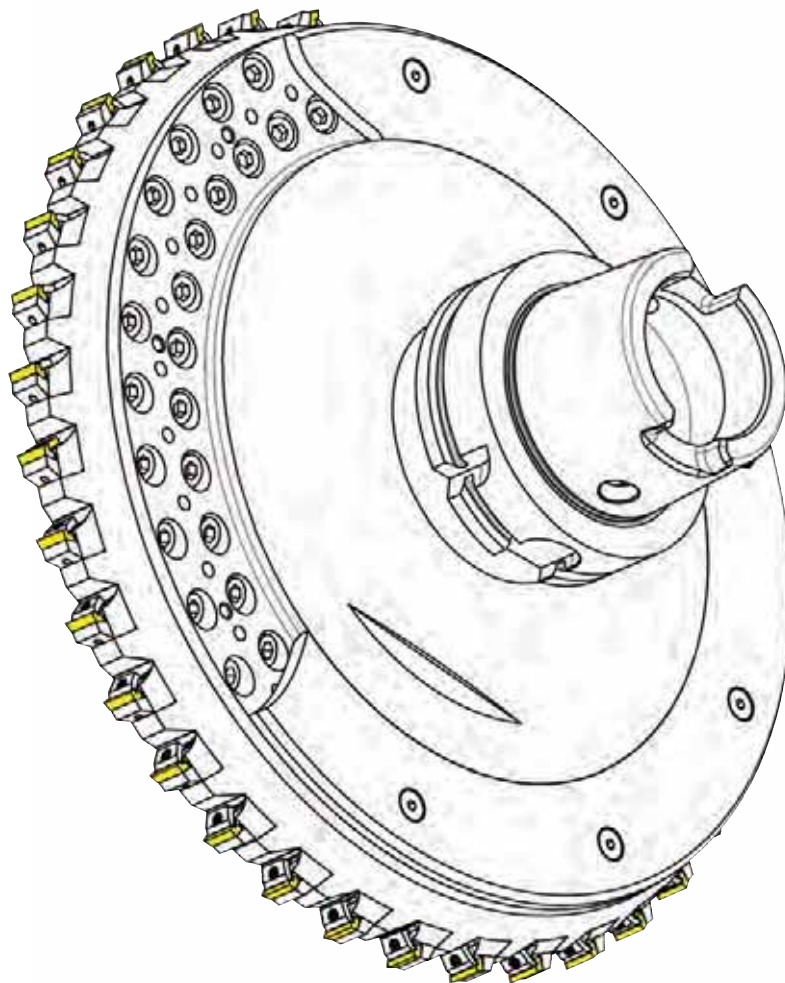


H Cylinder crankcase

Sealing surface

Milling of the sealing surface.

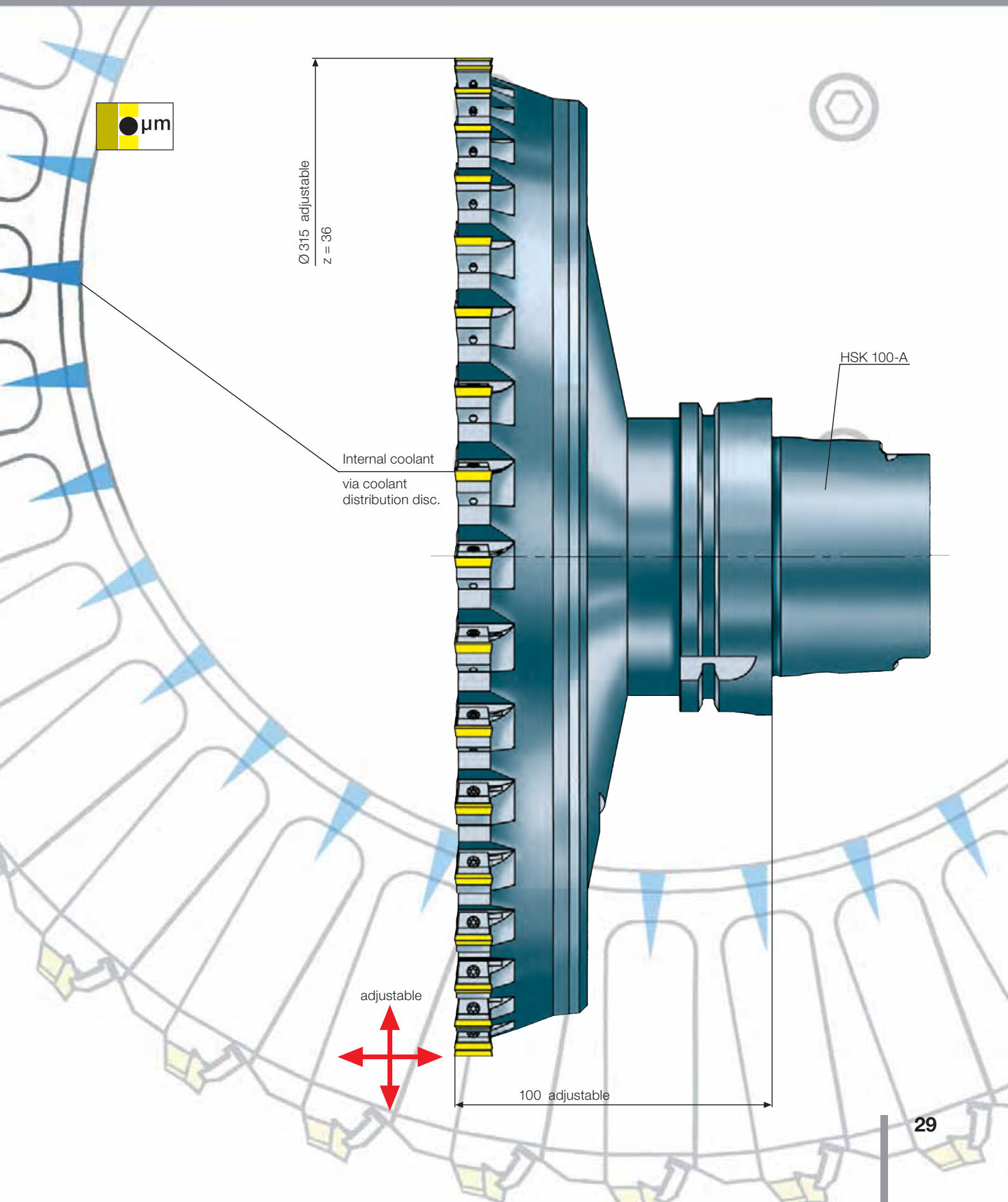
Aluminium crankcase with cast iron liners. All inserts adjustable.



| Workpiece | | Cylinder crankcase | Cylinder crankcase |
|-----------------------|-------------------|---|--|
| Material | | (DIN) ■ GD - Al Si 9 | (DIN) ■ GD - Al Si 9 / GG25 |
| Tool | | Face milling cutter | Face milling cutter |
| Number of teeth | | 36 | 36 |
| Insert | | standard | standard |
| Cutting grade | | PCD | carbide coated |
| Cutting speed | m/min | 3.000 | 320 |
| Number of revolutions | min ⁻¹ | 3.033 | 323 |
| Feed rate | mm/min | 10.919 | 1.744 |
| Feed rate per tooth | mm | 0,1 | 0,15 |
| Depth of cut | mm | 0,5 | 0,5 |
| Coolant | | yes, internal | yes, internal |
| Surface finish | | R _z 2 | R _z 6 |

Cylinder crankcase

Sealing surface



● μm

Ø 315 adjustable
z = 36

Internal coolant
via coolant
distribution disc.

HSK 100-A

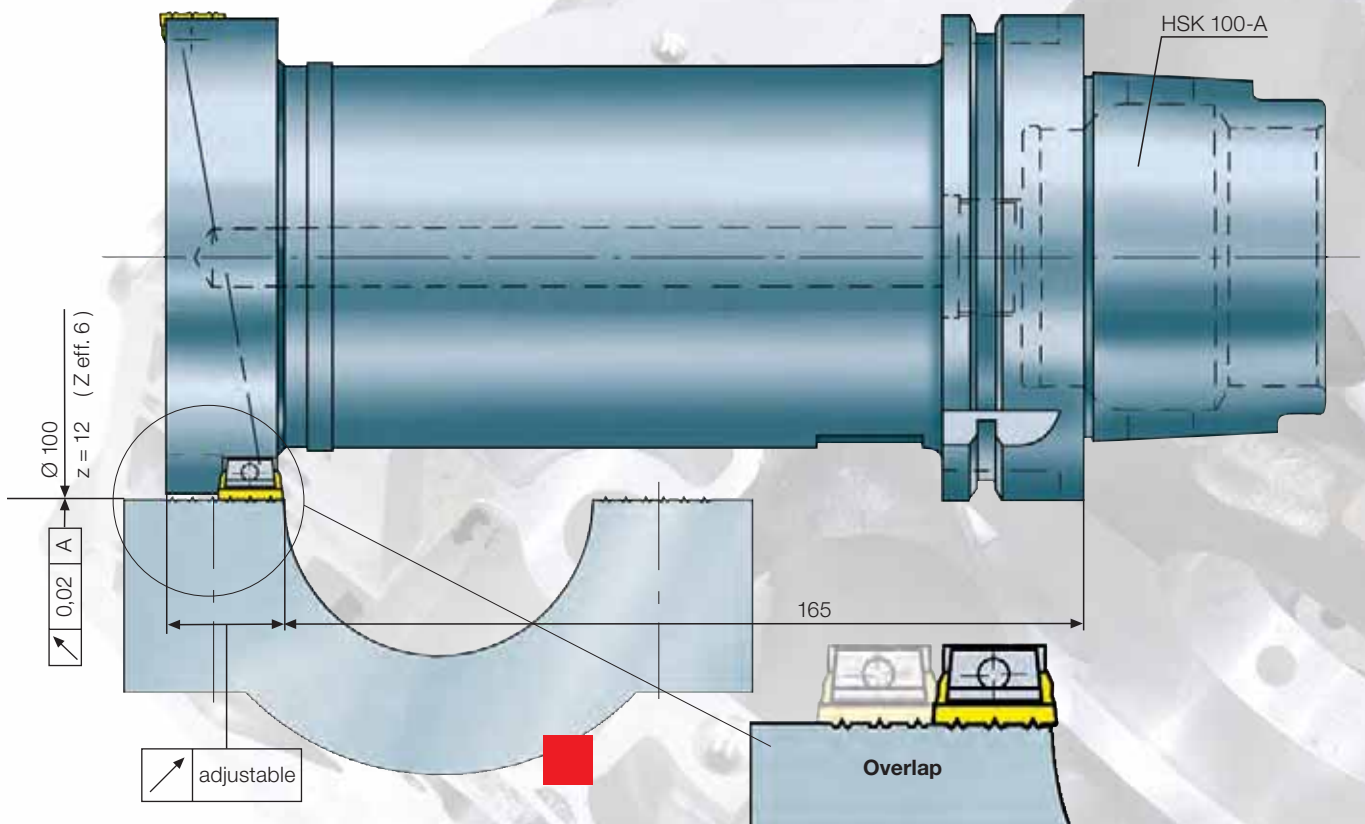
adjustable

100 adjustable

H Cylinder crankcase

Bearing cap

Form milling cutter to machine bearing caps.
Transition of the insert profile adjustable.



Workpiece

Material

Crankshaft bearing cap car

(DIN) ■ GGG 40

Tool

Form milling cutter

Number of teeth

2 x 6

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

240

Number of revolutions

min⁻¹

765

Feed rate

mm/min

460

Feed rate per tooth

mm

0,1

Depth of cut

mm

1

Coolant

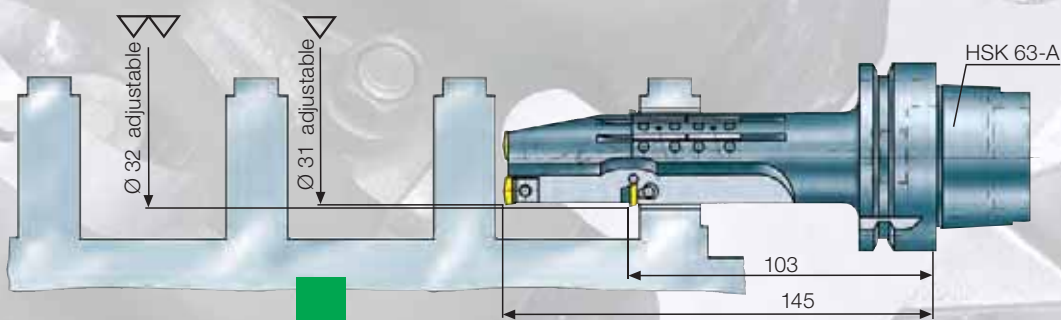
yes, internal

Cylinder crankcase

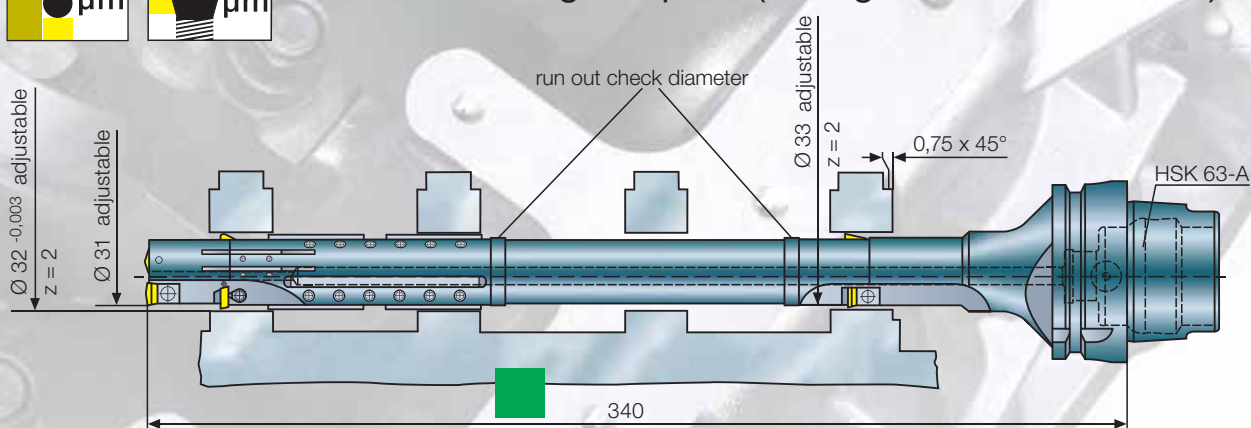
Ventilation bore



Pilot tool with guide pads (drilling in the solid material).



Finish tool with guide pads (drilling in the solid material).

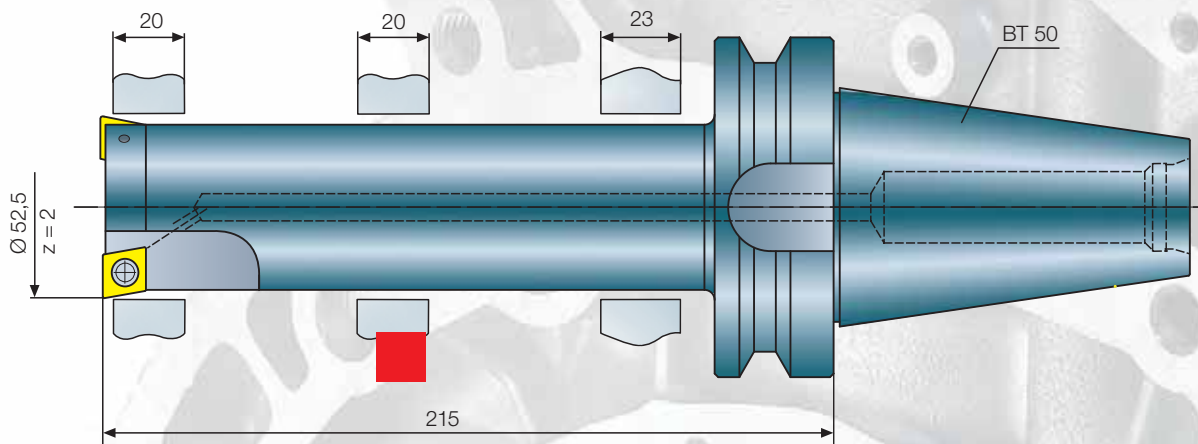


| | | Pilot- and finish tool |
|-----------------------|-------------------|---|
| Workpiece | | Ventilation bore |
| Material | | (DIN)  GK - Al Si 17 Cu 4 Mg |
| Tool | | Drilling- and fineboring tool |
| Number of teeth | | (drilling) effective 1 / (counterboring) 2 |
| Insert | | according to customer specification |
| Cutting grade | | K10 / PCD |
| Cutting speed | m/min | 320 |
| Number of revolutions | min ⁻¹ | 3.287 |
| Feed rate | mm/min | 460 |
| Feed rate per tooth | mm | 0,07 |
| Depth of cut | mm | into the solid material / 0,5 |
| Coolant | | yes, internal |

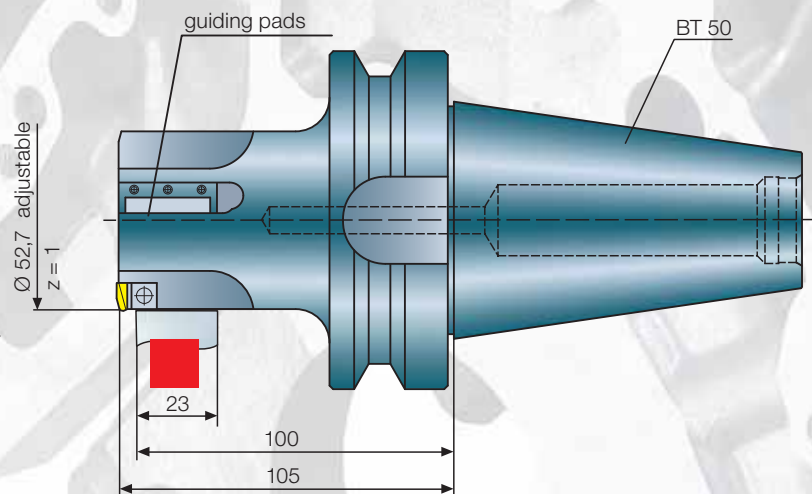
H Cylinder crankcase

Crankshaft bore

Operation 1: Pre-machining from 2 sides.



Operation 2: Pilot bore



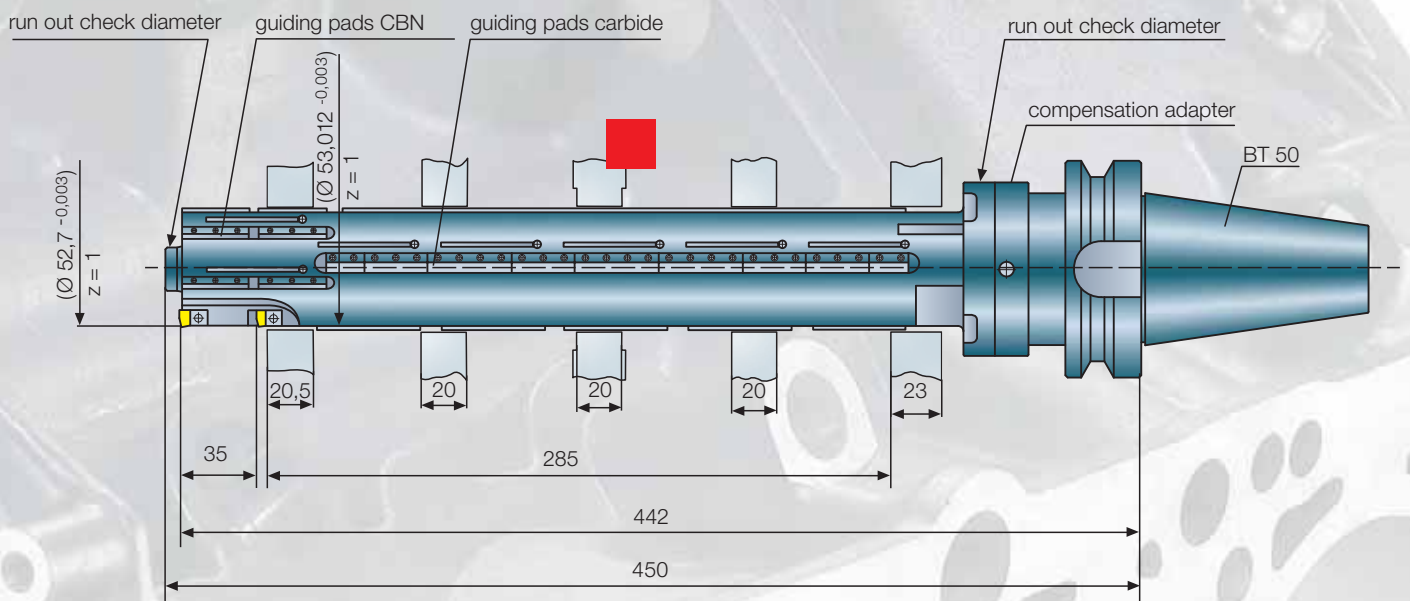
| | Operation 1 | Operation 2 |
|-----------------------|---------------------------|------------------------|
| Workpiece | Engine block | Engine block |
| Material | (DIN) ■ GG | (DIN) ■ GG |
| Tool | Counterboring tool | Fineboring tool |
| Number of teeth | 2 | 1 |
| Insert | ISO-standard | standard |
| Cutting grade | carbide coated | carbide coated |
| Cutting speed | m/min | 150 |
| Number of revolutions | min ⁻¹ | 900 |
| Feed rate | mm/min | 350 |
| Feed rate per tooth | mm | 0,2 |
| Depth of cut | mm | 2,5 |
| Coolant | yes, internal | yes, internal |

Cylinder crankcase

Crankshaft bore



Operation 3: Finish-machining

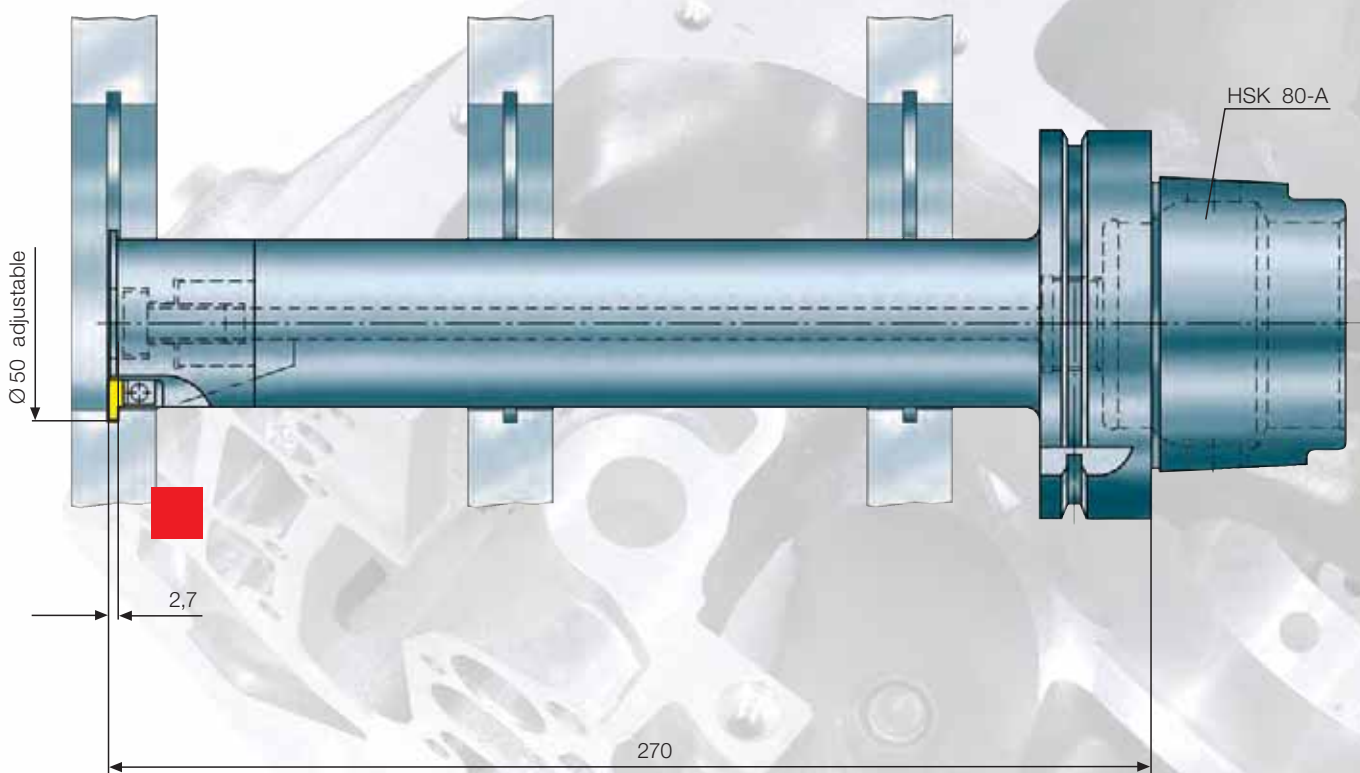


| | | Operation 3 |
|-----------------------|-------------------|------------------------|
| Workpiece | | Engine block |
| Material | | (DIN) ■ GG |
| Tool | | Fineboring tool |
| Number of teeth | | 1 / 1 |
| Insert | | standard |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 238 |
| Number of revolutions | min ⁻¹ | 1400 |
| Feed rate | mm/min | 136 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | 0,1 |
| Coolant | | yes, internal |

H Cylinder crankcase

Positioning groove

Milling of the positioning grooves in circular machining.
All inserts are adjustable in the diameter.



Workpiece

Material

Cylinder crankcase

(DIN) ■ GGG 40

Tool

Form milling cutter

Number of teeth

5

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

180

Number of revolutions

min⁻¹

1.147

Feed rate

mm/min

573

Feed rate per tooth

mm

0,1

Depth of cut

mm

-5

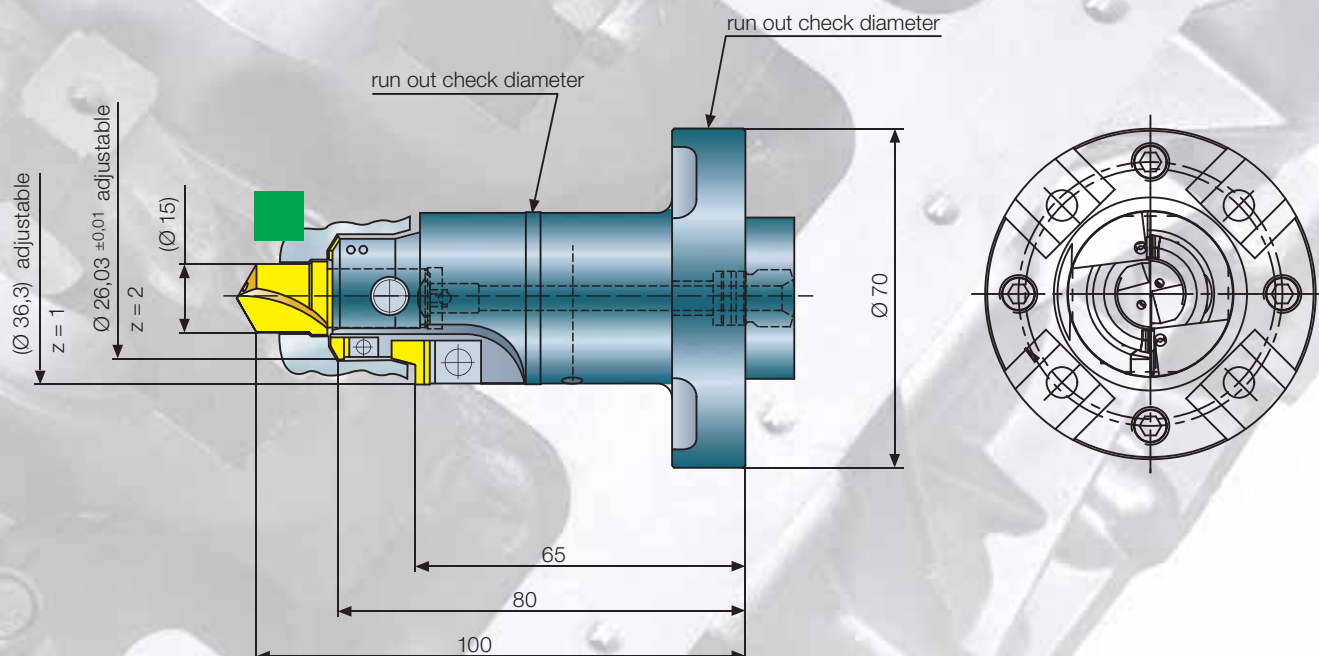
Coolant

yes, internal

Cylinder crankcase

Connecting boring

Combination tool with solid carbide drill for boring and adjustable inserts for fineboring and chamfering.



| Workpiece | | Cylinder crankcase | |
|-----------------------|-------------------|--------------------------------------|---------------|
| Material | | ■ Al | |
| Tool | | Drilling- and fineboring tool | |
| Number of teeth | | 2 / 2 / 1 | |
| Insert | | according to customer specification | |
| Cutting grade | | PCD | |
| | | drilling | fineboring |
| Cutting speed | m/min | 193 | 470 |
| Number of revolutions | min ⁻¹ | 4.150 | 4.150 |
| Feed rate | mm/min | 2.490 | 1.000 |
| Feed rate per tooth | mm | 0,3 | 0,12 |
| Depth of cut | mm | ins Volle | 5,5 |
| Coolant | | yes, internal | yes, internal |

H Gearbox case



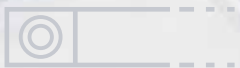
$P_t 0,3 \times R_z$

$R_z 10-25$

H6

$R_z 2$

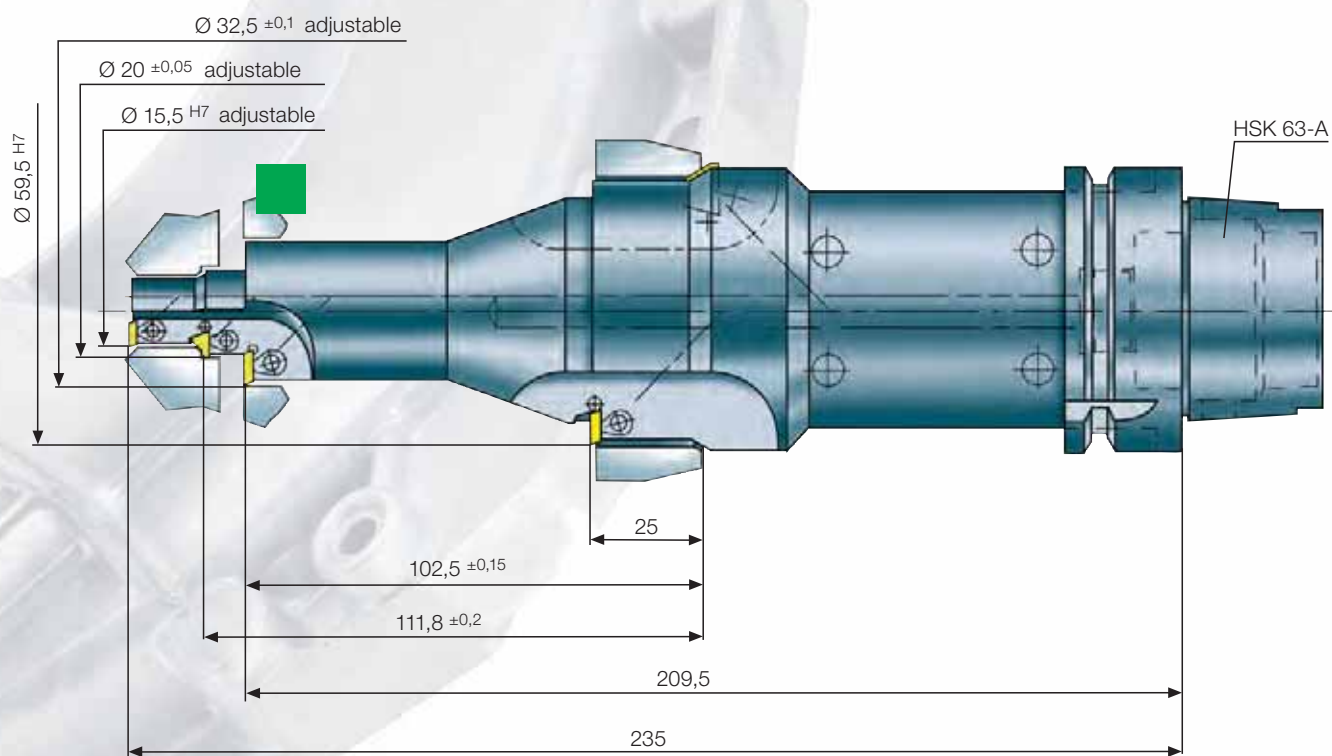
H7




Gearbox case

Bearing seats

Combination tool for machining various contours on the workpiece.

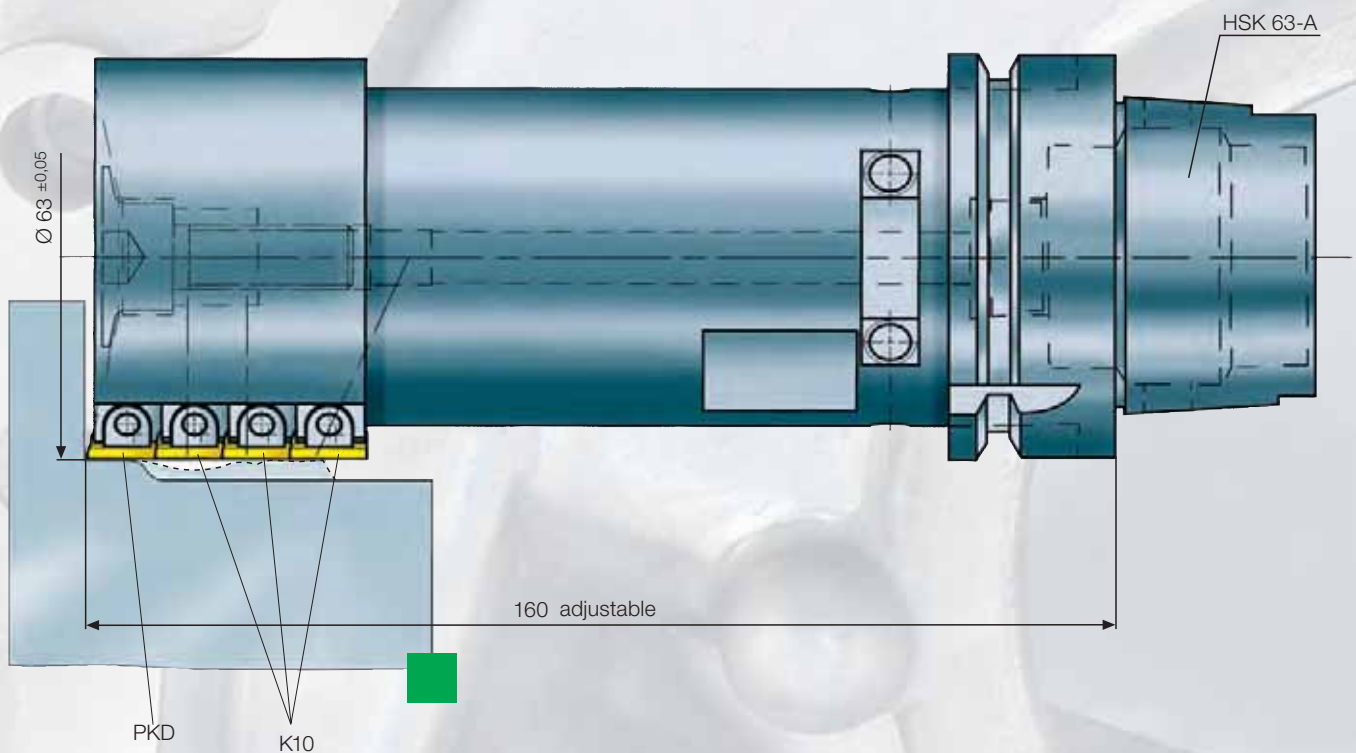


| Workpiece | | Gearbox case |
|-----------------------|-------------------|---|
| Material | | (DIN)  Al Si 9 |
| Tool | | Multistep-fineboring tool |
| Number of teeth | | effective 1 |
| Insert | | standard / according to customer specification |
| Cutting grade | | PCD |
| Cutting speed | m/min | (Ø 32,5) 450 |
| Number of revolutions | min ⁻¹ | 4.410 |
| Feed rate | mm/min | 662 |
| Feed rate per tooth | mm | 0,15 |
| Depth of cut | mm | -2 |
| Coolant | | yes, internal |

H Gearbox case

Various milling operations

Complete milling operation of the cast contours, in 95 % only PCD-inserts (a_p 4 mm) are used, carbide-inserts for “control cut” only.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Gearbox case car

(DIN) ■ Al Si 9 Cu

Multi tooth cutter

24 / effective 6

standard

PCD / K10

1.500

7.583

5.460

0,12

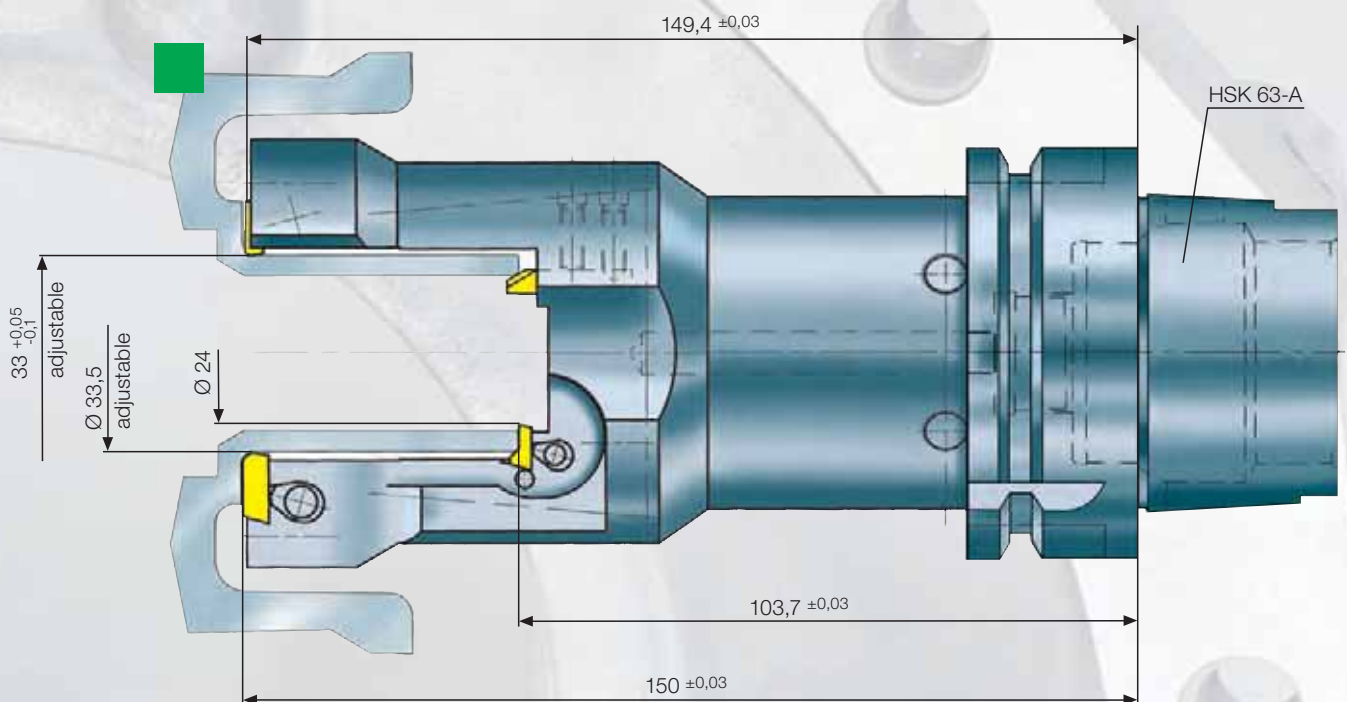
4-40

yes, internal

Gearbox case

Connecting shank

Roughing and finishing in one pass, over turning of a connecting shank.
All inserts adjustable.



Workpiece

Material

Connecting shank

(DIN)  GD - Al Si 9 Cu 3

Tool

Fineboring tool

Number of teeth

effective 1 per Ø

Insert

according to customer specification

Cutting grade

PCD

Cutting speed

m/min

(Ø 33,5) 400

Number of revolutions

min⁻¹

3.802

Feed rate

mm/min

380

Feed rate per tooth

mm

0,1

Depth of cut

mm

2 / -3

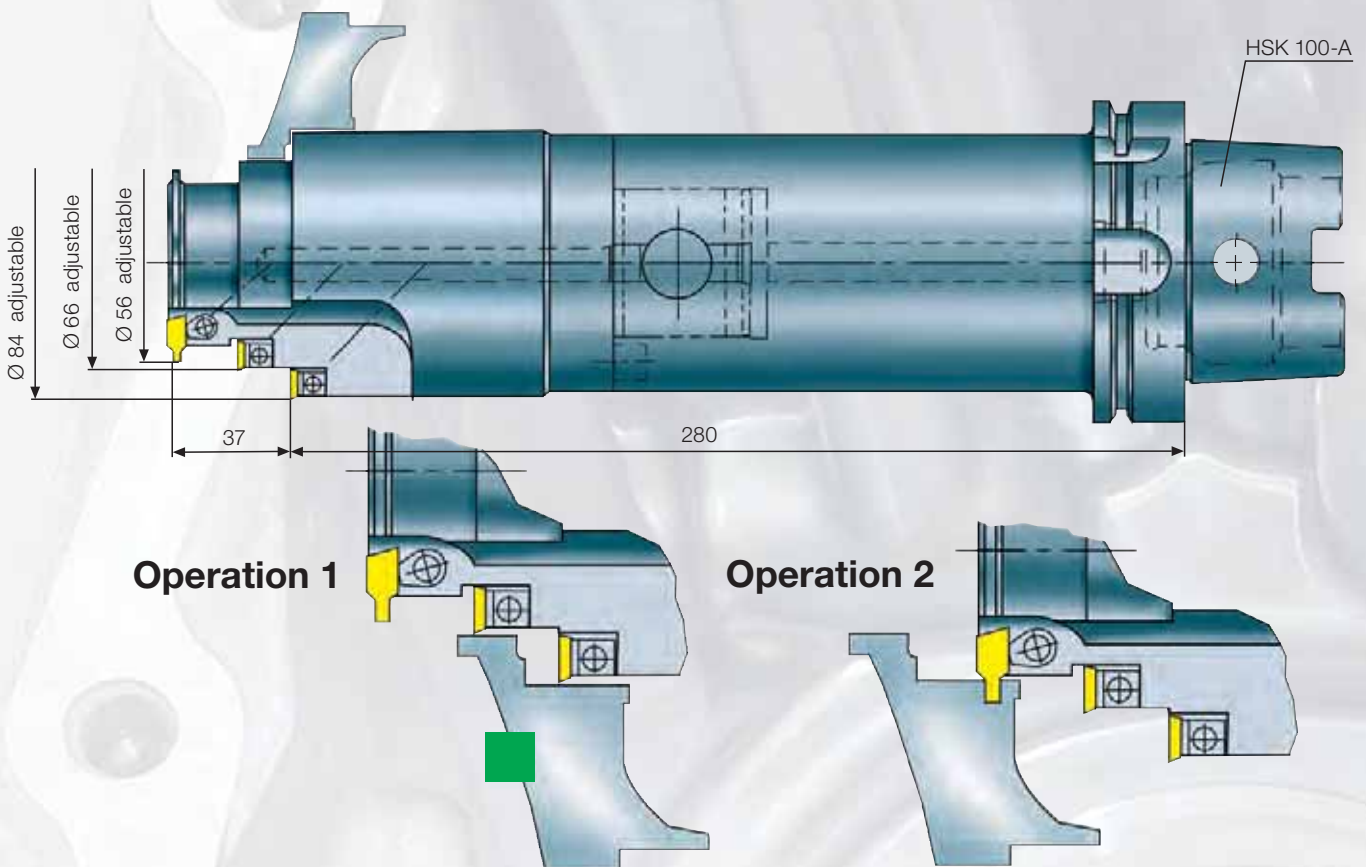
Coolant

yes, internal

H Gearbox case

Bearing seats

Combination tool for fineboring and circular milling.



Workpiece

Material

Gearbox case

(DIN) ■ Al Si 9

Tool

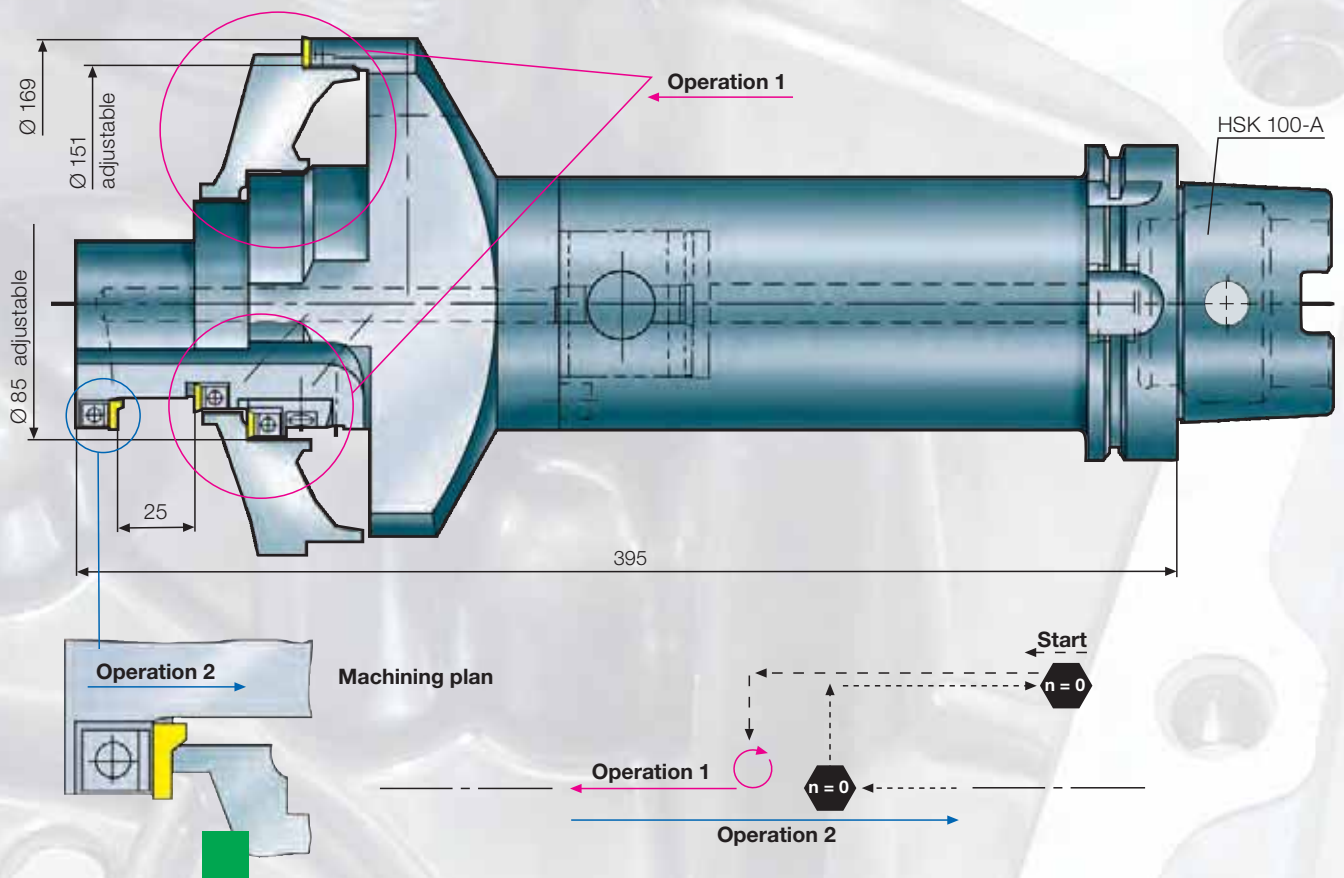
Fineboring- and circular milling tool

| | | | |
|-----------------------|-------------------|---------------|-------------------------------------|
| Number of teeth | | | 3 per Ø |
| Insert | | | according to customer specification |
| Cutting grade | | | PCD |
| | | fineboring | milling |
| Cutting speed | m/min | 450 | 517 |
| Number of revolutions | min ⁻¹ | 1.706 | 2.940 |
| Feed rate | mm/min | 409 | 1.058 |
| Feed rate per tooth | mm | 0,08 | 0,12 |
| Depth of cut | mm | -4 | -4 |
| Coolant | | yes, internal | yes, internal |

Gearbox case

Bearing seats

Combination tool for forward and backward fineboring and for over turning of outside diameter.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

m/min

min⁻¹

mm/min

mm

mm

Gearbox case

(DIN)  Al Si 9

Fineboring tool

5 / effective 1

according to customer specification

PCD

(Ø 85) 450

1.686

202

0,12

-2

yes, internal

Machining of pump housing

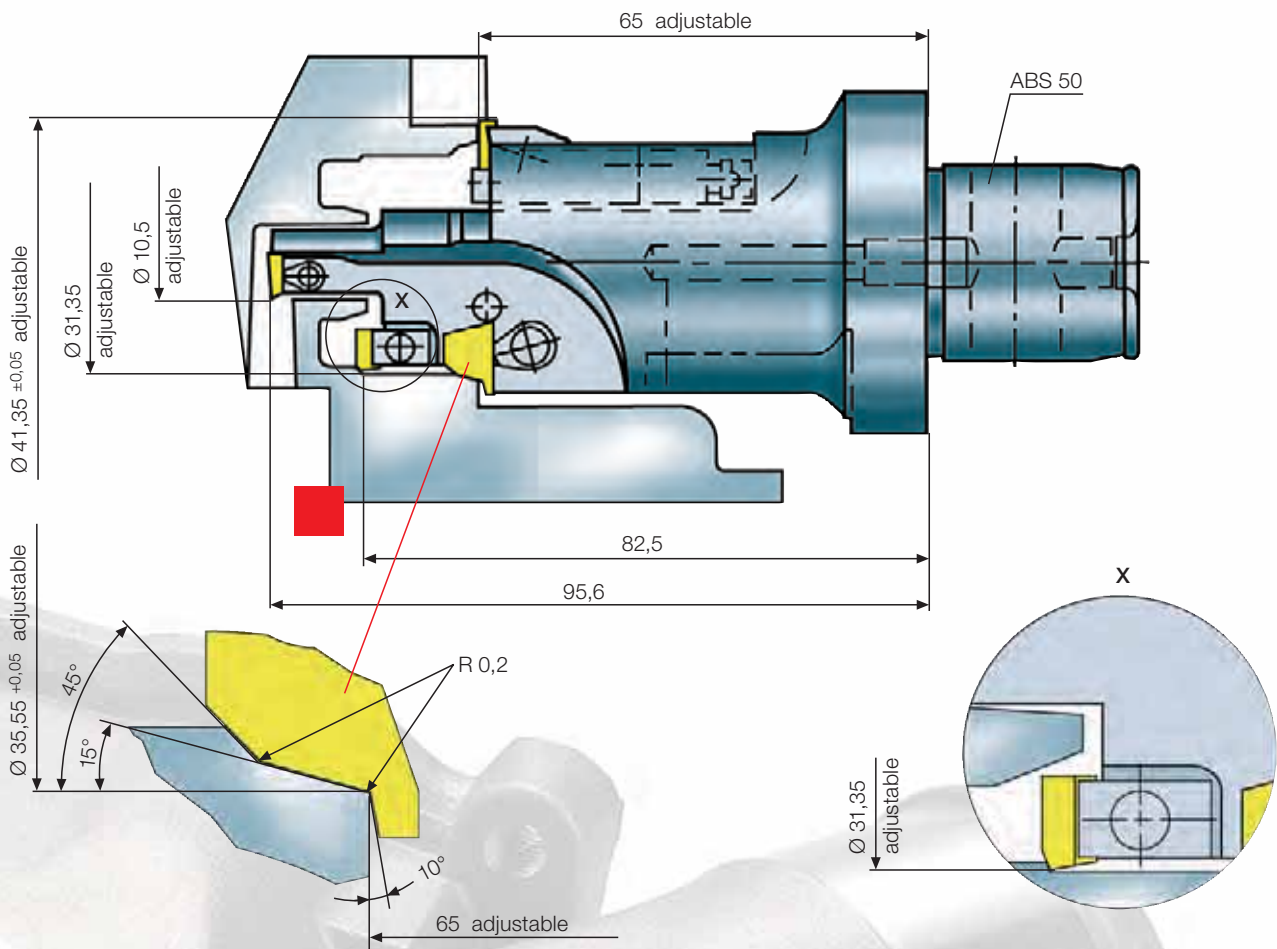
e.g.
Oil-pump
Injection pump



Oil-pump

Pump cavity

Combination tool. All diameters adjustable.



Workpiece

Material

Pump housing

(DIN)  GGG 40

Tool

Multistep-fineboring tool

Number of teeth

4 / effective 1

Insert

standard / according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

(Ø 41,35) 197

Number of revolutions

min⁻¹

1.516

Feed rate

mm/min

227

Feed rate per tooth

mm

0,15

Depth of cut

mm

-3

Coolant

yes, internal

H Oil-pump

Pump cavity

Operation 1

Fineboring tool for rough machining of the pump cavity.

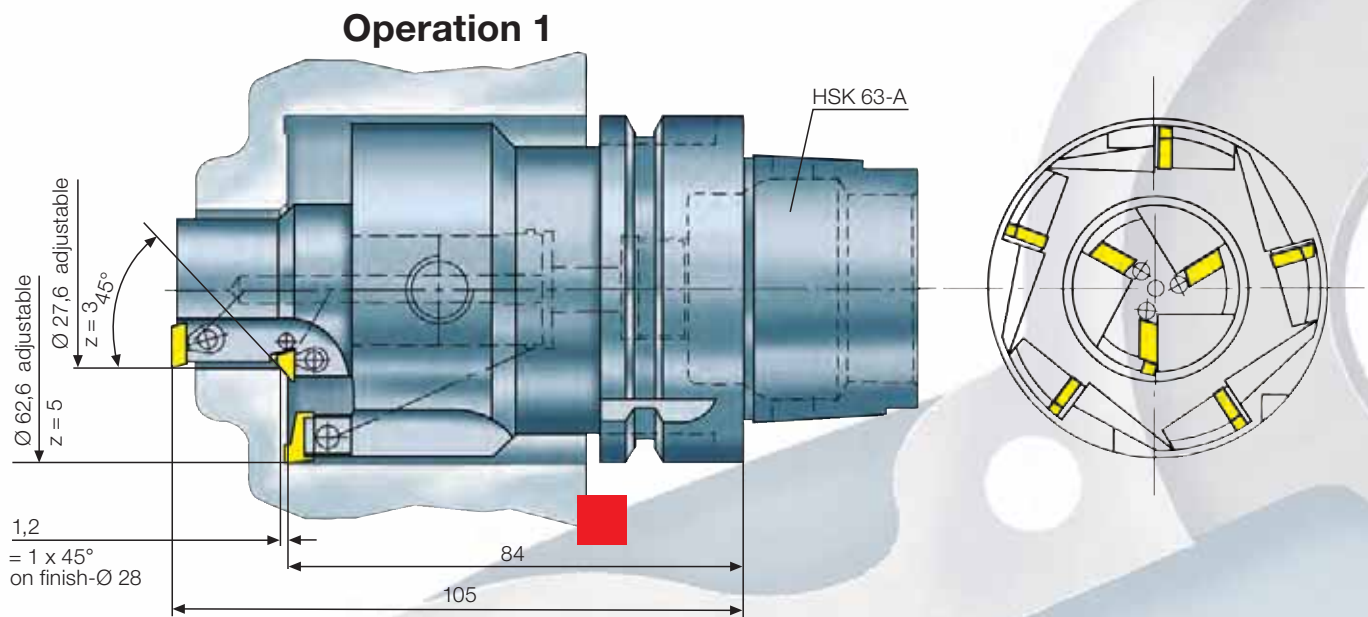
Operation 2

Step-milling cutter for simultaneous milling of the sealing surfaces.

Distance (Dim. 49) μm -accurate adjustable.

Operation 3

Fine machining of both diameters with CBN.

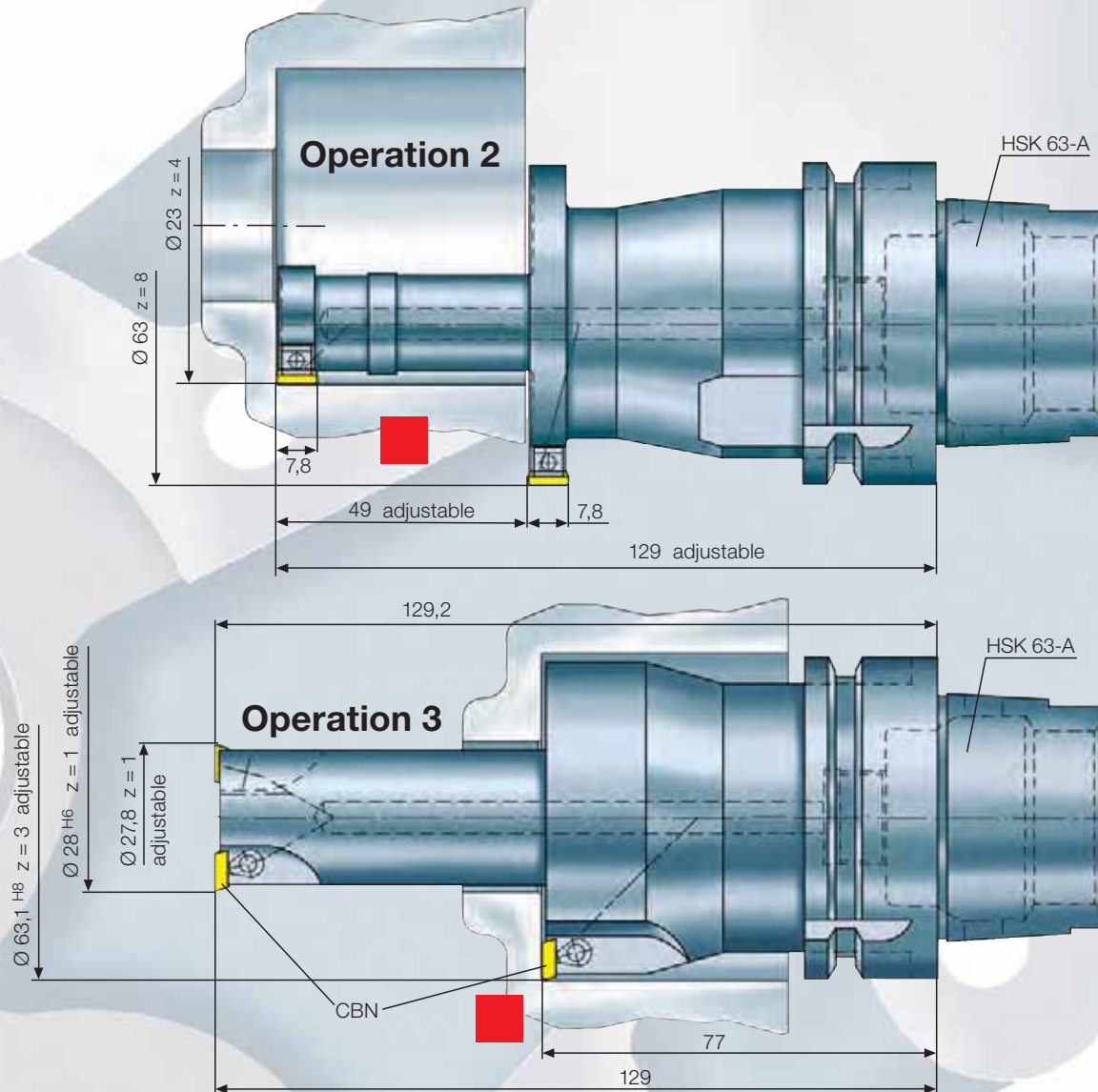




Operation 1

| | | |
|-----------------------|--|---|
| Workpiece | Oil-pump housing | |
| Material | (DIN) ■ GG 25 | |
| Tool | Multistep-fineboring tool | |
| Number of teeth | $(\text{Ø } 27,6)$ 3 $(\text{Ø } 62,6)$ 5 | |
| Insert | standard / according to customer specification | |
| Cutting grade | carbide coated | |
| Cutting speed | m/min | $(\text{Ø } 27,6)$ 108 $(\text{Ø } 62,6)$ 242 |
| Number of revolutions | min^{-1} | 1.230 |
| Feed rate | mm/min | 554 |
| Feed rate per tooth | mm | $(\text{Ø } 27,6)$ 0,15 $(\text{Ø } 62,6)$ 0,09 |
| Depth of cut | mm | -3 |
| Coolant | yes, internal | |

Oil-pump

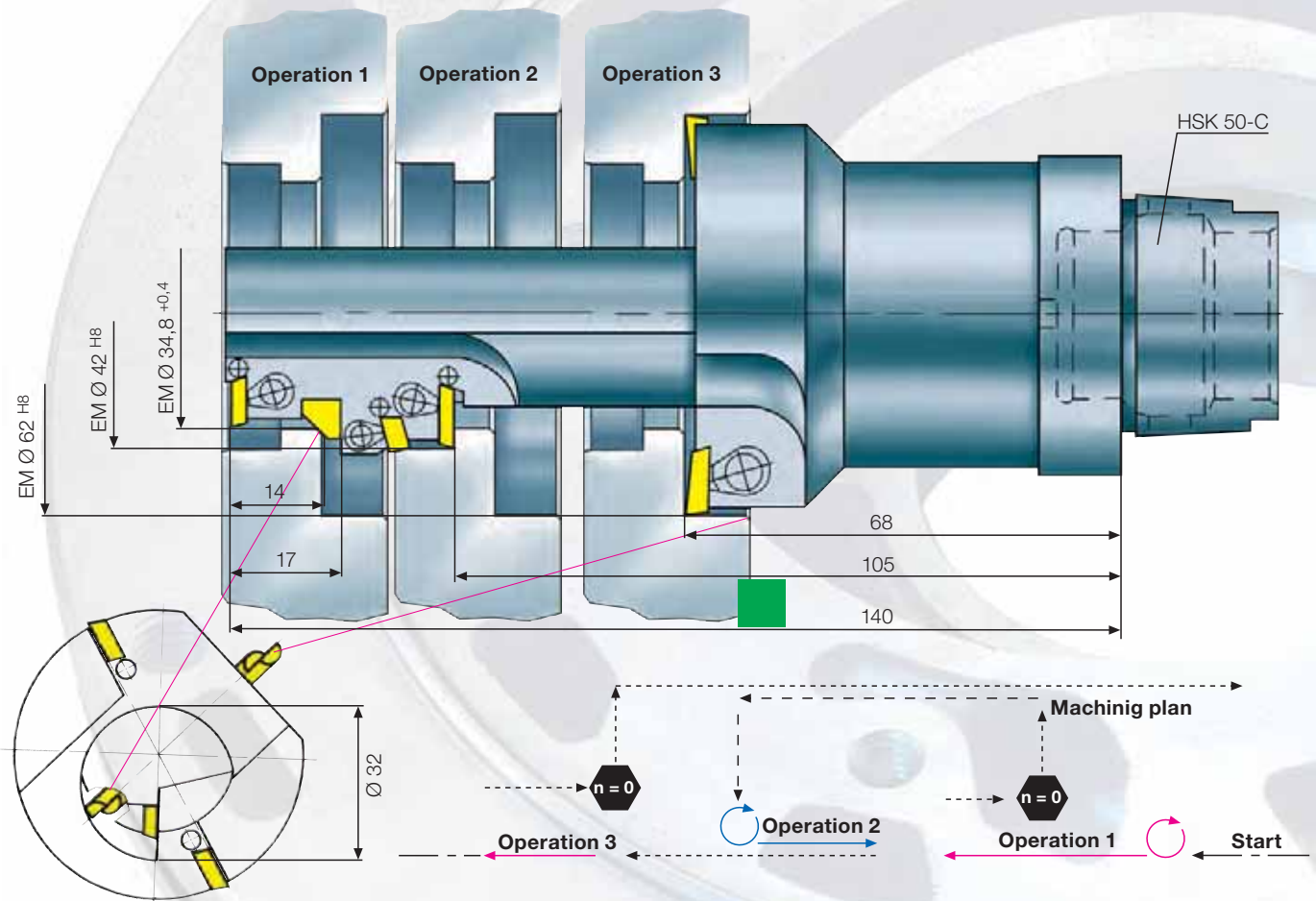
Pump cavity



| | | Operation 2 | Operation 3 |
|-----------------------|-------------------|---|---|
| Workpiece | | Oil-pump housing | Oil-pump housing |
| Material | | (DIN)  GG 25 | (DIN)  GG 25 |
| Tool | | Step milling cutter | Multistep-fineboring tool |
| Number of teeth | | 4 / 8 | (1x ▽ / 1x ▽▽) 1 + 1 / 3 |
| Insert | | standard | standard |
| Cutting grade | | carbide coated | CBN |
| Cutting speed | m/min | (Ø 23) 92 (Ø 63) 250 | 240 |
| Number of revolutions | min ⁻¹ | 1.264 | (Ø 28) 2.730 (Ø 63) 1.213 |
| Feed rate | mm/min | 606 | (Ø 28) 273 (Ø 63) 364 |
| Feed rate per tooth | mm | (Ø 23) 0,12 (Ø 63) 0,06 | 0,1 |
| Depth of cut | mm | ~ 2 | 0,2 |
| Coolant | | yes, internal | yes, internal |

H Oil-pump

Combination tool for 6 machining steps.
All inserts adjustable.



Workpiece

Material

Oil-pump housing

(DIN) ■ GD - Al Si 9 Cu 3

Tool

Forward and backward fineboring tool

Number of teeth

7 / effective 1

Insert

standard / according to customer specification

Cutting grade

PCD / K10

Cutting speed

m/min

(\varnothing 62) 467

Number of revolutions

min⁻¹

2.400

Feed rate

mm/min

288

Feed rate per tooth

mm

0,12

Depth of cut

mm

0,5

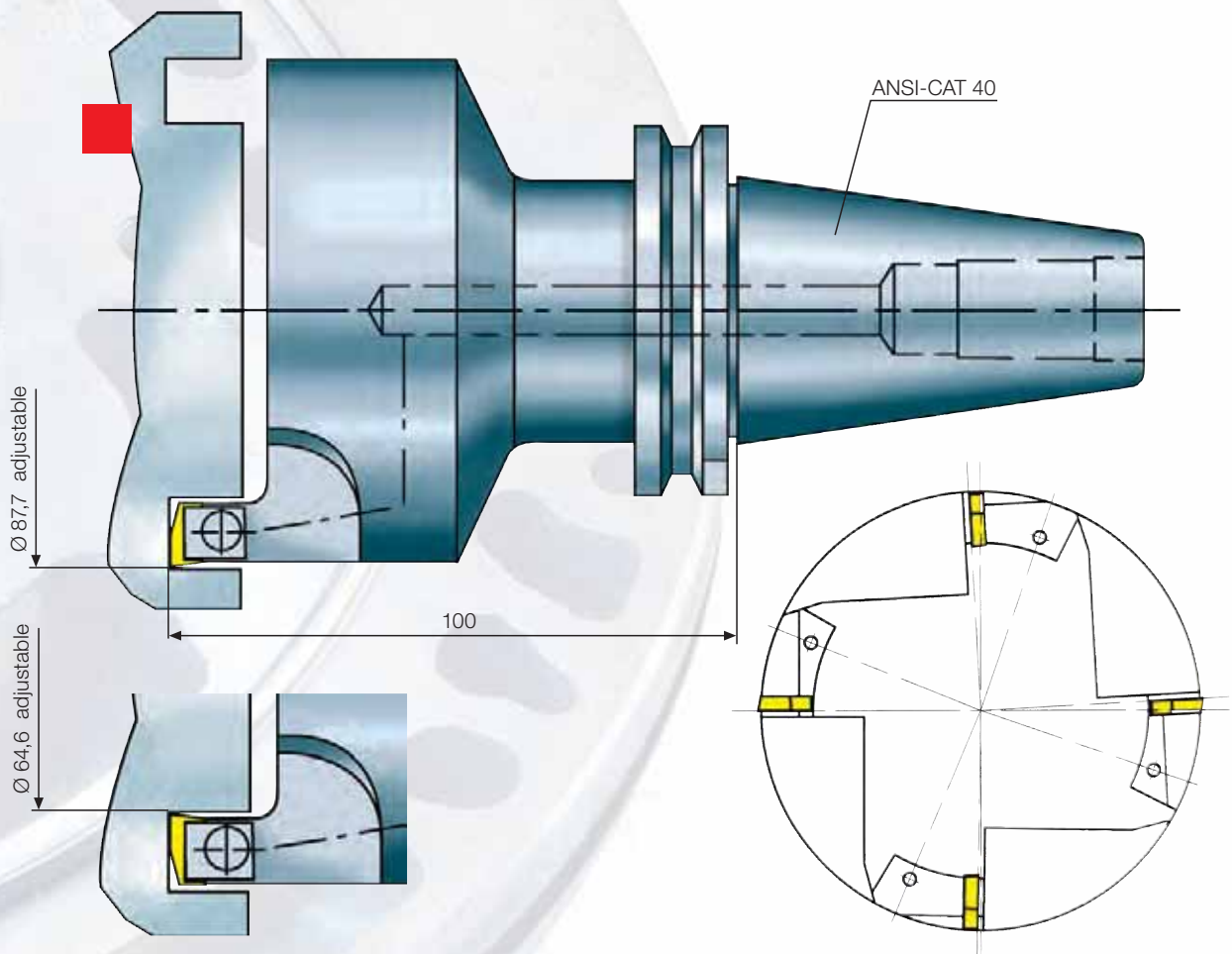
Coolant

yes, external

Oil-pump

Rotor clearance

Inside and outside diameter adjustable.



Workpiece

Material (DIN)  GG 25

Oil-pump housing for automatic gearbox

Tool

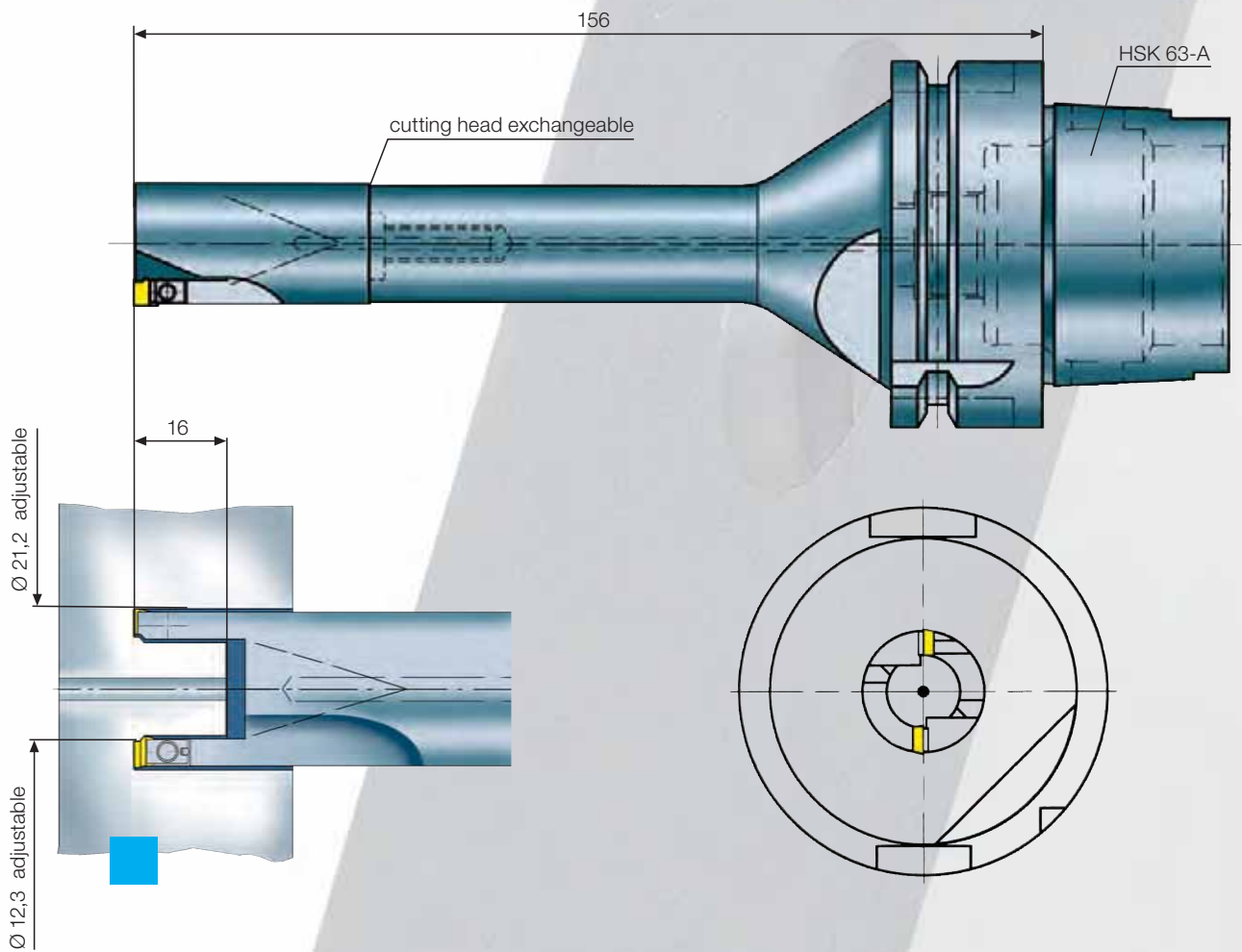
Fineboring- / plunging tool

| | | |
|-----------------------|-------------------|-------------------------------------|
| Number of teeth | | 2 x 2 |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 220 |
| Number of revolutions | min ⁻¹ | 800 |
| Feed rate | mm/min | 160 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | ~12, entire cutting width |
| Coolant | | yes, internal |

H Injection pump

Axial grooving

Plunging tool with adjustable inserts.



Workpiece

Material

Injection pump

(DIN) ■ 20 Mn Cr 5

Tool

Axial plunging tool

Number of teeth

2 / effective 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

(Ø 21,2) 121

Number of revolutions

min⁻¹

1.820

Feed rate

mm/min

146

Feed rate per tooth

mm

0,08

Depth of cut

mm

full cut

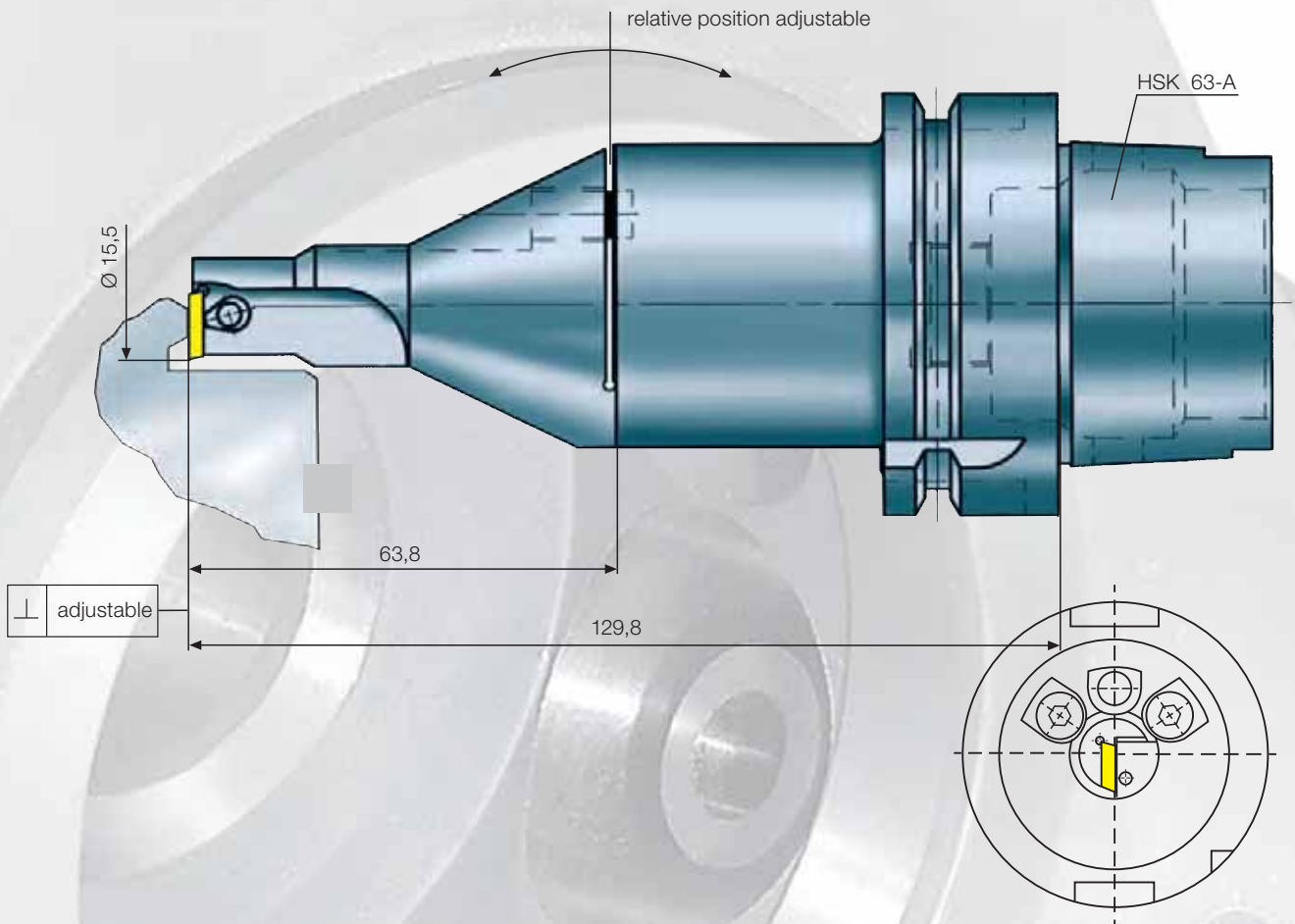
Coolant

yes, internal


Injection pump

Sealing surface, hard machining

Hard machining of the sealing surface.
Relative position of the cutting edge adjustable.



Workpiece

Material 60-62 HRC (DIN)  20 Mn Cr 5

Tool

Injection pump

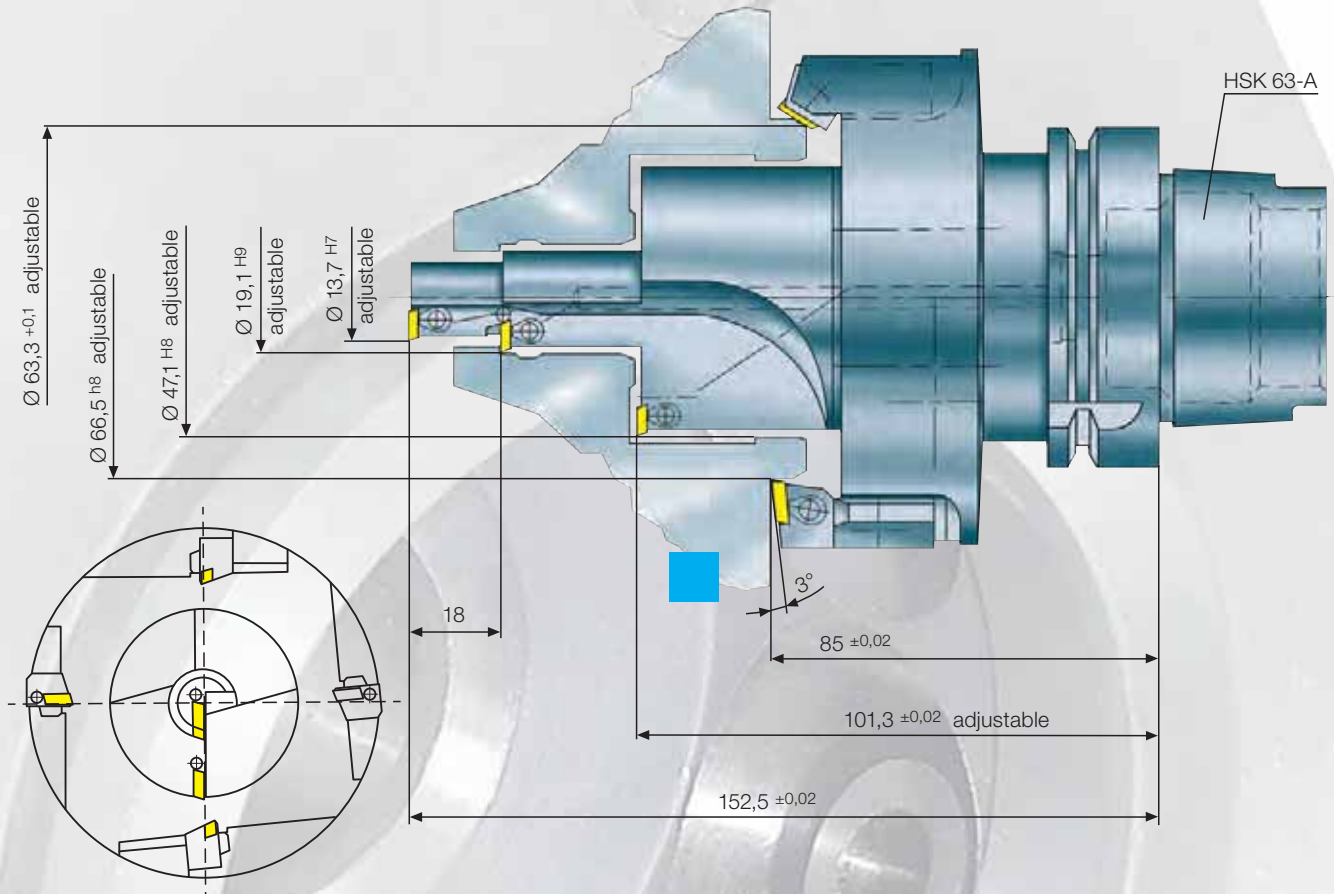
Fineboring tool

| | | |
|-----------------------|-------------------|-------------------------------------|
| Number of teeth | | 1 |
| Insert | | according to customer specification |
| Cutting grade | | CBN |
| Cutting speed | m/min | 195 |
| Number of revolutions | min ⁻¹ | 4.000 |
| Feed rate | mm/min | 100 |
| Feed rate per tooth | mm | 0,025 |
| Depth of cut | mm | 0,2 |
| Coolant | | yes, internal |

Injection pump

Cam cavity

Combination tool for 5 machining steps.



Workpiece

Material

Injection pump

(DIN) ■ 20 Mn Cr 5

Tool

Multistep-fineboring tool

Number of teeth

7 / effective 1 / (Ø 66,5 + Ø 63,3) z = 2

Insert

standard / according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min (Ø 13,7) 37 (Ø 66,5) 180

Number of revolutions

min⁻¹ 860

Feed rate

mm/min 130

Feed rate per tooth

mm (Ø 13,7) 0,15 (Ø 66,5) 0,075

Depth of cut

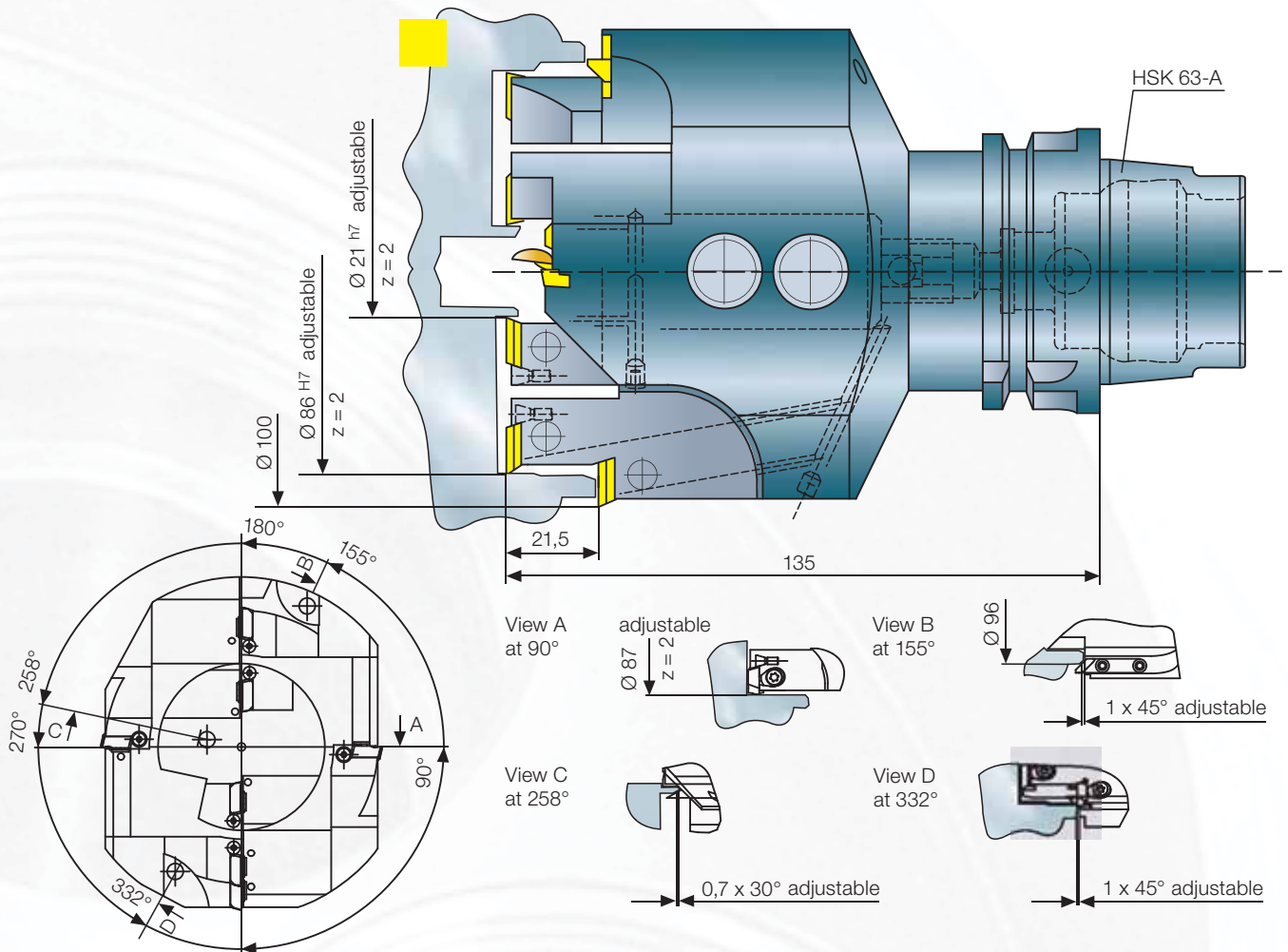
mm (Ø 13,7) 0,5 (Ø 66,5) 0,5 -1,5

Coolant

yes, internal

Stainless steel pump


Combination tool. All diameters adjustable.



Workpiece

Material

Stainless steel pump

(DIN)  X2CrNi 19-11

Tool

Multistep-fineboring tool

Number of teeth

2 / 2 / 2 / 1 / 1 / 1 / 1 / 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

25-100

Number of revolutions

min⁻¹

360

Feed rate

mm/min

18

Feed rate per tooth

mm

0,025

Depth of cut

mm

0,4

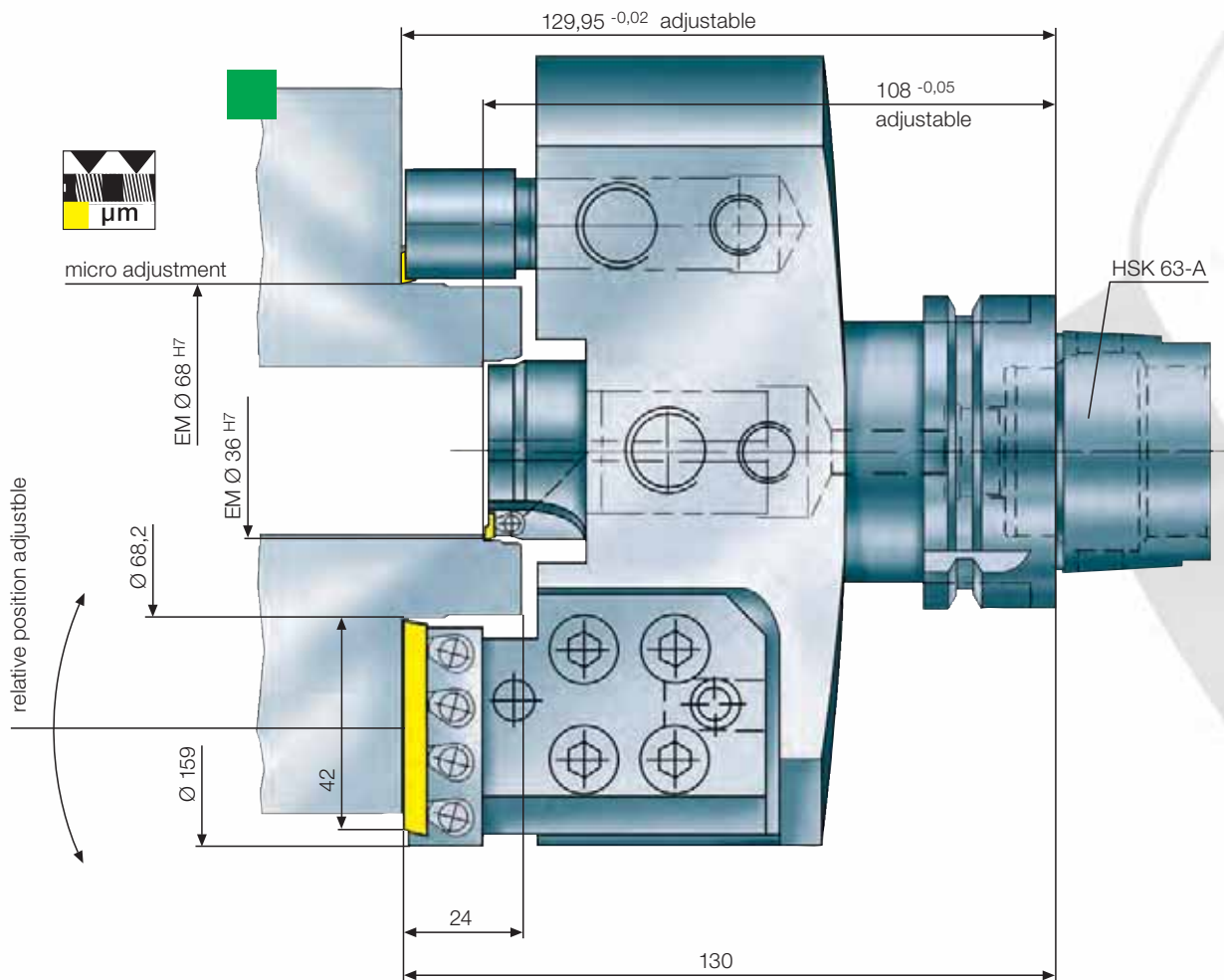
Coolant

yes, internal

H Injection pump

Flange machining

Combination tool for 6 machining steps.
Cartridges for different types of workpieces. Inserts adjustable in diameter.



Workpiece

Material

Radial piston pump

(DIN) ■ GD - Al Si 12 Cu

Tool

Fineboring tool

Number of teeth

6 / effective 1

Insert

according to customer specification

Cutting grade

PCD / K10

Cutting speed

m/min

(Ø 68) 641

Number of revolutions

min⁻¹

3.004

Feed rate

mm/min

360

Feed rate per tooth

mm

0,12

Depth of cut

mm

-4

Coolant

yes, internal

Injection pump



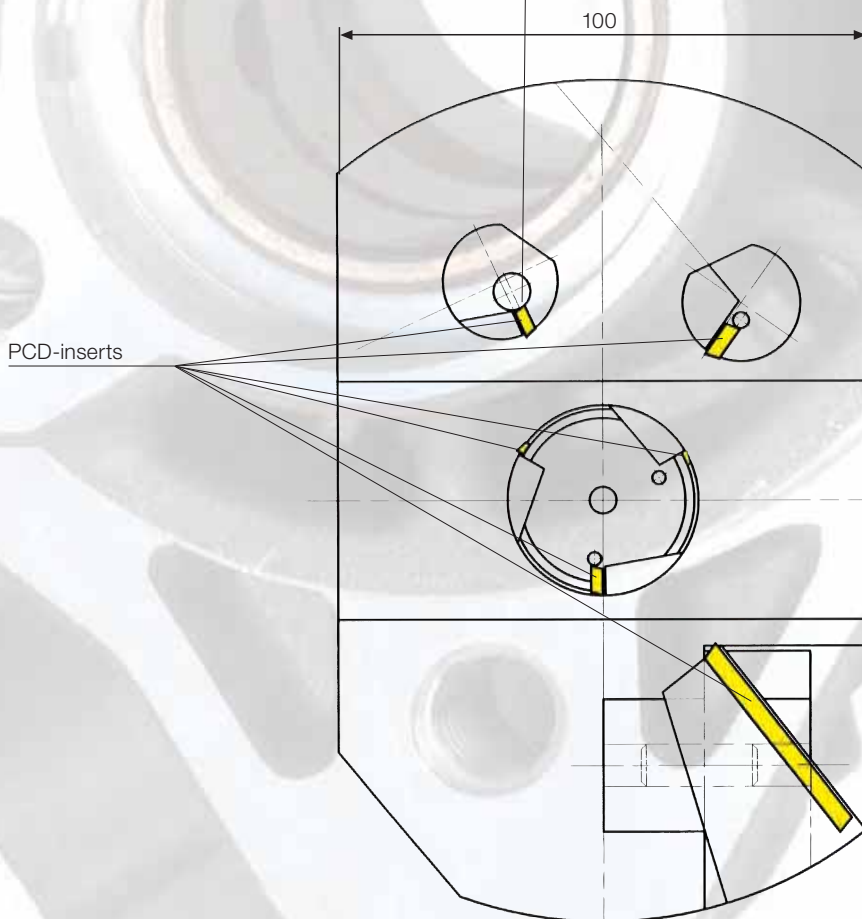
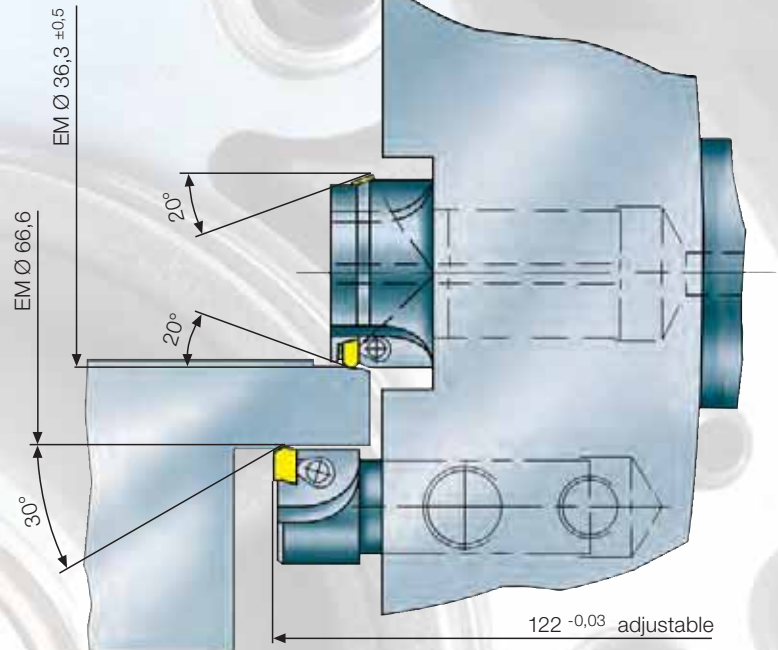
Flange machining



Micro-Adjustment

allows the precise adjustment of the tool diameter directly in the machine without using any devices, this leads to a reduction of non productive times in continuously running processes e.g. mass production of automotive components.

1 revolution = 0,02 mm in \varnothing



Various automotive components

e.g.

Connecting rod

Camshaft, crankshaft

Frame

Gearshift fork, housing

Starter housing, main brake cylinder

Steering housing, balance shaft housing

Motor bracket, drive flange

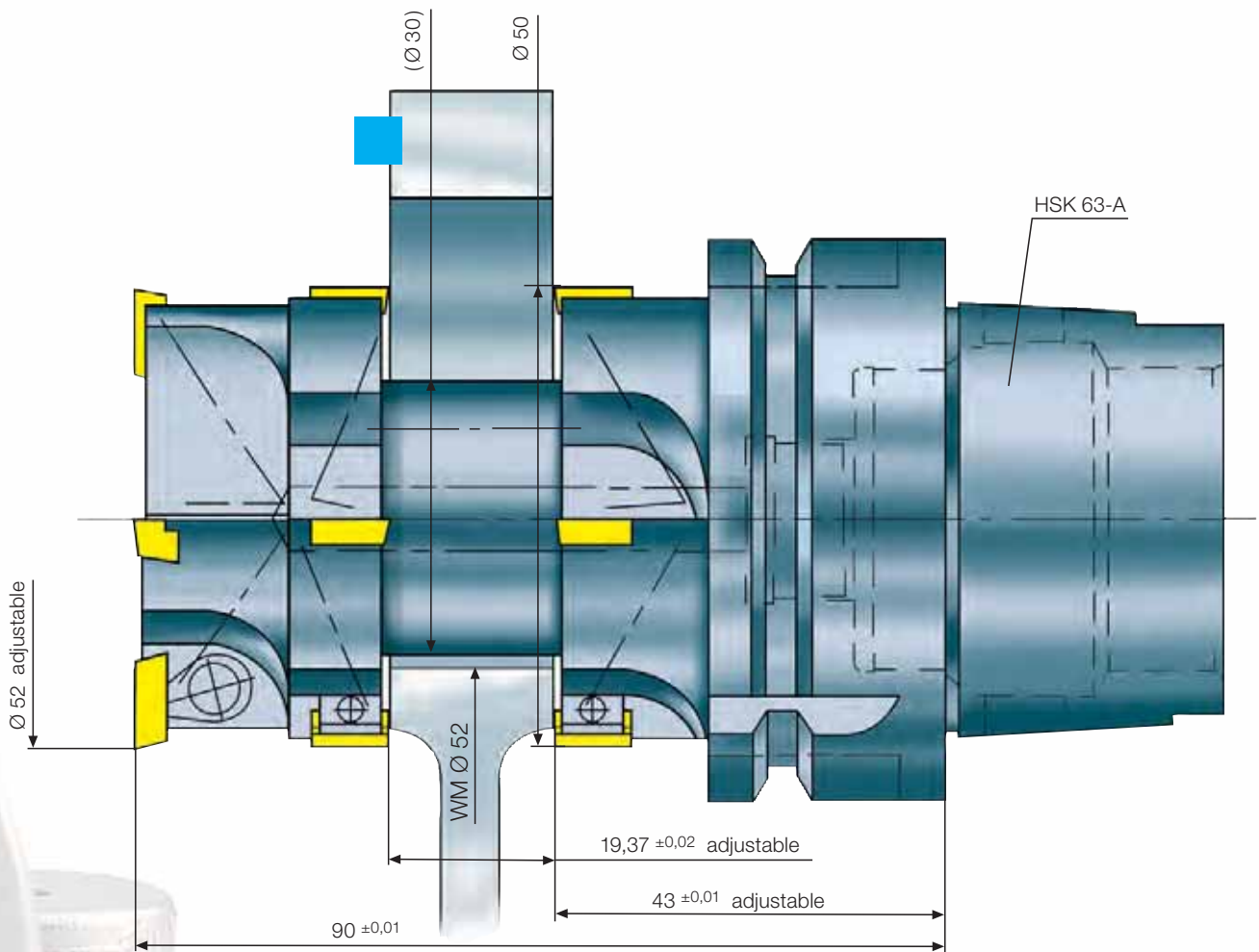
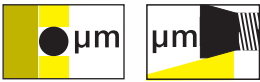
Brake caliper



Connecting rod

Large bearing bore


Combination tool for counterboring of the bearing bore followed by circular milling of the connecting rod width.



Workpiece

Material

Sintersteel connecting rod

(DIN)  Sint C70 (sintersteel metal)

Tool

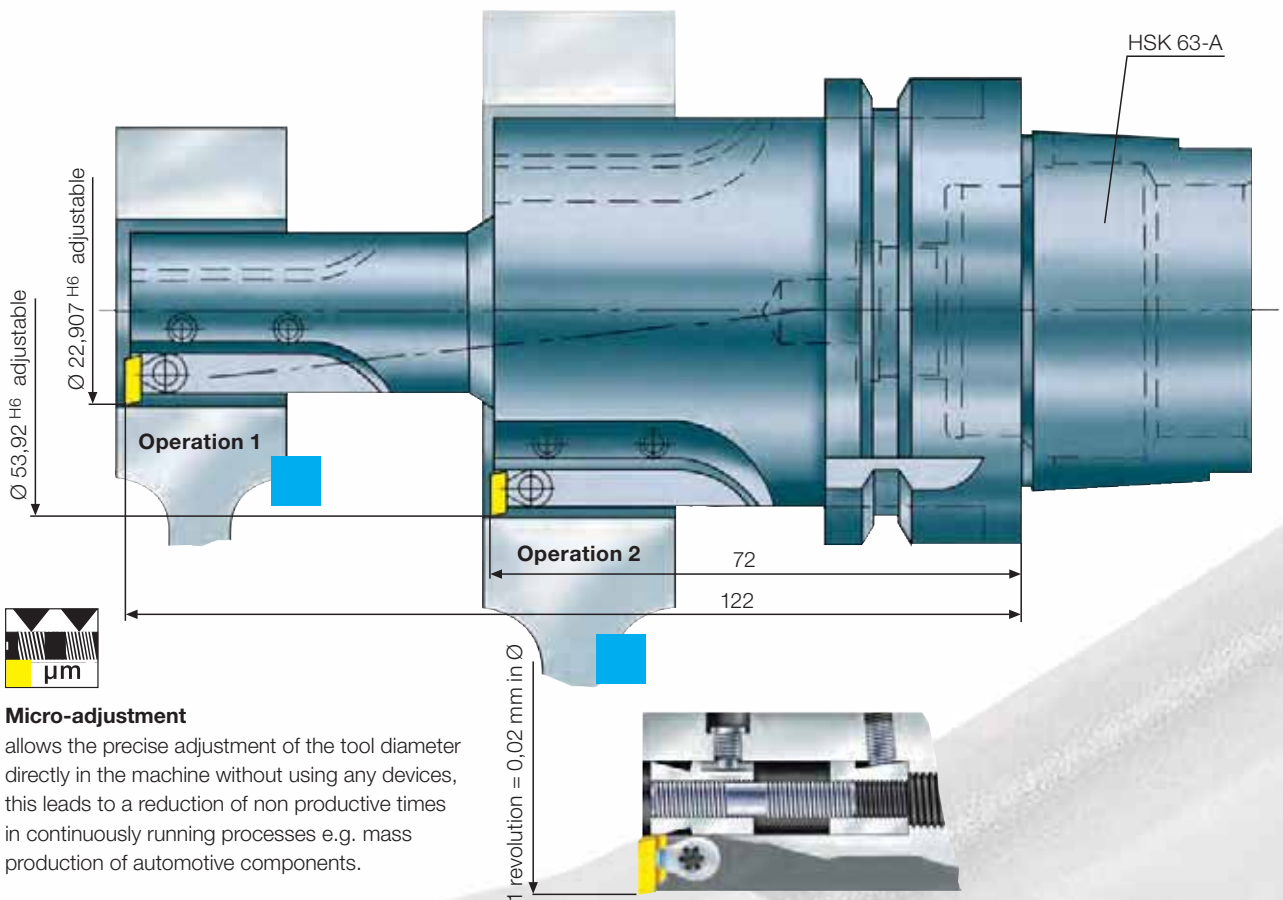
Fineboring and milling cutter tool

| | | |
|-----------------------|-------------------|--------------------------------|
| Number of teeth | | per 4 |
| Insert | | standard |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 85 |
| Number of revolutions | min ⁻¹ | 540 |
| Feed rate | mm/min | (fineboring) 216 (milling) 216 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | 5 |
| Coolant | | yes, internal |

Connecting rod

Large and small bearing bore

Machining of large and small bearing bore with one tool.
 Inserts adjustable with micro-adjustment.



Micro-adjustment

allows the precise adjustment of the tool diameter directly in the machine without using any devices, this leads to a reduction of non productive times in continuously running processes e.g. mass production of automotive components.

Workpiece

Material

Connecting rod

(DIN) ■ Sint D11 (sintersteel metal)

Tool

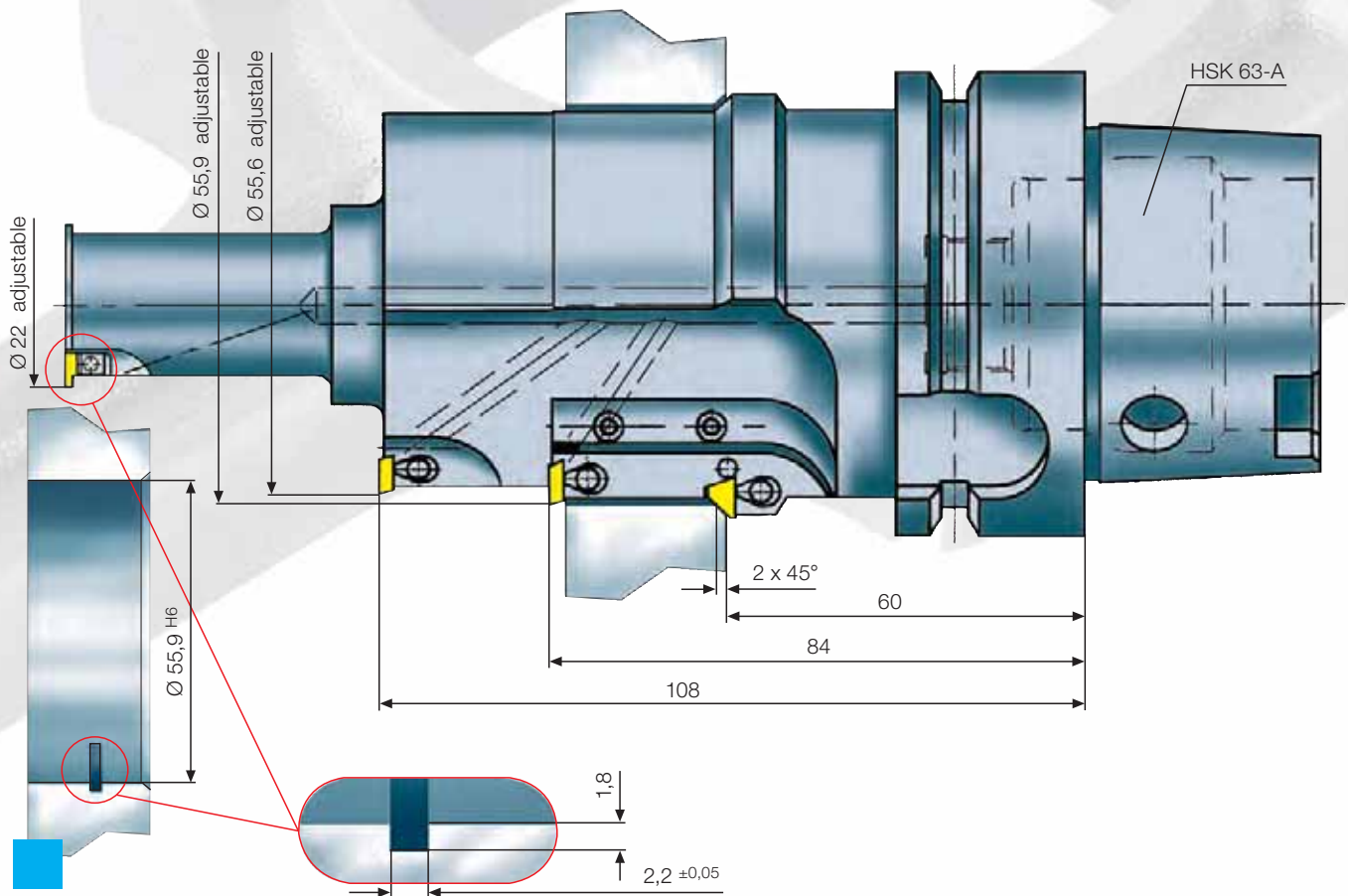
Fineboring tool with micro-adjustment


| | | | |
|-----------------------|-------------------|---------------|---|
| Number of teeth | | | per 1 |
| Insert | | | according to customer specification with wiper geometry |
| Cutting grade | | | Cermet |
| Cutting speed | m/min | (Ø 53,92) 203 | (Ø 22,907) 203 |
| Number of revolutions | min ⁻¹ | 1.200 | 2.822 |
| Feed rate | mm/min | 216 | 508 |
| Feed rate per tooth | mm | 0,18 | 0,18 |
| Depth of cut | mm | | 0,4 |
| Coolant | | | yes, internal |
| Surface finish | | | R _a 0,8 |

Connecting rod

Large bearing bore

Machining in 3 steps: Semifinish 3 cutting edges, finish + chamfer 1 cutting edge, milling. All inserts adjustable.

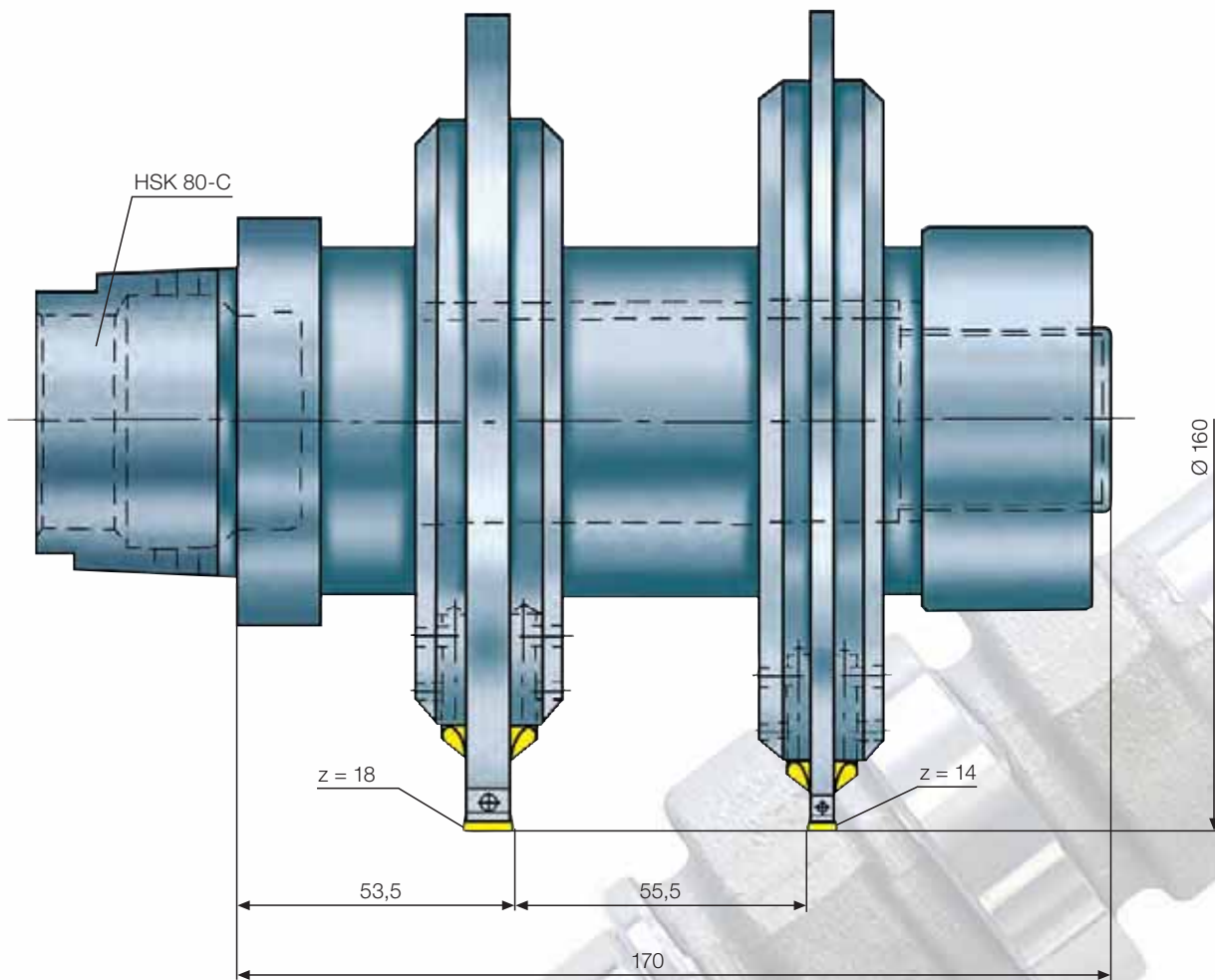


| Workpiece | | Connecting rod |
|-----------------------|---|--|
| Material | | (DIN)  Sint C70 (sintersteel metal) |
| Tool | Milling cutter and multistep-fineboring tool with micro-adjustment | |
| Number of teeth | | 3 / 1 |
| Insert | | according to customer specification |
| Cutting grade | | Cermet |
| Cutting speed | m/min | 207 |
| Number of revolutions | min ⁻¹ | 1.180 |
| Feed rate | mm/min | 531 / 177 |
| Feed rate per tooth | mm | 0,15 ∇∇ / 0,15 ∇∇∇ |
| Depth of cut | mm | ∇∇ 0,5 |
| Coolant | | yes, internal |

Camshaft

Drive slot

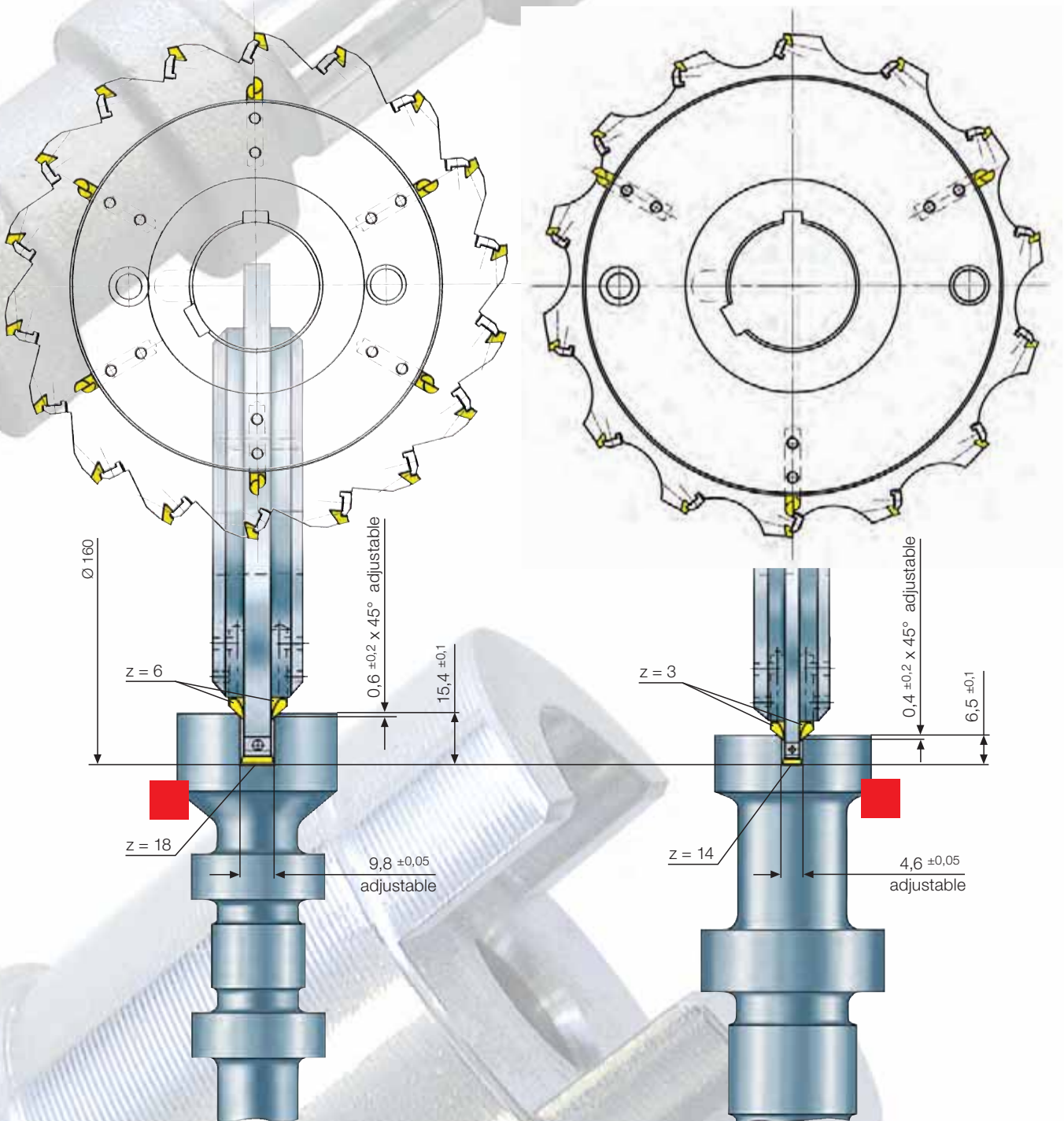
Machining of 2 types of camshafts.



| Workpiece | | Camshaft car |
|-----------------------|-------------------|---|
| Material | | (DIN) ■ GGG 40 |
| Tool | | Gang milling cutter |
| Number of teeth | | 18 / 14 |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 80 |
| Number of revolutions | min ⁻¹ | 160 |
| Feed rate | mm/min | z = 18 / 173 / z = 14 / 135 |
| Feed rate per tooth | mm | 0,06 |
| Depth of cut | mm | z = 18 / 16 / z = 14 / 7 |
| Coolant | | yes, external |

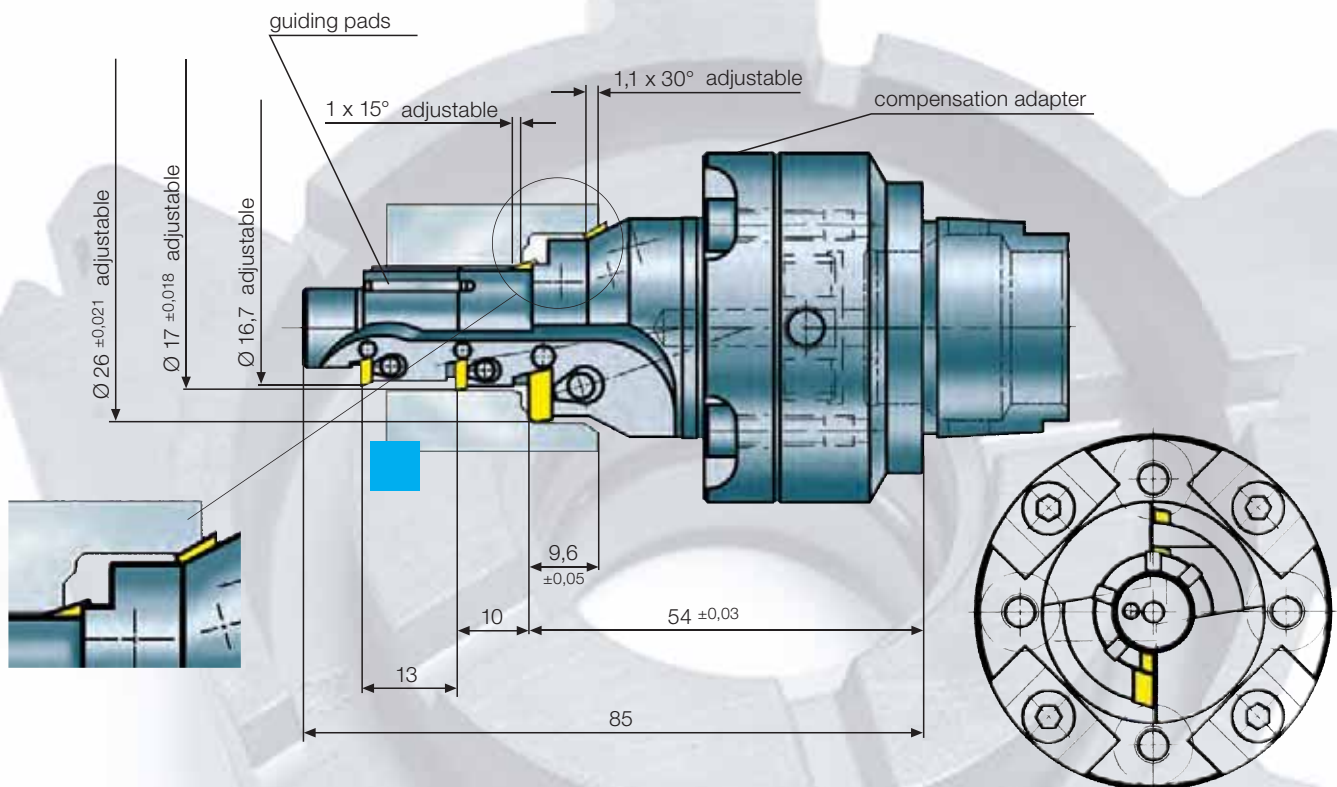
Camshaft

Drive slot



H Camshaft regulator

Simultaneous machining of diameter and chamfers.
Inserts are adjustable in diameter.



Workpiece

Material

Camshaft regulator

(DIN) ■ Sint D11 (sintersteel metal)

Tool

Multistep-fineboring tool with guiding pads

Number of teeth

5 / effective 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

(Ø 26) 280

Number of revolutions

min⁻¹

3.430

Feed rate

mm/min

274

Feed rate per tooth

mm

0,08

Depth of cut

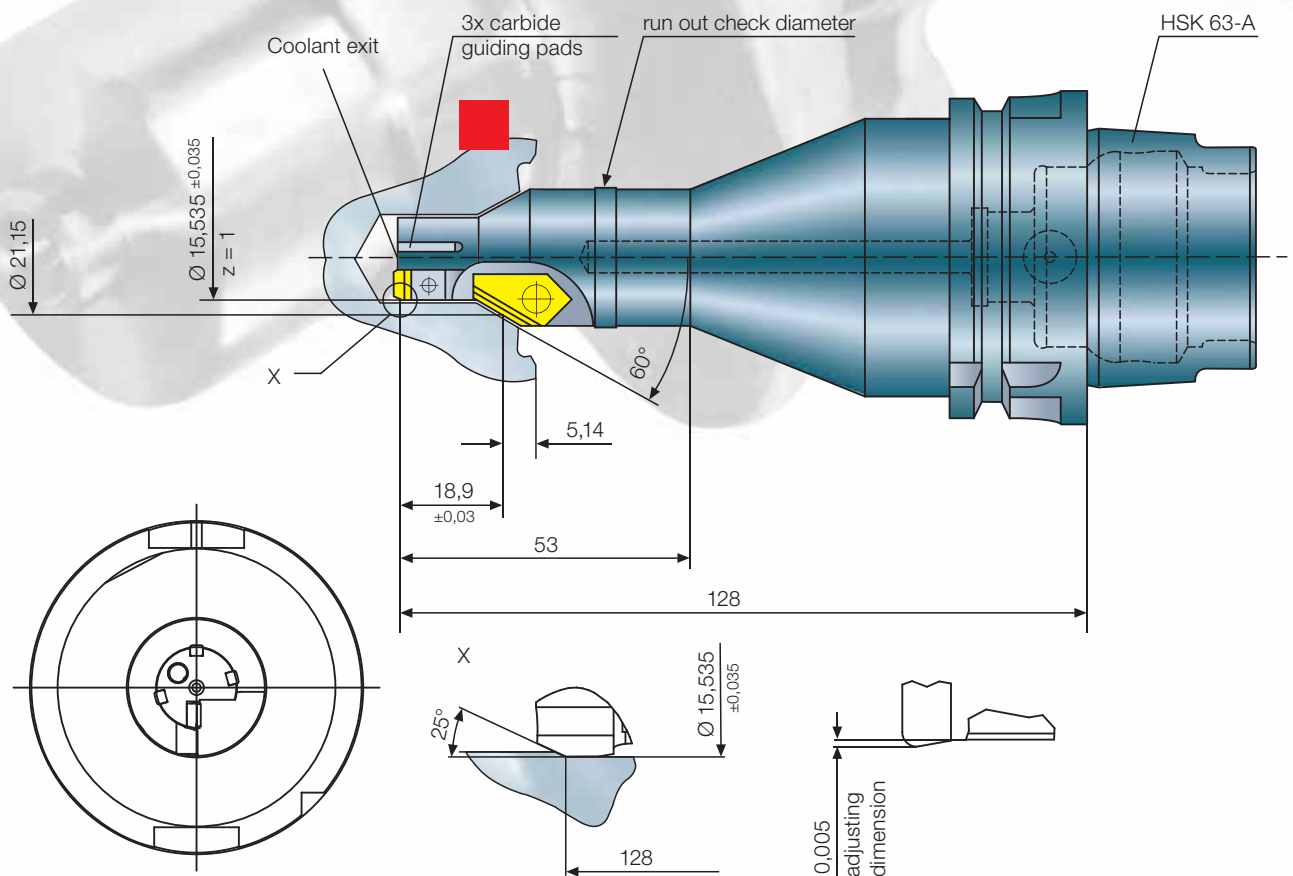
mm

-2

Coolant

yes, internal

Fineboring tool with carbide guide pads for machining of the flange bore.



Workpiece

Material

Crankshaft

(DIN)  GGG 60

Tool

Fineboring and chamfer tool

Number of teeth

1 / 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

80

Number of revolutions

min⁻¹

1.470

Feed rate

mm/min

220

Feed rate per tooth

mm

0,12

Depth of cut

mm

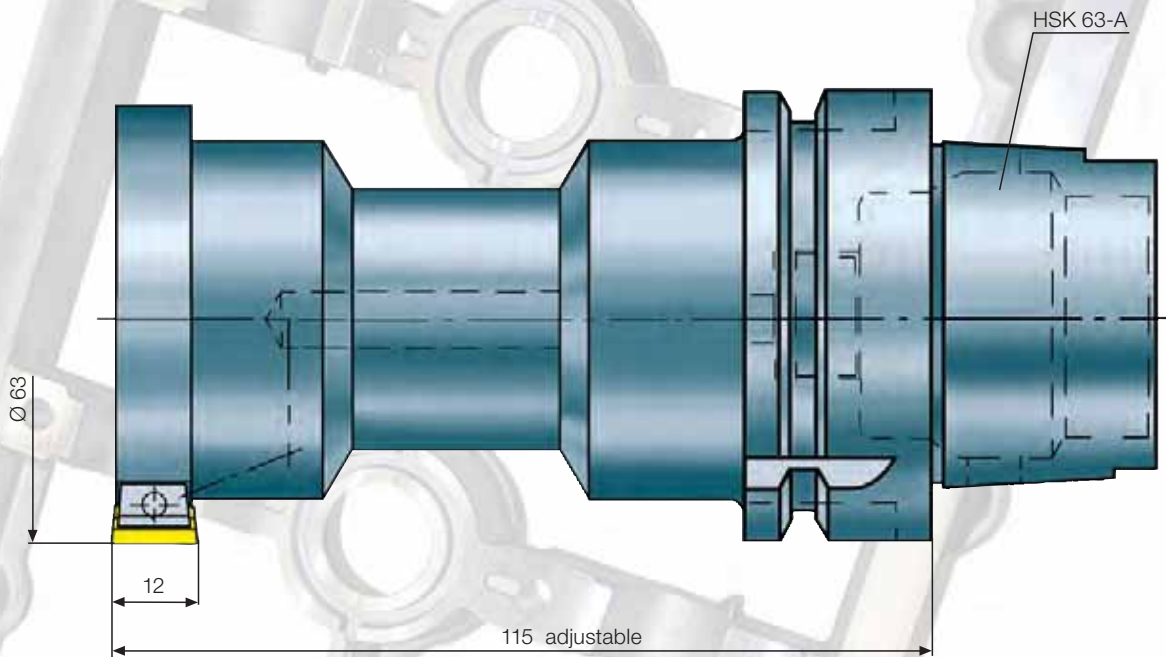
0,15

Coolant

yes, internal

H Frame

Milling of the sealing surface.
All inserts axially adjustable.



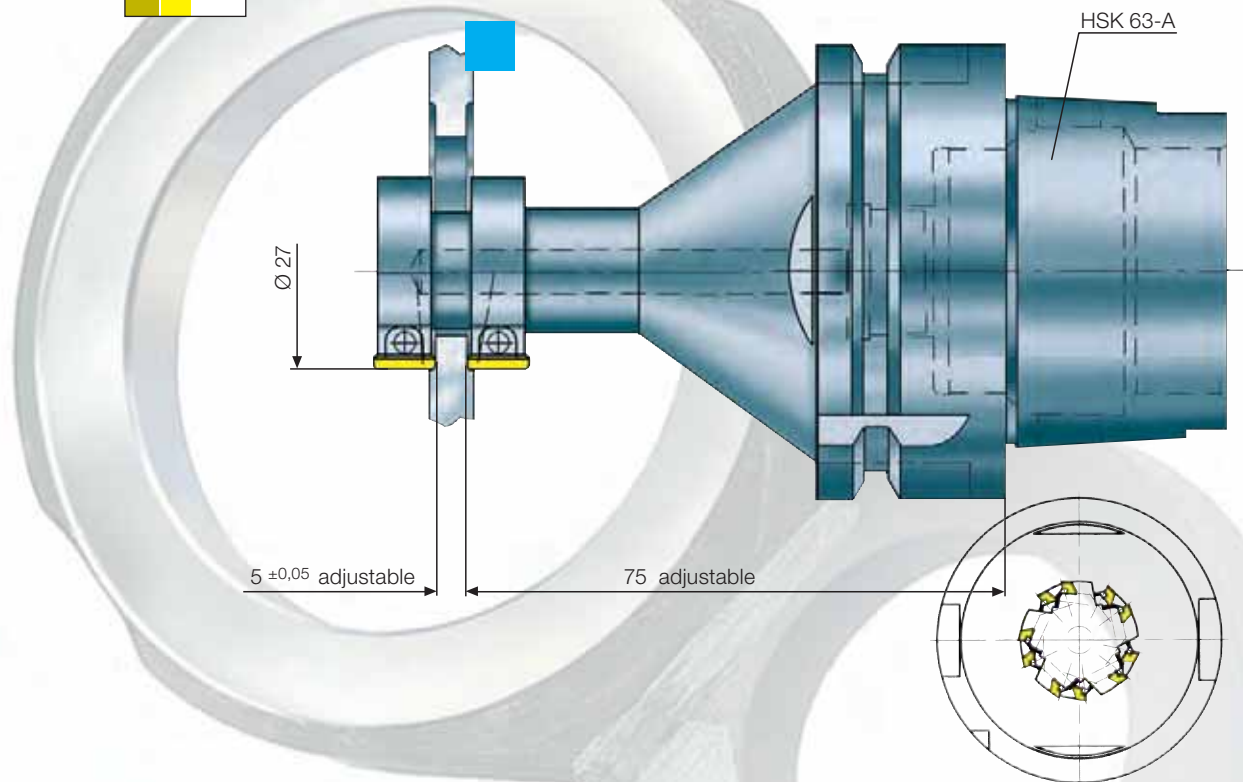
R_z15 - 18



| Workpiece | | Frame |
|-----------------------|-------------------|--|
| Material | | (DIN) ■ Al Si 12 Cu |
| Tool | | Face milling cutter |
| Number of teeth | | 8 |
| Insert | | standard |
| Cutting grade | | PCD |
| Cutting speed | m/min | 3.560 |
| Number of revolutions | min ⁻¹ | 18.000 |
| Feed rate | mm/min | 23.040 |
| Feed rate per tooth | mm | 0,16 |
| Depth of cut | mm | / |
| Coolant | | yes, internal |
| Surface requirement | | (sealing surface) R _z 10 - 25 |


Gearshift fork

Very unstable component, requires low cutting forces of the tool.
 Machining of the two ring surfaces in one cut.
 Inserts interchangeable among each other thus both cutting edges of the inserts can be used. All inserts adjustable.



Workpiece

Material

(DIN)  C 35 - 520 N/mm²

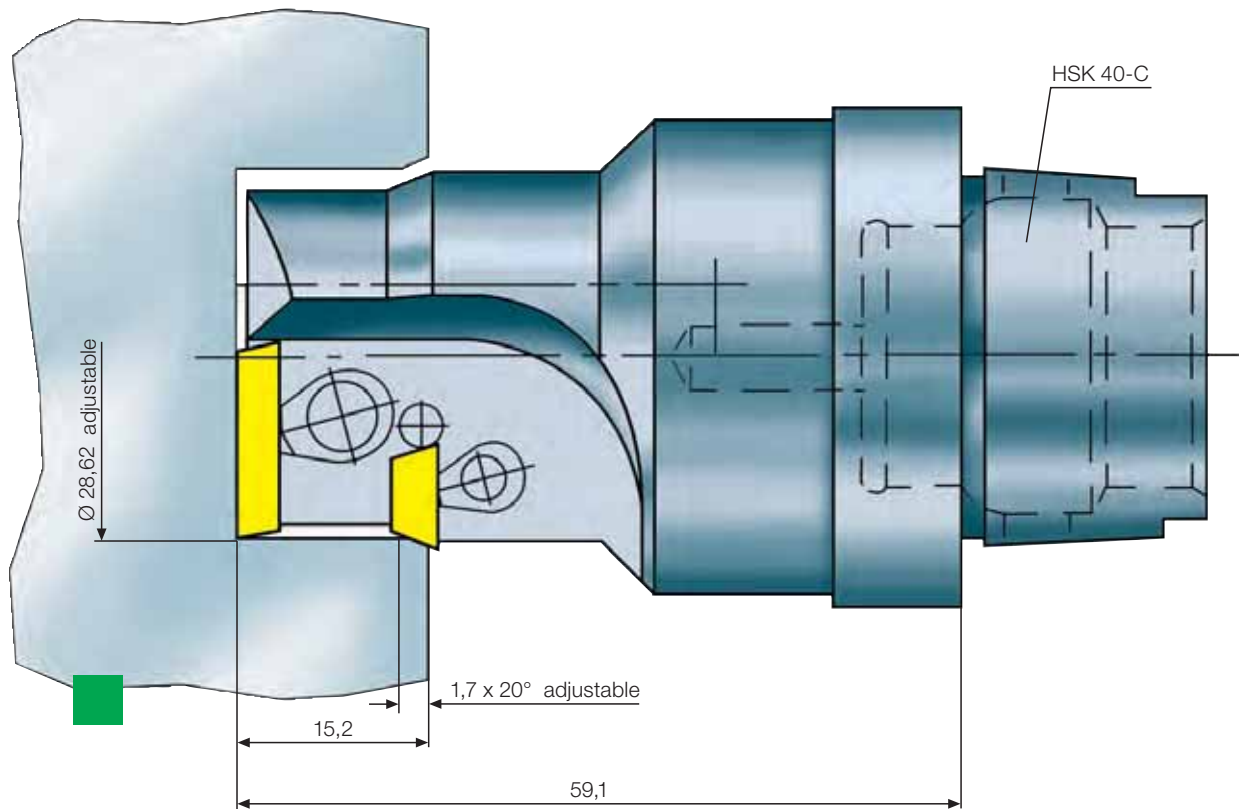
Tool

Gang milling cutter (monoblock)

| | | |
|-----------------------|-------------------|------------------|
| Number of teeth | | 10 / 5 effective |
| Insert | | standard |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 120 |
| Number of revolutions | min ⁻¹ | 1.415 |
| Feed rate | mm/min | 707 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | both sides 0,6 |
| Coolant | | yes, internal |

H Housing

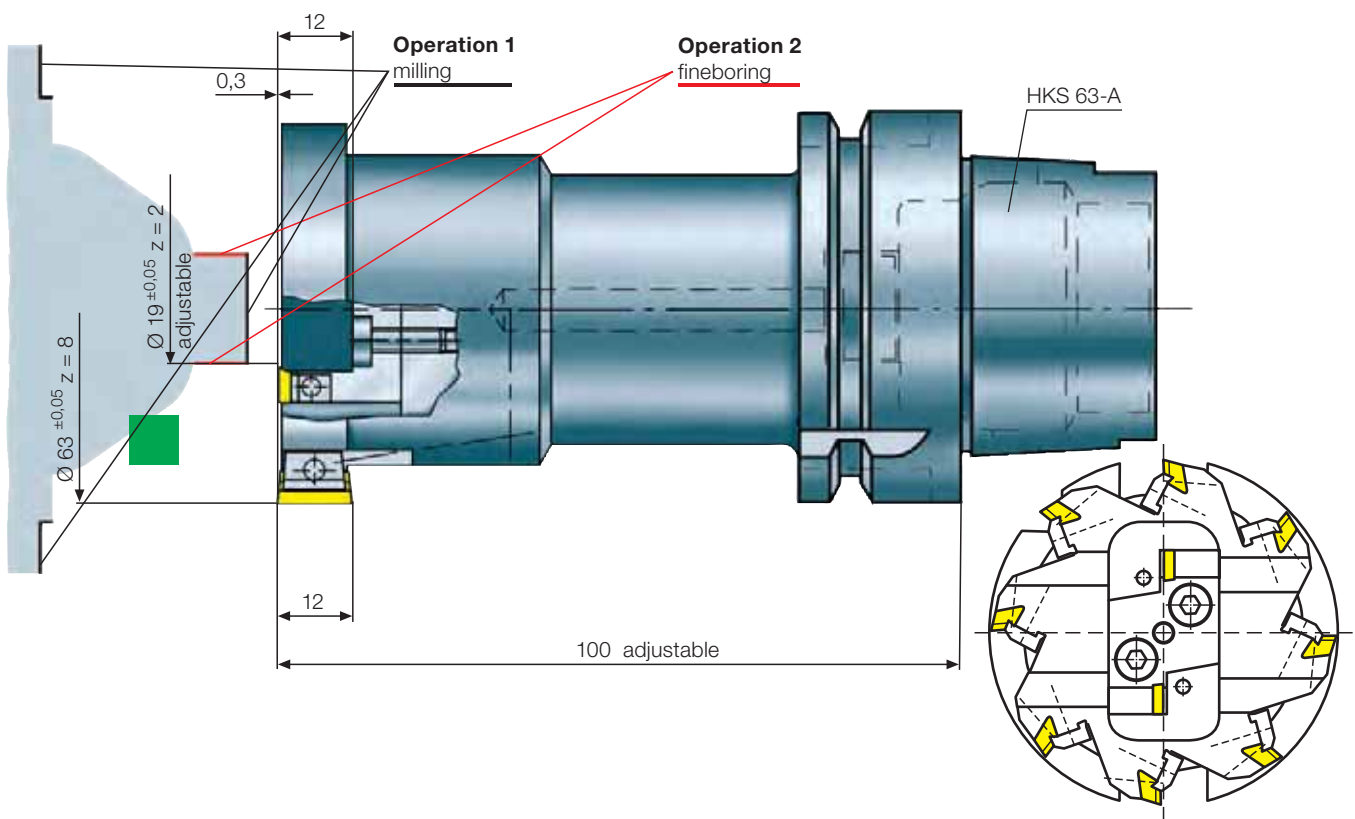
Machining of the bottom across to the centre.
Diameter and chamfer adjustable.



| Workpiece | | Housing |
|-----------------------|-------------------|-------------------------------------|
| Material | | (DIN) ■ GD - Al Si |
| Tool | | Drilling and chamfering tool |
| Number of teeth | | 2 / effective 1 |
| Insert | | according to customer specification |
| Cutting grade | | PCD / K10 |
| Cutting speed | m/min | 944 |
| Number of revolutions | min ⁻¹ | 10.500 |
| Feed rate | mm/min | 840 |
| Feed rate per tooth | mm | 0,08 |
| Depth of cut | mm | 15 |
| Coolant | | yes, internal |

Starter housing

Milling and overturning of a stud with one tool. Face runout of the milling cutter and diameter of the fineboring tool are adjustable.



Workpiece

Material

Starter housing

(DIN)  GD Al Si 12

Tool

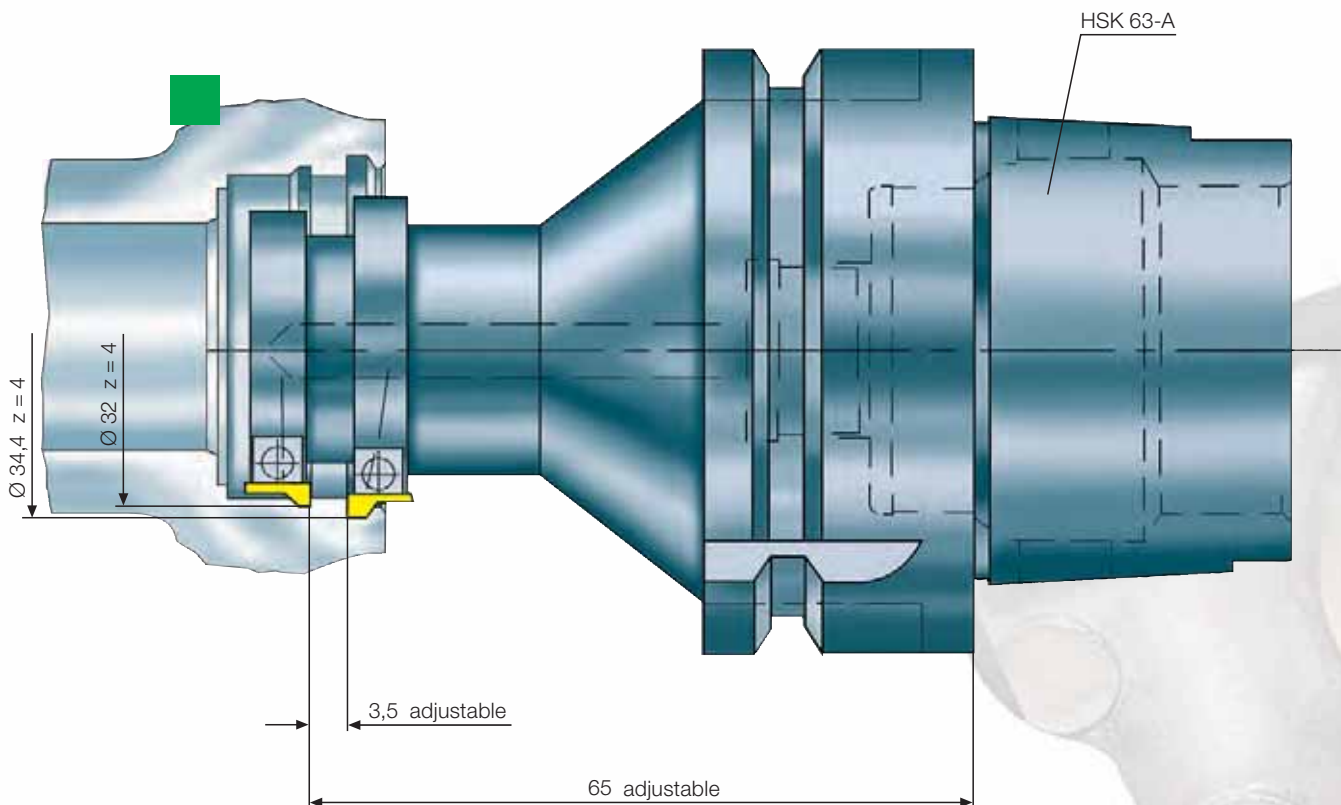
Milling- and overturning tool

| | | milling | fineboring |
|-----------------------|-------------------|-----------------------------------|-----------------------------------|
| Number of teeth | | 8 | 2 |
| Insert | | standard / acc. to customer spec. | standard / acc. to customer spec. |
| Cutting grade | | PCD | PCD |
| Cutting speed | m/min | (Ø 63) 1.800 | (Ø 19) 543 |
| Number of revolutions | min ⁻¹ | 9.100 | 9.100 |
| Feed rate | mm/min | 8.736 | 2.184 |
| Feed rate per tooth | mm | 0,12 | 0,12 |
| Depth of cut | mm | 0,8 | 0,8 |
| Coolant | | yes, internal | yes, internal |

H Main brake cylinder

Main bore

Milling of the two sealing grooves in one cut.
Distance of the grooves adjustable.



Workpiece

Material

Main brake cylinder

(DIN) ■ AI Si 12

Tool

Circular milling cutter

Number of teeth

8 / effective 4

Insert

according to customer specification

Cutting grade

K10

Cutting speed

m/min

800

Number of revolutions

min⁻¹

7.406

Feed rate

mm/min

1.482

Feed rate per tooth

mm

0,05

Depth of cut

mm

ca. 2

Coolant

yes, internal

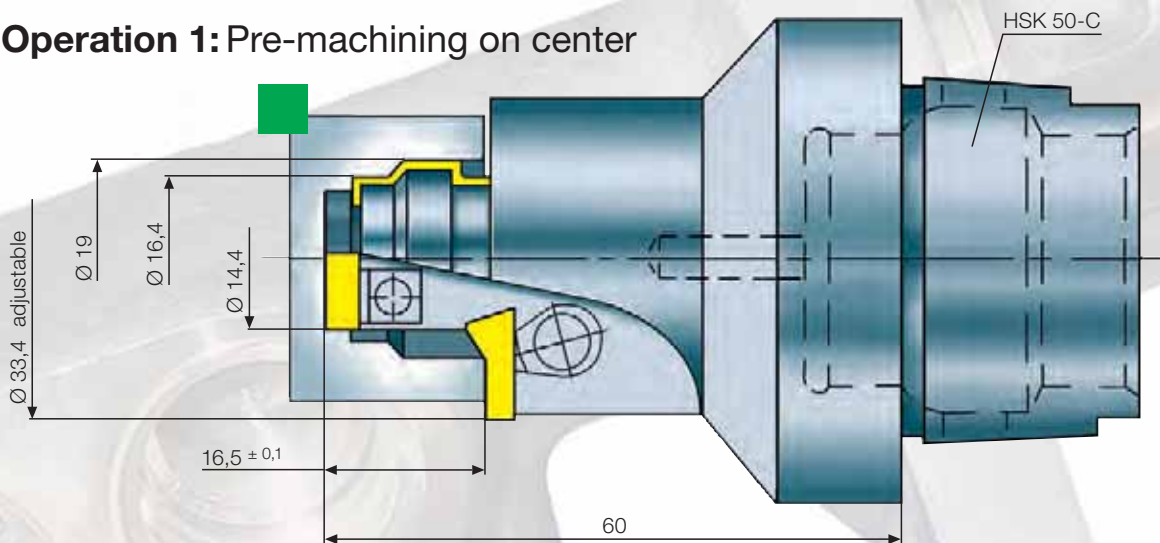
Main brake cylinder

Connecting boring

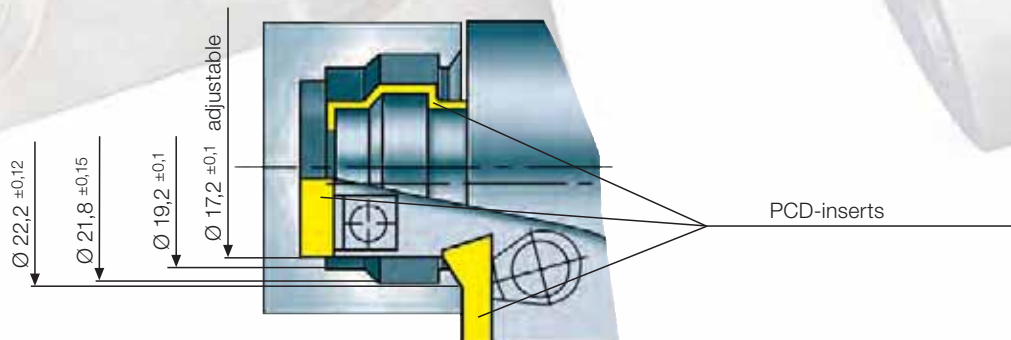
Drilling, fineboring, chamfering and circular milling.
All inserts adjustable.




Operation 1: Pre-machining on center



Operation 2: Chamfering and circular milling



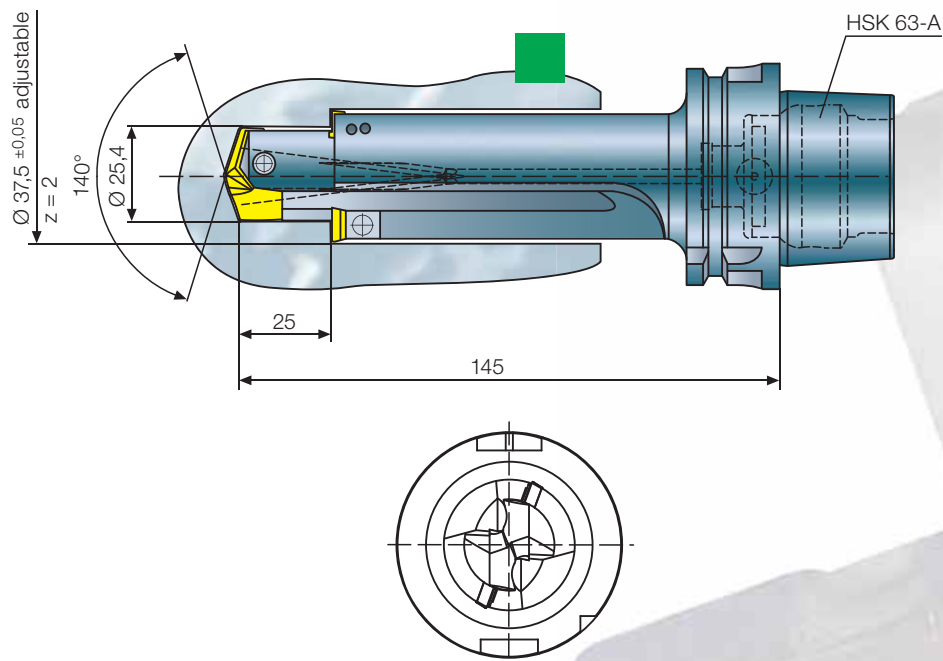
| Workpiece | | Main brake cylinder | |
|-----------------------|-------------------|--|---------------|
| Material | | (DIN)  Al Si 12 | |
| Tool | | Drilling- and circular milling tool | |
| Number of teeth | | 3 / effective 1 | |
| Insert | | according to customer specification | |
| Cutting grade | | PCD | |
| | | milling | fineboring |
| Cutting speed | m/min | (Ø 19) 569 | (Ø 19) 569 |
| Number of revolutions | min ⁻¹ | 9.535 | 9.535 |
| Feed rate | mm/min | 572 | 1.144 |
| Feed rate per tooth | mm | 0,06 | 0,12 |
| Depth of cut | mm | -16,5 | -16,5 |
| Coolant | | yes, internal | yes, internal |

H Main brake cylinder

Main bore

Operation 1: Pilot bore

Operation 2: with standard tool (without figure)



Workpiece

Material

Brake cylinder

(DIN) ■ Al Mg Mn

Tool

Drilling- and fineboring tool

Number of teeth

2 / 2

Insert

standard

Cutting grade

carbide

Cutting speed

m/min

120

Number of revolutions

min⁻¹

1.600

Feed rate

mm/min

600

Feed rate per tooth

mm

0,2

Depth of cut

mm

into the solid material

Coolant

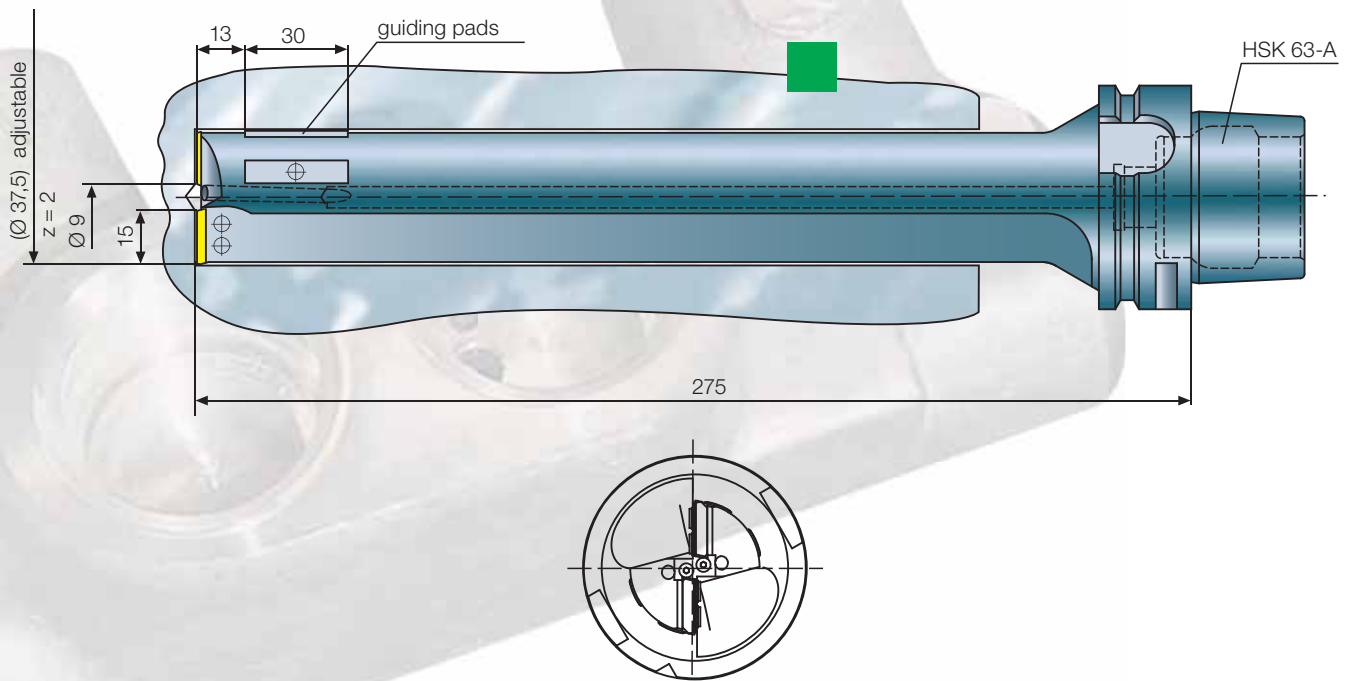
yes, internal

Main brake cylinder

Main bore

Operation 3:

Finishing with adjustable inserts and guide pads.



Workpiece

Material

Brake cylinder

(DIN)  Al Mg Mn

Tool

Fineboring tool

Number of teeth

2

Insert

according to customer specification

Cutting grade

carbide / PCD

Cutting speed

m/min

180

Number of revolutions

min⁻¹

1.600

Feed rate

mm/min

480

Feed rate per tooth

mm

0,15

Depth of cut

mm

6,05

Coolant

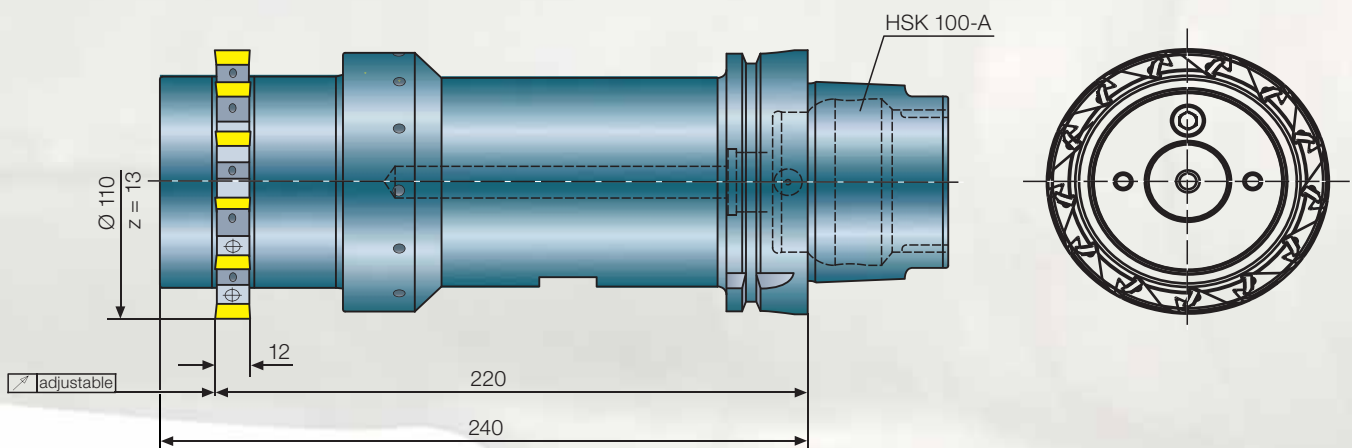
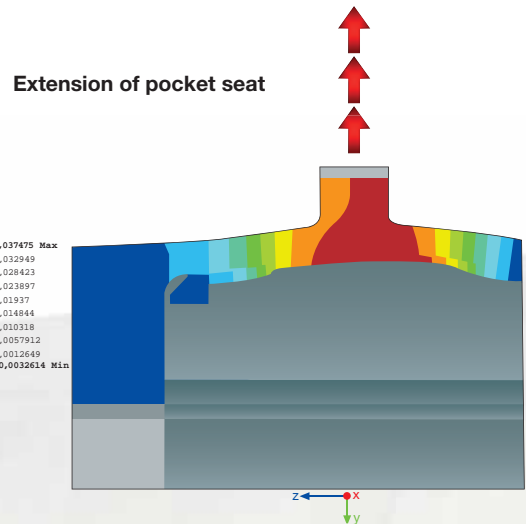
yes, internal

H Steering housing

Hydraulically adjustable reamer.



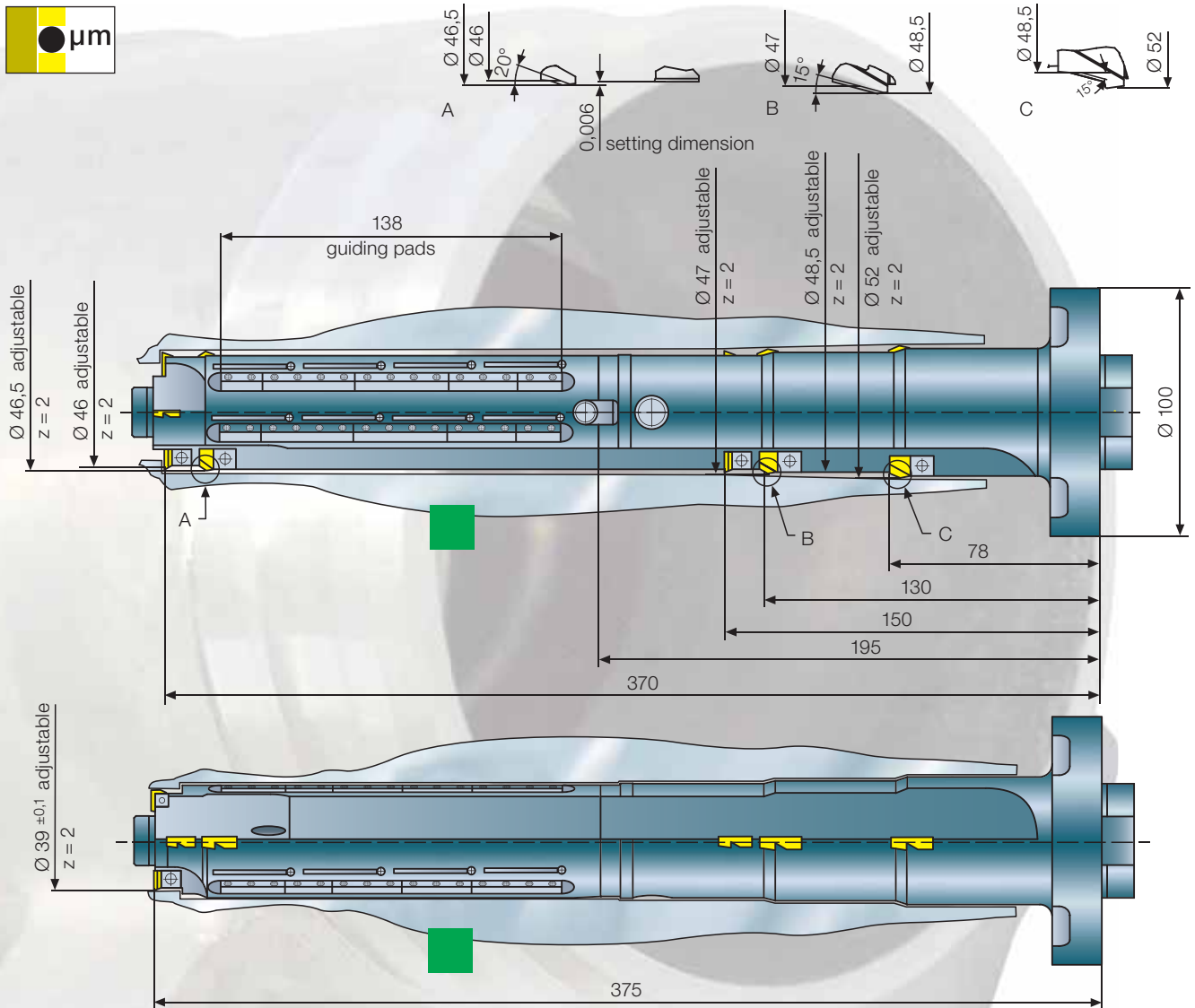
- Diameter µm-accurate adjustable
- Adjustment to both directions
- Adjustment range 60 µm for diameter
⇒ 5 µm per turn
- Interchangeable inserts



| Workpiece | | Steering housing |
|-----------------------|-------------------|-------------------------------------|
| Material | | (DIN) ■ GGG 50 |
| Tool | | Reaming tool |
| Number of teeth | | 13 |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 160 |
| Number of revolutions | min ⁻¹ | 500 |
| Feed rate | mm/min | 1.300 |
| Feed rate per tooth | mm | 0,2 |
| Depth of cut | mm | 0,25 |
| Coolant | | yes, internal |

Steering housing

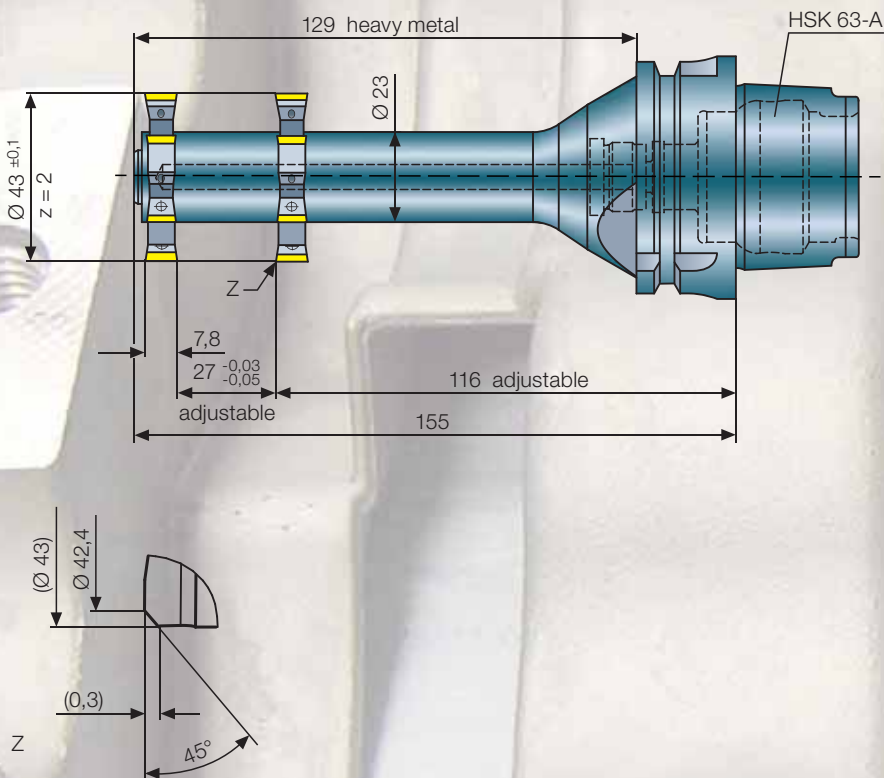
Multistep-fineboring tool with guide pads for machining of the main bore.



| Workpiece | | Steering housing |
|-----------------------|-------------------|--|
| Material | |  Al |
| Tool | | Multistep-fineboring tool |
| Number of teeth | | 12 / effective 2 |
| Insert | | standard / according to customer specification |
| Cutting grade | | PCD |
| Cutting speed | m/min | 280 |
| Number of revolutions | min ⁻¹ | 1.700 |
| Feed rate | mm/min | 510 |
| Feed rate per tooth | mm | 0,15 |
| Depth of cut | mm | 2 |
| Coolant | | yes, internal |

H Balance shaft housing

Milling cutter for the thrust bearing seat.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Balance shaft housing

(DIN) ■ GG 25

Gang milling cutter

2 / 2

according to customer specification

carbide coated

m/min 270

min⁻¹ 2.000

mm/min 600

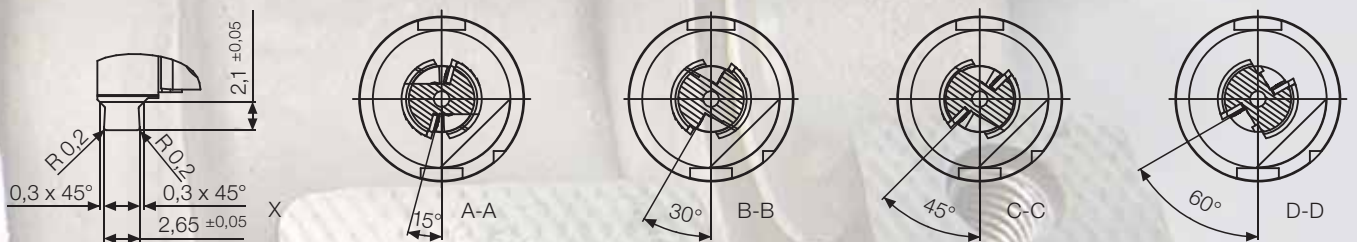
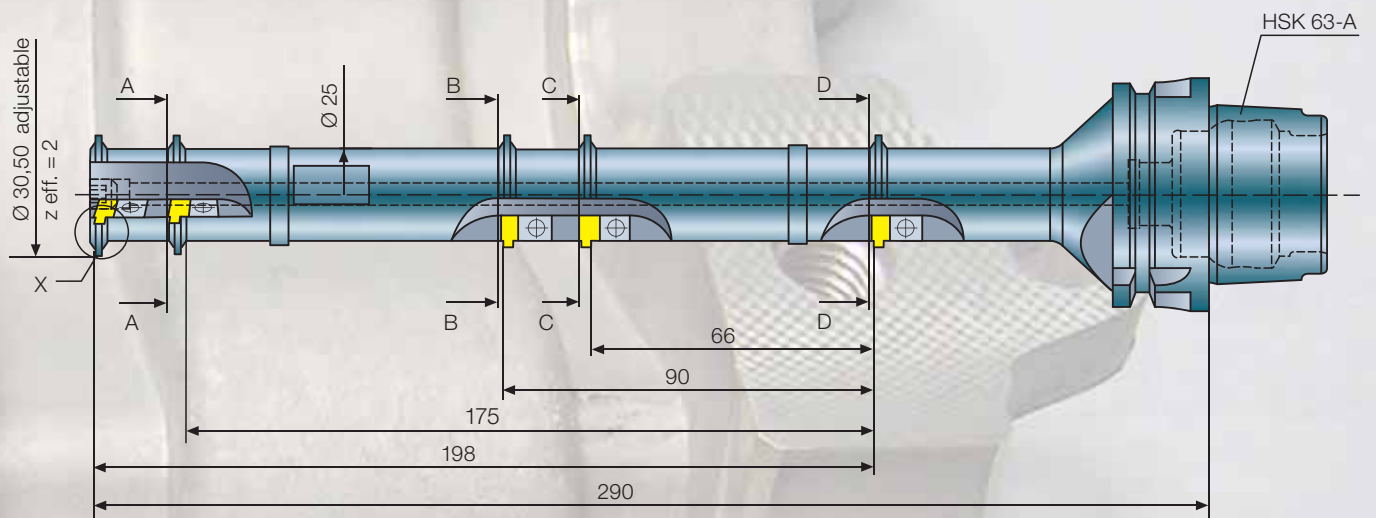
mm 0,15

mm 0,2

yes, internal

Balance shaft housing

Circular milling cutter for machining of the grooves.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Balance shaft housing

(DIN)  Al

Circular milling cutter

2 / 2 / 2 / 2 / 2

according to customer specification

PCD

490

5.000

500

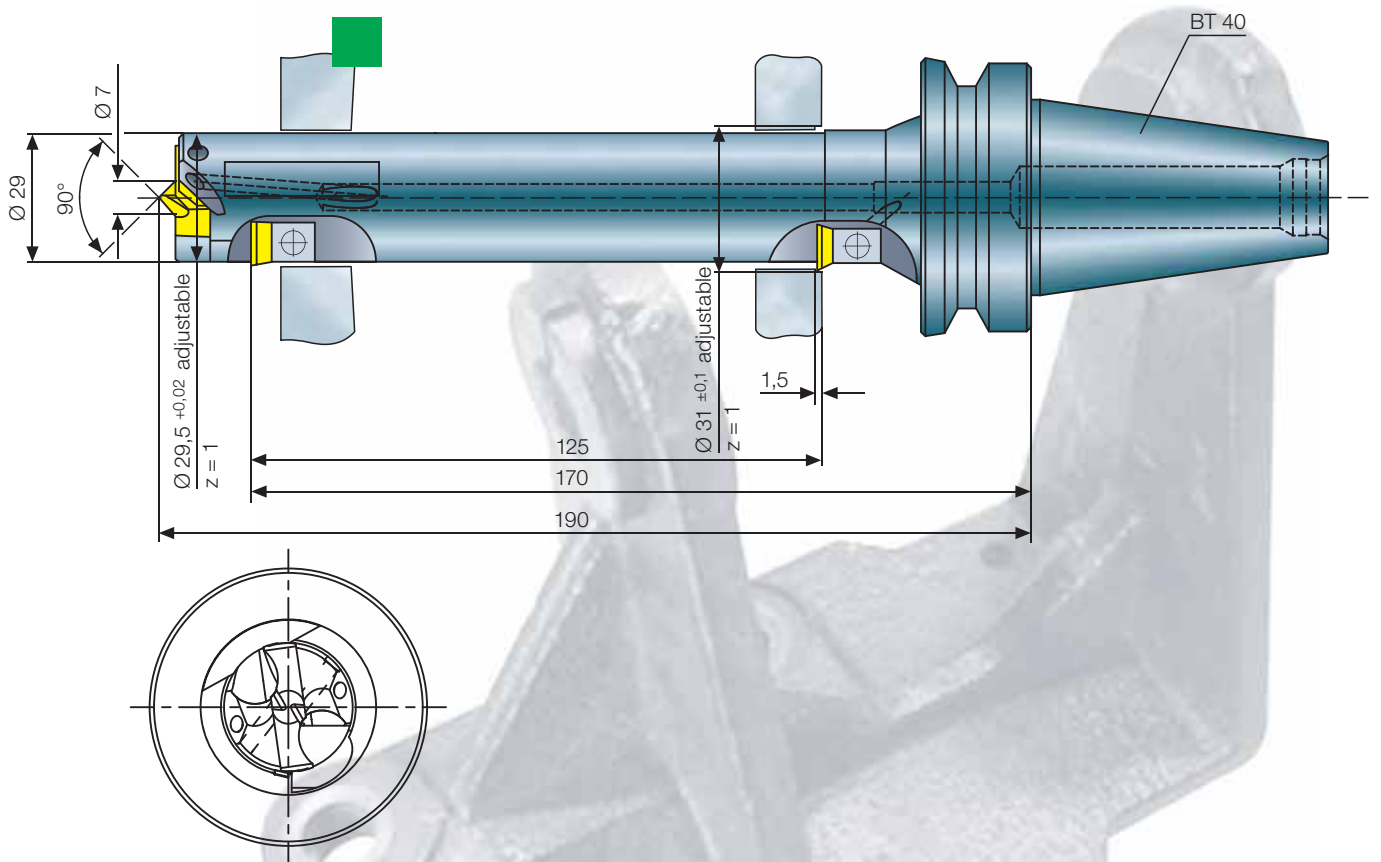
0,1

0,5 - 1,0

yes, internal

H Motor bracket

Combination tool for drilling and finishing.



Workpiece

Material

Motor bracket

■ GAISI 13/14

Tool

Drilling- and fineboring tool

Number of teeth

2 / 1 / 1

Insert

standard

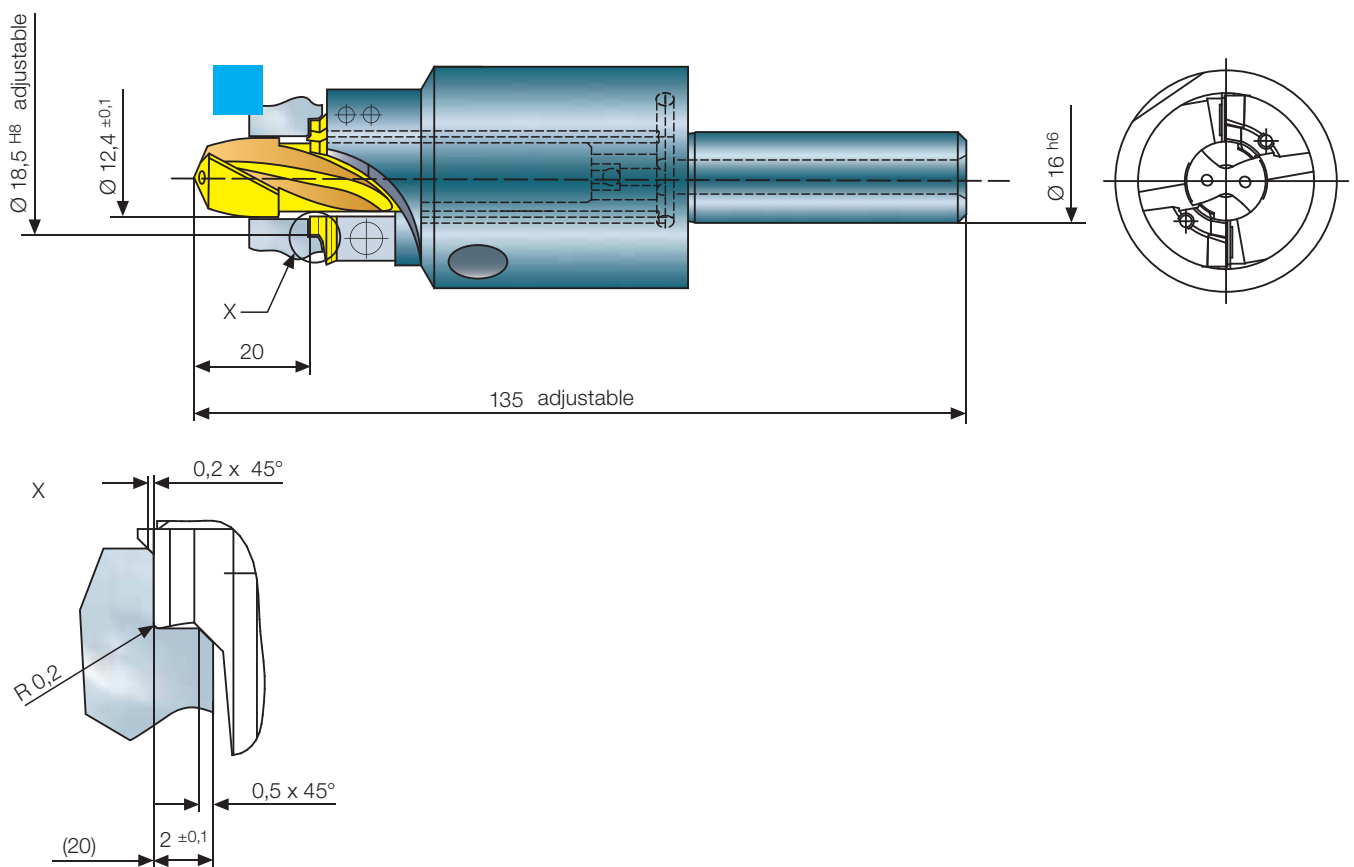
Cutting grade

PCD

| | | drilling | fineboring |
|-----------------------|-------------------|-------------------------|---------------|
| Cutting speed | m/min | 425 | 425 |
| Number of revolutions | min ⁻¹ | 4.500 | 4.500 |
| Feed rate | mm/min | 1.300 | 1.000 |
| Feed rate per tooth | mm | 0,15 | 0,2 |
| Depth of cut | mm | into the solid material | 1,0 |
| Coolant | | yes, internal | yes, internal |

Drive flange

Drilling, fineboring and chamfering tool.



Workpiece

Material

Drive flange

(DIN)  Ck 45

Tool

Drilling- and fineboring tool

Number of teeth

2

Insert

according to customer specification

Cutting grade

carbide coated

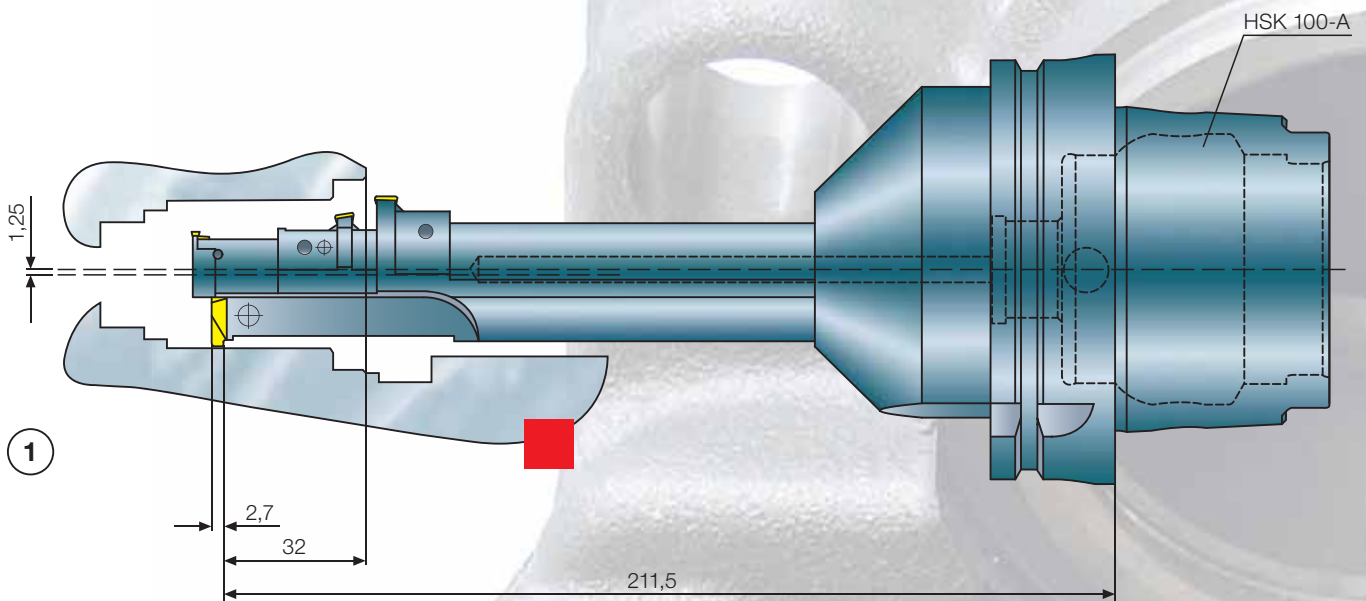
| | | drilling | fineboring |
|-----------------------|-------------------|-------------------------|---------------|
| Cutting speed | m/min | 71 | 141 |
| Number of revolutions | min ⁻¹ | 1.850 | 2.500 |
| Feed rate | mm/min | 444 | 400 |
| Feed rate per tooth | mm | 0,12 | 0,08 |
| Depth of cut | mm | into the solid material | 3,0 |
| Coolant | | yes, internal | yes, internal |

H Brake caliper

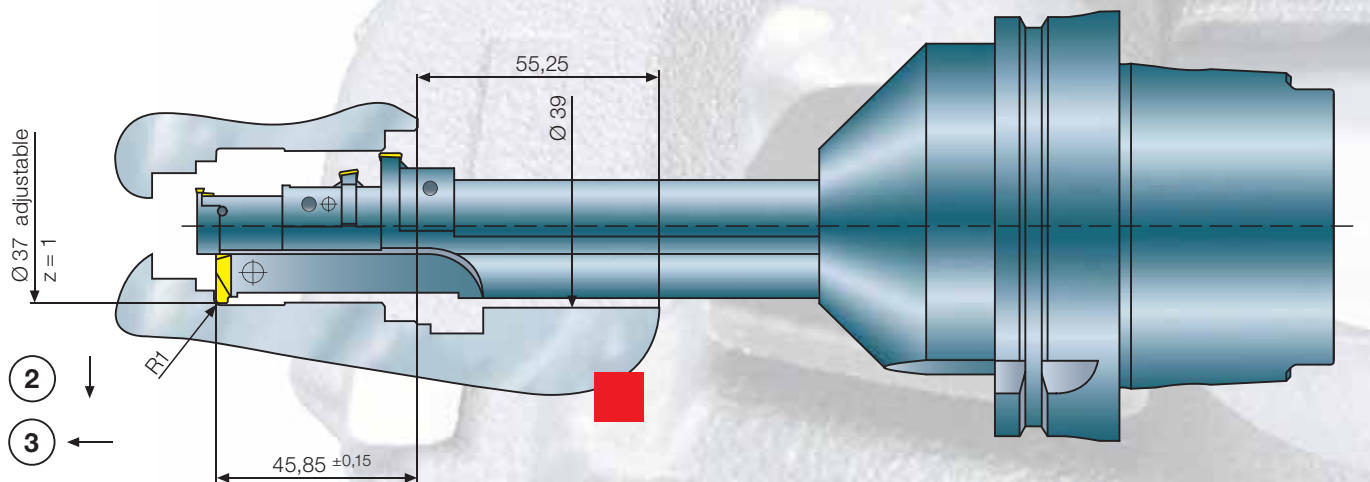
Interpolation turning tool.



1.Step Positioning 1,25 mm ex centre

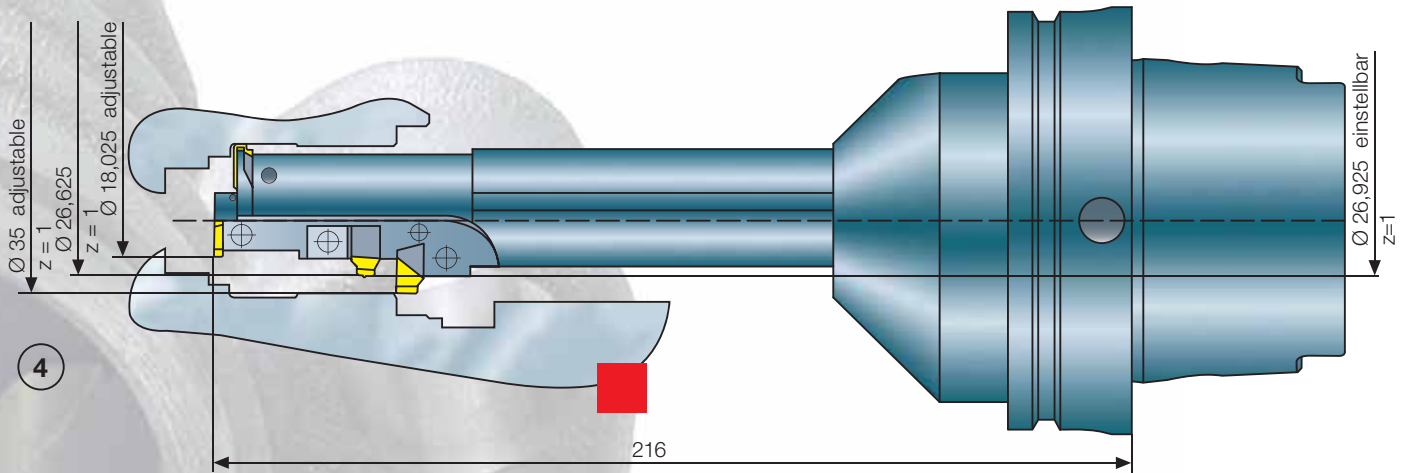


2.Step Entering by interpolation to nominal diameter
3.Step countersinking $\text{\O} 37$ mm

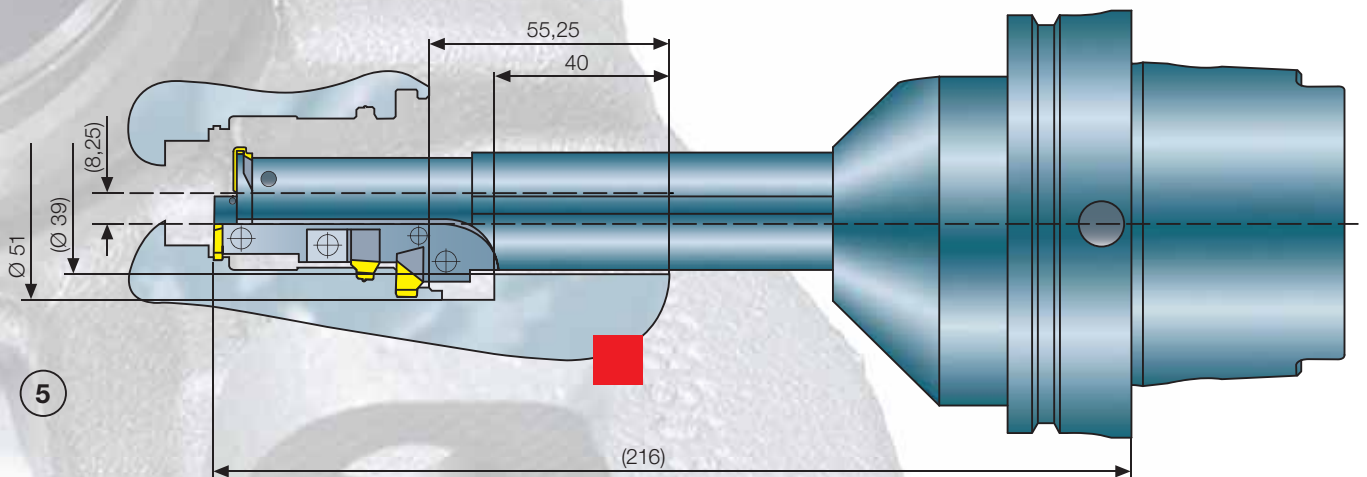


Brake caliper

4.Step Positioning



5.Step Interpolation turning of 3 slots / grooves



| Workpiece | | Brake caliper |
|-----------------------|-------------------|--|
| Material | | (DIN)  GGG 45 |
| Tool | | Interpolation turning tool |
| Number of teeth | | 4/1 |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | 70 |
| Number of revolutions | min ⁻¹ | 615 |
| Feed rate | mm/min | 75 |
| Feed rate per tooth | mm | 0,12 |
| Depth of cut | mm | 0,75 |
| Coolant | | yes, internal |

General engineering

Various components

e.g.
Electric industry
Hydraulic industry
Wind energy industry
End processing
Compressor industry

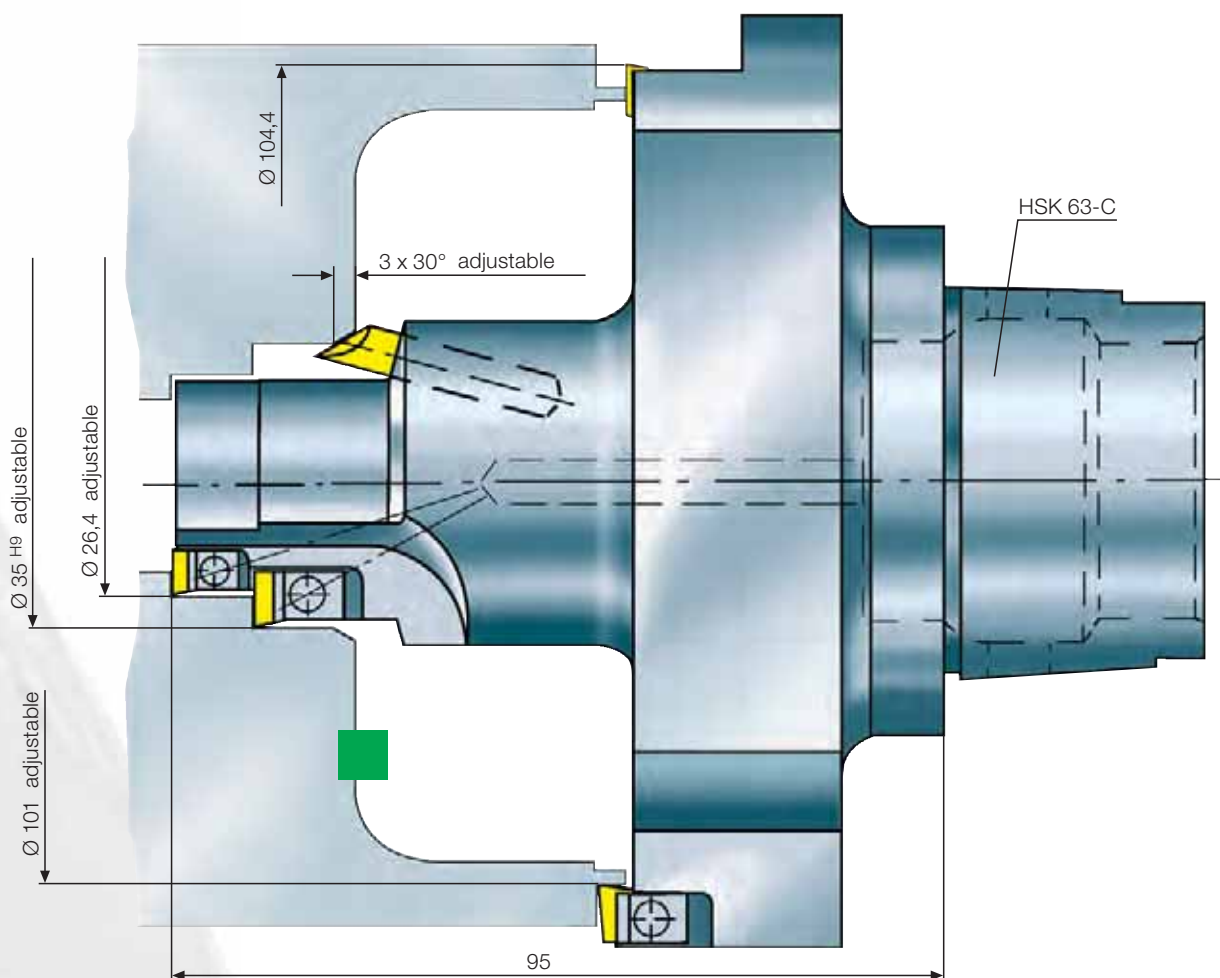


Right angle grinder-housing

Bearing seats



Combination tool for 5 machining steps.
All inserts adjustable.

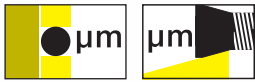


| Workpiece | | Right angle grinder-housing |
|-----------------------|-------------------|--|
| Material | | (DIN) ■ Magnesium |
| Tool | | Fineboring tool |
| Number of teeth | | 5 / effective 1 |
| Insert | | standard / according to customer specification |
| Cutting grade | | PCD / K10 |
| Cutting speed | m/min | (Ø 101) 2.548 |
| Number of revolutions | min ⁻¹ | 7.750 |
| Feed rate | mm/min | 1.086 |
| Feed rate per tooth | mm | 0,14 |
| Depth of cut | mm | -3 |
| Coolant | | yes, internal |

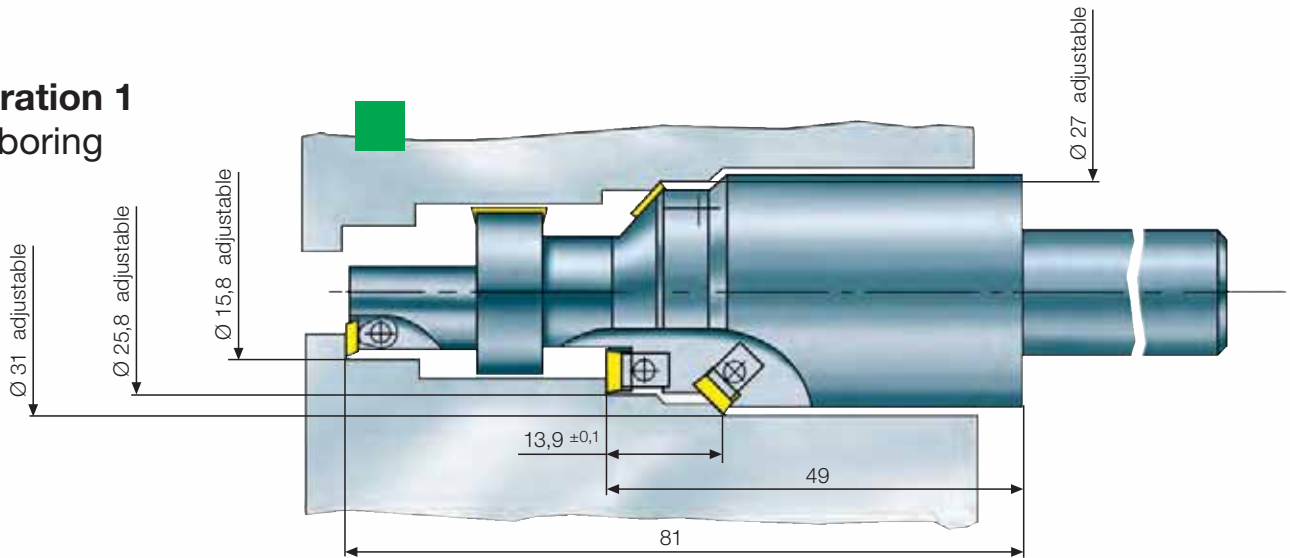
H Right angle grinder-housing

Bearing seats

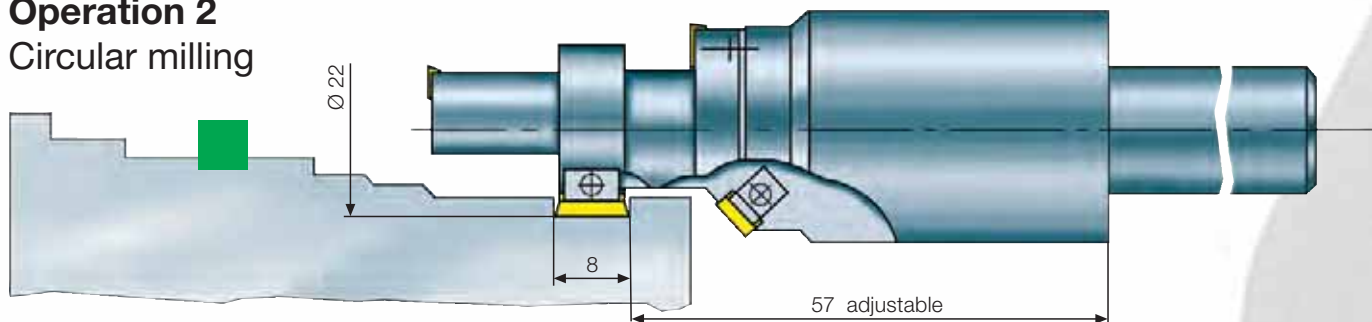
Combination tool for fineboring and circular milling.
Fine drilling diameter and milling cutter adjustable.



Operation 1 Fineboring



Operation 2 Circular milling



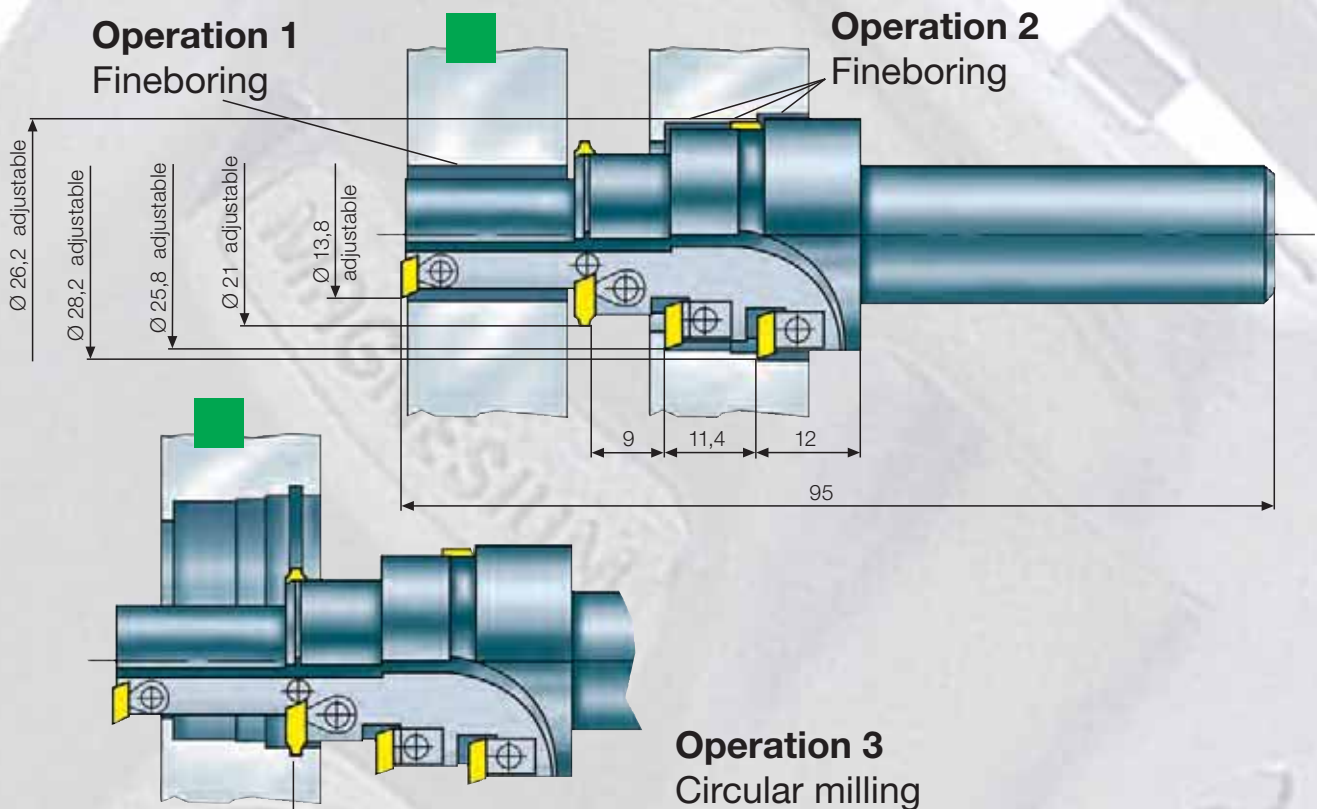
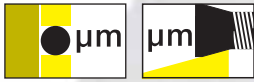
| Workpiece | | Right angle grinder-housing | |
|-----------------------|-------------------|--|---------------|
| Material | | (DIN) ■ Magnesium | |
| Tool | | Multistep-fineboring and circular milling cutter | |
| Number of teeth | | 5 / effective 1 | |
| Insert | | standard / according to customer specification | |
| Cutting grade | | PCD | |
| | | fineboring | milling |
| Cutting speed | m/min | (Ø 31) 1.022 | (Ø 22) 725 |
| Number of revolutions | min ⁻¹ | 10.500 | 10.500 |
| Feed rate | mm/min | 1.260 | 840 |
| Feed rate per tooth | mm | 0,12 | 0,08 |
| Depth of cut | mm | 0,8 | 8 |
| Coolant | | yes, internal | yes, internal |

Right angle grinder-housing

Bearing seats



Combination tool for fineboring and circular milling.
Fine drilling diameter and milling cutter adjustable.



| Workpiece | | Right angle grinder-housing | |
|-----------------------|-------------------|--|-------------|
| Material | | (DIN) | ■ Magnesium |
| Tool | | Multistep-fineboring and circular milling cutter | |
| Number of teeth | | 6 / effective 1 | |
| Insert | | standard / according to customer specification | |
| Cutting grade | | PCD | |
| Cutting speed | m/min | (Ø 28,2) 997 | |
| Number of revolutions | min ⁻¹ | 10.577 | |
| Feed rate | mm/min | (fineboring) 846 (milling) 1.692 | |
| Feed rate per tooth | mm | 0,08 | |
| Depth of cut | mm | 0,5 | |
| Coolant | | yes, internal | |

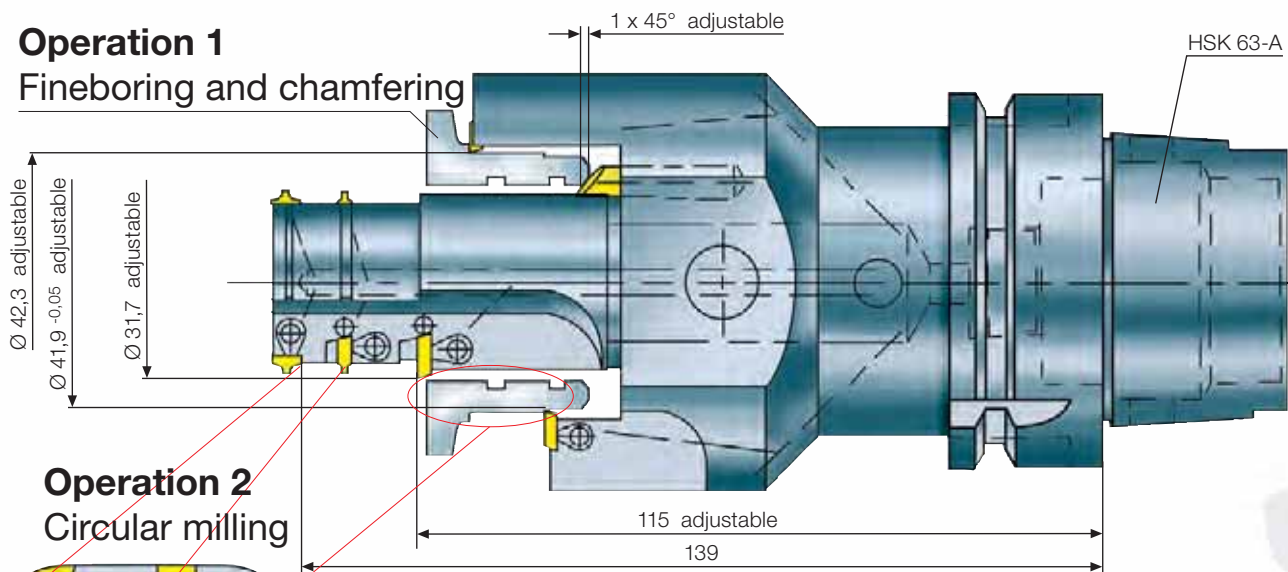
H Guide bushing

Combination tool for fineboring, chamfering and milling.
 Middle part exchangeable for different types of components.
 All inserts adjustable.



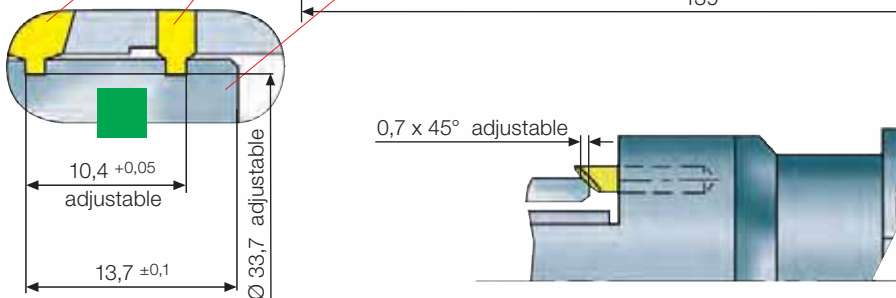
Operation 1

Fineboring and chamfering



Operation 2

Circular milling



Workpiece

Material

Guide bushing for drilling hammer

(DIN) ■ GD - Al Si 9 Cu 3

Tool

Fineboring-, chamfering- and circular milling tool

Number of teeth

(fineboring) 8 / effective 1 per Ø / (milling) 8 / effective 2 per Ø

Insert

standard / according to customer specification

Cutting grade

PCD / K10

Cutting speed

m/min

(Ø 31,7) 750 (Ø 42,3) 1.000

Number of revolutions

min⁻¹

7.530

Feed rate

mm/min

978

Feed rate per tooth

mm

(milling) 0,065 0,13

Depth of cut

mm

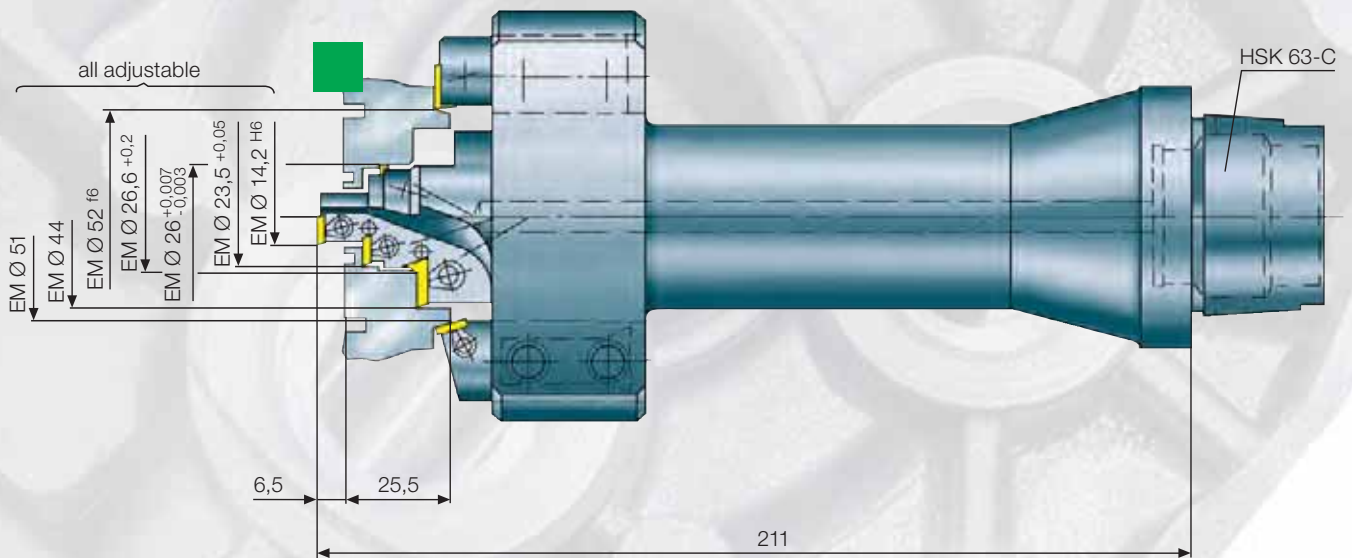
2 - 3

Coolant

yes, internal

Gearbox case

Combination tool for 6 machining steps.
All inserts adjustable.
Exchangeable cartridges for different types of housings.



Workpiece

Material

Gearbox case for hand drilling machine

(DIN)  GD - Al Si 9 Cu 3

Tool

Fineboring-, chamfering- and face tool

Number of teeth

6 / effective 1 per Ø

Insert

standard / according to customer specification

Cutting grade

PCD / K10

Cutting speed

m/min

800

Number of revolutions

min⁻¹

4.900

Feed rate

mm/min

735

Feed rate per tooth

mm

- 0,15

Depth of cut

mm

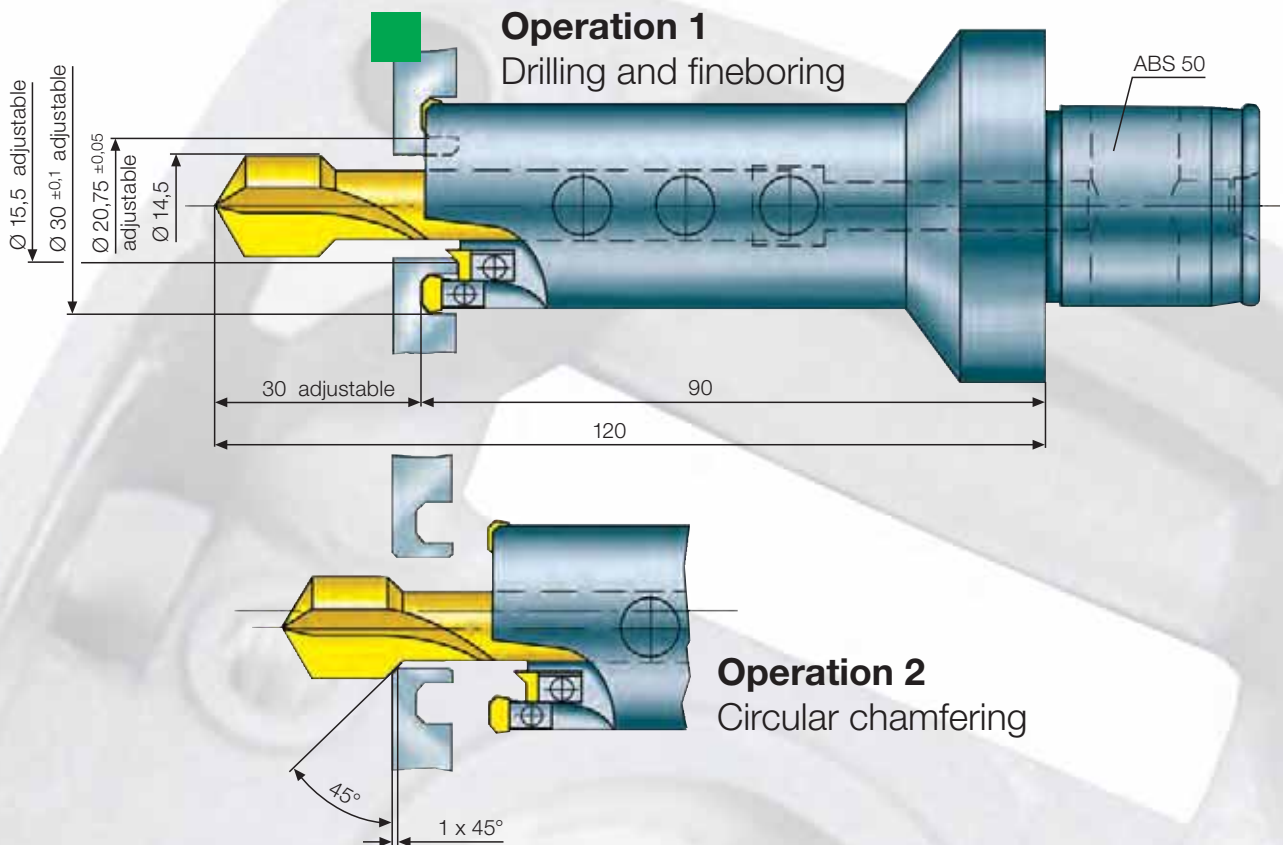
0,5

Coolant

yes, internal

H Drilling machine housing

Combination tool for 5 machining steps.
Diameter of the chamfer and the facegroove adjustable.



Workpiece

Material

Cap for hand drilling machine

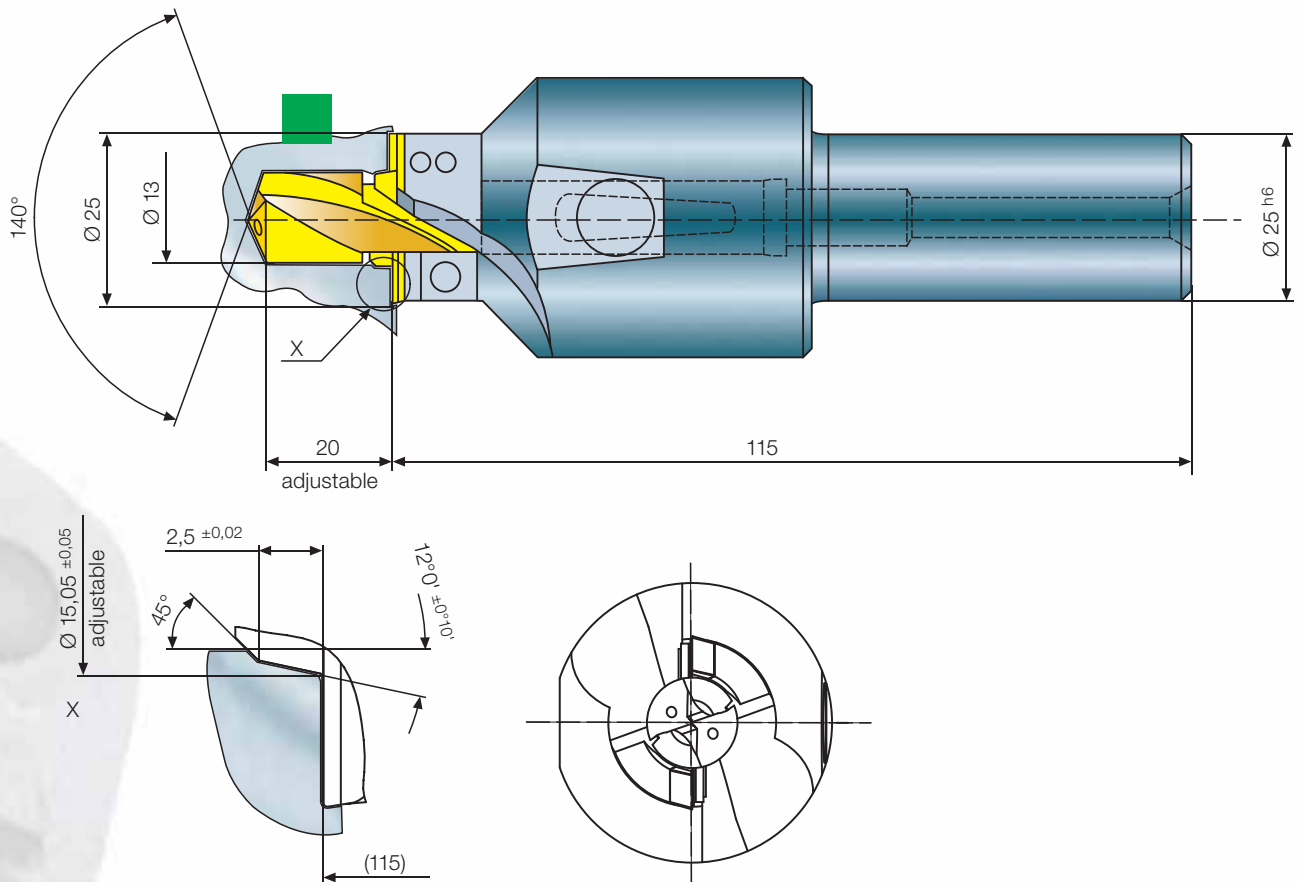
(DIN) ■ Al Si 12

Tool

Drilling- and fineboring tool

| | | drilling and chamfering | fineboring and chamfering |
|-----------------------|-------------------|--------------------------------|--------------------------------|
| Number of teeth | | 2 / 2 | 1 / 1 / 1 |
| Insert | | acc. to customer specification | acc. to customer specification |
| Cutting grade | | carbide coated | carbide coated |
| Cutting speed | m/min | (Ø 14,5) 160 | (Ø 30) 331 |
| Number of revolutions | min ⁻¹ | 3.514 | 3.514 |
| Feed rate | mm/min | 1.054 | 246 |
| Feed rate per tooth | mm | 0,15 | 0,07 |
| Depth of cut | mm | 7,25 | 4,9 |
| Coolant | | yes, internal | yes, internal |

Drilling-, chamfering- and fineboring in one tool.



Workpiece

Material

Hydraulic component

 Al

Tool

Drilling- and fineboring tool

Number of teeth

2 / 2

Insert

according to customer specification

Cutting grade

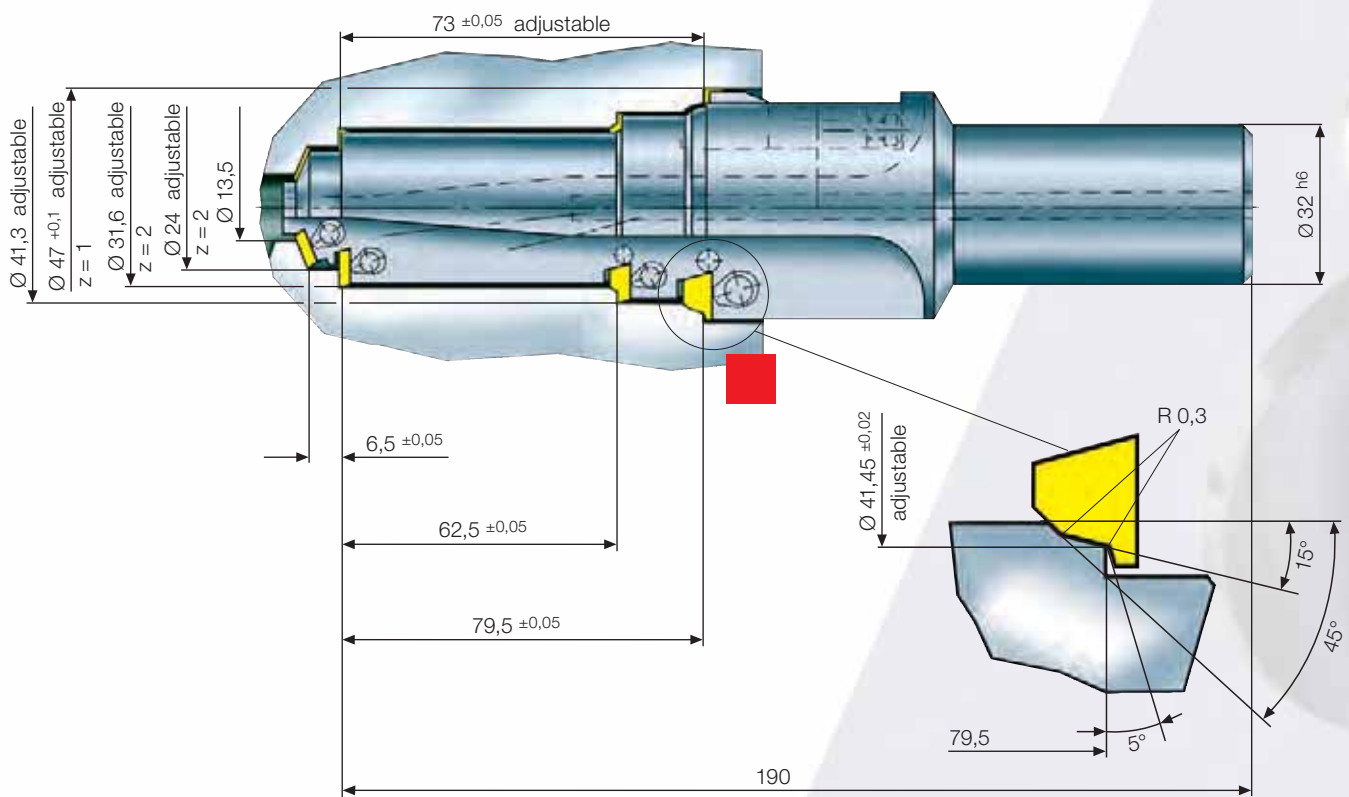
K10

| | | drilling | fineboring |
|-----------------------|-------------------|-------------------------|---------------|
| Cutting speed | m/min | 374 | 374 |
| Number of revolutions | min ⁻¹ | 4.750 | 4.750 |
| Feed rate | mm/min | 3.600 | 855 |
| Feed rate per tooth | mm | 0,38 | 0,09 |
| Depth of cut | mm | into the solid material | 1,3 |
| Coolant | | yes, internal | yes, internal |

Hydraulic industry

Connection holes

Tool for hydraulic connection.
All diameters adjustable.



Workpiece

Material

Valve block

(DIN) ■ GGG 50

Tool

Multistep-fineboring tool

Number of teeth

8 / effective 2

Insert

standard / according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

(Ø 47) 180

Number of revolutions

min⁻¹

1.220

Feed rate

mm/min

244

Feed rate per tooth

mm

(Ø 47 / Ø 41) 0,1

Depth of cut

mm

- 5

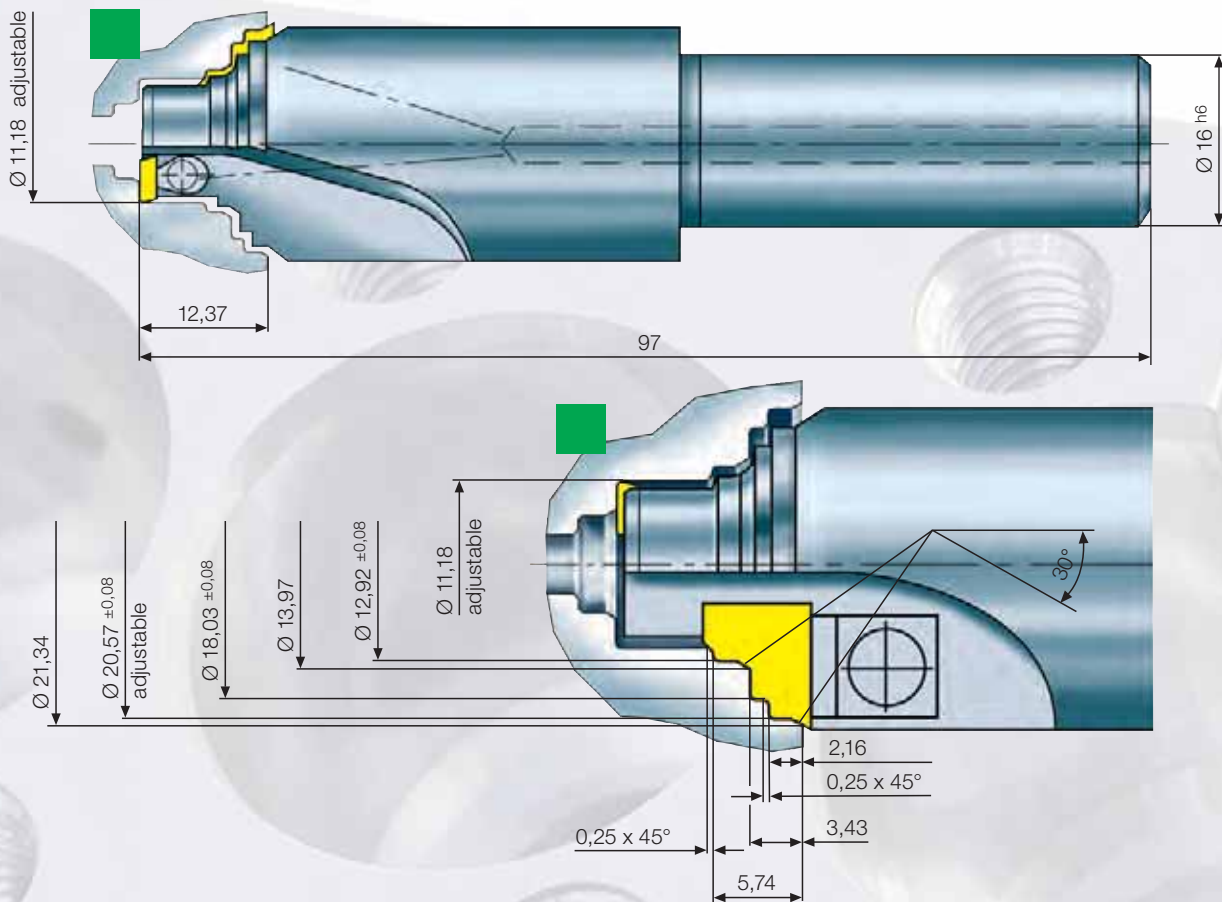
Coolant

yes, internal

Hydraulic industry

Connection holes

Multistep-fineboring tool for hydraulic connection.
PCD-form inserts with 5 steps. All diameters adjustable.



Workpiece

Material

Valve block

(DIN)  GD Al Si 9

Tool

Finboring- and chamfering tool

Number of teeth

2 / effective 1

Insert

according to customer specification

Cutting grade

PCD

Cutting speed m/min

(Ø 21,34) 700

Number of revolutions min⁻¹

10.500

Feed rate mm/min

1.050

Feed rate per tooth mm

0,1

Depth of cut mm

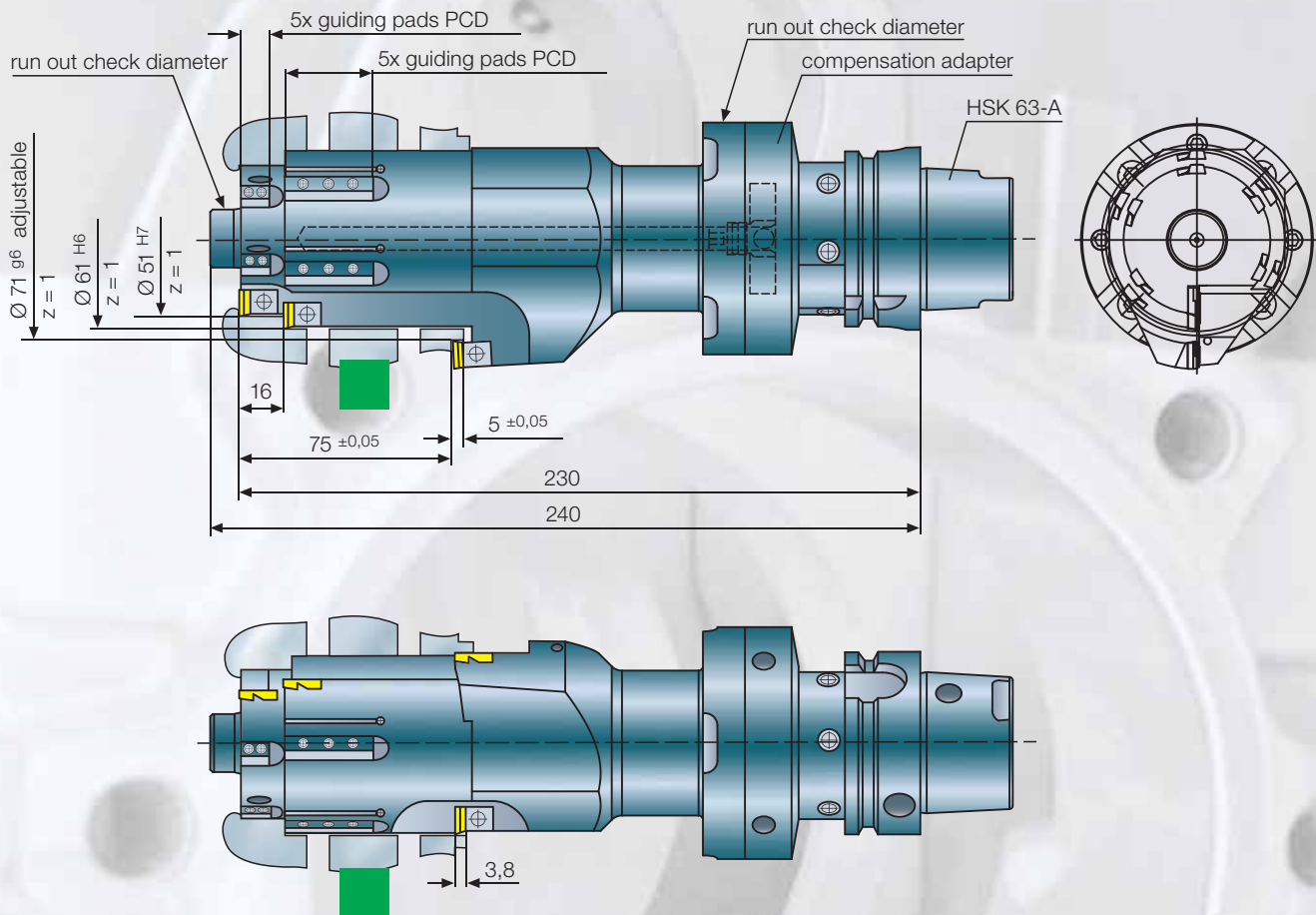
- 5

Coolant

yes, internal

Bearing bracket Housing


Multistep-fineboring tool with PCD guide pads.
 All inserts adjustable.



Workpiece

Material

Housing

(DIN)  Al Si 11 Cu 2 (Fe)

Tool

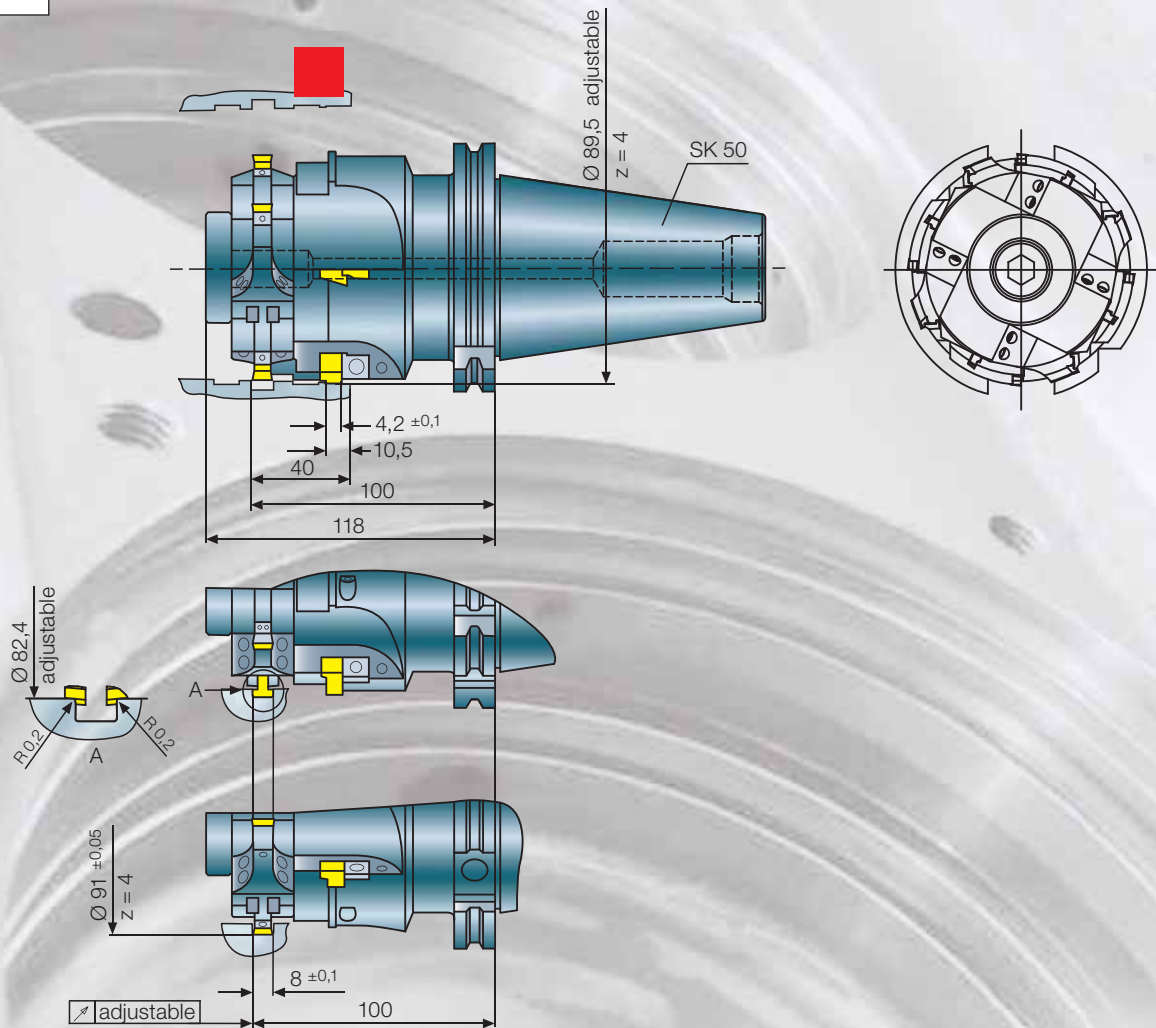
Multistep-fineboring tool

| | | |
|-----------------------|-------------------|-----------------|
| Number of teeth | | 4 / effective 1 |
| Insert | | standard |
| Cutting grade | | PCD |
| Cutting speed | m/min | 600 |
| Number of revolutions | min ⁻¹ | 3.080 |
| Feed rate | mm/min | 308 |
| Feed rate per tooth | mm | 0,1 |
| Depth of cut | mm | 0,2 |
| Coolant | | yes, internal |

Brake component

for wind power housing

Multistep circular milling cutter for machining of the grooves.



Workpiece

Brake component for wind power housing

Material

(DIN)  GGG 40

Tool

Circular milling cutter

Number of teeth

16 / effective 4

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

95

Number of revolutions

min⁻¹

336

Feed rate

mm/min

148

Feed rate per tooth

mm

0,11

Depth of cut

mm

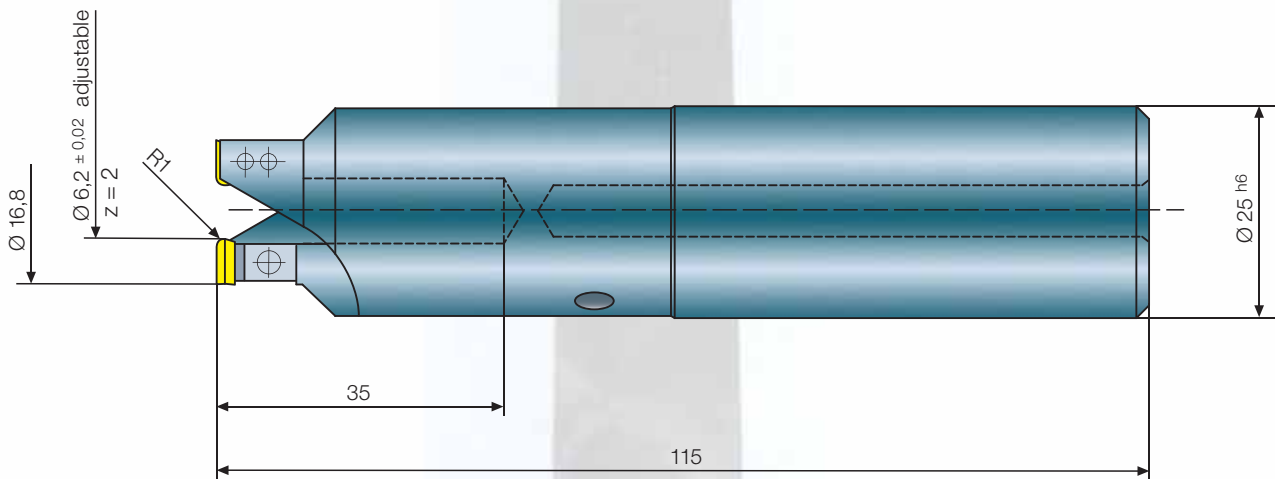
4

Coolant

yes, internal

H Fuel distributor

End machining tool with adjustable inserts.



Workpiece

Material

Fuel distributor

(DIN) ■ Ti Al 6V4

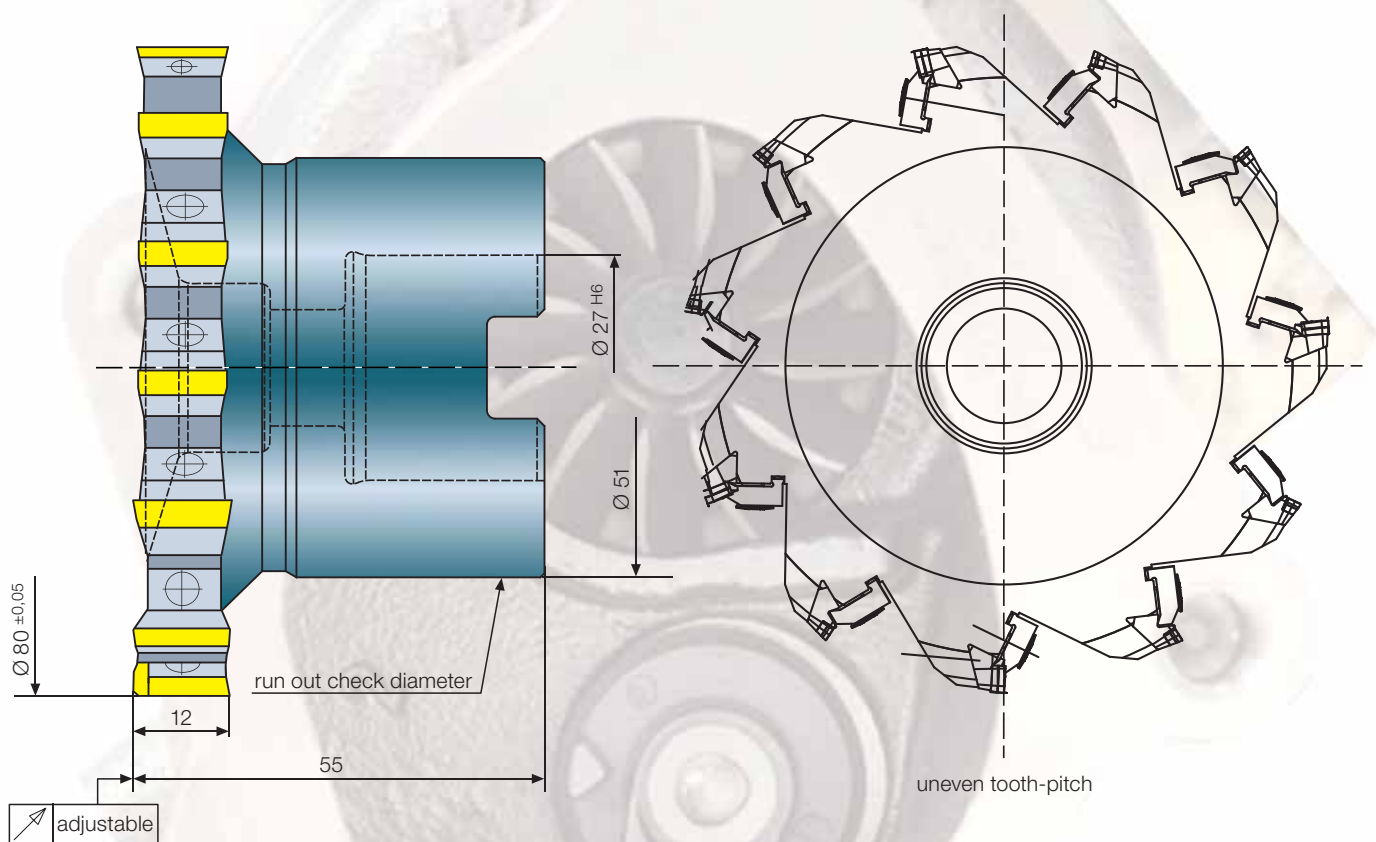
Tool

Axial plunging tool

| | | |
|-----------------------|-------------------|-------------------------------------|
| Number of teeth | | 2 |
| Insert | | according to customer specification |
| Cutting grade | | carbide |
| Cutting speed | m/min | 48 |
| Number of revolutions | min ⁻¹ | 2.486 |
| Feed rate | mm/min | 150 |
| Feed rate per tooth | mm | 0,03 |
| Depth of cut | mm | 0,25 |
| Coolant | | yes, internal |

Compressor housing

CBN-High feed-Finish milling.



Workpiece

Material

Tool

Number of teeth

Insert

Cutting grade

Cutting speed

Number of revolutions

Feed rate

Feed rate per tooth

Depth of cut

Coolant

Compressor housing

(DIN)  GG 25

Put on milling cutter

8 / 3

according to customer specification

CBN8 / CBN mixed assembly

1.200

4.775

7.162

0,136

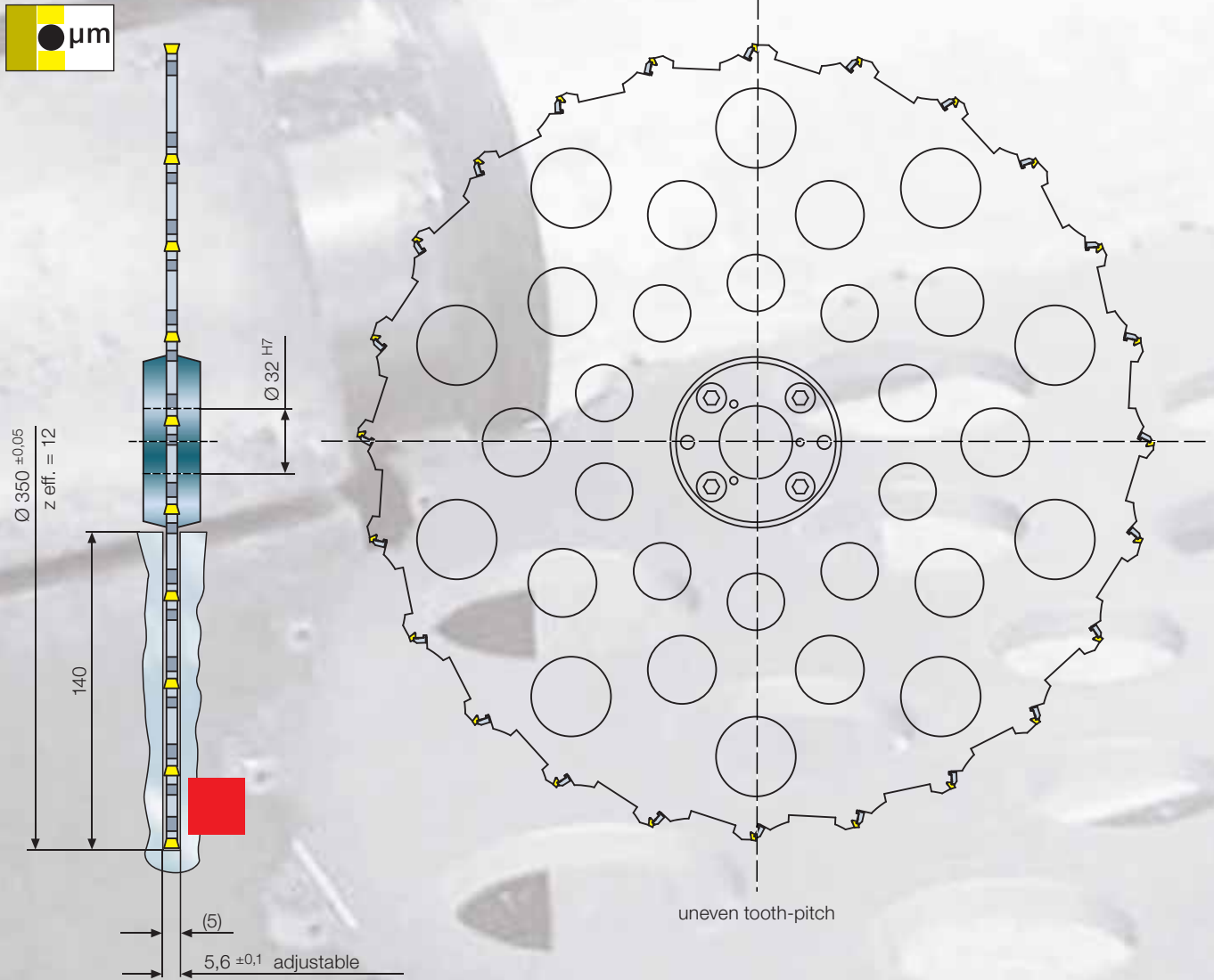
0,10

yes, internal

H Rotor shaft

Rotor for turbine

Milling of the grooves from the rotor.



Workpiece

Material

Rotor for turbine

(DIN) ■ GGG 50

Tool

Side milling cutter

Number of teeth

12 / 12

Insert

according to customer specification

Cutting grade

PCD

Cutting speed

m/min

80

Number of revolutions

min^{-1}

75

Feed rate

mm/min

88

Feed rate per tooth

mm

0,05

Depth of cut

mm

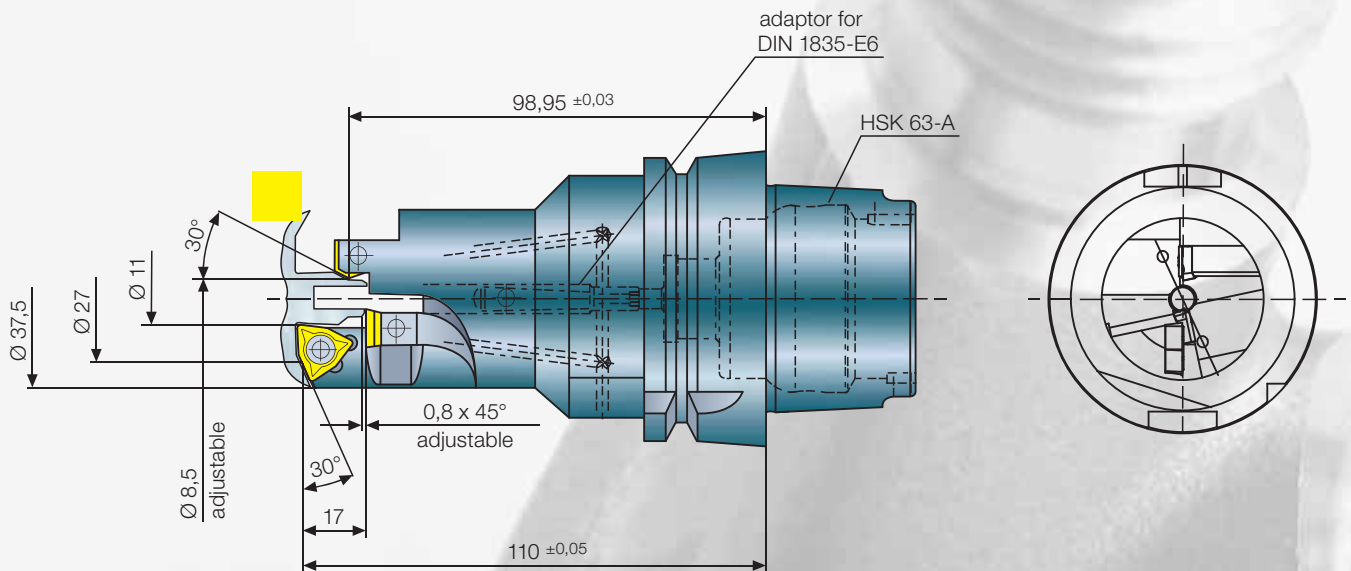
140

Coolant

yes, external

Connection housing


End machining tool with ISO- and adjustable inserts.



Workpiece

Material

Connection housing

 1.4031

Tool

Counterboring- and fineboring tool

Number of teeth

1 / 1 / 1

Insert

ISO and according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

43 - 56

Number of revolutions

min⁻¹

1.600

Feed rate

mm/min

160

Feed rate per tooth

mm

0,1

Depth of cut

mm

-1,5

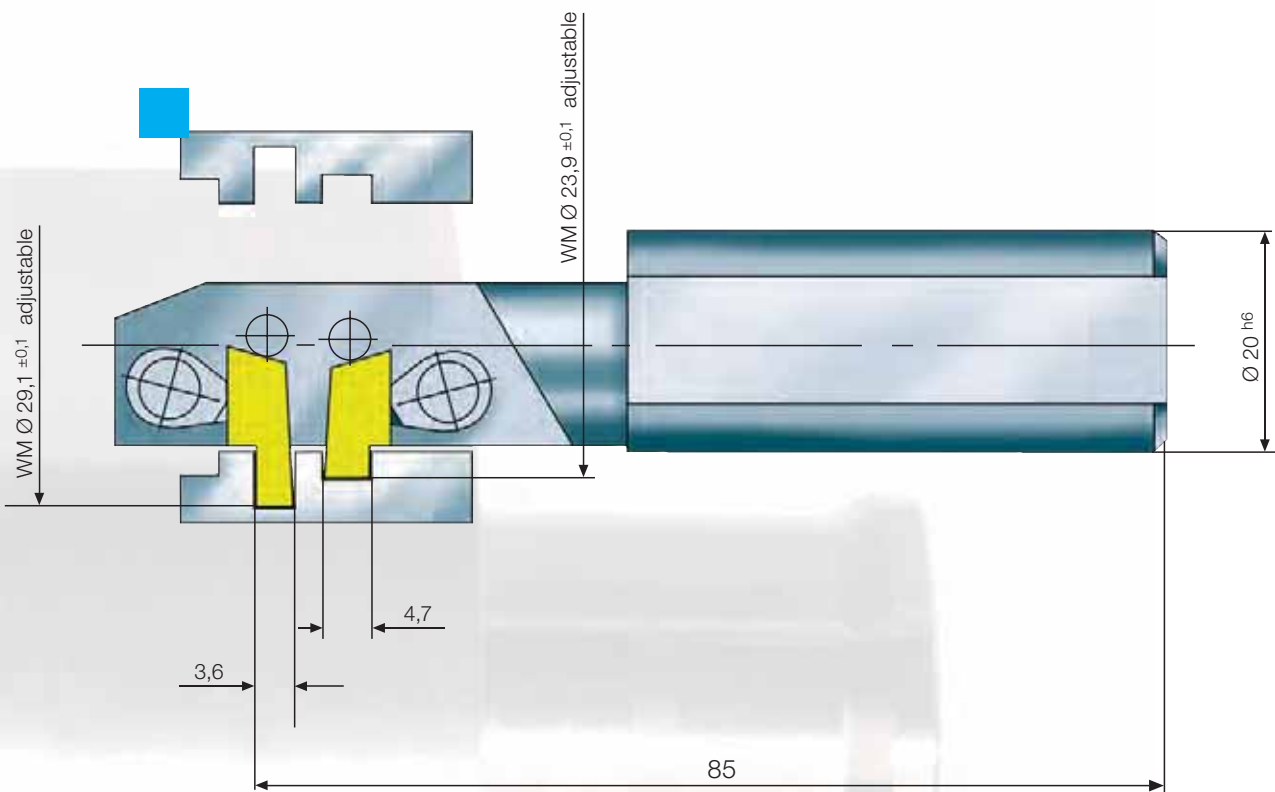
Coolant

yes, internal

Turning tools




Grooving inserts adjustable towards each other.



Workpiece

Material

Camshaft regulator

(DIN)  Sint D 11 (sintersteel metal)

Tool

Plunging tool for turning machines

Number of teeth

2 / effective 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

(Ø 29,1) 220

Number of revolutions

min⁻¹

2.408

Feed rate

mm/min

241

Feed rate per tooth

mm

0,1

Depth of cut

mm

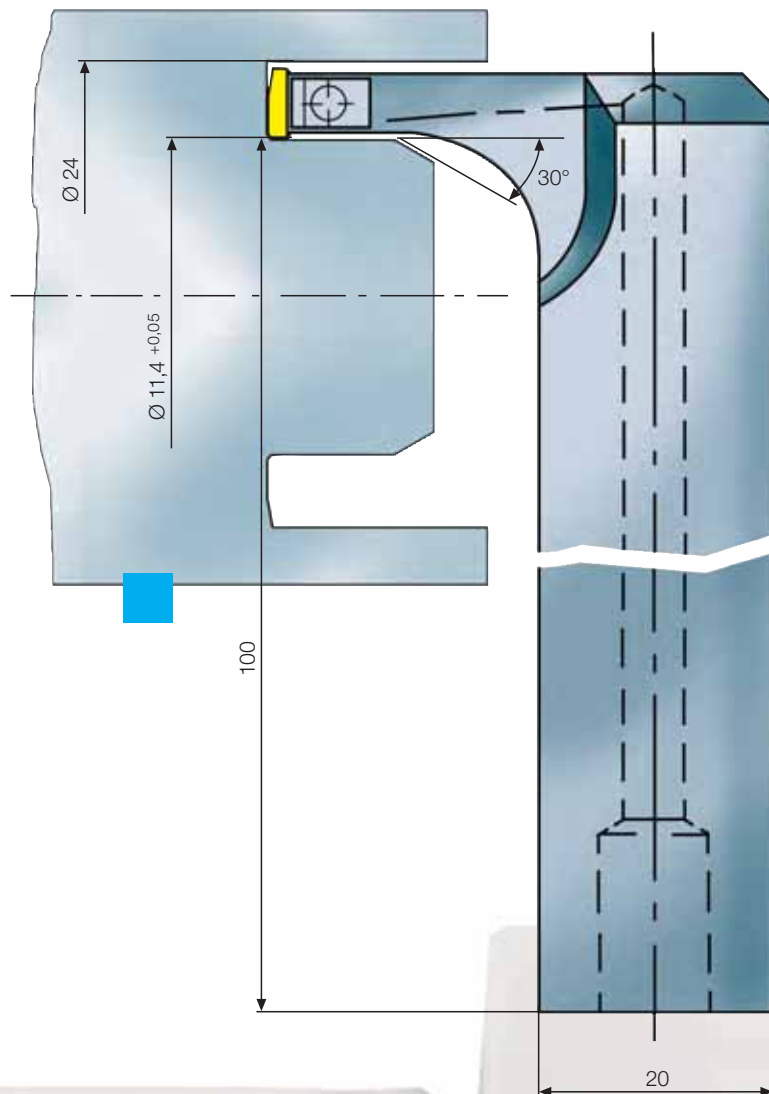
~ 4,5

Coolant

yes, internal

H Turning tools

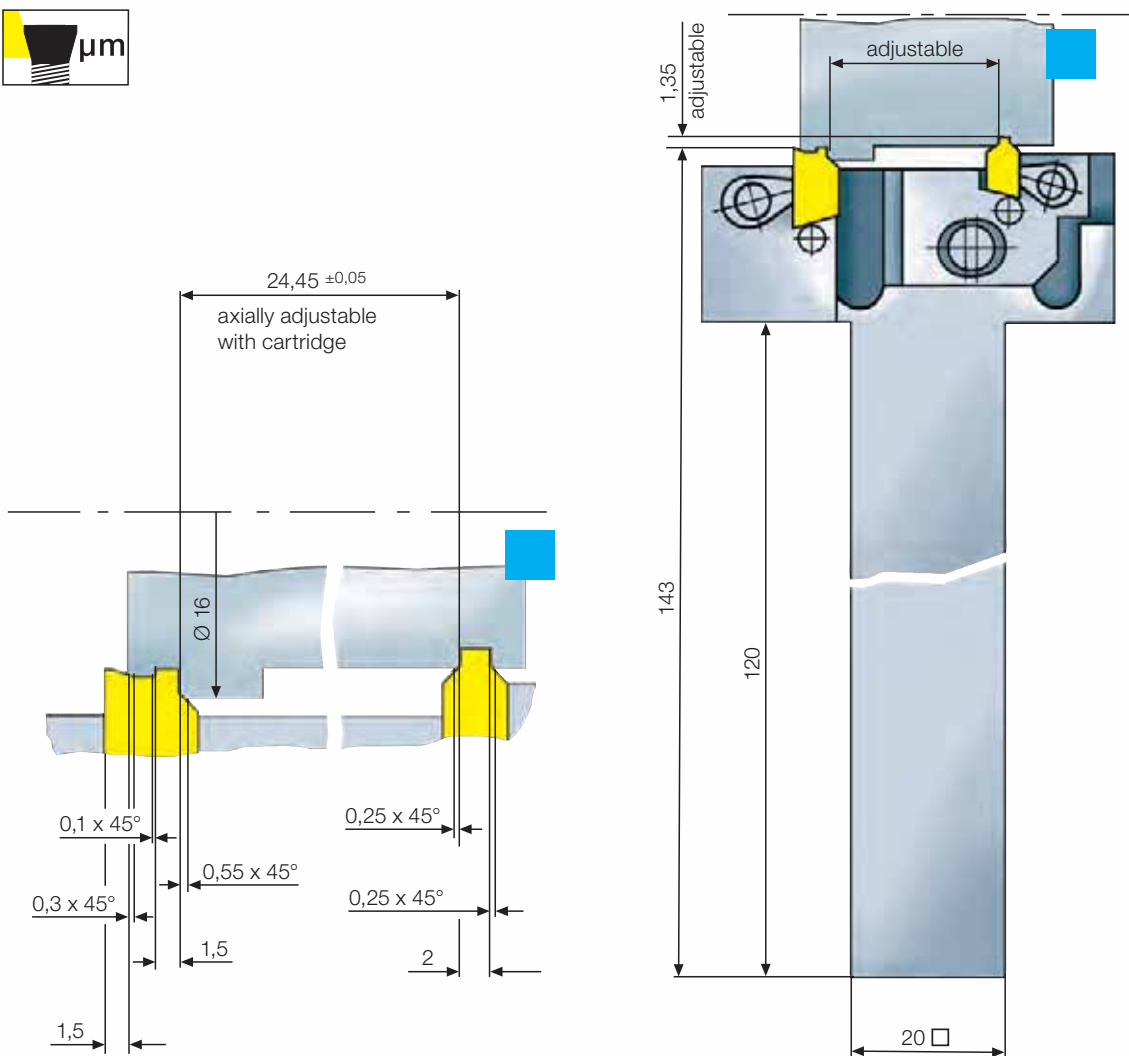
Finish machining chamfer 30° and $\varnothing 11,4^{+0,05}$.



| Workpiece | | Case |
|-----------------------|-------------------|-------------------------------------|
| Material | | (DIN) ■ 9 S Mn 28 K |
| Tool | | Plunging tool |
| Number of teeth | | 1 |
| Insert | | according to customer specification |
| Cutting grade | | carbide coated |
| Cutting speed | m/min | ($\varnothing 11,4$) 95 |
| Number of revolutions | min ⁻¹ | 2.654 |
| Feed rate | mm/min | 318 |
| Feed rate per tooth | mm | 0,12 |
| Depth of cut | mm | - 1 |
| Coolant | | yes, internal |

Turning tools


Plunge turning - profil recess.
Recesses adjustable towards each other.



Workpiece

Material

Profil shaft

(DIN)  9 S Mn 28 K

Tool

Plunging tool

Number of teeth

2 / effective 1

Insert

according to customer specification

Cutting grade

carbide coated

Cutting speed

m/min

120

Number of revolutions

min⁻¹

764

Feed rate

mm/min

76

Feed rate per tooth

mm

0,1

Depth of cut

mm

2

Coolant

yes, external



www.sefmeccanotecnica.it

SEDE
Via degli Orefici - Blocco 26
40050 FUNO (BO) ITALIA
Tel. +39 051 66.48.811
Fax +39 051 86.30.59

vendite@sefmeccanotecnica.it

Filiale di Milano
Piazzale Martesana, 6
20128 Milano
Tel. +39 02 25.75.288
Fax +39 02 25.70.121

milano@sefmeccanotecnica.it

