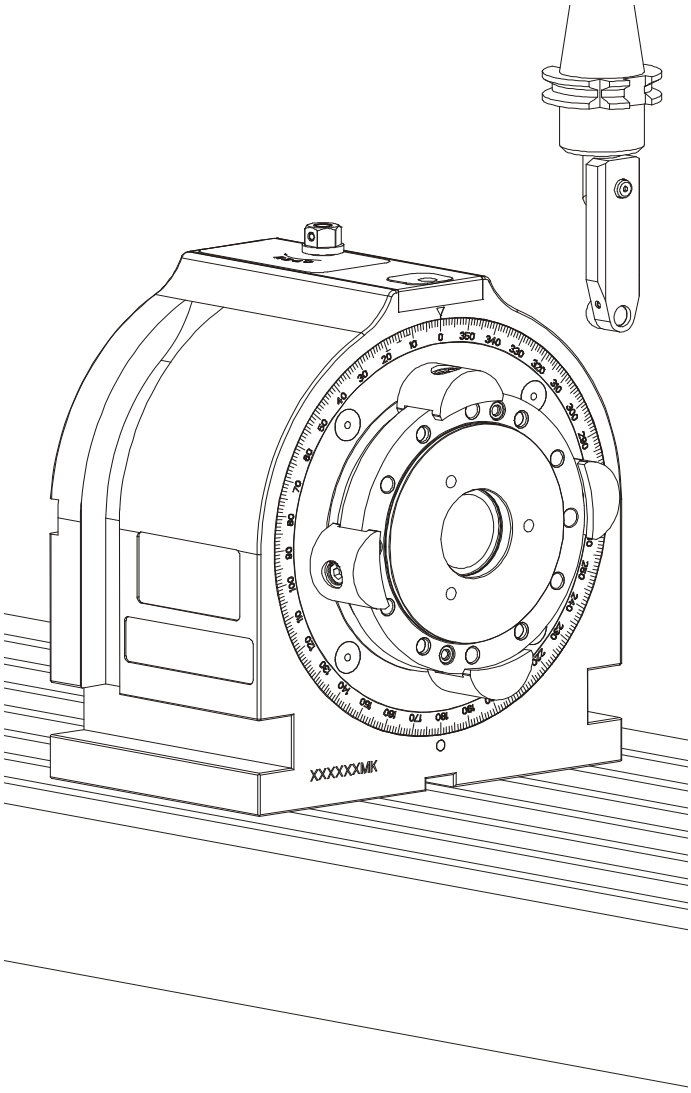
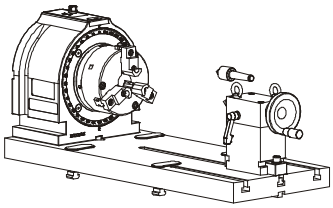
# OPERATING INSTRUCTIONS

## ROTOKLICK MK 150
## MULTIKLICK MK 150
## MULTIDEX



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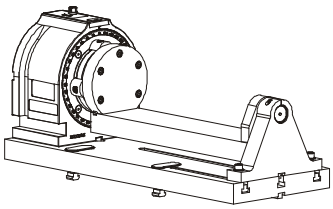

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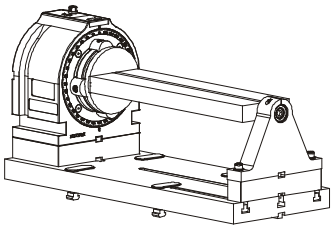

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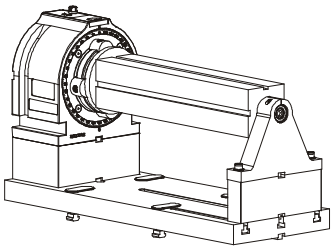
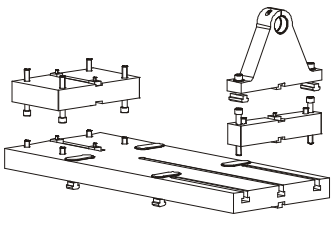


Type: Würfel



Type: Components

Haff & Schneider
1956

Haff & Schneider GmbH & Co. OHG
Obere Wank 2
D-87484 Nesselwang
www.haff-schneider.com

# Contents



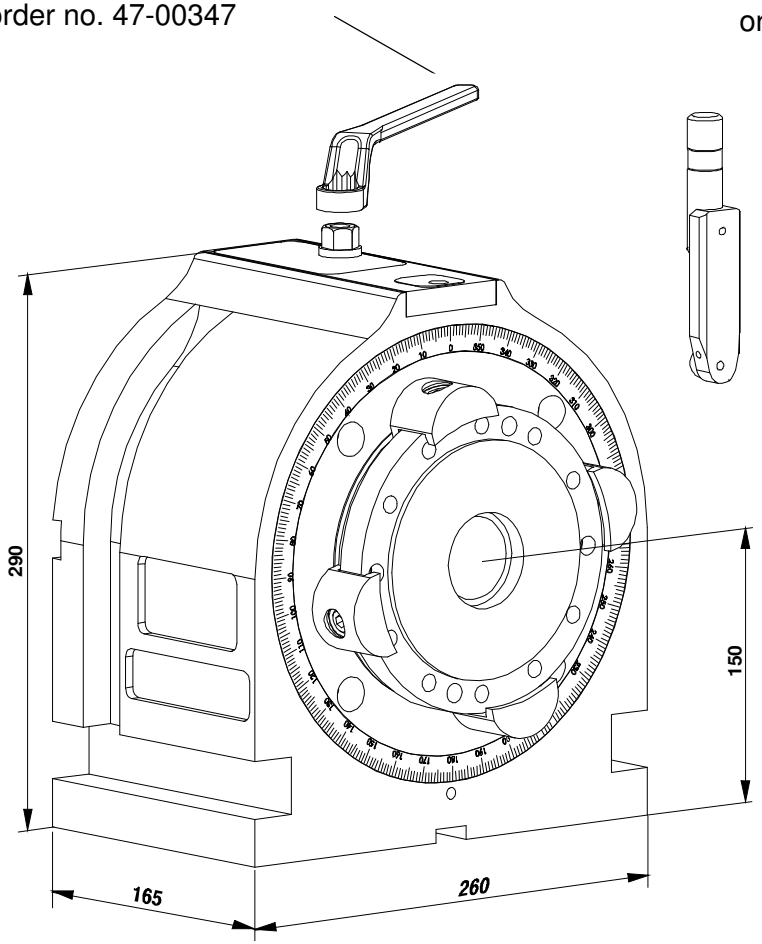
For further information like operating instructions / technical documentation as pdf-files see under www.haff-schneider.com.

# 1 Extent of Supply Rotoklick MK150

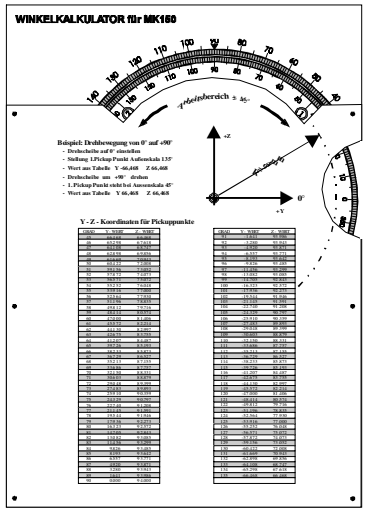
Order No. 71-05250

ring spanner for manual indexing
order no. 47-00347

indexing tool for CNC-indexing
order no. 71-05230




angle calculator DIN A4
order no. 47-00363



# 2 The Indexing Device MK150

## 2.1 Technical Data

| | |
|---|---|
| Division: | 360 x 1° |
| Center height standard: | 150 mm |
| Center height with option spacer plates: | 200 resp. 250 mm |
| Holding diameter cyl.: | d = 125 mm –0,005/-0,015 |
| Locating hole: | d = 50 H6, 10 mm depth |
| Through hole: | d = 43 mm |
| Locking mechanism: | positive interlocking (automatic) |
| Indexing accuracy: | +/- 10 seconds |
| Repeat accuracy: | +/- 4 seconds |
| Holding torque: | 2000 Nm |
| Push-in force of indexing tool approx. | 600 N |
| Weight: | 37 kg |
| | |
| Set-up positions: | vertical for vertical machines |

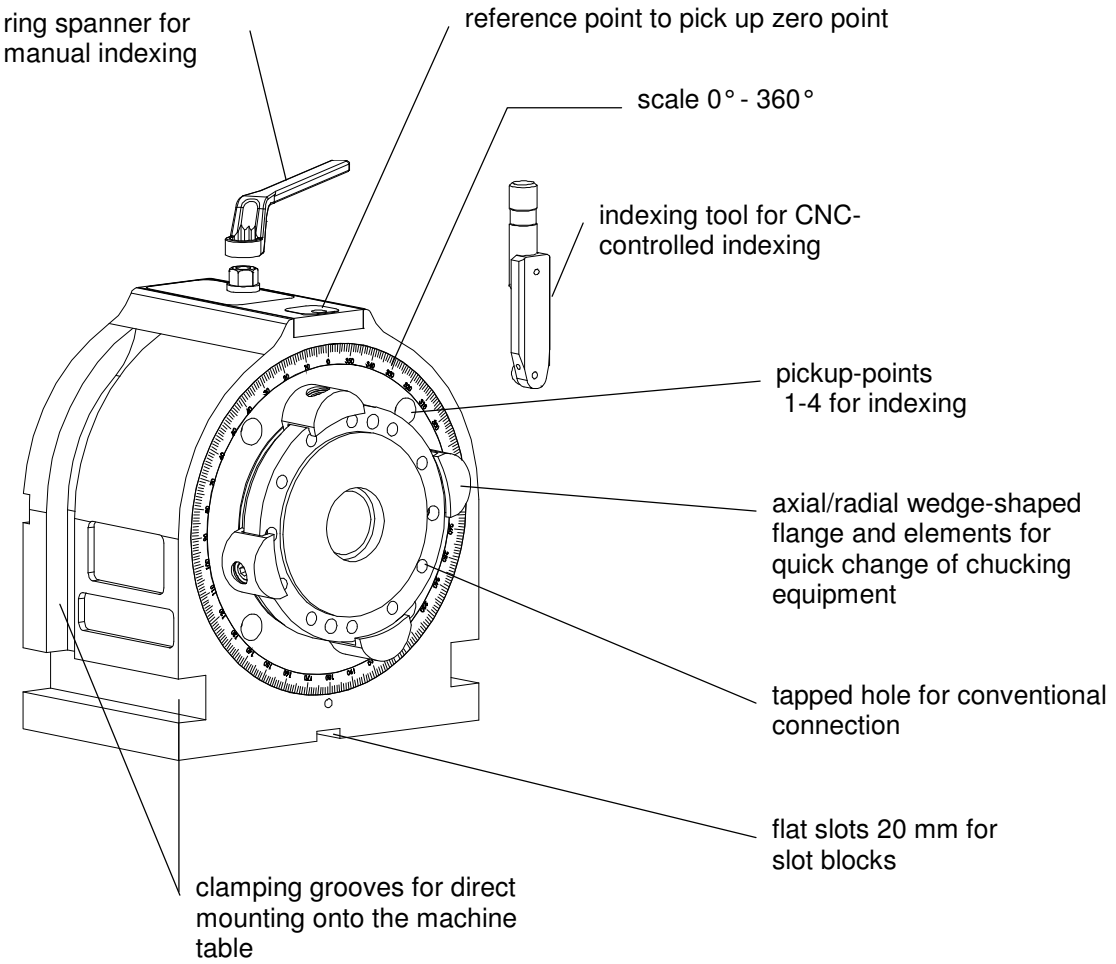
**The device is absolutely maintenance-free!**
**No regreasing necessary!**

# 2. The Indexing Device MK150

## 2.2 Set-up

### Vertical Set-up

Set-up directly on machine table or pallet
To be fixed through flat slots 20 mm using T-slot blocks (14, 16 or 18 mm)
If required: mount shaft support with clamping shoes through T-slot blocks

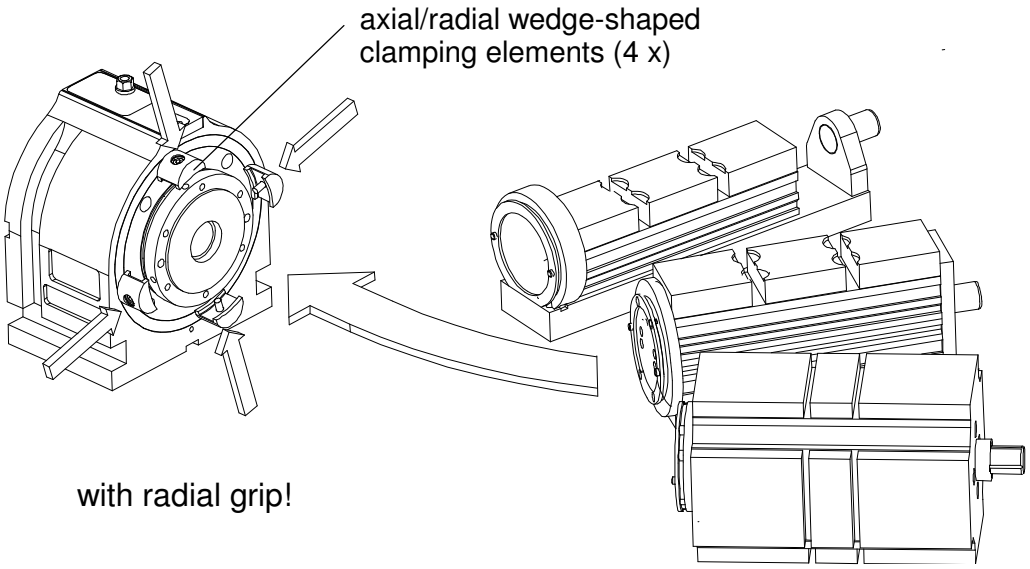



### Horizontal Set-up

Clamp indexing device lying on its back directly onto the machine table using clamping shoes and T-slot blocks

# 2. The Indexing Device MK150

## 2.3 Axial/Radial Wedge-shaped Clamping Elements




**Advantages:**
- Collision-free connection of any chucking equipment!
- Quick change of clamping systems!

**Radial Connection through Axial/Radial Wedge-shaped Clamping Elements:**
- Open axial/radial clamping elements by unscrewing four screws
- Radial clamping of workholding fixture

**Tightening Torque of Axial/Radial Wedge-shaped Clamping Elements:**
approx. 24 Nm

**Holding Torque of Axial/Radial Flange against Twisting:**
approx. 2.000 Nm

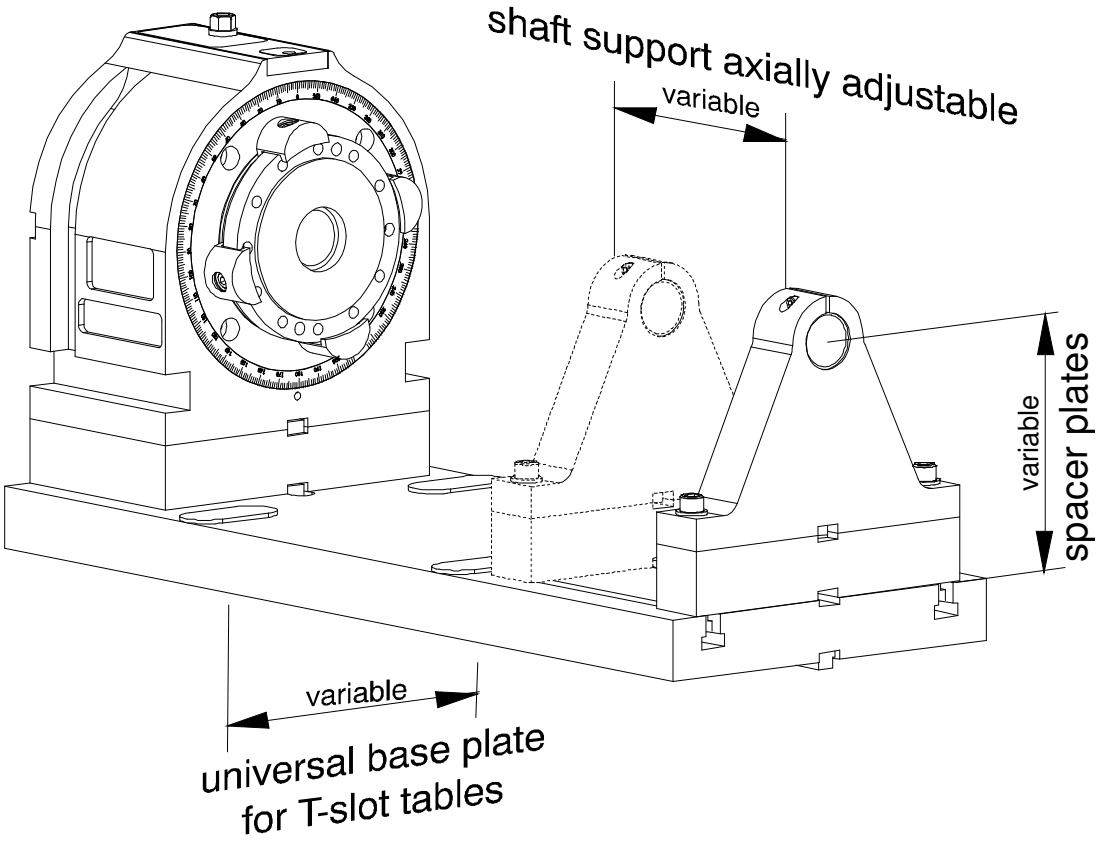
**Accessories for Connecting Special Fixtures:**
- Raw flange (order no. 71-05650-49)

**Conventional Connection:**
is possible through tapped holes M10x12 (6 pcs) at flange side

**For Conventional Connection:**
- Remove axial/radial wedge-shaped clamping elements

# 2. The Indexing Device MK150

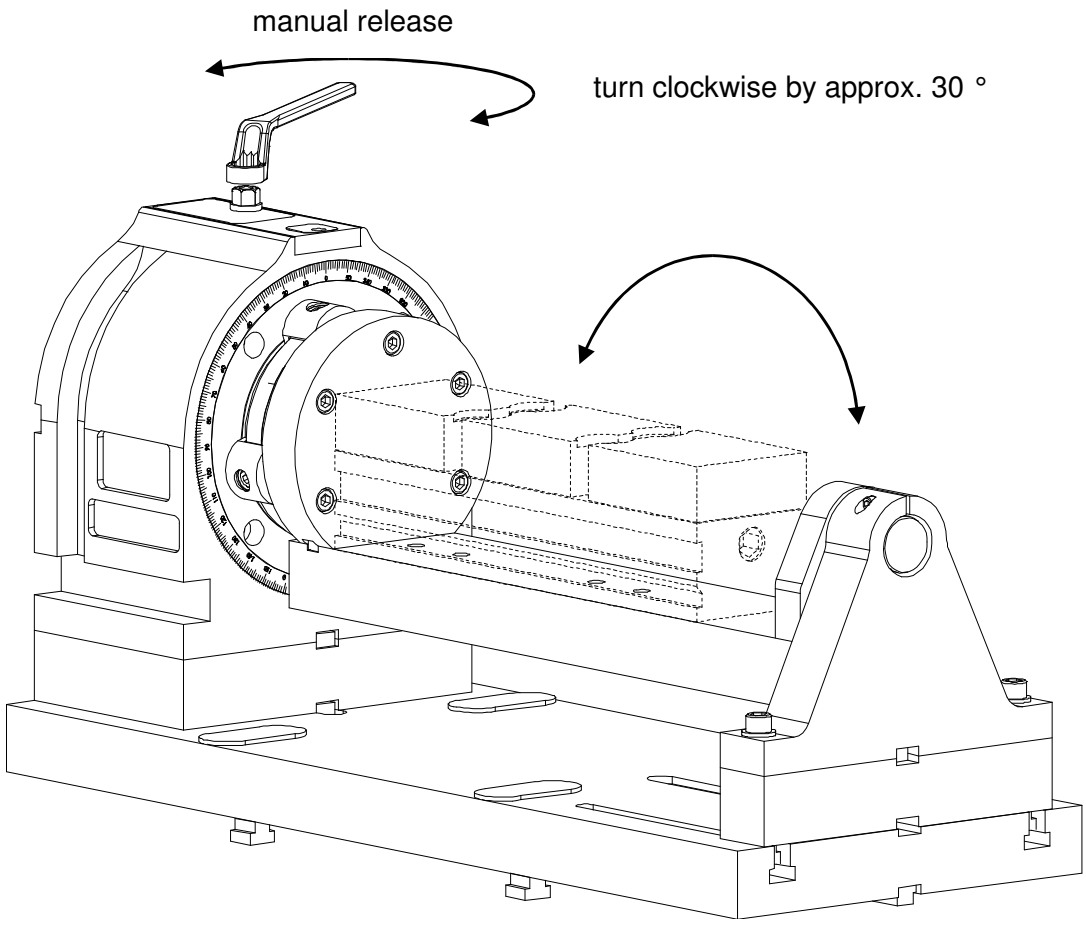
## 2.4 Variable System




**The Indexing Device Becomes a Variabale System with the Options**

- Shaft support (order no. 71-05430-49)
- Spacer plates (order no. 71-05560-49 for H=50mm / 71-05560-100 f. H=100mm)
- Universal base plate (order no. 71-05520-49)

# 3 Manual Dividing




**Manual Dividing with the Ring Spanner:**

- For loading of workpieces
- For indexing on conventional NC-machines without circle programming facility
- A slightly sensible resistance in zero position serves as a guideline for orientation

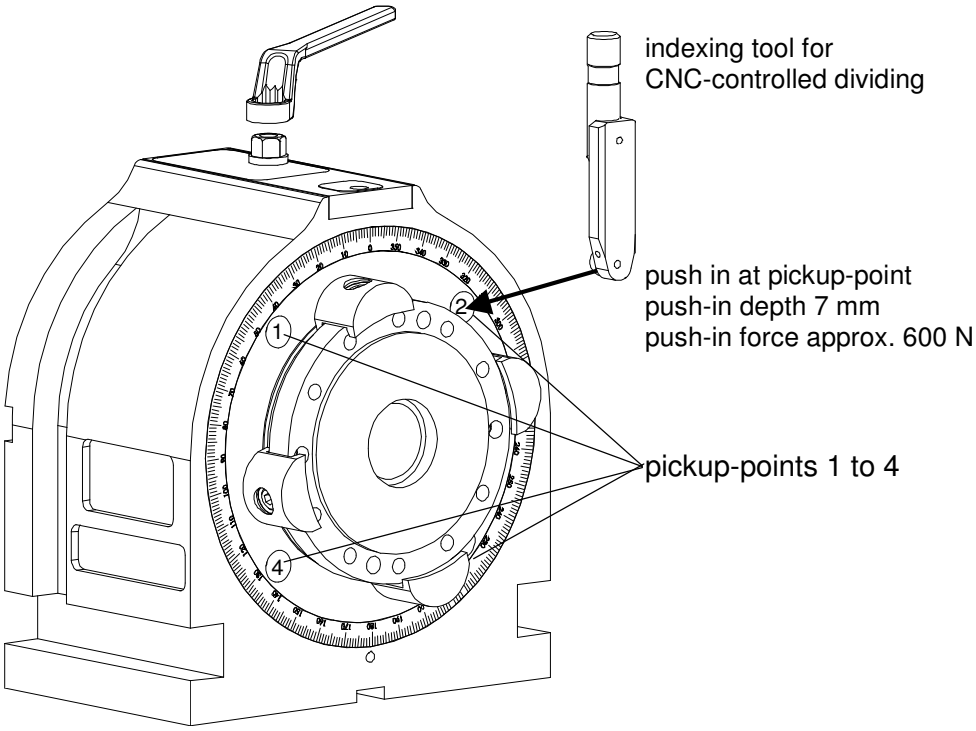
- Fix ring spanner onto nut at the top of the indexing device
- Turn ring spanner clockwise by approx. 30°
- Locking mechanism is released
- Hold ring spanner in the release position
- Execute division movement until the desired angle has been reached
- Release ring spanner
- Automatic locking in exact steps of 1°

## Warning!

Danger of injury in case of eccentric distribution of mass (out-of-balance) of clamping fixtures around the spindle axis!

# 4 CNC-controlled Dividing

## 4.1 Functional Description




**CNC-controlled Dividing:**
- Can be performed by any machine with 3-axes CNC-control
- Division with the help of the supplied indexing tool
- Cylinder shaft of the indexing tool fits into every Weldon chuck Ø 20 mm

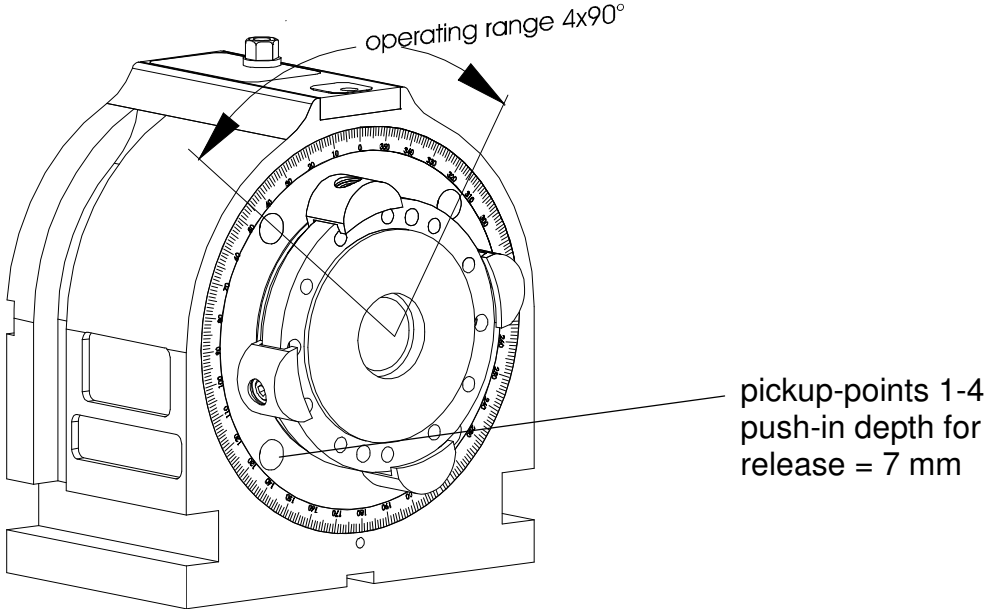
**Angle Calculator:**
- Contained in the extent of supply as standard equipment
- For determination and programming of the exact position of the four pickup-points
- Detailed programming instructions on the angle calculator

**Functional Description:**
- Push in indexing tool at one of the pickup-points (push-in depth 7 mm)
  ⇨ release
- CNC-controlled circle movement until the desired angle has been reached
- Return movement of the indexing tool
  ⇨ Locking in exact steps of 1°

# 4 CNC-controlled Dividing

## 4.2 Technical Data

| | |
|---|---|
| Minimum dividing increment | 1° |
| Max. operating range with one indexing movement | 90° |
| Push-in depth for release | 7 mm |
| Push-in force for release | 600 N |
| Recommended feed for push-in movement | 1 m/min |
| Recommended feed for dividing movement (depending on machine type and moving mass) | 5 – 15 m/min |



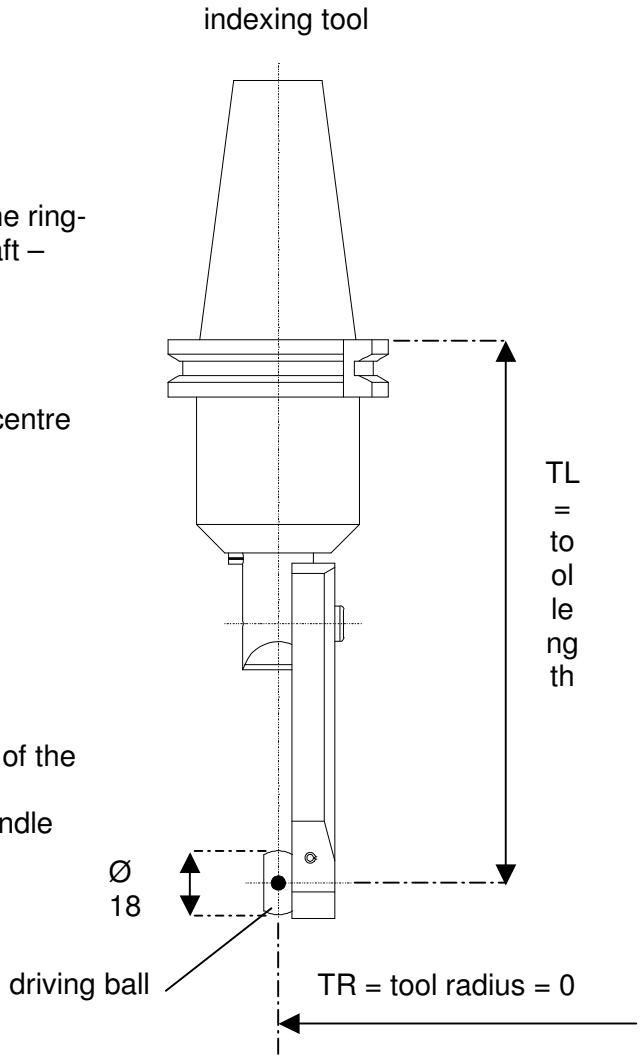

**Before Start of Programme:**
- Check precise start position at scale!
- If necessary, adjust manually to reach the programmed start position! (cf. Manual Dividing, p. 3.0)

**Notes for Feed Programming:**
- Feed motion with accurate positioning must be used!
- Switch off standard feed motion!

With certain CNC controls dwell time must be used in order to guarantee an exact push-in movement!

# 4 CNC-controlled Dividing

## 4.3 Indexing Tool




**Clamping:**
- into Weldon chuck Ø 20 mm
- Tightening screw must push into the ring-shaped recess at the clamping shaft – **controll!**

**Measure Tool:**
Note: The tool length TL refers to the centre of the driving key!

**Tool Data:**
List TL and TR (= 0)
in tool memory of the control

**Indexing Tool:**
Place indexing tool into tool magazine of the machine
Change indexing tool into machine spindle

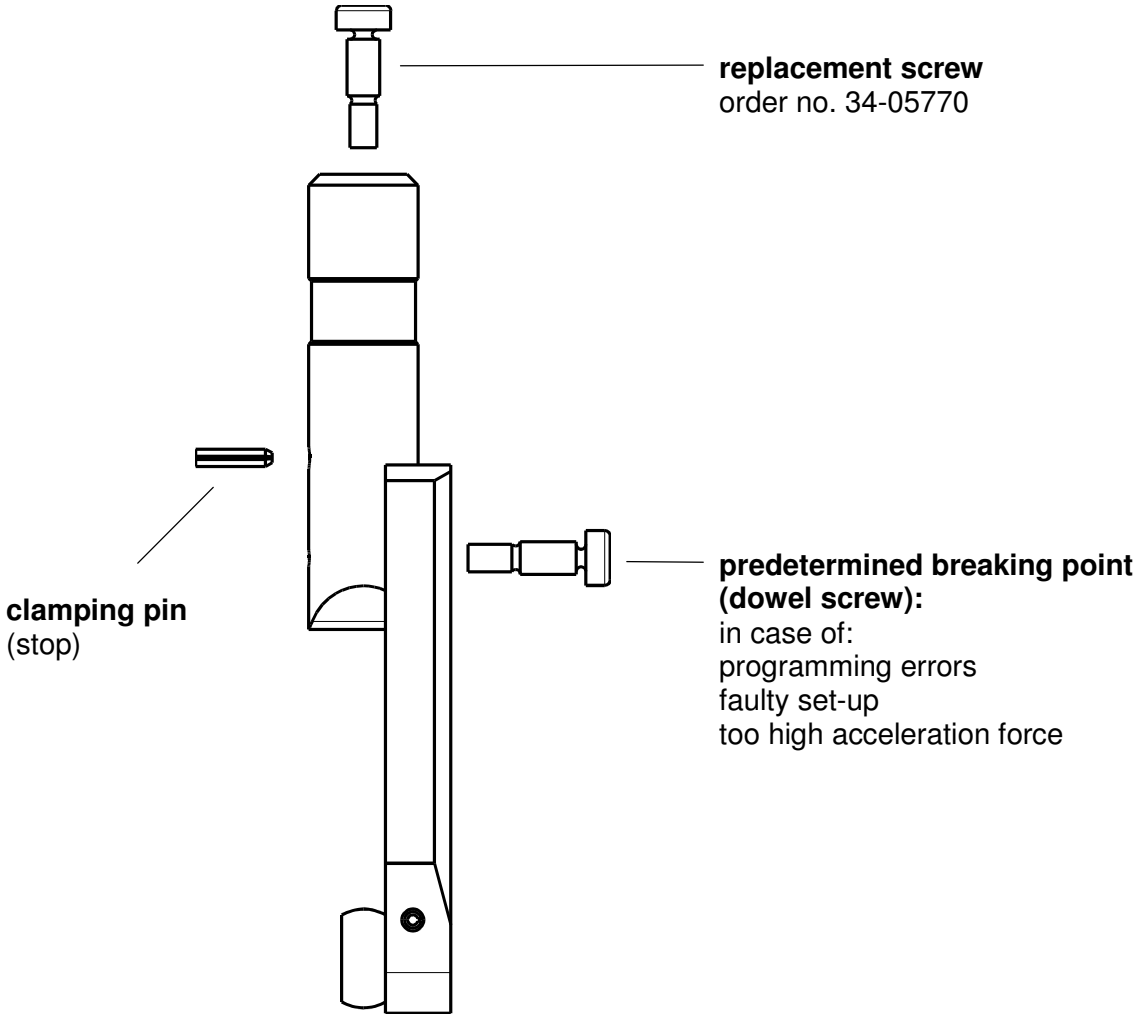
# Important:

The driving ball of the indexing tool must show towards the indexing device!
(an angle deviation of $\pm$ 3° is max. permissible)

**Greater angle deviations must be compensated:**
- either:
  correction through spindle orientation of the CNC-control
- or:
  turn indexing tool in the Weldon chuck to the correct position:
  – release tightening screw
  – turn indexing tool
  – fasten tightening screw
- Simultaneously:
  – observe tool length TL!
  – it might be necessary to measure TL once again!

# 4 CNC-controlled Dividing

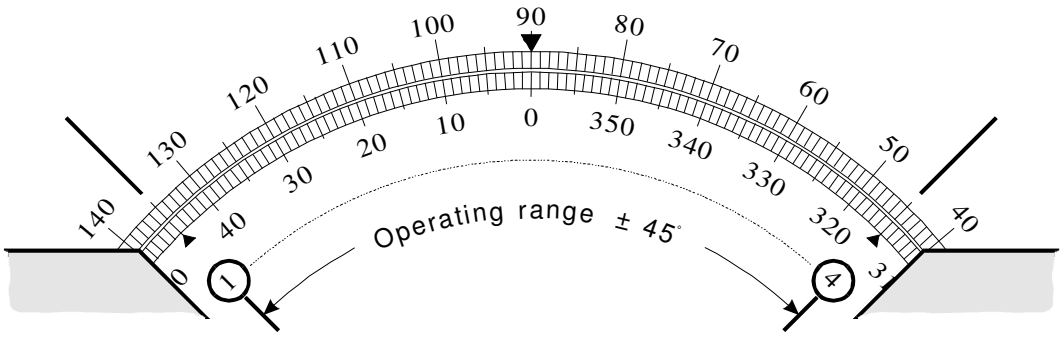
## 4.4 Predetermined Breaking Point at the Indexing Tool



# 4 CNC-controlled Dividing

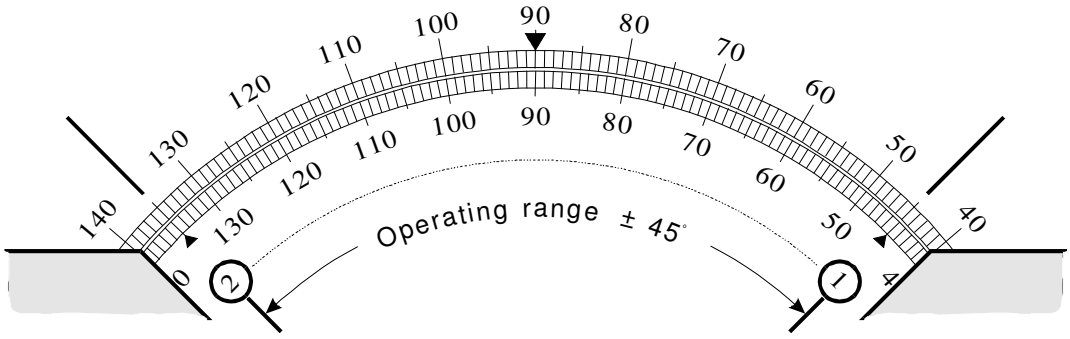
## 4.5 Use of the Angle Calculator

### 4.5.1 Example 1: Indexing Movement from 0° to 90°




- set rotating disk to 0°
- position of 1st pickup-point on outer scale at 135°
- Read values in table: Y –66,468  Z 66,468

| degree | Y - value | Z - value |
|---|---|---|
| 135 | -66.468 | 66.468 |




- Turn disk clockwise by 90°
- 1st pickup-point at 45° on outer scale
- read values in table: Y 66,468  Z 66,468

| degree | Y - value | Z - value |
|---|---|---|
| 45 | 66.468 | 66.468 |

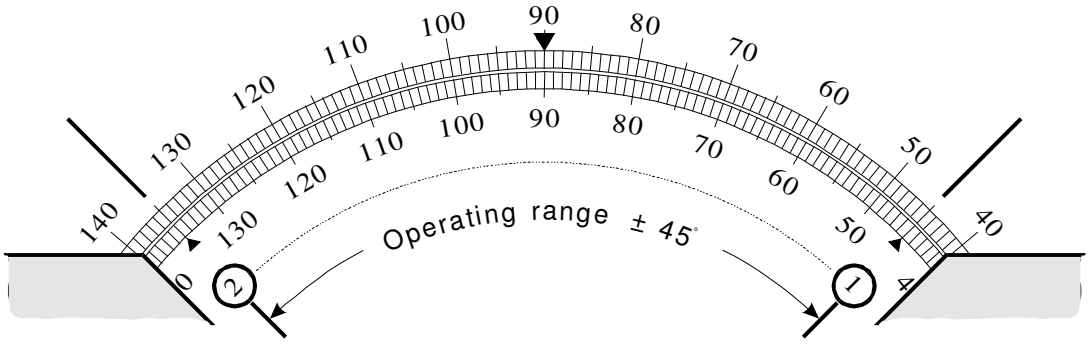
# 4. CNC-controlled Dividing

## 4.5 Use of the Angle Calculator

### 4.5.2 Example 2: Rotation from 0° to 120°

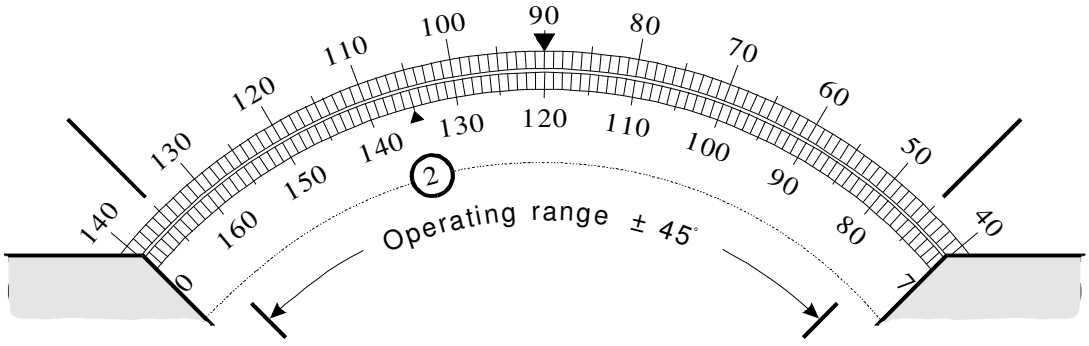
Since the operating range is ± 45°, every indexing movement of more than 90° must be performed in two steps.

- Rotation from 0° to 90° as in example 1




- second pickup-point is at 135° on outer scale
- read values in table for second pickup-point:
  Y –66,468  Z 66,468

| degree | Y - value | Z - value |
|---|---|---|
| 135 | -66.468 | 66.468 |



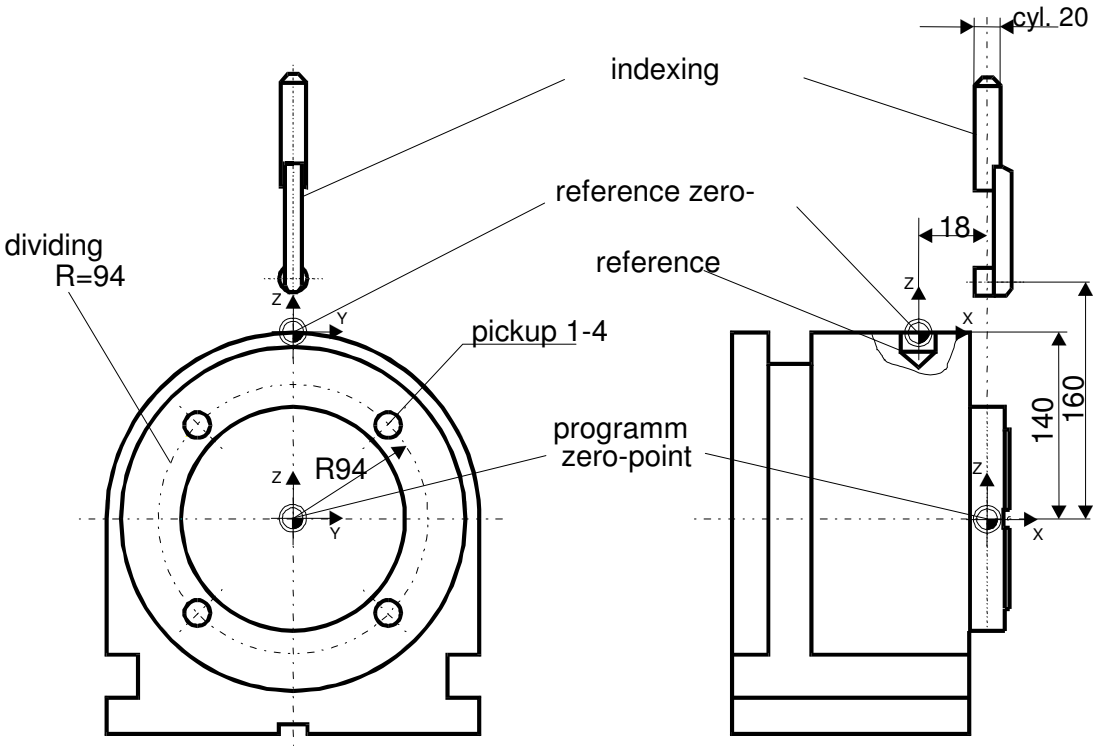

- Turn disk clockwise by further 30°
- second pickup-point is now at 105° on outer scale
- read values in table: Y –24,329  Z 90,797

| degree | Y - value | Z - value |
|---|---|---|
| 105 | -24.329 | 90.797 |

# 4 CNC-controlled Dividing

## 4.5 Use of the Angle Calculator

### 4.5.3 Reference Point / Programme Zero-Point for Indexing Movement

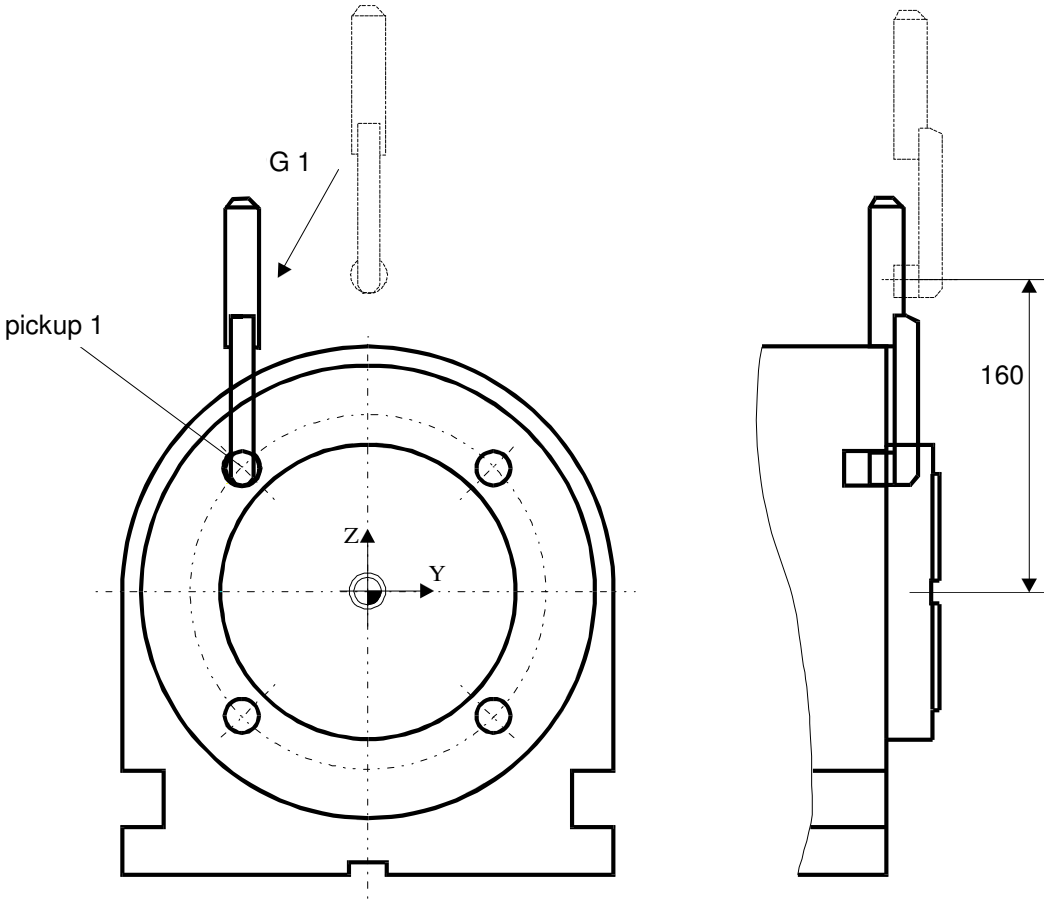



- List indexing tool in tool memory,
  L = tool length TL, R = 0
- Approach reference bore with 3D-Taster
- Write X0 Y0 into zero memory storage
- Approach reference point on upper edge of the indexing device with 3D-Taster
- Write Z0 into zero memory storage
- Shift absolute zero value to axis of indexing device
  (G93 X18 Y0 Z-140)

# 4 CNC-controlled Dividing

## 4.5 Use of the Angle Calculator

### 4.5.4 Starting / Unlocking

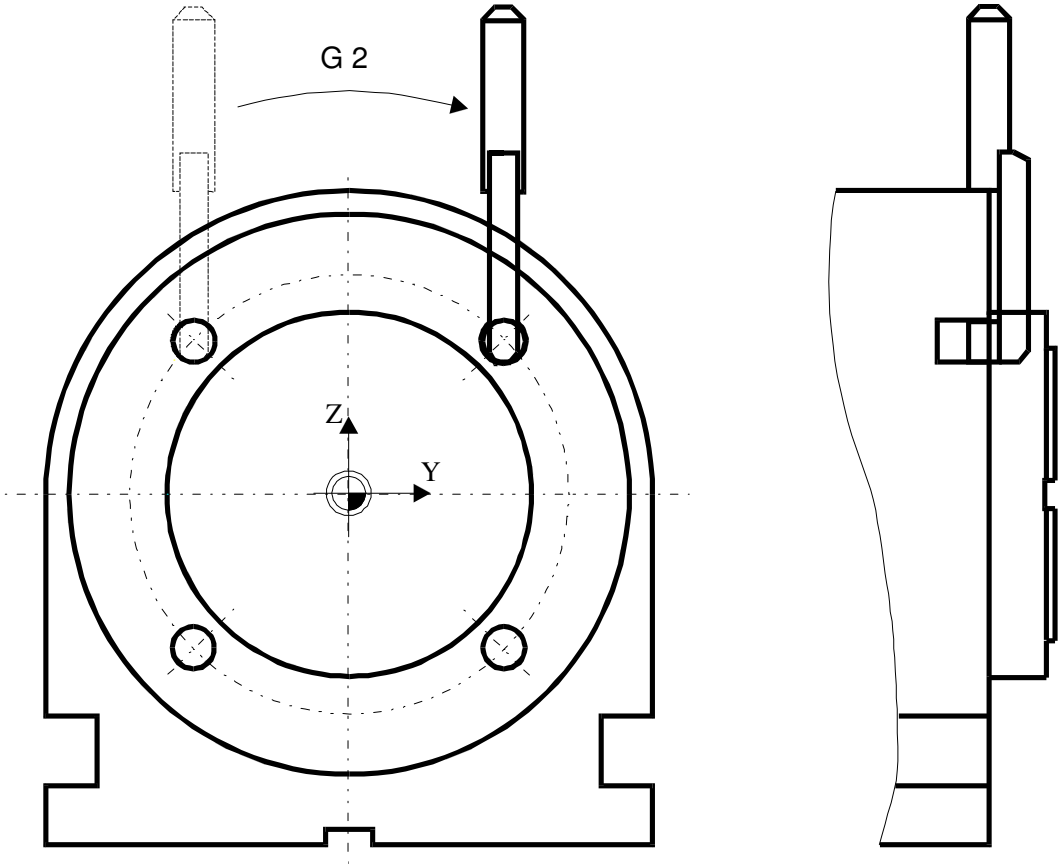



- Move to starting point G0 X0 Y0 Z160
- Check position of the first pickup-point
- Determine coordinates for indexing movement – radius of dividing circle R = 94 mm – (cf. table)
- Move to pickup-point
- Push in at pickup-point with G1 X-11,5
  (push-in distance = 7 mm)

# 4 CNC-controlled Dividing

## 4.5 Use of the Angle Calculator

### 4.5.5 Indexing / Rotation

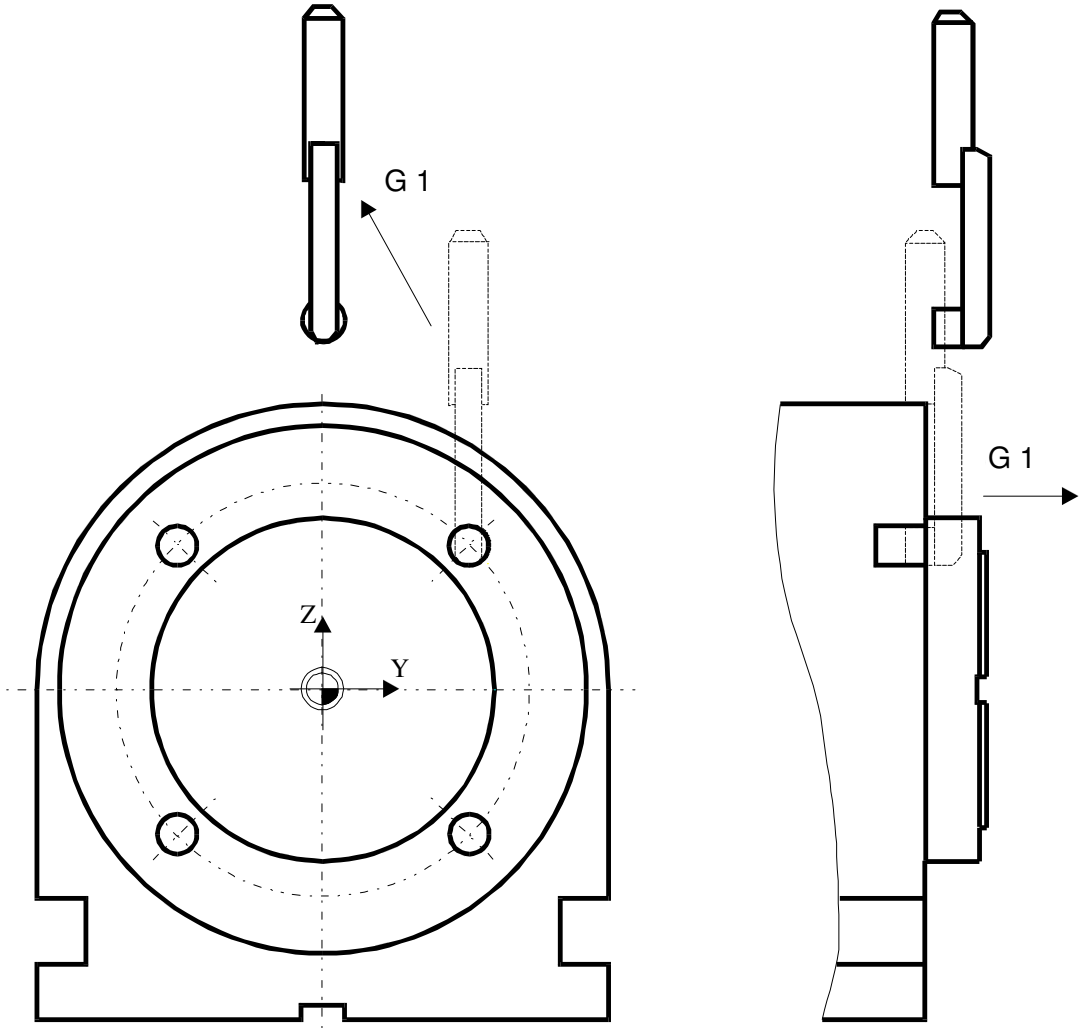



- Programme circular movement with centre of circle Y0 Z0:
  determine finish point coordinates Y and Z with the help of the table (cf. angle calculator), rotational movement G2
- Input G2 Y-coordinates, Z coordinates J0 K0
- Result: A rotation with the desired angle degree has been performed

# 4 CNC-controlled Dividing

## 4.5 Use of the Angle Calculator

### 4.5.6 Locking / Return Movement




- Pull out from pickup G1 X0
- Return to starting point G1 Y0 Z160

# 4 CNC-controlled Dividing

## 4.6 Programming Example for DIN control units

Indexing movement e.g. **DIN control units**
from 0° to 90° (scale of indexing device), corresponding to from 135° to 45° (outer scale of angle calculator).

For values of coordinates please refer to the angle calculator.

**Attention!** Check the coordinate system of the machine!

The zero-point G52 is the reference zero-point (cf. angle calculator).

**%PM**

| | |
|---|---|
| N9000 | (Rotate Rotoklick from 0° to 90°) |
| N10 G17 | (Activate plane G17) |
| N11 G52 | (Shift zero-point to reference zero-point) |
| N12 F1000 S0 T98 M6 | (Change indexing tool into spindle) |
| N 13 D90 M19 | Position spindle |
| N14 G22 N=9101 | (Call up Macro indexing movement) |
| N15 M30 | |

**%MM**

| | |
|---|---|
| N9101 | (Macro indexing movement) |
| N10 G93 X18 Y0 Z-140 | (Shift abs. zero value to axis of indexing device) |
| N11 G0 X0 Y0 Z160 | (Starting point above Rotoklick) |
| N12 G1 Y-66.468 Z66.468 | (Aproach 1st pickup-point) |
| N14 G1 X-11.5 | (Push in, unlock) |
| N15 G2 Y66.468 Z66.468 J0 K0 | (Rotation from 0° to 90°) |
| N16 G1 X0 | (Pull out, lock) |
| N17 G1 Y0 Z160 | (Finish point above Rotoklick) |
| N18 G93 X0 Y0 Z0 | (Delete shift of absolute zero-point) |

# 4 CNC-controlled Dividing

## 4.7 Programming example for Heidenhain TNC 355

Indexing movement for **Heidenhain Control TNC 355**
from 0° to 90° (scale of indexing device), corresponding to from 135° to 45°
(outer scale of angle calculator).

For values of coordinates please refer to the angle calculator.

**Attention!** Check the coordinate system of the machine!

The zero-point is the reference zero-point (cf. angle calculator).

| | |
|---|---|
| 0 BEGIN PGM 2802961 MM | (Rotate Rotoklick from 0° to 90°) |
| 1 TOOL CALL 90 Z S 0,00 | (List tool length in tool memory) |
| 2 | Stop position spindle |
| 3 CYCL DEF 7.0 NULLPUNKT | (Shift zero-point to axis of Rotoklick) |
| 4 CYCL DEF 7.1 X-18,000 | |
| 5 CYCL DEF 7.2 Y+0,000 | |
| 6 CYCL DEF 7.3 Z-140,000 | |
| 7 L X+0,000 Y+0,000 R0 F9999 M<br>L Z+160,000 R0 F9999 M | (Starting point above Rotoklick) |
| 8 L Y+66,468 Z+66,468 R F2000 M | (Approach 1st pickup-point) |
| 9 L X+11,500 R F M | (Push in, unlock) |
| 10 CC Y+0,000 Z+0,000 | (List centre of circle) |
| 11 CP IPA-90,000 DR- R F M | (Indexing movement with indication of angle) |
| 12 L X+0,000 R F M | (Pull out, lock) |
| 123 L Y+0,000 Z+160,000 R F M30 | (Finish point above Rotoklick) |

14 END PGM 2802961 MM

# 5 ROTOKLICK MK150 dimensional drawing