

HEIDENHAIN

Webinar



New touch probe cycles

TNC 640

WEBINAR





CONTENT

1. **Overview and application possibilities**
2. **New input parameters**
3. **Programming**
4. **Examples of use**



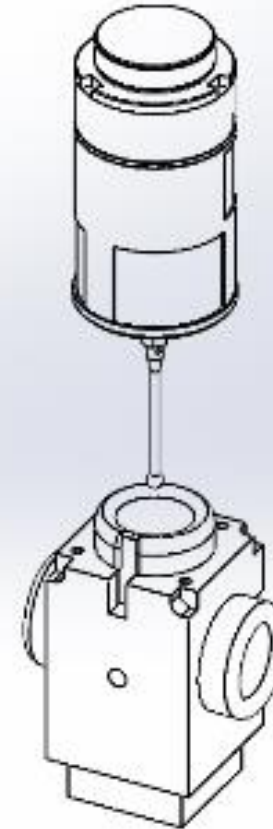
1 Overview and application possibilities



Overview

Cycles

- 1410 TOUCHING EDGE
- 1411 SENSING TWO CIRCUITS
- 1420 TOUCHING PLANE

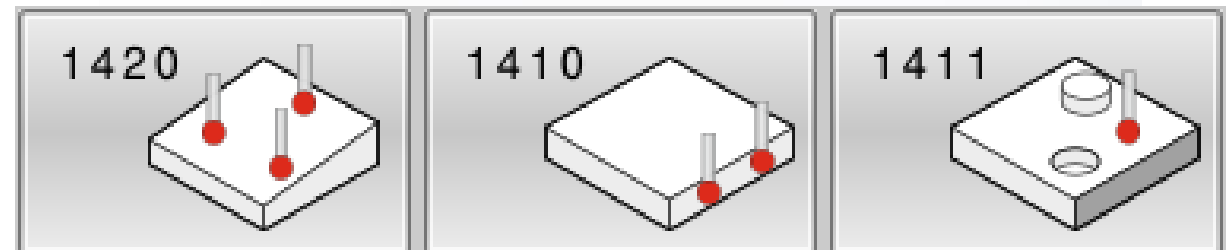
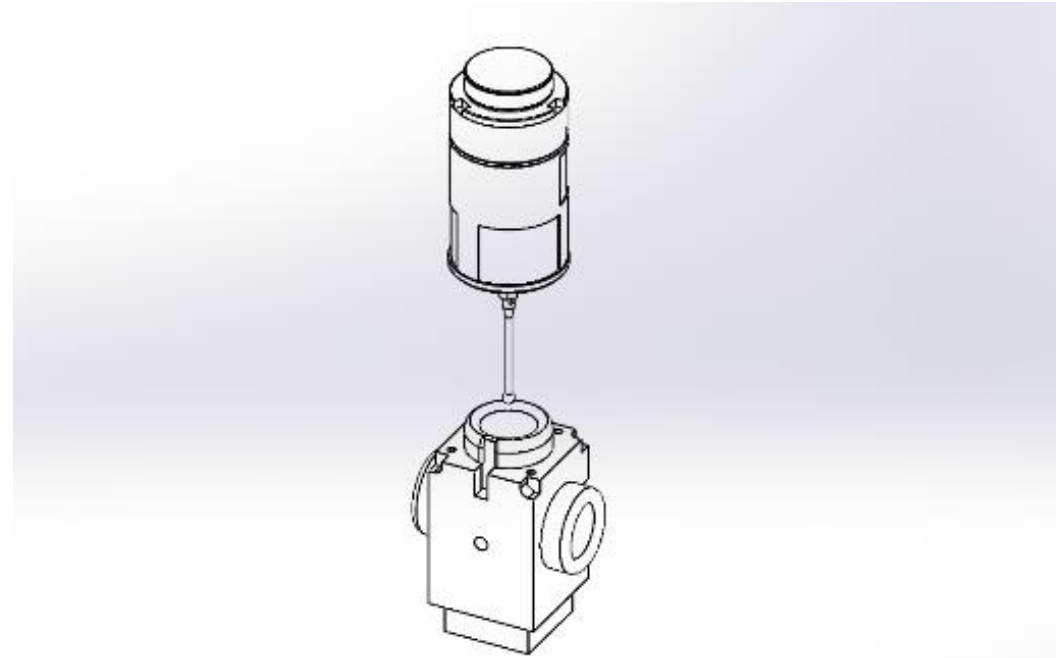




Application possibilities

Cycles

- Determination of rotations
- Semi-automatic probing
- Monitoring of tolerances
- Alignment via basic rotation or table rotation
- Describing the 3D basic rotation





2 New input parameters



New input parameters

Axis position

Absolutely

Q1100 = +45 ; 1ST POINT MAIN AXIS

Semi-automatic mode

QS1100 = "?+45" ;1ST POINT MAIN AXIS

Tolerances

QS1100 = "+45-1-0.5" ;1ST POINT MAIN AXIS

Transfer of an actual position

QS1100 = "+45@45.1" ;1ST POINT MAIN AXIS

Program Run Full S... Programming

TNC: \Webinar_14xx\14xx.h

→3rd nominal position tool axis?

```

0 BEGIN PGM 14XX MM
1 BLK FORM 0.1 Z X-50 Y-50 Z-20
2 BLK FORM 0.2 X+50 Y+50 Z+0
3 TOOL CALL "TOUCH_PROBE" Z
4 TCH PROBE 1420 PROBING IN PLANE
  QS1100="?-40" ;1ST POINT REF AXIS
  QS1101="?-40" ;1ST POINT MINOR AXIS
  QS1102="?-2" ;1ST POINT TOOL AXIS
  QS1103="@40" ;2ND POINT REF AXIS
  QS1104="@40" ;2ND POINT MINOR AXIS
  QS1105="@-2" ;2ND POINT TOOL AXIS
  QS1106="0+0.02" ;3RD POINT REF AXIS
  QS1107="40-0.05" ;3RD POINT MINOR AXIS
  QS1108="-3-0.09-0.02" 3RD POINT TOOL AXIS
  Q372=-3 ;PROBING DIRECTION
  Q320=+0 ;SET-UP CLEARANCE
  Q260=+50 ;CLEARANCE HEIGHT
  Q1125=+2 ;CLEAR. HEIGHT MODE
  Q309=+0 ;ERROR REACTION
  Q1126=+2 ;ALIGN ROTARY AXIS
  Q1120=+0 ;TRANSER POSITION
  Q1121=+1 ;CONFIRM ROTATION
5 STOP
6 END PGM 14XX MM
  
```

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BEGIN END MOVE WORD MOVE WORD INSERT OVERWRITE QS ENTER NUMBER



New input parameters

Align rotary axes

- **STAY**
Q1126 = 0
- **MOVE**
Q1126 = 1
- **TURN**
Q1126 = 2

Program Run Full S... Programming

TNC: \Webinar_14xx\14xx.
→Align rotary axes?

```
0 BEGIN PGM 14XX MM
1 BLK FORM 0.1 Z X-50
2 BLK FORM 0.2 X+50
3 TOOL CALL "TOUCH_PROB"
4 TCH PROBE 1420 PROBI
  QS1100="?-40" ;1ST
  QS1101="?-40" ;1ST
  QS1102="?-2" ;1ST
  QS1103="@40" ;2ND
  QS1104="@40" ;2ND
  QS1105="@-2" ;2ND
  QS1106="0+0.02" ;3RD
  QS1107="40-0.05" ;3RD
  QS1108="-3-0.09-0.0
Q372=-3 ;PROBING
Q320=+0 ;SET-UP
Q260=+50 ;CLEARANC
Q1125=+2 ;CLEAR.
Q309=+0 ;ERROR RI
Q1126=2 ALIGN R
  Q1120=+0 ;TRANSE
  Q1121=+1 ;CONFIR
5 STOP
6 END PGM 14XX MM
```

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New input parameters

Position for takeover

- No takeover
Q1120 = 0
- Acceptance of the 1st measuring point
Q1120 = 1
- Acceptance of the 2nd measuring point
Q1120 = 2
- Acceptance of the averaged measuring point
Q1120 = 3

Program Run Full S... Programming

TNC: \Webinar_14xx\14
→ Transfer position?

```

0 BEGIN PGM 14XX MM
1 BLK FORM 0.1 Z X-
2 BLK FORM 0.2 X+5
3 TOOL CALL "TOUCH
4 TCH PROBE 1420 PR
  QS1100="?-40" ;1
  QS1101="?-40" ;1
  QS1102="?-2" ;1
  QS1103="@40" ;2
  QS1104="@40" ;2
  QS1105="@-2" ;2
  QS1106="0+0.02"
  QS1107="40-0.05"
  QS1108="-3-0.09-
  Q372=-3 ;PROB
  Q320=+0 ;SET-
  Q260=+50 ;CLEA
  Q1125=+2 ;CLE
  Q309=+0 ;ERRO
  Q1126=+2 ;ALI
  Q1120=0 TRAN
  Q1121=+1 ;CON
5 STOP
6 END PGM 14XX MM
  
```

Q1120=0

~~*.PR X Y Z~~

Q1120=

*.PR X Y Z

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New input parameters

Accept rotation as

- No takeover
Q1121 = 0
- Set basic rotation
Q1121 = 1
- Execute rotary table rotation
Q1122 = 2

Program Run Full S... Programming

TNC: \Webinar_14xx\14...
→ CONFIRM ROTATION?

```

0 BEGIN PGM 1410 MM
1 BLK FORM 0.1 Z X-5
2 BLK FORM 0.2 X+50
3 TOOL CALL "TOUCH_P
4 TCH PROBE 1410 PRO
  Q1100=-10 ;1ST
  Q1101=+10 ;1ST
  Q1102=-5 ;1ST
  Q1103=+10 ;2ND
  Q1104=+10 ;2ND
  Q1105=-5 ;2ND
  Q372=+2 ;PROBI
  Q320=+0 ;SET-U
  Q260=+100 ;CLEAR
  Q1125=+2 ;CLEA
  Q309=+0 ;ERROR
  Q1126=+0 ;ALIG
  Q1120=+0 ;TRAN
  Q1121=0 CONF
5 STOP
6 END PGM 1410 MM


```

Q1121=0 →

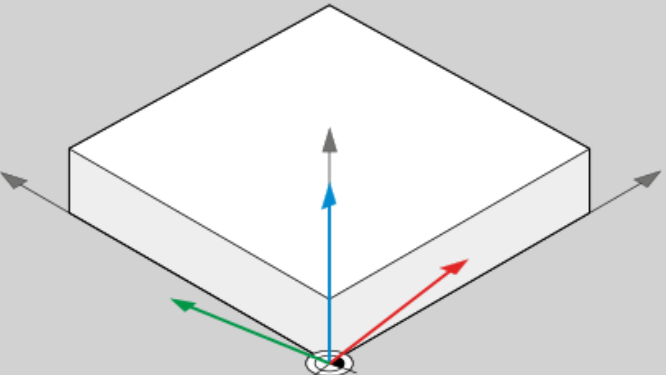
SPC	SPB	SPA
+0	+0	+0

Q1121=1 →

SPC	SPB	SPA
+10	+0	+0

 Q1121=2 →

A/B/C_OFFS
+10



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3 Programming



Programming

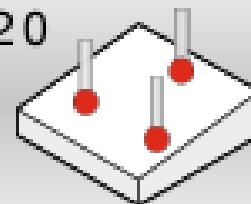
- Programming Target Coordinates
- Probing direction:
X+/X- Y+/Y- Z+/Z-
- Active reference point is described
- Touch probe results are stored as of Q950

TOUCH
PROBE

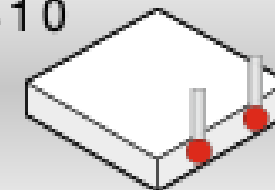
ROTATION



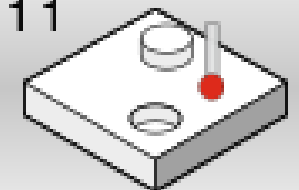
1420



1410



1411





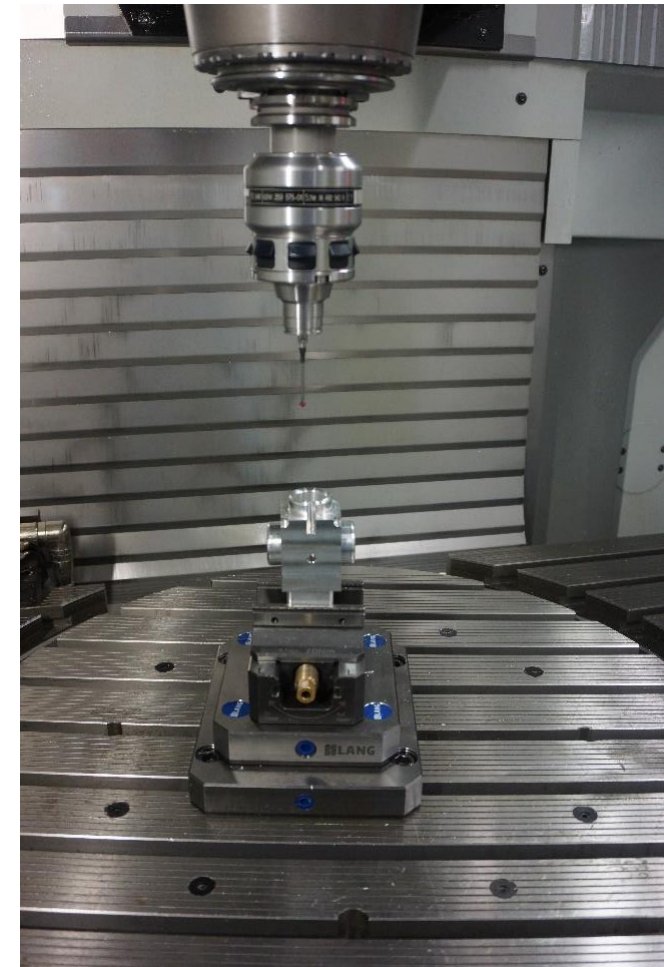
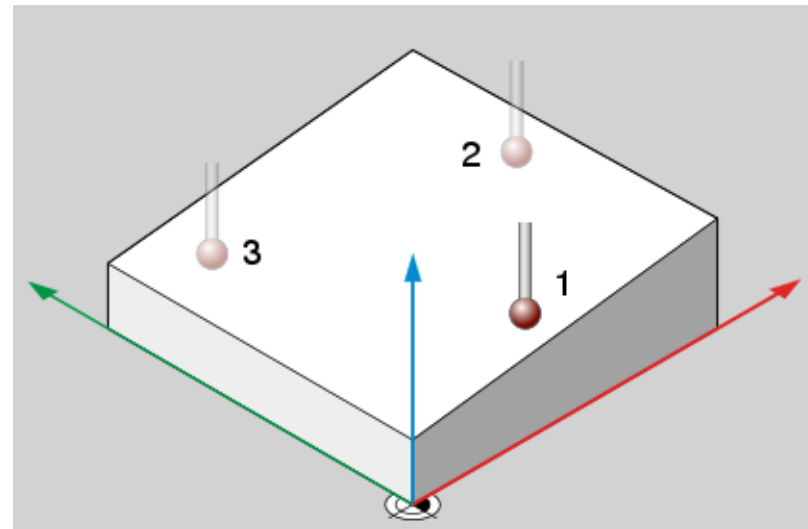
4 Examples of use



Application example 1

Surface Alignment

- Coordinates of the component are **known**
- Input of the nominal coordinates (important Z+0)
- Specifying the points define the coordinate system

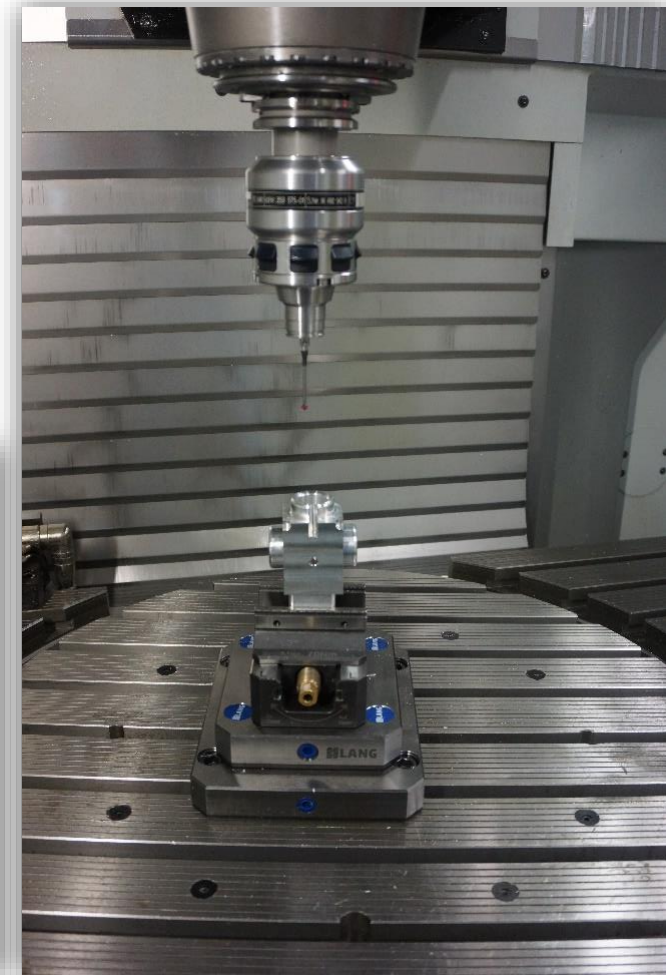
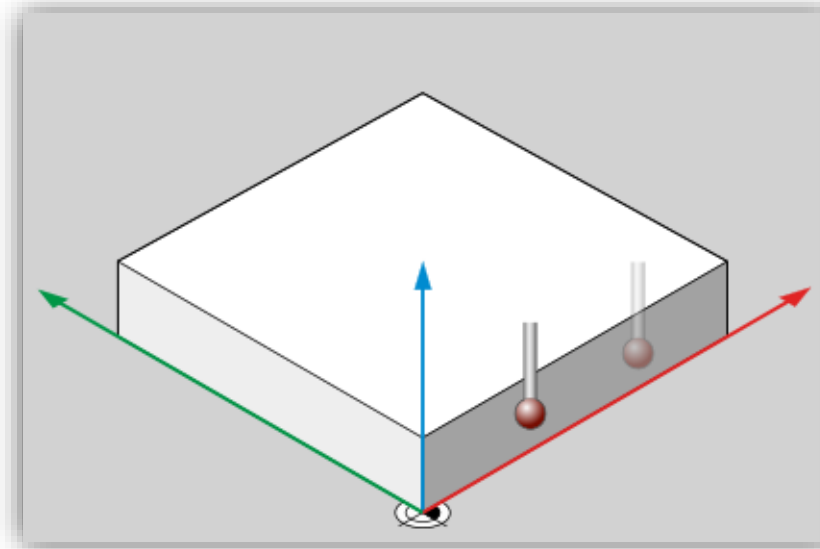




Application example 1

Align edge

- Coordinates of the component are **known**
- Input of the nominal coordinates (important Y+0)

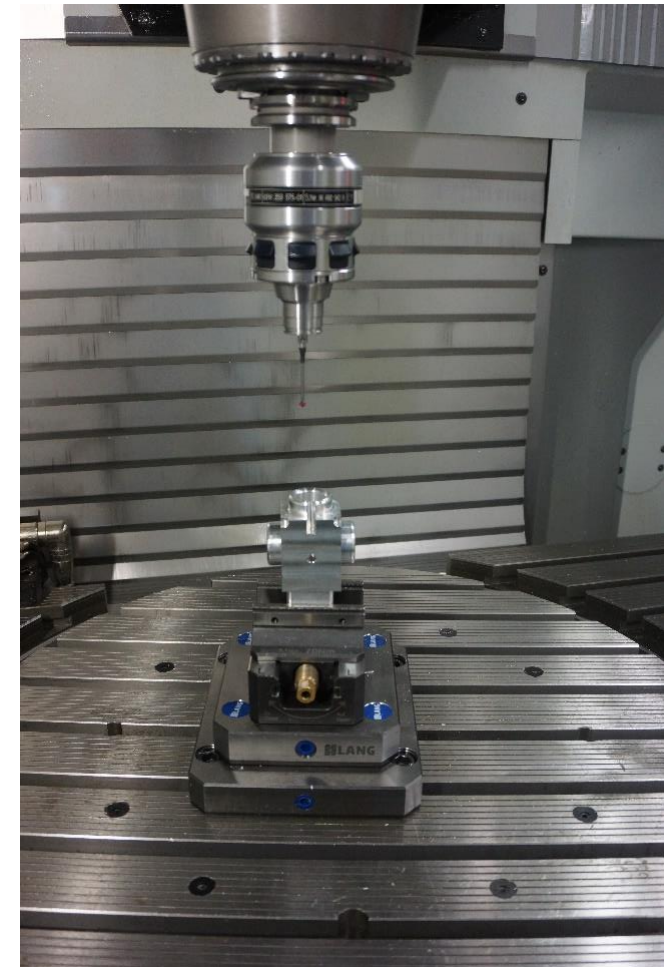
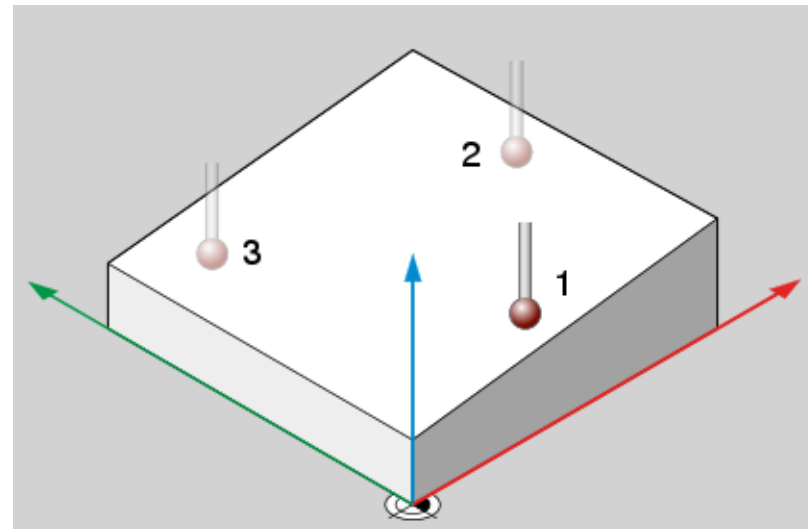




Application example 2

Surface Alignment

- Coordinates of the component are **unknown**
- Input of the nominal coordinates (important Z+0)
- Specifying the points define the coordinate system

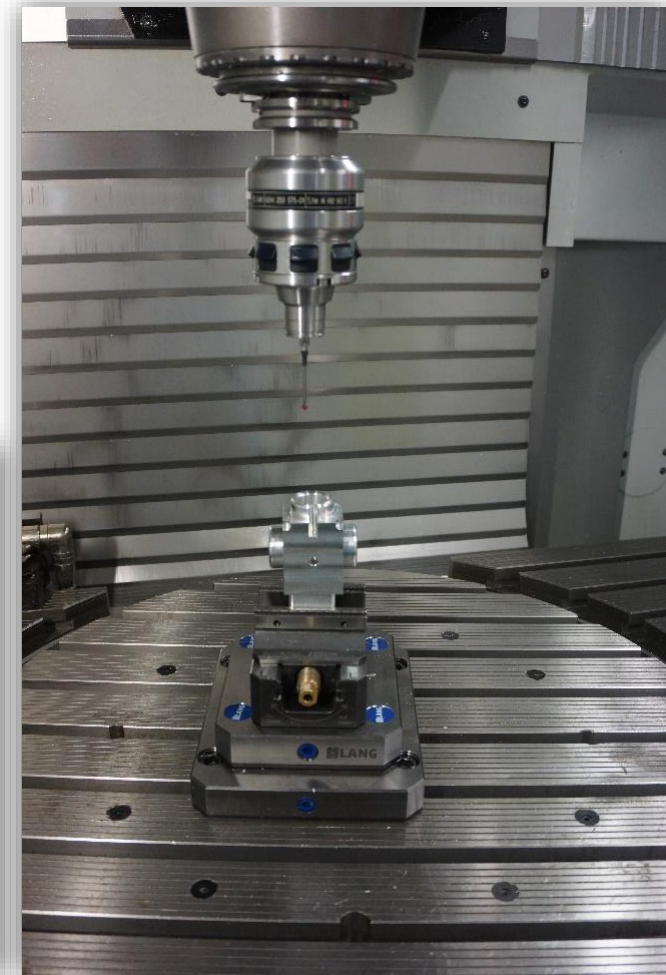
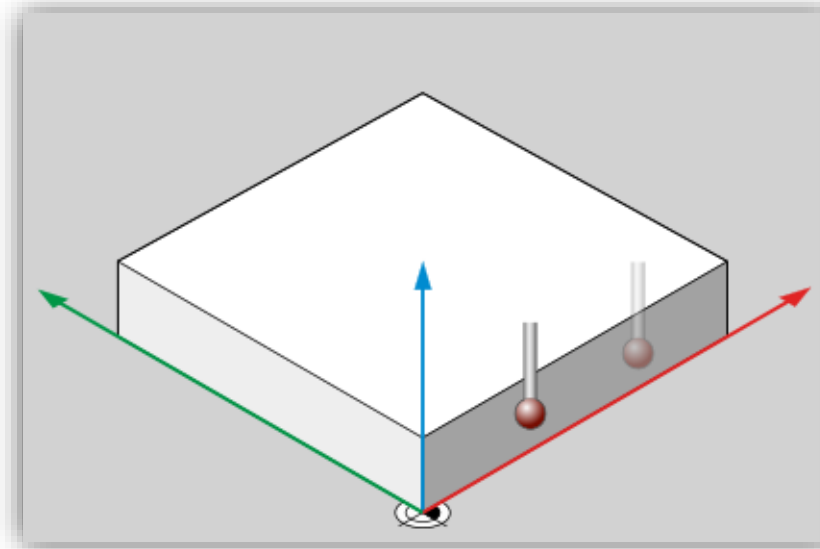




Application example 2

Align edge

- Coordinates of the component are **unknown**
- Input of the nominal coordinates (important Y+0)





Application example 3

Surface Alignment with three balls

- Nominal position of the balls known

- Measure actual position

- Calculate with cycle 1420:

Nominal position@actual position

- cycle calculates the rotations



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