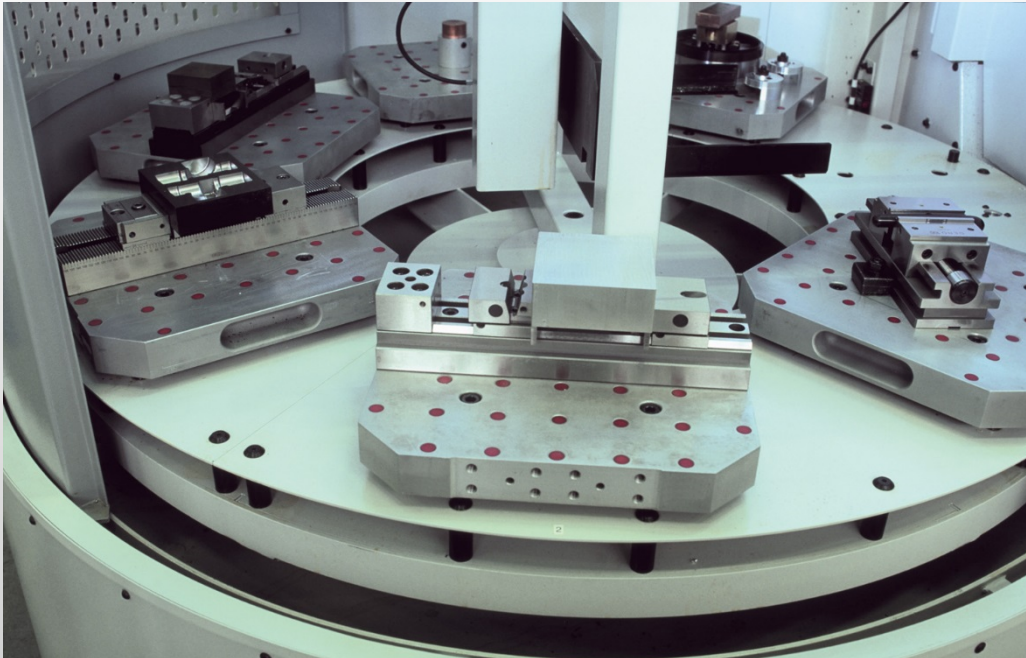


Working with Pallets on the TNC 640



HEIDENHAIN

Instructor: Michael Wiendl



Company: Dr. Johannes
HEIDENHAIN GmbH
Position: Trainer for
NC Programming



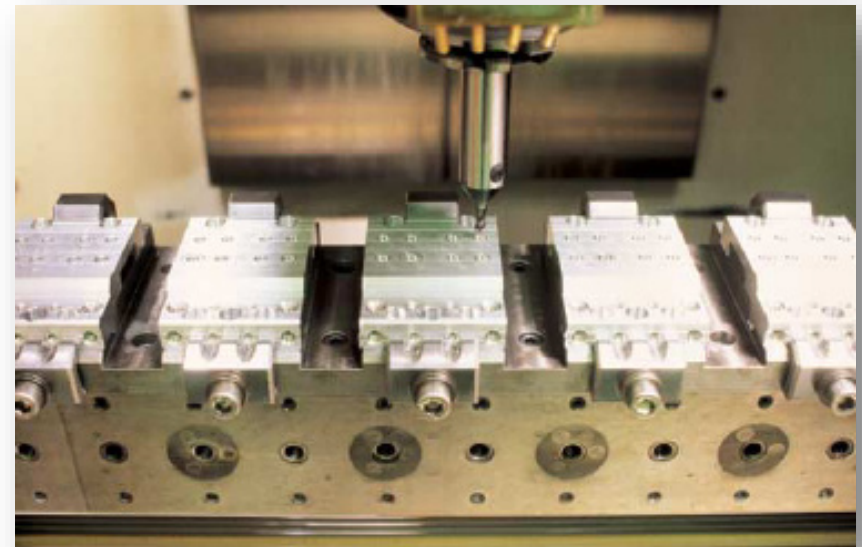
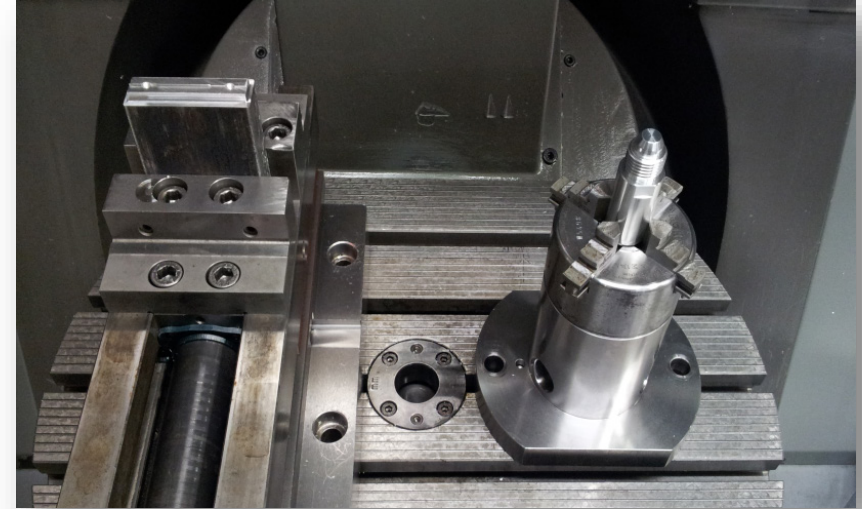
Applications

Individual programs can be linked

- Several programs are executed in succession
- Unattended operation possible

Tool-oriented machining

- The program for the single part can be used for series production
- No additional programming effort required
- Unnecessary tool changes are avoided





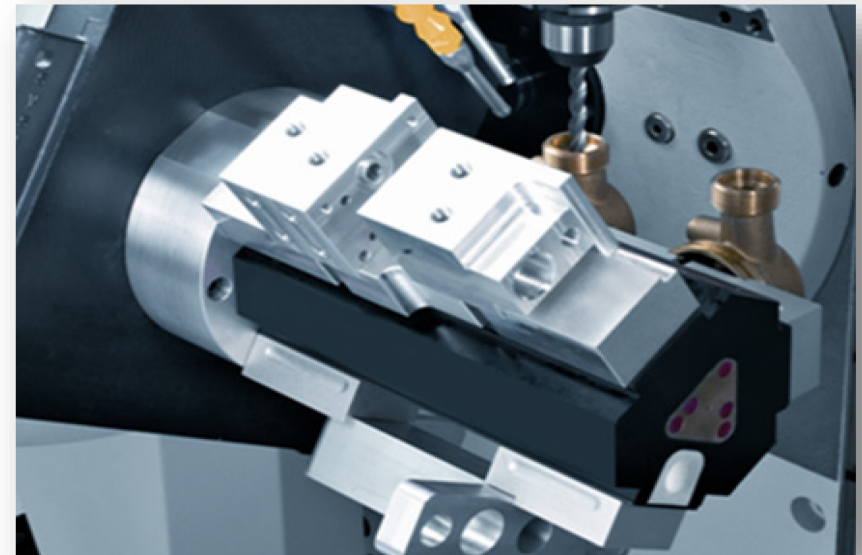
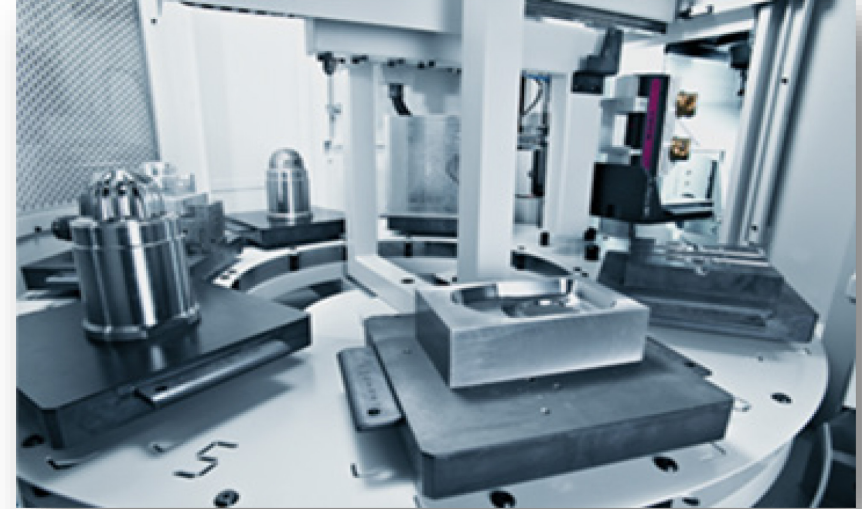
Applications

Working with pallet changer systems

- The job list is defined in the pallet file
- Editing from program run possible

Execution of multilateral fixtures

- Programming in home position
- Spatial angle of the lateral position of a fixture can be specified in the pallet file



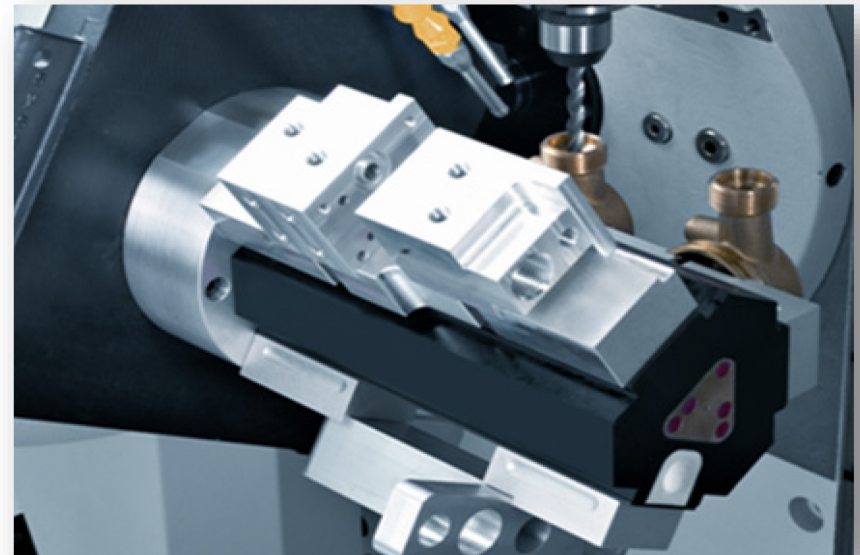
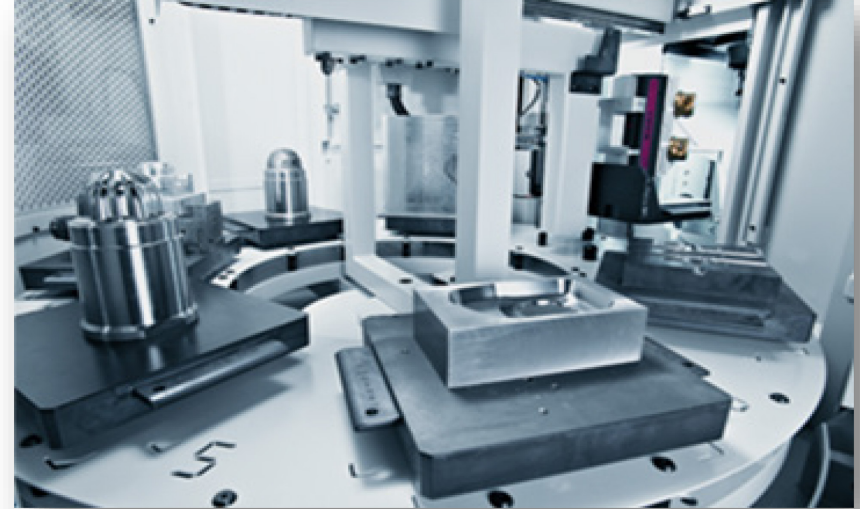


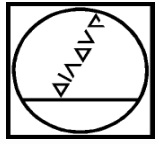
Overview of Possible Applications

- Pallet program for simple linking of individual programs. Several parts can be machined successively in the machine.
- Tool-oriented machining
- Pallet management
- Working with pallet changers
- Pallet handling with robots
- Execution of tombstone fixtures with multilateral setup

Advantages

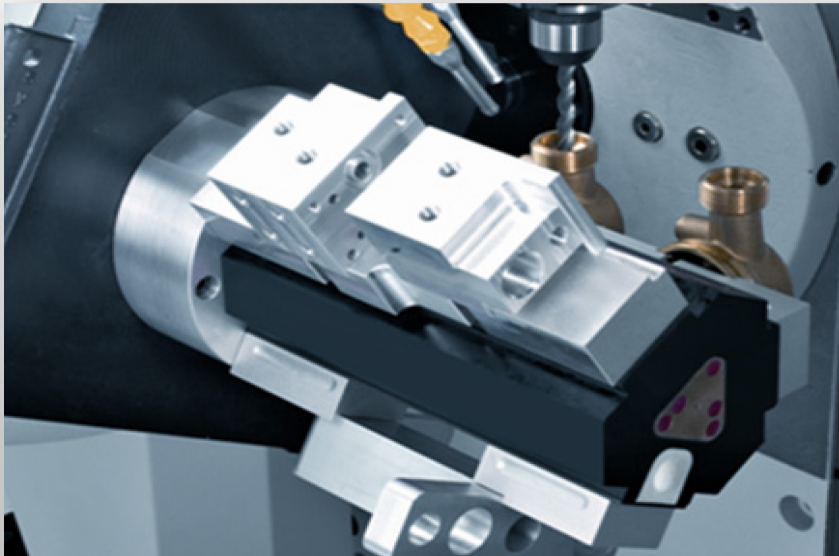
- Improved machine utilization
- Unattended operation possible
- No additional programming effort required
- No machine standstill during rechucking





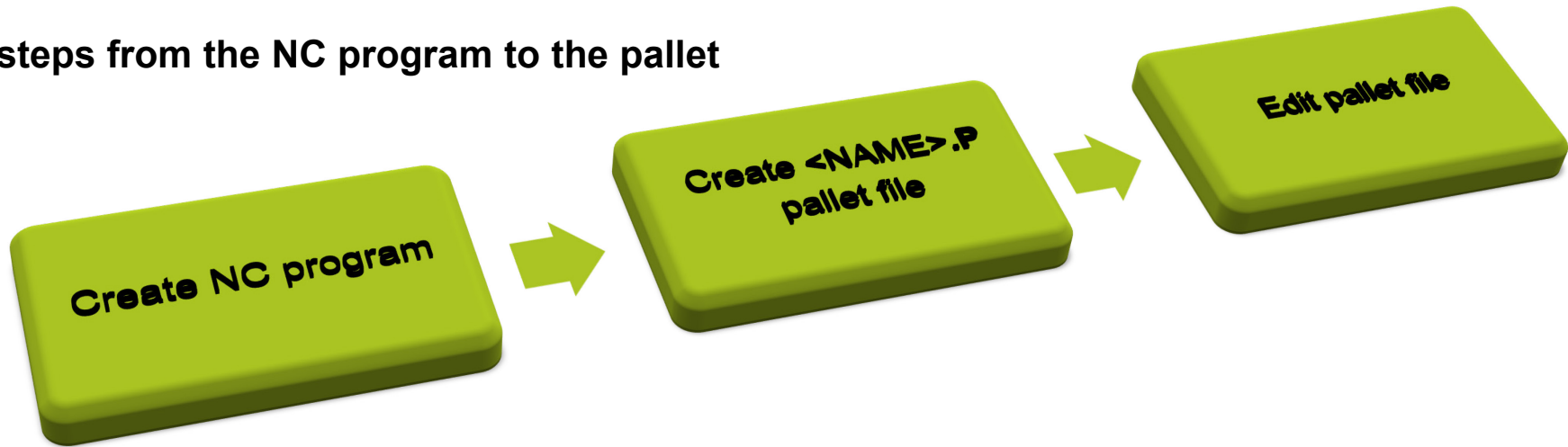
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Programing





3 steps from the NC program to the pallet



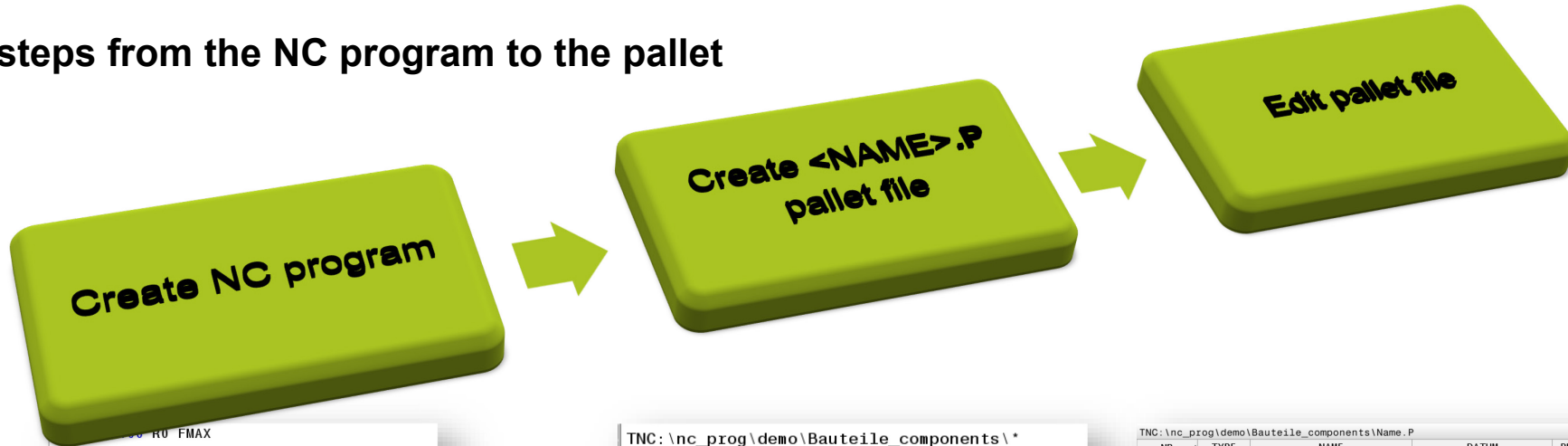
Fundamentals:

- Create NC programs as usual (with M30)
- Pallet files always have the extension .P
- Prototypes are created by the machine manufacturer

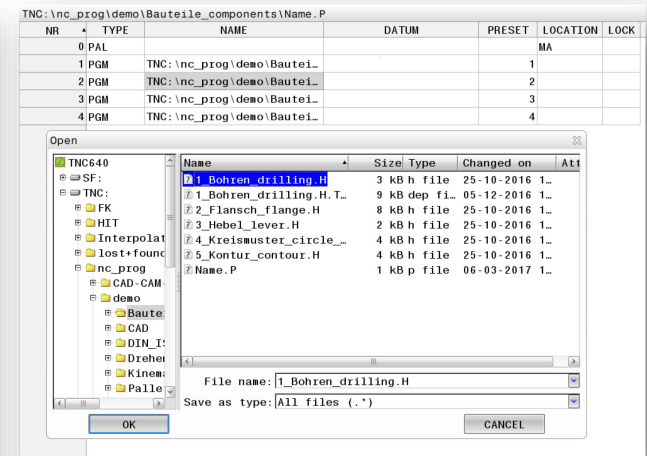
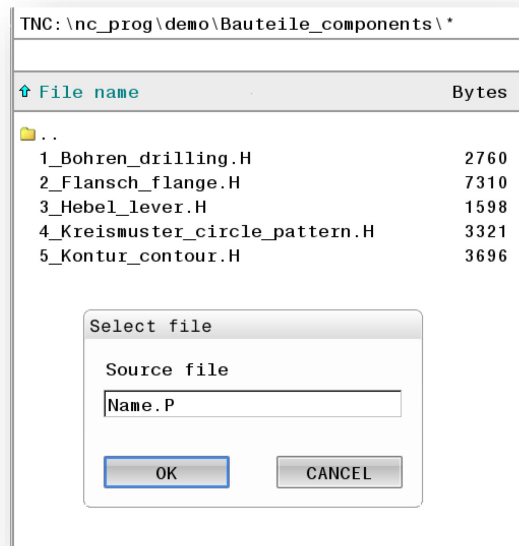
The machine must be prepared for pallet machining.



3 steps from the NC program to the pallet



```
10 L Z+100 R0 FMAX M3
4 BLK FORM 0.1 Z X+0 Y+0 Z-19.95
5 BLK FORM 0.2 X+100 Y+100 Z+0
6 FN 0: Q1 =+2
7 L Z+100 R0 FMAX
8 TOOL CALL "NC_SPOT_DRILL_D8" Z S3200
9 ; D8,0
10 L Z+100 R0 FMAX M3
11 CYCL DEF 200 DRILLING
    Q200=+2 ;SET-UP CLEARANCE
    Q201=-3.4 ;DEPTH
    Q206=+250 ;FEED RATE FOR PLNGNG
    Q202=+3 ;PLUNGING DEPTH
    Q210=+0 ;DWELL TIME AT TOP
    Q203=+0 ;SURFACE COORDINATE
    Q204=+20 ;2ND SET-UP CLEARANCE
    Q211=+0 ;DWELL TIME AT DEPTH
12 CALL LBL 10
13 L Z+100 R0 FMAX
14 TOOL CALL "DRILL_D5" Z S3800
15 ; D5,0
16 L Z+100 R0 FMAX M3
17 CYCL DEF 200 DRILLING
    Q200=+2 ;SET-UP CLEARANCE
    Q201=-16 ;DEPTH
    Q206=+350 ;FEED RATE FOR PLNGNG
    Q202=+13 ;PLUNGING DEPTH
    Q210=+0 ;DWELL TIME AT TOP
    Q203=+0 ;SURFACE COORDINATE
    Q204=+20 ;2ND SET-UP CLEARANCE
    Q211=+0 ;DWELL TIME AT DEPTH
    Q395=+0 ;DEPTH REFERENCE
18 CALL LBL 10
```



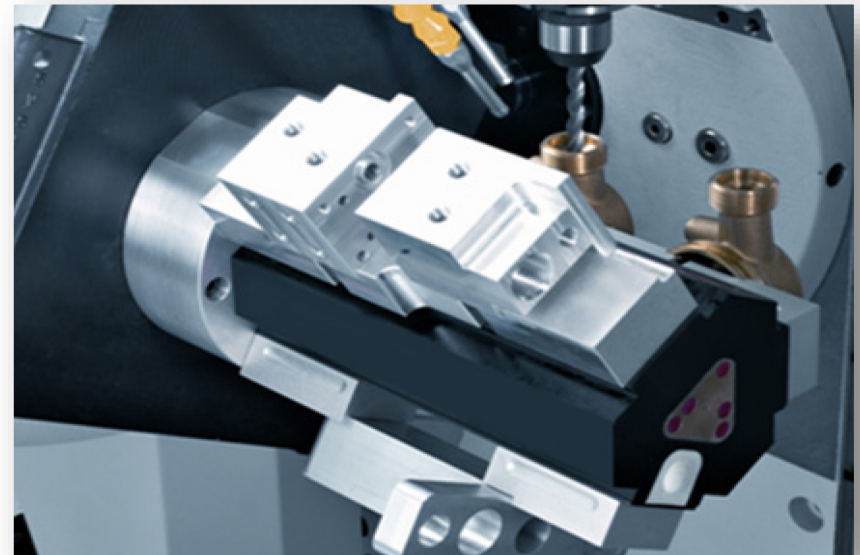
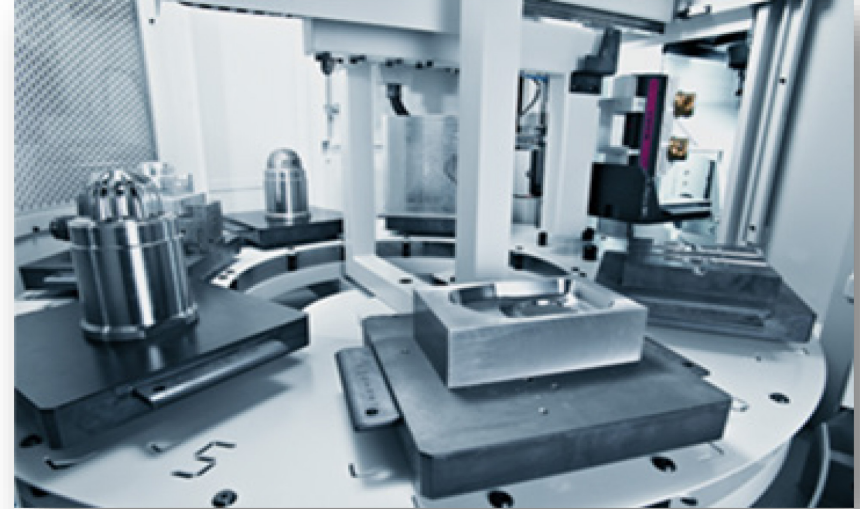
- Create lines
- Select NC program
- Assign PRESET



Configuring a pallet table:

The OEM can expand the pallet table with his own table columns:

- If needed, define additional columns through System/TableSettings in the configuration editor
- Define the prototype in the directory PLC:\proto\table with the file name extension .P
- Configure the prototype under CfgTablePrototype.





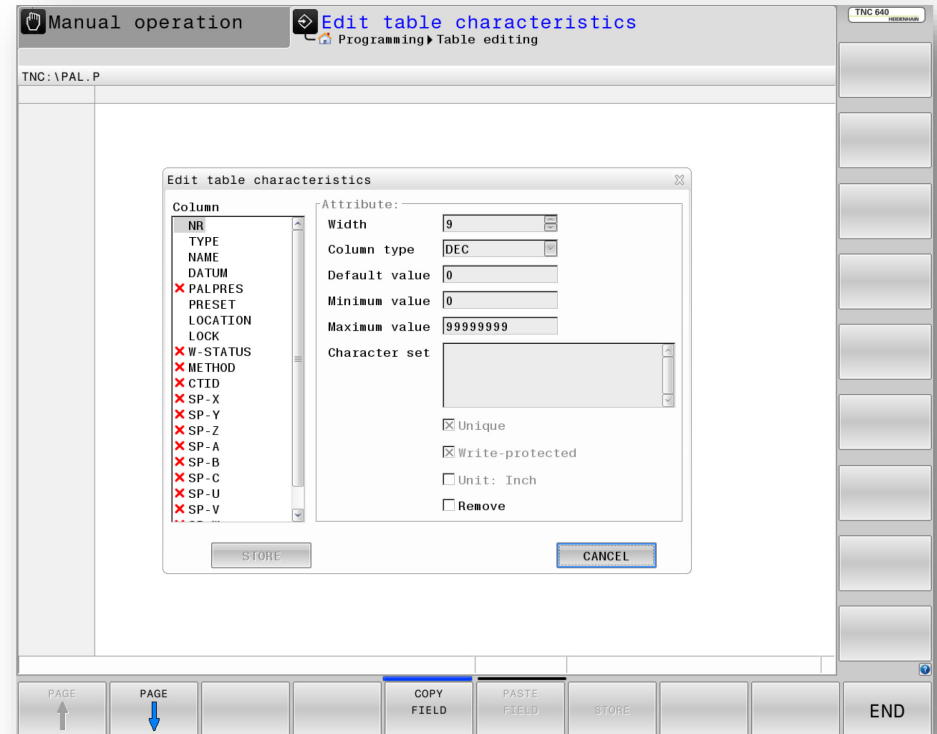
Requirements for Pallet Machining

MW M-TS/ Jan 2018

Add a column

- Create pallet-file
- MOD (key number 555343)
- MORE FUNCTIONS
- EDIT FORMAT

You can activate and deactivate remove for every column.





Programming Pallettable

MW M-TS/ Jan 2018

TNC:\nc_prog\demo\Bauteile_components\Name.P

NR	TYPE	NAME	DATUM	PRESET	LOCATION	LOCK
----	------	------	-------	--------	----------	------



TYPE
Selection:
PAL = Pallet
FIX = Fixture
PGM = Program

NAME
Pallet-Number
Fixture-Number
NC-Program

DATUM
Datum table

PRESET
Datum

LOCK
Locked?
YES = ENT
No=NOENT

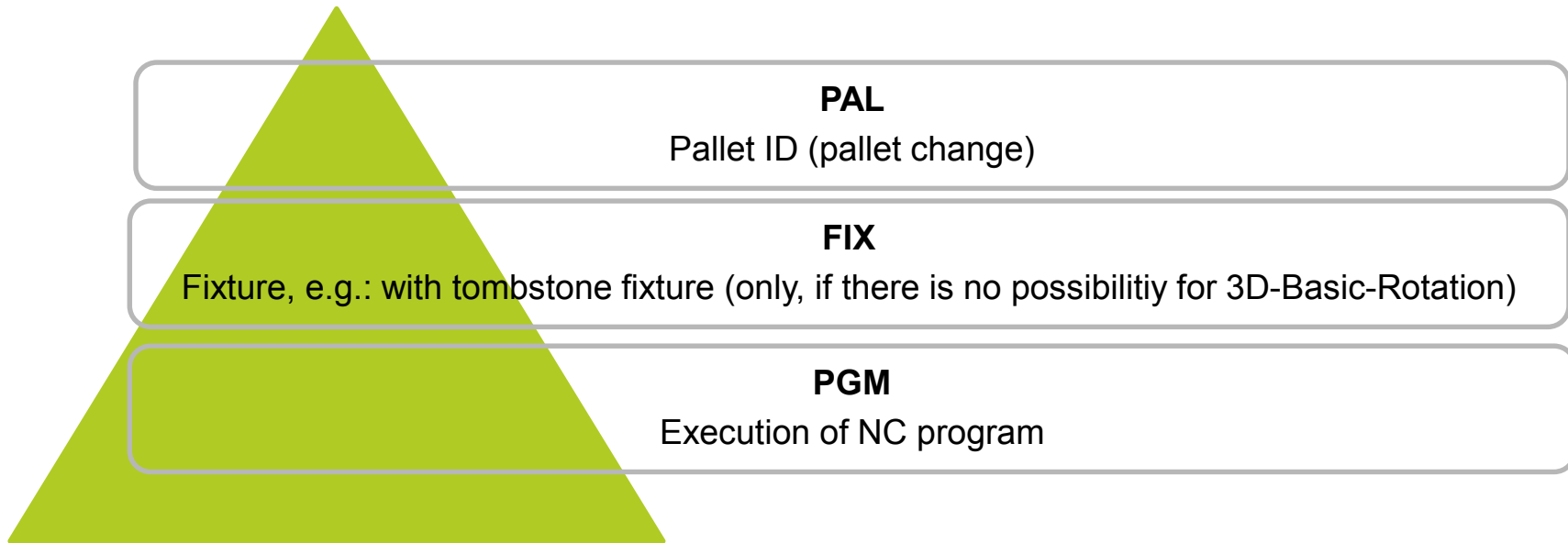
LOCATION

Location of run?
Machine = ENT
No = NOENT

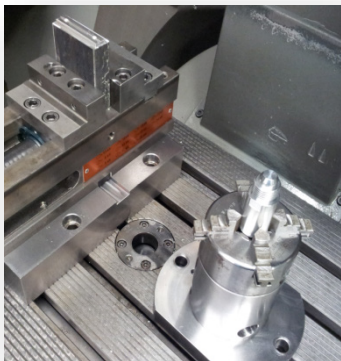


Programing Pallettable

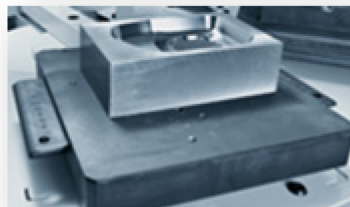
MW M-TS/ Jan 2018



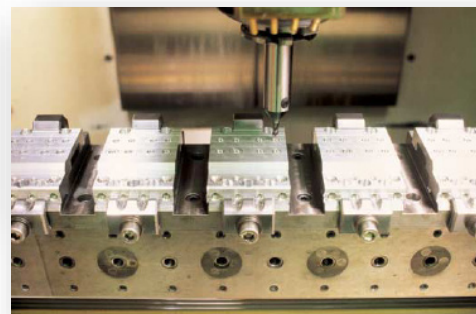
PGM + PGM



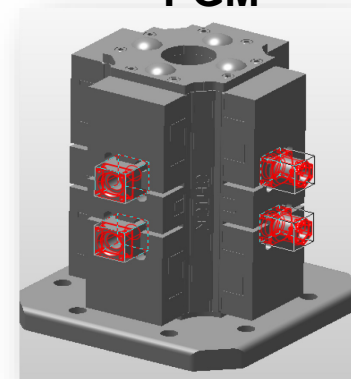
PAL + PGM



3D-Basic Rotation + PGM



3D-Basic Rotation + PGM





Preset table instead of FIX

Manueller Betrieb Programmieren 08:39

Manueller Betrieb

Pos.-Anzeige MODUS: SOLL

X	+100.000
Y	-300.000
Z	+560.000
B	+0.000
C	+0.000

T 264 Z
S 800.0 F 3000mm/min
Ovr 100% M 5/9

100% S-OVR
100% F-OVR S1 LIMIT 1

M S F ANTAST-FUNKTION BEZUGSPKT. VERWALTUNG 3D ROT WERKZEUG TABELLE

Manueller Betrieb Programmieren 08:39

Manueller Betrieb

NO	DOC	X	Y	Z	SPC	SPB	SPA	LOCKED
9	KKH250	+100	+50	+250	+0	+0	+0	
10	WP1	+0	-257.145...	+257.635...	+0	+0	+29	
11	WP2	+0	+257.145...	+257.635...	+180	+0	+29	

M



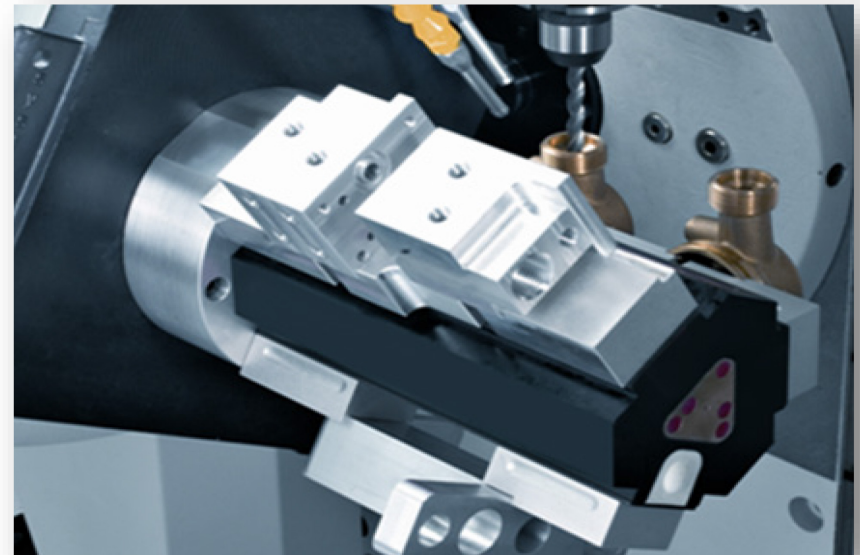
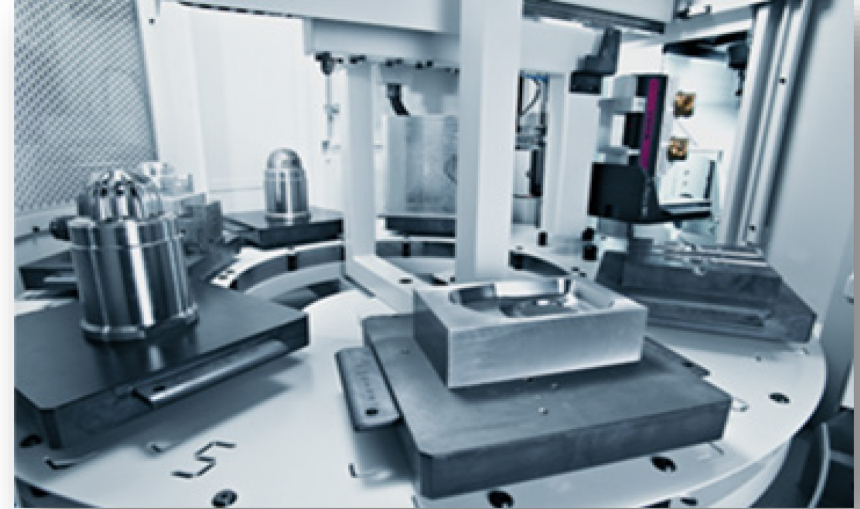
Requirements for Pallet Machining

MW M-TS/ Jan 2018

Config:

Under **Paths/CfgSystemCycle**, define the entry points for NC macros in the context of pallet machining:

- Pallet macro: PAL.H
This macro is required for using the pallet management (e.g. multiple setup without pallet). It suffices if the macro has a BEGIN PGM and END PGM (if no further functions are needed)
→ For a pallet entry of the PAL type: Call the **OEM_PALPG_PAL_CHNG** macro if the path is configured
- FIX macro: CLAMP.H
This is called for setup entries (FIX)
→ For a fixture entry of the FIX type: Call the **OEM_PALPG_FIX_CHNG** macro if the path is configured





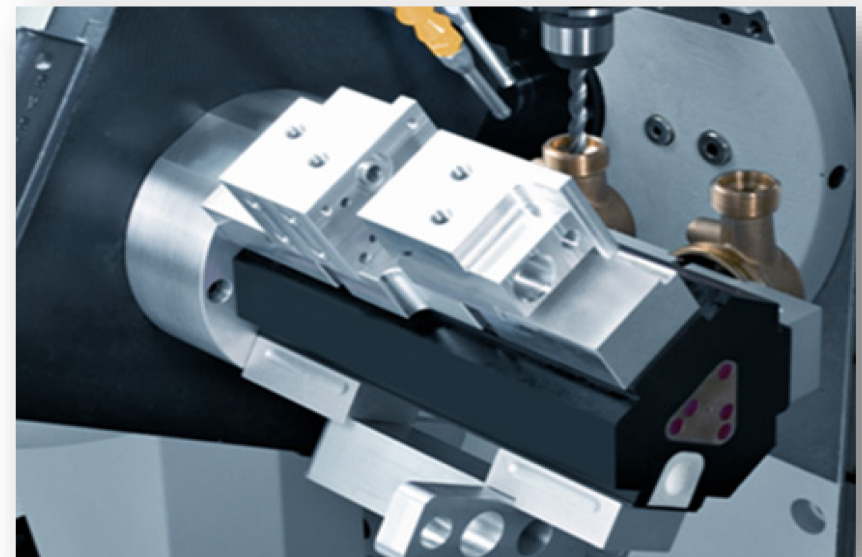
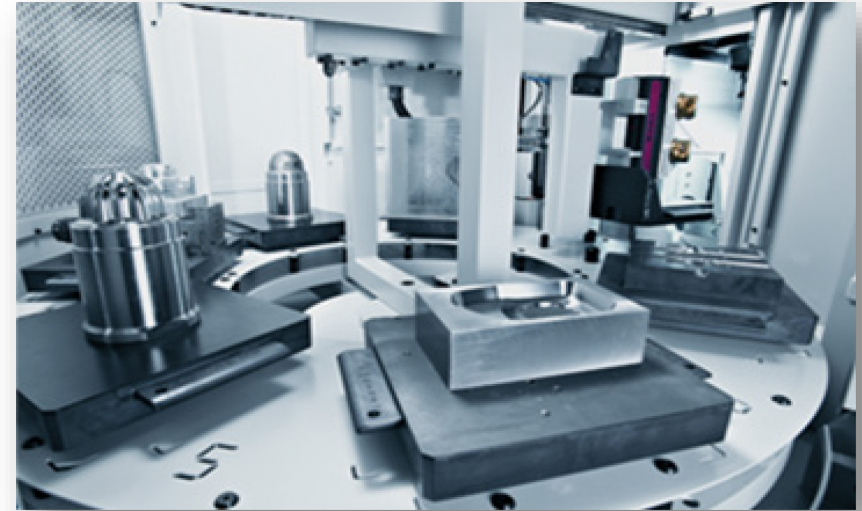
Requirements for Pallet Machining

MW M-TS/ Jan 2018

Config:

Under **Paths/CfgSystemCycle**, define the entry points for NC macros in the context of pallet machining:

- For a program entry of the PGM type: Call the **OEM_PALPG_PROLOG** macro if the path is configured
- After running the NC program (for PGM) type: Call the **OEM_PALPG_EPILOG** macro if the path is configured
- Tool macro: TOOLCALL.H
Required for tool-oriented machining
- Tool macro: OEM_PAL_TOOLMODE.H
This is called for tool-oriented machining.
→ For tool-oriented machining: Call the **OEM_PAL_TOOLMODE** macro if the path is configured **(340590-08)**





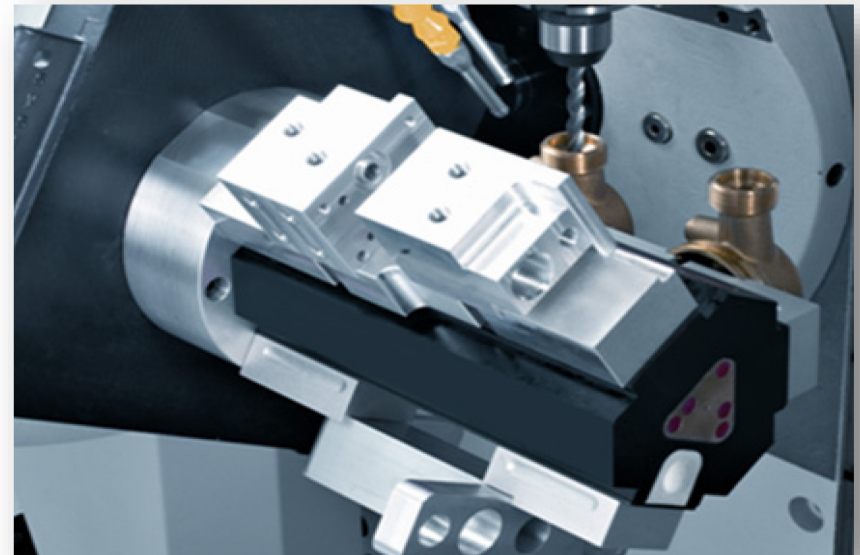
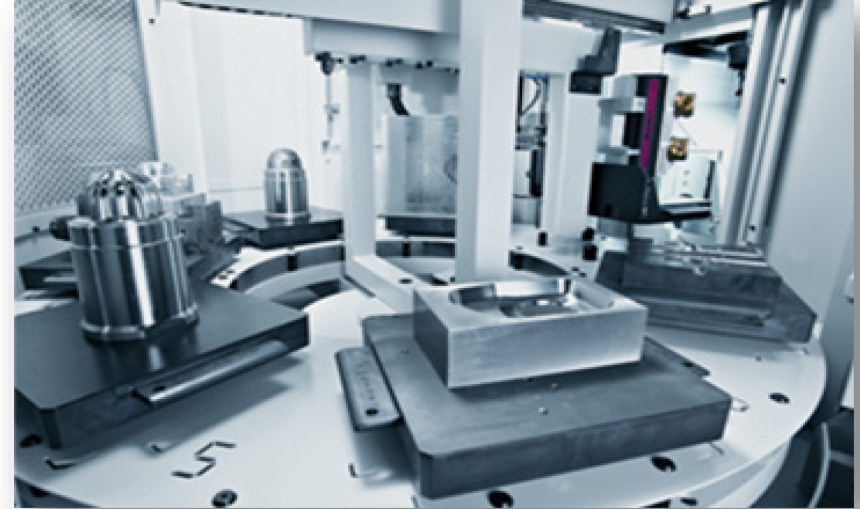
Requirements for Pallet Machining

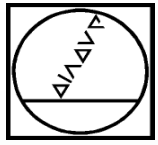
MW M-TS/ Jan 2018

OEM_PAL_TOOLMODE.H

```
BEGIN PGM OEM_PAL_TOOLMODE MM  
M146  
TOOL CALL  
END PGM OEM_PAL_TOOLMODE MM
```

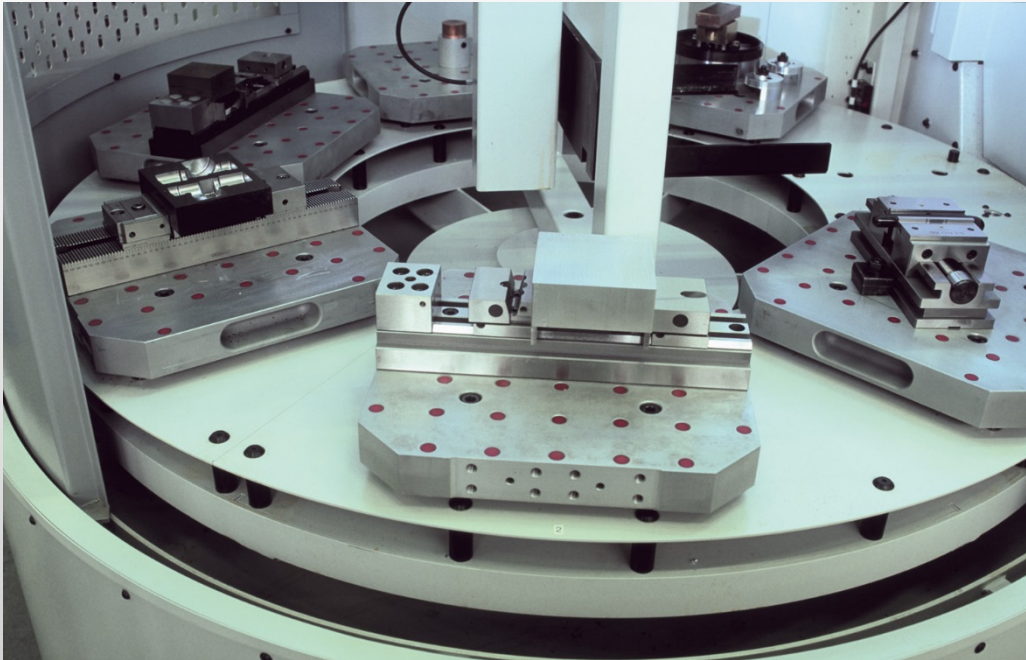
With the M function M146 the current geometry information is saved in a temporary file. This is required for further execution of NC programs with the tool-oriented strategy. In addition, a code is entered in the CTID column and W-STATE changes to INCOMPLETE.





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Example 1





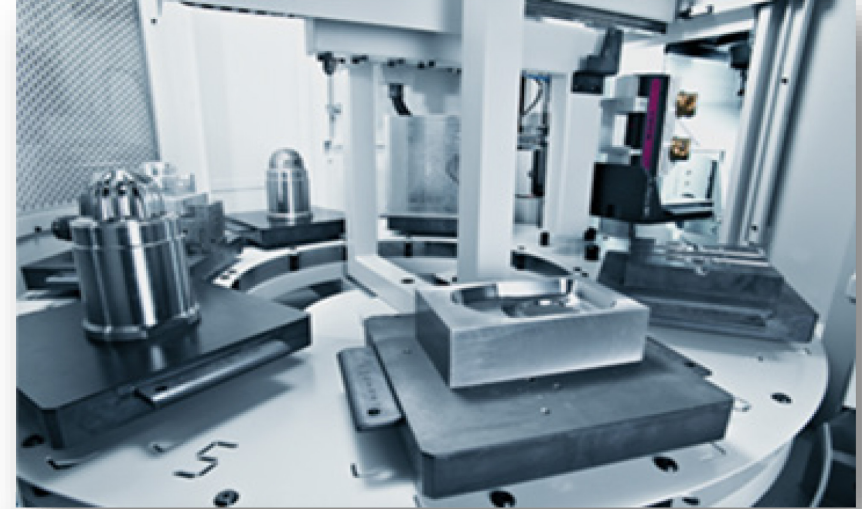
Example 1

MW M-TS/ Jan 2018

Simple Pallet changer

- Entry PAL for number of the pallet
- Entry PGM for NC-program for this pallet.

→ Without the LOCATION MA this pallet is a manual pallet, not in the pallet changer.



Manual operation Table editing
Programming ▶ Table editing

TNC:\nc_prog\demo\Bauteile_components\Name.P

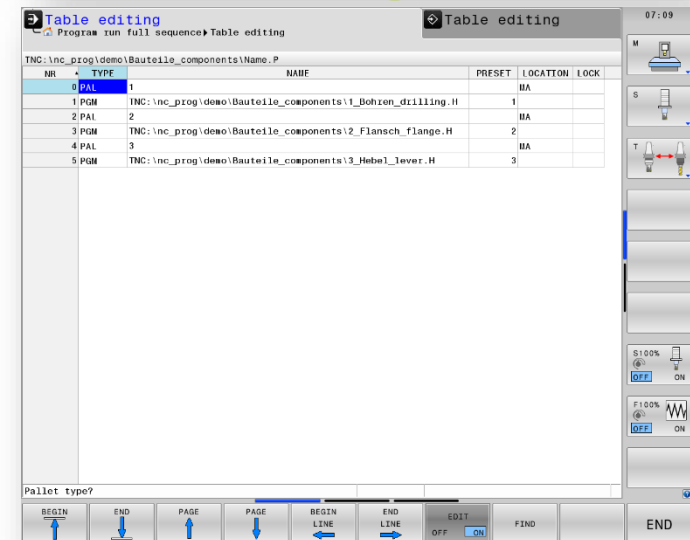
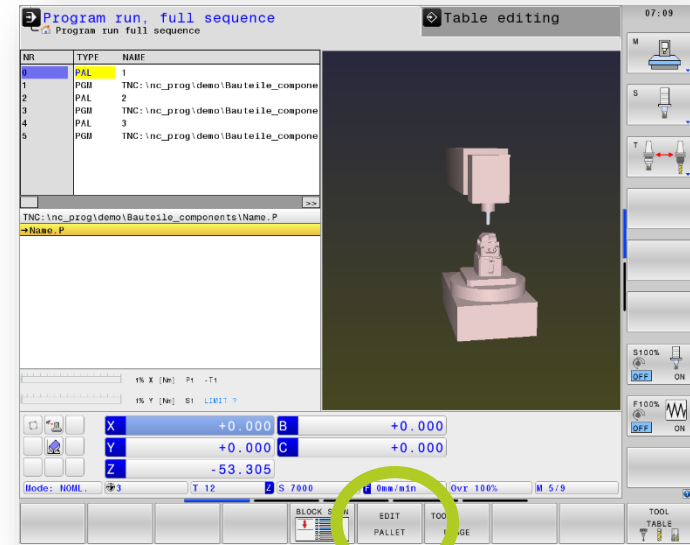
NR	TYPE	NAME	PRESET	LOCATION	LOCK
0	PAL	1		MA	
1	PGM	TNC:\nc_prog\demo\Bauteile_components\1_Bohren_drilling.H	1		
2	PAL	2		MA	
3	PGM	TNC:\nc_prog\demo\Bauteile_components\2_Flansch_flange.H	2		
4	PAL	3		MA	
5	PGM	TNC:\nc_prog\demo\Bauteile_components\3_Hebel_lever.H	3		

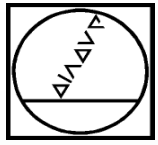


Example 1

Machining:

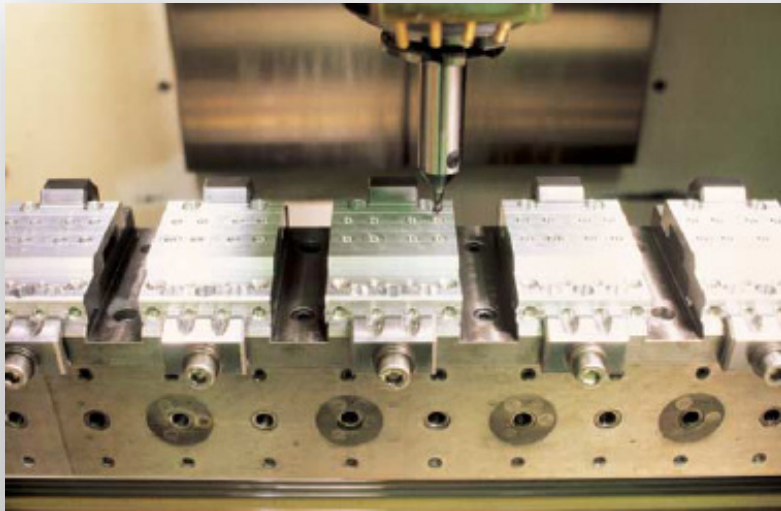
- In Program Run full sequence or single block you can start the .P-file
- You can't simulate the .P in Program Test. Simulate the NC-programs
- If the .P-File is active in Program run you can only edit the .P-File with the softkey





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Example 2





Example 2

Tool-Oriented Machining (Software 340590-07)

- NC-program with different tools
- NC-program should be produced on multiple fixture
- With tool-oriented machining you can save time with the combination of the tools

1	-400	-50	140
2	-200	-50	140
3	0	-50	140
4	200	-50	140

```
TNC:\nc_prog\demo\bauteile_componente\1_Bohren_drilling.H
1 BEGIN PGM 1_BOHREN_DRILLING_MM
2 CALL PGM ..\reset.H
3 L Z+100 R0 FMAX
4 BLK FORM 0.1 Z X+0 Y+0 Z-19.95
5 FN 0: Q1 =+2
6 L Z+100 R0 FMAX
7 TOOL CALL "NC_SPOUT_DRILL_D0" Z S3200
8 : DR 0
9 L Z+100 R0 FMAX M3
10 CYCL DEF 200 DRILLING Q200+2 ;SET-UP CLEARANCE Q201+-3.4 ;DEPTH Q206++250 ;FEED RATE FOR P
11 CALL LBL 10
12 L Z+100 R0 FMAX
13 TOOL CALL "DRILL_D5" Z S3800
14 : DS 0
15 L Z+100 R0 FMAX M3
16 CYCL DEF 200 DRILLING Q200+2 ;SET-UP CLEARANCE Q201+-16 ;DEPTH Q206++350 ;FEED RATE FOR P
17 CALL LBL 10
18 L Z+100 R0 FMAX
19 TOOL CALL "TAP_M6" Z S260
20 : M6
21 L Z+100 R0 FMAX M3
22 CYCL DEF 200 TAPPING Q200+3 ;SET UP CLEARANCE Q201- 11 ;DEPTH OF THREAD Q205+260 ;FEED R
23 CALL LBL 10
24 L Z+100 R0 FMAX
25 FN 9: IF +0 EQU +0 GOTD LBL 99
26 LBL 1
27 CYCL DEF 220 POLAR PATTERN Q216+0 ;CENTER IN 1ST AXIS Q217+0 ;CENTER IN 2ND AXIS Q244+2
28 CYCL DEF 220 POLAR PATTERN Q216+0 ;CENTER IN 1ST AXIS Q217+0 ;CENTER IN 2ND AXIS Q244+3
29 LBL 0
30 LBL 10
31 CYCL DEF 7 0 DATUM SHEFT
32 CYCL DEF 7 1 X+25
```

NR	TYPE	NAME	PRESET	LOCATON	LOCK
1	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining1.h	1		
2	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining1.h	2		
3	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining1.h	3		
4	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining1.h	4		
5	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining2.h	1		
6	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining2.h	2		
7	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining2.h	3		
8	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining2.h	4		
9	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining3.h	1		
10	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining3.h	2		
11	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining3.h	3		
12	PGM	TNC:\nc_prog\demo\bauteile_componente\Machining3.h	4		



Example 2

Program run single... Programming

TNC:\nc_prog\demo\Bauteile_components\1_Bohren_drilling.H

→ 1 Bohren_drilling.H

```

0 BEGIN PGM 1_BOHREN_DRILLING MM
1 CALL PGM ..\reset.H
2 L Z+100 R0 FMAX
3 BLK FORM 0.1 Z X+0 Y+0 Z-19.95
4 BLK FORM 0.2 X+100 Y+100 Z+0
5 FN 0: Q1 =+2
6 L Z+100 R0 FMAX
7 TOOL CALL "NC_SPOT_DRILL_D8" Z S3200
8 ; D8,0
9 L Z+100 R0 FMAX M3
10 CYCL DEF 200 DRILLING Q200=+2 ;SET-UP CLEARANCE Q201=-3.4 ;DEPTH Q206=+250 ;FEED RATE FOR P »
11 CALL LBL 10
12 L Z+100 R0 FMAX
13 TOOL CALL "DRILL_D5" Z S3800
14 ; D5,0
15 L Z+100 R0 FMAX M3
16 CYCL DEF 200 DRILLING Q200=+2 ;SET-UP CLEARANCE Q201=-16 ;DEPTH Q206=+350 ;FEED RATE FOR P »
17 CALL LBL 10
18 L Z+100 R0 FMAX
19 TOOL CALL "TAP_M6" Z S260
20 ; M6
21 L Z+100 R0 FMAX M3
22 CYCL DEF 206 TAPPING Q200=+3 ;SET-UP CLEARANCE Q201=-11 ;DEPTH OF THREAD Q206=+260 ;FEED R »
23 CALL LBL 10
24 L Z+100 R0 FMAX
25 FN 9: IF +0 EQU +0 GOTO LBL 99
26 LBL 1
27 CYCL DEF 220 POLAR PATTERN Q216=+0 ;CENTER IN 1ST AXIS Q217=+0 ;CENTER IN 2ND AXIS Q244=+2 »
28 CYCL DEF 220 POLAR PATTERN Q216=+0 ;CENTER IN 1ST AXIS Q217=+0 ;CENTER IN 2ND AXIS Q244=+3 »
29 LBL 0
30 LBL 10
31 CYCL DEF 7.0 DATUM SHIFT
32 CYCL DEF 7.1 X+25

```

07:19

07:27

07:27

:CENTER IN 2ND AXIS Q244=+2 -
:CENTER IN 2ND AXIS Q244=+3 -

SELECT CUT INSERT COPY FIND INSERT LAST REMOVE INSERT LAST NC BLOCK

Program run single... TNC:\nc_prog\demo\Bauteile_component

→ 1 Bohren_drilling.H

```

0 BEGIN PGM 1_BOHREN_DRILLING MM
1 CALL PGM ..\reset.H
2 L Z+100 R0 FMAX
3 BLK FORM 0.1 Z X+0 Y+0 Z-19.95
4 BLK FORM 0.2 X+100 Y+100 Z+0
5 FN 0: Q1 =+2
6 L Z+100 R0 FMAX
7 TOOL CALL "NC_SPOT_DRILL_D8" Z S3200
8 ; D8,0
9 L Z+100 R0 FMAX M3
10 CYCL DEF 200 DRILLING Q200=+2 ;SET-UP CLEARANCE Q201=-3.4 ;DEPTH Q206=+250 ;FEED RATE FOR P »
11 CALL LBL 10
12 L Z+100 R0 FMAX
13 TOOL CALL "DRILL_D5" Z S3800
14 ; D5,0
15 L Z+100 R0 FMAX M3
16 CYCL DEF 200 DRILLING Q200=+2 ;SET-UP CLEARANCE Q201=-16 ;DEPTH Q206=+350 ;FEED RATE FOR P »
17 CALL LBL 10
18 L Z+100 R0 FMAX
19 TOOL CALL "TAP_M6" Z S260
20 ; M6
21 L Z+100 R0 FMAX M3
22 CYCL DEF 206 TAPPING Q200=+3 ;SET-UP CLEARANCE Q201=-11 ;DEPTH OF THREAD Q206=+260 ;FEED R »
23 CALL LBL 10
24 L Z+100 R0 FMAX
25 FN 9: IF +0 EQU +0 GOTO LBL 99
26 LBL 1
27 CYCL DEF 220 POLAR PATTERN Q216=+0 ;CENTER IN 1ST AXIS Q217=+0 ;CENTER IN 2ND AXIS Q244=+2 »
28 CYCL DEF 220 POLAR PATTERN Q216=+0 ;CENTER IN 1ST AXIS Q217=+0 ;CENTER IN 2ND AXIS Q244=+3 »
29 LBL 0
30 LBL 10
31 CYCL DEF 7.0 DATUM SHIFT
32 CYCL DEF 7.1 X+25

```

BLOCK OFF BLOCK

07:27

07:27

:CENTER IN 2ND AXIS Q244=+2 -
:CENTER IN 2ND AXIS Q244=+3 -

INSERT LAST REMOVE INSERT LAST NC BLOCK

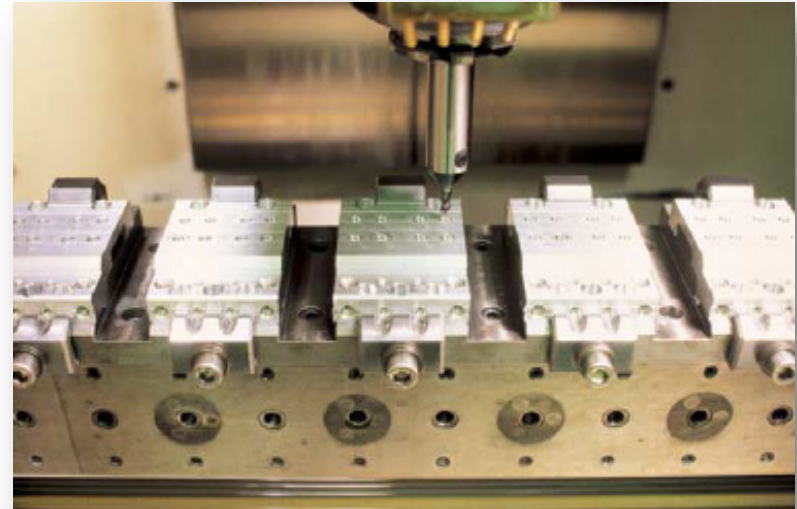


Example 2

MW M-TS/ Jan 2018

Tool-Oriented Machining (Software 340590-07)

- PAL not needed, if there is no palletchanger
- Entry PGM for NC-program for this pallet.
- Sort by
 - TOOL1
 - PRESET1/2/3/4
 - TOOL2
 - PRESET1/2/3/4



TNC:\nc_prog\demo\Bauteile_components\Name.P

NR	TYPE	NAME	PRESET	LOCATION	LOCK
1	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining1.h	1		
2	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining1.h	2		
3	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining1.h	3		
4	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining1.h	4		
5	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining2.h	1		
6	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining2.h	2		
7	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining2.h	3		
8	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining2.h	4		
9	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining3.h	1		
10	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining3.h	2		
11	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining3.h	3		
12	PGM	TNC:\nc_prog\demo\Bauteile_components\Machining3.h	4		

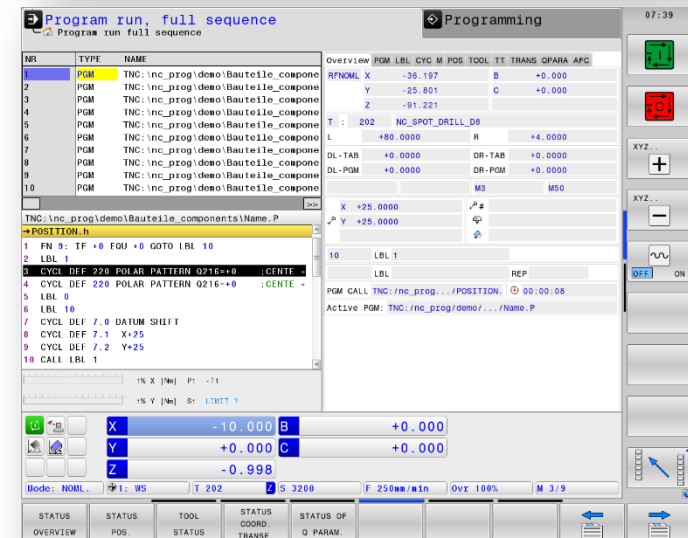
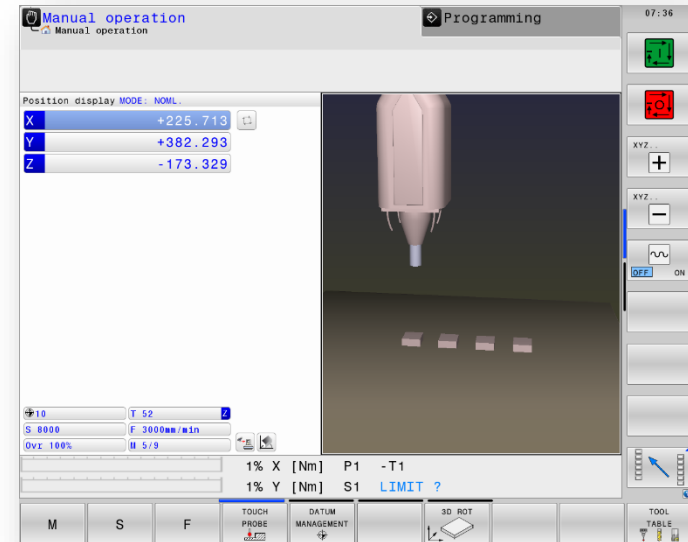


Example 2

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Machining:

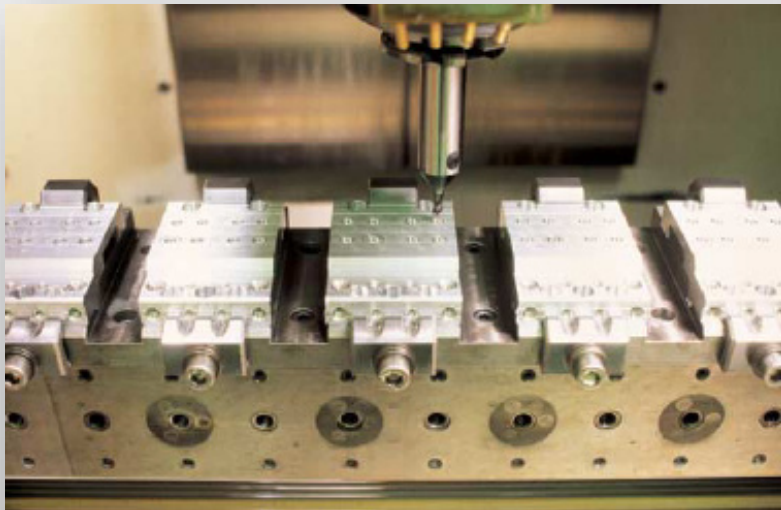
- In Program Run full sequence or single block you can start the .P-file
- You can't simulate the .P in Program Test. Simulate the NC-programs
- If the .P-File is active in Program run you can only edit the .P-File with the softkey





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Example 2 CALL PGM





Example 2

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Tool-Oriented Machining (Software 340590-07)

- NC-program with different tools
- NC-program should be produced on multiple fixture
- With tool-oriented machining you can save time with the combination of the tools
- CALL PGM for every machining

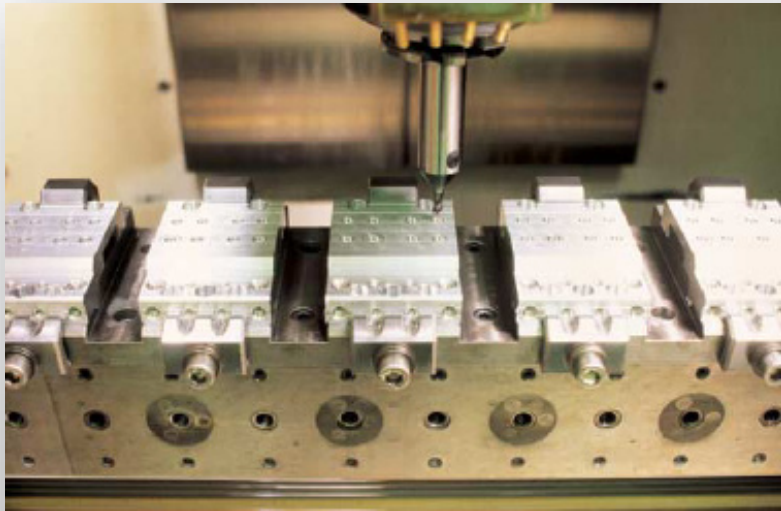
```
TNC:\nc_prog\demo\Bautteile_components\MAIN.H
--MAIN.H
0 BEGIN PGM MAIN MM
1 *- Machining 1
2 CYCL DEF 247 DATUM SETTING Q339--1 :DATUM NUMBER
3 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining1.h
4 CYCL DEF 247 DATUM SETTING Q339--2 :DATUM NUMBER
5 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining1.h
6 CYCL DEF 247 DATUM SETTING Q339--3 :DATUM NUMBER
7 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining1.h
8 CYCL DEF 247 DATUM SETTING Q339--4 :DATUM NUMBER
9 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining1.h
10 *- Machining 2
11 CYCL DEF 247 DATUM SETTING Q339--1 :DATUM NUMBER
12 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining2.h
13 CYCL DEF 247 DATUM SETTING Q339--2 :DATUM NUMBER
14 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining2.h
15 CYCL DEF 247 DATUM SETTING Q339--3 :DATUM NUMBER
16 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining2.h
17 CYCL DEF 247 DATUM SETTING Q339--4 :DATUM NUMBER
18 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining2.h
19 *- Machining 3
20 CYCL DEF 247 DATUM SETTING Q339--1 :DATUM NUMBER
21 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining3.h
22 CYCL DEF 247 DATUM SETTING Q339--2 :DATUM NUMBER
23 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining3.h
24 CYCL DEF 247 DATUM SETTING Q339--3 :DATUM NUMBER
25 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining3.h
26 CYCL DEF 247 DATUM SETTING Q339--4 :DATUM NUMBER
27 CALL PGM INC:\nc_prog\demo\Bautteile_components\Machining3.h
28 END PGM MAIN MM
```

1	-400	-50	140
2	-200	-50	140
3	0	-50	140
4	200	-50	140



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Example 3





Example 3

Tool-Oriented Machining (Software 340590-08)

- NC-program with different tools
- NC-program should be produced on multiple fixture
- With tool-oriented machining you can save time with the combination of the tools

1		-400	-50	140
2		-200	-50	140
3		0	-50	140
4		200	-50	140

```
TNC:\nc_prog\demo\Bauteile_componente\1_Bohren_drilling.H
-1 Bohren_drilling.H
0 BEGIN PGM 1_BOHREN_DRILLING_MM
1 CALL PGM ..\reset.H
2 L Z+100 R0 FMAX
3 BLK FORM 0.1 Z X+0 Y+0 Z-19.95
4 BLK FORM 0.2 X+100 Y+100 Z+0
5 FN 0: Q1 +=2
6 L Z+100 R0 FMAX
7 TOOL CALL "NC_SPO1_DRILL_D0" Z S3200
8 : DR 0
9 L Z+100 R0 FMAX M3
10 CYCL DEF 200 DRILLING Q200+=2 ;SET-UP CLEARANCE Q201+=-3.4 ;DEPTH Q206+=250 ;FEED RATE FOR P
11 CALL LBL 10
12 L Z+100 R0 FMAX
13 TOOL CALL "DRILL_D5" Z S3800
14 : DS 0
15 L Z+100 R0 FMAX M3
16 CYCL DEF 200 DRILLING Q200+=2 ;SET-UP CLEARANCE Q201+=-16 ;DEPTH Q206+=350 ;FEED RATE FOR P
17 CALL LBL 10
18 L Z+100 R0 FMAX
19 TOOL CALL "TAP_M6" Z S260
20 : M6
21 L Z+100 R0 FMAX M3
22 CYCL DEF 206 TAPPING Q200+=3 ;SET UP CLEARANCE Q201= -11 ;DEPTH OF THREAD Q206+=260 ;FEED R
23 CALL LBL 10
24 L Z+100 R0 FMAX
25 FN 9: IF +0 EQU +0 GOTD LBL 99
26 LBL 1
27 CYCL DEF 226 POLAR PATTERN Q216+=0 ;CENTER IN 1ST AXIS Q217+=0 ;CENTER IN 2ND AXIS Q244+=2
28 CYCL DEF 226 POLAR PATTERN Q216+=0 ;CENTER IN 1ST AXIS Q217+=0 ;CENTER IN 2ND AXIS Q244+=3
29 LBL 0
30 LBL 10
31 CYCL DEF 7 0 DATUM SHIFT
32 CYCL DEF 7.1 X+25
```

NR	TYPE	NAME	PRE	W-STATUS	METHOD	CTID	LOCATION
0	PAL	1					MA
2	PGM	TNC:\nc_prog\demo\Pallet\WOB\PGM1.h	1	BLANK	TO		
4	PGM	TNC:\nc_prog\demo\Pallet\WOB\PGM1.h	2	BLANK	CTO		
6	PGM	TNC:\nc_prog\demo\Pallet\WOB\PGM1.h	3	BLANK	CTO		
8	PGM	TNC:\nc_prog\demo\Pallet\WOB\PGM1.h	4	BLANK	CTO		



Programming Palletable

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TNC: \nc_prog\demo\Pallet\WOB\PAL.P

NR	TYPE	NAME	PRE...	W-STATUS	METHOD	CTID
0	PAL	1				

W-STATUS

BLANK
INCOMPLETE
ENDED
EMPTY
SKIP

METHOD

WPO = Workpiece-oriented
TO = Tool-oriented
CTO = Tool-oriented, linked with
line above

CTID

- Context ID number
- Contains instructions
about the machining
process



Example 3

Manual operation **Table editing**
Programming ▶ Table editing

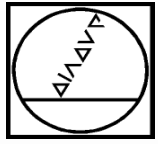
TNC: \nc_prog\demo\Pallet\WOB\PAL.P

NR	TYPE	NAME	PRE...	W-STATUS	METHOD	CTID	LOCATION
0	PAL	1					MA
2	PGM	TNC: \nc_prog\demo\Pallet\WOB\PGM1.h	1	BLANK	T0		
4	PGM	TNC: \nc_prog\demo\Pallet\WOB\PGM1.h	2	BLANK	CT0		
6	PGM	TNC: \nc_prog\demo\Pallet\WOB\PGM1.h	3	BLANK	CT0		
8	PGM	TNC: \nc_prog\demo\Pallet\WOB\PGM1.h	4	BLANK	CT0		

Bearbeitungs-Methode?

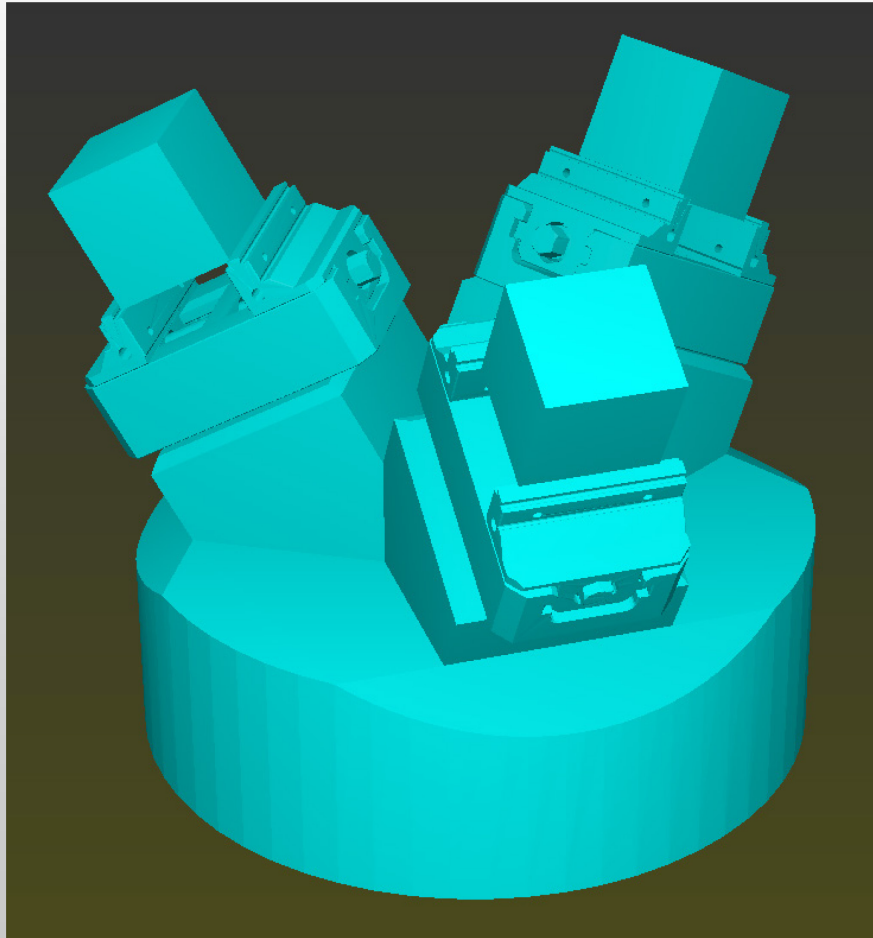
COPY FIELD PASTE FIELD APPEND N LINES INSERT LINE DELETE LINE RESET TABLE SELECT

08:11



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Example 4





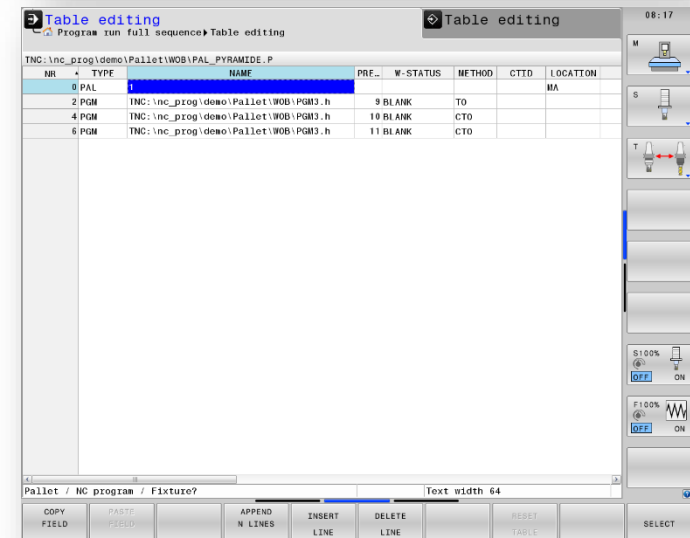
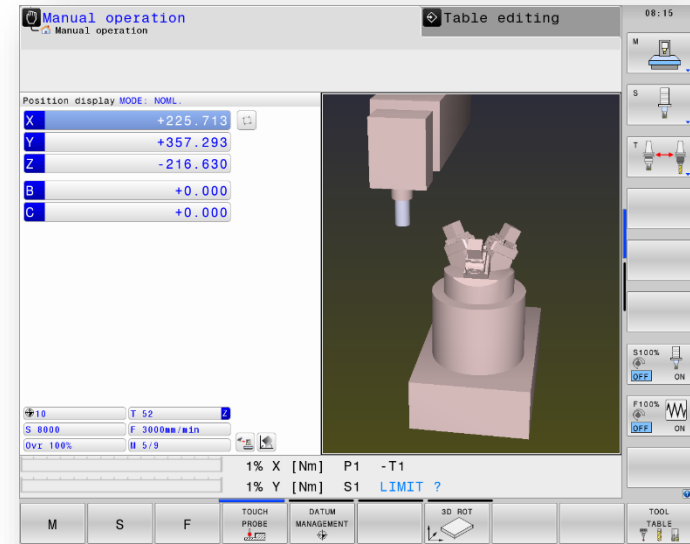
Example 4

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Tool-Oriented Machining (Software 340590-08)

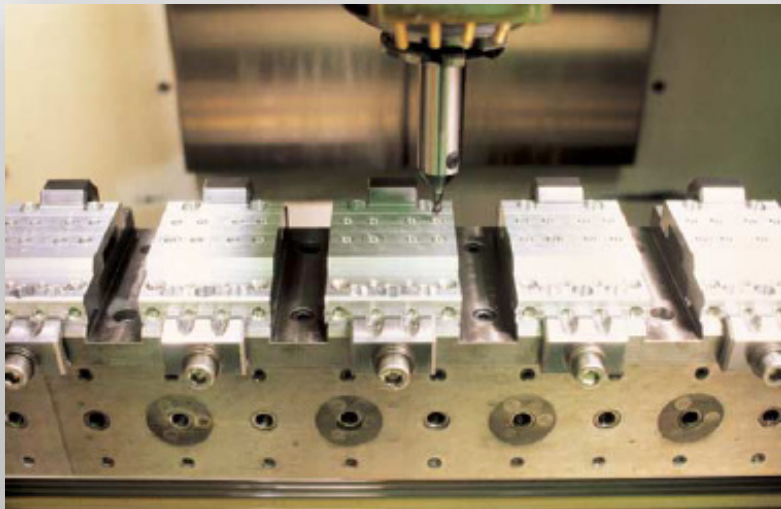
- NC-program with different tools
- NC-program should be produced on multiple fixture
- With tool-oriented machining you can save time with the combination of the tools

9	0	-153.8035	484.5	0	0	30
10	133.2	76.9	484.5	120	0	30
11	-133.2	76.9	484.5	240	0	30
12				0	0	0





Thank you for your attention!



HEIDENHAIN

Instructor: Michael Wiendl



Company: Dr. Johannes
HEIDENHAIN GmbH
Position: Trainer for
NC Programming