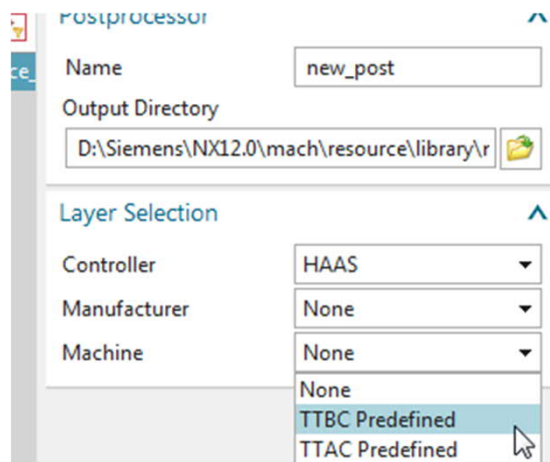


# NX Post Configurator

## 010 – Layer II

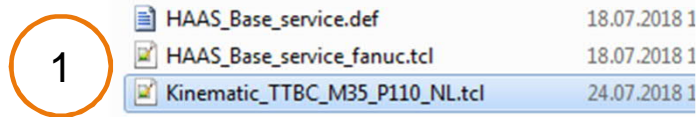
# 5 - Additional kinematic layers

## 5.1 – General purpose



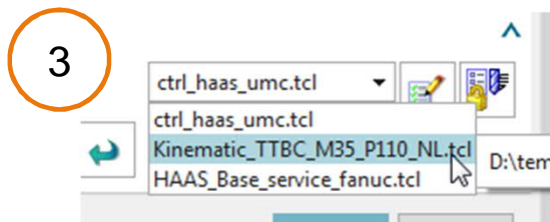
Post Configurator use MTB informations. If no model is loaded it will use a 45°-BC Headtable kinematic. To create Postprocessors without MTB but with preconfigured kinematics it's possible to add them during create process. These layers can be reused by different controllers.

## 5.2 – Additional kinematic layers (TTBC)



```
1 <?xml version="1.0" encoding="UTF-8"?>
2
3 <Configuration>
4   <Copyright>Copyright Statement</Copyright>
5   <Version>1.0</Version>
6   <Controller>Fanuc</Controller>
7   <MachineName>HAAS_Base</MachineName>
8   <Sourcing>
9     <Sequence>
10      <Filename Name="ctrl_haas_umc" Processing="true"/>
11      <Filename Name="HAAS_Base_mtb" Processing="true"/>
12      <Filename Name="Kinematic_TTBC_M35_P110_NL" Processing="true"/>
13      <Filename Name="HAAS_Base_service_fanuc" Processing="true"/>
14    </Sequence>
15  </Sourcing>
16 </Configuration>
```

2



1. Create a new file with information about the kinematic, e.g. kinematic type \_MinLimit4th\_MaxLimit4th\_MinLimit5th\_MaxLimit5th/nolimits
2. Include this file in the temporary postprocessor behind the mtb layer. When a postprocessor will be created the new one created will be located here automatically
3. Open Post Configurator and select the new created file and open it with the Tcl editor



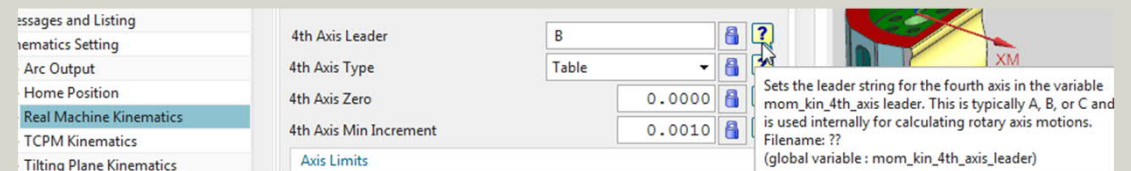
## 5.3 – Additional kinematic layers (TTBC)

```

1 #####
2 #
3 # Kinematic Layer TTBC
4 #
5 # Company      : Siemens Industry Software
6 # Contact person : Thomas Jenensch
7 # Mail         : thomas.jenensch@siemens.com
8 #
9 #####
10 #
11 # Copyright 2018 Siemens Industry Software
12 # All Rights Reserved.
13 #
14 #####
15 # Description
16 # This layer contains predefined kinematic conditions
17 # kinematic model.
18 #
19 # Kinematic type: Table Table
20 # 4th axis: B
21 # 4th axis Max limit: 110
22 # 4th axis Min limit: -35
23 # 5th axis: C
24 # 5th axis limits: no limits
25 #####
26 # History
27 # 24-07-18 TJ Initial version
28 #####
29 #
30 ### General kinematic settings ###
31 set ::mom_machine_mode MILL
32 set ::mom_kin_machine_type 5_axis_dual_table
33 set mom_sys_leader(X) X
34 set mom_sys_leader(Y) Y
35 set mom_sys_leader(Z) Z
36 set mom_sys_leader(fourth_axis) B
37
38 #####
39 # 4th axis settings ###
40 set mom_kin_4th_axis_leader B
41 set mom_kin_4th_axis_min_incr 0.001
42 set mom_kin_4th_axis_point(0) 0.0
43 set mom_kin_4th_axis_point(1) 0.0
44 set mom_kin_4th_axis_point(2) 0.0
45 set mom_sys_4th_axis_has_limits 1
46 set mom_kin_4th_axis_max_limit 110
47 set mom_kin_4th_axis_soft_max_limit 110
48 set mom_kin_4th_axis_min_limit -35
49 set mom_kin_4th_axis_soft_min_limit -35
50 set mom_kin_4th_axis_type Table
51 set mom_kin_4th_axis_vector(0) 0
52 set mom_kin_4th_axis_vector(1) 1
53 set mom_kin_4th_axis_vector(2) 0
54 set mom_kin_4th_axis_zero 0.0
55 ### 4th axis settings ###
56
57 #####
58 # 5th axis settings ###
59 set mom_kin_5th_axis_leader C
60 set mom_kin_5th_axis_min_incr 0.001
61 set mom_kin_5th_axis_point(0) 0.0
62 set mom_kin_5th_axis_point(1) 0.0
63 set mom_kin_5th_axis_point(2) 0.0
64 set mom_sys_5th_axis_has_limits 0
65 set mom_kin_5th_axis_max_limit 3600000
66 set mom_kin_5th_axis_soft_max_limit 3600000
67 set mom_kin_5th_axis_min_limit -3600000
68 set mom_kin_5th_axis_soft_min_limit -3600000
69 set mom_kin_5th_axis_type Table
70 set mom_kin_5th_axis_vector(0) 0
71 set mom_kin_5th_axis_vector(1) 0
72 set mom_kin_5th_axis_vector(2) 1
73 set mom_kin_5th_axis_zero 0.0
74 ### 5th axis settings ###

```

1. Add description of the layer and generic information about the kinematic type
2. Add all necessary mom-variables which are needed for the kinematics. The information which mom-variable is needed is located in the Tooltip help.



3. After finishing of set up the layer save and close the Tcl-editor.

## 5.4 – Additional kinematic layers (TTBC)

1

MILL

5\_axis\_dual\_table

0.0000

Metric

User Defined

Inherited

4th Axis

4th Axis Leader

4th Axis Type

4th Axis Zero

4th Axis Min Increment

Axis Limits

4th Axis has Limits

4th Axis Min Limit

4th Axis Max Limit

4th Axis Soft Min Limit

4th Axis Soft Max Limit

Axis Orientation and Position

2

B

Table

0.0000

0.0010

Yes

-35.0000

110.0000

-35.0000

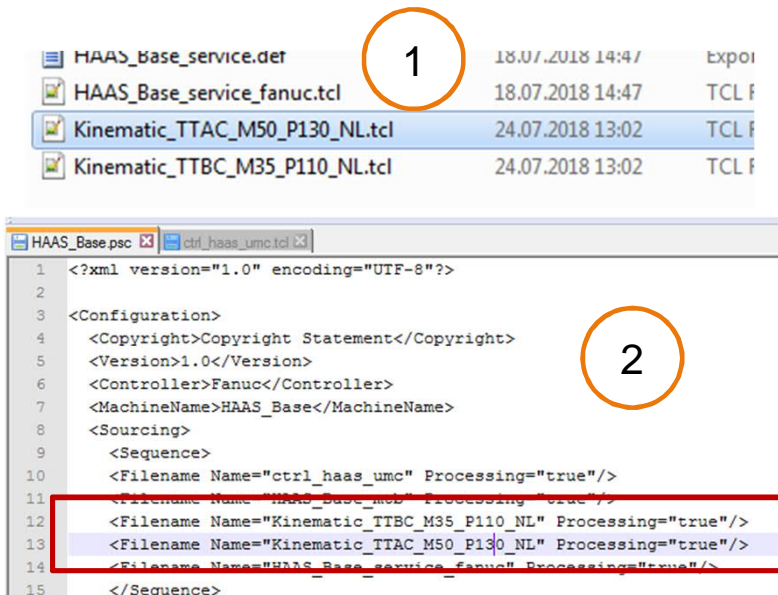
110.0000

User

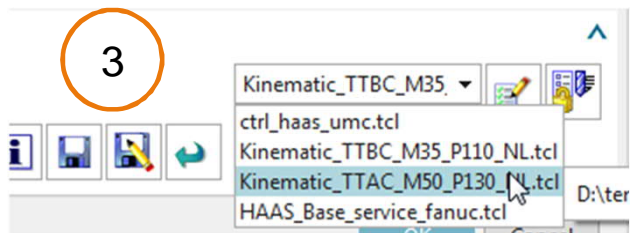
Inherited

1. Now check that this layer is sourced correctly and all changed properties get now the new default value from the layer for the machine type.
2. Repeat this for all properties which was changed in the UI of Post Configurator (open lock).

## 5.5 – Additional kinematic layers (TTAC)



1. Now concept of reusing running very well. Copy the first created kinematic file
2. Add this file also in sourcing in psc file (Important: behind the TTBC-kinematic)
3. Open the file with Post Configurator



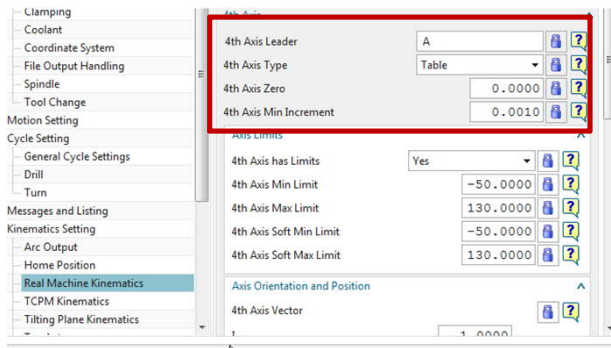
## 5.6 – Additional kinematic layers (TTAC)

```
1 #####
2 #
3 # Kinematic Layer TTAC
4 #
5 # Company      : Siemens Industry Software
6 # Contact person : Thomas Jenensch
7 # Mail         : thomas.jenensch@siemens.com
8 #
9 #####
10 #
11 # Copyright 2018 Siemens Industry Software
12 # All Rights Reserved.
13 #
14 #####
15 # Description
16 # This layer contains predefined kinematic conditions if the post will be created without an
17 # kinematic model.
18 #
19 # Kinematic type: Table Table
20 # 4th axis: A
21 # 4th axis Max limit: 130
22 # 4th axis Min limit: -50
23 # 5th axis: C
24 # 5th axis limits: no limits
25 #
26 # History
27 # 24-07-18 TJ Initial version
28 #####
29 #
30 ### General kinematic settings ###
31 set ::mom_machine_mode MILL
32 set ::mom_kin_machine_type 5_axis_dual_table
33 set mom_sys_leader(X) X
34 set mom_sys_leader(Y) Y
35 set mom_sys_leader(Z) Z
36 set mom_sys_leader(fourth_axis) A
37 set mom_sys_leader(fifth_axis) C
38 set mom_kin_spindle_axis(0) 0.0
39 set mom_kin_spindle_axis(1) 0.0
40 set mom_kin_spindle_axis(2) 1.0
41 ### General kinematic settings ###
42
43 ### 4th axis settings ###
44 set mom_kin_4th_axis_leader A
45 set mom_kin_4th_axis_min_incr 0.001
46 set mom_kin_4th_axis_point(0) 0.0
47 set mom_kin_4th_axis_point(1) 0.0
48 set mom_kin_4th_axis_point(2) 0.0
49 set mom_sys_4th_axis_has_limits 1
50 set mom_kin_4th_axis_max_limit 130
51 set mom_kin_4th_axis_soft_max_limit 130
52 set mom_kin_4th_axis_min_limit -50
53 set mom_kin_4th_axis_soft_min_limit -50
54 set mom_kin_4th_axis_type Table
55 set mom_kin_4th_axis_vector(0) 1
56 set mom_kin_4th_axis_vector(1) 0
57 set mom_kin_4th_axis_vector(2) 0
58 set mom_kin_4th_axis_zero 0.0
59 ### 4th axis settings ###
60
```

1. Add additional information in header
2. Change general settings, e.g. leader
3. Change all needed mom-variables for 4th axis (leader, vector, limits, type)



## 5.7 – Additional kinematic layers (TTAC)

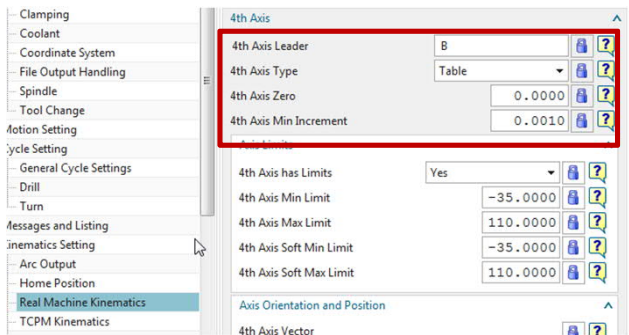


1

```
N18 G234 H1
N20 G17 G0 G90 Y-245.026 Y-95.398 S2228 M3
N22 Z244.136 A90. C119.972
N24 Z221.911
N26 G94 G1 X-245.01 Y-96.202 Z220.369 F1203.
```

```
<Filename Name="HAAS_Base.mtb" Processing="true"/>
<Filename Name="Kinematic TTBC M35 P110_NL" Processing="true"/>
<Filename Name="Kinematic TTAC M50 P130_NL" Processing="false"/>
<Filename Name="HAAS_Base_service_fanuc" Processing="true"/>
```

2



3

```
N16 G54
N18 G234 H1
N20 G17 G0 G90 X320.398 Y-20.026 S2228 M3
N22 Z244.136 B90. C29.972
N24 Z221.911
N26 G94 G1 X321.202 Y-20.01 Z220.369 F1203.
```

Summary:

Now it's possible to switch the kinematics easily.

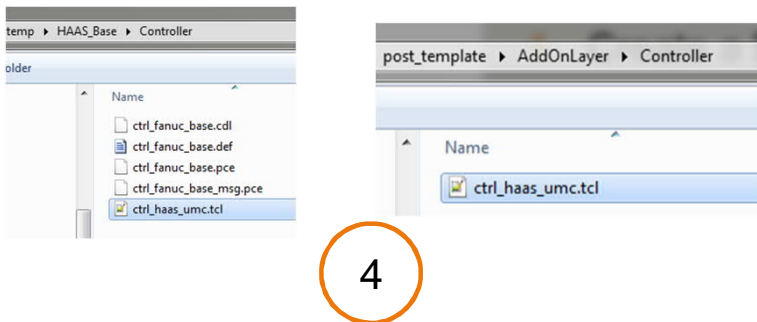
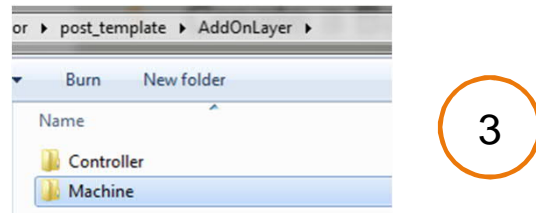
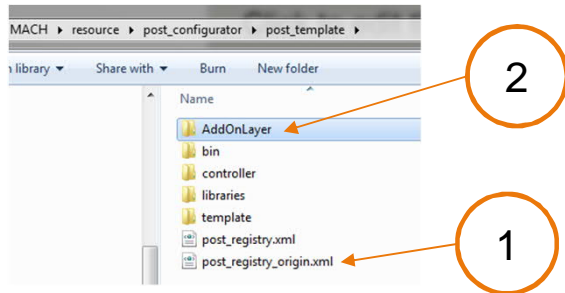
1. Postprocess an operation with TTAC kinematics file
2. In the psc-file turn off the processing of TTAC kinematics file
3. Reopen Post Configurator and postprocess again

Additional Background:

This can be reused for each predefined kinematic definition. In next topic this will be transferred into standard environment.

# 6 – Merge into Post Configurator Environment

## 6.1 – Create structure



1. Create a Backup of your origin post\_registry.xml
2. Create a new folder for the new created layers
3. In this folder create a sub structure, e.g. Controller, machine
4. Copy the created controller file from the temporary postprocessor into the folder

## 6.2 – Create structure

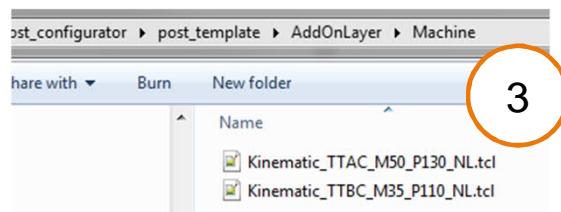
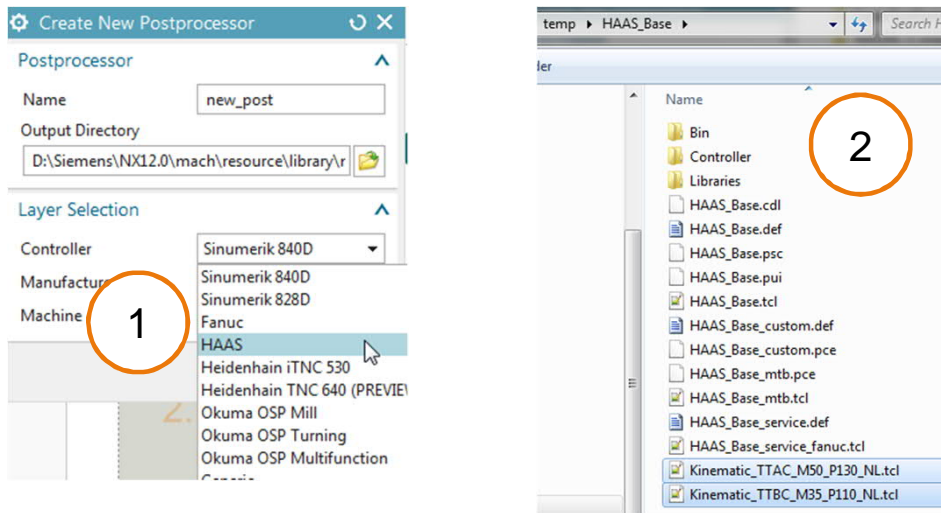
1. Open the post\_registry.xml
2. Copy the existing Fanuc entry
3. Rename the copy to e.g. HAAS
4. Add the entry for the main-tcl file which will also source the Fanuc controller
5. Save the file

The screenshot shows the XML structure of the post\_registry.xml file. Annotations are as follows:

- 1**: Points to the opening tag of the first <CTRL> block.
- 2**: Points to the <Path> entries within the Fanuc <CTRL> block.
- 3**: Points to the <Name>HAAS</Name> entry in the second <CTRL> block.
- 4**: Points to the <Path> entry for the main-tcl file in the second <CTRL> block.

```
<CTRL>
<CTRL>
  <Name>Fanuc</Name>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.cdl</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.def</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.pce</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base_msg.pce</Path>
  <Service_Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/service/template_service_fanuc.pce</Service_Path>
</CTRL>
<CTRL>
  <Name>HAAS</Name>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/AddOnLayer/Controller/ctrl_haas_umc.tcl</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.cdl</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.def</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.pce</Path>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base_msg.pce</Path>
  <Service_Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/service/template_service_fanuc.pce</Service_Path>
</CTRL>
<CTRL>
```

## 6.3 – Create structure



1. Open Post Configurator and check that post\_registry works fine and the added controller level is visible
2. Add the additional two kinematics files into the AddonLayer/Machine folder from the temporary postprocessor
3. Open the post\_registry.xml to add these files as machine layers for this HAAS controller



## 6.4 – Create structure

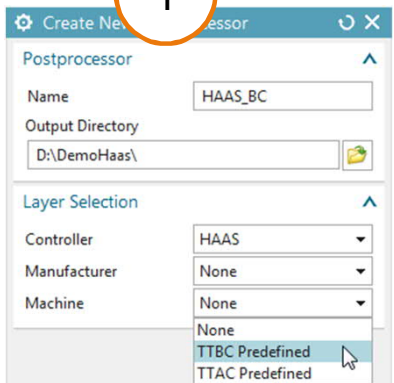
1. Copy an existing machine level, e.g. Fanuc
2. Give it a unique name and assign the Base\_CTRL (logic which files will be shown when select a controller)
3. Repeat the step for the second predefined kinematic and save the post\_registry.xml

The image shows a snippet of XML code from a file named post\_registry.xml. The code defines three machine levels. Annotation 1 points to the first machine level, 'Fanuc Sample Machine Level'. Annotation 2 points to the 'Base\_CTRL' element of the second machine level, 'TTBC Predefined', which is highlighted with a red box. Annotation 3 points to the third machine level, 'TTAC Predefined', which is highlighted with a blue box.

```
<MACHINE>
  <Name>Fanuc Sample Machine Level</Name>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/machine/machine_ootb_5ax_fanuc.pce</Path>
  <Base_CTRL>Fanuc</Base_CTRL>
</MACHINE>
<MACHINE>
  <Name>TTBC Predefined</Name>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/AddOnLayer/Machine/Kinematic_TTBC_M35_P110_NL.tcl</Path>
  <Base_CTRL>HAAS</Base_CTRL>
</MACHINE>
<MACHINE>
  <Name>TTAC Predefined</Name>
  <Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/AddOnLayer/Machine/Kinematic_TTAC_M50_P130_NL.tcl</Path>
  <Base_CTRL>HAAS</Base_CTRL>
</MACHINE>
```

## 6.5 – Create structure

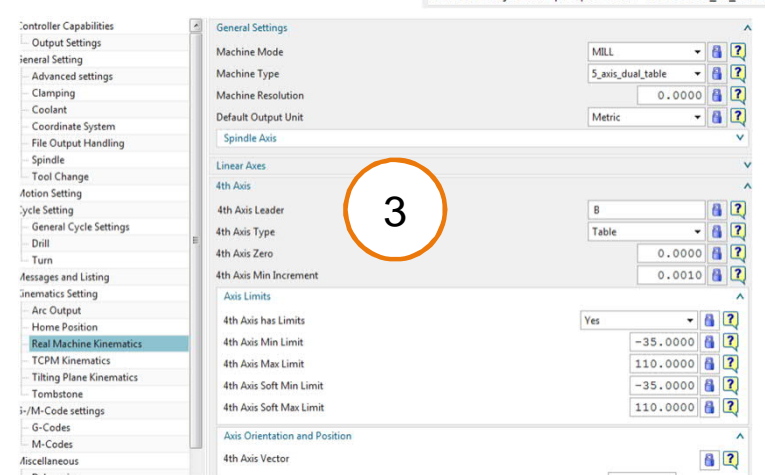
**1**



Postprocessor created successfully at: D:\DemoHaas\  
Successfully created layer: Machine Tool Builder  
Successfully created folder: Libraries  
Successfully added file to folder "Libraries": lib\_document.pce  
Successfully added file to folder "Libraries": lib\_file\_handling.pce  
Successfully added file to folder "Libraries": lib\_general.pce  
Successfully added file to folder "Libraries": lib\_msg.pce  
Successfully added file to folder "Libraries": lib\_pretreatment.def  
Successfully added file to folder "Libraries": lib\_pretreatment.tcl  
Successfully added file to folder "Libraries": lib\_pretreatment\_post.pce  
Successfully added file to folder "Libraries": lib\_sourcing.tcl  
Successfully added file to folder "Libraries": lib\_standard\_post\_func.pce  
Successfully added file to folder "Libraries": lib\_xml\_handling.pce  
Successfully created folder: Bin  
Successfully added file to folder "Bin": lib\_execute\_nx85\_64bit\_84.dll  
Successfully added file to folder "Bin": loader.dll  
Successfully added file to folder "Bin": utility.pce  
Successfully created folder: Controller  
Successfully added file to folder "Controller": ctrl\_haas\_umc.tcl  
Successfully added file to folder "Controller": ctrl\_fanuc\_base.cd1  
Successfully added file to folder "Controller": ctrl\_fanuc\_base.def  
Successfully added file to folder "Controller": ctrl\_fanuc\_base.psc  
Successfully added file to folder "Controller": ctrl\_fanuc\_base\_msg.pce  
Successfully created layer: Machine  
Successfully added file for layer "Machine": Kinematic\_TTBC\_M35\_P110\_NL.tcl  
Successfully created layer: Service  
Successfully created postprocessor files  
Successfully added postprocessor file: HAAS\_BC.cd1  
Successfully added postprocessor file: HAAS\_BC.def  
Successfully added postprocessor file: HAAS\_BC.psc  
Successfully added postprocessor file: HAAS\_BC.pui  
Successfully added postprocessor file: HAAS\_BC.tcl  
Successfully added postprocessor file: HAAS\_BC\_custom.pce  
Successfully added postprocessor file: HAAS\_BC\_service.def

**2**

**3**



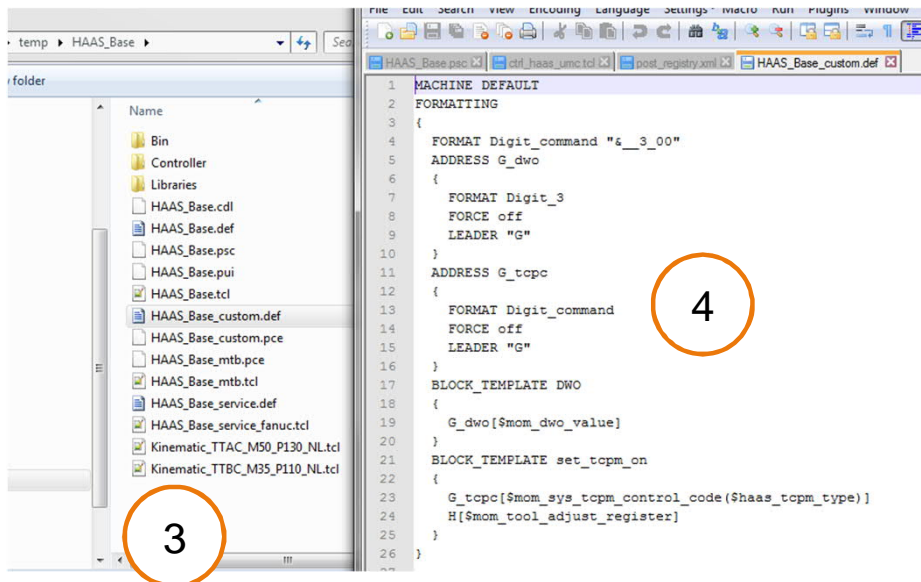
1. Check that everything is fine and open the Create Postprocessor Dialog
2. Create a new Postprocessor based on this data
3. Check/ recognize that kinematics are set directly correct

### Additional Background:

Even if a machine model is loaded now, the predefined kinematics will be used. For this you can build a property which decides use machine model kinematics or not.

## 6.6 – Create structure

```
***** MOM: TCL SCRIPT MESSAGE *****
User message: Error code 1745006: MOM given an invalid block name; MOM: DWO is an invalid block template name.
while executing
"MOM_do_template DWO"
  invoked from within
"if {1} {subst ${subst ::buffer::${00_1}}:::${00_section}::code(${00_tag}}\})"
  ("foreach" body line 8)
```

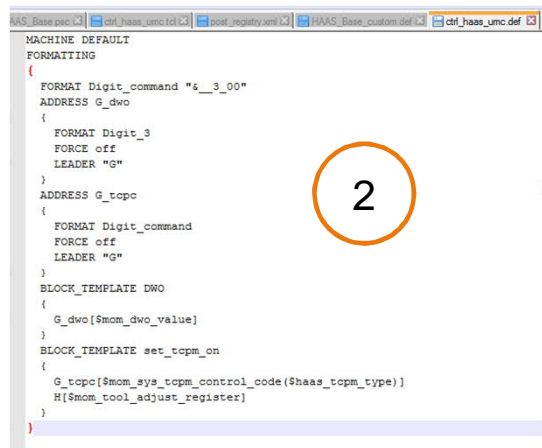
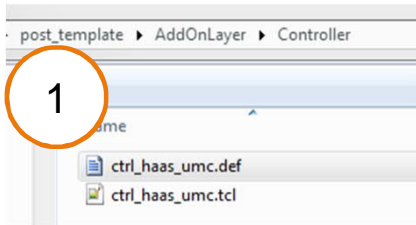


1. Select an operation and try postprocessing. You should get an error ☹️.
2. Thinking...
3. Remember, we defined additional Blocktemplates and address.
4. Open the custom.def-file from the temporary postprocessor.

### Additional Background:

All customization for address, Blocktemplates, Formats will be written in the xx\_custom.def file of the postprocessor. To reuse it we have to copy the content in a def-file controller layer

## 6.7 – Create structure



1. Create a new def-file in the AddOnLayer/Controller folder
2. Copy the content from temporary postprocessor/ custom def-file into that file
3. Link this file to the controller. Be aware of sourcing order if you overwritten Blocktemplates then the origin layer must be sourced before.

### Additional Background:

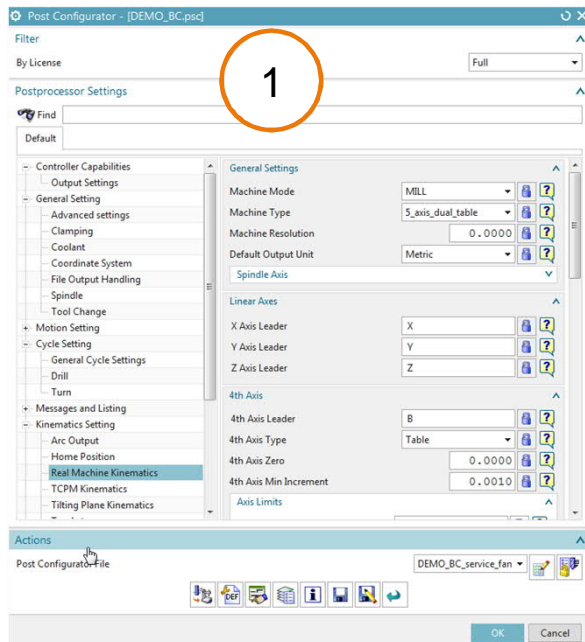
The same is possible for cdl-files which contains UDE's.

```
<CTRL>
<Name>HAAS</Name>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/AddOnLayer/Controller/ctrl_haas_umc.tcl</Path>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.cdl</Path>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.def</Path>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/AddOnLayer/Controller/ctrl_haas_umc.def</Path>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base.pce</Path>
<Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/base/ctrl_fanuc_base_msg.pce</Path>
<Service_Path>${UGII_CAM_RESOURCE_DIR}post_configurator/post_template/controller/fanuc/service/template_service_fanuc.pce</Service_Path>
</CTRL>
```

3

## 6.8 – Create structure

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2

```
(DATE : 24.07.2010 , 14:40)
(PARTNAME : ACCEPTANCE_PART.PRT
N10 G17 G21 G94 G90

(VARIABLE_STREAMLINE , TOOL : UGTI0203_052)

N12 G0 G53 Z99999.9
N14 T00 M6
N16 G54
N18 G234 H1
N20 G17 G0 G90 X320.398 Y-20.026 S2228 M3
N22 Z244.136 B90. C29.972
N24 Z221.911
N26 G94 G1 X321.202 Y-20.01 Z220.369 F1203.
N28 X322.442 Y-19.986 Z219.152
N30 X323.998 Y-19.956 Z218.378
N32 X325.718 Y-19.923 Z218.122
N34 X327.432 Y-19.89 Z218.411
N36 X327.166 Y-19.894 Z215.539 B89.442 C29.961
N38 X326.869 Y-19.9 Z212.597 B88.88 C29.948
N40 X326.532 Y-19.906 Z209.499 B88.299 C29.936
N42 X326.15 Y-19.911 Z206.23 B87.698 C29.927
N44 X325.724 Y-19.913 Z202.827 B87.087 C29.922
```

1. Create a new postprocessor again
2. After creation postprocess an operation.
3. Done.



## Q&A

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Siemens Manufacturing Forum

[www.siemens.com/plm/nxmanufacturingforum](http://www.siemens.com/plm/nxmanufacturingforum)

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