

Standard Scope of Saratech ISV Kit and Postprocessors

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INTRODUCTION

This document describes the range of features of the Saratech PostProcessor (PP). Throughout this document, the word postprocessor will also be referred to as PP. If the range of features varies between milling machines and lathes, this issue is identified specifically in the text and appendix.

Additional functions and services (e.g., controlling additional cycles, controlling further machine functions, clamping device models, further transfer variants on lathes, etc.) can be procured additionally from Saratech if required and technically feasible. This service description will be continuously adapted to future NX versions and delivered with each POST update. Newer versions replace older ones.

The functionality of the Saratech Post corresponds to the configuration of the corresponding machine in the delivery state. Subsequent adjustments to the machine (both by the customer OR by the manufacturer) that affect the post must be reported to Saratech by the customer.

INSTALLATION

The file which controls the PP list in the **Select Postprocessor** dialog box depends on whether you have a registered machine tool in your current setup. If there is a machine tool, the list is controlled by the corresponding DAT file in the machine kit. If there is no machine tool, the list is controlled by the **template_post.dat** file.

TOOL PATHS

The NX tool paths are translated into machine commands by the PP. Tool paths are output in absolute coordinates.

- **Linear Movements**
The PP generates linear movements from the trajectories of the internal tool path (rapid moves and linear moves). G0/G1 (Siemens, Fanuc)
- **Circular Movements**
The PP generates clockwise and counterclockwise circular movements from the trajectories of the internal tool path (arc moves). G2/G3 (Siemens, Fanuc)
- **Helical Movements**
The PP generates spiral movements from the trajectories of the internal tool path. If supported by the machine control system, these movements are implemented in circular movements, otherwise they are implemented in linear movements.

TECHNOLOGY

Feeds and speeds are output as programmed.

- **Feeds**
All feeds programmed in NX are generated in the programmed unit (mm/min or mm/rpm) by the PP. The feeds stated in the following are available in the standard scope of feature: Approach, movement to, machining and movement away.

- **Speeds**
The PP outputs the speeds and directions of rotation of spindles defined in the NX before the first positioning of the linear axes.
- **Tool Length Correction**
The PP outputs the cutting-edge register number in the NC program selected in the NX directly after the tool change; during this process the NX operation can inherit the tool number, or the number can be defined locally as required.
- **Tool Radius Correction**
The PP outputs operations during which a cutting-edge radius compensation can be programmed using the corresponding machine control system commands. 3D radius correction is not supported.
- **Tracking Points (turning)**
The PP outputs the tool path for lathe tools referred to the programmed control system point. It is therefore to be ensured that tool defined in NX matches the control system point saved on the real machine!
- **Dwell Times**
The PP outputs the dwell times possible in NX in the unit programmed (in seconds or revolutions). Depending on the machine operation, the dwell time can also be part of the control system cycle (for example drilling).

MACHINE FUNCTIONS M CODES

Machine functions are usually controlled by M-commands or cycles. They are supported according to the supplied documentation and machine manuals. Common M-commands are supported, and the implementation may differ due to machine type or customer requirements. The common functions are supported by the PP only if they are present on the machine and identified by the supplied documentation.

TOOLS

NX permits the selection and usage of a wide range of cutting tools. The tool trajectories are calculated based on the parametric tool definition.

Tool Change

- **Milling and Milling-Turning Machines**
The PP always generates a tool change if an operation starts with a tool that is different to the previous tool.
- **Lathes**
The tool to be changed can be output either as a tool number, tool name or tool number as name. Automatic and manual tool changes can be used for the NC code generation.

- **Tool Pre-Change**
The function is supported only on customer requirement and according to machine configuration.
- **Milling and Milling-Turning Machines**
Optionally, the PP always generates a tool pre-change if the next operation starts with a tool that is different to the previous tool. At the end of the program either a zero tool or the first tool in the program can be called.
- **Lathes**
For machines with milling spindle the PP optionally generates a tool pre-change if the next operation starts with a tool that is different to the previous tool.
For revolvers no tool pre-change commands are generated.
- **Angular heads**
Angular heads are not supported by the standard scope of features.
- **Tool lists**
Workshop documentation is only supported by chargeable additional modules. If customers require a tool list in the NC program it can be output if requested.
- **Probes**
Probe support is only provided by additional modules, which can be purchased separately as an option.

CLAMP DEVICES

Clamping devices are not included in the items supplied with the Saratech PP.

ZERO POINTS

As workpiece zero points NX CAM coordinate systems are assumed.

As standard the PP works with main and local zero points. The zero points must be used as per the PP documentation.

CYCLE OUTPUTS

The PP can only generate the output for a machining cycle if cycle output is intended/prepared by NX. Standard and documented cycles are supported in the context of the standard Saratech PP.

- **Cycles for Stationary Machining**
As standard the following cycles are generated for the related control system:
Centering, drilling / spot facing, deep bore drilling, tapping without compensation chuck, tapping without thread table, reaming, drilling out with dwell time.

- **Cycles for 2.5 D Machining**

These cycles are not supported by the standard scope of features of the Saratech PP.

UDE

Standard UDEs are available. They are part of the delivery if the machine supports the respective functions. Custom UDEs are possible if documentation and examples are supplied by the customer.

SPECIAL KINEMATIC FUNCTIONS

The NC output of indexing heads, handling devices (e.g. grippers, collecting trays, etc.) or other attachments are not supported by the standard scope of a Saratech PP unless requested and documentation and examples are supplied by the customer.

PROGRAM STRUCTURE

Program Header

- First tool change operation T1
- Operations without tool change, (0 or more)
- Second tool change operation T2
- Operations without tool change, (0 or more) Program end (M30)

Milling and Mill-Turn Machines

The standard PP generates a sequential program structure as has been defined by the NX program structure. Output using sub-routines is not supported in the standard scope of the PP.

Lathes

The standard PP generates a program structure as per the Saratech standard structure programming. Channel synchronization can only be inserted before an operation.

DELIVERY

The content and schedule for the handover of customizations ordered separately/additionally by customers will be defined separately. The scenarios described do not, expressly, represent machine commissioning. Commissioning assesses the performance and reliability of the Saratech PP.

Commissioning Parts

The PP is accepted based on a suitable example project from Saratech (standard commissioning). The essential functions of the postprocessor described are checked in the example projects based on suitable tool trajectories, tools and user-defined events (UDE). Various sample commissioning parts are available for

different scenarios. If commissioning is undertaken based on a customer project, the customer is to provide the fully programmed project or must order a corresponding service.

Commissioning Procedure

By default, the standard functionality of the PP is commissioned at Saratech, delivered, and installed at the customer's site via a remote session. The commissioning of the standard functionality is considered to be completed when the PP can run at the customer's site. In addition, the customer has three different ways to test other (complex) functionalities he has ordered for his own commissioning. Commissioning takes place with the help of the commissioning project agreed in accordance with the chapter on commissioning parts.

Test Phase by Customer

The customer tests the postprocessor within 8 weeks of delivery. If no defects are reported within this time, the postprocessor is considered accepted (statutory warranty claims are not affected by this aspect)

VM Commissioning

The postprocessor is considered accepted if the commissioning part is virtually manufactured on a Saratech virtual machine. This commissioning variant is only possible if a Saratech virtual machine is available for the related machine type. If the customer has not purchased a Saratech virtual machine, Saratech will, if possible, make available a virtual machine similar to the customer's machine for the commissioning. The personnel expenditure of Saratech must be covered in a separate service agreement.

Commissioning on the Customer Machine

The postprocessor is checked on the customer's machine based on a commissioning part together with service from Saratech. The postprocessor is considered accepted if the commissioning part can be manufactured dimensionally correctly with suitable production technology on the customer's machine.

The customer is to provide for this manufacturing the materials, clamping devices, tools (as per the tool list) and personnel with appropriate training on the use of the machine. The machine is to be provided with the complete setup on the commissioning date by the customer. The personnel expenditure of Saratech must be covered in a separate service agreement.

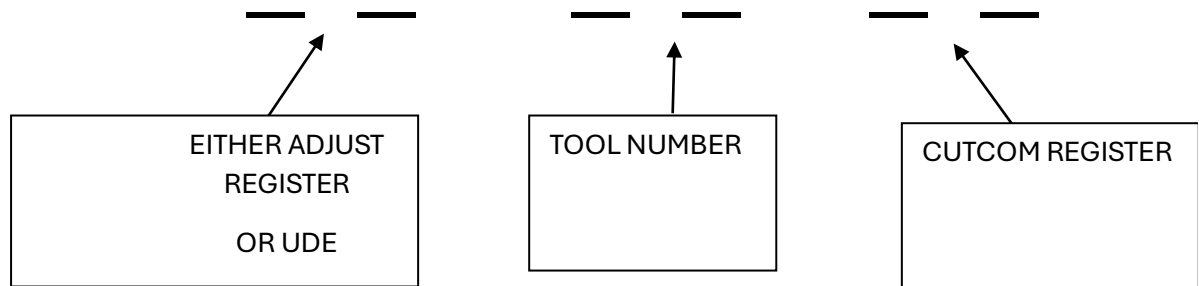
APPENDIX: POST SPECIFIC INFORMATION

TD= TOOL CHANGE CALL INFO

- IF NO UDE FOR TOOL ORIENTATION POSITION IN PLACE, FIRST TWO POSITIONS OF 6 DIGIT CALL WILL COME FROM “ADJUST REGISTER”
- LAST 4 DIGITS ARE SPLIT THUSLY:

FIRST 2 DIGITS – TOOL NUMBER

LAST 2 DIGITS – CUTCOM ADJUST REGISTER (TRACKING POINT)



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SECTION 5 S, T, AND M FUNCTIONS

5-5. TD Command (preparatory command for multitasking machine)

[Function]

Specifies the position number and the tool number with the set value following address TD.

The turret is indexed by performing tool change by the M323 (or M423) command.

The TD command can be used with a multitasking machine.

A multitasking machine is a machine that is equipped with turning and milling functions and the ATC (automatic tool changer) function.

[Command format]

TD= ○○ΔΔΔΔ M323 (or M423)

○○ : Position number (01 to 20)

ΔΔΔΔ : Tool number (0000 to 9999)

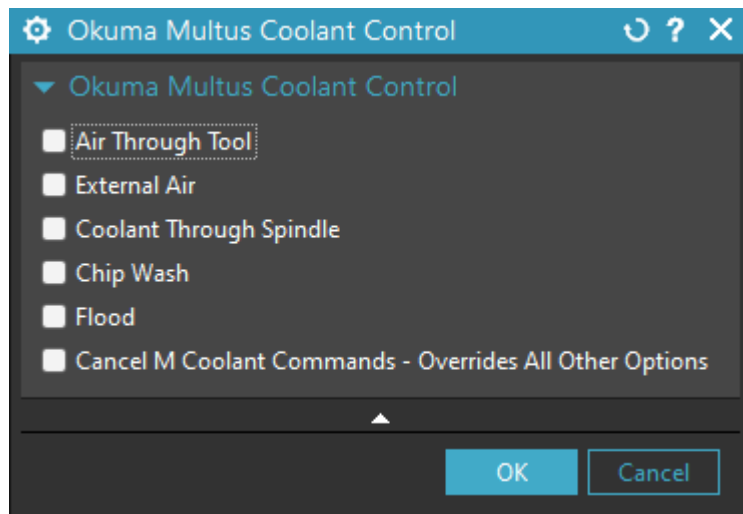
The M323 (M423) command executes tool change and tool index.

Specify the TD command and the M323 (M423) command in the same block.

When the position number is omitted in the program, the number set as the base position is applied.

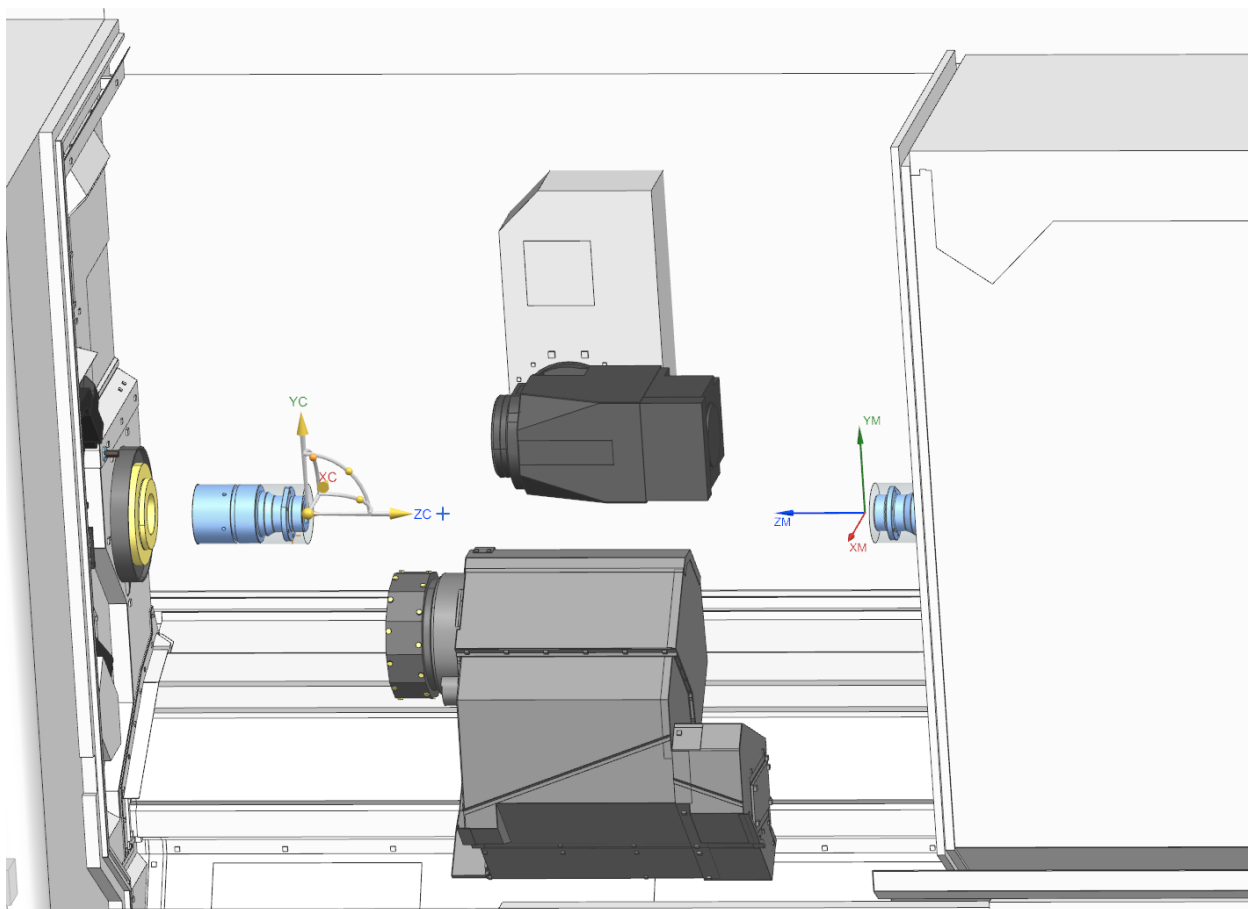
When command: **TD=0** M323 (or M423) is given, the tool currently mounted is returned.

MULTUS COOLANT UDE

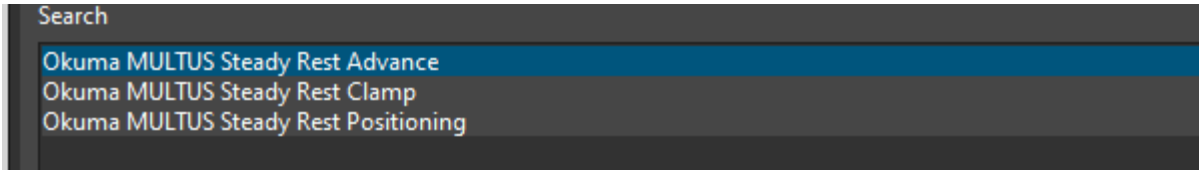


NOTE ON MCS SETUP:

MAIN AND SUB Z-AXIS MCS'S SHOULD BE POINTED TOWARDS EACHOTHER WITH ONLY Y AXIS ALIGNED ON BOTH MCS.



Steady Rest Activation via UDE:



THE THREE REQUIRED NAMING ELEMENTS OF THE MCS'S ARE: MAIN ZERO (MACHINE ZERO, SET TO PURPOSE "MAIN", 0), MAIN MCS, AND SUB MCS. YOU MUST INCLUDE MAIN OR SUB IN NAME OF MCS OR POST WILL ALARM.

