



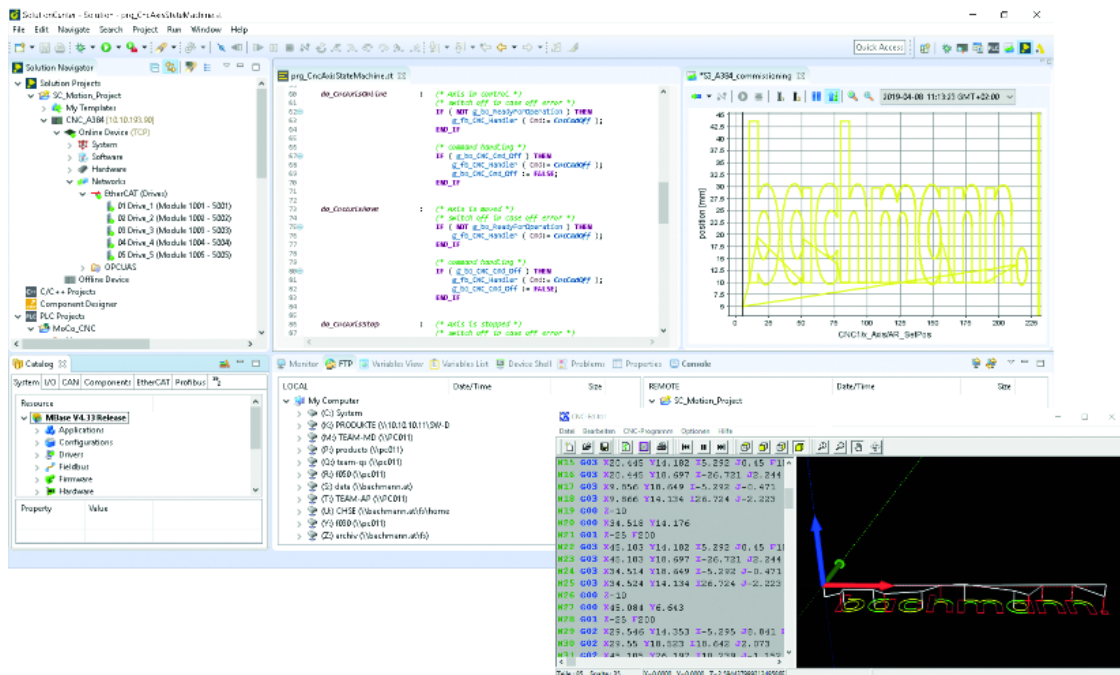
M-CNC Three-dimensional Motions

Complex motions in Cartesian three-dimensional space are mainly implemented with CNC systems. The defined path of a tool center point (TCP) is of particular interest. The path to be traveled is set in accordance with DIN 66025. The CNC system calculates from this setting the resulting path profiles of the three driven individual axes. This takes into account their achievable velocities, accelerations and decelerations, since these parameters are essential for a detailed reproduction of the defined path profile.

Features

- Software module for path motions with Cartesian 3-axis system in three-dimensional space
- Full interpolation in all three dimensions
- Profile setting in accordance with DIN 66025
- Configuration and diagnostics via the SolutionCenter
- Commissioning user interface (CNC-Monitor)
- Library for IEC 61131-3 PLC programs

Part type designation	Part number
M-CNC Download	00016377-90
M-CNC RT	00016377-63



Ready-to-use CNC solution

This means the first CNC application program is only three steps away:

- Configuration of 3 motion axes and definition of movement ranges
- Setting target position via CNC monitor or loaded CNC program
- Starting the movement

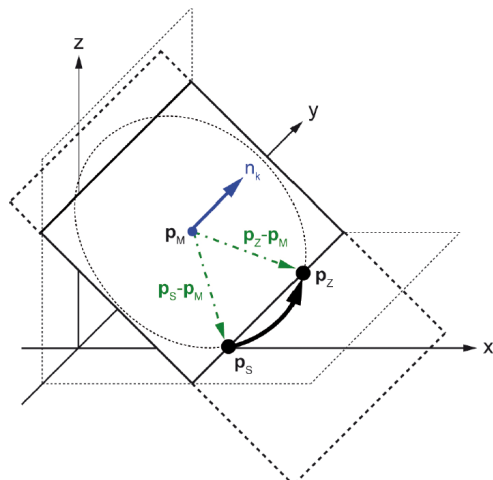
The initial commissioning is thus carried out without having to program a single data row of code.



Motions in 3D space

- Component milling
- Applying adhesives
- Positioning laser cutters

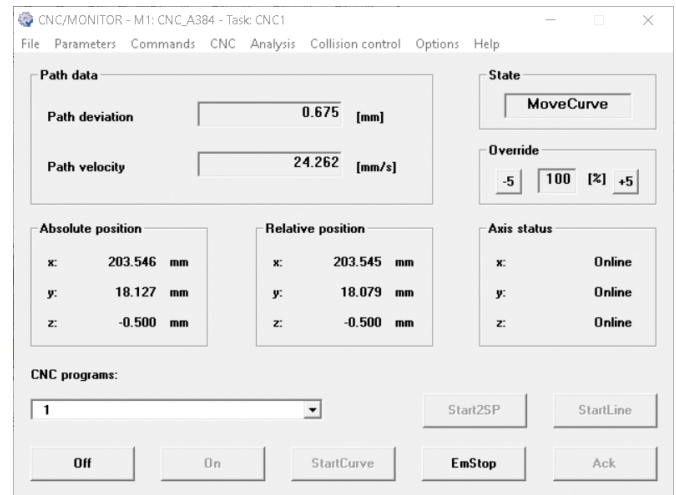
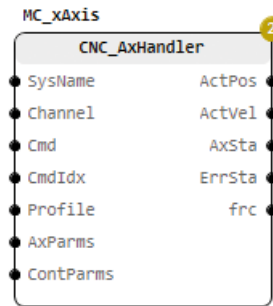
All these application programs have one thing in common: Their programs define their motion paths in three-dimensional space. Programmed positioning sequences can also be rotated around an angle or axis at a later time. This makes it possible to make a simple correction when the workpieces have not been clamped with the correct alignment.



Application programming

A higher-level sequence program coordinates the job acceptance, the material feed as well as the subsequent processing of the CNC program. The interaction with the M-CNC system is easily implemented via the available IEC 61131-3 library.

The CNC-Monitor commissioning user interface permits the complete parameter assignment and manual operation of the M-CNC software module. The Scope 3 software oscilloscope even records highly dynamic motions directly on the controller and enables comprehensive analysis on the engineering PC. In this way, a complete overview is always ensured. This not only shortens the time required for the initial commissioning, but also enables fast troubleshooting during operation.



M-CNC

General	
Controller core	Software module on the M200 controller
Configuration	SolutionCenter
Parameterization	CNC-Monitor
Operation	CNC-Monitor Application integration via library for IEC 61131-3
Product Features	
Number of interpolated axes	3 axes – fully interpolated
Number of fully-fledged CNC systems on an M200 controller	20
Sample time	200 µs to 20 ms
Motion profile	
Motion path	<ul style="list-style-type: none"> ● Setting according to DIN 66025 ● Any circle segments and straight lines selectable in 3D space
Approach to a target position	<ul style="list-style-type: none"> ● Circle interpolation (clockwise and counterclockwise direction) ● Straight line interpolation ● Point control behavior (PTP travel)
Dwell times	Predefinable
Functions	
Position setting / position control	Depending on motion axis type, the M-CNC performs different tasks: <ul style="list-style-type: none"> ● M-CNC performs the calculation of the set position including position control ● M-CNC performs the calculation of the set position, position control is performed in the drive
Definition of the workpiece zero point	Definable offset to the machine axis zero point
Correction of the tool path	Path correction is carried out on the basis of defined tool parameters
Rotation of set motion sequences	Motion sequences can still be rotated around an angle and around an axis before they are executed.
Monitoring of the movement range	Checking with reference to machine zero point or workpiece zero point, with/without consideration of the tool
Referencing of the axes	Various methods are available depending on the drive, encoder and initiator used.
Handwheel mode	The travel speed or travel position along the set motion path are defined by means of a handwheel.
Additional motion axes	Additional axes are configured in the SolutionCenter and integrated in the higher-level sequence program. This makes it possible to integrate spindle drives, lubrication pumps or material feeds.
Diagnostics	<ul style="list-style-type: none"> ● Commissioning interface CNC-Monitor ● Scope 3 software oscilloscope
Special Functions	
Collision monitoring	Acts for two CNC systems moving in the identical XY range. Continuously monitors whether the target point of the next path segment is not blocked by the second CNC system.
Single axis movement	The axes can be moved individually via CNC-Monitor or the application program.
Manual target point approach in the space	A target point is defined as required via CNC-Monitor and approached with straight line interpolation.
Machine commands in CNC programs	Communication with additional application programs (e.g. for tool changing) by setting digital or analog signals as well as SVI variables from the CNC program.

Drive connection	
Analog	Via Bachmann hardware modules (e.g. ISI222, GIO212)
Fieldbus	By means of DriveMiddleware or another user-specific drive integration
Position detection	
By M200 via rotary encoder	The actual position is determined with Bachmann hardware modules (e.g. ISI222, CNT204).
By the drive via rotary encoder	The actual position is determined in the drive and transferred to the M-CNC software module via the fieldbus.
Software interfaces	
Process communication	Internal values are provided as SVI variables and are directly available for other applications or the visualization.
Application interface	IEC 61131-3 library for parameter assignment, operation and diagnostics of the M-CNC
Installation	
Installation medium for engineering PC	Installer, available by download
License protection on the M200 controller	License file depending on hardware
System requirements	
Engineering PC	Microsoft Windows 7, 8, 10, hard disk drive 200 MB free memory
M200 real-time system	Bachmann M200 processor modules of the MX, MC, and MH series, M-Base from V3.85R

Order data

Part type designation	Part number	Description
M-CNC Download	00016377-90	Software, PLC library, commissioning tool and user documentation for M-CNC. Requires M-Base.
M-CNC RT	00016377-63	License file to operate the M-CNC software module on an M200 controller.