42 exclusive DMG MORI Technology Cycles

COMPLEX MACHINING EASILY REALIZED
DMG MORI TECHNOLOGY CYCLES

Complex machining simply realised!

WITHOUT TECHNOLOGY CYCLES
CLASSIC DIN PROGRAMMING

+ Long programs
+ Unclear structure
+ Difficulties during re-entry
+ User-dependent know-how

More informations about the DMG MORI technology cycles:

DMG MORI.COM
If your mobile phone has QR code recognition software, you will be taken straight to all informations about DMG MORI technology cycles.

**WITH TECHNOLOGY CYCLES DIALOGUE-GUIDED PROGRAMMING**

- Proper program structure
- Program up to 60 % faster
- Error minimization by dialog-guided programming
- Technology integration (gearSKIVING, Grinding)
- Technology know-how stored in the program

DMG MORI exclusive technology cycles are the true assistants of the production-oriented programming to increase productivity and safety as well as to extend machine capability.

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# DMG MORI Technology Cycles

## 42 exclusive DMG MORI Technology Cycles

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If your mobile phone has QR code recognition software, you will be taken straight to the video.

**HANDLING CYCLES**
- Simplifies machine operation e.g. – B-axis Plunging
- Automates workflows – e.g. Counter spindle tip
- Protects against operator errors with higher safety. For example: Steady rest for turret

**MEASURING CYCLES**
- Increases machining accuracy – e.g. 3D quickSET
- Opens up new measuring possibilities for bulky component geometries – e.g. L-measuring probe package
- Increases transparency in QC processes – e.g. gearMILL with in-process measurement

**MACHINING CYCLES**
- Integrates new machining technologies e.g. gearSKIVING
- Expands machine capability – e.g. Grinding
- Simplifies complicated programming tasks – e.g. Multi threading 2.0

**MONITORING CYCLE**
- Increases machine safety – e.g. MPC – Machine Protection Control 2.0
- Increases process safety – e.g. Easy Tool Monitoring 2.0
- Adapts process parameters to eliminate vibrations – MVC – Machine Vibration Control

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**Milling and Mill & Turn**

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**Advanced Technologies**

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**Machine overview of all technology cycles**

52 – 55
Tool sort cycle

**Highlights**
- Shorter non-productive times thanks to sorting of tools in the tool magazine according to the sequence of the tools in the program*
- Time-optimized sorting in the chain magazine due to the use of the tool shuttle instead of the spindle

*Optimization is not done in parallel to main time

**Customer benefits**
- Minimized tool changing times from lot sizes > 3
- Flexible Werkzeugebelegung im Magazin abhängig vom NC-programm

**User Interface**

"It is perfect for me as a Job shopper, that the machine can sort the tools as needed in the NC-program."

**Procedure:**
- Actual tool sequence according to the first program is logged
- Tools are implemented by means of the tool shuttle in the chain according to the generated tool insert list

**Machine type:** CTX TC | CTX TC 4A*
**Control system:** CELOS with SIEMENS
*Only with tool magazine
Tailstock for turret

**Highlights**

- Centring tip mounted on the turret
- Centring tip data is saved directly in the tool memory
- For fixed and spring-loaded centring tips

**Customer benefits**

- Easy operation for positioning the centring tip
- Position-locking the turret leads to increased process safety
- Pressing force of the tip is variable, programmable and monitorable

**User Interface**

Start position and support position in X and Z-axis can be programmed via the operator screen. Monitoring of support position in a predetermined position can be programmed by the operator.

“A real value addition to my turret, being able to use it with a tail-stock.”

Machine type: CTX TC 4A I NTX | SPRINT 50/65 | CTX 4A
Control system: CELLOS with SIEMENS | CELLOS with MAPPS
Steady rest for turret

**Highlights**

+ Hydraulisch betätigte Lünette zum Abstützen langer und schlanker Bauteile
+ Erweiterung der Einsatzmöglichkeit bei mehrkanaligen Maschinen
+ Der Zyklus ermöglicht sowohl das An- als auch Freifahren der Lünette

**Customer benefits**

+ Hydraulically operated steady rest in the tool table
+ Position-locking the turret leads to increased process safety
+ Fix the steady rest position, to position and shape tolerances to comply with the program after reboot

**User Interface**

Support positions in X and Z-axis directly via the user interface.
Automatic calculation of the approach and retract traverses.

Machine type: CTX TC 4A | NTX I SPRINT 50/65 | CTX 4A
Control system: CELOS with SIEMENS
Counter spindle tip

**Highlights**

+ Perfect combination of 6-sided complete machining and tailstock function
+ Automatically load and unload a tailstock centre into the chuck of the main spindle or counter spindle via the milling spindle and into the magazine
+ Support of long and slender workpieces on the main spindle thanks to the synchronous counter spindle tip

**Customer benefits**

+ Higher component accuracy due to automatic change without opening the door (heat flow constant)
+ Position-locking the spindle with the tip leads to increased process safety

Machine type: CLX* | CTX* | NLX* | CTX TC | CTX TC 4A | NTX* | SPRINT 50/65* | NZX* | CTX 4A* | ALX*

Control system: CELOS with SIEMENS | CELOS with MAPP S

* In combination with counter spindle without automatic change from tool magazine

Automatic changed centering tip.

Parameter Input Mask: Control Cleaning, changing tip and control coolant, ...
Control of program status

Highlights
• In combination with the GILDEMEISTER structure programming, a safe and fast reboot of the machining program after an interruption
• Easy program operation especially with multiple spindles or tool magazine
• Displays the process status of the workpiece

Customer benefits
• Display of the detailed status on the controller
• Enter remarks automatically by the GILDEMEISTER structure programming
• Safe re-entry into the program by the press of a button instead of searching for a specific block

More than 200 variants with Automation

Machine type: NEF | CTX | CTX TC | CTX TC 4A | NTX 1000* | SPRINT 50/65 | CTX 4A | CTV
Control system: CELOS with SIEMENS
* with SIEMENS

GILDEMEISTER Structural Program
• Structured approach with more than 20 standard programs and more than 200 processing variants incl. automation (bar processing, robot / portal loading, ...)
• Display of the program status with additional markers (EPS) for the sub-programs.
**User Interface**

Simplified usability of measuring and parameter setting procedure

**Machine type:** CTX | CTX TC | CTX TC 4A | NTX
**Control system:** CELDS with SIEMENS

**Highlights**

+ Automatic optimization of servo drives parameters for Main- and Sub-Spindle
+ Reduction of Setup time
+ Optimization of machining result

**Customer benefits**

+ Setup Time reduction
+ Automatic determination of parameters independent from machine operator experience
+ saving the setting in NC-program for more quality assurance

**autoCHUCK**

NEW

With autoCHUCK the spindle with the Chuck will be perfectly adjusted to the workpiece machined

A perfect supplement for my machine.
I save time, energy and I am able to increase my workpiece quality at the same time.”
5-axis simultaneous machining

**Highlights**
- Free form surfaces by 5-axis interpolation on the main and counter spindle
- Turning and milling with interpolated B-axis
- With ATC-Turning for increased machine dynamics
- An intelligent Look-ahead function for a continuous process

**Customer benefits**
- High surface quality and transitions in combination with thermal compensation
- Machines calibrated to half tolerance

---

"Due to the intelligent movement control, I can achieve top machining profiles on my turn-mill machine which are comparable to that of a 5-axis Milling machine."

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**User Interface**

- Cycle activation.
- Online help on the controls.

---

**Machine type**:
- CTX TC
- CTX TC 4A
- NTX
- CMX V
- NVX
- DMU
- NMV

**Control system**:
- CELOS with SIEMENS
- CELOS with MAPPS
**Multi threading 2.0**

**Highlights**

+ On-Point Threading – Position oriented thread production
+ Free definition of contours, pitches and number of starts possible
+ Creation of large transmission threads, which can not be manufactured by simple thread chasing

**Customer benefits**

+ Trapezoidal, buttress and knuckle thread easily programmable at the machine
+ Screw conveyor with any profile geometry
+ Ball screw nut with cross holes simple to realize

**User Interface**

*Without an expensive CAD/CAM system, I can create complex threads and screw geometries directly on the machine.*

Input of the parameter for thread length, position of the thread and the distance of the retract movement.

Parameters for thread shaping, e.g. profile height, pitch diameter, etc.

Machine type: NEF | CTX | NLX | NZX (Tailstock) | CTX TC | CTX TC 4A | NTX | SPRINT 50/65 | NZX | CTX 4A | CTV

Control system: CELOS with SIEMENS | CELOS with MAPPS (V 1.0)
Multi threading 2.0 Pro

Highlights

• Producing profiles with undercut due to the profile splitting option.
• Applying standard tools and tool holder for left and right sided machining of the flanks
• Surface quality of Ra 0,3 an CrNi-Alloys possible

“Higher productivity on my CTX TC 4A with high surface quality – exactly the way I need!”

Up to 40 % faster on production machines with tool carriers
TURNING AND TURN & MILL

Polygon- / Oval-Turning

**Highlights**

- Easy handling of non-circular parts
- Intuitive user interface for polygons / oval turning

**Customer benefits**

- Making the required geometries with possibilities of simple fine-tuning
- Possibility of fine tuning of the geometric parameters (long/short Semi-axis and bearing angle)
- Machining can be combined with main spindle or counter spindle

**User Interface**

- Pre-position and support position in X and Z-axis can be directly entered over the surface.
- Monitoring of the support position via a defined Position window.

“By synchronizing the spindle and spindle powered tools, I can make non-circular surfaces significantly faster.”

Machine type: CTX* | CTX TC | CTX TC 4A | NTX* | SPRINT 50/65* | CTX 4A* | CTV

Control system: CELOS with SIEMENS

* Only in combination with a Y-axis
“Away from special machines, to more technology integration without compromising productivity or quality. My answer for increasing the variety of products and decreasing lot size.”

**crownHOBBING**

**Highlights**

- Production of hirth serrations by impact milling on turn-mill machines
- Automatic calculation of the tool path movement
- Position-oriented tooth pairings by determining the angular position of the toothing on the component

**Customer benefits**

- Strong shortening of the process chain because no special machines are needed
- Lower set-up time and comprehensive quality control thanks to the 6-sided complete machining
- More flexibility in technology adjustments due to the flexibility of the Turn Mill machine

**User Interface**

- Simple, structured input of all workpiece and gear data, ideal for small lot sizes

**Machine type:** CTX TC  
**Control system:** CELOS with SIEMENS

*Input of workpiece-, gear- and tool data.*  
*Setting the machining strategy and the correction parameters.*
Gear Broaching

**Highlights**

- Broaching of internal and external splines with dialogue guided programming
- One-Tooth up to 4-theeth cutting tools with clear tool definition for easy setup.
- Compensation parameters for tool holder deviation in X-direction

**Kundennutzen**

- Fast process setup with safer programming
- High flexibility while process adaption and corrections
- Internal and external gears up to module 4*

* on CTX beta TC up to Module 2 I on CTX gamma TC up to Module 4 I depending on workpiece and cutting tool dimensions

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**User Interface**

Parameterized clear definition of cutting tools

Compensation for tool holder deviation in X-direction

**Machine type:** CTX TC | CTX TC 4A | NTX
**Control system:** CELOS with SIEMENS
Highlights

+ Higher stability due to optimal force transmission in the longitudinal direction of the tool holder
+ Generation of tool feed in the Y-direction for parting off components at a push of a button
+ Compatible with the standard cycle CYCLE92 (Part off cycle), so that the operator can program as usual (ShopTurn and DIN/ISO)

Customer benefits

+ Up to three times higher productivity possible [3x feed] with simultaneously improved chip control
+ Reduced noise level and higher surface quality through more tool stability
+ Less material loss due to reduction of the parting width

User Interface

Operator mask for switching on the Y-axis parting cycle on turret and turn-mill machines.
**Highlights**

- Structured input parameters for the groove geometry, the tool and the machining strategy
- Inner and outer grooves in any position and number freely adjustable
- Easy compensation of tool displacement
- Calculation of residual strokes based on selected machining strategy

**Customer benefits**

- High flexibility in the production of any groove geometries with standard tools on standard machines
- Reliable alternative when pushing with driven tools is no longer an economical or technological solution
- Advantages of rigid machine guidance for better groove quality

**User Interface**

Input mask for inside and outside grooves according to DIN with standard tools.

Input parameters of the process strategy: Compensation of tool displacement.
Turning and Turn & Mill
Turning / Milling
Milling and Mill & Turn
Advanced Technologies

FreeTurn

Highlights
+ For shop-floor programming with easier integration in the NC-program.
+ Easy tool definition in for the NC-program due to the integrated tool library.
+ Possibility to define the adjusting angle (kappa) for each cutting edge and each operation to achieve the best machining results.

* Simultaneous movement of Kappa must be programmed with CAM.

Customer benefits
+ Possible saving of different tools and related tool changing time.
+ For roughing and finishing, profile turning, external cylindrical and face turning operations with optimized cutting force direction.

User Interface

Easy selection of the FreeTurn Tool via integrated library.
Easy tool definition for shop-floor programming on the machine.

Machine type: CTX TC | NTX
Control system: CELOS with SIEMENS

NEW

"With the Technology Cycle of FreeTurn I can apply this innovative technology on my DMG MORI Machines easily with higher programming safety."
Runtime Monitor

**Application**
- Especially for multi-channel machines for time analysis of the production process and as a basis for the cycle time optimization
- Individual zoom in to view minute details for cycle time optimization

**Customer benefits**
- Histogram up to three channels
- Provides the basis for cycle time optimization by graphical inputs
- Save/load the recorded data to compare individual optimized steps

**User Interface**
- Recording of primary and auxiliary processing time, program pause and the time waiting for tool change

"I save a lot of time during machining, because of the complete monitoring of my program status that allows me to quickly optimize the program at the right position."
Multitool

**Highlights**

- Efficient use of multi-tip turning tools with more than one cutting edge on turn & mill
- Several “sister tools” on one main tool holder

**Customer benefits**

- Reduction of tool change times
- Saves tool magazine space

User Interface

Machine type: NLX | NZX | Tailstock | CTX TC | CTX TC 4A | NTX | NRX |
NZX S | NZX | ALX | CMX V | NVX | NHX | i-Series | NMV |
DMU/DMC monoBLOCK | DMU eVo | DMF | DMU Gantry
Control system: CELOS with SIEMENS | CELOS with MAPPS

Selection of the tool cutting edge overview of tool details.

“The non-productive times can be reduced significantly and I require less space in the tool magazine.”
**ATC 2.0 – Application Tuning Cycle**

**Highlights**
- Process-oriented adjustment of the feed rate in relation to the table loading
- Minimization of machining time with maximization of the component quality
- **NEW:** Now also available for CTX TC. Ideal machining result with the highest machine dynamics*

**Customer benefits**
- User-friendly setting of the machine dynamics with included DMG MORI knowhow
- Time saving in roughing
- High surface finish during finishing

**User Interface**

Machine type: CTX TC | CTX TC 4A | NTX | CMX V | DMC V | NVX | MILLTAP | NHX | i-SERIES | DMC H linear | DMU | NMV | DMU/DMC monoBLOCK | DMU eVo | HSC linear | DMF | DMU/DMC duoBLOCK | DMU P/DMC U | DMU Gantry | ULTRASONIC 20/65 | LASERTEC 65 3D

Control system: CELLOS with SIEMENS | CELLOS with MAPPS | CELLOS with HEIDENHAIN

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“Without expert knowledge I can improve my processes very easily.”

ATC 2.0 – Milling: Consideration of table loading.

ATC – Turning: for CTX TC for easy adjustment of the machine dynamics.
TURNING AND TURN & MILL/MILLING AND MILL & TURN

**Alternating speed**

**Highlights**

+ Easy to operate through three parameters and without additional sensors
+ Avoiding vibrations by means adaptation of the speed
+ Application for the main spindle and counter spindle, or for milling machines with FD tables with DirectDrive

**Customer benefits**

+ No manual intervention by the operator
+ Identical repeatability for all components
+ Increased process safety for special applications by avoiding vibrations.
+ Example: When using long thin drills
+ Example: For milling parts with critical clamping

**User Interface**

Enter the parameters for the setpoint, the differential speed and revolution frequency.

Machine type: NEF | CLX | CTX | NLX | NZX (Tailstock) | CTX TC |
CTX TC 4A | NTX | SPRINT 50/65 | NZX | CTX 4A | CTV |
DMU eVo | DMF | DMU/DMC duoBLOCK
Control system: CELOS with SIEMENS | CELOS with MAPPS
Retraction Cycle

**Highlights**

- By pushing the associated key the X-axis and the Y-axis travel to the positive end-positions for external machining
- Ideally suited to prepare the work space for set-up and alternatively also as an emergency rescue function

**Customer benefits**

- Easy operation when setting up multi-channel machinery
- Possibility of a Fast response during external machining as a rescue function

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“Really user friendly option during machine set-ups, to be able to retract both axis to the safe end-position with the push of a button.”

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**Functionality:**
Selection of the cycle by pressing the associated key on the operating panel.

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**Machine type:** NEF | CLX | CTX | NLX | NZX (Tailstock) | CTX TC | CTX TC 4A |
NTX | Wasino | NRX | NZX-S | SPRINT 50/65 | NZX | CTX 4A | ALX |
CMX V | NVX | NHX | i-Series | NMU

**Control system:** CELOS with SIEMENS | CELOS with MAPPS
“By regular recalibration of the machine, we leave nothing to chance and avoid rejections.”

3D quickSET – Turning

**Highlights**
- Measurement and correction of the position of turning and Pivot axes (C4/C3/B)
- Sag compensation possible
- Can be used in combination with standard probes from customers (recommended Renishaw, Blum)

**Customer benefits**
- Reliable re-calibration of the machine before a highly precise processing
- Continuous documentation of machine accuracy
- No rejected parts due to unknown Geometric-deviations

**User Interface**

Dialogue-guided measurement of the B- and C-axis.

Machine type: CTX TC | CTX TC 4A | NTX*
Control system: CELOS with SIEMENS*
In a few steps:
1: Confirm ball diameter  
2: Enter angular step  
3: Select axis to be measured  
4: Move the measuring probe to the start position  
5: Confirm the cycle with start button  
6: Automatic adaptation in the kinematics settings
Gear hobbing

**Highlights**
- Programming of the gearing parameters via dialog input
- For spur gear, helical gear and worm gear
- Gear cutters and disk cutters can be used
- Maximized tool life by shifting of the cutter
- Achievable quality ≤ DIN 7

**Customer benefits**
- Gear profile modifications easy to handle
- Use of regrinded tools
- Error prevention by monitoring (e.g., wrong axis cross angle, or wrong turning speed, or turning direction)

**User Interface**
- Dialogue-supported input of all necessary gearing data.
- Input of the gearing parameters by single tooth or single groove milling.

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“Thanks to dialog-based programming I’m up to 50% faster.”
TURNING AND TURN & MILL / MILLING AND MILL & TURN

**Highlights**

- Straight and helical external or internal spur gears and splines
- Arrow teeth with tooth offset Turn-mill machines*
- Ball-shaped toothing by mathematical transformation of the 6th virtual axis* on TC-machines

* On CTX TC with counter spindle

**Customer benefits**

- Internal toothing without angular head possible
- Short processing times, 10× faster than shaping
- Synchronization and tool path controlled by the cycle

**Machine type:**
- CTX | NLX | NZX (Tailstock) | CTX TC |
- CTX TC 4A | NTX | NZX | CTV** | DMU eVo | DMF |
- DMU/DMC duoBLOCK**

**Control system:**
- CELOS with SIEMENS | CELOS with MAPPS

* Only in combination with a Y-axis. ** Only with DMF

---

An ingenious processing process, what was exclusive to the gear-cutting machines is now available in a universal machining centre with top quality.”

---

Inside gear profile machining.

Outside gear profile machining.
DMG MORI gearMILL®

Highlights

+ Productive complete processing
+ Cost-effective gear cutting on standard machine with standard tools
+ Flexible for different gear geometries
+ Quality inspection in the process

Customer benefits

+ Program creation based on blank drawings and gear data
+ Optimization of workpiece orientation e.g. after heat treatment
+ Interface for coordinate measuring device (Klingenber, Leitz, Zeiss)

Machine type: NLX | NZX (Tailstock) | CTX TC | CTX TC 4A | NTX | NZX | ALX* | CMX V | NVX | NHX | DMC H linear | DMU | DMU/DMC monoblock | DMU eVo | DMF | DMU/DMC duoblock | DMU P/DMC U | DMU Gantry
Control system: PP für CELOS with SIEMENS | CELOS with MAPPS

* Only in combination with a Y-axis  ** Only with UPFD

Input of the gear parameters for the geometry calculation of a spur gear.

Grafische Betrachtung des Abwälzverfahrens.
“With this process integration, we are able to achieve new manufacturing tolerances and surface qualities, which give us further technological advantages and profitability.”

TURN & MILL

Grinding – Turning

**Highlights**

+ Turning, milling and grinding in one clamping
+ Grinding cycles for internal, external and face grinding as well as dressing cycles
+ Body-borne sound sensors for start-up and dressing
+ Full integration of measurement module for relative and absolute LIVE-Measuring - parallel to main time

**Customer benefits**

+ Expansion of the technological limits of the CTX TC
+ Surface accuracy < 0.4 µm
+ Roundness < 5 µm
+ Quality IT5 for Ø > 30 mm

User Interface

External, internal and circular grinding.
Grinding with straight/angle or cup disc.

Machine type: CTX TC | CTX TC 4A
Control system: CELOS with SIEMENS

Dressing straight, angled or cup discs simply visualized.
Schleifen – Fräsen

**Highlights**

- Better surface quality through integration of the grinding technology
- Grinding cycles for internal, external and face grinding as well as dressing cycles
- Body-borne sound sensors for start-up and dressing
- 1,300 l Cooling system with integrated centrifugal filter for the filtration of particles > 10 µ
- AKZ nozzle unit optionally available for best possible flushing of the grinding gap

**Customer benefits**

- Surface accuracy < 0,4 µm
- Roundness < 5 µm
- Quality 5 for ø < 120 mm
- Quality 4 for ø > 120 mm

**Machine type:** DMU/DMC duoBLOCK

**Control system:** CELIOS mit SIEMENS

Due to this process integration we can now cater to more customer requirements on our universal machines.

**User Interface**

Spiral plane grinding or oscillating plane grinding.

Longitudinal grinding.
"Polygonal shaft-hub connection can be produced perfectly to DIN specifications at the push of a button with one setup. We can eliminate further operations on other grinding machines and save precious time."

### Polygon- / Oval-Grinding

**Highlights**

- Producing high precision oval and und polygon geometries with grinding – tolerance class IT5*
- Easy parametrized definition of the geometries based on DIN 32711
- Perfect complement to technology cycle Polygon- / Oval-Turning

* as extension of the grinding technology cycle

**Customer benefits**

- New machining opportunities for more innovations on the part – e.g. shaft-hub connections.
- Position-oriented polygon and oval geometries due to 6-sided complete machining advantages

**User Interface**

- Dialog guided parameter setting of 4-edge polygon
- Dialog guided parameter setting of oval

**Machine type:** CTX TC | CTX TC 4A | NTX

**Control system:** CELOS with SIEMENS
The technology integration of flat grinding enables us to complete the machining process with only one clamping.

**Highlights**

- Technology integration flat grinding on standard machines for best surface results
- Possibility of straightness compensation by definition of calibration points
- Acoustic emission sensor assisted approaching cycle
- ECS nozzle unit for best possible flushing of the grinding gap optionally available

**Customer benefits**

- Easy programming with the integrated input parameters
- Complete machining with one setup

**Optional rotating dressing unit incl. dressing cycles**

**Machining strategies**

1. Rotary dressing unit
2. BN-grinding disk
3. ECS nozzle unit

Machine type: DMU/DMC duoBLOCK | DMU P | DMC U
Control system: CELOS with SIEMENS

- Zigzag - machining strategy
- Meander - machining strategy
- One-way machining strategy
"I can now generate eccentric part geometries on both turn – Mill machines."

Interpolation turning - turning recessing cycle

Movement 2: circular interpolation of the TC spindle in X and Y

User Interface – Turn & Mill

External, internal and surface grinding

Dressing straight, angled or potted discs easily visualized
TURNING AND TURN & MILL / MILLING AND MILL & TURN

Interpolation turning

Highlights

+ With interpolation turning, the tool cutter follows a circular movement, where the cutter is always oriented towards the center of the circle.
+ Possible for external and internal machining.
+ Synchronization and tool path controlled by the cycle.

Customer benefits

+ Easy manufacturing of sealing surfaces where milling operation might not be possible.
+ Complete component processing in one clamping possible.
+ Reduced investment costs for tools.

Machine type: CTX TC | CTX TC 4A | NTX | DMC V | NVX | MILLTAP | NHX |
DMC H linear | DMU | DMU | DMC monoBLOCK | DMU eVo | HSC linear |
DMF | DMU | DMU | duoBLOCK | DMU P | DMC U | DMU Gantry

Control system: CELOS with SIEMENS | CELOS with MAPPS
**Excentric turning and milling**

### Highlights
- Superposition of the turning movement by additional X- and Y-traverses
- Applicable for turning and milling

### Customer benefits
- Eccentric geometries easy to manufacture
- Exact axis coupling and synchronization in the background

### Machine types
- CTX | NLX | NZX (Tailstock) | CTX T | CTX TC 4A | NTX | SPRINT 50/65 | NZX | CTX 4A | CTV | DMU/DMC monoBLOCK | DMU/DMC duoBLOCK**

### Control system
- CELOS with SIEMENS | CELOS with MAPPS

* Only in combination with a Y-axis ** Only with DF/FO

---

*Instead of using a complex and expensive CAD / CAM system, its just a matter of pushing a few buttons on these machines.*

---

**User Interface**

- Enter the parameters for the position of the external workpiece area.
- Graphical representation of the position within the workpiece.
“Every second counts in a production environment. Now I can safely and easily optimize my process.”

**Efficient Production Package**

**Highlights**

+ Solutions for a safe process and for the efficient use of important machining steps
+ Applications: cone cleaning, tool data monitoring, safe withdrawal movement, tapping, deep hole drilling, external thread and spigot milling, internal thread and circular milling, reverse countersink cycle
+ 12 stored machining strategies for stock removal, deep hole drilling, Pocket milling machines*

**Customer benefits**

+ Runtime optimization according to individual application
+ Safe retraction after program break
+ Tool data monitoring

**User Interface**

- Tapping: Safe tool retraction in the event of a failure (e.g., power failure)
- Easy design of machining strategies for high productivity *

**Machine type:**
- NLX* | NZX (Tailstock) | NTX | NZX* | ALX* | CMX V | NVX | NHX |
- i-SERIES | DMC H /near | NMV | DMU / DMC monoBLOCK |
- DMU / DMC duoBLOCK | DMU Gantry

**Control system:**
- CELOS with SIEMENS | CELOS with MAPPS

* Only in combination with a Y-axis
Easy Tool Monitoring 2.0

 highlights

- Prevention of damage due to tool breakage or tool overload
- Sensorless with automated learning of load limits
- For turning, milling and drilling (up to 3 mm diameter)
- NEW: User interface on CELLOS SideScreen
- NEW: Powerful algorithm for efficient monitoring after the first workpiece

Customer benefits

- Protection Package: Perfect supplement to MPC on CTX TC machines. Price advantage (approx. 40%)
- Save the monitoring limits for each tool and every cutting edge in the program

User Interface

LIVE status display in CELLOS SideScreen; current, set process values.

Machine type: NEF | CLX | CTX | NLX | NZX/ Tailstock | CTX TC | CTX TC 4A | NTX | Wasino | NRX | NZX-S | SPRINT 50/65 | NZX | CTX 4A | ALX | CTV | CMX V | NVX | NHX | i-SERIES | NTV
Control system: CELLOS with SIEMENS | CELLOS with MAPPS [V 1.0]
Since using MPC, spindle or machine damage that occurred due to overload or collision has been reduced significantly.

The visualization in CELOS-Side-Screen. A clear Overview of process values, warnings and limits.

**MPC 2.0 – Machine Protection Control**

**Highlights**
- Vibration monitoring in the process
- Rapid shutdown in case of a crash
- Manual retraction even in swiveled machining plane
- NEW: Torque monitoring
- NEW: Recommended with Protection Package for CTX TC machines

**Customer benefits**
- Avoiding tool breakage
- Increase in machine availability
- Damage reduction

**User Interface**

- MPC Graph: current and learned process values.
- MPC Diagnostics: stock condition, number of impact and crash.

**TURNING AND TURN & MILL / MILLING AND MILL & TURN**

**MPC 2.0 – Machine Protection Control**

Machine type: CTX TC | CTX TC 4A | NTX | DMC V | NVX | NHX | DMC H (linear)
- CMX U | DMU | DMU/DMC monoBLOCK | DMU eVo | DMF
- DMU/DMC duoBLOCK | DMU P/DMC U | DMU Gantry
- ULTRASONIC 20/65 | LASERTEC 65 3D

Control system: CELOS with SIEMENS / MAPPS / HEIDENHAIN
Fit in – B-axis Plunging

**Highlights**

+ Full utilization of the working space during internal machining of high workpieces with long tools
+ Positional changes of the B axis during the turning are balanced by the X- and Y-axes
+ The Z-axis remains at the retracted position while the B-axis is moving

**Customer benefits**

+ Easy programming
+ Collision-free plunging in the workpiece
+ Safely coming out from the workpiece after machining

"Workpieces with extra height can also be internally machined safely."

User Interface

Machine type: DMU eVo | DMF | DMU/DMC duoBLOCK
Control system: CELOS with SIEMENS

Inner and outer travel of the B-axis.
“Unrecognized errors in tool assembly or cutting edges are now the problems of the past. Proactive testing before cutting protects against bad surprises!”

**Dynamic Tool Scanning – Dyna Line**

**Highlights**
- Precise tool measurement with the CMOS laser measuring device
- Due to the rotation of the turning tool, errors in the tool assembly and cutting edges can be detected

**Customer benefits**
- Visualization of the most important measurement results in CELOS-SideScreen
- Automatic measurement cycles easy to program

**User Interface**
- Display of the measuring result of the tool profile in CELOS.
- Display of the TIR (Total Indicated Runout) in CELOS.
L-Measuring probe packet

**Highlights**

- Measurement of webs and grooves on components
- Measurement of diameter in difficult to access places
- Available with manual and retractable Calibration unit Package content
- L-Measuring probe according to Customer-specific design

**Customer benefits**

- Flexible application possibilities
- In process measurement

"With this measurement package I can now also measure complex geometries directly in the process and correct the deviations. The perfect support for Aerospace applications."

**User Interface**

Semi-automatic Measurement solution.  
Automatic measurement solution.

**Machine type:** DMC H linear | DMU | DMU/DMC monoBLOCK | DMU eVo  
HSC linear | DMF | DMU/DMC duoBLOCK | DMU Gantry  

**Control system:** CELOS with SIEMENS
Without the fear of error, even inexperienced machine operators can take measurement manually as well as save time.

**W-Setter**

**Highlights**

- Manual tool length measurement and workpiece centering in simple steps
- Guided instructions in the measurement. Short set-up times with high operational safety

**Customer benefits**

- Shorter set-up times
- No expertise prerequisite to take simple measurements

**User Interface**

Structured user notes for the measurement results.

**Machine type:** CMX V | NVX | NHX | i-SERIES  
**Control system:** CELOS with MAPPS

**Toolsetter mode** – length / diameter and wear measurement.
VCS Complete

**Highlights**
- Geometric fingerprint of the machine
- Volumetric calibration at the touch of a button
- Detection and compensation of geometrical, positioning and angular errors of all axes
- Easy handling and implementation by the customer directly at the machine

**Customer benefits**
- Regular compensation of the machine geometry over the entire life cycle of the machine
- Dialogue-led operation for easy and fast handling
- Data recording for further analysis

Machine type: DMU/DMC monoBLOCK
Control system: CELOS auf Operate with SIEMENS 840D solutionline | HEIDENHAIN TNC 640

Possible accuracy deviation without VCS Complete.
MVC – Machine Vibration Control

**Highlights**

- Vibration sensors in the milling spindle
- Various indicators to display the vibration status
- New machining proposal to reduce vibrations
- With the edit function, the new machining state is easily applied to your program

**Customer benefits**

- More productive cutting condition with less vibration
- Automatic suggestions for suitable process parameter
- The simple visualization serves as an orientation aid for machine operators

**User Interface**

Status display of the process vibrations in CELOS.

Algorithm for the automatic recognition of regenerative vibrations.

Machine type: NTX | NVX | NHX
Control system: CELOS with MAPPS

"The intelligent algorithms take the work off me. The chattering detection is simply a must!"
MILLING AND MILL & TURN

TCC – Tool Control Center

**Highlights**

- Chip detection on plan pad and tool cone
- Monitoring of pull-in force
- Cutting edge control in process by symmetry monitoring of the bending moment per cutting edge
- Visualization of the bending moment over time via Graph

**Customer benefits**

- Tool and workpiece protection
- Optimized tool process
- Monitoring of the radial and axial spindle load depending on the actual pull-in force

Machine type: DMC H linear | DMU/DMC monoBLOCK | DMU/DMC duoBLOCK | DMU P/DMC U | DMU Gantry

Control system: CELOS with SIEMENS | CELOS with HEIDENHAIN

"Thus I have the best use of the tool life and can even increase production profitability."

Thus I have the best use of the tool life and can even increase production profitability.
The autonomous monitoring of the clamping force by the machine and thereby the needs-oriented, automated lubrication allows us a low-maintenance machine without manual intervention.

Maintenance Package i4.0

**Highlights**

+ Automatic recognition of tool pull-in force for consistently high process stability.
+ Predefined cycle for automatic lubrication, every 75h or after 20,000 tool changes.
+ Detection of leakage and measuring of usage of pneumatics system.

**Customer benefits**

+ Efficient and timesaving lubrication without operator intervention
+ High transparency by displaying the lubrication cycles and the current pull-in force.
+ Data recording in combination with the optionally available Condition Analyzer for additional analyzes of air consumption and changes of the pull-in force

**User Interface**

Simple query of the monitoring parameters and the current pull-in force.

Detection of leakage and measuring of usage of pneumatics system.
ADH - Automatic Hole Detection

**Highlights**

- Parameters for image processing can be configured individually
- Manual correction for hardly detectable or partially closed drill holes possible
- Automatic documentation of data for a consistent tracking of parts

**Customer benefits**

- Reduced cycle time for measuring and machining of parts by using only one setting
- Individual settings of acceptable deviations from target values (e.g. diameter) can be changed by the operator
- Retrofit with software extension possible (Existing software can still be used)

**Machine type:** LASERTEC 50 PowerDrill, LASERTEC 130 PowerDrill

Control system: CELOS with SIEMENS | CELOS with HEIDENHAIN

"With this innovative software extension, we can provide an increased efficiency for new and existing customers."

**User Interface**

Automatic detection and position compensation of round and elliptical drill holes

Possibility for manual correction of hardly detectable or partially closed drill holes
"Due to use of the ULTRASONIC microDRILL technology it is possible to drill thousands of micro holes with highest process safety."

**Highlights**

+ With ULTRASONIC 2nd Generation and 32,000 rpm for micro drilling with highest process safety
+ Fully integrated regulation of the drilling force in the preset-spindle down to smaller 1 N – independent from the z-axis of the machine
+ ICS with separate fine filtration and flow rate control starting from 1 l/min
+ Automatic ejector mechanism for drill cores from the diamond hollow drills

**Customer benefits**

+ Drilling diameter from 0.1 mm – 2.0 mm
+ Several thousand holes per part possible without manual interaction
+ Applicable for diamond hollow drills and spiral drills

**User Interface**

- Machine type: ULTRASONIC 50
- Control system: CELOS with SIEMENS

- Fully integrated into the display in the CELOS SideScreen
- Precise regulation of the drilling force incl. Control cycle up to smaller 1 N
AM-Evaluator

**Highlights**
- Visualization of relevant process data (for example, melt pool size, powder mass flow) as a digital 3D model and over time
- Detailed analysis of process data
- Direct comparison of processes for quality assurance
- Creation of part reports

**Customer benefits**
- Simplification of process development
- Support in quality control
- Enables individual analysis and work up of process-relevant data
- Easy retrofitting of the software within the AM-Analyzer product package (Existing software can still be used)

**User Interface**
- Machine type: LASERTEC 65 3D | LASERTEC 65 3D hybrid | LASERTEC 125 3D hybrid
- Control system: CELOS with SIEMENS

"The AM Evaluator provides a detailed analysis of process data to improve process stability"
### 42 Exklusive DMG MORI Technologiezyklen

**Categories**

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**Description:**

- *optional available
- - not available

1 only with Y-axis, 2 only customized on demand, 3 only with counter spindle.

Optional with 4 = SIEMENS, 44 = FANUC, 4H = MITSUBISHI, 5 = MAPPS (FIM) standard 6 = FANUC standard 7 = MITSUSILI standard

Optional with 4 = FANUC and SIEMENS 4H = SIEMENS and HEIDENHAIN 66 = FANUC and MITSUBISHI 7 = FANUC standard and SIEMENS optional 17 = SIEMENS standard 17H = SIEMENS standard and HEIDENHAIN optional
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### Milling

| Fit in – B-axis Plunging    | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| Dynamic Tool Scanning – Dyna Line | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| L-Measuring probe packet   | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| W-Setter                   | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| VCS Complete               | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| MVC – Machine Vibration Control | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| TCC – Tool Control Center  | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| Maintenance Package i4.0   | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |

### Advanced Technologies

| Automatische Bohrungserkennung (AHD) | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| ULTRASONIC microDRILL         | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |
| AM Evaluator                 | x   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |

**Description:**
- **x** = optional available – not available
- **1** only with Y-axis, **2** only customized on demand, **3** only with counter spindle,
- **4** = SIEMENS, **5** = MITSUBISHI, **6** = MAPPS (F+M) standard, **7** = SIEMENS standard
- **(4)** = FANUC standard, **(5)** = MITSUBISHI standard
- Optional with **4** = FANUC and SIEMENS, **5** = SIEMENS and HEIDENHAIN, **6** = FANUC and MITSUBISHI
- **7** = FANUC standard and SIEMENS optional / five.lf/four.lf

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Your contact persons

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