IndraMotion MTX micro
The compact CNC system for standard machines
IndraMotion MTX micro – profitability with complete functional range

The market for CNC machine tools is very diverse today and also requires low-cost control and drive solutions for standard turning and milling machines. CNC system IndraMotion MTX micro from Rexroth is the ideal tool for these applications and is exceptionally affordable.
IndraMotion MTX micro is the compact, simple, powerful, and nevertheless low-cost CNC solution from Rexroth for standard turning and milling machines. It consists of a custom HMI interface and a compact multi-axis drive controller with high-capacity CNC control and PLC.

**Advantage**
- Easy to use and practical
- Ultra-high reliability and production accuracy – down to the nanometer
- Machining times minimized thanks to a high-performance 32-bit processor
- Fast, easy commissioning of the turnkey system
- Small installation space in control cabinet required to accommodate compact multi-axis drive controller
- Direct connection to 200 - 500 V, 50 - 60 Hz supply mains without a transformer

All of these advantages make IndraMotion MTX micro the most compact and high-performance CNC in its class.

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**IndraMotion MTX micro is the perfect CNC system for:**
- Turning machines and basic turning centers
- Drilling machines
- Milling machines
- Basic machining centers

**Features**
- Operating panels and software optimized for turning and milling machines
- Comprehensive technology-cycle library for easy, efficient solving of complex machining tasks
- Multiple technological functions for complete machining
- Compatible with the standard, performance and advanced versions of IndraMotion MTX
- Preconfigured software for turning and milling
- Open PLC per IEC 61131-3 for application-specific enhancements
- Engineering tools for easy, fast commissioning and diagnosis
Turning – precise and complete

IndraMotion MTX micro offers all functions and options for the standard turning machine without option list:

- Constant surface speed
- Tapping with or without compensating chuck
- Spindle turret axis
- Turning, drilling and milling cycles for complete machining

\[ \text{Operating panel for turning machines} \]
- Brilliant color TFT display, 21.3 cm (8.4“)
- IP54 protection at the front
- Compact machine user panel
- Interface for inserting a USB memory stick
- Integrated hand wheel
- Emergency stop button
- Start/stop button
- 24 V DC connection voltage

\[ \text{Drilling and milling functions for complete machining} \]
- C axis machining with live tools
- Cylinder surface machining
- End-face machining
Milling – quick and efficient

IndraMotion MTX micro covers the complete range for the standard milling machines:

- 2.5D and 3D machining using up to 4 interpolating axes
- Direct programming of drawing measure
- Free positioning of the workpiece coordinate system in space
- Drilling, milling and turning cycles for complete machining

Operating panel for milling machines
- Brilliant color TFT display, 26.45 cm (10.4”)
- IP54 protection at the front
- Compact machine user panel
- Interface for inserting a USB memory stick
- Connection for mobile hand wheel
- Emergency stop button
- Start/stop button
- 24 V DC connection voltage

Functions for highly precise, fast machining
- Axis-specific jerk limitation
- 1,000 NC blocks with look-ahead function
- Spline interpolation
- B-spline compressor
- Nanometer interpolation
User friendly operation and programming

The customized operating panel combines all functions, from visualization, to machine operation, to programming in a single unit – IndraControl VDP 80. The control panel is available in two variants for turning and milling machines. In addition, there is the milling machine operating panel for universal application – with flexible labeling of the operating keys through slide-in stripes.

- ASCII keyboard for programming
- Direct selection of the operating area
- Rotary switch for override spindle
- Soft-keys for controlling the current operating area
- USB port
- Machine operating

- Operating area: flexible labeling through slide-in stripes
- Operating panel for universal application
  - Brilliant color TFT display 26.45 cm (10.4“)
  - Features as operating panel for milling machines
  - Additional interface for a second hand wheel
  - Flexible labeling of the operating keys through slide-in stripes
The software assists the operator in all tasks by providing intuitive dialog screens, e.g.:
- Set-up the machine
- Prepare the tools
- Develop and process the NC programs
- Change parameters
- Diagnose problems

Standard languages are German, English and Chinese, with additional languages available upon request.

Convenient editor functions facilitate NC programming and running in programs. The user interface is available in multiple languages, which can be toggled without having to restart the control system.
A user administration facility enables access to be restricted to specific functions so that the machine can be operated safely and reliably. Alarms and messages are output in plain text and documented in the integrated log book.
Cycles – parameterize instead of program

IndraMotion MTX micro features numerous technology cycles for standard machining processes. The comprehensive library covers even combined turning and milling work. Intuitive user guidance makes it easier to select a cycle and enter parameters. Dialogs provide information in text and graphical form. Everything remains straightforward thanks to practical pre-assignment of parameters. Even complex machining tasks can be carried out very quickly. This, in turn, improves efficiency and helps to avoid errors.

Contour cycles are used to easily program and efficiently machine turning and milling workpieces. Workpiece contours are described with DIN G-Code and the dimensions for lines, radii and chamfers copied into the program directly from the workpiece drawing. The contour cycles calculate automatic cut segmentation during machining and ensure efficient tool guidance. Threads, grooves, undercuts and pockets are then simply added via parameter configured technology cycles.

**Cycle examples**

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<tr>
<th>Turning</th>
<th>Drilling</th>
<th>Milling</th>
<th>Contouring</th>
<th>Engraving</th>
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**Cycle input dialog**

- Graphical assistance for every parameter
- Brief description of parameter
- View optional parameters for experts
- Plausibility protocols of parameters entered
Efficient CNC programming

NC functions with syntax according to DIN 66025
The conversational NC programming – movement sequences and their boundary conditions (geometry, kinematics, dynamics, corrections, etc.) are described using DIN programming. Standard programming is a language only for writing commands that control movements at the machine and specific machine functions.

The NC functions with high-level language syntax enhance G-code programming according to DIN 66025 to include additional performance functions for effective NC programming. The syntax also makes it easier to understand the NC program. Example: scale (long form) or SCL (short form) for enlarging or reducing a programmed contour.

The CPL programming (Customer Programming Language) is rooted in the BASIC high-level language standard and can therefore be easily learned. CPL can be used for variable programming, mathematical operations, control structures such as REPEAT, WHILE, FOR, IF, CASE, GOTO and access to system states.

Using CPL leads to:
- Shorter NC programs for repeat procedures and similar program segments
- Condition-based program variants
- Universally applicable subprograms

User cycles
DIN and CPL programming can be used to create separate cycles. Simple configuration allows them to be seamlessly integrated into the system next to the technology cycles.
Flexible setup functions

Tool management
The tool management facility is easy to use and can be adapted to the machine:

- Up to 999 tools, 16 cutting edges per tool
- Geometry and wear corrections
- Tool life management
- Radius correction, cutting edge correction
- Angle head tools
- Fixed-place coding/variable coding
- Alternate tools

Set workpiece and tool zero points
Intuitive dialogs for setting the zero points for workpieces and tools assist the operator during routine work. This simplifies the process of setting up the machine and reduces the time required for this – minimizing mistakes.
IndraMotion MTX micro Trainer – learn it easily, master it quickly

CNC operation and programming of IndraMotion MTX micro

With the software IndraMotion MTX micro trainer you simulate the CNC control system IndraMotion MTX micro on a PC. With the faithful representation of the operator panel and of the user interface you learn easily how to operate and create CNC programs for the IndraMotion MTX micro and you can master the tasks in a short time.

The CNC programming of the IndraMotion MTX micro is identical to the CNC control variants IndraMotion MTX standard, MTX performance and MTX advanced.

Benefits
- Easy learning of the operation and programming of the IndraMotion MTX micro CNC controller
- Testing of CNC programs in a realistic environment without the machine
- Sample programs and documentation included
- CNC programming is consistent with all IndraMotion MTX CNC controls.
- Cost free download from Internet
Impressive performance

Maximum precision
- High-resolution processing of command and actual positions ensures precision machining down to the nanometer.
- The absolute encoders for the servo motors, with a resolution of $2^{21} = 2097152$/revolution, provide for high control quality.
- Optional use of multiturn absolute encoders eliminates the need to reference the servo axes after the machines have been activated, even when long traversing ranges are involved.
- Special compensations in the drive take non-linearities in the mechanics into account.
- All parameters required for operation are stored in the encoder data memory in a fail-safe manner.

Dynamic movements for short machining times
Intelligent drive technology meets the demanding requirements for control quality and dynamics of the servo axes.
- All control functions are implemented close to the drive to achieve fast clock rates of up to 125 µs.
- The default parameter settings of the system typically eliminates the need for further optimization.
- Numerous options for making filter settings (e.g. electric current target value filter, axis-specific jerk limitation) meet the requirements for particularly dynamic motion sequences; autotuning, an oscilloscope function and integrated testing functions minimize commissioning times.

Filter settings (e.g. electric current target value filter) enable very dynamic axis movements with ultra-high machining accuracy.

Precision machining down to the nanometer with IndraMotion MTX micro
Direct communication

Program processing over the network
- Easy integration of IndraMotion MTX micro in existing network infrastructure via Ethernet and TCP/IP
- Almost unlimited storage space for CNC programs and data
- Slim transfer protocol ensures fast data transmission
- Seamless integration of external CNC data in the Indra-Motion MTX micro file system via network drives

Program processing over the external storage media
- A USB port on the front of the control panel can be used to connect external storage media such as a USB memory stick
- Integration of storage media in the file system of the controller enables direct selection of CNC programs (copying not necessary)

Remote maintenance and diagnostics
TCP/IP communication allows a connection to be made to an office PC and CNC control system. This, in turn, makes it possible to carry out diagnostics from a control station or even perform remote maintenance over the Internet.

Integration of IndraMotion MTX micro in existing network
- Remote maintenance over the Internet
- Program execution over the network
- Backups or program processing using a USB port
IndraMotion MTX micro from Rexroth raises the bar when it comes to easy installation and commissioning of a high-performance CNC system. Basic projects are provided for applications involving a typical CNC machine. A turning machine, milling machine or turning center can thus be parameterized in no time by loading the software. You can then concentrate on what matters most: the machine itself.

The high level of system integration also offers decisive advantages with respect to assembly and maintenance:
- Minimum number of modules
- Easy wiring
- Screwless terminals
- Ultrahigh availability
- Maintenance-free hardware

**Easy Setup Documentation**
The compact setup documentation is easy to understand but also comprehensive, since all relevant information is provided for you to quickly commission the CNC system.

**List of contents**
- Choosing and connecting hardware
- Basic software installation
- Basic project and general settings
- PLC commissioning
- Commissioning and optimization of the drives
- IndraMotion MTX micro operating software
- Connection diagrams
- Overview of parameters
- Standard I/O assignment
We offer you not only a complete range of drive and control solutions, but also an in-depth consultancy expertise and a best-in-class service portfolio: from conceptual development above commissioning to modernization – for an economical lifecycle of the machine.

**Industry-focused engineering and applications support**

Our experienced team of industry experts provides advice and support to assist you during conceptual development and design of your solution:

- Selection of specific automation components (hardware and software) for your application
- Detailed description of control and drive components, interfaces and data management
- Development of sample applications
- Active involvement in initial applications at your site
- Support during integration of Ethernet-based sercos real time communications
- Individual support for the systematic and compliant issue of safety strategies

**Software and hardware engineering**

Rexroth provides expert advice and support to assist you during development of your production systems and networks. IEC-compliant PLC function modules and NC cycles for nearly all industry sectors are available in our software library.

**Commissioning**

Our technical support experts are right at your side whenever you need fast, professional assistance during the commissioning phase. Each of our teams are made up of service engineers who specialize in a particular industry.

**Service**

Our service team supports you throughout the planning, installation, commissioning, operation and extended life phases:

- Technical support/helpdesk
- Field service
- Repair service
- Spares service
- Retrofit and modernization
- Industry-focused training
Example: a simple turning machine with 2 axes and 1 spindle

- Mobile hand wheel
- Simple data transmission and backup by means of USB memory stick
- Ethernet communication for engineering and DNC operation
- CompactFlash module as system data memory
- Operating panel: all controls integrated
- Main spindle encoder
- Main spindle drive
- Encoder feedback
- Power
- Servo motors
- Multi-axis drive controller
  - Integrated control with CNC kernel and IEC 61131-3 compliant PLC
  - High-end servo functions
  - HMI function
  - Modular expandable I/O assembly
  - Simple direct connection for 24 VDC I/O signals
  - No adaptation transformer required
  - Pluggable cable for power and encoder feedback
  - Integrated frequency converter to actuate standard asynchronous motors of up to 11 kW
  - Connection to external main spindle encoder
Example: turning centers and milling machines with 3 axes, 1 spindle, and 2 additional axes

- Ethernet communication for engineering and DNC operation
- Mobile hand wheel
- Simple data transmission and backup by means of USB memory stick

### Additional Components
- Connection of CNC axes and I/O modules via sercos

### Operating Panel
- All controls integrated

### Servo Motors
- Encoder feedback
- Power
- CompactFlash module as system data memory

### Main Spindle Encoder
- Main spindle drive

### Multi-axis Drive Controller
- Integrated control with CNC kernel and IEC 61131-3 compliant PLC
- High-end servo functions
- HMI function
- Modular expandable I/O assembly
- Simple direct connection for 24 VDC I/O signals
- No adaptation transformer required
- Pluggable cable for power and encoder feedback
- Actuation of high-performance spindle motors up to 11 kW
- Connection to external main spindle encoder
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- Standard
- Optional
- Not at 3 axes variant (HCT)
## 7 CNC programming

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## 9 PLC functions

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## 12 Controlled servo motors

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The data specified above only serve to describe the product. As our products are constantly being further developed, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.