

MefiCAM – CAD

Basic technical data

Hardware architecture

- Motherboard 4PCA, processor PENTIUM P4 HT 2,8GHz
- Units SU05 for control 4 axes max. axes number 16
- Double channel unit CDIST for connection serial distributed Inputs and Outputs
- Inputs/Outputs – external serial peripherals INOUT07 with a fast reaction possibility max. 320 ON/OFF inputs, 256ON/ OFF outputs and 112 matrix inputs
- Analog inputs AINP02 for 6 potentiometers or 3 differential analog inputs (max. 4 units)
- Backup memory - HARD DISK, FLASH DISK (e.g. 20GByte according to disc type)
- Connection to network MS WINDOWS (ETHERNET)
- Floppy disc (mainly for service purposes)
- Control of digital drives via CANBUS or by SLM technology

Software included

- Linear interpolation in 6 axes
- circle interpolation in machine layers, helix
- 16 servoloops
- Coordinates range +/- 69999.999 mm
- Spindle control in position feedback
- Copy according to origin, two groups of dragged coordinates
- Constant cutting speed
- Thread cutting with/ without run out, thread run in
- Table of nonlinear corrections for both directions with defined dependence. 3D nonlinear correction
- Compensation of dynamic clearance
- Coordinate transformation – planar / 3D (optional)
- Independent trajectory shift per rotation knob during moving
- Arbitrary number of pulse/inc. Rate with accuracy +/- 0.000001
- Optional potentiometer control of all axes
- Possibility of connection of mobile panel with rotation knob and axes control
- Possibility of connection of small mobile panel with rotation knob and LCD display

- Drives control per analog voltage or per pulse outputs
- Filter for frequency rejection filter for servoloops
- Servoloops matching to high speed machining (feed forward etc.)
- Measurement check (phase, checking counter, differential counter, broken and short circuited wire test)
- Automatic system adjusting for coded rulers
- Cycle time of drive servoloops 1ms, interpolator's cycle time 1 ms
- Minimum time of block execution without technological functions 1ms, with technological functions 20ms
- Minimum block execution time for fluent velocity matching 4ms
- Parabolic velocity response (acceleration increasing rejection)
- Frequency band- stop for servoloops for resonance rejection
- Envelope speed – „predicting“ and velocity correction 500 block in advance
- Heat compensation
- Optional connection of measuring probe
- Connection to networks Ethernet, Internet, TCP/IP, FTP optional wireless connection
- Event monitoring, event log file, connecting to FTP server
- Optional connection to DNC network MEFI together with adapters TRANS
- Possibility of control of asynchronous motors per frequency converters
- Graphical view 3D and graphic machining trajectory tracing with possible zoom and trajectory velocity and continuity analyzing
- Storage oscilloscope with up to 12 optional channels
- System time utilization information in text file format
- Language versions of control panel : Czech, German, English, Polish, Hungarian, Russian

Programming:

- Unlimited length of partprogram (20MB and more), depends on installed memory only

- Origin choosing, radius and length correction – computing up to 200 blocks in advance
- Coordinate transformation – origin, mirroring, scale
- Radius corrections with equidistant optimizing, possibility of circle inserting
- Programming via dialogue graphic
- Possibility of installation of high language designing system MefiCAM company COSCOM

PLC part:

- Length of the PLC program - 1Mbyte of machine code (max.16 modules)
- Possibility of programming the logical sequential automatons
- System control from the PLC per sequence of keys and a format option
- Possibility of external panel connection
- Control and setting of drive controller parameters
- Control of position feedback for rotational coordinates
- 6 one - axis position units for PLC use.
- Possibility of creating user PLC screens including pictures, animations and MENU structures
- Debugging of PLC by external computer, Debug tools in integrated environment WinTechnol

Dimensions [mm]: (Š x V x H)
CNC859

– control panel 483 x 356 x 75
– control unit 425 x 335 x 165

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CNC 8x9 DUAL

Continuous path Control

Purpose

Systems CNC8x9 HT are continuous systems with integrated PLC destined for control of lathe, drilling and burning machines or industrial manipulators also for water beam cutting machines and other technological equipment. The systems CNC8x9 HT belong to MEFI series control systems designated for exacting applications of high speed machining. The system is also convenient for processes required CNC control with possibility to create partprograms of extreme length with emphasis to fluent move and velocity control with prediction of slow down in a non continuous trajectory. The systems are also convenient as a substitution of older control systems during general repair of machines. They are destined for machines equipped with electrical DC or AC servodrives with analog, pulse or digital control.

Basic characteristic

A control system CNC8x9 HT is build on basic card (main board) 4PCA with processor P4 HT 2,8GHz. (HT= HyperThreading - two processors in one pack). One processor is for "panel part" e.g. operator interface per keyboard processing and displaying information from technological process by various screen formats (LCD color monitor 15"). This processor is destined also for input/ output and block preparing of the partprograms. The second processor provides real time computing of trajectories and also controls servoloops and part of the PLC destined for matching system to a real machine. The both processors communicate through shared memory area. A basic card is assembled with units for coordinate controls (if connection through CANBUS is not used) and with unit for connection of distributed Inputs/ Outputs and a panel keyboard. A connector for connecting to WINDOWS network is a standard.

The control systems CNC8x9 are delivered with separate display panel This panel is connected to control module unit through video cable and keyboard cable only. As

an option is a version „compact“ where the display panel is a part of the control unit.

Operation

The control system operation through operator panel is easy and user friendly. In easy manner is whenever possible to choose various screen formats for example listing ,graphic output, corrections, Inputs and Outputs. Creating and editing of partprograms is easy and by its comfort is similar to PC operation. Input and output of partprograms can be established through networkWINDOWS, through standard serial input RS232C or via DNC network. An embedded disc module is destined mainly for servicing purposesThe operator can use a graphical part-program preview with possibility of continuous zoom and pan ,can choose layers viewing including radius corrections with an analyze of fluent travel for envelope speed.

NC programming

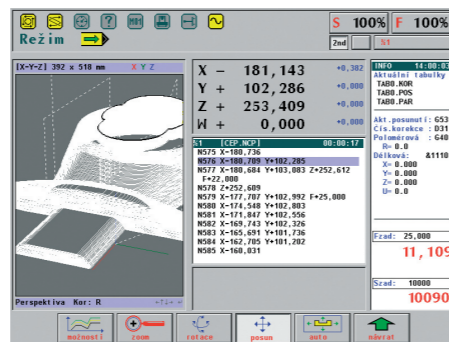
Th programming is in accordance with ISO standards with possibility of using subroutines, macrocycles and fixed drilling or turnery cycles. The possibility of parametric programming including parameter arithmetic is also included. The technological partprograms is possible to create also by high programming tools CAD/ CAM. The system allows user creation of fixed cycles with using of parameter arithmetic utilities with a big choice of mathematical and logical operations and conditional jumps.

Workshop programming

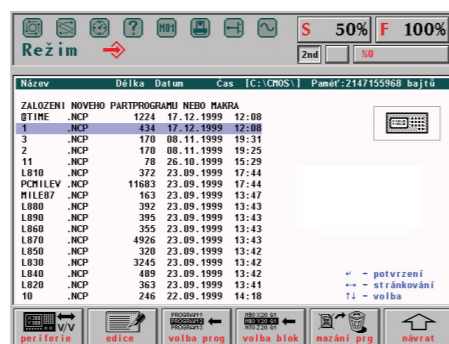
It is provided by dialog graphic. As an option a high designing system MefiCam can be installed manufactured for systems CNC8x9 by German company COSCOM.

Integrated PLC

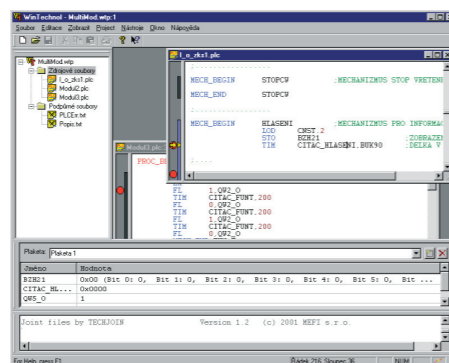
The integrated PLC controls through binary inputs and outputs all machine functions. The PLC program gives the possibility to create



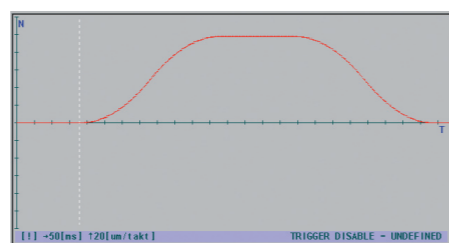
Display format



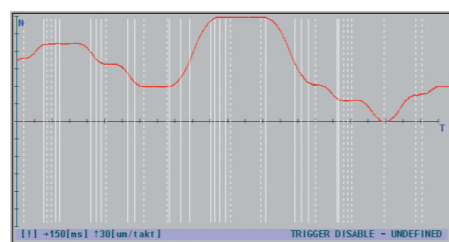
Display format



WinTechnol



Parabolic velocity response



Velocity response



Milling machine MCFHD80



Milling machine FCQV63



Lathe SPT16 NC



Lathe SPR63

user screens, menu structures and can use positioning units and tools for settings of servoloops dynamic. The software design is oriented to use Personal Computers. A user PLC program can be created and loaded to the system per integrated software environment WIN-TECHNOL.

Peripherals and I/O units

A distributed peripherals are used for inputs , outputs and analog inputs. To a one coaxial cable is possible to connect 8 external peripheral units (for example INOUT07, AINP02). The unit INOUT07 can read 4 input ports and control 3 output ports or can be modified for matrix scan of 56 inputs. The PLC program can control on each external peripherals 8 so called fast autonomous output to input reactions.

Parabolic velocity response

It is a way how to reject the effect of reaction forces and also reject the acceleration increasing. (ryv). The acceleration does not change in steps like in linear velocity ramps but depends linearly on acceleration derivation. The acceleration increasing rejection to a linear response results in parabolic velocity response. An impulse of force is a great deal less then in linear velocity response Thus also a reaction force that acts through drive

to a machine frame is less that results in machine resonant vibration restriction.

Dynamic velocity control with a next block analysis (look-ahead)

The CNC system goes fluently through block without velocity changing. (envelope speed) and predict the velocity according to certain criteria for example the dynamic accuracy maximally 500 block in advance. The term **envelope speed** means such a system feature where the system executes blocks fluently and goes after to programmed velocity during execution of multiple number of blocks. In this way is possible to execute even short length blocks with a great deal larger speed then without envelope speed option. Among important request of velocity control belongs dynamic and accuracy criteria. The dynamic approach is based on testing of centrifugal acceleration and a maximal allowed overload of machine drives. The accuracy criteria rejects the velocity with sufficient prediction in such a way that a deviation from an ideal trajectory is smaller then setting limit. In the system CNC 8x9 is the minimal time of one block execution 1ms and block execution time for fluent move is 4 ms. The cycle time of servoloops computation is 1 ms and cycle time of interpolator is also 1ms. The envelope speed checks the time of minimal block execution and if necessary slow down to keep this time within the limit..

Renovation of machines by control systems MEFI

Lathes:

SPRY16, SPRY25, SPR63, SPT16, SPT 32, SUI32, SUI63, SPS2, DST21, WEILER, SUT160, NDM

Carousels:

SKIQ12, SKIQ20, SKQ25, SKI16, SKI20, MCSK8

Cutters and horizontal cutters:

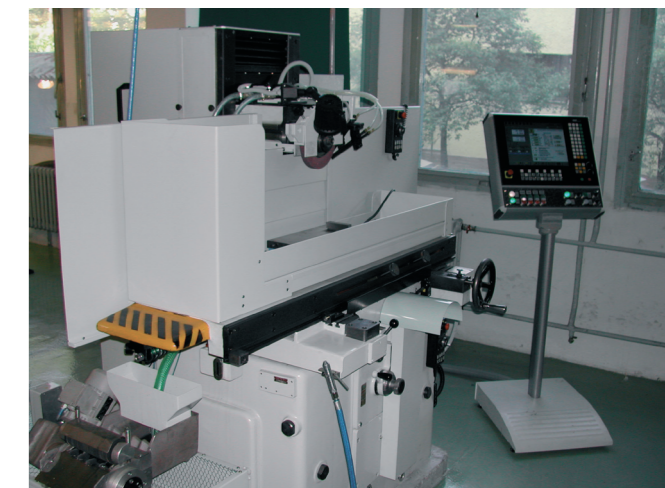
FV1000, FR50NC, FGS40NC, FCH63, FCR50, FQH50, WD160, WD160A, W200S, WFQ80NC, WHN9, WHN10, WHN11, WHN13A, WHN13B, WHN13C, MFCHD40, CINCINATI, COBURK, FCM25CNC

Drilling machines:

VXR50NC, VR5

Special machines:

One or double spindle grinding machines, tool grinders, cutting presses, burning machines, machines for water beam cutting



Grinding machine BPH200-2



Milling machine FCM25 CNC



Lathe SUI 63



Lathe S280