FANUC

CNC SYSTEMS
Product Overview

100% FANUC

FANUC is the leading global manufacturer of factory automation, with more than 60 years experience in the development of computer numerical control equipment. It has more than 4 million CNC controls and 20,000 laser systems installed worldwide and satisfied customers in every corner of the globe.

FANUC Laser Systems

FANUC CNC Controls

FANUC Drive Systems

Highest Quality Results –
Shortest Processing Time

With more than 60 years experience, FANUC offers the widest range of CNC systems in the industry from best value controls with powerful functionality, to high-performance control systems for complex machines – all with fast programming and ease of use, guaranteeing the highest quality and shortest processing times.

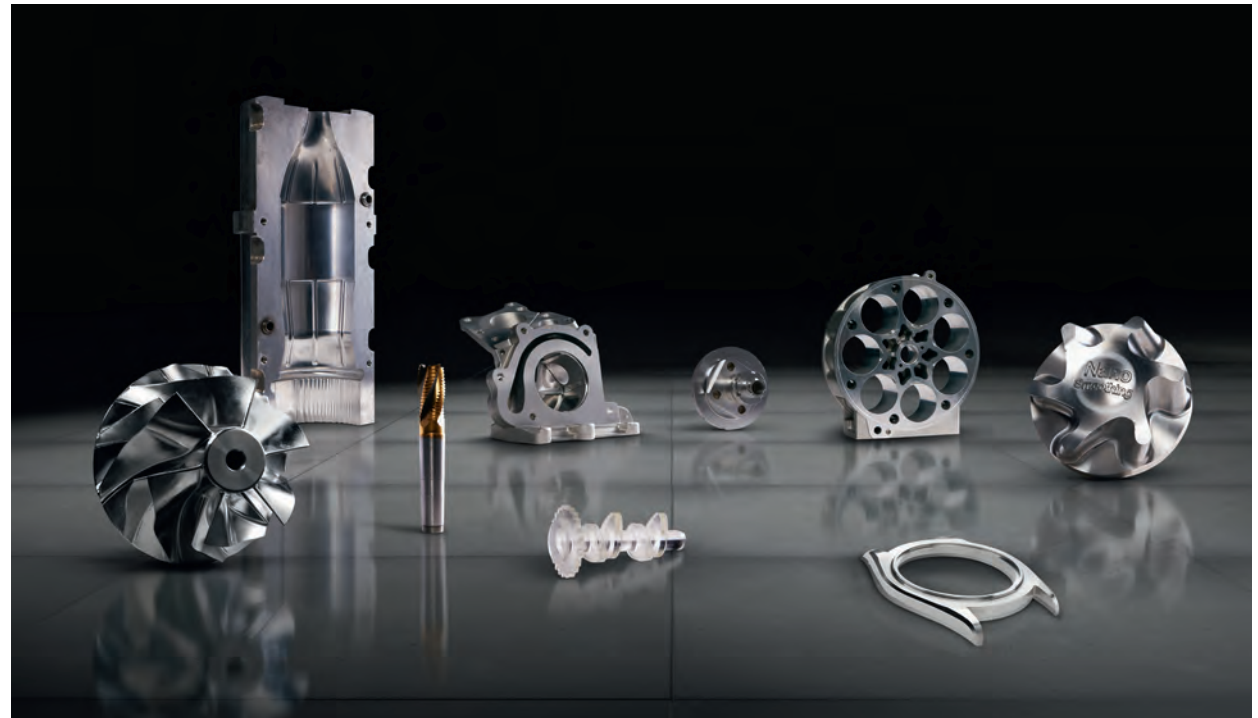**That's how we increase your productivity.**

Your advantages:

- 100% FANUC quality
- More than 60 years of experience
- Wide range of display and panel configurations
- Stand-alone CNCs
- LCD mounted CNCs
- Highly Customizable to meet your specific needs
- Lowest total cost of ownership

More than
50
years MTBF
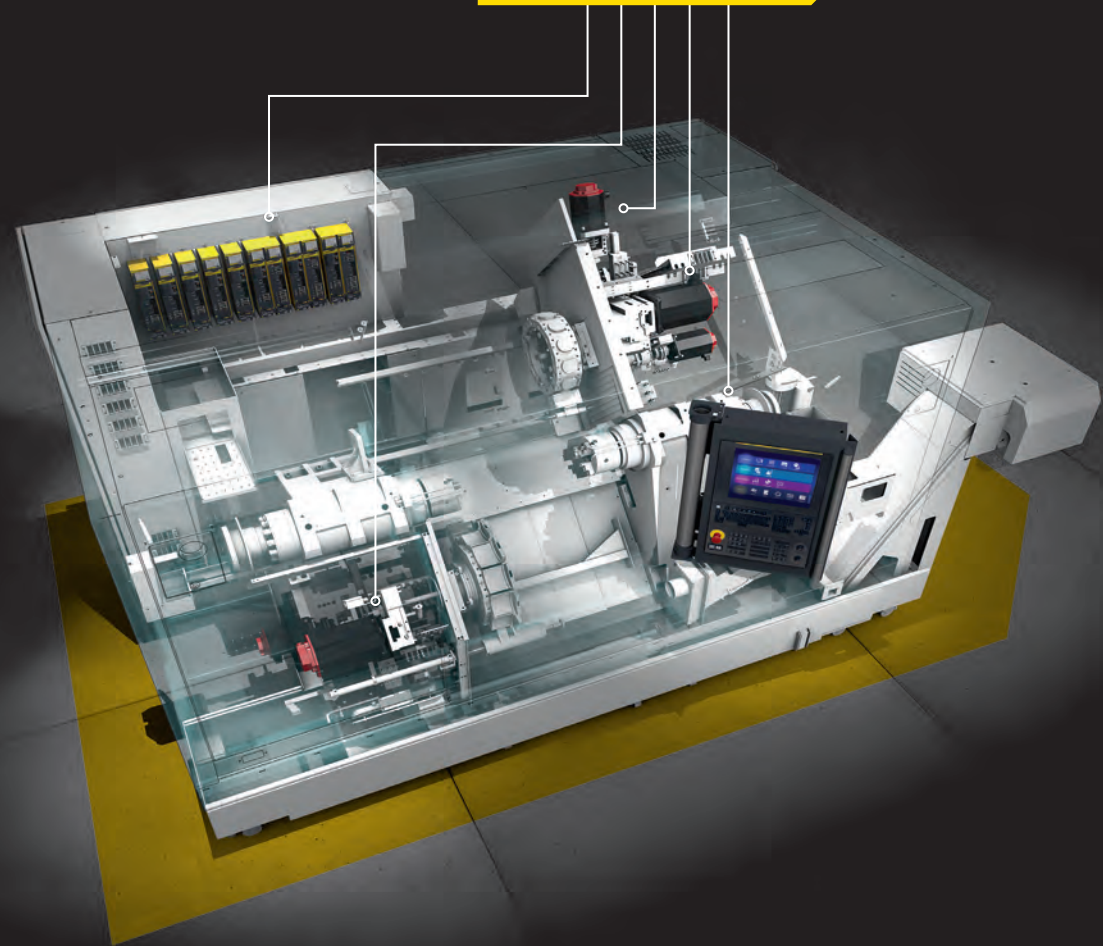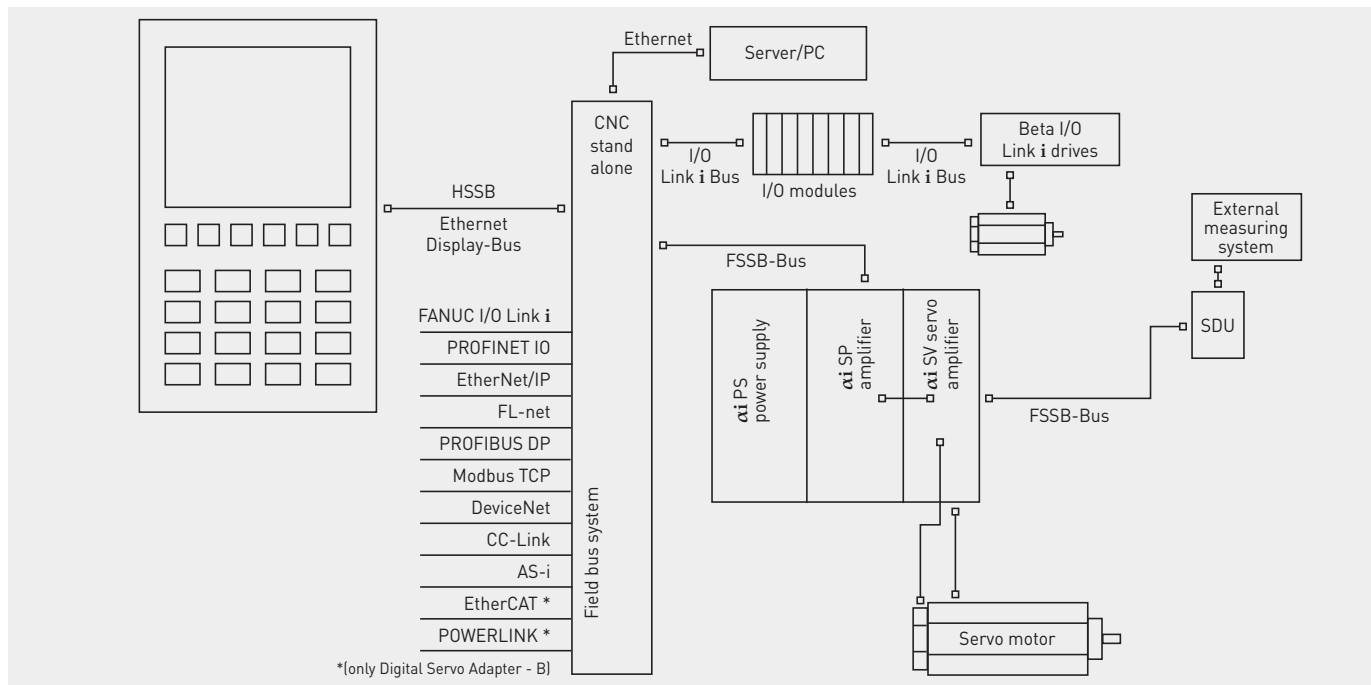*for 0i-D

60
years
of experience

Flexible package solutions

FANUC offers all major components for your CNC controlled machine: CNCs, motors and amplifiers in a tailor-made and easy-to-install package designed to meet your specific needs. All components are designed and manufactured at our highly automated manufacturing facility in Japan. This results in higher reliability and the highest levels of machine availability – with a mean time between failure of well over fifty years*, contributing to extremely low cost of ownership.

*for 0i-D

**All components
100% FANUC quality**

Diagram

Ethernet — Server/PC

CNC stand alone

I/O Link **i** Bus — I/O modules — I/O Link **i** Bus

Beta I/O Link **i** drives

HSSB
Ethernet Display-Bus

FANUC I/O Link **i**
PROFINET IO
EtherNet/IP
FL-net
PROFIBUS DP
Modbus TCP
DeviceNet
CC-Link
AS-i
EtherCAT *
POWERLINK *

*(only Digital Servo Adapter - B)

Field bus system

FSSB-Bus

α**i** PS power supply
α**i** SP amplifier
α**i** SV servo amplifier

FSSB-Bus

External measuring system

SDU

Servo motor

Your advantages:

- Perfect matching components
- All with 100% FANUC quality
- Highest reliability for all parts
- High compatibility (both backward and forward) for long time planning reliability
- One strong partner for all components
- Lifetime support for all parts and components

Unique flexibility

Only FANUC offers you CNC systems in two general versions: LCD mounted as compact, space-saving solution with less hardware or as highly flexible stand-alone solution. Your benefit: full flexibility for your machine design.

Versatile field bus systems

- FANUC I/O Link i
- PROFINET IO
- EtherNet/IP
- FL-net
- PROFIBUS DP
- Modbus TCP
- DeviceNet
- CC-Link
- AS-i
- EtherCAT and POWERLINK (with Digital Servo Adapter - B)

High-Performance CNC Systems for Complex Machine Tools
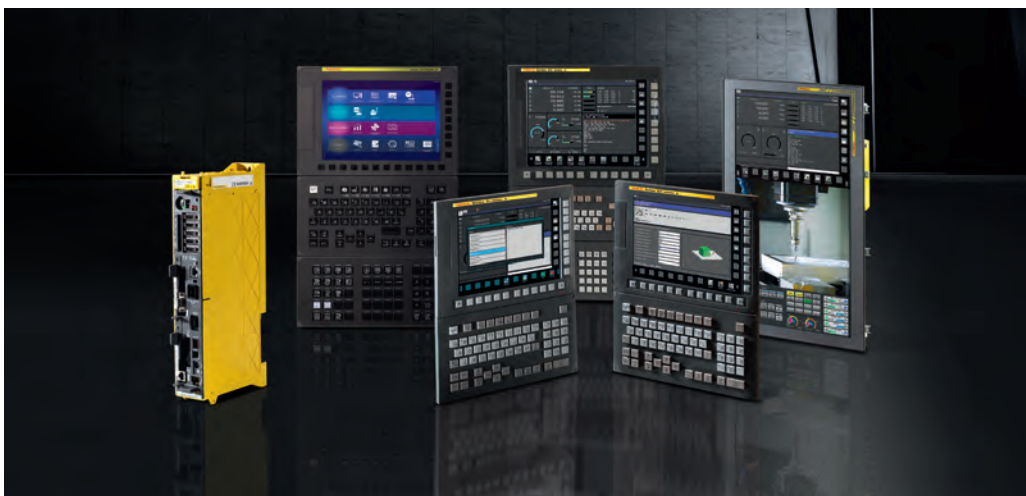
Key Features:
- Up to 96 axes, 24 spindle axes and 15 paths
- 5-Axis machining
- Compound mill/turn or turn/mill machining
- Expanded integrated preventive maintenance functions
- Integrated FANUC dual check safety function
- Conversational programming via MANUAL GUIDE *i*
- Collision control via 3D interference check
- Dynamic compensation functions for the highest accuracy
- High-speed smooth tool center point 5-axis compensation
- Learning control/high-speed-cycle-machining
- Integrated high-speed PMC
- High speed cutting
- *i*HMI offering intuitive, user friendly operation

Applications:
- Milling
- Turning
- Grinding
- Punching
- Laser
- Gear Cutting

CNC Series 30*i*/31*i*/32*i*-MODEL B

The FANUC Series 30*i*/31*i*/32*i*-MODEL B controls are ideal for highly complex machines with multiple axes, multiple paths, and high-speed, high-precision machining requirements. The hardware and innovative software provide the highest performance, precision and surface quality.

Basic Model for Multiple Control Applications

Key Features:
- Up to 12 axes, 6 spindle axes and 2 paths
- Up to 2 additional loader paths
- 4-Axis simultaneous and 3+2 axis machining
- Ready-to-use with integrated software package
- Excellent performance-to-cost ratio
- Integrated FANUC Dual Check safety function
- Shop-floor programming via MANUAL GUIDE *i* or TURN MATE *i*
- Functions for simple customization included
- Integrated high-speed PMC
- High speed and high quality machining package
- Maximum look-ahead blocks 400
- Common operability, maintainability, network and PMC function with CNC Series 30*i*-MODEL B
- *i*HMI offering intuitive and extremely user friendly operation

Applications:
- Milling
- Turning
- Grinding
- Punching
- Gear Cutting

CNC Series 0*i*-MODEL F Plus

The CNC Series 0*i*-MODEL F Plus provides the ideal solution for basic multiple control applications... Ready to use, it boasts latest generation hardware and a complete package of standard software. To maximize productivity on more specific applications, it can be easily customized using a wide range of additional functions. Combining unbeatable value with unrivalled performance and reliability, it includes features and functions typically found on high-performance systems.

CNC Designed for Transfer Lines

Key Features:
- Up to 20 axes, 4 spindle axes and 4 paths
- Ready-to-use with integrated software package
- Simple axis setup
- Additional functions for simple customization
- Up to 5 integrated high speed PMCs
- Integrated FANUC Dual Check Safety function

Applications:
- Transfer Lines
- Gantries
- Multiple Milling /
  Drilling Stations

CNC Series 35*i*-MODEL B

The FANUC series 35*i*-MODEL B control is primarily designed for transfer lines, gantries or multiple milling and drilling stations. Its software options provide high-precision multi-path processing with short processing times.

CNC for General Motion Control Applications

Key Features:
- Up to 32 axes and 4 paths
- Ready-to-use with integrated software package
- Integrated FANUC Dual Check Safety function
- Additional functions for simple customization
- Integrated high-speed PMC
- CAM function
- Perfect combination of pressure and position control

Applications:
- Packing
- Handling
- Wrapping
- Sawing
- Pressing
- Punching
- Bending
- Spinning
- Friction Welding

Power Motion *i*-MODEL A

The FANUC CNC Power Motion *i*-A is ideal for efficient motion control in a wide variety of applications from positioning up to multi-path axis interpolation.

CNC controls overview

	30*i*-B	31*i*-B5	31*i*-B	32*i*-B	0*i*-MF Plus	0*i*-TF Plus	0*i*-PF	35*i*-B	Power Motion *i*-A
Max. controlled axes total / per path	96 / 28	34 / 16	34 / 16	20 / 12	11 / 9	12 / 9	7	20 / 20	32 / 24
Max. feed axes total / per path	72 / 24	26 / 12	26 / 12	12 / 8	9 / 7	10 / 7	7	16 / 16	32 / 24
Max. spindle axes total / per path	24 / 4	8 / 4	8 / 4	8 / 4	4 / 3	6 / 4	–	4 / 4	–
Max. simultaneously controlled axes / path	24	5	4	4	4	4	4	4	4
Max. controlled paths	15	6	6	2	2	2	1	4	4
Type of installation									
LCD version	•	•	•	•	•	•	•	•	•
Stand-alone version	•	•	•	•	•	•	•	•	•
Operating units									
LCD panel	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"	8.4", 10.4", 15"
LCD panel for *i*HMI	10.4", 15", 19"	10.4", 15", 19"	10.4", 15", 19"	10.4", 15", 19"	10.4", 15"	10.4", 15"	–	–	–
PC front-end	10.4", 15", 19", 21,5"	10.4", 15", 19", 21,5"	10.4", 15", 19", 21,5"	10.4", 15", 19", 21,5"	10.4", 15"	10.4", 15"	10.4", 15"	10.4", 15"	10.4", 15"
PC front-end *i*HMI	•	•	•	•	10.4", 15", 19", 21,5"	10.4", 15", 19", 21,5"	–	–	–
Touch systems	•	•	•	•	•	•	•	•	•
Handheld control unit	Portable Manual Pulse Generator / **i**Pendant and / or Handy Machine Operator's Panel								
Machine operators panel	•	•	•	•	•	•	•	•	•
Part program memory									
Integrated from … to …	64 KB - 8 MB	64 KB - 8 MB	64 KB - 8 MB	32 KB - 8 MB	512 KB - 2 MB	512 KB - 2 MB	512 KB - 2 MB	32 KB -1 MB	32 KB -1 MB
Additional mass storage device CF-card	•	•	•	•	•	•	•	•	•
Additional mass storage device HD-PC-version	•	•	•	•	•	•	•	•	•
USB port	•	•	•	•	•	•	•	•	•
Ethernet	•	•	•	•	•	•	•	•	•
Field bus									
EtherNet/IP / PROFINET I/O	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •
FANUC I/O-Link *i* / FL-net	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •	• / •
AS-i / PROFIBUS DP / DeviceNet / CC-Link	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •
Modbus TCP	•	•	•	•	•	•	•	•	•
Compatible drive systems	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**	α**i**, ß**i**

PMC function									
Max. number of I/O	4096 / 4096	4096 / 4096	4096 / 4096	4096 / 4096	2048 / 2048	2048 / 2048	2048 / 2048	4096 / 4096	4096 / 4096
Max. number of I/O-Link	3	3	3	3	1	1	1	3	3
Max. number of PMC channels	5	5	5	5	3	3	3	5	5
Maximum steps	300 000	300 000	300 000	300 000	100 000	100 000	100 000	300 000	300 000
Block function	•	•	•	•	•	•	•	•	•
CNC functions									
3D Interference check	•	•	•	•	–	–	–	–	–
Dual Check Safety	•	•	•	•	•	•	•	•	•
Smart Machine Control	•	•	•	•	•	•	•	•	
Program Restart / Quick Program Restart	• / •	• / •	• / •	• / •	• / •	• / •	– / –	–	–
Nano Interpolation	•	•	•	•	•	•	•	•	•
Nano Smoothing	•	•	•	•	•	–	–	–	–
Fine Surface Technology	•	•	•	•	•	–	–	–	–
AI Advanced Preview / AI Contour Control	– / •	– / •	– / •	– / •	• / •	– / •	• / –	• / –	• / –
Macro Executor / C-Executor / FANUC Picture / FOCAS	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •	• / • / • / •
MANUAL GUIDE i / MANUAL GUIDE 0i	•	•	•	•	• / •	• / •	– / –	–	–
Tool Functions / Tool Management System	• / •	• / •	• / •	• / •	– / •	• / •	– / –	• / –	• / –
Tilted Working Plane / Tool Center Point Control	• / •	• / •	• / •	–	• / –	–	–	–	–
Smooth simultaneous 5-axis machining	•	•	–	–	–	–	–	–	–
Error Compensation / Volumetric Error Compensation	• / •	• / •	• / •	• / –	• / –	• / –	• / –	• / –	• / –
Technologies									
Milling	•	•	•	•	•	•	–	–	–
Turning	•	•	•	•	–	•	–	–	–
Grinding	•	•	•	•	•	•	–	–	–
Punching	•	–	•	–	–	–	•	–	–
Laser	•	–	•	–	–	–	–	–	–

All panels and screens shown are examples only.

Configure Your CNC

FANUC offers a diverse range of CNC panels and screen solutions. Your benefit: a wide variety of configuration options for every specific machining solution providing full flexibility for your ideas.

DISPLAY

The FANUC standard LCD display is available in 2 basic versions:

LCD-mounted type where the CNC is physically mounted directly behind the LCD panel or as a separate stand-alone display unit which is connected to the CNC using a fiber optics cable.

Standard LCD displays are available in 8.4", 10.4" and 15" sizes, with and without touch panel. LCD displays with touch panel can be used without any additional keyboards and push button panels and can provide small and smart HMI solutions for compact machines.

The standard LCD display generates the content of the screens, including customized HMI applications in the CNC. Or choose an LCD display with an embedded PC that provides PC CPU and storage capabilities at the display level.

MDI

Choose the Manual Data Input (MDI) device of your CNC control from a selection of a compact MDI, a standard size MDI, a 68-key MDI or a full keyboard with either English or symbolic key sheets for a variety of applications. Depending on the type, the device has alphanumeric keys to input part programs, operation keys like RESET, PAGE UP, PAGE DOWN, HELP and menu keys to switch between menu screens.

MOP

The new Machine Operation Panel (MOP) comes with new and improved safety options. All the buttons on this control panel are equipped with double wired keys and further safety functions like override switches. An integral ESP button enhances safety in case of emergency. The operator panel communicates with the CNC system via the FANUC I/O system, so it easily integrates with the FANUC Dual Check Safety system. Like its forerunner, the innovative Safety MOP has exchangable key tops for customizing the key layout.

FANUC *i*HMI - Simple. Efficient. Intuitive.

FANUC *i*HMI was designed to be extremely easy to use. Intuitive menu icons, high-visibility design and animated features simplify even complex machining operations, making accessing even the most sophisticated programs and functionalities straightforward. Despite its more intuitive layout, users will still find that it provides a familiar FANUC user experience.

Various cycles
• Turning
• Milling
• Measurement

CNC operation screen

Simple
Easy operation along process flow with integration of three screens:
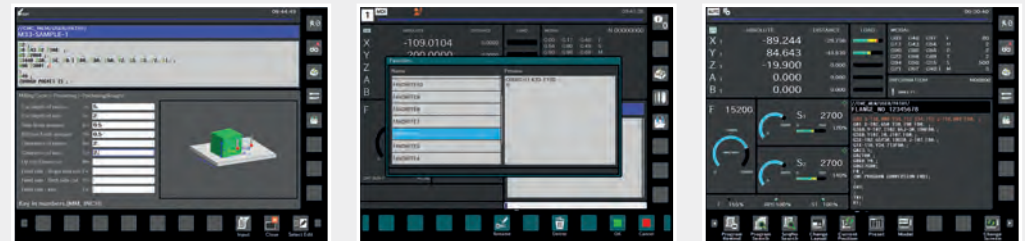
Friendly
Helpful troubleshooting with one-stop problem solving

Graphical
Intuitive icons and high-visibility design with animated features

Safety Function DCS

The certified FANUC Dual Check Safety (DCS) function provides a high level of safety for the operator during operations with protection activated while power is still applied. In case of an abnormal function FANUC DCS quickly shuts off power to protect the operator allowing a quick restart of the machine tool operation. Special functions are available to simplify the creation of the machine documentation, e.g. Test Mode Function for Dual Check Safety.

Your Benefits:
• Reliable operator safety
• Fewer external safety circuits required
• Overall cost reduction of the safety solution
• Certified to comply to safety standards

DUAL CHECK SAFETY

Tool Manager
Uniform tool information management

Machine Collision Avoidance
Uniform tool information management for machine

Maintenance Manager
Observe CNC and machine parts and set alert for exchange time

Data Logger
Monitor performance and identify potential issues while machining

Servo Viewer
Measure and display a variety of servo performance data

Manual Viewer
Easily access machine manuals

PLANNING
PC OPERATION   TOOL MANAGER   CALENDAR

MACHINING
NC OPERATION   COLLISION AVOIDANCE

IMPROVEMENT
DATA LOGGER   MAINTENANCE INFORMATION

UTILITY
MANUAL   MEMO   BROWSER   SETTING   MAINTENANCE DISPLAY
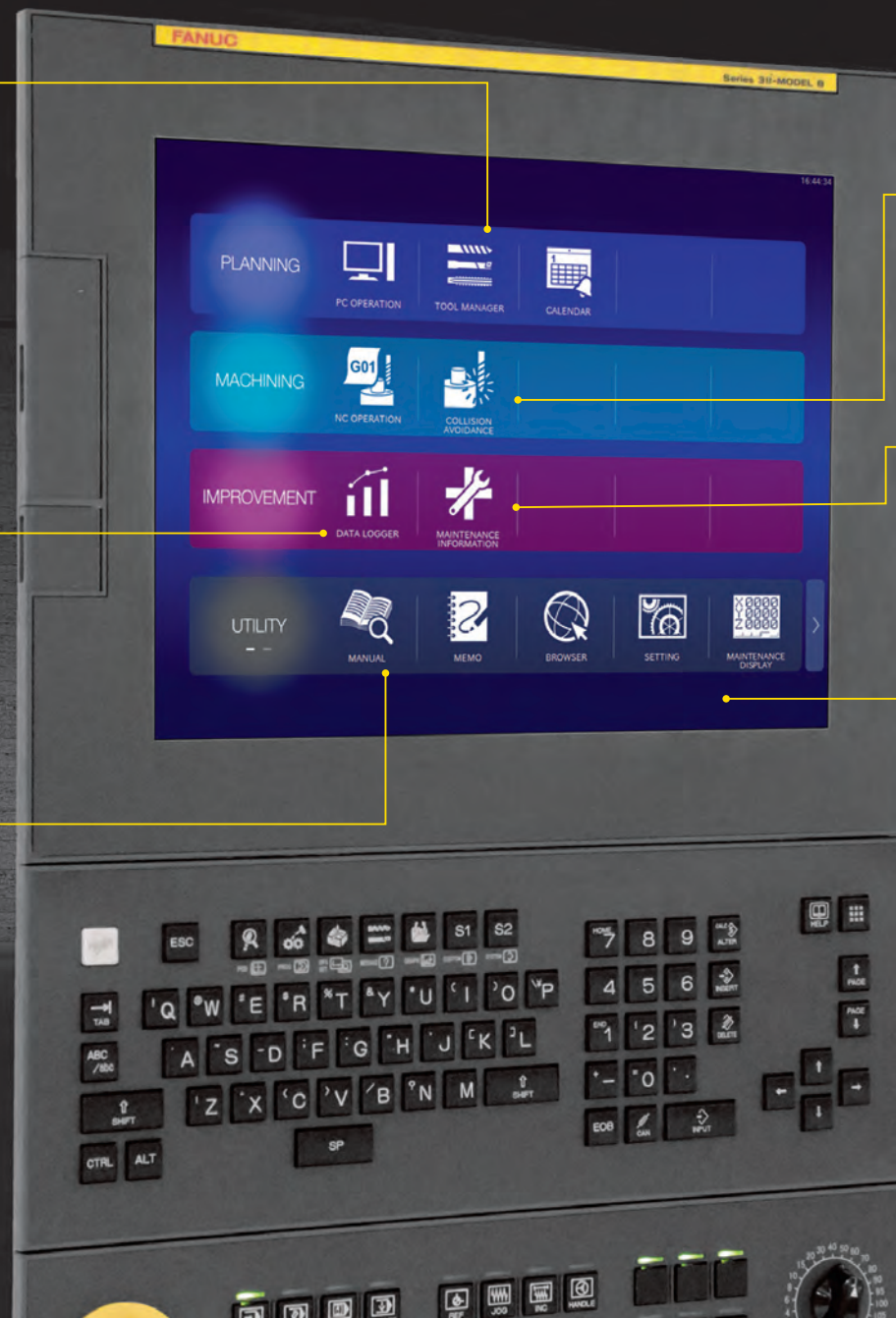
Tool Manager

Uniform tool information management for machine

- Up to 1000 tools with tool management option
- Up to 1024 sets of tools with tool life management option
- Up to 1000 tools when the CNC option is invalid
- Tool catalogue data available for about 2000 tools
- VERICUT format (TLS file) CAM/simulation software is compatible with tool data

Data Logger

Investigate cause of problem while machining

- Amount of data per second under 64 KB

Data types:
- Position of Axes
- CNC Status
- PMC Data
- Macro Variable Data
- Servo/Information
- Operational Information
- Alarm Information etc.

Manual Viewer

Always refer to the machine's manual

- Add MTB's manuals and easily organize program/maintenance manuals
- Use multiform file formats (HTML,TXT, PDF)
- Display manuals according to NC language setting
- Memory capacity for manuals is limited to 500 MB

Machine Collision Avoidance

Model, prevent interference and add to CNC before machining

- Collision status can be confirmed graphically
- Forecast positions for safe, precise collision detection
- Based on CGTech Co's CAS (Collision Avoidance Software)
- Maximum forecast time up to 600 msec.
- Create 3D models of the machine on a PC

Servo Viewer

Measure and display various kinds of data

- Servo and spindle data, e.g. position, speed and torque
- PMC data
- CNC status information, e.g. program number, M/S/T codes
- Analyze the axis movement and CNC operation timing
- Optimize the CNC program to reduce cycle times
- Monitor the machine's condition through periodic measurements

Maintenance Manager

Observe CNC and machine parts and set alert for exchange time

- Specified by usage time, amount of movement, PMC counter etc.
- Add a max. of 100 items as orig. monitoring item
- Min. 1 sec monitoring period
- Potential savings of an hour or more
- Easy to add monitoring items and notification information

Original FANUC Smart Software Tools

Connectivity and Development Tools
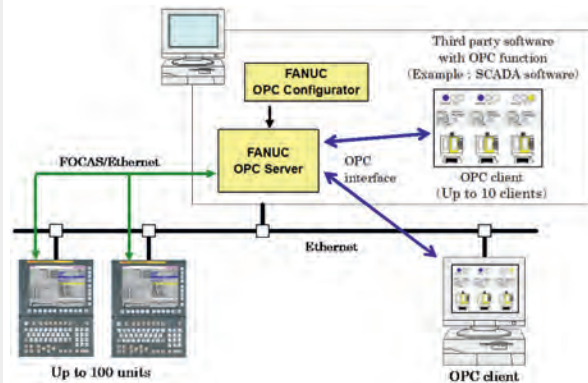
OPC SERVER

OPC is a communication standard for industrial automation. The FANUC OPC Server is Windows® application software for PCs that converts the communication protocol between OPC and FOCAS. Devices with an OPC client functionality can communicate with FANUC CNCs via this software.

Benefits:
• Easily connect to third party application software that has OPC client functionality

Details:
• Supports OPC-UA standard
• Supports OPC-DA standard 3.0, 2.0 and 1.0a
• Read and write PMC data
• One PC can communicate with up to 100 CNCs
• CNC can communicate with a PC via Embedded Ethernet or Fast Ethernet
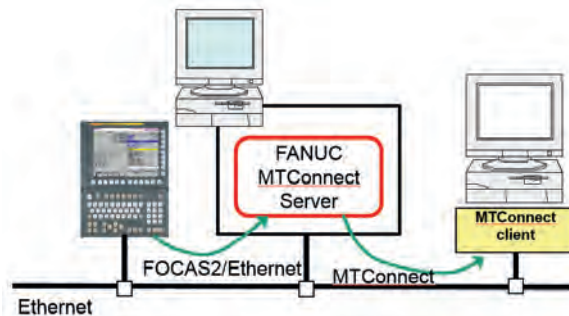
MTCONNECT SERVER

MTConnect is a protocol to retrieve data from machine tools and other factory equipment using client applications for data analysis and monitoring. With FANUC MTConnect Server, you can read data from machine tools equipped with FANUC CNCs. MTConnect Server collects data from CNCs and PMCs and provides them to client applications via MTConnect protocol.
"MTConnect Server Function" is required on the CNC in order to use this software.

Benefits:
• Read data from FANUC CNCs and PMCs via MTConnect
• Communicate with other client applications that require MTConnect
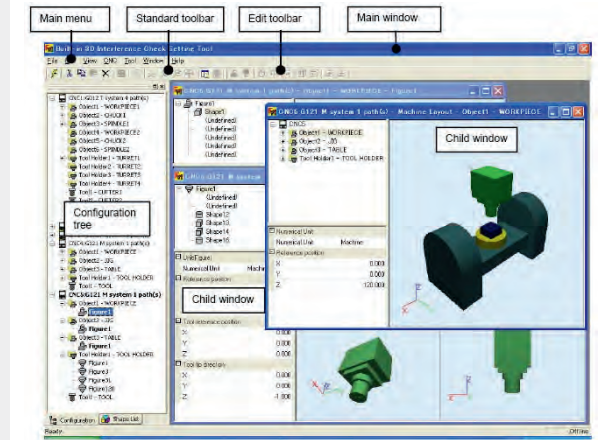
BUILT-IN 3D INTERFERENCE CHECK SETTING TOOL

With this easy-to-use Windows® application, users can set up the functions of the Series 30i/31i Built-In 3D Interference Check on their PC. These functions include creating, setting and displaying 3D objects and figures representing the work piece, the fixtures and tools, object moving and axis settings, real-time 3D interference check monitoring.

Benefits:
• Simple managment of 3D Interference Check Projects
• Easily import 3D shapes for faster set up
• Efficiently manage multiple machine settings and large projects
• Simplified start-up with online functions

Labels on screenshot: Main menu, Toolbar, Parent window, Edit toolbar, Child window, Child window, Status bar, Soft keys
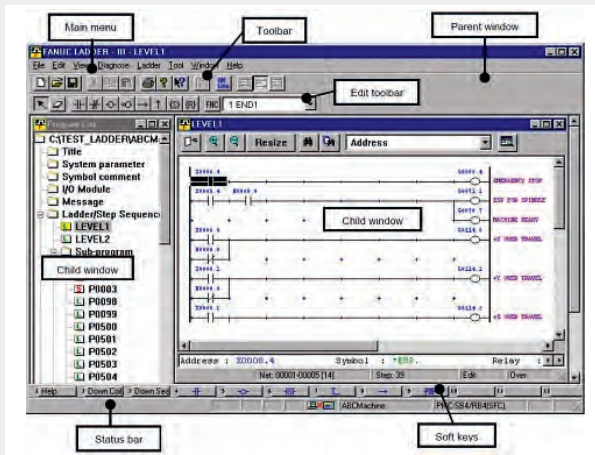
FANUC LADDER-III

FANUC LADDER-III is the standard programming system for creating, displaying, editing, printing, monitoring, and debugging ladder sequence programs for CNC PMC ladder. It works with CNC GUIDE on one or multiple PCs and is easy to connect to the CNC via Ethernet.

MACRO EXECUTOR AND C-LANGUAGE EXECUTOR

The Macro Executor function converts, loads and executes all Custom Macro programs that you create executable macro programs that can be called from a standard part program. With the C-Language Executor users can develop functions and programs and add new functionality to their CNC. The can also develop machine control functions written in C, and modify Macro Programs to follow machine and production evolution. Up to two independent real-time tasks can be run simultaneously for time critical functions.
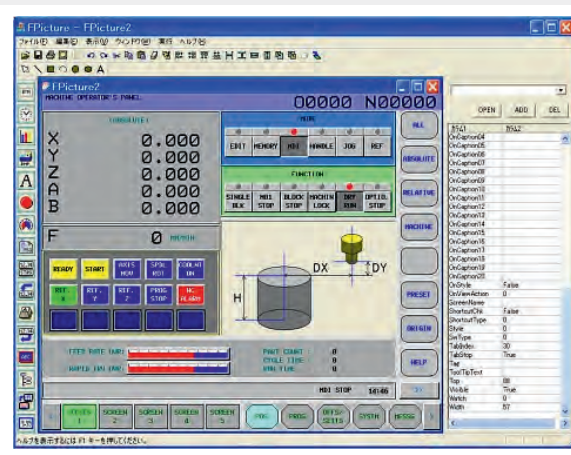
FANUC PICTURE

FANUC Picture offers an easy way to create customized operator and HMI screens for complex processes. It supports objects, animations, data and multiple languages. The software also features a macro language to run routines and perform tasks. Customized screens can be compiled and stored in either the CNC Flash-ROM (FROM) memory or on *i*HMI. Custom functions written in C/C++ also called from FANUC Picture.

Benefits:
• Simplified operator interface
• Fewer errors from operator error
• Simplified machine and process control

CNC GUIDE FOR TRAINING AND DEVELOPMENT

CNC Guide is FANUC's CNC software running on a PC, providing an authentic part programming, operation and maintenance environment at a fraction of the cost of using a production machine tool. CNC Guide supports both conventional G-code part programming and MANUAL GUIDE *i* conversational part programming so users can create and edit part programs; generate cycle time estimates; and create and test custom macro subroutines.
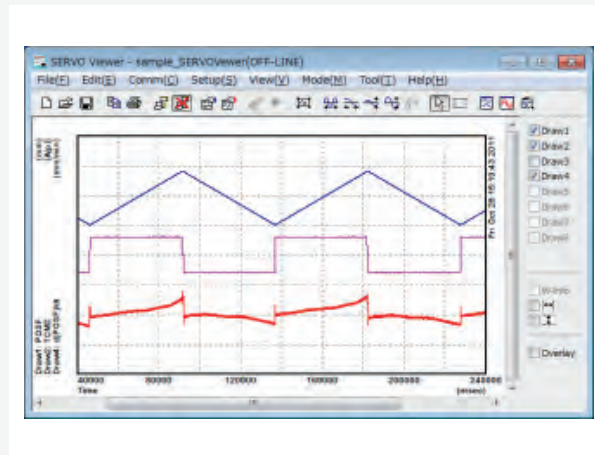
SERVO VIEWER

SERVO Viewer is a Windows® application software that measures and displays data from a machine tool with a FANUC CNC. Users can acqure and view servo/spindle data including position, speed and torque, PMC signals, or CNC status information such as program number, sequence number or M/S/T codes.

Benefits:
• Analyze the axis movement and CNC operation timing
• Optimize the CNC program to reduce cycle times
• Monitor the machine's condition by periodical measurements

FOCAS LIBRARY

FOCAS (FANUC Open CNC API Specification) is the protocol used to interact with your FANUC CNC from an external PC. The FOCAS library provides all required functions to develop Windows® applications which can communicate with a FANUC CNC via Ethernet or HSSB (fiber optics).

Benefits:
• Create customized functions and Windows® applications
• Modify Macro Programs to track machine and production evolution
• Easily access many of the FANUC CNC resources to create advanced applications

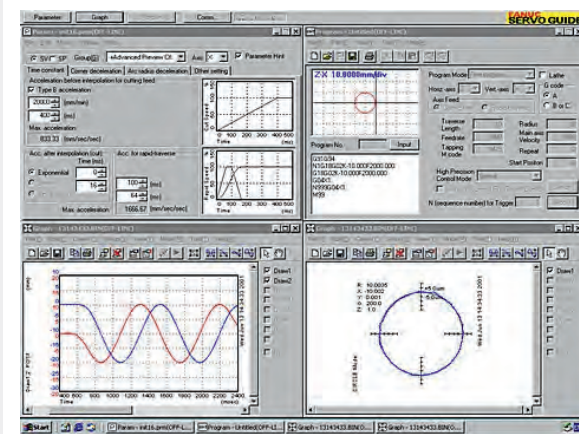# Original FANUC Smart Software Tools

Optimization Tool

## CNC User Interface for PC

User Tool

FANUC SERVO GUIDE

FANUC SERVO GUIDE is a Windows® application for quick and easy optimization of servo and spindle axes. This software provides the integrated environment to test programs, set the parameters and monitor data that is needed for servo and spindle tuning. Direct connection between PC and CNC is possible through Ethernet.
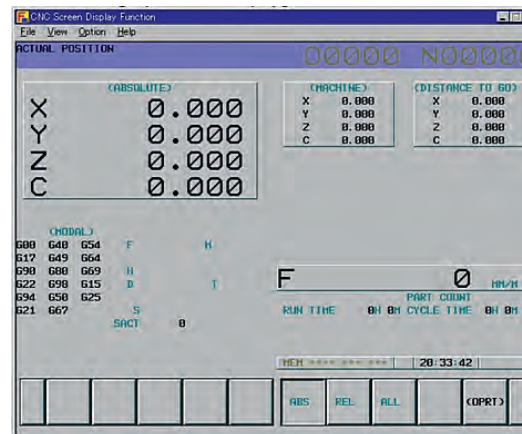
SCREEN DISPLAY FUNCTION

Our best tool for CNC maintenance and setup on Open CNC systems. The Screen Display Function provides quick and easy access to the CNC screen from a PC to create an efficient remote maintenance tool. The Windows® application provides a straightforward solution to display standard and custom CNC screens on a PC which can be connected by HSSB or Ethernet.
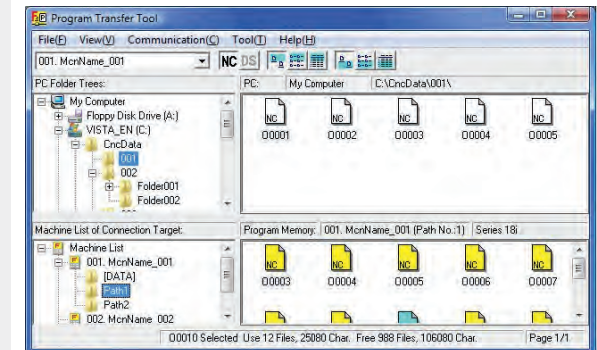
PROGRAM TRANSFER TOOL

This Windows® application enables you to manage part programs, tool offsets, custom Macro value, work piece origin offset, and tool management with easy connection between the CNC memory or data server and a PC by Ethernet.
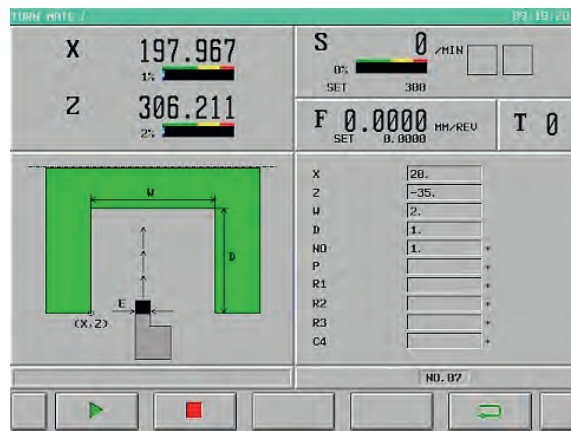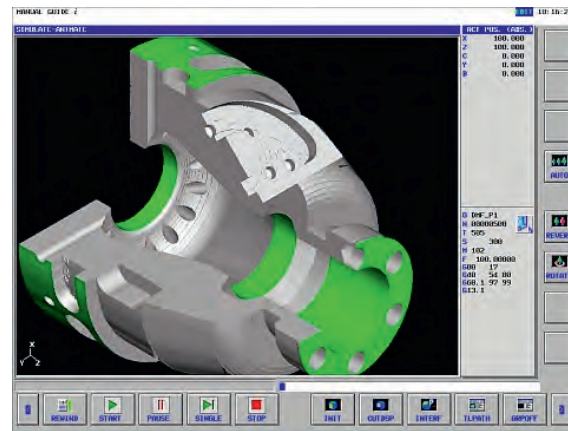
TURN MATE *i*

Increase the productivity and flexibility of your turning machines using FANUC TURN MATE *i* with simplified part programming. The conversational software function simplifies the operation of entry-level turning machines so no knowledge of G code ISO language is required to program work pieces. Operation is easy with clearly laid out screens.

MANUAL GUIDE *i*

Create your part programs from a drawing to a production part in just a few steps. MANUAL GUIDE *i* supports turning, milling and compound machining applications and can be used on simple machines as well as on very advanced machining processes. The software is built around the standard CNC ISO code format and provides an ergonomic Graphical User Interface (GUI) with user-friendly icons. All of the relevant information is displayed on a single CNC screen.

Benefits:
• Assisted and conversational programming of machining cycles
• Easy programming of parts, easy simulation
• Reduced time from drawing to cutting
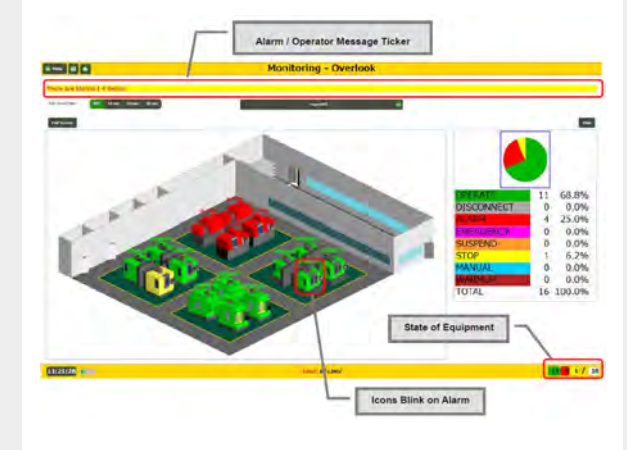
MT-LINK*i* SHOPFLOOR CONNECTIVITY

FANUC MT-LINK*i* and FANUC MT-LINK*i* Integration Server are fully scalable, out-of-the-box machine tool monitoring solutions that can monitor and manage data from one to one thousand machines. Operational and production data is monitored and collected using a PC and an Ethernet connection. A variety of data points are automatically collected, including alarm history, macro variables & signal history, servo/spindle motor currents & temperatures, battery & fan status, feed rate overrides and more.

More than
2000
service
engineers

264
subsidiaries
worldwide

Our Strength:
Service and Support

Intensive application support and personal customer service are major aspects of the FANUC world – from the first step to the last. Our skilled and dedicated service team can help you to build and operate the most efficient machines. Always flexible, always fast, always near. Through our commitment to our Service First philosophy, we give customers confidence that their machines will be available for production when they need them. We offer lifetime parts and maintenance support for all of our products as long as they are in use.

Wherever You Need Us:
We are There

With the largest global network of local subsidiaries in all continents, we are always there to meet your needs. Fast and efficient – 24/7. So you always have a local contact that speaks your language.

FANUC Academy

We help you get the most potential out of your automation through optimizing the skills of your employees. Certified FANUC instructors train them in our fully equipped professional training centres, or at your own premises, using standard training modules as well as customized training packages to meet your specific needs.

Let's optimize your productivity.

Service First