

Robotization of Machine Tools



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Revolutionising efficiency through automation

FANUC is the leading company of factory automation products including CNC, ROBOTS and ROBOMACHINES. The range of ROBOMACHINES comprise the full electric injection moulding machines FANUC ROBOSHOT, the wire-cut EDM machines FANUC ROBOCUT, vertical machining centres FANUC ROBORILL and the ultra-precision machine tool FANUC ROBONANO with 0.1 nm programming command resolution.

FANUC manufactures all of its own developed products in our factories in Japan. Our factories are highly automated and using a high number of Robots to achieve high efficiency and cost saving while maintaining the flexibility of production. Currently we use more than 1,000 machine tools in our factory and more than 92% are robotized,

which enable us to continue our production 24/7 while minimizing labour costs and give us very fast return on investments. Based on this experience, FANUC has been promoting the automation and Robotization of machine tools in all manufacturing sectors on a global scale.



Kenji Yamaguchi
President & CEO
FANUC Corporation

In Europe, FANUC is well represented in machine tool industry with its CNC and Robot. Our extended network of system integrators in Europe install the most advanced robot solutions including many different type of robot and also wide range of collaborative robots for machine tool tending applications to all types of CNC machines.

This is further supported by the quick setup and easy programming of FANUC robots and highly skilled technical support engineers in 22 FANUC subsidiaries all around Europe. To automate machine tools in this way helps companies to achieve a higher machine utilisation, efficient use of skilled labour, improved quality and increased flexibility, leading to improved competitiveness.

In case of any issues, the customers are in good hands as the FANUC organisation in Europe excels in technical support and service capabilities with approximately 1,000 highly skilled engineers dedicated in these two areas. We provide our service for as long as the customer uses our products without time limitation (lifetime maintenance).

In 2020, our service parts availability reached 99.99% with an average service completion time of 26.3 hours (the time between the customer's initial call and the completion of service intervention by our service engineer) in Europe, and we are continuously working to achieve the highest customer satisfaction. This handbook will guide you through the whole process and elements of Robotization of machine tool based on the latest technology of FANUC Corporation.



Shinichi Tanzawa
President & CEO
FANUC Europe Corporation


Value-engineered products for higher efficiency and unmatched proven reliability

FANUC is the only company in the industry to develop and manufacture all major components in-house. Every detail of our hardware and software undergoes stringent quality control checks – For solutions that are reliable, easy to repair, and lend planning security to your production. With the highest uptime in the market, our products are built to last.



60+
years of
experience

More than
810,000 robots,
25 million motors and
5 million CNCs
installed worldwide



Unmatched proven reliability

47
years MTBF
(Mean Time Between Failure)
for CNC Series 0i-D/F

41
years MTBF
(Mean Time Between Failure)
for Robot R-2000iB/iC



The champions of automation

Automation is our business – and we practice what we preach: FANUC has the most automated production facility in the industry. Currently we use more than 1,000 machine tools in our factory, of which more than 92% are robotized. Day and night, our robots are hard at work manufacturing FANUC products. So when you use our solutions, you can be sure that they are up to the highest standards, tried and tested in our own facilities.



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Product life cycle support

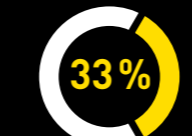


Easy customisation

Lifetime spare parts supply guaranteed



33%
1 in 3
FANUC employees
is a R&D engineer



271 locations supporting 109 countries



Service First
Worldwide support



intelligent automation – 100% FANUC

FANUC is your end-to-end supplier for factory automation (FA). Our ROBOTS and ROBOMACHINES are specifically designed and built to help our customers increase efficiency and productivity while lowering the total cost of ownership.

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Robot Welding Cells

Multi-robot welding cells – easy automated welding thanks to seamless connectivity and a single user-friendly CNC interface.

CO₂ Laser

CO₂ laser packages for efficient automated laser cutting.

Visual Bin Picking

Visual bin picking technology gives robots the ability to identify and pick loose parts and even bags from a bin.

Vertical Machining Centre

Retool in just 0.7 seconds – FANUC ROBODRILL, our vertical machining centre, is designed for maximum productivity in milling and drilling.

ROBOCUT Wire EDM

Replace up to 8 steps, including pre-machining, hardening, finishing and finishing, with one ROBOCUT wire-cut EDM machine.

0.5 kg to 2.3 tonnes

Lift up to 2.3 tonnes – Choose from over one hundred robots with payload capacities ranging from 0.5 kilograms to 2.3 tonnes.

Dual Check Safety (DCS)

DCS technology allows robots and CNC machines to meet safety standards without the need for external hardware or extended safety areas.

Collaborative Robots

No need for safety fences – FANUC collaborative robots allow easy integration into human workspaces. For even more efficiency and improved health and safety.

SCARA Robots

The FANUC SCARA series are the right solution for high-speed precision applications, such as assembly, pick and place, inspection and packaging.

Injection Moulding

High-precision electric injection moulding – with the FANUC ROBOSHOT a-SiA series.

Delta Robots

Ultra-fast picking, assembling and sorting – FANUC's range of delta robots are ideally suited to high-speed handling processes requiring a great deal of versatility.



Optimised energy consumption – intelligent energy management

IoT

IoT solutions like FIELD system, MT-LINKi and ZDT help improve efficiency



FANUC CNC lineup

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With more than 60 years' experience, FANUC offers the widest range of CNC systems in the industry. From entry-level controls with powerful functionality and excellent value for money to high-performance control systems for complex machines – all our CNC systems allow fast programming and are easy to use, combining the highest quality and short processing times.

FANUC Series 0i-MODEL F Plus

Basic CNC model for multiple control applications

The CNC Series 0i-MODEL F Plus is the ideal basic solution for multiple control applications. Ready to use, it boasts latest generation hardware and a complete package of standard software. To maximise productivity on more specific applications, it can be easily customised using a range of additional functions. The CNC Series 0i-MODEL F Plus comes with many functions typically reserved for high performance systems – for an unbeatable combination of excellent value for money and unrivalled performance and reliability.

Features

- iHMI for intuitive and user-friendly operation
- 15" screen for comfortable work
- High workability and customisation function
- Easy, fast and fine machining
- QSSR (Quick & Simple Start-up of Robotization) available

FANUC Series 30i/31i/32i-MODEL B Plus

High-performance CNC for complex machine tools

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

The FANUC Intelligent Human Machine Interface (iHMI) provides a simple, efficient and intuitive way to interact with the FANUC CNC series.

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Features

- iHMI for intuitive and user-friendly operation
- Up to 96 axes, 24 spindle axes and 15 paths
- Cycle time reduction with fast cycle-time technology
- High quality machining with fine surface technology
- Flat design and extensive display lineup (10.4", 15", 19", 21.5")
- Excellent usability for simultaneous 5-axes machining
- Customisation function
- Easy operation of robot from CNC (QSSR)
- Easy connection with peripheral equipment





Maximise productivity with a robotic machine tending solution

Benefits of robotization:

Increased Turnover

Machines can run through the night and at weekends without an operator. Higher machine tool utilization therefore helps increase production – and lead to a faster return on investment.

Efficient use of skilled labour

Robotization allows skilled operators to set up and operate multiple machines, increasing efficiency and reducing costs.

Improved Quality

Automated processes ensure that the highest quality standard is maintained consistently. Satisfied customers and reduced costs are the result.

Increased Flexibility

Robotization allows manufacturers to quickly respond to changing production requirements.

Applications for Robots with Machine Tools

- Parts load and unload
- Measurement and inspection
- Chuck jaw exchange
- Tool change
- Deburring

FANUC Robot models for machine tending

FANUC has a wide range of robot types, including compact high speed and high payload models. They can be applied to all kinds of machine tending processes, such as loading or unloading machine tools and inspection. Robots can also be installed inside machine tools. With rail and gantry mounting options, our robots are furthermore able to tend multiple types of machine tools.



Mini Robots Small/Medium Size Robots Heavy Load Robots Collaborative Robots



THE NEW ERA OF COLLABORATIVE TECHNOLOGY CONTINUES

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CRX-10iA/L & CRX-10iA
loading and unloading
a ROBOCUT and ROBODRILL

[▶ WATCH VIDEO](#)



ULTIMATE RELIABILITY

- Smooth, modern design that is completely safe to work side-by-side with people
- Backed by FANUC's decades-long experience in the design and manufacture of robots with world-renowned reliability
- The same uncompromising quality standards that customers expect from FANUC products
- 8 years maintenance free operations



QUICK SETUP

- Slim and compact design allows for easy integration into any work area or existing system
- Easy to install without specialist equipment
- CRX uses FANUC's latest compact R-30iB Mini Plus Controller for even more space savings
- Each model runs on standard 230V power



EASY PROGRAMMING

- Easily program and teach points on your new CRX cobot using all-new lead-through programming features and new teach pendant user interface
- Perfect solution for manufacturers with little to no robotic experience
- Connecting to peripheral equipment is easy with a wide selection of FANUC approved suppliers
- FANUC intelligent features allow for easy connection to 2D and 3D iRVision and more

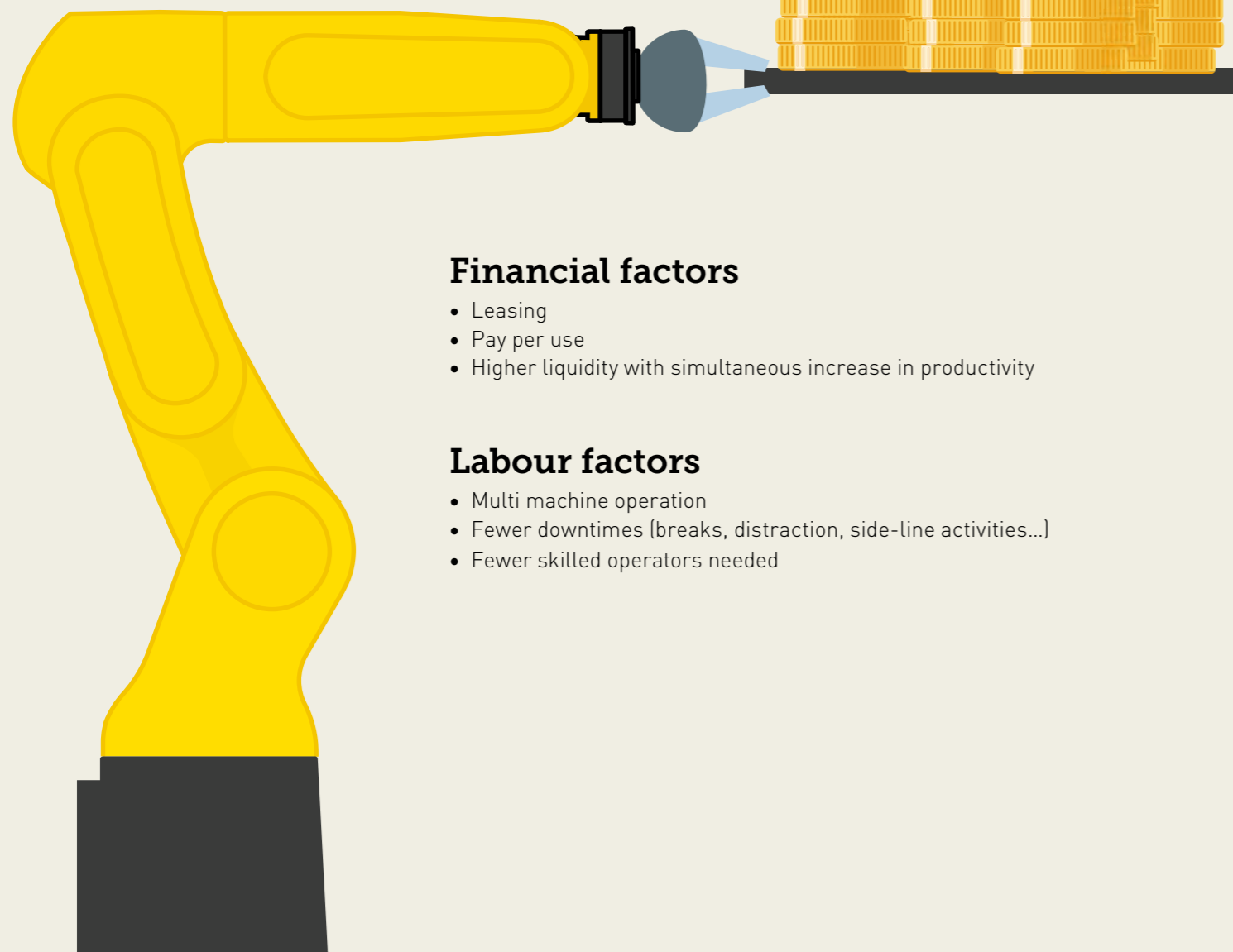
Return on Investment (ROI)

FANUC products are especially designed and built to help our customers increase efficiency and productivity while lowering the total cost of ownership.

Factors influencing the ROI

Investment factors

- Longer machine times ("ghost shift")
- Constant increased quality
- Scalable production



Financial factors

- Leasing
- Pay per use
- Higher liquidity with simultaneous increase in productivity

Labour factors

- Multi machine operation
- Fewer downtimes (breaks, distraction, side-line activities...)
- Fewer skilled operators needed

Example 1

Low-Cost Automation	
Initial investment	EUR 100,000.00
incl.:	
- robot and gripper	
- electric power system	
- assembly and installation	
- start-up	
- CE compatibility	
- operator training	
Total Cost of Ownership* (TCO)	EUR 4,800.00
Saving*	
- labour cost reduction (man-hours)	EUR 101,760.00
- miscellaneous	EUR 5,745.00
Profit Increase*	EUR 16,968.00
resulting from increased production	
Total benefit from automation*	EUR 124,473.00
Payback in months	10.03
Calculation based on the following scenario:	
- 2 shifts, 5 days per week, 48 weeks p.a.	
- hourly operator cost: EUR 25	
- machining cycle time: 5+1 min	
(1 minute for changing the part - manual operation)	
- output increase: 10%	
(due to faster parts change by automation)	
- profit per part: EUR 2,50	
- less scrap, TCO, less downtimes	

Example 2

High-End Automation	
Initial investment,	EUR 250,000.00
incl.:	
- robot and gripper	
- automation system	
- control system	
- electric power system	
- peripheral devices	
- assembly and installation	
- start-up	
- CE compatibility	
- operator training	
Total Cost of Ownership* (TCO)	EUR 9,600.00
Saving*	
- labour cost reduction (man-hours)	EUR 217,036.80
- miscellaneous	EUR 12,211.54
Profit Increase*	EUR 30,542.40
resulting from increased production	
Total benefit from automation*	EUR 250,190.74
Payback in months	11.99
Calculation based on the following scenario:	
- 3 shifts, 6 days per week, 48 weeks p.a.	
- hourly operator cost: EUR 25	
- machining cycle time: 5+1 min	
(1 minute for changing the part - manual operation)	
- output increase: 10%	
(due to faster parts change by automation)	
- profit per part: EUR 2,50	
- less scrap, TCO, less downtimes	

* Per annum

FANUC Robotization Solutions

Many interface connections

between FANUC CNC and Robot



Plug & Play connection

Save time and money by connecting a FANUC robot to a FANUC CNC via a common control platform. With FL-net or I/O LINK*i*, all you need is a simple cable. All components are supplied by a single source in a single package.

Your advantages:

Quick and easy data exchange

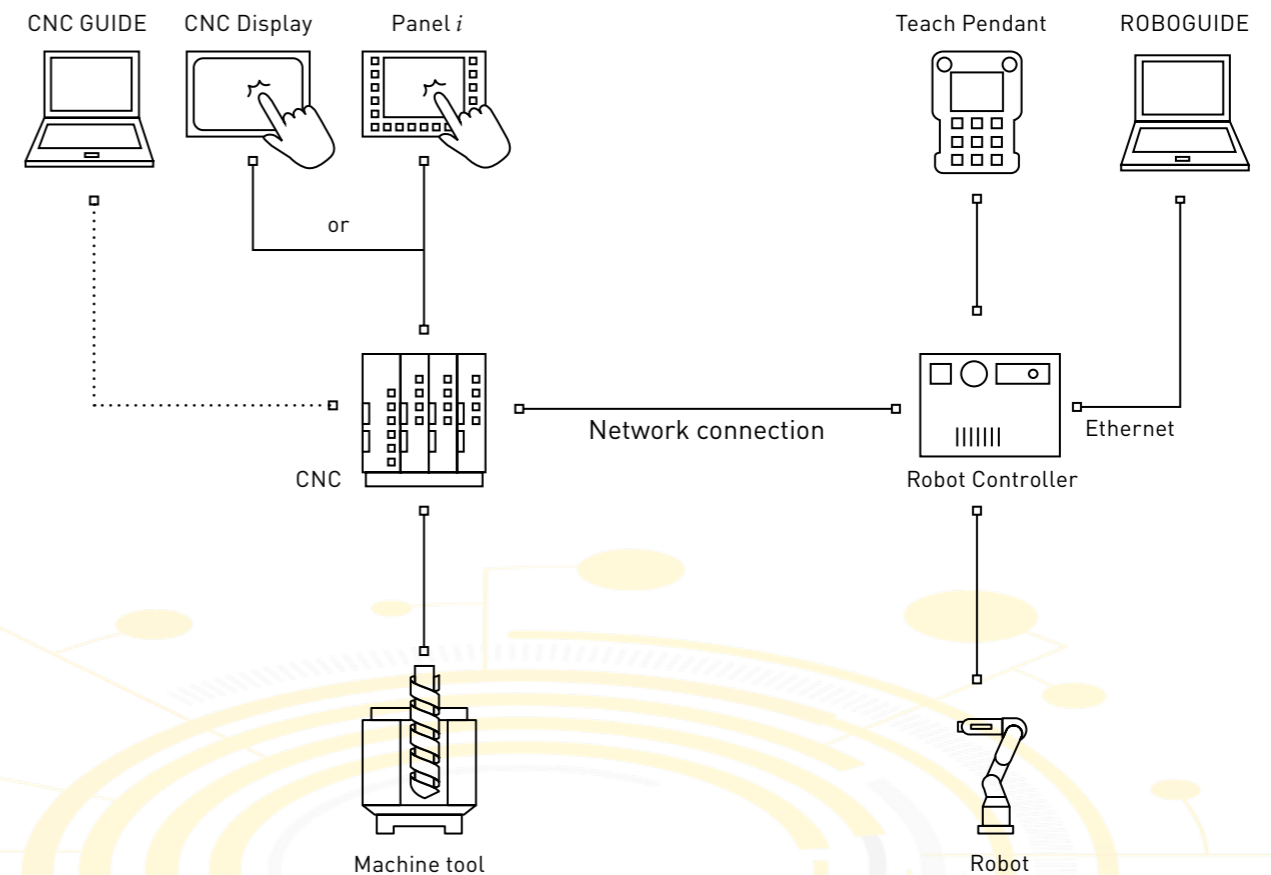
Data transfer between CNC and robot via standard interfaces. You can display CNC-related information on the robot's Teach Pendant controller screen, or display the robot status on the CNC screen.

Control of the robot via CNC

Axes, grippers, status, etc. can be controlled via CNC.

Customisable screens

The ability to create custom screens allows you to view robot and CNC information on a single page. Get the full picture at a single glance.



Industrial Network Options			
Network	FANUC CNC		FANUC Robot
I/O Link <i>i</i>	No additional hardware or SW option required	30i/31i/32i/35i-B 30i/31i/32i -B Plus 0i-MF/TF Plus 0i-MF/TF	No additional hardware or SW option required R-30iB (Mate) Plus
FL-net	Fast Ethernet Board SW option		Std Ethernet Port SW option
EtherNet/IP (Scanner & Adaptor)	Fast Ethernet Board SW option		Std Ethernet Port SW option
PROFINET IO Controller (Controller & Device)	Fast Ethernet Board SW option		PROFINET Master or Slave Board SW option
EtherCat	Not available		EtherCAT Slave Board SW option
DeviceNet (Master & Slave)	DeviceNet Master or Slave Board SW option		DeviceNet Master or Slave Board SW option
PROFIBUS-DP (Master & Slave)	PROFIBUS DP Master or Slave Board SW option		PROFIBUS DP Master or Slave Board SW option
CC-Link	CC-Link Slave Board SW option		CC-Link Slave Board SW option

FANUC Robotization Solutions

CNC - QSSR

Control and monitor the robot with the CNC

Designed with people that are unfamiliar with robots in mind, FANUC QSSR (Quick & Simple Start-up of Robotization) allows easy connection between a machine tool and a robot.

Your advantages:

Easy connection/setting

- Easy connection of CNC and robot with just one Ethernet cable (FL-net).
- Easy connection by setup guidance on CNC display screen (iHMI).

Easy programming

- Control robot from CNC by G-code programming (Manual handle, G-code).
- Easy to create a robot program to load/unload by guidance menu.
- Auto generation of robot program by using ROBOGUIDE technology.

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[+ READ MORE](#)

QSSR CONNECT



QSSR CONNECT simplifies the automation of machine tools with robots, e.g. for loading and unloading. Guidance functions enable an easy setup of the connection and start-up of the CNC and robot.

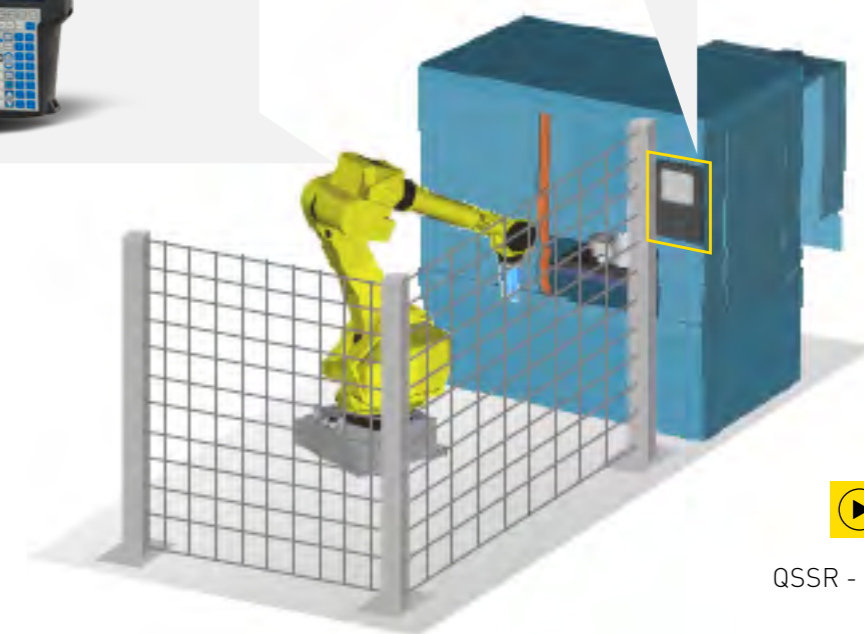
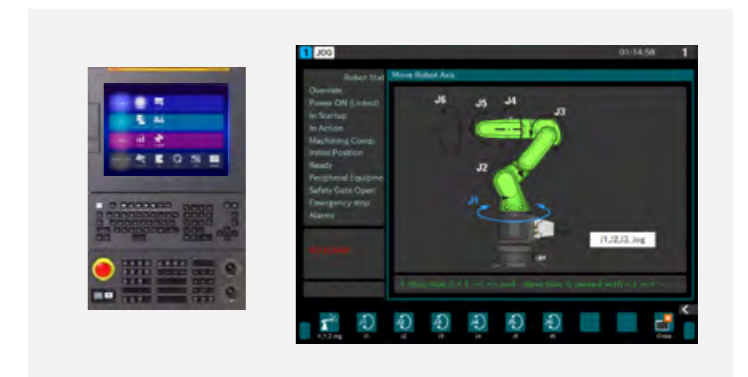
- Easy ladder development for robot connection by using function block
- Easy robot operation by M code in machining program
- Check machine tool and robot status on CNC screen

QSSR G-CODE



Control robot as a loader by CNC G-code program which is familiar for machine tool user.

Positioning by using manual handle of machine tool and specify passing point on CNC screen to create a robot program with one touch.



[▶ WATCH VIDEO](#)

QSSR - ROBODRILL and Robot

Application examples for **small-size parts**



Machine tending

Smart machine tending is much easier to integrate than you would imagine – robots provide an extremely flexible machine tending solution. Rotating chain loaders offer another method of loading and unloading your blanks and parts. Whatever solution you choose, control and seamless coordination is provided by your machine's CNC.



Tool changing

With a wide range of tool changing station mounting options, including top mounting, some types of robot serve as highly efficient tool changers. These robots are able to handle a wide range of tools, regardless of their weight.



iRVision system

Vision-based bin picking solutions are a great way to speed up processes involving parts bins by enabling robots to identify, select and load parts from a container. Sometimes boasting uptimes of 99.97%, this automated machine tending technology dramatically speeds up even the fiddliest of picking tasks.



Injection moulding

Robots are invaluable when it comes to injection moulding. From part removal to screw cutting, degating, labelling, lasering and adding inserts, they increase throughput across a varied range of tasks and eliminate the risk of damage.

Robot Model



LR Mate series **Small, fast, versatile**

This human-arm-sized robot is your best compact solution for fast handling and processing of parts.



M-10iD series **Slim wrist design for easy access**

Designed for easy integration into small work cells.



M-20iD series **A footprint that fits**

Ideally suited for narrow cells. Internal cable routing avoids cable interference.



CRX series **Lightweight and easy to program**

No need for safety fences. Easy to connect and easy to program.

Application examples for medium/large-size parts



Unmanned machining

Tending machines is a job that many people are unwilling to do. Good robots, by contrast, provide 720 hours of seamless production – they can multi-task between cells, load and unload parts and link up to eight machines.



Flexibility on a small footprint

Compact and space saving, cleverly designed vertical machining centres add additional flexibility to crowded production environments without the need for additional floor space.



Load multiple machines

With a range of rail, floor, wall and ceiling mounting options to save space and expand your robot's work envelope, some robot types are ideally suited to tending multiple machine tools – increasing your throughput and maximising production time.

[▶ WATCH VIDEO](#)

Robot Model



M-710iC series
High mechanical rigidity
Ideal for force applications such as polishing and deburring when equipped with a FANUC force sensor.

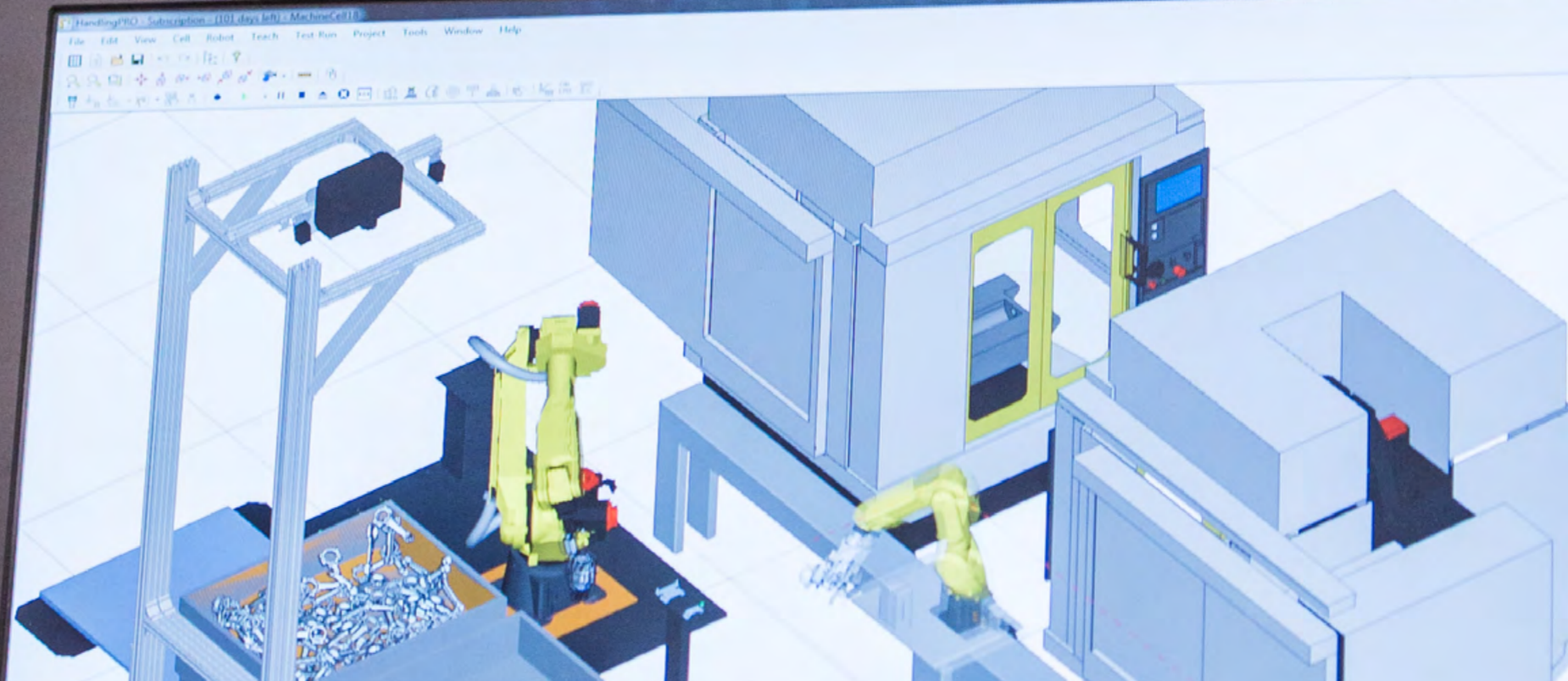


R-1000iA series
Built for speed
Every component in the R-1000iA series has been purpose built to deliver maximum speed and reliability.



R-2000iC/iD series
The versatile all-rounder
Capable of handling almost any gripper, this model is ideally suited to an almost infinite range of applications.

ROBOGUIDE – The offline simulation software for your robotization solution



Intelligent 3D Robot Simulation

FANUC's ROBOGUIDE is a powerful offline tool to improve the efficiency through robot system life cycle greatly.

Features:

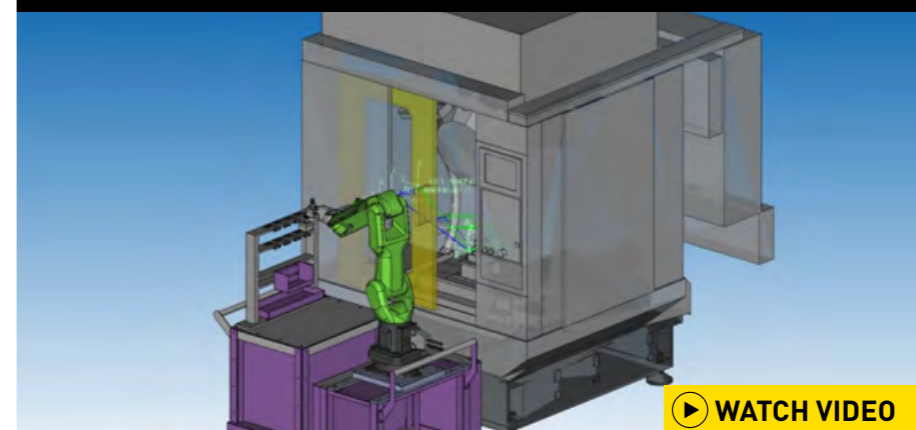
- All major cad formats are supported
- An auto place function helps to decide the optimal position for robot installation, taking the reach, cycle time, life/duty and power consumption into consideration
- Visual safety configuration to discover potential risks
- Motion analysis helps to investigate and optimise the program
- Easy to share and present design via free 3D player PC software

Benefits

- Accelerate the developing
- Powerful service tool

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ROBOGUIDE and NCGuide for QSSR



ROBOGUIDE for Machine Tool System



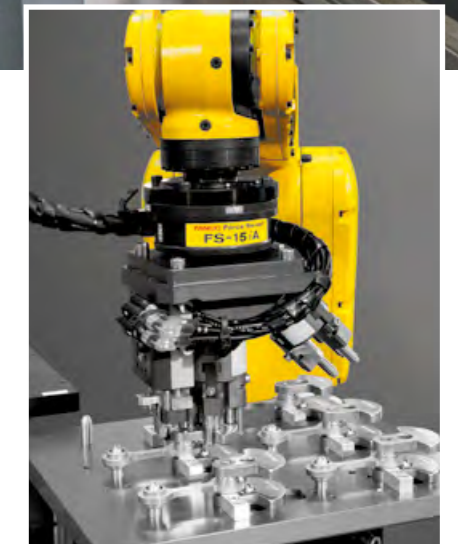
Force Sensor

Bringing tactile intelligence to your applications



Automated craftsmanship for assembly, contouring and measuring applications

FANUC's range of force sensors opens up a whole new realm of possibilities for intelligent automation solutions. That's because force sensors equip robots with an almost human-like sense of touch, enabling them to detect force and torque applied to the end effector in 6 degrees of freedom. With craftsman-like precision, robots fitted with this technology can perform assembly, contouring and measuring tasks across a vast number of industries. Four different sensor sizes are suitable for 6-axis robots to support payload classes up to 250 kg.



More productivity

- Complete integration into the robot for faster processing
- Supports practice-proven standard functions
- Robust hardware and intelligent software for reduced cycle times – all 100% FANUC
- Combines force control and *iR*Vision for unique functionality

Faster setups and maximum uptime

- Fast setups thanks to complete integration into the robot (no interface to external devices)
- Ready-to-use software library for addition features
- Seamless integration with FANUC vision systems
- Fewer parts and FANUC's reliability for maximum uptime

Quality control

- Complete production data tracking and logging
- High precision on assembly and contouring applications
- Automated force operation ensures consistent quality
- Full range of measurement options

Opening up your options

- Assembling – high-precision face matching, positioning, fitting, feeding, insertion up to clearance H7
- Contouring – accurate deburring, grinding, sanding and polishing
- Measuring – versatile mass measurement, weight and gravity centre calculation

Robot Functions

Get the most out of your FANUC Robot



iR-Vision System

FANUC's fully robot integrated visual detection system enables each robot to work as precisely as a human operator. Our 2D and 3D Vision Sensors cover a wide range of visual tasks. [READ MORE](#)



3D Robot Simulation

Visualise and simulate your automation ideas before installation with ROBOGUIDE – FANUC's offline simulation software. [READ MORE](#)



Zero Downtime (ZDT)

ZDT is a preventive and diagnosis function that monitors your production in real time, ensuring that downtime doesn't happen.



Dual Check Safety (DCS)

FANUC DCS is a smart integrated software solution designed to keep operators, robots and tooling completely safe. [READ MORE](#)



Extended Axis Control

Control software for auxiliary axes that move and are programmed together with the robot arm. One example is a rail unit carrying the robot arm: Here, each programmed position also defines where the rail axis must be.



Payload Identification

Payload Identification is an integrated function that measures and sets the robot payload using test motion of the robot axes J5 and J6.



Palletising

This function offers palletising motion instructions and registers for teaching simple palletising applications, e.g. for machine load/unload applications.



Soft Float

Minimize reactive forces and avoid damages and scratches on the workpiece with this function. Ideal for machine load/unload operations, e.g. gently and quickly extracting workpieces out of injection moulding or die casting machines.



Force Control Deburring Path Generation

The Force Deburring function supports deburring operations using a FANUC force sensor. In combination with iR-Vision, it automatically generates robot programs for deburring.

WWW.FANUC.EU

With more than 250 software functions for enhanced intelligence, motion, safety and productivity, plus a wide variety of high quality robot accessories, FANUC empowers you to do more. Contact your local FANUC support team for more details.

Peripheral equipment for robots



Gripper and handling system	Initiator and sensor	Robot-rail / external axis	Safety fences and emergency stop switch	Dresspack	Inspection and vision system	Programmable logic controller (PLC)
<p>Robot grippers are the physical interface between a robot arm and the work piece. Manufacturers choose grippers based on which handling application is required and the type of material in use.</p> <p>Types of robotic grippers:</p> <ul style="list-style-type: none"> - Vacuum grippers - Pneumatic grippers - Hydraulic grippers - Servo-electric grippers - Soft grippers <p>Examples of FANUC solutions to control the gripper system:</p> <ul style="list-style-type: none"> - Integrated robot I/O (available on the EE connector on the robot) - Profinet Option (J930 or J744) - Profibus (J713) 	<p>Sensors and initiators can be used to query the mechanical states, such as, e.g. gripper status query (opened / closed), workpiece present, distance measuring, etc.</p> <p>Types of initiators and sensors:</p> <ul style="list-style-type: none"> - Capacitive sensor - Inductive sensor - Magnetic sensor - Distance sensor - Photoelectric sensor/barrier <p>Examples of FANUC solutions to connect/integrate the sensor with the robot system:</p> <ul style="list-style-type: none"> - Integrated robot I/O (available on the EE connector on the robot) - Profinet Option (J930 or J744) - Profibus (J713) 	<p>Robot-rail or robot external axis is a robot with an external servo motor. This allows the robot to move on a rail expanding the robot's work envelope.</p> <p>Benefits of a robot on a rail</p> <ul style="list-style-type: none"> - Maximum flexibility - Optimised throughput - Leaner and safer work environment - Utilises less floor space - Ease of maintenance and cleaning <p>Example of FANUC solutions to control the external axis:</p> <p>The external axis can easily be controlled by a FANUC motor and powered by the robot controller. From a software point of view, the rail can be controlled as an independent or integrated axis. Example: Extended Axis Control (J518)</p>	<p>Normal robot work cells require a safety fence and an emergency stop around the machine or application in order to protect the workers.</p> <p>Example of FANUC solutions to connect to safety equipment:</p> <p>FANUC "DCS Safe I/O connect (J568)" allows a connection to the fences, light curtain, emergency stop and other safety equipment.</p>	<p>A robot dresspack refers to the cable and hose routing for a robot system. Some dress packs are external, while others are internally routed. Which solution is more suitable depends on the application and work environment.</p>	<p>Inspection is an essential component of any modern manufacturing system. It helps to filter out imperfections and assures the quality of the product, its parts and sub-assemblies. FANUC offers a range of solutions suited for any kind of inspection. In some cases, third-party manufacturers are involved in the inspection and vision systems.</p> <p>Examples of FANUC solutions for inspections:</p> <ul style="list-style-type: none"> - iRVision System - 3D Vision Sensor and 3D Area Sensor - iRVision 2D - iRVision 3D by 3DL Sensor 	<p>PLC is an industrial digital computer which has been ruggedised and adapted for the control of manufacturing processes, such as assembly lines, robotic devices, or any other activity that requires high reliability, ease of programming and process fault diagnosis.</p> <p>Today, competition in the industrial automation industry is fierce. Many companies developed their own PLC brands in order to keep up and stay ahead of the technology curve.</p> <p>Examples of FANUC solutions to connect and communicate with every kind of PLC</p> <ul style="list-style-type: none"> - Profinet (J744, J930, J931) - Profibus (J713, J751, J752) - EtherCAT (J743)

NOTE: Not all peripheral equipment is supplied by FANUC. Contact details for 3rd party suppliers can be provided.

Customer Voices

FANUC helps manufacturers to stay competitive and keep their customers happy, whether they are from a multinational or a small company.



KAVČIČ JANEZ ING. STR, DIRECTOR OF OKK

"Almost all of our machines are either made by FANUC or equipped with FANUC products. We use FANUC ROBODRILL machining center, FANUC robots and FANUC machine controllers. Consequently, we have reached the level of automation where repetitive tasks are mostly done by robots instead of workers. (...) For us, FANUC is the equivalent of quality and reliable performance."



JEROEN EVERS, DIRECTOR OF VULLINGS METAALBEWERKING

"We sometimes think that automation is costing jobs, but the opposite is also true. (...) Machining metals often evokes negative images of hard and dirty work, although operators here work on highly technological machines." (...) Thanks to the higher volumes we achieve through automation, we need to hire more staff."



FAHRYTDINOV FANIS, CEO OF AVTOREAL

"In order to pass their* audit and demonstrate our competitive advantages, we had to automatize our production further. For this automation, we chose FANUC robots. We didn't even consider other suppliers as we had a strong relationship with FANUC. After the installation of the first robot, we calculated the economic advantage and found world-class numbers which we still uphold today. (...) FANUC consultancy is always available. Very good service, very fast delivery!" * Avtoreal customer AvtoVAZ



ANDREAS PAULI, HEAD OF THE GEORG FISCHER WAVIN PRODUCTION FACILITY IN SUBINGEN

"We are especially able to maintain the world famous Swiss quality through automation and robots. (...) We chose FANUC robots because their service-oriented philosophy is crucial for keeping our machines running all year round."



TIAGO GUIMARÃES COELHO, MANAGER OF AGI

"In a market where Cartesian robots are the most used, we used our experience of robot integration to combine, in an articulated manner, the fantastic potential of FANUC robots. (...) As a product, the technological advance is clear, where artificial intelligence functions predominate and make it easy to achieve spectacular results in peace of mind. (...) I would define FANUC as "Fiabltechnology". I had to invent a new word since with FANUC, it's not possible separate technology from reliability!"



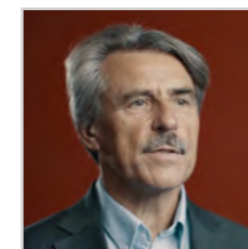
STEFFEN GRÜNIG, MANAGING DIRECTOR OF OTTO LYNKER GMBH

"We did not pursue automation on a whim. For us, productivity and the quality we wanted to achieve were paramount. (...) With any manual activity, there is "an amount of slack".



CHRISTOPHE RÉRAT, CO-DIRECTOR RECOMATIC

"For a long time, we wanted to create a partnership with FANUC, given the reliability of its equipment and the quality of its international service. (...) Together with FANUC, we ensure flexibility, profitability and adaptability to businesses and markets around the world."



DRAGO BRENCI, DIRECTOR OF LIVARNA TITAN, D.O.O.

"Automation has many advantages, especially in quality management, as it guarantees equal quality of various products at all times. We have increased productivity, cut costs and, most importantly, reduced lead time, meaning that delivery times are now much shorter."



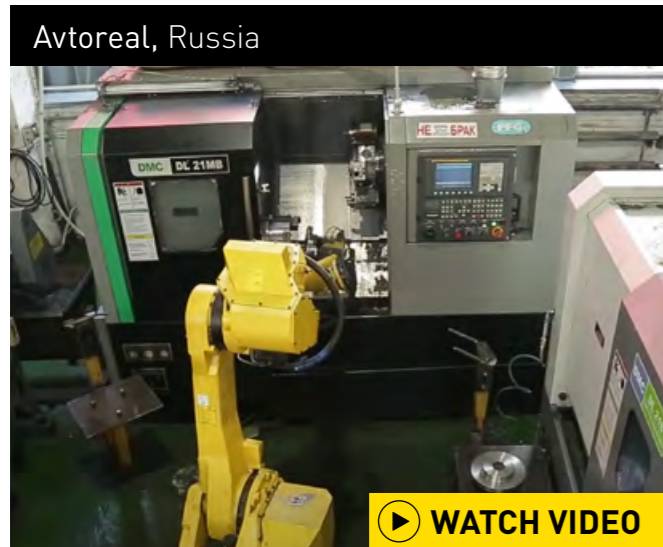
KARL VLAHEK, MANAGING DIRECTOR OF VL ROBOTIX GMBH

"With one stand-alone product, the customer would not have used the machine or the cell to capacity. (...) "Since all central components come from FANUC and we deliver such a cell from one source, all machines and components are coordinated."



HERBERT WAGNER, HEAD OF PRODUCTION AT RAU AG IN BÜLACH

"With the exception of surface technology, we make everything in-house. That's why, for me, it was important to have trouble-free components, such as the robots." (...) : "It may be that these components are not easier to integrate, but we know and value the reliability of FANUC."



Competitive and economic advantages thanks to automation

Avtoreal is a Russian company specialised in the production of automotive parts. Metalworking machines for milling and turning equipped with FANUC CNC and tended by FANUC robots are a center piece of their production line. To demonstrate their competitive advantages and meet their customer requirements, Avtoreal decided to invest in automation – and they chose FANUC robots for this undertaking. *“After the installation of the first robot, we calculated the economic advantage and found world-class numbers which we still uphold today. (...) FANUC consultancy is always available. Very good service, very fast delivery!”*, explains Fahrytdinov Fanis, CEO Avtoreal.



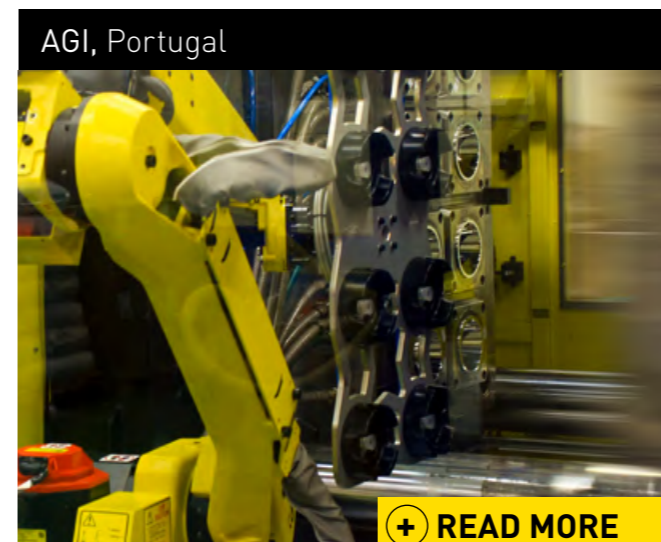
Robots take over repetitive tasks

OKK is a metalworking company in Slovenia with 50 years of experience in turning, grinding, honing and other key manufacturing methods. The company places a strong focus on efficiency and cycle time reduction. In order to facilitate this, OKK decided to streamline production with robotic automation. *“Almost all of our machines are either made by FANUC or equipped with FANUC products. (...) Consequently we have reached the level of automation where repetitive tasks are mostly done by robots instead of workers”*, explains director Kavčič Janez ing. str..



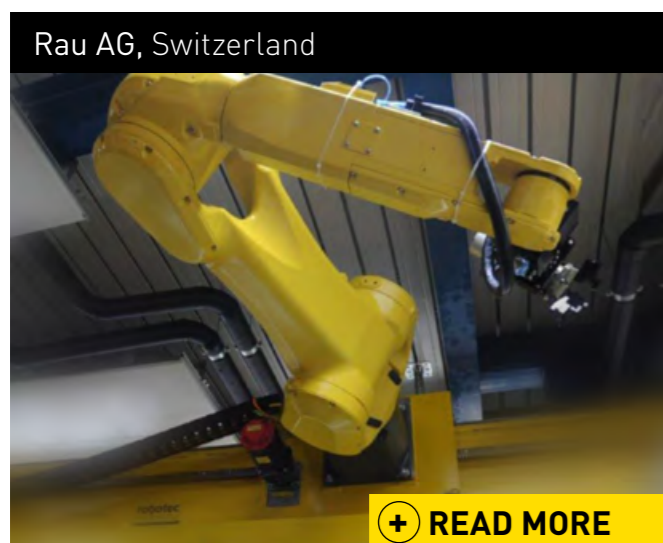
Non-stop metal machining with automated tending

Vullings Metaalbewerking BV, located in the Netherlands, produces products for turning and milling work that are usually made of stainless steel and other more complex kinds of steel. Vullings was looking for a fast machine that would be capable of processing small parts, delivering maximum technical availability and working around the clock. The solution: Two vertical machining centers (FANUC ROBODRILL) surrounded by robot cells for machine tending and product storage. Robots pick up castings on pallets and place them in the machine, remove them after machining, and place them on an outflow belt. Thanks to the reliability of FANUC ROBODRILL and automated machine tending, the machines in the workshops of Vullings Metaalbewerking are running 24 hours a day.



Robots to automate injection moulding and boost productivity

AGI, a family enterprise located in Portugal, is a dynamic and innovative player in the plastics industry. *“ROBOSHOT was our first FANUC product, with which we achieved spectacular results for very important customers with very high demands”*, explains Tiago Guimarães Coelho, Manager of AGI. The Integration of robots equipped with a vision system, allowed AGI to develop advanced moulding cell applications in a *“very simple way with optimum development”*. Thanks to this economical and flexible injection-plastics cell design, optimal assembling and recognition of inserts is achieved boosting customer competitiveness.



Making money during the unmanned shifts

Together with its system partner Robotec Engineering, the Swiss Rau AG automated two tooling machines – all while taking as little space as possible away from the regular production line. The manufacturer of component parts for customers from a variety of industries installed a robot with a vision system in the gripper, mounting it at a 90° angle on a 7.5 m beam above the machines so as not to limit the range of motion. During the unmanned night shifts, the FANUC Robot M-20iB/25 takes on the workers’ tasks. It is able to achieve 1.5 times the amount of work, practically in its sleep. A solution that is as innovative as it is efficient.



Numerical control and robots – a significant competitive advantage

SNAP ROBOTICS began its collaboration with FANUC in 2004, after searching for a global partner that could keep up with the company’s most complex applications. As a market leader in the machine tool sector, FANUC quickly became the obvious choice. The combination of CNC and robots stood out as a significant competitive advantage to the Italian company. The possibility of install robots for tending machining centers, lathes, grinding machines, broaching machines and other applications allows SNAP ROBOTICS to offer highly versatile all-inclusive cells. One of the advantages of this solution comes from the absence of safety fences, made possible by the FANUC Dual Check Safety system: Using a laser scanner, the system continuously verifies that no people are in the immediate proximity of the robot cells.

Elevate productivity to the next level

FANUC IoT/AI solutions: ZDT, MT-LINK*i*, FIELD system

ZDT (Zero Downtime) – Intelligent diagnostics for robots

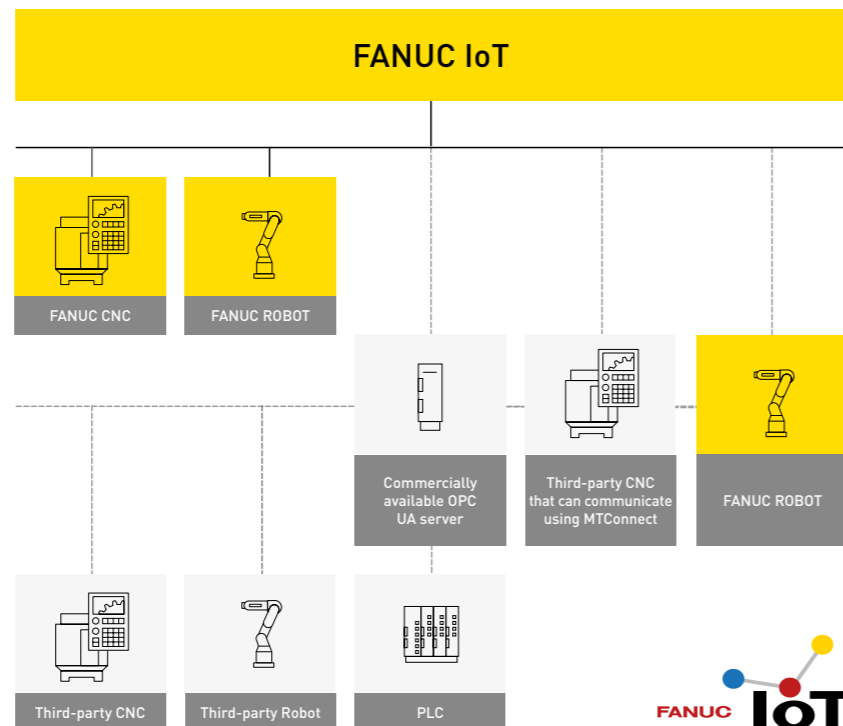
Unexpected downtime can result in very high costs. ZDT is FANUC's preventive and diagnosis function conceived to ensure that downtime doesn't happen. Thanks to a centralised system of Mechanical Condition Check, Process Status Check and Preventive Maintenance, ZDT constantly monitors each robot in order to proactively detect potential robot, controller, or process problems before unexpected downtime can occur. Notifications can even be checked via a smartphone.

MT-LINK*i* overview of your production

FANUC MT-LINK*i* is a PC software that connects the machines in the factory by Ethernet. It collects, manages and visualises machine information.

It can connect and collect information about machine tools with FANUC CNC, as well as peripheral devices like PLCs corresponding to OPC communication.

With the help of the MT-LINK*i* software, the customer gets an overview of production equipment and its use. This could be a first step towards Industrial IoT solutions.



FIELD system

Connect, monitor, think & drive

FIELD system (FANUC Intelligent Edge Link & Drive system) is an open platform for the manufacturing industry which targets improvements in productivity and efficiency. Third-party developers can freely develop and sell applications and converters for devices. Various devices on the shop floor can be connected without barriers related to generation or manufacturer. Furthermore, centralised management of equipment and data, as well as the sharing of data, are enhanced.

FIELD system

[▶ WATCH VIDEO](#)

[▶ WATCH TRAFIME CUSTOMER CASE](#)

Global power Service first

With a global network covering every continent and more than 271 local offices, we are always there to meet your needs quickly and effectively, whenever you need us. In Europe, our extensive network of subsidiaries provides sales, technical, logistics and service support throughout the continent. That way, you can be sure to have a local contact that always speaks your language.

Lifetime maintenance


Our open-minded and passionate team understands your needs – guiding you through your first steps in automation and providing support throughout the lifetime of your machine. Let's strive to improve your productivity!



99.97%
spare parts availability

24/7
support*
*chargeable contract option

Response time
19.4 hours*
(from customer's call to arrival of service engineer)



Machine downtime (MTTR): 25 hours*
(from customer's call to finish service intervention)
*average time calculated from 01.2021-12.2021

Lifetime OEM spare parts
As long as your machine is in use, we are able to provide you with original spare parts.

Efficient training
The FANUC Academy offers everything you need to upskill your teams and increase productivity – from introductory programs for beginners to courses tailored to the needs of expert users and specific applications.

Service First

WWW.FANUC.EU/SERVICE

A strong partner

With three core product groups - CNC systems, industrial robots and CNC machines - FANUC is a leading global manufacturer of factory automation solutions. We also provide powerful networking solutions to make complex automation scenarios simple. On top of this, we offer a range of additional benefits to reduce your costs - your entire solution from one supplier.

Widest range of industrial robots in the world



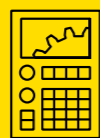
Productive, precise and reliable ROBOMACHINES

FANUC ROBOCUT
wire-cut EDM machines

FANUC ROBODRILL
vertical machining centres

FANUC ROBOSHOT
full electric injection moulding machines





FA
CNCs, Servo Motors
and Lasers



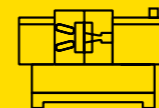
ROBOT
Industrial Robots,
Accessories and Software



ROBOCUT
CNC Wire-Cut Electric
Discharge Machines



ROBODRILL
Compact CNC Machining
Centres



ROBOSHOT
Electric CNC Injection
Moulding Machines



IoT
Industry 4.0
Solutions