Efficient automation for the Automotive Industry

Assembly
Meet the world’s first robot capable of lifting an entire car – and the world’s strongest collaborative robot with its 35 kg payload.

Speed and flexibility PAGES 20–27
for your powertrain production processes

Small parts and pre-assembly PAGES 10–13

Better body shop PAGES 18–19

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Revolutionising efficiency through automation

Since the early sixties when robots first took their place on factory floors, factory automation systems have been revolutionising the automotive industry. Today, robots and CNC machines are installed in car and automotive component plants around the world. Contributing massively to manufacturing efficiencies, these ensure manufacturers and suppliers alike to keep costs low and stay competitive. But this revolutionary process is still only just at the beginning. Heralded by the Internet of Things, the future will see fully networked smart factories operating at incredible high levels of efficiency and making a huge impact on the value chain. For the automotive industry, these solutions will be built around modularity, seamless communication and interfaces, energy efficiency, space savings and, in order to open up new realms of opportunity, human-machine collaboration.

Built around the Japanese principles of efficiency, simplicity and reliability

For almost 40 years, FANUC has been part of this story, partnering with OEMs and automotive suppliers to increase productivity and add value to supply chains throughout the industry. Now as before, FANUC’s manufacturing philosophy has also been helping to drive this revolutionary change. Built around the Japanese principles of efficiency, simplicity and reliability, it encapsulates all the principles that underpin tomorrow’s smart automotive factories. Nowhere else on earth can this be seen better than in FANUC’s own production facilities where over 2000 robots manufacture a vast range of automation solutions. At the time of going to print, some 380,000 FANUC robots, 3,300,000 CNCs and 256,000 machines were in operation in automotive plants around the world. FANUC reliability ensures that every one of these machines boasts an extremely low mean time between failures. Delivering the lowest possible TCO on the market, all FANUC products combine low running costs with flexibility and consistently high rates of throughput.

Fast integration and setup

To make setting up as quick and easy as possible, many FANUC solutions incorporate future-proof plug-and-play technology that is smart factory ready. These out-of-the-box technologies effectively eliminate downtime and enable you to create your own solutions using simple menus.

One common platform, multiple solutions

FANUC’s unrivalled one common platform approach enables the seamless integration of intelligent solutions and reduces the need for additional interfaces and wiring to a bare minimum.

Maximising energy efficiency

All FANUC products are designed with maximum energy efficiency in mind. Incorporating smart energy-saving features and intelligent servo technology, they provide maximum output for the lowest possible energy consumption.

Minimising floor space requirements

Since factory floor space is at a premium, FANUC products are built to make best use of it. Solutions include slim robots that come with a range of versatile mounting options, compact machining centres that outperform larger machines and intelligent DCS software that allows you to clearly define robot work areas according to designated safety zones.
Support & service

If it can’t do everything, does having a robot add up?
An interview with Markus Frischeisen, Head of Automation Development at AUDI AG

Added value
all along the automotive value chain from Tier 5 to OEM

Press shop
Efficient metal sheet handling, press tending, energy-saving cutting technology; the perfect CNC for presses, large motors

Small parts manufacturing and pre-assembly
Adaptable injection moulding for a multitude of parts, flexible line transfers for smaller charges, flexible ARC welding solutions, high-speed pre-assembly

Body shop
Low-cost automated spot welding, coordinated motion, faster welding times, laser welding, the fastest welding cell in the world

Paint shop
Painting, finishing, underbody sealing, specific FANUC paint series

Handling, loading, unloading
Transport, depalletising, line charging, bin picking, handling heavy parts

Powertrain
Speed and flexibility for your powertrain production; complex machining, cylinder head & cylinder block, gear & transmission cutting, non-cylindrical crankshaft machining

Drilling Milling EDM
Oil and transmission pumps, FANUC cutting philosophy; integrating a transfer line into a single machining centre, production cells for connection rods, transporting workpieces between machines

High-quality CNC applications
Hard turning, high-quality surface finish

Paint shop
Painting, finishing, underbody sealing, specific FANUC paint series

Assembly
Body transfer, handling complete cars without lifting systems or cranes, new possibilities thanks to collaborations
Intelligent front-of-line operations for more productivity

Efficient manufacturing starts with front-of-line processes such as transporting parts to production lines, depalletising, loading and line charging. Given changing production runs and a huge diversity of components, automated solutions need to be fully customisable as well as supremely adaptable and need to incorporate smart system solutions that reduce cycle times and drive productivity. The most effective way to achieve this is to choose a system capable of coordinating different robots and transfer lines using one common control. Not only does this drastically reduce integration time but it also saves valuable floor space and money since the need for additional interfaces and wiring is kept to an absolute minimum.

Automated bin picking for powertrain or body shop

Originally conceived for the Japanese market where labour costs are extremely high, FANUC’s 3D Area Sensor combined with a handling robot provides non-stop unmanned unloading capabilities, even in situations involving dirty, dusty or rusty products and/or difficult light conditions.

Easy to set up and program, it provides flexibility and increased efficiency on a range of front-of-line operations such as bin picking powertrain castings for deburring or body parts for assembly. Completely integrated into the robot controller, FANUC’s high-speed 3D Area Sensor uses structured light projection to create 3D maps. Using these maps, the system looks for parts. The part manager then does an evaluation and decides which part to pick. Taking reaching distance and collision avoidance into account, it then chooses the fastest picking option. If the part manager decides a pick has been unsuccessful or a part queue does not contain a part to pick, another image is taken and the process starts again using the new results.

The CNC for motion applications

Ideally suited to transfer and front-of-line material handling operations, a single FANUC Power Motion i-A CNC will control several robots on a single or on multiple lines. Faster and offering you more options than a conventional PLC solution, one control will synchronise up to 32 axes.

FANUC’s Power Motion i-A has been designed for a wide range of complex, high-performance general motion applications involving multiple axes, paths, speeds and torque controls. The biggest benefit: Power Motion i-A includes all the features of FANUC CNC technology. Often faster and offering more options than conventional solutions, when used in conjunction with rack-mounted robots, one Power Motion i-A control will manage every loading, unloading, picking and placing process on your line. And since it’s expandable, it allows you to keep adding further equipment such as conveyors to your system.

What better way of future-proofing your business?

High-speed heavy parts handling

Featuring high-performance capabilities and payload capacities up to 2300 kg, the FANUC range of industrial robots makes light work of even the most demanding of front-of-line material handling operations.

FANUC smart tip

Save energy on your production lines by using smaller robots. You will be surprised at what they can do.

Discover the entire range of FANUC handling robots

www.fanuc.eu/handling
The completely unmanned solution employs a rail-mounted M-20iA robot to distribute parts between the machining stations. At the stations another eight smaller LR Mate 200iC robots tend the machines and carry out quality control checks using visual intelligence.

The robots are coordinated by a single FANUC CNC which constantly communicates with them, adapts to their needs in real-time and, if necessary, reschedules tasks to maximise efficiency. The system’s Dual Check Safety (DCS) feature enables operators to enter the cell safely without interrupting production. When an operator enters the cell, the M-20iA simply revises its priorities and moves away from the operator while continuing to work. As well as increasing efficiency, the system has improved quality. The extra capacity gained by adding the robots has also enabled LISI to focus on new markets and grow its business.
Adaptable injection moulding for a multitude of parts

Modern vehicles contain a wealth of injection-moulded parts ranging from instrument panel components and lenses that demand extremely high levels of quality through to items such as interior trim, fastenings and electrical connectors. In order to produce these parts as efficiently as possible, manufacturers need machines to be capable of supporting a wide range of processes and maintaining extremely high quality standards. To minimise production time, machines also need to offer extremely high levels of reliability and fast turnaround times.

Relentless repeatability

Producing high-quality plastic parts for the automotive industry requires that suppliers ensure incredibly high levels of repeatability throughout very long production runs.

Here ROBOSHOT is in a class of its own – with every machine delivering exactly the same quality after 50,000 cycles as it did on the first shot. The most reliable machine on the market, it will also keep on producing flawless parts over the long term, delivering excellent cycle times and requiring minimum maintenance.

For full transparency and superior quality management, ROBOSHOT comes with up to 16 Multi Cavity Pressure Channels, cavity balance monitoring and historical data collection. To save money, ensure easier operation and minimise external components, monitoring is done via the CNC. You just select the required part quality.

Save energy on the shop floor as well as the road

Plastic automotive parts do not only equate with lighter energy-saving vehicles. Since they are quick and easy to produce using the world’s most energy-efficient injection moulding machine, the real savings start on the factory floor.

Superior servo technology and intelligent energetic recovery reduce FANUC ROBOSHOTs’ energy consumption by 50-70% compared to hydraulic machines and by up to 10-15% compared to other manufacturers’ electrical machines. Given very low maintenance costs, very high levels of uptime, fewer components and less wear, ROBOSHOT provides the lowest Total Cost of Ownership on the market.

"To streamline injection moulding processes, our Mastershot plastics cell is controlled by a Fanuc 31i-B Control to run the cell and equipped with a Fanuc CNC Power Motion i-A to manage the three-axis removal device. The result is an ideal combination since both controls come from a single source which means there are no workarounds required during integration. This makes the Hahn Automation Mastershot user-friendly for operating personnel and maintenance technicians.”

Thomas Hähn
Owner and MD of Hahn Automation, Rheinbollien, Germany

FANUC ROBOSHOT α-1000 i-A
www.fanuc.eu/uk/en/roboshot
Solutions for faster pre-assembly

Pre-assembly can involve a myriad of parts and processes and impact almost every tier in the supply chain. To make these key processes more efficient, FANUC has developed a range of intelligent solutions designed to streamline processes such as seat and light assembly, large component welding and much more. FANUC’s extensive range of automotive welding solutions, for instance, benefits from compact design, extremely fast motors and excellent acceleration. Every model helps increase weld quality, lowers your manufacturing costs and improves cycle times.

Flexible adaptation to every assembly situation

Available with different reaches and wrist speeds, FANUC’s human-arm-sized LR Mate robots are your best compact solution for fast handling and processing parts up to 7 kg with a calculated TCP speed of max. 4000 mm/sec.

This compact multi-function robot offers you full flexibility thanks to floor, ceiling, wall and angle mounting. With its compact design and sealed mechanical units (IP67), you can even integrate it directly into your machine tool. Its unique flip-over capability is the solution for reduced cycle times, more flexible cell designs, a full work envelope in upside-down mounting and the ability to run several robots close together.

Automated seat welding

Specifically designed for arc welding applications, the FANUC ARC Mate 0iA robots are extremely lightweight and compact. Equipped with FANUC iRVision, a FANUC ARC Mate 10iC robot picks parts from a tray and sets them into an automotive seat fixture. The ARC Mate 0iA and the ARC Mate 10iC robots then perform a spatterless welding operation. Once the weld cycle is finished, the ARC Mate 10iC unloads parts while the ARC Mate 0iA performs additional welds, and the cycle repeats.

“THE CELL WORKS REALLY WELL AND IS VERY EASY TO USE. OPERATORS SIMPLY PUT A NEW BIN IN THE CELL, SCAN THE LABEL AND PRESS ‘START’.”

Leading truck manufacturer DAF uses FANUC robots in pre-machining operations for con rods at production sites in the Netherlands. The FANUC R-2000iB robot uses FANUC iRVision to identify and pick con rods from a bin, orientate and place them into a laser machine ready for data matrix coding and verification. The con rod is then placed on a conveyor for grinding and onward processing. The FANUC project was launched to improve ergonomics and reduce costs. Compared with manual picking, an automated solution makes for a more ergonomic environment and allows for data matrix coding onsite rather than on external suppliers’ premises. Ergonomic and cost benefits include reduced manual labour – one con rod weighs 5 kg, and an average 500 are handled every shift. Onsite data matrix coding reduces costs and use of raw materials.

Peter Hoedemakers
Production Engineer at DAF

FANUC M-1iA ROBOT DISPENSES GLUE ONTO PART AND VERIFIES USING ERROR PROOFING

The robot uses iRVision Multi-View to locate the part, after which it employs the vision offsets to adjust the dispensing path. During the dispensing process, iRVision error proofing verifies that the glue is present and has been dispensed evenly onto the part.

Discover the complete FANUC pre-assembly range

www.fanuc.eu/assembly
Adaptable repeatability for your press shop

Pressing and fabricating automotive body panels involves the precision control of very high-exertive forces to accurately form sophisticated geometries. Presses not only need to provide repeatability but also a high level of adaptability given today’s shorter product life cycles and frequent model changes. The key to maximising the efficiency of these systems lies in the control and drives, and how well they interact with the distributed I/O, operator control and monitoring systems. Having one common control capable of coordinating an entire press or fabrication cell, including presses, cutting equipment and tending robots reduces complexity and makes adapting to new production scenarios easy. Opening up your options, advanced FANUC CNC technology provides you with the power to make the most of your metal forming processes. Whether it is bending, roll forming, spinning, deep drawing or stretch forming, reshaping sheet metal is more efficient with a FANUC CNC.

Efficient sheet metal handling

High-speed robots equipped with generous work envelopes are ideally suited to maximising the efficiency of sheet metal handling operations. In more challenging situations this can be improved further with the help of coordinated motion functionality.

Coordinated motion technology enables robots to work together, holding or manipulating workpieces for one another as well as providing exact work and travel angles. With more than 100 models to choose from, FANUC offers the widest range of robots in the world. Ideally suited to sheet metal, vehicle shell and panel handling applications, FANUC robots are easy to teach and offer huge amounts of flexibility thanks to a range of application-specific options, straightforward integration, payloads up to 2300 kg and maximum reaches up to 4683 mm.

Stefano Fava
General Manager at Starmatik, Treviso, Italy

“AN AUTOMATED BENDING SYSTEM OFFERS SEVERAL ADVANTAGES, AND NOT JUST IN TERMS OF PRODUCTION SPEED AND EFFICIENCY. USING ROBOTS FOR THIS KIND OF PROCESSING SIGNIFICANTLY REDUCES THE RISK OF OPERATOR INJURIES AND OCCUPATIONAL DISEASES AS WELL AS IT ENSURES THE CONSTANT QUALITY OF PRODUCTS MANUFACTURED ACCORDING TO A COMBINATION OF SPECIFIC PARAMETERS AND STANDARD PROCEDURES.”

Starmatik Italy’s Flexible Bending System (FBS) is a system consisting of fully integrated components: robot, press brake, peripherals, hardware and software control. The advantage of having the robot, press brake and/or other machinery and peripherals all integrated and communicating with each other reduces robot cell setup time, allowing for a cost-effective production, no matter how large or small the batch size. Starmatik’s offline programming software “SimulEasy” permits to create and simulate programs for new parts while the robot cell is in operation.

Energy-saving cutting technology

The FANUC CO2 Laser with 2D and 3D cutting technology offers a reliable, precise and cost-effective way to cut sheet metal. Delivering superior parts fitting regardless of material thickness, it also lowers your energy costs. That’s because it contains smart features that reduce electricity consumption by as much as 25% and gas consumption by as much as 30%. To provide you with a full range of options, FANUC has also released a fiber laser.

The perfect CNC for press machines

FANUC’s unique CNC Power Motion i-A makes an ideal alternative control for large servo applications such as press machines. In practice, Power Motion i-A translates to less power consumption and more control and precision than is possible using hydraulic technology. Thanks to high-speed response features for quick axis start/stop and high-speed execution cycles, it also reduces cycle times and keeps material stress to a minimum.

Smoothing precision running for press machines: With torque outputs up to 3000 Nm, FANUC Alpha i5 servomotors are ideally suited to large high-precision press machines.
A pioneer in advanced body shop engineering, PSA was one of the first in the automotive sector to adopt widespread use of electrically driven spot welding guns, replacing air actuators with servo versions. Their enhanced reliability, quality and cost-effectiveness have been recognised by most automotive companies, who have since installed third-generation FANUC drive servo guns with advanced features such as auto-tuning and battery-free gun change as standard right across their operations.

Europe's second largest car manufacturer, the PSA Group, has improved efficiency at its plants around the world by installing some 7000 FANUC robots on a range of automotive applications.

Recognition for its services to the PSA Group

"Working closely with FANUC to improve efficiency at its plants, the PSA Group recognised FANUC in 2009 and 2012 for its outstanding performance in the areas of services, industrial equipment and automotive parts. FANUC has been a PSA Core Supplier since 2012."
Better body shop

The quality of a car body, including flawless panel fit and precision welded seams, speaks directly to customers. Getting that right, given the hundreds of panels and thousands of spot, stud and seam welds that go into modern vehicles, demands a lot from suppliers and OEMs alike. That’s why FANUC body shop and panel welding solutions have been designed to deliver consistent welding parameters, better weld quality and faster cycle times – something that is backed by an extensive package of welding solutions and intelligent features designed to save you time and increase productivity. These include functionality to ensure accurate parts fit up, weld logging capabilities as well as a range of synchronised peripheral solutions to optimise external factors that impact cycle times, such as handling, positioning or assembling.

Innovation: Flow Drill Screwing

Flow Drill Screwing (FDS) is a novel production process developed for the automotive industry. Special fasteners are inserted by a drilling and inserting process, providing a strong and rigid car body without the need for welding.

FDS results in strong, high-quality car bodies and components. It uses a self-piercing screw (i.e., it drills its own hole) and is ideal in situations where poor access to both sides of the part make spot welding impossible, where the part might need disassembling or where metals are used that can’t be welded together. It offers a flexible choice of sheet metal type (steel, aluminium and magnesium are supported) and is easily combined with other assembly processes. Resistance to sideways and tilting forces is key to preventing the screw from slipping out and causing the process to fail. FANUC’s new M-900iB/280 robot was specially designed for this kind of automotive application. More rigid than other robots in this payload/reach range, it’s the perfect choice for processes that exert a lot of pressure on the tool and require heightened precision.

Robots versus traditional hem flange presses

The process of roller hemming using robots was introduced as a cost-cutting measure. Although slower than traditional flange presses, robots are considerably less expensive. They produce excellent results and can be used on a wide range of materials, including steel and aluminium. Coordinating them with other assembly processes such as spot welding, gluing, riveting is also very straightforward.

In a typical roller hemming cell the workpiece is mounted in the fixture that presents the panels and their edges to one or several robots. Bending is done gradually and the roller hemming may require 3 bending cycles to seal the hem completely. Two additional robots can be installed in a single cell to achieve faster cycle times. In many instances, inserting and extracting the workpiece into/from the fixture is also performed by robots. The new FANUC M-900iB/280 robot offers just the right rigidity for this process.

Faster welding times

On spot welding applications that demand the highest possible number of parts per hour, FANUC Learning Vibration Control (LVC) software enables robots to learn the characteristics of a spot welding path in order to improve cycle times.

Unmanned operation with laser

Replacing spot welding on a range of body shop applications, laser welding technology offers suppliers and OEMs alike high stability, no deformation, high welding speeds and lower costs. Unlike older spot welding solutions, laser also offers the additional benefit of complete unmanned operation.
Speed and flexibility for your powertrain production processes

The manufacture of automotive powertrains comprises a variety of machining processes that demand maximum flexibility from CNC systems. The large variety of vehicle models, short product life cycles and high volumes compound this further, meaning it is imperative for manufacturers to simplify processes as much as possible. This involves reducing complexity, increasing efficiency and focusing on seamless CNC systems that enable fast turnaround times between production runs as well as high levels of throughput.

Maximum control, maximum precision

FANUC’s 30i-B series CNC was purpose-built for fast, precise 5-axis machining processes used in the automotive industry. Easy to use and featuring dedicated automotive software, it provides the exacting levels of control required for machining an infinite number of complex and sophisticated parts including from camshafts, crankshafts and gears.
"USED FOR THE PRODUCTION OF POWERTRAIN COMPONENTS, EMAG’S REVOLUTIONARY VERTICAL TURNING MACHINE COMBINES DIFFERENT PROCESSES, INCLUDING WORKPIECE PICKUP, HOLDING AND REMOVAL, IN ONE CONTINUOUS COMPACT CYCLE."

For automotive suppliers this translates into incredibly high process stability and huge time savings, no matter whether they are machining gearwheels, sprockets, sliding sleeves, components for CVTs, link pins, con rods, rockers, bearing rings or piston rings.

To coordinate these processes within their innovative machine, EMAG chose FANUC’s advanced iA-series CNCs.

Matsuura Machinery GmbH
Wiesbaden-Delkenheim, Germany

Matsuura is a leading machine tool manufacturer whose CNC machining centres are used by BBS Motorsport to produce high-specification wheels for Formula 1 racing cars and other high-performance vehicles.

Fitted to high-speed 5-axis BBS’ Matsuura MAM72-40W machining centres, FANUC iA-series CNCs provide the sophisticated level of control required by BBS Motorsport. Matsuura equips its machines with FANUC CNCs given their incredible reliability and user-friendly menu structures. Machining is not only very fast, but the FANUC CNC also contains a number of software features specifically designed to get the most from 5-axis machining and fully utilise the machine’s potential. BBS Production Manager Francisco Serrano provides a case in point: “Recently we had to follow the path of bore holes, the diameter of which started at 0.4 mm and grew increasingly larger. Even for the very small radii, the edges had to be razor-sharp, which in turn required intricate machining during milling. We were able to achieve perfect results with the FANUC-controlled Matsuura.”

Erwin Junker Maschinenfabrik GmbH
Nordrach, Germany

“FANUC ADVANCED CNC TECHNOLOGY GIVES JUNKER GRINDING MACHINES AN EDGE.”

Helping to put the high-speed in Junker’s high-speed grinding machines, FANUC Advanced CNC Technology comes with a wide range of features to reduce cycle times and increase the efficiency of oscillating crankshaft grinding processes. Leading to more speed and accuracy, this includes Learning Control, minimal synchronous error between the spindle and feed axis, faster execution of part program results and simplified programming.

Hembrug Machine Tools
Haarlem, Netherlands

“CONTROL-RELATED FAILURES ARE VIRTUALLY NON-EXISTENT – EVEN OVER THE LONGER TERM.”

Hard turning provides a fully-fledged alternative to circular grinding on many automotive applications. Hembrug, a pioneer of this technology, specialises almost exclusively in fast ultra-precision hard turning solutions.

Depending on the specifications, its Mikroturm range of CNC lathes achieves incredible degrees of accuracy using either FANUC 30i-D or 32i CNCs. But accuracy was just one reason for choosing FANUC. Peter van Ommaren, Head of Electrical Design at Hembrug, says, “The combination of FANUC controls and drives in our machines works wonderfully. That’s something we hear again and again from our customers. FANUC electrical components, motors and controls are built to the highest standards of quality and are extremely robust, even when constantly exposed to electromagnetic forces.”
Seamless CNC concept: The compact FANUC 0i-F series CNC has been specifically designed to provide a straightforward solution for multiple control applications. Offering an incredible degree of compatibility, the 0i-F series integrates seamlessly into FANUC’s 30i-B series CNC to provide users with perfectly matched machine control regardless of the application. Since all the hardware design and programming is shared – something that completely precludes the need for redundancies –, the benefits of this ground-breaking approach are significantly lower development and setup costs.

Sophisticated machining is all about CNC

Demanding automotive machining operations often involve the use of multiple axes and tool paths. To make these processes efficient, machining centres need to guarantee utmost precision and flawless surfaces within the shortest possible cycle times. They are, however, only ever as good as the CNC that controls them. Fast, precise 5-axis milling, turning, grinding or cutting operations require a CNC that delivers the exacting levels of control required for machining an infinite number of complex and sophisticated automated parts – from camshafts, crankshafts and gears through to impellers.

The world’s most reliable CNC is also the most flexible

FANUC manufactures CNCs and machines dedicated to the production of automotive components. Whether it’s milling, drilling, tapping, boring, complex machining or EDM wire cutting, FANUC has a solution to improve your cycle times and increase throughput. Extremely reliable and designed for ultimate accuracy, FANUC products can also be customised easily to handle a vast range of automotive applications.

FANUC smart tip: Managed energy efficiency

All FANUC CNCs, motors and amplifiers employ intelligent energy management to ensure they provide the best performance for the lowest possible energy consumption.

FANUC CNC series + 0i-F & 31i-B

www.fanuc.eu/CNCseries
Versatile CNC for efficient machining

Rapidly changing production runs coupled with the need for complex parts – such as camshafts, crankshafts or gears – to be machined to incredibly fine tolerances require versatile CNC machines and machining centres that maximise efficiency and drive increased productivity. As well as being extremely robust and reliable, they need to offer huge versatility across a wide range of applications – from prototypes to entire production runs – while still delivering short cycle times.

“For our new oil pump cell we were looking for a smaller taper machine with a fixed table and a fourth axis in the form of a rotary indexer.”

In a dedicated cell, leading UK automotive supplier Concentric machines oil pump covers, pump bodies and transmission pumps from pressure aluminium die-castings using FANUC’s versatile Vertical Machining Centre.

Competitively priced and extremely well suited to machining of this kind, the 30-taper, high-speed, vertical spindle machine has significantly increased output for the automotive supplier. Explaining the reasoning behind the investment, Concentric Manufacturing Engineering Manager Mark McFall says, “for our new oil pump cell we were looking for a smaller taper machine with a fixed table and a fourth axis in the form of a rotary indexer. We opted for ROBODRILL due to FANUC’s good reputation in the market, especially for the reliability of their equipment. We went to see a similar machining centre that was robotically loaded at a manufacturer locally and the feedback was all positive. The ROBODRILL was also ideally sized in terms of its tool capacity as our applications require 20 tools and the machine’s turret-type magazine houses 21 cutters.”

FANUC ROBODRILL
High-Speed Vertical Machining Centre
www.fanuc.eu/robodrill
If it can’t do everything, does having a robot add up?

An interview with Markus Frischeisen, Head of Automation Development at AUDI AG

Mr Frischeisen, as far as the car industry is concerned, where do you see the current challenges facing automation technology?

Well, one of the main challenges lies in the fact that structures are currently undergoing some radical changes. Up to now, manufacturing a car body has involved around 10,000 to 12,000 network connections. That's standard. But recently the emphasis has switched to data. The buzzword is big data. We are adapting the emphasis has switched to data. The

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Smarter painting and dispensing

Paint application represents perhaps the most challenging process in vehicle manufacturing today. Paint shop environments are hard on equipment, involve sophisticated processes and setups, non-stop production and a high demand for energy. Today’s flawless paint surfaces and array of paint options also demand zero fault tolerance, repeatability and unrelenting reliability from automated systems. Given today’s shorter production runs and frequent model changes, these systems also need to be highly adaptable. To meet the challenges of these environments, FANUC has designed a dedicated range of paint robots that deliver incredible accuracy, maximised throughput and low energy consumption in harsh environments.

Intelligent painting and coating

FANUC’s intelligent paint robots provide OEMs and automotive suppliers with a competitive edge when it comes to painting and coating applications, including painting in a chain-on-edge conveyor. FANUC’s P-250iB robots series is designed to completely paint and coat a variety of products – all FANUC paint robots are explosion-proof and fully ATEX compliant for Category 2 and Group IIG.

Smart setup

To reduce turnaround times on model changeovers, FANUC has developed PaintTool™. Requiring very little or no previous programming experience, this software tool makes configuring and operating FANUC paint robots easy. With a range of standard configurations on board, it also saves time and provides adaptability across a host of process parameter settings including colour change, line tracking, path teaching and much more.

Flexible low-cost lifting on a small footprint: At GM three FANUC M-2000iA/900L robots lift and transfer full vehicle bodies through the underbody sealing and quality inspection process. Four FANUC M-20iA/10L robots use iRVision to locate seams in the underbody area and then apply sealer using FANUC’s patented servo dispensing technology for maximum quality control. This is one example of the unique capability of the M-2000iA to lift an entire automotive body with its best-in-class payload and working envelope. The M-2000iA robots eliminated the need for two custom engineered vertical lifts and a custom overhead conveyor system.

"COMPARED WITH CONVENTIONAL OVERHEAD CONVEYORS, M-2000iA ROBOTS MAKE FOR GREATER SYSTEM RELIABILITY, INCREASED PRODUCTION AND LOWER MAINTENANCE COSTS. THEY ALMOST HALVE THE SYSTEM FOOTPRINT AND ELIMINATE THE NEED FOR STRUCTURAL REINFORCEMENT DURING INSTALLATION."

Find the complete FANUC paint robots range www.fanuc.eu/painting
Defying gravity

With its huge 2.3 t payload, the new FANUC M-2000iA opens up new options for efficient assembly

Using large industrial robots like the FANUC M-2000iA/2300 on assembly operations to lift and position entire car bodies provides a flexible alternative to traditional hoists and gantries. Not only do their smaller operating footprints save valuable floor space but they also provide manufacturers with additional versatility thanks to a wide range of options. Incredibly reliable and easy to maintain, they come with ISD energy-saving features.

Capable of effortlessly lifting and positioning an entire car within its generous work envelope, this robot has been designed to improve workflow, increase efficiency and reduce costs.

Team up with a robot and do more than ever before

The world’s strongest collaborative robot, the FANUC CR-35iA, lifts up to 35 kg and operates completely without the need for fences. Designed to keep humans safe at all times, it is ideally suited to a whole range of automotive processes that humans have traditionally had to do alone, such as those involving heavy tools and powertrain components. Depending on what you want it to do, it comes with either a FANUC Vision Sensor or FANUC 3D Area Sensor.
“FANUC ROBOTS HAVE HELPED US FULLY AUTOMATE OUR MANUFACTURING PROCESSES.”

German automotive supplier GEDIA relies on FANUC robots to cut costs and meet growing demand at its newly revamped plant in Poland. A supplier of pressed metal components for cars and trucks, GEDIA has almost completely automated its manufacturing processes using FANUC robots. Starting in 1994, automation at the plant stems mostly from the need to meet constantly increasing quality and quantity requirements and carry out technically advanced processes that would be extremely dangerous or even impossible for manual operators.

Currently the plant operates 57 FANUC robots, mostly on welding and spot welding applications but also on material handling operations. Welding and material handling processes take place continuously at the plant and demand a very high level of precision and repeatability from the robots. Andrzej Marcinek, Managing Director of GEDIA Poland, says, “FANUC robots have helped us fully automate our manufacturing processes. In terms of quality we have been able to achieve 100% repeatability. The robots have also given us the flexibility to implement the changes required by our clients very quickly. They also allow us to manufacture several different components using one machine. Today, in tough market conditions, they give us a significant advantage by allowing us to react quickly to changing market trends.”

Automating GEDIA’s line has also helped to drastically reduce costs caused by human errors and mishandling, not to mention workplace accidents. Installing the robots has also enabled GEDIA to take on additional staff to cope with the increased productivity at the plant. Since the dirty, heavy and manually demanding work is now all completed automatically, new employment opportunities have been created for persons who, due to their age, gender or disability status, would have previously found it difficult to get work at the plant.

Buoyed by this success, GEDIA is now in the process of creating two additional production lines consisting of five robots as well as a smaller one comprising three robots for riveting, bonding and laser welding. The decision has been reinforced by the company’s satisfaction with FANUC robots.

“FANUC provides us with all the technical support and training we need. Additionally, the robots themselves are reliable and easy to use, and are built with a minimum of moving parts using proven solutions. FANUC also offers a wide assortment of software tools to improve productivity and ensure maximum precision.”

Andrzej Marcinek, Managing Director of GEDIA Poland
Mr Höllen, for clients in the automotive sector recently there have been some positive changes to the way FANUC deals with repairs. How is this impacting the European Repair Center in Echternach?

Well, for a start it has enabled us to carry out some exciting new developments. Since our founding in 1987, we’ve been providing support to Machine Tool Builders (MTBs) across all our 16 European affiliates. Currently we repair and overhaul about 1300 units a month. But due to intellectual property rights restrictions, we have only been able to do 70 percent of the repairs in-house, with the rest being sent back to Japan. Until recently we simply didn’t have test benches for more modern machines.

The newest product we were repairing was 15 years old. But that’s all changed now – and with the arrival of new tooling from Japan, we will soon be able to do 90 percent of repairs in Luxembourg, providing a faster response time to our European customers.

Is this why you’re expanding your facility?

Yes, we need more space. We are about to extend the Repair Center to include a further 550 m² of repair benches and warehousing. And, for the first time in our history, we will be training apprentices – something that represents a major milestone for us. The expansion also enabled us to hire four new repair technicians earlier this year.

Have things changed in other ways?

The nature of our work is also changing slightly. Originally our entire focus was on CNC repair, but since 2010 we’ve been repairing robot components too, mostly motors. Business is growing and output is starting to increase. Last year, for example, we only had one technician doing motor repairs but since then this figure has risen to six. Instead of repairing 30 motors a month, as was the case until recently, we’re now doing 160. Plus services that were once only available in Japan are now available in Europe. Our technicians are also receiving training in Japan, something that only became possible recently. In fact we’ve got two there right now.

Are there any other new angles to your business?

Well, aside from our established exchange and repair services that we’ve been growing, in January we started a teach pendant repair business from scratch. And we’ve gone from 0 to 50 units a month since the beginning of the year. Previously our affiliates did this, but the benefits of centralising repairs are that we can offer a complete service, get direct support from Japan and have all the latest test equipment at our disposal. Our increased output is evidence that our customers see it that way too.

“Currently we repair and overhaul about 1300 units a month.”

Despite an industry-leading mean time between failures, now and again FANUC products do need to be repaired. Nevertheless, faced with contractual deadlines and enormous costs, automotive suppliers and OEMs alike cannot afford to let this impact production. To keep your downtime to an absolute minimum and ensure you meet production schedules, FANUC has recently expanded its dedicated European Repair Center to provide the spare parts and expertise you need whenever you need them.
Service first

With a global network covering every continent and more than 245 local offices in 46 countries, we are always there to meet your needs quickly and effectively, whenever you need us. In Europe, a comprehensive FANUC network with 28 locations provides sales, technical, logistic and service support throughout the continent. That way you can be sure to have a local contact that always speaks your language.

Maximising your uptime

Regardless of where you are in the automotive supply chain, ensuring your machines exhibit maximum reliability is essential to your bottom line. That is why having a maintenance strategy that is ideally suited to you and your own individual needs is essential. At FANUC, we offer a whole range of individualised solutions – including preventative and predictive maintenance packages – to give you this flexibility and maximise productivity. Everything is based on our development guidelines to make products as reliable, predictable and easy to repair as possible. Backed by our enormous European stock of new and refurbished OEM parts and ultra-fast delivery, our local OEM-trained service engineers will also repair, refurbish and retrofit your machines to extend their lifespans and save you money.

Lifetime maintenance

As long as your machine is in service, we will endeavour to provide you with original spare parts for it – and that for a minimum of 25 years. If, for any reason, we cannot do that we will repair your components at the FANUC Repair Center to meet original quality specifications.

FANUC Academy – training where you want it, when you want it

In addition to an unrivalled range of courses in multiple languages at locations across Europe, the FANUC Academy offers courses specifically tailored to the needs of the automotive industry. These can be taught in our real-life production environment using the latest machines and control technology, technology cell replicas of your production facilities or at your premises using our mobile training cells. Whatever option you choose, you can be sure of the payoffs.
ONE FANUC – infinite opportunities

FANUC – your one-stop solution for robots, CNC, machining centres and global services for the automotive industry.
MANUFACTURED EFFICIENCY: 5 PRODUCT GROUPS – ONE COMMON SERVO AND CONTROL PLATFORM

FA
CNCs, Servo Motors and Lasers

ROBOTS
Industrial Robots, Accessories and Software

ROBOCUT
CNC Wire-Cut Electric Discharge Machines

ROBODRILL
Compact CNC Machining Centres

ROBOSHOT
Electric CNC Injection Moulding Machines

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