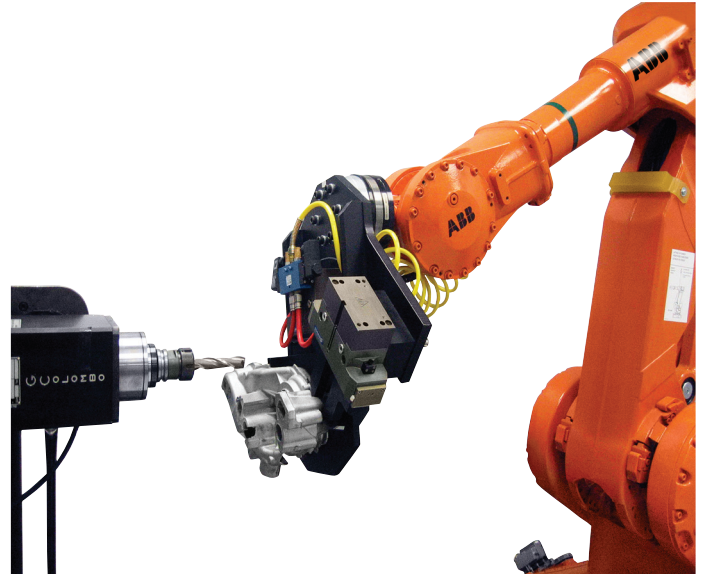


RobotWare Machining FC Force control for machining

For high-quality surface finishing and cast cleaning. Improved automated grinding and finishing is made possible with RobotWare Machining FC.



RobotWare Machining FC

At the heart of RobotWare Machining FC are three advanced software features, based on ABB's generic force control technology. The first, an easy way of programming with lead through and automatic path learning, allows easy, quick and accurate creation of complex robot paths. The graphical user interface is icon based and includes a wizard to help create programs by first using manual guidance and then letting the robot automatically follow the surface and record the path.

The second, FC Pressure, lets robots grind, polish or buff parts while maintaining a constant force between the tool and the work piece. RobotWare Machining FC contains a graphical user interface that simplifies configuration and programming of the generic force control feature FC Pressure. The third software feature, FC SpeedChange, enables a robot to deburr or deflash part-lines and surfaces of parts at a controlled speed, slowing down when for example encountering excessive burr on a casting. The configuration and programming of the feature is tightly integrated into the other software features of RobotWare Machining FC.

Position control, the conventional approach used to clean castings, involves complex and time-consuming programming as the robot path needs to be as exact as possible. The expectation is that the grinding or polishing will then give consistent results. But in reality, castings are all individual with different tolerances, and this generates inconsistent process results. ABB has developed RobotWare Machining FC to overcome this problem. It offers a number of benefits:

Reduced programming time

- Lead through and automatic path learning may save up to 90% programming time
- Up to 90% faster programming time for applications requiring controlled contact force as the robot “feels” the surface.

Shorter cycle time

- Up to 20% faster as the robot adapts to surface defects.

Longer tool life

- Up to 20% longer tool life as there is consistent wear by avoiding tool and work piece collisions.

Who benefits from using RobotWare Machining FC?

ABB's Force Control technology can be used for different applications in a range of industries, including:

- Foundry
- Aerospace & Defense
- Automotive
- White goods manufacturing
- Machine tool industry
- Steel
- Plastic injection & blow molding
- 3C (computer, communication, consumer electronics)

RobotWare Machining FC

Typical applications for FC Pressure

- Grinding of taps, turbine or propeller blades
- Grinding and polishing of aluminum wheels
- Polishing of casings for electronic equipment, i.e. laptops, mobiles
- Polishing of kitchen sinks or stainless steel cabinets, such as freezers, refrigerators
- Buffing of car bumpers, speakers for audio equipment or chromate
- Polishing of plastics molded in two parts, steering wheels and toilet seats

Typical applications for FC SpeedChange

- Grinding unevenly distributed material on cast surfaces
- Milling along the edge of a work piece
- Deburring along the contours of a work piece
- Deflashing unevenly distributed burr along a part-line of castings

Features of RobotWare Machining FC

- Provides a graphical user interface for easy, quick and accurate programming of machining applications
- Applies constant force perpendicular to the surface using the generic force control feature FC Pressure – provides the flexibility to deviate from a programmed path
- Maintains a constant material removal rate using the generic force control feature FC Speed-Change – Robot speed slows down when applied force is to high
- Flexible force sensor input – using either a one or six degrees of freedom sensor
- Can feed back data about load, detected forces or process status (supervision)
- Force sensor can be either robot-mounted or stationary

Product offer

RobotWare Machining FC controller software provides a graphical user interface for easy, quick and accurate programming. The software is based on the underlying advanced software for force control, such as RAPID instructions for FCPressure and FCSpeedChange. In addition to the software, additional controller software, electronics, force sensor and cabling is required to run force controlled robots. The offer give a possibility to tailor-made the solution based on customer's unique requirements.

ABB Integrated Force Sensors

ABB offers a package that contains all the required hardware to run force control functionality. The package contains;

- Force sensor – Measures all six components of force and torque
- Adapter plate
- Shielded high-flex cable
- Voltage measurement board – Measurement interface to IRC5 controller
- Force control software

The force sensor is fully integrated into ABB's hardware and software. The force sensor has a robust design offering high overload protection, IP65 and EMC tested. The compact and lightweight design makes it suitable for high precision robotic applications.

ATI Force Sensors

In addition, ABB uses ATI Force/Torque sensors – models Delta, Theta and Omega – with IP60 or IP65 protection and Viton seals for aggressive environments

