

Available in Michigan from:

Great Lakes Training Systems
800-852-3196
www.great-lakes-training.com

FMS Station

with SCORBOT-ER 9 robot and proLIGHT 1000 mill

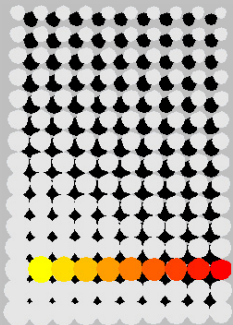
The flexible manufacturing system (FMS) station contains a 5-axis robot and 3-axis CNC milling machine which together execute automated manufacturing processes. The robot loads and unloads parts to and from the CIM conveyor and tends the CNC machine. To provide mobility and increase its work area, the robot is mounted on a linear slidebase.

The SCORBOT-ER 9 is a continuous path robot whose axes are driven by DC servo motors with optical encoder feedback. The robot's real-time, multi-tasking controller supports up to 12 axes, and 16 inputs and 16 outputs for communication and synchronization in the FMS and CIM cells. The controller's internal programming language provides all the functions and commands required for programming and operating a robotic workcell. A hand-held teach pendant enables direct operator manipulation of the robot and peripheral axes, position recording and other workcell functions.

The proLIGHT 1000 machining center is a tabletop CNC milling machine. Similar to larger industrial machines, the proLIGHT 1000 uses EIA, ISO, and Fanuc-compatible G and M code programs to cut parts in a variety of materials. The machine's software supports a number of programming modes, including linear, circular, and helical interpolation, multiple tool programming and canned cycles. The mill in the FMS station is equipped with an automatic tool changer (ATC).

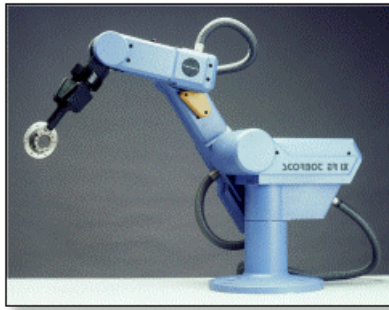
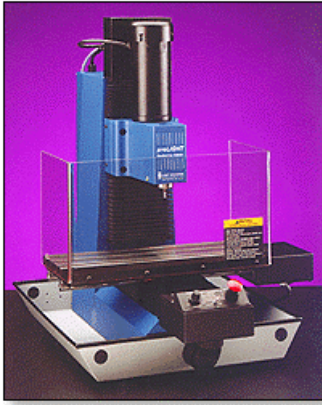
The FMS station allows students to study and acquire skills in the use of CAD/CAM software, as well as robotic and CNC programming and control. Moreover it gives students experience working with automated systems.

The robot and the machining center can be operated as stand-alone systems in addition to their integration and use as an FMS cell within the CIM system.



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FMS Station with Robot Tending CNC Mill



proLIGHT 1000 Machining Center	
Axis Travel	X Axis: 305 mm X Axis w/ATC: 197 mm Y Axis: 152 mm Z Axis: 229 mm Open height: 241 mm Open height w/ATC: 203 mm
Spindle	Drive motor: 745 W (1 hp) Motor type: DC permanent magnet Speed range: 0-5,000 RPM Spindle nose: R8 taper Collet capacity: up to 0.22 mm ATC Collet: ER-20, 12 mm Throat: 159 mm
Accuracy	Ball screw: 0.025 mm/300 mm Repeatability: 0.0127 mm Resolution: 0.00635 mm
Axis Drive Motors	Linear feed rate: 2-635 mm/min Circular feed rate : 2-457 mm/min Rapid feed rate (X,Y): 1270 mm/min Rapid feed rate (Z): 1016 mm/min Stepper motors: 105 Ncm, 200 step/rev
Automatic Tool Changer	Number of tools: 4 Maximum tool diameter: 12 mm Maximum tool length: 75 mm Tool to tool change time: 15 sec..
Tools and Accessories	Tool holder package Collet set, ER-20 12 piece set of cutting tools 3 piece set of engraving tools Pneumatic vise
Software	spectraCAM Milling

SCORBOT-ER 9 Robot System	
Degrees of Freedom	Vertically articulated robot; 5 rotational axes
Axis Range	Base rotation: 270° Shoulder rotation: 145° Elbow rotation: 210° Wrist pitch: 196° Wrist roll: 737°
Reach	691 mm without gripper
Speed	1.9 m/sec
Payload max.	2 kg
Repeatability	± 0.09 mm
Position Feedback	Incremental optical encoders with index pulse
Homing	Optical switch, encoder index pulse
Gripper	Pneumatic, 2-finger parallel, max. opening: 63 mm
Actuators	24 Vdc servo motors
Transmission	Harmonic drives
Controller	ACL Controller-B
Inputs	16
Outputs	4 relay, 12 open collector
Axis Servo Control	DC servo, PWM H-bridge drivers, with tacho feedback
Servo Axes	6; expandable to 12
Acceleration	Paraboloid and trapezoid profiles
Programming	ACL-Advanced Control Language; SCORBASE; Teach Pendant
Position Definition	Absolute, Relative, Cartesian, Joint, Tool
Multitasking	Up to 40 concurrent tasks
Trajectory Control	Point to point; continuous path; joint; linear; circular; 10 ms response time
Control Parameters	500 user-accessible parameters

The robot is mounted on a 1 m linear slidebase.

The FMS station includes all engineering and interfaces required for integration of the CNC machining center and robot system with each other and within the CIM system.

The FMS station also includes a CNC workbench with extensions for the station PCs

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Specifications subject to change without prior notice. Actual product may differ from the one shown here.