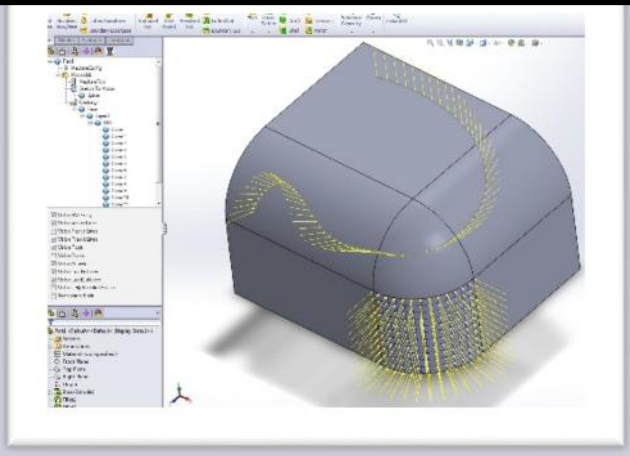
VDK6000 Robotic Work Center

Unique hybrid robotic work cell with the combination of additive and subtractive manufacturing capabilities all achieved through the automated MoDusCAM™ path-planning and process definition software. Flexible Robotic Environment's (FRE) six axis VDK6000 provides new strides in 3D robotics by directly supporting manufacturing for rebuilding and component creation.

System is standard with 6 DOF but may be configured with additional redundant axis. FRE's VDK6000 may synchronously manipulate an end effector in 3D space, thus achieving full orientation and positioning of the head with respect to the work-piece. The unit is fully guarded and interlocked per robotic standards and may be integrated with additional automation for ease of loading and unloading.

FRE's robotic work cell automates the many processes required for component repair and creation with high accuracies and repeatability. The unit allows you to complete the component operation with a single setup.

MoDusCAM™ – SolidWorks™ Application.



- Laser Scanning for the creation of 3D CAD solid models in SolidWorks™
- **Subtractive manufacturing** path planning and process definition for milling.
- **Additive manufacturing** path planning and process utilizing any technology
- Ultrasonic inspection for verification of parts after processing.
- Grinding, Polishing, and Drilling
- Laser processing (Scanner or Fixed Focus)

Robotic paths created by:

- 3D sketch path in space.
- 3D sketch path on a given solid.
- Import 2D files and project on surfaces.
- Select 3D contours for modifications.
- Subtractive manufacturing
- Printing 3D parts with slicing

FLEXIBLE ROBOTIC ENVIRONMENT

5305 Chateaux Ridge Court
Rapid City, SD 57702
(605) 791-2202
www.fresystems.com

Motion Maker Engineering · AEROTECH · SolidWorks Solution Partner

VDK6000 Robotic Work Center

Part Capabilities: (Process Dependent)

- Max Weight on Base Roll Plate = 100 kg (220 lbs) ~85 kg-m^2 inertia
- Max Working Space = 762 mm (2.5 ft) High x 914 mm (3 ft) Diameter
- Max Load on Pitch Axis = 34 kg (75 lbs)

System Operational Speeds: (Process Dependent)

- Linear Speed = 500 mm/s (20 in/s)(X, Y, y), 300 mm/s (12 in/s)(Z)
- Rotational Speed = 30 rpm (Roll, Yaw, and Pitch)
- Repeatability .75 µm (0.00002 in), accuracy 2 µm X/Y axis
- Tolerance = 10 µm to 50 µm (0.0004 in to 0.002 in)
- Machining Force 150N (34 lbs) (Continuous) to 300N (67 lbs) (Peak)
- Machining Speed = 100 mm/s (4 in/s)

FRE HMI and Controls:

- MoDusCAM™ - SolidWorks robotic path planning application with 3D graphical interface.
    - Accepting Process parameters associated with 3D path. (Speed & Feed)
    - Normal to 3D face tooling orientation control.
    - Import of 3D scans for reverse engineering.
    - Processing Options = **Additive, Subtractive, 3D Sketch, Cladding, and Slicing.**
- A2 Industrial PC Controller with Intel Pentium 2.0 GHz, (4) USB, Ethernet, Internet, 16 MG RAM, and two monitors
- Inverse and Direct Kinematic Algorithms using world, joint, and user frames.
- Custom SCADA's Included and dependent on processing applications
- Control Cards = 6-Axis DDS 32-Bit, I/O Fast Fire, and 64 Digital & Analogue I/O
- A4000™ = Hybrid of Aerotech A3200™ and CoDeSys™ run-time platforms

Aerotech Motion Axis:

- Base X axis = 1200mm (47 in)
- Base Y/y axis = 1200mm (47 in)
- Base Roll Axis = +/- 360º mounted to X axis
- Bridge Z axis =700mm (28 in)
- Bridge Yaw Axis = +/- 45º mounted to Z axis
- Bridge Pitch Axis = +/- 45º mounted to Yaw axis

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