

LARGE PART MANUFACTURING SOLUTION  
**CINCINNATI LARGE DRILL & TRIM SYSTEMS**



# Cincinnati AutoDrill™ systems mill, drill and countersink large composite and multi-material stack-up assemblies with ultra-precision accuracy



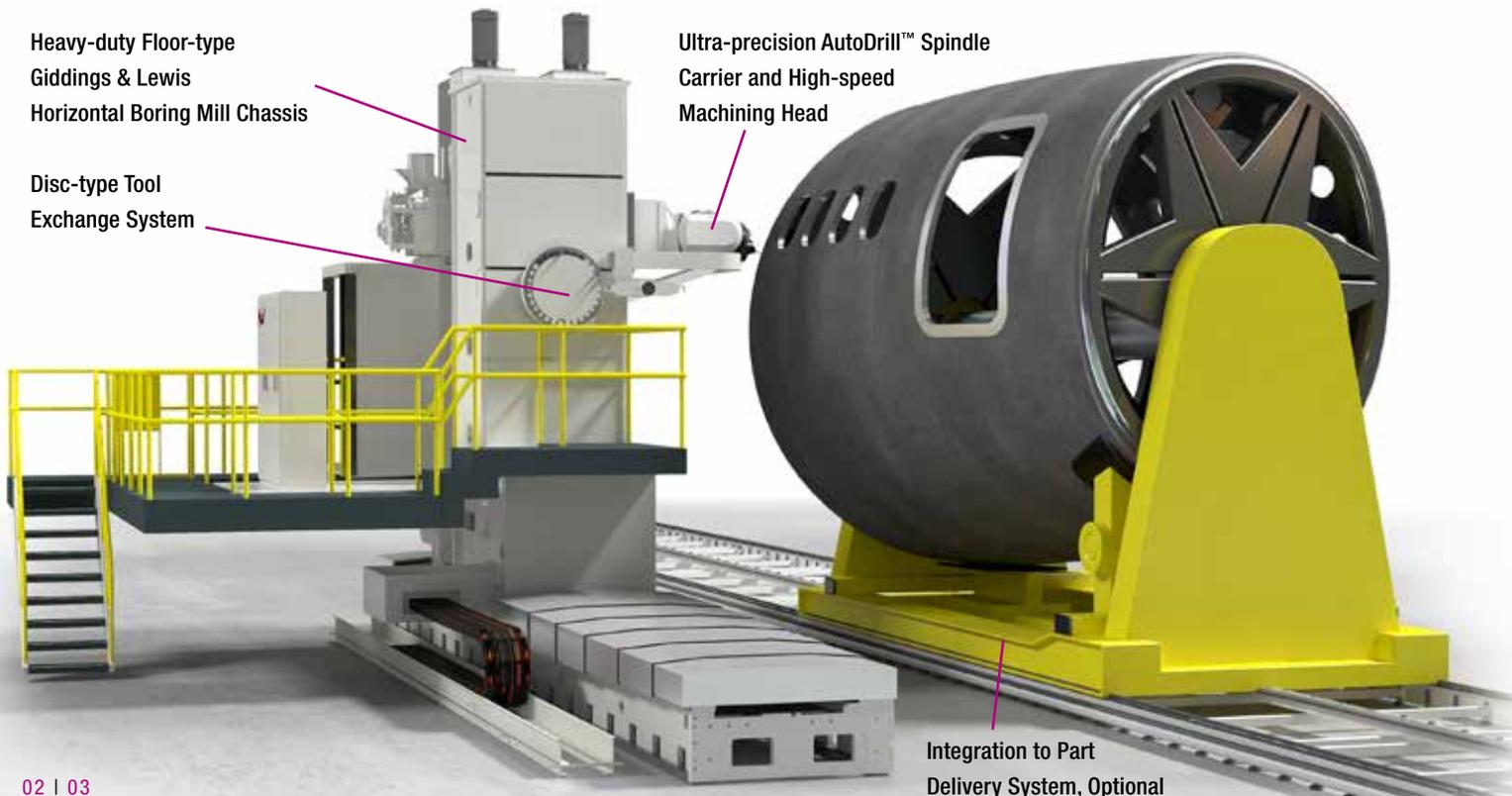
## Precision Cincinnati AutoDrill™ System

The Cincinnati AutoDrill delivers extended reach and ultra-precision processing capability to machine massive barrel-shaped parts. The AutoDrill system combines a rigid boring mill chassis and extended-reach ram with the unique AutoDrill gimbal head for ultra-precise milling and drilling on massive composite and sandwich structures. The AutoDrill system offers large capacity, high-efficiency, and ultra-precision to drill assembly holes, mill section edges, windows, and door cut outs for a wide variety of applications such as this composite fuselage.

The AutoDrill is a hybrid floor-type horizontal profiler equipped with the unique AutoDrill spindle carrier and machining head. Utilizing a 31 kW (41.5 hp) 20,000 rpm motorized spindle equipped with HSK 63A tool interface. The head incorporates a unique Q-axis pressure foot to detect part surface for ultra-precise countersink depth control. Laser sensors in the head accurately measure the distance from the tool tip to the work surface and verify the approach angle. This surface sensing technology ensures the radial centerline perpendicular to the skin for highest accuracy. The AutoDrill head is equipped with a 100 mm (3.98 in) W-axis drilling quill providing travel along the tool vector for precise depth control for drilling and countersink operations.

## Machine Highlights

- > Large part machining range to process extremely long, wide, and tall composite and sandwich parts
- > Flexible configuration Giddings & Lewis Boring Mill chassis delivers stiffness, extended reach, and accuracy
- > XYZ-axis head is equipped with ram collision protection
- > 6-axis machining to process complex part shapes
- > High performance linear guideways on XYZQW-axes
- > Standard modular 'building block' design:
  - X-axis travels: up to 16 meters (629.9 in)
  - Y-axis travels: up to 5 meters (196.8 in)
  - Z-axis travels: up to 1.4 meters (55.1 in)
- > Ultra-precision carrier and tilt-spindle head
  - C-axis rotation: 400° (± 200°)
  - A-axis rotation: 240° (± 120°)
  - Q-axis surface detection travel: 95.3 mm (3.75 in)
  - W-axis quill for drilling travel: 100 mm (3.94 in)
- > High-speed spindle: 20,000 rpm (24,000 opt) / 31 kW (41.6 hp) S1
- > HSK 63A tool interface
- > High-efficiency dust/chip vacuum system
- > VEC – 3D Volumetric Error Compensation, optional



## Cincinnati WingDrill™ system for precision machining of large aerospace wing skins and structural assemblies



### Cincinnati WingDrill System

Like the AutoDrill, the Gantry-type WingDrill system is designed to precision mill, drill and countersink composite and multi-material stack-ups and assemblies. Available in single and dual-spindle configurations, with independently operated heads, this WingDrill system is equipped with a gantry crossrail Y-axis support. A combination cross saddle and spindle carrier moves laterally on the X-axis base and is powered by a dual servomotor rack and pinion drive system and utilizes high performance linear guideways. The Y-axis features a precision dual ball screw system for vertical travel.

### Machine Highlights

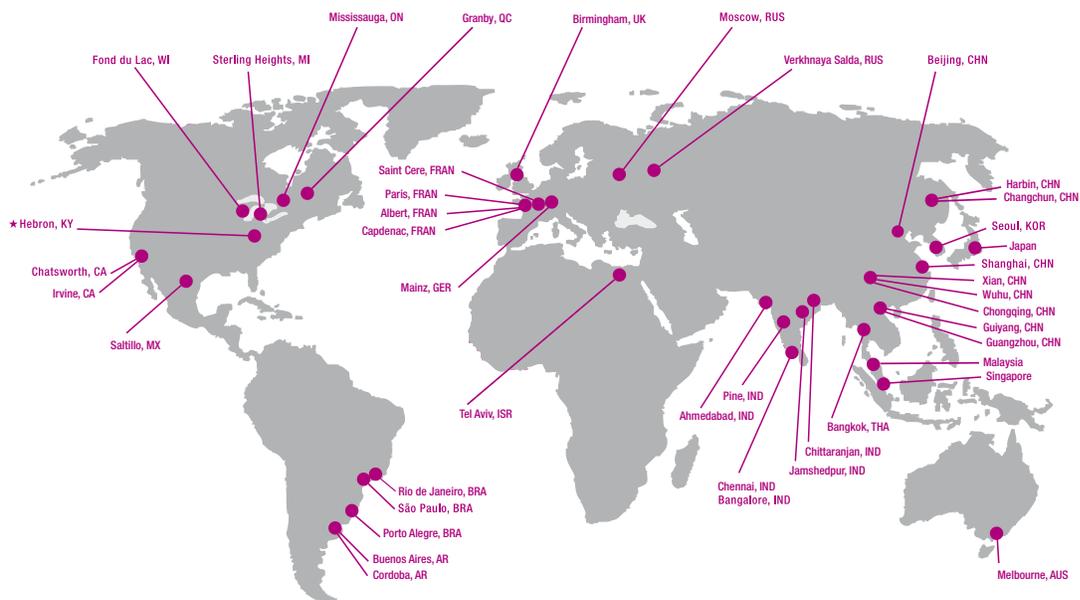
- > Gantry-style 6-axis precision machining center
- > Available in single and dual-spindle configurations
- > High performance linear guideways on XYZQW-axes
- > Large part XZY travels: up to 7.6 x 4 x 1.4 meters
- > Ultra-precision carrier and tilt-spindle head
  - C-axis rotation: 400° (± 200°)
  - A-axis rotation: 240° (± 120°)
  - Q-axis surface detection travel: 95.3 mm (3.75 in)
  - W-axis quill for drilling travel, 100 mm (3.94 in)
- > Surface detecting technology for precise depth control
- > High-speed spindle: 20,000 rpm (24,000 opt.) / 31 kW (41.6 hp) S1
- > High-efficiency dust/chip vacuum system
- > VEC – 3D Volumetric Error Compensation, optional



\* Part and locating fixtures not shown.



Technical Data	Cincinnati AutoDrill		Cincinnati WingDrill
<b>Machine Ranges</b>			
X-axis	m	Up to 16 in 2 m increments.	Up to 7.6 - single spindle oper.
Y-axis	m	Up to 5	Up to 4
Z-axis	m		Up to 1.4
<b>AutoDrill Rand / Head</b>			
A-axis tilt	deg		240 (± 120)
C-axis rotation	deg		400 (± 200)
Q-axis pressure foot	mm		95.3
W-axis for drilling	mm		101
<b>Spindle - S1 rating</b>	rpm / power / torque	20,000 (24,000 opt.) 31 kW / 33.3 Nm	
Tool interface	taper	HSK 63A	HSK 40A
<b>Tool Exchanger</b>			
Options	type / pockets	Disc-type / 10 and 30 tool	Disc- and Chain-type available
Tool weight	kg		10
Length	mm		58.5
Diameter	mm		31.8
<b>Feedrates</b>			
X- and Y-axes	m/min	20	30
Z- and W-axes	m/min		15.24
A-axis and C-axis	dpm / rpm		10,800 / 30
<b>Accuracy</b>			
XY-axes Positioning	mm	< 2000 mm = 0.015	X = 0.051 Y = 0.025
XY-axes Repeatability	mm	0.008	0.020
Z-axes Positioning	mm		< 2000 mm = 0.020
Z-axes Repeatability	mm		0.010
AC-axis Positioning	arc sec		± 15
AC-axis Repeatability	arc sec		15
<b>CNC</b>	model	Siemens 840D sl	



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