



ORBITEC 20

MAZAK ORBITEC 20

ADVANCED LARGE-PART PRODUCTIVITY

The ORBITEC 20 offers a groundbreaking approach to generating turned machining features on large, odd shaped parts, which are not conducive to normal turning operations. Large valves which require turning, threading, tapered boring, and phonographic facing are ideal components to be processed on the ORBITEC 20.

UNIQUE HEADSTOCK DESIGN

The unique Mazak-patented headstock design of the ORBITEC 20 effectively generates turned features on large parts by keeping the workpiece clamped and stationary, moving only the cutting tool.

As an internally counter balanced system, the ORBITEC 20's headstock keeps tool tips facing either toward or away from the centerline of rotation while tools orbit around workpieces. This provides stable precision machining and less part interference because tools do not protrude beyond the rotating headstock when working on larger diameters.

The ORBITEC 20's headstock design is a circle, as opposed to linear slides, within a circle for accurate linearly interpolated X-axis tool movement. For increased part accessibility, the machine's X-axis stroke measures 280 mm (11.02"), while its U, V, and Z-axis strokes are 600 mm (23.62"), 600 mm (23.62"), and 1,230 mm (48.43"), respectively.

VERSATILE MACHINING CAPABILITIES

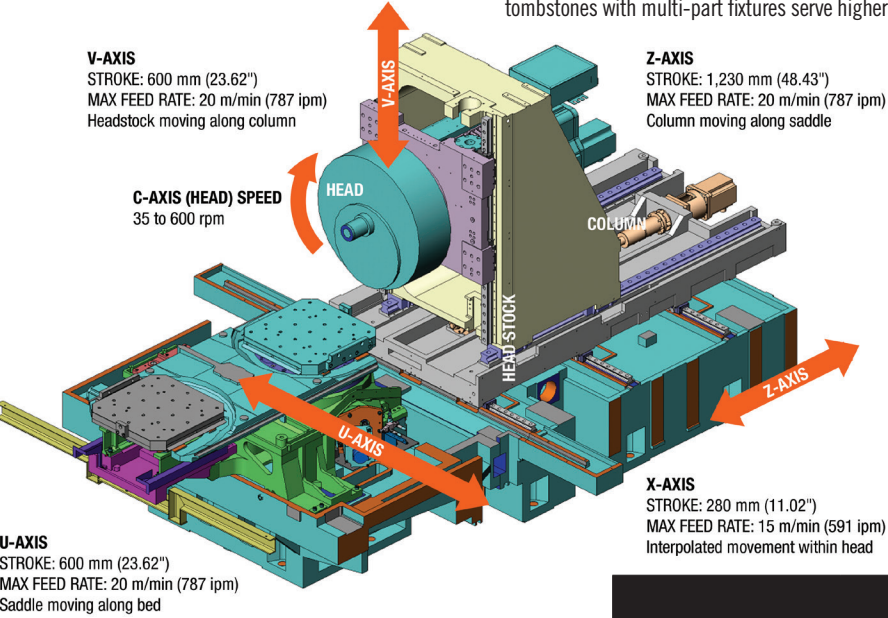
The unique design of the ORBITEC 20 headstock provides the capability to turn diameters of 508 mm (20") on large, awkward and complex parts fitting into a cylinder up to 1,050 mm (41.34") in diameter and 1,300 mm (51.18") in height.

The ORBITEC 20 increases part processing versatility by performing a wide range of machining operations, including generating phonographic finishes on flange surfaces, cutting tapered bores, and grooving in feed-out operations. The machine also does trepanning, threading, internal grooving, drilling and concave machining.

COMPLETE PART PRODUCTION INTEGRATION

Equipped with a standard 2-pallet changer, the ORBITEC 20 easily integrates into Mazak's advanced PALLETECH automation system. The ORBITEC 20 can then combine with Mazak HORIZONTAL CENTER NEXUS Machining Centers to create aggressive, complete Done-In-One® large-part manufacturing cells for lights-out operation.

Workpieces, once fixtured on the machine's pallet, feed into the ORBITEC 20 for turning operations. Then, the PALLETECH system transports parts to the machining centers for secondary milling operations and, afterwards, on to any other subsequent operations. Pallets and part fixtures allow for the economical manufacturing of single-part lots, and tombstones with multi-part fixtures serve higher production needs.



VERSATILITY + ACCESSIBILITY

The ORBITEC 20's versatility stems from the wide range of motion of its axes, which allows the headstock to easily maneuver around large, odd-shaped workpieces. All the while, the NC rotary table provides high positioning accuracy and repeatability, as well as boosts accessibility by locating a square machining center pallet to provide 360° to large parts.

AXIS STROKE CAPACITY		
U-Axis (mm / inch)	600 / 23.62	
V-Axis (mm / inch)	600 / 23.62	
Z-Axis (mm / inch)	1,230 / 48.43	
X-Axis (mm / inch)	280 / 11.02	
NC ROTARY TABLE		
Pallet Size	630 mm x 630 mm (24.8" x 24.8")	800 mm x 800 mm (31.5" x 31.5")
Max. Load	1,500 kg / 3,307 lbs	2,200 kg / 4,850 lbs
Min. Indexing Increment	0.0001°	

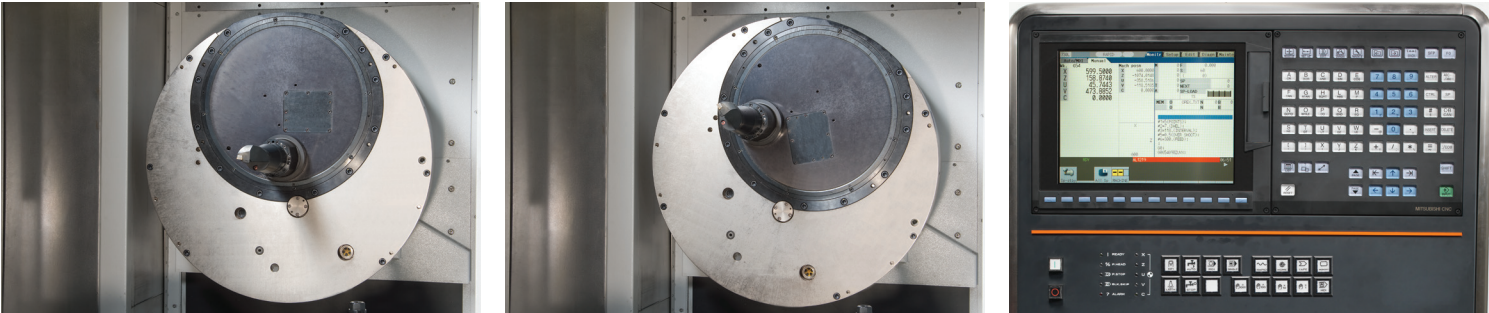


The ORBITEC 20 delivers unrivaled production of large workpieces. It also pairs with Mazak horizontal machining centers and the PALLETECH solution to form a fully automated system that provides 100% complete Done-In-One® manufacturing.

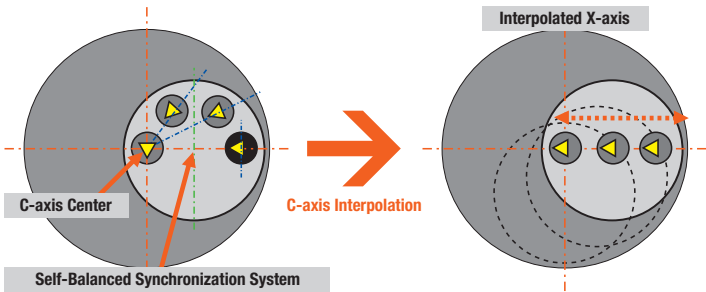


The ORBITEC 20 controls the mass of its uniquely designed facing head much more effectively than other facing designs.

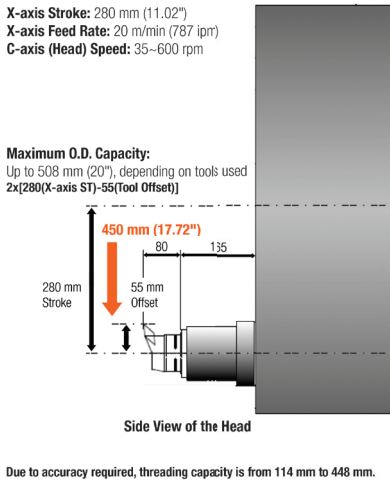
UNIQUE HEADSTOCK DESIGN



The headstock generates turned features on large parts by keeping them clamped and stationary, moving only the cutting tool. The positive X-axis moves the toolholder toward the outside of the spindle and toward the center of the spindle in the negative X-axis motion.

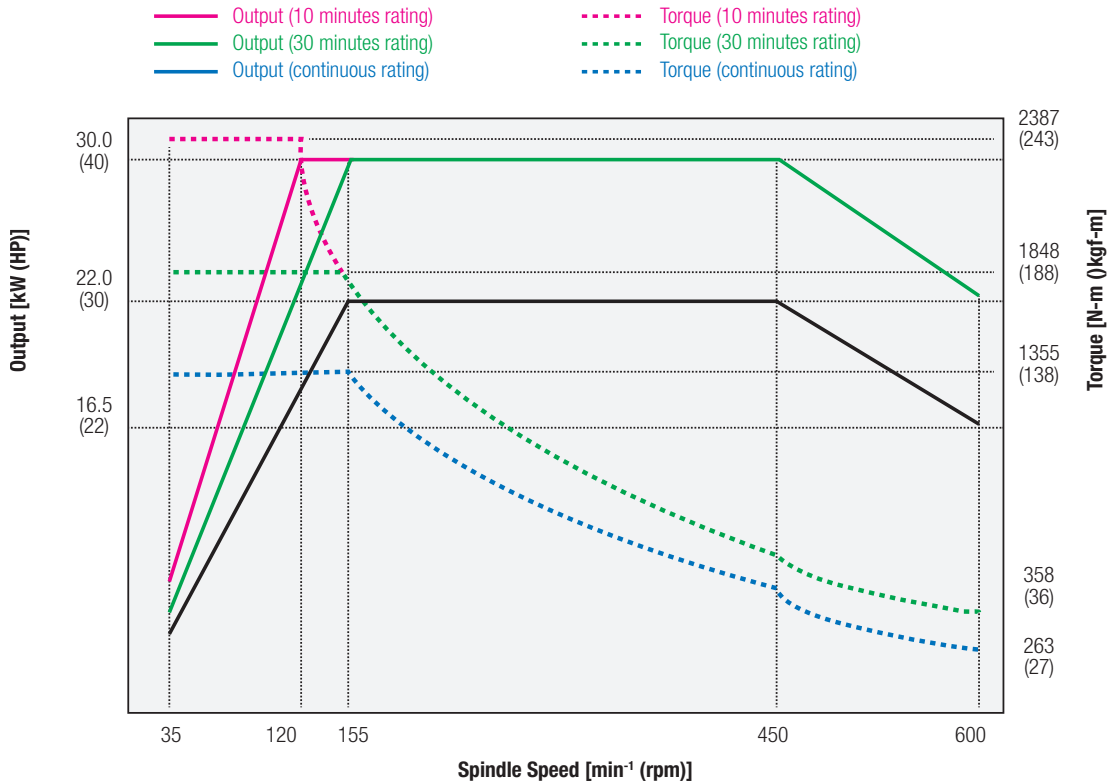


The unique Mazak-patented turn-face headstock provides turning capability of 508 mm (20") in diameter, coupled with supreme accuracy, durability and reliability. The unique system combines a circle-within-a-circle design with linearly interpolated X-axis tool movement, as opposed to a linear slide. The ORBITEC 20's expansive axis travels of 280 mm (11.02") X, 600 mm (23.62") U, 600 mm (23.62") V and 1,230 mm (48.43") Z combine with fast cutting feed rates of 20m/min (787 ipm) to quickly and efficiently maneuver around large, odd-shaped workpieces.

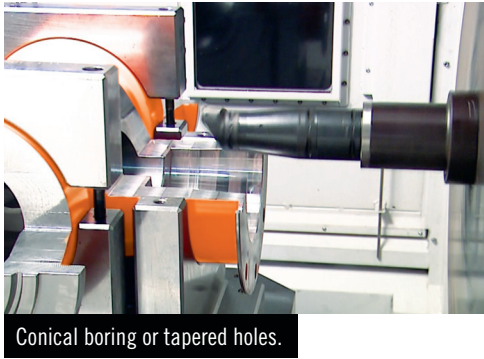
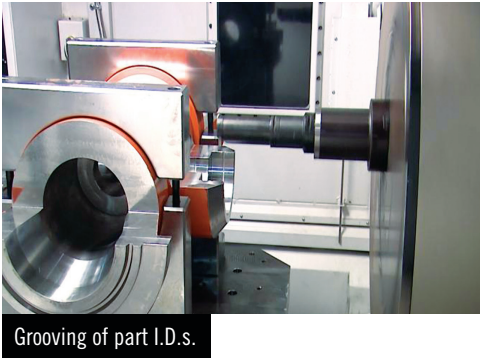
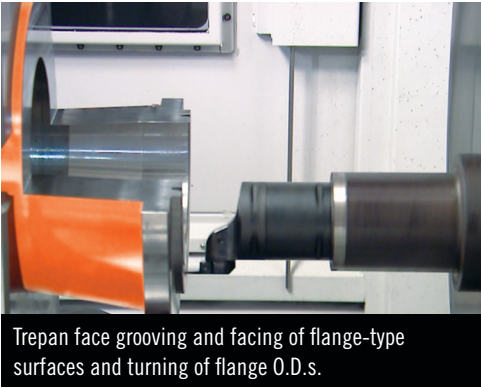
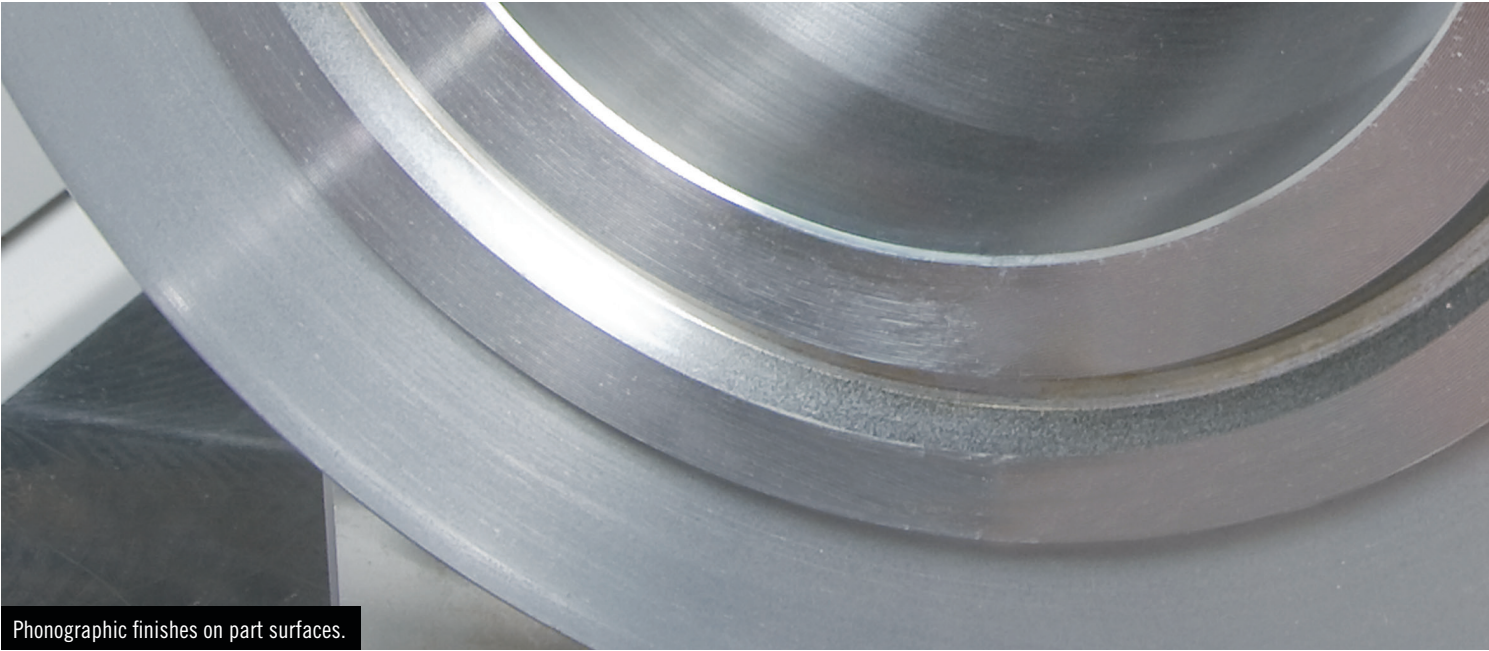


ROBUST SPINDLE PERFORMANCE

Able to handle a part that fits into a cylinder up to 1,050 mm (41.34") in diameter and 1,300 mm (51.18") in height, the ORBITEC 20 excels in demanding turning operations and heavy-duty metal removal due to a rigid, 30-kW (40 hp) integrated spindle motor with high torque. The spindle head rotates clockwise and counterclockwise in its C-axis and provides variable-processing speeds from 35 to 600 rpm for unmatched surface finishes.



VERSATILE PROCESSING CAPABILITIES



DIVERSE APPLICATIONS

The ORBITEC 20 excels in applications where workpieces are too big or awkward to process on conventional turning machines. With the ORBITEC 20, such large, heavy workpieces are fixtured once and remain stationary for completing multiple turning, boring, grooving, facing and threading operations.

From welded ball valve production to jobs requiring eccentric turning operations and grooving, the part processing capabilities of the ORBITEC 20 are endless.

TURNING

- Basic straight O.D. turning
- Eccentric/off-center O.D. turning

BORING

- Straight I.D. bores
- Conical/tapered bores

GROOVING

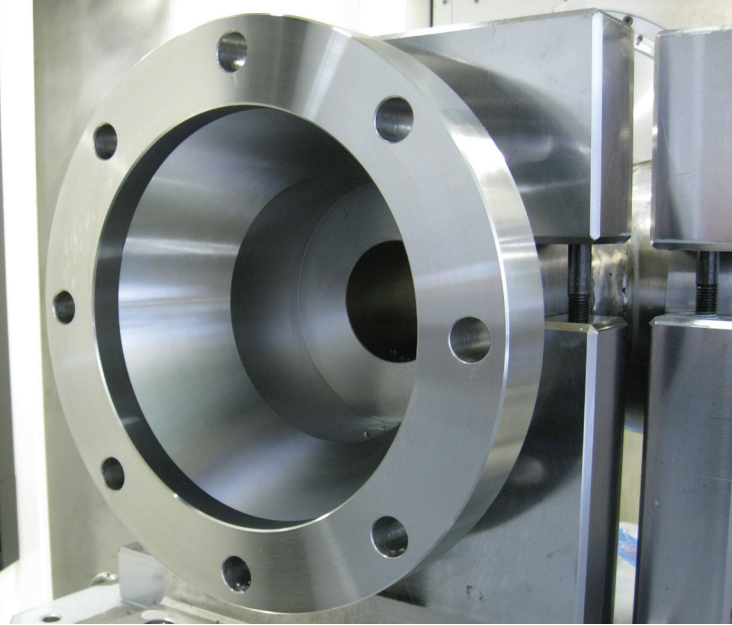
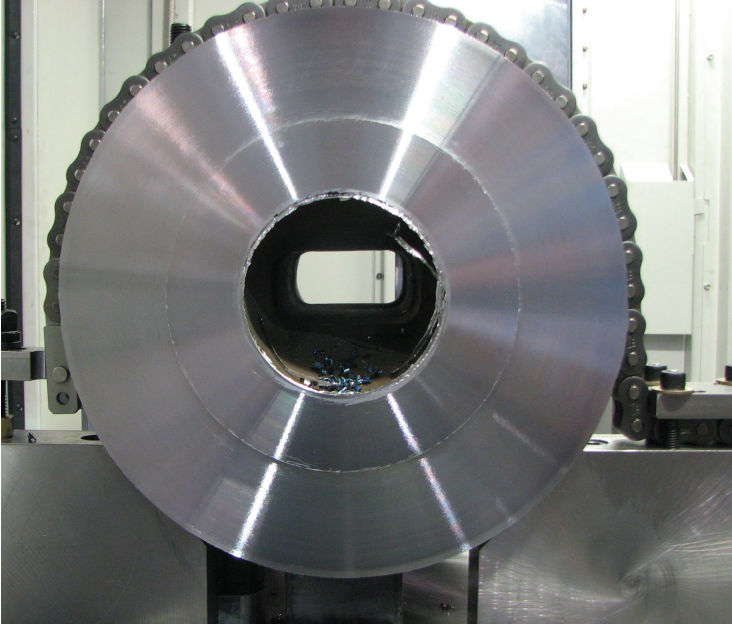
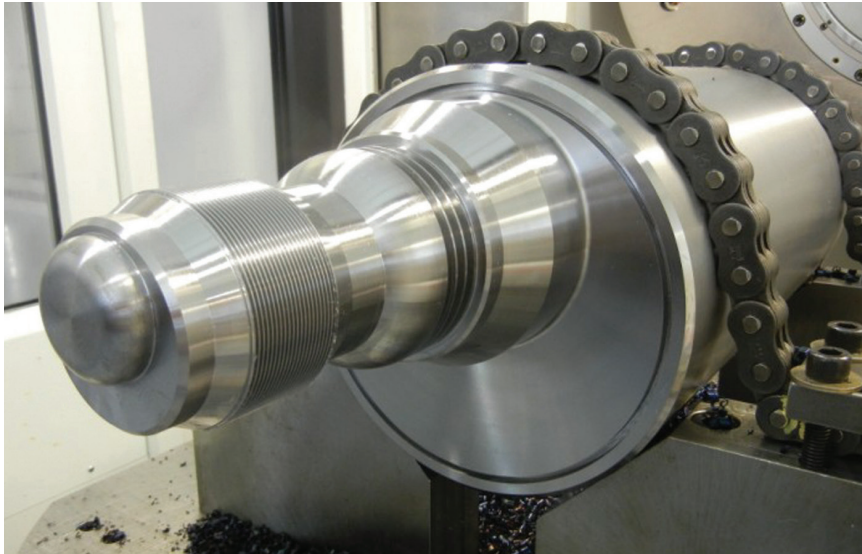
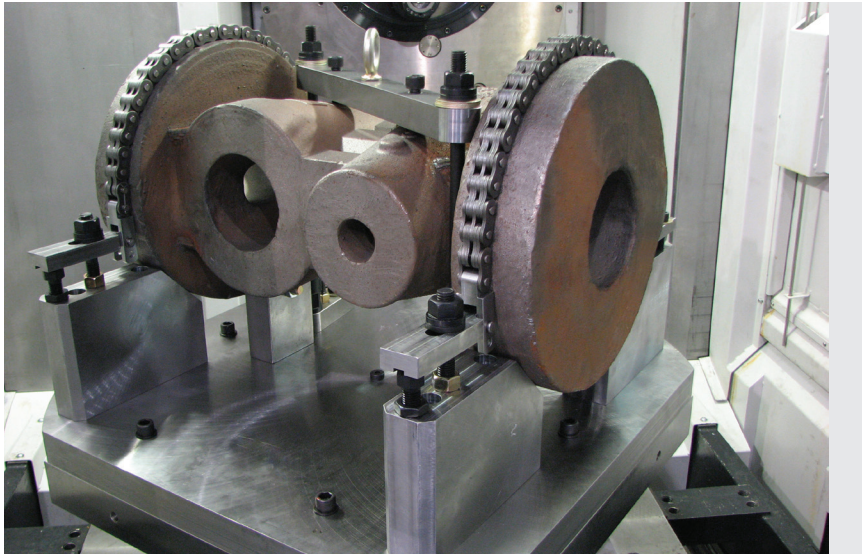
- Trepan face grooving
- Feed-out grooving
- O.D. grooving

FACING

- Phonographic finish facing
- Flange surface facing
- Trepanning

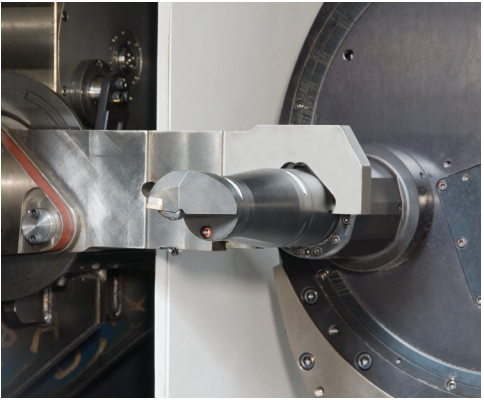
THREADING

- I.D. threading
- O.D. threading



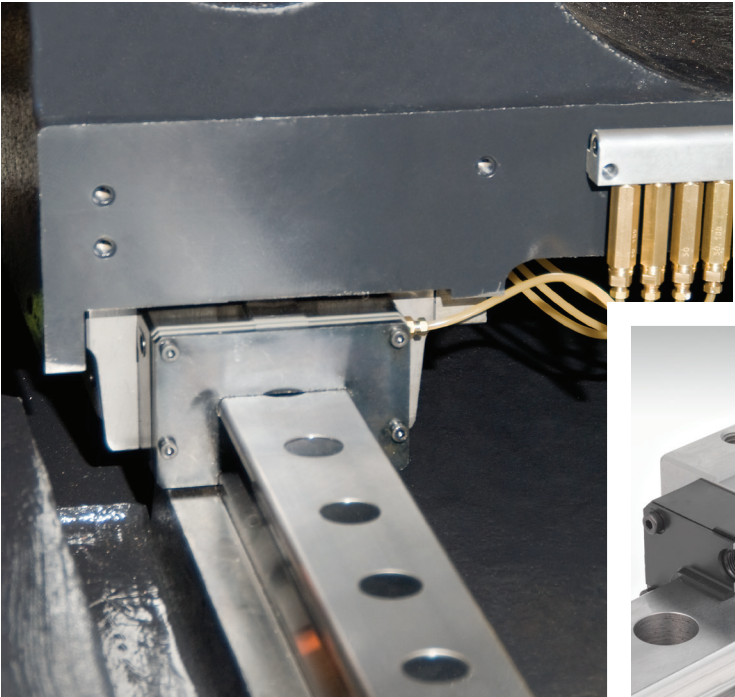
The headstock generates turned features on large, heavy parts by keeping them clamped and stationary, moving only the cutting tool.

AUTOMATIC TOOL CHANGER

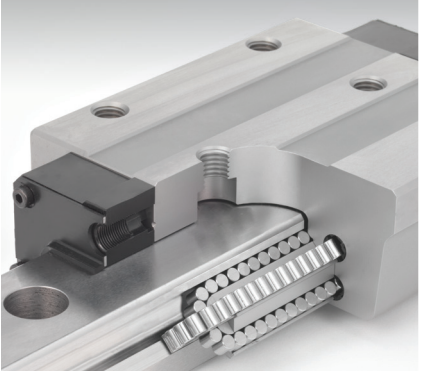


The ORBITEC 20 provides continuous processing through a standard ATC magazine that accommodates Capto-style tooling and stores up to 60 tools with maximum diameters of 125 mm (4.92") (250 mm (9.84") if adjacent tool pockets are empty) and maximum tool weight of 20 kg (44.09 lbs). From the gauge line, the ATC accommodates maximum tool lengths of 500 mm (19.69"). Additionally, the ATC magazine indexes to one pocket in 0.8 seconds and 30 pockets in 10 seconds.

DURABILITY, RIGIDITY AND ACCURACY



The Mazak MX Hybrid Roller Guide System incorporates a special "X-Design" that efficiently distributes load in four directions – radial clockwise, radial counterclockwise, reverse radial and lateral. For the best combination of consistent performance, accuracy and rigidity, the X-Design reduces reversal errors for unmatched cornering and provides more surface contact than balls, yet with less friction than slides. The roller guide also offers high durability through an unparalleled level of vibration dampening capability, resulting in extended tool life.



EASE OF MAINTENANCE

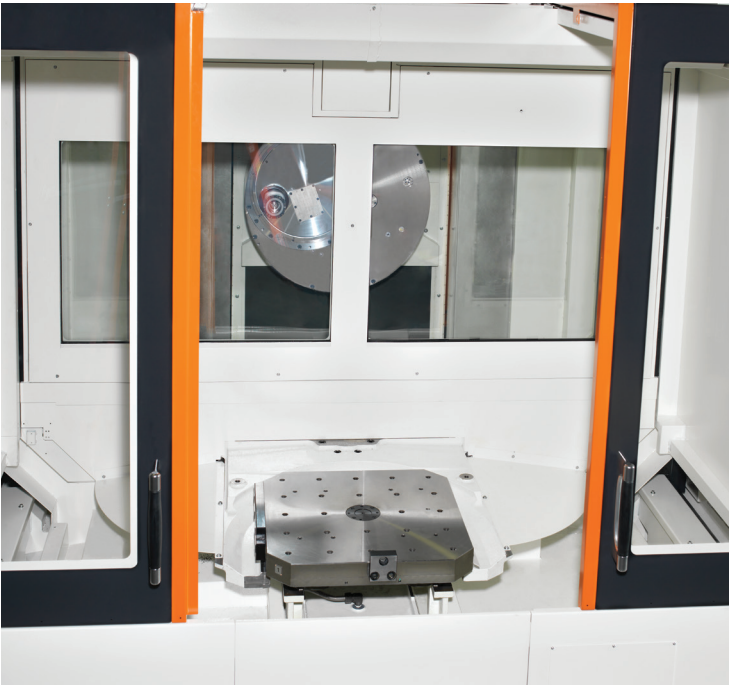


An ergonomic design situates the components of the ORBITEC 20 for easy access to items requiring routine attention. All such components are located on one convenient panel at the maintenance area of the machine.

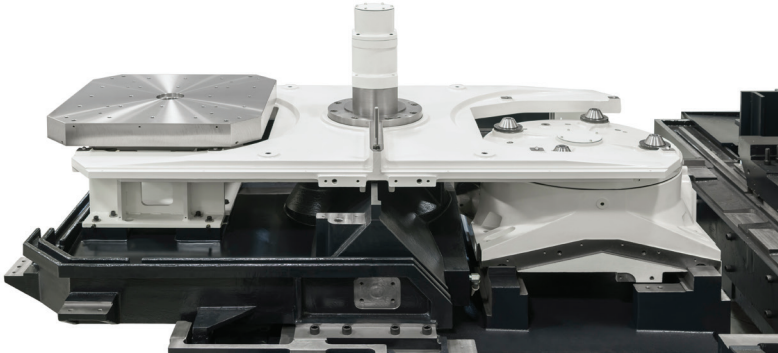
The machine's front door, as well as operator doors located on both sides, make the ORBITEC 20's work envelope readily accessible and lessen operator strain. Smooth ergonomic door handles and a movable machine CNC panel further reduce operator fatigue.

ENHANCED PRODUCTIVITY

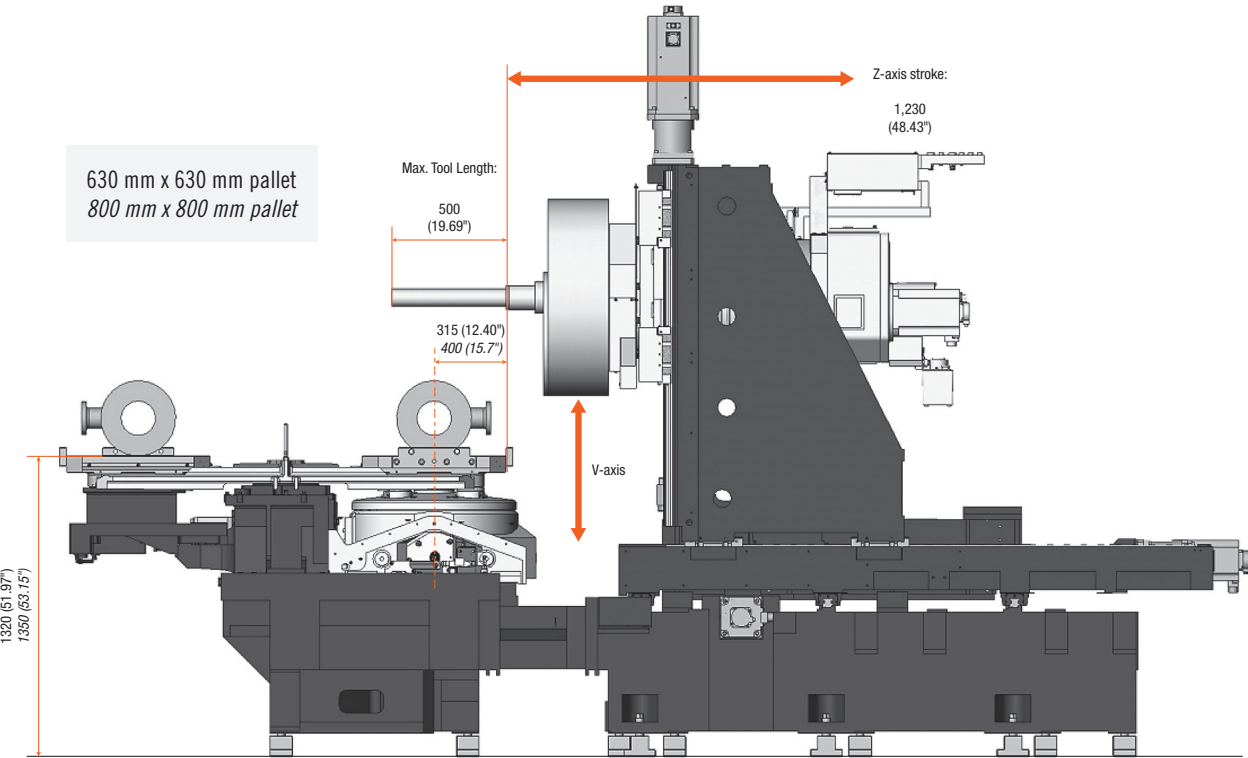
2-PALLET CHANGER



The ORBITEC 20's standard 2-pallet changer increases production efficiency by allowing the next workpiece to be set up during the machining of the current workpiece. The 2-pallet changer uses a roller cam system for high-speed pallet changing of loads weighing up to 1,500 kg (3,307 lbs). The spacious 630 mm (24.80") x 630 mm (24.80") and 800 mm (31.5") x 800 mm (31.5") pallets, compatible with those of Mazak's HORIZONTAL CENTER NEXUS 6800-II and 8800-II respectively, rotate 90° in 1.5 seconds (180° in 2.0 seconds) for accurate part positioning within 0.0042°, in addition to offering full NC contouring capability. The machine table secures pallets in place with a clamping force of 1,250 kg/m (9,035 ft-lbs).



NC POSITIONING TABLE / 2PC / PALLET SPECIFICATIONS		
Pallet size	630 mm (24.80") x 630 mm (24.80")	800 mm (31.5") x 800 mm (31.5")
Moveable load equally distributed on a table	1500 kgf (3307 lb)	2200 kgf (4850 lb)
Table clamping torque	12.25 kNm (1250 kgf m or 9035 ft lb)	15 kNm (11063.4 ft lb)
Table positioning time	1.5s/90°	2.2s/90°
Pallet change time	10 s	13 s



MAZAK MULTI-TASKING PALLETECH SYSTEM

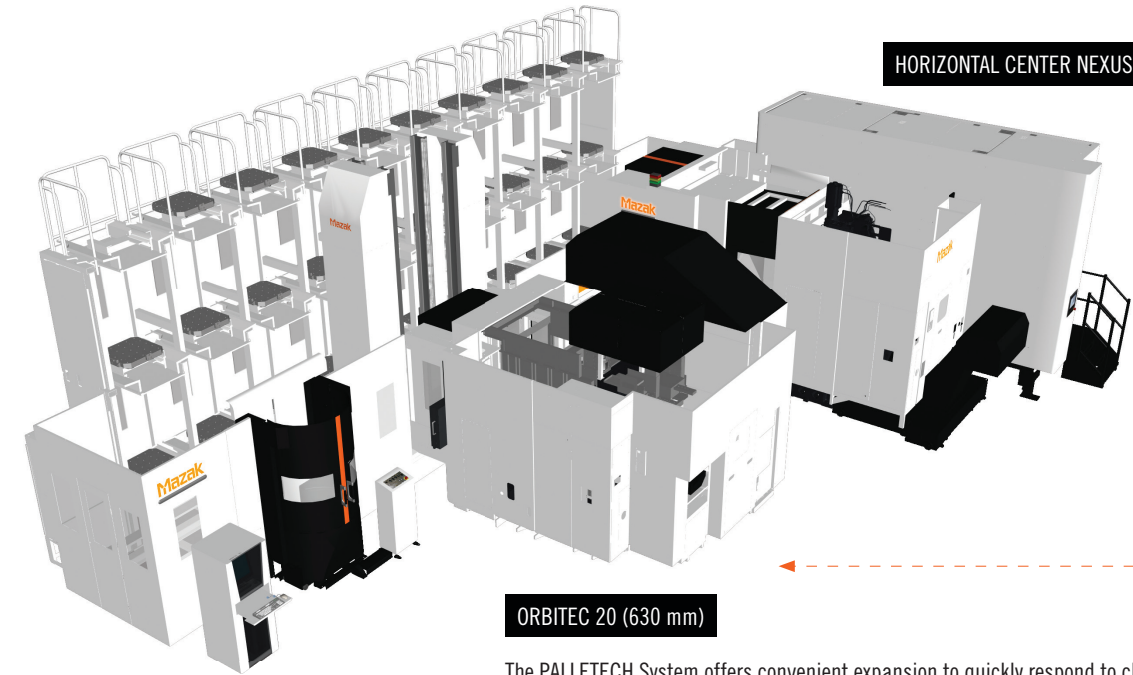
By providing standard, compatible pallet sizes, Mazak's Multi-Tasking PALLETECH System allows manufacturers to incorporate two different types of machining operations, turning and milling, into one system to achieve Done-In-One machining. Shops can add machines, pallets and load/unload stations as needed.



The HORIZONTAL CENTER NEXUS 6800-II features a 10,000 rpm, 50 hp integral motor spindle, maximum feed rate of 60,000 mm/min (2,362 ipm) and up to 330-tool storage capacity. Like the ORBITEC 20, the machine's 2-pallet changer is standard and pre-engineered to interface with Mazak's PALLETECH System.



Mazak's Multi-Tasking PALLETECH System links the ORBITEC 20 with milling centers to provide unprecedented productivity and flexibility.



ORBITEC 20 (630 mm)

The PALLETECH System offers convenient expansion to quickly respond to changing production needs. The system easily combines the ORBITEC 20 with Mazak horizontal machining centers to create unattended, flexible, Multi-Tasking solutions for manufacturers requiring both turning and milling of features on large parts. With a PALLETECH System, it is possible to increase pallet storage using minimal floor space while benefitting from automated Done-In-One production. Furthermore, the system provides the flexibility required for shorter product life cycles, reduces in-process inventory and allows for just-in-time production.

CNC SYSTEM

The ORBITEC 20's user-friendly CNC control minimizes programming time and maximizes machine performance. Its regular lathe G-code language simplifies and speeds part programming with no required special training. The CNC system comes with an expansive memory capacity of 2,000 KB (1,000 programs), with 80 sets of tool offsets and 700 sets of macro variable commands. It also offers reliable and precise control of constant surface speed and spindle/C-axis positioning. Furthermore, users can improve tool life with the CNC's tool life management functions and gain external search capabilities.



Memory capacity 2,000KB [5120m] (1,000 programs)
Tool offset 80 sets
Macro variable command 700 sets
Input least command increments 0.1µm
Feed per revolution
Thread cutting (Lead/Thread number designation)
Constant surface speed control
Spindle position control (Spindle/C-axis control)
Graphic check
Graphic trace
Program restart
User macro 4 levels
Geometric command
Parameter input by program
Memory-type pitch error compensation (Bi-Direction)
Skip
Multiple-step skip
Tool life management II
Tool life management 80 sets
Safety observation
PLC window
External search
Customization/APLC release
Synchronized Thread (for Mazak on confidential option)
Virtual diameter axis control (for Mazak only confidential option)

STANDARD SPECIFICATIONS

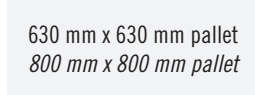
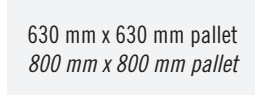
The ORBITEC 20 is built with the power, speed and capacity for large part processing. Equipped for ample tooling and efficient workhandling, the machine delivers versatility and continuous production output. Conservatively sized, the ORBITEC 20 requires minimal floor space while providing a spacious working envelope.

Capacity	Saddle		U-Axis: Horizontal Travel		mm	inch	600	23.62
	Column		V-Axis: Vertical Travel		mm	inch	600	23.62
	Head		Z-Axis: Horizontal Travel		mm	inch	1230	48.43
	Spindle		X-Axis: Stroke		mm	inch	280	11.02
	Head center to floor				mm	inch	1,067	42
Head	Spindle taper						CAPTO C8	
	Main spindle speed				rpm		35 to 600	
	Main spindle motor	Type				AC Inverter Motor		
		30min rating output		KW	HP	30	40	
		Cont rating output		KW	HP	22	30	
Radio Transmission Spindle Probe								
Feed Rate		U-Axis		m/min	ipm	20	787.4	
		V-Axis		m/min	ipm	20	787.4	
		Z-Axis		m/min	ipm	20	787.4	
		X-Axis		m/min	ipm	15	590.6	
ATC & Magazine	Tool storage capacity			Tools		60		
	Tool selection			60 Tools		Memory Random Mode		
	Tool shank			Type		CAPTO C8		
	Max. tool diameter	With adjacent tools		mm	inch	125	4.92	
		With adjacent tools removed		mm	inch	250	9.84	
	Max. tool change weight			kg	LBS	20	44.09	
	Magazine index time	1 Pocket		sec		1 Pocket in 0.8 sec		
		30 Pockets		sec		30 Pockets in 10 sec		
Max. tool length (from gauge line)			mm	inch	500	19.69		
Automatic Pallet Changer	Two Pallet Changer arranged for stand-alone or optional PALLETECH Manufacturing Cell operation							
	Two T-slot pallets with center location bore							
Machine Size	Machine height (from floor)			mm	inch	3725	146.65	
	Floor space (without chip conveyor)	Width		mm	inch	3595	141.54	
630 mm x 630 mm / 800 mm x 800 mm		Depth		mm	inch	6259 / 6899	246.43 / 271.61	
	Power supply	Power consumption		KVA		94		
Power Requirement	Air	Air pressure		kgf/cm2	psi	5	72.52	
	Hydraulic	Pressure		kgf/cm2	psi	80	1160.3	
NC Rotary Table								
Chip Conveyor	Hinge belt chip conveyor							

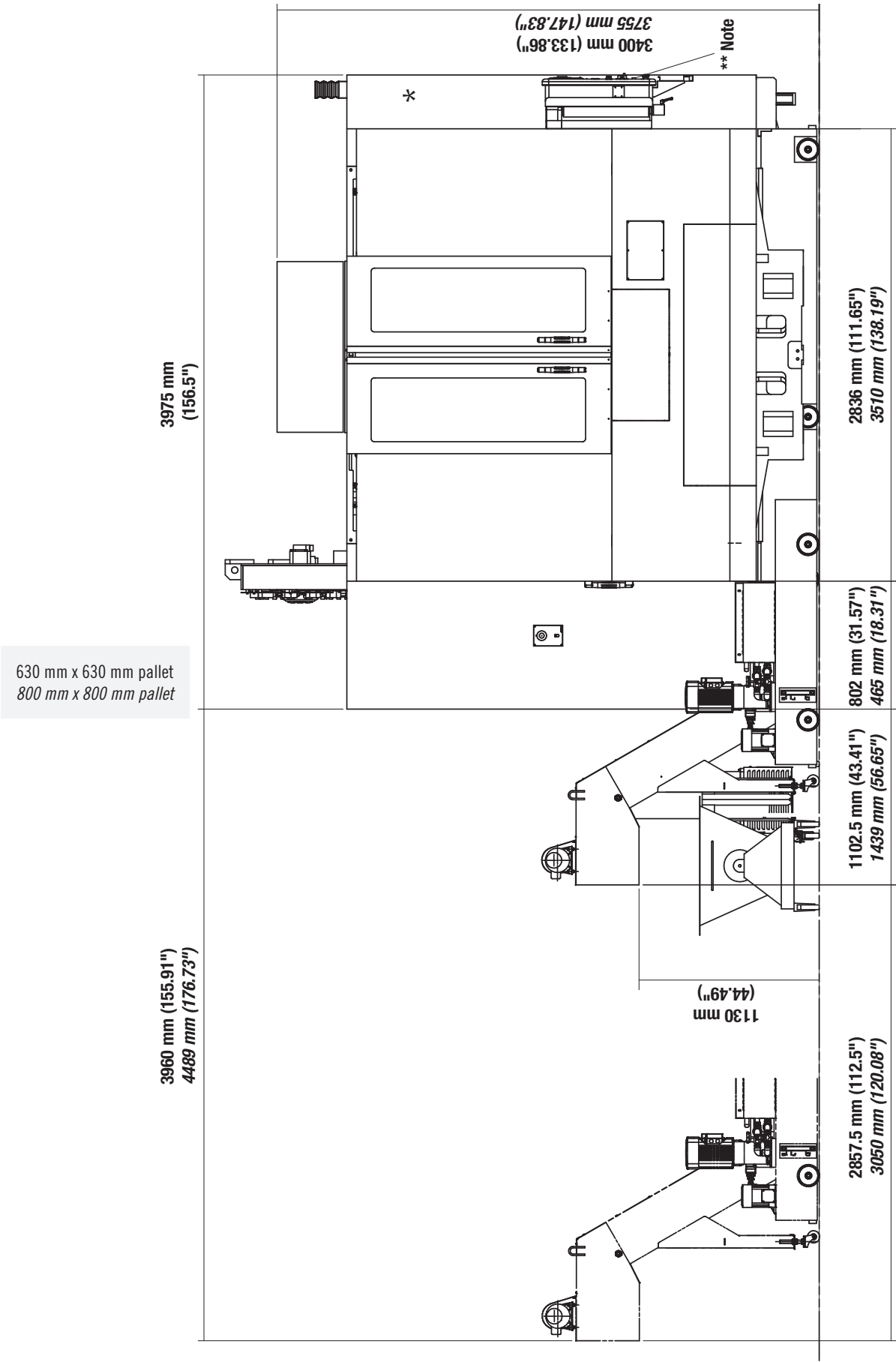
OPTIONAL SPECIFICATION

Chip Conveyor	Magnetic separator/conveyor
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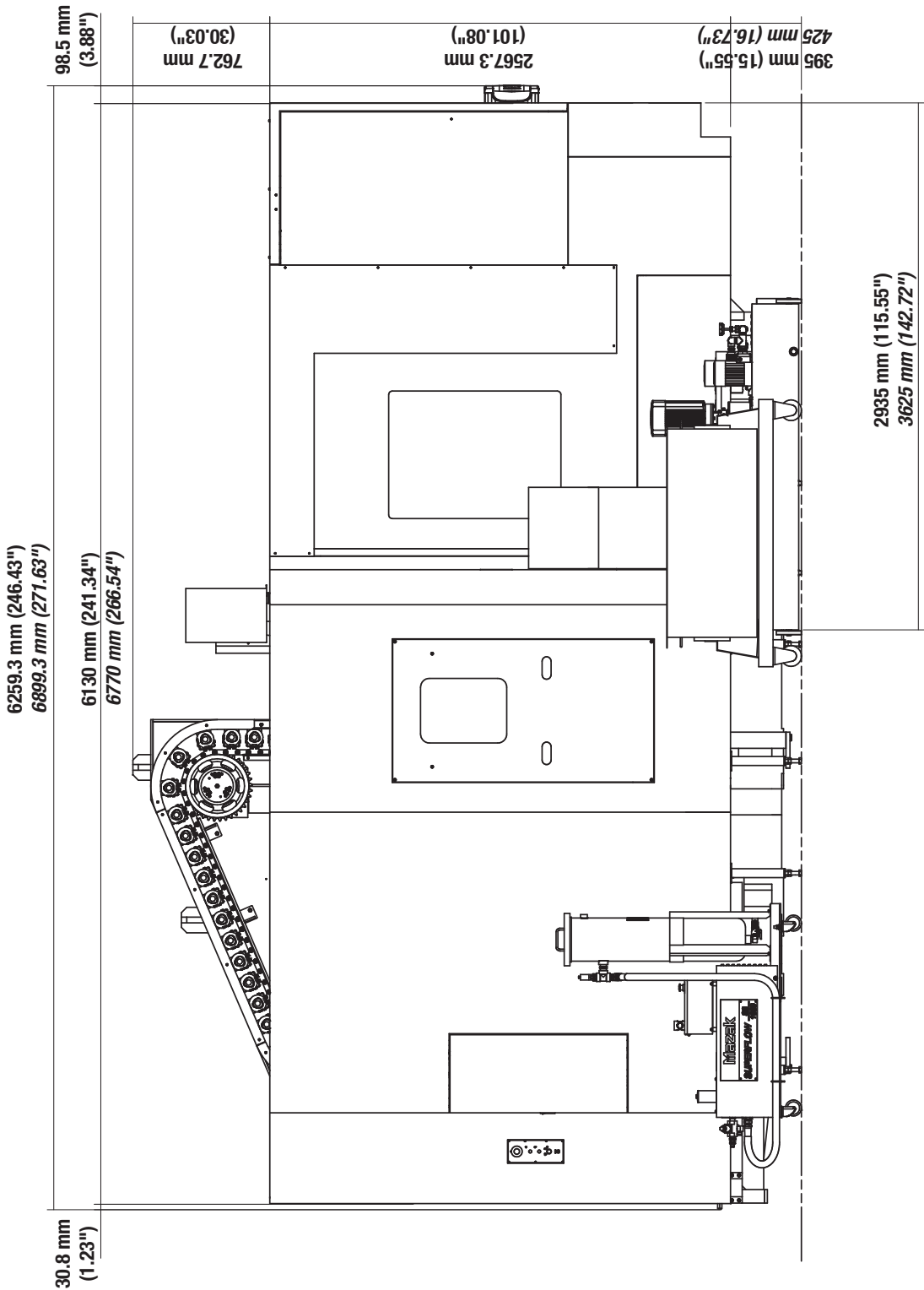
ORBITEC 20 DRAWINGS



ORBITEC 20 DRAWINGS



* Additional space needed 593.4mm (23.36") control cabinet door opening
** The Control Panel Swing on the 800mm is 677.3mm from the side end of the machine





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