

»»»» ORION

High Performance HMC



Series: H4000 | H5500 | H5500-50 | H6600 | H8000 | H8800 | H10000 | H12000



www.bfwindia.com

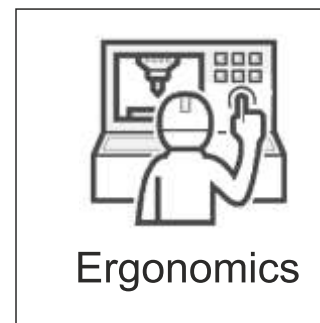
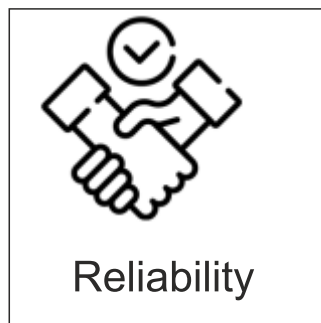
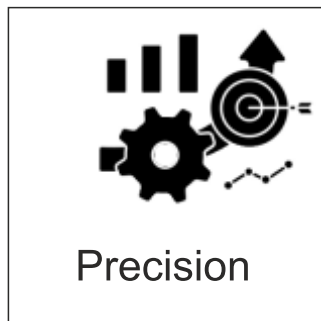
BFW
Enabling Progress ...

Series:
 H4000 | H5500
 H5500-50 | H6600 | H8000 | H8800
 H10000 | H12000

High Performance Horizontal Machining Centers

ORION is a prominent constellation of bright stars located on the celestial equator and visible through the world. ORION series is a constellation of Next-gen Horizontal machining centers setting new benchmarks in specifications and performance for our global clients. It is a result of Indo-German engineering excellence for your competitive manufacturing.

ORION Engineering Philosophy is based on four pillars:

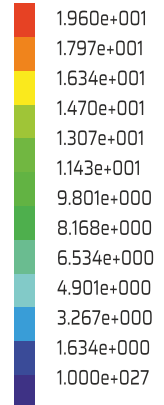
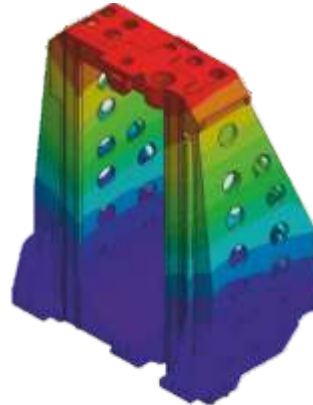


ORION platform has three series, covering 400 x 400 pallet to 1250 x 1000 pallet size horizontal machining centers catering to a wide range of applications

Model	H 4000	H 5500	H 5500-50	H 6600	H 8000	H 8800	H 10000	H 12000
Pallet size (mm)	400 x 400	500 x 500	500 x 500	630 x 630	800 x 800	800 x 800	1000 x 1000	1250 x 1000
Spindle taper	HSK A 63, BT40			HSK A 100, BT50				
Axes traverse (X/ Y/ Z)	X 600 Y 560 Z 600	X 800 Y 800 Z 800	X 740 Y 740 Z 800	X 1000 Y 1000 Z 1000	X1250 Y 1000 Z 1000	X 1400 Y 1200 Z 1350	X 1600 Y 1400 Z 1400	X 2000 Y 1400 Z 1400
Job Swing Dia x Ht (mm) Weight (kg)								

Precision

- Heavily ribbed cast iron structures
- Single piece stepped cast bed for rigidity
- Comprehensive FEM analysis
- Optimum weight and stiffness for enhanced natural frequency
- Higher spindle bearing dia for robust cutting performance
- Roller type precision LM guide-ways
- Double anchored double nut ball-screws
- Reduced spindle overhang for enhanced rigidity
- Static and dynamic compliance validated by AMTTF



Maximum rigidity with FEM optimized and structural parts for high precision

ORION HMCs offer spindle specifications in motorized spindle & geared spindle variants:

Motorized spindles are cartridge type design to facilitate easy maintenance/ replacement spindle are oil cooled, having temperature sensors to continuously monitor spindle bearings for any abnormal temperature rise. Tool clamping units are imported to deliver the required tool clamping forces and are rated for 1.5 million cycles.

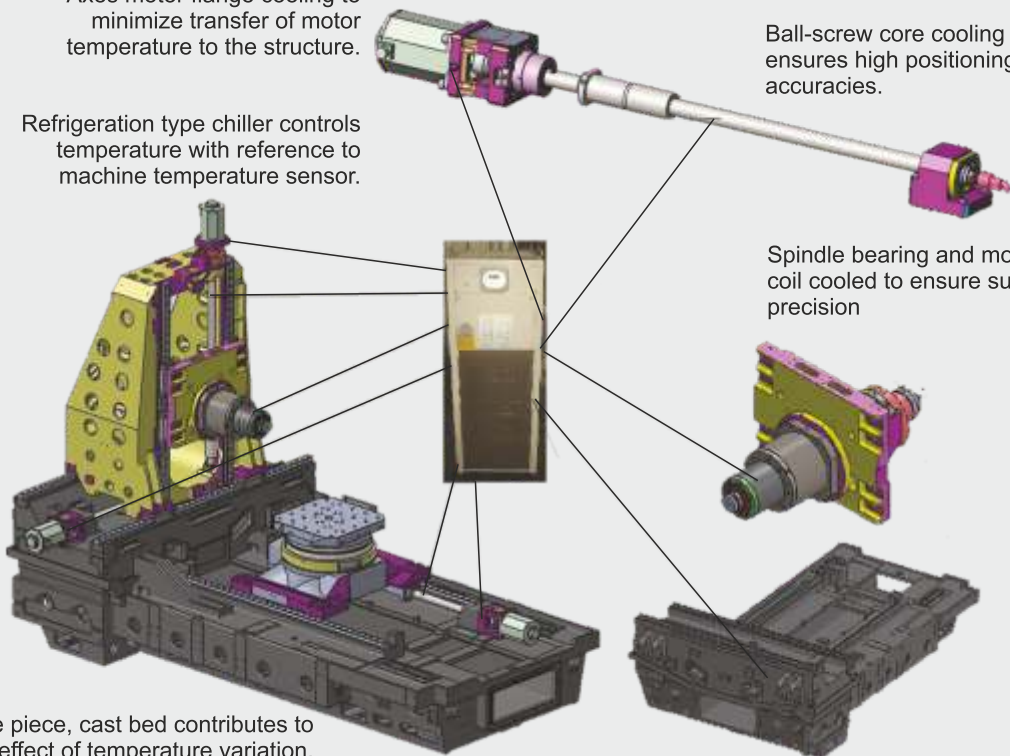


Axes motor flange cooling to minimize transfer of motor temperature to the structure.

Ball-screw core cooling ensures high positioning accuracies.

Refrigeration type chiller controls temperature with reference to machine temperature sensor.

Spindle bearing and motor coil cooled to ensure superior precision



Rigid, single piece, cast bed contributes to minimal effect of temperature variation.

- ✓ Thermo friendly design
- ✓ Thermo symmetric structures
- ✓ Axes motor flange cooling
- ✓ Ball-screw core cooling
- ✓ Spindle cooling
- ✓ Machine temperature for PID control of cooling oil temperatures

Precision

ORION horizontal machining centers are designed and manufactured to deliver excellent machine precision with the use of high precision with the use of high precision components and thermo friendly features:

- Robust structural parts made of cast iron for high rigidity and damping
 - High precision roller type LM guide-ways and DIN standard high precision ball-screws.
 - Spindle cooling, ball-screw core cooling and motor flange cooling with linear scale (option) for higher precision.
- This has resulted in high static and dynamic accuracies of the ORION series

Machine geometrical accuracies within 25% to 50% of ISO 10791 - 1 Values

As per ISO 230-1	ISO Value (mm)	ORION STD (mm)
Straightness	0.020	0.005
Squareness	0.020	0.010
Spindle run out @300 mm	0.015	0.006

Bi-directional positioning accuracy 0.008 mm and repeatability 0.005 mm as per ISO 230-2

As per ISO 230-2	ISO Value (mm)	ORION STD (mm)
Bi directional positioning accuracy A	0.032	0.008
Bi directional repeatability R	0.018	0.005

Circular deviation 0.005 mm (ISO 230-4)

ISO 230-4: 2005 (E)
 Circular deviation
 XY 360 deg 100 mm calibrated F559 20141208-132732

Machine: H6600 ORION
 QC20-W-05L455, last calibrated 2010-07-30

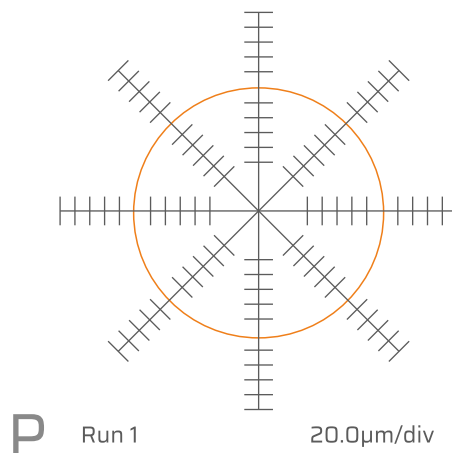
Circular deviation (CCW)

Value 3.4 μm

Circular deviation (CCW)

Radius 100,000 mm
 Sample rate 22,222 Hz
 Feedrate 599.0 mm/min
 Run direction CCW
 Plane under test XY

Test Position
 Start angle 180 deg
 End angle 180 deg
 Overshoot angle 180 deg



Finish machining accuracy results less than 50% of ISO 10791 - 7 values.

Note: results under standard test conditions of temperature and machine anchoring.

Productivity

APC

Rotary type automatic pallet changer for quick and smooth work piece change irrespective of load.



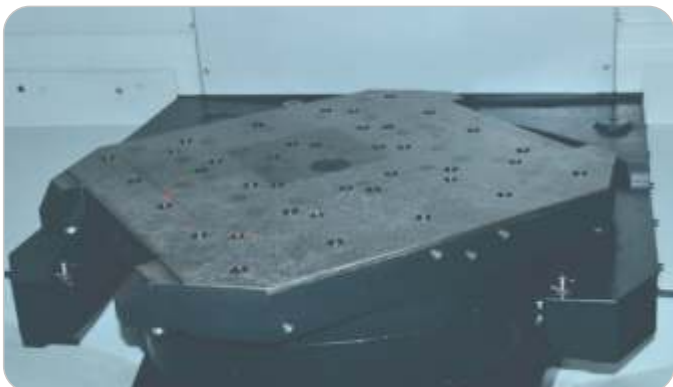
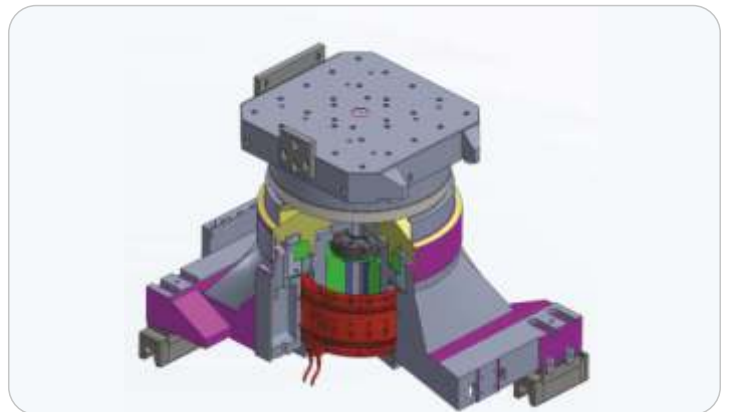
Index Table

Servo driven index table with 1° x 360 divisions positioning with Hirth coupling of ± 1 arc sec accuracy



DDRT

The state of the art direct drive rotary table for highest positioning accuracy, reliability and speed



Stocker Table

Stocker table with 4 x 90 °deg manual indexing and locking to facilitate easy workpiece setting on all 4 sides of pallet at loading/ unloading station.

Productivity

Tool Magazine

Servo driven tool magazine with 40/ 60/ 80 tool magazine can be offered for larger capacity
Tool loading and unloading possible while machining.
Touch screen HMI is available as option for easy tool management.
Option of tool breakage sensor on magazine side available



ATC



Servo driven high speed ATC for fast tool change can handle tool weights upto 30 kg.
ATC are provided with special tool locking mechanism for smooth and reliable tool change is provided as an optional feature.

Chip Conveyor

Efficient chip disposal with chip conveyor inside bed.
Direct chip disposal from stocker side.
Rear side chip disposal
Ample shower wash facility to avoid chip accumulation
16/ 40/ 70 bar coolant thru pressure with drum and cyclone filtration system
Oil skimmer to remove oil content and improve coolant life



Ergonomics

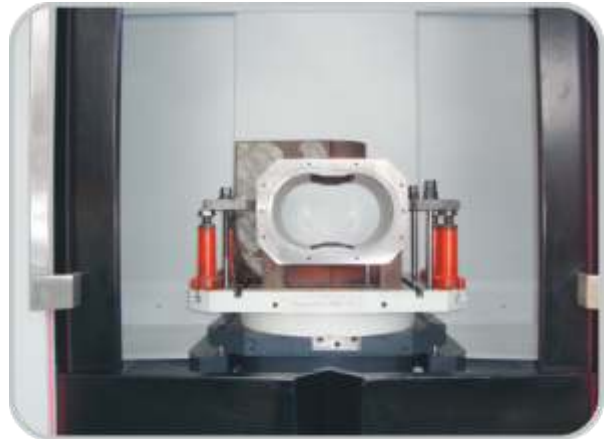


Wider operator door with large window for easy access & visibility
swivel type operator panel for easy operation

Easily accessible maintenance panel



Wide APC door for easy access to work piece
convenient loading height of 1100 mm



LED lamps for APC loading,
Tool loading, machining area.



HMI at tool loading station (optional)



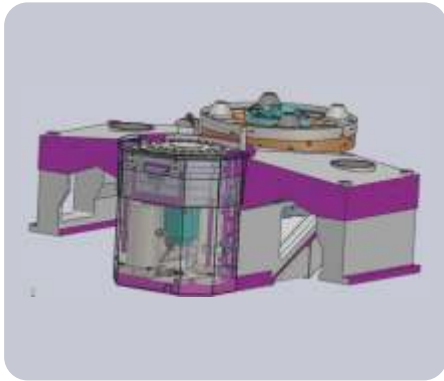
Foot switch at tool loading station



Environment Friendly

Automatic power off - sleep while idle
LED machine lamps
Energy efficient motors
possibility of grease lubrication

Reliability



Servo driven APC (H5500 onwards)



Servo driven ATC

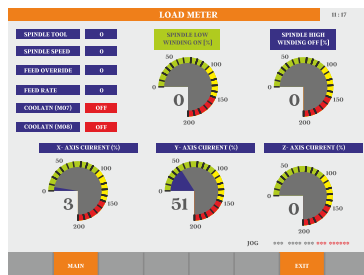


Sensor box with moulded cables, plug-socket connectors, LED indicators



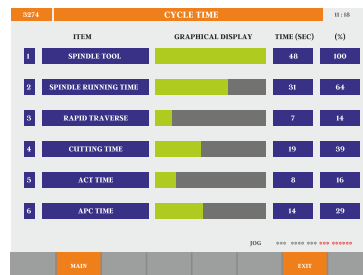
SS Lamella covers

User Screens



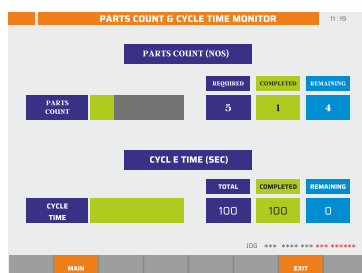
Load meter screen

Load on all the axes motors and spindle for optimising cutting performance and machine diagnosis



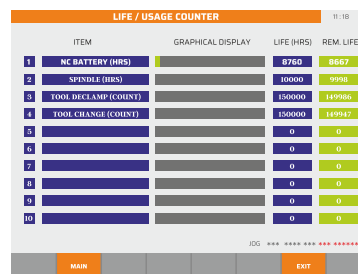
Cycle time screen

Cutting and idle timings of ATC, APC, axes movements for optimising the cycle time



Part counter screen

To manage production count and production plan schedules



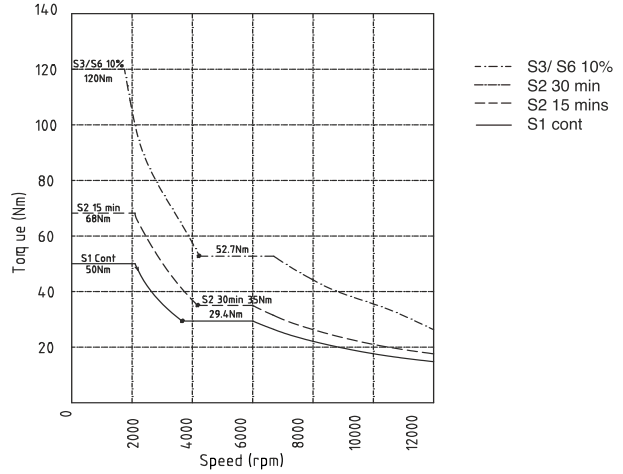
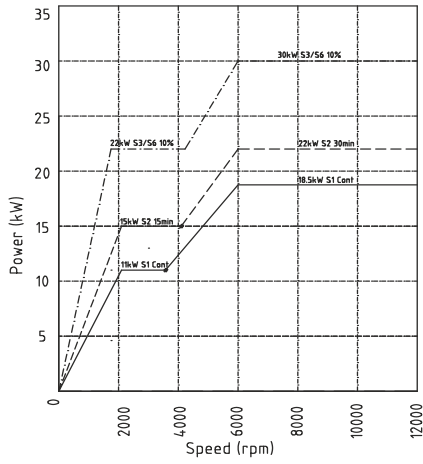
Life count screen

To monitor the battery life, Spindle run time, Spindle tool clamp/ de-clamp cycle, ATC cycles etc

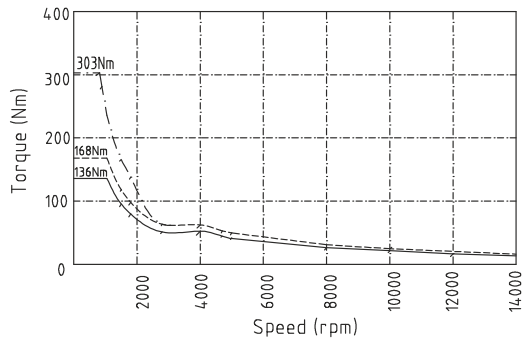
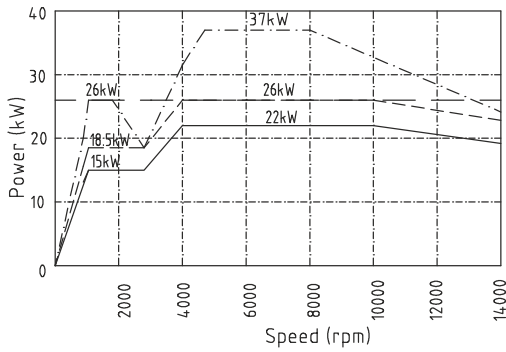
Spindle Characteristics

H4000 | H5500

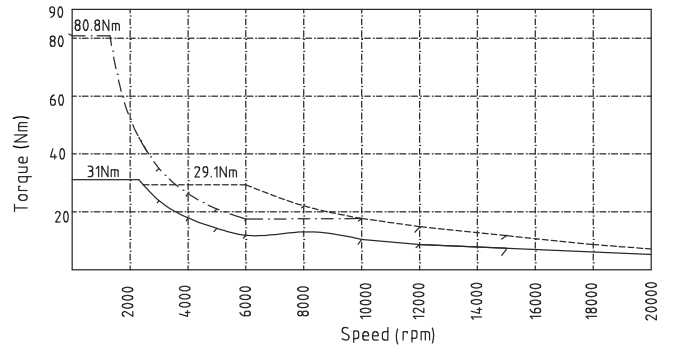
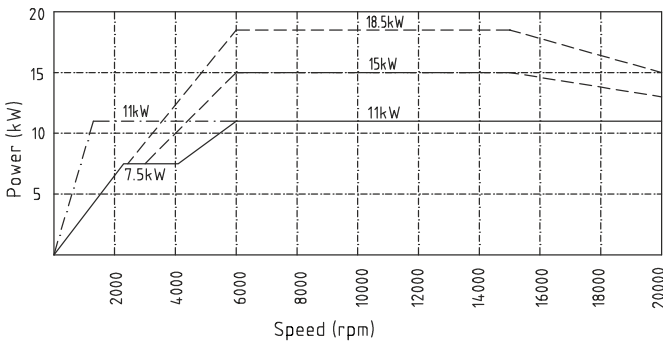
12,000 rpm standard spindle (Fanuc, Mitsubishi) - H4000



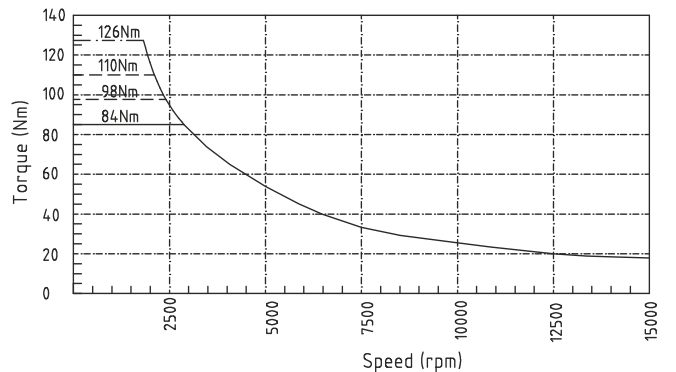
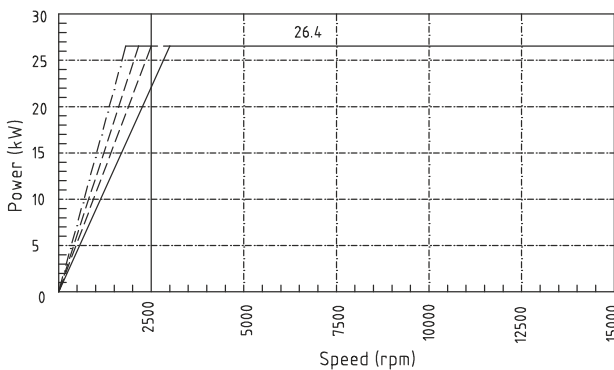
14,000 rpm high torque spindle (Fanuc, Mitsubishi) - H5500



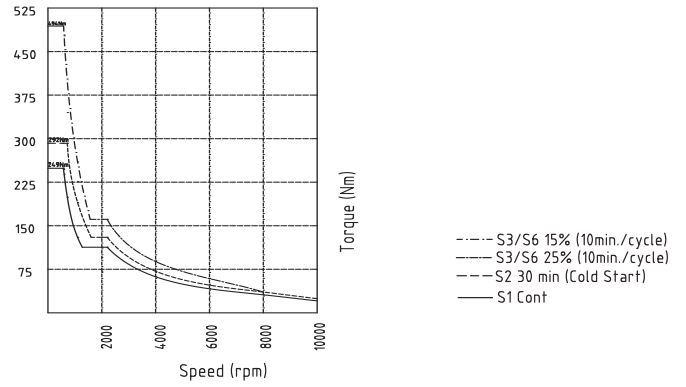
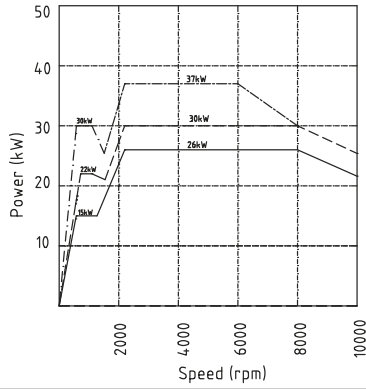
20,000 rpm high speed spindle (Fanuc, Mitsubishi) - H4000 & H5500



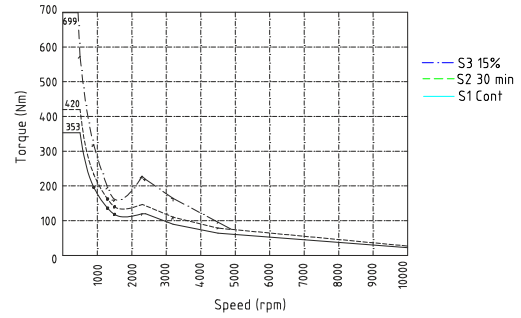
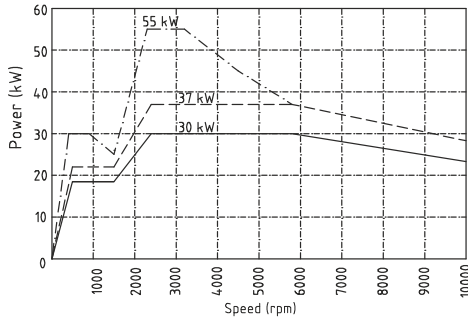
15,000 rpm Standard spindle (Siemens) - H5500



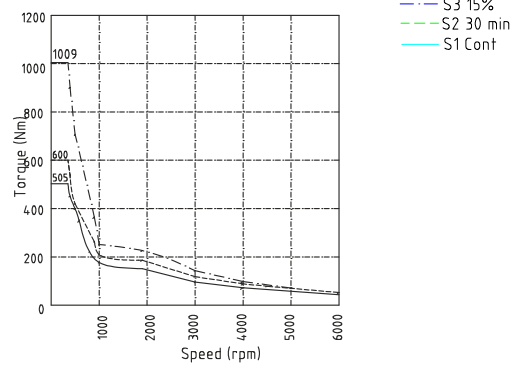
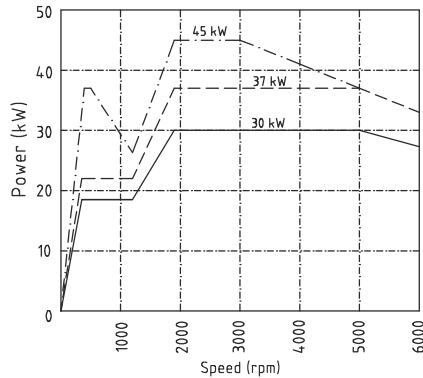
Only for H5000-50 (Fanuc & Mitsubishi)



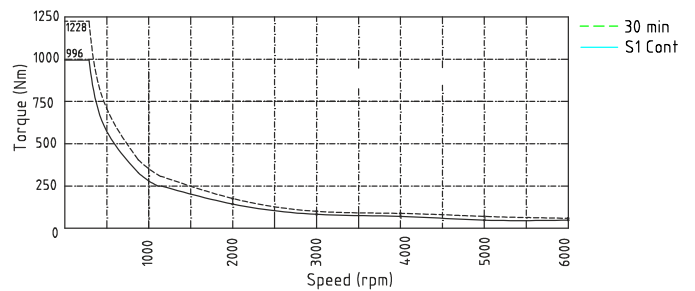
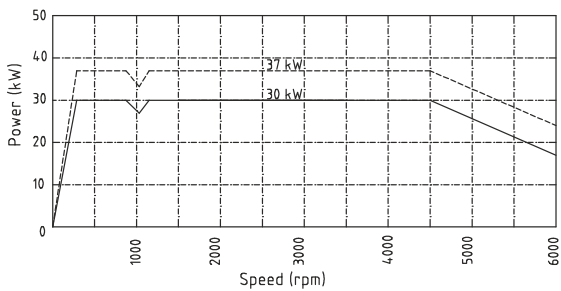
10,000 rpm standard spindle (Fanuc & Mitsubishi)



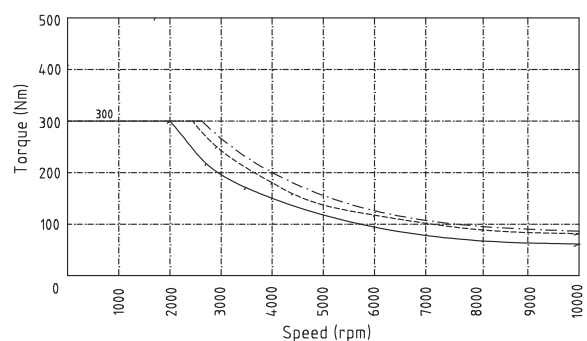
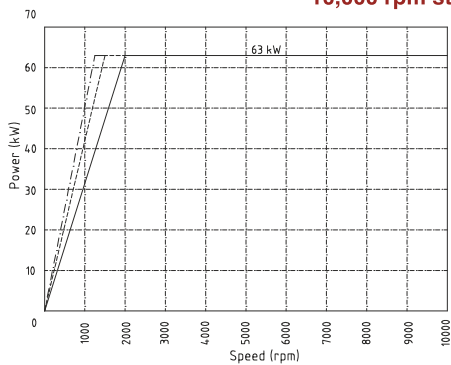
6,000 rpm high torque Spindle (Fanuc & Mitsubishi)



6,000 rpm geared spindle (Fanuc & Mitsubishi) (H10000 & H12000)

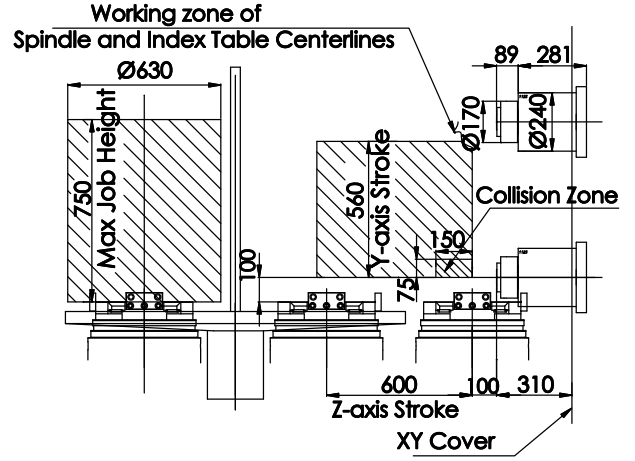
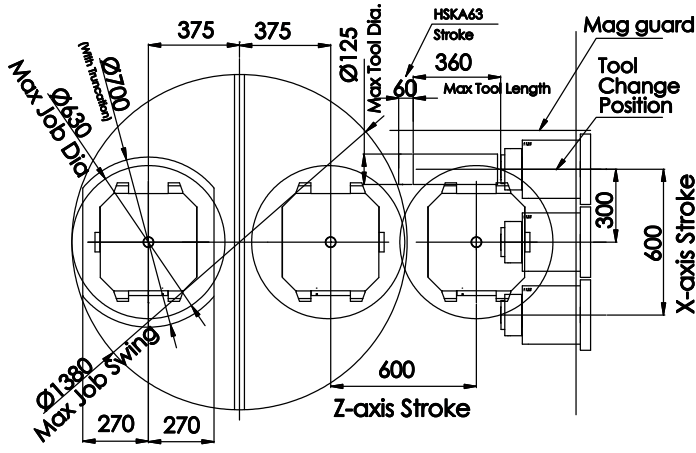


10,000 rpm standard spindle (Siemens)

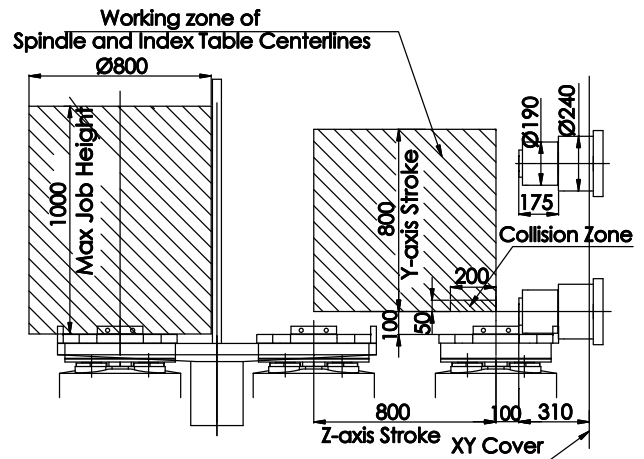
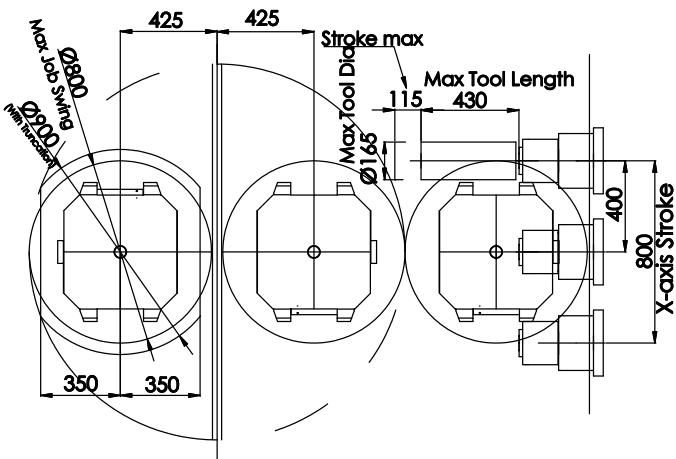


Machine Stroke Diagram

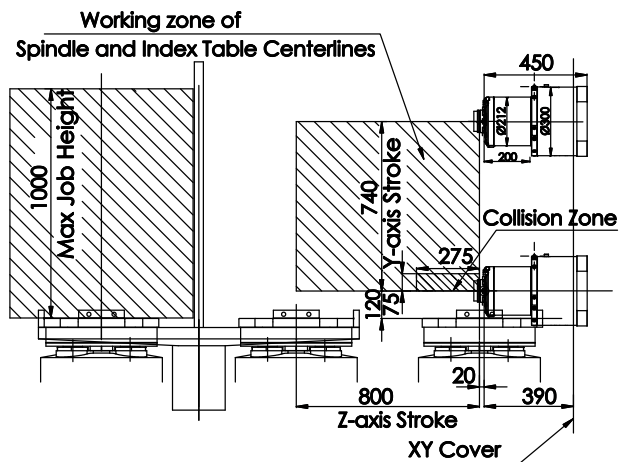
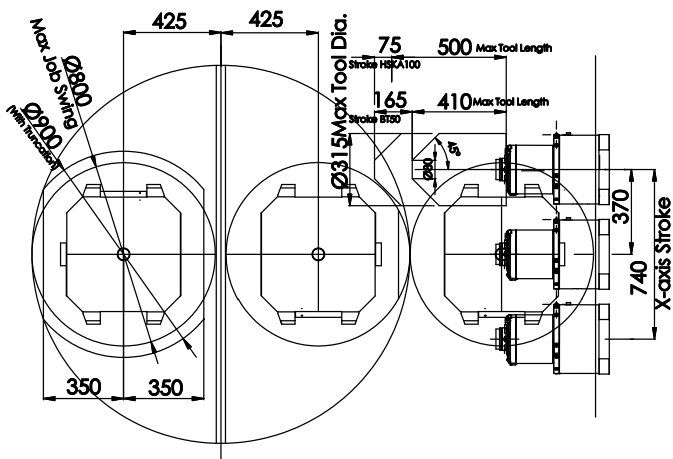
H4000



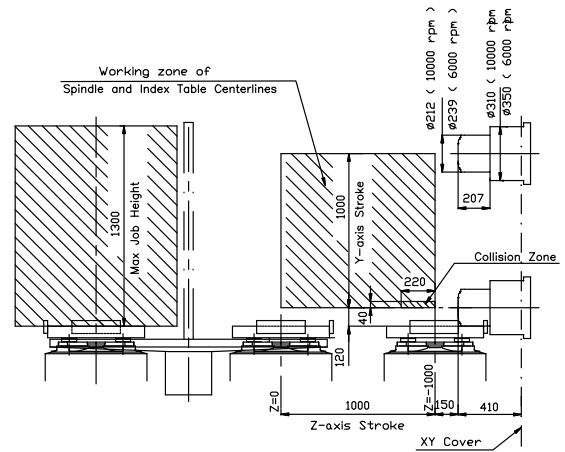
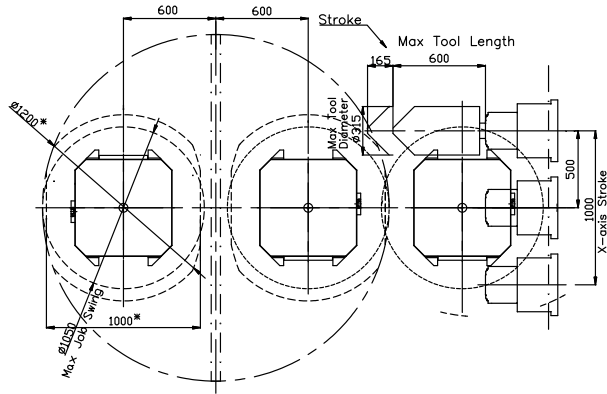
H5500



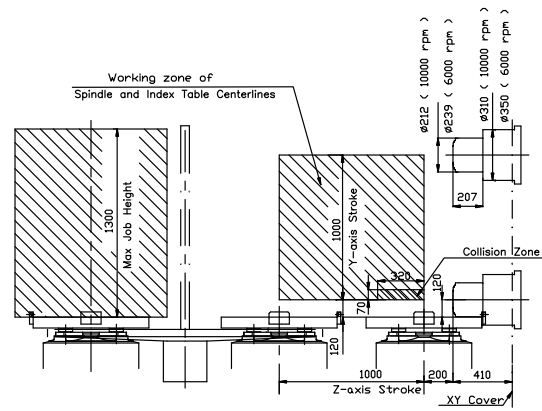
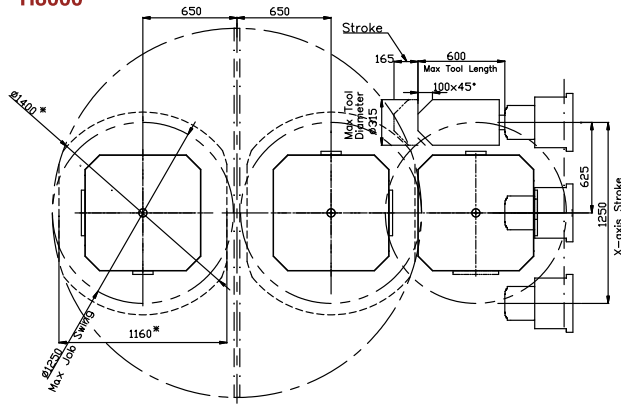
H5500-50



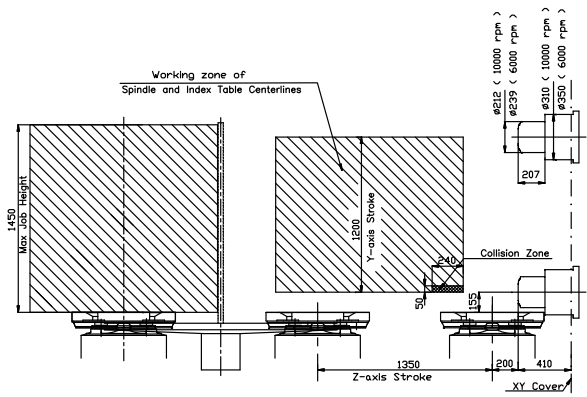
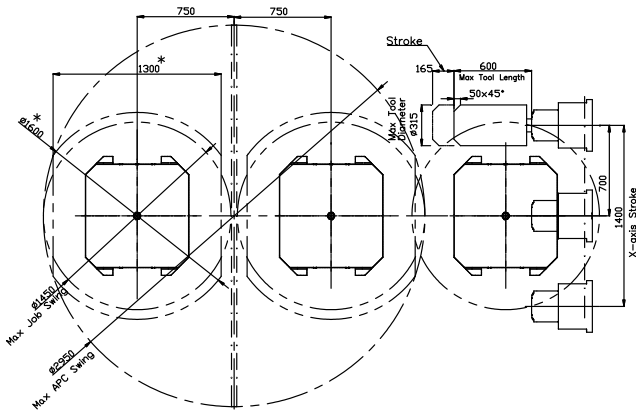
H6600



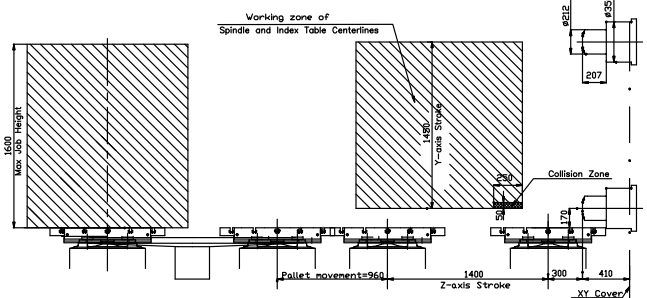
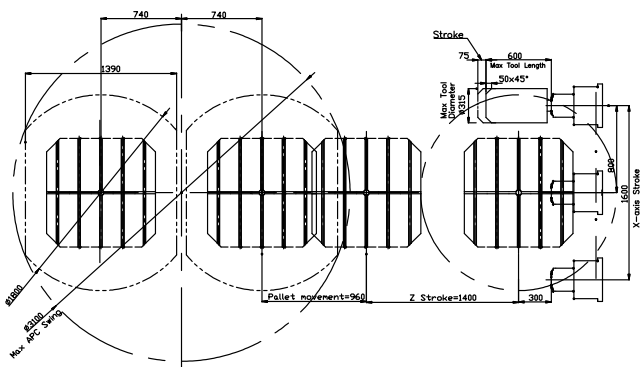
H8000



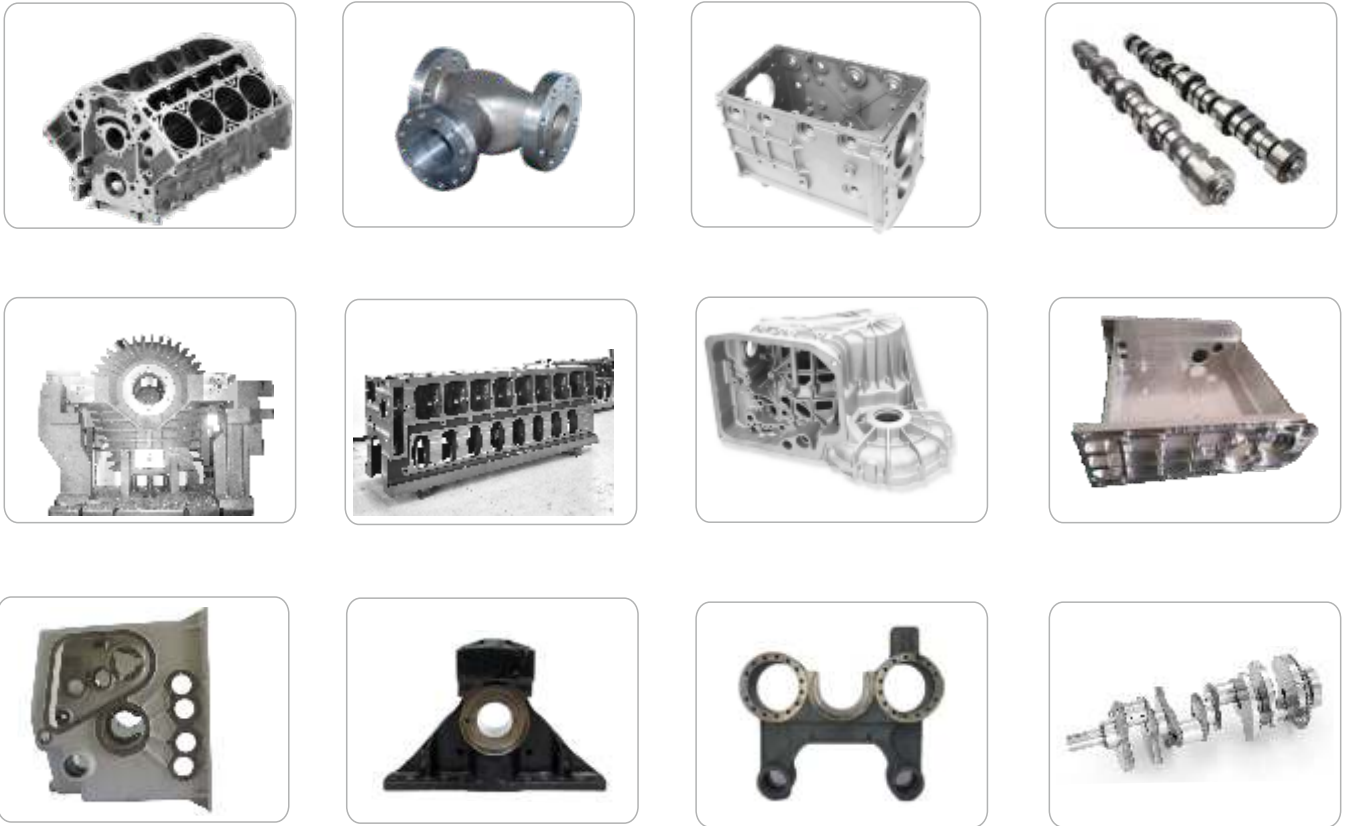
H8800



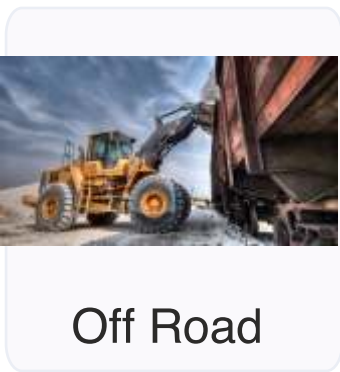
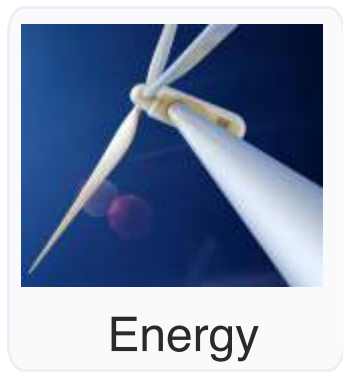
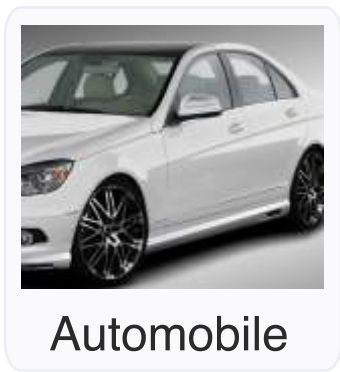
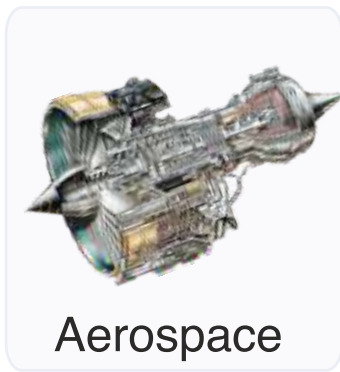
H10000



Applications

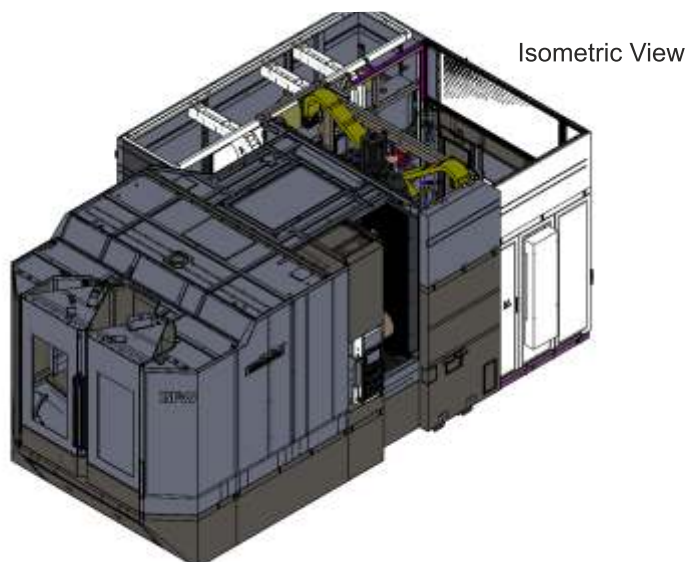
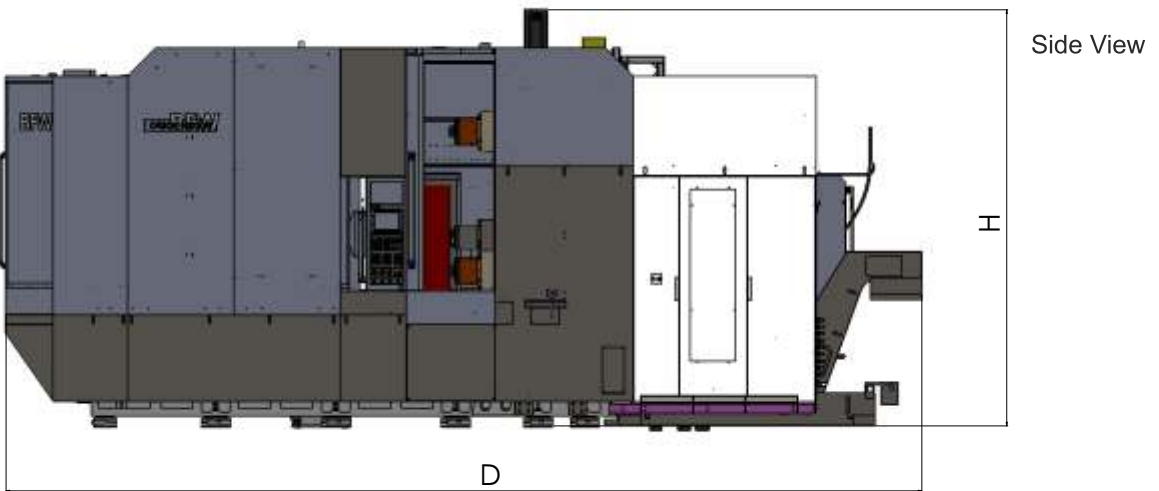
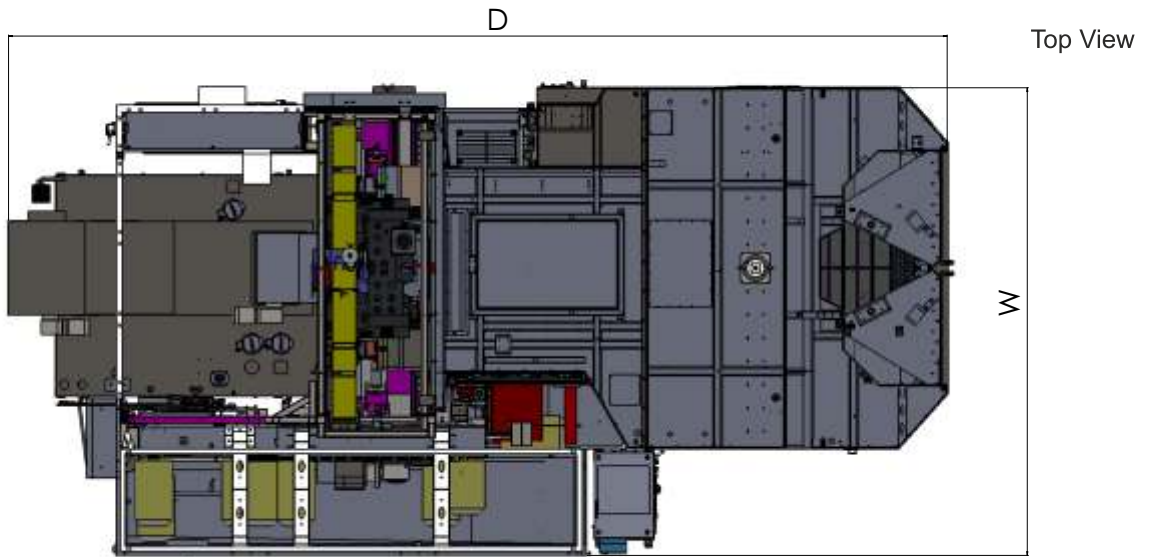


Industries



Many more..

Floor Plan



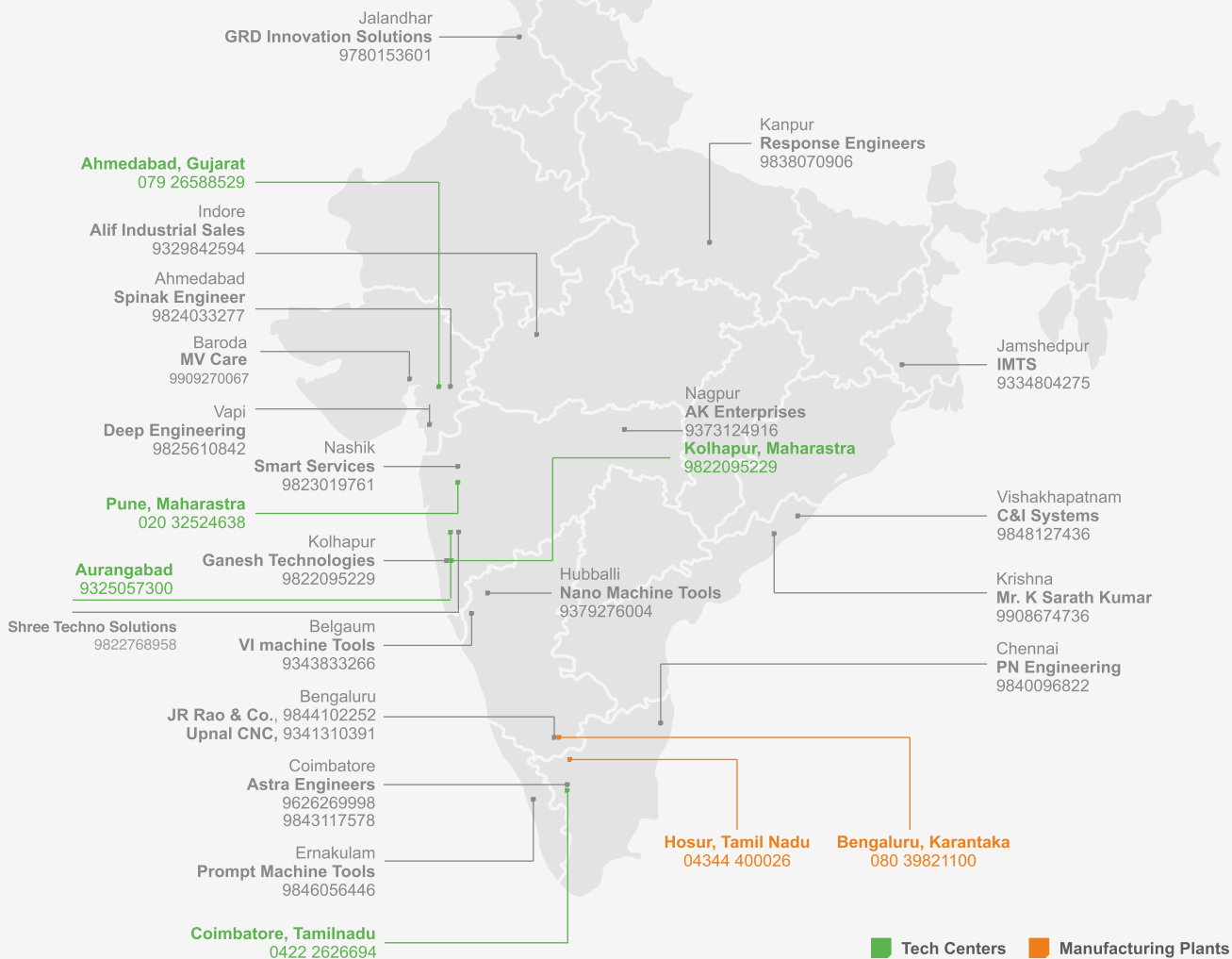
Model	Width (W)	Depth (D) (Drum filter + Cyclone filter)	Height
H 4000	2550	4525	2900
H 5500	2775	5283	3216
H 5500-50	3100	5300	3216
H 6600	3465	6222	3760
H 8000	3765	6472	3860
H 8800	3965	7150	3860
H 10000	4430	8650	4060
H 12000	4830	8650	4060

Technical Specifications

		ORION Series 1			ORION Series 2			ORION Series 3		
Specifications		ORION H 4000	ORION H 5500	ORION H 5500-50	ORION H 6600	ORION H 8000	ORION H 8800	ORION H 10000	ORION H 12000	
Axes										
Traverse (X/ Y/ Z)	mm	600 x 560 x 600	800 x 800 x 800	740 x 740 x 800	1000 x 1000 x 1000	1250 x 1000 x 1000	1400 x 1200 x 1350	1600 x 1400 x 1400	2000 x 1400 x 1400	
Rapid rates (X/ Y/ Z)	m/ min	60	60	60	60	60	40	40	40	
Max acceleration	g	0,9	0,7	0,7	0,6	0,6	0,4	0,4	0,4	
Table top to spindle center	mm	100 - 660	100 - 900	120 - 860	120-1120	120 - 1120	155-1355	120-1520	120-1520	
Table center to spindle face	mm	100 - 700	100 - 900	20 - 820	150-1150	200 - 1200	200 - 1550	300 - 1700	300 -1700	
Spindle - std										
Spindle taper	type	HSK A 63	HSK A 63/ BT 40	HSK A 100/ BT 50	HSK A 100/ BT 50	HSK A 100/ BT 50	HSK A 100/ BT 50	HSK A 100/ BT 50	HSK A100/ BT50	
Spindle power, Fanuc, Cont./ S2	kW	18.5 / 22	18.5 / 22	22/ 30	30/ 37	30/ 37	30/ 37	30/ 37	30/ 37	
Maximum spindle torque, Cont./ S3	Nm	50 / 120	50 / 120	249/ 414	353/ 699	353/ 699	353/ 699	353 / 699	353 / 699	
Spindle power, Siemens Cont.	kW	26.4	26.4	-	-	63/ 63	63/ 63	63/ 63	63/ 63	
Maximum spindle torque, S1/ S6 25%	Nm	126/ 84	126/ 84	126/ 84	300	300	300	300	300	
Spindle speed - Fanuc (Siemens)	rpm	12,000 (15,000)	12,000 (15,000)	10,000	10,000	10,000	10,000	10,000	10,000	
Spindle acceleration time - Fanuc (Siemens)	sec	0.7 (2.5)	0.7 (2.5)	3	3	3	3	3	3	
Spindle bearing diameter	mm	70	70	90	100	100	100	100	100	
Spindle - High torque option - Fanuc/ Mitsubishi										
Spindle power - cont./ S2	kW	-	22/ 26	-	30/ 37	30/ 37	30/ 37	30/ 37	30/ 37	
Maximum Spindle torque - cont / S3	Nm	-	136/ 302	-	505/ 1009	505/ 1009	505/ 1009	505/ 1009	505/ 1009	
Spindle speed	rpm	-	14,000	-	6,000	6,000	6,000	6,000	6,000	
Spindle bearing diameter	mm	-	80	-	120	120	120	120	120	
Spindle - High torque option - Siemens										
Spindle power - cont	kW	-	26	-	37	37	37	37	37	
Max spindle torque - cont / S6, 25 %	Nm	-	150/ 230	-	585/ 885	585/ 885	585/ 885	585/ 885	585/ 885	
Spindle speed	rpm	-	14000	-	6000	6000	6000	6000	6000	
Spindle bearing diameter	mm	-	80	-	120	120	120	120	120	
Index table										
Pallet size	mm	400 x 400	500 x 500	500 x 500	630 x 630	800 x 800	800 x 800	1000 x 1000	1250 x 1000	
Pallet type		tapped holes	tapped holes	tapped holes	tapped holes	tapped holes	tapped holes	T-slots	T-slots	
Load capacity	kg	400	700	700	1250	1500	2000	3000	4000	
Maximum job swing (dia x height)	mm	630 x 750	800 x 1000	800 x 1000	1050 x 1300	1250 x 1300	1450 x 1450	1800 x 1400	2200 x 1400	
Pallet height from ground level	mm	1100	1100	1100	1250	1250	1250	1250	1350	
Index positions	deg	360 x 1 deg	360 x 1 deg	360 x 1 deg	360 x 1 deg	360 x 1 deg	360 x 1 deg	-	-	
Direct drive rotary table - optional	deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	360,000 x 0.001 deg	
Automatic tool changer										
Number of tools	No	40 (60)	40 (60)	40 (60)	60 (80/ 120)	60 (80/ 120)	60 (80/ 120)	60 (80/ 120)	60 (80/ 120)	
Maximum tool diameter with adjacent pockets, full/ empty	mm	75 / 125	80/ 165	125/ 250	125/ 250 (315 with limit)	125/ 250 (315 with limit)	125/ 250 (315 with limit)	125/ 250 (315 with limit)	125/ 250 (315 with limit)	
Maximum tool length	mm	360	430	500 (410 for BT 50)	600	600	600	600	600	
Maximum tool weight	kg	8 (40 T) / 12 (60 T)	8 (40 T) / 12 (60 T)	20 (40 T) 25 (60 T)	30	30	30	30	30	
Tool changing time - BT/ HSK - retaining collet	sec	1.0 (3kg tool weight)	2.0 (1.4) (3 kg tool weight)	2.9 (2.0) (7 kg tool weight)	2.9 (2.0) (7 kg tool weight)	2.9 (2.0) (7 kg tool weight)	2.9 (7 kg tool weight)	2.9 (7 kg tool weight)	2.9 (2.5) (7 kg tool weight)	
Chip to chip time (min) As Per ISO 10791-9	sec	2.4 (3 kg tool weight)	3.7 (3.1) (3 kg tool weight)	4.7 (3.8) (7 kg tool weight)	5.1 (4.2) (7 kg tool weight)	5.3 (4.4) (7 kg tool weight)	6.1 (7 kg tool weight)	6.5 (7 kg tool weight)	6.5 (7 kg tool weight)	
Pallet changer										
Pallet change time (avg load, excluding seat check time)	sec	9	9	9	14	16	25	35	40	
Accuracy As per ISO 230/2										
Linear axes										
Positioning A - with encoder (with linear scale option)	mm	0.010 (0.008)	0.010 (0.008)	0.010 (0.008)	0.010 (0.008)	0.010 (0.008)	0.010 (0.008)	0.010 (with scale)	0.010 (with scale)	
Repeatability R - with encoder (with linear scale option)	mm	0.007 (0.005)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	0.007 (with scale)	0.007 (with scale)	
Rotary axes										
Positioning A	arc sec	10	10	10	10	10	12	12	20	
Repeatability R	arc sec	7	7	7	7	7	9	9	15	
Machine installation data										
Basic weight weight	kg	10,000	12,000	13,000	20,000	22,000	26,000	28,000	30,000	
Floor space (machine only) W x D	mm	2550 x 4525	2775 x 5283	3100 x 5300	3465 x 6222	3765 x 6472	3965 x 7150	4430 x 8650	4830 x 8650	
Compressed Air	bar	6	6	6	6	6	6	6	6	
Total connected load - Cont/ 30 min	kVA	40/ 50	50/ 60	50/ 60	80/ 90	80/ 90	80/ 90	90/ 100	90/ 100	
Power supply		3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	3 phase, 415 V, 50 Hz	
CNC system: Fanuc Oi MF+ / Mitsubishi										

Note: Values within parenthesis are options.

Network



International Network

- Bangladesh
- Bahrain
- China
- France
- Germany
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- Kuwait
- Netherlands
- Oman
- Poland
- Qatar
- Russia
- Saudi Arabia
- Sri Lanka
- South Africa
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