



V

SERIES

**C-TYPE 3-AXIS  
VERTICAL MACHINING CENTER**



# WE ARE AXILE

AXILE designs and builds agile smart 5-axis VMCs with leading automation solutions for manufacturers of complex parts and components.

**“ We believe manufacturers shouldn’t have to choose between high-speed and high-performance 5-axis machines. ”**

By combining sheer agility, digitalized intelligent automation, and a new standard of 5-axis machining, we’ve created an all-new approach:

## **Agile Smart Machining.**

In short, our dedicated team of industry experts brings together ultra-high removal rates, pinpoint precision, and 24/7 automation and reliability within each and every AXILE 5-axis machine.

Our breakthrough design concepts and advanced proprietary technologies serve highly sophisticated manufacturers of complex parts and components for applications in aerospace, die and mold, medical, and general job shop, among others.

The AXILE service and support network spans nearly 50 countries, with more than 70 distributors across Asia, Europe, and the Americas, and a service center in Croatia.



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ART™

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# V SERIES C-TYPE VMC

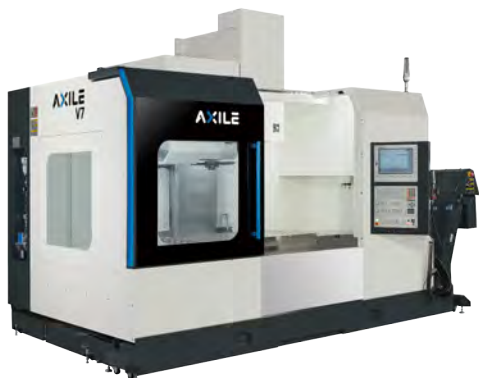
V4



V5



V6



V7

# DESIGN CONCEPT

## THE STRUCTURE

1

Flat support for tool magazine directly supported on the floor

No bending of the column and no limitation for bigger, heavier magazines

3

All body made of high-quality casting

Optimal damping of machining vibrations

Homogeneous thermal behaviour

2

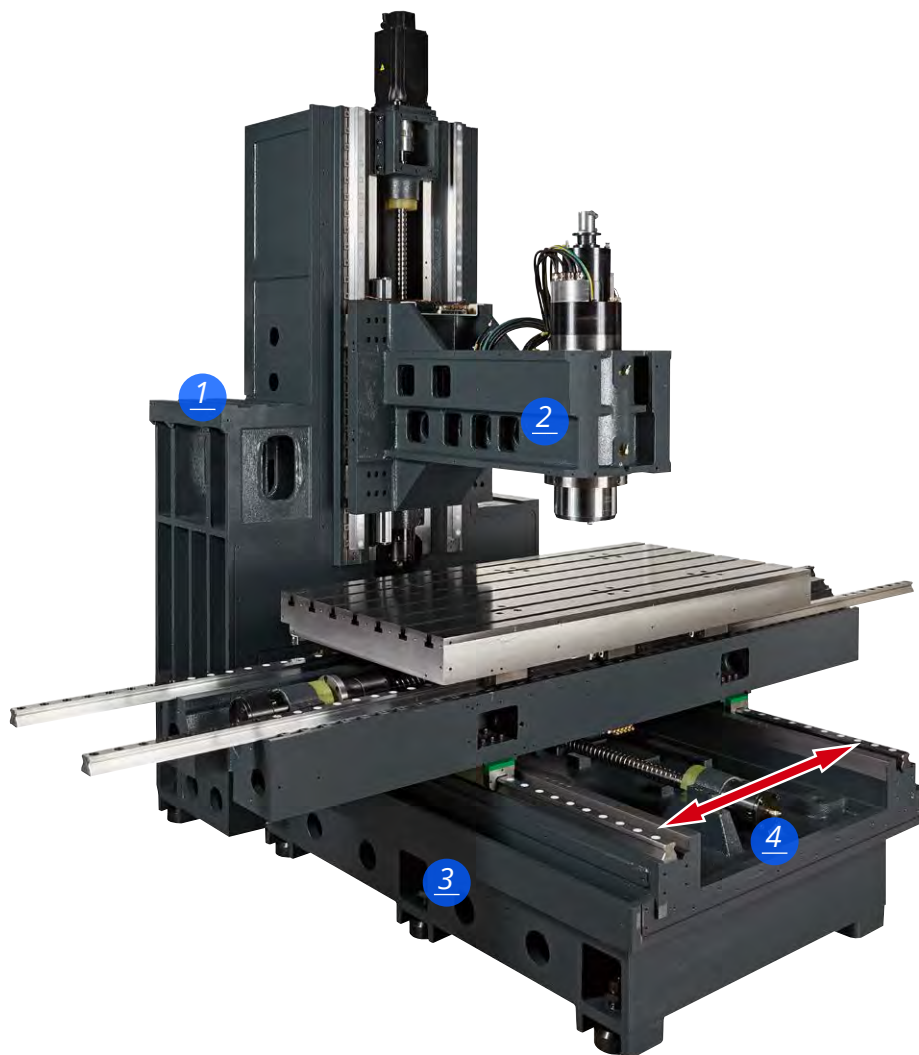
C-type proven design

High rigidity of Z-axis and spindle headstock  
Same behavior in full X and Y travel

4

Wide distance between Y-axis guides

Best support for saddle and table and stable machining even with heavy loads



# AGILITY

## LINEAR AXES

1

Direct driven servomotors (no belts/gears)

Best dynamic and minimal elasticity in the driving system

2

No counterbalance for Z-axis

Best dynamics using high-power Z-axis servo motor

3

0,1  $\mu\text{m}$  resolution absolute linear scales in ALL axes

Ensures best accuracy

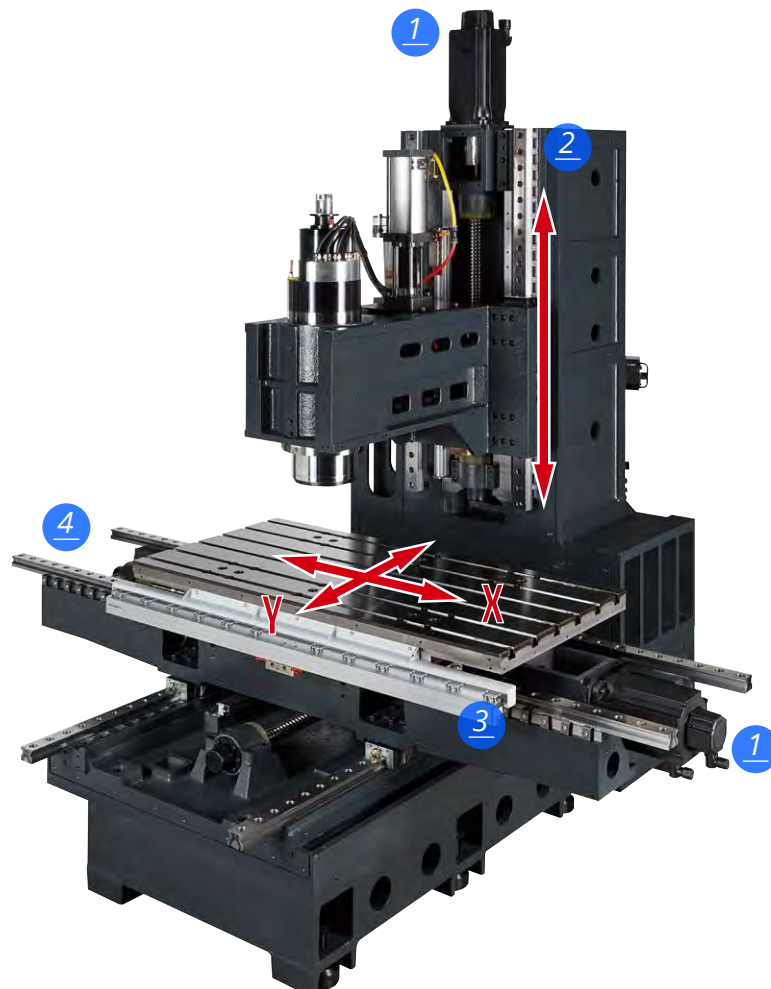
4

Longer guideways to support telescopic covers

Smooth high-speed feed-rates

Linear guideways  
Ball type - V4  
Roller type - V5/V6/V7

Best high-feed movement and vibration damping



# ACCURACY

## Linear axes accuracy

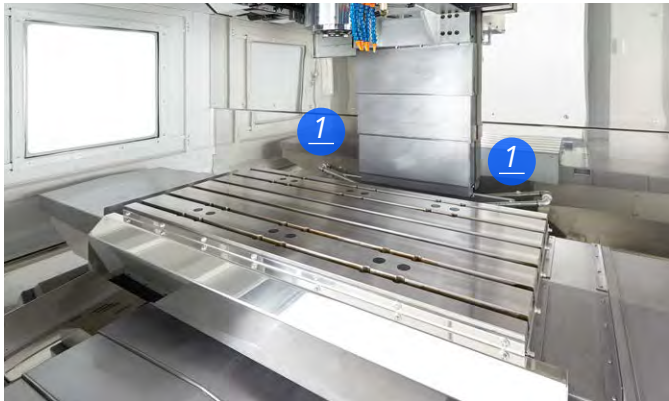
Ballscrew's thermal growth

0.1µm resolution absolute linear scales in ALL axes



# CHIP & TOOL MANAGEMENT

## FLUSHING CHIPS AWAY



- 1  
Chip flushing
- 2  
Coolant through spindle
- 3  
Coolant at spindle

## FLEXIBLE CAPACITY FOR EVERY APPLICATION



32 tools



40 tools (opt)

40 tool magazine: tools are accessible by operator

Surveillance and maintenance of tools is possible while machine is in automatic mode.



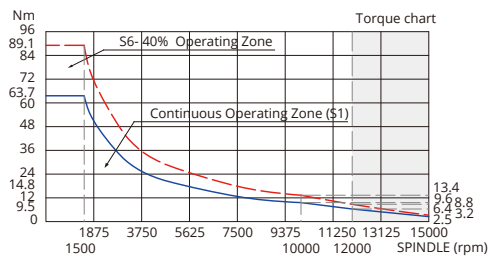
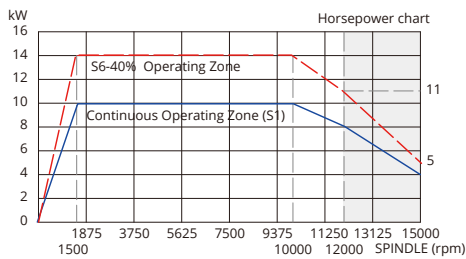
# SPINDLE

## IN-LINE SPINDLE 12000 RPM

### V4 / V5

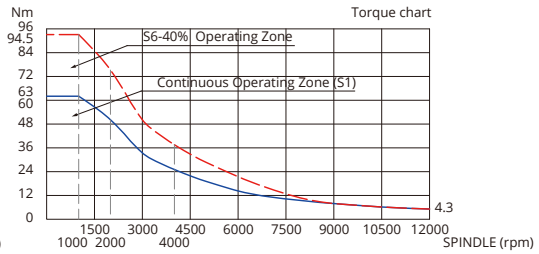
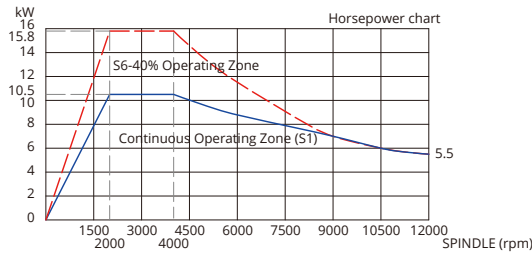
> Heidenhain 640

> Heidenhain QAN200UH 10/14 kW



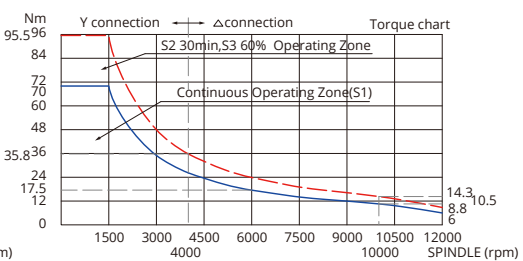
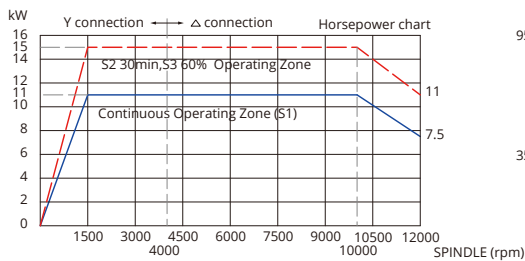
> Siemens 840D controller

> Siemens 1PH8107-1SG02-3LA1 10.5/15.8 kW



> Fanuc 31iB controller

> Fanuc AiT12 11/15 kW



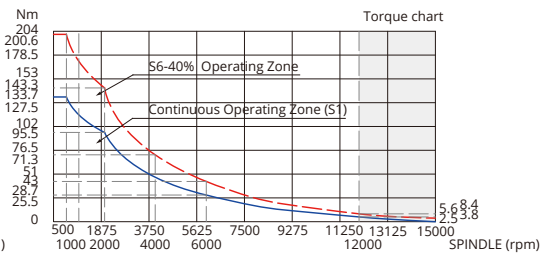
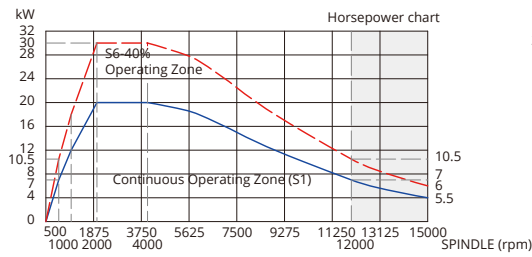


## V6 / V7

> Heidenhain 640

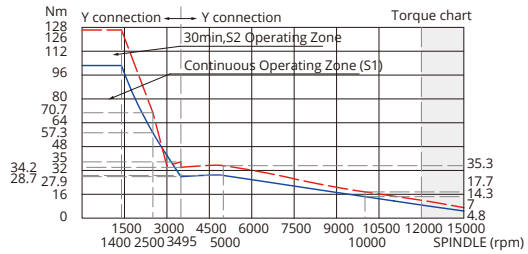
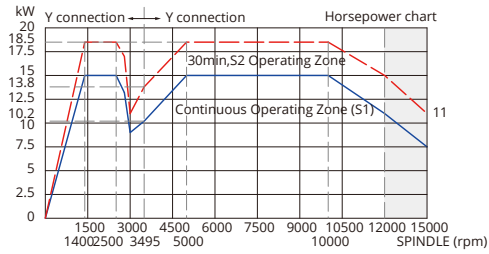
> Siemens 840D

> Siemens 1PH8133-1CG02-3MA1 20/30kW



> Fanuc 31iMB

> Fanuc alphaT15

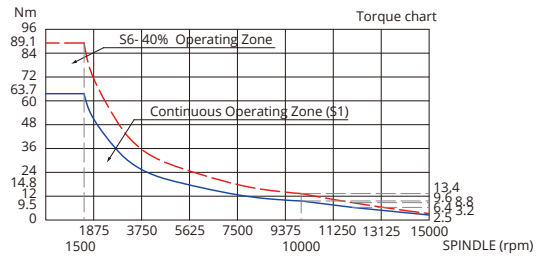
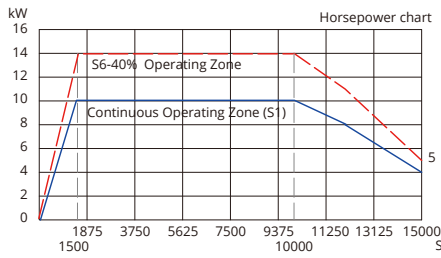


# IN-LINE SPINDLE 15000 RPM

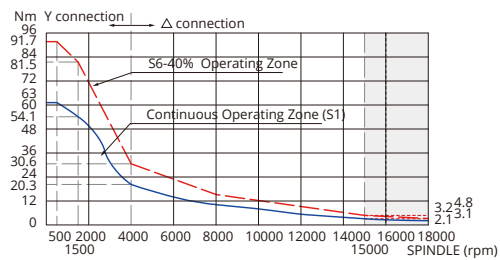
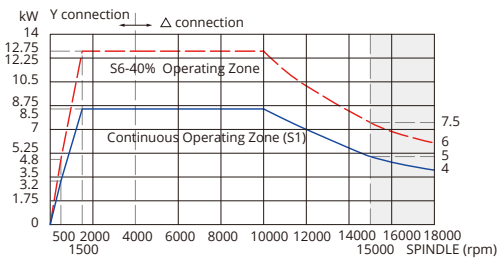
## V4 / V5



> Heidenhain 640 controller > Heidenhain QAN200UH 10/14 kW

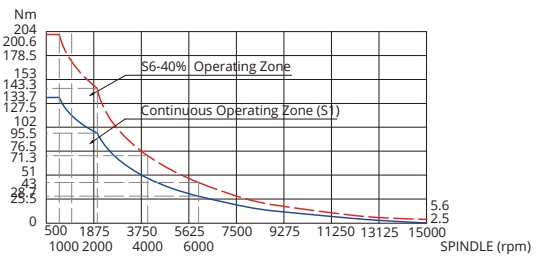
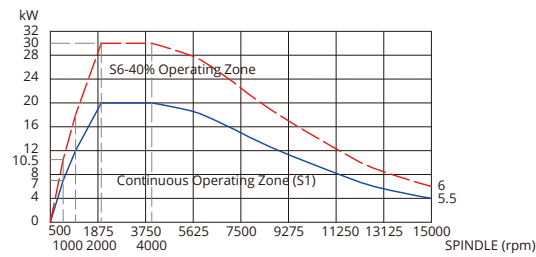


> Siemens 840D controller > Siemens 1PH8107-1SS02 8.5/12.8 kW

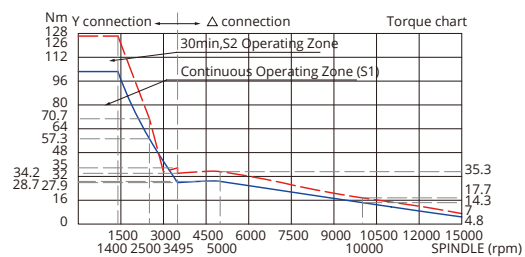
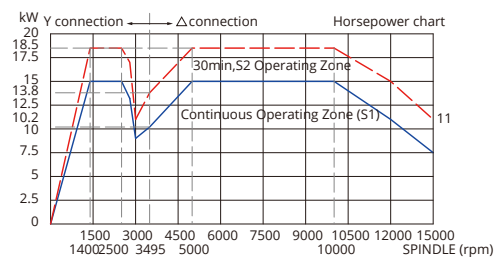


## V6 / V7

> Heidenhain 640 > Siemens 840D > Siemens 1PH8133 20/30kW




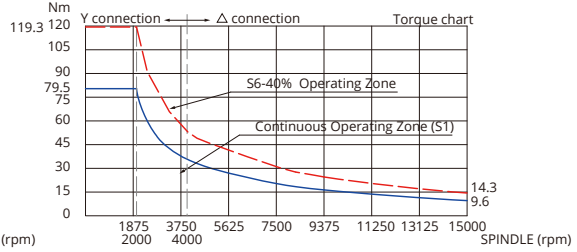
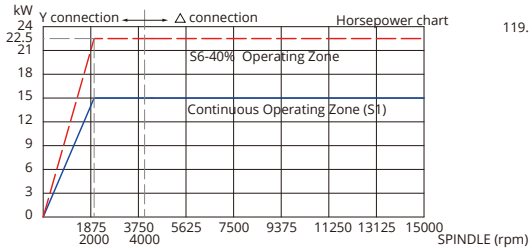
> Siemens 840D controller > Siemens 1PH8107-1SS02 8.5/12.8 kW



# HIGH SPEED BUILT-IN SPINDLE

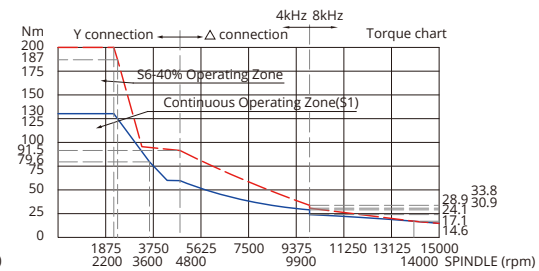
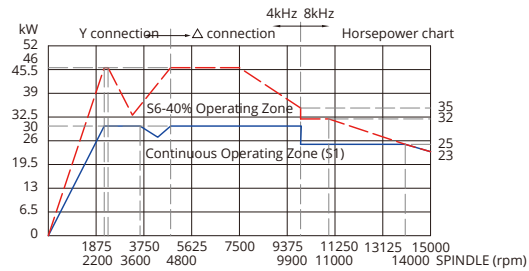
## V5 / V6 / V7 15000 rpm

 > 15/22.5 kW



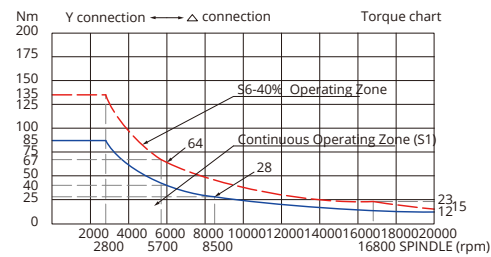
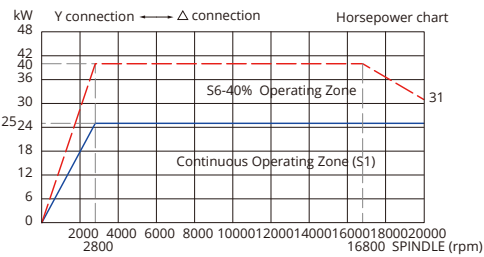
## V6 / V7 15000 rpm

 > 30/46 kW



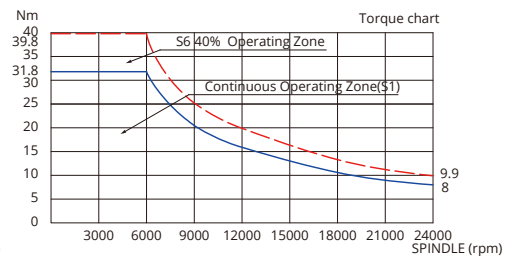
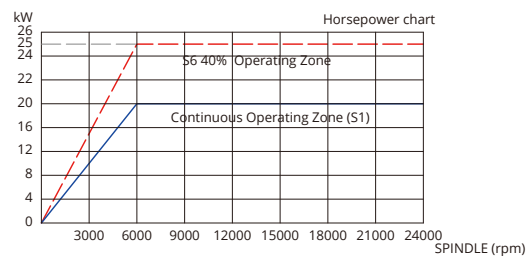
## V6 / V7 20000 rpm

 > 25/40 kW



## V4 / V5 24000 rpm

 > 20/25 kW

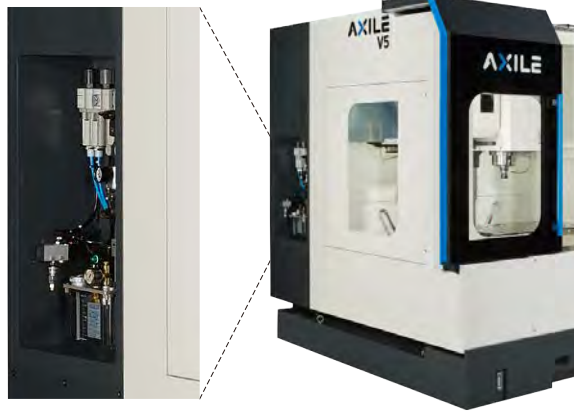


# ERGONOMICS

## ACCESSIBILITY TO WORKING AREA AND FOCUS ON THE OPERATOR

Wide opening of front door. Complete roof integrated in the door. Over-head crane reaches table center

Easy access, loading and unloading of bulky and heavy workpieces



All necessary consumables are located in the back for convenient checking and tank re-filling

No bending of the column and no limitation for bigger, heavier magazines

Standard chain type lift conveyor in front of the machine

Chip bucket can easily be reached from the machine front

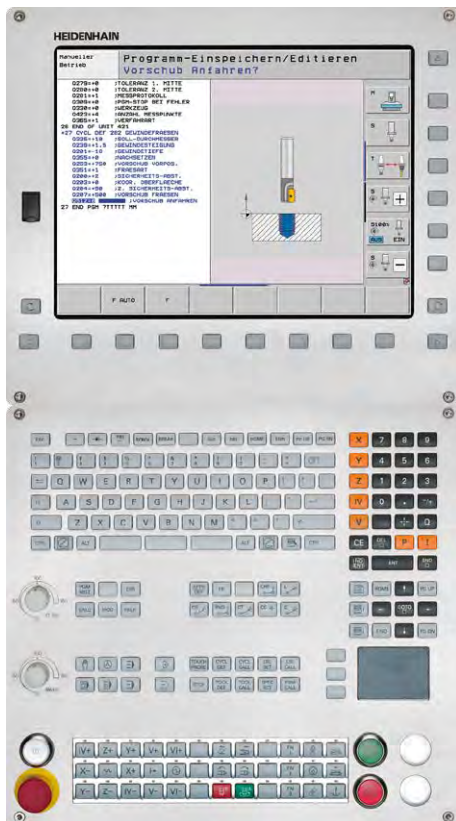
Swivelling control panel on the right side

Comfortable operator usage and compact design

# CONTROL UNIT

## A CONTROLLER FOR EVERY USER

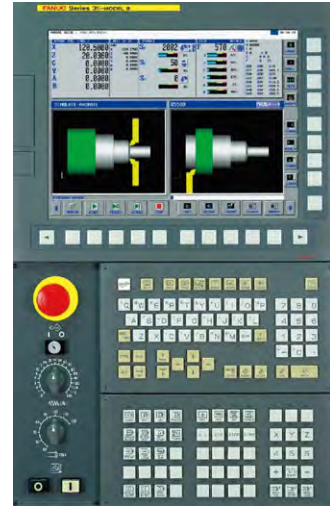
### Heidenhain TNC 640



### Siemens 840D SL



### Fanuc 31iB



- > High performance path control available
- > Automatic smoothing of contour
- > Perfect surfaces can be created with any CAM tool
- > 3D radius compensation available
- > Quick mid program start up on specific NC blocks
- > 3D line graphics enables visualization of externally generated NC programs
- > Free contour programming

# TECHNOLOGIES

**ART™**

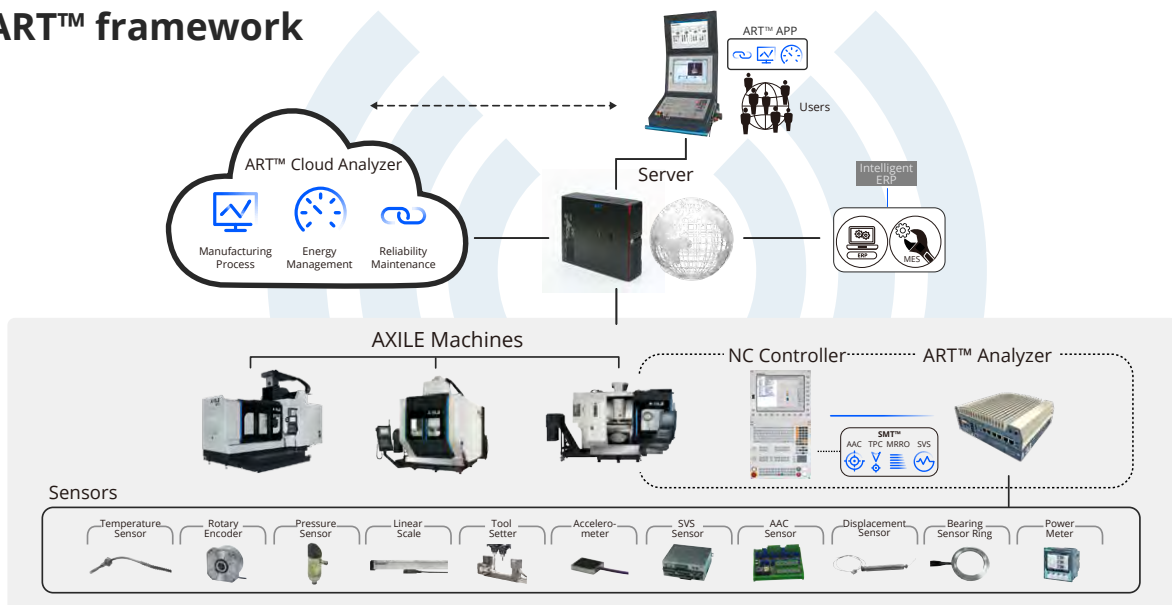
## INTELLIGENT MONITORING SYSTEM

The future of manufacturing depends on optimized, intelligent production. To gain an edge on the competition, embracing smart manufacturing is the best way to stay ahead of the curve.

To deliver agile smart machining, and that all-important competitive edge, we have created ART™, an intelligent monitoring system that enables 24/7 operations and eliminates unexpected downtime. ART™ monitors all wearing components, energy consumption, and fluids such as lubricant and coolant, to supply real-time status updates on the machine and its components, and to pre-empt future issues.

Utilizing ART™ in daily operations immediately improves production efficiency by empowering machinists to make informed decisions. Moreover, ART™ gives manufacturers the reassurance required to embrace automation solutions, by delivering vital oversight through total operational transparency.

### ART™ framework



## 3 Core Functions to Boost Productivity & Profitability



### Reliability Maintenance (RM)

Unexpected downtime is the enemy of profitability. ART™ delivers machine components diagnosis, machine lifetime estimation, and consumable supplies monitoring to pre-empt machine failure and eliminate unplanned downtime.



### Manufacturing Process (MP)

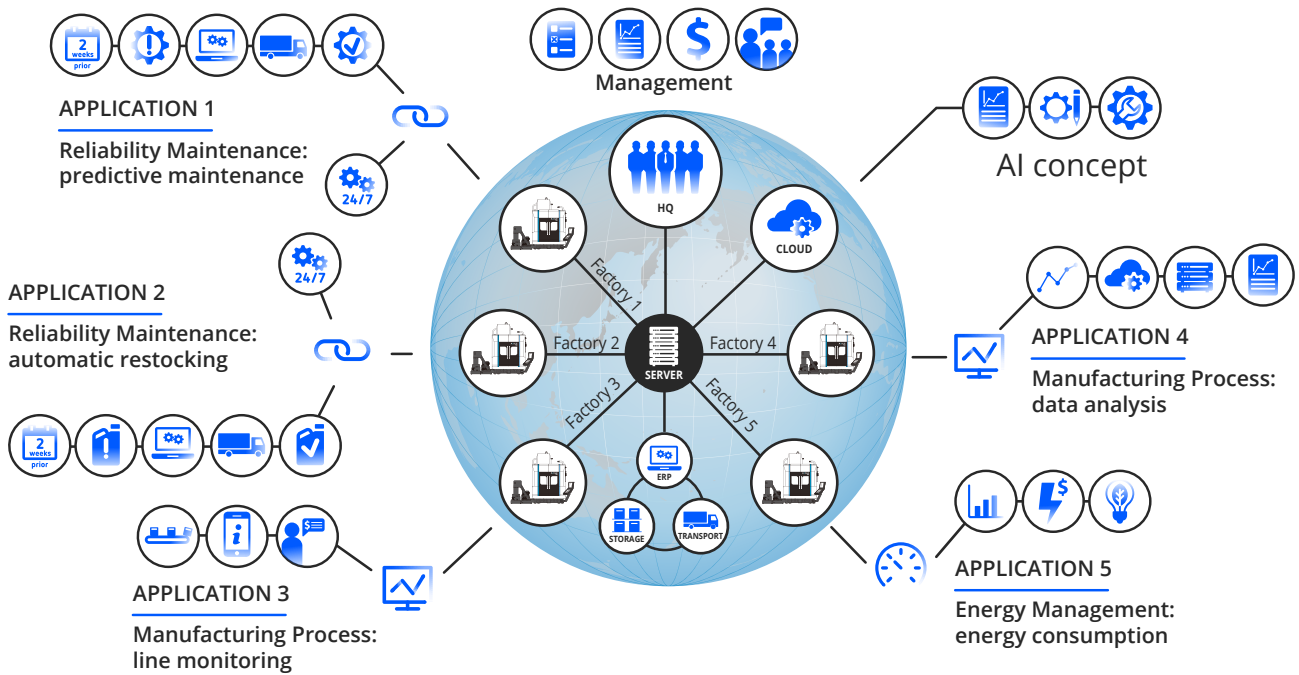
Knowledge is power. ART™ achieves superior data collection and analytics on machine status and utilization rates, to deliver real-time information for optimized production strategies.



### Energy Management (EM)

Every penny counts. ART™ enables manufacturers to monitor their power consumption, to identify ways to maximize energy efficiency and reduce expenditure.

## Industry 4.0 Solutions to Intelligent Machine

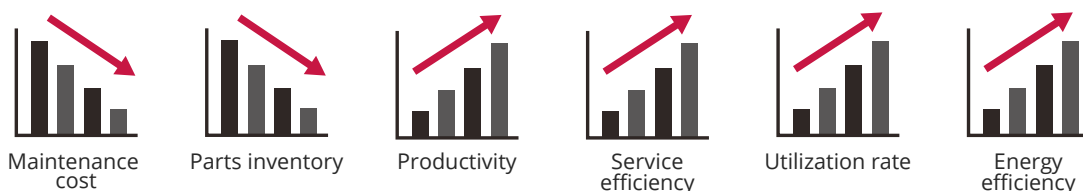


## How ART™ Brings Production Benefits

- > Clearly displays machine status, for quick decision-making
- > Maximizes machine accessibility and utilization, for optimized production
- > Provides real-time notification of abnormal conditions, for swift intervention
- > Gives machinists the information required to optimize removal rates and machine lifetime

## How ART™ Brings Maintenance & Service Benefits

- > Delivers pre-emptive error messages prior to breakdown, to eliminate unexpected downtime
- > Decreases service expenses, by precisely identifying the issue
- > Enhances service efficiency, by recommending appropriate action
- > Reduces spare parts inventory, by highlighting exactly what is needed and when
- > Automatically orders new parts, by linking to online purchasing system
- > Allows machines and equipment to remain on stand-by, always ready to work





## SMART MACHINING TECHNOLOGY

As pioneers of advanced mechatronic systems with decades of R&D expertise, AXILE has taken 5-axis CNC machining to the next level. Our patented SMT™ (Smart Machining Technology) delivers groundbreaking compensation and calibration functionality for unrivaled cutting speeds and industry-leading accuracy, and more importantly, resolves the aforementioned issues created by thermal expansion.

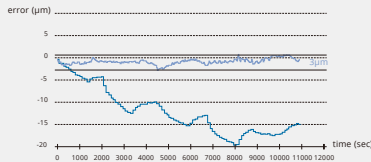
With AXILE's SMT™ manufacturers can have it all. There's no longer the need to choose between speed and precision, meaning manufacturers can produce superior parts rapidly, while also securing total process reliability and long-term machining performance.



### Axial Accuracy Control



- > **AXIAL THERMO MONITORING**  
Integration of temperature sensors and thermal error model
- > **HIGH PRECISION**  
Thermal induced positioning error compensation



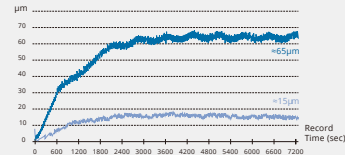
**THERMAL ERROR BEFORE AND AFTER COMPENSATION**  
With thermal compensation system, the thermal error can be reduced from 20µm to 3µm.



### Tool-tip Positioning Control



- > **HIGH ACCURACY**  
Directly measuring expansion
- > **BETTER SURFACE FINISH**  
5~6 times accuracy improved
- > **REAL-TIME COMPENSATION**  
Electrical type sensor

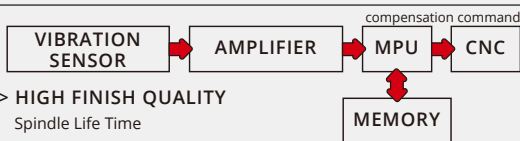


With compensation, the displacement of tool tip is reduced from 65µm to 15µm.

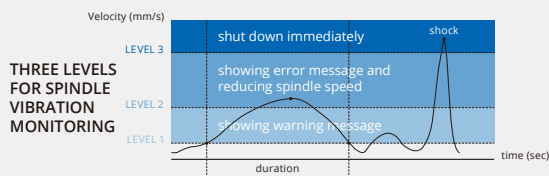
**ACCURACY IMPROVED 5~6 TIMES!**



### Spindle Vibration Supervision



- > **HIGH FINISH QUALITY**  
Spindle Life Time
- > **LONGER LIFE TIME**  
Wear reduction on spindle bearings and tools
- > **EASY FOR MAINTENANCE**  
Up to 12000 abnormal vibration data recording



### Metal Removal Rate Optimization

- > **OPTIMIZATION PRODUCTION**  
Fully utilize machine capability
- > **EXTREMELY FAST PROCESSING TIME**  
Maximization of metal removal rate
- > **HIGH TOOL DURABILITY & PERFECT SURFACE ROUGHNESS**  
Stable cutting force and chatter-free machining  
Surface Roughness improved 61.5%  
Spindle load decrease 13.6%

# STANDARD & OPTIONAL EQUIPMENT

## Standard details of a premium machine

Electrical cabinet in the right side of machine

Improves the layout as the back of the machine can be place close to wall



Separate type cooling unit including:

- > Cartridge filter
- > Paper filter
- > Through spindle 40 & 70 bar centrifugal and screw pumps
- > Oil skimmer
- > Oil cooler

Recommended for high aluminum or cast iron material cutting



## Customize the machine to your needs

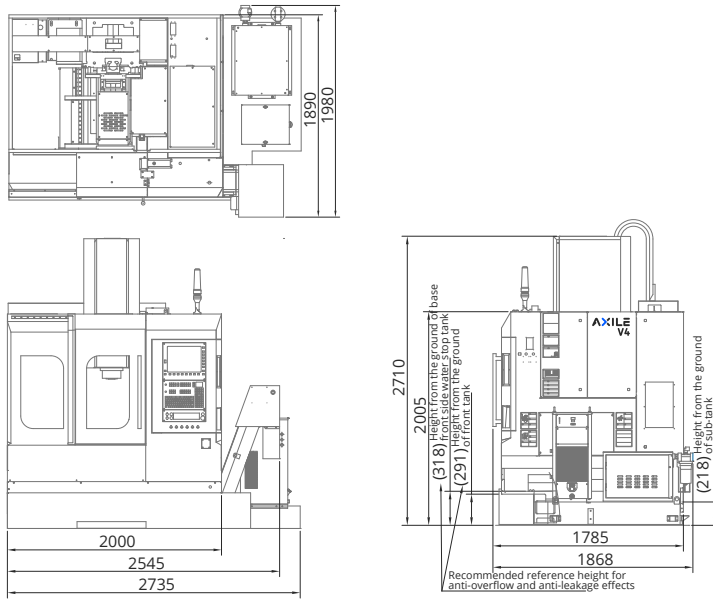
Chain-type chip conveyor and high pressure (40 bar) coolant through spindle

Machine is prepared for every machining operation

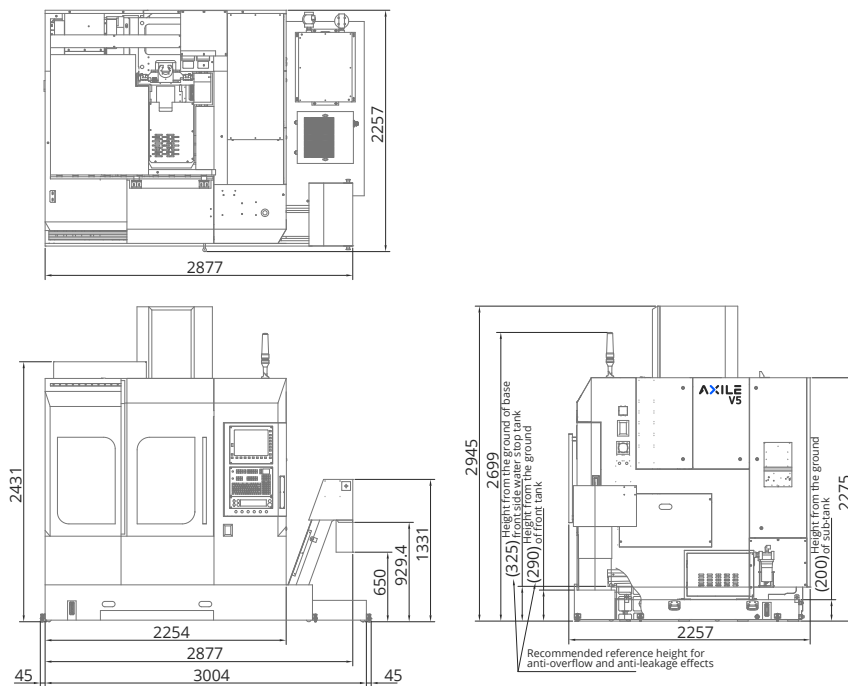


# LAYOUT

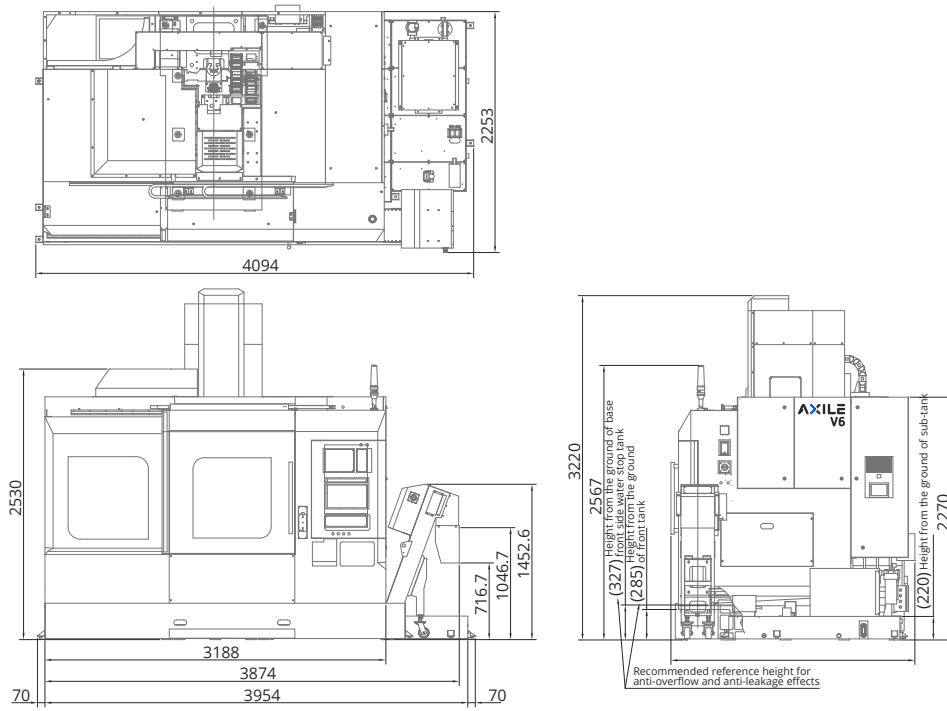
## V4



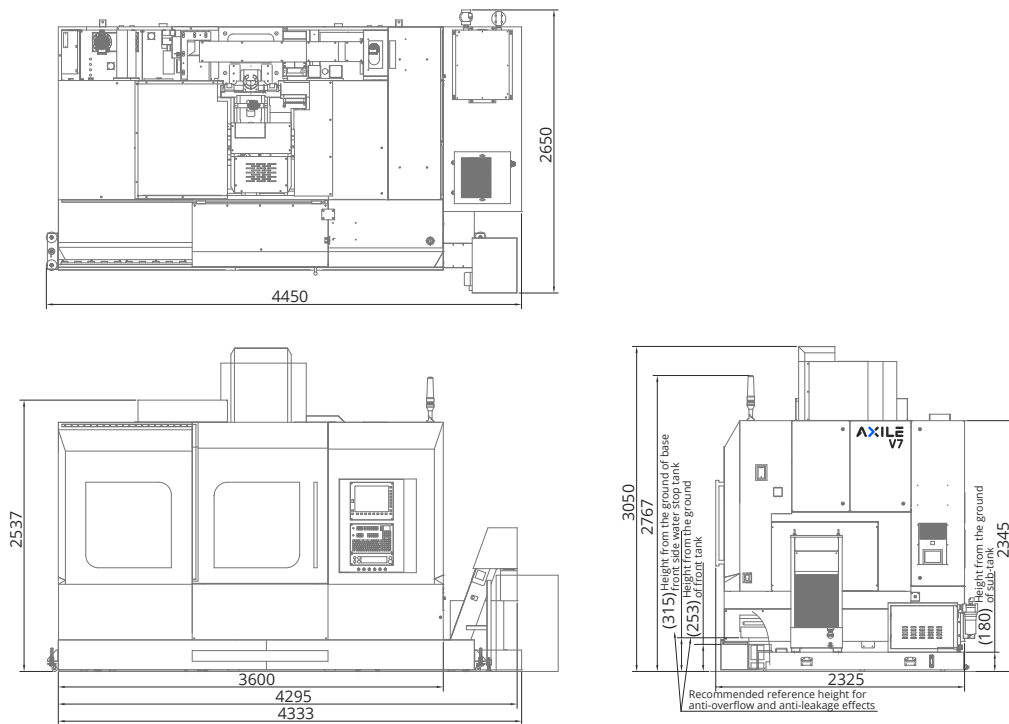
## V5



# V6



# V7



# TECHNICAL DATA

## COMMON DATA (METRIC)

LINEAR AXES	V4	V5	V6	V7
X travel (carriage left and right)	600 mm	800 mm	1050 mm	1200 mm
Y travel (saddle back and forth)	400 mm	500 mm	600 mm	730 mm
Z travel (headstock up and down)	450 mm	500 mm	600 mm	650 mm
Max feedrate X/Y/Z	36 m/min	40 m/min	40 m/min	40 m/min
WORKPIECE AND TABLE				
Table size	770x410 mm	900x520 mm	1200x600 mm	1400x710 mm
Maximum table load	400 kg	600 kg	800 kg	1000 kg
IN-LINE SPINDLE				
Spindle taper	ISO40			
Maximum speed	12000 rpm(std)/15000 rpm(opt)			
Power S1/S6-40% (Heidenhain)	10/14 kW		20/30 kW	
Torque S1/S6-40% (Heidenhain)	63.7/89.1 Nm		133.7/200.6 Nm	
Power S1/S6-40% (Siemens)	10.5/15.8 kW(12K) 8.5/12.8 Nm(15K)		20/30 kW	
Torque S1/S6-40% (Siemens)	63/94.5 kW(12K) 63/91.7 Nm(15K)		133.7/200.6 Nm	
Power S1/S6-40% (Fanuc)	11/15 kW	11/15 kW 15/18.5 kW	15/18.5 kW	
Torque S1/S6-40% (Fanuc)	70/95.5 Nm	70/95.5 Nm(12K) 102.7/126Nm(15K)	102.7/126 Nm	
BUILT-IN SPINDLE(OPTION)				
Spindle taper	HSK-A63			
Spindle specification	202 mm			
Maximum speed	15000 rpm			
Power S1/S6 (40%)	15/22.5 kW			
Torque S1/S6 (40%)	79.5/119.3 Nm			
BUILT-IN SPINDLE(OPTION)				
Spindle taper	HSK-A63		HSK-A63	
Spindle specification	170 mm		210 mm	
Maximum speed	24000 rpm		15000 ; 20000 rpm	
Power S1/S6 (40%)	20/25 kW		30/46 ; 25/40 kW	
Torque S1/S6 (40%)	31.8/39.8 Nm		130/200 ; 85/135 Nm	
TOOL CHANGER				
Magazine positions	Carousel 32 (std)/Chain 40 (opt)			
Change time T-T (50/60 Hz)	1.55/1.31 sec			
Maximum tool length	200 mm	300 mm	300 mm	300 mm
Maximum tool diameter (with adjacent pot empty)	75/125 mm			
Maximum tool weight	7 kg			
Maximum loading weight	160 kg(32T)/200 kg(40T)			
ACCURACY(VDI/DGQ 3441)				
Positioning	0.005 mm			
Repeatability	0.005 mm			
CONTROL UNIT				
Heidenhain	640			
Siemens	840D			
Fanuc	31iB			

\*Specifications are subject to change without notice.

## SPECIFIC DATA (METRIC)

LINEAR AXES	V4	V5	V6	V7
Linear guideways type	Ball type	Roller type	Roller type	Roller type
Linear guideways size X/Y/Z	35 mm	35mm	45 mm	45 mm
Distance between X/Y/Z axis guides	300/620/400 mm	360/700/400 mm	400/700/400 mm	405/720/365 mm
BALLSCREW				
Ballscrew diameter/pitch	32xP12 mm	40xP16 mm	40xP16 mm	40xP16 mm
X axis motor power/torque (Heidenhain)	2.64 kW/8.4 Nm	2.64 kW/8.4 Nm	5 kW/16 Nm	5.7 kW/18.1 Nm
Y axis motor power/torque (Heidenhain)	2.64 kW/8.4 Nm	2.64 kW/8.4 Nm	5.7 kW/18.1 Nm	5.7 kW/18.1 Nm
Z axis motor power/torque (Heidenhain)	3.1 kW/9.9 Nm	5.4 kW/17.3 Nm	5.4 kW/17.3 Nm	8.6 kW/27.5 Nm
X axis motor power/torque (Siemens)	1.5 kW/6 Nm	2.7 kW/12 Nm	2.7 kW/12 Nm	3.7 kW/18 Nm
Y axis motor power/torque (Siemens)	2.3 kW/11 Nm	2.7 kW/12 Nm	2.7 kW/12 Nm	4.9 kW/27 Nm
Z axis motor power/torque (Siemens)	2.3 kW/11 Nm	4.9 kW/27 Nm	4.9 kW/27 Nm	5.4 kW/36 Nm
X axis motor power/torque (Fanuc)	2.2 kW/8 Nm	2.2 kW/8 Nm	4 kW/22 Nm	4 kW/22 Nm
Y axis motor power/torque (Fanuc)	2.2 kW/8 Nm	2.2 kW/8 Nm	4 kW/22 Nm	4 kW/22 Nm
Z axis motor power/torque (Fanuc)	3 kW/12 Nm	4 kW/22 Nm	5.5 kW/40 Nm	5.5 kW/40 Nm
TOOL CHANGER				
Change type	Arm type			
MEASURING FEEDBACK				
Linear axes type	Linear scales			
Linear axes resolution	0.1 µm			
SPINDLE THROUGH COOLANT SUPPLY(STANDARD)				
High pressure pump	40 bar			
Filter accuracy	25 µm			
DIMENSION				
Length (with chip conveyor)	2735 mm	3500 mm	4400 mm	4600 mm
Width	1910 mm	2300 mm	2300 mm	2620 mm
Height	2720 mm	2950 mm	3250 mm	3050 mm
Weight	4250 kg	6200 kg	7000 kg	8650 kg
Floor space	2735x1910 mm	3500x2300 mm	4400x2300 mm	4600x2620 mm

\*Specifications are subject to change without notice.

## COMMON DATA (IMPERIAL)

LINEAR AXES	V4	V5	V6	V7
X travel (carriage left and right)	23.6 in	31.5 in	41.3 in	47.2 in
Y travel (saddle back and forth)	15.8 in	19.7 in	23.6 in	28.7 in
Z travel (headstock up and down)	17.7 in	19.7 in	23.6 in	25.6 in
Max feedrate X/Y/Z	1417 in/min	1575 in/min	1575 in/min	1575 in/min
WORKPIECE AND TABLE				
Table size	30.3x16.1 in	35.4x20.5 in	47.2x23.6 in	55.1x28 in
Maximum table load	881 lbs	1322 lbs	1764 lbs	2205 lbs
IN-LINE SPINDLE				
Spindle taper	ISO40			
Maximum speed	12000 rpm(std)/15000 rpm(opt)			
Power S1/S6-40% (Heidenhain)	13.4/18.8 hp		26.8/40.2 hp	
Torque S1/S6-40% (Heidenhain)	47/65.7 ft/lbs		98.6/148 ft/lbs	
Power S1/S6-40% (Siemens)	14/21 hp(12K) 6.3/9.4 ft/lbs(15K)		26.8/40.2 hp	
Torque S1/S6-40% (Siemens)	84.5/126.7 hp(12K) 46.5/67.6 ft/lbs(15K)		98.6/148 ft/lbs	
Power S1/S6-40% (Fanuc)	15/20 hp	15/20 hp 20/24.8 hp	20/24.8 hp	
Torque S1/S6-40% (Fanuc)	51.6/70.4 ft/lbs	51.6/70.4 ft/lbs(12K) 75.8/92.9 ft/lbs(15K)	75.8/92.9 ft/lbs	
BUILT-IN SPINDLE(OPTION)				
Spindle taper	HSK-A63			
Spindle specification	7.6 in			
Maximum speed	15000 rpm			
Power S1/S6 (40%)	20/30.2 hp			
Torque S1/S6 (40%)	58.6/88 ft/lbs			
BUILT-IN SPINDLE(OPTION)				
Spindle taper	HSK-A63		HSK-A63	
Spindle specification	6.7 in		8.3 in	
Maximum speed	24000 rpm		15000 ; 20000 rpm	
Power S1/S6 (40%)	26.8/33.5 hp		40.2/61.7 ; 33.5/53.6 hp	
Torque S1/S6 (40%)	23.5/29.4 ft/lbs		95.9/147.5 ; 62.7/99.6 ft/lbs	
TOOL CHANGER				
Magazine positions	Carousel 32 (std)/Chain 40 (opt)			
Change time T-T (50/60 Hz)	1.55/1.31 sec			
Maximum tool length	7.9 in	11.8 in	11.8 in	11.8 in
Maximum tool diameter (with adjacent pot empty)	3/5 in			
Maximum tool weight	15.4 lbs			
Maximum loading weight	353 lbs(32T)/441 lbs(40T)			
ACCURACY(VDI/DGQ 3441)				
Positioning	0.0002 in			
Repeatability	0.0002 in			
CONTROL UNIT				
Heidenhain	640			
Siemens	840D			
Fanuc	31iB			

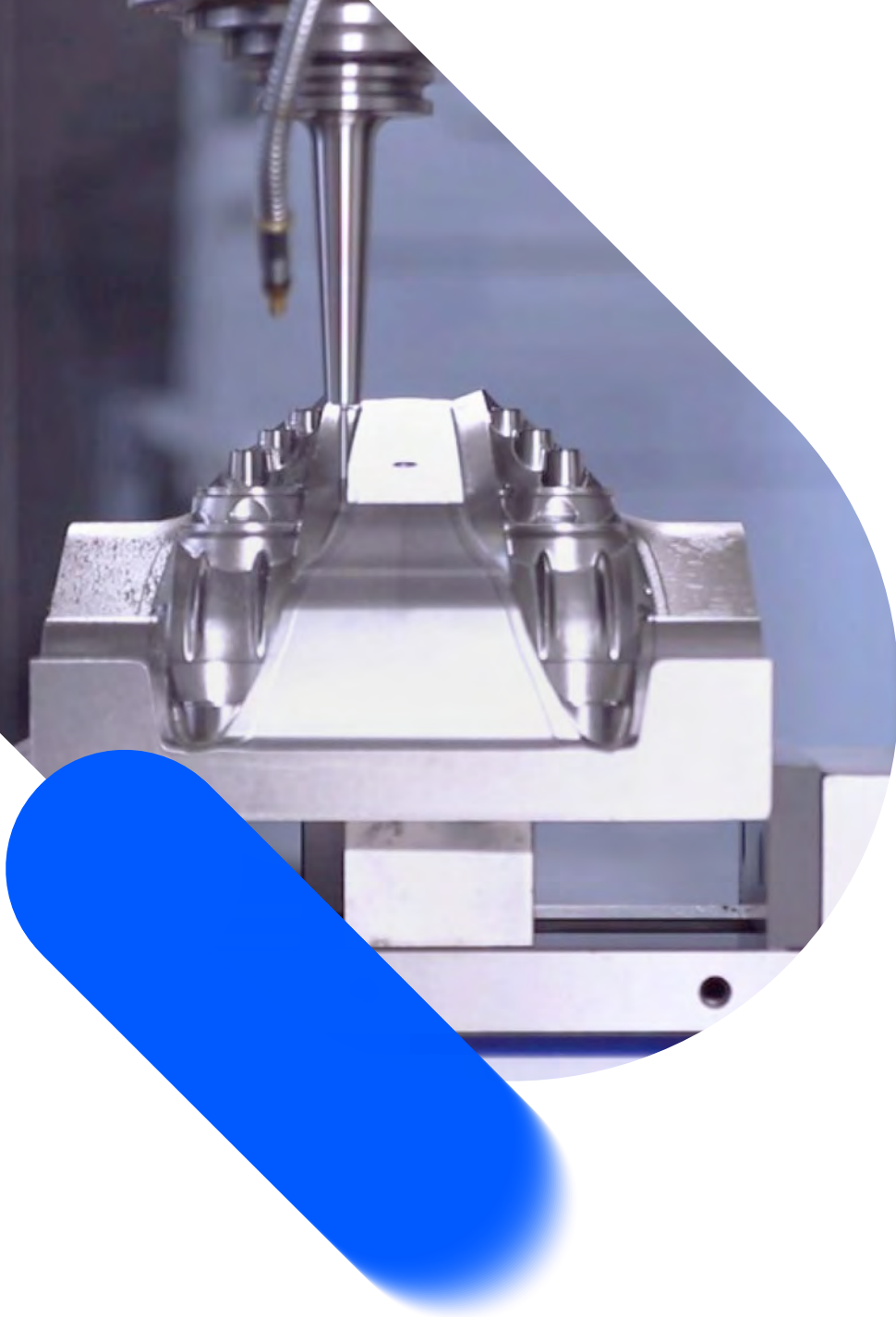
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## SPECIFIC DATA (IMPERIAL)

LINEAR AXES	V4	V5	V6	V7
Linear guideways type	Ball type	Roller type	Roller type	Roller type
Linear guideways size X/Y/Z	1.4 in	1.4 in	1.8 in	1.8 in
Distance between X/Y/Z axis guides	11.8/24.4/15.8 in	14.2/27.6/15.8 in	15.8/27.6/15.8 in	16/28.3/14.4 in
BALLSCREW				
Ballscrew diameter/pitch	1.3xP0.5 in	1.6xP0.6 in	1.6xP0.6 in	1.6xP0.6 in
X axis motor power/torque (Heidenhain)	3.5 hp/6.2 ft/lbs	3.5 hp/6.2 ft/lbs	6.7 hp/11.8 ft/lbs	7.6 hp/13.4 ft/lbs
Y axis motor power/torque (Heidenhain)	3.5 hp/6.2 ft/lbs	3.5 hp/6.2 ft/lbs	7.6 hp/13.4 ft/lbs	7.6 hp/13.4 ft/lbs
Z axis motor power/torque (Heidenhain)	4.2 hp/7.3 ft/lbs	7.2 hp/12.8 ft/lbs	7.2 hp/12.8 ft/lbs	11.5 hp/20.3 ft/lbs
X axis motor power/torque (Siemens)	2 hp/4.4 ft/lbs	3.6 hp/8.8 ft/lbs	3.6 hp/8.8 ft/lbs	5 hp/13.3 ft/lbs
Y axis motor power/torque (Siemens)	3.1 hp/8.1 ft/lbs	3.6 hp/8.8 ft/lbs	3.6 hp/8.8 ft/lbs	6.6 hp/20 ft/lbs
Z axis motor power/torque (Siemens)	3.1 hp/8.1 ft/lbs	6.6 hp/20 ft/lbs	6.6 hp/20 ft/lbs	7.2 hp/26.6 ft/lbs
X axis motor power/torque (Fanuc)	3 hp/5.9 ft/lbs	3 hp/5.9 ft/lbs	5.4 hp/16.2 ft/lbs	5.4 hp/16.2 ft/lbs
Y axis motor power/torque (Fanuc)	3 hp/5.9 ft/lbs	3 hp/5.9 ft/lbs	5.4 hp/16.2 ft/lbs	5.4 hp/16.2 ft/lbs
Z axis motor power/torque (Fanuc)	4 hp/8.8 ft/lbs	5.4 hp/16.2 ft/lbs	7.4 hp/29.5 ft/lbs	7.4 hp/29.5 ft/lbs
TOOL CHANGER				
Change type	Arm type			
MEASURING FEEDBACK				
Linear axes type	Linear scales			
Linear axes resolution	0.1 µm			
SPINDLE THROUGH COOLANT SUPPLY(STANDARD)				
High pressure pump	40 bar			
Filter accuracy	25 µm			
DIMENSION				
Length (with chip conveyor)	107.7 in	137.8 in	173.2 in	181.1 in
Width	75.2 in	90.6 in	90.6 in	103.2 in
Height	106.7 in	116.1 in	128 in	120 in
Weight	9370 lbs	13669 lbs	15432 lbs	19070 lbs
Floor space	107.7x75.2 in	137.8x90.6 in	173.1x90.6 in	181.1x103.2 in

\*Specifications are subject to change without notice.



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