RS-Series
High-Performance
Multi-Tasking Turning Centers

TURNING

www.hardinge.com
RS-Series turning centers are unmatched in the industry for high precision. Vibration control, thermal stability and accuracy result in superior part roundness, surface finish and unparalleled SPC (statistical process control) capability. The RS and Super-Precision RS turning centers are powerful, collet-ready spindle machines that utilize a wide range of Hardinge precision workholding devices for the most stringent machining requirements. They are also ideal for “hard milling” or “hard turning” the toughest of materials to grinding quality finishes.

So whether it’s high-precision part production or machining precision parts complete in a single set-up utilizing an array of multi-tasking features, the new RS-Series machines will allow you to get results that no other machine in the industry can!

RS machines offer superior features and performance for both job shops and production environments. The machines can be configured for 2-axis turning or for complex multi-tasking operations in a single set-up.

Standard features include:

- Powerful and rigid collet-ready spindle
- Rigid HARCRETE®-reinforced cast iron base
- Exclusive ESA turret top plate and PRECI-FLEX® tooling system
- 2.9-bar (187-psi) thru-tool coolant
- Heavy-duty linear guideways, ball screws and axis drives
- Linear glass scale (X-axis)
- User-friendly pendant-mounted control
- Manual Guide i programming
- Ethernet connectivity
- Super-Precision models also offer a host of unprecedented features

RS-Series High-Performance Multi-Tasking Turning Centers

Featuring our world-famous collet-ready high-precision spindle, delivering unparalleled performance
Unique features that make the RS-Series the best in the industry!

Rigid machine base
See page 4

Heavy-duty linear guideways, ballscrews and axis drives
See page 5

Powerful and rigid collet-ready spindle
See page 6

Unique ESA turret top plate and tooling system
See page 8
RS-Series High-Performance Multi-Tasking Turning Centers

Rigidity that is built like a rock from the ground up

Rigid machine base
Finer surface finishes and 30% longer tool life
Our rugged cast iron bases with HARCRETE® polymer composite (synthetic granite) reinforcement offer added stiffness with superior damping characteristics of vibration to the workpiece.

FEA (Finite Element Analysis)
Heavy cutting capability, extended tool life and fine surface finishes
FEA techniques were used to design a rigid, structurally balanced machine, resulting in superior damping characteristics for minimized vibration to the workpiece.

This analytical procedure assures that the machine structure has the ideal thermal characteristics for high-precision machining.
Heavy-duty linear guideways, ballscrews and axis drives

Faster traverse rates, longer machine life and greater positioning accuracy

Wide-spaced, oversized linear guideways provide optimum stiffness with less friction, less heat and less thermal growth. The linear way modules consist of slide members (guide trucks) and linear rails to provide a large load rating, stable accuracy, high rigidity and low friction. The spacing between the Z-axis rails provides optimum stiffness for the overall machine design. Oversized 40mm (1.57") ballscrews are featured. Torque limiters are provided as standard equipment.

Linear glass scale

High machining accuracy and repeatability

The Heidenhain closed-loop linear scale system on the X-axis provides direct measurement to compensate for any ballscrew thermal growth and wear over the life of the machine.
RS-Series High-Performance Multi-Tasking Turning Centers

Spindle rigidity and versatility that put all others to shame

Exclusive collet-ready spindle

*Increased concentricity, surface finish capability and superior roundness*

The preferred method of holding a workpiece for precision machining is with a collet. The Hardinge-designed and -built ANSI collet-ready spindle permits the industry's best part rigidity, since parts are gripped close to the spindle bearings. Ask for “The Hardinge Advantage” Technical Information Bulletin TIB-229.

Hardinge spindle tooling

*Workholding solutions for optimized productivity*

Hardinge manufactures the world’s most complete line of collets, jaw chucks and quick-change spindle tooling for the most demanding workholding applications. Request brochure 2353 for a concise overview of the tooling available on RS turning centers.
Unprecedented performance characteristics

Powerful and rigid main spindle

Powerful main spindle drive has all the power and torque you’ll need to do precise turning, drilling and rigid tapping operations. Harding-built spindles are hardened & ground and of one-piece construction. They are mounted in a high-strength cast iron headstock housing and mounted to the HARCRETE-reinforced cast iron base for optimum stiffness, rigidity and damping. In addition, a labyrinth seal shields coolant from the spindle bearings. This design accommodates the use of higher pressure coolant systems.

![Power and Torque Graph](image)

Continuous air flow

Headstock Cooling

Exceptional thermal stability for increased part accuracy

The spindle incorporates a unique “thermocentric” design, utilizing the principles of symmetry and thermal isolation to minimize the transfer of heat generated by the spindle bearings into the cast iron machine structure. The spindle head incorporates a “winged” construction that connects it to a cast iron riser for maximum rigidity and minimum thermal contact area. The unique symmetry of the design allows the spindle head to warm up without affecting the location of the spindle centerline. Air blows through the riser to cool the spindle, minimizing its expansion. The air then flows through a space between the spindle head and riser, cooling the spindle structure and removing heat before the air can migrate to the riser. The thermal expansion error associated with machine warm-up is greatly diminished, effectively by isolating the warm spindle head and limiting heat from migrating to the cast iron structure.
The exclusive ESA (Eppinger Self Alignment) turret top plate and tooling system is featured on RS turning centers. You can also choose from a VDI turret top plate (with or without live tooling and Y-axis options), or a Hardinge T-style top plate for static tooling compatibility with QUEST® and CONQUEST® T42/T51/T65 lathes equipped with a T-style top plate.

**Live tooling**
This option is available on ESA and VDI 30 top plates to work on the main or sub spindle (standard on RS M, RS MS and RS MSY models). Each station can be equipped with a driven tool for cross- or end-milling/drilling operations in the toughest materials. C-axis is included on machines configured with live tooling. One-degree spindle orient is available as an option. Internal and external coolant-style live tool holders are offered to direct coolant to the work area. Angular drilling or milling is easily accomplished using adjustable live tooling attachments. Air/oil mist lubrication is included.

**Y-Axis option**
Perform thread milling and complex off-center milling and drilling operations on either the main or sub spindle option—85.6mm (3.38”) overall travel!

**Rigid tapping**
Rigid tapping is standard capability on the main spindle and sub spindle option, as well as cross- and face-working operations on machines equipped with the live tooling option.
Hard Turning and Hard Milling capability with Hardinge’s exclusive ESA turret top plate, tooling system

Experience 3 to 5 times longer tool life with the PRECI-FLEX spindle and adapter system

- Run out adapter: < 0.002mm (< .000078")
- Run out tool tip (shrink fit type): < 0.003mm (< .00012")
- Tool change: < 60 sec
- Repeatability: < 0.003mm (< .00012")
- Tool clamping force: > 4 x collet
- Chip removal volume: > 2 x collet
- Increased insert/tool life: + 3-5 X
RS-Series High-Performance Multi-Tasking Turning Centers

Choose the machine variation that suits your current and future needs

S—Sub Spindle
M—Live Tooling & C-Axis
MY—Live Tooling, C-Axis & Y-Axis
MS—Live Tooling, Sub Spindle & C-Axis (both spindles)
MSY—Live Tooling, Sub Spindle, Y-Axis & C-Axis (both spindles)

Machine name example: RS 42 MSY

RS 42 and Super-Precision RS 42
- A2-5, 16C collet spindle nose
- 42mm (1-5/8”) bar capacity
- 11-kW (15-hp) spindle drive system
- 95Nm (70ft-lb) torque
- 6,000-rpm spindle speed
- Hardinge/GE Fanuc i Series RS or Siemens 840D control

RS 51 and Super-Precision RS 51
- A2-6, 20C collet spindle nose
- 51mm (2”) bar capacity
- 15-kW (20-hp) spindle drive system
- 286Nm (211ft-lb) torque
- 6,000-rpm spindle speed
- Hardinge/GE Fanuc i Series RS or Siemens 840D control

RS 65 and Super-Precision RS 65
- A2-6, 25C collet spindle nose
- 65mm (2-1/2”) bar capacity
- 22-kW (30-hp) spindle drive system
- 365Nm (270ft-lb) torque
- 4,500-rpm spindle speed
- Hardinge/GE Fanuc i Series RS or Siemens 840D control
Wide range of optional equipment to increase your productivity

Polygon turning
When used with live tooling, this feature allows cutting square, hexagon or other polygon shapes on workpiece ODs.

C-Axis contouring (main and sub spindle)
Polar, cylindrical and 3-axis interpolation allows unlimited machining capabilities when used with the live tooling option—positioning increments of .001 degree (C-Axis is standard on RS M, RS MS and RS MSY models).

A2-5 Sub spindle
The sub spindle offers a thru-capacity up to 42mm (1\&frac{3}{4}”) with 16C collets and a gripping capacity of 139mm (5\&frac{1}{2}”) with 150mm (6”) jaw chucks. Exact synchronization between the main and sub at any rpm can be programmed for part transfer for secondary machining.

Additional optional features include:
- VDI 30 12- and 16-station top plates
- Hardinge T-style 10- and 12-station top plates
- Part probe
- Air blast system (main spindle)
- 98.95-Bar (1,000-psi) High-pressure coolant
- Thru-spindle coolant (main or sub spindle)
- Sub spindle parts catcher
- Chip conveyor
- Bar feed systems
- Power transformers
- 3-Position stack light
- Manual VDI tool presetter system

Exclusive Hardinge technological features available—see page 15:
- HydroGlide Hydrostatic Guideways
- ICEFLY® Cryogenic Machining
- Shape-compliant Chuck System

Out-of-the-box automation solutions

Sub spindle (part present sensor shown)
Hardinge GE/Fanuc i-Series RS CNC Control
with Manual Guide i Programming

Programming Functions (cont’d)
- Extended Part Program Edit
- External Workpiece Number Search
- Graphic Toolpath Display
- Hardinge Safe Start Format
- Helical Interpolation
- Input of Offset Value by Programming (G10)
- Interpolation (Linear and Circular)
- Multiple Repetitive Canned Cycles I (Turning)
- Multiple Repetitive Canned Cycles II (Pockets)
- Polygon Turning Software
- Program Number Search
- Reference Point Return
- Registered Part Programs (63 total)
- Registered Part Programs —
  (125, 200 or 400 total)
- Rigid Tapping
- Sequence Number Search
- Single Block Operation
- Stored Stroke Check 2 & 3
- Thread Cutting Cycle Retract
- Thread, Synchronous Cutting
- Tool Life Management
- Tool Nose Radius Compensation
- Variable Lead Thread Cutting

Operation (cont’d)
- Machine Lock
- Manual Pulse Generator (MPG)
- On-Screen Spindle & Axis Load Meters
- Option Stop
- Rapid Traverse Override (Low-25-50-100%)
- Spindle Speed and T-Code Displays
  on All Screens
- Tool Geometry and Tool Wear Offsets —
  (32 pairs each)

Miscellaneous
- Actual Cutting Speed Display
- C-Axis with Polar and Linear Interpolation
- Color LCD Display with Full Keyboard —
  English
- French/German, Italian or Spanish
- Ethernet Card
- Flash Card Capability
- Ladder Diagram Display
- Mechanical Run Meter
- On-Screen “HELP” Functions for Alarms
- One-Degree Spindle Orient
- Program Protect
- Run Time and Parts Counter
- Self-Diagnosis Function
- Stored Pitch Error Compensation
- Y-Axis with offsets (32 pair)
- 3D Coordinate System Conversion—
  Y-Axis with Angular Tool
- Standard ○ Optional
  1 - Hardware package suggested
  2 - Included with Live Tooling Option

Manual Guide i
Manual Guide i is an advanced conversational programming system. A fully animated version of the operator-generated part program can be easily viewed on the large full-color display. Using Manual Guide i ensures that the process is proven prior to actual machining. If desired, the simple push of a button converts the conversational program into a standard G- and M-code program.
Siemens 840D CNC Control with ShopTurn Programming

General
- Two Interpolating Axes
- Programmable Resolution—.0010mm (.00010")
- Super-Precision® Models—.00010mm (.000010")
- Tool Offset Capability—.0010mm (.00010")
- Super-Precision® Models—.00010mm (.000010")
- Part Program Storage (7,860 Meters; 3MB)
- 38,400 meters; 15MB
- 256MB on System CF Card

Data Input/Output
- MDA Manual Data Input Operation
- USB and Ethernet Capability

Programming Functions
- Absolute/Incremental Programming
- Additional Custom Macro Variables
- Auto Coordinate System Setting
- Auto Acceleration/Deceleration
- Background Editing
- Block Search with Calculation
- Block Search with Calculation to Operation
- Canned Cycles (Drilling and Milling)
- Chamfer/Camber Rounding
- Constant Surface Speed Programming
- Continual Thread Cutting
- Coordinate System Setting
- High-Level Programming (Custom Macro)
- Decimal Point Programming
- Diameter/Radius Programming
- Direct Drawing Dimension Programming
- Engraving Cycle (Peripheral and End Faces)
- Exact Stop
- Extended Part Program Edit
- External Workpiece Number Search
- Feedrate in Inch/Tooth or mm/Tooth
- (Used with Live Tool option milling)
- Graphic Toolpath Display
- Harding’s Safe Start Format
- Helical Interpolation
- Input of Offset Value by Direct Input Programming
- Interpolation (Linear and Circular)
- Multiple Repetitive Canned Cycles I (Turning)
- Multiple Repetitive Canned Cycles II (Pockets)
- Peripheral Surface Transformation
- Polygon Turning Software
- Program Number Search
- Program Processing on Selection before Execution
- Reference Point Return
- Registered Part Programs (400 total)
- Rigid Tapping
- Sequence Number Search
- Single Block Operation (FNE)
- ShopTurn and ShopTurn Programming
- ShopTurn Residual Material Detection & Machining
- Stored Stroke Check 2 & 3 (Protection Zones)
- Thread Cutting Cycle retract
- Thread, Synchronous Cutting
- Tool Life Management
- Tool Nose Radius Compensation
- Tool Offsets (Configured for 100 and 300 Offsets)
- Travel-to-Fixed Stop (Force Control of E-Axis)
- TRANSMIT Transformation (Main and Sub Spindle)
- Variable Lead Thread Cutting
- C-Axis with Polar and Linear Interpolation
- CE Specification
- Color LCD Display with Full Keyboard
- English, French, German, Italian, Spanish & Chinese
- Czech, Danish, Dutch, Finnish, Hungarian, Japanese, Korean, Polish, Portuguese, Russian, Swedish, Taiwanese & Turkish

Operation
- Block Skip
- DFR (Handwheel Offsets)
- Dry Run
- Dwell Time
- Emergency Stop
- Execution from External Device
- Feed-Hold
- Feedrate Override (0 to 120%)
- Incremental Jog
- Incremental Jog with 3D Coordinate System Conversion
- Jog Feed
- Jog Feed with 3D Coordinate System Conversion
- Machine Lock
- Manual Pulse Generator (MPG)
- Handwheel
- On-Screen Spindle & Axis Load Meters
- Option Stop
- Program Management of External Device
- Create, Edit, Copy & Paste (To and From)
- Rapid Traverse Override (Low-25-50-100%)
- Reposition to Contour (REPOS)
- Spindle Speed and T-Code Display
- Tool Geometry and Tool Wear Offsets
- Configured for 100 Tools & 300 Tool Offsets
- Actual Cutting Speed Display
- C-Axis with Polar and Linear Interpolation
- One-Degree Spindle Orient
- Run Time and Parts Counter
- Self-Diagnosis Function
- Stored Cross Axis (Geometric) Compensation
- Stored Pitch Error Compensation
- Y-Axis Offsets
- 3D Coordinate System Conversion—Y-Axis with Angular Tool
- Standard
- Optional

ShopTurn
ShopTurn is an advanced graphically-assisted programming system that goes beyond G-Code assisted programming. The operator is guided through the steps required to build a program from a blue print or drawing with logical checks at each step. Links to the tool data and contours created allow the program to be developed from a single area of the control. ShopTurn builds operator confidence by clearly displaying the required input information while creating a program, providing visual checks with detailed graphic simulation and checking the logical validity of programs prior to execution. Operators from beginners to advanced can create programs even with complex operations involving live tool milling on the peripheral surface and end face and with complete operations involving a sub spindle.
RS-Series High-Performance Multi-Tasking Turning Centers

Super-Precision® technology exclusively from Hardinge

Super-Precision models...designed for accuracy

The world’s only Super-Precision turning centers by Hardinge are designed and manufactured to provide solutions for extremely close tolerances and very fine surface finishes. Heat shields and isolation blocks are built into the spindle motor for controlled thermal growth. Spindle motor and collet closer assemblies are dynamically balanced in two planes to a G-1 specification. X- and Z-axis error compensation is performed to fine tune positioning and compensate offset at the tool tip. Programmable resolution and tool offset capability is .00010mm (.000010”).

Headstock cooling

The spindle cartridge and headstock casting are designed to allow radial dissipation of heat. A fan is also added to the headstock for additional cooling to ensure that ambient air draws over the thermally-symmetrical headstock frame, allowing heat to dissipate radially as compared to linearly. This design allows the spindle centerline to remain in a “fixed” location, unlike conventional machine spindles that may migrate vertically as a result of thermal growth.

Linear glass scales

Digital glass scales are provided on the X axis for continuous high machining accuracy (also included on Z axis of Super-Precision models). The closed-loop linear scale system for positioning feedback provides direct measurement of the slides, eliminating the need to compensate for ball screw thermal growth and wear over the life of the machine.

Rigorous testing and accuracy certification

All Super-Precision RS machines receive error compensation to the X and Z axes to correct positioning and offset errors at the tool tip, straightness checks (using laser measurement technology) to the X and Z axes, CMA (continuous machining accuracy) tests to verify machining accuracy, and sample checks on part diameters that must yield a total variation of less than 5 micron (.0002”). Accuracy certification—personally signed by the President of Hardinge Inc.—is included as assurance that the machine is as accurate as we say.

Inherent design features for SPC control:

- HARCNET®-reinforced cast iron base and its vibration damping capability
- Spindle tooling mounted directly in the spindle, providing minimum overhang and bearing loading
- Heavy-duty linear guideway systems
- Class zero ball screws, matched P4Y spindle bearings and ground spindle belts
- Ball screw pitch, diameters and motors matched for speed and longevity
- Integrated heat management system to minimize thermal effects on cutting performance

Super-Precision RS 42
- .38 Micron (.00015”) Part Roundness
- .20 Micron (8 micro-inch) Part Surface Finish

Super-Precision RS 51
- .50 Micron (.00020”) Part Roundness
- .20 Micron (8 micro-inch) Part Surface Finish

Super-Precision RS 65
- .63 Micron (.00025”) Part Roundness
- .20 Micron (8 micro-inch) Part Surface Finish

Actual Hardinge customer SPC chart

SPECIFICATION: 0.0002” on diameter for a minimum of 40 pieces with temperature-controlled 68° ± 3°F.

* Actual results may be greater or less than those listed due to a number of factors, including but not limited to speeds, feeds, tooling, machine maintenance, coolant, material, ambient temperature (68° ±3°F) and type of machine foundation.
Exclusive Hardinge technology... 

taking your capabilities to the next level

Hard Turn machining
Hardinge is the recognized market leader in providing “hard turning” machines, workholding and process support. SPC (statistical process control) for size repeatability, surface finish quality and thermal stability is a hallmark for RS turning centers that are built and tested to ensure “in-tolerance” parts and surface finishes with predictable tool wear. RS machines are also ideally suited for Hard Milling applications.

Visit our web site at www.hardinge.com/hardturn for extensive technical resources.

Why “hard turn” instead of grind?
Because you’ll reduce your costs in many ways:

• “Soft turn” and “hard turn” on the same machine
• Smaller floor space requirement
• Lower overall investment
• Metal removal rates of 4-to-6 times greater
• Turn complex contours
• Multiple operations in a single setup
• Low micro finishes
• Easier configuration changes
• Lower cost tooling inventory
• Higher metal removal rates
• Easier waste management (chips vs. “swarf”)

HydroGlide hydrostatic guideways
The patented HydroGlide® linear guideway system developed by Hardinge Inc. is unlike conventional box ways, ball linear guides or roller linear guides. The HydroGlide system (available on RS 42, RS 51 and RS 65 models only) features no metal-to-metal contact—the guide trucks move on a thin cushion of hydraulic fluid under high pressure. The end result... ZERO guideway wear and significant performance benefits over other “way” systems, including improved “hard turning” with interrupted cuts, crash protection, significantly longer tool life, longer machine life, increased axis speeds, improved part roundness, and improved part surface finish.

Request Technical Information Bulletin (TIB-228) for complete information.

ICEFLY® cryogenic machining
The ICEFLY cryogenic coolant system was originally developed by Air Products (Lehigh Valley, PA) and is now refined for real-world machining by Hardinge, Inc. The system delivers a jet of -320°F liquid nitrogen directly to the insert during turning operations. Liquid nitrogen insert cooling extends insert life, increases cutting speeds up to 200 percent, and allows greater use of low-cost ceramic inserts for hard turning operations on hardened materials up to 90 Rc.

Visit our web site at www.hardinge.com/hardturn for complete information.

Hardinge Shape Compliant Chuck system
This is the answer to maintaining high accuracy roundness on thin-wall hardened and out-of-round parts. This patent-pending Hardinge design grips the part at multiple locations with equal force to maintain the part’s original shape for optimum finished roundness. This feature is available only with a new machine purchase.

Request brochure 1351 for complete information.
The Hardinge Group™

Bridgeport® milling machines, Hardinge® turning centers, Hauser, Kellenberger®, Tripet and Tschudin grinding machines, and Workholding and industrial products

The Hardinge Group produces more than just the RS-Series machines shown in this brochure... we build a full range of value-packed and high-precision turning centers; vertical and horizontal machining centers; high-speed and 5-axis milling machines; creep-feed, jig, universal cylindrical and ID/OD grinding machines; and workholding systems and equipment. Hardinge machine tool technology is not only the most comprehensive on the market, it’s also creating new benchmarks as a solutions provider for quality, productivity and reliability.

Whether you are an OEM or sub-contract precision engineering company—regardless of the sectors you serve (aerospace, automotive, medical, autosport, mold, tool and die or general engineering)—the Hardinge product portfolio will interest you.

Our advanced manufacturing technologies in combination with our range of after-sales and support services (maintenance and service contracts; operator training; technical and applications support) have been designed to help you improve your performance and maintain your competitive advantage.

If you would like to know more about our manufacturing solutions, call us at 800.843.8801 or 607.734.2281 and request our Product Guide #1365. You can also e-mail us at info@hardinge.com or visit our web site at www.hardinge.com.

Hardinge standard, performance and high-performance turning centers

We can help you turn your business around! From our competitively-priced standard SV-Series machines to our performance GS-Series and ELITE®-Series range of quick-changeover bar and chucking machines right through to our high-performance QUEST® GT gang tool, RS- and SR-Series multi-tasking machines, we can provide you with the optimum turning solution.

Bridgeport standard, performance and high-performance milling machines and machining centers

Our comprehensive line of Bridgeport milling machines have been designed to meet any manufacturing challenge you might be facing today or in the future. Our market-leading XR-Series of vertical machining centers continue to grow in popularity—and we have similar expectations with our new competitively-priced XV and GX VMCs as well. For heavy-duty, high metal removal we offer our HMC range of Horizontal Machining Centers and for increased manufacturing flexibility and improved productivity there’s our 5-axis (5AX) model that is well worthy of consideration. If you are making your first step up to CNC machining, you will find that our entry-level GX 480 and GX 480 DT machines provide the ideal solution. For high-speed machining applications, our HSC machining centers are second to none.

Kellenberger, Hauser, Tripet and Tschudin grinding machines

The Hardinge grinding companies include Hauser, Kellenberger, Tripet, Tschudin and, most recently, Bridgeport. Collectively we have all the technology, experience and know-how you need to transform your manufacturing operations. From high-performance cylindrical and jig grinding machines through to multi-functional ID/OD and universal machines—not to mention Bridgeport’s state-of-the-art Flexible Grinding Centers (FGC 2). It doesn’t get more comprehensive than this.

Hardinge workholding and industrial products

Because we design and manufacture market-leading, technically-excellent machine tools it’s no surprise that we know more than a thing or two about workholding solutions. From our extensive portfolio of CNC toolholders, collets and chucks—right through to our SC Indexing systems—our workholding and fixturing technology will improve your performance when and where it matters most.

Hardinge rotary products

The Hardinge Group™... Bridgeport® milling machines, Hardinge® turning centers, Hauser, Kellenberger®, Tripet and Tschudin grinding machines, and Workholding and industrial products
Optimum tool clearance and dimensional information

Tool clearance

The machine headwall design allows for zero interference of extended tooling when machining close to the spindle face.

Minimal ESA tool interference

The illustration represents the maximum part diameters that can clear adjacent tool holders.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Dimension</th>
<th>Diameter</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>235.2mm (9.26&quot;)</td>
<td>H</td>
<td>284.2mm (11.19&quot;)</td>
</tr>
<tr>
<td>B</td>
<td>235.5mm (9.27&quot;)</td>
<td>I</td>
<td>241.1mm (9.49&quot;)</td>
</tr>
<tr>
<td>C</td>
<td>240.8mm (9.48&quot;)</td>
<td>J</td>
<td>261.4mm (10.29&quot;)</td>
</tr>
<tr>
<td>D</td>
<td>240.8mm (9.48&quot;)</td>
<td>K</td>
<td>225.0mm (8.86&quot;)</td>
</tr>
<tr>
<td>E</td>
<td>240.5mm (9.47&quot;)</td>
<td>L</td>
<td>231.1mm (9.10&quot;)</td>
</tr>
<tr>
<td>F</td>
<td>240.3mm (9.46&quot;)</td>
<td>M</td>
<td>231.4mm (9.11&quot;)</td>
</tr>
<tr>
<td>G</td>
<td>235.0mm (9.25&quot;)</td>
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RS-Series High-Performance
Multi-Tasking Turning Centers

Specifications that set a new benchmark for competitive machines

<table>
<thead>
<tr>
<th>Programmed Resolution/Tool Offset Capability</th>
<th>RS 42 &amp; Super-Precision RS 42</th>
<th>RS 51 &amp; Super-Precision RS 51</th>
<th>RS 65 &amp; Super-Precision RS 65</th>
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</thead>
<tbody>
<tr>
<td>Precision Models</td>
<td>.0010mm (.00010”)</td>
<td>.0010mm (.00010”)</td>
<td>.0010mm (.00010”)</td>
</tr>
<tr>
<td>Super-Precision® Models</td>
<td>.0010mm (.00010”)</td>
<td>.0010mm (.00010”)</td>
<td>.0010mm (.00010”)</td>
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| Spindle—Configuration (ANSI)                | A2-5, 16C                  | A2-6, 20C                  | A2-6, 25C                  |
| Spindle Through-Hole                        | 48.0mm (1.89”)             | 60.4mm (2.378”)            | 74.4mm (2.930”)            |
| Bar Capacity                                | 42mm (.1625”)              | 51mm (.2”)                 | 65mm (2.5”)                |
| Jaw Chuck Size                              | 150mm (6”)                 | 150mm (6”)                 | 200mm (8”)                 |
| Step Chuck (Gripping Capacity)              | 152.4mm (6”)               | 152.4mm (6”)               | 152.4mm (6”)               |
| Turning Length with Collet (Max.)           | 609.6mm (24.0”)            | 609.6mm (24.0”)            | 609.6mm (24.0”)            |
| Turning Length with Jaw Chuck (Max.)        | 500.4mm (19.7”)            | 500.4mm (19.7”)            | 500.4mm (19.7”)            |
| Spindle Centerline Height                   | 1041.4mm (41.0”)           | 1041.4mm (41.0”)           | 1041.4mm (41.0”)           |
| Spindle Reach                                | 475.0mm (18.7”)            | 475.0mm (18.7”)            | 475.0mm (18.7”)            |

| AC Digital Belted Drive System              |                            |                            |                            |
| Base Speed                                  | 1,100 rpm                  | 500-750 rpm                | 575 rpm                    |
| Power Rating at Base Speed                  | 11kW (15hp)                | 15kW (20hp)                | 22kW (30hp)                |
| Torque Rating at Base Speed                 | 95Nm (70ft-lb)             | 286-191Nm (211-141ft-lb)   | 365Nm (270ft-lb)           |
| Speed Range (1-rpm steps)                  | 60 to 6,000                | 60 to 6,000                | 45 to 4,500                |

| Carriage and Cross Slide                    |                            |                            |                            |
| Swing Diameter Over-Way Cover              | 519.2mm (20.44”)           | 519.2mm (20.44”)           | 519.2mm (20.44”)           |
| Turning Diameter (Max.)                    |                            |                            |                            |
| ESA Turret Option                          | 321.3mm (12.65”)           | 321.3mm (12.65”)           | 321.3mm (12.65”)           |
| VDI Turret Option                          | 311.9mm (12.28”)           | 311.9mm (12.28”)           | 311.9mm (12.28”)           |
| Conventional T-Style Turret Option         | 356.8mm (14.05”)           | 356.8mm (14.05”)           | 356.8mm (14.05”)           |
| Travels (Max.)                              |                            |                            |                            |
| X-Axis                                      | 189.2mm (7.45”)            | 189.2mm (7.45”)            | 189.2mm (7.45”)            |
| Z-Axis                                      | 638.3mm (25.13”)           | 638.3mm (25.13”)           | 638.3mm (25.13”)           |
| Y-Axis Option                               | +508 to -349mm (+200 to -1377”) | +508 to -349mm (+200 to -1377”) | +508 to -349mm (+200 to -1377”) |
| Traverse Rates (Max.)                       |                            |                            |                            |
| X-Axis                                      | 28m/min (1,100rpm)         | 28m/min (1,100rpm)         | 28m/min (1,100rpm)         |
| Z-Axis                                      | 38m/min (1,500rpm)         | 38m/min (1,500rpm)         | 38m/min (1,500rpm)         |
| Z-Axis with HydroGlide Option              | 58m/min (2,300rpm)         | 58m/min (2,300rpm)         | 58m/min (2,300rpm)         |
| Y-Axis Option                               | 9.5m/min (375rpm)          | 9.5m/min (375rpm)          | 9.5m/min (375rpm)          |
| Thrusts (Max.)                              |                            |                            |                            |
| Z-Axis                                      | 6,450N (1,450lb)           | 10,000N (2,250lb)          | 10,000N (2,250lb)          |
| Z-Axis with HydroGlide Option              | 8,007N (1,800lb)           | 8,007N (1,800lb)           | 8,007N (1,800lb)           |
| Y-Axis Option                               | 5,227N (1,175lb)           | 5,227N (1,175lb)           | 5,227N (1,175lb)           |

| Inspection Specifications                   |                            |                            |                            |
| Part Surface Finish                         | .30 micron (12 micro-inch) | .30 micron (12 micro-inch) | .30 micron (12 micro-inch) |
| Overall Axis Repeatability                 | 1.27 micron (.000050”)     | 1.27 micron (.000050”)     | 1.27 micron (.000050”)     |
| Part Surface Finish                         | .20 micron (8 micro-inch)  | .20 micron (8 micro-inch)  | .20 micron (8 micro-inch)  |
| Part Roundness                              | .38 micron (.000015”)      | .50 micron (.000020”)      | .63 micron (.000025”)      |
| Part Continuous Machining Accuracy          | 5 micron (.0002”)          | 5 micron (.0002”)          | 5 micron (.0002”)          |
| Overall Axis Repeatability                 | .76 micron (.00030”)       | .76 micron (.00030”)       | .76 micron (.00030”)       |

1—30-minute intermittent ratings used for power and torque specifications.
2—Available as original equipment only. 3—Actual dimension based on tool overhang.
4—Not available on Super-Precision models.
5—Low/high range listed.
6—Results were derived from actual tests conducted at Hardinge. Due to varying cutting conditions, actual results may be greater or less than those listed.
7—5-minute rating. 8—30% duty cycle (3-minute rating).
9—The sub spindle provides general precision machining capabilities on Super-Precision machines.
10—Maximum distance between spindle faces.
11—FLA shown for base machine. NOTE: A supplementary power transformer is required for all voltages other than 230V, 50/60Hz.
Bidirectional Turret Top Plate

<table>
<thead>
<tr>
<th></th>
<th>RS 42 &amp; Super-Precision RS 42</th>
<th>RS 51 &amp; Super-Precision RS 51</th>
<th>RS 65 &amp; Super-Precision RS 65</th>
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<tbody>
<tr>
<td>ESA Tool Configuration</td>
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<tr>
<td>Square Shank Tool Size (Max.)</td>
<td>25mm (1&quot;&quot;)</td>
<td>25mm (1&quot;&quot;)</td>
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<tr>
<td>Round Shank Tool Size (Max.)</td>
<td>32mm (1.25&quot;)</td>
<td>32mm (1.25&quot;)</td>
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<tr>
<td>Indexing Time (Station-to-Station)</td>
<td>.35 Second</td>
<td>.35 Second</td>
<td>.35 Second</td>
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<tr>
<td>ESA Live Tooling Option—All Stations</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
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<tr>
<td>Tool Shank Diameter w/ER25 Collets</td>
<td>25mm (1&quot;)</td>
<td>25mm (1&quot;)</td>
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<tr>
<td>Power Rating 1</td>
<td>3.7kW (5hp)</td>
<td>3.7kW (5hp)</td>
<td>3.7kW (5hp)</td>
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<td>Torque Rating 1</td>
<td>23.6Nm (17.4ft-lb)</td>
<td>23.6Nm (17.4ft-lb)</td>
<td>23.6Nm (17.4ft-lb)</td>
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<tr>
<td>Speed Range (1-rpm Steps)</td>
<td>80 to 8,000</td>
<td>80 to 8,000</td>
<td>80 to 8,000</td>
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<tr>
<td>VDI 30 Tool Configuration Option 2</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
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<td>Tool Shank Diameter (Max.)</td>
<td>40mm (1.5&quot;)</td>
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<td>Indexing Time (Station-to-Station)</td>
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<td>VDI 30 16-Station Tool Configuration Option 2</td>
<td>16 Stations</td>
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<td>Tool Shank Diameter w/ER25 Collets</td>
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<tr>
<td>Power Rating at Tool Tip 2</td>
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<td>Torque Rating at Tool Tip 2</td>
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<tr>
<td>Speed Range (1-rpm Steps)</td>
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<td>80 to 8,000</td>
<td>80 to 8,000</td>
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<tr>
<td>VDI 30 Live Tooling Option—All Stations 2</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
<td>2 to 16mm (.062 to .625&quot;)</td>
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<td>Tool Shank Diameter (Max.)</td>
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<td>Indexing Time (Station-to-Station)</td>
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<td>Tool Shank Diameter w/ER25 Collets</td>
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<td>Power Rating at Tool Tip 2</td>
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<td>3.7kW (5hp)</td>
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<td>Torque Rating at Tool Tip 2</td>
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<td>23.6Nm (17.4ft-lb)</td>
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<tr>
<td>Speed Range (1-rpm Steps)</td>
<td>80 to 8,000</td>
<td>80 to 8,000</td>
<td>80 to 8,000</td>
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<tr>
<td>Conventional Hardinge Top Plate T-Style</td>
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<tr>
<td>Round Shank Tool Size (Max.)</td>
<td>20mm (3/4&quot;)</td>
<td>25mm (1&quot;)</td>
<td>25mm (1&quot;)</td>
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<tr>
<td>Indexing Time (Station-to-Station)</td>
<td>.35 Second</td>
<td>.35 Second</td>
<td>.35 Second</td>
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<td>Sub Spindle Option 1-2-9</td>
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<tr>
<td>Spindle Configuration (ANSI)</td>
<td>A2-5, 16C</td>
<td>A2-5, 16C</td>
<td>A2-5, 16C</td>
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<td>Round 16C Collet (Through Capacity)</td>
<td>42mm (1.625&quot;)</td>
<td>42mm (1.625&quot;)</td>
<td>42mm (1.625&quot;)</td>
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<tr>
<td>Jaw Chuck Size</td>
<td>150mm (6&quot;)</td>
<td>150mm (6&quot;)</td>
<td>150mm (6&quot;)</td>
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<tr>
<td>Step Chuck (Gripping Capacity)</td>
<td>152.4mm (6&quot;)</td>
<td>152.4mm (6&quot;)</td>
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<tr>
<td>Power Rating at 1,500-rpm Base Speed</td>
<td>7.5kW (10hp)</td>
<td>7.5kW (10hp)</td>
<td>7.5kW (10hp)</td>
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<tr>
<td>Speed Range (1-rpm steps)</td>
<td>47.7Nm (35ft-lb)</td>
<td>47.7Nm (35ft-lb)</td>
<td>47.7Nm (35ft-lb)</td>
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<tr>
<td>Travel (Max) 10</td>
<td>603.3mm (23.75&quot;)</td>
<td>603.3mm (23.75&quot;)</td>
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<tr>
<td>Traverse Rate (Max.)</td>
<td>38m/min (1,500rpm)</td>
<td>38m/min (1,500rpm)</td>
<td>38m/min (1,500rpm)</td>
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<td>Hydraulic Tailstock Option 2</td>
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<tr>
<td>Part Length (Max.)</td>
<td>609.6mm (24.00&quot;)</td>
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<td>Travel (Max)</td>
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<tr>
<td>Traverse Rate (Max.)</td>
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<td>7.6m/min (300rpm)</td>
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<tr>
<td>Hydraulic Applied Force (Min. to Max.)</td>
<td>129 to 320daN (290 to 720lb)</td>
<td>280 to 700daN (630 to 1,570lb)</td>
<td>280 to 700daN (630 to 1,570lb)</td>
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<tr>
<td>Miscellaneous 11</td>
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<tr>
<td>Power Supply Requirement</td>
<td>230v/3 Phase/99FLA</td>
<td>230v/3 Phase/112FLA</td>
<td>230v/3 Phase/135FLA</td>
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<tr>
<td>Coolant Tank Capacity</td>
<td>189liter (50gal)</td>
<td>189liter (50gal)</td>
<td>189liter (50gal)</td>
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<tr>
<td>Coolant Pressure</td>
<td>12.9bar (187psi)</td>
<td>12.9bar (187psi)</td>
<td>12.9bar (187psi)</td>
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<tr>
<td>Coolant Flow Rate</td>
<td>25.5L/min (6.75gpm)</td>
<td>25.5L/min (6.75gpm)</td>
<td>25.5L/min (6.75gpm)</td>
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<td>High-Pressure Thru-Tool Coolant Option</td>
<td>98.95bar (1,000psi)</td>
<td>98.95bar (1,000psi)</td>
<td>98.95bar (1,000psi)</td>
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<tr>
<td>Machine Dimensions</td>
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<tr>
<td>Length</td>
<td>2991.6mm (117.78&quot;)</td>
<td>2991.6mm (117.78&quot;)</td>
<td>2991.6mm (117.78&quot;)</td>
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<tr>
<td>Length with Chip Conveyor Option</td>
<td>4190.8mm (164.99&quot;)</td>
<td>4190.8mm (164.99&quot;)</td>
<td>4190.8mm (164.99&quot;)</td>
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<tr>
<td>Depth</td>
<td>2287.6mm (90.14&quot;)</td>
<td>2287.6mm (90.14&quot;)</td>
<td>2287.6mm (90.14&quot;)</td>
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<tr>
<td>Height</td>
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<td>1973.8mm (77.71&quot;)</td>
<td>1973.8mm (77.71&quot;)</td>
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<tr>
<td>Weight (Approx.)</td>
<td>679kg (14,986lb)</td>
<td>679kg (14,986lb)</td>
<td>679kg (14,986lb)</td>
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<tr>
<td>Shipping Weight (Approx.)</td>
<td>6804kg (15,000lb)</td>
<td>7070kg (15,586lb)</td>
<td>7206kg (15,886lb)</td>
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</tbody>
</table>
Over the years, The Hardinge Group™ steadily diversified both its product offerings and operations. Today, the company has grown into a globally diversified player with manufacturing operations in North America, Europe and Asia. In addition to designing and building turning centers and collets, Hardinge is a world leader in grinding solutions with the addition of the Kellenberger, Hauser, Tripet and Tschudin brands to the Hardinge family. The company also manufactures Bridgeport machining centers and other industrial products for a wide range of material cutting, turnkey automation and workholding needs.

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