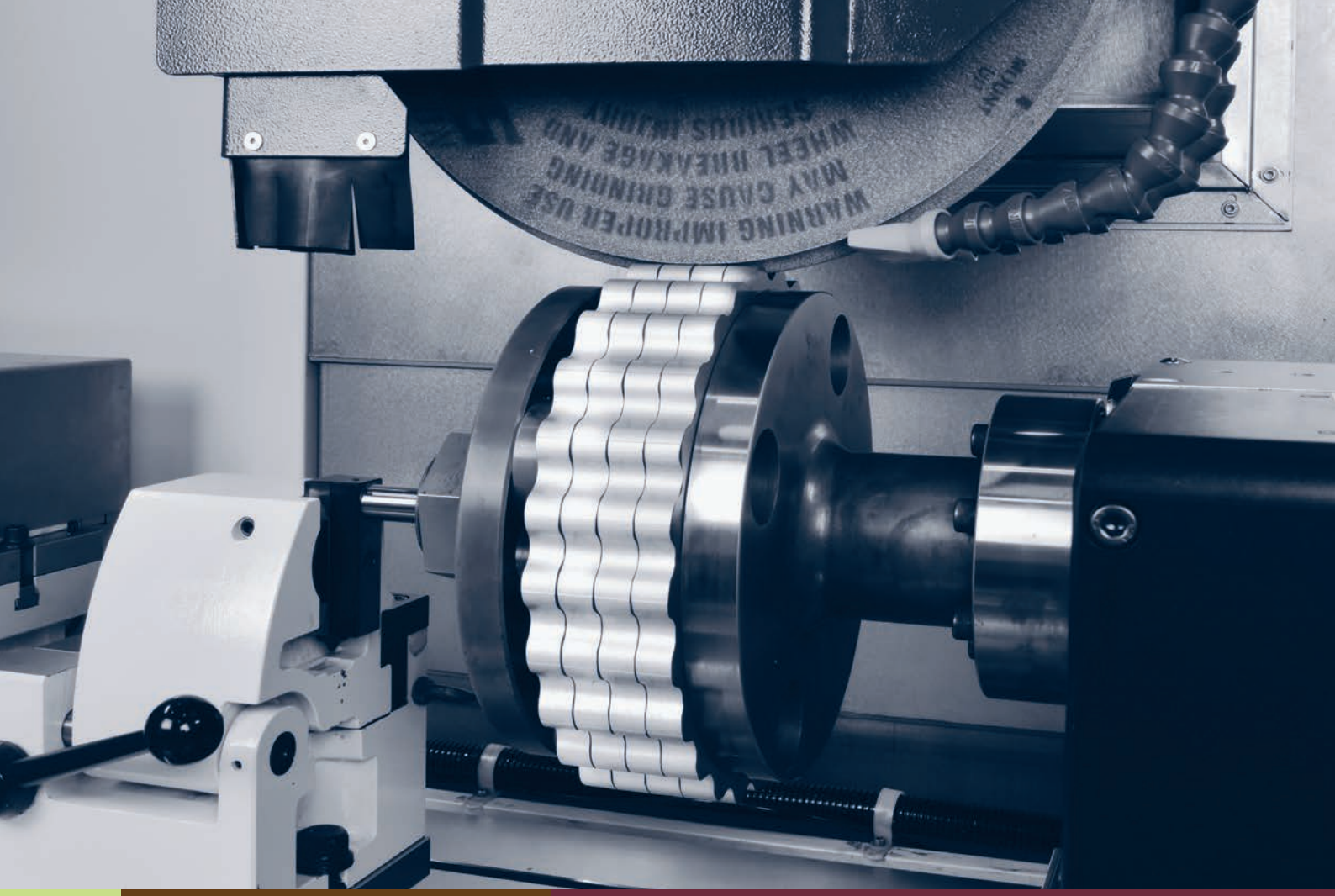
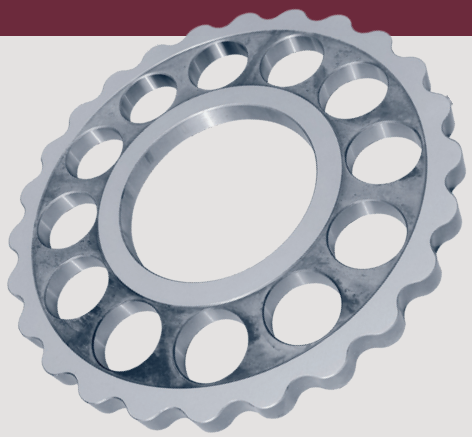


SMART-H/B 20/24IV Series

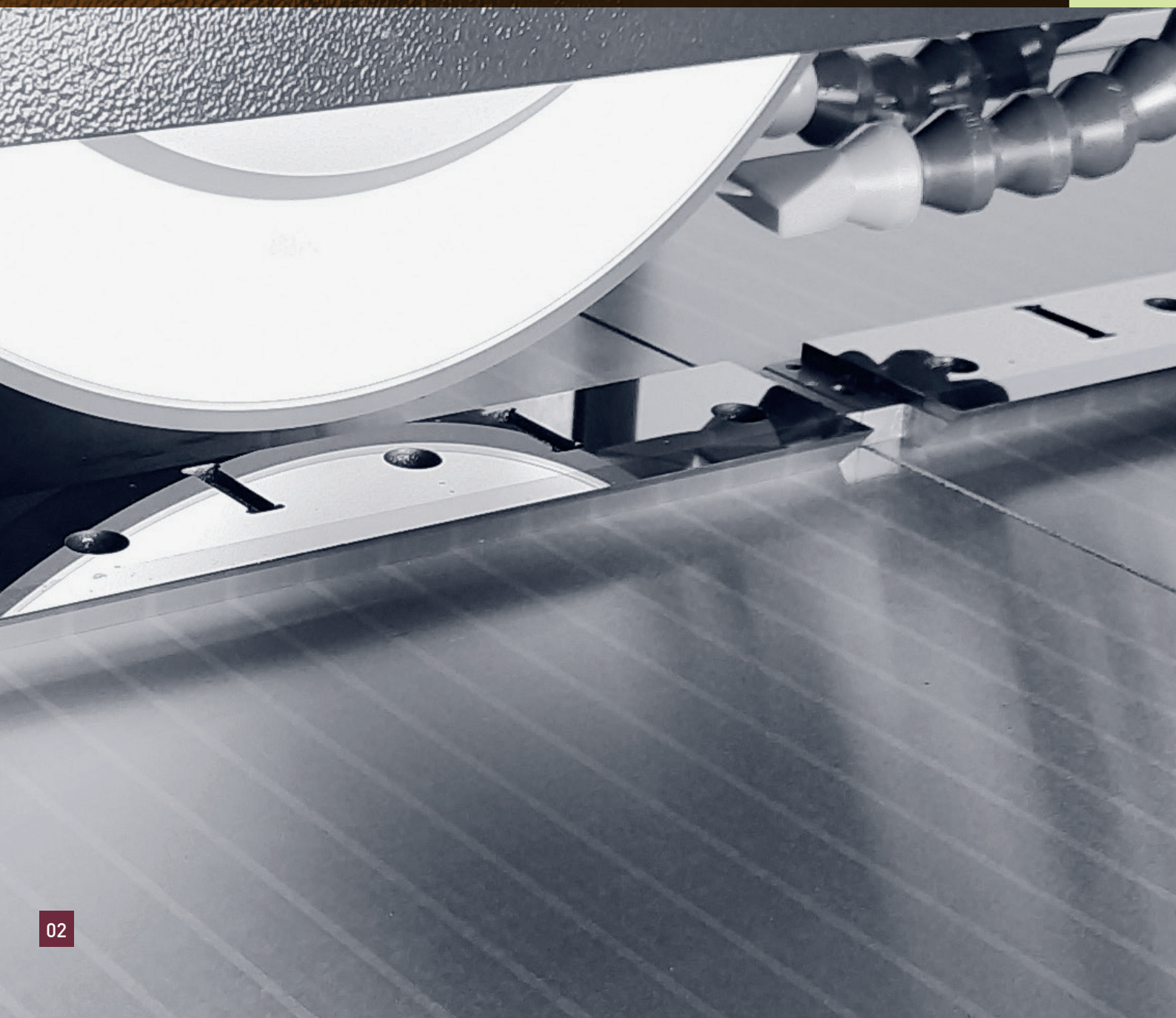
Column-type, Multi-function
CNC Surface Grinder

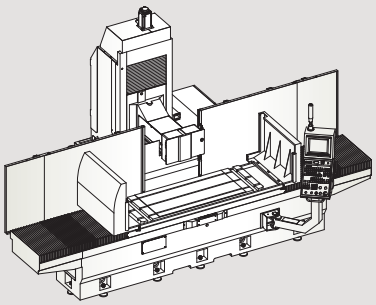
Highly accurate, heavy load, intelligent CNC grinding



CHEVALIER®
We shape your ideas.™

Chevalier's SMART-H/B20/24IV Series larger machine size is designed for heavy loads to achieve higher accuracy and performance in finer workpiece finishes





Highly accurate, heavy load, intelligent CNC grinding

Chevalier's SMART-IV Series now includes the larger-sized SMART-H/B20/24IV machines, which have several newly designed features: a column-type structure to further reduce vibration and achieve higher accuracy; a spindle that can withstand heavy load grinding; and a double-V slide rail for smooth, stable longitudinal movements.

These features are the standards required by the aerospace, automotive, energy, medical, semiconductor, mold and processing industries in order to meet current and future market demands.

These larger-sized machines are designed for heavy load grinding to improve performance, precision and stability for highly accurate workpieces along with finer finishes. A number of components contribute to a single-piece design, rigid machine structure that minimizes vibration and displacement. They include: heavy-duty double-V guideway, a double-hydraulic cylinder and a base under the machine table that is long enough to support the full travel of the table.

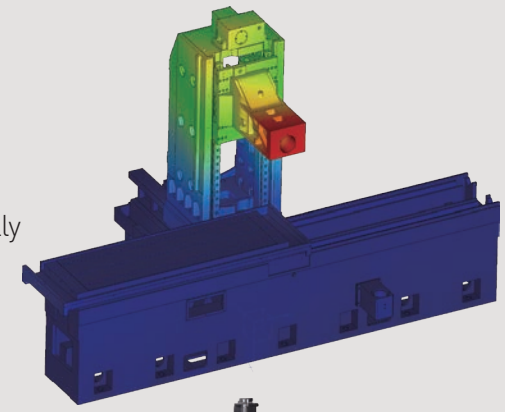
These CNC grinding machines are designed to be user friendly. Our exclusive next generation SMART iControl incorporates production efficiency, which simplifies operation procedures and greatly enhances the performance of Chevalier CNC grinders. Combined with TaskLink+, it allows operators to easily create their own programs for generating complex grinding tasks in a single cycle.

The SMART-H2448IV is shown with optional accessories.

Key Features and Benefits

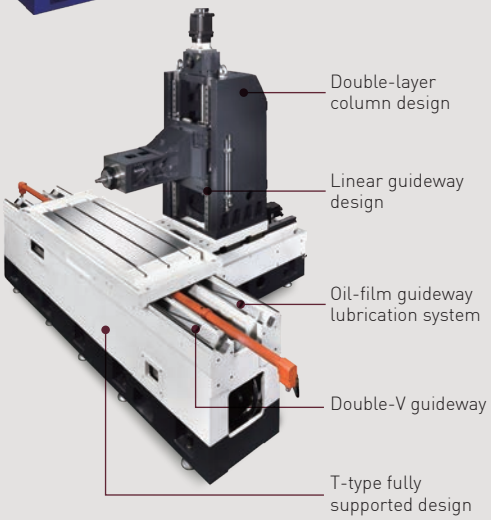
Optimized structure

The SMART-20/24IV machine structure is designed with the Finite Element Method (FEM). The new column-type design features a highly rigid, double-layer structure for higher rigidity. The base under the front part of the machine is a fully supported, single-piece design. The rear base is designed with a high-damping linear guideway. The strong main structure supports heavy load grinding to greatly improve grinding performance, precision and stability.



Transmission mechanism (SMART-H type)

The longitudinal guideway system incorporates double-V guideways, dual hydraulic cylinder and circulating oil-film guideway lubrication system. The elevating transmission mechanism is equipped with a linear guideway that incorporates a ballscrew and direct drive AC servo motor. The cross-feed transmission mechanism uses highly rigid casting and linear guideways, and a ballscrew combined with direct-drive AC servo motors to improve grinding quality and achieve a mirror-finish.

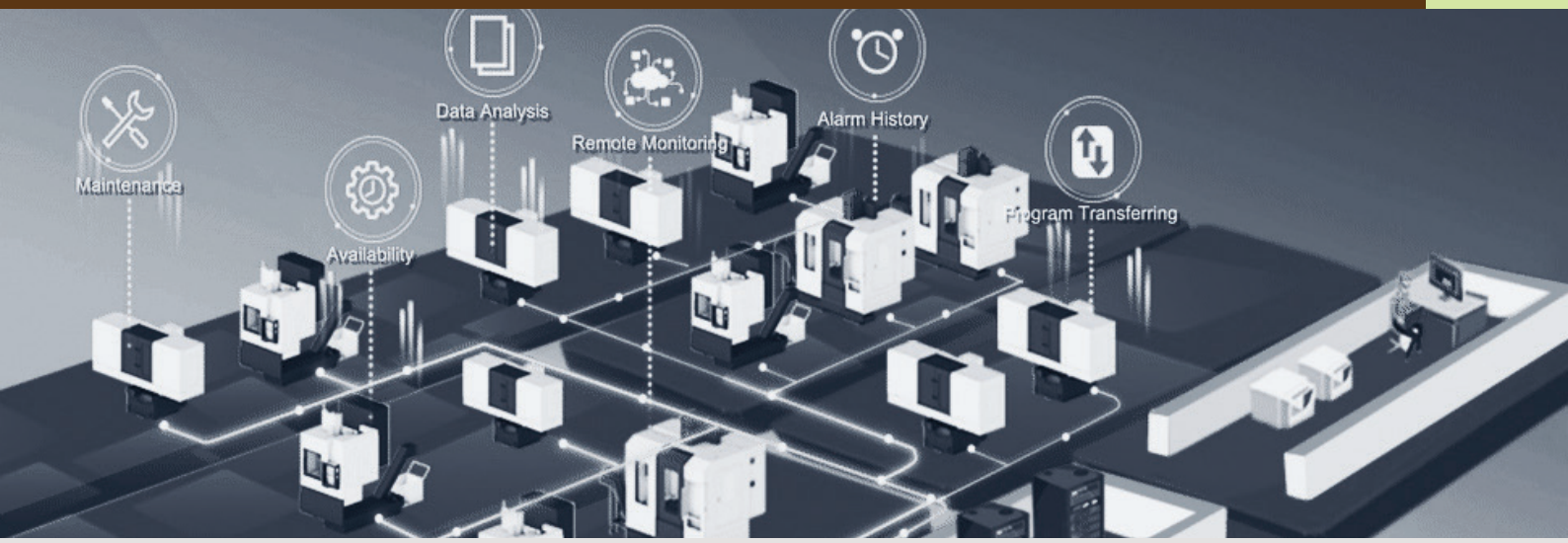


Optional fully enclosed cover design

The fully enclosed cover design provides more protection, preventing cutting coolant splashing and oil mist dissipation. It completely protects the operator and environment.

iMachine Communications System™ (iMCS)

iMCS is a comprehensive remote monitoring software that integrates with IoT functions on Chevalier's CNC machines to perform 24/7 data collection, utilization monitoring, data analysis, alarm history, maintenance and overall equipment effectiveness (OEE), all which help to avoid downtime and increases productivity. Additional PC and software are required.



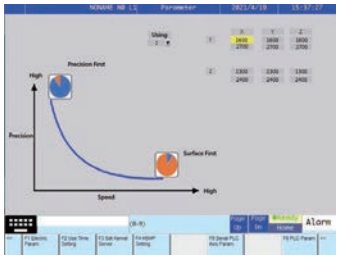
The iMachine Communications System™ collects and integrates data from different machine controllers* and monitors the tasks and processes remotely. That means you will save physical time being in front of machines, reduce production time by monitoring on one device and foresee the wear and tear with live data.

**Controllers vary depending on regions and may be subject to change without notice or obligation.*

Control Features and Benefits

Intelligent grinding assistant system

Sets parameters based on prioritizing the machining process for precision or speed in order to improve application efficiency.

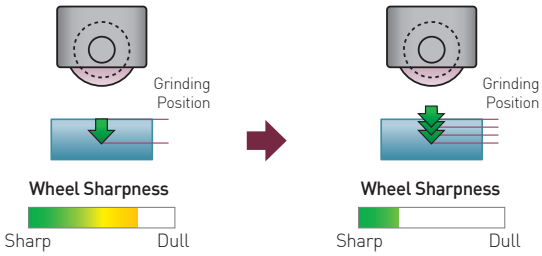


Worktable reversing smoothing function (SMART-B type)

Low-frequency vibration is suppressed during reciprocating motion to enhance the surface finish of the workpiece and improve efficiency.

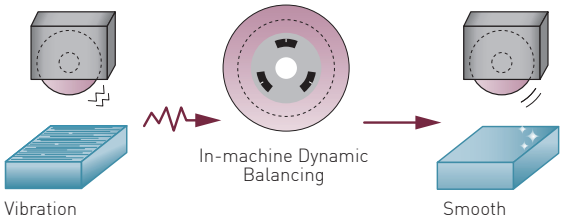
Intelligent auto wheel dressing

This function detects when the wheel needs to reach optimal cutting efficiency regardless of operator experience to avoid poor grinding quality.



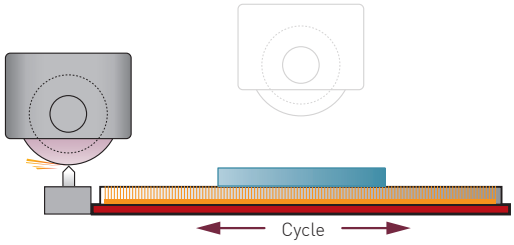
In-machine dynamic balancing

Operator can manually adjust the grinding wheel balance to reduce wheel vibration and eliminate chatter marks to improve grinding quality.



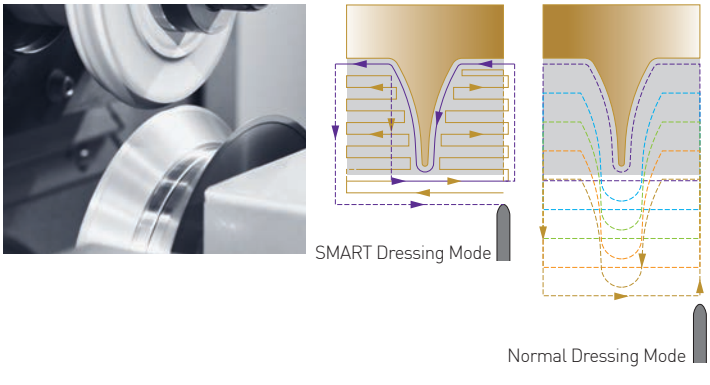
Automatic wheel dressing with compensation

An automatic wheel dressing with compensation feature dresses the wheel automatically during rough and/or fine grinding and again at the end of rough grinding. This enables the machine to run unattended for hours, making it ideal for high-volume production runs, while reducing machining costs and increasing line productivity.



Constant-contact dressing mode

A normal dressing mode wastes time by cutting in air. The SMART iControl dressing mode never cuts air because the diamond is in constant-contact with the wheel to minimizes dress time.



Control Features and Benefits

The Next Generation of SMART iControl

Our exclusive next generation SMART iControl now delivers a bounty of benefits. Users no longer need to write complicated programs and memorize detailed variables. Instead, they can complete huge, complex processing programs and perform intricate grinding. The powerful computing ability enhances the HMI for better grinding accuracy and, with data analysis from network connection, allows managers to improve the production process and increase output.

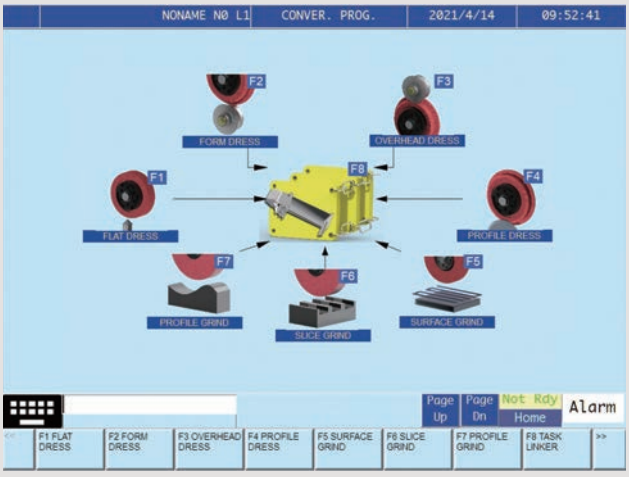
The SMART iControl's conversational programming eliminates complicated programming codes

The SMART iControl supports M3 serial communication servo systems, a communication bandwidth increased to 100Mbps and with support for 24-bit resolution, to improve reading speed and processing smoothness.

High computing capabilities of 2,000 single blocks per second produce high-precision smoothness, high-precision contour control, machining path smoothing, multi-group working conditions and quick parameter setting to significantly improve the grinding machine's accuracy and flatness.

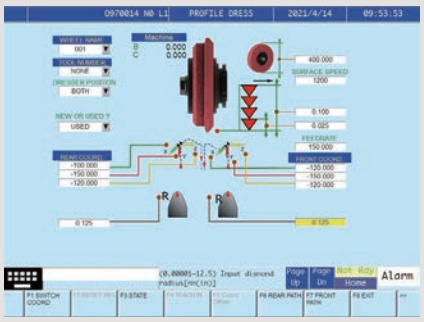
Up to eight CNC axes can be controlled for multi-function machining requirements and 4-axis simultaneous control for complex form grinding.

The SRI interface communication IO module adds extra IO points (optional) and connects other automation equipment to meet future automation needs.



The SMART iControl comes standard with a 10.4" LCD monitor with HMI.

The three-dimensional graphic image display minimizes text descriptions and looks very similar to the actual workpieces.



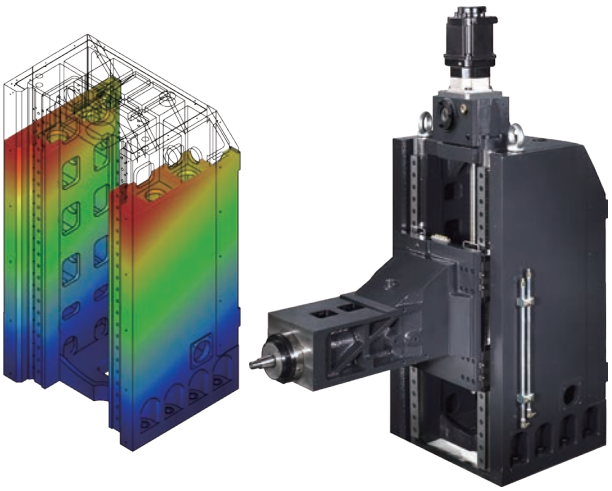
SMART iControl
NONAME N0 L1
CONVER. PROG.
2021/4/14
09:52:41
Alarm
F1 FLAT DRESS
F2 FORM DRESS
F3 OVERHEAD DRESS
F4 PROFILE DRESS
F5 SURFACE GRIND
F6 SLICE GRIND
F7 PROFILE GRIND
F8 TASK LAUNCH
PARK PARK
LEFT RIGHT
CYCLE
AUX1
AUX2
AUX3
RETRACT
FEEDRATE OVERRIDE
SPINDLE OVERRIDE
MDI
AUTO
EDIT
INCR
JOG
HANDLE
ZRN
EMERGENCY STOP
i HDW

Machine Construction

Elevating transmission mechanism

The double-layer casting structure, which has undergone FEM analysis to optimize its mechanical design, provides better grinding efficiency and accuracy.

The elevating transmission, driven by a C2-grade ballscrew, worm gear mechanism and an AC servo motor, provides high torque, high speed and accurate positioning. It is equipped with a linear guideway and linear scale to improve elevating accuracy. Accurate positioning with a minimum increment of 0.001 mm (0.0001").



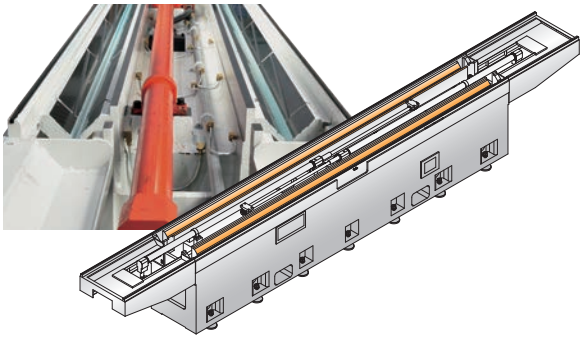
The double "V" guideways for table and machine base aid in precision side grinding operations

Longitudinal slide ways (SMART-H type)

This series features a double-V, guideway design laminated with Turcite-B, anti-friction material for smooth and stable longitudinal movement. Equipped with a new oil-film guideway lubrication system designed for low-wear, the series easily and effectively achieves mirror grinding while improving grinding accuracy.

Fully supported design of worktable.

SMART-H type: Maximum table speed: 30 m/min (98.4 fpm), increases processing efficiency.



The SMART-H2048IV is shown with optional accessories.

Machine-body temperature control integration

The cooling system regulates the temperature for the spindle, lubrication system and hydraulic system.

Establishes a consistent temperature for the entire machine and greatly improves accuracy and stability.

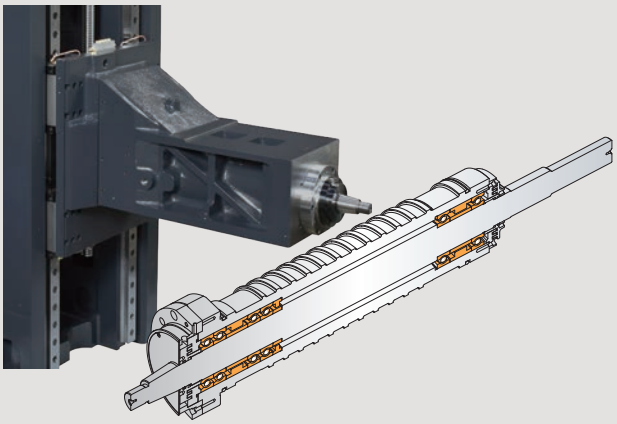
SMART-H type: Includes the spindle oil, lubricating oil and hydraulic oil, which are a three-in-one cooling device.

SMART-B type: Includes the spindle oil and lubricating oil, which are a two-in-one cooling device.

SMART-H type three-in-one cooling device is shown in the above photo.

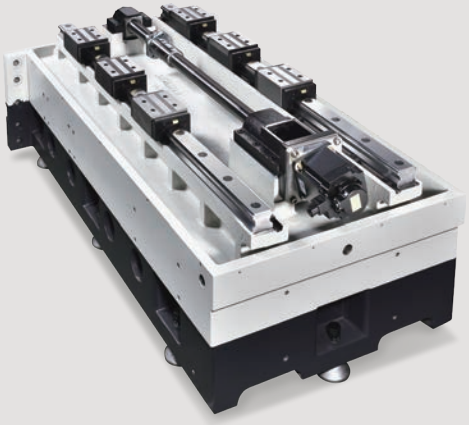
Spindle design

The newly designed spindle is supported by six Class 7 (P4), ultra-precision angular contact ball bearings (four in front, two in rear). The spindle structure is rigid and withstands heavy load grinding. The flexible coupling connecting the spindle and the motor incorporates a precise-balanced calibration process, which effectively reduces vibration and ensures grinding quality.



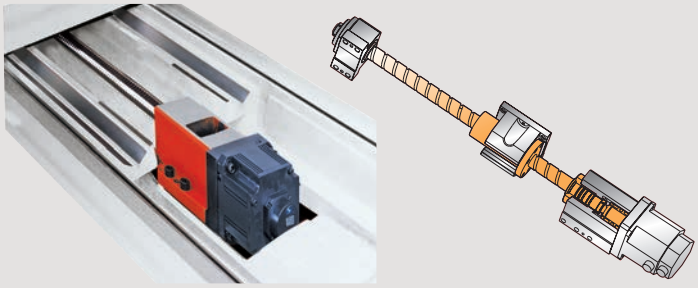
Stable feed, superior accuracy

The crossfeed slideway system features a perfect mating of linear slideways, precision ballscrews and a servo motor that provides high torque and high speed.

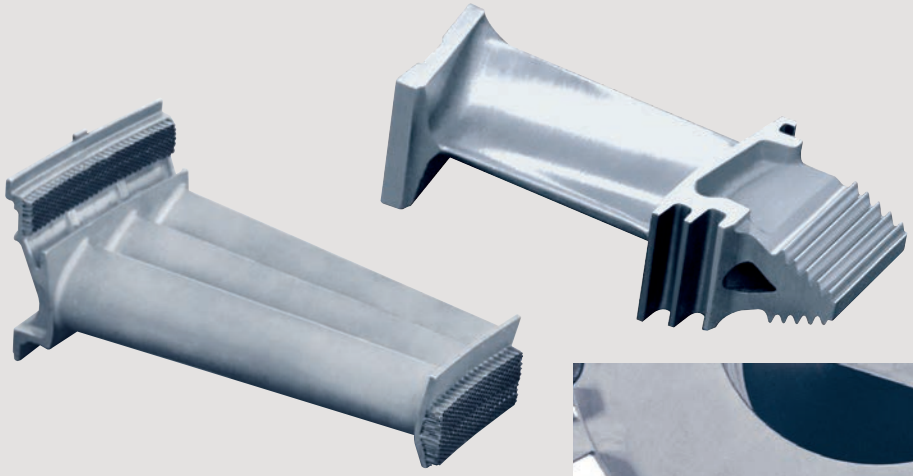


Longitudinal ballscrew drive construction (SMART-B type)

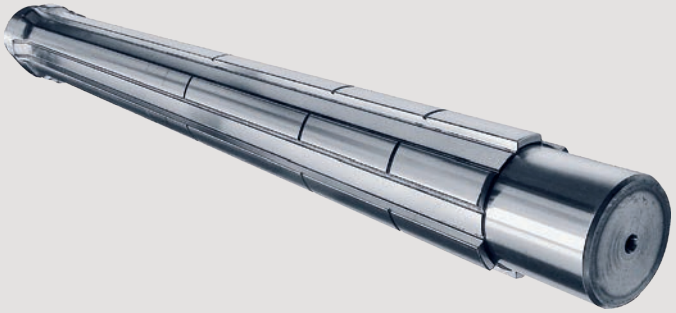
The table is driven by an AC servo motor and positioned with a high-precision ballscrew, maximizing the control of table speed and high positioning accuracy.

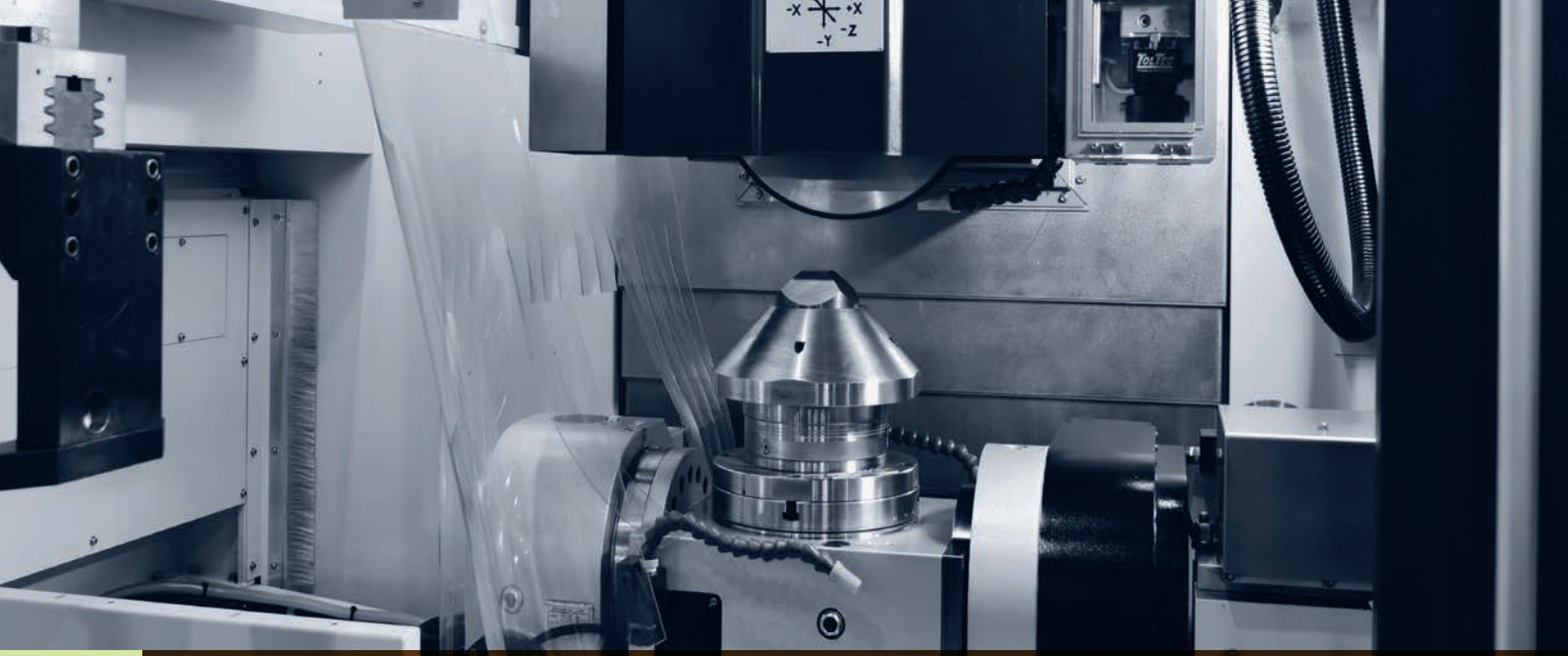


Applications



The SMART-H/B20/24IV Series easily adapts to future needs for aerospace, automotive, semiconductor, medical industries and job shops





A full line of standard and optional accessories adds flexibility to SMART-H/B20/24IV Series grinders

Accessories

Standard accessories

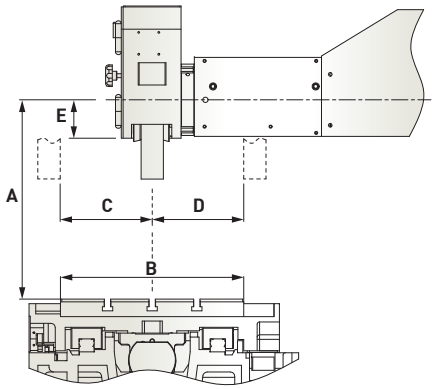
- Wheel flange (clamping width):
  SMART-H/B20IV Series: 22~38 mm (0.9" ~ 1.5")
  SMART-H/B24IV Series: 43~50 mm (1.7" ~ 2.0")
- Grinding wheel (OD x Width x Bore):
  SMART-H/B20IV Series:
  Ø405 x 50 x Ø127 mm (Ø16" x 2" x Ø5")
  SMART-H/B24IV Series:
  Ø405 x 75 x Ø127 mm (Ø16" x 3" x Ø5")
- Splash guard
- Double-sided water baffle
- Heat exchanger for electric cabinet
- Oil cooling system-lubricating oil, hydraulic oil, spindle oil cooling (SMART-H type)
- Air purge spindle
- Linear scale on Y-axis
- Diamond dresser stand with diamond rod
- Automatic dressing and compensation system (Table-mounted)
- Toolbox (includes balancing arbor, spanner, ring spanner, locking nut and wheel flange extractor)
- Ball point hex wrench set
- Leveling screws, nut and pads:
  SMART-H/B2048IV: 16 sets
  SMART-H/B2064/2464IV: 20 sets
  SMART-H/B2448IV: 18 sets
  SMART-H/B2480IV: 26 sets
  SMART-H24120IV: 32 sets
  SMART-H24160IV: 38 sets

Optional accessories

- 15" LCD touch screen with HMI
- Chuck control
- Electromagnetic chuck
- Guideway-type balancing stand
- Coolant system with auto paper feeding device
- Coolant system with auto paper feeding device and magnetic separator
- Automatic grinding wheel dynamic balancer
- Rotary tables
- Single disc dresser
- Dual support rolling type wheel dresser
- Work lamp
- Z-axis linear scale
- Spindle motor-25 HP
- Oil mist collectors
- Fully enclosed splash guard
- Fully enclosed splash guard (Automatic door system)
- High semi enclosed splash guard

Maximum Working Space

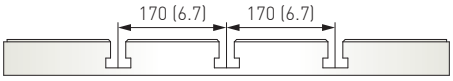
Units: mm (")



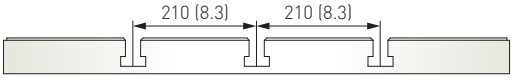
Item	A	B	C / D	E
SMART-H/B2048IV	850 (33.5)	500 (19.7)	250 (9.8)	85 (3.3)
SMART-H/B2064IV	850 (33.5)	500 (19.7)	250 (9.8)	85 (3.3)
SMART-H/B2448IV	850 (33.5)	600 (23.6)	300 (11.8)	110 (4.3)
SMART-H/B2464IV	850 (33.5)	600 (23.6)	300 (11.8)	110 (4.3)
SMART-H/B2480IV	850 (33.5)	600 (23.6)	300 (11.8)	110 (4.3)
SMART-H24120IV	850 (33.5)	600 (23.6)	300 (11.8)	110 (4.3)
SMART-H24160IV	850 (33.5)	600 (23.6)	300 (11.8)	110 (4.3)

Table and T-slot Dimensions

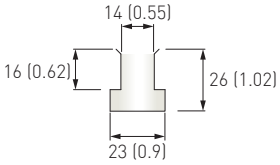
SMART-H/B2048/2064IV



SMART-H/B2448/2468/2480IV
SMART-H24120/24160IV

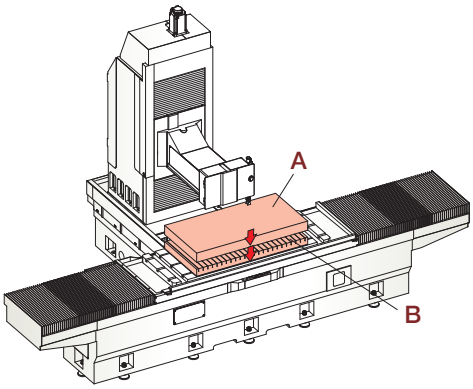


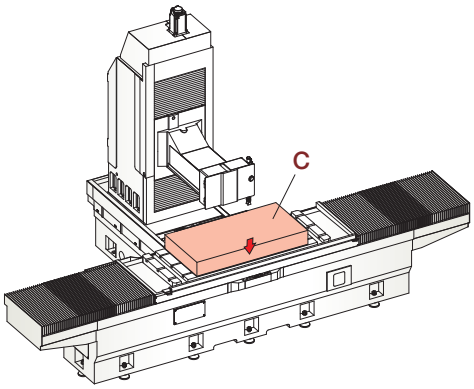
Units: mm (")



SMART-H/B2048IV	T-slot x 3
SMART-H/B2064IV	T-slot x 3
SMART-H/B2448IV	T-slot x 3
SMART-H/B2464IV	T-slot x 3
SMART-H/B2480IV	T-slot x 3
SMART-H24120IV	T-slot x 3
SMART-H24160IV	T-slot x 3

Loading Capacity



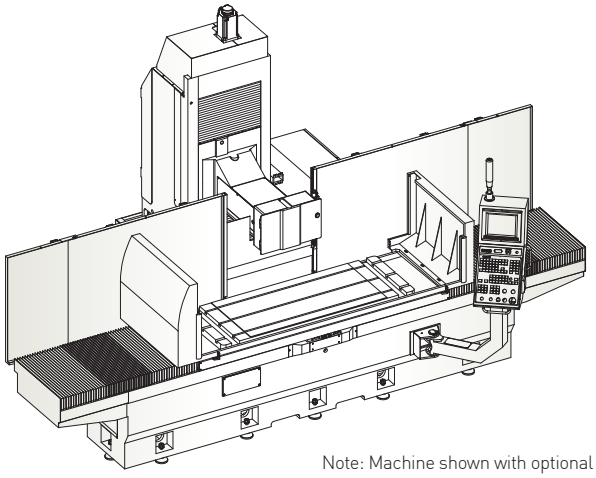


Item	SMART-H/B2048IV	SMART-H/B2064IV	SMART-H/B2448IV	SMART-H/B2464IV	SMART-H/B2480IV	SMART-H24120IV	SMART-H24160IV
A	930 kg (2,048 lbs.)	1,110 kg (2,445 lbs.)	1,150 kg (2,533 lbs.)	1,335 kg (2,941 lbs.)	1,240 kg (2,731 lbs.)	1,350 kg (2,974 lbs.)	1,250 kg (2,753 lbs.)
B	320 kg (705 lbs.)	470 kg (1,035 lbs.)	450 kg (991 lbs.)	515 kg (1,134 lbs.)	760 kg (1,674 lbs.)	1,050 kg (2,313 lbs.)	1,550 kg (3,414 lbs.)
C	1,250 kg (2,753 lbs.)	1,580 kg (3,480 lbs.)	1,600 kg (3,524 lbs.)	1,850 kg (4,075 lbs.)	2,000 kg (4,405 lbs.)	2,400 kg (5,287 lbs.)	2,800 kg (6,167 lbs.)

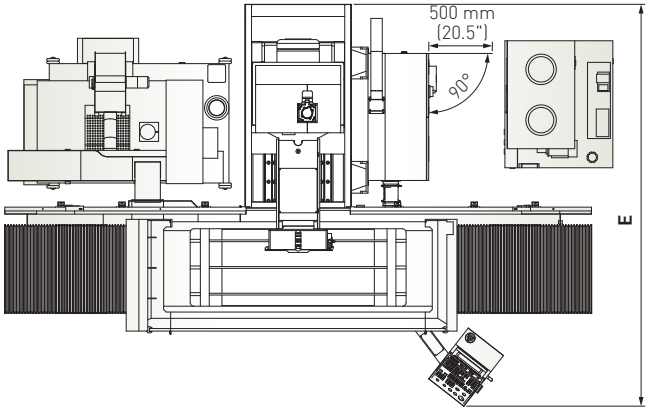
Suggested maximum table loads
A = Workpiece, B = Chuck, C = A+B

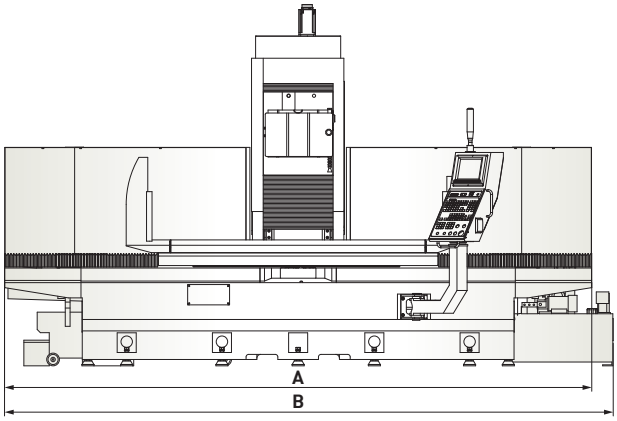
Machine Dimensions

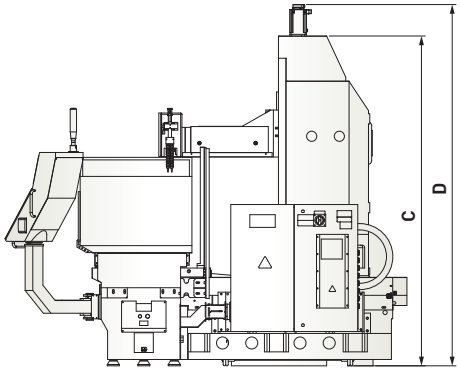
Units: mm (")



Note: Machine shown with optional accessories.







Item	A	B	C	D	E
SMART-H2048IV	4,400 (173.2)	4,600 (181.1)	2,495 (98.2)	2,745 (108.1)	2,950 (116.1)
SMART-B2048IV		—			
SMART-H2064IV	5,200 (204.7)	5,200 (204.7)	2,495 (98.2)	2,745 (108.1)	2,950 (116.1)
SMART-B2064IV		—			
SMART-H2448IV	4,630 (182.3)	4,800 (189.0)	2,600 (102.4)	2,850 (112.2)	3,320 (130.7)
SMART-B2448IV		—			
SMART-H2464IV	6,165 (242.7)	6,165 (242.7)	2,600 (102.4)	2,850 (112.2)	3,320 (130.7)
SMART-B2464IV		—			
SMART-H2480IV	7,710 (303.5)	7,710 (303.5)	2,600 (102.4)	2,850 (112.2)	3,320 (130.7)
SMART-B2480IV		—			
SMART-H24120IV	8,740 (344.1)	8,740 (344.1)	2,600 (102.4)	2,850 (112.2)	3,320 (130.7)
SMART-H24160IV	11,200 (440.9)	11,200 (440.9)	2,600 (102.4)	2,850 (112.2)	3,320 (130.7)

Specifications

Item	Description	SMART-H2048IV	SMART-B2048IV	SMART-H2064IV	SMART-B2064IV
Control system		SMART iControl			
Capacity	Max. grinding length-longitudinal	1,200 mm (47.2")		1,600 mm (63.0")	
	Max. grinding width-crosswise	500 mm (19.7")			
	Distance between table to spindle centerline	850 mm (33.5"), optional 730 mm (28.7")			
	Max. table load	1,250 kg (2,754 lbs.)		1,580 kg (3,481 lbs.)	
Table	Table size	500 x 1,200 mm (19.7" x 47.2")		500 x 1,600 mm (19.7" x 63.0")	
	T-slots (width x pitch x no.)	14 mm x 170 mm x 3 (0.6" x 6.7" x 3)			
	Height from the machine table to ground	900 mm (35.4")			
	Table speed (variable)	5~30 m/min (16~98.4 fpm)	0~20 m/min (0~65.6 fpm)	5~30 m/min (16~98.4 fpm)	0~20 m/min (0~65.6 fpm)
	Max. table travel	1,300 mm (51.2")		1,700 mm (66.9")	
Transverse movement (Z)	Max. travel	560 mm (22.0")			
	Feed speed	0~5,000 mm/min (0~16.4 fpm)			
	Min. input	0.001 mm (0.0001")			
Wheelhead elevation (Y)	Max. travel	665 mm (26.2")			
	Feed speed	0~2,000 mm/min (0~6.56 fpm)			
	Min. input	0.001 mm (0.0001")			
Spindle	Spindle speed (variable speed)	500~2,200 rpm			
	Spindle motor	11 kW (15 HP), optional 18.5 kW (25 HP)*			
Motors	Axis motors (X / Y / Z)	Y: 3.1 kW Z: 2.4 kW	X: 5.9 kW Y: 3.1 kW Z: 2.4 kW	Y: 3.1 kW Z: 2.4 kW	X: 5.9 kW Y: 3.1 kW Z: 2.4 kW
	Hydraulic motor	5 HP / 6P	—	5 HP / 6P	—
Wheel dimension	OD x Width x Bore	Ø405 x 50 x Ø127 mm (Ø16" x 2" x Ø5"), optional Ø510 x 50 x Ø127 mm (Ø20" x 2" x Ø5")*			
Power and air requirement	Power required	40 kVA			
	Total air consumption — Pressure	6 kg/cm^2 (86 psi)			
	Total air consumption — Flow	200 NL/min (7 cfm)			
Tank capabilities	Oil tank capacity	255 L (67 gals.)	50 L (13 gals.)	255 L (67 gals.)	50 L (13 gals.)
Machine dimensions	Floor space (W x D x H)	4,600 x 2,950 x 2,745 mm (181.1" x 116.1" x 108.1")	4,400 x 2,950 x 2,745 mm (173.2" x 116.1" x 108.1")	5,200 x 2,950 x 2,745 mm (204.7" x 116.1" x 108.1")	5,200 x 2,950 x 2,745 mm (204.7" x 116.1" x 108.1")
	Net weight	6,400 kg (14,100 lbs.)		8,000 kg (17,600 lbs.)	
Accuracy	Positioning accuracy	Y/Z: 0.005 mm (0.00020")	X: 0.008 mm (0.00032") Y/Z: 0.005 mm (0.00020")	Y/Z: 0.005 mm (0.00020")	X: 0.008 mm (0.00032") Y/Z: 0.005 mm (0.00020")
	Repeatability accuracy	Y/Z: 0.003 mm (0.00012")	X: 0.006 mm (0.00024") Y/Z: 0.003 mm (0.00012")	Y/Z: 0.003 mm (0.00012")	X: 0.006 mm (0.00024") Y/Z: 0.003 mm (0.00012")
	Accuracy standard	ISO 1986-1			

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*U.S.A. standard

SMART-H2448IV	SMART-B2448IV	SMART-H2464IV	SMART-B2464IV	SMART-H2480IV	SMART-B2480IV	SMART-H24120IV	SMART-H24160IV
SMART iControl							
1,200 mm (47.2")		1,600 mm (63.0")		2,000 mm (78.7")		3,000 mm (118.1")	4,000 mm (157.5")
600 mm (23.6")							
850 mm (33.5")							
1,600 kg (3,525 lbs.)		1,850 kg (4,075 lbs.)		2,000 kg (4,406 lbs.)		2,400 kg (5,280 lbs.)	2,800 kg (6,160 lbs.)
600 x 1,200 mm (23.6" x 47.2")		600 x 1,600 mm (23.6" x 63.0")		600 x 2,000 mm (23.6" x 78.7")		600 x 3,000 mm (23.6" x 118.1")	600 x 4,000 mm (23.6" x 157.5")
14 mm x 210 mm x 3 (0.6" x 8.3" x 3)							
900 mm (35.4")							
5~30 m/min (16~98.4 fpm)	0~20 m/min (0~65.6 fpm)	5~30 m/min (16~98.4 fpm)	0~20 m/min (0~65.6 fpm)	5~30 m/min (16~98.4 fpm)	0~20 m/min (0~65.6 fpm)	5~30 m/min (16~98.4 fpm)	
1,300 mm (51.2")		1,700 mm (66.9")		2,100 mm (82.7")		3,200 mm (125.9")	4,200 mm (165.4")
675 mm (26.6")							
0~5,000 mm/min (0~16.4 fpm)							
0.001 mm (0.0001")							
665 mm (26.2")							
0~2,000 mm/min (0~6.56 fpm)							
0.001 mm (0.0001")							
500~2,200 rpm							
11 kW (15 HP), optional 18.5 kW (25 HP)*							
Y/Z: 3.1 kW	X: 7.5 kW Y/Z: 3.1 kW	Y/Z: 3.1 kW	X: 7.5 kW Y/Z: 3.1 kW	Y/Z: 3.1 kW	X: 7.5 kW Y/Z: 3.1 kW	Y/Z: 3.1 kW	
7.5 HP / 6P	—	7.5 HP / 6P	—	7.5 HP / 6P	—	10 HP / 6P	15 HP / 6P
Ø405 x 75 x Ø127 mm (Ø16" x 3" x Ø5"), optional Ø510 x 75 x Ø127 mm (Ø20" x 3" x Ø5")*							
40 kVA							44 kVA
6 kg/cm^2 (86 psi)							
200 NL/min (7 cfm)							
255 L (67 gals.)	50 L (13 gals.)	255 L (67 gals.)	50 L (13 gals.)	255 L (67 gals.)	50 L (13 gals.)	320 L (84 gals.)	
4,800 x 3,320 x 2,850 mm (189.0" x 130.7" x 112.2")	4,630 x 3,320 x 2,850 mm (182.3" x 130.7" x 112.2")	6,165 x 3,320 x 2,850 mm (242.7" x 130.7" x 112.2")		7,710 x 3,320 x 2,850 mm (303.5" x 130.7" x 112.2")		8,740 x 3,320 x 2,850 mm (344.1" x 130.7" x 112.2")	11,200 x 3,320 x 2,850 mm (440.9" x 130.7" x 112.2")
8,100 kg (17,800 lbs.)		9,500 kg (20,900 lbs.)		10,200 kg (22,500 lbs.)		15,000 kg (33,000 lbs.)	17,500 kg (38,500 lbs.)
Y/Z: 0.005 mm (0.00020")	X: 0.008 mm (0.00032") Y/Z: 0.005 mm (0.00020")	Y/Z: 0.005 mm (0.00020")	X: 0.008 mm (0.00032") Y/Z: 0.005 mm (0.00020")	Y/Z: 0.005 mm (0.00020")	X: 0.008 mm (0.00032") Y/Z: 0.005 mm (0.00020")	Y/Z: 0.005 mm (0.00020")	
Y/Z: 0.003 mm (0.00012")	X:0.006 mm (0.00024") Y/Z: 0.003 mm (0.00012")	Y/Z: 0.003 mm (0.00012")	X:0.006 mm (0.00024") Y/Z: 0.003 mm (0.00012")	Y/Z: 0.003 mm (0.00012")	X:0.006 mm (0.00024") Y/Z: 0.003 mm (0.00012")	Y/Z: 0.003 mm (0.00012")	
ISO 1986-1							

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