

# Rush Machinery, Inc.

## Specification- *Model 250A-SV (Structural Version) Drill Grinders*

### I. Operational Features

#### A. Drill & Tool Size Capacities

1. Drill Diameter Range: 3/32" (2.5 mm) to 2" (51 mm)
2. Tool Shanks: Straight Shanks: 3/32" (2.5mm) to 2" (51mm) diameter  
Morse Taper Shanks: to #5
3. Maximum Drill Length: 16" (406mm); 26" (660mm) with optional spindle extension (P/N SP50). For most drills less than 3/4" (19mm) diameter, almost any length can be accommodated. Drills over 3/4" (19mm) diameter and over 26" (660mm) long can be ground, in some cases. Contact Rush Machinery regarding specific applications.
4. Maximum Diameter of Tools Other than Drills: 2-1/2" (63mm), with a maximum shank diameter of 2" (51mm).
5. Maximum Length of Tools Other than Drills: 5" (127mm) excluding the tool shank. Note: Maximum length is reduced 3/4" (19mm) on machines equipped with automatic infeed.

#### B. Basic Drill & Tool Sharpening Capabilities

1. Drill Sharpening (right or left hand) *Note: For all left hand tools, optional cams are required.*
  - a) Point Angle Range: 40 to 180+ degrees
  - b) Number of Flutes-2 & 4
  - c) Flute Types-straight, spiral (slow, standard & fast) and parabolic
  - d) Shank Types- Straight and Morse Taper Nos. 1\*, 2, 3, 4 & 5\*  
(\* *Optional* rear steadies available).
  - e) Point Types – structural steel point, conventional point, web thinned, split point, lip corrected, double angle, 4-facet, flat bottom, plastic point\*, spiral point\*, sheet metal\* (\* *Optional* cam required, see para. II.D.7.)
  - f) Step and subland - sharpen point and step
2. Annular Cutters: 3, 4, 6, and 8 flutes  
Requires an optional dish-type grinding wheel. See Rush Price List or contact Rush Machinery for details.
3. Countersink Sharpening (evenly spaced flutes only)  
Number of Flutes- 1\*\*, 2, 4, & 6\*. (\**Optional* cam required)  
\*\* *Optional*- Single Flute Grinding Attachment (P/N SF80) required.
3. Tap Sharpening
  - a) Sharpens the tap chamfer.
  - b) Straight flutes (for high spiral taps- bottoming chamfer only)
  - c) Number of Flutes- 2, 4\*, 6\*, & 8\* (\* *Optional* cam required)
4. Reamer Sharpening
  - a) Sharpens the reamer chamfer
  - b) Number of flutes- 4\*, 6\*, 8\* & 10\* (\* *Optional* cam required)

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5. End Mill and Counterbore sharpening
  - a) Number Flutes (End Sharpening)
    - (1) Center cutting- 2, 3 & 4
    - (2) Non-center cutting- 6
  - b) On end-grind - Primary, secondary and gash in one setup.
  - c) End Mill O.D. Grinding (any number of flutes) with *optional*: Air Bearing Grinding Attachment (P/N AB50)
6. Spin and Index grinding
  - a) Spin Grind- straight (i.e. drill shanks and pilots), chamfer (adjustable angle) & square end.
  - b) Index grind flats - with integral 12 position indexing plate.
7. Grind most tool materials (i.e. high speed steel, cobalt high speed steel and tungsten carbide) with the use of the properly selected grinding wheels.

#### **II. Construction Features**

##### **A. Grinding Spindle Assembly**

1. Wheel Spindle shaft- hardened and ground steel with a standard tapered end for wheel hub mounting (taper- 3" per foot).
2. Sealed ball bearings- (1) single row and (1) double row, angular contact bearing
3. Spindle Housing
  - a) Material - cast iron
  - b) Adjustable tilt from horizontal: +/- 30 degrees
4. Spindle Mounting Column
  - a) Material- cast iron
  - b) Spindle vertical position adjustment is by Acme screw, bronze nut & hand wheel.
  - c) Vertical dovetail ways are provided with adjustable tapered gibs.
  - d) Linear vertical positioning scales are mounted on each side of the column.
  - e) Accordion type dust cover is used over the ways and lead screw.
5. Spindle motor- 1/2 H.P., Totally Enclosed Fan Cooled (TEFC), 3450 rpm, 1 phase, 115 volts, 60 Hz.  
*Option*- 3 phase system, 230/400/460V, 1 HP, 50/60 Hz (P/N MS04).  
*Note*- Machines equipped with the Automatic In-feed System, the 1 H.P., 3 phase motor is provided as standard.
6. Starter switch- for single phase motor is a manual switch with overload protection. *Optional*- Magnetic starter system is used for a 3 phase motor and has overload protection; 115V output control transformer and a push button on/off station.
7. Coupling- motor/spindle shaft- keyed, self-aligning splined elastomer type.
8. Protective steel grinding wheel shroud with hinged cover for easy access

##### **9. Grinding Wheels**

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- a) Standard - 6-1/2" diameter x 1-1/8" wide x 1-1/4" bore, CBN electroplated grinding wheel (P/N BPS1). This wheel does not require dressing, and can be recoated when it is worn.
  - b) *Optional*- Ceramic/aluminum oxide, CBN and diamond wheels of various types - See Rush Price List or contact Rush Machinery for details.
- B. Cross Slides (X & Y directions)
1. Cast iron
  2. Spindle mounting vertical column mounts on the cross-slides.
  3. Dovetail ways with adjustable tapered gibs on each slide
  4. Both slides are equipped with Acme screws and bronze nuts
  5. An adjustable stop is mounted on the traverse ways to ensure a repeatable centering position during point splitting and other operations. Stop can be quickly disengaged, when not in use.
  6. The traverse slide has a calibrated dial with crank. Dial calibrations are to 0.002"
  7. In-feed slide has a calibrated dial with crank. Dial calibrations are to 0.001".  
*Note: Optional*- Millimeter dial calibrations (6. & 7. above) available.
  8. Metal and accordion type dust covers protect the ways.
- C. Machine base
1. Cast iron
  2. Tool point angles set with easy to read, point angle scale
  3. Provides mounting for the cross-slides and the workhead
  4. Two manual pin holes, in the base, provide positive workhead angular "lock" locations, at perpendicular to and parallel to the grinding wheel axis.
- D. Work head
1. Machined cast aluminum- main body and gear cover with cast iron work head base.
  2. Work holding Chuck 6-1/2" (165 mm) O.D.- self centering, with 6 precision and hardened steel jaws with holding length of 2-5/16" (59 mm), Meehanite body and hardened steel scroll plate. Chuck work holding diameter range- 3/32" (2.5 mm) to 2" (51 mm).
  3. Chuck spindle- hollow, hardened and ground with 2"+ (51+ mm) diameter bore. Spindle provides 12 index slots for index grinding.
  4. Chuck spindle and cam rotation drive uses machined gears in a covered housing. Drive source is a hand crank or geared-head air motor.

#### **Model configurations:**

Model 250A-SV as above.

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Model 250AS-SV semiautomatic or automatic in-feed models have a Pneumatic system to provide chuck rotation with an adjustable speed controlled air motor, through a timing belt, as the drive source plus a hand knob for small quick chuck position adjustments. The system also includes air lubricator, pressure regular and filter, speed control valve, 4-way valve (for forward, reverse and stop control) and a gear-head air motor (mentioned above).

Model 250AS-SV with Automatic In-feed System: The In-feed system functions through electronic and pneumatic elements, in addition to, the above mentioned chuck rotation pneumatic system. In-feed control elements include: a programmable controller, proximity switch (to count chuck revolutions), electric counter with count limit control, in-feed “on” & “off” push buttons, toggle switch with “full” & “½” feed rate positions, and an adjustable in-feed screw ratchet mechanism (adjusts for 0.0005”, 0.001” or 0.0015” in-feed for each chuck revolution control signal). *Note*: With automatic in-feed “off”, the machine can be manually operated. *Note*: Information sheet is available for the Automatic Infeed System

5. The spindle bearing is a large diameter precision rotary-linear ball bearing which provides anti-frictional motion in both rotational and linear directions.
6. The spindle and cam rotational drive system uses hardened and ground gear shafts with radial and thrust anti-friction needle bearings. Gear ratio between the cam and workhead spindle rotation is 2:1 for rotational grinding of only an even number of flutes.
7. Cam action- provides controlled spindle forward/back axial motion for a variety of grinding requirements including grinding *left hand* (LH) & *right hand* (RH) tools.
  - a) All cams are surface hardened.
  - b) Cam followers are ball bearing roller type
  - c) Cams can be changed in 5 to 10 seconds without tools.

P/N	Standard Cams	P/N	Optional Cams
C04	#4- RH 2-flute drills & taps	C09	#9- LH 6-flute straight taps & reamers
C14S	#14S- RH 2-flute structural steel point	C10	#10- RH 6-flute straight taps & reamers
		C10A	#10A- RH 6-flute for larger taps
	<b>Optional Cams</b>	C12	#12- RH 2-flute self-centering spiral pt.

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C01	#1- LH 2-flute drills & taps	C14	#14- RH 2-flute sheet metal, fishtail &
C05	#5- LH 2-flute step & subland drills		brad point
C06	#6- RH 2-flute step and subland drills		
C07	#7- LH 2-flute step and subland drills	C15	#15- LH 8-flute reamers & taps
C08	#8- RH 4-flute drills & taps	C16	#16- RH 8-flute reamers & taps
C08A	#8A- RH 4-flute high relief for taps	C17	#17- LH 10-flute reamers
	1" diam. & up	C18	#18- RH 10-flute reamers

#### 8. Rear Steady Rest

- a) Provides centering support for drills with Morse tapers and larger diameter straight shank drills in the spindle bore.
- b) Rear Steady Rest
  - (1) Morse Taper- Standard: MT #2, #3, & #4  
*Optional:* MT # 1 (P/N 50MT01) & #5 (P/N MT05)
  - (2) Straight shank- *Optional:* Recommended for drills over 3/4" (19 mm) diameter (P/N RS50)

#### E. Flood Coolant System

1. Consists of: tank, motor-pump, shutoff valve, check valve, flexible feed line with nozzle, associated pipe, fittings and flexible supply and return hoses.
2. Tank- rectangular, 10 gallon capacity, has a removable strainer basket and a two part tank to allow settling of grinding residue.
3. Motor-pump
  - a) Motor 1/8 HP
  - b) Delivers up to 6 gallons per minute.
  - c) Pump runs only when the grinding spindle motor is activated via separate auxiliary contacts in the spindle control.

#### F. Cabinet- Machine Stand with enclosed storage

1. Material - 12 Ga. sheet steel
2. Dimensions- 30" (762 mm) high, 30" (762 mm) deep and 28"-23" (710 mm-584 mm) (tapered) width.
3. Continuous hinged door with latch knob for storage area.
4. Cabinet top with 2" (50 mm) high sides serves as coolant tray with a drain tube connection at the rear.
5. Four floor mount feet each with a 13/32" (10.3 mm) hole.  
Included are the following supplementary items
  - a) Flat vertical mount splash shield (7"[178 mm] high" x 16"[406mm] long), which clip mounts along the coolant collector top lip.
  - b) Curved splash shield with a magnetic mount.

#### G. Standard Work Light

1. Maximum 100 watts incandescent lamp @ 115 V.
2. Goose neck- 24" long for adequate maneuverability.
3. Cool lamp shade construction
4. *Optional-* Attached inspection magnifier (2X mag.) for standard work

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light. (P/N MG02)

5. *Optional*- High Intensity Halogen work light (P/N HL02) plus an *optional* attached 2.5X inspection magnifier (P/N MG01).

#### H. Machine Weights & Dimensions

1. Crated Dimensions:     37" (94cm) wide  
                                      37" (94cm) deep  
                                      64" (163cm) high
2. Weights:                     Manual:                     590lbs (268kg) net  
                                                                                              710lbs (323kg) crated  
                                                           Semi-automatic:         615lbs (280kg) net  
                                                                                              735lbs (334kg) crated  
                                                           Automatic infeed:       700lbs (318kg) net  
                                                                                              820lbs (373kg) crated
3. Maximum Dimension (full extension of travels):  
      Manual, Semi-automatic: 45" (114cm) wide x 40" (102cm) deep x 54"  
                                                                                              (137cm) high  
      Automatic infeed:         47" (119cm) wide x 43" (109cm) deep x 56"  
                                                                                              (142cm) high

#### III. **Optional** Equipment- Items available to mount on or compliment these machines.

- A. Air Bearing End Mill Grinding Attachment (P/N AB50) *Note: Air Bearing Fixture Specification is available.*
- B. Halogen Hi Intensity Work Light (P/N HL02) has an *optional* mounted Inspection Magnifier with 2.5 X magnification (P/N MG01).
- C. Radial Relief Attachment (P/N RR50)- for pilot relief of step drills
- D. Precision Wheel Balancer (P/N WB01) with taper wheel hub supporting mandrel.
- E. Spindle Extension (P/N SP50) - supports extra long drills, from 16" to 26" OAL.
- F. Rear Steady for Straight Shank Drills (P/N RS50) -for drills over 3/4" (19mm) dia.
- G. Single Flute Countersink Grinding Attachment (P/N SF80)
- H. Radius Grinding Fixture (See Radius Grinding Fixture Specifications)
- I. #5 Morse Taper Rear Steady Rest (P/N 50MT05)
- J. Various Diamond wheels for grinding carbide tools
- K. Various CBN and conventional wheels for grinding high speed and high speed cobalt steel tools