

# Rush Machinery, Inc.

## Specification- *Model 382S* series Drill & Tool Grinders

### I. Operational Features

#### A. Drill & Tool Size Capacities

1. Drill Diameter Range: 3/16" (5mm) to 3-1/8" (80mm)
2. Tool Shanks: Straight Shanks: 3/16" (5mm) to 3-1/8" (80mm) diameter  
Morse Taper Shanks: to #6
3. Maximum Drill Length: 20" (508mm); 28" (711mm) with optional spindle extension (P/N SE80). For most drills less than 1" (26mm) diameter, almost any length can be accommodated. Drills over 1" (26mm) diameter and over 28" (711mm) long, can be ground, in some cases. Contact Rush Machinery regarding specific applications.
4. Maximum Diameter of Tools Other than Drills: 4" (102mm), with a maximum shank diameter of 3-1/8" (80mm)
5. Maximum Length of Tools Other than Drills: 7" (178mm) 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-1, 2, 3 & 4
  - c) Flute Types-straight, spiral (slow, standard & fast) and parabolic
  - d) Shank Types- Straight and Morse Tapers Nos. 2, 3, 4, 5, & 6
  - e) Point Types - conventional, split point, lip corrected, web thinned, spiral point\*, sheet metal\*, double angle, 4-facet, flat bottom, structural steel\* & plastic point. (\* *Optional cam* required, see para. II.D.7.)
  - f) Step and subland - sharpen point and step
2. Countersink Sharpening (evenly spaced flutes only)
  - a) Number of Flutes- 1, 2, 3, 4, 5\*, 6\* (\* *Optional cam* required)
3. Tap Sharpening
  - a) Sharpens the tap chamfer.
  - b) Straight flutes (for high spiral taps- bottoming chamfer only)
  - c) Number of Flutes- 2, 3, 4, 5\*, 6\*, 7\*, & 8\* (\* *Optional cam* required)
4. Reamer Sharpening
  - a) Sharpens the reamer chamfer
  - b) Number of flutes- 4, 5\*, 6\*, 7\*, 8\* & 10\* (\* *Optional cam* required)
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.

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- c) End Mill O.D. Grinding (any number of flutes) with *optional*: Air Bearing Grinding Attachment (P/N AB80)
- 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 H.P., Totally Enclosed Fan Cooled (TEFC), 3450 rpm, 3 phase system, 230/400/460 V, 50/60 Hz.  
*Note*- Machines equipped with the Automatic In-feed System, a 1½ H.P. 3 phase motor is provided, as standard.
- 6. Magnetic starter system is used for a 3 phase motor control 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 grinding wheel shroud with hinged cover for easy access
  - a) Steel construction
  - b) Has provision for using the *optional* - Overhead Rush "Easy Dress" Wheel Dresser (P/N WD01- See *optional* list in para. III)
- 9. Grinding Wheels
  - a) Standard - Main wheel: 7" diameter by 1-1/2" wide aluminum oxide & ceramic blend with 1-1/4" bore. *Note*: A CBN main grinding wheel is provided, as standard, with the *optional* Automatic Infeed System.
  - b) *Optional*- Ceramic/aluminum oxide, CBN and diamond wheels of various types - See Rush Price List or contact Rush Machinery for details.

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#### 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)*
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 work head base.
2. Work holding Chuck 7-9/16" (192 mm) O.D.- self centering, with 6 precision and hardened steel jaws with a holding length of 3.25" (82.5mm), Meehanite body and hardened steel scroll plate. Chuck work holding diameter range-3/16" (4.5 mm) to 3-1/8" (80 mm).
3. Chuck spindle- hollow, hardened and ground with 3-1/8"+ (80+ mm) diameter bore.
4. Chuck spindle and cam rotation drive uses machined gears in a covered housing. Spindle drive source for the Model 382S and the below, 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 an 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 configurations:**

Model 382S as above.

Model 382S 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

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elements: 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). *Notes:* With automatic in-feed “off”, the machine automatically switches to manual in-feed control.

*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/s between the cam and spindle rotation are 2:1 for even number of flutes and 1:1 for odd number of flutes. The cams provide controlled axial motion to the workhead spindle for various grinding requirements
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.
  - d) Cams available:

<b>P/N</b>	<b>Standard Cams</b>		<b>Optional Cams</b>
C04	#4- RH 2-flute drills & taps	C07	#7- LH 4-flute drills & taps
C06	#6- RH 2-flute step & subland drills	C08A	#8A- RH 4-flute high relief for taps 1”
C08	#8- RH 4-flute drills & taps		Diam. & up
C22	#22- RH <i>single-flute</i> countersinks	C09	#9- LH 6-flute straight taps & reamers
C24	#24- RH 3-flute countersinks, core drills, & taps.	C10	#10- RH 6-flute straight taps & reamers
	<b>Optional Cams</b>	C10A	#10A-RH 6-flute for larger taps
C01	#1- LH 2-flute drills & taps	C12	#12- RH 2-flute self-centering spiral pt.
C05	#5- LH 2-flute step & subland drills	C14	#14- RH 2-flute sheet metal, fishtail & brad point.

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P/N	Optional Cams	P/N	Optional Cams
C14S	#14S- RH 2-flute structural steel point	C24A	#24A- RH 3-flute <u>high relief</u> for larger taps
C15	#15- LH 8-flute reamers & taps		(5/8" dia. & up)
C16	#16- RH 8-flute reamers & taps	C25	#25- LH 5-flute taps, c'sinks & reamers
C17	#17- LH 10-flute reamers	C26	#26- RH 5-flute taps, c'sinks & reamers
C18	#18- LH 10-flute reamers	C26A	#26A-
C21	#21- LH <i>single-flute</i> countersinks	C27	#27- LH 7-flute taps & reamers
C23	#23- LH 3-flute taps, countersinks &	C28	#28- RH 7-flute taps & reamers
	Core drills		

#### 8. Rear Steady Rests

- a) Provides centering support for drills with Morse tapers and larger diameter straight shank drills in the spindle bore.
- b) Rear Steady Rests
  - (1) Morse Taper- Standard: MT #2, #3, #4, #5 & #6
  - (2) Straight shank- *Optional*: Recommended for drills over 1" (25 mm) diameter (P/N RS80)

#### E. Flood Coolant System

1. Consists of: tank, motor-pump, shutoff valve, check valve, flexible feed line with nozzle, associated pipe, fittings and "see-thru" flexible supply and return hoses.
2. Tank- rectangular, 10 gallon capacity has a removable return strainer 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.

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6. Included are the following supplementary items
  - a) Padded tool/work tray (6"[152 mm] x 12" [305 mm]), which clip mounts anywhere along the coolant collector top lip.
  - b) Flat vertical mount splash shield (7"[178 mm] high" x 16"[406 mm] long), which clip mounts along the coolant collector top lip.
  - c) Curved splash shield with a magnetic mount.

#### G. Standard Work Light

1. Maximum 100 watts incandescent lamp @ 115 V.  
*Note:* Power @ 115 V. is provided from an oversized control transformer.
2. Goose neck- 24" long for adequate maneuverability.
3. Cool lamp shade construction
4. *Optional*- Attached inspection magnifier (2X mag.) for standard work 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  
                                  49" (124cm) deep  
                                  64" (163cm) high
2. Weights:               Semi-automatic:               745lbs (339kg) net  
  915lbs (416kg) crated  
                                  Automatic infeed:               835lbs (380kg) net  
  1010lbs (459kg) crated
3. Maximum Dimension (full extension of travels):  
      Semi-automatic:               48" wide x 44" deep x 55" high  
      Automatic infeed:             50" wide x 47" deep x 57" high

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

- A. Air Bearing End Mill Grinding Attachment (P/N AB80).  
*Note:* Air Bearing Grinding Fixture Specification is available.
- B. Mounted Overhead Wheel Dresser "Easy Dress" (P/N WD01)- designed for simple one hand operation. *Note:* Wheel Dresser information sheet is available.
- C. Halogen Hi Intensity Work Light- 20 watts (P/N HL02) has an *optional* mounted Inspection Magnifier with 2.5 X magnification (P/N MG01).
- D. Radial Relief Attachment (P/N RR80) - for pilot relief of step drills
- E. Precision Wheel Balancer (P/N WB01) with tapered wheel hub, supporting mandrel.
- F. Spindle Extension (P/N SE80)- support assistance for extra long drills, from 20" to 28" over all length.
- G. Rear Steady for Straight Shank Drills (P/N RS80) - for drills over 1" dia.
- H. Radius Grinding Fixture (See Radius Grinding Fixture Specifications)