Winslow® FR-200

Form Relief Grinder

Winslow
Engineering Inc.

This Form Relief Grinder Outperforms Primary/Secondary Grinding 6 Ways

1 One Machine Does Multiple Tasks

Standard machine accommodates cutting tools with shaft diameters up to 1–1/2”, and requires no special tools, jigs, or fixtures to complete sharpening operations. It’s complete in itself.

2 Better Cutting Edge Support Reduces Tool Wear

Form relief grinding requires just a single setup and a slightly curved grinding path to dress the cutting edge; consequently, ample metal remains to support the edge and absorb damaging heat... the major cause of tool wear and breakage. The form relief method also improves tools previously sharpened by the primary/secondary relief method because less metal is removed with recurring sharpenings.

3 Increased Body Strength Reduces Tool Breakage

Step tools and others that perform two operations can be precision sharpened without undercutting at intersections. The elimination of intersection gashing increases tool body strength and greatly reduces tool breakage.

4 High-Speed Cutting Improves Productivity And Profit

Because more metal remains behind the cutting edge to absorb heat and shock, the cutting tool can operate at higher cutting speeds. Result: Reduced manufacturing costs and higher quality performance.

5 Proper Cutting-Tool Balance Maintains Edge

Taps, counterbores, and reamers having several “lands” are sharpened with same length, diameter and relief on each cutting edge – so lands load evenly. This eliminates chatter, permits greater feedrates, and lengthens the interval between tool sharpenings.

6 Burr-Free Edge Prevents Cutter Failure

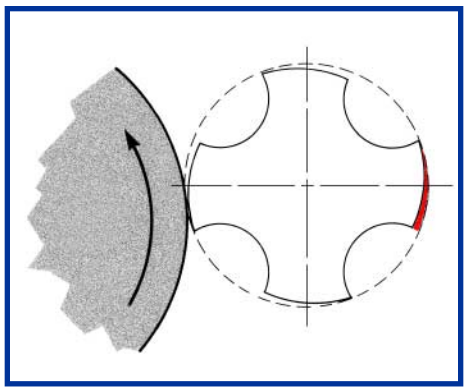
Because the grinding wheel rotates into the cutting edge, a precision burr-free edge is produced at the intersection of relief and margin. If no margin is desired, a burr-free knife edge is produced with form relief extending from the cutting edge to the heel of the tool. This contributes to cooler operation, prevents galling and/or premature breakdown of the cutting edge.

Step Spotface | Trepanning Cutter | Spiral Flute Tap | Punch Insert | Step Reamer | Mill Cutter

The Obvious Difference is the Strength Behind the Cutting Edge

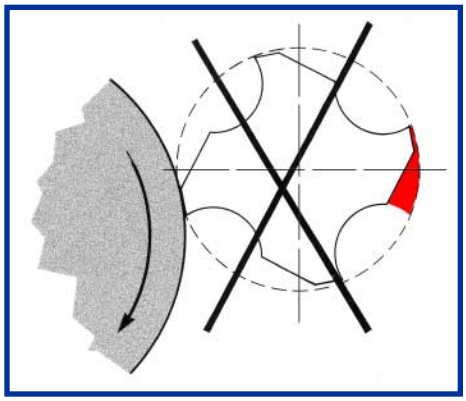
One-Step FR-200 Method Form Relief Edge

A single pass on the grinding wheel removes minimal metal, yet produces a sharp edge with generous cutting edge support.



Two-Step Traditional Method PrimaryISecondary Edge

Requires two setups and two grinding passes; one flat-surface grind to produce the primary relief,



a second flat-surface grind to produce the secondary relief. **Note:** There is less support for the cutting edge because a greater amount of metal is removed with the first grind and with subsequent sharpenings. **Result:** Early breakdown of cutting edge.

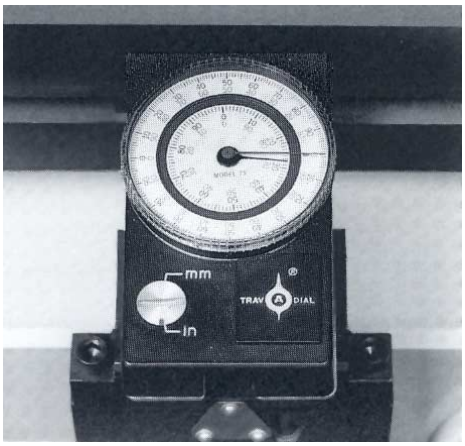
Multiple Step Cutter | Special Form Cutter | Step Drill & Spotface Combination Cutter | Form Boring Cutter

Handles shaft diameters to 1-1/2”
Use for precision form relief grinding; O.D. & I.D. grinding; surface grinding of most types of cutting tools, including 1 to 18 flute cutters, taps, drills, step drills, subland drills, center drills, boring tools, reamers, and those cutting tools shown here.

Study, Compact Design Brings All Elements to Your Fingertips

Trav-A-Dial Indicator Verifies True Grind

Optional indicator measures position movement in .001” increments over the full 26” of table



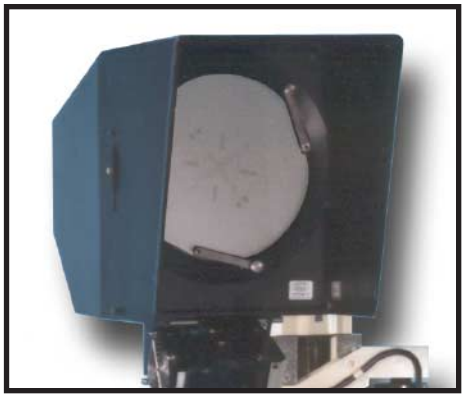
travel. Mounts on base. Allows inspection of cutting tool lengths prior to removing from workhead.

Wheelhead Cross-Slide Positions In Increments of .0005”

Heavy dovetail ways offer smooth precise motion. Stress-relieved steel leadscrew has double-nut adjustment to prevent backlash.

Optical Comparator Verifies Tool Form

Optional accessory has 10° diameter viewing screen and offers 10x & 20x magnification of work zone. Inspection of cutting tool for precise tolerances can be accomplished prior to removal from the workhead.



Machine Base Provides Stiff Support

This heavy-duty weldment features coolant lip with drain and 3-point screw leveling. Designed for optional built-in coolant system.

Workhead Offers Simple Setup

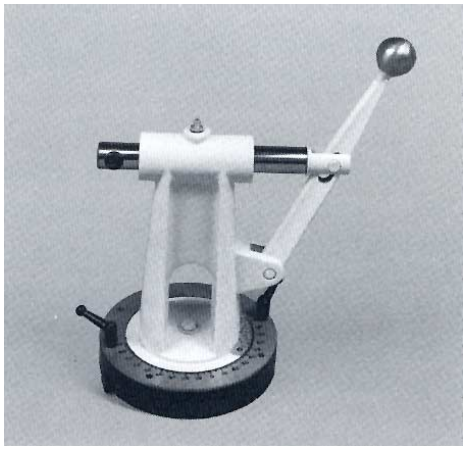
Action zone is designed for quick operator access. All controls are visible and within easy reach. A single cam and two proportioning slides generate independent axis motions. Up to .100” radial relief and up to .250” axial relief can be generated separately or in any combination.

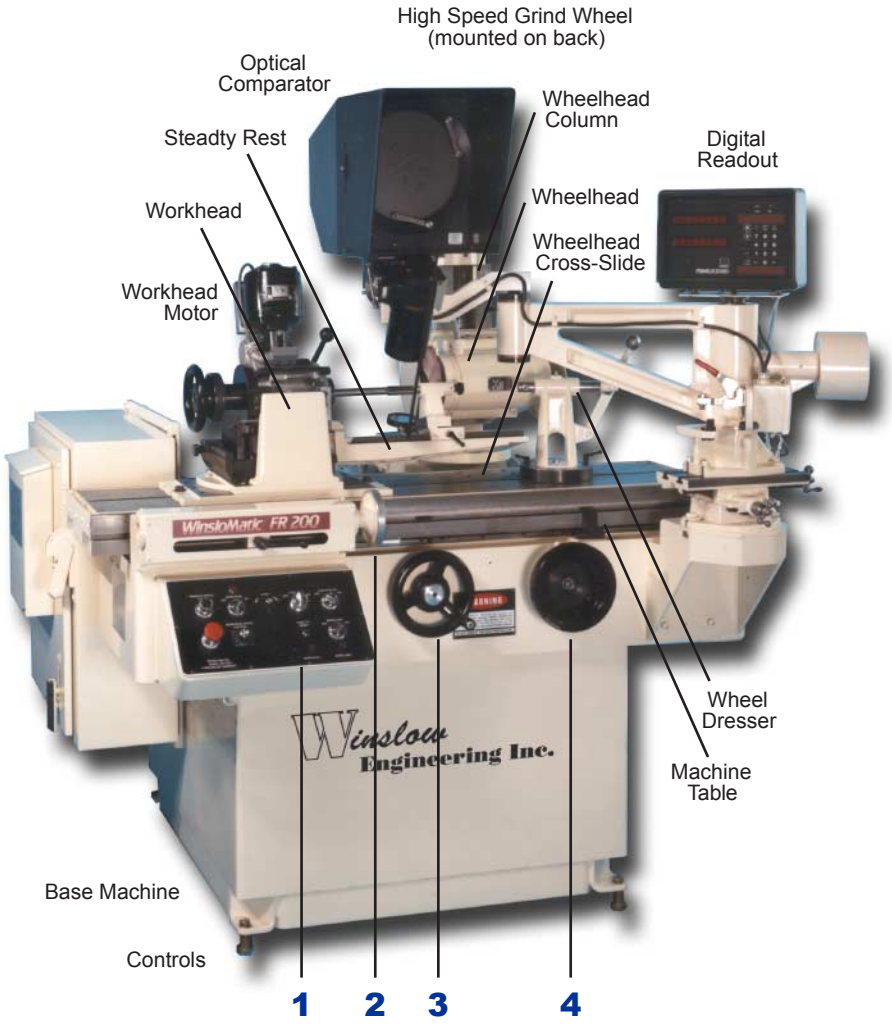
Machine Table Allows Fast Traverse And Precision Positioning

Table has 60” x 14” work surface and slides on a hardened, precision-ground way system. Includes coolant lip and drain, and T-slot for mounting fixtures and accessories. Table features rapid traverse and fine feed positioning and offers adjustable stops.

Handy Wheel Dresser Saves Time

This (optional) accessory dresses the grinding wheel face parallel to the table and at any desired angle. Dresser diamond is adjustable. Column rotates 360°. Unit locks in table T-slots.





Workhead Motor Offers Variable Speed Adjustment

The 1/8 hp, DC workhead drive system offers stepless speed adjustment from 0 to 85 rpm with either left or right-hand spindle rotation.

High-Speed, Grindwheel Attachment Increases Machine Output

Optional, self -contained spindle and motor unit provide variable speed from 10,000 to 40,000 rpm. Produces 1.5 hp continuously. Mounts to back side of column. Special controls provided. Refer to photo on page 7.

Wheelhead Holds Two Grinding Wheels To Save Time, Boost Productivity

Standard 1 hp drive system (230/460 ac) permits 3600 rpm power to both grinding wheels. Accommodates up to 7” diameter wheels. As an option, a variable speed drive is available for speeds up to 7200 rpm.

Wheelhead Column Mounts Firmly, Swivels 360°

The 10” diameter column base provides rigid support for the traveling wheelhead unit(s) .Rotates 360° to use optional, high-speed wheelhead attachment.

Controls Center Offers Convenient Access

1 Grinding wheel and workhead controls, coolant switch, comparator switch, worklight switch.

2 Fine-feed handwheel for table travel.

3 Table traverse handwheel.

4 Handwheel for column cross-slide.

Digital Readout For X & Y Axes

A (2) axes digital readout unit can be provided to accomplish accurate table and column infeed positioning. The digital readout unit includes the following features: key entry, memory preset, inch/metric conversion, axis indicator, decimal point entry, absolute zero recall/ incremental positioning and self-diagnostics.

Steadyrest Unit Accommodates Long Tools

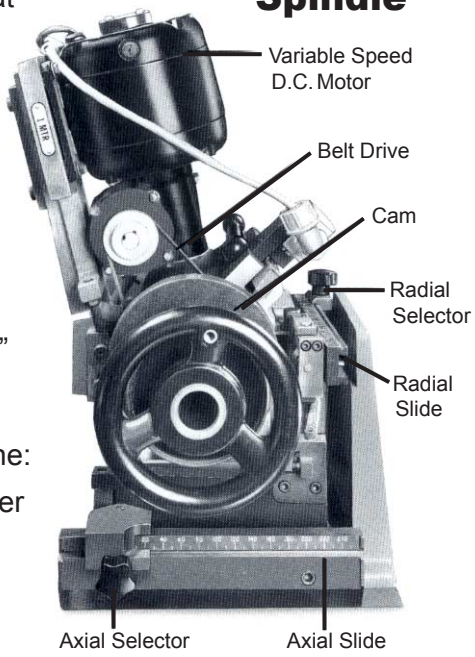
Steadyrest attachment handles tools as long as 13 inches between centers. Longer parts can be accommodated using bushing supports.

Major Elements Have Heavy-Duty Design and Convenience Features

Workhead Design Speeds Setup

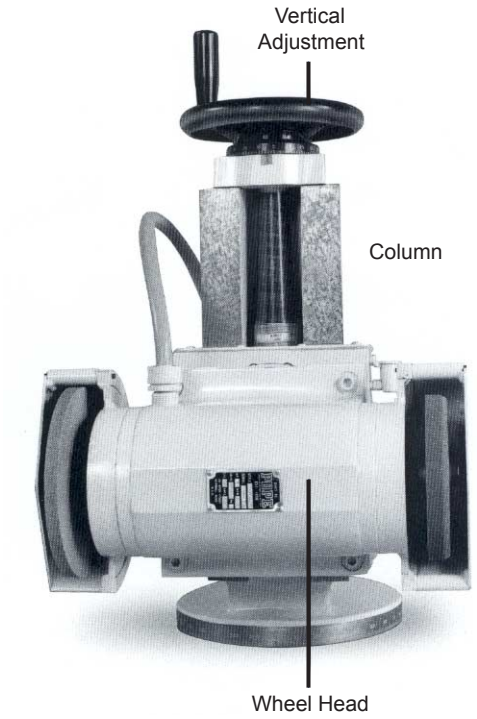
The standard workhead accepts collets that provide a maximum of 1” capacity through the spindle drawbar. Optional spindle utilizes a rubber-flex collet system and provides a maximum of 1-1/2” capacity through the spindle. When ordering, select one:

- #5C spindle taper up to 1” collet
- #33 spindle taper up to 1-1/2” collet



Wheelhead Assembly Features Precision Pope® Dual-Grinding Spindle

Pope spindle features axial and radial rigidity which eliminates wheel endplay and rollout. Designed for exceptional accuracy and durability, the double-ended grinding wheel design saves both setup and operation time. The optional variable speed drive permits operation to 7200 rpm. The wheelhead tilts up to 25° either side of horizontal and is graduated in 1° increments.



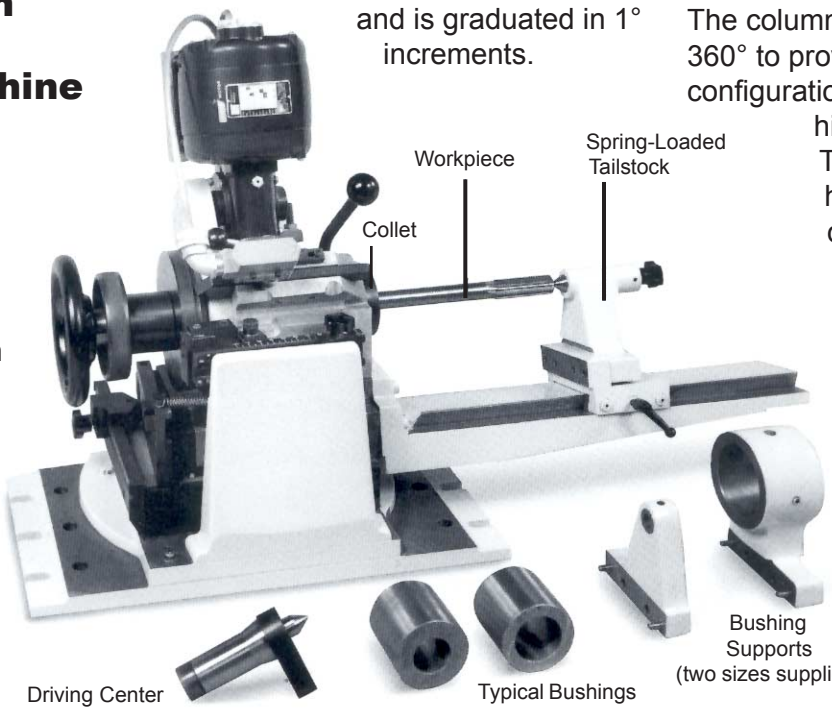
The column vertical slide permits sufficient adjustment to clear a 4” diameter tool and is operated by a handwheel graduated in .001” increments.

The column base rotates a full 360° to provide access to all wheel configurations and the optional high-speed spindle.

The column cross-slide has scraped cast iron dovetail ways to dampen vibration and is -operated by a hand-wheel graduated in .0005” increments. A precision- ground leadscrew is pre-loaded to minimize backlash.

Workhead With Steadyrest Broadens Machine Capacity

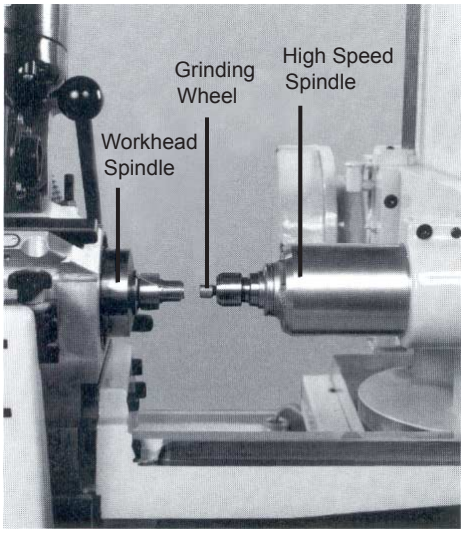
The cast iron dovetail steadyrest unit is an extremely rigid attachment with capacity to hold tools up to 13” long between centers. Even longer parts can be handled using additional bushing supports. Spring - loaded tail stock and driving center provides firm, accurate support.



Pope® is a trademark of the Pope Corporation.

High-Speed Spindle Attachment Boosts Productivity

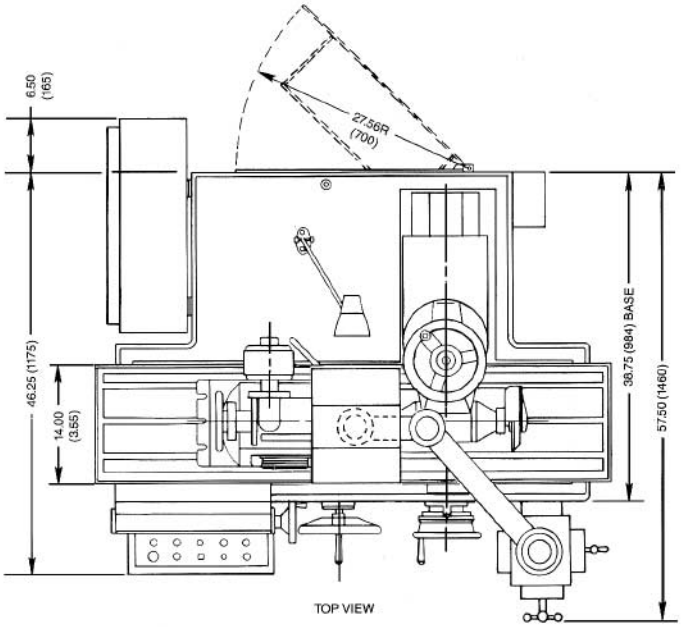
The optional high-speed grinding spindle is especially suited for ID tool grinding and the grinding of combination tools that have tight radius tolerances at the intersection of two cutting surfaces.

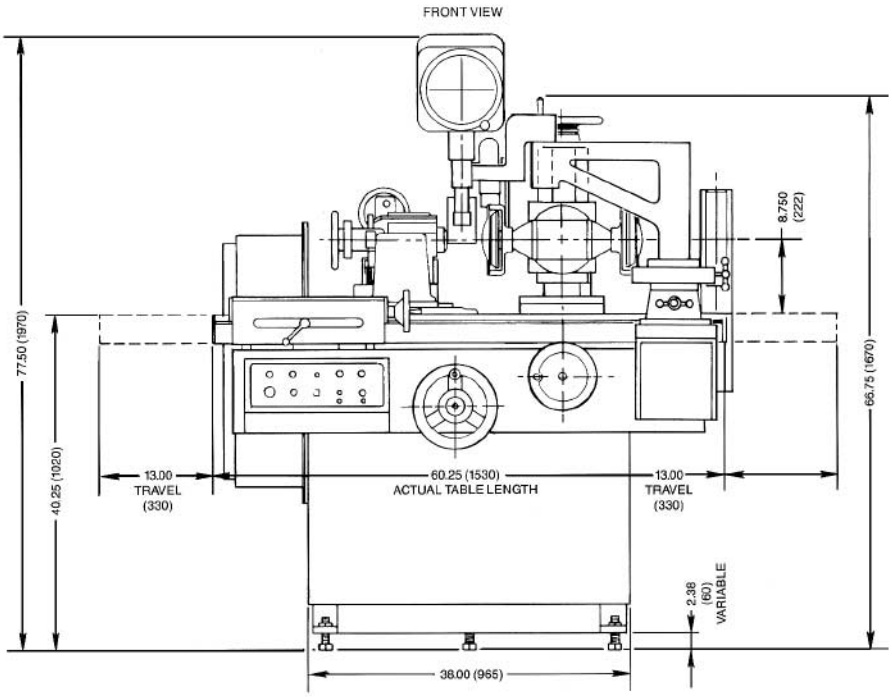


This spindle is mounted to the backside of the column opposite the wheelhead assembly. Rotate the column 180° and this spindle is ready to grind.

The motor is rated at 1.5 hp (continuous) through the infinitely variable speed range of 10,000 to 40,000 rpm. The motor mount swivels 360° to accommodate all special tool grinding requirements.

FR200





Winslow Engineering... for Every Drill Grinding Need

Model HR
Drill Point Grinder

Automatic cycle sharpens drills from 1/16” (1.55 mm) to 1-1/2” (38.0 mm) at a rate up to 120 per hour. Handles right-hand and left-hand drills, point angles from 60º to 160º. Generates conventional, Winslow-Helical, Racon®, Bickford Point® and split points.

Model 520
Drill Point Splitter

Automatic wheel dressing and infeed cycle permits accurate splitting at a rate up to 350 per hour. Splits drills from 3/32” (2.4 mm) to 1/2” (12.5 mm); web thins drills from 5/16” (8.0 mm) to 3/4” (19.0 mm). Meets or exceeds all NAS 907 specifications.

Model HC
Drill Point Grinder

Extremely versatile, semi-automatic machine from 1/16” (1.55 mm) to 1-1/2” (38.0 mm) at a rate up to 100 per hour. Handles right-hand and left-hand drills, point angles from 60º to 160º. Capable of grinding conventional, Winslow-Helical, Racon®, Bickford Point®, four-

Model 100C & 1000CC
Drill Point Grinder

High production machines for grinding with high accuracy, including fully automatic cycle and wheel dresser. The 100C grinds drills from 1/16” (1.55 mm) to 1-1/2” (38.0 mm), point angles from 90º to 140º up to 500 units per hour. Point styles include conventional, Winslow-Helical, Racon®, Bickford Point®, core drills, step drills, taps and reamers. The hopper-feed 1000CC grinds jobber drills from 3/32” (2.4 mm) to 1/2” (13.0 mm), up to 600 units per hour. Point styles include conventional, Winslow-Helical and wide-web helical points. For drill manufacturers only.

Model 525
Drill Point Splitter

Automatic chucking and indexing of the drill permits precision splitting at up to a rate up to 400 per hour. Splits drills from 1/16” (1.55 mm) to 1” (25.5 mm); web thins drills from 1/8” (3.2 mm) to 1” (25.5 mm). Meets or exceeds all NAS 907 specifications.

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