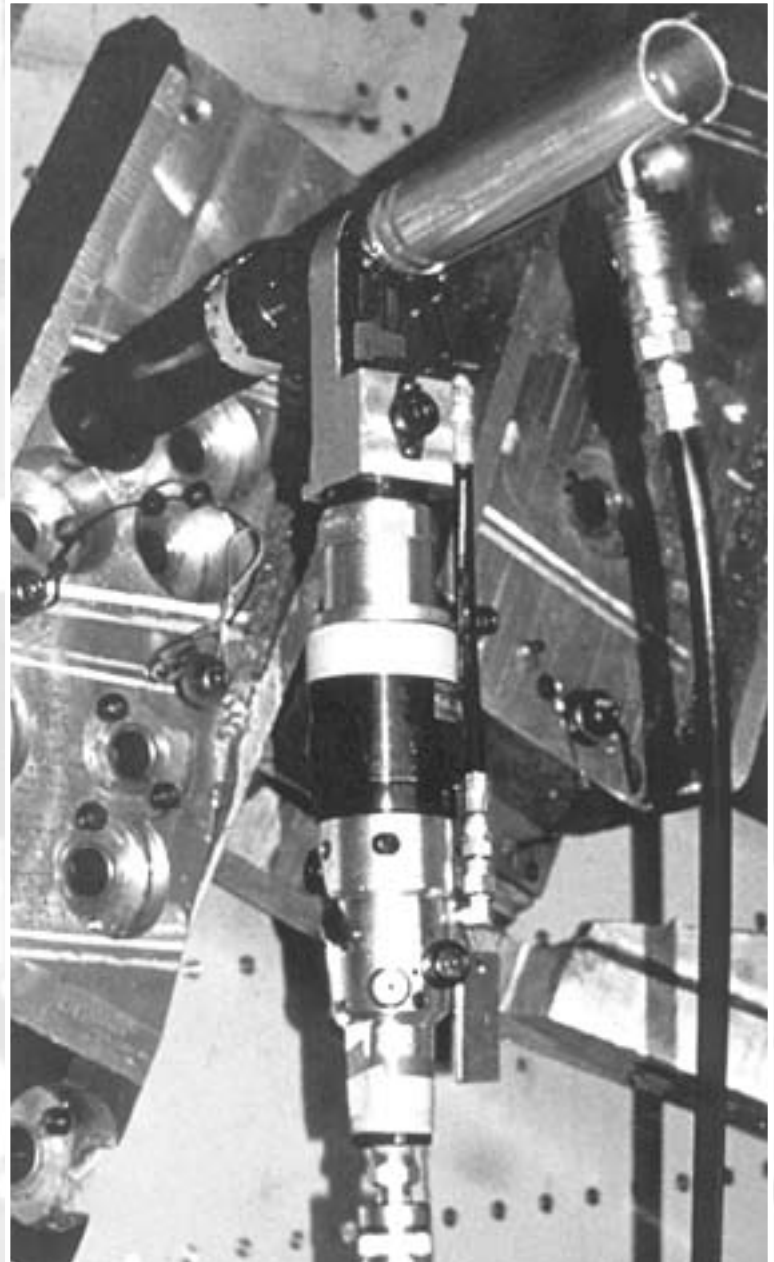


Right Angle Positive Feed Tools

ADVANCED DRILLING EQUIPMENT



Introduction

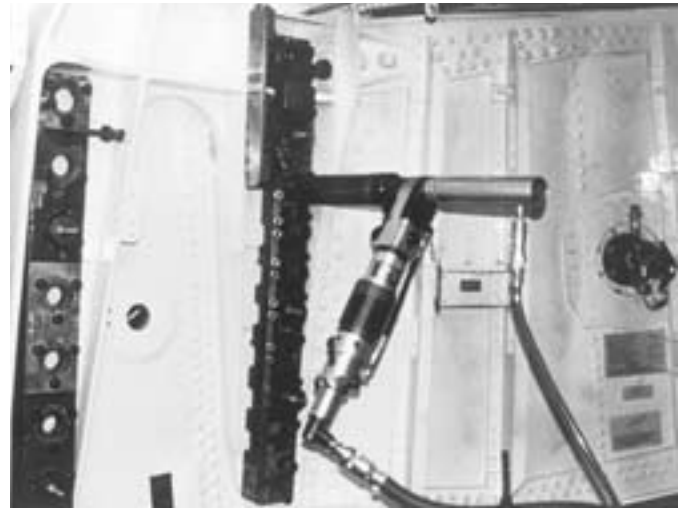
Right Angle Positive Feed Drills

Our positive feed drill motors are available in both in-line and right angle configurations (*please also see the in-line tool section*), The right angle tools are rapidly growing in popularity due to their compact size, light weight and ease of operation.

In-line drills have a limited stroke, but with a right angle drill a deeper stroke can be achieved by simply applying a longer spindle and nosepiece. In addition, the fixtures do not have to be as robust with a right angle drill, which represents a significant cost savings. The tools themselves weigh less and in use are closer to the fixture, resulting in less deflection of the fixture. Right angle tools have also been shown to reduce operator fatigue.

In general, positive feed drills are used for the larger holes and heavier structures in the aircraft industry such as the spars and the ribs, primarily in landing gear, wing and fuselage joints.

Positive feed drills produce a hole in a predictable and constant time. With each revolution of the spindle,



the cutter travels a precise distance, i.e., one-thousandth of an inch or three-thousandths of an inch depending on the settings. This is true whether the tool is drilling air or drilling a tough alloy. The benefit is that burrs caused by surging of the cutter on the exit side of the cycle are virtually eliminated.

Since the cutter advances a precise distance with each revolution, the cutter does not rotate without cutting. This reduces heat and deformation, resulting in less chance of the material work hardening.

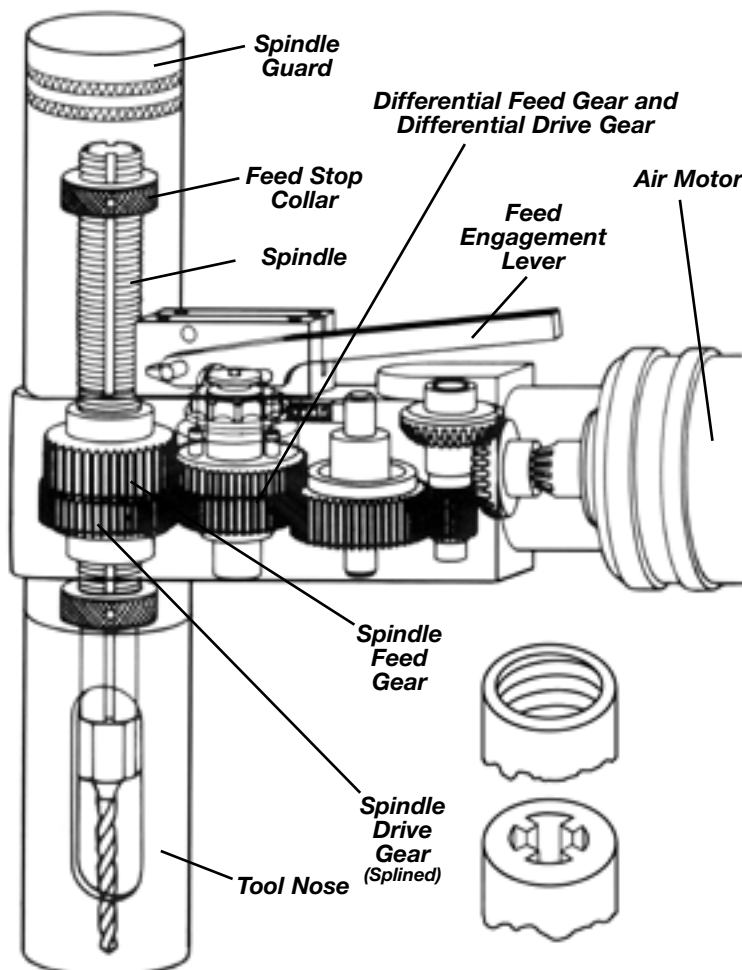
Many of the accessories for our in-line and right angle tools are interchangeable, such as chucks, nose pieces, motors and gears.

How Positive Feed Right Angle Drills Operate

The fixed rate of spindle advancement (feed) for each rotation of the drill spindle in right angle tools is accomplished by differential gearing. The spindle of a right angle drill has external left-hand threads and four drive grooves that run the length of the spindle. The spindle fits into and through two gears: the spindle drive gear and the spindle feed gear.

The spindle drive gear has internal male splines that engage the drive grooves on the spindle. When the air motor is turned on, the spindle drive gear rotates, turning the spindle.

The spindle feed gear is threaded internally to match the external thread of the spindle, and its function is to

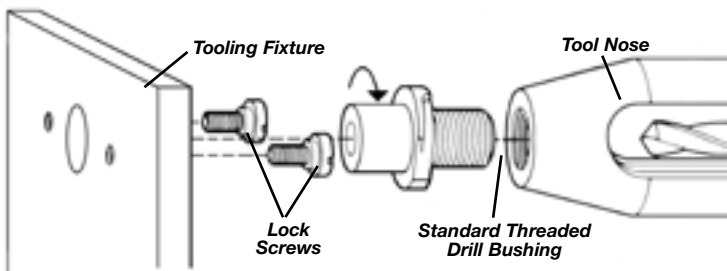
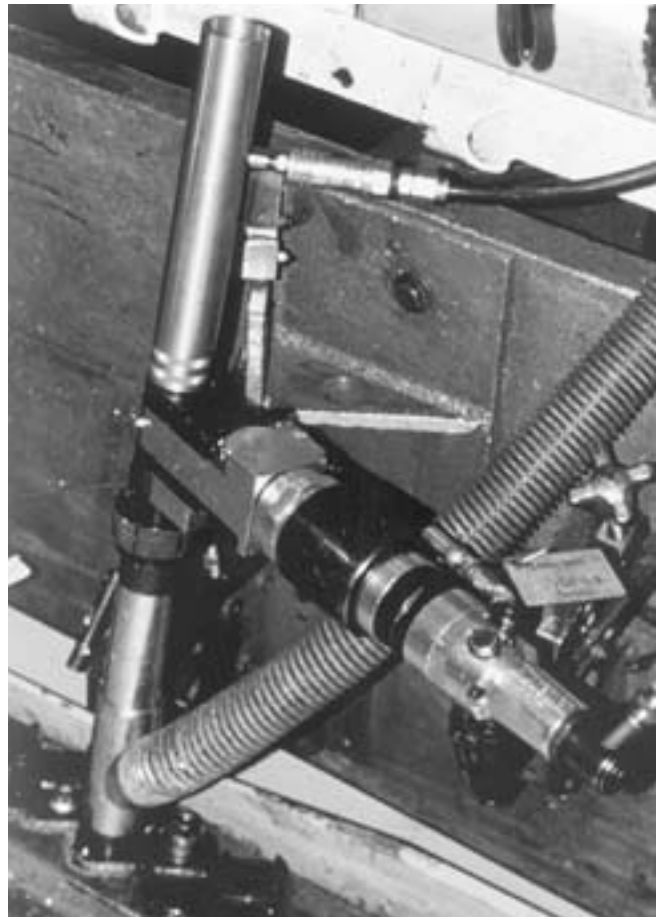


advance or retract the spindle. When this gear rotates faster than the spindle, the spindle will feed. When it stops, the spindle will retract. The desired feed rate is obtained by the differential gear ratio between the spindle drive and spindle feed gears.

At the completion of the drilling cycle, the feed stop collar contacts the feed engagement lever, lifting the differential feed gear and locking it in a stationary position. With the spindle continuing to rotate in a forward direction and the spindle feed gear held stationary, the spindle automatically retracts. This action occurs approximately three times faster than the advancement cycle. Depending on the positive feed model selected, the tool is shut down either manually or automatically.

Taper-Lok Fixturing

Customized fixtures are constructed to accept Taper-Lok Bushing Tips. Advanced Drilling Equipment tools with the Bushing Tips are inserted into the fixture, twisted and cam-locked into place.



The Bushing Tip's tapered flanges fit under the shoulder of lock screws in the fixture. The Bushing Tip holds the tool in alignment and absorbs the thrust and torque of drilling. At the completion of the drilling cycle, the tool is rotated to unlock, withdrawn from the fixture and moved to the next position.

Several different types of Taper-Lok Fixturing are available. The following are the most common.

Lock Liners

Method for mounting to a fixture. A hole is bored in the jig to accommodate the lock liner bushing. The lock ring holds the lock liner bushing in position in the jig.

Direct Mounting

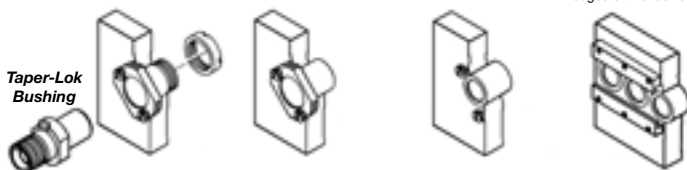
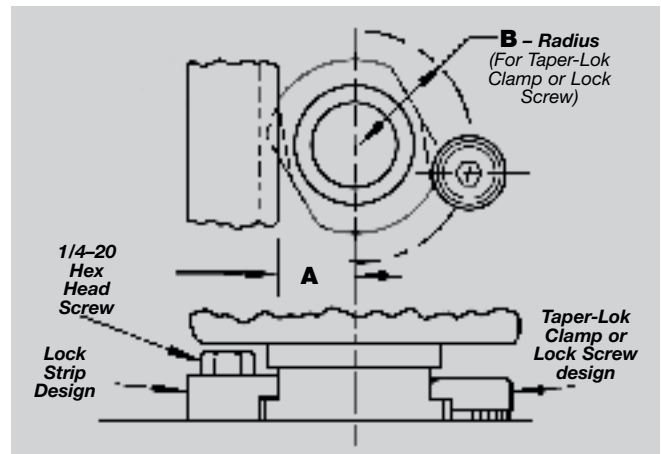
The Serrated Liner is used in potted or cast-in-place installations.

Direct Mounting

Most common mounting method has lock screws mounted directly into the fixture plate. The shank of the drill bushing tip fits directly into a bored hole in the fixture plate.

Lock Strip

This method for closely spaced holes employs a lock strip along each side of the row of holes in the fixture plate. The flanges on the Drill Bushing Tip lock under the extended edges of the lock strip.



Location Data for Taper-Lok Clamp, Lock Screw, and Lock Strip Mounting

Drill Bushing Tip Series	A	B	Tool Nose Thread (I.D.)
21000	.312	.625	3/4-16
22000	.609	.922	1-14
23000	.734	1.047	1 1/4-12
24000	.859	1.172	1 1/2-12
25000	None	1.562	2-16

Quackenbush™

932QR
942QR

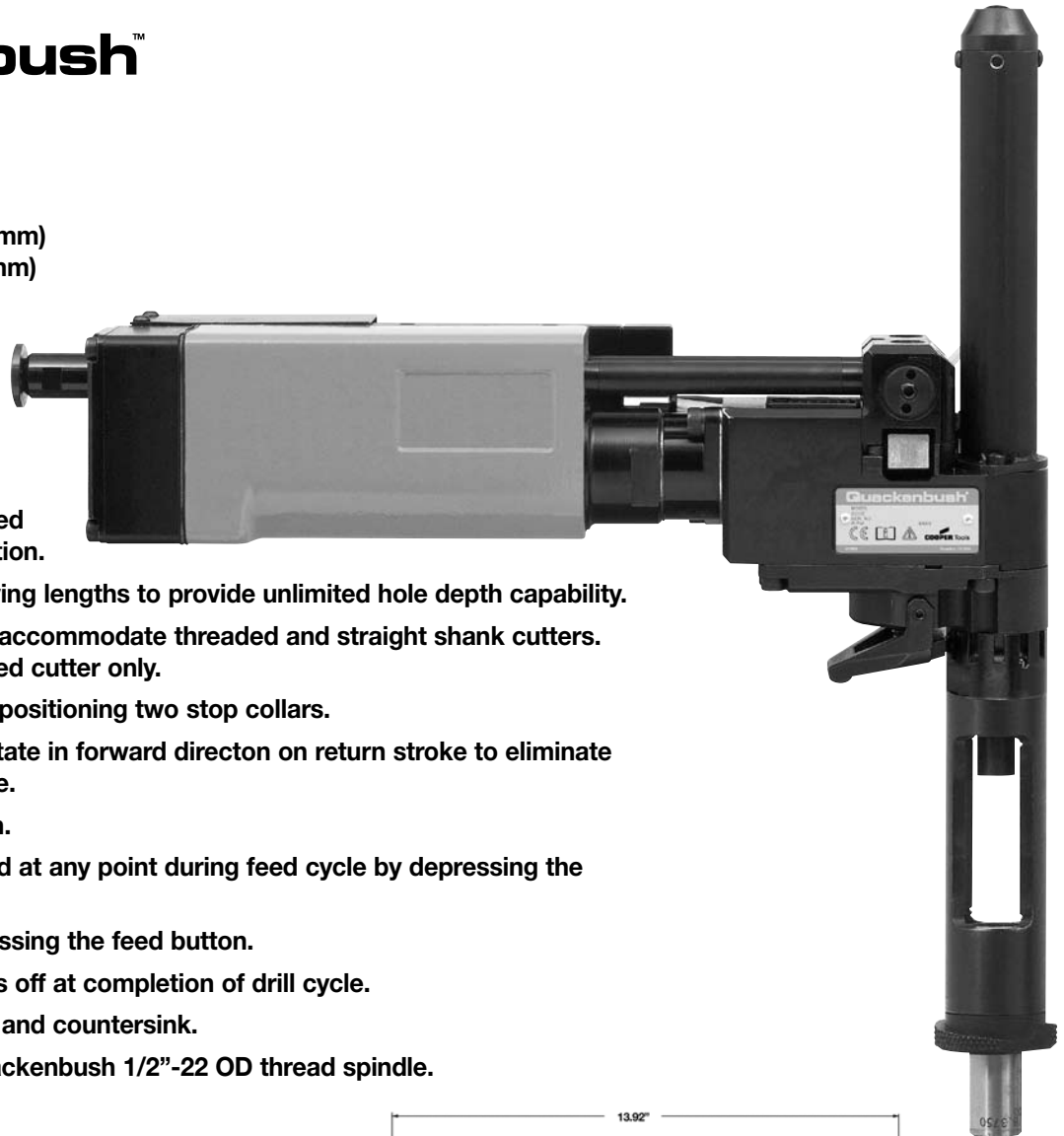
Capacity:

- Aluminum - .5625" (14.3mm)
- Titanium - .4375" (11.1mm)
- Steel - .4375" (11.1mm)

Stroke:

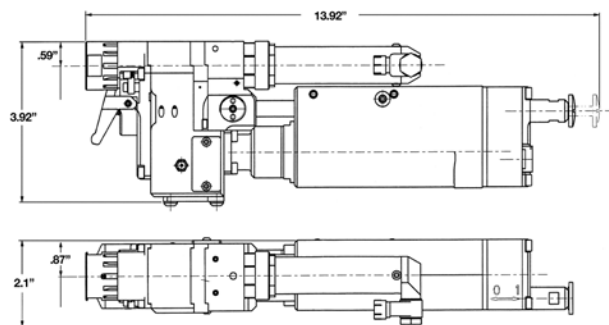
- Unlimited
- Min. - .375" (9.5mm)

- 0.9 and 1.3 nominal horsepower motors.
- Right angle tool designed for close quarter operation.
- Utilizes spindles of varying lengths to provide unlimited hole depth capability.
- Utilizes spindles which accommodate threaded and straight shank cutters. Fluid spindle for threaded cutter only.
- Stroke is adjustable by positioning two stop collars.
- Spindle continues to rotate in forward direction on return stroke to eliminate withdrawal spiral in hole.
- Rapid spindle retraction.
- Spindle can be retracted at any point during feed cycle by depressing the manual return lever.
- Feed is engaged by pressing the feed button.
- Tool automatically shuts off at completion of drill cycle.
- 932QR drill, 942QR drill and countersink.
- Easily adaptable to Quackenbush 1/2"-22 OD thread spindle.



Options

- Vacuum on nose and concentric collet
- Concentric collet
- Pneumatic counter
- Electronic back-counter
- Micro-pump
- Handle on the upper side



Model	Motor Configuration	HP	Max. Stroke		Weight		Max. Length		Spindle Speeds	Feed Per Revolution			Inlet	Min. Hose
			in.	mm	lbs	kg	in.	mm		Inches	mm			
932QR	Right Angle	0.9	No Limit		5.8	2.2	13.92	354	450, 800, 4500	.0005, .001, .002, .003, .004, .006	.013, .03, .05, .07, .10, .15	.250" NPT	.375"	
932QR	Right Angle	1.3	No Limit		5.8	2.2	13.92	354	1300, 1600, 2000, 3200	.0005, .001, .002, .003, .004, .006	.013, .03, .05, .07, .10, .15	.250" NPT	.375"	
942QR	Right Angle	0.9	No Limit		5.8	2.2	13.92	354	450, 800, 4500	.0005, .001, .002, .003, .004, .006	.013, .03, .05, .07, .10, .15	.250" NPT	.375"	
942QR	Right Angle	1.3	No Limit		5.8	2.2	13.92	354	1300, 1600, 2000, 3200	.0005, .001, .002, .003, .004, .006	.013, .03, .05, .07, .10, .15	.250" NPT	.375"	

Rated tool performance at 90 PSIG measured at tool inlet with motor running.
EXTRA EQUIPMENT:
Nose, spindle, spindle guard.

WHEN ORDERING TOOL:

Tool nose and spindle must be specified when tool is ordered.

932 Q R - XXXX - .XXXX - MS - B B - A - A - XXX

Tool Series
932 Right Angle
942 Right Angle (*Countersink*)

Quackenbush

Tool Style
R = Right Angle

Spindle Speed (RPM)
Select desired speed from catalog

.9 Nominal HP	1.3 Nominal HP
450 RPM	1300 RPM
800 RPM	1600 RPM
4500 RPM	2000 RPM
	3200 RPM

Feed Rate

05 = .0005 IPR	30 = .003 IPR
10 = .001 IPR	40 = .004 IPR
20 = .002 IPR	60 = .006 IPR

Motor Stop
MS = Motor Stop 932QR
DS = Depth Sensing 942QR

Last three digits of material number

Accessories
A = Nose
B = Chuck
C = Other (specify)

Options

A = Micro pump w/counter	F = Handle w/trigger
B = Micro pump wo/counter	G = Handle wo/trigger
C = Counter	I = Indexer
D = Concentric collet	J = Large ID indexer (special 932QR only)
E = HP booster (1300, 1600, 2000, 3200 RPM models only)	X = None

Spindle Stroke

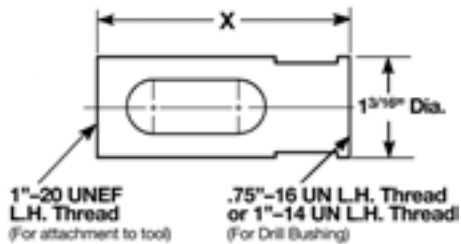
A = 40mm (1.57")	E = 120mm (4.72")
B = 60mm (2.36")	F = 140mm (5.51")
C = 80mm (3.15")	G = 180mm (7.08")
D = 100mm (3.94")	H = 1/2-22 (specify length) (932QR only)

Spindle Thread

A = 1/4 - 28	D = M8 x 100 internal
B = 5/16 - 25	E = M6 x 100 internal
C = 3/8 - 24	F = 9/16 - 18

Quackenbush 932QR & 942QR Tool Noses & Spindle Assemblies

- When ordering a tool, specify one nose and spindle assembly from chart below. (*Spindle assembly includes spindle and spindle guard.*)
- Order Tool Nose Adapter (614722) to attach S125 & S300 Tool Noses.
- Order Tool Nose Adapter (614973) to attach S150 & S275 Tool Noses.
- Other Noses and Spindles are available upon request.
- Optional mounted lubricator with counter (22007057) and without counter (22007067) are available.
- Use spindle adapter 632759 to adapt 3/8" capacity three jaw chuck 849108 to spindles with 3/8"-24 internal threads.



Standard Tool Noses

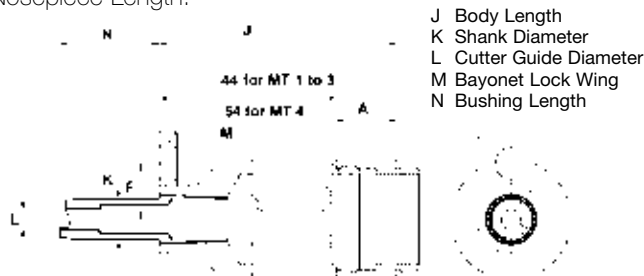
Bushing Thread	Length X	Part Number
.75 - 16 UN LH	3.0"	614905
.75 - 16 UN LH	4.0"	614824
1" -14 UN LH	3.0"	624812
1" -14 UN LH	4.75"	614814

Fluid Spindle Assemblies

Stroke	Cutter End	Part Number
2.25"	.250" - 28	22005572
2.25"	.3125" - 24	22005582
2.25"	.375" - 24	22005592
3.00"	.375" - 24	22005594

Bayonet Nosepiece

Specify Shank Diameter and Cutter Guide Diameter in Nosepiece Term. Code. Specify overall length as Bayonet Nosepiece Length.



Adapter Kits

Description	Part Number
Convert Inline tool to Right Angle	92050932
Convert Right Angle tool to Inline	92050952

Quackenbush™

15QDA-RAB-SU-RS Series

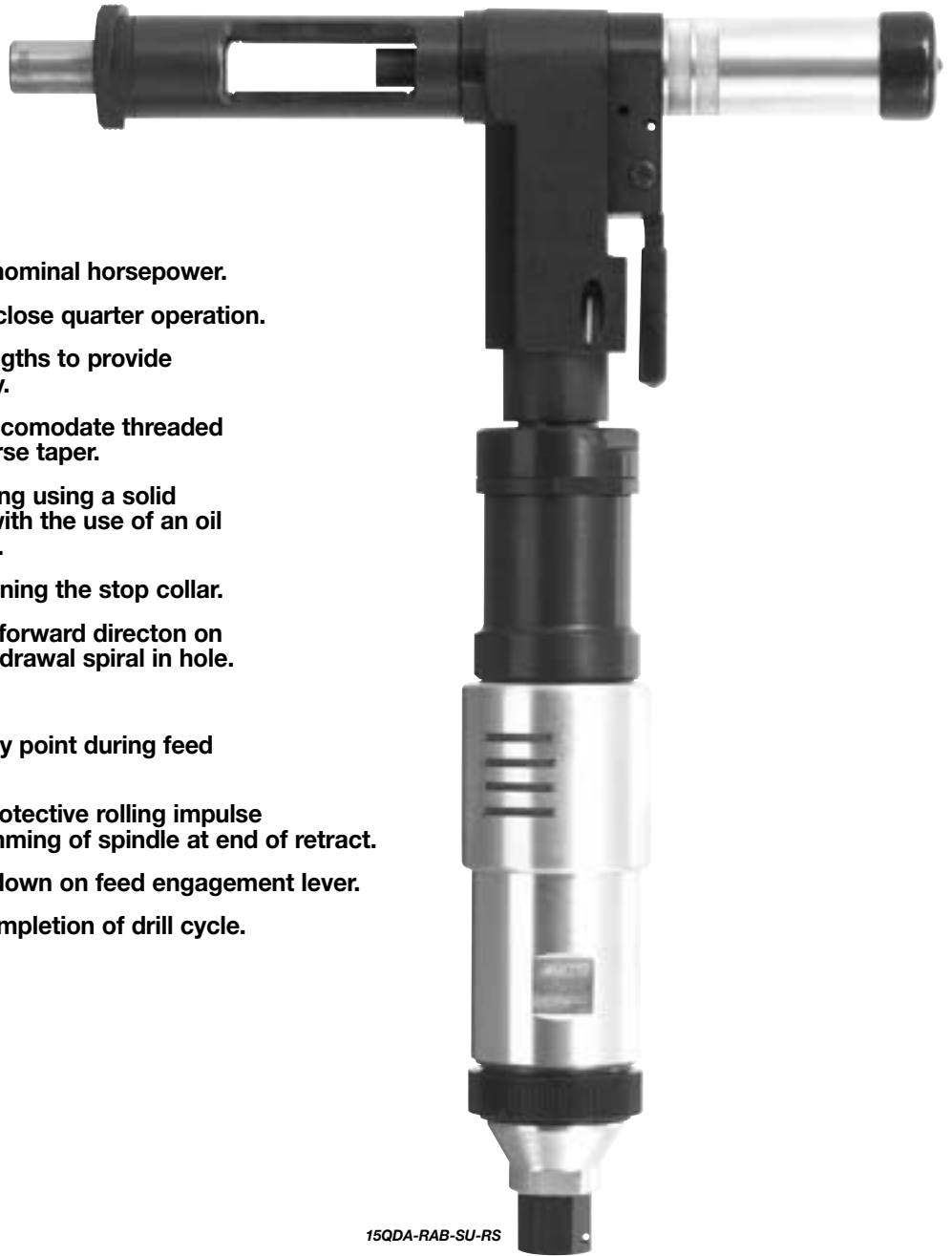
Capacity:

- Aluminum – .5625" (14.3mm)
- Titanium – .4375" (11.1mm)
- Steel – .4375" (11.1mm)

Stroke:

- Unlimited
- Min. – .375" (9.5mm)

- 15 series motor develops 1.0 nominal horsepower.
- Right angle tool designed for close quarter operation.
- Utilizes spindles of varying lengths to provide unlimited hole depth capability.
- Tool utilizes spindles which accommodate threaded shank, straight shank and morse taper.
- Easily adapted to oil hole drilling using a solid spindle and a fluid chuck, or with the use of an oil hole spindle and a fluid swivel.
- Stroke is adjustable by positioning the stop collar.
- Spindle continues to rotate in forward direction on return stroke to eliminate withdrawal spiral in hole.
- Rapid spindle retraction.
- Spindle can be retracted at any point during feed cycle by lifting retract lever.
- Automatic retract stop with protective rolling impulse clutch prevents accidental jamming of spindle at end of retract.
- Feed is engaged by pressing down on feed engagement lever.
- Tool is manually shut off at completion of drill cycle.



15QDA-RAB-SU-RS

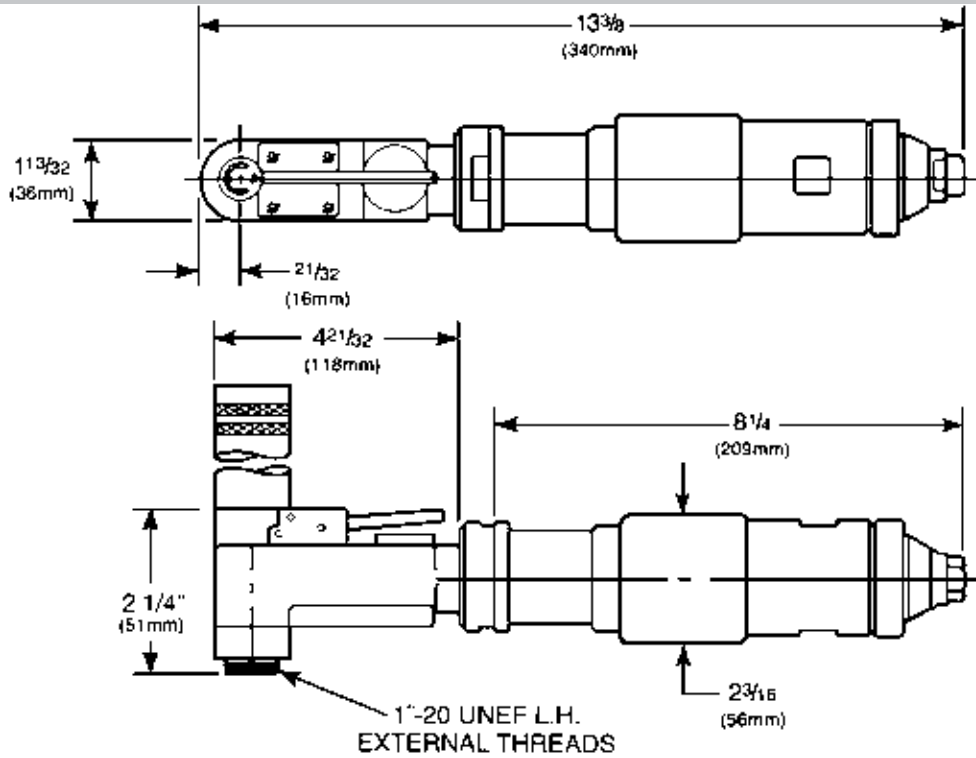
Model	Motor Configuration	Maximum Stroke		Weight		Maximum Length		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
15QD-RAB-SU-RS	Right Angle	No Limit		5	2.27	13 3/8	34	165, 265, 335, 465, 660, 1000, 1650	.0005, .001, .002, .003, .006	.375" NPT	.375"

EXTRA EQUIPMENT:

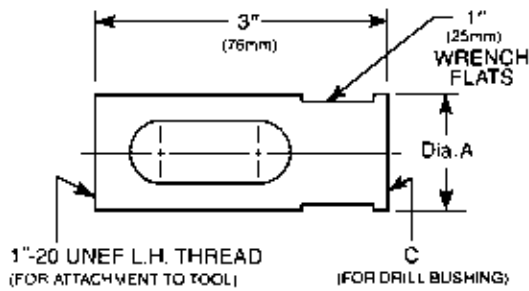
Tool Noses, Spindles.
 Rated tool performance at 90 PSIG measured at tool inlet with motor running.
 When selecting speeds and feeds, see page I-5.
 Mist lubricator – 631889
 SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
 SEE PAGE 2-22 – 2-25 FOR TOOLING ACCESSORIES.

WHEN ORDERING TOOL:

Tool noses and spindles are available at extra charge – see page 2-26.



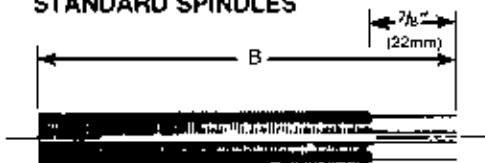
STANDARD TOOL NOSES



STEEL TOOL NOSES (Select One)

Dia. "A"	Length	"C" Thread	Part No.
1.1875" (30mm)	3" (76mm)	.75"-16 L.H. (21000)	614905
1.25" (32mm)	3" (76mm)	1.0"-14 L.H. (22000)	614906

STANDARD SPINDLES



1/2-22 L.H.

SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Part No.
Solid	4" (101mm)	1.12" (29mm)	.25"-28 Internal Thread	623266
Solid	4" (101mm)	1.12" (29mm)	.375"-24 Internal Thread with Counterbore	615915

- Order Tool Nose Adapter (614722) to attach S125 & S300 Tool Noses (1.75" O.D.) and accessories. (See page 2-26)
- Order Tool Nose Adapter (614973) to attach S150 & S275 Tool Noses (2" O. D.) and accessories (See page 2-26)
- Order Chuck Adapter (619136) when utilizing 3-jaw chuck with .375 -24 Internal Thread Spindles.

- Fluid Swivel (631256) used with Oil Hole Spindles, and selection of Fluid Chucks. (See page 2-28)
- Fluid Chucks used with .375 -24 Internal Thread Spindles.
- Other Noses and Spindles are available as required (see page 2-24).
- Nose Indexer (631249). New design 641244.

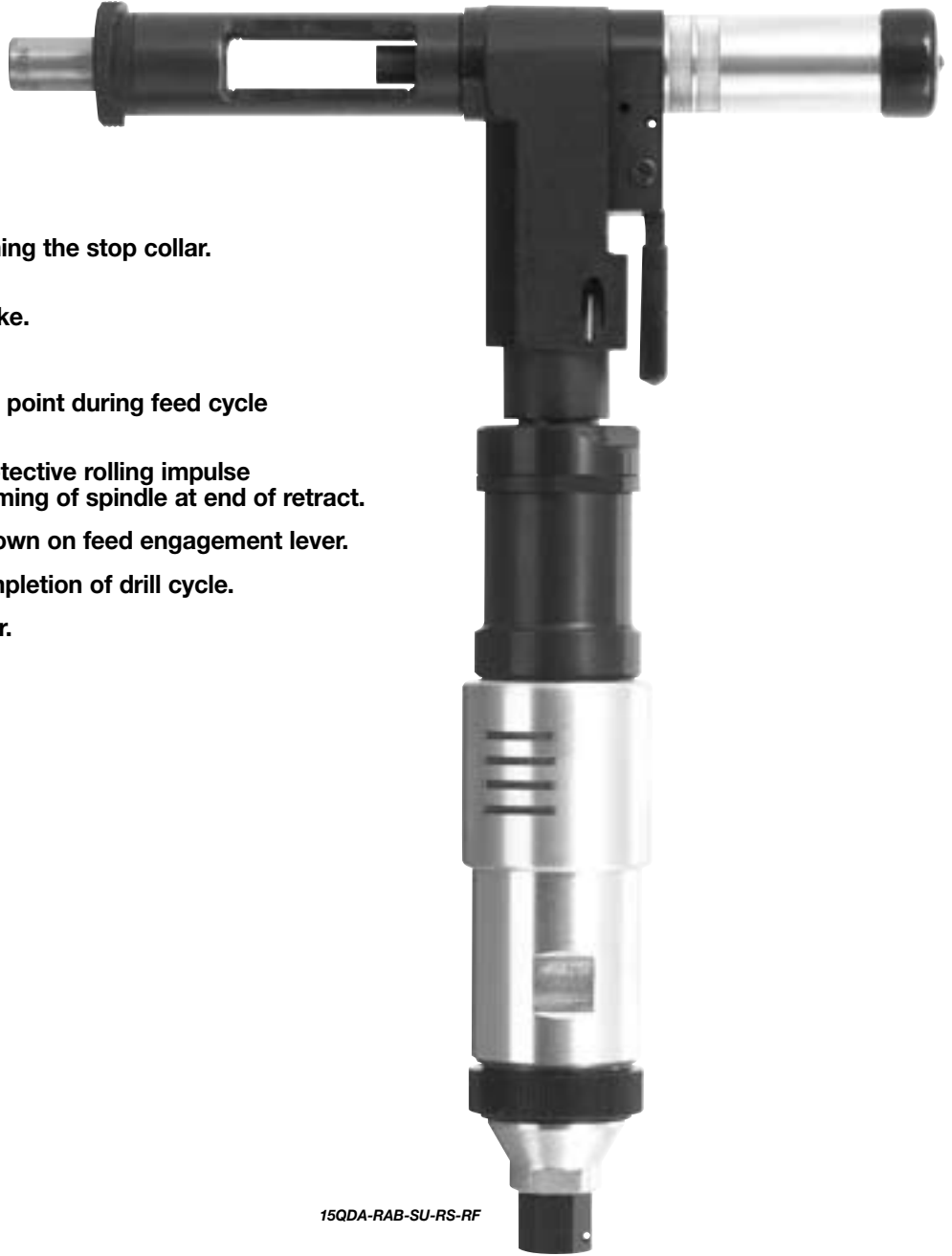
Quackenbush™

15QDA-RAB-SU-RS-RF Series Back Spotfacer

Stroke:

Min. - .375" (9.5mm)
Max. - Unlimited

- 15 series motor develops 1.0 nominal horsepower.
- Right angle tool designed for close quarter operation.
- Stroke is adjustable by positioning the stop collar.
- Spindle continues to rotate in forward direction on return stroke.
- Rapid spindle retraction.
- Spindle can be retracted at any point during feed cycle by lifting retract lever.
- Automatic retract stop with protective rolling impulse clutch prevents accidental jamming of spindle at end of retract.
- Feed is engaged by pressing down on feed engagement lever.
- Tool is manually shut off at completion of drill cycle.
- Spindle guard protects operator.



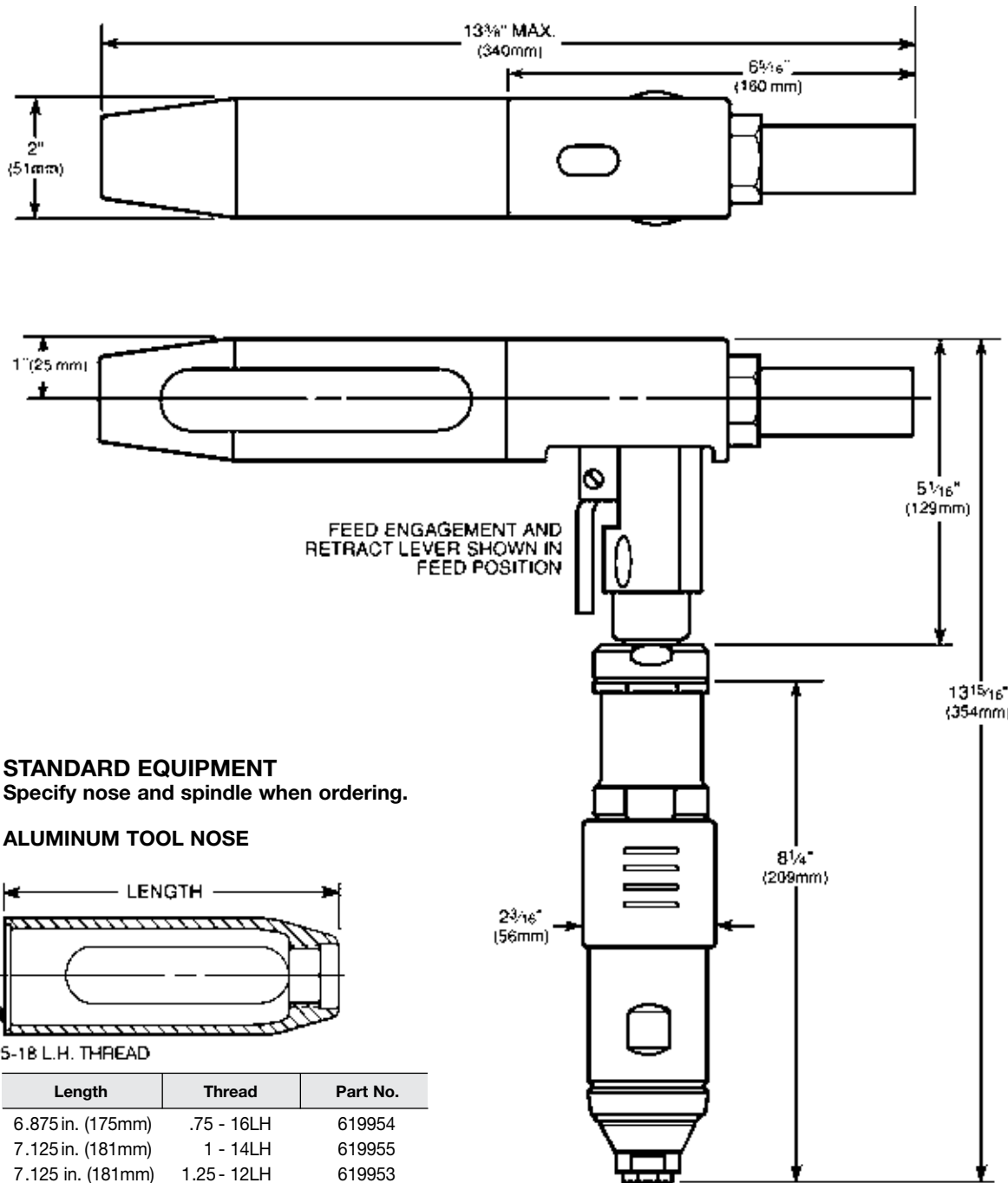
15QDA-RAB-SU-RS-RF

Model	Motor Configuration	Maximum Stroke		Weight		Maximum Length		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
15QDA-RAB-SU-RS-RF	Right Angle	No Limit		5	2.27	13 3/8	34	160, 265, 335, 465, 660 1000, 1650	.0005, .001, .002, .003, .006	.375" NPT	.375"

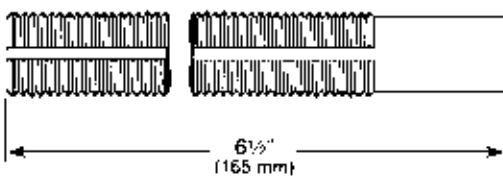
EXTRA EQUIPMENT:

Noses and spindles must be specified when ordering.
Rated tool performance at 90 PSIG measured at tool inlet with motor running.

When selecting speeds and feeds, see page I-5.
SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
SEE PAGE 2-22 - 2-25 FOR TOOLING ACCESSORIES.



SPINDLE



THREAD: .5-22 R.H. Thread
 INTERNAL THREAD: .375 - 24 with Counterbore
 MAX. STROKE: 3.626" (92MM)
 PART NO: 624146-7

Quackenbush™

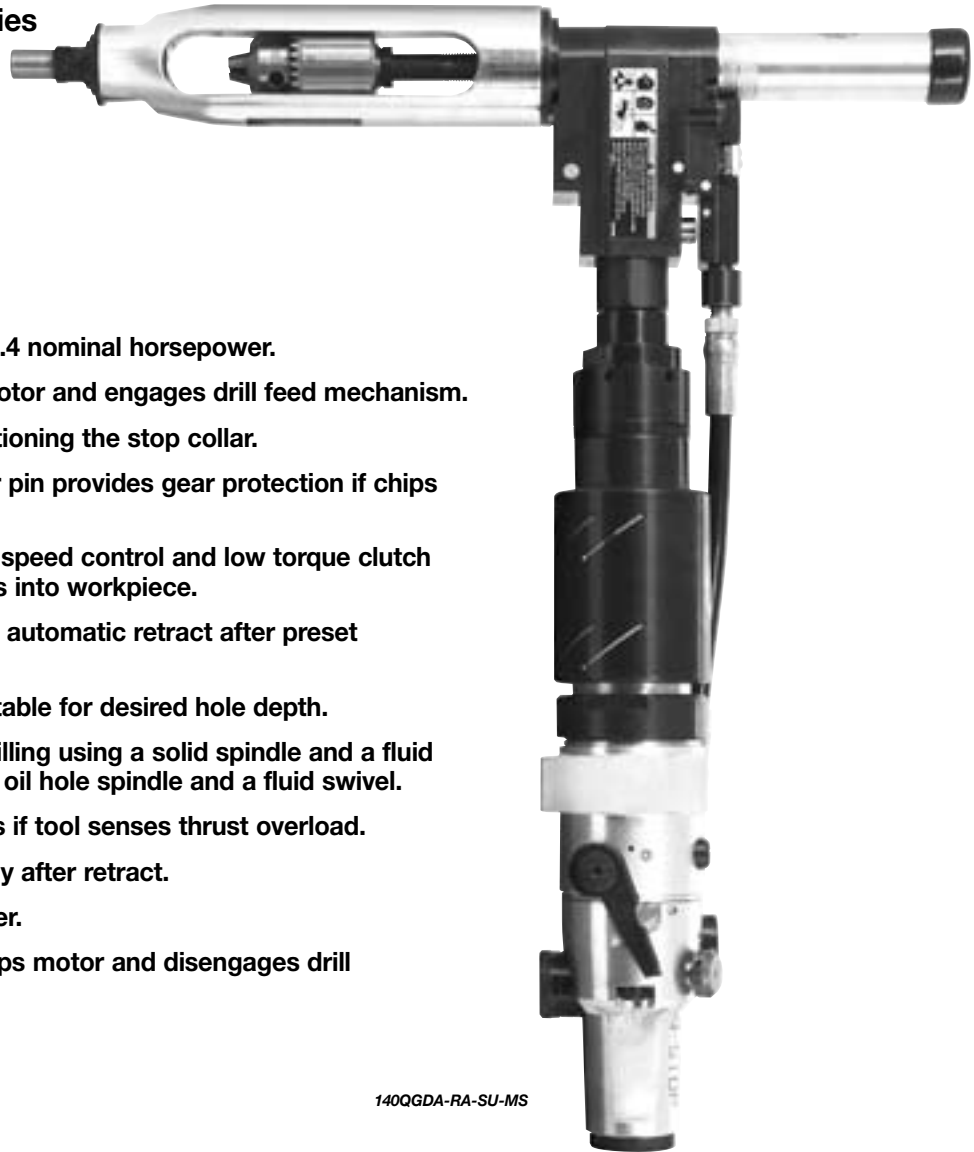
140QGDA-RA-SU-MS Series

Capacity:

- Aluminum – .5625" (14.3mm)
- Titanium – .4375" (11.1mm)
- Steel – .4375" (11.1mm)

Stroke:

- Min. – .3125" (8mm)
- Max. – Unlimited



140QGDA-RA-SU-MS

- 140 series motor develops 1.4 nominal horsepower.
- Single push-button starts motor and engages drill feed mechanism.
- Stroke is adjustable by positioning the stop collar.
- Externally replaceable shear pin provides gear protection if chips pack or cutter binds.
- Rapid advance with manual speed control and low torque clutch protection if cutter advances into workpiece.
- Precision depth control with automatic retract after preset dwell period.
- Positive depth stop is adjustable for desired hole depth.
- Easily adapted to oil hole drilling using a solid spindle and a fluid chuck, or with the use of an oil hole spindle and a fluid swivel.
- Cutter automatically retracts if tool senses thrust overload.
- Motor shuts off automatically after retract.
- Auxilliary manual retract lever.
- Emergency push-button stops motor and disengages drill feed mechanism.

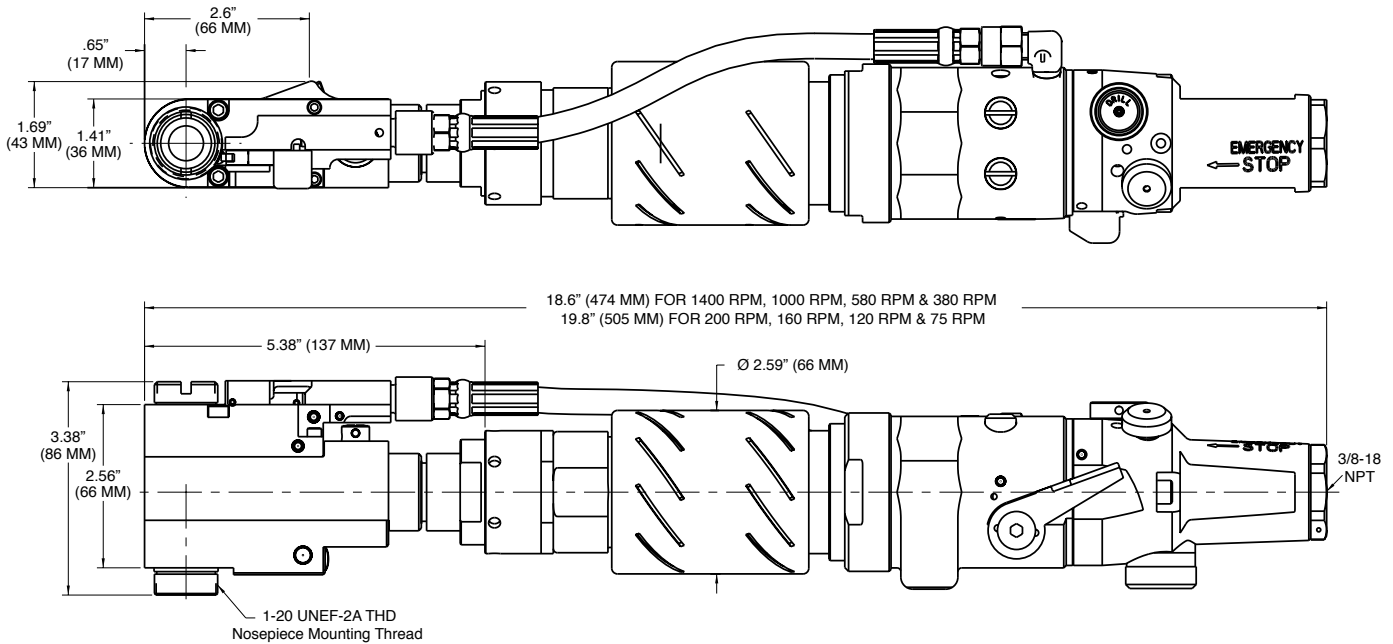
Model	Motor Configuration	Maximum Stroke		Weight		Maximum Length		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
140QGDA-RA-SU-MS	Right Angle	No Limit		10.75	4.88	19.875	505	95, 150, 200, 260, 380, 580, 1000	.0005, .001, .002, .003, .006	.375" NPT	.5"
140QDA-RA-SU-MS	Right Angle	No Limit		10.75	4.88	19.875	505	1,400	.0005, .001, .002, .003, .006	.375" NPT	.5"

EXTRA EQUIPMENT:

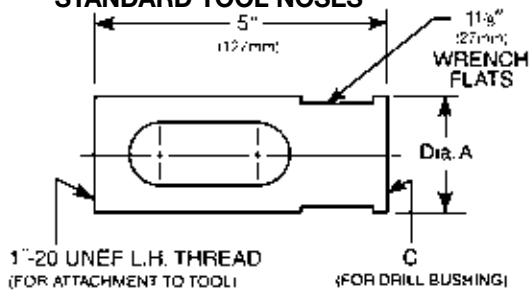
Noses and spindles must be specified when ordering.
 Rated tool performance at 90 PSIG measured at tool inlet with motor running.
 When selecting speeds and feeds, see page I-5.
 SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
 SEE PAGE 2-22 – 2-25 FOR TOOLING ACCESSORIES.

WHEN ORDERING TOOL:

Tool noses and spindles are available at extra charge – see page 2-26.



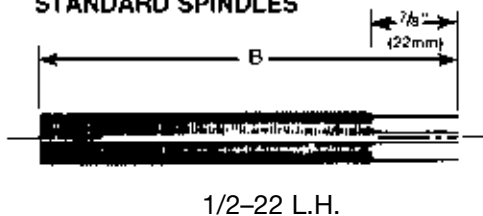
STANDARD TOOL NOSES



STEEL TOOL NOSES (Select One)

Dia. "A"	Length	"C" Thread	Part No.
1.1875" (30mm)	5" (127mm)	.75"-16 L.H. (21000)	614919

STANDARD SPINDLES



SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Spindle Part No.	Spindle Guard No.
Solid	6" (152mm)	2.75" (70mm)	.375"-24 Internal Thread with Counterbore	615747	624342
Oil Hole	6" (152mm)	2.75" (70mm)	.375"-24 Internal Thread with Counterbore	623812	624332

- Order Tool Nose Adapter (629222) to attach S125 & S300 Tool Noses (1.75" O.D.) and accessories. (See page 2-24)
- Order Tool Nose Adapter (629224) to attach S150 & S275 Tool Noses (2" O. D.) and accessories (See page 2-24)
- Order Chuck Adapter (619136) when utilizing 3-jaw chuck with .375 -24 Internal Thread Spindles.

- Fluid Swivel (631256) used with Oil Hole Spindles, and selection of Fluid Chucks. (See page 2-25)
- Fluid Chucks used with .375 -24 Internal Thread Spindles.
- Other Noses and Spindles are available as required (see pg. 2-26).
- Nose Indexer (631864). New design 641267.

Quackenbush™

904QR

Capacity (Diameter):
 Aluminum – .80" (20mm)
 Titanium – .63" (16mm)

- **Very lightweight and compact**
Powerful 1.6 HP Motor yet compact
Only .80 from centerline to side of Angle Head
For straight hole applications
- **Easy to setup and operate**
Automatic Retract
Standard Quackenbush motor
- **Variety of speeds, and feed rates**
All control valves in one module
Thru-spindle cutter lubrication
- **Bayonet or Taperlock Fixturing**
Concentric Collet - see page 6-8
Handle for convenient handling
- **Options:**
Nosepiece Indexer - easy to operate to orient clamp up
Precision Depth Control - contact Factory
Telescoping Spindle for limited access areas
Concentric collet



Model	Spindle Speed	Feed Rate (rev)		Stroke	
		in.	mm	in.	mm
904QR	175, 350	.001	0.025	2.4	60
	525, 700	.002	0.050	3.1	80
	1100, 1500	.003	0.075	4.0	100
	1750	.004	0.100	4.8	120
		.006	0.150		

Spindle Termination	Nosepiece Termination	Nosepiece Length	Accessories
---------------------	-----------------------	------------------	-------------

Spindle Termination

3/8" Geared Chuck
 5/16" - 24 Int'l Thread, 120 Taper
 3/8" - 24 Int'l Thread, 120 Taper
 7/16" - 20 Int'l Thread, 120 Taper

Note: All threaded spindles provide for thru-the-spindle cutter lubrication.

Nosepiece Termination

Bayonet Nosepieces - pages 6-6

None, M28 x 150 LH Internal Nosepiece Thread
 Bayonet Nosepiece Code.
 Specify Shank Diameter & Cutter Guide Diameter.
 Example: 20 mm Shank Diameter
 12.57 Cutter Guide Diameter

Note: Use threaded spindle terminations for Nosepieces P.

Taperlock Nosepieces - pages 2-20

22000 Taperlock (1.000-14 LH)
 23000 Taperlock (1.250-12 LH)
 24000 Taperlock (1.500-12 LH)
 None, 1.000-20 LH Ext'l Mounting Thread
 None, 1.562-20-14 LH Int'l Mounting Thread
 None, 1.825-18 LH Ext'l Mounting Thread

Accessories

Drill Point Lubricator Q, Pressure Fill
 Drill Point Lubricator - Fluid Pump
 Nose Indexer, 1"-1/4-16 LH
 Fluid Inducer
 Vacuum Collector Port
 Air Inlet Adapter - 3/8" NPT

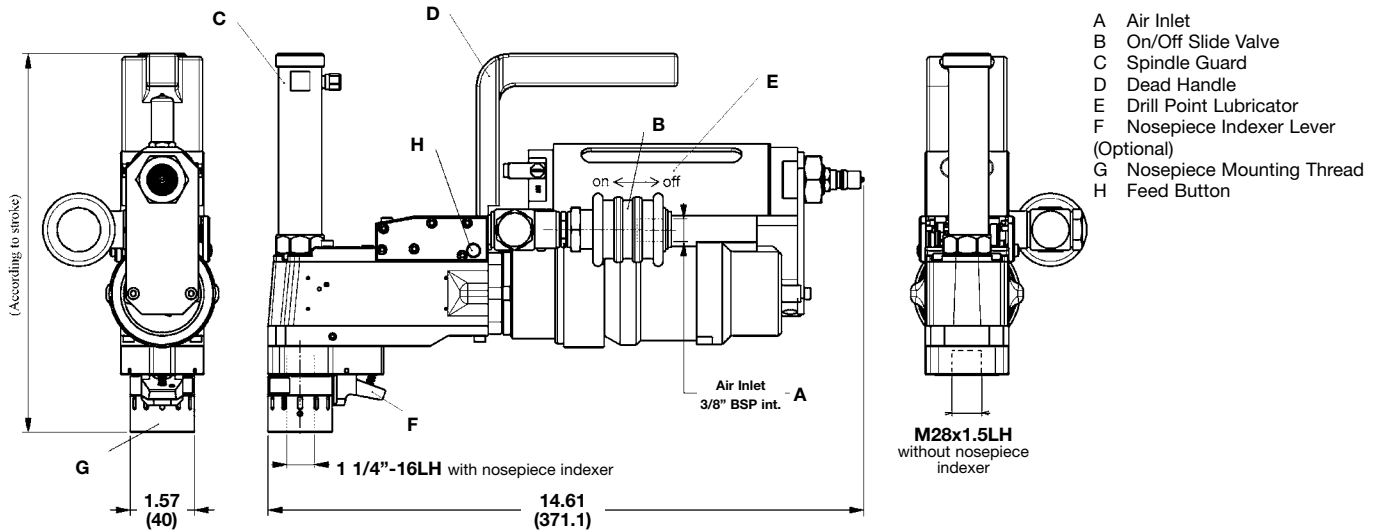
Nosepiece Length

Bayonet Nosepiece Length

mm	in.	mm	in.
44	1.73	79	3.11
59	2.32	84	3.31
64	2.52	89	3.50
69	2.72	94	3.70
74	2.92		

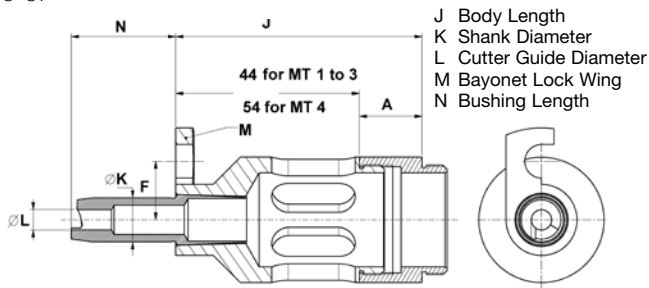
Taperlock Nosepiece Length

See page 2-22: Select nospiece length appropriate to Taperlock Series.



Bayonet Nosepiece

Specify Shank Diameter and Cutter Guide Diameter in Nosepiece Term. Code. Specify overall length as Bayonet Nosepiece Length. For complete Bayonet details, see page 6-6.



Concentric Collet

See page 6-8 for 20904 with Concentric Collet and Depth Sensing.

Taperlock Nosepieces

Quackenbush Nosepieces are provided to utilize Taperlock Bushing Tips. Taperlock Series must be specified-for details, see pages 1-3 and 2-20.

Setup

1. Install cutter; verify cutter guide bushings are correct size.
2. Adjust stroke by removing spindle guard, rotating End Stop and tighten Lock Screws.
3. Adjust Drill Point Lubricator to give desired flow rate.
4. (Option) Depress Indexer Lever and rotate Nosepiece to give optimum orientation.

Operation

1. Set Nosepiece into fixture and rotate to lock.
2. Push Slide Valve forward; motor starts, spindle rotates but does not advance.
3. Push Feed Button - spindle/cutter moves at fixed feed rate.
4. At end of stroke, spindle/cutter automatically returns to start position and motor stops.
5. Pull Slide Valve rearward - motor stops.

SPECIFICATIONS:

Air Inlet = 3/8" BSP
 Power = 1.2 KW (1.6 HP)
 Depth Repeatability = 0.025 mm (.001 inch) with Depth Sensing Nosepiece
 Weight = 5.9 Kg (13.2 lb) with typical spindle and nosepiece
 Spindle Offset = 20 mm (0.80 Inch)
 Air Consumption = 1550 L/Min (55 CFM)
 Noise = 80 dBA

GENERAL INFORMATION SEE PAGES NOTED:

To determine:
 Speed, page I-14
 Bayonet Fixturing: page 6-6
 Taperlock Fixturing: page 1-3

At all times Verify that Guards are in place and secure. Operators must understand and follow Safety Practices - See Pages I-11.

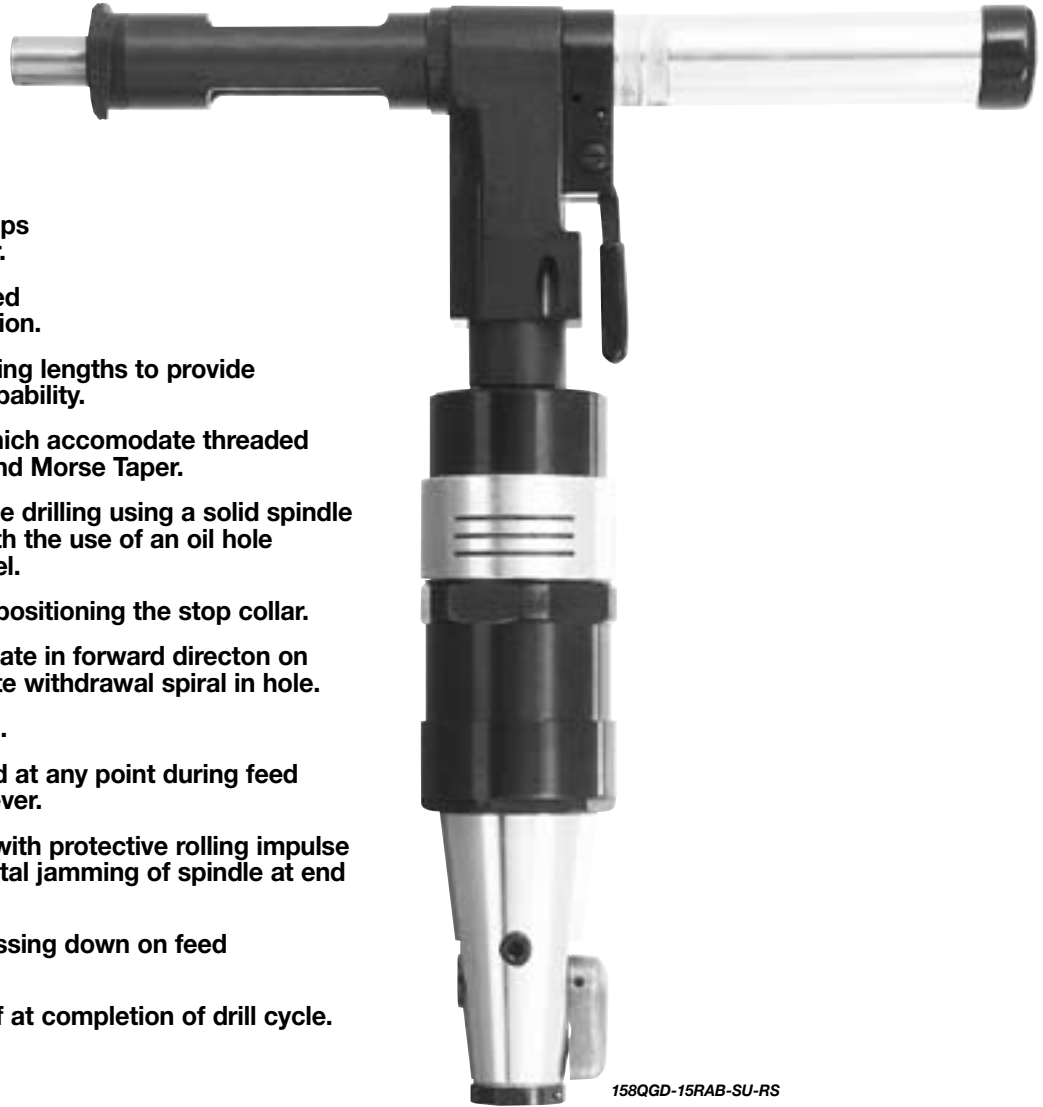
Quackenbush™

158QGD-15RAB-SU-RS Series

Capacity:
Aluminum - .5625"
(14.28mm)

Stroke:
Unlimited
Min. - .375"

- 158 series motor develops 1.6 nominal horsepower.
- Right angle tool designed for close quarter operation.
- Utilizes spindles of varying lengths to provide unlimited hole depth capability.
- Tool utilizes spindles which accommodate threaded shank, straight shank and Morse Taper.
- Easily adapted to oil hole drilling using a solid spindle and a fluid chuck, or with the use of an oil hole spindle and a fluid swivel.
- Stroke is adjustable by positioning the stop collar.
- Spindle continues to rotate in forward direction on return stroke to eliminate withdrawal spiral in hole.
- Rapid spindle retraction.
- Spindle can be retracted at any point during feed cycle by lifting retract lever.
- Automatic retract stop with protective rolling impulse clutch prevents accidental jamming of spindle at end of retract.
- Feed is engaged by pressing down on feed engagement lever.
- Tool is manually shut off at completion of drill cycle.



158QGD-15RAB-SU-RS

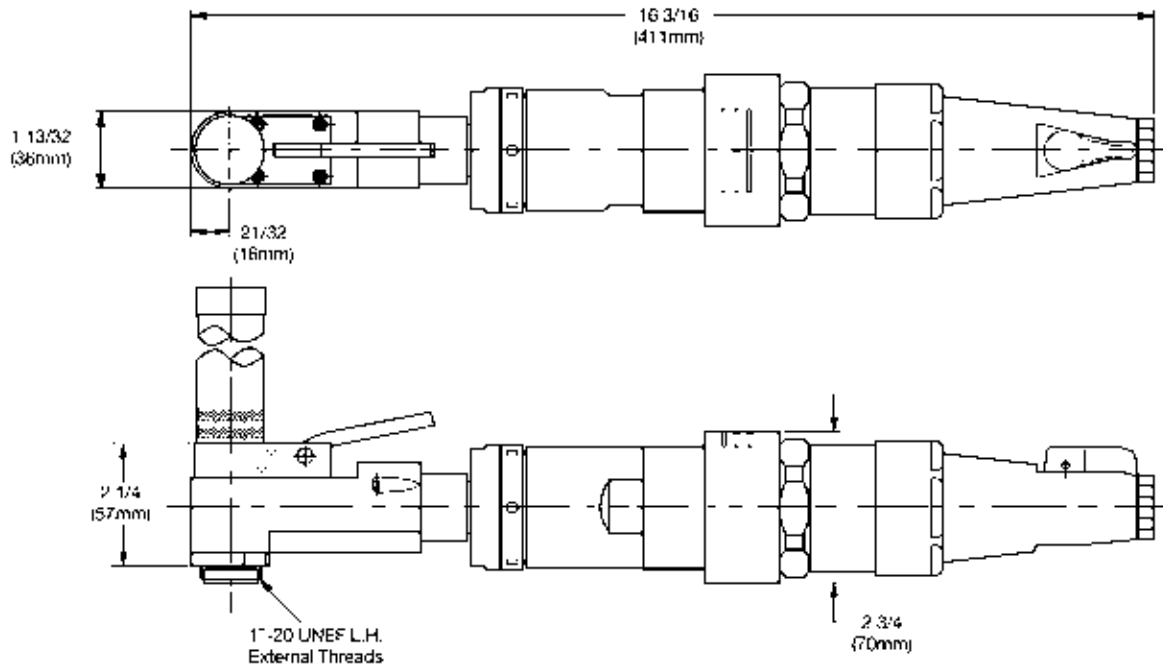
Model	Motor Configuration	Maximum Stroke		Weight		Maximum Length		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
158QGD-15RAB-SU-RS Right Angle		No Limit		9.25	4.2	16 3/16	411	550, 1000, 2000, 3000	.0005, .001, .002, .003	.375" NPT	.5"

EXTRA EQUIPMENT:

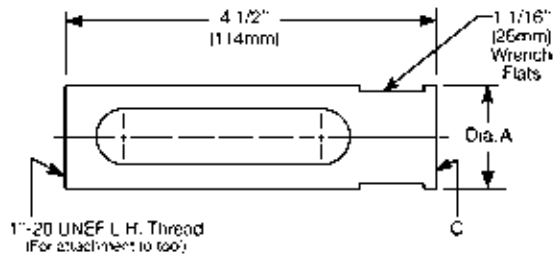
Tool Noses. Spindles.
Rated tool performance at 90 PSIG measured at tool inlet with motor running.
When selecting speeds and feeds, see page I-5.
SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
SEE PAGE 2-20 – 2-23 FOR TOOLING ACCESSORIES.

WHEN ORDERING TOOL:

Tool noses and spindles are available at extra charge — see page 2-24.



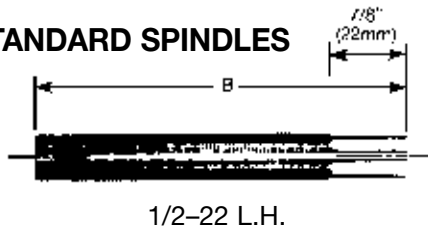
STANDARD STEEL TOOL NOSE (Part No. 615460)



STEEL TOOL NOSES (Select One)

Dia. "A"	Length	"C" Thread	Part No.
1.1875" (30mm)	4.5" (114mm)	.75"-16 L.H. (21000)	615460

STANDARD SPINDLES



SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Part No.
Solid	6" (152mm)	3.12" (79.4mm)	.375"-24 Internal Thread with Counterbore	615747
Oil Hole	6" (152mm)	3.12" (79.4mm)	.375"-24 Internal Thread with Counterbore	623812

- Order Tool Nose Adapter (614722) to attach S125 & S300 Tool Noses (1.75" O.D.) and accessories. (See page 2-26)
- Order Tool Nose Adapter (614973) to attach S150 & S275 Tool Noses (2" O. D.) and accessories. (See page 2-26)
- Order Chuck Adapter (619136) when utilizing 3-jaw chuck with .375 -24 Internal Thread Spindles.

- Fluid Swivel (631256) when used with Oil Hole Spindles, and selection of Fluid Chucks used with .375 -24 Internal Thread Spindles. (See page 2-25)
- Other Noses and Spindles are available as required (see page 2-26).
- Nose Indexer (631249). New design 641244.

Quackenbush™

158QGDA-RAD-SU-RS Series

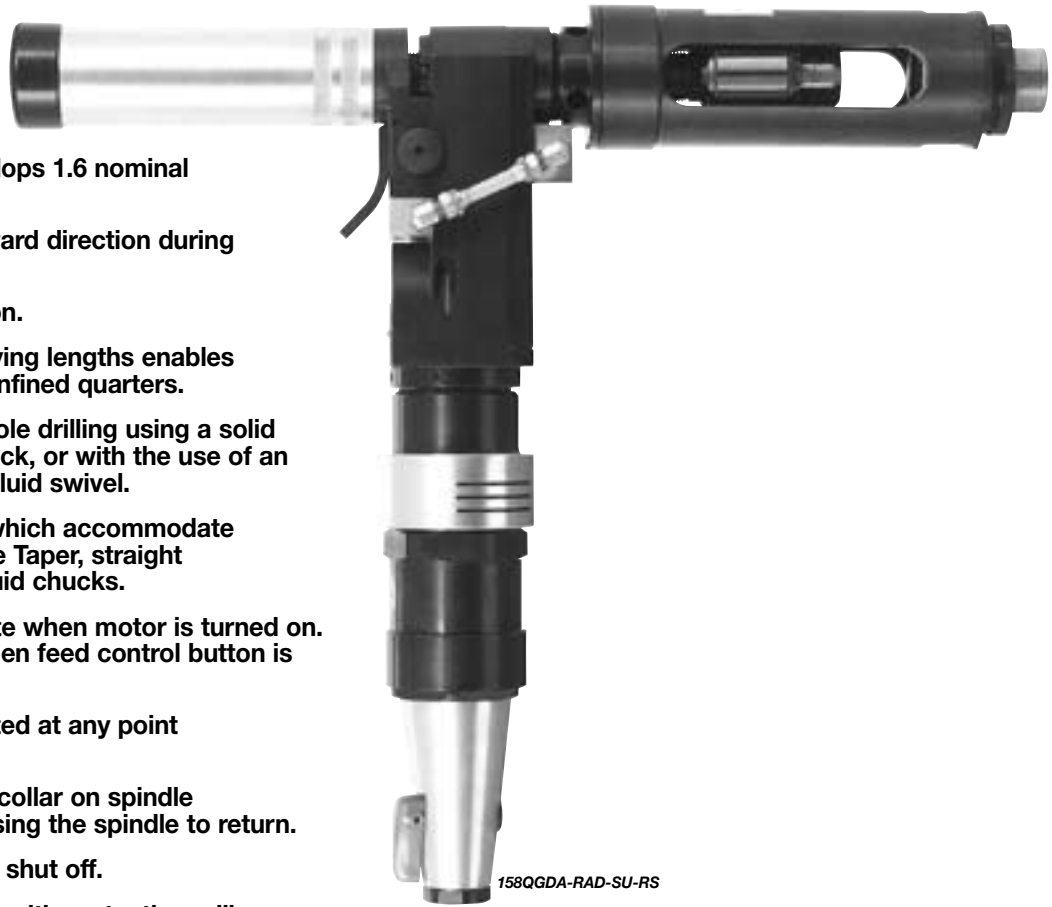
Capacity:

- Aluminum - 1.25" (32mm)
- Titanium - 1" (25.4mm)
- Steel - 1" (25.4mm)

Stroke:

- Min. - .5" (12.7mm)
- Max. - Unlimited

- 158 series motor develops 1.6 nominal horsepower.
- Spindle rotates in forward direction during return stroke.
- Rapid spindle retraction.
- Use of spindles of varying lengths enables tool to drill holes in confined quarters.
- Easily adapted to oil hole drilling using a solid spindle and a fluid chuck, or with the use of an oil hole spindle and a fluid swivel.
- Tool utilizes spindles which accommodate threaded shank, Morse Taper, straight shank, reamers and fluid chucks.
- Spindle begins to rotate when motor is turned on. Tool begins to feed when feed control button is depressed.
- Spindle may be retracted at any point during drilling cycle.
- At end of stroke, stop collar on spindle trips retract lever, causing the spindle to return.
- Tool must be manually shut off.
- Automatic retract stop with protective rolling impulse clutch prevents accidental jamming of spindle at end of retract.
- Spindle guard protects operator.



158QGDA-RAD-SU-RS

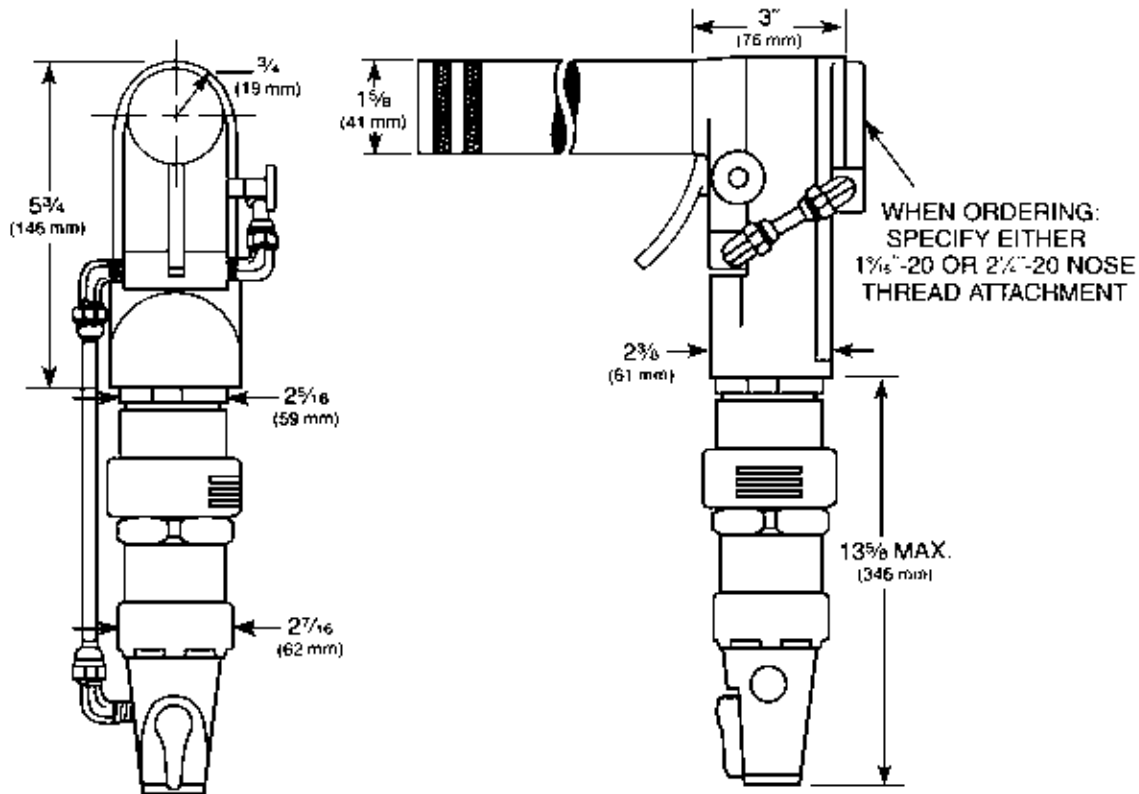
Model	Motor Configuration	Maximum Stroke		Weight		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg				
158QGDA-RAD-SU-RS	Right Angle	No Limit		12.5	5.67	47, 56, 70, 94, 110, 120, 140, 185, 194, 230, 288, 380, 388, 460, 485, 570, 760, 950	.0005, .001, .002, .0035, .0055, .0075	.375" NPT	.5"
158QGDAV-RAD-SU-RS	Right Angle	No Limit		12.5	5.67	47/120, 92/230, 194/485, 380/950	.0005, .001, .002, .0035, .0055, .0075	.375" NPT	.5"

EXTRA EQUIPMENT:

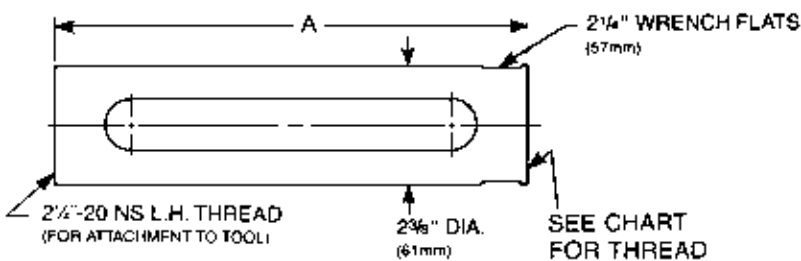
Noses and spindles must be specified when ordering.
 Rated tool performance at 90 PSIG measured at tool inlet with motor running.
 When selecting speeds and feeds, see page I-5.
 Mist lubricator (631298-7) may be ordered.
 SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
 SEE PAGE 2-22 – 2-25 FOR TOOLING ACCESSORIES.

WHEN ORDERING TOOL:

Tool noses and spindles are available at extra charge – see page 2-26.



STANDARD STEEL TOOL NOSE



STEEL TOOL NOSES (Select One)

Length "A"	Thread	Part No.
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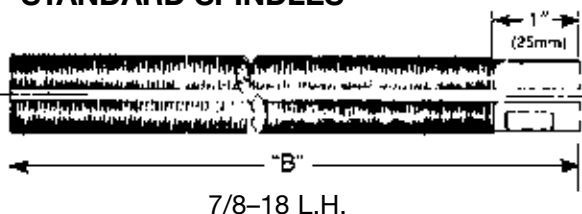
S400 SERIES

9.5" (241mm)	.75" - 16 L.H.	621235
9.5" (241mm)	1" - 14 L.H.	621236
9.5" (241mm)	1.25" - 12 L.H.	621237
9.5" (241mm)	1.5" - 12 L.H.	621238
9.375" (238mm)	2" - 16 L.H.	614751

S600 SERIES

11.5" (282mm)	1" - 14 L.H.	621244
11.5" (282mm)	1.25" - 12 L.H.	621245
11.5" (282mm)	1.5" - 12 L.H.	621246
11.375" (279mm)	2" - 16 L.H.	614757

STANDARD SPINDLES



SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Part No.
Oil Hole	9.25" (235mm)	5.5" (140mm)	.5625"-18 Internal Thread with Counterbore and 118° Angle	623955
Oil Hole	9.25" (235mm)	5.5" (140mm)	.625"-18 Internal Thread with Counterbore and 118° Angle	615964
Solid	9" (229mm)	5.25" (133mm)	No. 2 Short Morse Taper with Side Knock-Out	614470
Solid	9" (229mm)	5.25" (133mm)	.5625"-18 Internal Thread with Counterbore	615319

■ When adapting a 3-jaw chuck to .5625-18 internal thread spindle, order Chuck Adapter (623643) for .375" cap, chuck OR Chuck Adapter (619400) for .5" cap. chuck.

■ Fluid Swivels used with oil hole spindles and selection of Fluid Chucks (see page 2-25).

■ Other Noses and Spindles are available on request (see page 2-26).

■ Nose Indexers

1.5625 -20 (381326)

2.25 -20 (381327) Use with 615705 nose adapter.

New Design for 2.25-20: 641260

Quackenbush™

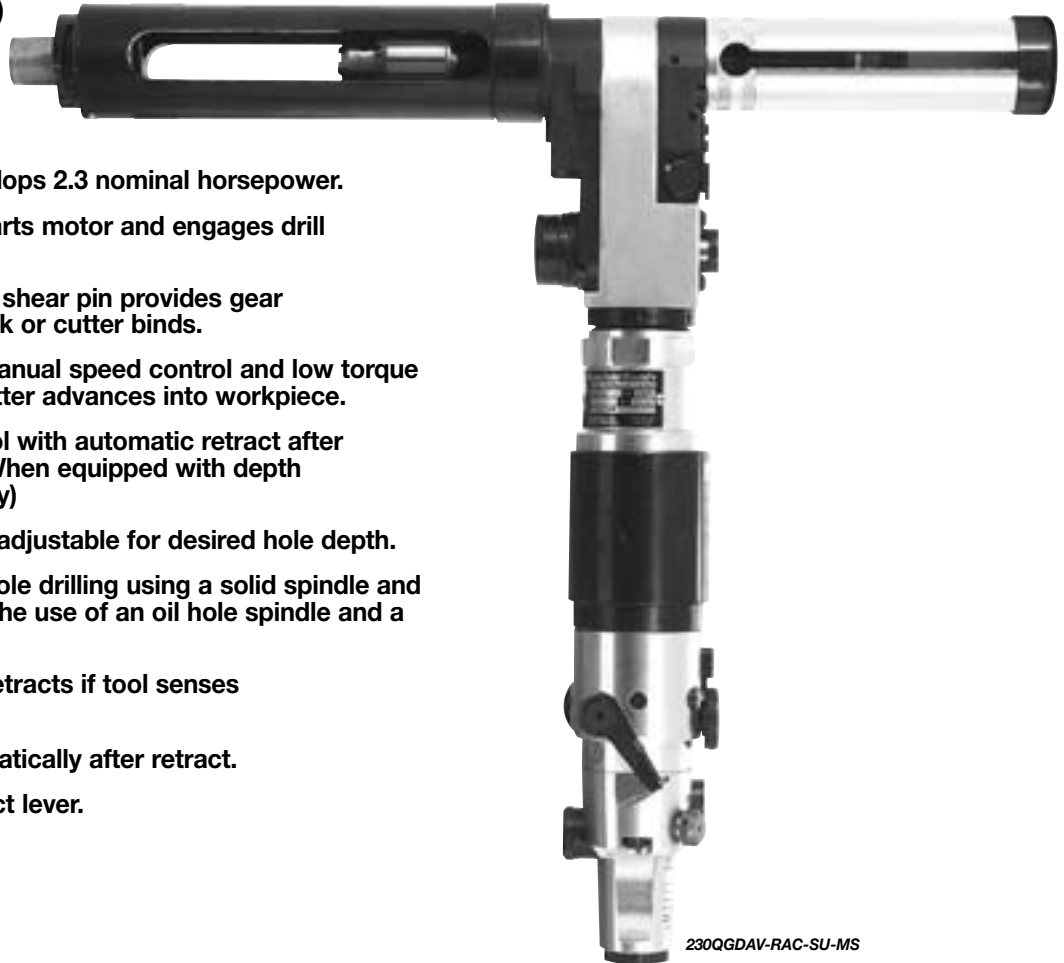
230QGDA-RAC-SU-MS Series

Capacity:

- Aluminum – 1.375" (34.9mm)
- Titanium – 1" (25.4mm)
- Steel – 1" (25.4mm)

Stroke:

- Min. – .125" (3.18mm)
- Max. – Unlimited



- 230 series motor develops 2.3 nominal horsepower.
- Single push-button starts motor and engages drill feed mechanism.
- Externally replaceable shear pin provides gear protection if chips pack or cutter binds.
- Rapid advance with manual speed control and low torque clutch protection if cutter advances into workpiece.
- Precision depth control with automatic retract after preset dwell period. (When equipped with depth sensing nose assembly)
- Positive depth stop is adjustable for desired hole depth.
- Easily adapted to oil hole drilling using a solid spindle and a fluid chuck, or with the use of an oil hole spindle and a fluid swivel.
- Cutter automatically retracts if tool senses dull cutter overload.
- Motor shuts off automatically after retract.
- Auxiliary manual retract lever.

Model	Motor Configuration	Maximum Stroke		Weight*		Length*		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
230QGDA-RAC-SU-MS	Right Angle	No Limit		17	7.7	20.75	527	50, 65, 80, 100, 125, 160, 205	.0005, .001, .002, .003, .0045, .006, .008, .012	.5" NPT	.5"
230QGDA-RAC-SU-MS	Right Angle	No Limit		15.75	7.1	18.75	476	260, 320, 390, 440, 550, 640, 770, 1000	.0005, .001, .002, .003, .0045, .006, .008, .012	.5" NPT	.5"
230QGDAV-RAC-SU-MS	Right Angle	No Limit		17.5	7.9	21.25	549	50/125, 100/250	.0005, .001, .002, .003, .0045, .006, .008, .012	.5" NPT	.5"
230QGDAV-RAC-SU-MS	Right Angle	No Limit		16.25	7.4	19.25	489	210/520, 420/1000	.0005, .001, .002, .003, .0045, .006, .008, .012	.5" NPT	.5"

*Weight and Length will vary depending on Gear Train.

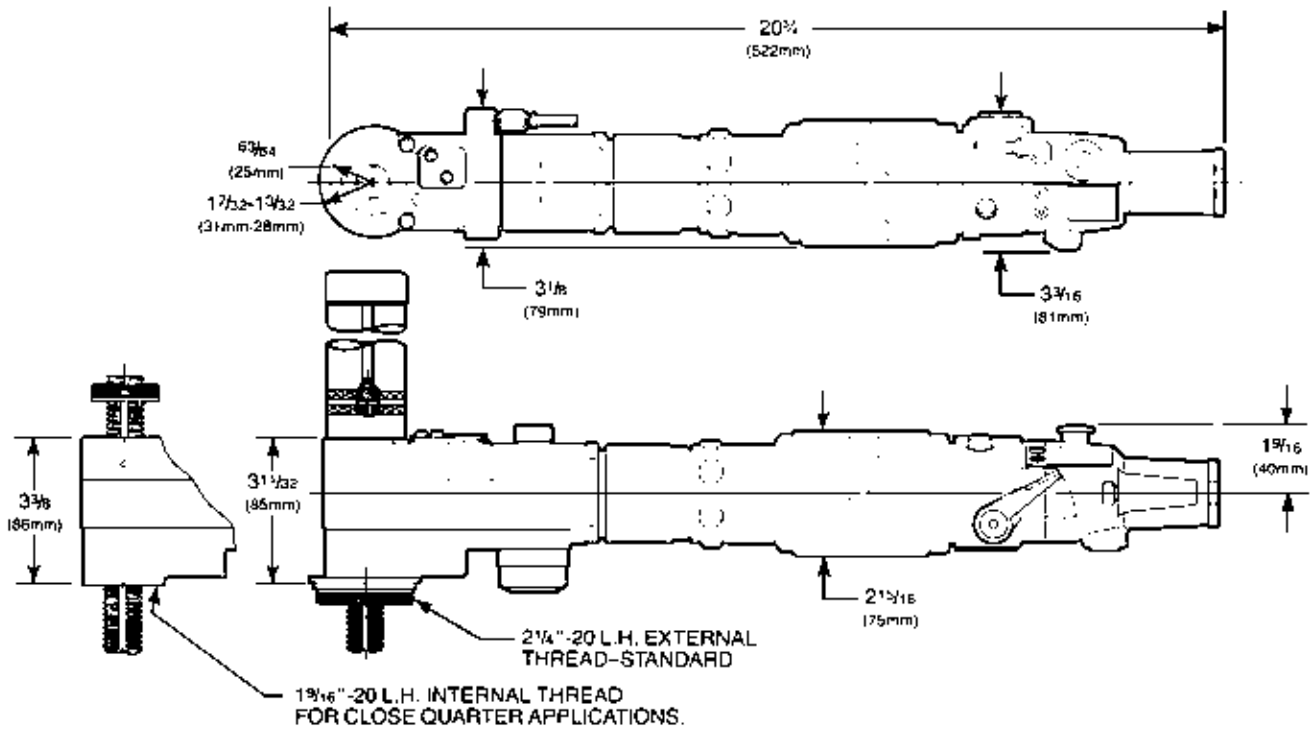
NOTE:

Tool model with either the 2.25"-20 L.H. External Nose Attachment Thread (Standard) or the 1.5625"-20 Internal Thread (Special) must be specified when ordering.
 Rated tool performance at 90 PSIG measured at tool inlet with motor running.
 When selecting speeds and feeds, see page I-5.

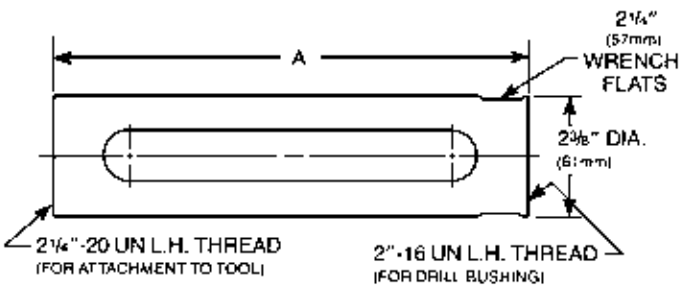
SEE PAGES I-11–I-13 FOR SAFETY PRECAUTIONS.
 SEE PAGE 2-22 – 2-25 FOR TOOLING ACCESSORIES.

WHEN ORDERING TOOL:

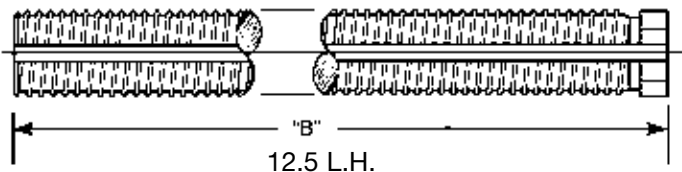
Tool noses and spindles are available at extra charge – see page 2-26.
 Specify EITHER 2.25"-20 External Thread OR 1.5625"-20 LH Internal Thread.



STANDARD TOOL NOSE



STANDARD SPINDLE



- 2.25"-20 Nose Thread Attachment on standard tool accepts S400 and S600 Tool Noses and accessories.
- For close quarter applications, a special tool with 1.5625"-20 L.H. Internal Nose Attachment Thread is available.
- With the 1.5625"-20 L.H. Internal Thread, order Nose Adapter (614244) to attach S150 and S275 (2" O.D.) Tool Noses and accessories, OR Nose Adapter (614228) to attach S400 and S600 (2.375" O.D.) Tool Noses and accessories. (See page 2-26)

STEEL TOOL NOSES (Select One)

Length "A"	Thread	Part No.
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S400 SERIES

9.5" (241mm)	.75" - 16 L.H.	621235
9.5" (241mm)	1" - 14 L.H.	621236
9.5" (241mm)	1.25" - 12 L.H.	621237
9.5" (241mm)	1.5" - 12 L.H.	621238
9.375" (238mm)	2" - 16 L.H.	614751

S600 SERIES

11.5" (282mm)	1" - 14 L.H.	621244
11.5" (282mm)	1.25" - 12 L.H.	621245
11.5" (282mm)	1.5" - 12 L.H.	621246
11.375" (279mm)	2" - 16 L.H.	614757

SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Part No.
Oil Hole	9" (229mm)	4" (103mm)	.5625"-18 Internal Thread with Counterbore and 118° Angle	382599
Oil Hole	9" (229mm)	4" (103mm)	.625"-18 Internal Thread with Counterbore and 118° Angle	382346
Solid	9" (229mm)	4" (103mm)	No. 2 Short Morse Taper with Side Knock-Out	382628

- Nose Indexers - For 1.5625"-20 nose threads use 381326; For 2.25"-20 use 381327 + 615705 Nose Adapter. New Design for 1.5625-20: 641261; 2.25-20: 641262
- When adapting a 3-jaw chuck to .5625 - 18 Internal Thread Spindle, order Chuck Adapter (623643) for .375" cap. chuck OR Chuck Adapter (619400) for .5" cap. chuck. (See page 2-24).
- Fluid Swivels used with oil hole spindles and selection of Fluid Chucks. (See page 2-25)
- Other Noses & Spindles are available at extra charge. (See pg. 2-26)

Quackenbush™

230QGDA-RAC-SU-MS Depth and Dwell Attachment

The Quackenbush Depth Control or Countersink Attachment is a high quality, precision attachment for the 230 Series Positive Feed Drill which is used to precisely control the depth of drilled and reamed, straight or tapered holes on both flat or contoured surfaces.

The attachment is also used for precision countersink operations. This attachment has been proven on the most demanding hole preparation jobs in the aircraft industry, and has earned the reputation for producing exceptionally high quality holes with precise depth accuracy, roundness and a high level of finish.

How the depth and dwell attachment operates

■ Start

Threaded to the end of the Depth and Dwell Attachment is a DRILL BUSHING ③ which is used to secure the unit to the tooling fixture ②. A tubular SENSING SLEEVE ⑥ is piloted by and slides axially inside the DRILL BUSHING ③. The SENSING SLEEVE surrounds and pilots the CUTTER ⑦ and the SPINDLE ⑧. It is SPRING ④ biased to engage the WORKPIECE ① and seat against it ⑤. The primary function of the SENSING SLEEVE is to provide a positive, definite stopping surface that is a precise repeatable distance from the workpiece.

■ Finish

Attached to SPINDLE ⑧ is a patented micrometer type, ADJUSTABLE ROTATING STOP ⑨ with a self-contained anti-friction bearing designed to engage the SENSING SLEEVE when the CUTTER has achieved the desired depth.

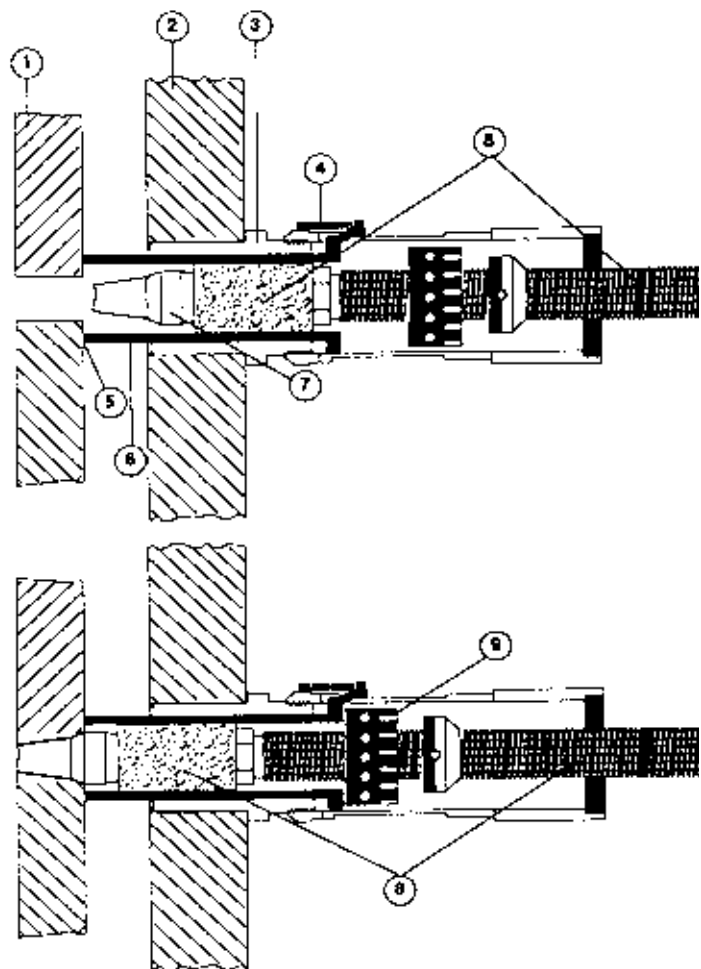
Once the pre-determined depth has been reached, the advancement of the CUTTER is stopped by the engagement of the ADJUSTABLE STOP on the SPINDLE contacting the SENSING SLEEVE. This allows the CUTTER to dwell (continue rotation without further feed) and produce the desired hole characteristics.

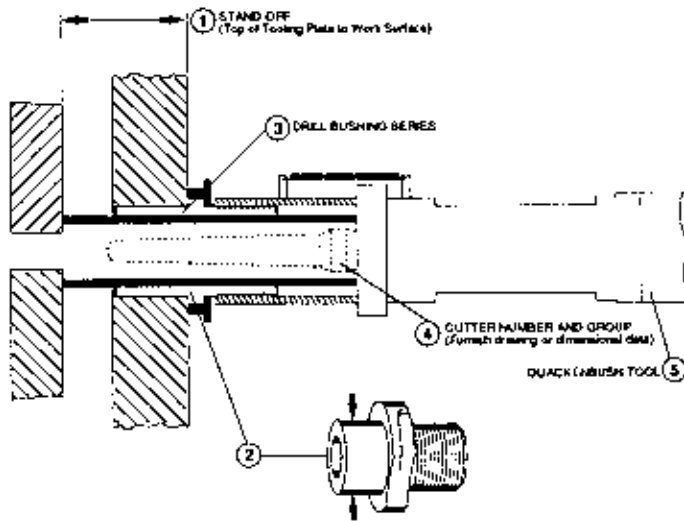
The Model 230 Right Angle Drill (furnished under separate order) features automatic thrust activated retract, torque overload shear pin, and automatic motor stop after retract.

When mounted on the Model 230 Right Angle Positive Feed Drill, the common SPINDLE ⑧ extends through and is driven by the right angle drill head.

Spindles (up to 15" long) will be hollow for coolant flow. A fluid inducer (Part No. 381213) may be purchased for the remote end of the spindle. Rear spindle guards must be used on all applications.

NOTE: Models designed for 1.186 maximum diameter cutters are common. Larger units for 1.750 maximum diameter cutters are available. Shortened models are available for short strokes in confined work areas.

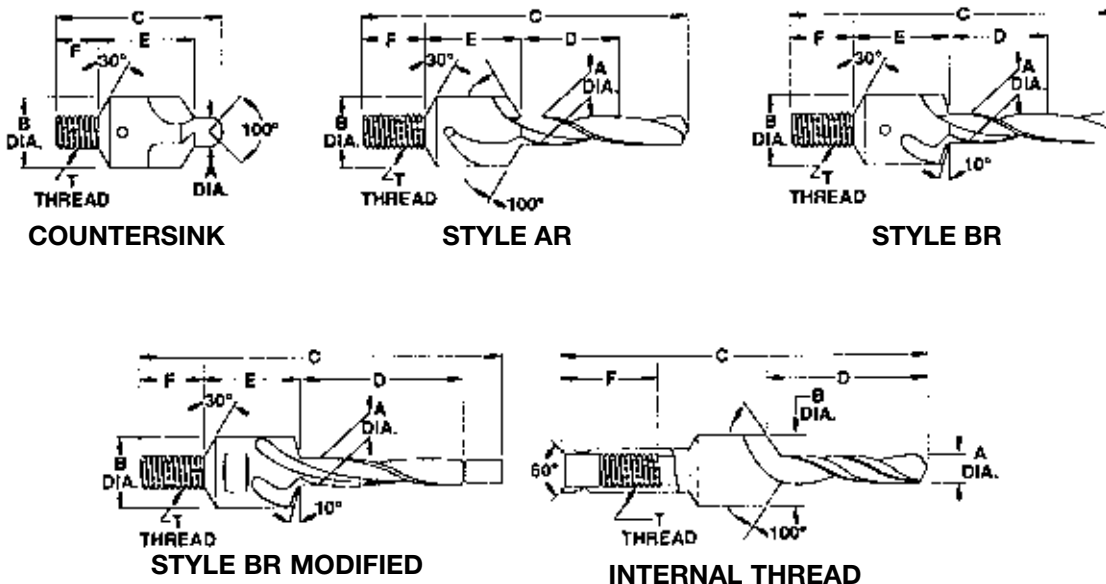




Depth and Dwell attachments are designed for each tooling application. The following information is required in order to obtain a quotation from the factory, Contact your local Quackenbush Specialist for assistance.

- ① Stand Off: _____ inches. (Minimum chip clearance .375")
- ② Drill Bushing Tip Outside Diameter: _____ inches.
- ③ Drill Bushing Series (Circle One):
 - 2 Lock — 22,000, 23,00 & 24,000 Series
 - 3 Lock — 25,000, 26,000 Series
- ④ Cutter Information:
 - Style (reference drawings at bottom of this page): _____.
 - Furnish cutter Drawing or Dimensional Data (reference drawings at bottom of this page)
 - A _____ F _____
 - B _____ T _____ External Thread
 - C _____ or _____
 - D _____ T _____ Internal Thread
 - E _____ Fluid Spindle: Yes _____ No _____
- ⑤ Nose Indexer: Yes _____ No _____
- ⑥ Quackenbush Tool Model No. _____

NOTE: • Important— If chip escape reliefs are required on the sensing sleeve, they must be specified when ordering. A drawing must be provided showing the exact location and type openings required.
 • Some applications involving long cutters require that the tips of the cutter extend beyond the Dwell and Depth Attachment when the spindle is fully retracted.



FOR OTHER CUTTER STYLES, FURNISH CUTTER DRAWING

Quackenbush™

230QGDA-RAD-GD Gun Drill Series

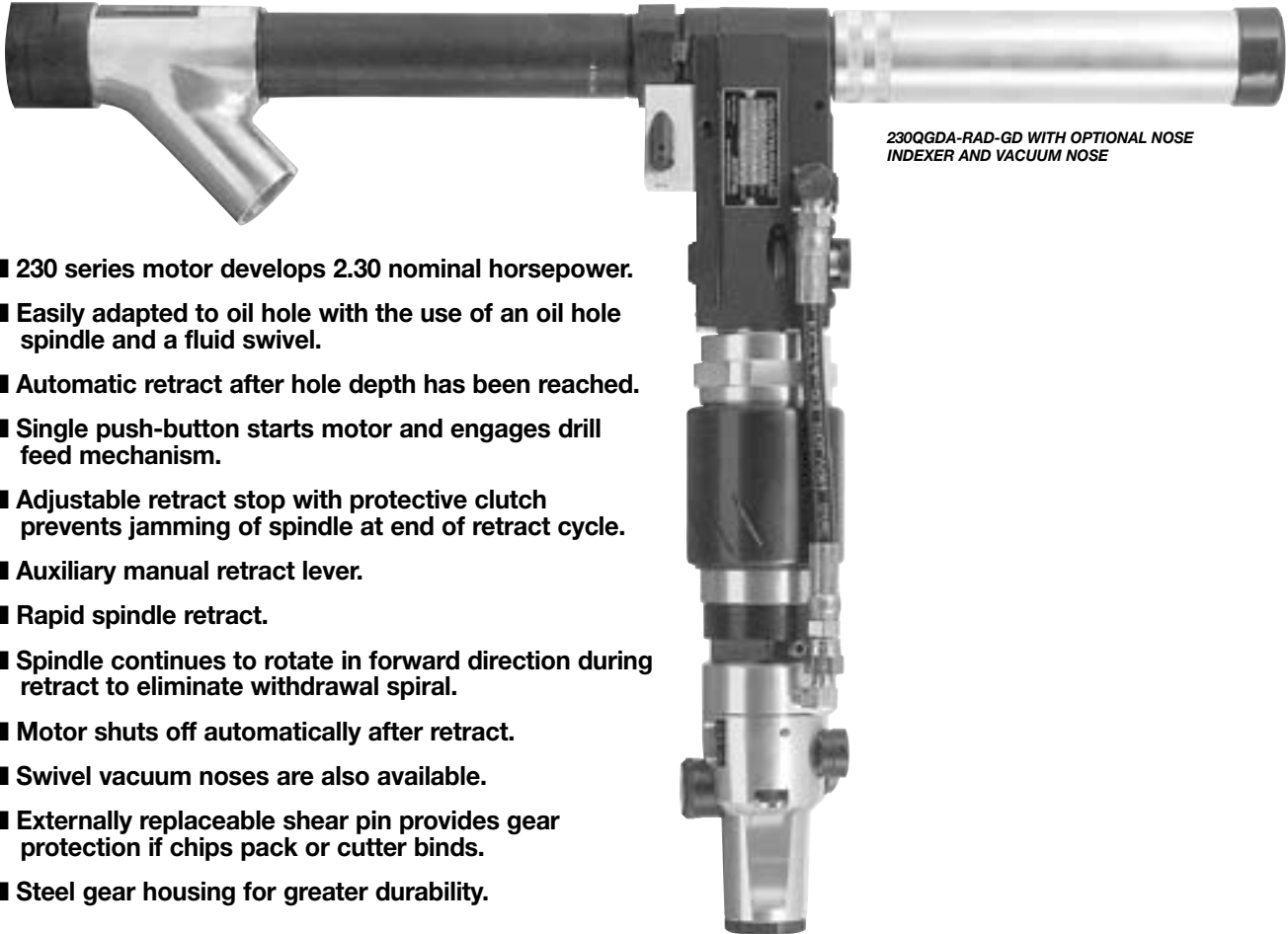
Capacity:

Aluminum – .75" (19.1mm)

Stroke:

Min. – .125" (3.2mm)

Max. – Unlimited

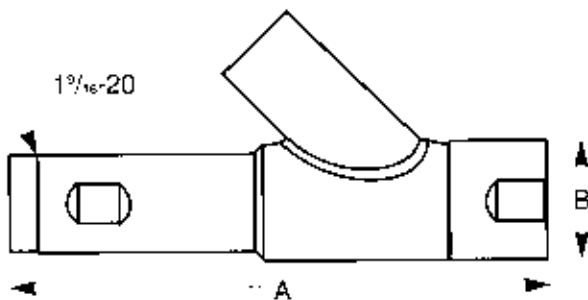
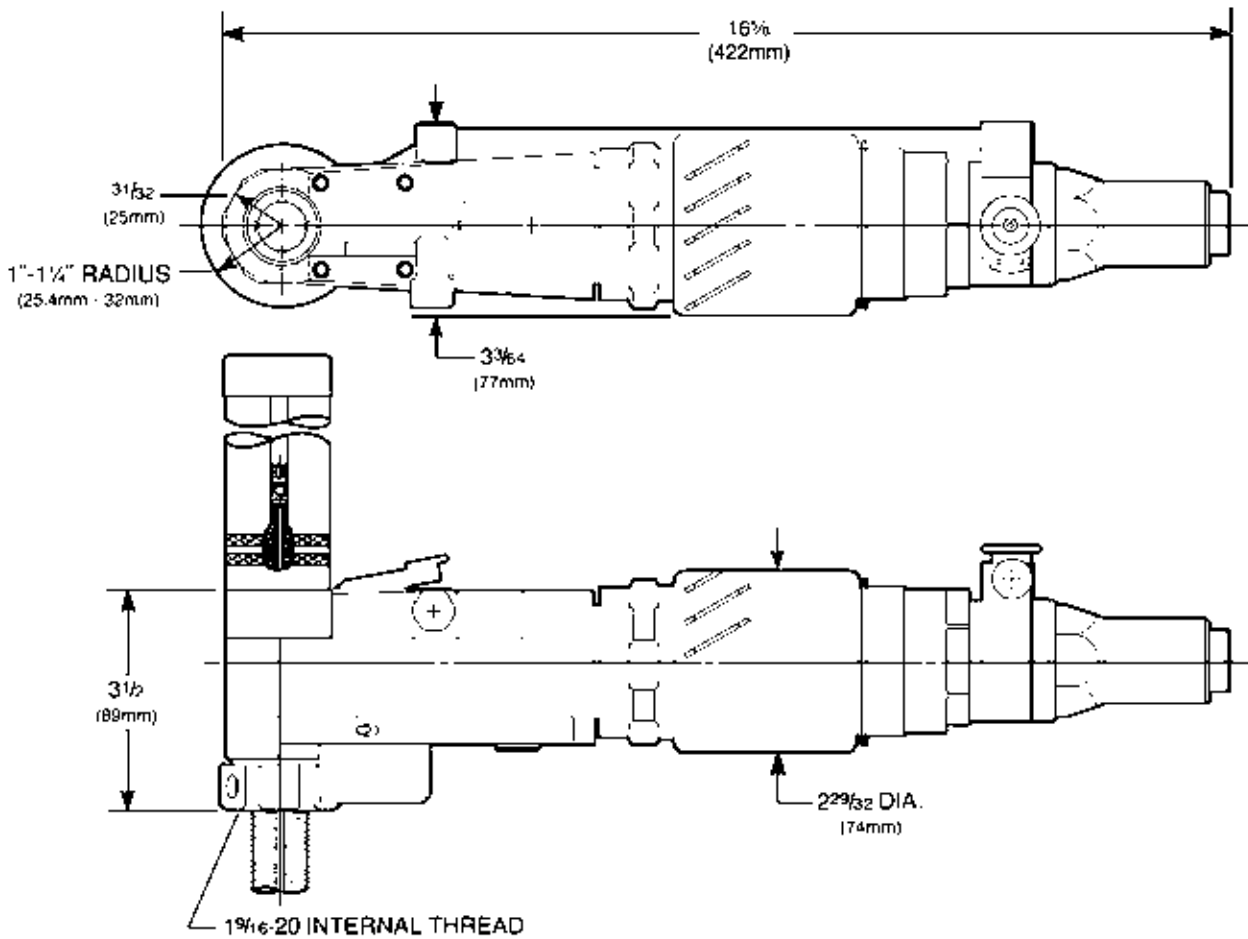


- 230 series motor develops 2.30 nominal horsepower.
- Easily adapted to oil hole with the use of an oil hole spindle and a fluid swivel.
- Automatic retract after hole depth has been reached.
- Single push-button starts motor and engages drill feed mechanism.
- Adjustable retract stop with protective clutch prevents jamming of spindle at end of retract cycle.
- Auxiliary manual retract lever.
- Rapid spindle retract.
- Spindle continues to rotate in forward direction during retract to eliminate withdrawal spiral.
- Motor shuts off automatically after retract.
- Swivel vacuum noses are also available.
- Externally replaceable shear pin provides gear protection if chips pack or cutter binds.
- Steel gear housing for greater durability.

Model	Motor Configuration	Maximum Stroke		Weight*		Maximum Length		Spindle Speeds	Feed Per Revolution	Inlet	Minimum Hose Size
		in.	mm	lbs	kg	in.	mm				
230QGDA-RAD-GD	Right Angle	No Limit		13.25	5.95	15 7/8	403.23	1500, 1850, 2100	.0005, .001	.5" NPT	.5"

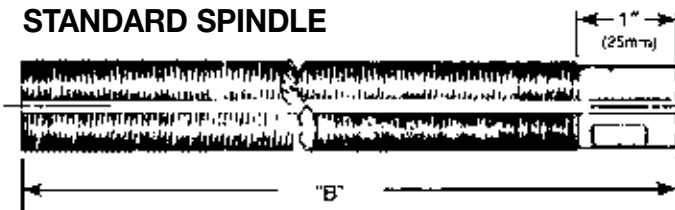
*Weight is tool without spindle and nose piece.
 Rated tool performance at 90 PSIG measured at tool inlet with motor running.
 When selecting speeds and feeds, see page I-5.
 Mist lubricator (631298) may be ordered.

SEE PAGES I-11-I-13 FOR SAFETY PRECAUTIONS.
 SEE PAGE 2-22 – 2-25 FOR TOOLING ACCESSORIES.



Overall Length A	Part Number	Drill Bushing Thread Size B
7.50	631300	1.250-12 L.H.
8.50	631301	1.250-12 L.H.
9.50	631302	1.250-12 L.H.
11.50	631303	1.250-12 L.H.
7.50	631304	1.500-12 L.H.
8.50	631305	1.500-12 L.H.
9.50	631306	1.500-12 L.H.
11.50	631359	1.500-12 L.H.
8.50	631485	2.000-16 L.H.

STANDARD SPINDLE



SPINDLES (Select One)

Spindle Type	Length "B"	Max. Stroke	Thread Description	Part No.
Oil Hole	9.25" (235mm)	4.5" (114mm)	.5625"-18 Internal Thread with Counterbore and 118° Angle	623955
Oil Hole	9.25" (235mm)	4.5" (114mm)	.625"-18 Internal Thread with Counterbore and 118° Angle	615964

- Nose Indexer - 1.5625"-20 (381326)
- Fluid Swivels used with oil hole spindles and selection of Fluid Chucks. (See page 2-25)
- Other Noses and Spindles are available at extra charge. (See page 2-26)

Right Angle Tools Accessories

Accessories for the No. 15 and 140 Series Right Angle Drills

Nose Adapter
15 Series - 614722
140 Series - 629222

1 5/8"-18 L.H. THREAD

DIA. 1 3/4" (44mm)

BUSHING THREAD

Bushing Thread	S125 Series		S300 Series	
	Dim A	Part No.	Dim. A	Part No.
.75 - 16 L.H.	5.3125 in. (135mm)	619143	6.9375 in. (176mm)	619333
1" - 14 L.H.	5.4375 in. (138mm)	619142	6.9375 in. (176mm)	619297
1.25" - 12 L.H.	5.4375 in. (138mm)	619271	6.9375 in. (176mm)	619274

15RAG HEAD

1"-20 THD. 1/2"-22 L.H. THD.
1"-20 L.H. THD.

3/8"-24 INTERNAL THD

3/8"-24 THD

2.410

SPINDLE ADAPTER
619136

3/8" CAP. CHUCK
849108

KEY
849120

2.375

MORSE TAPER
NO. 1 613542
NO. 2 612934

3/8"-24 THD.

2 1/4"

3/8"-24 THD.

1 1/4" DIA.

Bore	END FEED		SIDE FEED	
	Part No.	Part No.	Part No.	Part No.
Bore .250	621389	621373	621373	621373
Bore .375	621390	621374	621374	621374
Bore .500	621391	621375	621375	621375

FLUID CHUCKS

1.825-18 L.H. THREAD

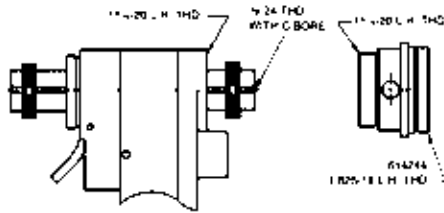
DIA. 2 in. (51mm)

BUSHING THREAD

Nose Adapter
15 Series - 614973
140 Series - 629224

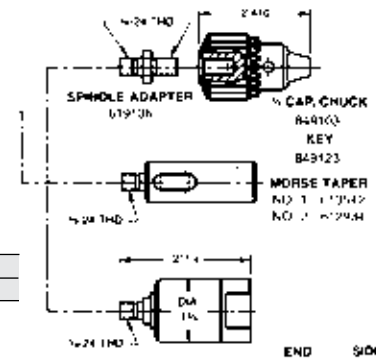
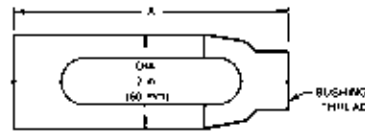
Bushing Thread	S150 Series		S275 Series	
	Dim. A	Part No.	Dim. A	Part No.
.75 - 16 L.H.	5.625 in. (143mm)	619662	6.875 in. (175mm)	619954
1" - 14 L.H.	5.875 in. (149mm)	619683	7.125 in. (181mm)	619955
1.25" - 12 L.H.	5.875 in. (149mm)	619704	7.125 in. (181mm)	619953
1.5" - 12 L.H.	-	-	7.125 in. (181mm)	617802

Accessories for the No. 158 and 230GD Series Right Angle Drills

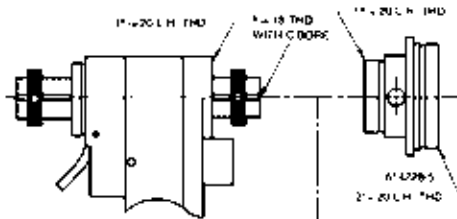


158RA HEAD
230GD HEAD

Bushing Thread	S150 Series		S275 Series	
	Dim. A	Part No.	Dim. A	Part No.
.75" - 16 L.H.	5.625 in. (143mm)	619662	6.875 in. (175mm)	619954
1" - 14 L.H.	5.875 in. (149mm)	619683	7.125 in. (181mm)	619955
1.25" - 12 L.H.	5.875 in. (149mm)	619704	7.125 in. (181mm)	619953
1.5" - 12 L.H.	-	-	7.125 in. (181mm)	615627

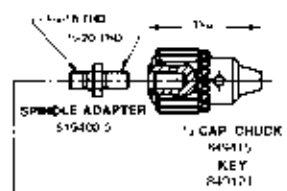
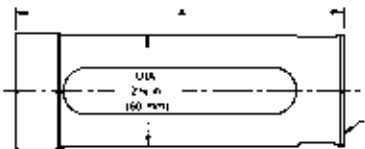


FLUID CHUCKS	END FEED	SIDE FEED
Bores 1-25	621389	621373
Bores 3-75	621390	621374
Bores 500	621391	621375

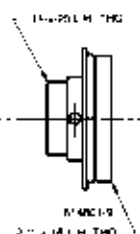


158RA HEAD
230GD HEAD

Bushing Thread	S400 Series		S600 Series	
	Dim. A	Part No.	Dim. A	Part No.
1" - 14 L.H.	9.5 in. (241mm)	621236	11.5 in. (292mm)	621244
1.25" - 12 L.H.	9.5 in. (241mm)	621237	11.5 in. (292mm)	621245
1.5" - 12 L.H.	9.5 in. (241mm)	621238	11.5 in. (292mm)	621246
2" - 16 L.H.	9.375 in. (238mm)	614751	11.375 in. (289mm)	614757



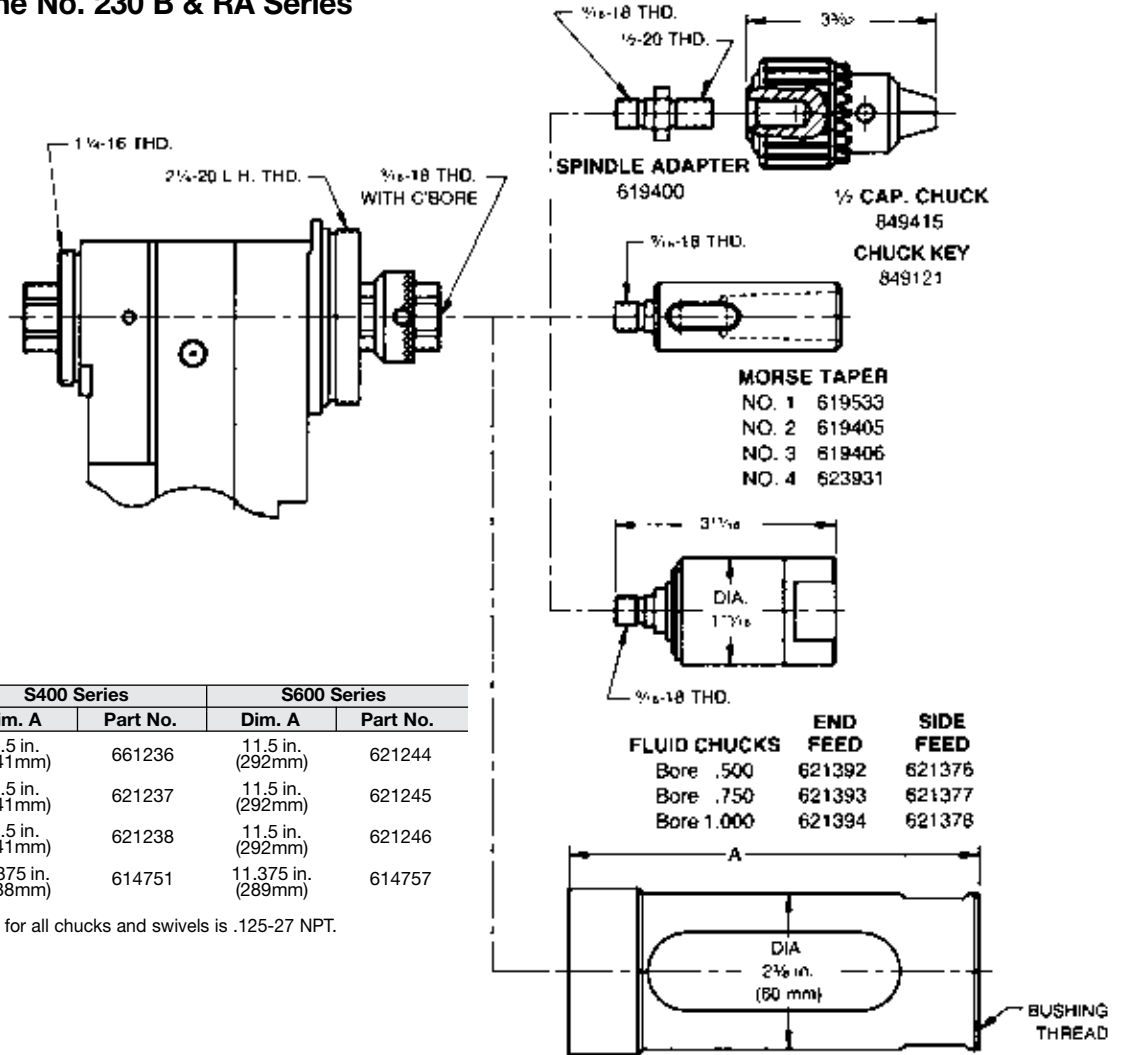
FLUID CHUCKS	END FEED	SIDE FEED
Bores 500	621392	621376
Bores 750	621393	621377
Bores 1000	621394	621378



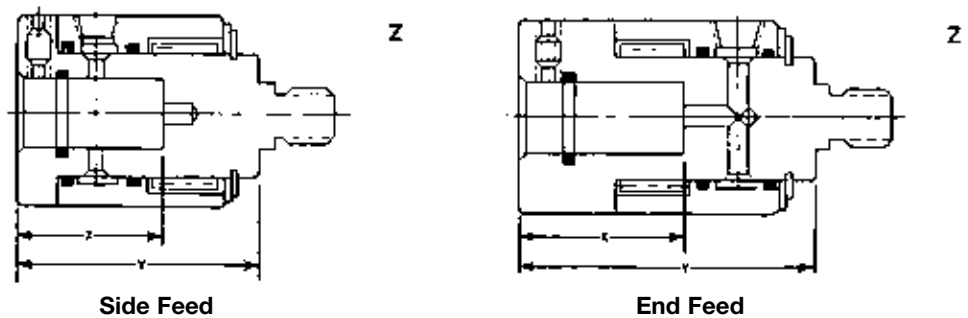
Bushing Thread	S700 Series	
	Dim. A	Part No.
1" - 14 L.H.	13.5625 in. (344mm)	621228
1.25" - 12 L.H.	13.5625 in. (344mm)	621229
1.5" - 12 L.H.	13.5625 in. (344mm)	621230
2" - 16 L.H.	13.4375 in. (341mm)	614749

Right Angle Tools Accessories

Accessories for the No. 230 B & RA Series Right Angle Drills



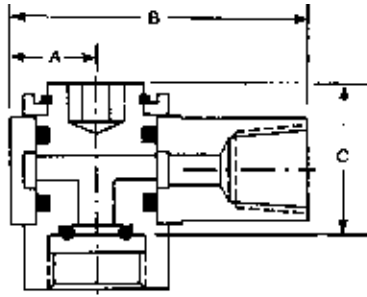
Fluid Chucks



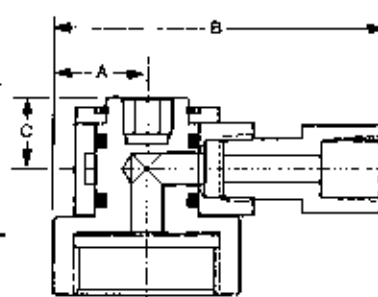
Quackenbush Drill*	Bore Dia.	Side Feed			End Feed				
		Part No.	"X"	"Y"	"Z"	Part No.	"X"	"Y"	"Z"
S-125, S-300	.250	621373	1.510	2.031	.375-24	621389	1.000	2.312	.375-24
S-265	.375	621374	1.510	2.031	.375-24	621390	1.000	2.312	.375-24
S-150, S-275	.500	621375	1.510	2.031	.375-24	621391	1.000	2.312	.375-24
S-400, S600	.500	621376	1.510	2.406	.5625-18	621392	1.437	3.000	.5625-18
S-400, S600	.750	621377	1.510	2.406	.5625-18	621393	1.687	3.000	.5625-18
S-400, S600	1.000	621378	1.510	2.406	.5625-18	621394	1.687	3.000	.5625-18
S-700, S750	1.000	621408	1.510	2.406	.75-16	621395	1.687	3.000	.75-16

*Stroke length. Note: Dimensions X & Y are reference.

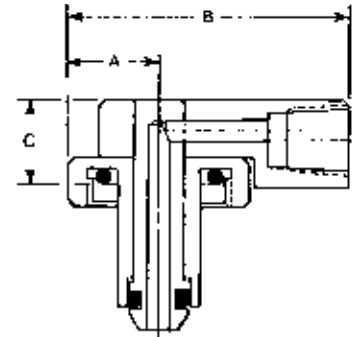
Fluid Chucks



15 & 140 Series Swivel



158 Series Swivel



230 Series Swivel

Solid or Slotted Spindle Guards with Fluid Inducers

Length	Solid Spindle Guards			Slotted Fluid Spindle Guards		
	15QDA	158QGDA	230QGDA	15QDA	158QGDA	230QGDA
1.00	624339	624360				
1.37	627118					
2.00	624340	624361		624328	624375	
2.50		632538			632675	
3.00	624341	624362		624329	624376	
4.00	624095	624103		624330	624322	624404
5.00	624342	624363	624503	624331	624377	624505
6.00	624096	624104	624397	624332	624323	624405
7.00	624343	624364	624500	624333	624378	624406
8.00	624344	382395	624398	624334	624324	624407
9.00	624345	624365	624399	624335	624379	624408
10.00	624346	624366	624400	624336	624380	624409
11.00	624347	624367	624504	624337	624381	624506
12.00		624368	624401		624382	624410
13.00		624369	624402		624383	624411
14.00	624777	624370	624501		624384	624502
15.00		624371	624403		624385	625444
16.00		624372	632246		632251	632254
17.00		624373	632245		624386	625607
18.00	624348	632250	632247		632252	632255
19.00		624374	632248	624338	632253	629260
20.00		624516	632249		624387	632256

Add "S" to end of part number for steel
 EXAMPLE: 632249 20.0" GUARD ALUM IS 632249S FOR 20.0" GUARD STEEL

Fluid Inducer Kit

15/140QR/B	158QR	230QR
641948	641947	641946

Fluid Swivel

15/140QR/B	158QR	230QR
631256	621448	381213



Right Angle Tools Accessories

Nose Indexers for the 15, 158 & 230 Series Right Angle Drills

These new indexers eliminate the need to relocate lock screws on the fixtures, or shim nose pieces in order to orientate the tool to fit the application. An indexer aids in applying a right angle tool in confined spaces, and on applications where multiple tools are used in close proximity. The tool is orientated to the desired position by depressing a spring loaded lever, which allows the nose to rotate and lock without changing the position of the tool.

As an accessory for a new 15 series right angle tool, use part number 641244. To retrofit a previously purchased tool use part number 641245. Either indexer adds approximately 1 3/8" of length to the tool.

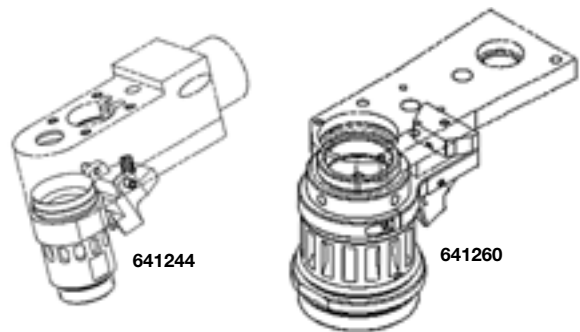
158 right angle tool indexer is part number 641260. This is the same basic indexer used with the 230 series except for the thread adapter (632684) and the retainer block (632691). The 632684 adapter allows the indexer to be attached directly to the 1 9/16-20 internal threads in the head of the tool.

Therefore, if the tool has a 614228 adapter for the 2 1/4-20 nose threads, simply remove the 614228 adapter before installing the indexer. The 641260 indexer adds approximately 2 3/8" of length.

There are two adapters for the 230 series because the 230 series comes with either the 1 9/16-20 or the 2 1/4-20 nose attachment threads. Use indexer 641261 for a tool with the 1 9/16-20 internal threads in the tool. The 641261 indexer adds approximately 2" of length. Use indexer 641262 for a tool with the 2 1/4-20 external threads. The 641262 indexer adds approximately 2 1/4" of length.

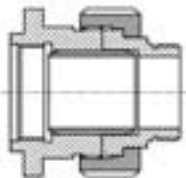
The indexers are basically the same except the 641262 requires the 632685 thread adapter and the 632693 retainer block. Both indexers are designed to accommodate noses with either the 1 9/16-20 or 2 1/4-20 attachment threads.

Quackenbush Drill	Model	Part No.	Length
15QDA-RAB-SU-RS	New	641244	1 3/8"
15QDA-RAB-SU-RS	Retrofit	641245	1 3/8"
140QDA-RAB-SU-RS	1"-20	641267	1.94"
158QGDA-RA3-SU-RS	1 9/16-20 / 2 1/4-20	641261	1 3/8"
230QGDA-RAD-SU-RS	1 9/16-20	641261	2"
230QGDA-RA-SU-MS	2 1/4-20	641262	2 1/4"

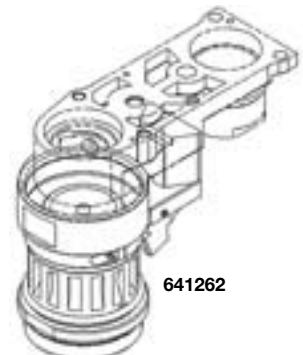
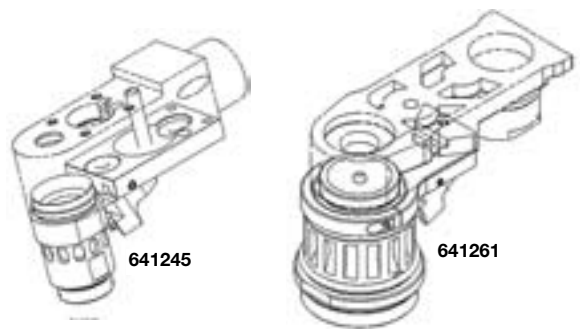


Manual Indexer

Quackenbush Drill	Model	Part No.
140Q	1"-20	631864
15Q	Retrofit	631249
158Q / 230Q	1 9/16-18	381326
158Q / 230Q	2 1/4-20	38127



631864 Manual Indexer



Lubricators

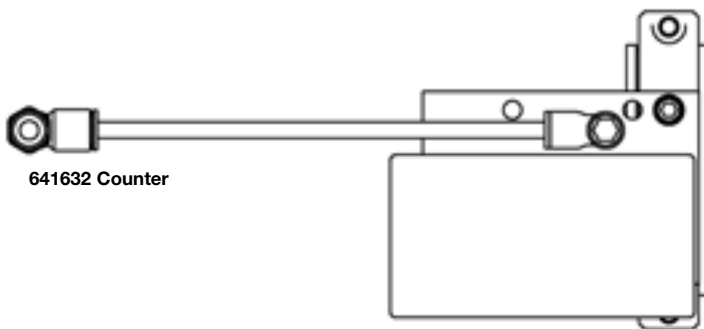
Model	631800 – Manual Fill Standard Capacity	631799 – Manual Fill Large Capacity	631801 – Pressure Fill Standard Capacity	631802 – Pressure Fill Large Capacity	22007057 – Recoules Pump Luber	Micro-Pump Adapter Kit
10QNPD	631887		631888			
15QNPD	631885		631886			
15SC	631881	631883	631882	631884		
136SC	631878		631879	631880		
120SC	641109	641081	641110	641082		
180SC	641109	641081	641110	641082		
15QDA			631889			NEW #
140QGDA			641047			
158QGDA-15RAB				631930		
158QGDA		641552		641038		92050129
230QGDA				641160		
120QP					680209	92050128

932QR/942QR Micropumps/Counters

Tool Model	Description	Part Number
932QR/942QR	Micro-Pump with manual counter	22007057
932QR/942QR	Micro-Pump without counter	22007067
932QR/942QR	Manual Counter	22008167

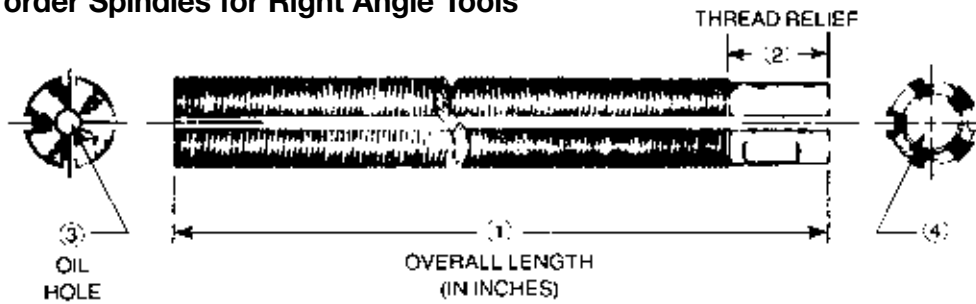
Counters

Tool Model	Part Number	
	Analog Counter	Electronic Counter
140QGDA	641632	641632E
230 / 158QGDA	641634	641634E
15QDA	641949	641949E



Right Angle Tools Accessories

How to order Spindles for Right Angle Tools



INFORMATION REQUIRED TO ORDER SPINDLES:

① OVERALL LENGTH:

- Stroke _____ + 2.87" (73mm) for 15QDA-RA = _____ Overall Length
 Stroke _____ + 3.50" (89mm) for 140QGDA-RA-SU-MS = _____ Overall Length
 Stroke _____ + 3.75" (95mm) for 158QGDA-RA = _____ Overall Length
 Stroke _____ + 4.93" (125mm) for 230QGDA-RA-MS = _____ Overall Length
 Stroke _____ + 4.75" (121mm) for 230QGDA-RA-GD = _____ Overall Length
 Stroke _____ + 4.93" (125mm) for 230QGDAB-MS = _____ Overall Length

② STANDARD SPINDLE THREAD RELIEF

- .875" for 15QDA-RA and 140QGDA-RA
 1" for 158QDA-RA
 (.5625" flange width for 230QGDA-RA-MS)
 1" for 230QDA-RA-GD

NOTE: Specify if Thread Relief is other than standard.

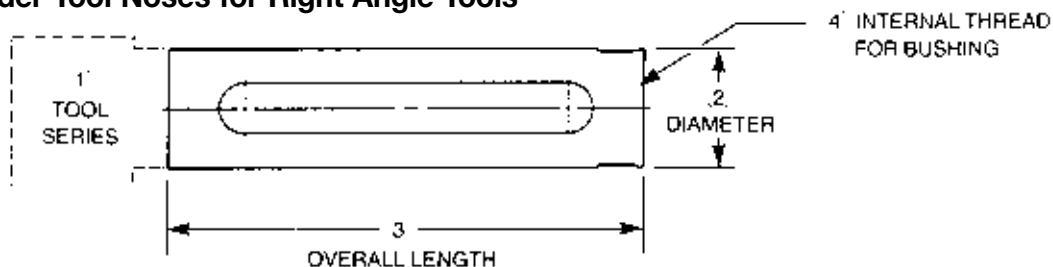
③ OIL HOLE REQUIRED? Yes No

NOTE: Spindle guards are highly recommended and are available for all spindles. Please specify when ordering.

④ END PREPARATION OF SPINDLE:

- INTERNAL THREAD:
 (Provide drawing specifying thread, depth, angle and counterbore depth if required)
 STRAIGHT BORE:
 Bore Diameter _____ inches
 Depth _____ inches
 INTERNAL MORSE TAPER (for 158 and 230 Models only)
 No. 1 Morse Taper
 No. 2 Morse Taper

How to order Tool Noses for Right Angle Tools



INFORMATION REQUIRED TO ORDER TOOL NOSES:

① TOOL SERIES

- 15QDA-RA (1"-20 Nose Thread)
 158QGDA-RA (1.5625"-20 OR 2.25"-20 Nose Thread)
 230QGDA-RA-MS (1.5625"-20 OR 2.25"-20 Nose Thread)
 230QGDA-RA-GD (1.5625"-20 OR 2.25"-20 Nose Thread)

② DIAMETER

- Standard Sizes - 1.1875" OD
 15QDA-RA - 1.5625", 2" and 2.375" OD
 230QGDA-RA-MS - 1.5625", 2" and 2.375" OD
 230QGDA-RA-GD - 1.5625", 2" and 2.375" OD

③ OVERALL LENGTH

④ DRILL BUSHING SERIES

NOTES: Drawings for special tool noses must be provided when ordering.

Nose guard cover is nose number with "C" suffix.

Also available in vacuum and coolant styles.

DRILL BUSHING

BUSHING SERIES	QUACKENBUSH NOSE THREAD (ID)
21000	.75" - 16
22000	1" - 14
23000	1.25" - 12
24000	1.5" - 12
25000	2" - 16

Bushings not furnished with Quackenbush Tools.

Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

Dallas, TX
Cooper Tools
Sales & Service Center
1470 Post & Paddock
Grand Prairie, TX 75050
Tel: (972) 641-9563
Fax: (972) 641-9674

Detroit, MI
Cooper Tools
Sales & Service Center
4121 North Atlantic Blvd.
Auburn Hills, MI 48326
Tel: (248) 391-3700
Fax: (248) 391-6295

Houston, TX
Cooper Tools
Sales & Service Center
6550 West Sam Houston
Parkway North, Suite 200
Houston, TX 77041
Tel: (713) 849-2364
Fax: (713) 849-2047

Lexington, SC
Cooper Tools
Sales & Service Center
670 Industrial Drive
Lexington, SC 29072
Tel: (800) 845-5629
Tel: (803) 359-1200
Fax: (803) 358-7681

Los Angeles, CA
Cooper Tools
Sales & Service Center
15503 Blackburn Ave
Norwalk, CA 90650
Tel: (562) 926-0810
Fax: (562) 802-1718

Seattle, WA
Cooper Tools
Sales & Service Center
2865 152nd Ave N.E.
Redmond, WA 98052
Tel: (425) 497-0476
Fax: (425) 497-0496

York, PA
Cooper Tools
Sales & Service Center
3990 East Market Street
York, PA 17402
Tel: (717) 755-2933
Fax: (717) 757-5063

Canada
Cooper Tools
Sales & Service Center
5925 McLaughlin Road
Mississauga, Ont. L5R 1B8
Canada
Tel: (905) 501-4785
Fax: (905) 501-4786

Cooper Tools
P.O. Box 1410
Lexington, SC 29071-1410
USA
Phone: 800-845-5629
803-359-1200
Fax: 803-359-0822

Cooper Tools
4121 North Atlantic Blvd.
Auburn Hills, MI 48326
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Phone: (248) 391-3700
Fax: (248) 391-6295

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Fax: (905) 501-4786

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Fax: +55-15-228-3260

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htwe.sales@cooperindustries.com

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