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- UNSURPASSED SERVICE
- EXCEPTIONAL DELIVERY



## HYDRAULIC DRILLING & TAPPING UNITS

**MOST POWERFUL UNITS  
IN THE WORLD FOR THEIR SIZE**

**3rd Edition**

AAA PRODUCTS INTERNATIONAL • DALLAS, TEXAS U.S.A.  
<http://www.aaaproducts.com> e-mail: [info@aaaproducts.com](mailto:info@aaaproducts.com)



## AAA Products International

FLUID POWER VALVES - *Jiffy* PRODUCTS

Dear Manufacturers,

You probably know that more and more U.S. manufacturing is being done out of our country. This can affect your profits, but you can do something about it.

Here is some simple tooling you can do at a relatively small cost that can help you retain most of your business. Are you aware that large part of the production machining done in this country is done on CNC machining centers? Most manufacturers use them, both in the USA and abroad. Machining centers drill and tap from one side of a part at a time. The answer is for you to drill and/or tap your parts from more than one side at a time. If you drill or tap on 2 sides of a part simultaneously, you can double the output, 3 sides at a time will triple your output, etc. and multiple spindle drill or tap heads help even more.

We use AAA Products **Jiffy-Tap** units in our plant, where we tap 17 holes in 5 sides of our 3/8 inch aluminum air valve body (5 of the holes are 3/8" NPTF and 12 are 10-24). The total time floor to floor is 5 seconds. That's 204 precision tapped holes per minute! The total cost of the machine, built in our shop using **Jiffy-Tap** units, is a fraction of the cost of one small CNC machining center. We have been using this machine daily since 1982 and have not had to perform any repair work on the **Jiffy-Tap** units, hydraulic power unit, hydraulic valves, nor the hydraulic motors. The machine is built using cold rolled steel bars and steel angle iron. Our AAA **Jiffy** units have been in production since 1981 and are being used in many of the largest high production manufacturing plants.

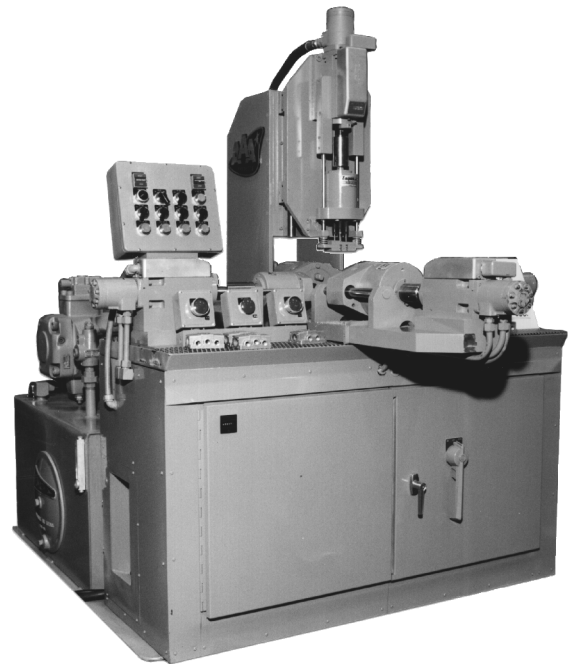
For most jobs, you can mount the **Jiffy** drilling or tapping units on a angle iron frame, and can change them from one frame to another in a few minutes to drill from 1/8" through 1-1/2" in steel or precision lead screw tapping from 4-40 through 1-1/2" diameter in steel. There is no complex maintenance in using the **Jiffy** units, and these simple machines can be operated and maintained with an unskilled operator. (This is not the case with machining centers.) With the **Jiffy-Tap** units, all holes are tapped to exact depth, and there are no thread depth problems as with clutch type tappers.

**Jiffy-Tap** is the only precision lead screw tapping unit in the world that can be changed from one size and/or thread pitch to another in 5 minutes. (Change from a 6-32 to 1-1/2 NC or metric equivalent.)

You can not compete with foreign manufacturers with the same machines that they use. Foreign labor and overhead is a small fraction of your cost here in the USA.

If we can answer any questions, or provide you with more information, please call us at 214-357-3851. Ask for a free video. "We can help you."

Sincerely,  
AAA Products International  
R.C. Womack  
President



**Simple17 Tapper - 20 times more  
production than a machining center  
at a fraction of the investment  
(shop built: 4-1/2' width x 7' depth)**

# *Find out for yourself why Jiffy-Drills and Jiffy-Taps are the best in the world!*

We, at AAA Products International, are committed to provide our customers with superior products of premium quality.

AAA Products International manufactures the most powerful, compact, dependable and affordable drilling and tapping units available today. We invite you to put them on your toughest jobs.

We pride ourself in our ability to supply special customer specific products to fit their unique applications. We invite you to join with us to help you solve your production challenges. We promise unsurpassed customer service, exceptional delivery and competitive prices.

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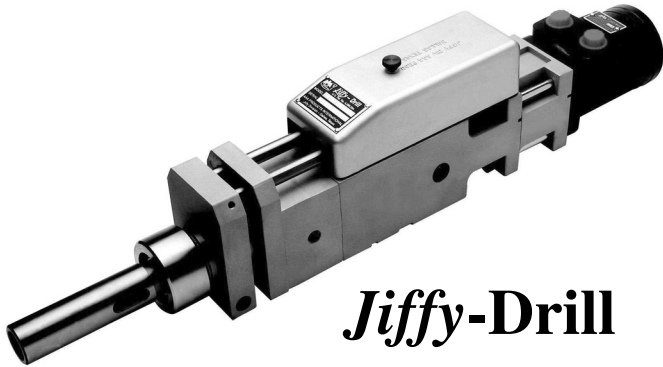


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Standards Institute  
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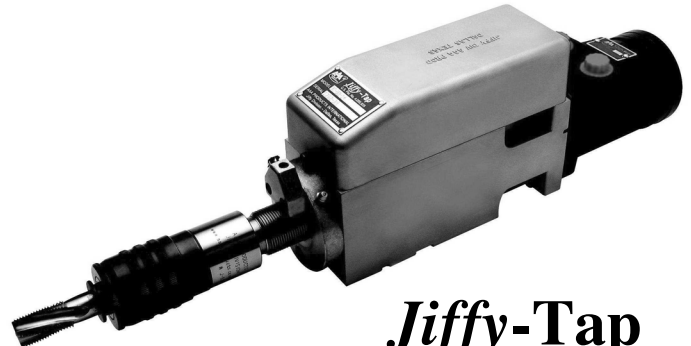
See Bulletin A-266 for the location of your authorized AAA distributor.

# ***AAA PRODUCTS INTERNATIONAL***

## ***Jiffy UNITS***



***Jiffy-Drill***



***Jiffy-Tap***

## ***OPERATIONAL ADVANTAGES OF Jiffy PRODUCTS***

1. High strength aluminum alloy body.
2. 1"- 6 spline ETD-150 steel alloy drive.
3. Hardened drive spindle and sleeve for long life.
4. Precision ground drive components.
5. Heavy duty hydraulic motors. Quick change motors available.
6. Four large, 1/2"-13 mounting holes.
7. 5/8" x 3/32" deep alignment cross keyways precision milled for easy alignment.  
(Easily move units from one machine to another.)
8. Optional 8 pin plug-in cable with/without 12 foot cord.
9. No proprietary power unit configuration required.

### **ADVANTAGES SPECIFIC TO *JIFFY-DRILL***

1. The ***Jiffy-Drill*** has a piston quill that is one piece, precision ground with special wear resistant and corrosion resistant coating. Quill is equipped with long life, anti-galling wear rings.
2. Can be setup for rapid advance, rapid retract or skip drilling.
3. All internal parts have a special long-wear, corrosion resistant coating.
4. Safety interlock switch.
5. Large variety of spindle adaptors including Morse female tapers, ASA, and Jacobs types.
6. Easily handles 1-1/2" drilling capacity in steel. Will drill 1-3/4" in mild steel.
7. Can be used as a screw or plug driver using depth or torque retraction signal.

### **ADVANTAGES SPECIFIC TO *JIFFY-TAP***

1. 1-5/16" diameter ETD-150 steel alloy lead screw.
2. Grease fitting on lead screw nut, and oiler on lead screw wiper assembly for easy lubrication and extended life.
3. #4 Jacobs taper for true chuck alignment. Additional chuck features are:
  - A) Chuck is secured with 1/4" socket head cap screw.
  - B) 808 Woodruff key prevents rotation.
4. Optional Lead Screw quick change is available.
5. Optional Lead Screw auto reverse is available.

# JIFFY MODEL NUMBERING CODE

**Jiffy-Drills, Jiffy-Spindles and Jiffy-Taps** use a simplified model code which calls out the most important characteristics with a minimum of coding.

The first two letters in the code (3D) designates the type of unit. The next two letters designates the motor or drive style. The third grouping designates either a **Jiffy-Drill** and **Jiffy-Spindle** spindle size, or pitch size for a **Jiffy-Tap** lead screw. This completes the basic drilling or tapping unit. Additional optional features available are described on pages 12 and 13 for **Jiffy-Drills** and pages 34 through 38 for **Jiffy-Taps**, with the correct option code to be added to the standard model number.

3D=**Jiffy-Drill** (See page 7)

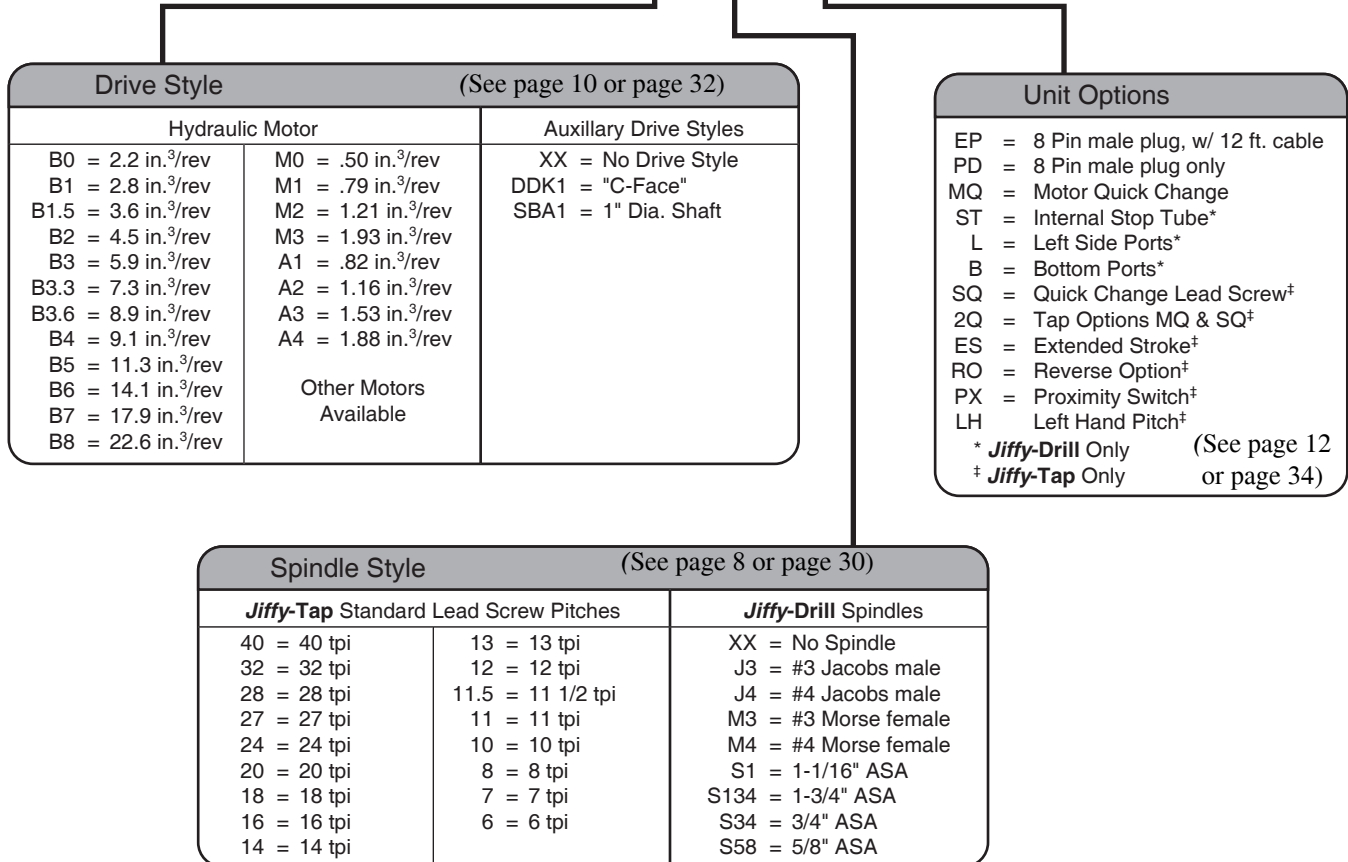
3S=**Jiffy-Spindle** (See page 7)

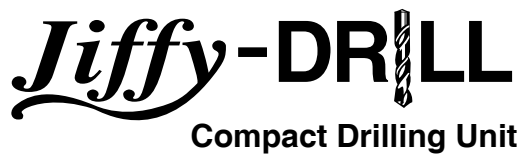
3T=**Jiffy-Tap** (See page 29)

**3D-B3-M4-MQ**

Append option codes, separated by dashes, as needed.

i.e.: MQ-EP-L, (Order is not critical)





## Features at a Glance

## SPECIFICATIONS\*

**Stroke Length:** 0" to 3-1/2" maximum±

**Drill Capacity:** 1-1/2" in 1018 steel

**Spindle RPM:** 5000 RPM maximum

**Spindle Type:** #3 Morse (shown) - others available

**Spindle Torque:** 15 - 3700 in.-lbs. maximum

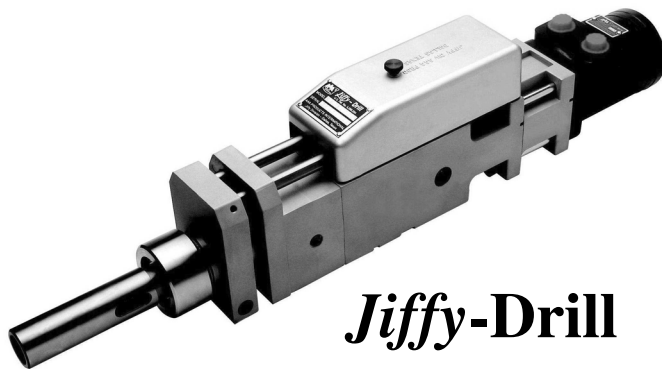
**Drill Thrust:** 400 - 2500 lbs. maximum (meter in)

**Feed Cylinder:** Extend - 3.15 in.<sup>2</sup> rear piston area  
Retract - 1.37 in.<sup>2</sup> front piston area

**Weight:** 39 lbs. approximately

\*Some options may limit or alter the listed values.

‡Stroke is limited by drilling torque. (See page 19)



### TYPES OF OPERATIONS:

Standard Hole Drilling: (See page 16)

Peck Drilling: (See page 17)

Multiple Spindles: (See page 18)

Hole Reaming: (See page 16)

Spot Facing: (See page 16)

Skip Drilling: (See page 18)

Hole Tapping: (See page 18)

**AVAILABLE SPINDLES:** (See page 8)

M3: #3 Morse Female Taper (standard)

M4: #4 Morse Female Taper

J3: #3 Jacobs Male Taper

J4: #4 Jacobs Male Taper

### S58: 5/8" Adjustable Adapter

S34: 3/4" Adjustable Adapter

S1: 1-1/16" Adjustable Adapter

S138: 1-3/8" Adjustable Adapter

**AVAILABLE DRIVE STYLES:**

Hydraulic Motor: (See page 10)

Electric Motor: (See page 10)

1" Keyed Shaft: (See page 11)

C-Face Mount: (See page 10)

**AVAILABLE DRILL OPTIONS:**

EP or PD: 12 Ft. Cord and/or 8-Pin Pigtail (See page 13)

MQ: Motor Quick Change (See page 12)

L or B: Alternate Feed Port Location (See page 13)

ST: Stroke Limiting Stop Tube (See page 13)

## *Jiffy-Drill Quick Index*

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# Jiffy-Drill Features

- Light weight - approximately 39 lbs. It is so light that it can be used in special fixtures as a portable drilling unit, or with magnetic base, or as a rail drill.
- Can easily be set up for rapid advance feed, rapid return, and to dwell, skip, or peck drill. (May require optional equipment and different feed control circuits.)
- Precision adjustment on the limit switch which controls depth of drilled hole.
- Your choice of spindle tapers or configuration.
- When using hydraulic motors, **Jiffy-Drill** unit can be stalled in the work or operated at a high cycle rate without overheating or damage to the hydraulic motor or to the system.
- Quill and feed piston are manufactured from 1-piece alloy steel, with a special long wearing, space age corrosion resistant coating.
- Quill retract piston area is approximately half the extension piston area. This allows for rapid retract of the quill.

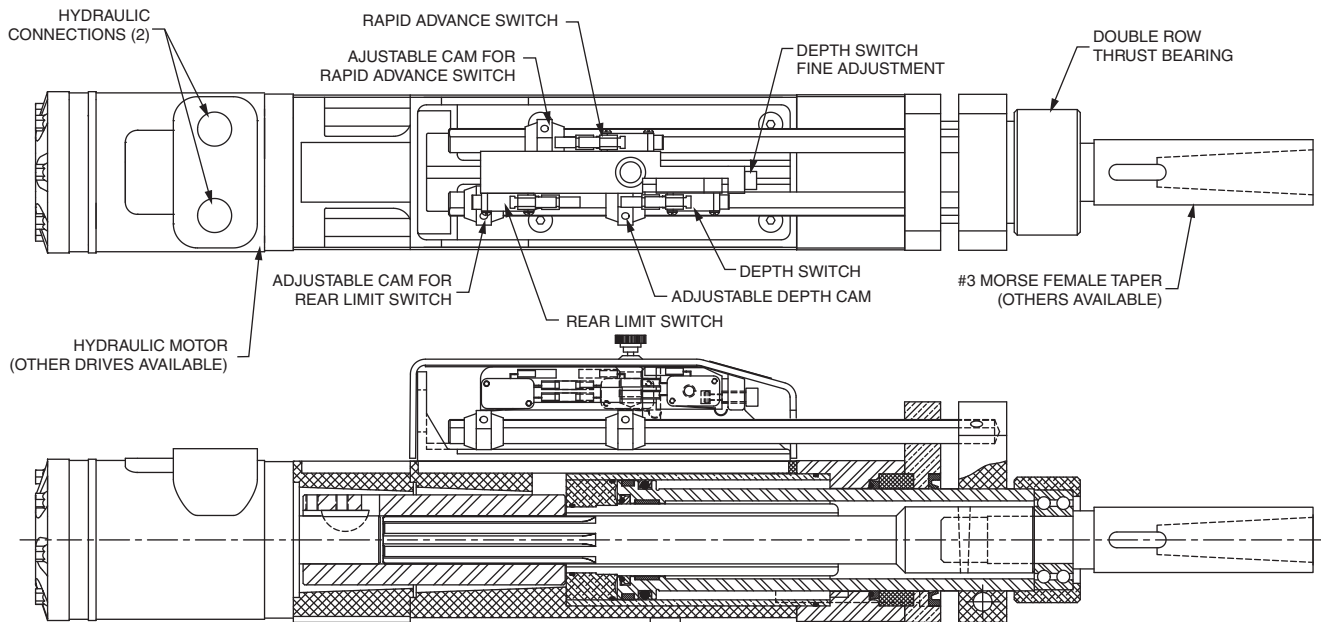
## What Is a Jiffy-Drill

**Jiffy-Drill** is the light, powerful, and compact answer to production drilling, reaming, spot facing, and similar operations. It will drill holes up through 1-1/2" diameter in steel with ample allowance for dull bits. In tests, it has drilled 1-3/4" diameter holes in cast iron, and has produced 0.025 chips in mild steel using a Model B-6 hydraulic motor.

Using a hydraulic motor to rotate the spindle, the standard unit will produce more than 10 HP, yet is so compact that two units will mount side-by-side on 3-5/16" spacing, or as close as 3-3/16" if hydraulic motor housing is specially

machined and if one unit is ordered with feed piston ports on the opposite side, or bottom. (See optional port locations on page 13.)

The **Jiffy-Drill** is very compact when using a hydraulic motor. With a maximum length of less than 27" from end of motor to end of drill chuck when a standard Model B-3 hydraulic motor and a #3 Morse female taper spindle are used. The length is slightly greater with larger hydraulic motors.



## How a Jiffy-Drill Works

**Spindle Rotation:** The spindle is rotated by your choice of drive style options. (See page 10 for drive styles.) We recommend using compact hydraulic motors for greater power. Although in many applications alternative methods to rotate the spindle may be beneficial. Spindle should be limited to 5000 RPM maximum to prevent over heating of the spindle bearing causing possible damage.

**Spindle Advance:** The spindle is advanced and retracted by a built-in coaxial piston which is powered by hydraulic power. The pressure to advance the spindle is dependent upon the size of the drill. The limit on feed pressure is 800 PSI maximum which will develop over 2500 lbs. thrust. (See pages 15 through 18 for control circuits.)

**Position Switches:** Built-in electric limit switches and cams are used to provide spindle location feedback to your control circuit. The use of these switches is entirely dependant upon your control circuit and how you choose to operate the **Jiffy-Drill** unit.

Both the rear limit switch and the rapid advance switch are securely mounted to the switch plate and sensor trigger adjustments are easily made by moving the appropriate position cam. Only the forward limit switch has both a position cam adjustment as well as a fine adjustment for controlling stroke limitation.

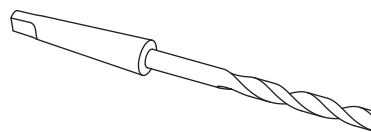


# Jiffy-Drill Spindles

The type of spindle that you need is dependent upon the tool you are planning on using. The number and types of tools that can be controlled by the **Jiffy-Drill** is unimaginable. But fortunately the tooling industry has centered their efforts around a few standards. We offer these standards and a few others to reduce the confusion of how to attach your tooling to the **Jiffy-Drill**. We recommend that you have decided on the tooling prior to selection of the spindle.

For standard drilling with off the shelf twist drills, the most common standard is the Morse female taper. The size of the Morse taper depends upon the size of the drill. The table shows the most common Morse taper versus size designation. This table is to serve only as a guideline. Consult your drill supplier for availability and cost. Most drill suppliers stock drills in one Morse size on either side of the standard.

All spindles use the same size drive shaft with different spindles attached at the factory. The spindles are attached to a male splined drive shaft using an anti-seize compound on the mating threads. The combined drive shaft and spindle are drilled and reamed for a tapered pin. This pin is interference fit to prevent the spindle detaching from the drive shaft. Separation of the spindle and drive shaft is not recommend. If a new spindle configuration is required, a replacement drive shaft and spindle combination should be used.



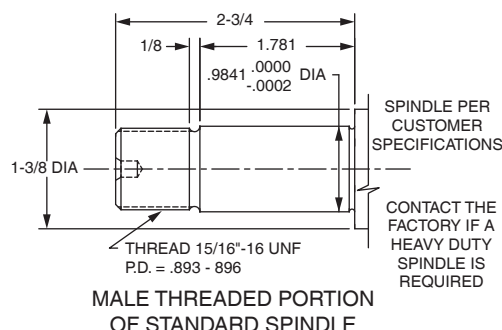
**Morse Size for Standard Drills**

Drill Size Range	Morse Taper
1/8" to 15/32"	1
31/64" to 25/32"	2
51/64" to 1-1/16"	3
1-5/64" to 1-1/2"	4
1-17/32" to 3"	5

## XX - No Spindle

Some customers want to create their own spindle for driving a unique tool. When ordering a drill unit without a spindle, the drill will be supplied with a drive shaft, standard bearing retainer, and standard bearing. The customer will need to supply a #6 taper pin, and a spindle end machined to fit the drive shaft on one end and the other end configured to attach to their tool.

To assemble spindle and drive shaft, first place spindle (threaded end) through the bearing retainer, slide the bearing over spindle bearing surface. Coat threads with anti-seize compound, and thread spindle into female end of drive shaft. After spindle is securely attached and completely bottomed out, drill and ream for the #6 taper. The taper should be located so it goes through the drive shaft and spindle. Location should be 0.500" from end of drive shaft (rear of bearing). Once the pin is hammered in place, turn drive shaft between centers and remove excess pin. Mark the small end of the tapered pin by stamping "X" on either side of the pin, so you can remove the pin by placing a punch between the "X's".

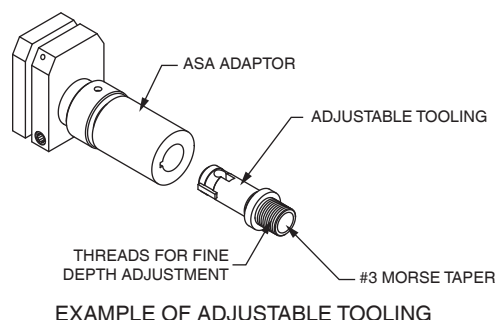


## S1, S138, S34, or S58 - Adjustable Spindle Adaptor

The adjustable spindle adaptors are designed to use adjustable tooling manufactured by several readily available "off the shelf" vendors.

There are several benefits of using adjustable adaptors. One benefit is the additional fine adjustment of drill depths between drill changes. Great for use with internal stroke limiter option. (See page 13.) Another advantage is the ability to install quick change adaptors to facilitate rapid changing of drills. Another benefit to adjustable adaptors, is that your shop can use standardized tooling for all your drilling operations and be able to swap drills from operation to operation.

The exact style of adjustable adaptors is dependent upon the manufacturer of the tooling. Consult your local machine supply shop for adaptors available in your area.



## M3 or M4 - Morse Female Taper Spindle

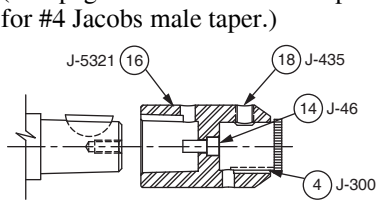
The M3 and M4 are an internal, "Self-Holding" Morse female taper. Common off the shelf twist drills will readily fit either a #3 Morse or a #4 Morse taper. Adapters to go from a #3 Morse to a #2 or #1 Morse are available from local tooling supply stores. Most drills are also available with either a larger or smaller than standard Morse taper. Consult your tool supply store for various options available.

# Jiffy-Drill Spindles (continued)

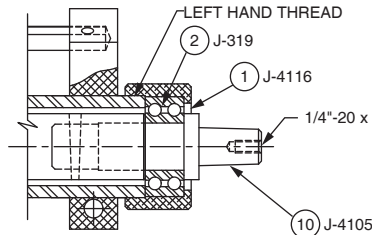
## J3 or J4 - Jacobs Male Taper Spindle

The J3 and the J4, are an external "Self-Holding" Jacobs male tapers. Most common tool holders are supplied with either a #3 Jacobs female or a #4 Jacobs female taper. Both #3 and #4 Jacobs male tapers have a 1/4"-20 threaded hole, and #4 has an 808 Woodruff key for securing tool holders. Contact your local tool supply store for tooling options available.

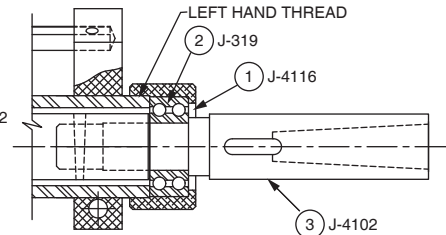
(See page 30 for additional tap chucks for #4 Jacobs male taper.)



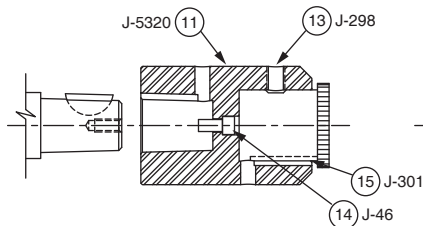
#1 TAP CHUCK  
MOUNTS ON #4 JACOBS TAPER



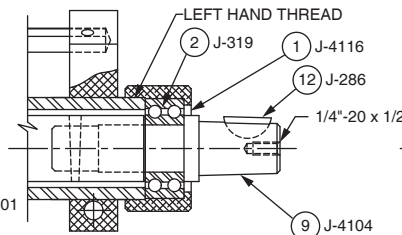
J3 - #3 JACOBS MALE TAPER



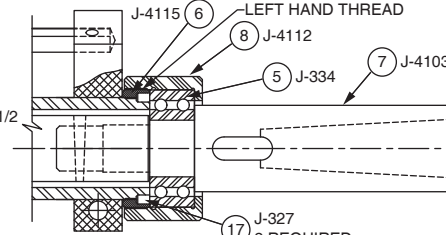
M3 - #3 MORSE FEMALE TAPER



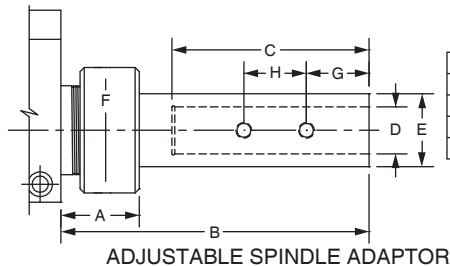
#2 TAP CHUCK  
MOUNTS ON #4 JACOBS TAPER



J4 - #4 JACOBS MALE TAPER



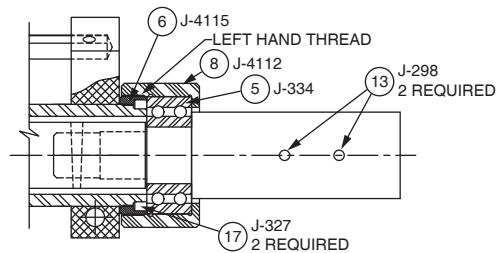
M4 - #4 MORSE FEMALE TAPER  
REQUIRING LARGER BEARING



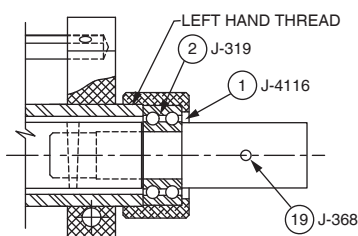
ADJUSTABLE SPINDLE ADAPTOR

MFG. NO.	PART NO.	REF. NO.	A	B	C	D	E	F	G	H	Set Screw
J-4149	S-58	J-4149	1-5/8	4-3/4	2-5/8	5/8	1.235	2-5/8	1-1/4	N/A	5/16"-24 x 1/4
J-4144	S-34	J-4144	1-5/8	4-3/4	2-5/8	3/4	1.235	2-5/8	1-1/4	N/A	5/16"-24 x 1/4
J-4139	S-1	J-4139	1-5/8	5-5/16	3-1/8	1-1/16	1.610	2-5/8	1-9/16	N/A	5/16"-24 x 1/4
J-4143	S-138	J-4143	1-7/8	6-5/8	4-1/8	1-3/8	2.230	3	1-1/2	1-1/2	3/8"-16 x 1/2

Order adjustable spindles by their part numbers (e.g. S-1, S-138)



REQUIRING LARGER BEARING



REQUIRING STANDARD BEARING

## Parts List

Item	Part No.	Description	Item	Part No.	Description
1	J-4116	Bearing Retainer, Standard	10	J-4105	Spindle, #3 Jacobs Male Taper
2	J-319	Dbl. Seal Bearing (5205 SBKFF) 0.984" I.D. x 2.047" O.D.	11	J-5320	Tap Chuck, #2
3	J-4102	Drill Spindle, #3 Morse Female Taper	12	J-286	Woodruff Key 808
4	J-300	Long Key (optional) 1/8" sq. x 3/4"	13	J-298	Cup Point Set Screw, 3/8"-16 x 1/2"
5	J-334	Dbl. Seal Bearing (5206 SBKFF) 1.181" I.D. x 2.440" O.D.	14	J-46	Socket Head Cap Screw 1/4"-20 x 3/4"
6	J-4115	Adaptor Ring	15	J-301	Long Key 3/16" sq. x 1-1/4"
7	J-4103	Spindle, #4 Morse Female Taper	16	J-5321	Tap Chuck, #1
8	J-4112	Bearing Retainer, Heavy Duty	17	J-327	Set Screw, 10-24 x 5/16"
9	J-4104	Spindle, #4 Jacobs Male Taper	18	J-435	Cup Point Set Screw, 3/8"-16 x 3/8"
			19	J-368	Cup Point Set Screw, 5/16"-24 x 1/4"

Order adjustable spindles by their part numbers (e.g. S-1)

# Jiffy-Drill Drive Styles

## Hydraulic Motor Drive

**Spindle Hydraulic Motor:** The *Jiffy-Drill* can be ordered with choice of 20 hydraulic motor models covering a wide range of speed/torque ratios. Motor selection depends on the drill bit diameter, speed, and the hardness of the material to be drilled. Hydraulic motors can be attached in any 90° increment for easy plumbing. All *Jiffy* motors are reversible.

There is a choice of 8 motor models for medium speed tapping up to 2200 RPM. A choice of another 12 motor mod-

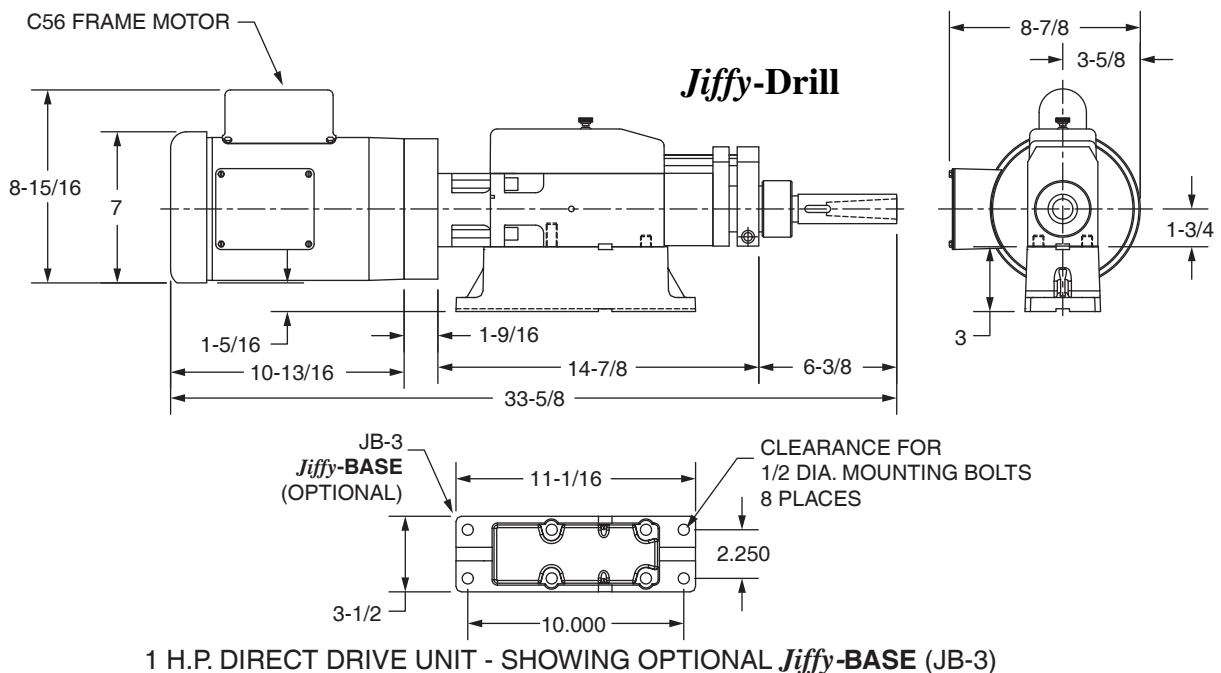
els for low speed, high torque tapping with larger taps or when working with harder materials. Consult factory for additional high speed, low torque motors for applications up to 5000 RPM.

Motors A-1 through A-4 and M-0 through M-3 are for high speed drilling up to 2200 RPM. Motors B-0 through B-8 are low speed, high torque motors for larger bits or harder materials.

Additional motors may be available for special orders.

In order to size the proper hydraulic motor, you must know what RPM and torque is required for the cutting tool to machine the material you are using. This information can usually be obtained from the manufacturer of the cutting tool used. For standard twist drills, see pages 19 through 22 to estimate required torque, RPM and thrust. Then refer to pages 51 through 55 to choose a hydraulic motor that will deliver the torque and RPM needed. If you will be using an existing power unit, you will be limited by the pressure and GPM available from your existing power unit. On new applications try to keep operating pressures around 600 - 800 PSI and GPM at 25% to 75% of maximum GPM the motor can operate at.

## DDK1 - "C-Face" Mount For Electric Motor Drive



### Electric Drive Features

- Speed range, 1140, 1725, or 3450 RPM using standard electric motors.
- Optional variable speed drive is available by using an inverter duty motor and control. (Consult factory for additional information.)
- Adaptable for usage of local electric motors and voltages.
- Uses standard C56 frame C-Face mounting arrangement.

### How a DDK1 Works

The spindle is rotated with an in-line, totally enclosed, fan cooled electric motor. Choice of 1/2 to 2 HP single phase or 3-phase electric motor.

Will easily drill holes up to 3/4" in cold rolled steel. The quill is advanced and retracted by a built-in piston assembly. The piston will deliver 2500 lbs. thrust when powered by 800 PSI hydraulic pressure.

Built-in cams and electric limit switches can easily be adjusted for stroke limits, for feed start position, or for rapid advance and rapid retract when used with properly designed fluid and electric circuits.

# Jiffy-Drill Drive Styles (continued)

## SBA1 - 1" Diameter External Shaft

### External Shaft Features

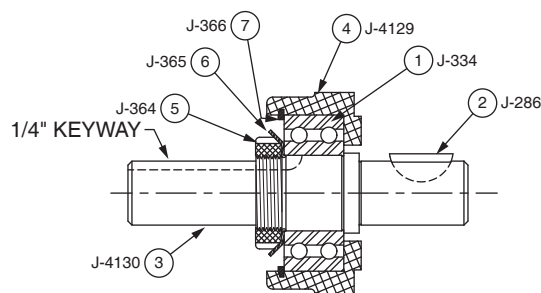
- Speed and horse power range is determined by drive component. (Maximum spindle speed is 5000 RPM.)
- Adaptable for various usages.
- Uses standard 1" diameter shaft.

### How a SBA1 Works

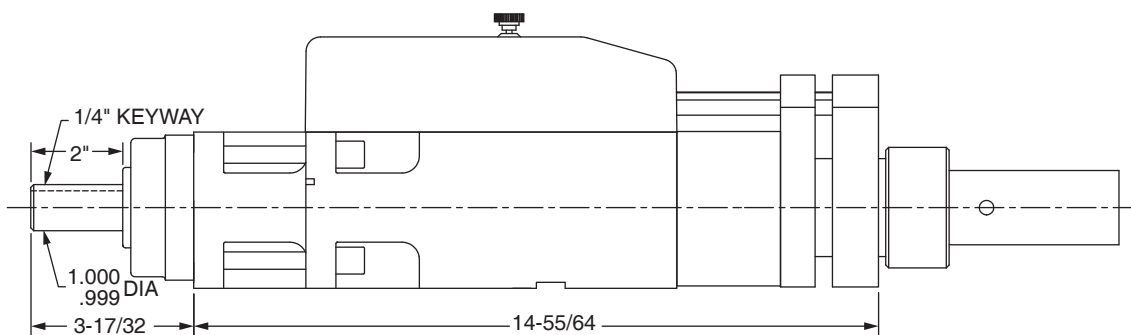
The unit is equipped with a 1" diameter shaft. This is equipped with a 1/4" keyway that runs the entire length of the exposed shaft. The unit can be driven by any method conceivable by connecting to this external shaft.

### Parts List

Item	Qty	Part No.	Description
1	1	J-334	Dbl. Seal Bearing (5206 SBKFF) 1.181" I.D. x 2.440" O.D.
2	1	J-286	Woodruff Key 808
3	1	J-4130	Direct Drive Shaft
4	1	J-4129	Drive Shaft Adapter
5	1	J-364	Locknut
6	1	J-365	Tap Washer
7	1	J-366	Retainer Ring



1" KEYED SHAFT DIRECT DRIVE

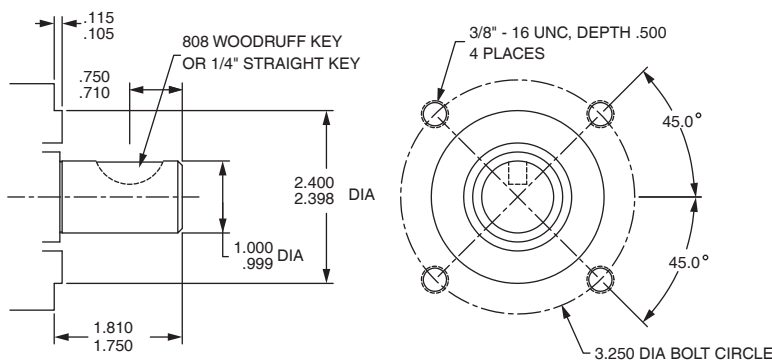


1" KEYED SHAFT - DIRECT DRIVE *Jiffy-DRILL*  
(side view)

## XX - No Drive Unit

The *Jiffy-Drill* unit can be ordered without a drive unit. When ordered, a standard unit will be supplied with a splined spindle sleeve, a hydraulic motor adapter ring, four attachment studs, four socket head nuts and an 808 Woodruff key. The customer will need to supply a drive style that mounts to the rear of the unit with the appropriate interface dimensions.

To attach drive unit to the rear of unit, first attach the splined sleeve to the drive shaft of the customer drive unit, using the 808 Woodruff key or customer supplied 1/4" straight key. If the hydraulic motor adapter ring is required, place the ring on prior to attaching the sleeve (the outside diameter of the sleeve is larger than the inside diameter of the ring). Once the sleeve is securely attached, it is recommended to swedge the set screws in place to prevent accidental loosening by vibration. Slide the spindle sleeve over the drive shaft, and secure drive unit to *Jiffy-Drill* unit using the four studs and four socket head nuts.

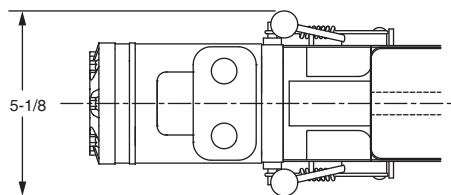


DIMENSIONS OF REQUIRED CUSTOMER DRIVE

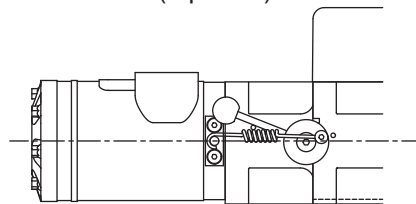
# Jiffy-Drill Options

## Option MQ: Hydraulic Motor Quick-Change System

CHANGE HYDRAULIC MOTORS IN 3 MINUTES OR LESS

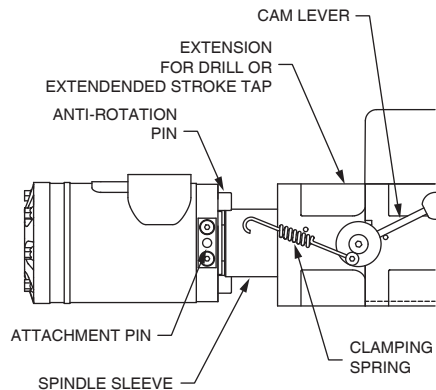


MOTOR ATTACHED  
(top view)



MOTOR ATTACHED  
(side view)

### Example of Quick-Change option for Hydraulic Motors



REMOVAL OF MOTOR

Above items are factory order items and must be ordered with the **Jiffy-Drill** unit, except for extra hydraulic motors with the quick change option. When ordering extra hydraulic motors with the quick change feature, we recommend ordering the motor with an extra spindle sleeve. (Specify spindle sleeve is for **Jiffy-Drill**.)

The quick change option does not add any length to unit but will increase the width from 3-5/16" to 5-1/8".

## Quick-Change Parts List

### QUICK-CHANGE MOTOR - Unit Side

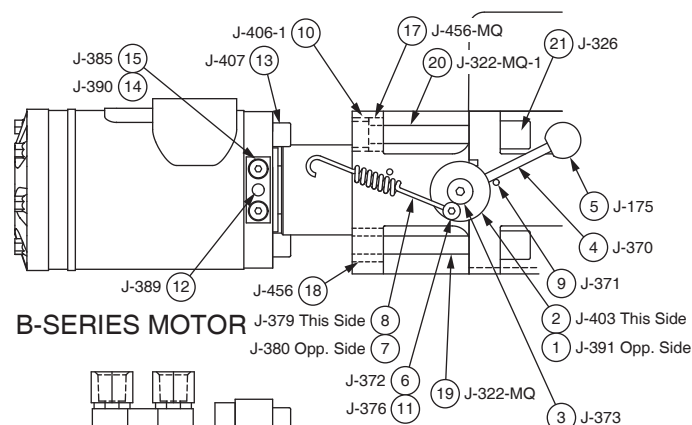
Item	Qty	Part No.	Description
1	1	J-391	Cam - Right Side, Motor End
2	1	J-403	Cam - Left Side, Motor End
3	2	J-373	Screw 1/4"-20 x 3/4" Flat Head
4	2	J-370	Roll Pin 3/16" x 2-1/4"
5	2	J-175	Knob 3/4" Diameter
6	2	J-372	Screw 10-24 x 3/8" Button Head
7	1	J-380	Spring - Right Side, Motor End
8	1	J-379	Spring - Left Side, Motor End
9	4	J-371	Drive Lock Pin 1/8" x 1"
10	2	J-406-1	Modified Bushing
11	2	J-376	Modified #10 Split Lock Washer
17	2	J-456-MQ	Modified Threaded Insert
18	2	J-456	Threaded Insert
19	2	J-322-MQ	Stud, 3-3/8 Long
20	2	J-322-MQ-1	Stud, 3-1/16 Long
21	4	J-326	Socket Head Nut

### QUICK-CHANGE MOTOR - B Series

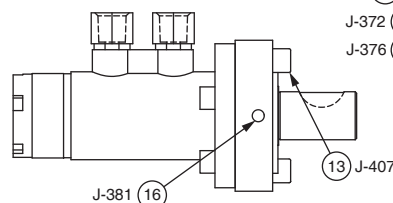
Item	Qty	Part No.	Description
12	2	J-389	Rivet 1/4" x 5/8"
13	2	J-407	Anti-Rotation Pin
14	4	J-390	Screw 10-24 x 1/2" Flat Head
15	2	J-385	Plate

### QUICK-CHANGE MOTOR - A or M Series

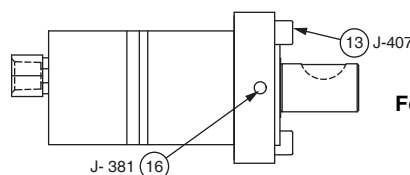
Item	Qty	Part No.	Description
16	2	J-381	Drive Lock Pin 1/4" x 1"
13	1	J-407	Anti-Rotation Pin



B-SERIES MOTOR



A-SERIES MOTOR



M-SERIES MOTOR

LEFT SIDE SHOWN

For questions or replacement parts not shown, please consult factory.

# Jiffy-Drill Options (continued)

## Option EP and PD: Pre-wired Cord and Connector

Wiring harness, cable and plug assembly used to connect **Jiffy-Drill** limit switches to external circuitry through a plug and socket disconnect.

When ordered at the same time as the **Jiffy-Drill**, it will be installed and wired to terminals on the limit switches. If ordered later, connections to the **Jiffy-Drill** limit switches must be made by the user.

**Option EP** includes an 8-pin male plug with screw coupling, to mount on the **Jiffy-Drill**, with wiring harness connected to limit switch terminals. Also included is an 8-wire socket to plug into the **Jiffy-Drill**. Standard length of this cable is 12-ft. unless otherwise specified. Wires in the 12-ft.

connecting cable are the same colors as those inside the **Jiffy-Drill** which connect to the switch terminals.

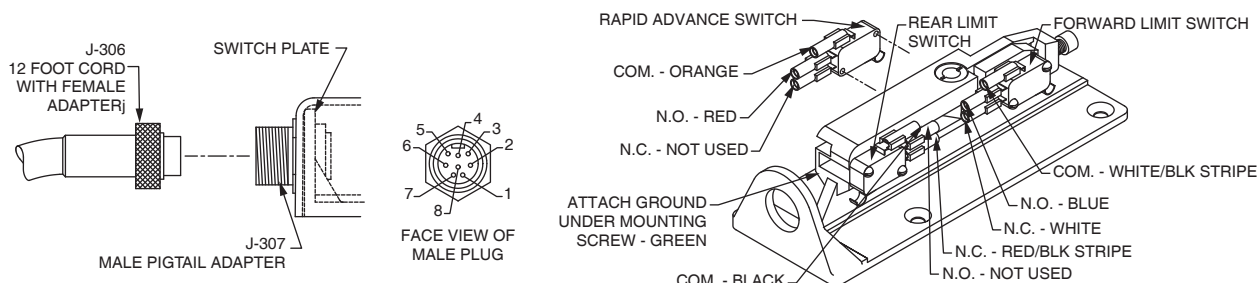
**Option PD** includes only an 8-pin male plug with screw coupling to mount on the **Jiffy-Drill**. No wiring harness is supplied.

On both options, equipment ground is carried through the green wire to Pin 4.

### Replacement Parts:

**J-306:** 12 foot cord with 8 pin female pigtail adapter.

**J-307:** 8 pin male pigtail adapter.



### WIRING COLOR CODE

Switch Circuit	Wire Color	Plug Term.	Switch Circuit	Wire Color	Plug Term.
Common - Rear Limit Switch	Black	1	Common - Rapid Advance Sw.	Orange	5
Normally Closed - Front Limit Sw.	White	2	Normally Open - Front Limit Sw.	Blue	6
Normally Open - Rapid Advance Sw.	Red	3	Common - Front Limit Sw.	White/Blk	7
Earth Ground to Frame	Green	4	Normally Closed - Rear Limit Sw.	Red/Blk	8

## Option ST: Internal Stroke Limiter

The standard stroke of the **Jiffy-Drill** is 3-1/2". By using the depth switch, strokes from 0" to 3-1/2" can be obtained. These depths are not a positive stop. Meaning, as soon as the depth switch is triggered, the control circuit will retract the feed cylinder. The bottom of the hole may not completely clean-up. If you plan on using any kind of dwell circuit, then a positive stop is recommended.

The stroke limiter is a short piece of tube that is placed in the cylinder to reduce the complete stroke of the unit. **When ordering this option, please include the desired stroke.**

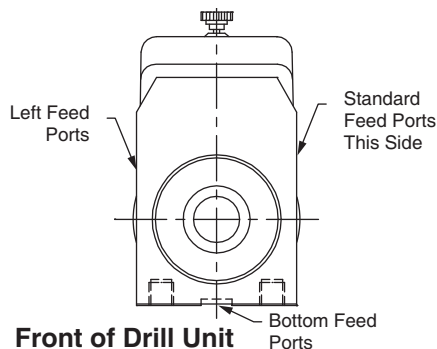
## Option L or B: Alternate Feed Port Locations

The width of the **Jiffy-Drill** unit is 3-5/16". But a unit can be specially machined to be as narrow as 3-3/16". When placing two units side by side, the feed cylinder connections of one unit may interfere with the location of the second unit. To accommodate the placing of two units side by side, you can order one unit with feed ports either located on the left (when looking from the spindle to the motor) of the drill unit or on the bottom. (Refer to drawing on page 26 for standard location of ports.)

When ordering bottom located feed ports, alter your machine surface to allow clearance of the cylinder connectors.

**Option L:** Left sided feed ports.

**Option B:** Bottom located feed ports.





# *Standard Setup for All Types of Drilling*

## *Mounting the Jiffy-Drill*

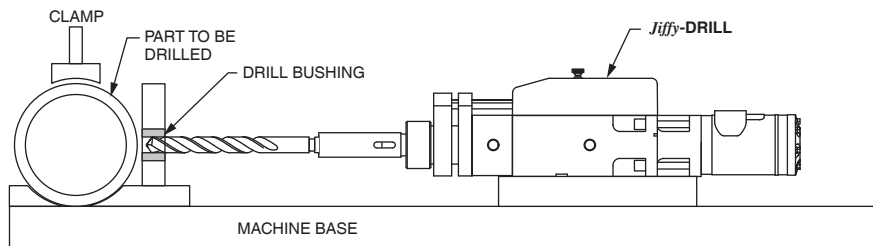
The unit can be mounted in any position, but if mounted to drill upward, a chip cover should be used to keep coolant and chips out of the electrical switch compartment or use coolant resistant limit switches.

There are four, 1/2"-13, tapped holes in the base of the **Jiffy-Drill** body which can be used for mounting. **Caution!** The two front mounting bolts must not penetrate more than 1/2" to avoid damage to the feed piston barrel. Although, on most tapping jobs, usually less than 50 lbs. feed force is required, on drilling applications the structure supporting the **Jiffy-Drill** may have to take up to 2500 lbs. thrust. (See page 26 for mounting dimensions and envelope requirements.)

## *General Information*

The **Jiffy-Drill** is designed specifically to drill both small holes and large holes in a variety of materials. The size of hole and the material determines the power and RPM required to perform the task. On most applications a single motor is not capable of doing a wide range of holes or materials. In these cases, the motor can be changed to achieve the best power and RPM needed. Although, you can normally sacrifice drilling cycle times to reduce the number of different motor sizes needed.

When using the **Jiffy-Drill** unit, **we always recommend using a fixed hardened bushing**. The design of the **Jiffy-Drill** allows for smooth extension and retraction, using soft seals and wear rings. The unit can not sustain accuracy if the drill bit is subjected to a side load or drilling on a curved or uneven surface without a hardened bushing. We recommend installing a bushing in a fixture as close to the part as possible. In some cases this fixture and the **Jiffy-Drill** can be mounted on a slide and becomes an integral part of clamping the part to be drilled.



## *Hydraulic Setup*

A hydraulic power unit to operate a **Jiffy-Drill** is not part of the **Jiffy-Drill** but may be ordered as auxiliary equipment, or perhaps a standard hydraulic power unit already on hand can be used. Hydraulic hoses should be ordered locally after the distance between the power unit and the drilling unit is established. Several **Jiffy-Drill** units, which are powered with hydraulic motors can be run from one hydraulic power supply.

## *Hydraulic to Rotate Spindle*

Flow for spindle motor will be determined by desired RPM on each **Jiffy-Drill**. Several power arrangements may be used: two (or more) pumps driven from the same or from opposite ends of a double shaft electric motor; a two-section (or more) hydraulic pump; two (or more) separate hydraulic power units. A pressure compensated pump may be used for both the main motor drive and the spindle advance. Spindle rotation is determined by which port is connected to the hydraulic pump. During setup, verify tool rotation.

Choose a hydraulic motor from pages 51 through 55 that will deliver the required torque and RPM. If you will be using an existing power unit, you will be limited by the pressure and flow available from your existing power unit. On new applications try to keep operating pressures around 600 - 800 PSI and GPM at 25% to 75% of maximum GPM the motor can operate at.

On jobs where several **Jiffy-Drill** units are to be used, one large power unit can serve all the units by having one or more large pumps and with pressure compensated flow control valves installed in each **Jiffy-Drill** motor circuit and feed circuit.

## *Hydraulic to Advance Jiffy-Drill Spindle*

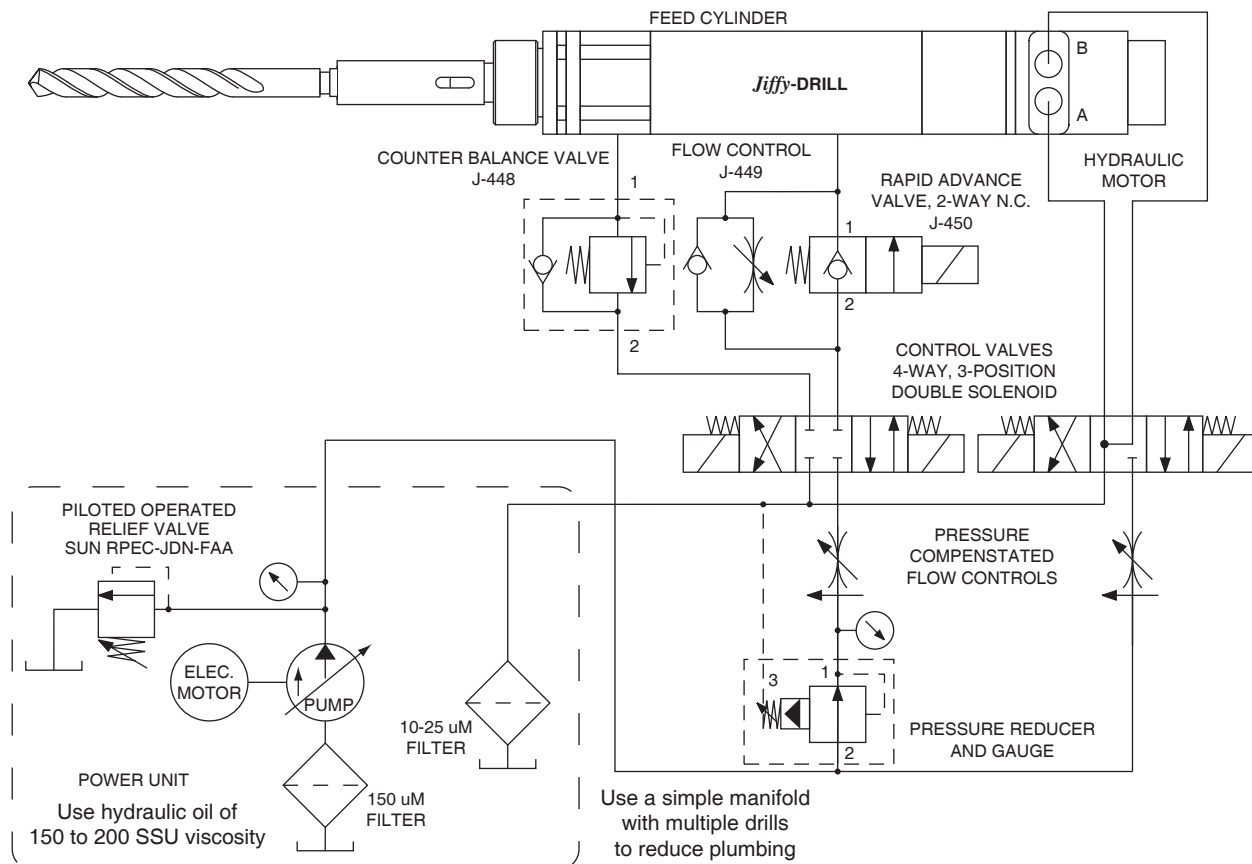
A flow of 2 GPM is usually sufficient for piston advancement. Hydraulic pressure of 100-800 PSI is needed to advance and retract the spindle when drilling holes. A hydraulic pressure of 200 PSI, for example, working on the internal piston area of 3.14 square inches, will give a thrust of about 600 lbs. on the drill bit. With hydraulic feed pressure up to a maximum of 800 PSI, a thrust of about 2500 lbs. can be produced. It is important to use a pressure reducer and gauge in the feed circuit.

To maximize drill feed control, a counter balance valve should be installed in the outgoing flow line of the **Jiffy-Drill**. This valve tends to hold the drill back when it strokes forward by resisting sudden high surges in the flow. It should be adjusted to the minimum setting which gives adequate control, as it places an extra load on the hydraulic power source. The counter balance valve should contain a check valve for free flow on drill retraction.

The system compensator setting should not be used to regulate chip thickness. It should be set and locked at a pressure high enough to take care of moderately dull drills, but no higher than necessary because surplus oil from the hydraulic power supply must discharge across it. The higher its setting, the greater the heat generated in the oil.

The 2-way solenoid valve is optional, and used only when a rapid advance up to the work is desired. It should be energized for rapid advance, then de-energized just before the drill bit touches the work. It may be wired to operate from the deceleration switch located on the **Jiffy-Drill** unit.

## Recommended Jiffy-Drill Hydraulic Circuit



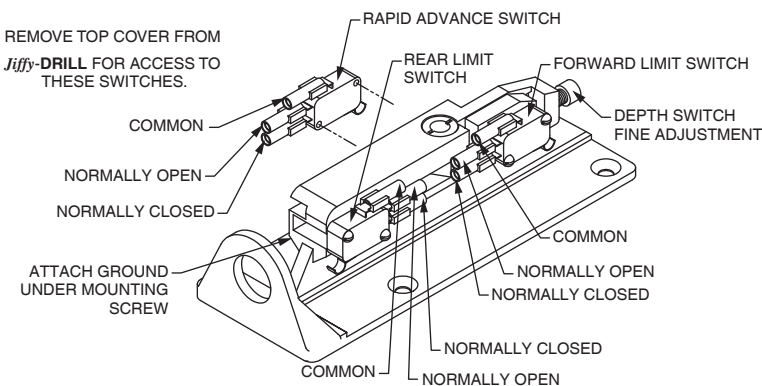
**Do not use meter-out circuits for Jiffy-Drill units.** The design of the **Jiffy-Drill** unit allows for quicker retract by using a reduced front piston area. This reduced area will increase pressure approximately 2-1/2 to 1 when using a meter-out circuit. Damage to the unit may occur.

## Electric Control of the Jiffy-Drill

Three built-in limit switches should provide adequate switching for design of circuits for fast forward, skip feed, normal feed, dwell, reverse, and reverse stop. Each switch is actuated by an adjustable cam. The forward limit switch has a fine thread adjustment for drill depth. After setting its cam for approximate depth, loosen lock screw and adjust screw for fine adjustment. Turn adjusting screw clockwise for a depth increase of 0.0357" per turn. Tighten lock screw to secure adjustment screw.

Limit switches are rated up to 4 amps at 125 volts A-C or 1/2 amp at 125 volts D-C. Use relays, if necessary, to control higher current or voltage.

On standard **Jiffy-Drill** units these switches are not wired, and the external wiring is brought through the conduit hole in the rear of the switch cover. (For factory wired units see option -EP on page 13.)



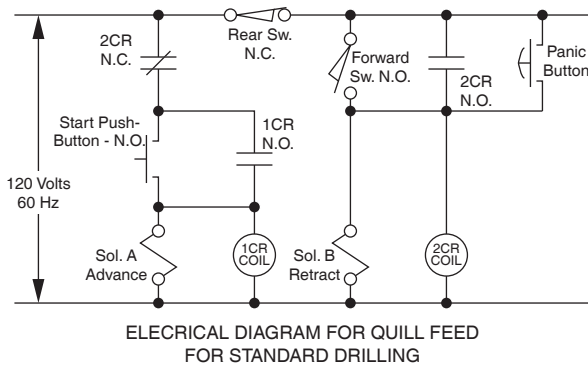


# Sample Jiffy-Drill Operations

## General Information

The following samples only consider the electrical controls needed to control the extension and retraction of the feed cylinder for various types of drilling operations. The control of the spindle rotation may be incorporated into the feed circuit. Although for most applications the spindle rotation control is independent of the feed. These circuits serve only as a guideline in assisting you in setting up the **Jiffy-Drill**. We currently use several of these circuits in our manufacturing facility, but caution is urged to limit possible damage during the initial setup and testing of your control circuit. In some cases, customers have incorporated a reverse spindle rotation option during the initial design of their machining center.

## Standard Drilling with Jiffy-Drill



The two limit switches are those in the **Jiffy-Drill**. Solenoids A and B are those on a 4-way hydraulic valve. Other components include two relays, a start push-button, and a panic button. The rear limit switch is held in its open position when the quill is retracted.

To start a drilling cycle the operator momentarily presses the start push-button. Solenoid A and Relay 1CR become energized and the quill starts forward. The relay locks in electrically through its own contacts and the N.C. (normally closed) contacts of Relay 2CR. This keeps Solenoid A energized throughout the forward stroke. When the forward (depth) limit switch is actuated, Solenoid B and Relay 2CR become energized. The relay locks in electrically through its own contacts. It also breaks the locking circuit to Relay 1CR and releases Solenoid A. The quill retracts until the rear limit switch is actuated. This breaks the circuit to Solenoid B and Relay 2CR. The 4-way valve spool goes to neutral position and unloads the pump.

## Hole Reaming with Jiffy-Drill

The **Jiffy-Drill** can be used to ream an existing hole. It is critical in this application to have proper alignment between the **Jiffy-Drill**, drill bushing, and existing hole. Any one of these elements being out of alignment will cause flexing of the drill and reduce performance and tool life.

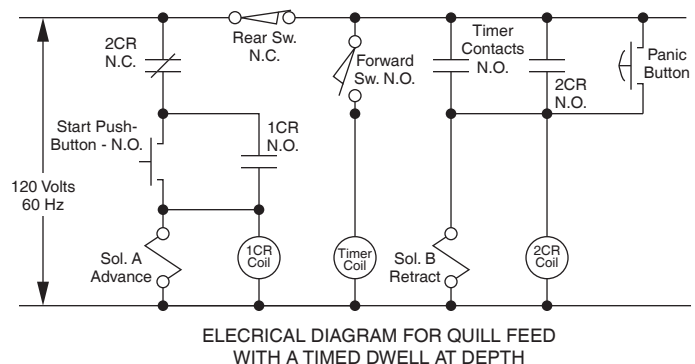
## Spot Facing with Jiffy-Drill

The **Jiffy-Drill** can be used to spot face an existing hole or used with a step drill. In these applications the hydraulic feed circuit must be carefully designed to reduce the possibility of chatter on the spot face surface. The control circuit is designed with a short dwell time when the depth limit switch is triggered. This allows the spot face to be cleaned up before the drill retracts. (Timer is not included with the **Jiffy-Drill**.)

The drill must be installed so that at full stroke of the unit (cylinder is bottomed out), the desired depth of the spot face is achieved. The unit can be mounted on a locking slide to allow for periodic adjustment of the spot face depth. (The location of the drill determines spot face depth.) To reduce the full length stroke, an internal stop tube can be used. (See page 13.)

The electric timer used for dwell timing is the re-set type: its contacts do not close until the end of the time period. When the coils de-energize, the contacts re-set to zero time.

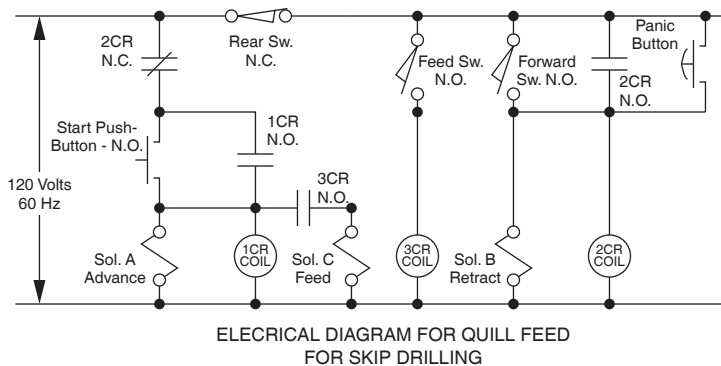
The operator momentarily presses the start push-button. Solenoid A becomes energized and causes the quill to advance. When the forward limit switch is actuated, this energizes the coil of the electric timer. The quill remains stalled at full stroke until the timer contacts close. This energizes Solenoid B to retract the quill.





# Sample Jiffy-Drill Operations (continued)

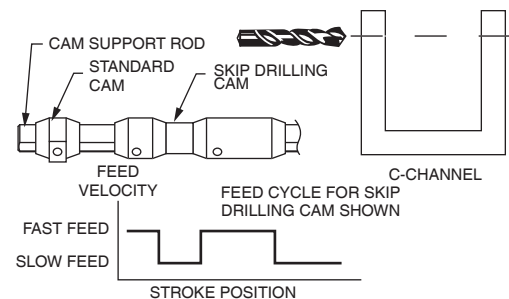
## Skip Drilling with Jiffy-Drill



When the operator momentarily depresses the start push-button, Solenoid A is energized and starts the quill forward. Depending upon the location and design of the skip drilling cam, the **Jiffy-Drill** will advance at one of two feed rates. The rapid advance switch is "On" during the high spots of the skip drilling cam and "Off" during the low spots. When the advance switch is "On", Coil 3CR is activated causing Solenoid C to energize and allow the feed cycle to bypass the slow feed control valve therefore rapidly advancing the feed cylinder. When the advance switch is "Off", the feed cycle resumes to normal slow feed.

The **Jiffy-Drill** can be made to shift from fast forward into feed several times during forward stroke of the quill by replacing the standard deceleration cam with a special cam made by the user on a lathe, having peaks and valleys to energize and de-energize Solenoid C at the proper distance intervals.

Similar to the "Rapid Advance Feed Circuit", skip drilling uses a 2-way, normally closed solenoid valve to bypass the slow feed control. The major difference between the skip drilling circuit and the rapid advance circuit, is the rapid advance switch is used to turn "On" the bypass of the slow feed valve in the skip drilling circuit. In the rapid advance circuit this switch is used to turn "Off" the bypass valve.



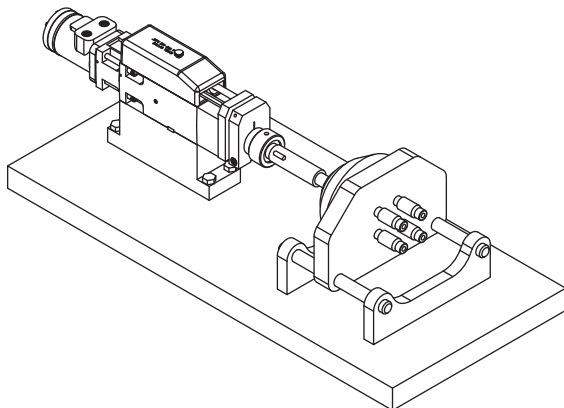
## Hole Tapping with Jiffy-Drill

Although we recommend our **Jiffy-Tap** lead screw tapping unit for best thread quality on tapping applications, tap chucks are also available for the **Jiffy-Drill** and it can be used for hole tapping or die threading from 1/4" through 1-1/2" N.C. by using the proper hydraulic motor to rotate the spindle at the best tapping speed. The **Jiffy-Drill** should be ordered with an "ASA" adjustable spindle to be used with an after market tension/compression tap holder. Once the tap has entered the hole it will follow its own lead. Class 1 and 2 threads may be produced this way, but Class 3 threads usually require lead screw tapping such as with the **Jiffy-Tap**.

## Precision Boring

Precision boring directly with the **Jiffy-Drill** is not recommended. The clearance in the sliding spline on the inner end of the spindle could cause chatter. If the customer still desires to use a **Jiffy-Drill** for precision boring, the user should construct a special fixture to hold a boring bar between two bronze bushings. The **Jiffy-Drill** spindle can be coupled to the boring bar to cause it to rotate, advance, and retract, using the bronze bushings for steady support.

## Multi-Spindle Drilling

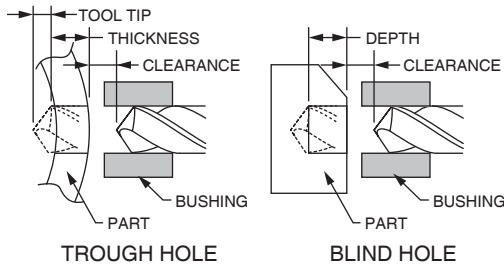


A multi-spindle head can easily be attached to and controlled by a standard **Jiffy-Drill** unit. By using a riser block you can raise the center line of the **Jiffy-Drill** to match the center line of the multi-spindle head. The head can then be moved along hardened chrome rods using oil impregnated bronze bushings inserted in the head.

When sizing a **Jiffy-Drill** for multi-spindle head use, remember that the RPM of the unit will usually be the same as an individual spindle but that the horsepower will need to be multiplied by the number of spindles.

# Sizing Jiffy-Drill Units

## Determining Required Stroke



**Through Hole Applications:** Add the length of the tool tip to the thickness of the part, and the clearance from the tool tip to the part. Add a little extra for cleaning up the through hole.

**Blind Hole Applications:** Add the clearance from the tool tip to the part at fully retracted position, to the depth of the desired hole.

*Tool Tip = Drill Dia. x A*, where A is from table below.

	Drill Tip Angle		
	Ø = 118°	Ø = 135°	Other
Constant A	0.300	0.207	1/(2 x Tan(Ø/2))

**Example:** Tip length of a 3/8" drill with 135° tip  
 $0.375 \times 0.207 = 0.078$  in.

## Possible Stroke Limitations

The **Jiffy-Drill** operates by an S.A.E. 6-spline sliding torque transfer joint. This allows the transfer of horsepower from the stationary driving unit to the linearly advancing spindle. At rest, the drive shaft is retracted into this splined fitting and has maximum spline engagement. As the spindle is advanced forward, this engagement is reduced. As the amount of spline engagement reduces, the amount of torque that can be transferred to the spline is reduced. Excessive spline wear should not occur with the following recommended stroke limitation. For torques greater than 350 in.-lbs. use the following limitation on stroke:  $Stroke (in.) = 3.50 - Torque (in.-lbs.) / 850$ .

**Example:** Drilling a 3/4" diameter hole in mild steel takes approximately 400 in.-lbs. Limit stroke of unit to 3" to prevent excessive spline wear.

## Estimating Cycle Time

Once you have determined the necessary stroke of the unit, desired feed rate, and spindle RPM; use the following formula to calculate cycle times:  $Time = \frac{Stroke \times 60}{feed \times RPM}$ , where *Stroke* is inches, and *feed* is inches per revolution (IPR). The time it takes to retract the drill bit is not normally considered when calculating cycle times since it occurs so rapidly and is negligible compared to the slower feed rate when advancing the drill bit.

**Example:** Drilling a 3/8", 0.5" deep hole in Aluminum with a tip clearance of 1/4" - feed rate is 0.006 IPR, RPM is approximately 2600, stroke is 0.75". The cycle time for this operation is approximately 2.9 seconds.

## Estimating Feed Cylinder Pressure

Once you have determined the necessary thrust of the unit, use the following formula to calculate feed cylinder pressure:

$Pressure = \frac{Thrust}{3.15 in^2}$ , where *Thrust* is lbs. force. The minimum pressure for reliable shifting and control of the feed rate should be 150 PSI, and the maximum pressure to prevent damage to cylinder during retract is 800 PSI.

**Example:** to develop 450 lbs. of force, you need 150 PSI of pressure.

## Converting Torque and RPM to Horsepower

To convert torque (in.-lbs.) and RPM to horsepower use the following equation:  $HP = Torque (in.-lbs.) \times RPM / 63025$ .

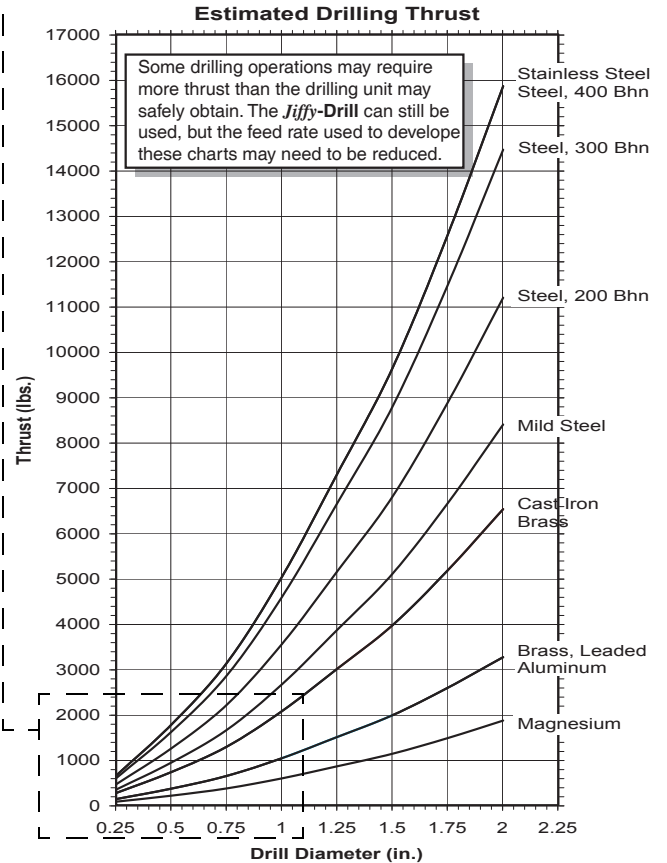
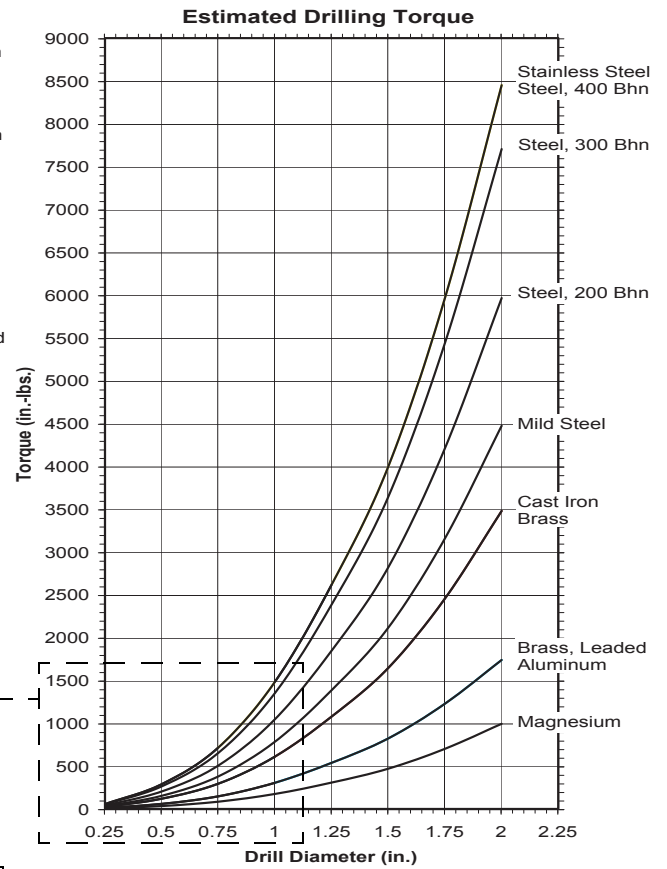
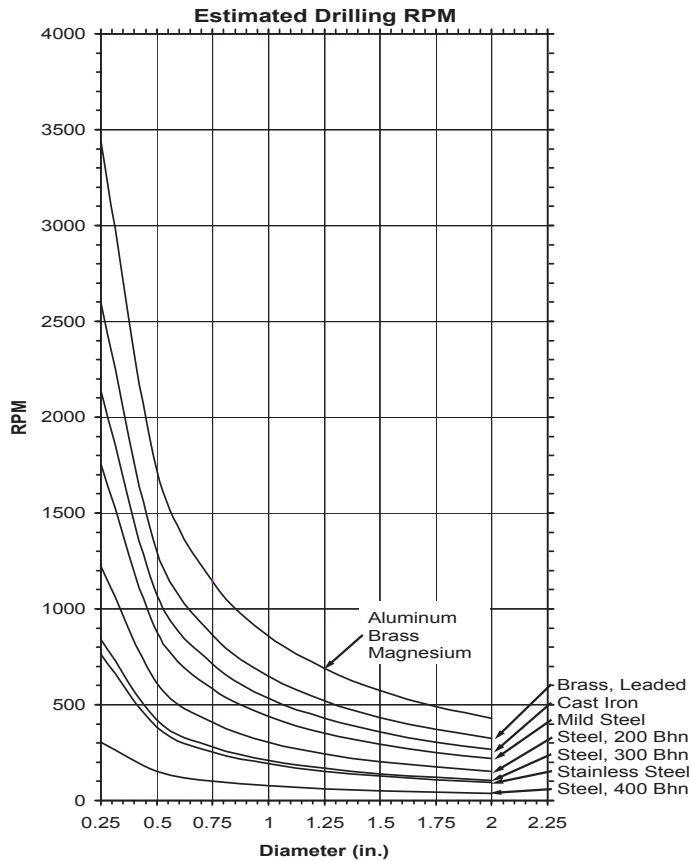
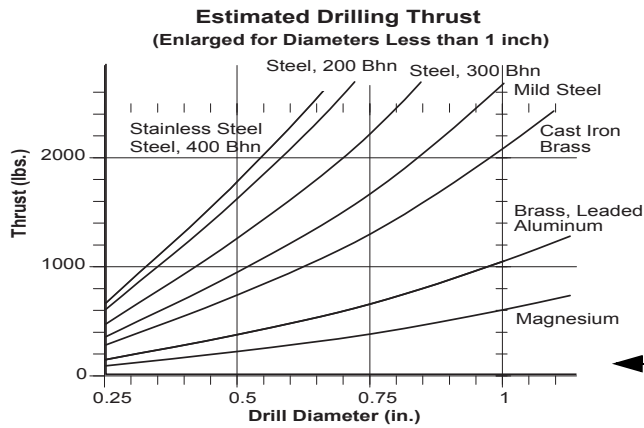
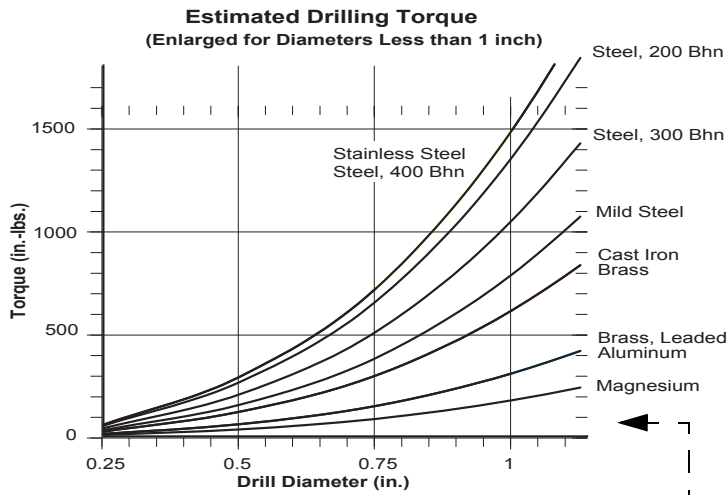
To convert torque (ft.-lbs.) and RPM to horsepower use the following equation:  $HP = Torque (ft.-lbs.) \times RPM / 5252$ .

## Converting Horsepower and RPM to Torque

To convert horsepower and RPM to torque (in.-lbs.) use the following equation:  $Torque (in.-lbs.) = HP \times 63025 / RPM$ .

To convert horsepower and RPM to torque (ft.-lbs.) use the following equation:  $Torque (ft.-lbs.) = HP \times 5252 / RPM$ .

# Drilling Torque, Thrust and RPM Estimation Charts



# Sizing Jiffy-Drill Units (continued)

## Estimating Drilling Torque, Thrust and RPM

The **Jiffy-Drill** is designed specifically to drill both small holes and large holes in a variety of materials. The size of hole and the material determines the power and RPM required to perform the task. In order to size the proper drive requirements you must know the RPM and torque required for the cutting tool to machine the material you are using. This information can usually be obtained from the manufacturer of the cutting tool you are using.

For standard twist drills see page 20 to estimate required torque, RPM and thrust.

**CAUTION:** Drilling torques, thrusts and speeds depend on many factors; the machine, the material being drilled, the design of the hole, the lubricant, and the style of drill used. No exact rules can be given that take into account all of these variables. However, the following can be used as a guide in determining a starting point and course to follow for obtaining maximum unit performance.

## Sizing By Using The Charts On Page 20

**Feed Rate:** The charts use a fixed feed rate based on the diameter of the drill. To determine what feed rate was used, you must use the equation given below.

**RPM:** To estimate RPM, use the chart labeled “*Estimated Drilling RPM*”. On the bottom axis, locate the diameter of the standard twist drill. Create an imaginary vertical line from the diameter to where it intersects the material being drilled. Create another imaginary horizontal line from this intersection point to the left axis, this will be the suggested RPM of the standard twist drill.

**Torque:** Use the above described technique with the cart labeled “*Estimated Drilling Torque*” to estimate torque.

**Thrust:** Use the above described technique with the cart labeled “*Estimated Drilling Thrust*” to estimate thrust.

## Sizing By Using The Equations Below

**Feed Rate:** The charts use a fixed feed rate based on the diameter of the drill. To determine the feed rate used to determine the charts, use the equation:  $Feed = (0.0109 \times Dia) + 0.0021$  where *Dia* is drill diameter in inches.

**Example:** Drilling a 3/4" hole in aluminum. Feed rate =  $(0.0109 \times 0.75) + 0.0021 = 0.010$  inches per revolution.

**RPM:** To estimate RPM use the following equation:  $RPM = 3.82 \times \frac{SFM}{Dia}$  where SFM is from the table “*Drilling SFM*” from the table below-right, and *Dia* is drill diameter in inches.

**Example:** Drilling a 3/4" hole in aluminum.  $RPM = 3.82 \times 225/0.75 = 1146$  RPM

**Torque:** To estimate torque, use the following equation:  $Torque = 1.41 \times K \times f^{0.8} \times Dia^{1.8}$  where *f* is feed rate, *Dia* is drill diameter in inches, *K* is from the table below-right, and *Torque* is in.-lbs.

**Example:** Drilling a 3/4" hole in aluminum, and using previous calculated values.  $Torque = 1.41 \times 7000 \times 0.010^{0.8} \times 0.75^{1.8} = 147.7$  in.-lbs.

**Thrust:** To estimate thrust, use the following equation:  $Thrust = 3.523 \times K \times f^{0.8} \times Dia^{0.8} + 0.0345 \times K \times Dia^2$  where *f* is feed rate, *Dia* is drill diameter in inches, *K* is from the table below-right, and *Thrust* is lbs.-force.

**Example:** Drilling a 3/4" hole in aluminum, and using previous calculated values.  $Thrust = 3.523 \times 7000 \times 0.010^{0.8} \times 0.75^{0.8} + 0.0345 \times 7000 \times 0.75^2 = 571$  lbs. force.

**Standard Feed Rates Versus Drill Diameter:**

Drill Diameter	Feed Rate (inches/rev)
smaller than 1/8 in.	0.001 to 0.003
1/8 to 1/4 in.	0.002 to 0.006
1/4 to 1/2 in.	0.004 to 0.010
1/2 to 1 in.	0.007 to 0.015
larger than 1 in.	0.010 to 0.025

**Drilling SFM And Equation Constants:**

Material	Allowable SFM	SFM Used	Constant K
Steel, 200 Bhn	70-90	80	24,000
Steel, 300 Bhn	40-65	55	31,000
Steel, 400 Bhn	15-25	20	34,000
Aluminum Alloys, Most	200-250	225	7,000
Magnesium Alloys, Most	200-250	225	4,000
Brass, Most	200-250	225	14,000
Brass, Leaded	140-200	170	7,000
Cast Iron	130-150	140	14,000
Steel, Mild, Resulfurized	110-120	115	18,000
Stainless Steel (316)	50	50	34,000



# Sizing Jiffy-Drill Units (continued)

## Choosing a Hydraulic Motor

Once you have determined the required torque and RPM, use the table below to choose the optimum hydraulic motor. For the actual GPM and pressure required to operate the chosen hydraulic motor, refer to the motor data on pages 51 through 55. Only 14 of the available 20 hydraulic motors are listed in the table below since the performance of several motors may overlap. The table below is just a quick reference, and all values should be compared to the actual motor data sheets.

When using the **Jiffy-Drill** to drill various hole sizes or materials, a single hydraulic motor may not be able to generate the range of torques and the range of RPMs needed. In these cases, the motor can be changed to achieve the best power and RPMs needed. Although in some cases, you can sacrifice drilling cycle times to reduce the number of different motor sizes needed.

**How to Use the Table:** For a given torque, scan down the list to find a motor where the torque is within the recommended torque range. Verify that the desired RPM is also within the recommended RPM range. If there is no motor that meets both criteria, you may use a motor that has a higher torque range to maintain the desired RPM. You may have to sacrifice RPM to obtain desired torque. The values in the table are based on the average performance of the hydraulic motor at moderate GPM and pressures. You can go directly to the motor data and choose a motor where the GPM is either higher and/or lower or the pressure is either higher or lower. For extreme RPMs above 1500, refer to Motor A-1 on page 52 or consult factory.

	RECOMMENDED		LIMITS	
	TORQUE	RPM	TORQUE	RPM
<b>A-1 (page 52)</b>	20 - 100	1500 +	8 - 128	86 - 2239
<b>M-0 (page 51)</b>	20 - 67	1055 - 1500	6 - 102	250 - 1902
<b>M-1 (page 51)</b>	67 - 135	715 - 1055	6 - 214	194 - 1575
<b>B-0 (page 54)</b>	135 - 232	620 - 715	36 - 489	162 - 1021
<b>B-1 (page 54)</b>	232 - 349	567 - 620	36 - 641	127 - 969
<b>B-2 (page 54)</b>	349 - 481	442 - 567	36 - 1036	76 - 760
<b>B-3 (page 54)</b>	481 - 613	347 - 442	52 - 1365	55 - 585
<b>B-3.3 (page 54)</b>	613 - 761	281 - 347	67 - 1687	45 - 469
<b>B-3.6 (page 55)</b>	761 - 883	243 - 281	82 - 1942	39 - 385
<b>B-4 (page 55)</b>	883 - 1013	217 - 243	92 - 2046	37 - 353
<b>B-5 (page 55)</b>	1013 - 1238	182 - 217	120 - 2320	29 - 304
<b>B-6 (page 55)</b>	1238 - 1565	145 - 182	167 - 2657	25 - 243
<b>B-7 (page 55)</b>	1565 - 1976	114 - 145	211 - 2977	13 - 192
<b>B-8 (page 55)</b>	1976 - 2450	30 - 114	266 - 3604	16 - 152

**Choosing a Motor From The Data:** If you must use the hydraulic motor data on pages 51 through 55 to choose a motor, use the following guidelines:

- Choose a motor that is capable of generating required torques at a moderate range of pressure, between 400 to 1000 PSI.
- Keep the GPM requirements low, but still above 1-2 GPM on A and M series motors, and above 3-4 GPM on B series.
- If using an existing power unit, you will be limited by the GPM and pressure your unit can deliver.
- If using a new power unit, it is normally cheaper to build a power unit that is higher in pressure than higher in GPM.

## Choosing an Electric Motor

Once you have determined the required torque and RPM, convert these values to horsepower. Then use the table below to choose the optimum electric motor. With a direct drive electric motor your RPM is fixed to that of the electric motor. Variable speed is obtained by using an inverter duty motor with variable speed drive. Consult your local motor supplier. Choose the motor with the greater torque than what you need:

To convert to horsepower:  $HP = \frac{\text{torque} \times \text{RPM}}{63025}$ , where *torque* is in.-lbs.

Torque (in.-lbs.)	HP	RPM	Voltage
<b>9</b>	1/2	3450	120/240 1Ø, 230/460 3Ø
<b>14</b>	3/4	3450	120/240 1Ø, 230/460 3Ø
<b>18</b>	1/2	1725	120/240 1Ø, 230/460 3Ø
<b>18</b>	1	3450	120/240 1Ø, 230/460 3Ø
<b>27</b>	3/4	1725	120/240 1Ø, 230/460 3Ø
<b>27</b>	1 1/2	3450	120/240 1Ø, 230/460 3Ø
<b>28</b>	1/2	1140	120/240 1Ø, 230/460 3Ø

Torque (in.-lbs.)	HP	RPM	Voltage
<b>37</b>	1	1725	120/240 1Ø, 230/460 3Ø
<b>37</b>	2	3450	120/240 1Ø, 230/460 3Ø
<b>41</b>	3/4	1140	120/240 1Ø, 230/460 3Ø
<b>55</b>	1	1140	230/460 3Ø
<b>55</b>	1 1/2	1725	120/240 1Ø, 230/460 3Ø
<b>73</b>	2	1725	230/460 3Ø
<b>83</b>	1 1/2	1140	230/460 3Ø

# *Jiffy-Drill Maintenance*

## *Routine Maintenance Items*

**Spline Drive Lubrication:** The spindle drive spline should be wiped generously with a high film strength grease. To reach the spline, unscrew the bearing retainer. This is a left-hand thread. Pull out the spindle for access to the spline.

Wipe a light film of the same grease on the switch cam rods where they go through the torque plate.

**Hydraulic Drive Motor:** This motor is lubricated by the hydraulic oil and needs no other lubrication. Should the shaft seal ever need replacing, seal kits are available from the factory, complete with instructions.

**Removing Drill Bits:** With Morse taper spindles, drill bits should be removed from the spindle by inserting a lever-type drill knock-out in the slot provided. **Caution!** Do not hammer on the knock-out or spindle; this may damage the spindle bearing.

**Quill:** Keep dirt wiped off the quill, and lubricate it once every 12,000 cycles or once a month, whichever is sooner, with a few drops of oil.

**Limit Switches:** Routinely inspect limit switches for loose contacts, damaged trigger levers, broken or worn mechanisms, and general structural rigidity.

**Seals:** Visually inspect unit for hydraulic leakage which could indicate the need for seal replacement. (Seal leakage is a very rare occurrence.)

## *Removing Spindle Bearing*

First remove spindle as described under spline drive lubrication. The spindle and drive shaft are locked together by a tapered pin. Punch the taper pin out by striking it from the side labeled X-X. To remove the bearing, the two parts of the spindle must be unscrewed from each other. These are standard right hand threads.

## *Interchanging Hydraulic Motors*

In setting up for a different job, the hydraulic motor can be interchanged with a different model which may have a more favorable ratio of torque and RPM for the new job. See our motor quick change option on page 12 for alternative options.

Remove four socket head nuts. Pull out the motor with spline sleeve still attached. The spline sleeve set screws are swedged in place and removal might be difficult. It is recommended when using interchangeable motors, that you keep the spline sleeve attached and not swap sleeves between motors. If removal of sleeve is necessary, the swedge must be removed by deburring or use a small end mill to remove swedge. Loosen set screw, and pull spline sleeve off motor shaft. Transfer motor ring, if used, to new motor shaft. Replace spindle sleeve and re-swedge tightened set screw. Unscrew four studs from the old motor and mount them on the new motor. Place the spline sleeve on new motor shaft and tighten set screw. Plug the new motor assembly into the **Jiffy-Drill** body, engaging the spline sleeve with the spline on the spindle. Reinstall and tighten the four socket head cap nuts.

## *Recommended Spare Parts*

At least one spare limit switch should be kept on hand. In an emergency, the deceleration limit switch, if not used, can be substituted as a replacement for one of the other switches.

When replacing a limit switch, transfer one wire at a time from the old to the new switch, to avoid the possibility of getting the new switch wired incorrectly.

## *Locating Unit Serial Number*

The unit serial number is located on the right side of the unit when looking at the spindle end. Be aware that the covers between units are interchangeable. Therefore, the part number on the cover may not be the correct part number of the unit. Consult the factory for determining the exact part number of your unit or locating the serial number. Serial number may be required when ordering replacement parts.

## *Seal Kits*

Seal kits are available from your local distributor or the factory. Be prepared to supply unit serial number to determine proper seal kit number.

RKJD-1: Complete soft seal kit for serial numbers up to 577Q1. (Units purchased prior March, 1986.)

RKJD-2: Complete soft seal kit for serial numbers starting with 578Q3.

## *Drill Cylinder Seal Kit Installation*

1. Remove bearing retainer nut (left hand thread). Pull drive shaft out.
2. If there is an adapter ring, remove by first removing the two loc-tited set screws in face. Use a torch to break the loc-tite bond. Remove the adapter ring (left hand thread).
3. To remove stop rod mounting plate, loosen socket head cap screw at bottom. Use a flat head screw driver to slightly spread stop rod mounting plate and slide mounting plate off of the quill. You will need to remove the switch cams to completely remove stop rod mounting assembly.
4. To remove torque plate, remove 4 mounting screws. Pull torque plate up to the threads on quill. It is easier to remove plate by unscrewing seal around thread (left hand thread).
5. To remove cylinder rod end, rotate rod end 45 degrees, slide off rod end using the corners to grab hold of. Remove bronze bearing and seal from the rod end. Remove quill from the barrel. Remove seals, being careful not to damage quill surface. Clean and dry surface of all parts before re-assembly. Lubricate using high film strength grease.
6. Replace seals using a small screw driver, being careful not to damage seal or quill surface. Using a thin film of grease on the seals will improve installation and sealing.
7. Re-assemble in reverse order.



[illegible]

# B-SERIES HYDRAULIC MOTOR

# *Jiffy-Drill Parts List*

Item	Qty	Part No.	Description	Item	Qty	Part No.	Description
1	1	J-5307	Adapter Ring, Motor	28	2	J-321	NY-LOK Set Screw, 1/4"-28 x 1/2"
2	1	J-4118	Adaptor, Hydraulic Motor	29	1	J-4113	Torque Plate
3	1	J-4100	Sleeve, Spindle	30	1	J-4110	Retract Switch Adjusting Screw
4	1	J-4123	<i>Jiffy-Drill</i> Body	31	4	J-212	Drive Screw, No. 2 x 3/16"
5	1	J-4101	Drive Shaft	32	1	J-320	Nameplate, Main Unit
6	1	J-329	O-Ring, No. 028	33	6	J-328	Round Head Screw, 4-40 x 5/8"
7	1	J-4120-21	Cylinder Blind End/Inner Seal Tube	34	3	J-318	Limit Switch
8	1	J-330	O-Ring, No. 036	35	1	J-4107	Retract Switch Adj. Block
9	1	J-399	Outer Wear Ring	36	9	J-356	Solderless Terminal
10	1	J-401	Inner Seal	37	1	J-367	Insulator
11	1	J-400	Outer Seal	38	1	J-4127	Switch Cover
12	1	J-398	Inner Wear Ring	39	1	J-361	NY-LOK Set Screw, 1/4"-28 x 5/16"
13	1	J-4126	Barrel	40	1	J-310	808 Woodruff Key
14	1	J-4119	Piston Rod End	41	1	J-405	NY-LOK Set Screw, 1/4"-28 x 7/16"
15	1	J-333	O-Ring, No. 038	42	1	J-289	Nameplate, Hydraulic Motor
16	1	J-404	Front Quill Seal	43	2	J-281	Drive Screw, No. 4 x 1/4"
17	1	J-4117	Plain Bronze Bearing	44	1	B-X	Hydraulic Motor, B-Series
18	1	J-4125	Quill	45	4	J-322	Studs, 3/8"-16 x 4"
19	4	J-323	Socket Head Cap Screw 5/16"-18 x 3"	46	3	J-4109	Switch cam
20	1	J-317	Wiper, CR No. 21059	47	3	J-327	Set Screw, 10-24 x 5/16"
21	1	J-325	Socket Head Cap Scr. 3/8"-16 x 2-1/2"	48	1	J-4106	Limit Switch Plate
22	5	J-326	Socket Head Nut, 3/8"-16	49	2	J-4108	Plain Switch cam Rod
23	1	J-340	No. 6 Taper Pin	50	4	J-324	Flat Head Screw, 1/4"-20 x 1/2"
24	1	J-4102	Drill Spindle, #3 Morse Female Taper	51	1	J-292	Socket Head Cap Screw 1/4"-20 x 1/2"
25	1	J-4116	Bearing Retainer (Std.)	52	1	J-335	SAE Washer, 1/4"
26	1	J-319	Dbl. Seal Bearing (5205 SBKFF) 0.984" I.D. x 2.047" O.D.	53	1	J-363	External Lock Ring
27	1	J-4111	Stop Rod Mtg. Plate	54	1	J-362	Knob Cover
				55	1	J-341	Switch Cover Retainer Receptacle

## *Seal Kits*

Seal kits are available from your local distributor or the factory. Be prepared to supply unit serial number to determine proper seal kit number. Refer to page 23 for installation instructions.

**RKJD-1:** Complete soft seal kit for serial numbers up to 577Q1. (Units purchased prior March, 1986.)  
Consult factory for parts included in this seal kit.

**RKJD-2:** Complete soft seal kit for serial numbers starting with 578Q3.

Item	Qty	Part No.	Description
8	1	J-330	O-Ring, No. 036
9	1	J-399	Outer Wear Ring
10	1	J-401	Inner Seal
11	1	J-400	Outer Seal
12	1	J-398	Inner Wear Ring
15	1	J-333	O-Ring, No. 038
16	1	J-404	Front Quill Seal
20	1	J-317	Wiper, CR No. 21059

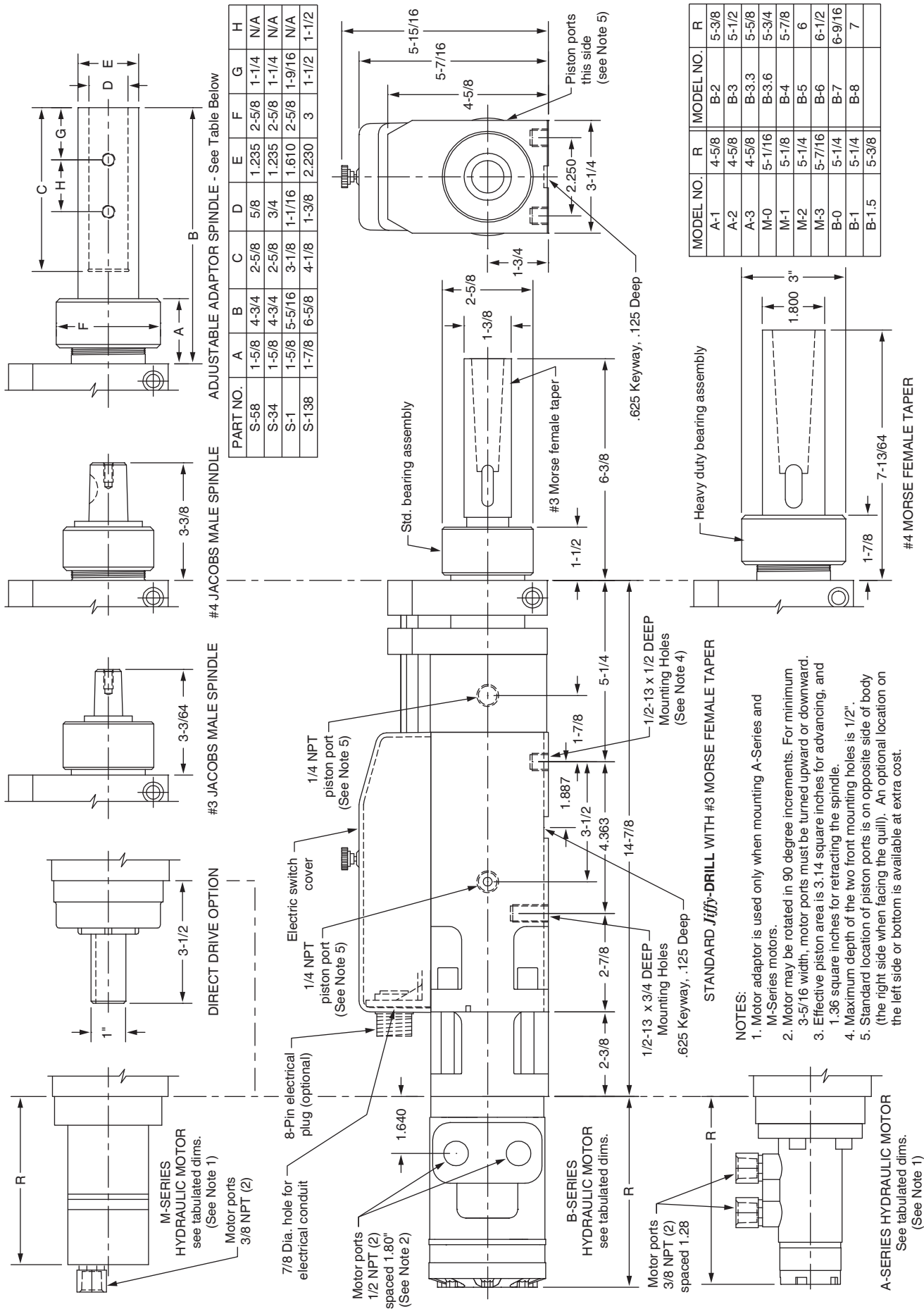
## *Not All Parts Are Shown Above.*

**For parts specifically associated with *Jiffy-Drill* spindles see pages 8 and 9.**

**For parts specifically associated with *Jiffy-Drill* drive styles see pages 10 and 11.**

**For parts specifically associated with *Jiffy-Drill* options see pages 12 and 13.**

# Jiffy-Drill Dimensional Drawing



This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for writing or drawing. There are no margins, text, or other markings present.

# *Jiffy*-TAP

Compact Tapping Unit

## *Features at a Glance*

### **SPECIFICATIONS\***

**Standard Stroke Length:** 0" to 2-1/8"‡  
**Extended Stroke Length:** 0" to 3-3/8"‡  
**Tap Capacity:** 1-1/2" NPT in cast iron  
**Spindle RPM:** 3000 RPM maximum  
**Spindle Taper:** #4 Jacobs male taper  
**Spindle Torque:** 15 - 3700 in.-lbs. maximum  
**Weight:** 28 lbs. with hydraulic motor

\*Some options may limit or alter the listed values.  
 ‡Stroke is limited by tapping torque, (See page 42.)



*Jiffy*-Tap

### **TYPES OF OPERATIONS:**

Lead Screw Taping: (See page 41)  
 External Threading: (See page 41)  
 Multiple Spindles: (See page 41)

Rapid Retract: (See page 41)  
 Thread Chasing: (See page 41)

### **AVAILABLE SPINDLE PITCHES:**

Listing of Standard and Special Pitches: (See page 30)  
 Extra Lead Screws: (See page 30)

### **AVAILABLE CHUCKS:**

#1 Chuck: (See page 30)  
 #2 Chuck: (See page 30)

#3 Chuck: (See page 30)  
 #4 Chuck - Quick Change Taps: (See page 30)

### **AVAILABLE DRIVE STYLES:**

Hydraulic Motor: (See page 32)  
 Electric Motor: (See page 32)

1" Keyed Shaft: (see page 33)  
 C-Face Mount: (see page 32)

### **AVAILABLE TAP OPTIONS:**

EP or PT: 12 foot cord and/or 8-pin pigtail (See page 38)  
 MQ: Motor Quick Change (See page 34)  
 SQ: Lead Screw Quick Change (See page 35)  
 RO: Automatic Reverse Option (See page 37)

ES: Extended Stroke Option (See page 36)  
 PX: Coolant Resistant Sensors (See page 37)  
 LH: Left Handed Pitch (See page 30)

## *Quick Jiffy-Tap Index*

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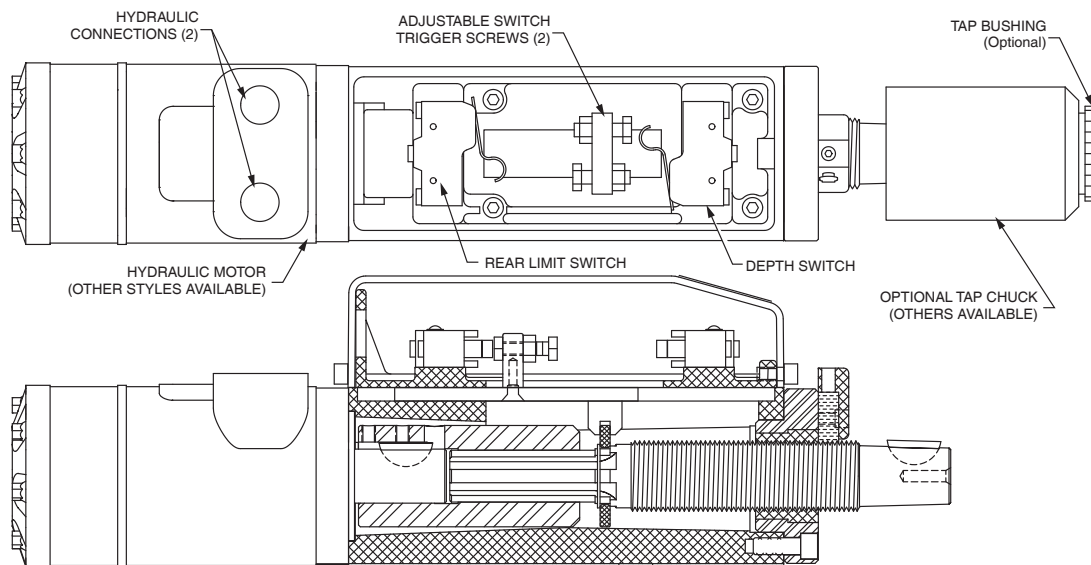
# Jiffy-Tap Features

- Choice of lead screws from 6 to 40 threads per inch, Class 3 thread. Metric, left hand and special leads are available with many in stock; consult factory. The lead screw can be changed in the field in less than 5 minutes by changing the lead screw spindle and its matching bushing.
- **Jiffy-Tap** allows the use of smaller diameter rotary tables and shorter linear movement when building transfer type machines. This allows more tapped holes per work piece, and more tapping stations in a given space.
- Tap torque can be adjusted with the relief valve on the remote hydraulic power unit which furnishes power for the **Jiffy-Tap** hydraulic motor.
- **Jiffy-Tap** units weigh approximately 28 lbs., and can readily be moved from one machine to another because of the line-up slot in the base. If hydraulic quick couplers and the optional electrical plug-in harness are used, the **Jiffy-Tap** unit can be rapidly re-located.
- **Jiffy-Tap** units can be used with multiple tap heads with mounted guide rods. Each standard unit will handle up to six 3/8" N.C. taps in cast iron, and larger or more taps in brass or aluminum, or at reduced RPM. Larger hydraulic motors will do much more.
- **Jiffy-Tap** can be used as a portable tapping unit with a slide-in fixture for large parts.
- **Jiffy-Tap** can be reversed 120 times a minute without damage.
- **Jiffy-Tap** is a heavy duty unit; it has been used for many years on tough production jobs. (Very popular with the high production Detroit parts manufacturers.)

## What Is a Jiffy-Tap

**Jiffy-Tap** is the light, compact, and powerful answer to production lead screw tapping or die threading in close quarters. It will easily drive taps up through 1-1/2" N.C. size in medium cast iron with ample allowance for dull taps. Using a hydraulic motor to rotate the spindle, the standard unit will produce more than 10 HP, yet is so compact that two units

will mount side-by-side on 3-5/16" spacing. On special orders this can be reduced to 3-3/16". The maximum length from end of motor to end of tap chuck is less than 20". No other tapping unit can deliver the long life and high torque of the **Jiffy-Tap** in such a small frame.



## How a Jiffy-Tap Works

**Spindle Rotation:** The spindle is rotated by your choice of drive style option. (See page 10.) We recommend using compact hydraulic motors for greater power. Although in many applications alternative methods to rotate the spindle may be beneficial. Reversals of 120 times per minute (or more) are no problem for the **Jiffy-Tap**.

**Spindle Advance:** The **Jiffy-Tap** is a lead screw tapping unit. As the spindle rotates, the spindle is either advanced or retracted depending upon the direction of spindle rotation and lead screw pitch. The lead screw pitch is the

same as the pitch of the hole to be tapped.

**Position Switches:** Built-in electric limit switches and adjustment screws are used to provide spindle location feedback to your control circuit. The use of these switches is entirely dependant upon your control circuit and how you choose to operate the **Jiffy-Tap** unit.

Both the rear limit switch and the depth switch are securely mounted to the switch plate and sensor trigger adjustments are easily made by adjusting the appropriate trigger screw.

# Jiffy-Tap Spindles

**Jiffy-Tap** lead screw spindles are available in a wide range of standard pitches and custom pitches. The table below specifies our standard pitches and the most common non-standard lead screw spindles. Consult factory for pitches not listed below.

Standard Pitches (Right Hand Threads)		
40 tpi	18 tpi	11 tpi
32 tpi	16 tpi	10 tpi
28 tpi	14 tpi	8 tpi
27 tpi	13 tpi	7 tpi
24 tpi	12 tpi	6 tpi
20 tpi	11 1/2 tpi	

Common Non-standard Pitches (Right Hand Threads)		
36 tpi	2.00 mm	0.75 mm
26 tpi	1.75 mm	0.70 mm
19 tpi	1.5 mm	
15 tpi	1.25 mm	
9 tpi	1.00 mm	
	0.80 mm	

**Options:** If ordering a left hand thread lead screw, use the option code “-LH” in either the unit part number or the extra lead screw part number (i.e. 3T-B3-11.5-LH, or LS-11.5-LH). All left hand threaded lead screws are considered non-standard.

Lead screw spindles, nut housings, or nut bushings can not be sold separately. However, individual parts such as wiper housing, screws, wiper felt, and etcetera can be purchased separately. Contact factory or local distributor.

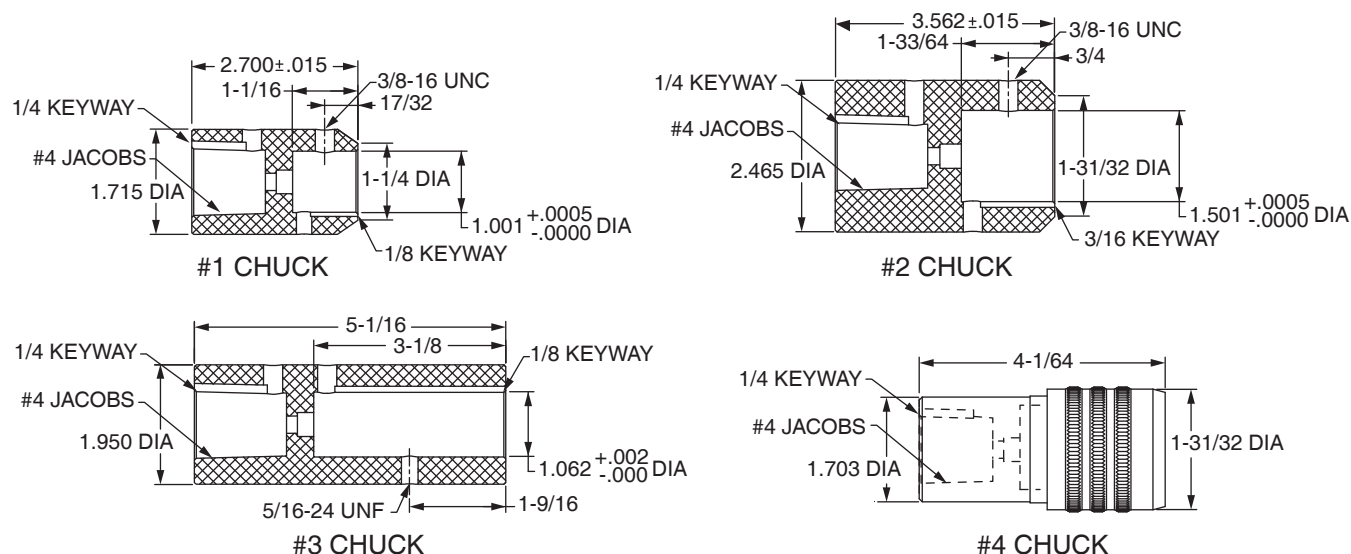
## Extra Lead Screws

Additional lead screws are sold as a matched set that includes lead screw, nut, and wiper assembly. To order an additional lead screw use the following part number: LS-XX where XX is replaced by the pitch of the lead screw. **Example:** an 11-1/2 tpi pitch lead screw would be ordered as LS-11.5. A 1.00 mm pitch metric lead screw would be LS-1.00MM. If the additional lead screw is to go on a unit with either the quick change spindle option (option code “-SQ”, see page 35), an extended stroke unit (option code -ES, see page 36), or a unit with the automatic reverse option (option code “-RO”, see page 37), then use the appropriate option code when ordering a replacement lead screw (i.e. LS-11.5-RO). When ordering extra lead screws, it is recommended to also order an extra chuck, since changing chucks between lead screws is difficult and time consuming.

## Jiffy-Tap Chucks

All chucks attach to the same size #4 Jacobs male taper using a standard 808 Woodruff key and can be secured with a standard 1/4"-20 x 3/4 socket head cap screw. Chucks can be interchanged in the field, but it is recommended to keep chucks attached to the lead screw. We can manufacture special chucks to meet customer specifications, please contact the factory for additional information.

**To determine which size chuck you need, first refer to the table “Standard Tap Dimensions” on pages 61 and 62. Determine the diameter of the tap you will use, then refer to the table of available bushings for the size of tap used.**



**All chucks and bushings are ordered as separate line items.**

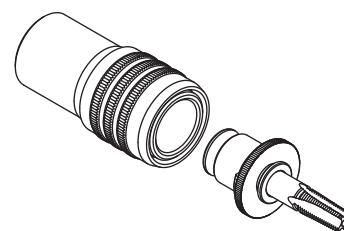
# Jiffy-Tap Chucks (continued)

## Benefits of #4 Chuck - Quick Change Bushings

The *Jiffy* quick change chuck and tap bushing system are better:

- To change a tap bushing you don't need any type of wrenches or keys. Just push back on the knurled section of the chuck and the tap bushing pops out.
- To install a new bushing, align the square driver in the back of the bushing flange with the cut out in the top of the chuck and push. The knurled part of the chuck will pop forward and lock the bushing in place.
- To change a tap in a bushing, you don't have to remove the bushing from the chuck. Just push back the small bushing flange and the tap will come out. Insert a new sharp tap and push tap in. The bushing flange will pop back in place, securing the new sharp tap.
- All tap changes can be accomplished in under a minute.
- Can utilize existing quick change bushing manufactured by, Bilz, T.M. Smith, etc.

**Note:** Change lead screws when changing tap pitches.



**#4 Chuck and Quick Change Bushing**

## Adaptor Bushings to Fit #4 Chuck (Quick Change Bushings)

Part No.	Adaptor Bushing I.D.‡	For Tap Size	Part No.	Adaptor Bushing I.D.‡	For Tap Size	Part No.	Adaptor Bushing I.D.‡	For Tap Size
QB-006	0.141	0 to No.6	QB-120	0.367	1/2"	QPB-116	0.3125	1/16" NPT†
QB-008	0.168	No. 7 & 8	QB-916	0.429	9/16"	QPB-180	0.4375	1/8" NPT†
QB-010	0.194	No. 9 & 10	QB-580	0.480	5/8"	QPB-140	0.5625	1/4" NPT
QB-012	0.220	No.12	QB-1116	0.542	11/16"	QPB-380	0.700	3/8" NPT
QB-140	0.255	1/4"	QB-340	0.590	3/4"	QPB-120	0.6875	1/2" NPT
QB-516	0.318	5/16"	QB-1316	0.652	13/16"			
QB-380	0.381	3/8"	QB-780	0.697	7/8"			
QB-716	0.323	7/16"						

## Jiffy-Tap Bushings for #1 and #2 Chucks

A bushing is needed for each size tap to be used.

They come in small (1" O.D.) and large (1-1/2" O.D., size to fit many tap sizes).

(Specify desired bushing by part number. Select from sizes shown below.)

### Adaptor Bushings to Fit #1 Chuck (Small 1" O.D.)

Part No.	Adaptor Bushing I.D.‡	For Tap Size	Part No.	Adaptor Bushing I.D.‡	For Tap Size
SB-006	0.141	0 to No.6	SB-1116	0.542	11/16"
SB-008	0.168	No. 7 & 8	SB-340	0.590	3/4"
SB-010	0.194	No. 9 & 10	SB-1316	0.652	13/16"
SB-012	0.220	No.12	SB-1516	0.760	15/16"
SB-140	0.255	1/4"	SPB-116	0.3125	1/16" NPT†
SB-516	0.318	5/16"	SPB-180	0.4375	1/8" NPT†
SB-380	0.381	3/8"	SPB-140	0.5625	1/4" NPT
SB-716	0.323	7/16"	SPB-380	0.700	3/8" NPT
SB-120	0.367	1/2"	SPB-120	0.6875	1/2" NPT
SB-916	0.429	9/16"			
SB-580	0.480	5/8"			

### Adaptor Bushings to Fit #2 Chuck (Large 1-1/2" O.D.)

Part No.	Adaptor Bushing I.D.‡	For Tap Size	Part No.	Adaptor Bushing I.D.‡	For Tap Size
LB-008	0.168	No.7&8	LB-1018	0.896	1-1/8"†
LB-010	0.194	No. 10	LB-10316	0.959	1-3/16"†
LB-012	0.220	No.12	LB-1014	1.021	1-1/4"
LB-140	0.255	1/4"	LB-1038	1.108	1-3/8"
LB-516	0.318	5/16"	LB-10716	1.171	1-7/16"†
LB-380	0.381	3/8"	LB-1012	1.233	1-1/2"
LB-716	0.323	7/16"	LB-1058	1.305	1-5/8"
LB-120	0.367	1/2"	LPB-116	0.3125	1/16" NPT†
LB-916	0.429	9/16"	LPB-180	0.4375	1/8" NPT†
LB-580	0.480	5/8"	LPB-140	0.5625	1/4" NPT
LB-1116	0.542	11/16"	LPB-380	0.700	3/8" NPT
LB-340	0.590	3/4"	LPB-120	0.6875	1/2" NPT
LB-1316	0.652	13/16"	LPB-340	0.9063	3/4" NPT
LB-780	0.697	7/8"	LPB-1000	1.125	1" NPT
LB-1516	0.760	15/16"			
LB-1000	0.800	1"			
LB-10116	0.862	1-1/16"†			

‡ Refer to standard tap dimensions on pages 61 and 62

†Tap manufacturers may vary shank diameter. Verify actual tap shank diameter to order proper bushing.



# Jiffy-Tap Drive Styles

## Hydraulic Motor Drive

**Spindle Hydraulic Motor:** The *Jiffy-Tap* can be ordered with choice of 20 hydraulic motor models covering a wide range of speed/torque ratios. Motor selection depends on the tap size, thread pitch, speed, and the hardness of the material to be tapped. Hydraulic motors can be attached in any 90° increment for easy plumbing. All *Jiffy* motors are reversible.

There is a choice of 8 motor models for medium speed tapping up to 2200 RPM. A choice of another 12 motor mod-

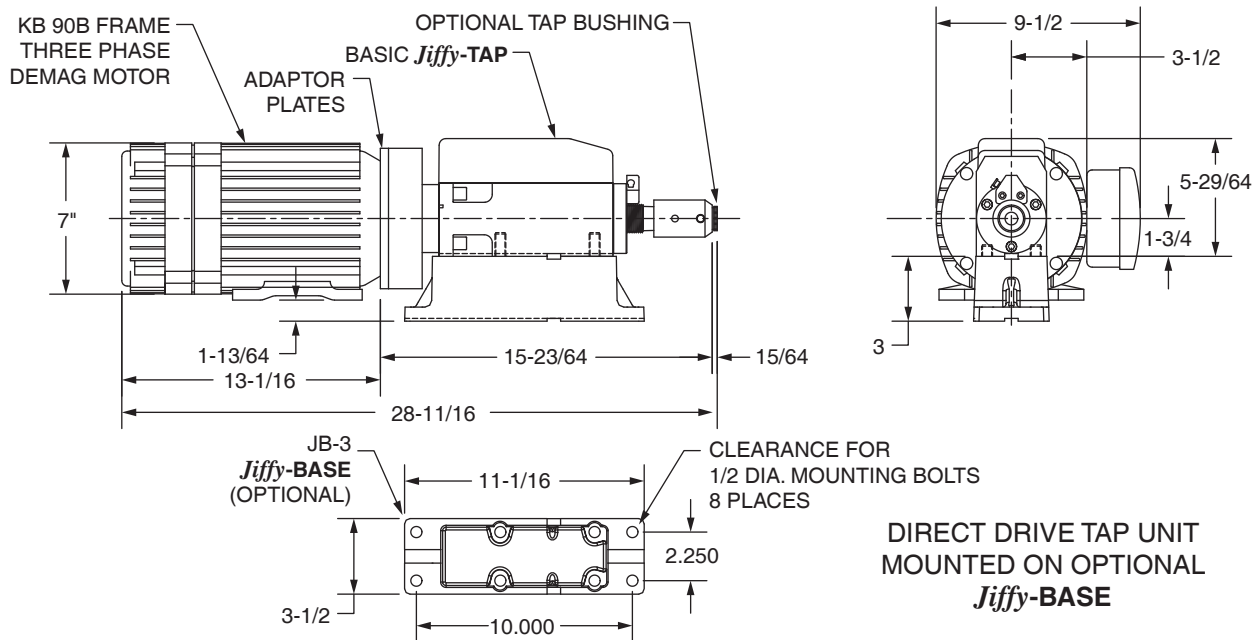
els for low speed, high torque tapping with larger taps or when working with harder materials. Consult factory for additional high speed, low torque motors for applications up to 3000 RPM.

Motors A-1 through A-4 and M-0 through M-3 are for high speed tapping up to 2200 RPM. Motors B-0 through B-8 are low speed, high torque models for larger taps or harder materials.

Additional motors may be available for special orders.

In order to size the proper hydraulic motor, you must know what RPM and torque is required for the cutting tool to machine the material you are using. This information can usually be obtained from the manufacturer of the cutting tool used. For standard taps see pages 42 through 45 to estimate required torque and RPM. Then refer to pages 51 through 55 to choose a hydraulic motor that will deliver the torque and RPM needed. If you will be using an existing power unit, you will be limited by the pressure and GPM available from your existing power unit. On new applications try to keep operating pressures around 600 - 800 PSI and GPM at 25% to 75% of maximum GPM the motor can operate at.

## DDK1 - "C-Face" Mount For Electric Motor Drive



### Electric Drive Features

- Direct drive speed range is 900, 1200, or 1800 RPM.
- Adaptable for usage of local electric motors and voltages.
- Uses standard C56 frame C-Face mounting arrangement.
- Not suitable for precision, high speed tapping.

### How a DDK1 Works

The unique *Jiffy-Tap* is powered by a brake motor especially designed for high start/stop cycling. A wide selection of lead screws, tap chucks, and adaptor bushings are also available.

The tapping cycle is started with an electrical signal. The signal may originate from a push-button, or from a sequence switch on an automatic machine installation. A limit switch mounted in the *Jiffy-Tap* provides a signal for reversal when proper depth has been reached. Another built-in switch stops the tap when retracted position has been reached. These stop and reverse positions are adjustable.

# Jiffy-Tap Drive Styles (continued)

## SBA1 - 1" Diameter External Shaft

### External Shaft Features

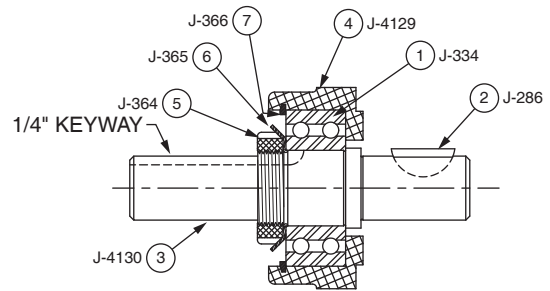
- Speed and horsepower range is determined by drive component. (Maximum spindle speed is 3000 RPM.)
- Adaptable for various usages.
- Uses standard 1" diameter shaft.

### How a SBA1 Works

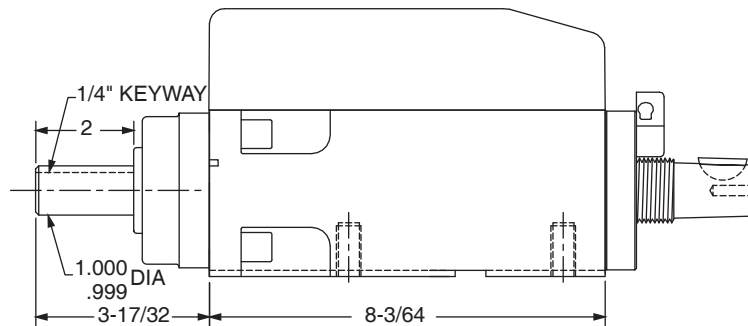
The unit is equipped with a 1" diameter shaft. This is equipped with a 1/4" keyway that runs the entire length of the exposed shaft. The unit can be driven by any method conceivable by connecting to this external shaft.

### Parts List

Item	Qty	Part No.	Description
1	1	J-334	Dbl. Seal Bearing (5206 SBKFF) 1.181" I.D. x 2.440" O.D.
2	1	J-286	Woodruff Key 808
3	1	J-4130	Direct Drive Shaft
4	1	J-4129	Drive Shaft Adapter
5	1	J-364	Locknut
6	1	J-365	Tap Washer
7	1	J-366	Retainer Ring



1" KEYED SHAFT DIRECT DRIVE



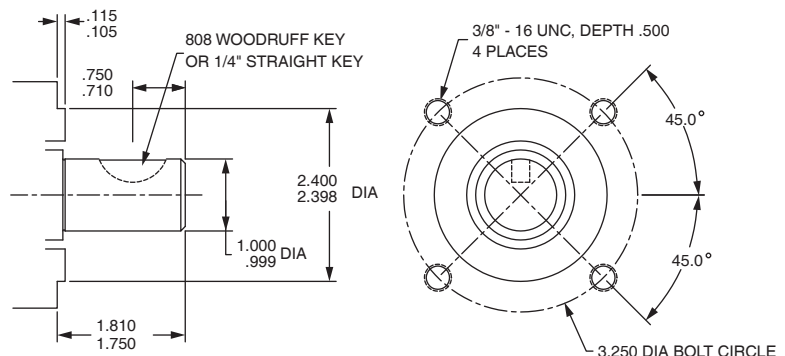
1" KEYED SHAFT - DIRECT DRIVE *Jiffy-TAP*  
(side view)

## XX - No Drive Unit

The *Jiffy-Tap* unit can be ordered without a drive unit. When ordered, a standard unit will be supplied with a splined spindle sleeve, a hydraulic motor adapter ring, four attachment studs, four socket head nuts and an 808 Woodruff key. The customer will need to supply a drive style that mounts to the rear of the unit with the appropriate interface dimensions.

To attach drive unit to the rear of unit, first attach the splined sleeve to the drive shaft of the customer drive unit, using the 808 Woodruff key or customer supplied 1/4" straight key. If the hydraulic motor adapter ring is required, place the ring on

prior to attaching the sleeve (the outside diameter of the sleeve is larger than the inside diameter of the ring). Once the sleeve is securely attached, it is recommended to swedge the set screws in place to prevent accidental loosening by vibration. Slide the spindle sleeve over the drive shaft, and secure drive unit to *Jiffy-Tap* unit using the four studs and four socket head nuts.

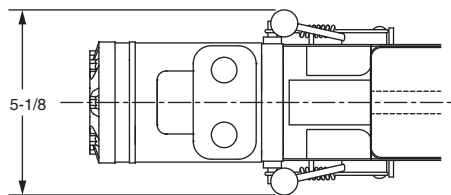


DIMENSIONS OF REQUIRED CUSTOMER DRIVE

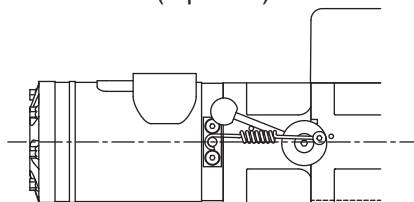
# Jiffy-Tap Options

## Option MQ: Hydraulic Motor Quick-Change System

CHANGE HYDRAULIC MOTORS IN 3 MINUTES OR LESS

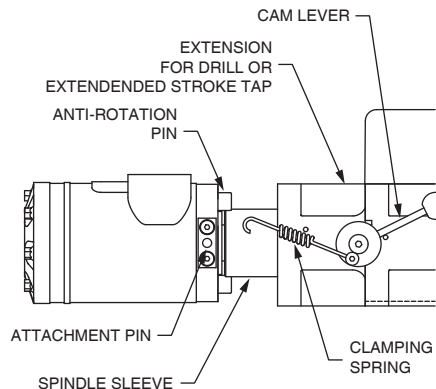


MOTOR ATTACHED  
(top view)



MOTOR ATTACHED  
(side view)

### Example of Quick-Change Option for Hydraulic Motors.



REMOVAL OF MOTOR

Above items are factory order items and must be ordered with the **Jiffy-Tap** unit, except for extra hydraulic motors with the quick change option. When ordering extra hydraulic motors with the quick change feature, we recommend ordering the motor with an extra spindle sleeve. (Specify spindle sleeve is for **Jiffy-Tap**.)

The quick change option does not add any length to unit but will increase the width from 3-5/16" to 5-1/8".

## Hydraulic Motor Quick-Change Parts List

### QUICK-CHANGE MOTOR - Unit Side

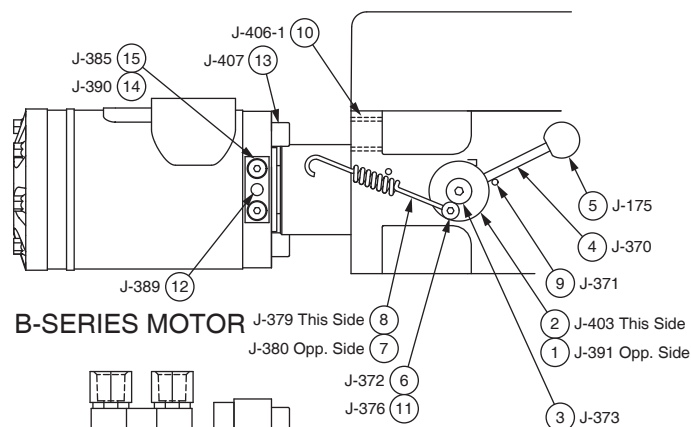
Item	Qty	Part No.	Description
1	1	J-391	Cam - Right Side, Motor End
2	1	J-403	Cam - Left Side, Motor End
3	2	J-373	Screw 1/4"-20 x 3/4" Flat Head
4	2	J-370	Roll Pin 3/16" x 2-1/4"
5	2	J-175	Knob 3/4" Diameter
6	2	J-372	Screw 10-24 x 3/8" Button Head
7	1	J-380	Spring - Right Side, Motor End
8	1	J-379	Spring - Left Side, Motor End
9	4	J-371	Drive Lock Pin 1/8" x 1"
10	2	J-406-1	Modified Bushing
11	2	J-376	Modified #10 Split Lock Washer
17	2	J-456-MQ	Modified Threaded Insert
18	2	J-456	Threaded Insert.
19	2	J-322-MQ	Stud, 3-3/8 Long
20	2	J-322-MQ-1	Stud, 3-1/16 Long
21	4	J-326	Socket Head Nut

### QUICK-CHANGE MOTOR - B Series

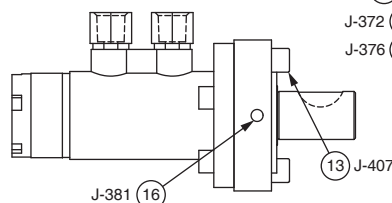
Item	Qty	Part No.	Description
12	2	J-389	Rivet 1/4" x 5/8"
13	2	J-407	Anti-Rotation Pin
14	4	J-390	Screw 10-24 x 1/2" Flat Head
15	2	J-385	Plate

### QUICK-CHANGE MOTOR - A or M Series

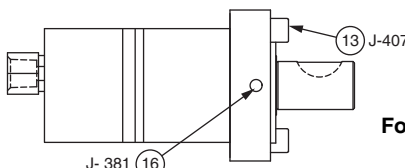
Item	Qty	Part No.	Description
16	2	J-381	Drive Lock Pin 1/4" x 1"
13	2	J-407	Anti-Rotation Pin



B-SERIES MOTOR



A-SERIES MOTOR



M-SERIES MOTOR

LEFT SIDE SHOWN

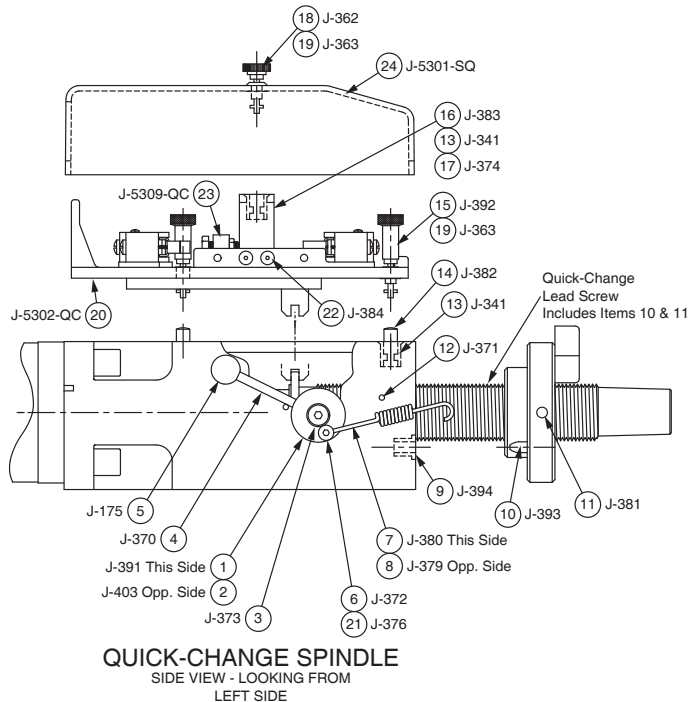
For questions or replacement parts not shown, please consult factory.

# Jiffy-Tap Options (continued)

## Option SQ: Spindle Quick Change

CHANGE LEAD SCREW SPINDLES IN 5 MINUTES OR LESS

### Lead Screw Spindle Quick-Change Parts List



### Example of Quick-Change Option for Jiffy-Tap Lead Screw Spindles.

Item	Qty	Part No.	Description
1	1	J-391	Cam - Left Side, Spindle End
2	1	J-403	Cam - Right Side, Spindle End
3	2	J-373	Screw 1/4" - 20 x 3/4" Flat Head
4	2	J-370	Roll Pin 3/16" x 2-1/4"
5	2	J-175	Knob 3/4" Diameter
6	2	J-372	Screw 10-24 x 3/8" Button Head
7	1	J-380	Spring - Left Side, Spindle End
8	1	J-379	Spring - Right Side, Spindle End
9	1	J-394	Bushing
10	1	J-393	Bullet Nose Dowel
11	2	J-381	Drive Lock Pin 1/4" x 1"
12	4	J-371	Drive Lock Pin 1/8" x 1"
13	3	J-341	1/4 Turn Cam Receptacle
14	2	J-382	Drive Lock Pin 5/16" x 3/4"
15	2	J-392	Extended 1/4 Turn Cam
16	1	J-383	Angle Mount
17	1	J-374	Nut - 1/4 Turn Receptacle
18	1	J-362	1/4 Turn Cam
19	3	J-363	Lock-Ring
20	1	J-5302-QC	Quick-Change Switch Plate
21	2	J-376	#10 Split Lock Washer
22	2	J-384	Screw 6-32 x 3/8" Flat Head
23	1	J-5309-SQ	Block, Sw. Act, Quick Chg
24	1	J-5301-SQ	Switch Cover, Quick Chg

Above items are factory order items and must be ordered with the **Jiffy-Tap** unit, except for extra lead screw spindles with the quick change option. Standard lead screws will not work on units modified for quick change spindles. This option can not be used in combination with the auto-reverse option shown on page 37.

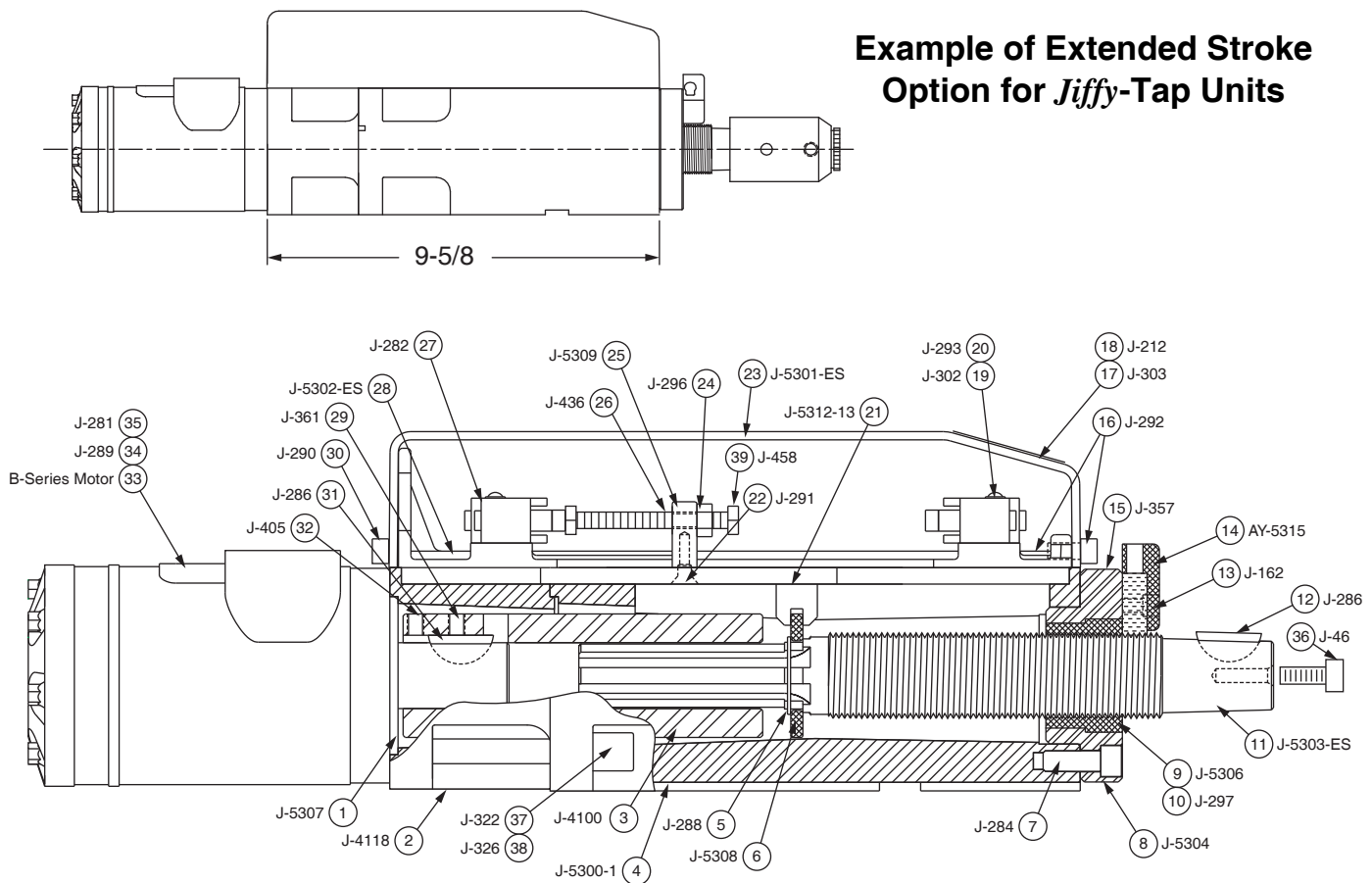
The quick change option does not add any length to unit but will increase the width from 3-5/16" to 5-1/8".

## Option 2Q: Spindle and Motor Quick Change

This option is used to specify both options MQ and SQ on the same unit. See individual options for clarification. This option is only used to shorten the part number. A unit that is ordered with the -MQ-SQ option is interchangeable with the -2Q option.

## Option ES: Extended Stroke Unit

Everything is the same as the basic tapping unit, except stroke is increased by 1-1/4" to a full 3-3/8" stroke. (See page 42 for stroke limitations.) The overall length of unit increases by 1-5/8".



**Example of Extended Stroke  
Option for Jiffy-Tap Units**

## Extended Stroke Jiffy-Tap Parts List

Item	Qty	Part No.	Description	Item	Qty	Part No.	Description
1	1	J-5307	Adapter Ring	20	4	J-293	Round Head Screw 6-32 x 7/8"
2	1	J-4118	Adapter, Hydraulic Motor	21	1	J-5312/13	Slide Bar Assembly
3	1	J-4100	Spindle Sleeve	22	2	J-291	NY-LOK Flat Head 10-24 x 1/2"
4	1	J-5300-1	Jiffy-Tap Body, Ext. Stroke	23	1	J-5301-ES	Switch Cover, Ext. Stroke
5‡	1	J-288	Retaining Ring	24	2	J-296	Hex Nut 1/4"-20
6‡	1	J-5308	Switch Fork Disc	25	1	J-5309	Switch Actuator Block
7	3	J-284	Soc. Hd. Cap Scr. 5/16"-18 x 7/8"	26	1	J-436	Hex Hd. Bolt 1/4"-20 x 2-1/2"
8*‡	1	J-5304	Lead Screw Nut Housing	27	2	J-282	Limit Switch
9*‡	1	J-5306	Lead Screw Nut	28	1	J-5302-ES	Limit Switch Plate, Ext. Stroke
10‡	2	J-297	Cup Pt. Set Scr. 1/4"-20 x 3/8"	29	1	J-361	NY-LOK Set Scr. 1/4"-28 x 5/16"
11*‡	1	J-5303-ES	Spindle, #4 Jacobs Taper, ES	30	2	J-290	Soc. Hd. Cap Scr. 1/4"-20 x 3/8"
12‡	1	J-286	Woodruff Key 808 (modified)	31	1	J-286	Woodruff Key 808
13‡	2	J-162	Soc. Hd. Cap Scr. 10-24 x 5/8"	32	1	J-405	NY-LOK Set Screw 1/4"-28 x 7/16"
14‡	1	AY-5315	Wiper Housing Assembly (oiler, wiper, set screw and spring)	33	1	B-XX	B-Series Motor
15‡	1	J-357	Grease Fitting	34	1	J-289	Nameplate, Motor
16	5	J-292	Soc. Head Screw 1/4"-20 x 1/2"	35	2	J-281	Drive Screw, No. 4 x 1/4"
17	1	J-303	Nameplate, Jiffy-Tap	36‡	1	J-46	Soc. Hd. Cap Scr. 1/4"-20 x 3/4"
18	4	J-212	Drive Screw, No.2 x 3/16"	37	4	J-322	Studs, 3/8"-16 x 4"
19	4	J-302	Lock washer, No. 6	38	4	J-326	Socket Head Nut, 3/8"-16
				39	1	J-458	Hex Hd. Bolt, all thread, 1/4"-20 x 2"

\* Lead screw nut, nut housing and spindle sold as match set only. Refer to page 30 when ordering a lead screw assembly.

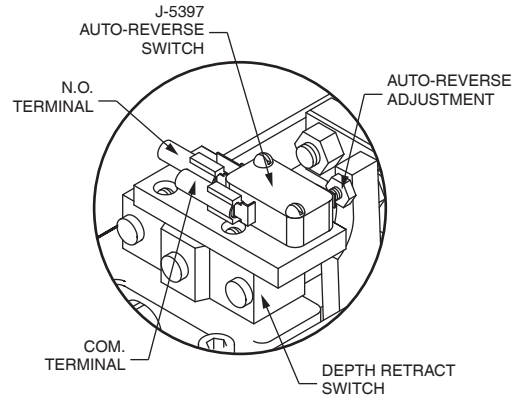
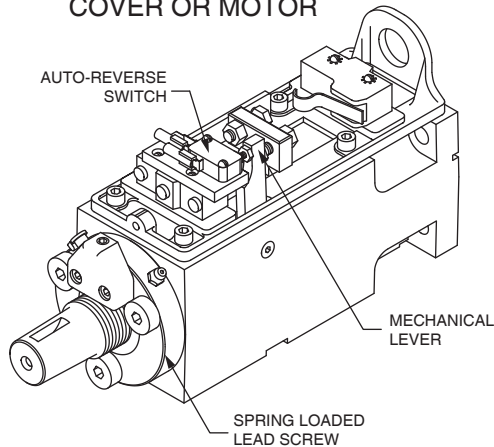
‡ These items are included when ordering an LS-XX-ES lead screw; where XX is the lead screw pitch, see page 30.

# Jiffy-Tap Options (continued)

## Option RO: Jiffy-Tap Auto-Reverse Option

NO LONGER IS THE FEAR OF BREAKING SMALL TAPS A LIMIT FOR HIGH PRODUCTION.

AUTO-REVERSE *Jiffy-TAP* WITHOUT COVER OR MOTOR



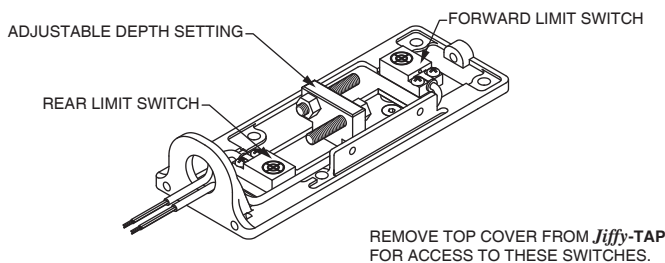
CLOSE-UP OF AUTO-REVERSE

The Auto-Reverse (option -RO on *Jiffy-Taps*) prevents tap breakage by instantly retracting the lead screw if the tap misses the hole or if there is no hole in the part. The Auto-Reverse option uses a mechanical linkage that senses motion in the lead screw nut. Standard lead screw translation is 0.030". The electrical sensing switch is triggered causing the tap to instantaneously reverse and retract the tap. The sensitivity of the lead screw nut can be adjusted by the strength of the internal compression springs. The standard sensitivity is hard for large taps over 1/2" and soft for taps 1/2" and under. When ordering this option, specify either hard or soft sensitivity. The internal springs that determine sensitivity can easily be changed in the field.

The Auto-Reverse switch can be wired in parallel with the depth retract switch, or as a separate circuit. The Auto-Reverse switch provides a common (Com.) terminal and both normally open (N.O.) and normally closed (N.C.) terminals. The separate Auto-Reverse switch provides you with great flexibility in designing and implementing your control circuit. For example: to stop a machine, turn on a light or open a reject chute. The Auto-Reverse switch is rated up to 4 amps at 125 volts A-C or 1/2 amp at 125 volts D-C. Use relays, if necessary, to control a higher current or voltage. The Auto-Reverse switch can be replaced with part number J-5397.

Above items are factory order items and must be ordered with the *Jiffy-Tap* unit, except for extra lead screw spindles with the Auto-Reverse option. The Auto-Reverse option does not affect the overall envelope space required for a *Jiffy-Tap*. This option can not be used in combination with the spindle quick change option shown on page 35 or the proximity switch option shown below. Auto-Reverse option is not recommended for high speed, short stroke applications. Consult factory for options.

## Option PX: Proximity Switch - Coolant Resistant Sensors



The environment around machining centers is the pits -- flooding coolant, material chips, grease, dirt and heat. But the proximity switch takes it all in stride. Completely waterproof, the switch functions just fine being splashed by either water based coolant or black oil. The envelope of the *Jiffy-Tap* is unaffected by the use of the proximity switch option.

Proximity sensors are made to interface with solid state controllers such as programmable controllers (PLC's). Each switch is normally open (N.O.), and NPN. NPN type sensors are designed to be a current sink device.

Current from the controller is supplied to the sensor and it will "sink" the current to ground when the sensor is activated. Sensor activation is triggered by the depth setting adjustment bolts.

The proximity switch housing is manufactured from high quality ABS plastic resin. The switch can handle supply voltages between 10-30 VDC, with 100 mA maximum load. The length of cord is approximately 42 inches. The ambient temperature should be between -13 to 158°F (-25 to 70°C). The environmental rating is IP 67 and is equipped with short circuit and reverse polarity protection.

**Replacement Proximity Switch:** J-453, proximity sensor switch

**For reliable depth and retraction detection in the most severe conditions, use the option -PX.**



# Jiffy-Tap Options (continued)

## Option EP and PT: Pre-wired Cord and Connector

Wiring harness, cable and plug assembly can be used on a **Jiffy-Tap** to connect limit switches to external circuitry through a plug and socket disconnect.

When ordered at the same time as the **Jiffy-Tap**, it will be installed and wired to terminals on the electric switches. If ordered later, connections to the **Jiffy-Tap** limit switches must be made by the user.

**Option EP** includes an 8-pin male plug with screw coupling, to mount on the **Jiffy-Tap**, with wiring harness connected to limit switch terminals. Also included is an 8-wire socket to plug into the **Jiffy-Tap**. Standard length of this cable is 12-ft. unless otherwise specified. Wires in the 12-ft.

connecting cable are the same colors as those inside the **Jiffy-Tap** which connect to the switch terminals.

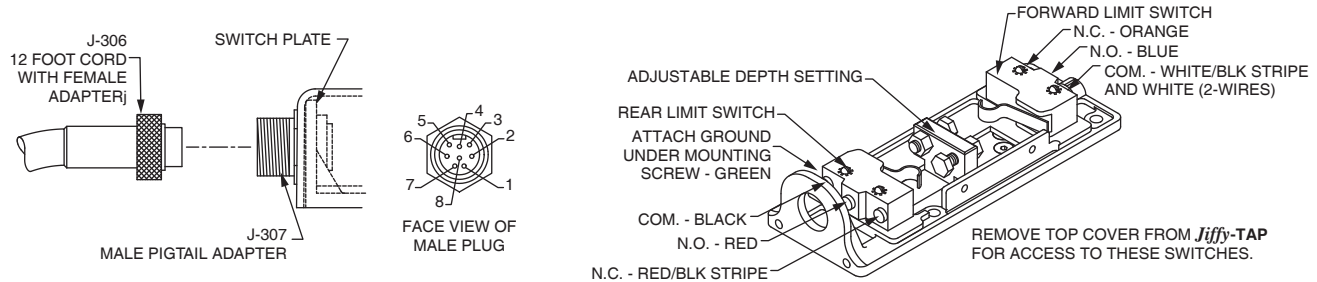
**Option PT** includes only an 8-pin male plug with screw coupling to mount on the **Jiffy-Tap**. No wiring harness is supplied.

On both options, equipment ground is carried through the green wire to Pin 4.

### Replacement Parts:

**J-306:** 12 foot cord with 8 pin female pigtail adapter.

**J-307:** 8 pin male pigtail adapter.



### WIRING COLOR CODE

Switch Circuit	Wire Color	Plug Term.	Switch Circuit	Wire Color	Plug Term.
Common - Rear Limit Switch	Black	1	Norm. Closed - Front Limit Sw.	Orange	5
Incoming Voltage - Front Limit Sw.	White	2	Norm. Open - Front Limit Sw.	Blue	6
Norm. Open - Rear Limit Sw.	Red	3	Voltage Return- Front Limit Sw.	White/Blk	7
Earth Ground to Frame	Green	4	Norm. Closed - Rear Limit Sw.	Red/Blk	8

When the **Jiffy-Tap** is wired as shown, the control circuits are dead and the **Jiffy-Tap** hydraulic motor cannot run, unless the 12-ft. cable is plugged into the **Jiffy-Tap**. The hot side of the incoming voltage supply runs into the **Jiffy-Tap** on the white wire in the cable to Pin 2. Pins 2 and 7 are connected together on the COM terminal of the front limit switch, so if the cable is plugged into the **Jiffy-Tap**, the hot line returns through Pin 7. When the 12-ft. cable is plugged into the **Jiffy-Tap**, all control circuits become active. This interlocking arrangement prevents the **Jiffy-Tap** from over-running the limit switches while they are disconnected from the control box.

# *Standard Setup for All Types of Tapping*

## *Mounting the Jiffy-Tap*

**Jiffy-Tap** units may be mounted in any position. However, if they are to be mounted with the switch cover down, two 1/8" diameter holes should be drilled in the cover, one at each end, to allow drainage of any hydraulic oil which might leak past the shaft seal in the hydraulic motor. If any drainage is noticed, a new shaft seal kit for the motor should be ordered. Like all seals on hydraulic equipment, the motor shaft seal may have to be replaced after extended service. Instructions for replacing the motor shaft seal are included with the seal kit.

To hold the **Jiffy-Tap** securely, four mounting holes are provided. Mounting bolts, 1/2"-13, should be used, and should be long enough to engage the **Jiffy-Tap** body to a

depth of 5/8". An alignment groove, 5/8" wide and 3/32" deep is provided in the base of the **Jiffy-Tap** body. With this groove, the **Jiffy-Tap** can be accurately re-aligned with the work after having been removed for use elsewhere.

If tapping a brittle material that may produce fine granular chip dust, avoid tapping vertically upward, or use an extension on the tap with a rotary seal to prevent chip dust from getting into the **Jiffy-Tap** spindle bearing. Avoid washing fine cuttings into the lead screw with the coolant by directing the coolant flow away from the lead screw. Also use a strainer on the coolant to prevent fine granular chips from packing into the lead screw nut, causing it to lock.

## *General Information*

The **Jiffy-Tap** is designed specifically to tap both small holes and large holes in a variety of materials. The size of hole and the material determines the power and RPM required to perform the task. In most cases a single motor is not capable of doing a wide range of holes or materials. In these cases, the motor can be changed to achieve the best power and RPM needed. Although in some cases, you can sacrifice tapping cycle times to reduce the number of different motor sizes needed.

## *Tap Stroke and Spindle Adjustment*

The spindle spline will disengage from the hydraulic motor at about a 2-1/2" extension. To prevent damage to the spline, it must always be sufficiently engaged. (See page 42 for possible stroke limitations when tapping large holes or hard material. If longer strokes are needed, see page 36 for extended stroke option.)

The spindle should not be allowed to bottom out on the retraction stroke because the thrust may force the lead screw nut out of its housing. (If this should happen, it can be pressed back in.) The switch actuator block and rear actuator screw have been designed, and have been factory set, to stop the spindle about 1/16" from the bottom out position. Normally, the position of the rear limit switch need not be adjusted. In practice, however, either switch can be set to stop the spindle at any position, forward or reverse, although in extreme cases, the standard 1/4"-20 x 3/4" actuating bolt may have to be replaced with a longer one. Be sure that the longer bolt will not damage the opposite switch.

When changing the depth of stroke or the retract position, carefully cycle through the tapping process manually. This is accomplished by using a JOG button in the circuit. (Refer to the standard **Jiffy-Tap** circuit on page 41.) You can determine potential problems prior to any damage to the unit or control switches by slowly advancing the lead screw to verify proper setup.

## *Hydraulic Setup*

A hydraulic power unit to operate a **Jiffy-Tap** is not part of the **Jiffy-Tap** but may be ordered as auxiliary equipment, or perhaps a standard hydraulic power unit already on hand can be used. Hydraulic hoses should be ordered locally after the distance between the power unit and the tapping unit is established. Several **Jiffy-Tap** units which are powered with hydraulic motors can be run from one hydraulic power supply.

## *Hydraulic to Rotate and Advance Spindle*

Flow for spindle motor will be determined by desired RPM on each **Jiffy-Tap**. Several power arrangements may be used: two (or more) pumps driven from the same or from opposite ends of a double shaft electric motor; a two-section (or more) hydraulic pump; two (or more) separate hydraulic power units. A pressure compensated pump may be used for the main motor drive. Spindle rotation is determined by which port is connected to the hydraulic pump. During setup, verify tool rotation.

With lead screw spindles, the spindle is advanced or retracted depending upon the rotation of the spindle.

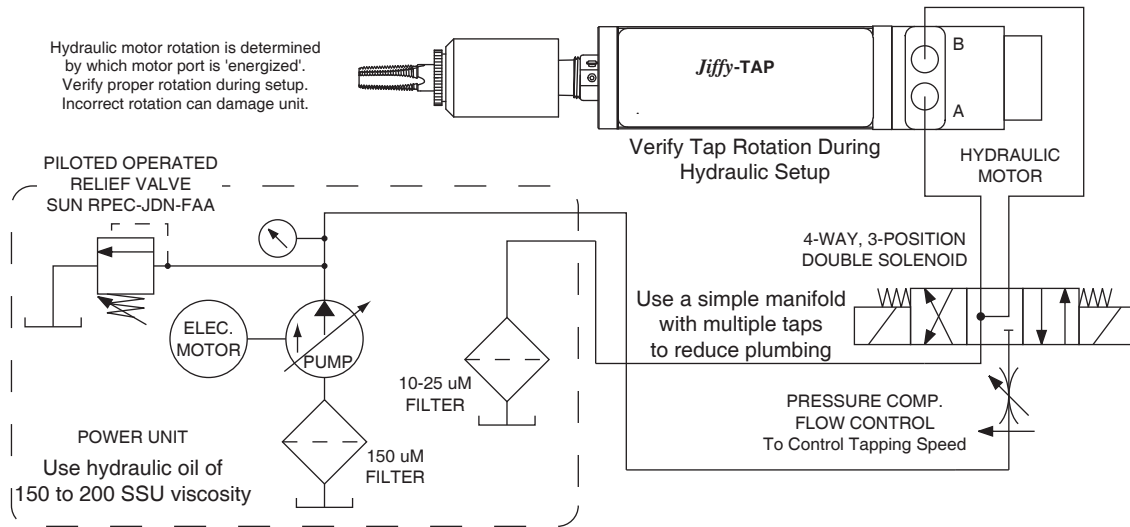
Choose a hydraulic motor from pages 51 through 55 that will deliver the required torque and RPM. If you will be using an existing power unit, you will be limited by the pressure and flow available from your existing power unit. On new applications try to keep operating pressures around 600 - 800 PSI and GPM at 25% to 75% of maximum GPM the motor can operate at.

On jobs where several **Jiffy-Tap** units are to be used, one large power unit can serve all the units by having one or more large pumps and with pressure compensated flow control valves installed in each **Jiffy-Tap** motor circuit.



# Jiffy-Tap Setup (continued)

## Recommended Jiffy-Tap Hydraulic Circuit



## Electric Control of the Jiffy-Tap

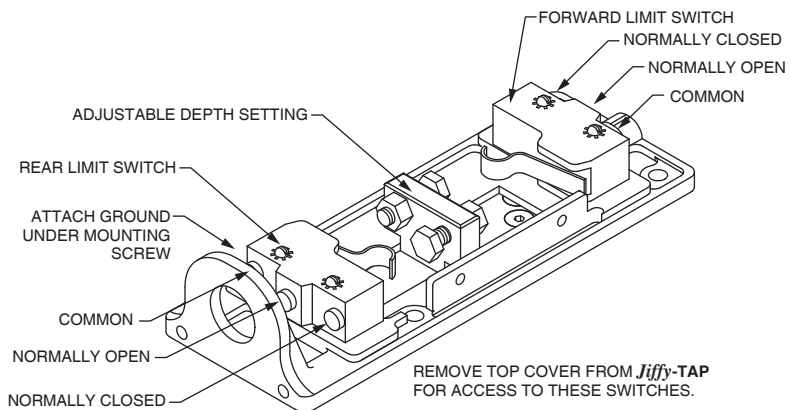
Two built-in electric limit switches mounted inside the top cover of the **Jiffy-Tap** are of high quality with a life expectancy of 20,000,000 cycles. Each switch has a common, a normally open (N.O.), and a normally closed (N.C.) set of contacts, permitting them to be used in almost any electrical control circuit devised for the **Jiffy-Tap**. On Standard basic **Jiffy-Tap** units these switches are not wired, and the external wiring is brought through the conduit hole in the rear of the switch cover. Electrical Option EP is a 12-foot cable wired to all terminals on the switches and to frame ground, and brought in through an 8-pin plug and socket in the switch cover. This permits the **Jiffy-Tap** to be unplugged quickly from its wiring. (Limit switches are rated up to 4 amps at 125 volts A-C or 1/2 amp at 125 volts D-C. Use relays, if necessary, to control higher current or voltage.)

The position of both limit switches may be adjusted to control tapping depth and retracted position of the spindle. If a switch should fail, or if the control valve spool should fail to center when both solenoids are de-energized, the **Jiffy-Tap** spindle might over travel. However, precautions have been taken in the **Jiffy-Tap** design to minimize damage (if any) if such a failure should ever occur.

If the spindle should over travel on its forward stroke, chances are that the tap would simply stall in the work piece, especially on tapered pipe threads, provided the relief or compensator valve on the hydraulic power supply has been properly set. If the relief or compensator valve has been set too high, the tap (especially a small tap) may break, or the advancing spindle may cause the two 6-32 mounting screws on the forward limit switch to break off. After the cause of the malfunction has been corrected, these mounting screws can be replaced. If the spindle should continue to advance, the internal spline will disengage before serious damage is done to the lead screw nut. This disengagement occurs at about 2-1/2" extension of the spindle.

If the spindle should over travel on its return stroke, the lead screw nut may be pushed out of its press fit in the housing. After the malfunction has been corrected, the nut can be pressed back into its housing and secured with two screws in a new place.

If the spindle should lock up in its retracted position and will not start forward, the rear limit switch adjustment may be incorrect, letting the spindle bottom against the hydraulic motor shaft. To release the jam, use a strap wrench to screw the spindle out one turn. Never use a wrench on the threaded portion of the lead screw. Set the limit switch actuating screw 1/16" toward the rear switch, then lock it. If spindle cannot be turned with a strap wrench, loosen the three screws holding the nut.

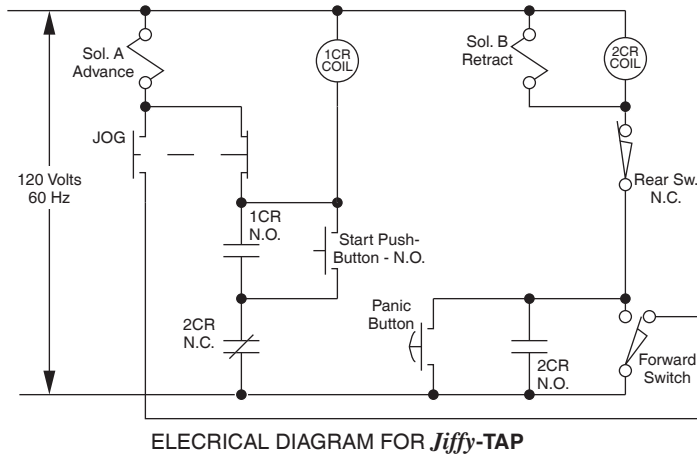


# Sample Jiffy-Tap Operations

## General Information

The following samples only consider the electrical controls needed to control the spindle rotation. These circuits serve only as a guideline in assisting you in setting up the **Jiffy-Tap**. We currently use several of these circuits in our manufacturing facility, but caution is urged to limit possible damage during the initial setup and testing of your control circuit.

## Standard Tapping with Jiffy-Tap



The two limit switches are those in the **Jiffy-Tap**. Solenoids A and B are those on a 4-way hydraulic valve. Other components include two relays, a start push-button, a jog button and a panic button. The rear limit switch is held in its open position when the spindle is retracted.

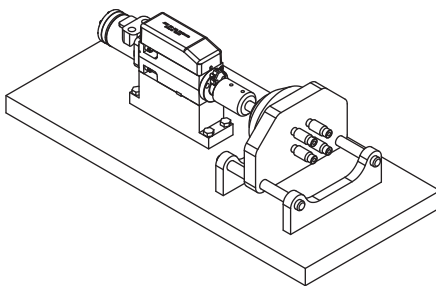
To start a tapping cycle, the operator momentarily presses the start push-button. Solenoid A and Relay 1CR become energized and the spindle starts forward. The relay locks in electrically through its own contacts and the N.C. contacts of Relay 2CR. This keeps Solenoid A energized throughout the forward stroke. When the forward (depth) limit switch is actuated, Solenoid B and Relay 2CR become energized. The relay locks in electrically through its own contacts. It also breaks the locking circuit to Relay 1CR and releases Solenoid A. The spindle retracts until the rear limit switch is actuated. This breaks the circuit to Solenoid B and Relay 2CR. The 4-way valve spool goes to neutral position and unloads the pump.

The jog button allows the user to slowly advance the spindle to verify that it will retract when the depth switch is set. This function is recommended during any change in setup or wiring of the **Jiffy-Tap**. If the forward limit switch is not properly wired, the spindle will not retract when at depth and possibly break the forward limit switch.

## External Threading with Jiffy-Tap

Any style of rotating thread cutting head, or standard die can be attached to a standard **Jiffy-Tap** and used to cut external threads. Rotating thread cutting heads with a 1" shank can be attached using a #1 Chuck. Dies must use a customer supplied tool holder that attaches to the unit using either a standard chuck, or directly to the #4 Jacobs male taper.

## Multi-Spindle Tapping



A multi-spindle head can easily be attached to and controlled by a standard **Jiffy-Tap** unit. With a riser block, you can raise the center line of the **Jiffy-Tap** to match the center line of the multi-spindle head. The head can then be moved along hardened chrome rods using oil impregnated bronze bushings inserted in the head.

When sizing a **Jiffy-Tap** for multi-spindle head use, remember the RPM of the unit will usually be the same as an individual spindle but the horsepower will need to be multiplied by the number of spindles. Also remember that the connection should match the #4 Jacobs male taper on the lead screw spindle or match the inside diameter of #1 Chuck, #2 Chuck or #3 Chuck. (See page 30.)

## Setting Jiffy-Tap for Rapid Retract

The **Jiffy-Tap** can be retracted at a higher speed than advancing by carefully controlling the spindle motor. When using a carefully selected motor, and two pressure compensated flow controls instead of one, you can set the retract GPM higher than the advance GPM. The hydraulic motor must be able to operate under the higher GPM. Other drive systems can be used and setup to allow for different spindle RPM's.

## Thread Chasing - Picking Up Existing Lead

The **Jiffy-Tap** is a lead screw tapping unit. Any tool directly connected to the spindle will follow the pitch of the lead screw. In order to pick up an existing thread, you must use a tension/compression tool holder. Contact your local tool supplier.

# Sizing Jiffy-Tap Units

## Calculating Proper Tap Drill Diameter

Tapping troubles are sometimes caused by tap drills that are too small in diameter. The tap drill should not be smaller than is necessary to give the required strength to the thread as even a very small decrease in the diameter of the drill will increase the torque required and the possibility of broken taps. Tests have shown that any increase in the percentage of full thread over 60 percent does not significantly increase the strength of the thread. Often a 55 to 60 percent thread is satisfactory, although 75 percent threads are commonly used to provide an extra measure of safety.

It must be remembered that a twist drill is a roughing tool that may be expected to drill slightly oversize and that some variations in the size of the tapping holes are almost inevitable. When a closer control of the hole size is required it must be reamed. Reaming is recommended for the larger thread diameters and for some fine pitch threads.

To calculate tap drill diameter:

For American Unified Thread form:  $HoleSize = BasicMajorDiameter - \frac{0.01299 \times PercentThread}{NumberofThreadsperInch}$

For ISO Metric Thread form (mm):  $HoleSize = BasicMajorDiameter - (0.01299 \times Pitch \times PercentThread)$

**Example:** What drill size to use for 1/4"-20 with 75% thread;  $0.25 - (0.01299 \times 75 / 20) = 0.201$

Calculated values for common American Unified Thread forms are listed in the table on page 63.

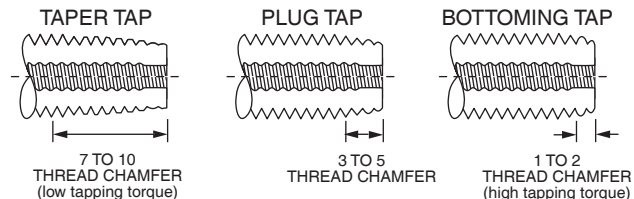
## Calculating Proper Hole Depth

The depth of the thread in the tapped hole is dependent on the length of thread engagement and on the material. In general, when the engagement length is more than one and one-half times the nominal diameter, a 50 or 55 percent thread is satisfactory. Soft ductile materials may permit use of a slightly larger tapping hole than brittle materials such as cast iron.

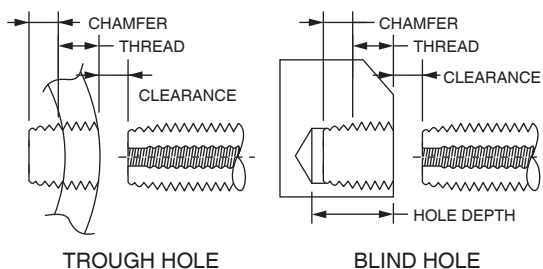
As a rule of thumb, acceptable allowances on the threaded portion of the blind or through hole should be around:

- for Steel castings; depth approximately 1.25 times fastener diameter.
- for Cast Iron or Bronze; depth approximately 1.5 to 1.75 times fastener diameter.
- for Aluminum; depth approximately 1.75 to 2 times fastener diameter.

The type of tap used also affects the depth of the tapped hole. When tapping you must tap the depth of the hole plus the thread chamfer. Therefore the depth of the hole should be at least the sum of the length of needed thread engagement, plus the chamfer allowance shown, plus 2 thread pitches for chip clearance.



## Determining Required Stroke



**Through Hole Applications:** Add the clearance from the tool tip to the part at fully retracted position, to the thickness of the part, plus the chamfer of the tap. Add a little extra for making sure the thread is completely formed.

**Blind Hole Applications:** Add the clearance from the tool tip to the part at fully retracted position, plus the chamfer of the tap, plus chip clearance.

Nothing beats experimentation to get the correct stroke required, the tap style used and exact thread length required.

## Possible Stroke Limitations

The **Jiffy-Tap** operates by an S.A.E. 6-spline sliding torque transfer joint. This allows the transfer of horsepower from the stationary driving unit to the linearly advancing spindle. At rest, the drive shaft is retracted into this splined fitting and has maximum spline engagement. As the spindle is advanced forward, this engagement is reduced. As the amount of spline engagement reduces, the amount of torque that can be transferred to the spline is reduced. Excessive spline wear should not occur with the following recommended stroke limitation. For torques greater than 350 in.-lbs. use the following limitation on stroke:  $Stroke (in.) = 2.125 - Torque (in.-lbs.) / 850$ .

For extended stroke units (option code -ES, see page 36): Add 1.25 in. to available stroke.

**Example:** Tapping 3/4"-10 hole in mild steel takes approximately 850 in.-lbs. Limit stroke of unit to 1.125" to prevent excessive spline wear.

# Sizing Jiffy-Tap Units (continued)

## Estimating Tapping Torque and RPM

The **Jiffy-Tap** is designed specifically to tap both small holes and large holes in a variety of materials. The size of hole, pitch of the thread and the material determines the power and RPM required to perform the task. In order to size the proper drive requirements, you must know the RPM and torque required for the cutting tool to machine the material you are using. This information can usually be obtained from the manufacturer of the cutting tool you are using.

For standard projection taps see page 44 to estimate required torque, RPM and thrust.

**CAUTION:** Tapping torques and speeds depend on many factors, the machine, the material being tapped, thread pitch, the design of the hole, the lubricant, and the style of tap used. No exact rules can be given that take into account all of these variables. However, the following can be used as a guide in determining a starting point and course to follow for obtaining maximum unit performance.

## Sizing By Using The Tables On Page 44

**RPM:** To estimate RPM, use the table labeled “*Torque and RPM Required to Tap Cast Iron Using Plug Tap or Standard Pipe Taps*”. Find the tap size, and record the RPM @ 1 SFM. Multiply this value by the SFM based on pitch from the table below to get the preferred RPM.

**Torque:** To estimate torque, use the table labeled “*Torque and RPM Required to Tap Cast Iron Using Plug Tap or Standard Pipe Taps*”. Find the tap size, and record the torque. This is the torque to tap cast iron. For other materials use the table labeled “*Material Multipliers*” to obtain the material multiplier. Multiply this value with the torque for cast iron to get the estimated torque required to tap the hole.

## Sizing By Using The Equations Below

**RPM:** To estimate RPM use the following equation:  $RPM = 3.82 \times \frac{SFM}{Diameter}$  where SFM is from the table “*Tapping SFM*” shown below.

**Example:** Tapping a 3/4"-10 hole in aluminum.  $RPM = 3.82 \times 100/0.75 = 509$  RPM.

**Torque:** To estimate torque, use the following equation:  $Torque = K \times C_T \times C_M$  where all constants are from the tables below, and *Torque* is in.-lbs.

**Example:** Tapping a 3/4"-10 hole in aluminum with a standard tap and 75% thread.  $C_m = 0.000618$ ; Torque = 324 in.-lbs.

**Tapping SFM And Equation Constant**

Material	SFM based on Pitch				Constant K
	3-7	8-15	16-24	25 Up	
Steel, 200 Bhn	30	40	50	50	350,000
Steel, 300 Bhn	20	40	50	50	450,000
Steel, 400 Bhn	5	10	15	25	500,000
Aluminum Alloys, Most	50	100	150	200	100,000
Magnesium Alloys, Most	40	80	100	150	60,000
Brass, Most	50	100	150	200	200,000
Brass, Leaded	50	100	150	200	100,000
Cast Iron	30	60	90	140	175,000
Steel, Mild, Resulfurized	40	55	70	90	260,000
Stainless Steel (316)	8	10	15	20	500,000

For 55% Thread Height:

$$C_M = \frac{0.125 \left( \frac{Dia}{2} - \frac{0.202}{N} \right) \left( \frac{N}{20} \right)^{0.2}}{N^2}$$

For 65% Thread Height:

$$C_M = \frac{0.162 \left( \frac{Dia}{2} - \frac{0.245}{N} \right) \left( \frac{N}{20} \right)^{0.2}}{N^2}$$

For 75% Thread Height:

$$C_M = \frac{0.205 \left( \frac{Dia}{2} - \frac{0.289}{N} \right) \left( \frac{N}{20} \right)^{0.2}}{N^2}$$

For 85% Thread Height:

$$C_M = \frac{0.252 \left( \frac{Dia}{2} - \frac{0.332}{N} \right) \left( \frac{N}{20} \right)^{0.2}}{N^2}$$

where  $N$  = Number of Threads per Inch

**Equation Constant  $C_T$**

Tap Style	Constant $C_T$	
	Sharp	Dull
Chip Driver (Spiral Point)	2.10	3.15
R.H. Helical Flutes	2.73	4.20
Straight Flutes	3.57	5.24
Standard Pipe Tap	-	5.24

**For Pipe Threads**

For pipe threads you must account for the taper and can not use the size designation in the formulas. You use the actual pipe diameters (see page 62) in the formulas above, and use the following multiplier:

$$C_P = \frac{3.838^{Dia}}{4.2376} \quad \text{Therefore: } Torque = K \times C_T \times C_M \times C_P$$

Example: 1/4 NPT, actual pipe diameter is 0.540

$C_P = 0.488$ ,  $C_m @ 75\% = 0.000157$

In Aluminum torque = 40 in.-lbs.

# Sizing Jiffy-Tap Units (continued)

## Tapping Torque and RPM Estimation Tables

**Torque and RPM Required to Tap Cast Iron Using Plug Tap or Standard Pipe Taps (75% thread)**

Tap Size	Torque (in.-lbs.)	RPM @ 1 SFM	Tap Size	Torque (in.-lbs.)	RPM @ 1 SFM	Pipe Taps	Torque (in.-lbs.)	RPM @ 1 SFM	Pipe Dia.
1/4-20	52	15.28	1-8	1136	3.82	1/8-27	22	9.48	0.405
1/4-28	29	15.28	1-12	562	3.82	1/4-18	72	7.08	0.540
5/16-18	80	12.22	1 1/8-7	1623	3.40	3/8-18	108	5.65	0.675
5/16-24	49	12.22	1 1/8-12	635	3.40	1/2-14	242	4.55	0.840
3/8-16	119	10.20	1 1/4-7	1817	3.06	3/4-14	466	3.64	1.050
3/8-24	59	10.20	1 1/4-12	709	3.06	1-11 1/2	1184	2.91	1.315
7/16-14	177	8.75	1 3/8-6	2627	2.78	1 1/4 - 11 1/2	2040	2.31	1.660
7/16-20	96	8.75	1 3/8-12	783	2.78	1 1/2 - 11 1/2	3414	2.01	1.900
1/2-13	233	7.64	1 1/2-6	2884	2.56				
1/2-20	111	7.64	1 1/2-12	857	2.56				
9/16-12	303	6.80	1 3/4-5	4662	2.18				
9/16-18	151	6.80	2-4.5	6453	1.91				
5/8-11	395	6.11	2 1/4-4.5	7315	1.70				
5/8-18	169	6.11	2 1/2-4	10040	1.53				
3/4-10	567	5.08	2 3/4-4	11105	1.39				
3/4-16	251	5.08	3-4	12171	1.27				
7/8-9	803	4.35							
7/8-14	373	4.35							

### Material Multipliers

Material	M
Steel, 200 Bhn	2.00
Steel, 300 Bhn	2.57
Steel, 400 Bhn	2.86
Aluminum Alloys, Most	0.57
Magnesium Alloys, Most	0.34
Brass, Most	1.14
Brass, Leaded	0.57
Cast Iron	1.00
Steel, Mild, Resulfurized	1.48
Stainless Steel (316)	2.86

### Example:

Find the torque required to tap 3/8"-16 in aluminum:  
 For cast iron = 119 in.-lbs. and 1020 RPM @ 100 SFM  
 Material multiplier is 0.57  
 Torque = 0.57 x 119 in.-lbs = 67.8 = 68 in.-lbs.  
 From SFM table page 43, SFM at 16 pitch = 150  
 RPM = 10.20 x 150 = 1530 RPM

## Estimating Cycle Time

Once you have determined the necessary stroke of the unit and spindle RPM; use the following formula to calculate cycle times:  $Time = \frac{2 \times Pitch \times Stroke \times 60}{RPM}$ , where *stroke* is inches. The time it takes to retract the tap is considered when calculating cycle times since it occurs normally at the same rate as the forward cycle.

**Example:** Tapping 3/8"-16, 0.5 inches deep (actual thread engagement is less) in Aluminum with a tool clearance of 1/4". RPM is approximately 1530, stroke is 0.75. The cycle time for this operation is approximately 0.94 seconds.

# Sizing Jiffy-Tap Units (continued)

## Choosing a Hydraulic Motor

Once you have determined the required torque and RPM, use the table below to choose the optimum hydraulic motor. For the actual GPM and pressure required to operate the chosen hydraulic motor, refer to the motor data on pages 51 through 55. Only 14 of the available 20 hydraulic motors are listed in the table below, since the performance of several motors may overlap. The table below is just a quick reference, and all values should be compared to the actual motor data sheets.

When using the **Jiffy-Tap** to tap various hole sizes or materials, a single hydraulic motor may not be able to generate the range of torques and the range of RPMs needed. In these cases, the motor can be changed to achieve the best power and RPM needed. Although, in some cases, you can sacrifice cycle times to reduce the number of different motor sizes needed.

**How to Use the Table:** For a given torque scan down the list to find a motor where the torque is within the recommended torque range. Verify that the desired RPM is also within the recommended RPM range. If there is no motor that meets both criteria, you may use a motor that has a higher torque range to maintain the desired RPM. You may have to sacrifice RPM to obtain the desired torque. The values in the table are based on the average performance of the hydraulic motor at moderate GPM and pressures. You can go directly to the motor data and choose a motor where the GPM is either higher or lower or the pressure is either higher or lower. For extreme RPM above 1500, refer to Motor A-1 on page 52.

	RECOMMENDED		LIMITS	
	TORQUE	RPM	TORQUE	RPM
A-1 (page 52)	20 - 100	1500 +	8 - 128	86 - 2239
M-0 (page 51)	20 - 67	1055 - 1500	6 - 102	250 - 1902
M-1 (page 51)	67 - 135	715 - 1055	6 - 214	194 - 1575
B-0 (page 54)	135 - 232	620 - 715	36 - 489	162 - 1021
B-1 (page 54)	232 - 349	567 - 620	36 - 641	127 - 969
B-2 (page 54)	349 - 481	442 - 567	36 - 1036	76 - 760
B-3 (page 54)	481 - 613	347 - 442	52 - 1365	55 - 585
B-3.3 (page 54)	613 - 761	281 - 347	67 - 1687	45 - 469
B-3.6 (page 55)	761 - 883	243 - 281	82 - 1942	39 - 385
B-4 (page 55)	883 - 1013	217 - 243	92 - 2046	37 - 353
B-5 (page 55)	1013 - 1238	182 - 217	120 - 2320	29 - 304
B-6 (page 55)	1238 - 1565	145 - 182	167 - 2657	25 - 243
B-7 (page 55)	1565 - 1976	114 - 145	211 - 2977	13 - 192
B-8 (page 55)	1976 - 2450	30 - 114	266 - 3604	16 - 152

**Choosing a Motor From The Data:** If you must use the hydraulic motor data on pages 51 through 55 to choose a motor, use the following guidelines:

- Choose a motor that is capable of generating required torques at a moderate range of pressure, between 400 to 1000 PSI.
- Keep the GPM requirements low, but still above 1-2 GPM on A and M series motors, and above 3-4 GPM on B series.
- If using an existing power unit, you will be limited by the GPM and pressure your unit can deliver.
- If using a new power unit, it is normally cheaper to build a power unit that is higher in pressure than higher in GPM.

## Choosing an Electric Motor

Once you have determined the required torque and RPM, convert these values to horsepower. Then use the table below to choose the optimum electric “braking” motor. With a direct drive unit your RPM is fixed to that of the electric motor. Choose the motor with the greater torque than what you need:

To convert to horsepower:  $HP = \frac{Torque \times RPM}{63025}$ , where *Torque* is in.-lbs.

Torque (in.-lbs.)	HP	RPM	Voltage
94	2.5	1700	230/460 3Ø
89	1.55	1110	230/460 3Ø

Torque (in.-lbs.)	HP	RPM	Voltage
67.2	.88	840	230/460 3Ø

**Note:** Electric motors are not recommended on high cycle tapping applications.

# *Jiffy-Tap Maintenance*

## *Routine Maintenance Items*

**Tap Lubrication and Coolant:** *Jiffy-Tap* units are properly lubricated at assembly, and should be checked periodically, especially if running under unusually severe conditions or located where coolant splash tends to wash lubricant off the spindle threads. Re-lubrication points are the spline end of the spindle, the switch slide bar, the switch fork, the switch fork disc, and lead screw threads. Access to these points is by removal of the switch cover, and the switch mounting plate. Coat the above parts with a high film strength grease. These lubrication points should be checked occasionally as a precautionary measure.

The felt wiper which keeps the spindle threads lubricated should occasionally be oiled with 10 to 20 weight engine or machine oil. Once a year it should be removed, cleaned, and re-oiled and replaced if worn. This spring loaded felt wiper clears chips off the spindle as it retracts, as well as lubricating the spindle threads.

Tapping or threading should be done with a good grade of lubricant/coolant. Your local supplier can recommend the best type for the material being worked.

It is best to have the coolant coming out of the tap flutes, toward the *Jiffy-Tap* if possible. This helps to wash out chips which otherwise would load the tap. This is especially important when cutting taper pipe threads because, as the tap is being retracted, chips fall into the threads and are crushed. On many jobs of pipe thread tapping, the coolant can be pumped through the bottom of the hole, and will flow outward toward the *Jiffy-Tap*. On jobs where this is not possible, the parts should be flooded with coolant to carry away chips and heat and to lubricate the tap.

Once each month put a very small shot of high film strength grease in the grease fitting located on the lead screw nut housing. Care must be taken when greasing the lead screw through the grease fitting. Excess grease will squirt out of the lead screw nut and become a potential chip collector. These chips would eventually work their way between the lead screw spindle and the lead screw nut, causing the lead screw to seize and lock-up. Remove any excess grease from the front of the lead screw nut.

**Hydraulic Drive Motor:** This motor is lubricated by the hydraulic oil and needs no other lubrication. Should the shaft seal ever need replacing, seal kits are available from the factory, complete with instructions.

**Inspecting Lead Screws:** The lead screws should be inspected for impacted chips, excessive wear and unusual wear patterns. The lead screws should be evaluated on a maintenance schedule that is in conformance with the environment that the tap is operating in.

**Limit Switches:** Routinely inspect limit switches for loose contacts, damaged trigger levers, broken or worn mechanisms, and general structural rigidity.

## *Removing the Lead Screw Spindle*

To change to a different thread lead, the *Jiffy-Tap* spindle must be changed. Order additional spindles in any standard thread from 6 to 40 threads per inch, N.F., N.C., or metric.

No more than 5 - 10 minutes should be required to replace the spindle. Please follow these steps in sequence:

1. Be sure to cut off all electrical power to the *Jiffy-Tap* unit before working on it.
2. Loosen 3 screws and take off switch cover.
3. Remove 4 socket head screws, which hold the switch plate, but do not remove the plate.
4. Remove 3 socket head screws, holding the lead screw nut housing to front of *Jiffy-Tap*.
5. Lift the limit switch plate, and the limit switch slide bar, just far enough to disengage the slide bar from the disc on the spindle.
6. Pull out the complete spindle assembly from the front of the *Jiffy-Tap*.

## *Installing a New Lead Screw Spindle*

1. Screw the new lead screw nut and housing assembly on the spindle to about the same position as the old nut and housing on the spindle just removed.
2. Insert the complete spindle assembly into the *Jiffy-Tap* body, lifting the slide bar slightly so the fork on the slide bar can clear the disc on the spindle. Slightly rotate the spindle to engage the spline.
3. Lower the fork on the slide bar to engage the disc on the spindle. To check for engagement, move the spindle in and out. The slide bar should move with it.
4. Position the limit switch plate. Insert and tighten 4 screws.
5. Install and tighten the 3 screws which hold the lead screw nut housing to the *Jiffy-Tap* body. **Caution:** As you tighten these screws, be careful that the rear limit switch actuating bolt does not jam into and damage the rear switch, and that the spindle does not bottom out against the end of the hydraulic motor shaft, in case the lead screw nut was not positioned correctly when it was installed.
6. Turn on electric power to the *Jiffy-Tap* unit.
7. Cycle the unit under power, jogging it to see that the limit switch bar is operating and that spindle reversal takes place at the desired position.
8. Set the position of the forward limit switch actuating bolt for the desired tapping depth and lock with the jam nut. The rear switch actuating bolt has been factory set to leave about 1/16" gap between the lead screw spindle and the end of the hydraulic motor shaft when spindle is retracted. It can be adjusted to leave more gap, if desired, but should not be set to allow the spindle to bump the motor shaft.
9. Replace the switch cover.



# ***Jiffy-Tap Maintenance (continued)***

## ***Interchanging Hydraulic Motors***

In setting up for a different job, the hydraulic motor can be interchanged with a different model which may have a more favorable ratio of torque and speed for the new job.

Remove four socket head bolts. Pull out the motor with spline sleeve still attached. The spline sleeve set screws are swedged in place and removal might be difficult. It is recommended when using interchangeable motors, that you keep the spline sleeve attached and not to swap sleeves between motors. If removal of sleeve is necessary, the swedge must be removed by deburring or a small end mill to remove swedge. Remove set screws, and pull spline sleeve off of motor shaft. Transfer motor ring if used, to the new motor shaft. Place the spline sleeve on new motor shaft, insert and tighten set screws. Plug the new motor assembly into the **Jiffy-Tap** body, engaging the spline sleeve with the spline on the spindle. Reinstall and tighten the four socket head cap bolts.

## ***Recommended Spare Parts***

At least one spare limit switch (J-282) should be kept on hand for replacement in an emergency. When replacing a limit switch, transfer one wire at a time from the old to the new switch, to avoid the possibility of getting the new switch wired incorrectly.

In high production applications an extra lead screw should also be kept on hand.

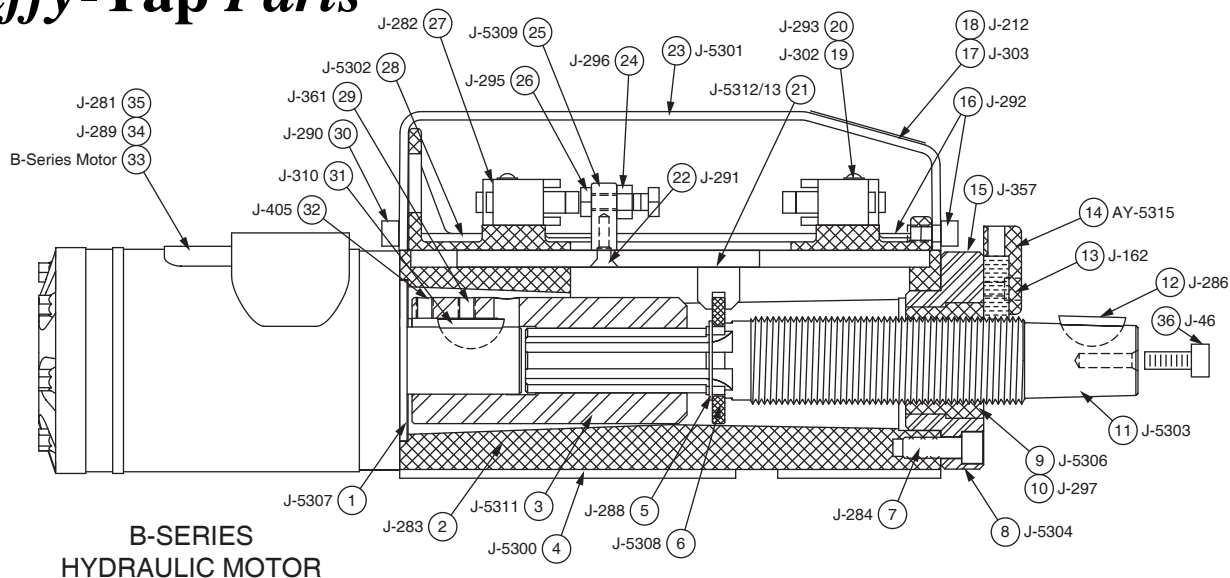
## ***Locating Unit Serial Number***

The unit serial number is located on the right side of the unit when looking at the spindle end. Be aware that the covers between units are interchangeable. Therefore, the part number on the cover may not be the correct part number of the unit. Consult the factory for determining the exact part number of your unit or locating the serial number. Serial number may be required when ordering replacement parts.

## ***Factory Repair***

The factory can repair units or lead screws at a fraction of the replacement cost for units that need extensive repair or lead screw replacement. Each unit received will be evaluated and the best repair/replace scenario will be provided to the customer.

# Jiffy-Tap Parts



## Jiffy-Tap Parts List

Item	Qty	Part No.	Description	Item	Qty	Part No.	Description
1	1	J-5307	Adapter Ring	19	4	J-302	Lock washer, No. 6
2	4	J-283	Soc. Hd. Cap Scr. 3/8"-16 x 1-1/4"	20	4	J-293	Round Head Screw 6-32 x 7/8"
3	1	J-5311	Spindle Sleeve	21	1	J-5312/13	Slide Bar Assembly
4	1	J-5300	<b>Jiffy-Tap</b> Body	22	2	J-291	NY-LOK Flat Head 10-24 x 1/2"
5‡	1	J-288	Retaining Ring	23	1	J-5301	Switch Cover
6‡	1	J-5308	Switch Fork Disc	24	2	J-296	Hex Nut 1/4"-20
7	3	J-284	Soc. Hd. Cap Scr. 5/16"-18 x 7/8"	25	1	J-5309	Switch Actuator Block
8*‡	1	J-5304	Lead Screw Nut Housing	26	2	J-295	Hex Hd. Bolt 1/4"-20 x 1"
9*‡	1	J-5306	Lead Screw Nut	27	2	J-282	Limit Switch
10‡	2	J-297	Cup Pt. Set Scr. 1/4"-20 x 3/8"	28	1	J-5302	Limit Switch Plate
11*‡	1	J-5303	Spindle, #4 Jacobs Taper	29	1	J-361	NY-LOK Set Scr. 1/4"-28 x 5/16"
12‡	1	J-286	Woodruff Key 808 (modified)	30	2	J-290	Soc. Hd. Cap Scr. 1/4"-20 x 3/8"
13‡	2	J-162	Soc. Hd. Cap Scr. 10-24 x 5/8"	31	1	J-310	Woodruff Key 808
14‡	1	AY-5315	Wiper Housing Assembly (oiler, wiper, set screw and spring)	32	1	J-405	NY-LOK Set Screw 1/4"-28 x 7/16"
15‡	1	J-357	Grease Fitting	33	1	B-XX	B-Series Motor
16	5	J-292	Soc. Head Screw 1/4"-20 x 1/2"	34	1	J-289	Nameplate, Motor
17	1	J-303	Nameplate, <b>Jiffy-Tap</b>	35	2	J-281	Drive Screw, No. 4 x 1/4"
18	4	J-212	Drive Screw, No.2 x 3/16"	36‡	1	J-46	Soc. Hd. Cap Scr. 1/4"-20 x 3/4"

\* Lead screw nut, nut housing and spindle sold as match set only. Refer to page 30 when ordering a lead screw assembly.

‡ These items are included when ordering an LS-XX lead screw; where XX is the lead screw pitch, see page 30.

### *Not All Parts Are Shown Above.*

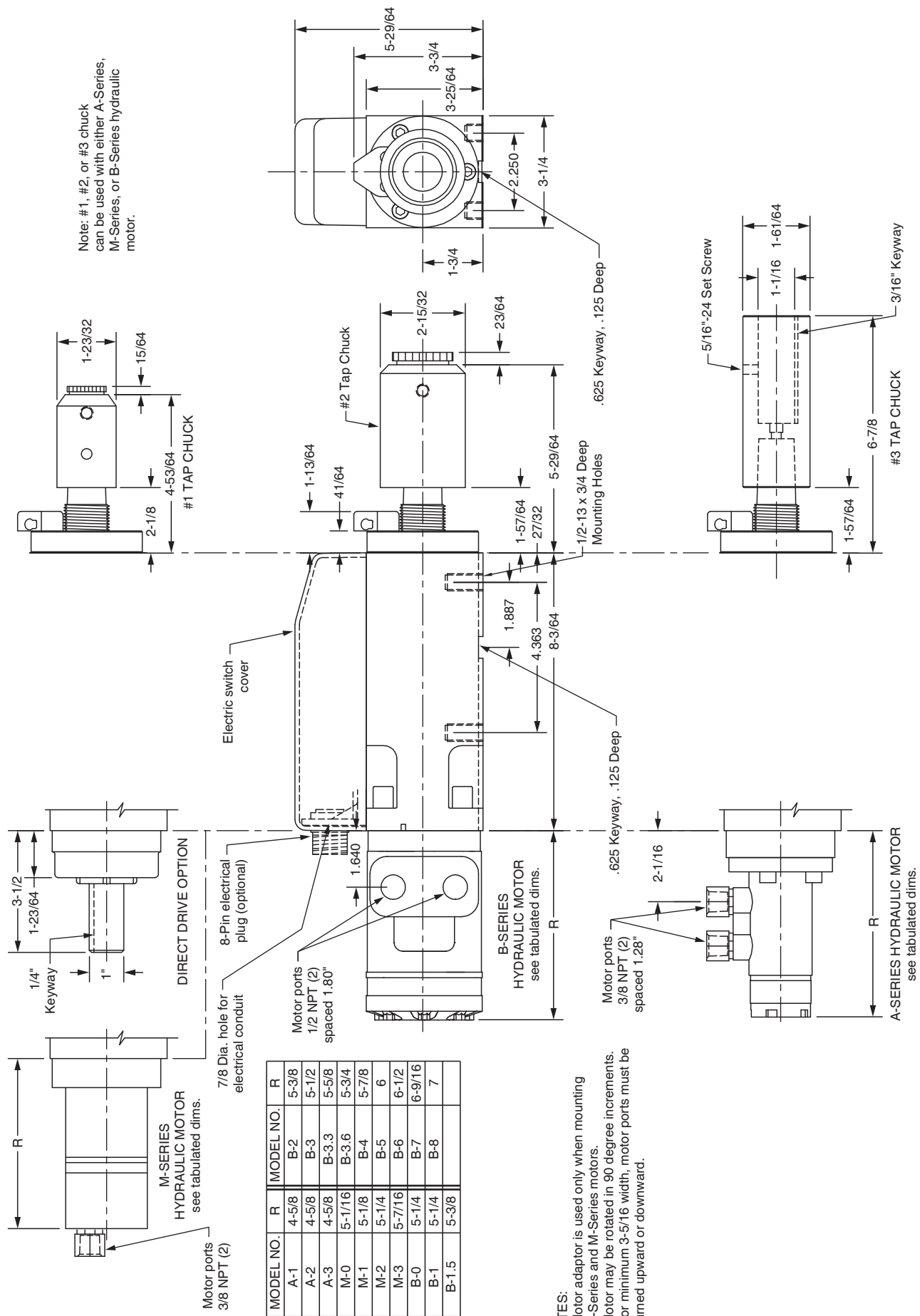
**For parts specifically associated with Jiffy-Tap spindles see page 30.**

**For parts specifically associated with Jiffy-Tap chuck styles see pages 30 and 31.**

**For parts specifically associated with Jiffy-Tap drive styles see pages 32 and 33.**

**For parts specifically associated with Jiffy-Tap options see pages 34 through 38.**

# *Jiffy-Tap Dimensional Drawing*



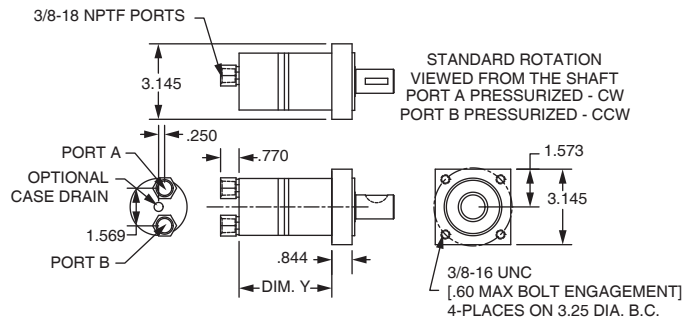
**NOTES:**

1. Motor adaptor is used only when mounting A-Series and M-Series motors.
2. Motor may be rotated in 90 degree increments. For minimum 3-5/16 width, motor ports must be turned upward or downward.

[illegible]

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings present.

# M-Series Hydraulic Motors



Model Number	Displ. in. <sup>3</sup> /rev	Dim. Y
M0	.50	4.09
M1	.79	4.21
M2	1.21	4.38
M3	1.93	4.68

Motor dimensions based on model number.

**Recommended Fluids:** Premium quality, anti-wear type hydraulic oil. Minimum oil viscosity (at operating temperature) should be greater than 70 SUS.

**Recommended Maximum System Operating Temp.:** -30°F to 180°F

For best motor life, run motor for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

## Motor Options

**Option MQM:** Basic *M-Series* motor ordered with Quick-Change option. This options does not include the spindle sleeve. Order a 0.50 cu. in./rev as B0-MQM.

**Option MQD:** Basic *M-Series* motor ordered with Quick-Change option and spindle sleeve for use with a *Jiffy-Drill*. This option is available only on original factory order. Order a 0.50 cu. in./rev as B0-MQD.

**Option MQT:** Basic *M-Series* motor ordered with Quick-Change option and spindle sleeve for use with a *Jiffy-Tap*. This option is available only on original factory order. Order a 0.50 cu. in./rev as B0-MQT.

## Motor Repair Kit

**RKMM:** Includes seals and instructions for replacing worn out or broken seals for all sizes of *M-Series* motors.

**Note:** Motors are sold with adapter plate and shaft adapter for replacement of any drive style.

The information listed is in the following format:  $\frac{[Torque(in-lbs)]}{Rpm}$

### M-0 (.50 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	500	600	700	800	1000	1500	2000
Flow GPM (gal./min.)	1	[11] 456	[25] 444	[33] 437	[40] 429	[47] 422	[55] 412	[69] 394	[102] 332	[130] 250
	2	[9] 897	[24] 886	[31] 877	[38] 867	[46] 860	[53] 847	[68] 823	[105] 749	[139] 657
3		[6] 1349	[20] 1331	[28] 1318	[35] 1309	[44] 1296	[51] 1285	[65] 1261	[102] 1176	[137] 1070
	4.5	0 0	[16] 1902	[23] 1885	[30] 1873	[36] 1858	[44] 1846	[60] 1817	[97] 1721	[131] 1684

### M-2 (1.21 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	500	600	700	800	1000	1500	2000
Flow GPM (gal./min.)	1	[32] 189	[67] 187	[85] 186	[102] 185	[119] 183	[136] 182	[170] 179	[253] 169	[321] 141
	2	[30] 379	[65] 375	[83] 373	[101] 370	[119] 368	[136] 366	[172] 361	[257] 347	[328] 312
3		[21] 569	[57] 565	[75] 563	[93] 560	[111] 558	[128] 556	[163] 551	[248] 523	[325] 487
	4	[12] 761	[47] 758	[65] 754	[83] 751	[101] 749	[119] 746	[154] 741	[239] 707	[316] 660
5.5		0 0	[31] 1043	[49] 1040	[67] 1035	[84] 1033	[101] 1028	[137] 1021	[218] 990	[295] 938

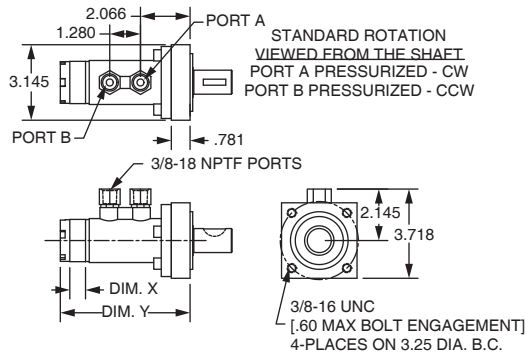
### M-1 (.79 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	500	600	700	800	1000	1500	2000
Flow GPM (gal./min.)	1	[19] 290	[43] 285	[54] 281	[65] 277	[76] 273	[88] 268	[109] 260	[164] 230	[214] 194
	2	[16] 573	[39] 566	[51] 561	[63] 555	[74] 549	[86] 544	[109] 534	[165] 490	[221] 442
3		[11] 859	[35] 849	[47] 843	[58] 838	[70] 832	[82] 825	[105] 810	[163] 763	[219] 708
	4	[6] 1153	[30] 1140	[41] 1135	[53] 1129	[64] 1124	[76] 1117	[99] 1101	[157] 1044	[214] 982
5.5		0 0	[19] 1575	[30] 1566	[42] 1556	[54] 1547	[65] 1539	[89] 1521	[148] 1457	[205] 1396

### M-3 (1.93 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	500	600	700	800	1000	1500	1750
Flow GPM (gal./min.)	1	[51] 118	[106] 116	[133] 115	[160] 113	[187] 112	[213] 111	[265] 107	[383] 81	[439] 70
	2	[46] 236	[103] 234	[132] 232	[159] 230	[187] 228	[214] 225	[269] 221	[387] 175	[446] 165
3		[36] 355	[94] 352	[122] 349	[149] 347	[177] 345	[205] 342	[259] 336	[377] 287	[440] 273
	4	[24] 474	[79] 472	[107] 469	[135] 466	[162] 462	[190] 460	[246] 452	[362] 393	[425] 373
5.5		0 0	[55] 650	[83] 647	[111] 645	[139] 640	[167] 636	[221] 629	[334] 575	[400] 550

# A-Series Hydraulic Motors



Model Number	Displ. in. <sup>3</sup> /rev	Dim. X	Dim. Y
A1	.82	.25	5-13/32
A2	1.16	.375	5-13/32
A3	1.53	.50	5-13/32
A4	1.88	.625	5-17/32

**Table 1: Dimensions based on model number.**

**Recommended Fluids:** Premium quality, anti-wear type hydraulic oil. 100 SUS AT 100°F

**Recommended Maximum System Operating Temp.:** 130°F

**Standard Seals:** Motors come with T-84 jacketed teflon seals as a standard. Optional 301 stainless metal seals available.

For best motor life, run motor for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

## Motor Options

**Option MQM:** Basic *A-Series* motor ordered with Quick-Change option. This options does not include the spindle sleeve.

**Option MQD:** Basic *A-Series* motor ordered with Quick-Change option for use with a *Jiffy-Drill*. This option is available only on original factory order.

**Option MQT:** Basic *A-Series* motor ordered with Quick-Change option for use with a *Jiffy-Tap*. This option is available only on original factory order.

## Motor Repair Kit

**RKMA:** Includes seals and instructions for replacing worn out or broken seals for all sizes of *A-Series* motors.

**Note:** Motors are sold with adapter plate and shaft adapter for replacement of any drive style.

The information listed is in the following format:  $\frac{Torque(in-lbs)}{Rpm}$

### A-1 (.82 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1500
Flow GPM (gal./min.)	1	[17] 298	[37] 265	[58] 233	[78] 200	[98] 168	[119] 135	[139] 103	[149] 86
	2	[14] 580	[34] 547	[54] 515	[75] 482	[95] 450	[116] 417	[136] 385	[146] 368
	3	[11] 862	[31] 829	[51] 797	[72] 764	[92] 732	[113] 699	[133] 667	[143] 650
	4	[8] 1144	[28] 1111	[48] 1079	[69] 1046	[89] 1014	[110] 981	[130] 948	[140] 932
	6		[22] 1675	[42] 1642	[63] 1610	[83] 1577	[104] 1545	[124] 1512	[134] 1496
	8		[16] 2239	[36] 2206	[57] 2174	[77] 2141	[97] 2109	[118] 2076	[128] 2060

### A-3 (1.53 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1500
Flow GPM (gal./min.)	1	[37] 153	[75] 146	[113] 140	[151] 133	[189] 126	[227] 118	[265] 111	[284] 107
	2	[34] 302	[71] 296	[109] 289	[147] 282	[185] 275	[224] 267	[262] 260	[281] 256
	3	[29] 453	[67] 446	[105] 439	[143] 432	[181] 425	[220] 418	[258] 410	[277] 406
	4	[24] 605	[62] 598	[100] 591	[138] 584	[177] 577	[215] 569	[253] 562	[272] 558
	6	[12] 902	[50] 900	[88] 895	[127] 890	[165] 884	[203] 877	[242] 869	[261] 865
	8		[35] 1205	[74] 1203	[112] 1200	[150] 1196	[188] 1189	[227] 1182	[246] 1178

### A-2 (1.16 in.<sup>3</sup>/rev)

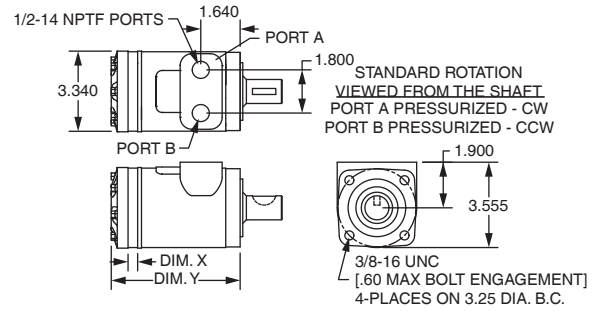
		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1500
Flow GPM (gal./min.)	1	[29] 201	[59] 183	[88] 164	[118] 146	[148] 127	[178] 109	[207] 90	[222] 81
	2	[24] 401	[53] 383	[83] 364	[113] 346	[143] 327	[172] 309	[202] 290	[217] 281
	3	[18] 601	[48] 583	[78] 564	[108] 546	[137] 527	[167] 509	[197] 490	[212] 481
	4	[13] 801	[43] 783	[73] 764	[102] 746	[132] 727	[162] 709	[192] 690	[206] 681
	6		[32] 1183	[62] 1164	[92] 1146	[122] 1127	[151] 1109	[181] 1091	[196] 1081
	8		[22] 1583	[52] 1564	[81] 1546	[111] 1528	[141] 1509	[170] 1491	[185] 1481

### A-4 (1.88 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1500
Flow GPM (gal./min.)	1	[50] 117	[98] 110	[146] 100	[195] 88	[243] 73	[291] 54	[339] 34	[363] 22
	2	[46] 233	[95] 227	[143] 217	[191] 204	[239] 188	[287] 170	[335] 149	[360] 137
	3	[42] 352	[90] 345	[138] 335	[187] 322	[235] 306	[283] 288	[332] 266	[356] 254
	4	[36] 474	[84] 467	[133] 456	[181] 443	[230] 427	[278] 408	[327] 386	[351] 374
	6	[22] 724	[70] 717	[119] 706	[168] 692	[216] 675	[265] 655	[314] 632	[338] 620
	8		[52] 978	[101] 967	[150] 952	[199] 935	[248] 914	[297] 890	[321] 877

# B-Series Hydraulic Motors

The B-Series hydraulic motors are economical, efficient, small, compact, and powerful, designed for medium duty applications. These motors have the industry proven spool valve design combined with state-of-the-art gerotors. In addition, direction of shaft rotation and shaft speed can be controlled easily and smoothly throughout the speed range of the motor.



Model Number	Displ. in. <sup>3</sup> /rev	Dim. X	Dim. Y
B0	2.2	0.25	5.22
B1	2.8	0.25	5.22
B1.5	3.6	0.40	5.37
B2	4.5	0.40	5.37
B3	5.9	0.52	5.49
B3.3	7.3	0.65	5.62
B3.6	8.9	0.79	5.76

Model Number	Displ. in. <sup>3</sup> /rev	Dim. X	Dim. Y
B4	9.7	0.86	5.84
B5	11.3	1.00	5.97
B6	14.1	1.25	6.22
B7	17.9	1.59	6.56
B8	22.6	2.00	6.97

**Table 1: Motor dimensions based on model number.**

**Recommended Fluids:** Premium quality, anti-wear type hydraulic oil. Minimum oil viscosity (at operating temperature) should be the highest of the following: 100 SUS or  $\frac{20 \times PSI}{RPM} = SUS$

**Recommended Maximum System Operating Temp.:** -30°F to 180°F

For best motor life, run motor for approximately one hour at 30% of rated pressure before application to full load. Be sure motor is filled with fluid prior to any load applications.

## Motor Options

**Option MQM:** Basic *B-Series* motor ordered with Quick-Change option. This options does not include the spindle sleeve.

**Option MQD:** Basic *B-Series* motor ordered with Quick-Change option for use with a *Jiffy-Drill*. This option is available only on original factory order.

**Option MQT:** Basic *B-Series* motor ordered with Quick-Change option for use with a *Jiffy-Tap*. This option is available only on original factory order.

## Motor Repair Kit

**RKMB:** Includes seals and instructions for replacing worn out or broken seals for all sizes of *B-Series* motors.

**Note:** B-Motors are a direct replacement for any drive style.



# B-Series (continued)

The information listed is in the following format:

$[Torque(in - lbs)]$   
Rpm

## B-0 (2.2 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	700	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[49] 204	[103] 201	[162] 198	[189] 194	[270] 189	[325] 184	[379] 177	[432] 170	[489] 162
	4	[47] 408	[106] 407	[160] 402	[191] 399	[274] 394	[327] 387	[384] 381	[439] 373	[495] 365
	6	[44] 613	[102] 612	[158] 609	[188] 604	[272] 599	[328] 591	[383] 586	[440] 576	[496] 565
	8	[40] 817	[97] 817	[153] 814	[184] 807	[270] 799	[326] 793	[383] 785	[440] 776	[497] 762
	10	[36] 1021	[90] 1021	[148] 1015	[180] 1008	[265] 1001	[322] 991	[380] 981	[438] 969	[495] 959

## B-1 (2.8 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[64] 161	[136] 158	[212] 156	[284] 153	[355] 148	[426] 145	[497] 139	[567] 133	[641] 127
	4	[61] 323	[139] 320	[209] 316	[286] 314	[359] 310	[429] 304	[503] 300	[576] 293	[649] 287
	6	[58] 486	[134] 481	[207] 479	[282] 475	[356] 471	[430] 464	[502] 461	[577] 453	[650] 444
	8	[52] 648	[128] 643	[200] 640	[276] 635	[354] 628	[428] 623	[502] 617	[577] 610	[651] 599
	10	[47] 808	[118] 803	[194] 798	[269] 793	[347] 787	[423] 779	[498] 771	[575] 761	[649] 753
	12	[36] 969	[109] 964	[188] 960	[260] 952	[340] 946	[417] 938	[492] 931	[567] 922	[643] 914

## B-1.5 (3.6 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[79] 127	[169] 125	[260] 123	[305] 121	[437] 117	[526] 114	[616] 109	[704] 103	[796] 96
	4	[76] 254	[168] 254	[257] 251	[307] 249	[441] 246	[529] 241	[620] 236	[710] 230	[800] 224
	6	[73] 381	[161] 381	[252] 380	[303] 377	[439] 373	[529] 368	[618] 364	[709] 358	[802] 349
	8	[64] 508	[151] 508	[243] 508	[294] 504	[428] 500	[519] 496	[609] 491	[701] 484	[794] 476
	10	[57] 635	[141] 635	[234] 634	[283] 630	[419] 626	[512] 621	[602] 614	[693] 608	[786] 601
	12	[45] 762	[131] 762	[227] 762	[274] 757	[409] 753	[505] 747	[593] 741	[684] 734	[778] 728
	14	[33] 889	[118] 889	[213] 887	[266] 882	[396] 877	[492] 872	[583] 866	[676] 860	[770] 851
	15	[29] 953	[111] 953	[205] 951	[260] 945	[389] 940	[486] 935	[576] 929	[670] 921	[765] 913

## B-2 (4.5 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[103] 101	[220] 99	[339] 98	[454] 96	[569] 93	[685] 90	[801] 86	[916] 81	[1036] 76
	4	[99] 203	[219] 201	[335] 199	[457] 197	[574] 194	[689] 191	[808] 187	[925] 182	[1042] 177
	6	[94] 305	[210] 303	[328] 301	[451] 298	[571] 296	[689] 292	[805] 288	[924] 283	[1044] 276
	8	[86] 406	[196] 404	[319] 402	[438] 399	[558] 396	[676] 393	[793] 388	[913] 383	[1033] 377
	10	[74] 507	[183] 505	[310] 502	[422] 499	[545] 496	[667] 492	[784] 486	[903] 482	[1024] 476
	12	[58] 608	[171] 606	[295] 603	[408] 600	[533] 596	[657] 591	[773] 587	[891] 581	[1013] 576
	14	[43] 709	[154] 706	[277] 702	[396] 698	[515] 694	[640] 691	[760] 686	[880] 681	[1002] 674
	15	[36] 760	[145] 757	[268] 753	[387] 749	[506] 744	[632] 740	[750] 735	[873] 729	[996] 723

## B-3 (5.9 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[134] 78	[292] 76	[442] 75	[593] 73	[746] 71	[899] 68	[1054] 65	[1209] 61	[1365] 55
	4	[131] 156	[281] 155	[436] 153	[596] 151	[750] 149	[903] 147	[1059] 143	[1212] 139	[1367] 134
	6	[126] 234	[269] 233	[425] 231	[588] 230	[747] 228	[900] 224	[1054] 221	[1206] 217	[1368] 210
	8	[110] 312	[246] 311	[408] 310	[566] 308	[718] 305	[873] 303	[1023] 300	[1177] 295	[1339] 291
	10	[96] 390	[231] 389	[392] 387	[539] 385	[699] 383	[859] 380	[1005] 376	[1156] 373	[1318] 368
	12	[77] 468	[218] 467	[378] 465	[522] 463	[681] 460	[844] 457	[990] 453	[1142] 449	[1301] 445
	14	[60] 546	[197] 544	[358] 542	[513] 539	[662] 537	[828] 535	[973] 531	[1131] 526	[1293] 521
	15	[52] 585	[189] 583	[346] 581	[495] 578	[651] 575	[819] 573	[963] 569	[1126] 564	[1286] 559

## B-3.3(7.3 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1800
Flow GPM (gal./min.)	2	[162] 62	[357] 61	[544] 61	[736] 59	[927] 58	[1116] 55	[1305] 53	[1498] 49	[1687] 45
	4	[160] 125	[348] 124	[539] 123	[736] 121	[930] 120	[1119] 119	[1316] 116	[1506] 114	[1698] 110
	6	[155] 188	[338] 187	[530] 186	[729] 185	[923] 183	[1116] 180	[1310] 178	[1500] 175	[1699] 170
	8	[139] 250	[319] 250	[515] 249	[710] 247	[901] 245	[1094] 243	[1283] 241	[1476] 237	[1673] 233
	10	[121] 313	[303] 312	[497] 311	[686] 309	[883] 308	[1081] 306	[1267] 302	[1460] 300	[1655] 296
	12	[102] 375	[288] 374	[480] 373	[664] 371	[862] 370	[1060] 367	[1246] 365	[1440] 361	[1640] 358
	14	[78] 438	[263] 437	[458] 435	[652] 433	[841] 431	[1041] 430	[1228] 427	[1420] 423	[1616] 419
	15	[67] 469	[253] 468	[446] 466	[632] 464	[828] 462	[1030] 460	[1214] 458	[1411] 454	[1608] 450

# B-Series (continued)

## B-3.6 (8.9 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1700
Flow GPM (gal./min.)	2	[198] 51	[435] 50	[664] 50	[897] 49	[1130] 47	[1361] 45	[1591] 43	[1827] 40	[1942] 39
	4	[196] 103	[424] 102	[657] 101	[898] 99	[1133] 99	[1365] 97	[1604] 95	[1836] 93	[1954] 92
	6	[189] 154	[412] 153	[646] 152	[889] 151	[1125] 150	[1361] 148	[1598] 146	[1829] 143	[1951] 141
	8	[169] 205	[389] 205	[628] 204	[866] 203	[1098] 201	[1333] 200	[1564] 197	[1799] 195	[1919] 193
	10	[148] 257	[369] 256	[605] 255	[836] 253	[1076] 252	[1318] 251	[1544] 248	[1780] 246	[1899] 244
	12	[125] 308	[351] 307	[586] 306	[810] 305	[1051] 303	[1293] 301	[1519] 299	[1756] 296	[1878] 295
	14	[95] 359	[321] 358	[558] 357	[795] 355	[1026] 354	[1290] 352	[1497] 350	[1731] 347	[1851] 346
	15	[82] 385	[308] 384	[544] 383	[771] 381	[1010] 379	[1256] 378	[1480] 375	[1720] 373	[1840] 371

## B-4 (9.7 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )								
		200	400	600	800	1000	1200	1400	1600	1650
Flow GPM (gal./min.)	2	[209] 47	[465] 46	[715] 46	[937] 45	[1228] 44	[1478] 42	[1724] 40	[1981] 38	[2046] 37
	4	[210] 94	[460] 94	[710] 93	[971] 91	[1229] 91	[1480] 90	[1745] 89	[1996] 87	[2059] 87
	6	[205] 141	[454] 141	[704] 140	[965] 139	[1216] 138	[1477] 136	[1738] 134	[1991] 132	[2055] 132
	8	[186] 188	[440] 188	[683] 187	[951] 186	[1205] 185	[1461] 183	[1716] 181	[1973] 179	[2038] 178
	10	[164] 235	[422] 234	[671] 234	[930] 232	[1189] 232	[1451] 230	[1702] 228	[1965] 226	[2032] 225
	12	[144] 282	[404] 281	[652] 281	[900] 279	[1163] 279	[1421] 277	[1674] 275	[1937] 273	[2004] 272
	14	[109] 330	[374] 329	[623] 328	[883] 327	[1140] 325	[1396] 323	[1653] 322	[1900] 319	[1963] 319
	15	[92] 353	[359] 352	[612] 351	[861] 350	[1123] 348	[1381] 347	[1633] 345	[1886] 343	[1950] 342

## B-5 (11.3 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1600
Flow GPM (gal./min.)	2	[257] 40	[554] 40	[847] 39	[1150] 38	[1447] 37	[1739] 36	[2035] 33	[2320] 29
	4	[254] 81	[546] 81	[845] 80	[1145] 79	[1448] 78	[1744] 77	[2049] 76	[2343] 74
	6	[246] 121	[540] 121	[834] 120	[1137] 120	[1434] 119	[1736] 117	[2036] 115	[2337] 112
	8	[224] 162	[520] 162	[820] 161	[1117] 160	[1414] 159	[1716] 157	[2014] 155	[2315] 152
	10	[202] 202	[499] 202	[793] 201	[1095] 201	[1394] 200	[1699] 198	[1997] 196	[2299] 193
	12	[176] 243	[475] 242	[767] 242	[1063] 241	[1368] 240	[1664] 238	[1969] 236	[2268] 234
	14	[140] 283	[443] 283	[735] 282	[1035] 281	[1340] 280	[1637] 279	[1936] 277	[2227] 274
	15	[120] 304	[425] 303	[719] 302	[1014] 301	[1320] 300	[1618] 299	[1914] 297	[2205] 294

## B-6 (14.1 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )							
		200	400	600	800	1000	1200	1400	1450
Flow GPM (gal./min.)	2	[338] 32	[707] 32	[1074] 31	[1456] 30	[1827] 30	[2192] 28	[2572] 26	[2657] 25
	4	[328] 65	[695] 65	[1076] 64	[1447] 63	[1827] 62	[2201] 62	[2577] 60	[2699] 60
	6	[317] 97	[687] 97	[1057] 97	[1434] 96	[1811] 95	[2186] 94	[2555] 92	[2650] 91
	8	[289] 130	[659] 130	[1038] 130	[1406] 129	[1777] 128	[2160] 127	[2531] 124	[2625] 124
	10	[265] 162	[631] 162	[1004] 162	[1381] 162	[1751] 160	[2131] 158	[2510] 156	[2602] 156
	12	[230] 195	[599] 195	[968] 194	[1345] 194	[1722] 193	[2088] 192	[2480] 189	[2571] 189
	14	[191] 227	[563] 227	[927] 227	[1299] 226	[1686] 226	[2058] 224	[2428] 222	[2519] 221
	15	[167] 243	[538] 243	[904] 243	[1279] 242	[1661] 242	[2030] 240	[2404] 238	[2493] 238

## B-7 (17.9 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )						
		200	400	600	800	1000	1200	1350
Flow GPM (gal./min.)	2	[427] 26	[893] 25	[1361] 25	[1829] 24	[2293] 22	[2672] 16	[2977] 13
	4	[419] 51	[886] 51	[1362] 51	[1833] 50	[2305] 49	[2771] 47	[3110] 44
	6	[402] 77	[872] 77	[1342] 76	[1819] 76	[2291] 74	[2757] 71	[3098] 68
	8	[367] 102	[838] 102	[1316] 102	[1785] 101	[2252] 100	[2723] 98	[3070] 95
	10	[332] 128	[803] 128	[1276] 128	[1749] 127	[2215] 126	[2684] 123	[3034] 120
	12	[289] 153	[760] 153	[1230] 153	[1706] 153	[2177] 151	[2634] 149	[2989] 146
	14	[241] 179	[712] 179	[1176] 179	[1650] 179	[2126] 177	[2592] 175	[2935] 172
	15	[211] 192	[683] 192	[1149] 192	[1623] 191	[2096] 190	[2558] 188	[2905] 185

## B-8 (22.6 in.<sup>3</sup>/rev)

		PSI (lbs./in. <sup>2</sup> )						
		200	400	600	800	1000	1200	1250
Flow GPM (gal./min.)	2	[537] 20	[1121] 20	[1715] 20	[2285] 19	[2862] 16		
	4	[532] 40	[1123] 40	[1715] 40	[2308] 39	[2893] 38	[3467] 36	[3604] 35
	6	[508] 61	[1100] 61	[1693] 61	[2294] 60	[2884] 58	[3458] 55	[3598] 53
	8	[463] 81	[1060] 81	[1661] 81	[2255] 80	[2840] 79	[3414] 76	[3557] 74
	10	[414] 101	[1017] 101	[1613] 101	[2203] 101	[2788] 99	[3363] 96	[3506] 94
	12	[363] 121	[960] 121	[1553] 121	[2152] 121	[2737] 119	[3305] 116	[3446] 115
	14	[303] 142	[897] 142	[1484] 142	[2086] 142	[2667] 140	[3246] 137	[3386] 136
	15	[266] 152	[862] 152	[1452] 152	[2050] 152	[2630] 150	[3206] 148	[3347] 147

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings present.

This image shows a full page of blank white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings present.

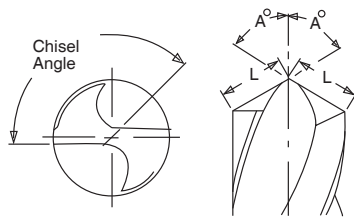
# Reference Data Section

## Drill Points Suggested for Various Materials

The follow data is supplied by Regal Cutting Tools.

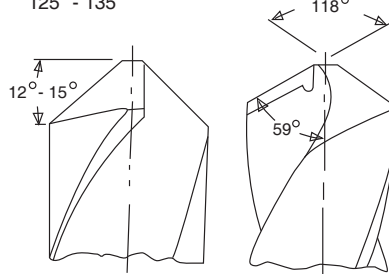
**NOTE:** Point designs illustrated are not necessarily available from factory stock. Grinds suggested may be made and evaluated by user.

**IMPORTANT:** Lip lengths and angles must be equal.



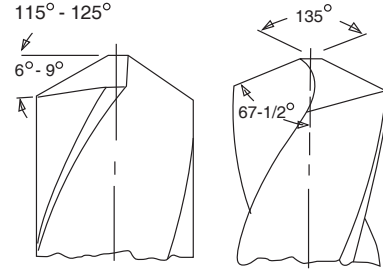
BRASS and SOFT BRONZE

CHISEL ANGLE  
125° - 135°



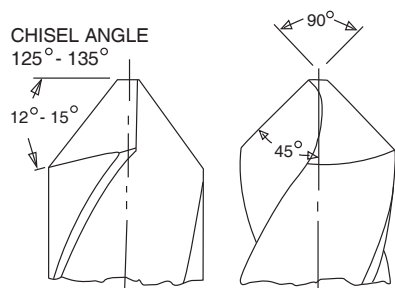
HARD and TOUGH MATERIALS,  
MANGANESE STEEL RAILS, etc.

CHISEL ANGLE  
115° - 125°



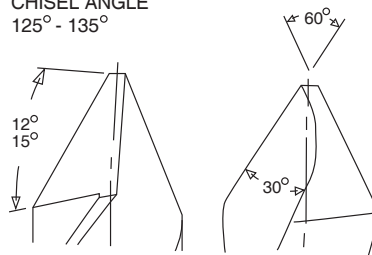
HARD WOOD, BAKELITE, HARD RUBBER  
and FIBERS, SOFT and MEDIUM CAST IRON

CHISEL ANGLE  
125° - 135°



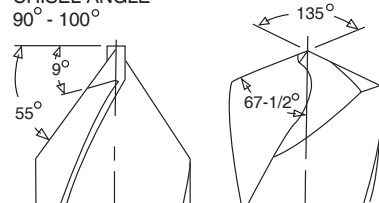
WOOD, RUBER, BAKELITE,  
FIBER, MOLDED PLASTICS

CHISEL ANGLE  
125° - 135°



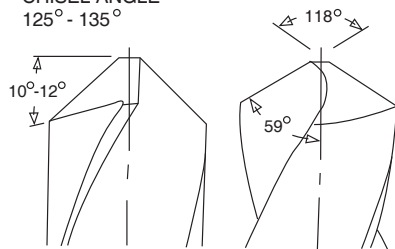
CRANKSHAFT or SPLIT POINT for  
DEEP HOLES  
Overcomes excessive thrust (due to heavy  
web) HARD and TOUGH MATERIALS

CHISEL ANGLE  
90° - 100°



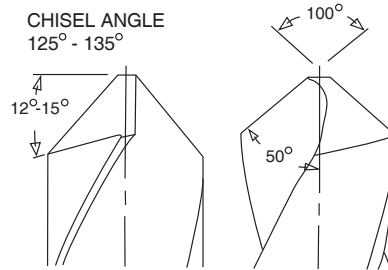
REGULAR POINT...GENERAL PURPOSE,  
MILD STEELS, LAMINATED PLASTICS, etc.

CHISEL ANGLE  
125° - 135°



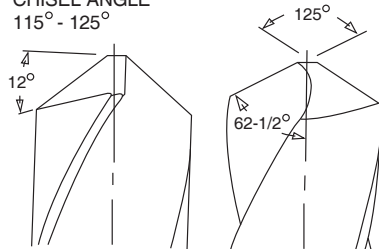
SOFT ALUMINUM, MAGNESIUM, COPPER  
and MEDIUM HARD BRASS

CHISEL ANGLE  
125° - 135°



HEAT TREATED STEELS, DROP FORGINGS  
and CONNECTING RODS

CHISEL ANGLE  
115° - 125°



# *Decimal and Millimeter Equivalents of Fractional Inches*

Fraction	Decimal	mm	Fraction	Decimal	mm	Fraction	Decimal	mm	Fraction	Decimal	mm
1/64	0.0156	0.3969	49/64	0.7656	19.4469	1-33/64	1.5156	38.4969	2-17/64	2.2656	57.5469
1/32	0.0313	0.7938	25/32	0.7813	19.8438	1-17/32	1.5313	38.8938	2-9/32	2.2813	57.9438
3/64	0.0469	1.1906	51/64	0.7969	20.2406	1-35/64	1.5469	39.2906	2-19/64	2.2969	58.3406
1/16	0.0625	1.5875	13/16	0.8125	20.6375	1-9/16	1.5625	39.6875	2-5/16	2.3125	58.7375
5/64	0.0781	1.9844	53/64	0.8281	21.0344	1-37/64	1.5781	40.0844	2-21/64	2.3281	59.1344
3/32	0.0938	2.3813	27/32	0.8438	21.4313	1-19/32	1.5938	40.4813	2-11/32	2.3438	59.5313
7/64	0.1094	2.7781	55/64	0.8594	21.8281	1-39/64	1.6094	40.8781	2-23/64	2.3594	59.9281
1/8	0.1250	3.1750	7/8	0.8750	22.2250	1-5/8	1.6250	41.2750	2-3/8	2.3750	60.3250
9/64	0.1406	3.5719	57/64	0.8906	22.6219	1-41/64	1.6406	41.6719	2-25/64	2.3906	60.7219
5/32	0.1563	3.9688	29/32	0.9063	23.0188	1-21/32	1.6563	42.0688	2-13/32	2.4063	61.1188
11/64	0.1719	4.3656	59/64	0.9219	23.4156	1-43/64	1.6719	42.4656	2-27/64	2.4219	61.5156
3/16	0.1875	4.7625	15/16	0.9375	23.8125	1-11/16	1.6875	42.8625	2-7/16	2.4375	61.9125
13/64	0.2031	5.1594	61/64	0.9531	24.2094	1-45/64	1.7031	43.2594	2-29/64	2.4531	62.3094
7/32	0.2188	5.5563	31/32	0.9688	24.6063	1-23/32	1.7188	43.6563	2-15/32	2.4688	62.7063
15/64	0.2344	5.9531	63/64	0.9844	25.0031	1-47/64	1.7344	44.0531	2-31/64	2.4844	63.1031
1/4	0.2500	6.3500	1	1.0000	25.4000	1-3/4	1.7500	44.4500	2-1/2	2.5000	63.5000
17/64	0.2656	6.7469	1-1/64	1.0156	25.7969	1-49/64	1.7656	44.8469	2-33/64	2.5156	63.8969
9/32	0.2813	7.1438	1-1/32	1.0313	26.1938	1-25/32	1.7813	45.2438	2-17/32	2.5313	64.2938
19/64	0.2969	7.5406	1-3/64	1.0469	26.5906	1-51/64	1.7969	45.6406	2-35/64	2.5469	64.6906
5/16	0.3125	7.9375	1-1/16	1.0625	26.9875	1-13/16	1.8125	46.0375	2-9/16	2.5625	65.0875
21/64	0.3281	8.3344	1-5/64	1.0781	27.3844	1-53/64	1.8281	46.4344	2-37/64	2.5781	65.4844
11/32	0.3438	8.7313	1-3/32	1.0938	27.7813	1-27/32	1.8438	46.8313	2-19/32	2.5938	65.8813
23/64	0.3594	9.1281	1-7/64	1.1094	28.1781	1-55/64	1.8594	47.2281	2-39/64	2.6094	66.2781
3/8	0.3750	9.5250	1-1/8	1.1250	28.5750	1-7/8	1.8750	47.6250	2-5/8	2.6250	66.6750
25/64	0.3906	9.9219	1-9/64	1.1406	28.9719	1-57/64	1.8906	48.0219	2-41/64	2.6406	67.0719
13/32	0.4063	10.3188	1-5/32	1.1563	29.3688	1-29/32	1.9063	48.4188	2-21/32	2.6563	67.4688
27/64	0.4219	10.7156	1-11/64	1.1719	29.7656	1-59/64	1.9219	48.8156	2-43/64	2.6719	67.8656
7/16	0.4375	11.1125	1-3/16	1.1875	30.1625	1-15/16	1.9375	49.2125	2-11/16	2.6875	68.2625
29/64	0.4531	11.5094	1-13/64	1.2031	30.5594	1-61/64	1.9531	49.6094	2-45/64	2.7031	68.6594
15/32	0.4688	11.9063	1-7/32	1.2188	30.9563	1-31/32	1.9688	50.0063	2-23/32	2.7188	69.0563
31/64	0.4844	12.3031	1-15/64	1.2344	31.3531	1-63/64	1.9844	50.4031	2-47/64	2.7344	69.4531
1/2	0.5000	12.7000	1-1/4	1.2500	31.7500	2	2.0000	50.8000	2-3/4	2.7500	69.8500
33/64	0.5156	13.0969	1-17/64	1.2656	32.1469	2-1/64	2.0156	51.1969	2-49/64	2.7656	70.2469
17/32	0.5313	13.4938	1-9/32	1.2813	32.5438	2-1/32	2.0313	51.5938	2-25/32	2.7813	70.6438
35/64	0.5469	13.8906	1-19/64	1.2969	32.9406	2-3/64	2.0469	51.9906	2-51/64	2.7969	71.0406
9/16	0.5625	14.2875	1-5/16	1.3125	33.3375	2-1/16	2.0625	52.3875	2-13/16	2.8125	71.4375
37/64	0.5781	14.6844	1-21/64	1.3281	33.7344	2-5/64	2.0781	52.7844	2-53/64	2.8281	71.8344
19/32	0.5938	15.0813	1-11/32	1.3438	34.1313	2-3/32	2.0938	53.1813	2-27/32	2.8438	72.2313
39/64	0.6094	15.4781	1-23/64	1.3594	34.5281	2-7/64	2.1094	53.5781	2-55/64	2.8594	72.6281
5/8	0.6250	15.8750	1-3/8	1.3750	34.9250	2-1/8	2.1250	53.9750	2-7/8	2.8750	73.0250
41/64	0.6406	16.2719	1-25/64	1.3906	35.3219	2-9/64	2.1406	54.3719	2-57/64	2.8906	73.4219
21/32	0.6563	16.6688	1-13/32	1.4063	35.7188	2-5/32	2.1563	54.7688	2-29/32	2.9063	73.8188
43/64	0.6719	17.0656	1-27/64	1.4219	36.1156	2-11/64	2.1719	55.1656	2-59/64	2.9219	74.2156
11/16	0.6875	17.4625	1-7/16	1.4375	36.5125	2-3/16	2.1875	55.5625	2-15/16	2.9375	74.6125
45/64	0.7031	17.8594	1-29/64	1.4531	36.9094	2-13/64	2.2031	55.9594	2-61/64	2.9531	75.0094
23/32	0.7188	18.2563	1-15/32	1.4688	37.3063	2-7/32	2.2188	56.3563	2-31/32	2.9688	75.4063
47/64	0.7344	18.6531	1-31/64	1.4844	37.7031	2-15/64	2.2344	56.7531	2-63/64	2.9844	75.8031
3/4	0.7500	19.0500	1-1/2	1.5000	38.1000	2-1/4	2.2500	57.1500	3	3.0000	76.2000

# *Decimal and Millimeter Equivalents of Wire, Fractional and Letter Size Drills*

Drill Size	Decimal	mm	Drill Size	Decimal	mm	Drill Size	Decimal	mm	Drill Size	Decimal	mm
80	0.0135	0.3429	49	0.0730	1.8542	20	0.1610	4.0894	I	0.2720	6.9088
79	0.0145	0.3683	48	0.0760	1.9304	19	0.1660	4.2164	J	0.2770	7.0358
1/64	0.0156	0.3969	5/64	0.0781	1.9844	18	0.1695	4.3053	K	0.2810	7.1374
78	0.0160	0.4064	47	0.0785	1.9939	11/64	0.1719	4.3656	9/32	0.2813	7.1438
77	0.0180	0.4572	46	0.0810	2.0574	17	0.1730	4.3942	L	0.2900	7.3660
76	0.0200	0.5080	45	0.0820	2.0828	16	0.1770	4.4958	M	0.2950	7.4930
75	0.0210	0.5334	44	0.0860	2.1844	15	0.1800	4.5720	19/64	0.2969	7.5406
74	0.0225	0.5715	43	0.0890	2.2606	14	0.1820	4.6228	N	0.3020	7.6708
73	0.0240	0.6096	42	0.0935	2.3749	13	0.1850	4.6990	5/16	0.3125	7.9375
72	0.0250	0.6350	3/32	0.0938	2.3813	3/16	0.1875	4.7625	O	0.3160	8.0264
71	0.0260	0.6604	41	0.0960	2.4384	12	0.1890	4.8006	P	0.3230	8.2042
70	0.0280	0.7112	40	0.0980	2.4892	11	0.1910	4.8514	21/64	0.3281	8.3344
69	0.0292	0.7417	39	0.0995	2.5273	10	0.1935	4.9149	Q	0.3320	8.4328
68	0.0310	0.7874	38	0.1015	2.5781	9	0.1960	4.9784	R	0.3390	8.6106
1/32	0.0313	0.7938	37	0.1040	0.2642	8	0.1990	5.0546	11/32	0.3438	8.7313
67	0.0320	0.8128	36	0.1065	2.7051	7	0.2010	5.1054	S	0.3480	8.8392
66	0.0330	0.8382	7/64	0.1094	2.7781	13/64	0.2031	5.1594	T	0.3580	9.0932
65	0.0350	0.8890	35	0.1100	2.7940	6	0.2040	5.1816	23/64	0.3594	9.1281
64	0.0360	0.9144	34	0.1110	2.8194	5	0.2055	5.2197	U	0.3680	9.3472
63	0.0370	0.9398	33	0.1130	2.8702	4	0.2090	5.3086	3/8	0.3750	9.5250
62	0.0380	0.9652	32	0.1160	2.9464	3	0.2130	5.4102	V	0.3770	9.5758
61	0.0390	0.9906	31	0.1200	3.0480	7/32	0.2188	5.5563	W	0.3860	9.8044
60	0.0400	1.0160	1/8	0.1250	3.1750	2	0.2210	5.6134	25/64	0.3906	9.9219
59	0.0410	1.0414	30	0.1285	3.2639	1	0.2280	5.7912	X	0.3970	10.0838
58	0.0420	1.0668	29	0.1360	3.4544	A	0.2340	5.9436	Y	0.4040	10.2616
57	0.0430	1.0922	28	0.1405	3.5687	15/64	0.2344	5.9531	13/32	0.4063	10.3188
56	0.0465	1.1811	9/64	0.1406	3.5719	B	0.2380	6.0452	Z	0.4130	10.4902
3/64	0.0469	1.1906	27	0.1440	3.6576	C	0.2420	6.1468	27/64	0.4219	10.7156
55	0.0520	1.3208	26	0.1470	3.7338	D	0.2460	6.2484	7/16	0.4375	11.1125
54	0.0550	1.3970	25	0.1495	3.7973	1/4	0.2500	6.3500	29/64	0.4531	11.5094
53	0.0595	1.5113	24	0.1520	3.8608	E	0.2500	6.3500	15/32	0.4688	11.9063
1/16	0.0625	1.5875	23	0.1540	3.9116	F	0.2570	6.5278	31/64	0.4844	12.3031
52	0.0635	1.6129	5/32	0.1563	3.9688	G	0.2610	6.6294	1/2	0.5000	12.7000
51	0.0670	1.7018	22	0.1570	3.9878	17/64	0.2656	6.7469			
50	0.0700	1.7780	21	0.1590	4.0386	H	0.2660	6.7564			

## *Millimeters Converted to Decimal Inches*

mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
0.50	0.0197	8.00	0.3150	15.50	0.6102	23.00	0.9055	30.50	1.2008
1.00	0.0394	8.50	0.3346	16.00	0.6299	23.50	0.9252	31.00	1.2205
1.50	0.0591	9.00	0.3543	16.50	0.6496	24.00	0.9449	31.50	1.2402
2.00	0.0787	9.50	0.3740	17.00	0.6693	24.50	0.9646	32.00	1.2598
2.50	0.0984	10.00	0.3937	17.50	0.6890	25.00	0.9843	32.50	1.2795
3.00	0.1181	10.50	0.4134	18.00	0.7087	25.50	1.0039	33.00	1.2992
3.50	0.1378	11.00	0.4331	18.50	0.7283	26.00	1.0236	33.50	1.3189
4.00	0.1575	11.50	0.4528	19.00	0.7480	26.50	1.0433	34.00	1.3386
4.50	0.1772	12.00	0.4724	19.50	0.7677	27.00	1.0630	34.50	1.3583
5.00	0.1969	12.50	0.4921	20.00	0.7874	27.50	1.0827	35.00	1.3780
5.50	0.2165	13.00	0.5118	20.50	0.8071	28.00	1.1024	35.50	1.3976
6.00	0.2362	13.50	0.5315	21.00	0.8268	28.50	1.1220	36.00	1.4173
6.50	0.2559	14.00	0.5512	21.50	0.8465	29.00	1.1417	36.50	1.4370
7.00	0.2756	14.50	0.5709	22.00	0.8661	29.50	1.1614	37.00	1.4567
7.50	0.2953	15.00	0.5906	22.50	0.8858	30.00	1.1811	37.50	1.4764

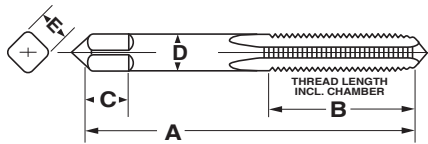
For other values use the following conversion: to convert millimeters to inches divide by 25.4

## *Hardness Conversion Numbers For Steel*

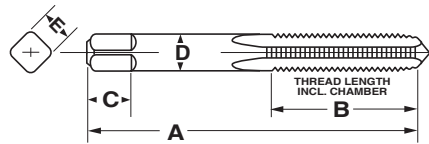
Brinell 3000 kg. Load 10 mm. Ball		ROCKWELL		Tensile Strength PSI Approx.	Brinell 3000 kg. Load 10 mm. Ball		ROCKWELL		Tensile Strength PSI Approx.
Diameter mm	Hardness Number	B Scale	C Scale		Diameter mm	Hardness Number	B Scale	C Scale	
2.25	745		65.3		3.75	262	103.0	26.6	125,000
2.30	712				3.80	255	102.0	25.4	121,000
2.35	682		61.7		3.85	248	101.0	24.2	118,000
2.40	653		60.0		3.90	241	100.0	22.8	114,000
2.45	627		58.7		3.95	235	99.0	21.7	111,000
2.50	601		57.3		4.00	229	98.2	20.5	109,000
2.55	578		56.0		4.05	223	97.3	18.8	104,000
2.60	555		54.7	298,000	4.10	217	96.4	17.5	103,000
2.65	534		53.5	288,000	4.15	212	95.5	16.0	100,000
2.70	514		52.1	274,000	4.20	207	94.6	15.2	99,000
2.75	495		51.0	264,000	4.25	201	93.8	13.8	97,000
2.80	477		49.6	252,000	4.30	197	92.8	12.7	94,000
2.85	461		48.5	242,000	4.35	192	91.9	11.5	92,000
2.90	444		47.1	230,000	4.40	187	90.7	10.0	90,000
2.95	429		45.7	219,000	4.45	183	90.0	9.0	89,000
3.00	415		44.5	212,000	4.50	179	89.0	8.0	88,000
3.05	401		43.1	202,000	4.55	174	87.8	6.4	86,000
3.10	338		41.8	193,000	4.60	170	86.8	5.4	84,000
3.15	375		40.4	184,000	4.65	167	86.0	4.4	83,000
3.20	363		39.1	177,000	4.70	163	85.0	3.3	82,000
3.25	352	110.0	37.9	170,000	4.80	156	82.9	0.9	80,000
3.30	341	109.0	36.6	163,000	4.90	149	80.8		
3.35	331	108.5	35.5	158,000	5.00	143	78.7		
3.40	321	108.0	34.3	152,000	5.10	137	76.4		
3.45	311	107.5	33.1	147,000	5.20	131	74.0		
3.50	302	107.0	32.1	143,000	5.30	126	72.0		
3.55	293	106.0	30.9	139,000	5.40	121	69.8		
3.60	285	105.5	2.9	136,000	5.50	116	67.6		
3.65	277	104.5	28.8	131,000	5.60	111	65.7		
3.70	269	104.0	27.6	128,000					



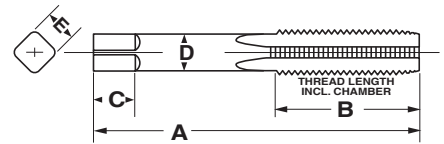
# Standard Tap Dimensions



Size #0-12 Machine Screw  
Sizes 1.6-6.3 mm



Size #14 Machine Screw  
Sizes 7-10 mm



Sizes larger than 3/8"  
Sizes 12 mm and larger

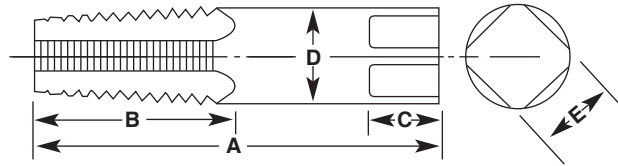
## STYLE-1

## STYLE-2

## STYLE-3

Nominal Diameter Range (in.)		Mach. Screw Size No.	Nominal Fractional Diameter (in.)	Nominal Metric Diameter (mm)	Style	Tap Dimensions - Inches				
Over	To (incl.)					Length Overall A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E
.052	.065	0	1/16	M1.6	1	1-5/8	5/16	3/16	.141	.110
.065	.078	1	-	M1.8	1	1-11/16	3/8	3/16	.141	.110
.078	.091	2	-	M2, M2.2	1	1-3/4	7/16	3/16	.141	.110
.091	.104	3	3/32	M2.5	1	1-13/16	1/2	3/16	.141	.110
.104	.117	4	-	-	1	1-7/8	9/16	3/16	.141	.110
.117	.130	5	1/8	M3, M3.15	1	1-15/16	5/8	3/16	.141	.110
.130	.145	6	-	M3.5	1	2	11/16	3/16	.141	.110
.145	.171	8	5/32	M4	1	2-1/8	3/4	1/4	.168	.131
.171	.197	10	3/16	M4.5, M5	1	2-3/8	7/8	1/4	.194	.152
.197	.223	12	7/32	-	1	2-3/8	15/16	9/32	.220	.165
.223	.260	14	1/4	M6, M6.3	2	2-1/2	1	5/16	.255	.191
.260	.323	-	5/16	M7, M8	2	2-23/32	1-1/8	3/8	.318	.238
.323	.395	-	3/8	M10	2	2-15/16	1-1/4	7/16	.381	.286
.395	.448	-	7/16	-	3	3-5/32	1-7/16	13/32	.323	.242
.448	.510	-	1/2	M12, M12.5	3	3-3/8	1-21/32	7/16	.367	.275
.510	.573	-	9/16	M14	3	3-19/32	1-21/32	1/2	.429	.322
.573	.635	-	5/8	M16	3	3-13/16	1-13/16	9/16	.480	.360
.635	.709	-	11/16	M18	3	4-1/32	1-13/16	5/8	.542	.406
.709	.760	-	3/4	-	3	4-1/4	2	11/16	.590	.442
.760	.823	-	13/16	M20	3	4-15/32	2	11/16	.652	.489
.823	.885	-	7/8	M22	3	4-11/16	2-7/32	3/4	.697	.523
.885	.948	-	15/16	M24	3	4-29/32	2-7/32	3/4	.760	.570
.948	1.010	-	1	M25	3	5-1/8	2-1/2	13/16	.800	.600
1.010	1.073	-	1-1/16	M27	3	5-1/8	2-1/2	7/8	.896	.672
1.073	1.135	-	1-1/8	-	3	5-7/16	2-9/16	7/8	.896	.672
1.135	1.198		1-3/16	M30	3	5-7/16	2-9/16	1	1.021	.766
1.198	1.260		1-1/4	-	3	5-3/4	2-9/16	1	1.021	.766
1.260	1.323		1-5/16	M33	3	5-3/4	2-9/16	1-1/16	1.108	.831
1.323	1.385		1-3/8	-	3	6-1/16	3	1-1/16	1.108	.831
1.385	1.448		1-7/16	M36	3	6-1/16	3	1-1/8	1.233	.925
1.448	1.510		1-1/2	-	3	6-3/8	3	1-1/8	1.233	.925
1.510	1.635		1-5/8	M39	3	6-11/16	3-3/16	1-1/8	1.305	.979
1.635	1.760		1-3/4	M42	3	7	3-3/16	1-1/4	1.430	1.072
1.760	1.885		1-7/8	-	3	7-5/16	3-9/16	1-1/4	1.519	1.139
1.885	2.010		2	M48	3	7-5/8	3-9/16	1-3/8	1.644	1.233
2.010	2.135		2-1/8	-	3	8	3-9/16	1-3/8	1.769	1.327
2.135	2.260		2-1/4	M56	3	8-1/4	3-9/16	1-7/16	1.894	1.420
2.260	2.385		2-3/8	-	3	8-1/2	4	1-7/16	2.019	1.514
2.385	2.510		2-1/2	-	3	8-3/4	4	1-1/2	2.100	1.575
2.510	2.635		2-5/8	M64	3	8-3/4	4	1-1/2	2.225	1.669
2.635	2.760		2-3/4	-	3	9-1/4	4	1-9/16	2.350	1.762
2.760	2.885		2-7/8	M72	3	9-1/4	4	1	2.475	1.856
2.885	3.010		3	-	3	9-3/4	4-9/16	1-5/8	2.543	1.907
3.010	3.135		3-1/8	-	3	9-3/4	4-9/16	1-5/8	2.668	2.001
3.135	3.260		3-1/4	M80	3	10	4-9/16	1-3/4	2.793	2.095
3.260	3.385		3-3/8	-	3	10	4-9/16	1-3/4	2.883	2.162
3.385	3.510		3-1/2	-	3	10-1/4	4-15/16	2	3.008	2.256
3.510	3.635		3-5/8	M90	3	10-1/4	4-15/16	2	3.133	2.350
3.635	3.760		3-3/4	-	3	10-1/2	5-5/16	2-1/8	3.217	2.413
3.760	3.885		3-7/8	-	3	10-1/2	5-5/16	2-1/8	3.342	2.506
3.885	4.010		4	M100	3	10-3/4	5-5/16	2-1/4	3.467	2.600

# Pipe Tap Dimensions - Straight and Taper



Nominal Size Inches	Pipe Diameter Inches	Standard Projection	Minimum Projection	Length Overall A	Length of Thread B	Length of Square C	Diameter of Shank D	Size of Square E
1/16-27	0.300	0.312	Flush ("0" Proj.)	2-1/8	11/16	3/8	0.3125	0.234
1/8-27 Small Shank	0.405	0.312	Flush ("0" Proj.)	2-1/8	3/4	3/8	0.3125	0.234
1/8-27	0.405	0.312	Flush ("0" Proj.)	2-1/8	3/4	3/8	0.4375	0.328
1/4-18	0.540	0.459	0.218	2-7/16	1-1/16	7/16	0.5625	0.421
3/8-18	0.675	0.454	0.150	2-9/16	1-1/16	1/2	0.7000	0.531
1/2-14	0.840	0.579	0.260	3-1/8	1-3/8	5/8	0.6875	0.515
3/4-14	1.050	0.565	0.245	3-1/4	1-3/8	11/16	0.9063	0.679
1-11.5	1.315	0.678	0.275	3-3/4	1-3/4	13/16	1.1250	0.843
1-1/4-11.5	1.660	0.686	0.285	4	1-3/4	15/16	1.3125	0.984
1-1/2-11.5	1.900	0.699	0.300	4-1/4	1-3/4	1	1.5000	1.125
2-11.5	2.375	0.667	0.267	4-1/2	1-3/4	1-1/8	1.8750	1.406
2-1/2-8	2.875	0.925	0.525	5-1/2	2-9/16	1-1/4	2.2500	1.687
3-8	3.500	0.925	0.525	6	2-5/8	1-3/8	2.6250	1.968
3-1/2-8	4.000	0.938	0.525	6-1/2	2-11/16	1-1/2	2.8125	2.108
4-8	4.500	0.950	0.525	6-3/4	2-3/4	1-5/8	3.0000	2.250

$$\text{Drill Size (inches)} = \text{Major Diameter (inches)} - (0.01299 \times \% \text{Thread} / \# \text{ of Threads Per Inch})$$

## READING RECOMMENDED

Taps Size	1/16	1/8	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2
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‡For dryseal straight pipe threads, suggested drill sizes are as shown, except: 1/4" pipe, 0.444 drill size.

$$\text{Drill Size (inches)} = \text{Major Diameter (inches)} - (0.0068 \times \% \text{Thread} / \# \text{ of Threads Per Inch})$$
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# Metric Tap Drill Sizes for Cut Threads

Drill Size (mm) = Major Diameter (mm) - (0.01299 x Metric Pitch x %Thread)

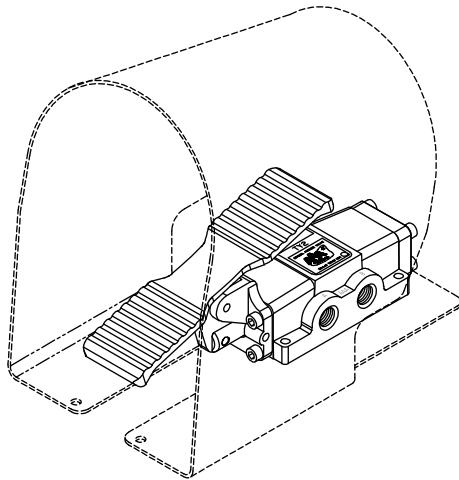
Tap	Tap Drill	Decimal Equiv. of Tap Drill (inches)	Theo. % of Thrd	Mean Probable Oversize (inches)	Probable Hole Size (inches)	% of Thrd	Tap	Tap Drill	Decimal Equiv. of Tap Drill	Theo. % of Thrd	Mean Probable Oversize (inches)	Probable Hole Size (inches)	% of Thrd
4-0.70	#30	.1285	81	.0029	.1314	73	10-1.50	“Q”	.3320	80	.0044	.3364	75
	3.3mm	.1299	77	.0029	.1328	69		8.5mm	.3346	77	.0044	.3390	71
	3.7mm	.1457	82	.0032	.1489	74		10.25mm	.2035	77	.0047	.4082	72
4.5-0.75	#26	.1470	79	.0032	.1502	70	12-1.75	“Y”	.4040	76	.0047	.4087	71
	#25	.1495	72	.0032	.1527	64		13/32	.4062	74	.0047	.4109	69
	4.2mm	.1654	77	.0032	.1686	69		15/32	.4688	81	.0048	.4736	76
5-0.80	#19	.1660	75	.0032	.1692	68	14-2.00	12mm	.4724	77	.0048	.4772	72
	#10	.1935	84	.0038	.1973	76		35/64	.5469	81	.0049	.5518	76
	#9	.1960	79	.0038	.1998	71		16-2.00	14mm	.5512	77	.0049	.5561
6-1.00	5mm	.1968	77	.0038	.2006	70	20-2.50	11/16	.6875	78	.0050	.6925	74
	#8	.1990	73	.0038	.2028	65		17.5mm	.6890	77	.0052	.6942	73
	“A”	.2340	81	.0038	.2378	74		13/16	.8125	86	.0052	.8177	82
7-1.00	6mm	.2362	77	.0038	.2400	70	24-3.00	21mm	.8268	77	.0059	.8327	73
	“B”	.2380	74	.0838	.2418	66		53/64	.8281	76	.0059	.8340	72
	6.7mm	.2638	80	.0041	.2679	74		1-1/32	1.0312	83	.0071	1.0383	80
8-1.25	17/64	.2656	77	.0041	.2697	71	30-3.50	26.5mm	1.0433	77	.0071	1.0504	73
	“H”	.2660	77	.0041	.2701	70		1-3/64	1.0469	75	.0072	1.0541	70
	6.8mm	.2677	74	.0041	.2718	68		36-4.00	1-17/64	1.2656	74	Reaming Recommended	
	8.4mm	.3307	82	.0044	.3351	76							

# Metric Tap Drill Sizes for Rolled Threads

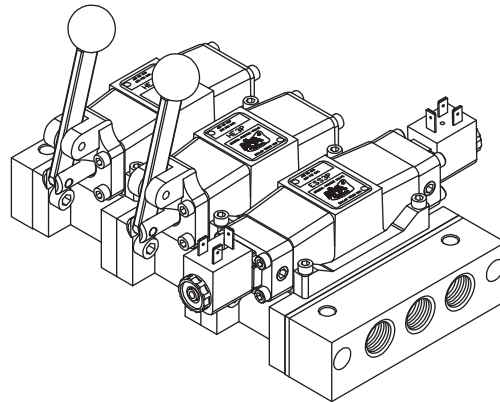
Drill Size (mm) = Major Diameter (mm) - (0.0068 x Metric Pitch x %Thread)

Tap	Theoretical Drill Size		Tap	Theoretical Drill Size	
	Max. 55% Thread	Min. 75% Thread		Max. 55% Thread	Min. 75% Thread
5-0.50	4.81	4.75	14-1.00	13.63	13.50
5-0.80	4.70	4.60	14-2.00	13.25	13.00
6-0.75	5.72	5.63	16-1.00	15.63	15.50
6-1.00	5.63	5.50	16-2.00	15.25	15.00
7-0.75	6.72	6.63	20-1.00	19.63	19.50
7-1.00	6.63	6.50	20-2.50	19.06	18.75
8-0.75	7.72	7.63	24-1.00	23.63	23.50
8-1.25	7.53	7.38	24-3.00	22.88	22.50
10-0.75	9.72	9.63	30-3.50	28.69	28.25
10-1.50	9.44	9.25	36-4.00	34.50	34.00
12-1.00	11.63	11.50			
12-1.75	11.34	11.13			

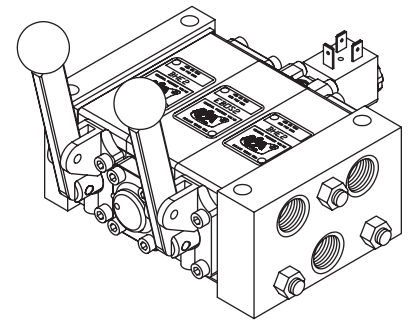
# ***AAA Products International Also Manufactures Control Valves for your Pneumatic Needs***



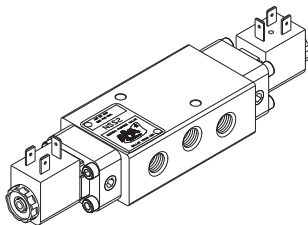
***Foot Operated Valves***



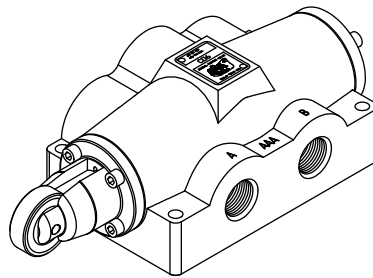
***Manifold Style Valves***



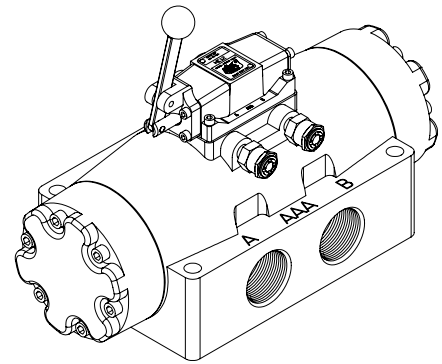
***Stacking Valves***



***Small Valves***



***Medium Valves***



***Large Valves***

- Spool Type Directional Valves
- Single and Stack Valves
- All Popular Actuators
- 1/4" Through 2" Sizes
- 250 PSI Air Service

## ***Example of a Few of Our Valves***

***Over 250 Customer Specials***

### ***Soft Seal 4-Way Air Valves***

Soft seal valves will operate on vacuum, inert gas, or compressed air. Solenoid models are the pilot operated type, and operate from 50 to 150 PSI, but will cover higher pressure ranges if a suitable source of external pilot air is used.

O-Ring seals between all ports give leaktight operations. Viton rings are used on 1/4" and 3/8" valves, buna-N on larger sizes. Bodies, end caps, and spools are aluminum; springs are stainless or music wire.

All valves are built with dual exhaust ports. Any valve port may be plugged or pressurized for 2-way, 3-way, or 5-way service. One secret to the superior performance is the large spool end area which is 25 to 50% larger than competi-

tive valves. The double taper of the flow grooves on the spool allows more accurate throttling on manually controlled valves.

Seals are standard O-Rings. If a valve should ever need repacking, seals are available almost every where, and replacement is quick and easy.

Closed center spools are standard on all 3-position valves. Alternate spool configurations are available.

Solenoid models use a "DIN 43650" style with 11 mm "Industrial Form B" connector pin pattern, most common voltages are immediately available. Other voltages and coil styles available. Consult factory or distributor for options.