

**INSTRUCTION BULLETIN  
& MAINTENANCE MANUAL  
FOR CTD PF400  
PUSHFEED  
AUTOMATIC SAW**

**CTD MODEL NO:** \_\_\_\_\_

**CTD SERIAL NO:** \_\_\_\_\_

**MANUFACTURE DATE:** \_\_\_\_\_

**DISTRIBUTOR PURCHASED THROUGH:**

**(IF ANY)** \_\_\_\_\_



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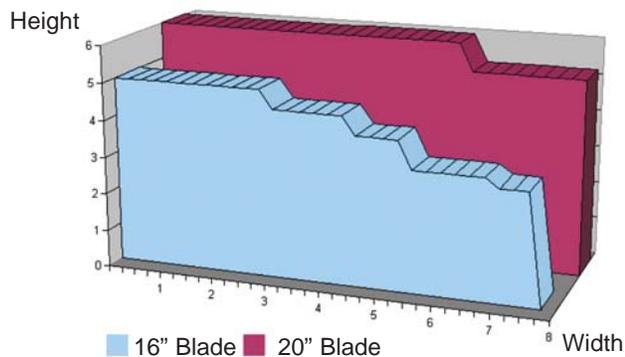
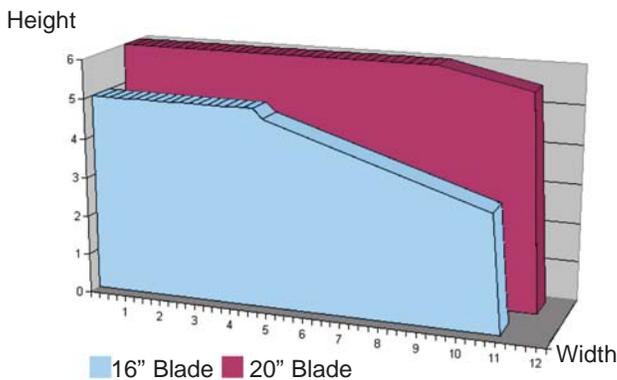
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**Machine Requirements:**

MODEL NO: \_\_\_\_\_ SERIAL NO: \_\_\_\_\_



16" Blade - 90° Cutting Capacities DM400, M416, F426  
 20" Blade - 90° Cutting Capacities DM400, M516, F526

16" Blade - 45° Cutting Capacities DM400, M416  
 20" Blade - 45° Cutting Capacities DM400, M516

**Pneumatic Requirements:** (if applicable) 2 CFM per 10 strokes at 75 PSI (.086 cubic meters at 5.4 kg/cm2)

**Dust Collection Requirements:** 1100 CFM at 4" outlets

**Electrical Requirements:** Based on one motor per machine

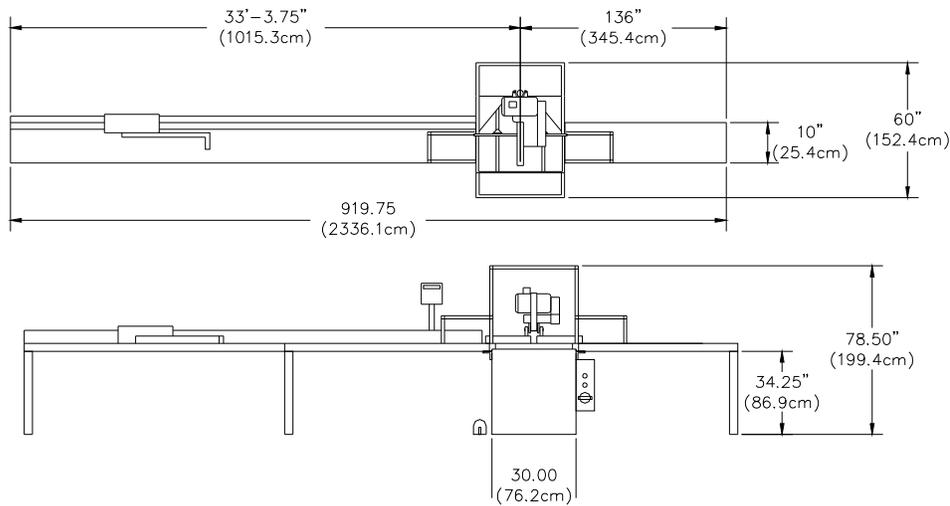
<u>Motor Size</u>	<u>Required Amperage</u>	<u>Breaker Needed</u>
7-1/2 H.P. 3 Phase, 230 Volt	20 amps	30 amp
7-1/2 H.P. 3 Phase, 460 Volt	10 amps	20 amp
10 H.P. 3 Phase, 230 Volt	26 amps	40 amp
10 H.P. 3 Phase, 460 Volt	13 amps	20 amp
15 H.P. 3 Phase, 230 Volt	34 amps	50 amp
15 H.P. 3 Phase, 460 Volt	17 amps	30 amp

**Cutting Tool Requirements:** Heavy, rigid plate blades.

16" blades: .120 to .130 plate

20" blades: .150 to .160 plate

## Space Requirements



### Installation and Set Up:

The CTD saw you have purchased is designed to cut wood, aluminum, plastic and steel, with of course the proper blade and conditions. For the material you are cutting, please refer to the cutting instructions for each material type. The 400 Series machines use a NEMA 213T or 215T, 7-1/2 H.P., 1725 RPM, 60 Hertz TEFC Motor. CTD uses a speed-up so that the blade will run at approximately 12,500 SFPM on a 16" blade and 14,000 SFPM on a 20" blade.

**IMPORTANT:** Before operating saw, please be sure to read the “**SAFETY INSTRUCTIONS TO THE OPERATOR**” (see Page No. 6).

**Note:** The floor stand must be shimmed, leveled and bolted to the floor, or framed in to eliminate vibration. Use holes provided in bottom of floor stand. All machines have been completely assembled at the factory, then disassembled for shipment.

### Blade Installation:

Before setting blades on spindle, *always shut off or disconnect air supply*. With motor **OFF** and power disconnected, loosen wing nut on Bottom Blade Guard Strap, P/N 6F07B (see Diagram “D“ below) and swing down. Now, lift main blade guard, exposing Spindle Assembly.

1. Remove Spindle Nut, P/N 4B1P48 and Outer Flange, P/N 4BM43. If necessary, hold blade in hand with rag or lower blade into a piece of wood. Push down with a wrench.
2. Place blade on spindle with tips pointing down. Make sure Slinger (inner flange), P/N 4BM44 and blade surface are **clean** before putting blade on spindle. This is a critical surface and is ground within .0005 flatness. Any debris or dust will wear this surface. Wipe both surfaces (blade and slinger) with a clean rag.
  - A. The blade must **ALWAYS** rotate to the rear of the machine on the underside of the blade (see Diagram “D“). ***Always check rotation before cutting a piece of material.***
3. Replace Outer Flange, P/N 4BM43 and Spindle Nut, P/N 4B1P48 as before and tighten (refer to Diagram “C“). Pull up with wrench. Do not over-tighten. Snugging the blade is all that is necessary.

If blades were purchased from CTD, your machine has been set with your blades. If not, blade diameters may vary. Check to see if the blade contacts the base or disc in the down position. If repositioning is necessary, adjust down stop bolt located under Arm Casting, P/N 4BC01 (refer to Page No. 11).

Diagram "C"

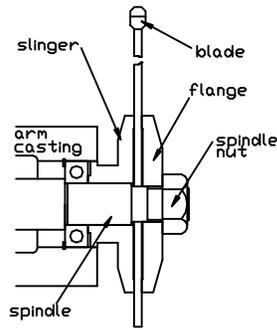
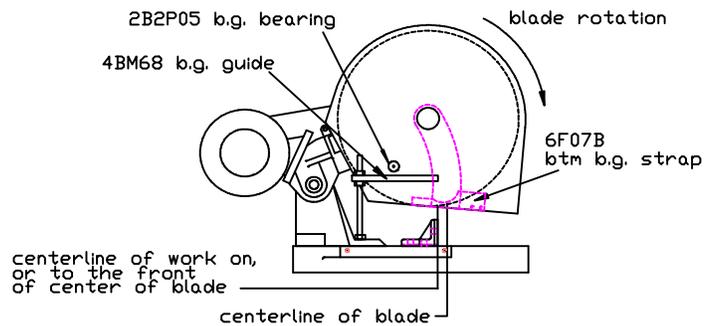


Diagram "D"



*These machines are general purpose in their design, therefore the user should attach any additional guarding to the blade guard or table base if the cutting application causes unsafe blade exposure.*

This label is attached to the blade guard. ***Never put hand or fingers near or under the moving blade.*** Use a piece of wood to remove short pieces from saw.

**Blade Guard:** The blade guard and belt drive are enclosed. When the saw arm is lowered, the Blade Guard Bearing, P/N 2B2P05 contacts Blade Guard Guide, P/N 4BM68. The blade continues through the work as the blade guard rides forward on the guide. Always keep the blade guard guide as close as possible to the material for maximum protection of the operator.

**Electrical Installation:**

The CTD 400 Series Cut-Off Saws use 7-1/2 H.P. three phase 1725 RPM, 60 HZ TEFC (totally enclosed fan cooled) motors on a NEMA 213T or 215T Frame. CTD uses a speed up drive so that the blade will run at approximately 2900 RPM for a 16" blade and 2700 RPM for a 20" blade.

Electrical installation should be performed by a qualified and certified electrician. It is highly recommended that a lock-out or disconnect switch be located close to the machine between your main electrical panel and the machine. This disconnect switch is used to shut off power to the machine and should be used whenever the blades are changed or at any time the machine is serviced and the blade is exposed. A Magnetic Starter (OSHA required) is standard on the machine. The starter protects the motor from overheating and will not allow the motor to restart itself after power outages or undervoltage situations.

**Electrical Installation of Power to Starter by a Qualified Electrician:**

All wiring from the motor to the starter has been completed and tested at the factory several times. The voltage has been clearly tagged. ***DO NOT CONNECT ANY VOLTAGE THAT IS DIFFERENT THAN THE TAGGED VOLTAGE, AS THIS MAY CAUSE SEVERE DAMAGE AND DANGER.*** Consult the factory if any changes are needed. Bring power lines to the top of the Magnetic Starter. Use dust proof connectors if available.

**Three Phase Motors:**

Connect incoming power line leads to L1 (line 1), L2, and L3. (See Wiring Diagram for Three Phase Motors below.) Green ground wire must be grounded to enclosure. *Be sure to check rotation* as polarities may be different. The blade must rotate down and to the rear on the underside of the blade (see Diagram "D" on Page No. 4).

If a change in rotation is necessary, reverse any two of the incoming power wires. *Example:* *If the blades are running backwards and incoming wires are connected White L1, Black L2, and Red L3, switch the Black wire with the Red so that Black is connected to L3 and Red is connected to L2. This will change the motor to rotate properly.*

## Motor Load Amperes

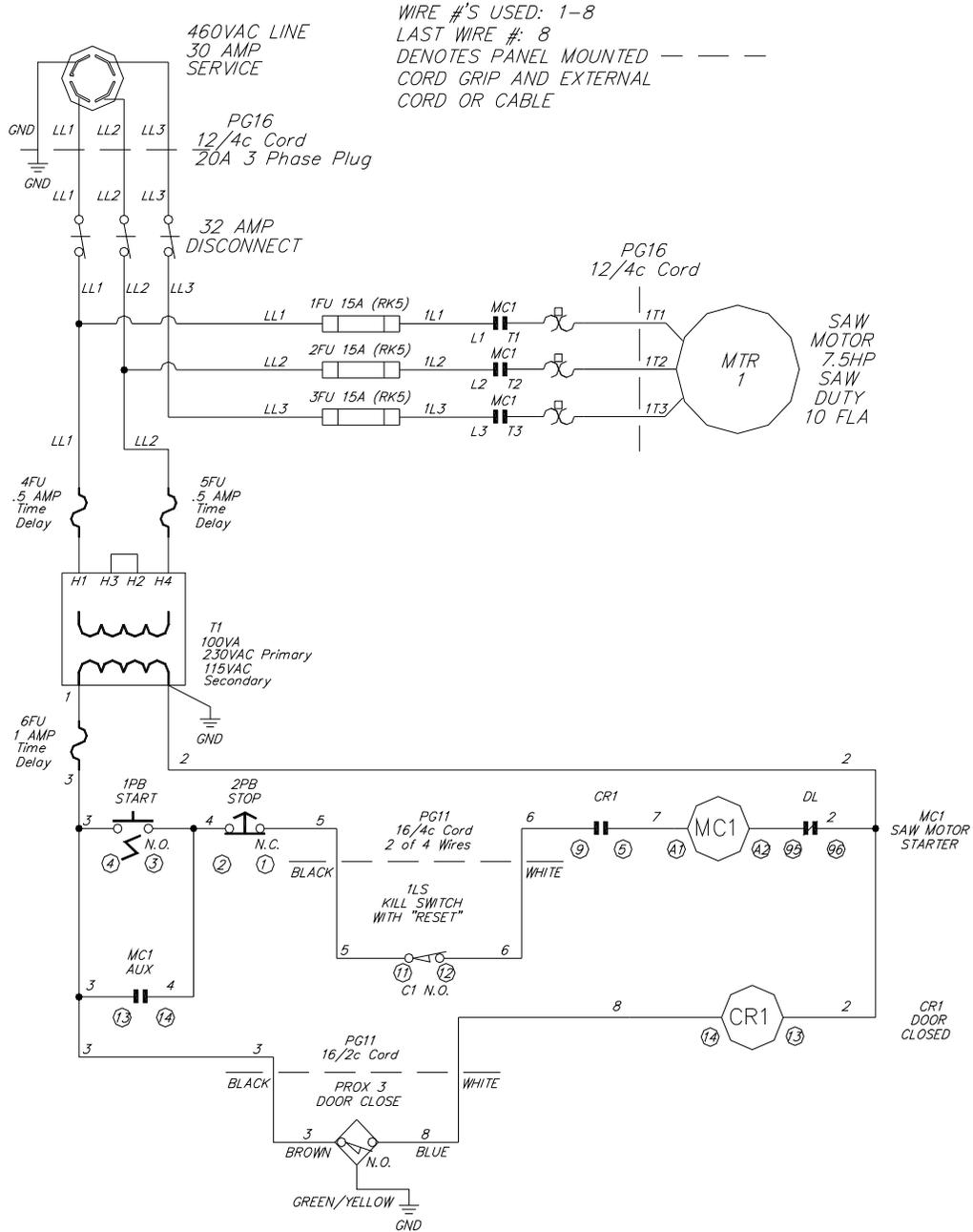
<u>Motor Size</u>	<u>208 Volt</u>	<u>230 Volt</u>	<u>460 Volt</u>
7-1/2 H.P., 3 Phase	21.5 amps	20 amps	10 amps
10 H.P., 3 Phase	28 amps	26 amps	13 amps
15 H.P., 3 Phase	37.5 amps	34 amps	17 amps

### Safety Instructions to the Operator:

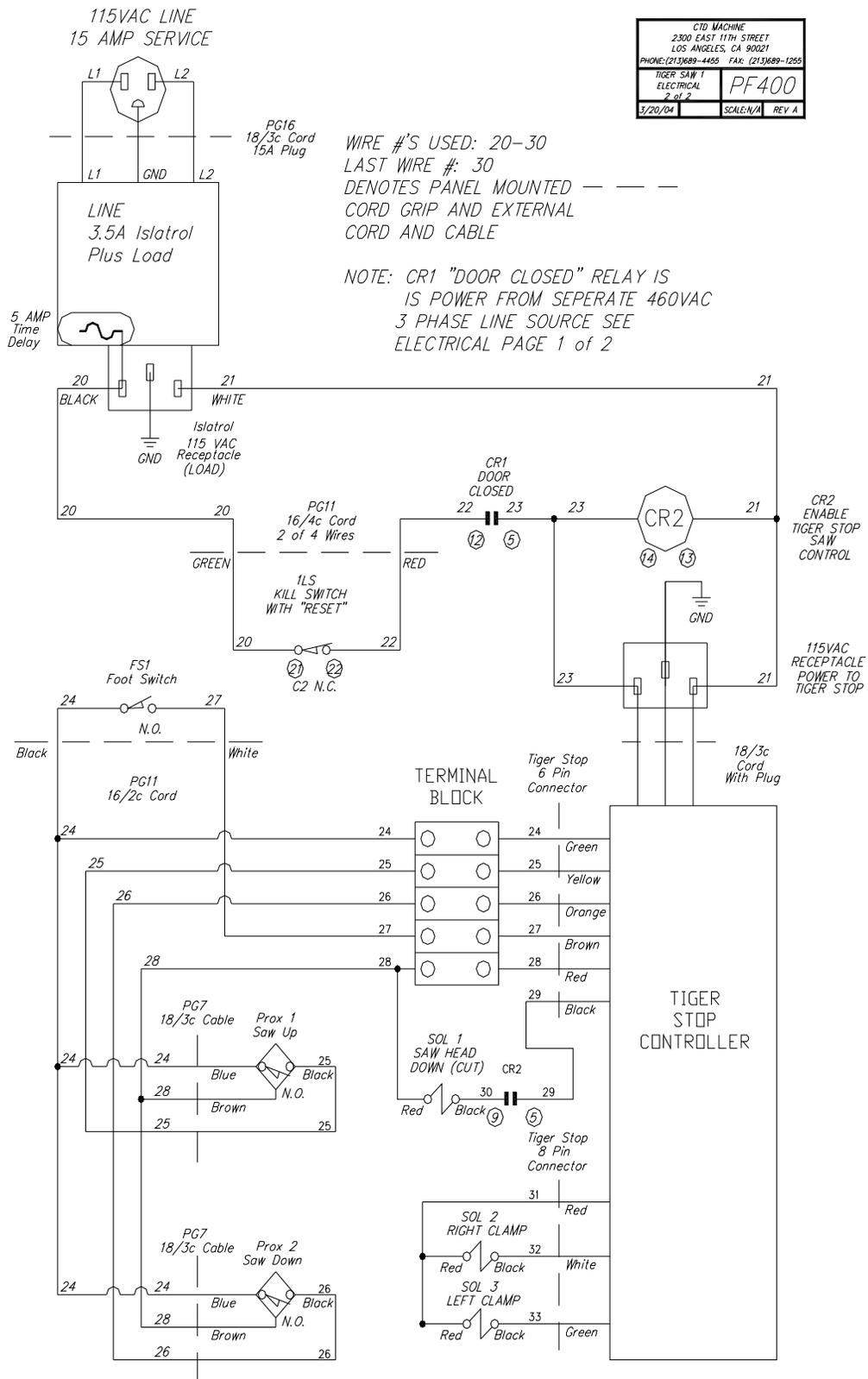
1. *KNOW YOUR CTD SAW.* Read this instruction manual carefully. Learn the operation, application, and limitations, as well as the specific potential hazards peculiar to this machine.
2. Avoid accidental starting. Make sure switch is **OFF** before plugging in power cord. A Magnetic Starter (which is OSHA required by user) is provided standard on the machine to give the operator added protection.
3. *Always* use a plug equipped with a ground.
4. *Always* keep blade guard in place. Do not wire-up or chain-up, so that blade is exposed.
5. Be sure all unnecessary tools are removed from machine before turning on power.
6. Use safety goggles. Also use a face or dust mask if operation is dusty.
7. Support work. To maintain control of work at all times, it is necessary that material be level with cutting surface.
8. Wear proper apparel. Do not wear loose clothing or jewelry. Do not wear a tie or gloves. These items can get caught in the moving parts of the machines.
9. Do not over-reach. Keep your proper footing and balance at all times.
10. Maintain your machine in top condition. Use proper blades. Clean machine weekly for proper maintenance.
11. Keep work area clean. Cluttered areas, benches and slippery floors invite accidents.
12. Avoid dangerous environments. Keep work area well illuminated.
13. Wear ear protection if exposed to long periods of very noisy shop operations.
14. Keep visitors away. All visitors should be kept a safe distance from work area.
15. Do not force the machine. The saw will do a better job and be safer to operate at the speed for which it was designed. Forcing the saw can be very hazardous to the operator.
16. Use recommended accessories. Use of other accessories may be hazardous. Use this instruction manual or consult CTD for the proper accessories available.
17. Do not drown the blade using a steady stream of coolant when cutting non-ferrous material. Only spray the work to cool it.
18. Be sure to use the proper blade for the particular material to be cut.
19. Disconnect power cord before adjusting, servicing, and before changing belts, or for installing accessories.
20. Safety is combination of operator COMMON SENSE and ALERTNESS at all times when the machine is being used.
21. ***WARNING!!! DO NOT ALLOW FAMILIARLITY (GAINED FROM FREQUENT USE OF YOUR SAW TO DULL YOUR AWARENESS!! ALWAYS REMEMBER THAT A CARELESS FRACTION OF A SECOND IS SUFFICIENT TO INFLICT SEVERE INJURY!!***

# ELECTRICAL WIRING DIAGRAM 1

CTD MACHINE 2300 EAST 11TH STREET LOS ANGELES, CA 90021 PHONE: (213) 689-4455 FAX: (213) 689-1255		
TIGER SAW 1 ELECTRICAL 1 of 2	PF400	
3/20/04	SCALE: N/A	REV: A



## ELECTRICAL WIRING DIAGRAM (CONTINUED 2)



## **How to operate the PF400 Series Single Cut-Off Saws:**

Before operating the machine, please read the “SAFETY INSTRUCTIONS TO THE OPERATOR” on Page 8. Other important information and features need to be learned before operating the machine.

### **Rotation:**

The blade must rotate to the rear of the machine on the underside of the blades (see Diagram “D” on Page No. 4).

### **Blade Guard and Safety Gage:**

The blade and belt drive are enclosed. When the saw arm is lowered, the blade guard bearing, P/N 2B2P05 contacts Blade Guard Guide, P/N 4BM68. The blade continues through the work as the blade guard rides forward on the guide. *Never remove any blade guard part, exposing the blade.* Always keep the Blade Guard Guide as close to the material as possible for maximum operator protection. The safety cage encloses the entire sawhead and base portion of the machine. The opening door has a lockout switch interlocked with the door. Opening the door with the motor running will automatically shut down the machine.

## **Initial Operating & Set up Instructions**

1. Plug in 110V power cord from Autostop Controller to control box (located at bottom of Saw Control Box).
2. Attach data cable as described in Tiger Stop Manual.
3. Attach pin connector from Tiger Stop Motor Box to Tiger Control Panel.
4. Connect Power source for saw (typically 3 phase 230 or 460V) and 110V power source from saw Control box.
5. Connect Air Supply.
6. Connect Kill Switch cable from Control Box to Kill Switch Box. (White-12; Black-11 Red-21; Green-22)
7. Push Kill Switch (blue button) in to reset.  
(Yellow pointer should be located in the center of indicator window.
8. Close front door.)
9. Turn on main Rotary Power Switch.
10. Push Green Start Button (located on front of Saw Control Box) to start saw motor (Red Stop Button must be released by turning button).
12. Turn on Tiger Stop Switch located on blue Tiger Stop Motor Box.
13. Follow instructions in Tiger Stop manual for set up routine.
14. To Stop or Start cycle, press the foot switch once. This allows operator to take break & come back without resetting machine or setup

Refer to Tiger Stop manual for programming information. See page 44.

### **Horizontal Air Vises:**

The two Horizontal Air Vises are six inch stroke cylinders. Each cylinder comes with a stop block to limit the stroke. It is recommended to adjust this block so the cylinder pad is positioned within 1/4” of the material to be clamped. The cylinder will now return to a shortened stroke position. This eliminates extra unnecessary cylinder movement. The vises are actuated by two four way valves prior to the sawhead cutting action.

**Horizontal Vises should be positioned at 3 5/8” FROM THE REAR FENCE (NO CLOSER). This allows the 3 1/2” wide pusher foot to push material forward to the blade without interference or damage.**

### **CAUTION:**

When cutting shorter pieces at the end of a length of material, make sure Horizontal Vises **do not contact** the Vertical clamp in down position. **This will damage the cylinder on the Vertical clamp assembly.**

### **NOTE:**

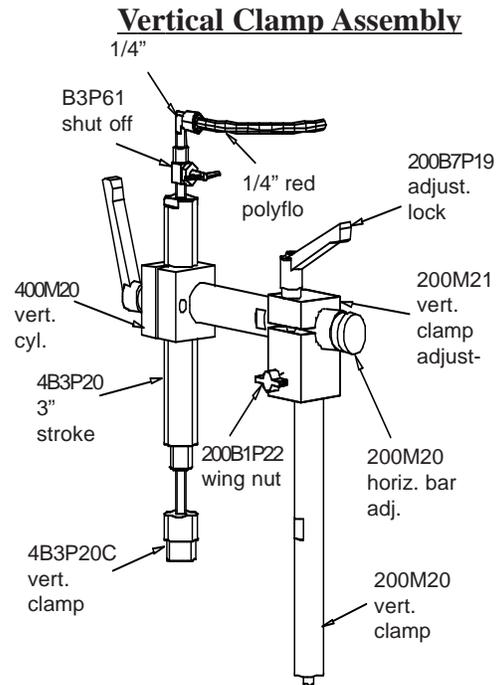
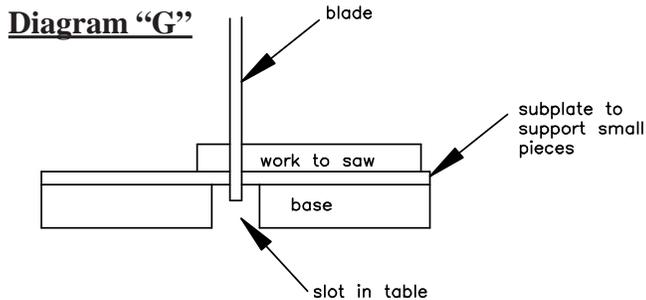
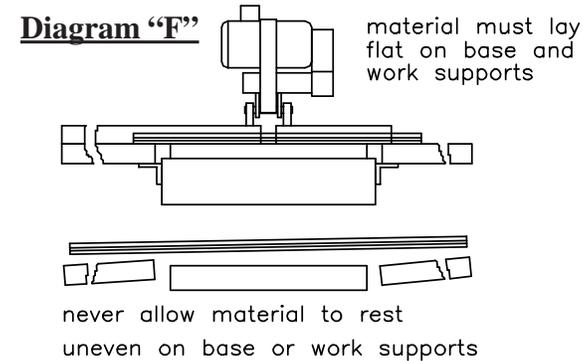
The pushfeed mechanism as it pushes the last portion of the stock length (less than 8”) of material toward the blade, will back off, so that the clamps will **not contact** the feeding mechanism (thereby causing damage to the mechanism). **!DO NOT CHANGE THIS SAFETY SET-UP!**

## Clamping and Work Slippage:

The work must never be allowed to move or vibrate as it is being cut. When the work is positioned it must be clamped by pneumatic air vises and clamps. CTD offers both Horizontal Air Vises and Vertical Clamps. The Horizontal Air Vise pushes the material backwards against the rear fence. Vertical Clamps hold the material down, against the table base. The clamps are actuated prior to the saw head movement down.

## Cutting the Material:

The material to be cut (both the incoming pieces and the cut pieces) must lay flat on the table base, or the blade may bind the material. ***THIS CAN DAMAGE THE BLADE OR THROW THE CUT PIECE OUT OF THE SAW, POSSIBLY HARMING THE OPERATOR*** (see Diagram "F").



## Removing Material From the Blade:

If the machine is stalled while cutting, immediately shut saw off and disconnect power. ***NEVER attempt to free the blade while the motor is still on.*** If a piece is bound on the blade, do not attempt to raise the blade out of the material. Instead, tap the piece down on both sides of the blade with light pressure until the piece has freed the blade.

## Cutting Wood:

While wood is generally soft and simpler to cut than aluminum, it requires that the material be held in place as the blade passes through the material. CTD suggests using a Carbide Blade with Alternate Top Bevel (AT) for lighter wood sections and picture frame mouldings. This type of blade gives the finest of finishes. No ***ONE*** blade will cut all material perfectly. High laquers or mica moulding may require a special modified blade for best results. Consult factory. ***Never use a wood blade to cut aluminum,*** as it will chip and fracture the carbide tips of the blade.

## Cutting Plastic:

Plastic can be cut as easily as wood on the 400 Series Saws. However, because of its elastic properties, the material can deflect as the blade passes through. Therefore, it is important to clamp the material as close as possible to the blade and support it by use of fixtures. CTD offers Horizontal and Vertical Clamps for this application. Additional tooling may be required.

## Cutting Aluminum:

As with cutting any material, it is important that aluminum be clamped properly. Precision blades are required for accurate cutting. CTD suggests and uses a Triple Chip Grind on all its non-ferrous Carbide Blades. When cutting aluminum, or other non-ferrous materials, it is essential that the blades be lubricated with a Sawblade Lubrication System or other blade lubricating system for the finest finish. See "Sawblade Lubrication System" on the next page for more details.

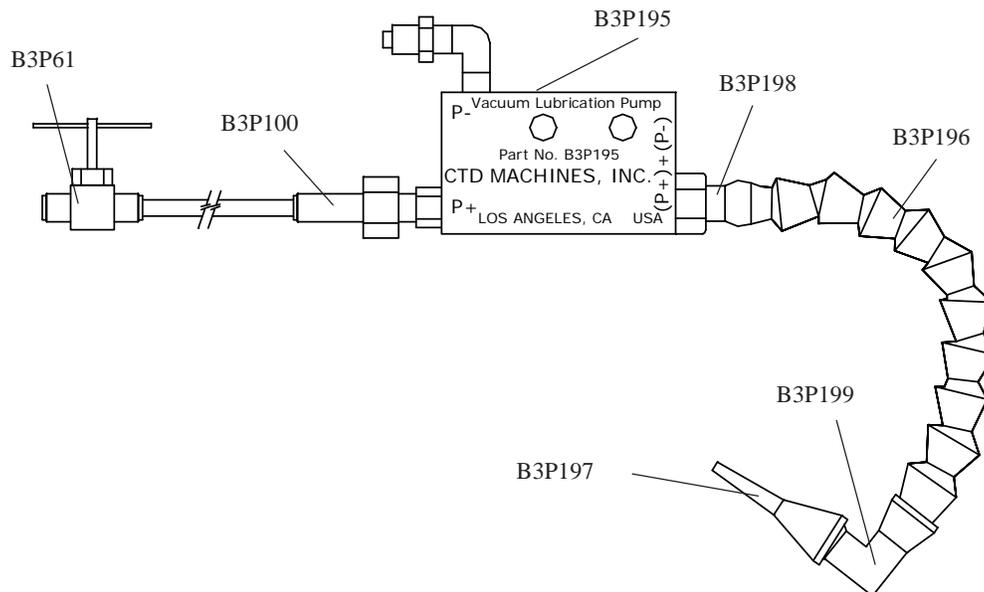
## Combination Blades:

Any combination blade is basically an aluminum cutting blade. Significant blade life in between sharpenings will be lost if a blade is used for cutting both aluminum and wood. The amount of production for either wood or aluminum should be the determining factor in the assessment of the particular blade type to be used. Please consult factory.

## Sawblade Lubrication System:

The Sawblade Lubrication System is used when cutting aluminum or other non-ferrous materials. This system normally uses a Water Soluble Oil mixture of *10 parts water to one part oil*. The system operates by syphoning the lubrication up the line to the spray nozzle. Any air leak will cause inconsistent fluid flow to the spray nozzle. ***BE SURE*** your fluid is free from chips and other debris. A fluid container supplied with the machine contains a One-Way Check Valve, Part No. B3P96 at the end of the clear fluid line. This check valve helps to hold the lubrication in the line, however after a couple of minutes the lubrication or oil will back-flow into the container. Priming of the system may be necessary if the machine has been standing without use. The system may be shut off by closing the toggle valve next to the vacuum pump. The fluid must be clean or the Vacuum Pump will clog.

<u>Part No.</u>	<u>Description</u>
B3P195	Vacuum Pump
B3P196	Link Tubing
B3P197	Spray Nozzle Fitting
B3P198	1/8" NPT Adapter
B3P199	1/4" Elbow fitting
B3P61	Shut Off Toggle Valve
B3P100	1/8" NPT to 1/4" tube fitting
B3P96	Check Valve
B3P97	Lubricant Container
BF30	Bracket for SLS



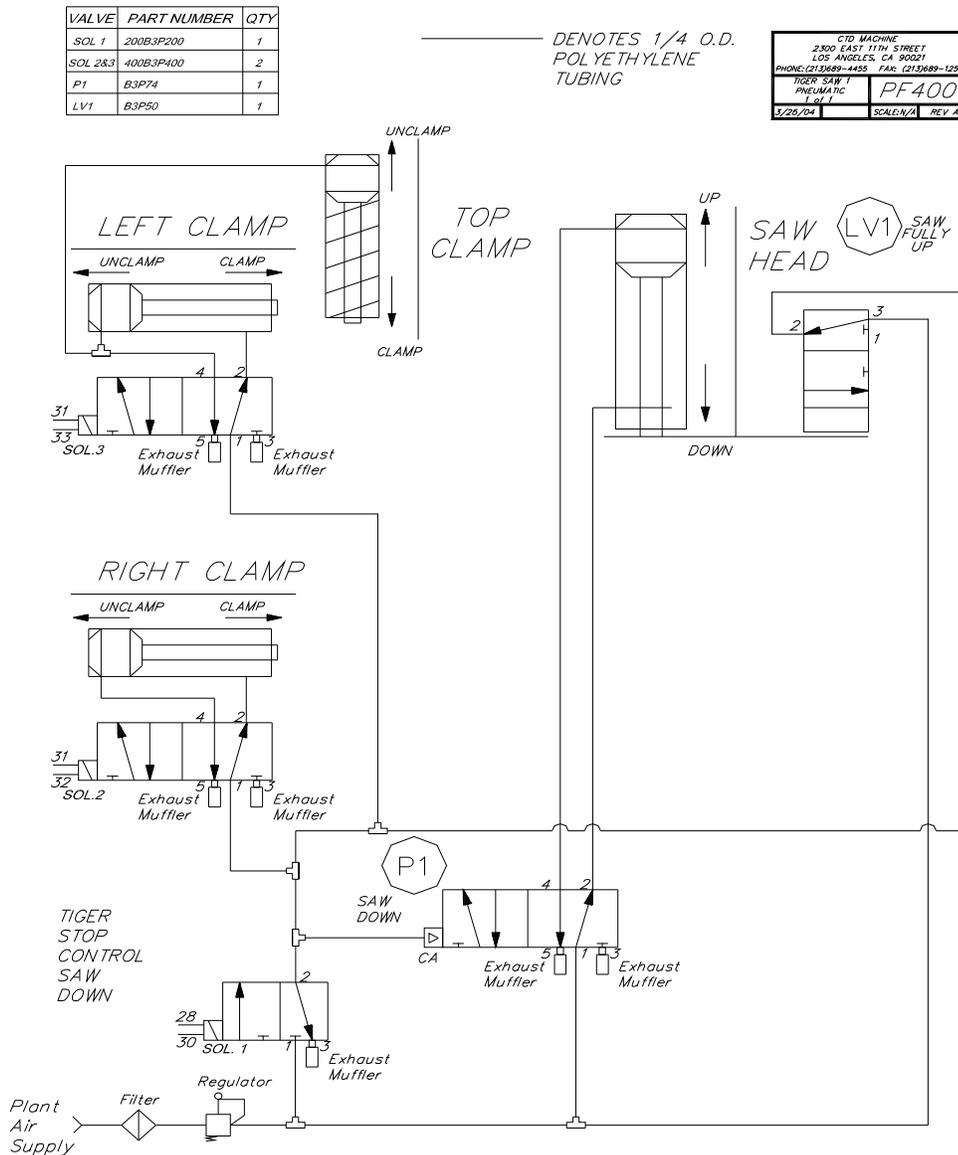
## CTD Bio Lubrication System:

The CTD biodegradable lubrication system operates by pulse spraying a minute amount of biodegradable lubricant directly on to the saw tooth of the blade in time-measured increments. The majority of the lubricant then dissipates with the heat of the cutting action. Chips coming off the blade are hot and dry, and are more easily collected. (See specific instructions included with system.)

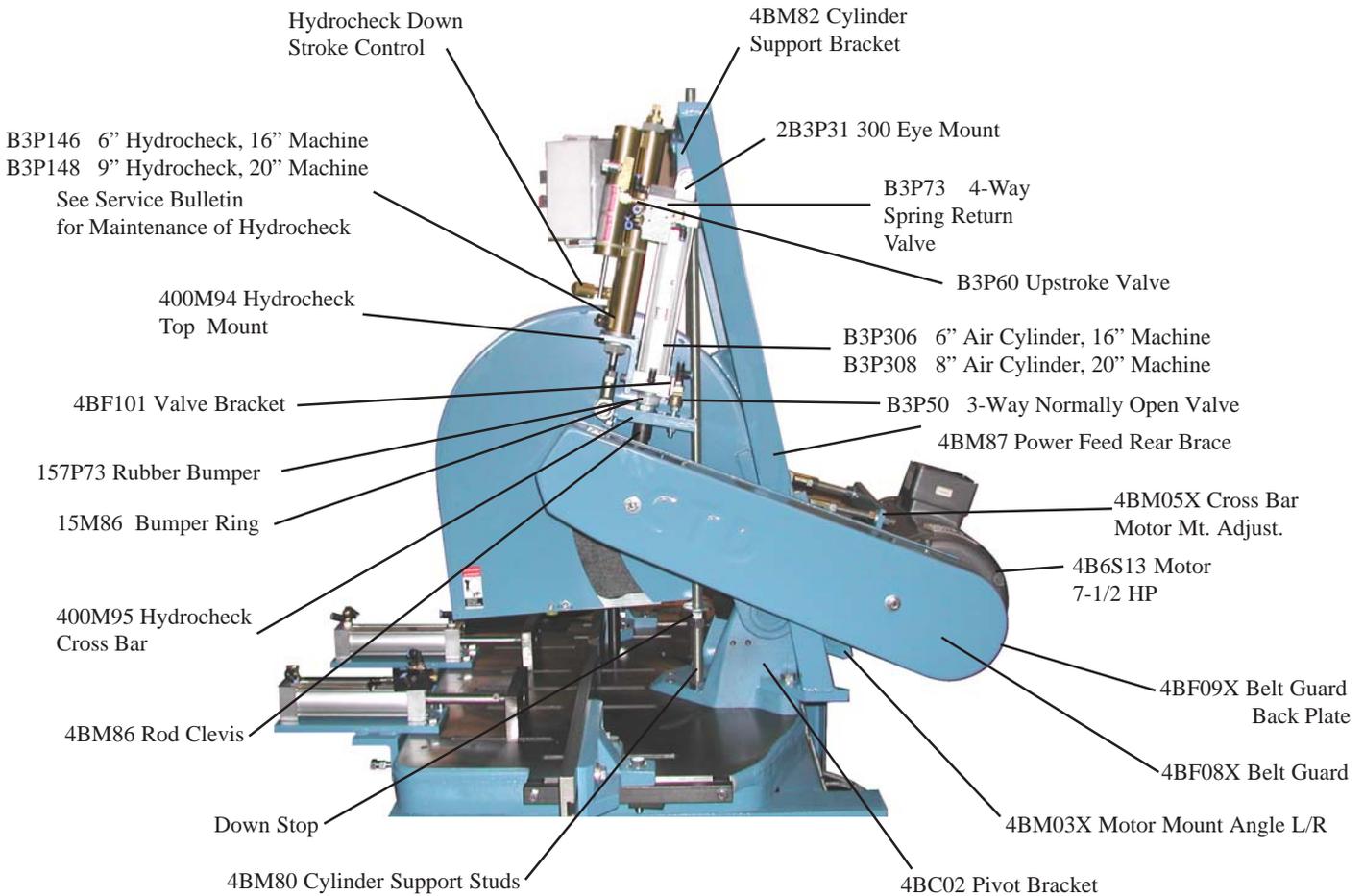
# 400 Series Air/Pneumatic System:

The air pneumatic system on the 400 Series Models is simple to use and understand, and easy to operate. The main components of the air system are shown below in the Air Circuit Piping Diagram. The system operates using a Two-Hand Anti-Tie Down Control for safety. Included with the air pneumatic system is the main drive Cylinder and Valves, an Air Filter/Regulator/Lubricator, two horizontal air vises and one Vertical Pneumatic Clamp. The pneumatic vises and clamps hold the material and the main drive cylinder, P/N B3P306 for 16" machines, or P/N B3P308 for 20" machines, pushes the saw down. A Hydrocheck for precision controlled downstroke is also used. The speed of descent is controlled by the Hydrocheck, P/N B3P146 for 16" machines, and P/N B3P148 for 20" machines located next to the Cylinder. When the saw reaches the downstroke limit proximity switch, the main drive cylinder reverses and the sawhead returns to the rest position. This allows the pushfeeder to move forward. The process then repeats itself.

*Air Circuit Schematic PF400*



## 400 Air/Pneumatic System Diagram



No.	Part No.	**	Description
1	B3P306		6" Air Cylinder—drive for saw head, 16" machine
1	B3P308		8" Air Cylinder—drive for saw head, 20" machine
1	B3P146		6" Hydrocheck—speed of saw down, 16" machine
1	B3P148		9" Hydrocheck—speed of saw down, 20" machine
1	B3P73	P1	4-Way Spring Return Valve, main control valve
1	B3P50	LV1	3-Way Normally Open (N/O) Valve, controls accessory items SLS and VC/400
1	B3P60		Upstroke Valve, speed of saw up
1	157P73		Rubber Bumper
1	15M86		Bumper Ring
1	B3P54A		FRL Unit with Auto Drain
1	4BF101		Valve Bracket
2	4BM80		Cylinder Support Studs
1	4BM82		Cylinder Support Bracket
1	4BM86		Rod Clevis Cylinder
1	4BM87		Power Feed Rear Brace
1	400M95		Hydrocheck Cross Bar
1	400M94		Hydrocheck Mount Bracket / Cylinder Top
1	B3P86	S1	Shuttle Valve
1	2B3P31		300 Eye Mount

See Pneumatic Clamp Parts on back page

\*\*Refer to Air Schematic on Page No. 10

## Air Supply:

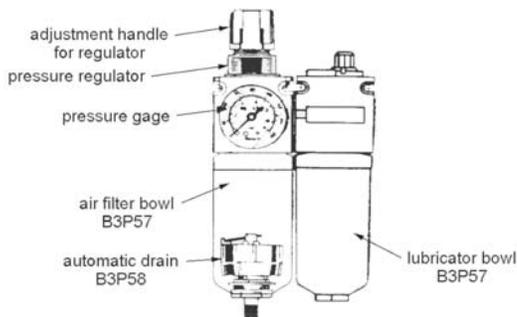
The air supply must be turned off and all electrics disconnected before making adjustments on the power feed. A working pressure of 75 PSI (pounds per square inch at 5.4 kg/cm<sup>2</sup>) is required. An industrial-type compressor of at least 5 CFM (cubic feet per minute) is recommended. An additional 3 CFM is required for Saw Blade Lubrication. A conveniently located valve should be supplied by the user to shut off the air line. **Arms should be raised or lowered *by hand* when setting up machine.** The machine must use clean, filtered air. The speed of descent of the saw head will vary if the air pressure varies. An Air Filter/Regulator/Lubricator is essential.

## FRL:

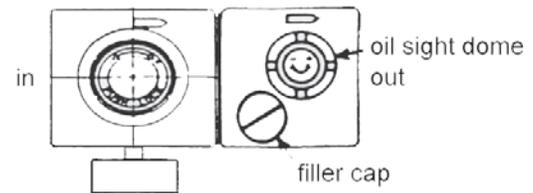
An Air Filter/Regulator/Lubricator is installed ahead of the air inlet to the machine. This system helps prevent foreign material from entering the system. It also provides lubrication in the air supply which helps prevent valves and cylinders from sticking. The FRL is comprised of three different components.

1. The Air Filter Bowl is located on the left side and is provided with an automatic drain. This collects and then releases foreign matter and condensation collected by the air filter.
2. The Pressure Regulator, which is located on top of the air filter, controls the amount of air pressure allowed into the system. An operating pressure of 75 PSI @ 5.4 kg/cm<sup>2</sup> is required. (This is set at the factory.)
3. The Lubricator Bowl is located on the right side of the FRL. It allows a small amount of Light Hydraulic Oil (10 weight) into the air system to keep the air valves lubricated. One drop of oil per 20-30 strokes is all that is required. All machines are adjusted at the factory. Be sure that the lubricator is filled regularly. Check every week.

### Air Filter/Regulator/Lubricator



Complete FRL Assembly is Part No. B3P54A



## Trouble Shooting the Pneumatic System for Downfeed of Saw Head:

If the Air Feed no longer has smooth action, check the Hydrocheck oil level. See separate instructions on Hydrocheck.. If there is no Speed Control, the Hydrocheck may need oil. Consult factory. If air is leaking from the bottom of the cylinder, replace Cylinder with Part No. B3P306 or P/N B3P308.

### **Hand Valve:**

The Hand Valve, P/N B3P75 actuates the clamps into position. Once the Hand Valve is pushed, the Two Hand Anti-Tie Down Control is energized and ready to activate. As soon as the Two-Hand Control buttons are depressed, the clamp pressure will be maintained by Limit Valve #1, P/N B3P50.

### **Speed Control of Blade Movement:**

The downstroke speed of the blade is controlled by the Hydrocheck, P/N B3P146 or P/N B3P148 located next to the main drive Cylinder, P/N B3P306 or P/N B3P308. The Upstroke Control Valve, P/N B3P60 is located in port No. 5 of the main control Valve, P/N B3P73. Simply rotate head of valve and adjust *in* to slow down, or *out* to speed up.

### **Preventative Maintenance:**

The 400 Series machines are relatively easy machines to operate and maintain. Following is a weekly check list of General Maintenance items. The best preventative maintenance advise is to *CLEAN THE MACHINE DAILY*, especially around the pivot points on the machine.

### **Lubrication and Adjustments of Bearings:**

**NO LUBRICATION OR ADJUSTMENTS ARE REQUIRED.** All CTD cut-off saws are assembled using sealed, prelubricated ball bearings. The spindle and pivot assembly are constructed using preloaded belleville springs. These springs eliminate the need for adjustments of bearings and also greatly increase the life of the bearings.

### **General Maintenance Weekly Check List:**

Always disconnect electrical power and air supply.

1. Keep machine clean—especially around pivot bracket and pivot bearings.
2. Blow off and clean around the cylinder
3. Check the oil level in the FRL unit (Air Filter/Regulator/Lubricator) if purchased.
  - A. Fill with *Light Hydraulic Oil, 10 wt.* Do not overfill.
4. Check Air Filter Bowl for water and condensation build up.
5. Remove any scrap pieces and dust build up from inside floor stand.
6. Check monthly;
  - A. For excessive belt wear
  - B. Make sure motor pulley set screws are tight.

### **Repair and Service:**

Always use CTD factory authorized replacement parts and consult factory before making any repairs or adjustments which may be unclear.

### **Fence Alignment :**

All machines are preset at the factory for perfect 90° cuts. If any adjustments are necessary;

1. Check alignment of fences—left to right as shown in Diagram “E” on Page No. 7. Use a two foot steel scale or quality precision straight edge and lay flat on table base. Butt edge against fence bracket and long measuring gage (if purchased). Touch the outside corner of the straight edge. If one side of the straight edge pulls away from the fence, then the long fence gage is not in alignment with the Right Fence, P/N 400M05.
2. Loosen 3/8-16 lock nut on Left Fence Bracket, P/N 41C04L and Fence Support Angle, P/N BF16. Clean all surfaces of dirt or dust, and re-assemble as before (see Diagrams “A” & “B” on Pages No. 3 & 4).
3. Re-align right fence to left fence with your straight edge. Once you are sure both fences are in alignment, you now have a reference point to check your blade alignment.

### Irregular Mitres:

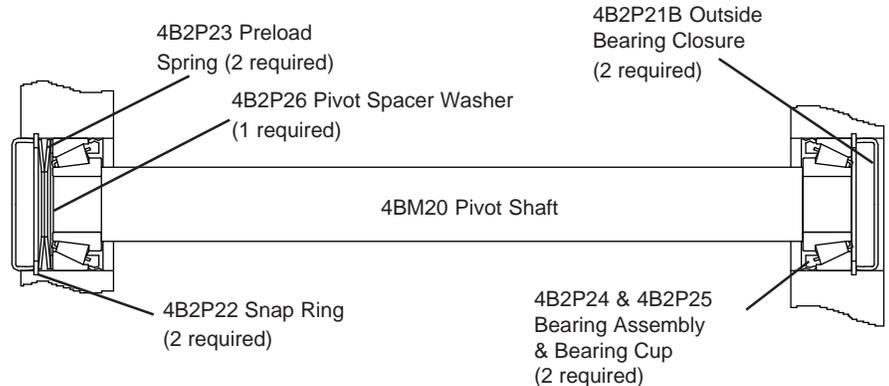
Irregular cuts are almost always caused by out-of square material. Check your material with a 90° square and a straight edge. Material that has a high spot on the bottom will move, or roll forward as it is being cut (even with pneumatic hold down clamps), thereby causing the blade to cut more on the inside of the moulding than the outside. Another cause of irregular cuts is too thin a blade plate thickness. Blade plate thickness should be .120 to .130 on 16" blades and .150 to .160 on 20" blades. Blades will find the easiest avenue to cut through material, and sometimes the blade plate will distort when cutting heavier sections. The drawing is an example of a cut when blade plate is too thin for the material being cut.

### Other Repairs:

See specific areas within the manual for additional information on repairs and maintenance.

### Pivot Shaft Assembly for 400 Series:

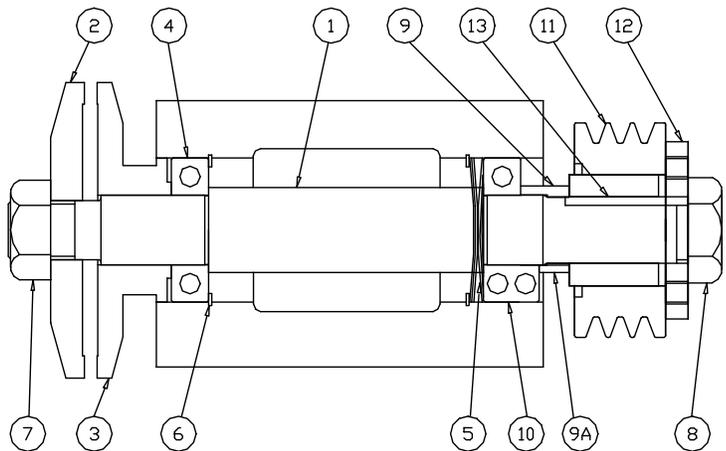
The Pivot Shaft Assembly is engineered to practically eliminate any maintenance during the life of the machine. The diagram of the assembly is for reference only.



### 400X SPINDLE ASSEMBLY

No.	Description	Part No.
1	Spindle	4BM41X
2	Flange	4BM43
3	Slinger	4BM44
4	Bearing (2 required)**	4B2P45
5	Preload Spring (4 required)	4B2P46
6	Snap Ring (2 required)	4B2P47
7	Nut, Blade—Left thread	4B1P48
8	Nut, Jam—Right thread	4B1P49X
9	Spacer	4BM50X
9A	Spacer (for 15 HP)	4BM51X
10	Bearing, Double Row (for 15 HP only)	4B2P45C
11	Pulley (per individual order)	B4P3P3V
12	Bushing, Pulley	B4PP118
13	Key, Pulley	4BM23A
14	3VX630 Drive Belts	4B4P3V630

\*\* Use two #4 bearings are for 7.5 H.P and 10 H.P. motors. Use one #4 and one #10 bearing for 15 H.P. motor.



Part No. **4BM40X Spindle Assembly** consists of following parts assembled together with the face of the slinger ground:

- A. Spindle, No.1
- B. Bearings, No. 4 (2 each)\*\*
- C. Slinger, No. 3
- D. Flange, No. 2

Note: Items 1-4 are assembled, items 5, 6, 7, 8, 9 & 13 are included Spindle Assembly, but are shipped loose.

## **400X Spindle Assembly and Bearing Installation Instructions:**

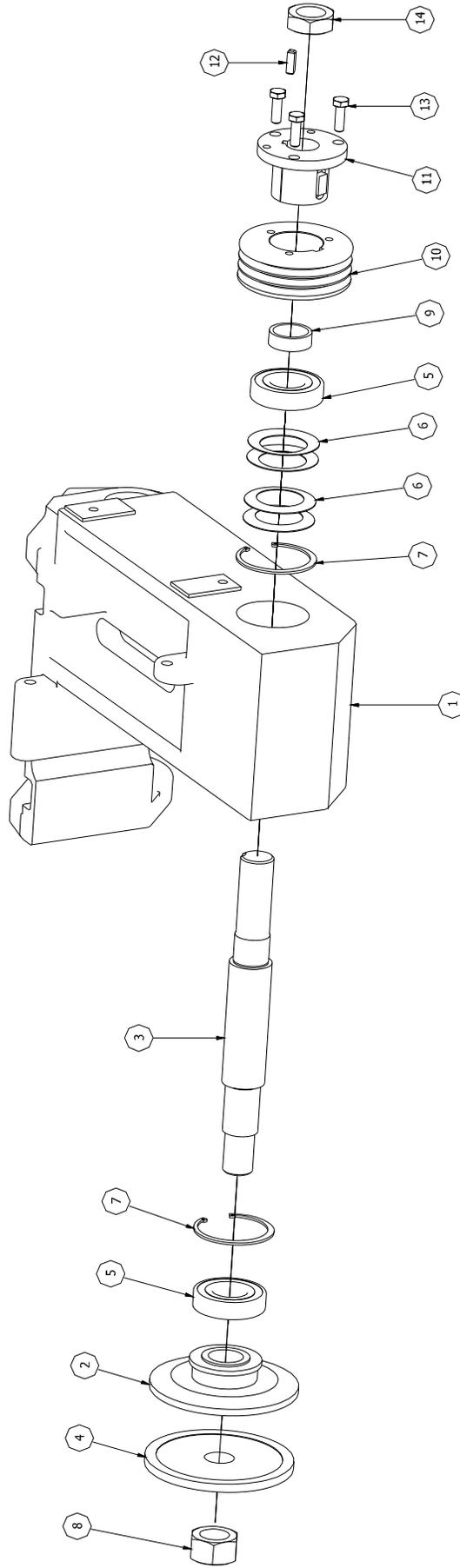
Refer to Spindle Diagram on previous page.

Spindles are assembled using a fool-proof, tamper-proof snap ring assembly. The preload belleville springs automatically provide the exact bearing preload necessary for continued high performance and long life of the bearings. There are no adjustments needed. The outer race of the bearings are a tight *slip-fit* in the housing of the arm. The inner race is a *press fit* on the spindle. It is suggested that replacement spindle assemblies be purchased from CTD before disassembly. The old spindles can be returned for bearing replacement and slinger facing for a nominal charge. If replacement spindle assemblies are not on hand, a machine shop service must be available for replacement of spindle bearings. Read and understand the following instructions before disassembly. *Great care must be taken with ball bearings* or the life of the bearing will be reduced.

### **To Remove Spindle Assembly:**

- A. Remove Nut #8 by holding pulley bushing, and remove Pulley #11. In most cases, the 400X Spindle is assembled using a split tapered bushing which compresses onto the shaft. This bushing is bolted to the pulley with bolts usually located at #12. These bolts also act as jackscrews. By transferring them to the tapped holes in the bushing, they will force the pulley off of the bushing—at which time both the pulley and bushings may be removed from the spindle. Partially re-assemble nut to protect threads on spindle.
- B. With soft hammer, gently drive spindle towards blade side. Take care to protect pivot bearings by holding arm casting on blade side to overcome effects of hammer blows.
- C. Spindle Assembly, consisting of Spindle #1, Slinger #3, and Blade Bearing #4, will come out of housing. Pulley bearing will slip out from pulley side. Normally it is the pulley side bearing that fails first. If replacement Spindle Assembly was purchased, go to “G”.
- D. If the bearing on the blade side must be replaced, an arbor press must be used to disassemble the bearing and slinger from the spindle. Great care must be used in disassembly or the spindle will be scored and stripped by the slinger. Before pressing apart, scribe a line on the face of the spindle and slinger so that they will be re-assembled exactly in the same position in relation to each other.
- E. Upon re-assembly of blade bearing and slinger, the face of the slinger must be checked to make sure the face (next to the blade) is running true.
- F. If face is not running true, it should be refaced. Partially assemble pulley bearing on spindle. Hold outer races of both bearings in vice lightly and use side of a surface grinder wheel to dress face, by rotating spindle in bearings slowly against direction of grinding wheel.
- G. Be certain before re-assembly of spindle in arm that Springs #5 are assembled as in diagram. To re-assemble spindle assembly, slip assembly consisting of Spindle #1, Slinger #3 and Bearing #4 into arm housing up to snap ring.
- H. Make sure Belleville Springs are assembled properly. Install Pulley Bearing #4, for 7.5 or 10 H.P. motors and bearing #10 for 15 H.P. motor, onto spindle as far as possible, then Spacer #9.
- I. Put Pulley Key #13 into shaft keyway.
- J. Place Pulley #11 onto Bushing #12 and slide onto shaft. Install Nut #8.
- K. Hold pulley bushing with pipe wrench and tighten nut which will press Bearing #4 (for 7.5 & 10H.P. motors and #10 for 15H.P. motor) onto shaft. Tighten until bearing bottoms out against shoulder of bearing seat.
- L. Install three bolts to pulley bushing located at #12 in diagram. Tighten evenly.
- M. *Belt tension is of critical importance.* To get proper tension, press down on top of belts with a moderate amount of pressure (five pounds). The belts should deflect about 1/2 inch.
- N. If motor must be moved, centerline of shaft and spindle must be parallel. Both pulleys must be in line or belts will not wear evenly. This should be checked by placing a straight edge across both pulleys.

# 400S Right Spindle Assembly



**Note:**

For 15 HP motor replace Spacer (p/n 4BM50X) with Spacer (p/n 4BM51X).  
 Also, replace slinger side bearing (p/n 4B2P45) with a Double Row Bearing (p/n 4B2P45C).  
 Spindle Pulley (#10) changes to B4P43V41 for 16" machines & B4P43V47 for 20" machines.

Parts List			DESCRIPTION
ITEM	QTY	PART NUMBER	
1	1	4BC01	Arm Casting, Rt.
2	1	4BM44	Slinger
3	1	4BM41X	Spindle
4	1	4BM43	Flange
5	2	4B2P45	Bearing
6	4	4B2P46	Preload Spring
7	2	4B2P47S	Snap Ring
8	1	4B1P48	Nut, Blade-Left Thread
9	1	4BM50X	Spindle Spacer
10	1	B4P3V36	Spindle Pulley
11	1	B4PF118	Bushing, Pulley
12	1	4BM23A	Key, Pulley
13	3	5/16-18 x 1 Hex Bolt	Pulley Bushing Locking Bolt
14	1	4B1P49X	Nut, Jam-Right Thread

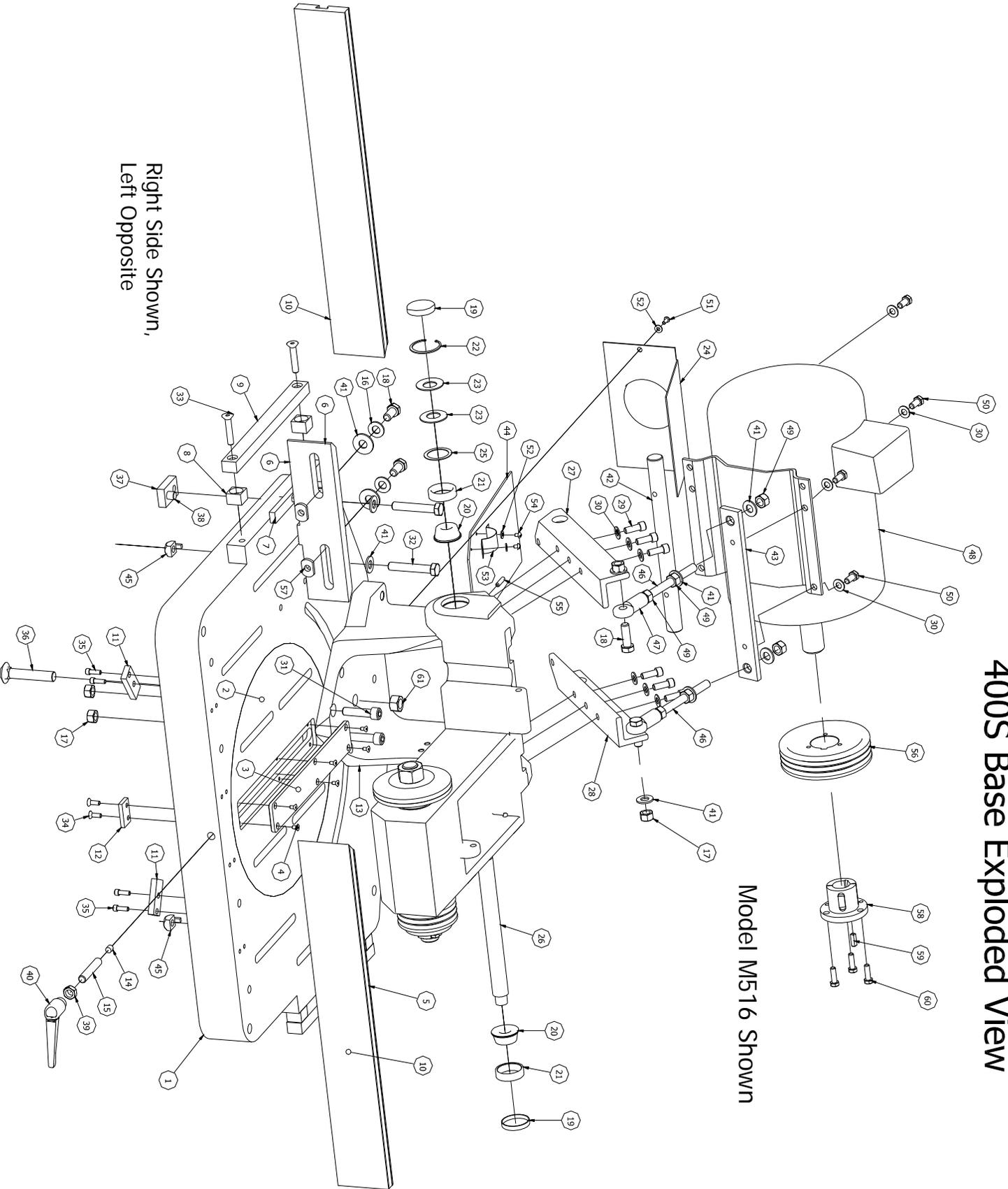


# 400S Blade Guard and Stand Parts List

## Model M516 Shown

Parts List								
ITEM	QTY	PART NUMBER	DESCRIPTION	F526	M416	F426	DM400	PF400
1	1	4BM68	Blade Guard Guide	X	X	X	X	X
2	2	1/4-20 Hex Nut	Blade Guard Strap Locking Nut	X	X	X	X	X
3	2	3/4-10 Hex Jam Nut	Blade Guard Guide Locking Nut	X	X	X	X	X
4	11	3/8 Washer	3/8 Washer	X	X	X	X	X
5	4	3/8-16 x 3.5 Socket Head Bolt	Base Casting Locking Bolt	X	X	X	X	X
6	1	3/8-16 x 3/4 Socket Head Screw	Belt Guard Back Plate Locking Screw	X	X	X	X	X
7	10	3/8-16 Hex Nut	3/8-16 Hex Nut	X	X	X	X	X
8	2	10-32 x 1/2 Slotted Round Head Mach. Screw	B. G. Dust Outlet Locking Screw	X	X	X	X	X
9	1	4BF09X	Belt Guard Backing Plate	X	X	X	X	X
10	1	4BF10	Handle	X	X	X		
11	1	30A12-20" / 30A12-16"	B. G. Dust Outlet 4"	30A12-20"	30A12-16"	30A12-16"	30A12-20"/16"	30A12-20"/16"
12	1	41F06	Floor Stand	X	X	X		X
13	3	3/4 Washer	3/4 Washer	X	X	X	X	X
14	1	4B7P11	Handle Grip	X	X	X		
15	1	4BE13/4BE12	16" / 20" Blade Guard Assy.	4BE12	4BE13	4BE12	4BE13/4BE12	4BE13/4BE12
16	2	4B1P11	Belt Guard Stud	X	X	X	X	X
17	2	4BM28	Stop Stud Spring	X	X	X		
18	2	4BM11	Blade Guard Ear	X	X	X	X	X
19	1	6F07B	Bottom Blade Guard Strap	X	X	X	X	X
20	2	1/4-20 Pem Stud	1/4-20 Pem Stud	X	X	X	X	X
21	1	1/4-20 Wing Nut	1/4-20 Wing Nut	X	X	X	X	X
22	3	1/4 Washer	1/4 Washer	X	X	X	X	X
23	1	3/8-16 x 1 Flat Head Screw	B. G. Bearing Locking Screw	X	X	X	X	X
24	1	2B2P05	Blade Guard Roller Bearing	X	X	X	X	X
25	1	3/8-16 x 3.5 Shoulder Bolt	Blade Guard Pivoting Bolt	X	X	X	X	X
26	1	BF96	Magnetic Starter Bracket	X	X	X	X	X
27	1	B5P7.5H3Q230V/CH	7.5HP 230V Mag. Starter #18 7.5HP 460V Mag. Starter #16 10HP 230V Mag. Starter #21 10HP 460V Mag. Starter #19 15HP 230V Mag. Starter #23 15HP 460V Mag. Starter #20	X	X	X	X	X
28	3	4B4P3V630	3V630 Belt	X	X	X	X	X
29	4	3/4-10 Hex Nut	3/4 Hex Nut	X	X	X	X	X
30	1	4BM13	Blade Guard Angle Stop	X	X	X	X	X
31	1	3/8-16 x 2 Hex Bolt	Stop Bolt	X	X	X	X	X
32	1	400S Crutch Tip	Stop Bumper	X	X	X	X	X
33	1	4BM32	Return Spring W/Washer	X	X	X	X	X
34	2	1/4-20 x 1/2 Hex Bolt	Mag. Starter Bracket Locking Bolt	X	X	X	X	X
35	1	4BF08X	Belt Guard	X	X	X	X	X

# 400S Base Exploded View



Right Side Shown,  
Left Opposite

# 400S Base Parts List

Model M516 Shown

Parts List								
ITEM	QTY	PART NUMBER	DESCRIPTION	F526	M416	M426	DM400	PF400
1	1	41C01	Base	42C01	X	42C01	4DM01R/L	42C01
2	1	41C02X	Disc		X			
3	1	400B7PF52	Chip Breaker		X			X
4	6	10-32 x 3/8 Flat Head Screw	Chip Breaker Locking Screw		X			X
5	1	41C04R	Fence Bracket, Rt.	X	X	X	X	X
6	1	41C04L	Fence Bracket, Lt.	X	X	X	X	X
7	2	41M09	Fence Key	X	X	X	X	X
8	4	41M07	Fence Key Spacer		X			
9	2	41M08	Fence Key Support		X			
10	2	400M05	Fence	400M02	X	400M02	400M02	400M02
11	2	41M03A	Disc Support/Side		X			
12	1	41M03B	Disc Support/Front		X			
13	1	4BC02	Pivot Bracket	X	X	X	X	X
14	1	41M04	Mitre Lock Plug		X			
15	1	41M04B	Threaded Stud/Handle		X			
16	4	1/2 SAE Washer	1/2 SAE Washer	X	X	X	X	X
17	4	1/2-13 Hex Nut	1/2-13 Hex Bolt	X	X	X	X	X
18	6	1/2-13 x 1.5 Hex Bolt	1/2-13 x 1.5 Hex Bolt	X	X	X	X	X
19	2	4B2P21B	Timken Bearing Closure	X	X	X	X	X
20	2	4B2P24	Pivot Timken Bearing Assy.	X	X	X	X	X
21	2	4B2P25	Pivot Timken Bearing Cup	X	X	X	X	X
22	2	4B2P22	Pivot Snap Ring	X	X	X	X	X
23	2	4B2P23	Pivot Belleville Spring	X	X	X	X	X
24	1	4BF30	Rear Dust Outlet	X	X	X	X	X
25	1	4B2P26	Pivot Spacer Washer	X	X	X	X	X
26	1	4BM20X	Pivot Shaft	X	X	X	X	X
27	1	4BM03LX	Left Angle/Motor Mount	X	X	X	X	X
28	1	4BM03RX	Right Angle/Motor Mount	X	X	X	X	X
29	6	3/8-16 x 1 Socket Head Screw	Motor Mount Angle Locking Screw	X	X	X	X	X
30	10	3/8 USS Washer	3/8 USS Washer	X	X	X	X	X
31	2	1/2-13 x 2 Socket Head Screw	Pivot Bracket Locking Screw	X	X	X	X	X
32	4	1/2-13 x 3 Hex Bolt	Fence Bracket Locking Bolt					
33	4	3/8-16 x 2 Flat Head Screw	Fence Key Support Locking Screw		X			
34	2	1/4-20 x 3/4 Flat Head Screw	Front Disc Support Locking Screw		X			
35	4	1/4-20 x 3/4 Socket Head Screw	Side Disc Support Locking Screw		X			
36	1	5/8-11 x 3 Carriage Bolt	Pivot Bracket Locking Bolt		X			
37	2	41M10	Fence Nut Special		X			
38	2	1/2 x 1" Dowel Pln	Fence Nut Pin		X			
39	1	1/2-13 Jam Nut	Handle Locking Nut		X			
40	1	9B7P38	Quick Adjust Handle		X			
41	16	1/2 USS Washer	1/2 USS Washer	X	X	X	X	X
42	1	4BM04X	Rod Motor Mount Pivot Shaft	X	X	X	X	X
43	1	4BM05X	Motor Mount Adjusting Cross Bar	X	X	X	X	X
44	1	4BM07X	Chip Deflector Plate	X	X	X	X	X
45	2	41M11	Fence Tab Nut	X	X	X	X	X
46	2	4BM06	Motor Mount Adjusting Stud	X	X	X	X	X
47	2	200B2P80	Rotating Rod Ends	X	X	X	X	X
48	1	4B6S13/4B6S17/4B6S18	7.5 HP, 3 Ph/10 HP, 3 Ph/18 HP, 3 Ph. 230 V Motor	X	X	X	X	X
49	6	1/2-20 Hex Nut	1/2-20 Hex Nut	X	X	X	X	X
50	4	3/8-16 x 1 Hex Bolt	Motor Locking Bolt	X	X	X	X	X
51	2	10-32 x 1/2 Slotted Rd. Head Mach. Screw	Dust Outlet Locking Screw	X	X	X	X	X
52	4	#10 Washer	#10 Washer	X	X	X	X	X
53	2	Two Hole Pipe Stripe	Galvanized Clamp	X	X	X	X	X
54	4	10-32 x 1/4 Slotted Rd. Head Mach Screw	Clamp Locking Screw	X	X	X	X	X
55	2	1/4-20 x 1 Set Screw	Pivot Shaft Set Screw	X	X	X	X	X
56	1	B4P3P3V60-16" / B4P3P3V56-20" B4P4P3V36-16" or 20"	Motor Pulley for 7.5 HP or 10 HP Motor Pulley for 15 HP	X	X	X	X	X
57	4	B1P1213	1/2-13 Tee Nut	X	X	X	X	X
58	1	B4PP138	1 3/8 Pulley Bushing	X	X	X	X	X
59	1	1/4 x 1/4 x 1.75" Key	Motor Pulley Key	X	X	X	X	X
60	3	5/16-18 x 1 Hex Bolt	Motor Pulley Locking Bolt	X	X	X	X	X
61	1	5/8-11 Hex Nut	Pivot Bracket Locking Nut	X	X	X	X	X

## Parts List

### Base, Disc, and Fence Parts:

41C01	M416/M516 Base
41C02	M416/M516 Disc
41C04L/R	Fence Bracket, Left & Right
41E51	M416/M516 Base, Disc & Stand Assembly
41F06	400 Series Floor Stand
41M03A	Disc Support, Side
41M03B	Disc Support, Front
400M05L/R	M416/M516 Fence, Left & Right
41M07	Fence Key Spacer
41M08	Fence Key Support
41M09	400 Series Fence Key
41M10	M416 Fence Nut, Special
41M11	Tab Nut
9B7P38	Mitre Lock Handle
42C01	F426/F526 Base
42E52	F426/F526 Base & Stand Assembly
400M02	F426/F526 Fence
B1P1213	1/2-13 Tee Nut

### Clamp and Vise Parts:

400M20	400S Vertical Cylinder Bracket, New Style
4B3P20	Vertical Clamp Cylinder, Light Duty
4B3P30C	Vertical Clamp Pad Assembly, Light Duty
4BF90	Vertical Air Vise Bracket
4B7P20	Quick Action Vise, Large
4BM96	Pad for Quick Action Vise
4BM97	Base for Quick Action Vise
4BM91	Air Vise Jaw
4BM92	Air Vise Base, Angle
4BM93	Fence Support with HAV
B3P243	Vertical Air Vise Cylinder
B3P246	Horizontal Air Vise Cylinder

### Arm, Pivot Shaft and Head Parts:

4BC01	400 Series Arm
4BC02	400 Series Pivot Bracket
4BE100	400 Head Assembly, 16"
4BE100-20"	400 Head Assembly, 20"
4BE50	Arm & Pivot Assembly, no spindle
4BM03LX/RX	Angle, Motor Mount, Left & Right
4BM04X	Rod, Motor Mount Pivot Shaft
4BM05X	Cross Bar, Motor Mount Adjustment
4BM07X	Chip Deflector Plate
4B6S13	7-1/2 H.P. TEFC Motor
200B2P80	Rotating Rod End Motor Mount
4BM06	Motor Mount Adjustment Rods ( 2 )

### Blade Guard and Belt Guard Parts:

4BE13	16" Blade Guard Assembly
4BE13S	16" Blade Guard Assembly w/SLS
4BF12	20" Blade Guard Assembly
4BE12S	20" Blade Guard Assembly w/SLS
4BM68	Blade Guard Guide
6F07B	Bottom Blade Guard Strap
30A12	Rear Blade Guard Dust Outlet
4BF08X	Belt Guard
4BF09X	Belt Guard Backing Plate

### Miscellaneous Parts:

4BF10	400 Series Handle
4BF30	Rear Dust Outlet
4BM32	Return Spring w/Washer
4BM31	Downstop Block 400 Hand Operated
4BM223-6'	6' Extended Fence-extrusion 3.5" H
4BM224-10'	10' Extended Fence-extrusion 3.5" H
4BM225-12'	12' Extended Fence-extrusion 3.5" H
400BM38	Stop for Extended Fence

### Motor Warranty:

Motors which fail during the warranty period of one (1) year must be returned to an authorized Baldor Service Representative for examination to determine whether the failure was caused by defective manufacturing. In the event a replacement is required before factory examination, a motor will be sold at the list price. If the factory authorizes replacement, CTD will credit customer's account for the replacement cost. All motors are shipped FOB CTD, Los Angeles, CA plant.

### Guarantee:

CTD warrants that their cut-off machines and accessories are free from defect of material, workmanship, and title, and are of the kind of quality indicated and described in applicable specifications. The foregoing warranty is exclusive and in lieu of all other warranties, whether written or oral. CTD's obligation under the foregoing warranty is limited to the repair or replacement (at CTD's option) of the part which is defective in materials or workmanship for a period of one (1) year from the date of shipment to the original purchaser of the equipment. CTD's liability to the purchaser, whether for warranties, negligence, or otherwise, shall not in any way include consequential damages, or costs of removing or reinstalling the products. All parts and machines are shipped FOB CTD, Los Angeles, CA plant.



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