

INSTRUCTION BULLETIN
& MAINTENANCE MANUAL
FOR CTD MODELS
DM200R & DM400

CTD MODEL NO:_____

CTD SERIAL NO:_____

MANUFACTURE DATE:_____

DISTRIBUTOR PURCHASED THROUGH:

(IF ANY)_____



CTD MACHINES

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Machine Requirements:

MODEL NO: _____ SERIAL NO: _____

Cutting Capacities

Model DM200R

90° Cutting:

2" (51mm) high x 7-3/4" (197mm) wide
3-3/4" (95mm) high x 3-3/4" (95mm) wide

45° Cutting:

1-1/2" (38mm) high x 4-7/8" (123mm) wide
2" (57mm) high x 4-1/4" (108mm) wide
3-1/2" (89mm) high x 3-1/2" (89mm) wide

DM400, 16" Blade Capacity

90° Cutting:

5" (127mm) high x 6" (152mm) wide
3" (76mm) high x 11" (280mm) wide

45° Cutting:

3" (76mm) high x 8" (203mm) wide
5" (127mm) high x 5" (127mm) wide

DM400, 20" Blade Capacity

90° Cutting:

5-1/2" (140mm) high x 11" (280mm) wide
6" (152mm) high x 10" (254mm) wide

45° Cutting:

5-1/2" (140mm) high x 8" (203mm) wide
6" (152mm) high x 6" (152mm) wide

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

Dust Collection Requirements: 800 CFM at each 2" outlet for DM200R; 1000 CFM at each 4" outlet for DM400.

<u>Model No.</u>	<u>Motor Size</u>	<u>Required Amperage</u>	<u>Breaker Needed**</u>
DM200R	2 H.P. 1 Phase, 230 Volt	12.5 amps each motor	40 amp
DM200R	2 H.P. 3 Phase, 230 Volt	5.4 amps each motor	20 amp
DM200R	2 H.P. 3 Phase, 460 Volt	2.7 amps each motor	15 amp
DM200R	3 H.P. 3 Phase, 230 Volt	7.4 amps each motor	30 amp
DM200R	3 H.P. 3 Phase, 460 Volt	3.7 amps each motor	20 amp
DM400	8 H.P. 3 Phase, 230 Volt	20 amps each motor	60 amp
DM400	8 H.P. 3 Phase, 460 Volt	10 amps each motor	40 amp
DM400	10 H.P. 3 Phase, 230 Volt	26 amps each motor	60 amp
DM400	10 H.P. 3 Phase, 460 Volt	13 amps each motor	40 amp
DM400	15 H.P. 3 Phase, 230 Volt	34 amps each motor	60 amp
DM400	15 H.P. 3 Phase, 460 Volt	17 amps each motor	60 amp

**Breaker needed if both motors on the same circuit breaker

Cutting Tool Requirements: Heavy, rigid plate blades.

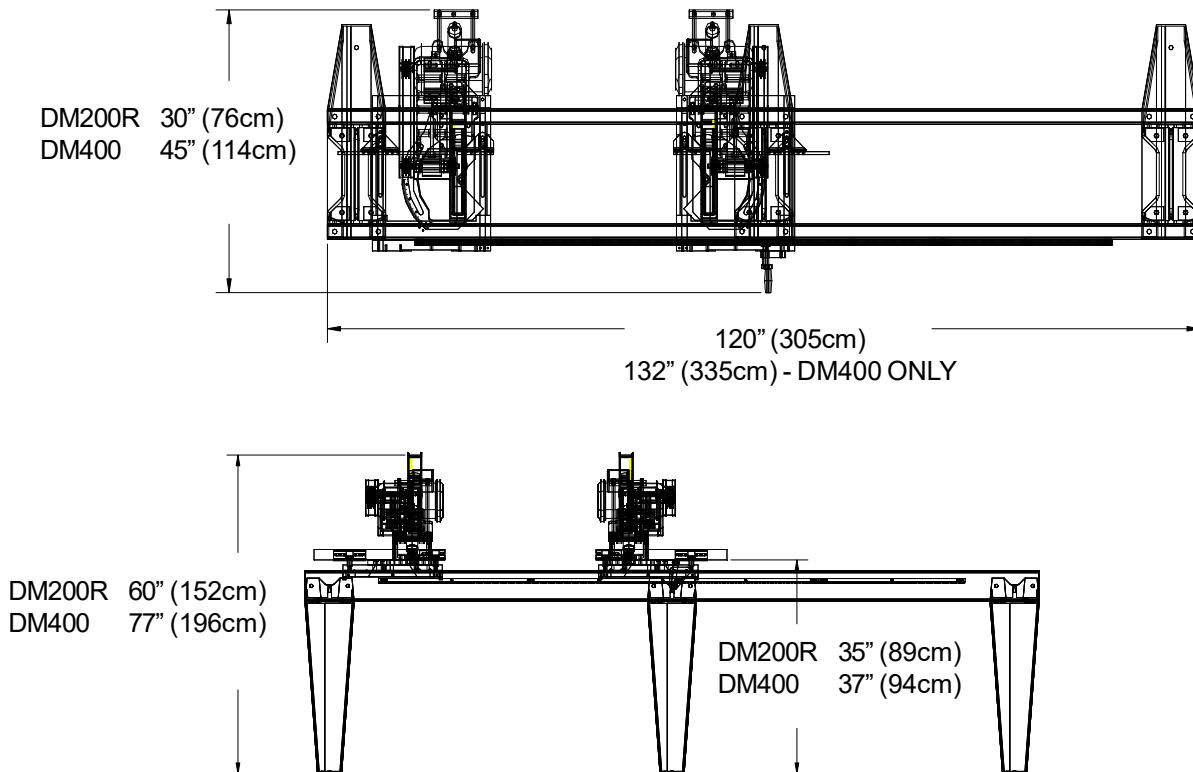
12" blades: .100 to .110 plate

16" blades: .120 to .130 plate

20" blades: .150 to .160 plate

Space Requirements

For Models DM200R & DM400 Only



Note: The floor stand must be shimmed, leveled and bolted to the floor to eliminate vibration. Use holes provided in support legs for this purpose.

Installation and Set Up:

The CTD saw you have purchased is designed to cut wood, aluminum, plastic and steel, with of course the proper blades and conditions. For the material you are cutting, please refer to the cutting instructions for each type. The machine must be leveled and framed in or bolted to the floor. See “Alignment of Saw “on page 5.

The Model DM200R uses NEMA 56 Frame 2 H.P., 3450 RPM, 60 Hertz TEFC Motors.

The DM400 uses NEMA 213T or 215T Frame 8 H.P. or 10 H.P., 1725 RPM, or 15 H.P., 3450 RPM, 60 Hertz TEFC Motors. CTD uses a speed up drive 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 the saw, please be sure to read the “**SAFETY INSTRUCTIONS TO THE OPERATOR**” (see Page No. 7).

Blade Installation: (for model DM200R)

Before setting blades on spindle, always shut off or disconnect air supply. The model DM200R uses a lower rotating blade guard. With **Motor OFF** and **Power Disconnected**, rotate Lower Blade Guard (p/n 200A270) up into main blade guard. Slide link puller (p/n 200M360Lor R) off screw and bushing through large hole in slot. Loosen and remove four machine nuts on Blade Guard Cover (p/n 200F250Lor R) and remove entire Blade Guard Cover Assembly (p/n 200E250Lor R). The entire Blade Guard Cover Assembly, consisting of Bearing Housing, Lower Blade Guard and Link Puller with Pawl (p/n 200M261) will come off as one piece, exposing spindle nut and flange. (Refer to Page No. 18.) After blade has been placed on spindle and tightened (see Blade Installation below), replace Blade Guard Cover Assembly with Housing and Link Puller by reversing the sequence.

For **DM400** loosen wing nut on bottom blade guard strap and swing down.
Now lift main blade guard, exposing spindle assembly.

To install or remove blade:

1. Hold blade in hand with a rag covering sharp tips, or lower blade into a piece of wood so it will not rotate. Push down with wrench on spindle nut. Remove spindle nut and outer flange.
2. Place blade on spindle with tips pointing *down*. Make sure slinger (inner flange) 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
Always check rotation before cutting a piece of material.
3. Replace outer flange and nut as before and tighten (refer to Diagram “A” on Page 5). Pull up with your wrench. Do not over tighten. Snugging the blade is all that is necessary. Replace Blade Guard parts as before or close door to cover the blade.

If blades were purchased from CTD, your machine has been set with your blades. If a chip breaker is included on your machine, it has been cut with the blades purchased from CTD. If not, blade diameters and widths vary and your chip breaker has not been cut. Cut chip breaker using your blades **VERY SLOWLY** the first cut through.

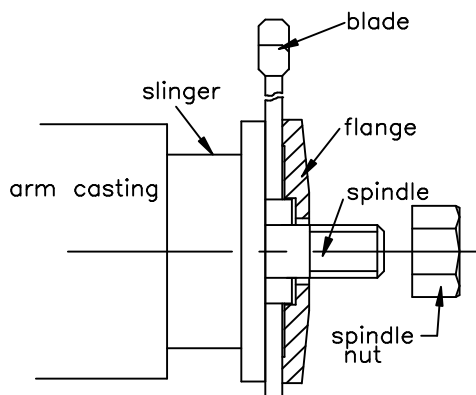
Note: Also make sure blades do not contact top base in the down position. Adjust downstop if necessary.

Blade Guard:

DM200R: The blade and belt drive are enclosed. When the saw arms are lowered, the lower blade guard rotates up into the main blade guard. The blade continues through the work as the lower blade guard rotates up, via linkage arm. ***Cut only material that fits into the cutting capacity of the machine. Damage to the blade guard will result if too large material is attempted to be cut.***

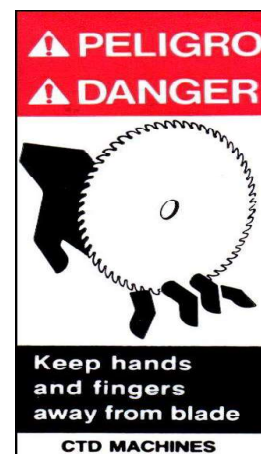
DM400: When the saw arms are lowered, the Blade Guard Bearing, P/N 2B2P05 contacts Blade Guard Guide, P/N 4BM68. The blade continues through the work as the blade guard rides forward on the guide. ***Always keep the blade guard guide as close as possible to the material for maximum protection to the operator.***

Diagram "A"



*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*



Alignment of the Saw:

1. The Floor Stand Assembly and base of double mitre saws must be leveled lengthwise, and front to back. The front and rear tubes must be parallel, in good alignment, and not twisted. Bolt down holes are provided in the support legs of the floor stand for this purpose.
2. In the operation of the double end mitre saws, it is very important that long work be supported in the center to avoid springing or vibration of the work as it is being cut. If the work is allowed to "sag", inaccurate cuts will be made. This problem is eliminated by the use of the Center Work Support accessory (item CWS), which may be purchased along with the machine.
3. The fences on both heads must be in good alignment with each other. This is easily accomplished as the fences are keyed, and will maintain their relationship to the centerline of the machine. A straight edge should be used for setting the fences (see Diagram "B" for each model machine).
4. The outside fences must be set close to the blades so that the scrap piece that drops does not bind between the blade and fences. **ALWAYS use outside fence** as this acts as a back support for the scrap piece. If you remove the fence, the scrap piece will be unsupported and can be thrown into the blade causing damage to it and possibly to the operator.

Diagram "B" DM200R

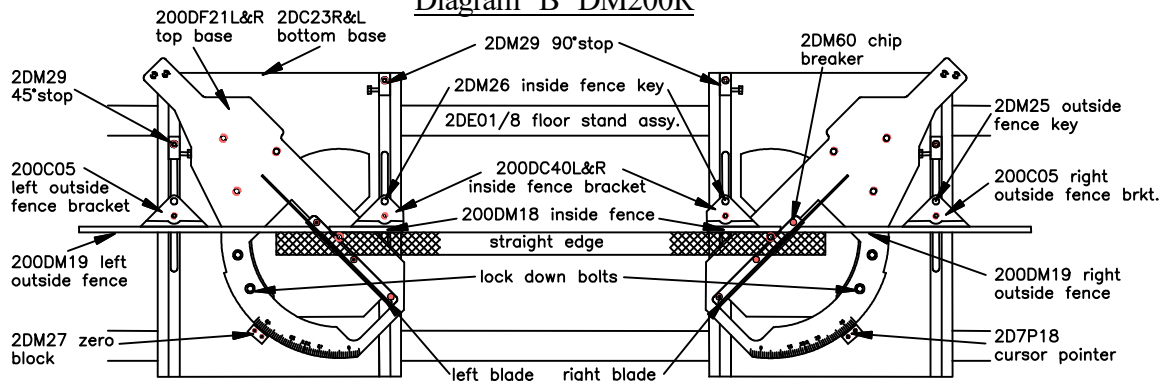
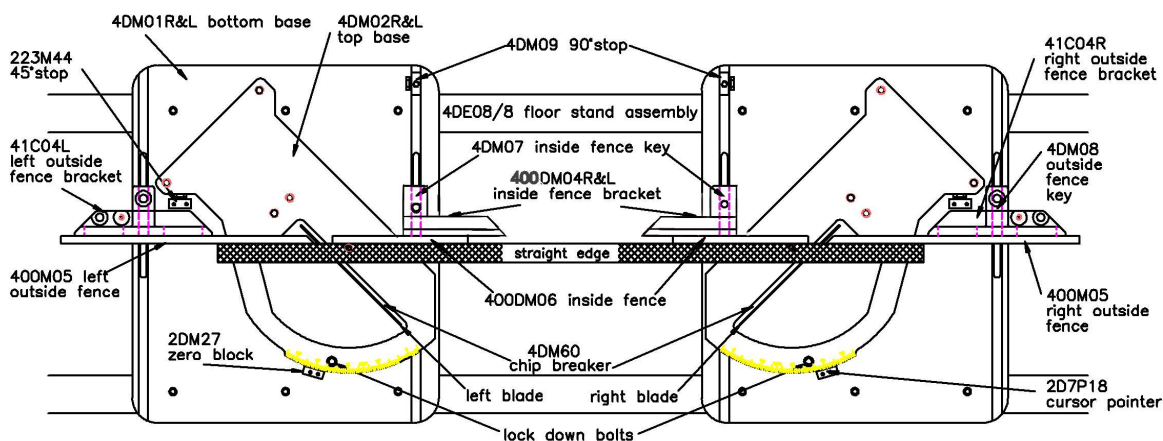


Diagram "B" DM400



Electrical:

The **DM200R** uses two NEMA 56 Frame, 2 H.P. 3 Phase, 3450 RPM, 60 Hertz TEFC Motors.

The **DM400** uses two NEMA 213T or 215T Frame, 8 H.P. 3 Phase, 1725 RPM, 60 Hertz TEFC Motors.

CTD uses a speed up so that the blades run at approximately 12,000 SFPM. 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 anytime the machine is serviced and the blades are exposed.

A Magnetic Starter for each motor is supplied. This 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 motors 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 each Magnetic Starter. Use dust-proof connectors if available.

Single Phase Motor Replacement:

Connect leads to L1 (line 1) and L2 for single phase motors. (See Wiring Diagram for Single Phase Motors on Page No. 7.) Green ground wire must be grounded to enclosure. If using type “SO” wire and plug, use a romex connector through starter box and a grounded plug. *Be sure to check rotation.* The blade must rotate down and to the rear on the underside of the blade.

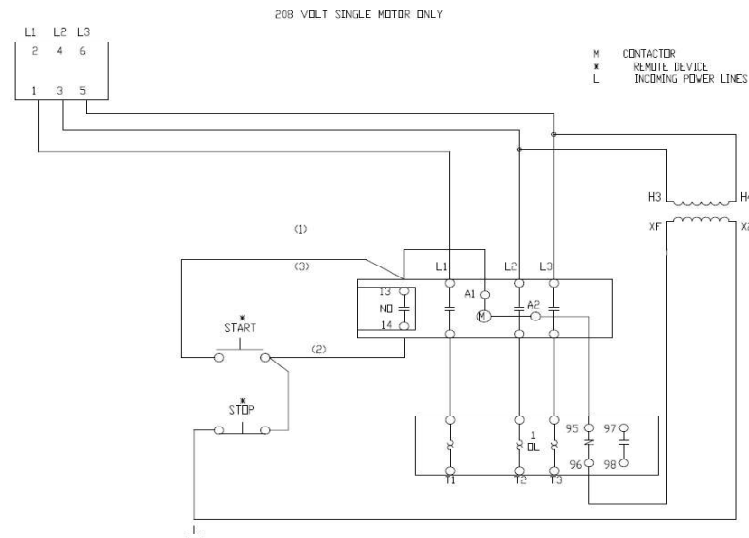
Three Phase Motor Replacement:

Connect incoming power line leads to L1 (line 1), L2 and L3. (See Wiring Diagram for Three Phase Motors on Page No. 7.) 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. 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, 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</u>	<u>Model</u>	<u>Frame</u>	<u>208 Volt</u>	<u>230 Volt</u>	<u>460 Volt</u>
2 H.P. 3 Phase	DM200R	56Z	5.7 amps	5.4 amps	2.7 amps
2 H.P. 1 Phase	DM200R (optional)	56Z	N/A	12.5 amps	N/A
3 H.P. 3 Phase	DM200R (optional)	56Z	7.8 amps	7.4 amps	3.7 amps
8 H.P. 3 Phase	DM400	213T	21.5 amps	20 amps	10 amps
10 H.P. 3 Phase	DM400 (optional)	215T	28 amps	26 amps	13 amps

Wiring Diagram for Magnetic Starter



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 is provided to give the operator added protection. (OSHA required by user.)
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 machine.
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 materials. 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 a combination of operator COMMON SENSE and ALERTNESS at all times when the machine is being used.
21. **WARNING!!!** *DO NOT ALLOW FAMILIARITY (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!!*

How to Operate a Double End Trim Saw:

Before operating the machine, please read the “Safety Instructions to the Operator” on Page No. 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 blade.

Blade Guard:

Model DM200R : The blade and belt drive are enclosed. When the saw arms are lowered, the lower blade guard rotates up into the main blade guard. The blade continues through the work as the lower blade guard rotates up via the linkage arm.

Model DM400: When the saw arms are 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 Blade Guard Guide as close to the material as possible for maximum protection of the operator.

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.

Positioning the Work and Alignment of Fences:

Fences should be set so that the centerline of the work is either to the front, or on the centerline of the blade. Fences must be adjusted so that short pieces cannot be trapped between the blade and the fences. Fences must be in line with each other—front to back (see Diagram “B”). If fences are set 5/8” in front of the centerline, then when changing mitre angle, the length dimension at 45 and 90 degrees will stay the same. No adjustment to measuring scale will be necessary. However, any other angles require slight adjustment of the scale. **Note:** The scrap drop off piece needs to be backed up by the rear outside fence. If the trimmed cut-off material is not supported by the rear outside fence, the cut-off piece can catch on the blade with the possibility of firing the scrap piece into the blade. *This will cause damage to the blade, the blade guard, and has the potential for harming the operator. Always back up the cut-off trim piece with the outside fence supplied.*

Measuring Scale and Pointer for Length:

The length measuring scale (used to determine length of cut between two saw heads) is located on top of precision gear rack. The measurement rule and bar must be reset if the fences are moved or the blades are changed. If a small adjustment is needed, this can be accomplished by adjusting the pointer located on the right saw head carriage or base. The measurement rule and bar can be reset by loosening screws that hold it in place on top of gear rack. Move the bar with tape, left or right as necessary, to correct length dimension between the two blades.

To Move Saw Head Base:

1. Loosen hand knob located in front of saw head base.
2. Rotate crank handle until pointer registers desired dimension. *Always move saw head base in one direction* to eliminate any backlash between gear rack and pinion.
3. Tighten hand knob. This automatically squares up saw head base to the front rail or tube.

Digital Length Measurement System:

The length of cut is determined the same way as explained on Page No. 9. The length measurement is now displayed in thousandths of an inch, (i.e. 1/16", 1/32", or metric dimensions) by pressing the mode button on the digital display. Since the right saw head base is usually the movable saw head, the digital scale will read to the negative number. When setting the length between the two saw heads;

1. Manually use a scale or cut a piece of wood to determine the exact length between blades.
2. Hold the negative button down until the correct length dimension appears. (Negative only if right saw head base is movable.)
3. The scale is now accurately set for length dimension for the angle and fence position chosen. If fences are moved front to back, or if angle changes (unless fences set on the centerline), then the display will need to be reset.



Mitre Angle Adjustment:

To change angle on all machines, locate lock down bolts in Diagram "B" on Page No. 5 for particular machine purchased—Models DM200R and DM400.

1. Loosen lock down bolts on each saw head with an Allen wrench (5/16" for Model DM200R or 3/8" for DM400).
2. Manually rotate Top Base to desired degree setting, aligning angle mark and pointer. 45° & 90° stops are provided.
3. Tighten lock down bolts.

Saws are designed to mitre toward each other as shown in Diagram "B". If you have purchased a machine with angular adjustment in the opposite direction, it is necessary to remove lock down bolts and reposition in additional tapped holes provided. Also, the inside fences may have to be removed or repositioned and a Center Work Support (item CWS) added. Please consult factory for this special modification.

Cutting:

A double end trim saw operates by making two cuts at the same time on both ends of a piece of material. The material is positioned against the rear inside fences, making sure any scrap (off each end, outside the two blades) is located against outside fences. If scrap piece is not backed by the outside fence, it is possible this part will catch on the blade, causing damage to the blade. The material to be cut ***must*** lay flat on the table base, or the blades may bind in the material. *This can damage the blade or throw the cut piece out of the saw, possibly harming the operator.* The material is held in place with two Vertical Inside Air Clamps which are actuated by a Foot Valve. The saw heads are then activated downward by a Two-Hand Anti-Tie Down, Maintained Contact Control. See "AIR SYSTEM" on Page No. 13 for additional details.

Cutting Speed:

The blade is rotating at approximately 3700 RPM for Model DM200R. For Model DM400, the 16" machine's blade rotates at 2900 RPM and the 20" machine's blade rotates at 2700 RPM. When moving the blade through the material, the blade must **NEVER** be allowed to dwell in the work. If fine finishes are required;

1. Use a sharp blade.
2. Use a CONSTANT, EVEN PRESSURE when cutting through the material.

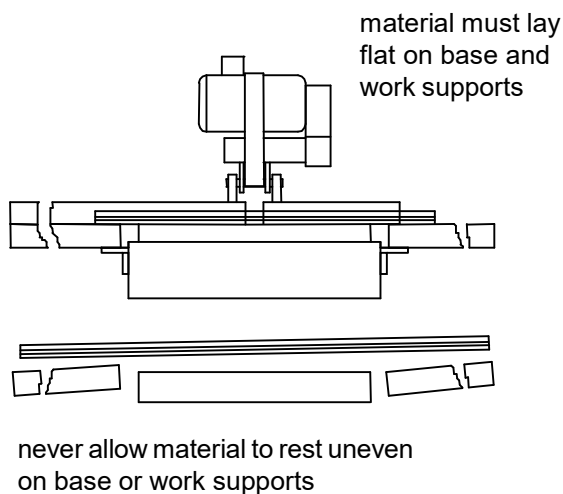
Clamping and Work Slippage:

The work must **NEVER** be allowed to move or vibrate as it is being cut, or inconsistent cuts will result. Two inside Vertical Clamps, which hold material down against the table base are provided as a standard feature on all double end trim saws. For odd shapes and profiles, additional clamping or fixturing may be necessary. Horizontal Clamps that push the material back against fence, can be provided as an optional accessory. The Horizontal Clamps mount to the Center Supports that hold the Vertical Clamps for the DM400. They mount to special inside supports for the DM200R. The Horizontal Clamps are adjustable front to back on the Center Supports for different widths of material. The clamps are actuated prior to the saw head by depressing the Foot Valve. An Anti-Tie Down, Two-Hand Control drives down the saw heads. Check your material for squareness using a 90° square. Material that is out of square will move when it is cut, causing irregular mitres. (See "IRREGULAR MITRES" on Page No. 17.) Additional tooling may be needed. Consult factory for more information.

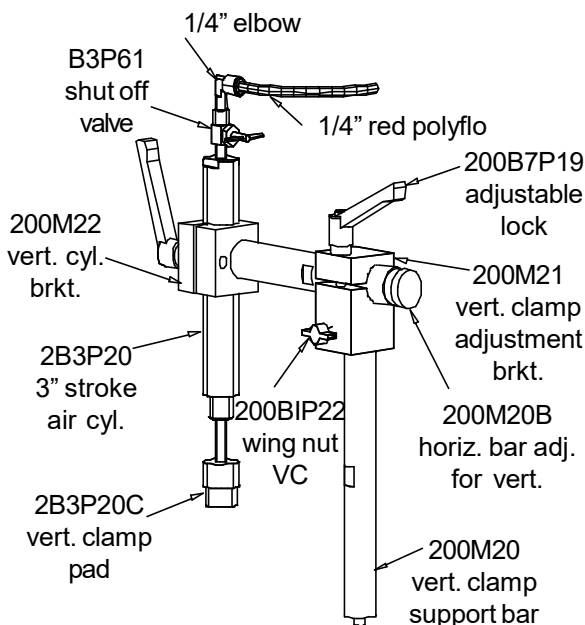
Cutting the Material:

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 "C" below).

Diagram "E"



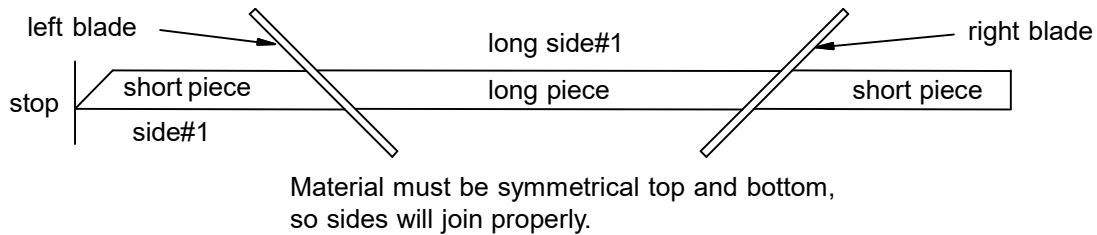
Vertical Clamp Assy.



Double Cutting Material for Two Pieces in One Pass on Symmetrical material only:

If your material is *symmetrical* on both sides and edges when looking at the end, then double cutting as shown below would be an option. By placing a stop outside the left blade, two pieces can be cut simultaneously, one between the two saws and one between the left saw head and stop. Double cutting is not possible on material that is moulded or profiled on the top of the moulding.

Diagram "D"



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 running.** 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 blades pass through the material. CTD suggests using a Carbide Blade with an 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 lacquers or mica mouldings 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 all double end trim saws. However, because of its elastic properties, the material can deflect as the blades pass through. CTD offers Horizontal and Vertical Clamps for this application. Additional tooling may be required. Special carbide blades are available for cutting plastics.

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 our non-ferrous Carbide Blades. When cutting aluminum, or other non-ferrous materials, it is essential that the blades be lubricated with a saw blade Lubrication System or other blade lubricating system for the finest finish. See "Saw Blade Lubrication" on 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 the factory.

CTD Bio Lubrication System:

The CTD biodegradable lubrication system operates by pulse spraying a minute amount of biodegradable lubricant directly on to the saw teeth 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.)

Angular Adjustment in Opposite direction for CTD Models DM200R or DM400:

1. Remove 90 degree stop, p/n 2DM29 from keyway by removing bolt, lifting away and setting aside.
2. Move Vertical Clamp Assembly on inside fence bracket to center work support by: (see diagram on bottom of page 10 of the instruction Bulletin)
 - a) Loosen wing nut, p/n 200B1P22
 - b) Lift vertical clamp adjustment bracket, p/n 200M21 from vertical clamp support bar, p/n 200M20
 - c) Loosen thread on vertical clamp support bar, p/n 200M20 and
 - d) Move 200M20 to a threaded hole in center work support and tighten
 - e) Place vertical clamp adjustment bracket, p/n 200M21, with assembly back on bar, p/n 200M20 and tighten wing nut.
3. Remove inside fence and inside bracket assembly with key from inside keyway. These are p/n's 200DC40L or R, 200DM18 and 2DM26 for DM200R, or 400DM06 and 41C04L or R for DM400
4. Move lock down bolt with tab washer (below table surface) from rear hole to front hole.
5. Rotate Top Base Assembly, p/n 200DF21L or R with Sawhead Assembly in the opposite direction, aligning etched quadrant on base and the desired angle with the secondary zero block and pointer.
6. Attach longer inside fence supplied to the center work support fence Bracket, with the fasteners provided, to create a new inside fence support for the material to be cut.
7. Align and adjust fences front to back and side to side with outside fences Using a long straight edge.

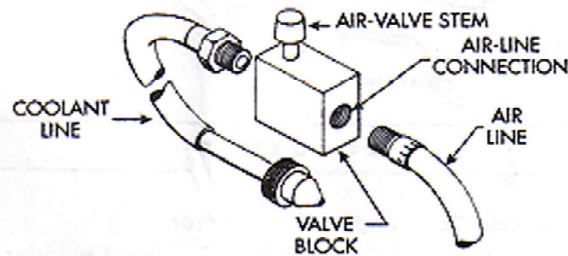
Make sure fences do not contact blade.

8. Readjust vertical clamp assembly as necessary.

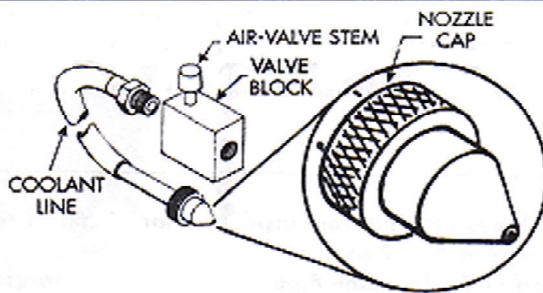
See Diagram on page 10

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.



1. Connect air-line hose to valve block on Coolant Tank.
2. Recommended air pressures: Higher preferred 60 to 125 psi

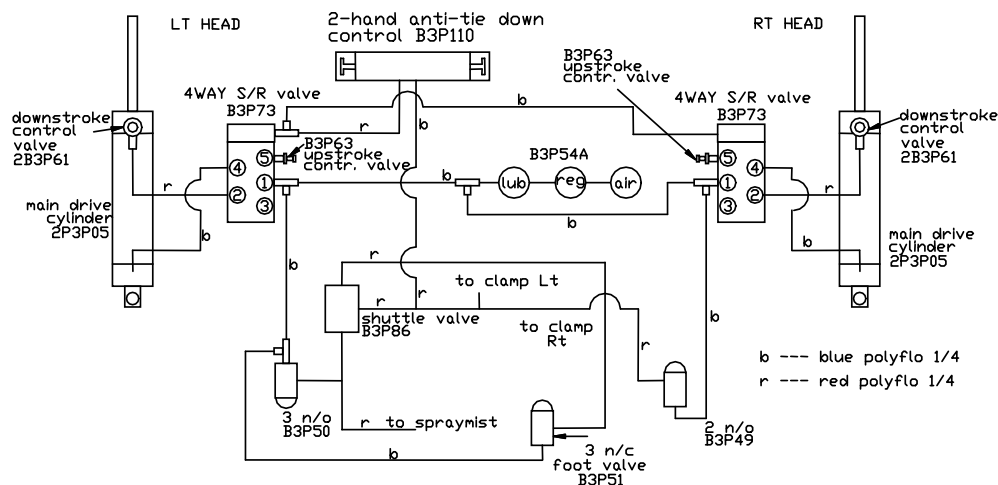


1. Open Air-Valve approximately one full turn.
2. Close Nozzle Cap until snug at end of Coolant Line, then open Nozzle Cap about 1/4 turn until a fine pin-point spray develops.
3. Once spray is coming out of nozzle final adjustment can be made by turning either or both the Air-Valve knob & Nozzle Cap.
4. The best method of testing the mist spray is to direct the spray into the palm of your hand, and when the spray is frigid cold, it has been properly adjusted.

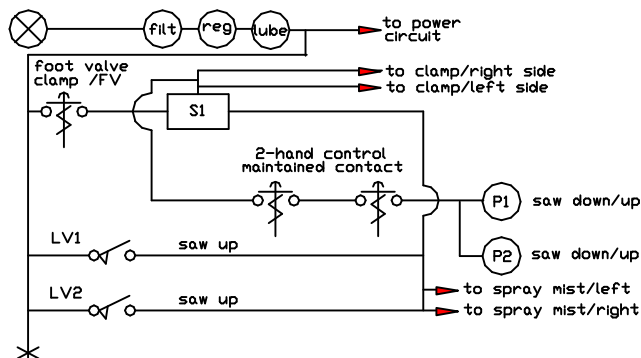
Air Pneumatic System for Double End Trim Saws:

The air pneumatic system on all CTD double end trim saws is simple to use and understand, and easy to operate. The main components of the air system are shown in the Air Circuit Piping Diagram on the following page. The system operates using a Two-Hand Anti-Tie Down Control for safety. Included with the Air Pneumatic System are the main drive Cylinders and Valves, an Air Filter/Regulator, and two Vertical Pneumatic Clamps. The Vertical Clamps must be actuated prior to the activation of the saw heads via a Foot Valve, P/N B3P53E, which in turn energizes the Two-Hand Control, P/N B3P110. The two hand buttons must be depressed at the same time for the saw heads to travel downward. The system operates by depressing the Foot Valve, P/N B3P53E, then clamps move in place. This gives a signal to the Shuttle Valve, P/N B3P86 to allow air to pass to the Two Hand Anti-Tie Down Control, P/N B3P110. By depressing both palm buttons simultaneously (at the same time), a signal is given to the main 4-Way Control Valve, P/N B3P73 to change direction—allowing air to pass to the main drive Cylinder, P/N 2B3P05. Drive Cylinder for 16" DM400 is P/N B3P306; for DM400, 20" is P/N B3P308. The Cylinder pushes the saw head down. The speed of descent is controlled by the Speed Control Valve, P/N 2B3P61 (for DM200R) located on the Cylinder. The Speed Control Valve for DM400 is P/N B3P60. By releasing the Two-Hand palm buttons, air is shut off to the main 4-Way Valves. The valves shift direction and the main drive cylinders reverse.

Air Circuit Piping Diagram



Air Schematic



**When Spray Mist or Biolube is included on the machine
add Check Valve, P/N B3P65

***When Independent Operation is included on the machine,
add 3-Way Normally Closed Valve, P/N B3P51 for Foot Valve;
P/N B3P110, 2-Hand Control; (2) P/N B3P86 Shuttle Valves;
and change LV2 to P/N B3P50. (2) Shut Off Valves, P/N B3P61
are also included

Parts for Air Pneumatic System

Model/Part No.	Quantity	Description
<u>DM200R</u>		
B3P110	<u>DM400</u>	
2B3P05	B3P110 (2 Hand)	1 2-Hand Anti Tie Down Control Assembly
	B3P306 (16")	2 Air Cylinder (drive for saw head)
	B3P308 (20")	2 Air Cylinder (drive for saw head)
2B3P61	B3P60	2 Flow Control Valve (speed of saw down)
B3P73	B3P73 (P1&2)	2 4-Way Spring Return Valve (main control valve)
B3P50	B3P50 (LV1)	1 3-Way Normally Open (N/O) Valve (controls accessory items SM and VC)
B3P86	B3P86 (S1)	1 Shuttle Valve
B3P63	B3P63	2 Upstroke Valve (speed of saw up)
2B7S15	157P73	2 Rubber Bumper
B3P154	B3P154	1 FR Unit with Auto Drain
200M06	N/A	2 Motor Mount Plate
200M80	4BM80	2 Cylinder Support Studs
200M82	2B3P31	2 Cylinder Clevis Rear/or mount
200M84	4BF101	2 Auto Valve Bracket
200M87	4BM82	2 Power Feed Cylinder Support Bar
200M86A	400M95	2 Cross Bar Cylinder (Hydrocheck for DM400)
B3P51	B3P51 (FV)	1 3-Way Normally Closed (N/C) Foot Valve
B3P49**/aaa	B3P49 (LV2)	1 2-Way Normally Open Valve
N/A	4BM86	1 Cylinder Clevis, Rod
N/A	4BM87	1 Power Feed Brace
200M47(opt.)	400M94	1 Hydrocheck Mount Bracket for Cylinder

See Pneumatic Clamp parts on Page No. 12.

Air Supply:

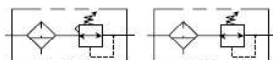
The air supply must be turned off and all electrics disconnected before making adjustments on the power feed. A working pressure of 75 PSI (pounds per square inch at 5.4 kg/cm²) is required. An industrial-type compressor of at least 3 CFM (cubic feet per minute) is recommended. An additional 3 CFM is required for Spray Mists. 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.

FR:

An Air Filter/Regulator 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 FR is comprised of two different components.

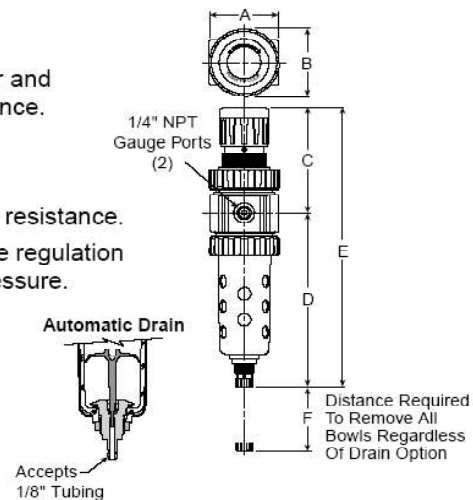
1. The **Air Filter Bowl** is located on the left side and is provided with an automatic drain. This collects and then releases foreign matter and condensation collected by the air filter.
2. The **Pressure Regulator**, which is located on top of the air filter, controls the amount of air pressure allowed into the system. An operating pressure of 75 PSI @ 5.4 kg/cm² is required. (This is set at the factory.)

Air Filter/Regulator



Features

- Space saving package offers both filter and regulator features for optimal performance.
- Excellent water removal efficiency.
- Rolling diaphragm for extended life.
- Removable non-rising knob for tamper resistance.
- Quick response, and accurate pressure regulation regardless of changing flow or inlet pressure.
- 40 micron filter element standard, 5 micron and adsorber available.
- High Flow: 1/4" – 30 SCFM\$
3/8" – 40 SCFM\$



Trouble Shooting the Pneumatic System for Downfeed of Saw Head:

If the Air Feed no longer has smooth action, check the Downstroke Control Valve, P/N 2B3P61 or P/N B3P60. If there is no speed control, replace with Part No. 2B3P61 or P/N B3P60. If air is leaking from the bottom of the cylinder, replace Cylinder with P/N 2B3P05 (for DM200R); P/N B3P306 (for 16" DM400); or P/N B3P308 (for 20" DM400).

4-Way Valve:

The 4-Way Valve is the main control, five port valve located on the Air Feed Unit. If the saw is sticking in the up or down position, the spool located in the valve probably is not shifting from side to side as necessary. This condition is caused by unclean air passing through the system. The internal parts become gummed up, and the air pressure can no longer shift the spool. A broken spring in the valve is another common cause. A 4-Way Valve Repair Kit, P/N B3P76 is available for the valve.

Air Hold Down Clamps for the Material:

Both Horizontal or Vertical Air Clamps are available. Vertical Clamps are provided standard on the machine. These clamps pneumatically hold the material in place when the saw blades are cutting the material. The clamps are controlled by a 3-Way Valve mounted on the bottom of the Power Feed Unit. When the machine is in the rest position, the Upstroke Stud contacts the 3-Way Valve, LV1 & LV2 (2-Way Valve). As soon as the Foot Valve is tripped, the clamps move into position. A manual shut-off for the clamps is provided should you not want to use the clamps for a particular moulding.

Foot Valve:

The Foot Valve, P/N B3P53E actuates the clamps into position. Once the Foot Valve is depressed, the Two-Hand Anti-Tie Down Control is energized and ready to activate. As soon as the Two-Hand Control buttons are depressed, your foot can be removed from the Foot Valve. The clamp pressure will be maintained by Limit Valve #1 & #2, P/N B3P50 & P/N B3P49.

Speed Control of Blade Movement:

The downstroke speed of the blade is controlled by the Speed Control Valve, P/N 2B3P61 or P/N B3P60, located in the lower port of the main drive Cylinder, P/N 2B3P05 or P/N B3P306. Adjust as required for best finish. The Upstroke Control Valve, P/N B3P63, is located in port No. 5 of the main control Valve, P/N B3P73. Simply loosen nut on machine screw (10-32 thread) and adjust **IN** to slow down, or **OUT** to speed up.

Preventative Maintenance:

The CTD Double End Trim Saws 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 Air Filter Bowl for water and condensation build up.
4. Remove any scrap pieces and dust build up from inside floor stand.
5. 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 and 45° Angle Adjustment of Blades:

All machines are preset at the factory for perfect 90° and 45° mitre cuts. If any adjustments are necessary:

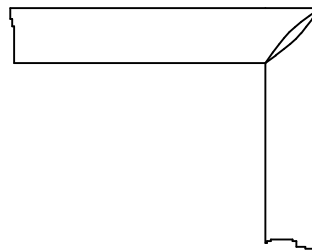
1. Check alignment of fences—left to right, as shown in Diagram “B” on Page No. 5. Use a two foot steel scale or quality precision straight edge and lay flat on table base. Butt edge against inside fence and outside fence. Touch the outside corner of the straight edge. If one side of the straight edge pulls away from the fence, then the outside fence is not in alignment with the inside fence.
2. Loosen 3/8-16 lock nut on both fence brackets. Clean all surfaces of dirt or dust, and re-assemble as before.
3. Re-align inside fence to outside fence with your straight edge. Once you are sure both fences are in alignment, you now have a reference point to check your 45° mitre.

If adjustments of the 45° mitre settings are necessary, you will need a precision draftsman's triangle. Check the 45° mitre by placing the triangle against the inside fence and the plate of the blade, below or in between the gullets or teeth of a Carbide Blade. Touch the triangle against the steel plate of the blade—not against the tips. If an adjustment is necessary:

- A. Loosen the lock nut on the adjusting screw (3/8-16 Hex Cap Screw), that locks through the 45° Stop Key, P/N 2DM29.
- B. Adjust 3/8-16 screw until blade plate aligns perfectly with precision triangle. Now, tighten the screw and nut. It is not necessary to move the 45° stop key.

Irregular Mitres:

Irregular mitre 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 mitre cuts is too thin a blade plate thickness. Blade plate thickness should be .100 to .110 on 12” 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:

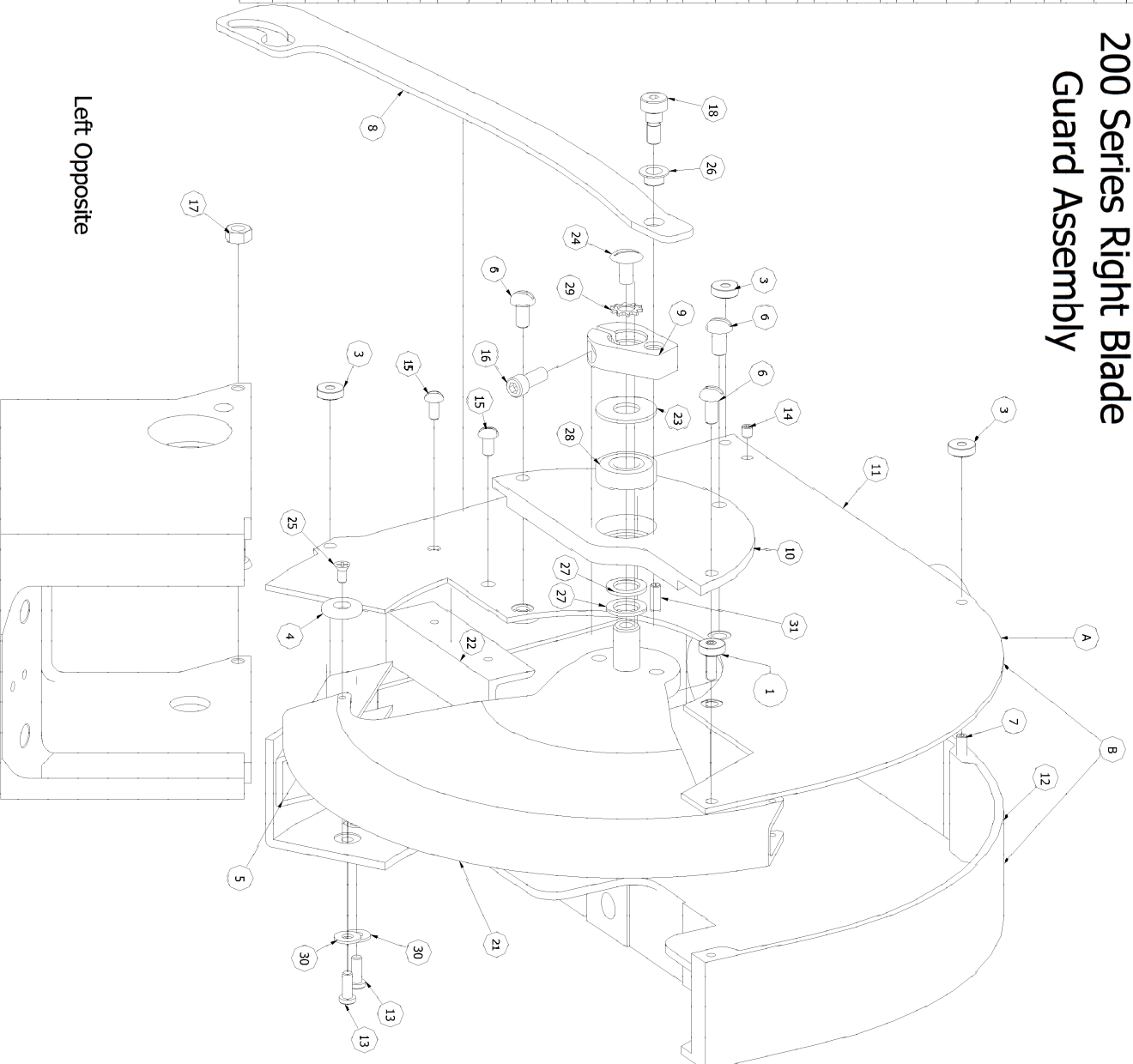
See specific sections within the manual for additional information on repairs and maintenance.

200 Series Right Blade Guard Assembly

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	200BJP25A	Blade Guard Cover Knob W/Stud
2	1	200M35	Top Dust Tube Main Blade Guard
3	3	200BJP25	Blade Guard Cover Lock Nut
4	1	200BJP30	Roller Bearing Lower Blade Guard
5	1	200M35R/L	Rear Blade Guard Channel, Rt. or Lt.
6	3	1/4-20 x 1/2 Slotted Rd. Head Mach. Screw	Bearing Housing Bolt
7	3	10-32 x 3/4 Set Screw	Blade Guard Cover Locating Studs
8	1	200M320	Blade Guard Link/Puller
9	1	200M361	Rotating Pawl
10	1	200M365R/L	Bearing Housing Blade Guard Assy, Rt. or Lt.
11	1	200F250R/L	Blade Guard Cover, Rt. or Lt.
12	1	200A26R/L	Main Blade Guard, Rt. or Lt.
13	2	10-32 x 1/2 Socket Head Screw	Rear Blade Guard Channel
14	1	10-32 x 1/4 Set Screw	Dust Tube Lock Screw
15	2	10-32 x 3/4 Slotted Rd. Head Mach. Screw	Material Deflector Screw
16	1	1/4-20 x 5/8 Socket Head Screw	Lock screw Pawl
17	1	1/4-20 Hex Nut	Lock Nut Rear Puller Bolt
18	1	200BJP267	Pawl Shoulder Bolt
19	1	200BJP35	Rear Bushing for Link/Puller
20	1	1/4-20 x 1 Flat Head Phil. Undercut Mach. Screw, Plated	Rear Link Puller Screw
21	1	200A270	Lower Rotating Blade Guard
22	1	200M36	Material Deflector Angle
23	1	200BJP269	Teflon Space Washer
24	1	1/4-20 x 3/8 Truss Head Comb. Mach Screw, Plated	Pawl & Lower Blade Guard Lock Screw
25	1	8-32 x 3/8 Flat Head Phil. F Thread-Cutting Screw	Roller Bearing Screw
26	1	200BJP36	Front Bushing for Link/Puller
27	2	2BM13	Space Washers for Pin
28	1	2B2P09	Rotation Bearing for Housing
29	1	200BJP268	External Tooth Lock Washer
30	2	10 Washer	Rear Channel Screw Washer
31	1	3/16 x 1/2 Zinc Plated Roll Stop Pin	Rotating Blade Guard Upper Stop Pin
A	1	200E250R/L	Lower B.G. Cover Assy, Lt. or Rt. 4,6,8-11,15-30
B	1	200E260R/L	Blade Guard Assy, Lt. or Rt. 1-30

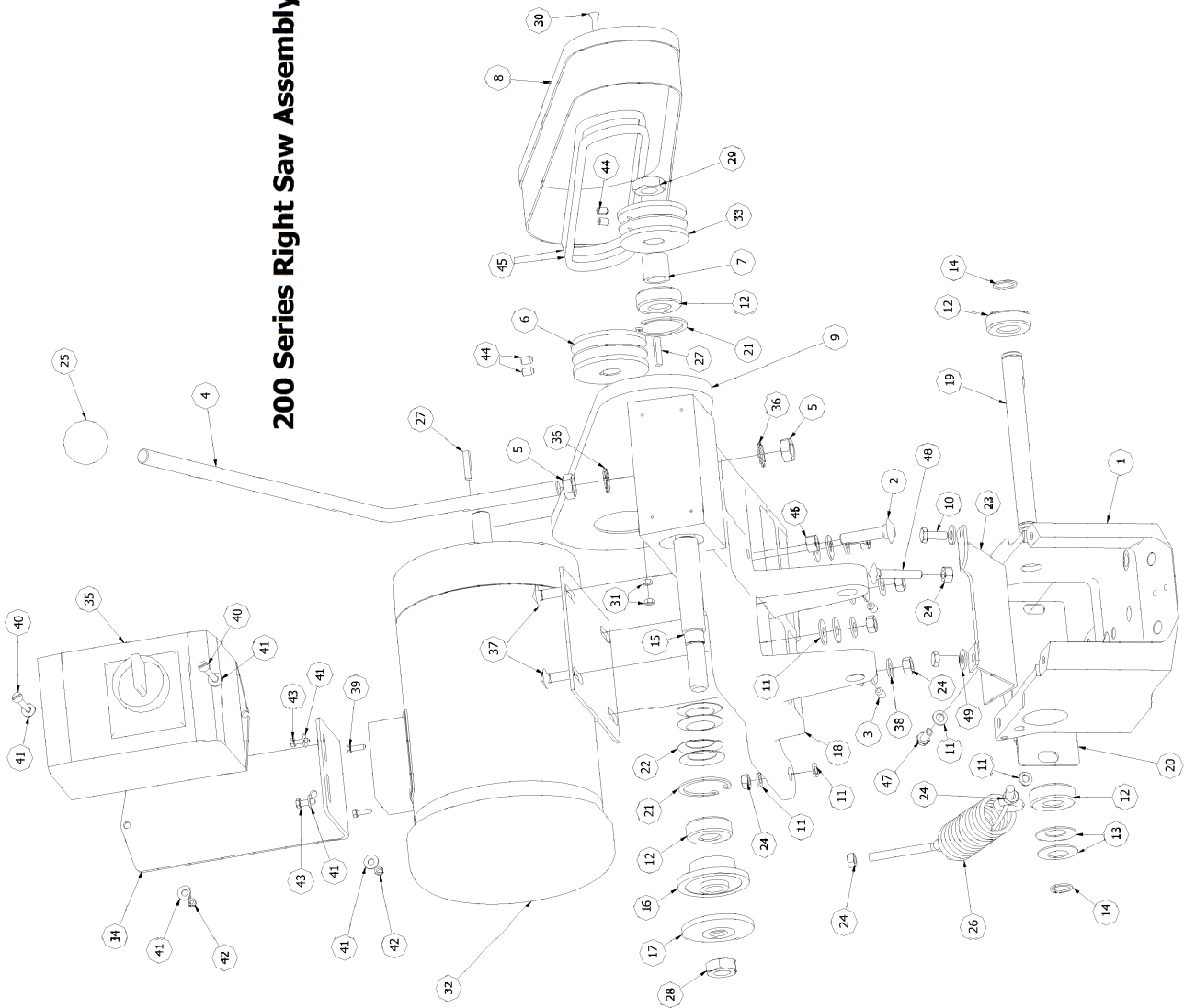
Additional Parts:

200E260L Blade Guard Assy. Complete Lt.
 200E260R Blade Guard Assy. Complete Rt.
 200F250L 12" Blade Guard, Cover Left
 200F250R 12" Blade Guard, Cover Right
 200A26L 12" Main Blade Guard, Left
 200A26R 12" Main Blade Guard, Right
 200E250L&R Cover & Lower Blade Guard Assy with Link Puller L&R
 200A270L&R Lower Rotating Blade Guard Assembly w/pin, Left & Right
 200M365L&R Bearing Housing Blade Guard Assy, L & R
 B87S01-06 Safety Decals



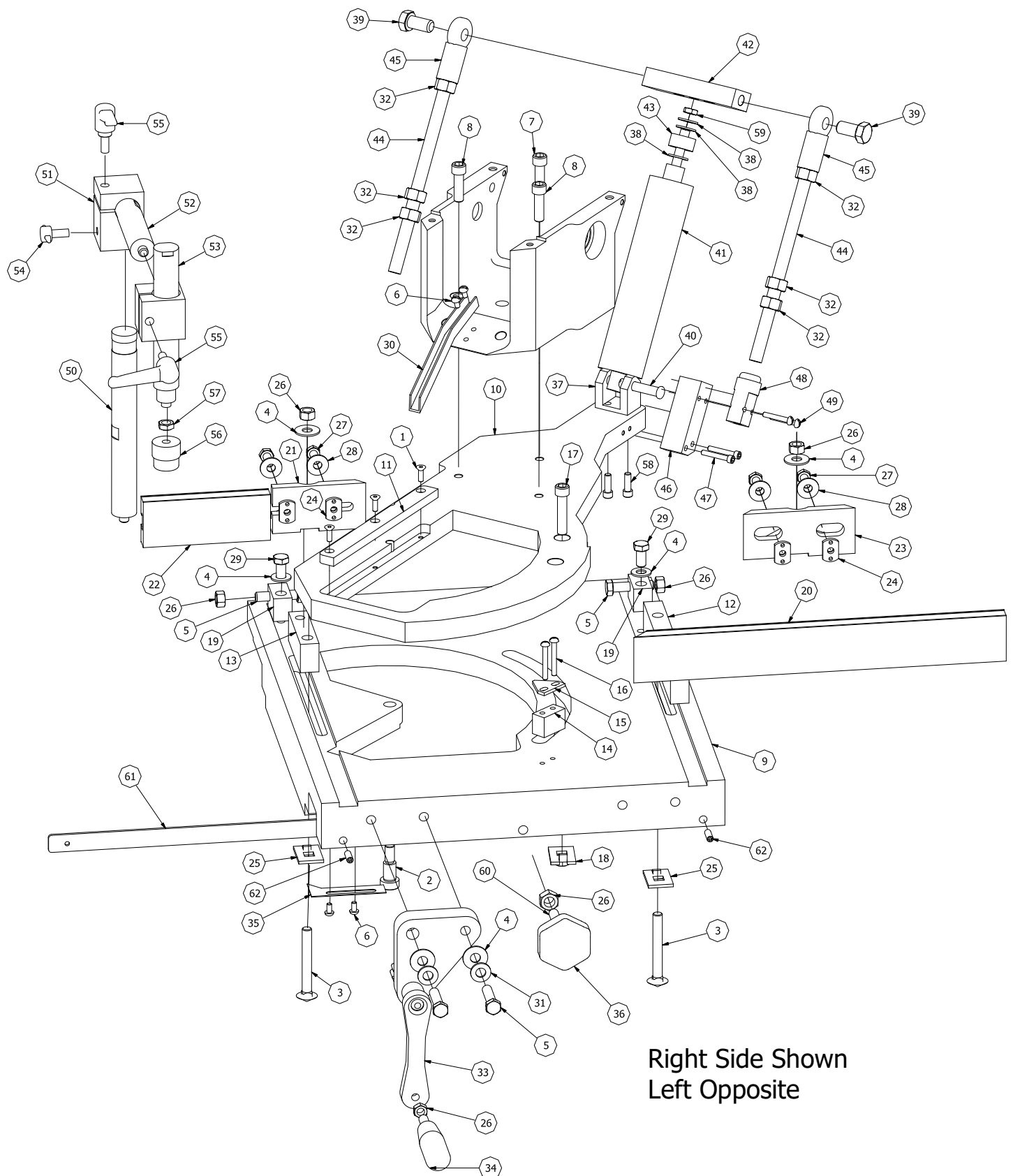
Left Opposite

Parts List				DESCRIPTION
ITEM	QTY	PART NUMBER		
1	1	200D21M	200S Pivot Bracket	
2	1	3/8-16 x 1.5 Carriage Bolt	Down Stop Bolt	
3	2	1/4-20 x 1/2 Set Screw	Arm/Pivot Lock	
4	1	2B118	Pull Down Handle	
5	2	1/2-13 Hex Nut	Handle Lock Nut	
6	1	2B4P24	Motor Pulley	
7	1	2B105	Spindle Spacer	
8	1	2B131R	Belt Guard Cover, Right	
9	1	2B128R	Belt Guard Backing Plate, Right	
10	2	1/4-20 x 3/4 Hex Bolt	1/4-20 x 3/4 Hex Bolt	
11	12	5/16 Washer	5/16 Washer	
12	4	2B2P05	Spindle / Pivot Bearing	
13	2	3B2P10	Pivot Belleville Spring	
14	2	3B2P11	Pivot Snap Ring	
15	1	2B102R	200S Spindle, Right	
16	1	200B104	200S Slinger	
17	1	200B103	200S Flange	
18	1	200B101R	200S Arm, Right	
19	1	3B108	Pivot Shaft	
20	1	200F45A	2" Dust Outlet	
21	2	2B2P06	Snap Ring Spindle	
22	4	2B2P07	Preload Belleville Spring Washer	
23	1	200F22	Dust Deflector	
24	8	5/16-20 Hex Nut	5/16-20 Hex Nut	
25	1	2B7P17	Hand Knob, Handle	
26	1	200B16E	Return Spring Assy.	
27	2	2B103	Pulley/Spindle/Motor Key	
28	1	2B1P37	Spindle Nut, Left Thread	
29	1	151P16R	Pulley Jam Nut, Right	
30	1	10-32 x 2.5 Slotted Flat Head Mach. Screw	Belt Guard Bolt	
31	2	10-32 Hex Nut	Belt Guard Lock Nuts	
32	1	2B5S01	Motor 1 HP 1 Phase	
33	1	2B4P23	Spindle Pulley	
34	1	200B196	Manual Overload Starter Bracket	
35	1	Manual Overload Starter	Manual Overload starter	
36	2	1/2 Tooth Lock Washer	Handle Lock Washer	
37	4	5/16-18 x 3/4 Carriage Bolt	Motor Mount Bolt	
38	4	5/16 SAE Washer	5/16 SAE Washer	
39	2	10-32 x 1/2 Hex Bolt	10-32 x 1/2 Hex Bolt	
40	2	10-32 x 3/4 Slotted Rd. Head Mach. Screw	10-32 x 3/4 Slotted Rd. Head Mach. Screw	
41	6	10 Washer	10 Washer	
42	2	10-32 Hex Nut	10-32 Hex Nut	
43	2	10-32 x 1/2 Hex Bolt	10-32 x 1/2 Hex Bolt	
44	4	1/4-20 x 3/8 Set Screw	1/4-20 Set Screw for Motor/Spindle Pulley	
45	2	2B4P25	3V335 Drive Belt	
46	1	3/8-16 Hex Nut	3/8-16 Hex Nut	
47	1	5/16-18 x 1/2 Hex Bolt	5/16-18 x 1/2 Hex Bolt	
48	1	5/16-18 x 1.5 Carriage Bolt	Up Stop Bolt	
49	2	1/4 Washer	1/4 Washer	



200 Series Right Saw Assembly

DM200 Base Assembly Exploded View

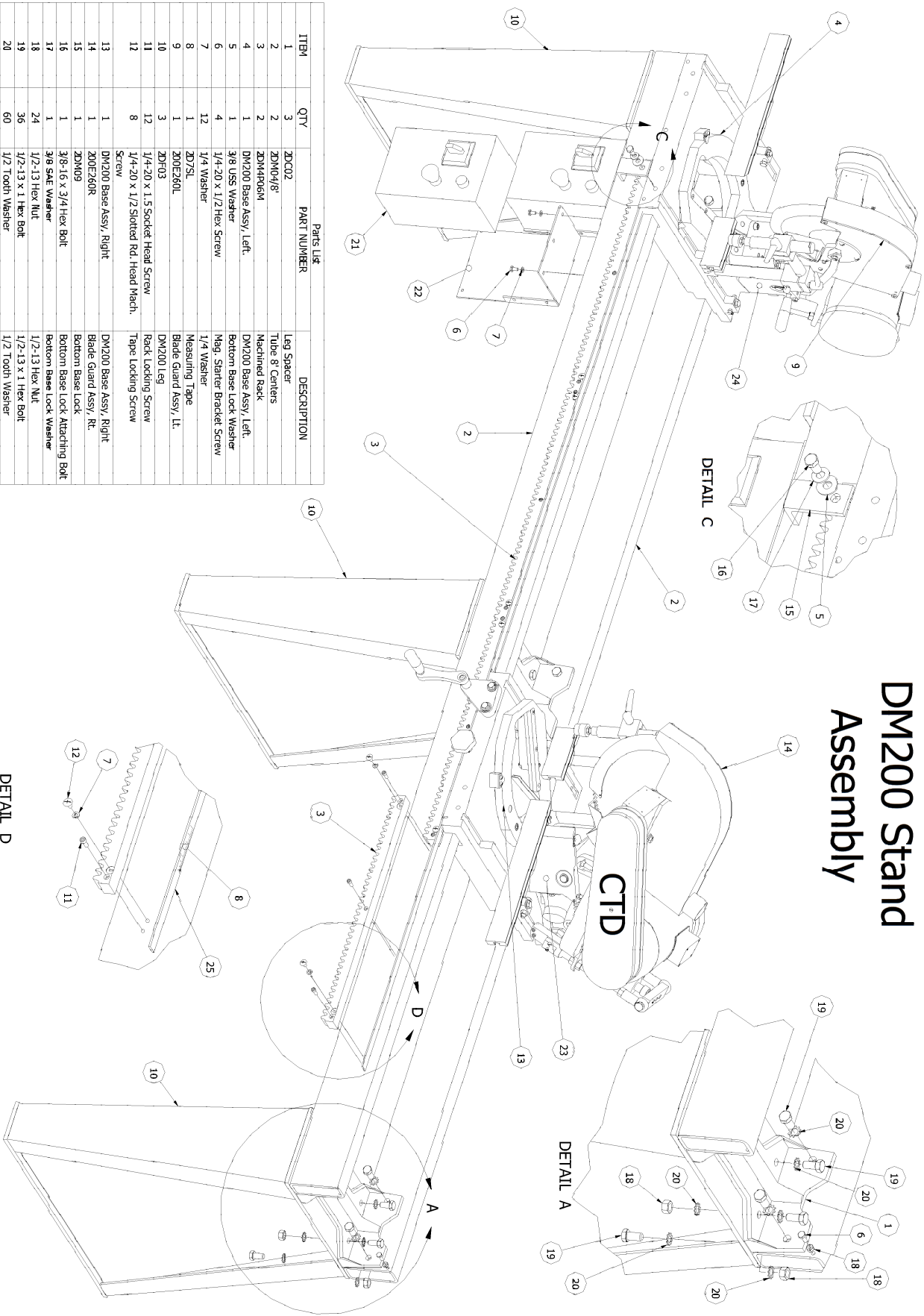


Right Side Shown
Left Opposite

DM200 Base Assembly Parts List

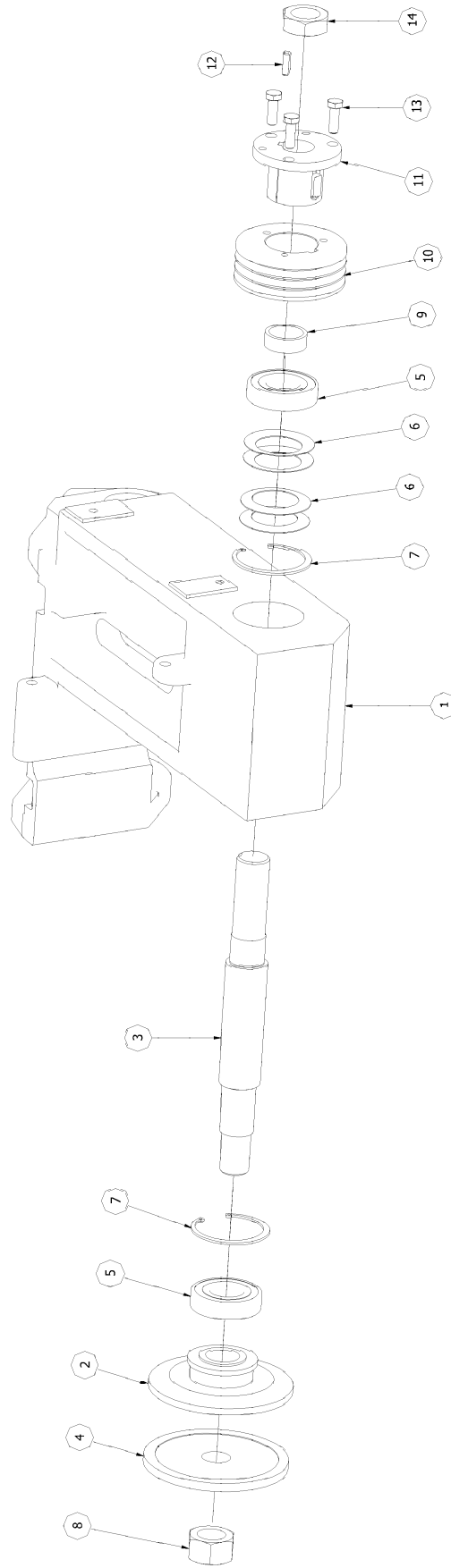
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	10-32 x 3/4 Flat Head Socket Screw	Chip Breaker Locking Screw
2	1	3/8-16 x 1/2 Shoulder Bolt	Top Base Pivot Bolt
3	2	3/8-16 x 2.75 Carriage Bolt	Fence Bracket Locking Bolt
4	6	3/8 USS Washer	3/8 USS Washer
5	4	3/8-16 x 1.5 Hex Bolt	3/8-16 x 1.5 Hex Bolt
6	4	10-32 x 3/8 Slotted Rd. Head Mach. Screw	Pointer/Dust Deflector Locking Screws
7	1	3/8-16 x 3/4 Socket Head Screw	Pivot Bracket Locking Screw (Rear)
8	2	3/8-16 x 1.25 Socket Head Screw	Pivot Bracket Locking Screw (Front)
9	1	2DC23R	Bottom Base, Rt.
10	1	200DF21R	Top Base, Rt.
11	1	2DM60R	Chip Breaker
12	1	2DM25	Outside Fence Key
13	1	2DM26	Inside Fence Key
14	1	2DM27	Zero Block Pointer Support
15	1	2D7P18	Pointer
16	2	10-32 x 3/4 Slotted Rd. Mach. Head Screw	Pointer Locking Screw
17	1	3/8-16 x 2 Socket Head Screw	Top Base Locking Bolt
18	1	BF19B	Tab Washer W/Nut Assy.
19	2	2DM29	45° & 90° Stop
20	1	200DM19	Outside Fence
21	1	200DC40R	Inside Fence Bracket, Rt.
22	1	200DM18	Inside Fence
23	1	200C05	Outside Fence Bracket
24	4	B1P51618	5/16-18 Tee Nut
25	2	BF19	Tab Washer
26	6	3/8-16 Hex Nut	3/8-16 Hex Nut
27	4	5/16-18 x 3/4 Hex Bolt	Fence Locking Bolt
28	4	5/16 Washer	5/16 Washer
29	2	3/8-16 x 1 Hex Bolt	Stop Block Locking Bolt
30	1	2DM34	Dust Deflector
31	2	3/8 UNC Washer	3/8 UNC Washer
32	6	1/2-20 Hex Nut	1/2-20 Hex Nut
33	1	2DE07	Crank Assy
34	1	2D7P10	Crank Handle
35	1	2DF15	Length Pointer
36	1	2D4P13	Hand Knob
37	1	200M82	Rear Cylinder Clevis
38	3	7/16 Washer	7/16 Washer
39	2	1/2-13 x 1 Hex Bolt	Rod End Locking Bolt
40	1	3/8 x 1.75" Clevis Pin	Cylinder Clevis Pin
41	1	2B3P05	Air Cylinder
42	1	200M86A	Cross Bar Air Feed
43	1	2B7S15	Rubber Bumper
44	2	200M81	Cylinder Support Rod
45	2	200B2P80	Rot. Rod End
46	1	200M84	3 Way Valve Bracket
47	2	10-32 x 1.25 Socket Head Screw	Valve Bracket Locking Screw
48	1	B3P50	3 Way N/O Valve
49	2	10-32 x 1.25 Slotted Rd. Head Mach. Screw	Valve Locking Screw
50	1	200M20	N.S. V/C Support Bar
51	1	200M21	V/C Adjusting Bracket
52	1	200M20B	Horizontal Bar V/C Support
53	1	2B3P20	3" Stroke Clamp Cylinder
54	1	200B1P22	5/16-18 Wing Stud
55	2	200B7P19	5/16-18 x 1.25 Adj. Handle
56	1	2B3P20C	Vertical Clamp Pad Assy.
57	1	3/8 - 24 Jam Nut	Clamp Pad Locking nut
58	2	1/4-20 x 3/4 Socket Head Screw	Cylinder Clevis Locking Screw
59	1	7/16-20 Hex Nut	Cylinder Shaft Locking Nut
60	1	30M51	Base Lock Stud
61	1	2DM16	Base Gib
62	2	1/4-20 x 3/4 x 1/2 Dog Point Set Screw	Set Screw Base Gib

DM200 Stand Assembly



ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	DMC02	Leg Spacer
2	2	DMM04/8"	Tube 8" Centers
3	2	DMM4P06M	Machined Rack
4	1	DM200 Base Assy, Left	DM200 Base Assy, Left
5	1	3/8 USS Washer	Bottom Base Lock Washer
6	4	1/4-20 x 1/2 Hex Screw	Mag. Starter Bracket Screw
7	12	1/4 Washer	1/4 Washer
8	1	DM7SL	Measuring Tape
9	1	DM0E260L	Blade Guard Assy, Lt.
10	3	DMF03	DM200 Leg
11	12	1/4-20 x 1.5 Socket Head Screw	Rack Locking Screw
12	8	1/4-20 x 1/2 Slotted Rd. Head Mach. Screw	Tape Locking Screw
13	1	DM200 Base Assy, Right	DM200 Base Assy, Right
14	1	DM0E260R	Blade Guard Assy, Rt.
15	1	DMM09	Bottom Base Lock
16	1	3/8-16 x 3/4 Hex Bolt	Bottom Base Lock Attaching Bolt
17	1	3/8 SAE Washer	Bottom Base Lock Washer
18	24	1/2-13 Hex Nut	1/2-13 Hex Nut
19	36	1/2-13 x 1 Hex Bolt	1/2-13 Hex Bolt
20	60	BSP2H3Q230V/CH	ZHPQ230V Mag. Starter #11
21	2	BF96	Magnetic Starter Bracket
22	1	Right Saw Assembly	Right Saw Assembly
23	1	Left Saw Assembly	Left Saw Assembly
24	1	DM110	Base for Tape
25	1		

400S Right Spindle Assembly



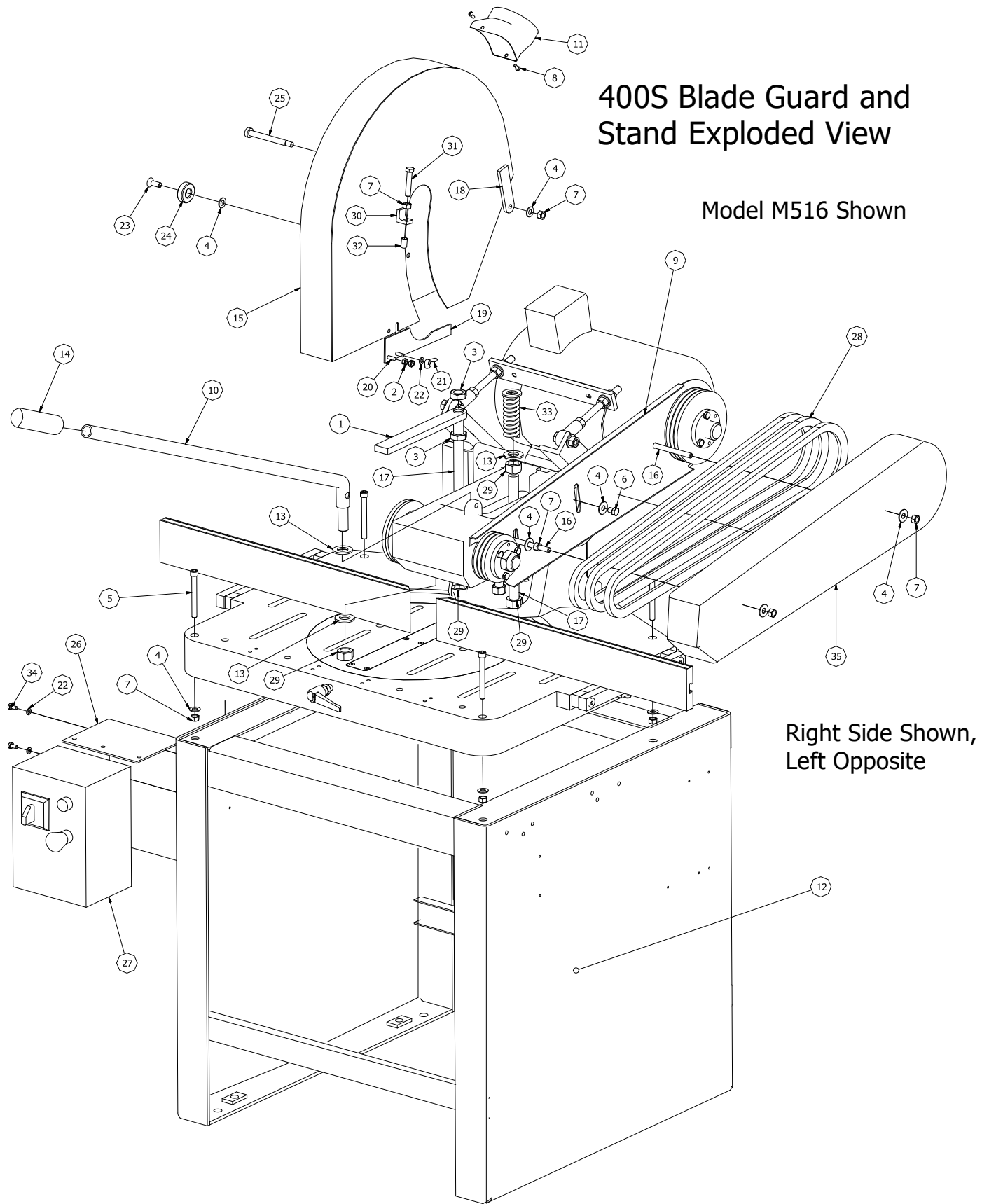
Note:

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 B4P4P3V41 for 16" machines & B4P4P3V47 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	1	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	B4P3P3V36	Spindle Pulley
11	1	B4P118	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 Exploded View

Model M516 Shown

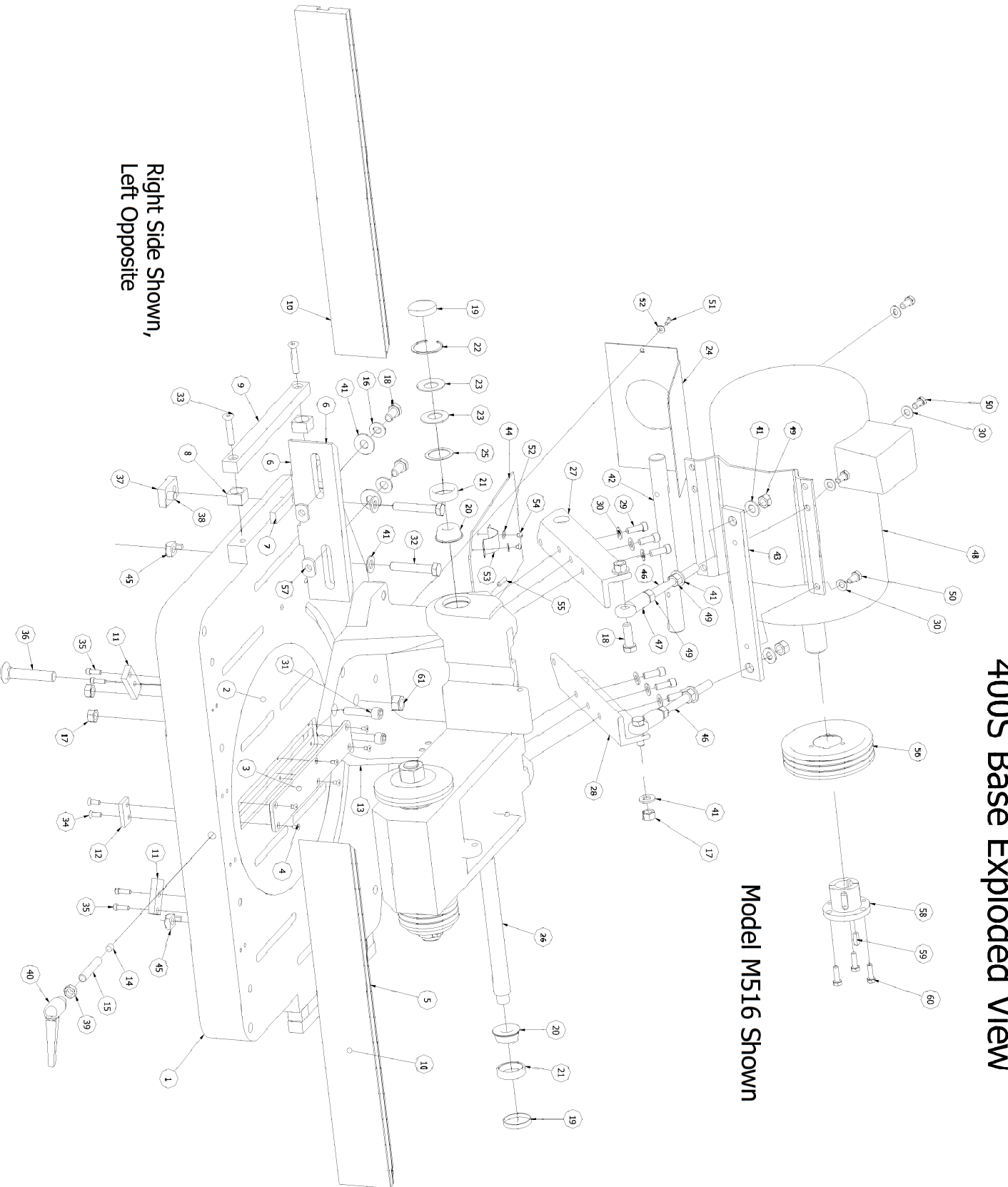


400S Blade Guard and Stand Parts List

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

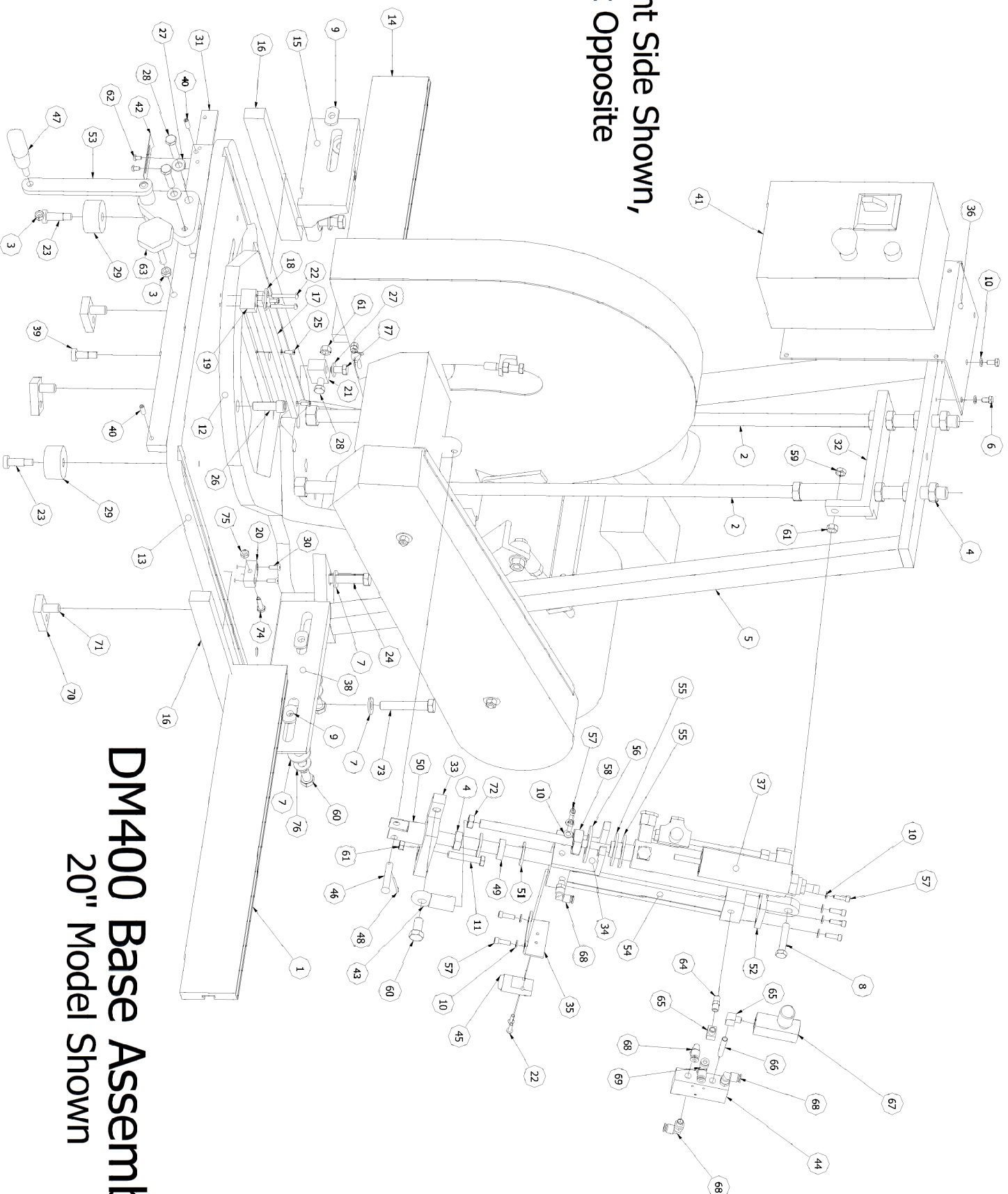


400S Base Parts List

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 Pin	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

Right Side Shown,
Left Opposite



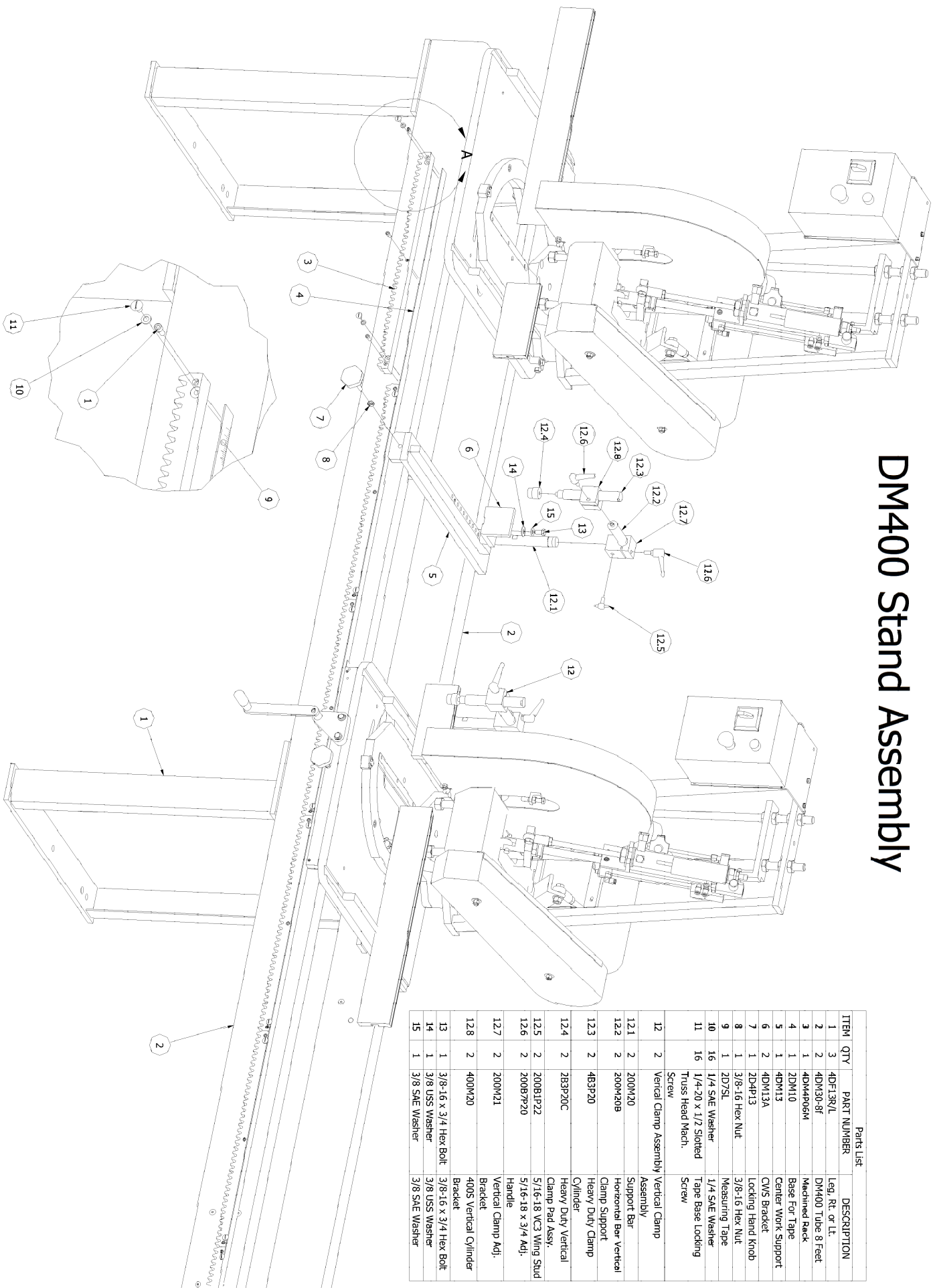
DM400 Base Assembly 20" Model Shown

DM400 Base Assembly

Parts list

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	400M05R/L	Outside Fence, Rt. or Lt.
2	2	4BM80	Guide/Support Rod
3	2	5/16-18 Hex Nut	5/16-18 Hex Nut
4	12	3/4-10 Hex Jam Nut	3/4-10 Hex Jam Nut
5	1	4BM87	Power Feed Rear Brace
6	2	1/4-20 x 1/2 Hex Bolt	1/4-20 x 1/2 Hex Bolt
7	7	1/2 USS Washer	1/2 USS Washer
8	1	3/8-16 x 2 Hex Bolt	Cylinder Pivot Bolt
9	4	B1P1213	1/2-13 Tee Nut
10	10	1/4 USS Washer	1/4 USS Washer
11	1	3/8-16 x 2 Hex Bolt	Valve Upstop Adj. Bolt
12	1	4DM02R/L	Top Base, Rt. or Lt.
13	1	4DM01L/4DM01RE	Bottom Base, Rt. or Lt.
14	1	400M06	Inside Fence
15	1	400DM04R/L	Inside Fence Bracket, Rt. or Lt.
16	2	4DM08	Outside Fence Key
17	1	4DM60	Chip Breaker
18	1	2D7P18	Clear Cursor Pointer
19	1	2DM27	Zero Block
20	1	223M44	45° Stop Block
21	1	2DM29	90° Stop Key
22	4	10-32 x 3/4 Slotted Rd. Head Mach. Screw	10-32 x 3/4 Slotted Rd. Head Mach Screw
23	2	3/8-16 x 1 Shoulder Bolt	Roller Locking Bolt
24	2	1/2-13 x 3 Hex Bolt	Brace Locking Bolt
25	3	10-32 x 1/2 Flat Head Screw	Chip Breaker Locking Screw
26	1	1/2-13 x 1.5 Socket Head Bolt	1/2-13 x 1.5 Socket Head Bolt
27	3	3/8 USS Washer	3/8 USS Washer
28	3	3/8-16 x 1.5 Hex Bolt	3/8-16 x 1.5 Hex Bolt
29	2	400D7P01	Base Roller Bearing
30	2	10-32 x 3/4 Flat Head Screw	10-32 x 3/4 Flat Head Screw
31	1	4DM16	Bottom Base Gib
32	1	4BM82	Cylinder Support Bracket
33	1	400M95	Hydro Cross Bar
34	1	400M94	Hydro Top Mount Bracket
35	1	4BF101	Valve Bracket
36	1	BF96	Magnetic Starter Bracket
37	1	B3P146/B3P148	6" Hydrocheck (16" Saw)/ 8" Hydrocheck (20" Saw)
38	1	400DM05R/L	Outside Fence Bracket, Rt. or Lt.
39	1	3/8-16 x 3/4 Shoulder Bolt	Top Base Pivot Bolt
40	2	1/4-20 x 3/4 Set Screw	1/4-20 x 3/4 Set Screw
41	1	B5P7.5H3Q230V/CH	7.5HP 230V Mag. Starter #18
42	1	2DF15	Pointer
43	1	200B2P80	Rotating Rod End
44	1	B3P73	4/W Spring Return Valve
45	1	B3P50	3-Way N/O Valve
46	1	3/8 x 1.5" Clevis Pin	3/8 x 1.5" Clevis Pin
47	1	2D7P10	Crank Handle
48	1	Cotter Pin	Cotter Pin
49	1	157P73	Rubber Bumper
50	1	15M26	Rod Clevis
51	2	3/4 Washer	3/4 Washer
52	1	2B3P31	Eye Mount
53	1	4DE07	Heavy Duty Crank Assembly
54	1	B3P308/B3P306	300 x 8" Air Cylinder (20" Saw) / 300 x 6" Air Cylinder (16" Saw)
55	2	1" Washer	1" Washer
56	1	400B1P96	Hydrocheck Washer
57	8	1/4-20 x 3/4 Socket Head Screw	1/4-20 x 3/4 Socket Head Screw
58	1	1-8 Hex Nut	1-8 Hex Nut
59	1	3/8-16 Jam Nut	3/8-16 Jam Nut
60	4	1/2-13 x 1 Hex Bolt	1/2-13 x 1 Hex Bolt
61	2	3/8-16 Hex Nut	3/8-16 Hex Nut
62	2	10-32 x 3/8 Slotted Rd. Head Mach. Screw	Pointer Locking Screw
63	1	2D4P13	Locking Hand Knob
64	1	1/8" NPT Nipple	1/8" NPT Nipple
65	2	90° Street Elbow	90° Street Elbow
66	1	1/8 x 2.5" Nipple	1/8 x 2.5" Nipple
67	1	B3P60	Upstroke Flow Control Valve
68	4	1/8 x 1/4" Elbow	1/8 x 1/4" Elbow
69	1	1/4 x 1/8" NPT Male Run Tee	1/4 x 1/8" NPT Male Run Tee
70	3	41M10	Fence Nut
71	3	1/2 x 1.5 Dowel Pin	1/2 x 1.5 Dowel Pin
72	1	1/2-20 Jam Nut	1/2-20 Jam Nut
73	1	1/2-13 x 3 Hex Bolt	1/2-13 x 3 Hex Bolt
74	1	1/4-20 x 1 Hex Bolt	1/4-20 x 1 Hex Bolt
75	1	1/4-20 Hex Nut	1/4-20 Hex Nut
76	3	1/2 SAE Washer	1/2 SAE Washer
77	1	3/8-16 x 1 Hex Bolt	3/8-16 x 1 Hex Bolt

DM400 Stand Assembly



DM200R Spindle Assemblies and Bearing Installation Instructions:

Refer to Spindle and Pivot diagrams on the following page.

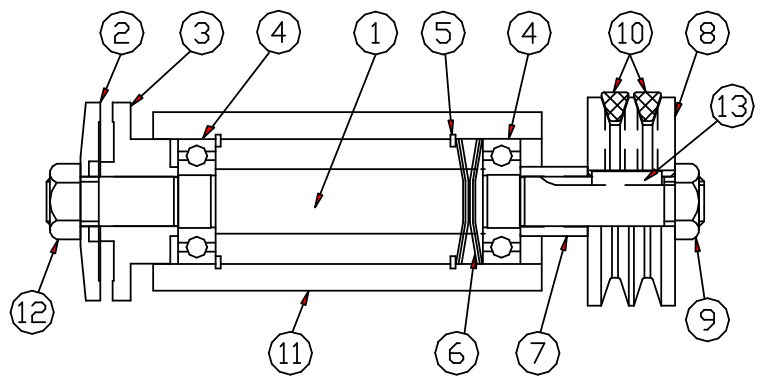
It is suggested that replacement spindle assemblies be purchased from CTD before disassembling. Old spindles can be returned for bearing replacement and slinger refacing for a nominal fee. The DM200R spindle assembly provide for a “slip-fit” between the outer races of the bearing and the housing or arm casting, and a “press-fit” between the inner race and the spindle. Great care must be taken with ball bearings or the life of the bearings will be reduced. To remove the spindle assembly;

- A. Loosen motor and remove belts.
- B. Remove Spindle Pulley Nut #9 by holding pulley. ***Never*** hold slinger or spindle nut to loosen or tighten pulley nut. Face of slinger can be damaged, and spindle nut can damage spindle thread. Loosen set screws in pulley.
- C. Remove Pulley #8, Pulley Key #13, and Spindle Spacer #7. Place Pulley Nut #9 back onto spindle to protect threads.
- D. With a soft hammer or rubber mallet, 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.
- E. Remove Pulley Nut #9, again.
- F. Spindle Assembly, consisting of Spindle #1, Slinger #3, and Blade Bearing #4 will come out of housing. Outside bearing will slip out of housing. If a replacement spindle assembly was purchased, go to item “L”.
- G. If bearing on the blade side must be replaced, an arbor press must be used to disassemble the bearing and the slinger from the spindle. *Great care must be used in disassembling*, or the spindle will be scored or stripped by the slinger. Before pressing apart, scribe a line on the face of the spindle and the slinger so that they will be re-assembled in exactly the same position in relation to each other. Use an arbor press or pulley puller.
- H. Press off slinger and bearing from spindle.
- I. Press new bearing on to spindle, making sure spindle is square to the bore.
- J. Replace slinger, as above, making sure scored lines match.
- K. The face of the slinger must be checked to make sure the face (next to the blade) is running true. If it is not running true, it should be refaced. Slinger should indicate <.001. To reface;
 1. Partially assemble pulley bearing on spindle.
 2. Hold outer races of both bearings gently in a vise.
 3. Use the side of a surface grinder wheel to dress the face of the slinger by rotating spindle in bearing slowly against the direction of the grinding wheel.
- L. Clean bearing hole and slip new spindle assembly into arm casting up to snap ring. From the opposite side of the arm, make sure that Belleville Springs #6 are assembled in housing as shown in sketch.
- M. To re-assemble spindle assembly, slide Outside Bearing #4 onto the spindle as far as it will go, being careful that bearing goes into housing square.
- N. Slide pulley onto shaft with pulley key and spacer (for DM200R only).
- O. Hold pulley to replace pulley jam nut. Replace jam nut on spindle threads, and slowly tighten pulley jam nut. This will push bearing onto shaft. Tighten thoroughly.
- P. Since motor was moved, the centerline of the motor 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 pulley grooves. Tighten motor.
- Q. Belt tension is of *critical* importance. To obtain proper tension, press down on top of belts with a moderate amount of pressure. Belts should deflect approximately 1/4”.
- R. Tighten set screw in both pulleys. To check assembly after tightening belts, apply pressure in the direction of the blade on the pulley nut. A slight spring pressure should be felt. If spindle does not spring back, the belts may be too tight.

<u>No.</u>	<u>Description</u>	<u>Part No.</u>
1	Spindle, Right Hand (Left Thrd)	2BM02R
	Spindle, Left Hand (Right Thrd)	2BM02L
2	Flange	200M03
3	Slinger	200M04
4	Bearing (2 required)	2B2P05
5	Snap Ring (2 required)	2B2P06
6	Preload Belleville Spring (4 req)	2B2P07
7	Spindle Spacer	2BM05
8	Spindle Pulley	2B4P23
9	Pulley Jam Nut, Right	151P16R
	Pulley Jam Nut, Left	151P16L
10	3V335 Drive Belt (2 required)	2B4P25
11	200 Series Arm, Right	200BC01RX
	200 Series Arm, Left	200BC01LX
12	Spindle Nut, Right Thread**	2B1P36
	Spindle Nut, Left Thread**	2B1P37
13	Pulley Key	2BM23
*	Spindle Assembly	200BE21L or R

Consists of 1,2,3,4,5,6,7,9, & 12

Note: A Spindle Nut, **Left Thread is used on the
Right Hand Saw, facing it from the front.
Belt guard is on right side, blade guard is on the left side.



400X SPINDLE ASSEMBLY

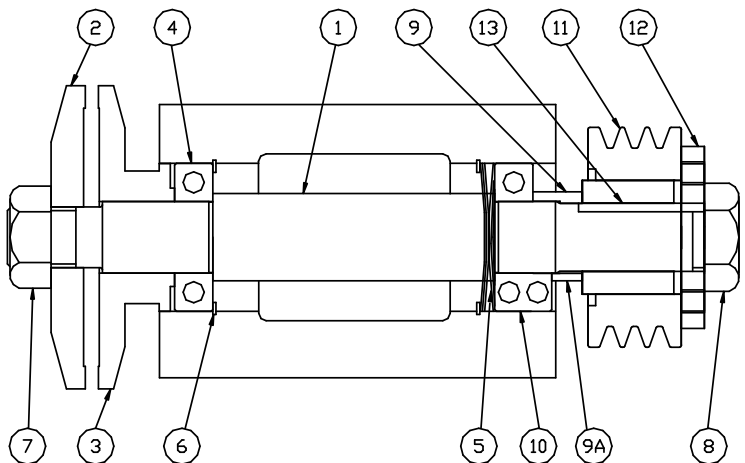
<u>No.</u>	<u>Description</u>	<u>Part No.</u>
1	Spindle	4BM41X
2	Flange	4BM43
3	Slinger	4BM44
4	Bearing (2 required)**	4B2P45
5	Preload Spring (4 required)	4B2P46
6	Snap Ring (2 required)	4B2P47
7	Nut, Blade—Left thrd	4B1P48
8	Nut, Jam—Right thrd	4B1P49X
9	Spacer	4BM50X
9A	Spacer (for 15 HP & 20 HP)	4BM51X
10	Bearing, Double Row (for 15 HP & 20 HP)	4B2P45C
11	Pulley (per individual order)	B4P3P3V
12	Bushing, Pulley	B4PP118
13	Key, Pulley	4BM23A

**except for 15 HP & 20 HP

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 (1 each)
- C. Slinger, No. 3
- D. Flange, No. 2

Note: Items 1 - 4 (1 each), 5, 6, 7, 8, 9 & 13 are included in 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 foolproof, 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.

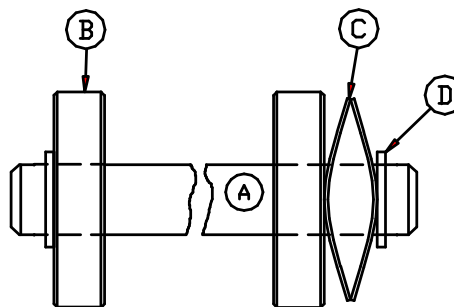
To Remove Spindle Assembly:

- 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. Install Pulley Bearing #10 onto spindle as far as possible, then Spacer #9. Make sure Belleville Springs are assembled properly.
- 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 #10 onto shaft.
- 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.

DM200R & CDM300R PIVOT SHAFT ASSEMBLY

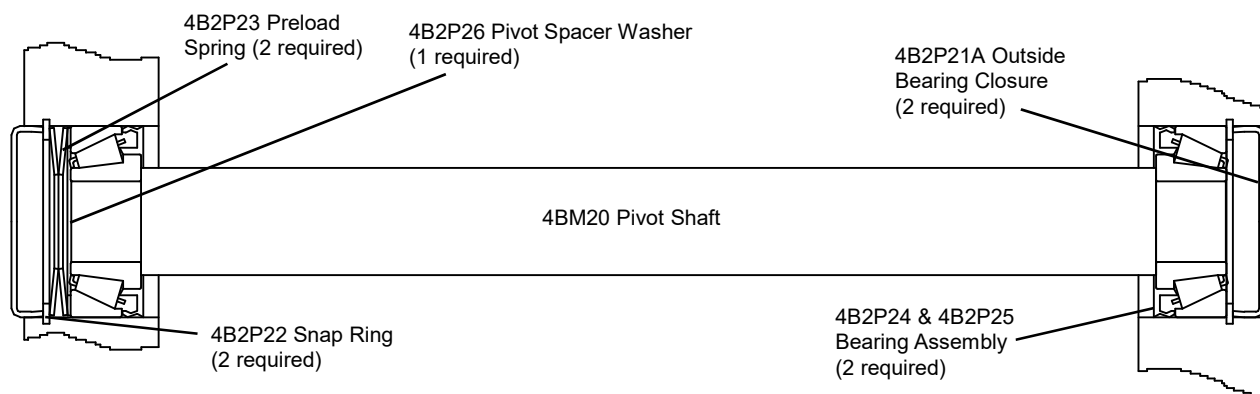
Assemble preload springs back-to-back as shown.

<u>No.</u>	<u>Description</u>	<u>Part No.</u>
A.	Pivot Shaft	3BM08
B.	Pivot Bearing (2 required)	2B2P05
C.	Pivot Belleville Spring, (2 required)	3B2P10
D.	Pivot Snap Ring (2 required)	3B2P11



Pivot Shaft Assembly for Model DM400:

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



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.



CTD MACHINES

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