KALAMAZOO®

Metal Cutting Saws

Operating Manual

MODELS FA-350SA, FS-350SA, FA-350A, and FS-350A

Manual P/N KTS-06
Revised June, 1992

THIS OPERATING MANUAL SHOULD BE READ BY EVERYONE EXPECTED TO OPERATE OR SUPERVISE THE OPERATION OF THIS MACHINE. SPECIAL ATTENTION SHOULD BE FOCUSED ON THE PAGES CONCERNING SAFETY.

For your convenience when ordering parts,
please fill in the following information
when you receive your new KALAMAZOO saw.

MODEL _____

SERIAL NO. _____

KALAMAZOO has been committed to continuous product improvement since 1867. In keeping with this commitment, we reserve the right to change the information in this manual without notice. Every attempt has been made to insure the accuracy of this manual. Even so, KALAMAZOO assumes no responsibility for errors or omissions, nor is any liability assumed for damages resulting from the use of the information contained in this manual.

Kalamazoo Saw * 508 Harrison, Kalamazoo, MI 49007
(616) 345-2141 (MI) [redacted] (616) 345-3932 (FAX)

Models FA-350SA, FS-350SA, FA-350A, and FS-350A

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SAFETY PRECAUTIONS

This saw has been equipped with guards to protect operators from moving parts wherever possible. However, always remember that it is a machine tool designed to cut metal using a sharp tool (saw blade) at high speeds. It also has moving parts which in some cases are automatically actuated without any action on the part of the operator. Therefore, the operator must be constantly aware of these conditions and take care to prevent injury.

1. Always assume that the saw is top-heavy, and handle it accordingly. Be sure that the chains or straps used to lift the machine are securely attached. Also be sure that they are placed in such a way that hydraulic or pneumatic lines, electrical leads, and other such objects are not damaged.

2. When installing the saw, be sure that both the grounding wire and the energized leads are connected properly. Check the supply voltage before using the saw. It should match the voltage printed on the tag attached to the electrical enclosure.

3. The saw should be installed according to state and local codes as well as the National Electrical Code.

4. ALWAYS wear eye protection when attending and operating this machine.

5. NEVER operate this machine unless all guards supplied are in place and closed.

6. NEVER insert hands and arms into or near the cutting area while the machine is running.

7. NEVER load or unload the machine while the blade is running.

8. NEVER wear loose clothing, long sleeves, gloves, jewelery, or any other item which may be caught. Confine long hair.

9. ALWAYS support stock on both sides of the machine to keep it from falling.

10. ALWAYS disconnect power at the source before performing maintenance work on the saw or making adjustments other than those necessary for normal operation of the machine.

11. ALWAYS keep the cutting area clear of tools and other loose objects.

12. ALWAYS be sure the vise is securely clamped and the machine is properly set up before starting a cutting cycle.

13. ALWAYS follow safe practices and inspection procedures when installing new blades. Refer to section 5 for details.

14. For machines with pneumatic (air-powered) vises:

    a) BEFORE starting the cutting cycle, be sure that the set-up is correct and that the vise will securely clamp.

    b) Vises close automatically - Keep hands clear.

    c) Make sure the workpiece is clamped on both sides of the blade. Unclamped pieces can be caught in the blade, possibly causing injury.

ALWAYS OPERATE THE MACHINE SAFELY!

BE CAREFUL!

MACHINE DESCRIPTIONS

FA-350SA: Semi-Automatic Full Cycle non-ferrous cutting saw with air-powered vise and head feed.

FA-350A: Fully-Automatic non-ferrous cutting saw with preset number of carriage feeds and pieces to cut.

FS-350SA: Semi-Automatic Full Cycle ferrous cutting saw with air-powered vise and head feed.

FS-350A: Fully-Automatic ferrous cutting saw with preset number of carriage feeds and pieces to cut.

SPECIFICATIONS: FA-350 SAWS

Motor: 3hp, 1725 RPM, 208/230/460V Operation, NEMA 182 Frame, TEFC

Spindle Speed: 3210 RPM (11,580 SFPM) standard
2070 RPM (7,465 SFPM) optional

Blade Arbor Size: 32mm (1.2598") Dia

Flange Diameter: 73mm (2.874")

Maximum Blade Size: 350mm (13.75") Dia

Electrical Operation: 208/230/460/575V Three Phase with 115VAC controls (additional 24VDC controls on FA-350A saws). Blade Safety Switch located on handle of manually operated saws.

Maximum Vise Opening: 6 1/4" (160mm)

Vise: Manually operated (FA-350M) or Air-powered with optional adjustable clamping pressure. Automatic operation during the cutting cycle (FA-350PV/SA/A). Self-centering with replaceable wear plates.

Coolant System: Spray Mist with 1 qt. (Manual Head) or 1 gal. (Powered Head) reservoir. Adjustable air and coolant flow. Water soluble coolant. Control Panel switch (1 gal. units). Works with head feed.

Construction: Cast iron head, head support, vise support, and vise jaws. Welded steel base with leveling screw holes.

Work Height: 37 1/2" (952.5mm)

SPECIFICATIONS: NON-FERROUS SAWS
(continued)

SPECIFICATIONS: FS-350 SAWS

Motor: 3/1.5hp, 1725/850 RPM, 208/230V or 460V operation, NEMA 184TC frame, TEFC

Spindle Speed: 30/60 RPM (108/217 SFPM) standard. 20/40 RPM (72/144 SFPM) also available.

Blade Arbor Size: 32mm (1.2598") Dia

Flange Diameter: 85mm (3.375")

Maximum Blade Size: 350mm (13.75")

Electrical Operation: 208/230V or 460V Three Phase with 115VAC controls (additional 24VDC controls on FS-350A saws). Blade Safety Switch located on handle of manually operated saws.

Maximum Vise Opening: 6 1/4" (160mm)

Vise: Manually operated (FS-350M) or Air-powered with adjustable clamping pressure. Automatic operation during the cutting cycle (FS-350PV/SA/A). Self-centering. Replaceable wear plates.

Coolant: Flood system with 6 gallon reservoir. Adjustable flow at cutting head. On/Off switch at control station. Water soluble coolant.

Construction: Cast iron head, head support, vise support, and vise jaws. Welded steel base with leveling screw holes.

Work Height: 37 1/2" (952.5mm)

CUTTING CAPACITIES (350MM BLADE)

	FA-350	FS-350
90°		
Round Tubing	5"	4 1/4"
Round Solids	5"	2"
Rectangular Tubing	4 1/2" x 6"	3 1/4" x 5 1/2"
Rectangular Solids	4 1/2" x 6"	2"x 2"
Square Solids	4 1/2"	2"
45°		
Round Tubing	4 1/2"	4 1/4"
Round Solids	4 1/2"	2"
Rectangular Tubing	4" x 4 1/2"	3"x 3 1/4"
Rectangular Solids	4" x 4 1/2"	2"x 2"
Square Solids	4"	2"

DIMENSIONS AND SHIPPING WEIGHTS

FA-350SA: 74"H x 35"W x 42"D (without stock stop)
1155 lbs

FA-350A: 70 1/2"H x 84"W x 42"D
1892 lbs

FS-350SA: 74"H x 35"W x 42"D (without stock stop)
1305 lbs

FS-350A: 70 1/2"H x 84"W x 42"D
2040 lbs

Chip Removal System: 26" dia x 51"H
178 lbs

5' Roller Table (RT-0507): 40 1/4"H (max) x 10"W x 60" Long

10' Roller Table (RT-1007): 40 1/4"H (max) x 10"W x 120" Long

OPTIONAL EQUIPMENT

ELECTRONIC MOTOR BRAKE (CS-7140): The motor brake is factory set to stop the motor in 8 seconds or less. As always, DO NOT enter the cutting zone until the blade has come to a complete stop. The brake is optional on FA-350 series saws, it is not available on FS-350 series saws. The motor brake option must be factory installed.

VACUUM CHIP REMOVAL SYSTEM (CS-9001): The chip removal system is powered by a separate electrical circuit from the saw. While the system will not collect every chip produced during a cut, with proper adjustment of the guards, 75% to 80% of the chips can be collected. Chip collection will also vary with the material being cut, since lighter chips will collect more easily.

ROLLER TABLES: Both 5 foot long (RT-0507) and 10 foot long (RT-1007) non-powered roller tables are available to support longer stock on either side of the blade. The table height should be set so that the top of the rollers is level with the top of the vise support casting. Tables of either length may be joined in any combination to get a desired total length. For safety, these tables should be bolted to the floor.

SHORT-LENGTH CUTOFF STOCK STOP (CS-7400 and CS-7400-S): When cutting repetitive pieces up to 7" long in light extrusions, this system can be used instead of the stock stop rod. The stop is positioned along a "T" slot in the top of the vise wear plate and locked down. When the part is cut, a blast of air helps move the piece away from the stop.

90° WEAR PLATE (CS-7401 and CS-7401-S): The 90° wear plate is available for use when angle cutting will not be needed. The square end allows better support near the blade while cutting. This also allows for a shorter minimum cut (1/8"). These wearplates are totally interchangeable with the standard wear plates, and can be switched in minutes.

SPEED CHANGE KITS (FA saws): These kits are available to change the blade speed from 3210 RPM to 2070 RPM (CS-7450) or vice versa (CS-7451), depending on the blade speed originally ordered.

OVERHEAD CLAMP (CS-7500): The Overhead Clamp option allows stock to be clamped vertically as well as horizontally (by the saw vise). The Clamp is plumbed to work with the saw vise, and is especially useful in bundle cutting.

FIXTURE MOUNTING TABLE ACCESSORY (CS-7600): The fixture table mounts in place of the standard vise. The "T" slots and flat surface of the table allow the use of a variety of clamps to hold irregular workpieces that could not fit securely in the standard vise. The fixure table can be easily switched with the standard vise at any time.

FOOT PEDAL START (CS-9052): The foot pedal works in parallel with the "Cycle Start" pushbutton on semi-automatic and automatic saws. The foot pedal can be particularly useful in speeding up the cycle times on semi-automatic saws.

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WARRANTY

Each 'KALAMAZOO'saw is warranted to be free of defects in materials and/or workmanship for a period of TWO YEARS from the date of installation. This WARRANTY is LIMITED to factory defects and specifically excludes items subject to normal wear (see lists below). Moreover this warranty only applies to machines which have been installed and operated in accordance with instructions given in the KALAMZOO Operation and Service Manual which is provided with each and every machine, have not been tampered with in any way, misused, or suffered damage through accident, neglect, or conditions beyond Kalamazoo's control.

THERE ARE NO OTHER WARRANTEES, EXPRESSED OR IMPLIED, AND KALAMAZOO SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR CONSEQUENTIAL DAMAGES. Return of the Kalamazoo Saw Warranty Card within 10 days of installation shall serve as proof of installation for warranty coverage.

KALAMAZOO'S WARRANTY includes all parts and labor during the first twelve months of operation and replacement of parts only during the second year of operation.

NOTE: Replacement parts replaced during the warranty period are warranteed for the remainder of the saw's warranty. There is a 30 day warranty (from date of shipment) on parts replaced after the saw's warranty period has expired.

EXCLUDED FROM WARRANTY COVERAGE:

Horizontal Band Saws: saw blades, blade brush, vise cam nut assembly, blade drive belts, electrical fuses, and light bulbs.

VT-18 saws: saw blades, blade brush, blade drive belts, electrical fuses, and light bulbs.

VS-20/VS-36: saw blades, blade brush, blade drive belts, electrical fuses, light bulbs, wear plates, and blade grinder wheel (if equipped).

Circular saws: saw blades, blade brush, blade drive belts, vise screw retainer block, electrical fuses, light bulbs, and wear plates.

MP-8, MP-14, and LDV-20 Saws: saw blades, blade drive belts, rubber 'tires' on blade wheels, vise work block, light bulbs, electrical fuses, and blade grinder wheel (if equipped)

RETURNED GOODS

Whenever goods are required to be returned to the factory for exchange or credit, KALAMAZOO will work to make the transaction fair to all concerned, and to get your machine back into service as quickly as possible. To help us do this, the following returned goods policy shall be followed:

1. ITEMS RETURNED FOR CREDIT must have prior authorization and will be subject to factory inspection and approval upon receipt. Goods which pass this inspection will be accepted for credit at the original (or current) invoice value less a 15% restocking charge. Components not built by KALAMAZOO (motors, coolant pumps, motor switches, etc.) that have been taken apart cannot be accepted for credit.

2. WARRANTY REPLACEMENTS shall be shipped prepaid and invoiced at current prices. Full credit will then be issued upon receipt of the defective item(s) and shall not be subject to a restocking charge.

3. PRE-AUTHORIZATION NUMBERS: All returned goods must have a Return Goods Authorization (RGA) shipping label with an authorized number before sending the returned goods. The RGA shipping label can be obtained by contacting the Returned Goods Department at KTS, (616) 345-2141 (Michigan) or (800) 637-3371 (Outside Michigan) To help us handle your returned goods quickly, complete the form that we send with the RGA shipping label. Please describe your problem as completely as possible. If the RGA number is not clearly marked and the shipping label is not visible, KTS can not accept the returned goods. Warranty replacement invoices will reference the required RGA for the items being returned.

5. ALL returned goods must be shipped prepaid (by the user).

6. Goods MUST be returned within 30 DAYS of the date the authorization was given.

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SHIPPING NOTE

This machine was carefully inspected, checked, properly packaged for shipment, and was delivered to the carrier in good condition. Thanks to our time-tested packaging procedures, we fully expect your new KALAMAZOO saw to arrive in good condition.

As soon as it is loaded on the truck, however, this saw technically became your property. Therefore, it is important that you take note of any damage, whether obvious or hidden, and report it to the carrier BEFORE the driver leaves. This will help you avoid forfeiting claims for the damage.

If your saw is damaged:

Leave the saw, packing material, and shipping skid 'as is'. Notify the carrier's local office and ask for an immediate inspection of your saw.

After the carrier's inspection, and you have a written acknowledgement of the damages, please contact out claims department at (800) 637-3371 (616-345-2141 in MI) or FAX (616) 345-3932 for a return authorization number. We will either repair or replace your saw depending on the extent of the damage.

IT IS YOUR RESPONSIBILITY TO FOLLOW THE ABOVE INSTRUCTIONS or the carrier will not honor a damage claim. Also, if you find any shortages, or nave any questions about this order, please notify us immediately.

INSTALLATION

After uncrating the machine, check to see that all items are present and that no damage exists.

The saw can be lifted off the shipping skid using the eyebolts located in the corners of the saw bed (or the fork pockets on automatic saws). Be careful with chains or slings so that no electrical or fluid lines are damaged and that no guards are bent. NOTE: The saw is both top heavy and back heavy. Make allowances for this in your handling of the saw.

Once the saw is on the shop floor it can be leveled by screwing a 3/4-16 bolt into the holes in the base (1/2-13 on automatic saws).

On semi-automatic ('SA') saws, install the stock stop bar (if equipped) by screwing the pipe into the bracket on the right side of the vise support casting. The pipe should be on the operator's side of the casting. The stock stop slide is mounted on the pipe by tightening the socket head screw provided. The stock stop rod can be adjusted by turning the threaded rod .

The eyebolts on SA saws must be removed after installation to allow the head to be rotated for angle cutting.

ELECTRICAL CONNECTION
FA-350/FS-350 SAWS

Your machine is wired to operate on the voltage shown on the tag wired to the electrical enclosure. It is very important to check your wiring to make sure it matches the tag BEFORE energizing your saw. If it is different, CALL YOUR DEALER OR THE KALAMAZOO FACTORY IMMEDIATELY! If this is a re-installation at a different voltage, see the section on 'Changing Operating Voltages' in the 'Circular Saw Maintenance Manual'.

For optimum performance, your saw should be wired to its own electrical circuit. A fused disconnect is provided in the saw, but an additional disconnect in the shop wiring is recommended for increased safety. Fuse values are as shown below:

FA-350 Saws	FS-350 Saws
208/230V Three Phase: 30 Amp	208/230V Three Phase: 30 Amp
460V Three Phase: 12 Amp	460V Three Phase: 12 Amp
575V Three Phase: 10 Amp	

All wiring should be done as specified in the local electrical codes and/or the National Electrical Code.

ALWAYS LOCK OUT THE ELECTRICAL SUPPLY WHEN SERVICING THE SAW!

The incoming power leads should be attached only to the terminals at the top of the disconnect switch located in the top right hand corner of the electrical enclosure.

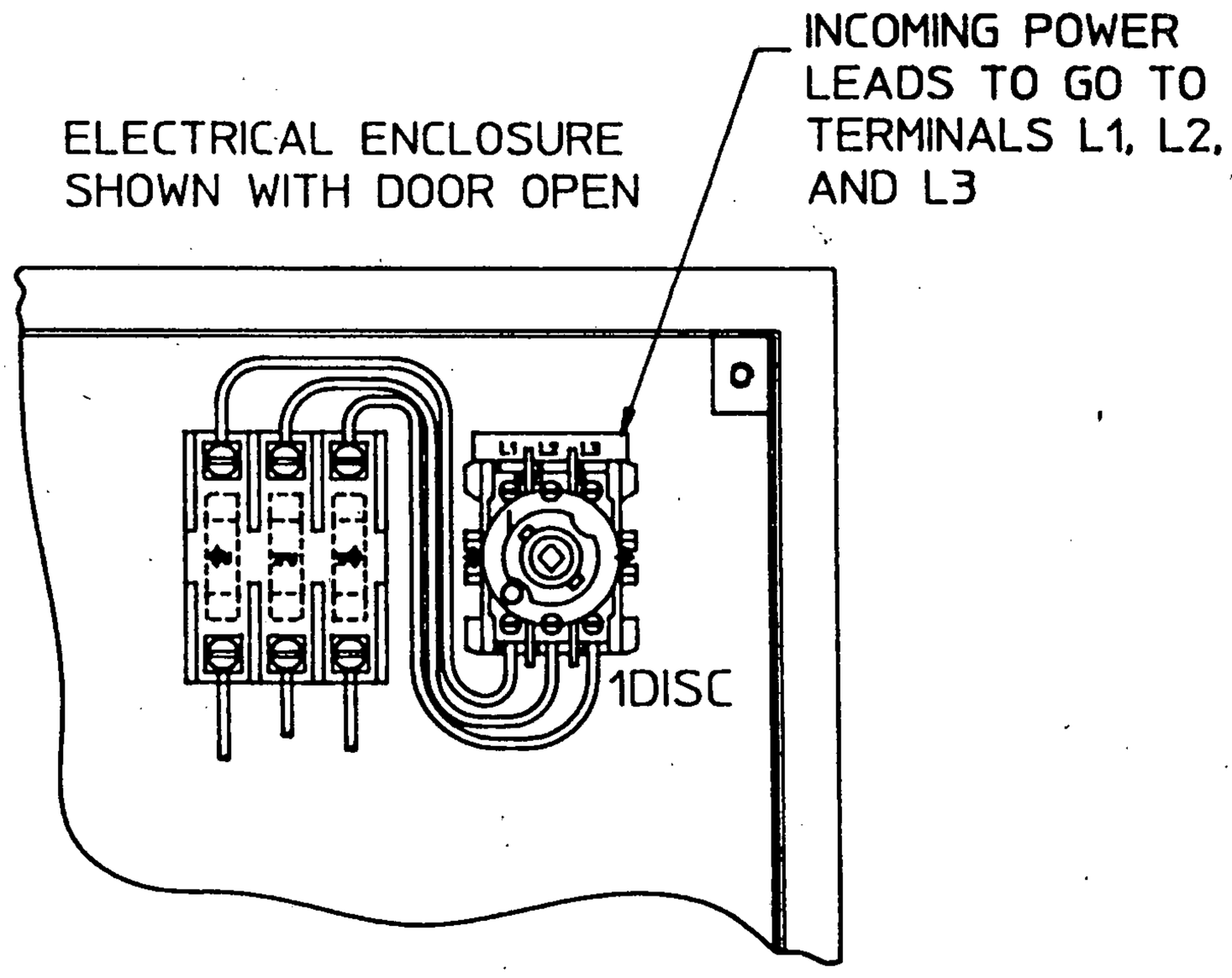


figure 2.1

COOLANT SYSTEMS

SPRAY MIST (FA series saws):
FA series saws are equipped with a spray mist coolant system for increased blade life and performance. The system will operate with air pressures between 50-100 PSI.

The reservoir holds 1 gallon of coolant; Use a clean, non-toxic water soluble coolant mixture. Select a coolant made for misting to eliminate solidifying, clogging, or damaging the tubes, valves, or nozzles. Mix as necessary following the manufacturer's instructions. Always mix the coolant BEFORE pouring it into the reservoir.

The two valves on the mixing block should be adjusted to cause a slight beading of coolant on the workpiece. If only air is needed to act as a chip blower, simply close the 'Coolant' (brass) valve.

The spray mist only operates while the saw vise is clamped.

FLOOD COOLANT (FS series saws):
The coolant reservoir is located in the machine base and holds 6 gallons of coolant mixture. It should be mixed according to the directions on the container. Always add the concentrate to the water rather than pouring water into the concentrate. When replacing the coolant, thoroughly clean the reservoir and stir the mixture to insure proper mixing.

The coolant pump depends on the surrounding fluid for its cooling; therefore it is important to keep the coolant pump at least 3/4 under the coolant at all times (the coolant pump is submerged in the coolant tank).

The amount of coolant flow to the cutting area is controlled by a valve located on the fixed blade guard, and operates when the blade motor is running.

If the coolant being used causes rusting of exposed metal, switch to a different brand of water soluble oil.

AIR SYSTEM

All 'Freedom Series' saws built with powered vises are factory-equipped with an air regulating system consisting of a filter/regulator combimation, an oil removal filter, and a mist lubricator. Both filters have a manual drain which should be checked regularly and drained as needed. The drains are on the bottoms of each filter and require only a fingertip push to drain.

The pressure regulator must be set no higher than 100 PSI. The incoming air connection port is 1/4 NPT. The air supply should be at least 6-8 CFM for 'SA' saws and 15-20 CFM for 'A' saws.

The lubricator holds 5 ounces of light mineral oil (100-200 SSU viscosity - see page 6.2 for recommended oils). The flow is adjusted by turning the metering screw counter-clockwise to increase the flow and clockwise to decrease the flow. Proper flow is set at 1 drop per 10 machine cycles. CAUTION: ONLY FILL THE LUBRICATOR WITH THE AIR SUPPLY DISCONNECTED.

'SA' and 'A' model saws have an available regulator for adjusting the clamping pressure. The clamping pressure should be reduced for cutting thin tubing or extrusions.

CHIP REMOVAL SYSTEM INSTALLATION
(optional on FA-350 saws)

The chip removal system is shipped assembled on a shipping skid. Inside the barrel are the adapters and the hose to connect to the saw.

The electrical connection should be made in accordance with state and local codes as well as the National Electrical Code. Check the motor rotation after wiring. It should be clockwise when looking down on the motor. If the rotation is reversed, switch any two of the three power leads to the switch.

The sheet metal elbow must be mounted to the air outlet for safety. The vacuum manufacturer also strongly advises that the cloth bag provided be clamped to the open end of the exhaust elbow.

WARNING: KEEP AWAY FROM THE CHIP REMOVAL SYSTEM WHILE IT IS RUNNING. THERE ARE TWO (2) ROTATING ELEMENTS THAT CAN CAUSE PERSONAL INJURY. ONE IS INSIDE THE BLOWER HOUSING AND ONE IS IN THE COOLING FAN ON TOP OF THE MOTOR. DO NOT USE THE DRUM COVER FOR STORAGE OF ANY KIND.

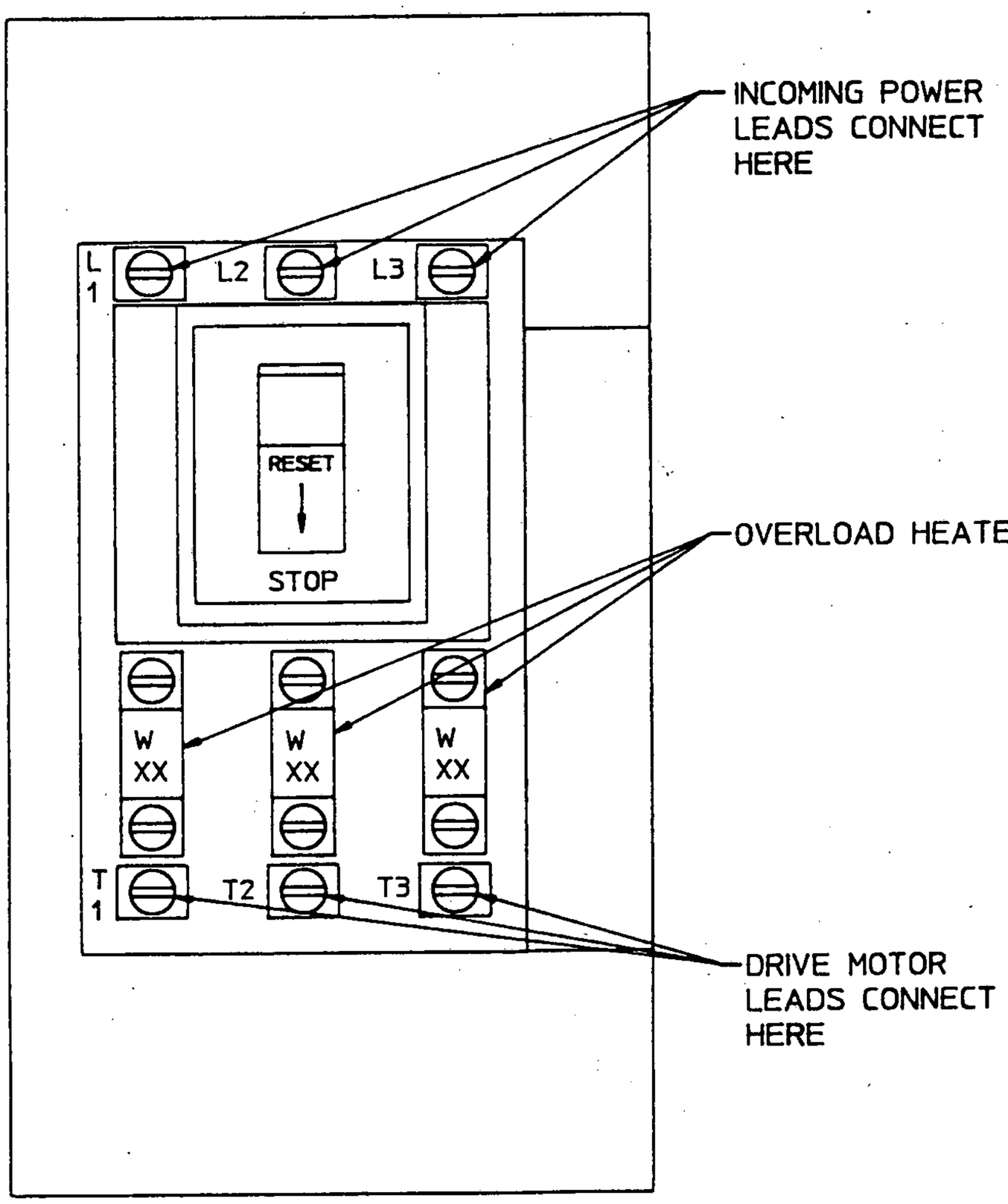


figure 2.2

SEMI-AUTOMATIC OPERATOR CONTROLS

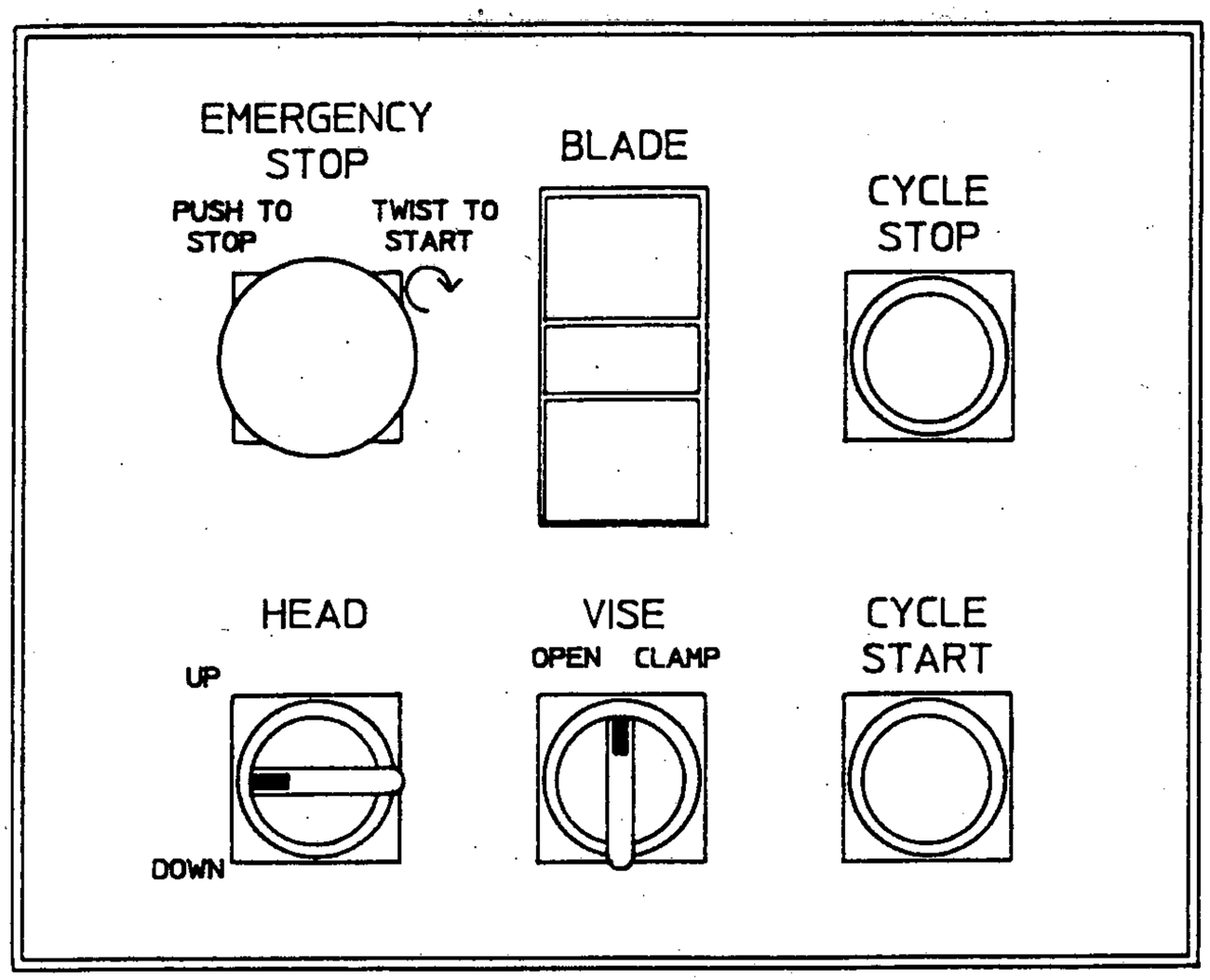


figure 3.1

1. EMERGENCY STOP: To stop all machine functions, push in the red Emergency Stop button. To energize the electrical system, twist the button clockwise. The green 'Cycle Start' light comes on to indicate that power is on.

2. BLADE: Pushing the green section of the Blade switch will start the blade, while the red section stops the blade. Please note that pushing the red button will not stop the blade during a cutting cycle; to interrupt a cut, push the 'Cycle Stop' button.

3. CYCLE STOP: Pushing the 'Cycle Stop' button will raise the saw head out of the cut to interrupt a cutting cycle. The blade will stop at the end of the head raise and the vise will open.

4. HEAD: Turning the switch clockwise will raise the saw head; counter-clockwise will lower the head. Releasing the switch will stop the head travel.

5. VISE: Turning the switch to the right will clamp the saw vise; in the left position, the vise will open. The switch returns to the center position when released.

6. CYCLE START: The two cycle start pushbuttons (FS-350 series saws use one pushbutton to initiate the cutting cycle) must be pushed at the same time to initiate a cutting cycle. Note: the blade will start, the vise will clamp, and the 'Cycle Start' light will go out when the 'Cycle Start' buttons are pushed.

AUTOMATIC OPERATOR CONTROLS

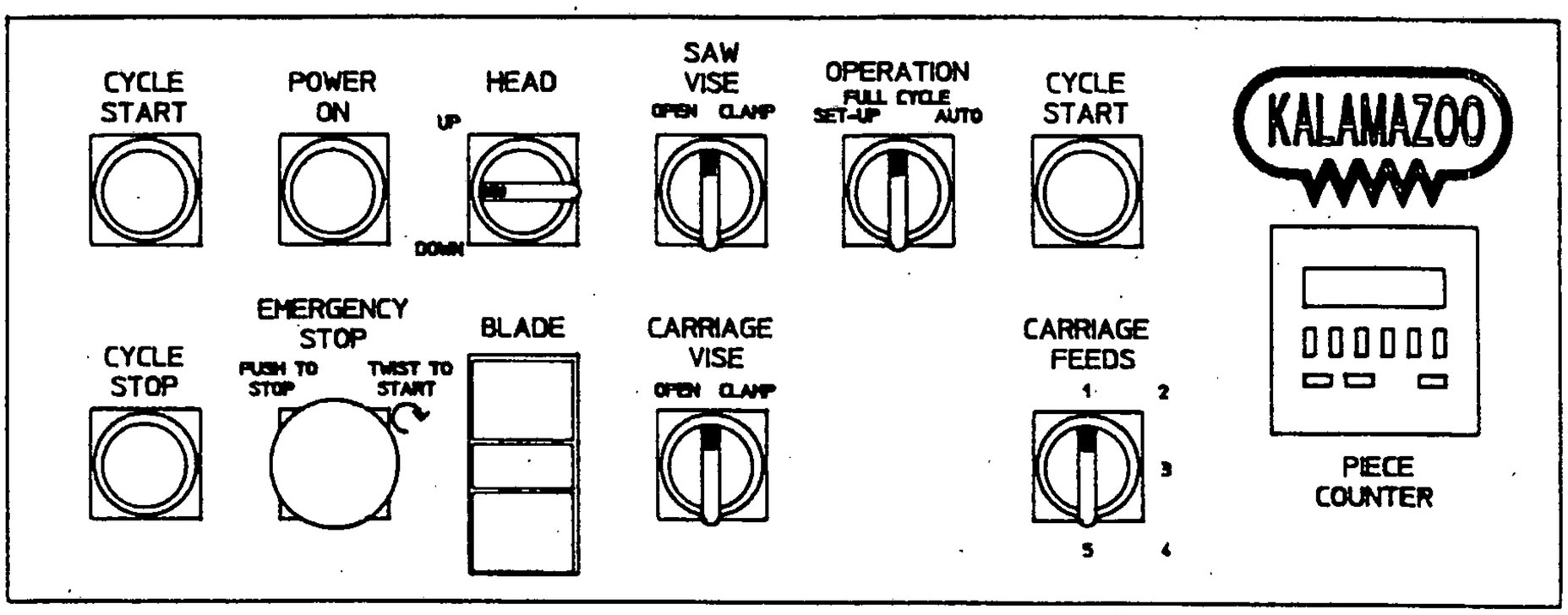


figure 3.2

1. CYCLE START: The two cycle start pushbuttons must be pushed to initiate a cutting cycle. Note: the blade will start, the vise will clamp, and the 'Cycle Start' light will go out when the 'Cycle Start' buttons are pushed.

2. POWER ON: The 'Power On' light is on whenever the electrical controls are energized.

3. HEAD: Turning the switch clockwise will raise the saw head; counter-clockwise will lower the head. Releasing the switch will stop the head travel.

4. SAW VISE: Turning the switch to the right will clamp the saw vise; in the left position, the vise will open. The switch returns to the center position when released.

5. OPERATION: The 'Set-Up' position is used for manually moving the saw head or vise, or for manually operating the blade. The 'Full Cycle' position is used for semi-automatic cutting (single cuts). The 'Auto'position is used for fully automatic cutting. Refer to section 4 for operation details.

6. CYCLE STOP: Pushing the 'Cycle Stop' button will raise the saw head out of the cut to interrupt a cutting cycle. The blade will stop at the end of the head raise and the vise will open.

7. EMERGENCY STOP: To stop all machine functions, push in the red Emergency Stop button. To energize the electrical system, twist the button clockwise.

8. BLADE: Pushing the green section of the Blade switch will start the blade, while the red section stops the blade. Please note that pushing the red button will not stop the blade during a cutting cycle; to interrupt a cut, push the 'Cycle Stop' button.

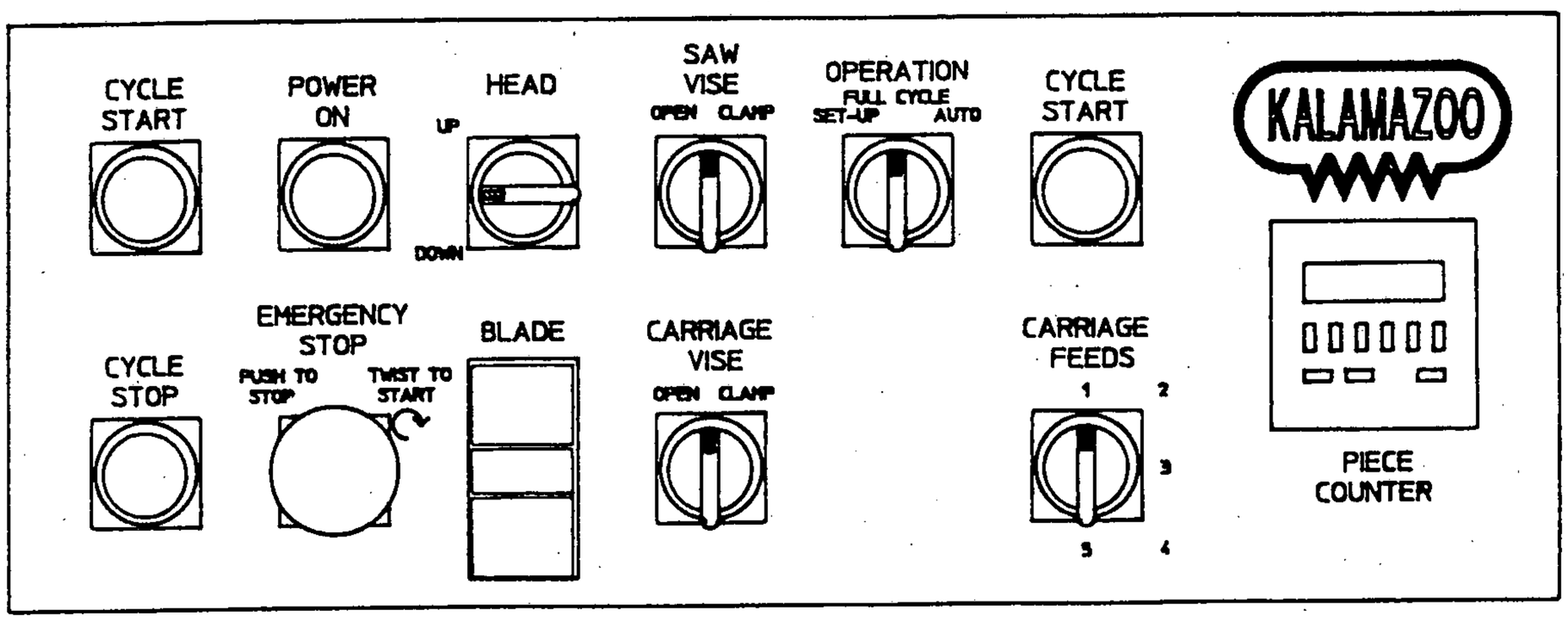


figure 3.2

9. CARRIAGE VISE: Turning switch to the right will clamp the saw vise; in the left position the vise will open. This switch should be in the 'Open' position during a cutting cycle.

10. CARRIAGE FEEDS: For cuts less than 17" long, set the switch to '1'; for cuts 17-34" long, set to '2'; 34-51", set to '3'; 51-68", set to '4', and for cuts between 68-85" set the switch to '5'.

11. PIECE COUNTER: The counter uses the 'Head Down' limit switch to count the number of cuts made.

    TO PROGRAM: Press and hold the 'I' key (ref fig. 3.x). The current preset value will be displayed and the 'I' indicator will flash in the upper left corner of the display.

    To change any number in the preset, press the button under that number. An arrow will appear under that number and the number will go up as you hold the button down. When you reach the desired number, release the button under that number. Do this for each number until you have the correct preset value.

    Press the 'R' reset button to enter this number as your new preset value.

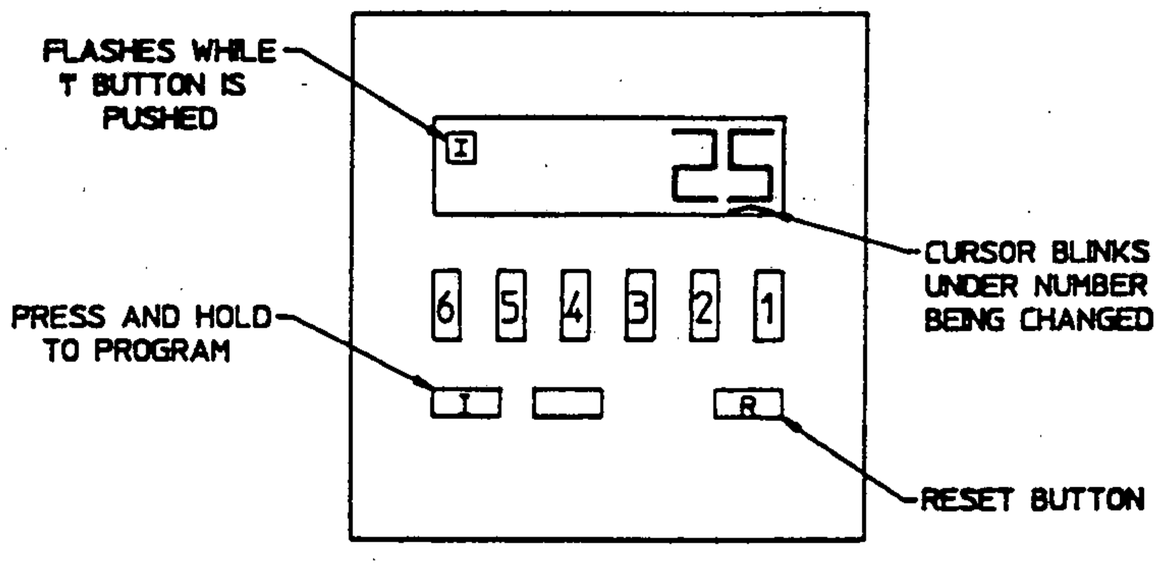


figure 3.3

HEAD HEIGHT STOP ADJUSTMENT
(Semi-Automatic and Automatic Saws)

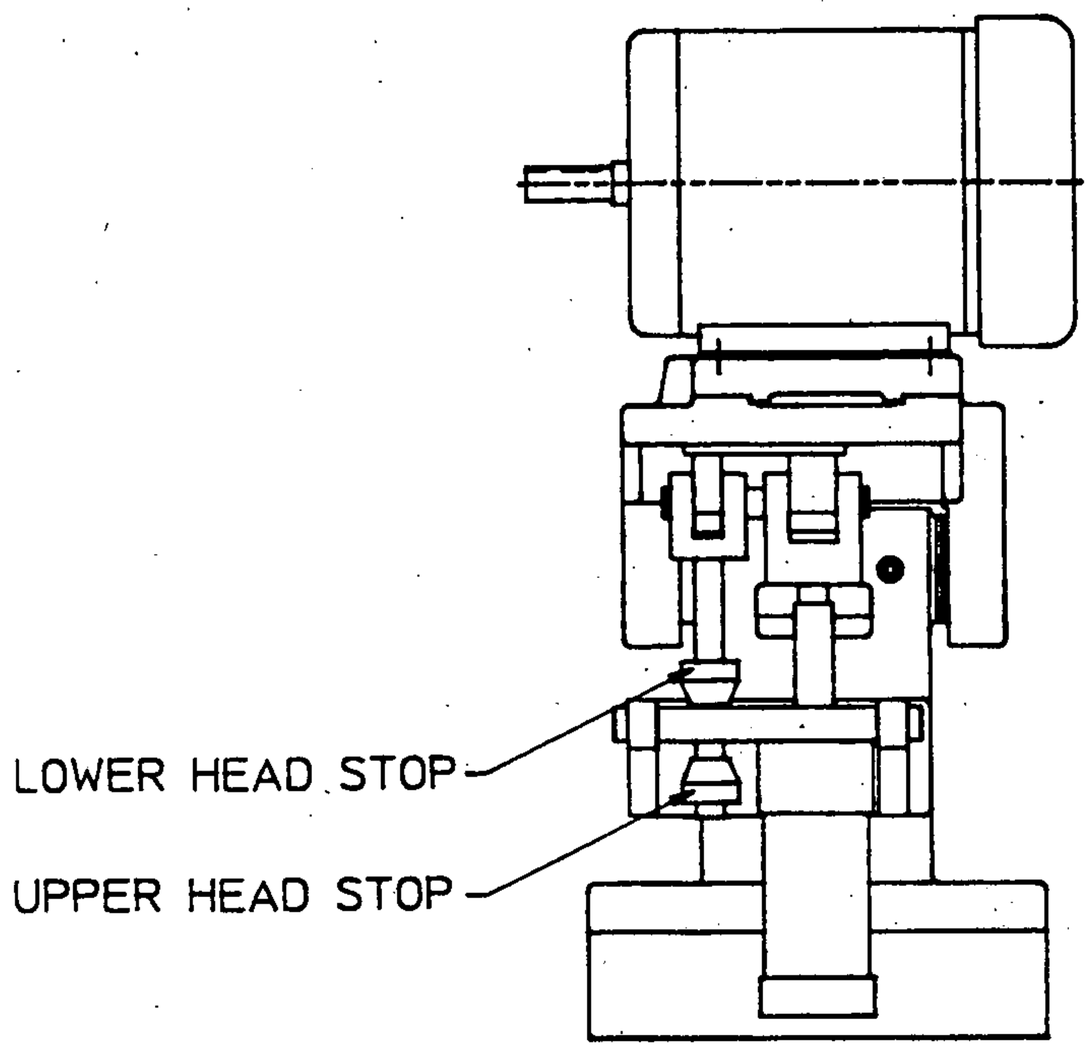


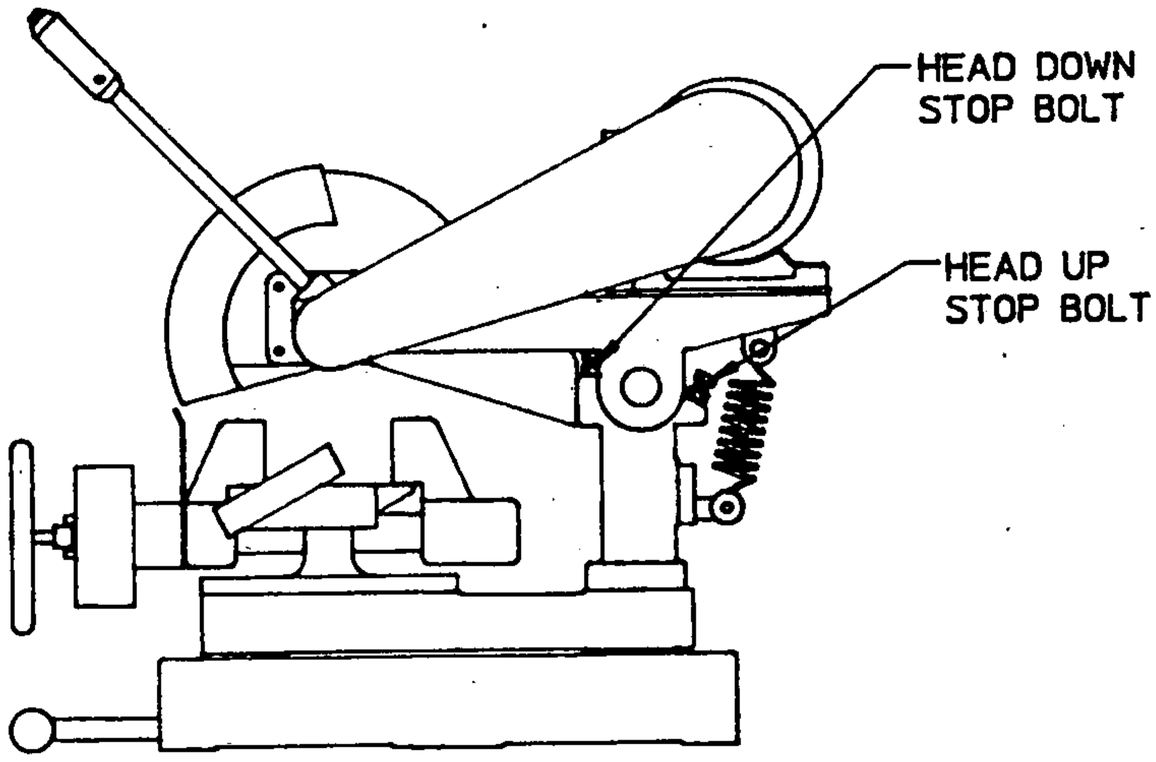
figure 3.3

The movement of the cutting head can be limited using the threaded collars located on the rod next to the head lift cylinder. To adjust, loosen the set screws in the collar, rotate to the proper position, and re-tighten the set screws to lock the collars in place. The lower collar limits how far down the head will feed, and the upper collar controls the maximum height the head will raise at the end of a cut.

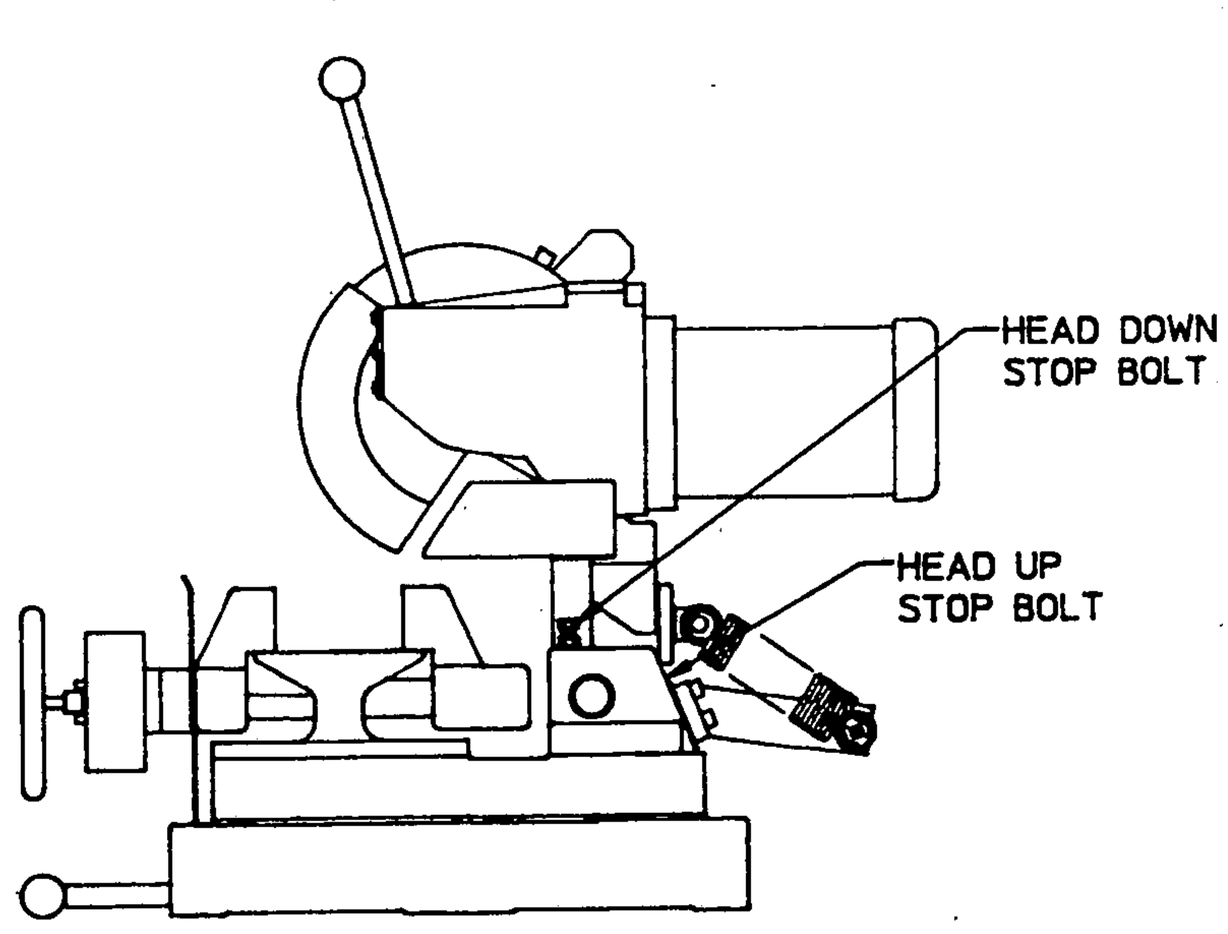
DO NOT set the lower collar so low that the saw blade can cut into the vise jaws or the vise center block (beyond the factory cut).

HEAD STOP BOLTS

Every KALAMAZOO circular saw leaves the factory with two head stop bolts. One limits how far the head can be fed through the workpiece, and the other keeps the head from being raised too far. These bolts are set at the factory for use with a 350 mm blade. If a smaller blade is installed, the lower stop bolt will need to be lowered to allow a full cut. When changing from a smaller blade to a larger blade, the stop bolt MUST be raised to prevent cutting through the vise center block into the vise screw. This is especially important on CA or FA saws, since the carbide-tipped aluminum cutting blades are not designed to cut steel. If the carbide tips contact steel they can shatter, causing personal injury.



CA-350/FA-350 SAWS



CS-350/FS-350 SAWS

MAKING SEMI-AUTOMATIC CUTS
FA-350SA/FS-350SA

1. With the disconnect switch in the 'On' position, twist the 'Emergency Stop' switch clockwise. This will energize the saw's electrical system.

2. If necessary, turn the 'Head' switch to 'up' to raise the cutting head clear of the workpiece to be cut. It may be necessary to reset the head travel stop collars (see page 3.4). The blade should raise to a point approximately 1/4" above the workpiece.

3. Using the handwheel, adjust the vise so that the front jaw is about 1/8" from the workpiece. This gap provides room for the powered vise to operate properly.

4. Check to see that the head travel stop bolt is in place and properly adjusted (see page 3.5). This bolt prevents the head from cutting too far into the vise.

5. After setting the head rotation angle (see page 5.7), MAKE SURE the vise locking handle is locked as tightly as possible. This will keep the vise rigid, giving you the best cut.

6. Position the stock in the cutting zone. Make sure that the stock is properly supported on both sides of the vise. Set the stock stop, if desired, to the proper length.

7. Set the vise clamping pressure (if so equipped) feed speed, and blade speed (FS-350 saws) for the material to be cut. Refer to the Sawing Guide in section 5 for recomendations.

8. AFTER verifying that all precautions have been taken, press the green 'Cycle Start' button(s). The blade will start, the vise will clamp, and the head will feed into the workpiece. At the end of the cut, the head will raise to the upper limit (as determined by the stop collars), the blade will stop, and the vise will open. DO NOT attempt to remove the cut piece until the blade has come to a complete stop.

9. The stock may now be re-positioned for the next cut.

MAKING SEMI-AUTOMATIC CUTS
FA-350A/FS-350A

1. With the disconnect switch in the 'On' position, twist the 'Emergency Stop' switch clockwise. This will energize the saw's electrical system.

2. If necessary, turn the 'Head' switch to 'up' to raise the cutting head clear of the workpiece to be cut. It may be necessary to reset the head travel stop collars (see page 3.4). The blade should raise to a point approximately 1/4" above the workpiece.

3. Using the handwheel, adjust the vise so that the front jaw is about 1/8" from the workpiece. This gap provides room for the powered vise to operate properly.

4. Check to see that the head travel stop bolt is in place and properly adjusted (see page 3.5). This bolt prevents the head from cutting too far into the vise.

5. After setting the head rotation angle (see page 5.7), MAKE SURE the vise locking handle is locked as tightly as possible. This will keep the vise rigid, giving you the best cut.

6. Position the stock in the cutting zone. Make sure that the stock is properly supported on both sides of the vise. Set the stock stop, if desired, to the proper length.

7. Set the vise clamping pressure (if so equipped), feed speed, and blade speed (FS-350 saws) for the material to be cut. Refer to the Sawing Guide in section 5 for recomendations.

8. AFTER verifying that all precautions have been taken, turn the 'Operation' switch to the 'Full Cycle' position, and press the green 'Cycle Start' button(s). The blade will start, the vise will clamp, and the head will feed into the workpiece. At the end of the cut, the head will raise to the upper limit (as determined by the stop collars), the blade will stop, and the vise will open. DO NOT attempt to remove the cut piece until the blade has come to a complete stop.

9. The stock may now be re-positioned for the next cut.

MAKING AUTOMATIC CUTS

1. With the disconnect switch in the 'On' position, twist the 'Emergency Stop' switch clockwise. This will energize the saw's electrical system.

2. If necessary, turn the 'Head' switch to 'up' to raise the cutting head clear of the workpiece to be cut. It may be necessary to reset the head travel stop collars (see page 3.4). The blade should raise to a point approximately 1/4" above the workpiece.

3. Using the handwheel, adjust the vise so that the front jaw is about 1/8" from the workpiece. This gap provides room for the powered vise to operate properly.

4. Check to see that the head travel stop bolt is in place and properly adjusted (see page 3.5). This bolt prevents the head from cutting too far into the vise.

5. After setting the head rotation angle (see page 5.7), MAKE SURE the vise locking handle is locked as tightly as possible. This will keep the vise rigid, giving you the best cut.

6. Position the stock in the cutting zone. Make sure that the stock is properly supported on both sides of the vise.

7. Set the vise clamping pressure (if so equipped), feed speed, and blade speed (FS-350 saws) for the material to be cut. Refer to the Sawing Guide in section 5 for recomendations.

8. Set the 'Feeds' switch for the number of feed strokes. Set the number of pieces to be cut (batch size) on the programmable counter. Refer to section 3 for details.

9. Check the setting of the Backstop Position Counter located at the end of the saw. If the value displayed is correct, proceed to step 10. If not, rotate the backstop handwheel to position the backstop. If the piece to be cut is longer than 17 1/2", see the pages on "Multiple Feed Operation' (Pages 4.5 and 4.6).

10. AFTER verifying that all precautions have been taken, press the green 'Cycle Start' button(s). The blade will start, the vise will clamp, and the head will feed into the workpiece.

11. The cutting cycle will continue to cut and feed automatically until the preset number of cuts have been made or the barfeed runs out of stock. At the end of the preset number of cuts, the head will raise to the upper limit (as determined by the stop collars), the blade will stop, and the saw vise will open. If the barfeed runs out of stock, switch the 'Operation' switch to 'Set Up' and reload the barfeed. Allow stock for another trim cut. Check the Piece Counter for the number of cuts still to be made. Add one piece to the number displayed. Enter this number as the new preset, and re-start the cycle.

EXAMPLE: Your original batch preset was 40. When the saw stopped, the Piece Counter reading was 24.

Add 1 to the counter reading: 24 + 1 = 25. This allows for the trim cut that begins each automatic cutting cycle. Enter this as your new preset and re-start the cutting cycle.

KERF COMPENSATION - CIRCULAR SAWS

If the blade kerf (width of material removed during a cut) is taken into consideration when setting the Backstop Position Indicator, the length of the part to be cut will be the distance used to position the backstop. If no allowance is made for the kerf loss, each piece cut will be short.

To determine the kerf allowance:

With the barfeed carriage fully forward, bring the backstop forward until it is in contact with the carriage. The Position Indicator should read 00000 and the lines for the right hand number should be zeroed. If it does not, loosen the set screw in the counter collar and rotate the collar until the counter zeros out, then tighten the set screw. Now rotate the handwheel to move the backstop back to a desired location (for example 1.000").

Make 1 or 2 automatic cuts and measure the cut parts. The difference between the counter setting and the piece length is the kerf loss from this blade. For example, if the backstop is at 1.000" and the cut length is .865" the kerf loss of the blade is .135".

To set the kerf allowance:

Zero the counter as explained in step 2 above. Move the backstop back until the counter shows the value of the kerf loss determined above. Stop and rezero the Indicator as explained above.

Once the kerf allowance is set, DO NOT reset the Indicator unless the blade is changed. Every time a blade is changed, the kerf loss must be checked to insure correct cut lengths.

15

MULTIPLE FEED OPERATION

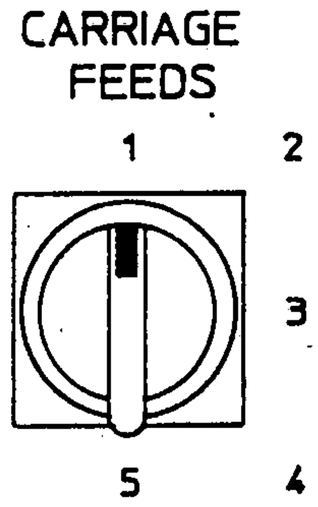


figure 4.1

The 'Carriage Feeds' switch tells the carriage how many times to cycle for each piece to be cut. Pieces 1/8" to 17 1/2" long can be cut in one stroke, 17 1/2" to 35" need two strokes, 35" to 52 1/2" need three strokes, etc.

When positioning the backstop for multiple feed cutting, we need to allow for the extra saw kerfs being added on each stroke. On page 4.4 we set the kerf allowance for the blade we are using. This length is now being added to the length set on the counter. For any cut, we only need one kerf length to be added to our feed length. For cuts needing more than one feed, we need to adjust the backstop position to make up for these extra kerf lengths. For two feeds, we need to shorten the feed length by 1/2 the kerf allowance; for three strokes we need to shorten the feed by 2/3 the kerf allowance, and so on.

To determine how many strokes to feed, divide the length of the part to cut by 17 1/2, and used the next higher whole number.

EXAMPLES:

part is 38 1/4" long: 38 1/4 divided by 17 1/2 is 2.18
You should set 'Preset One' to 3

part is 60" long: 60 divided by 17 1/2 is 3.43
You should set 'Preset One' to 4

To determine the feed length setting, find the number of feed strokes needed, as decribed above. Divide the part length by the number of strokes to get a basic length. In the examples above, the length for the 38 1/4" piece would be 12.75" and the length for the 60" piece would be 15".

Now we need to shorten these lengths to make up for the extra kerf allowances as we discussed above. To find out how much we need to subtract, we need to multiply the blade kerf by a factor that leaves us the one kerf we need. Listed below are the factors for 2 to 5 carriage strokes:

2 strokes: .500 3 strokes: .667 4 strokes: .750 5 strokes: .800

MULTIPLE FEED OPERATION
(continued)

If our blade kerf is .160 (as an example) and we want to cut the 38 1/4" piece mentioned on the last page, we need to multiply the .160 kerf by the .667 factor in the table for 3 strokes. .160 X .667 = .10672 which we can round off to .107. This is the amount to subtract from the 12.75" stroke length to 'make up' for the extra blade kerfs. The counter reading for 'Counter Three' should be 12.75 - .107 = 12.643.

SUGGESTION: To speed this process up, once you determine your kerf allowance for the blade on your saw, develop your own table of the numbers to subtract from the feed length. If you do this for each kerf value you use (kerf can vary from blade to blade), you will not need to go through this process each time.

As an example the chart for a .145 kerf would look like this:

2 strokes: .073
3 strokes: .097
4 strokes: .109
5 strokes: .116

SAWING SUGGESTIONS

Apart from machine malfunctions, most sawing problems can be attributed to improper practices or applications. Here are some suggestions to help achieve the maximum efficiency from your KALAMAZOO circular saw.

1. Match the correct blade to the work to be done. This includes correct blade size, number of teeth, and blade speed. See the chart on page 5.4 for general recommendations. On ferrous saws always remember to use the smallest practical blade diameter for the size material to be cut !!!

2. Check the blade for any dullness, rounded tooth corners, or discoloring. Label any blades like this to avoid using them, and have them properly re-sharpened.

3. Only use blades with a 32mm (1.260") arbor hole diameter. Follow the blade changing instructions (pages 5.6 and 5.7).

4. Clamp the workpiece securely. Follow the instructions for machine operation and the additional ideas for clamping non-standard shapes (page 5.8)

5. On ferrous saws the proper feed speed is very important. The proper feed speed varys according to the hardness and size of the material to be cut. If the feed speed is too fast blade life and accuracy will suffer, if the feed speed is too slow blade chatter and excessive cutting time will result. The key to proper cutting is to observe the saw chips the blade is producing. The chip should be consistent in thickness (.004 to .007) and have a curled, circular shape. If the chip varys in thickness and has an irregular shape the blade is likely to be chattering. This can be corrected by using a smaller diameter blade (if possible) with fewer teeth. Blade chattering can usually be both seen and heard, a proper cut will be quiet and smooth. Also keep an eye on the color of the chips, if they turn a straw color or blue the blade speed is too fast. Use a slower speed and/or smaller diameter blade to correct this problem.

6. Use plenty of coolant on all materials except cast iron. Be sure to mix the coolant properly according to the coolant manufacturers instructions. On saws equipped with mist coolant units mix the coolant and water in a separate container, not in the coolant reservior.

7. Break in new and newly resharpened blades by decreasing the feed speed by approximately 1/2 for the first 5-10 cuts. This will greatly increase the life expectancy of the blade.

8. Keep the work area clean and chip free. This is very important in the vise area, as chip build-up can prevent the vise from clamping the workpiece properly and lead to a possibly dangerous condition.

(continued)

SAWING SUGGESTIONS
(continued)

9. There are drag screws under the vise ways on both saw vise jaws, and one on top the vise screw in the rear saw vise jaw. It is important that these screws are in contact during cutting. If the drag screw on the vise screw is not properly adjusted, the vise can work open, which can allow the stock to slip during a cut and break a blade. On automatic saws there is a drag screw located on the bottom of the front vise jaw.

BLADE SELECTION

Proper blade selection will help in obtaining the best performance from your KALAMAZOO circular saw. Among the things to consider are tooth style, blade diameter, and tooth pitch.

The blade arbor hole is 32mm (1.260") diameter. Blades for the FS-350 series saws have two 10mm (.3937") anti-rotation pins on the outside flange on a 63mm (2.480") diameter circle.

TOOTH STYLE: The Triple Chip tooth configuration is highly recommended for general purpose cutting of full sections, tubes, or profiles with thick walls. Specially ground blades are available for extremely hard or difficult-to-cut materials. Consult either the factory or a reputable saw blade specialist for these applications.

BLADE DIAMETER: The blade diameter can be sized to vary the blade speed (in surface feet per minute) as shown on the chart on page 5.3. On ferrous saws always use the smallest practical blade diameter for the size of material being cut especially on solids and large rectangular tubing. Failure to do this usually causes poor cutting performance.

BLADE PITCH: Pitch is the number and spacing of the blade teeth, selected according to the hardness and shape of the material to be cut.

General recomendations for blade selection and cutting speeds for common materials are listed on page 5.4. These recommendations should be used as a reference point. Your own experiments and experience will ultimately determine the best blades for your particular application.

BLADE SPECIFICATIONS

PART NUMBER	DIAMETER mm (in)	NO. TEETH	GRIND	KERF WIDTH mm (in)
HIGH SPEED STEEL BLADES (for 20/40 & 30/60 rpm saws only) Arbor hole dia.: 32mm with (2) 10mm drive pins on 63mm circle				
MB-127	300 (11.8)	80	TC	2.5 (.098)
MB-113	315 (12.5)	300	AC	2.5 (.098)
MB-114	315 (12.5)	200	TC	2.5 (.098)
MB-118	315 (12.5)	160	TC	2.5 (.098)
MB-115	315 (12.5)	120	TC	2.5 (.098)
MB-119	315 (12.5)	100	TC	2.5 (.098)
MB-117	315 (12.5)	80	TC	2.5 (.098)
MB-140	350 (13.8)	240	AC	3.0 (.118)
MB-141	350 (13.8)	180	TC	3.0 (.118)
MB-142	350 (13.8)	120	TC	3.0 (.118)
BRAZED CARBIDE BLADES (for non-ferrous 1700/3400 rpm saws only) Arbor hole dia.: 32mm				
MB-207	350 (13.8)	120	TC	3.6 (.141)
MB-208	350 (13.8)	108	TC	3.6 (.141)
MB-209	350 (13.8)	80	TC	3.6 (.141)
MB-210	350 (13.8)	48	TC	3.6 (.141)

TYPE OF GRIND:

AC - ACME CURVED TOOTH (for thin wall tube)
TC - TRIPLE CHIP TOOTH (for solids & thick walled tube)

CUTTING SPEEDS (sfpm)

BLADE DIAMETER	SPINDLE SPEED (rpm) 20	30	40	60
HSS BLADES				
300mm	62	93	123	185
315mm	65	98	131	196
350mm	72	108	144	217

	SPINDLE SPEED (rpm) 1700	3400
CARBIDE BLADES		
350mm	6142	12284

BLADE USAGE RECOMMENDATIONS

INSTRUCTIONS:
This chart is designed to help choose the correct saw blade for the material being cut. Find the type of material to be cut in the left column and then follow that row to the cross sectional thickness to be cut. The number appearing there is the part number of the blade you should use (see page 5.3 for complete blade specifications) then continue following the row to the right column for the correct blade rpm.
NOTE: On 20/40 & 30/60 rpm saws use high speed to cut all non-ferrous materials.

HOW TO DETERMINE THE CROSS SECTION VALUE:
TUBING - measure the horizontal thickness of the vertical wall
SHAPES - (structural or extrusions) measure the horizontal thickness of the largest vertical member
SOLIDS - measure at the widest horizontal section

NOTE: When making miter cuts be sure to measure actual wall thickness the blade is cutting, its always more than when cutting at 90 deg.

MATERIAL	CROSS SECTION VALUE					RPM
non-ferrous	0-1/8	1/8-3/8	1/4-1	1-3	3-5	
ALUMINUM ALLOYS	207	208	208	209	210	3400
PLASTIC & WOOD	207	208	208	209	210	3400
BRASS	207	208	208	209	210	1700
LEAD	207	208	208	209	210	1700
COPPER	207	208	208	209	210	1700
BRONZE	207	208	208	209	210	1700
ferrous						
STEEL 1005-1055	113/140	140/118	118/119	119/117	NR	30
STEEL 1108-1213	113/140	140/118	118/119	119/117	NR	30
ALLOY STEEL 1320-9850	113/140	114/118	118/119	117/127	NR	20
STNL.STEEL 301-446	113/140	114/118	118/119	117/127	NR	20
NICKEL STEELS	113/140	114/118	118/119	117/127	NR	20
DIE STEEL A2-A6/D1-D7	113/140	114/118	118/119	117/127	NR	20
TOOL STL S1-S5/T1-T15	113/140	114/118	118/119	117/127	NR	20

*NR - NOT RECOMMENDED

SAWING CONTROLS

FEED SPEED: The feed speed valve, located in the center of the saw door panel, controls how fast the head feeds into the workpiece. It should be set so that the blade is pulling the correct chipload for the material being cut.

VISE PRESSURE: (OPTIONAL) The vise pressure valve allows you to vary the vise clamping pressure when cutting thin sections. The air pressure is read on the gauge attached to the valve. For normal solids cutting, the clamping pressure should be set at 80-100 PSI. You should use the highest possible clamping pressure without distorting the workpiece. This will assure the most secure clamping. The pressure valve is mounted on the inside of the saw cabinet door.

CHANGING BLADES
FA-350 SAWS

1. MAKE SURE THE POWER IS OFF before attempting to change the blade and that the saw head is fully raised.

2. Loosen the bolts that hold the vise shield and move it out of the way.

3. Loosen and remove the knob that connects the retractor arm to the retractor bracket. Slide the moving guard up as far as possible.

4. Insert the spring loaded 3/8" hex wrench from the tool kit into the hole in the belt guard and into the end of the spindle shaft. Using the 1 1/2" open end wrench, turn the spindle nut clockwise (left hand thread). Remove the flange and blade.

   NOTE: Never attempt to remove a blade by force. Never use a hammer or pipe to 'help' the wrenches. Heat build-up in the spindle or bearings may cause the blade to temporarily lock in place. Allow the saw to cool and the blade usually will come loose easily.

5. When mounting the new blade, check the arbor for nicks and burrs. Also check the flanges and nut.

6. Make sure the blade center hole diameter is correct (32mm or 1.2598") and that the blade is correct for the application. Make sure the blade teeth point in the correct direction,and re-install the blade, flange, and nut. Turn the nut counterclockwise to tighten.

7. Reposition the moving blade guard and re-connect the retractor arm. Re-mount the vise shield.

CHANGING BLADES
FS-350 SAWS

1. MAKE SURE THE POWER IS OFF before attempting to change the blade and that the saw head is fully raised.

2. Loosen the bolts that hold the vise shield and move it out of the way.

3. Loosen and remove the knob that connects the retractor arm to the retractor bracket. Slide the moving guard up as far as possible.

4. Reaching into the blade guard with a 3/8" hex wrench, loosen the bolt that holds the blade and spindle drive plate on. Remove the plate and blade. NOTE: NEVER try to force a blade on or off a spindle.

5. When mounting the new blade, check the arbor for nicks and burrs. Also check the flange and the spindle drive plate.

6. Make sure the blade center hole diameter is correct (32mm or 1.2598") and that the blade is correct for the application. Make sure the blade teeth point in the correct direction,and re-install the blade, plate, and bolt. Be sure to take up the play between the blade drive pins and the blade. Do this by rotating the blade by hand OPPOSITE the normal cutting direction until it stops. Hold the blade in this position while tightening the blade retaining bolt. Failure to do this can cause the blade to break.

7. Reposition the moving blade guard and re-connect the retractor arm. Re-mount the vise shield.

ANGLE CUTTING

To change the cutting angle between the saw head and the vise:

1. Move the vise locking shaft under the handwheel to the left (toward the center of the saw) to allow head rotation.

2. Grasp the saw head by the head support casting and rotate the saw head to the desired angle. The angle may be read on the protractor scale mounted to the head rotation casting. Adjustable stops are provided at 90° & 45° to the left and right of center.

3. Move the vise locking shaft under the handwheel to the right (away from the center of the saw) to lock the head rotation casting in place. MAKE SURE this handle is locked as tightly as possible. This provides the maximum rigidity for the cut.

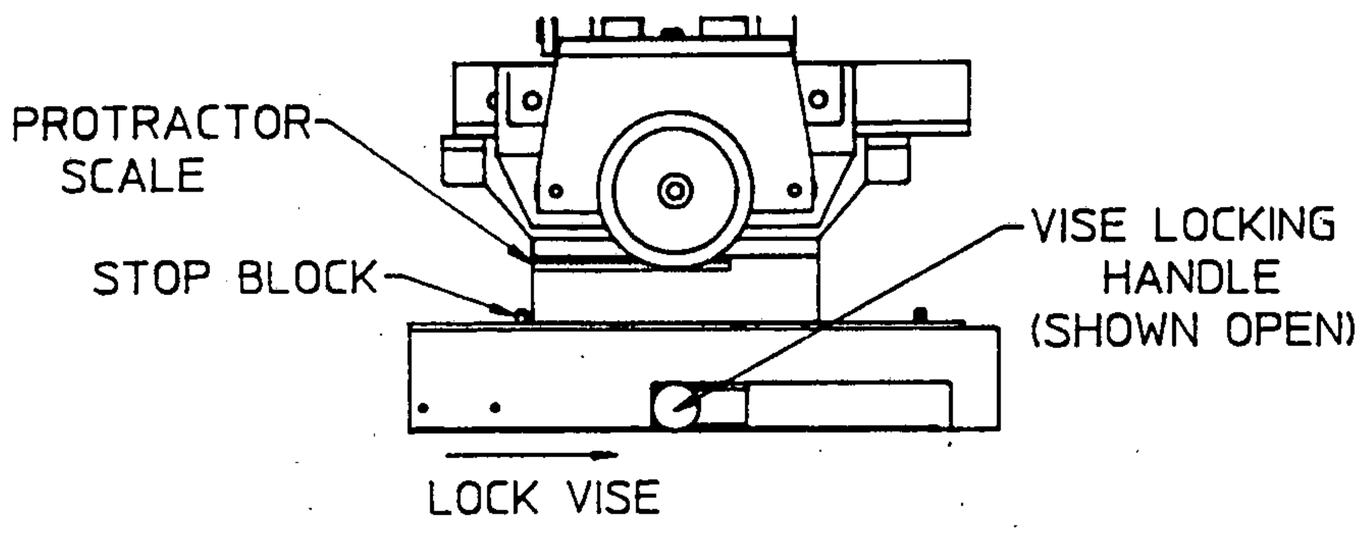


figure 5.1

CUSTOM VISE CLAMPING

Because of their shapes, some materials cannot be easily clamped in the standard vise jaws. Their shapes or cross-sectional areas may not allow secure clamping, or they may bend or collapse. In these cases, it may be necessary to make special wearplates to support these shapes. Some examples of special wearplates are shown below.

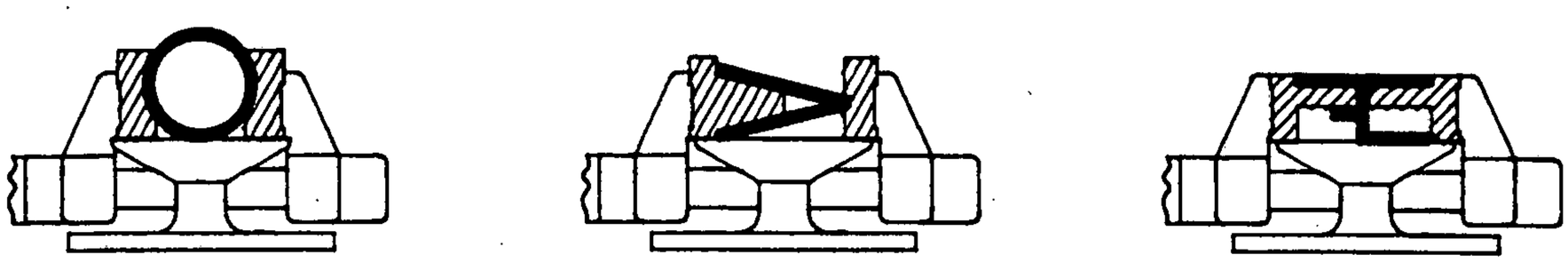


figure 5.3

The important wearplate dimensions are shown below. Other dimensions should be fitted to the part being clamped. Materials that can be used for wearplates include steel, aluminum, plastic, wood, or phenolic.

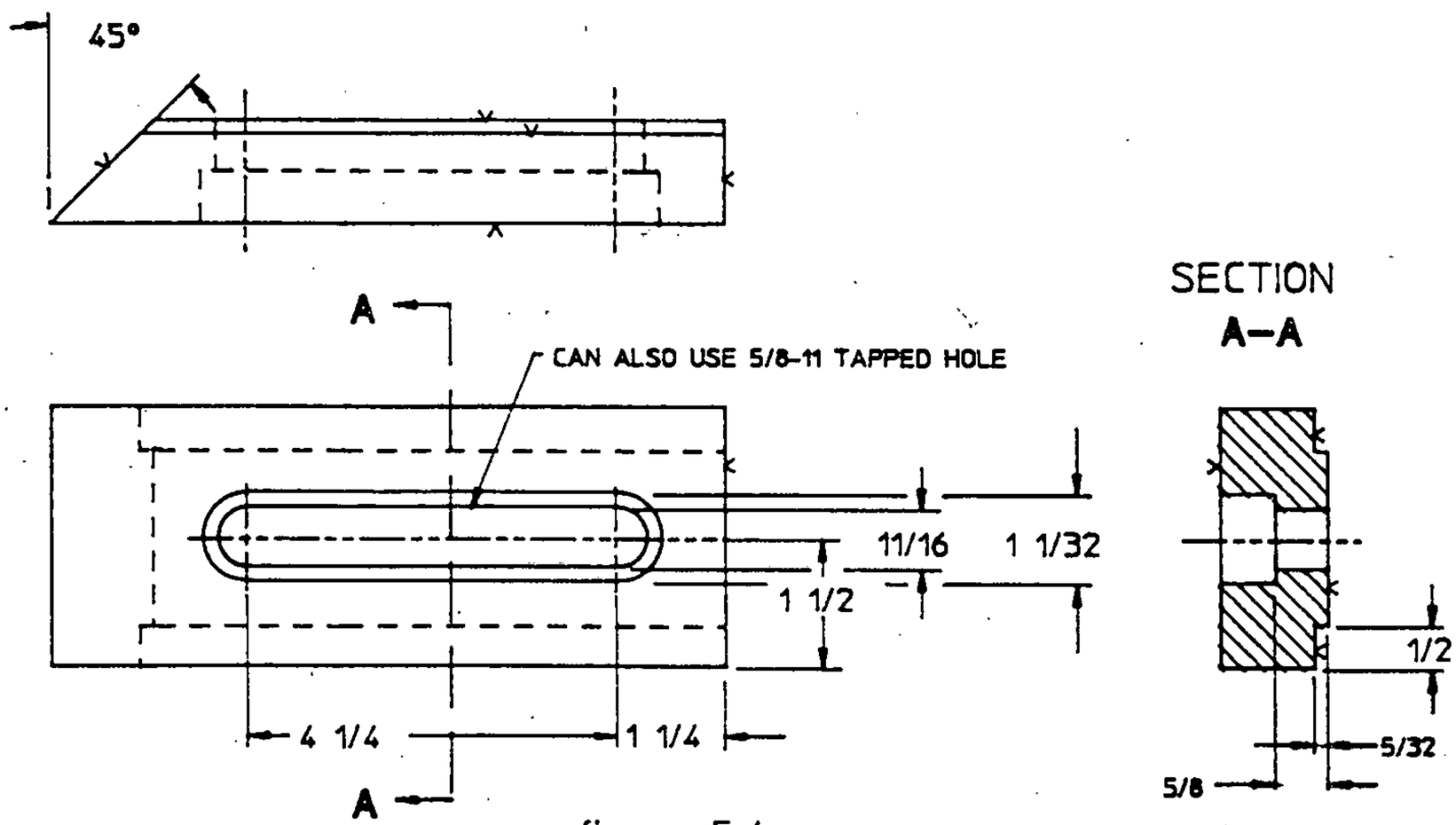


figure 5.4

LUBRICATION

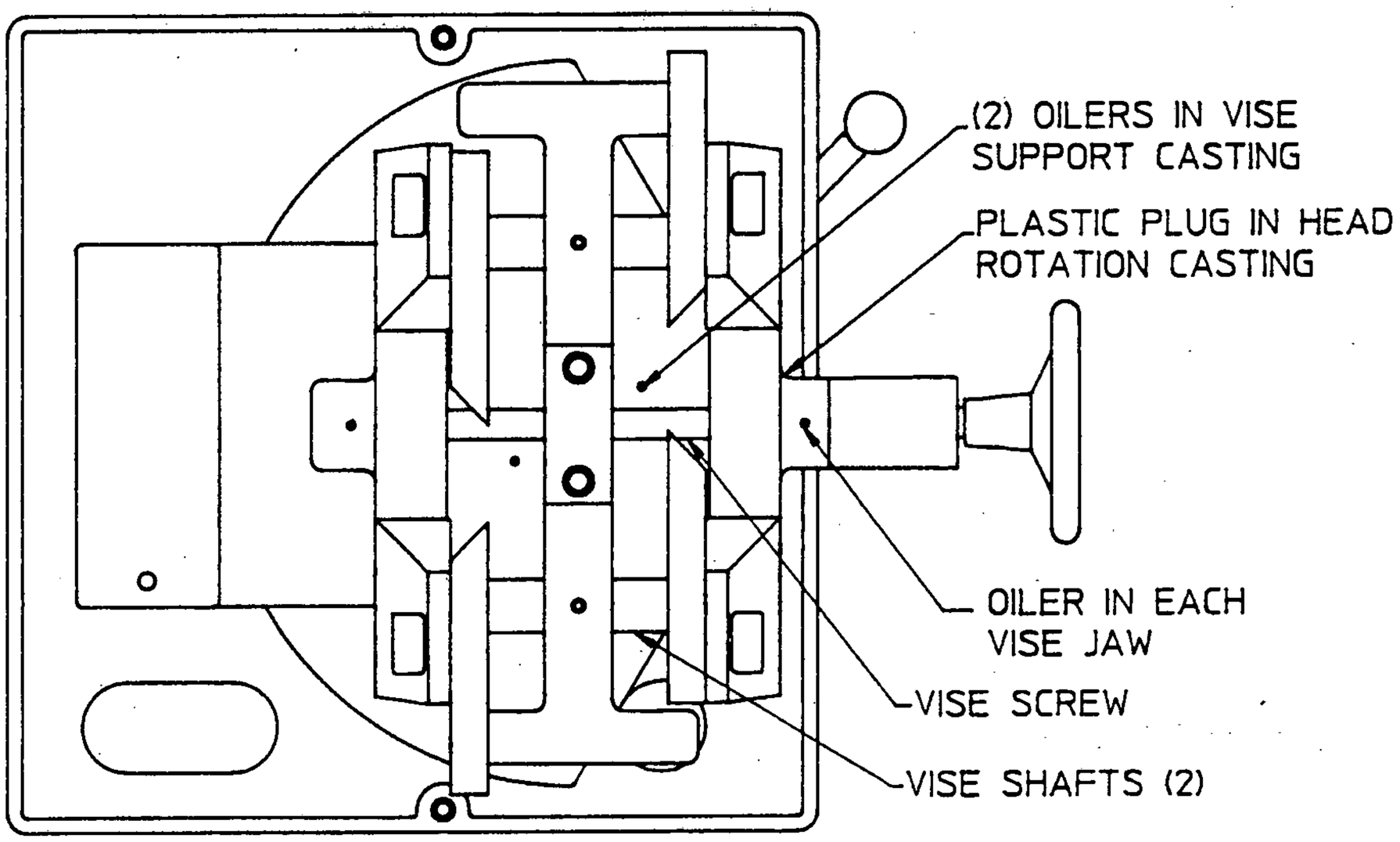


figure 6.1

DAILY:

* Check the filters on the incoming air. Drain as needed.

* Clean any chips off the machined surfaces of the saw base and OIL as needed to help head rotation.

* Make sure all chips are out of the vise area before starting a cut. Chips may prevent proper clamping of the vise and create an unsafe condition.

* Pull out the plastic plug in the front of the Head Rotation casting and squirt oil into the hole to prevent rusting of the saw bed.

* Pump oil into both of the flush oiler fittings on the base of the vise support casting. This will help keep the vise pivot shaft from rusting and binding.

* Oil the round vise ways to help the vise slide in and out. Also oil the vise screw threads.

* On automatic saws, pump oil into the two flush oilers on the carriage vise as well as onto the carriage vise shafts and screw threads.

* Make sure any vise screw threads are free of chips.

* Clean and oil the barfeed carriage shafts on automatic saws.

GEARBOX LUBRICATION

The gearbox oil in CS-350 and FS-350 saws should be drained at the end of two weeks operation, and the gearbox flushed with a light flushing oil. If it is filtered, the drained oil may be re-used; otherwise use new oil. After this first change, the oil should be changed every six months or 2500 operating hours, whichever comes first. Under severe conditions, such as rapidly changing temperatures, damp, or dirty atmospheres, it may be necessary to change the oil every one to three months.

DO NOT allow the gearbox oil to become contaminated with water or dirt. This will contribute to the build-up of sludge in the oil, which will greatly reduce the life of the gearbox.

OILS AND LUBRICANTS

* GEARBOX (CS-350/FS-350 saws): Mobilgear #634 or SHC 634
  (5 qts req'd)

* AIR/HYDRAULIC RESERVOIRS: Mobil 'Velocite #10' or equal
  (107 SUS @ 100°F)

  Head Feed: approx. 1 qt. for both

  Carriage Feed: approx. _ qts. for both

* PNEUMATIC LUBRICATOR (saws with power vise): Mobil 'Velocite #10'
  (5 ounces)

* OIL: 20W motor oil (as required for lubricating shafts, etc)

AIR/OIL RESERVOIRS

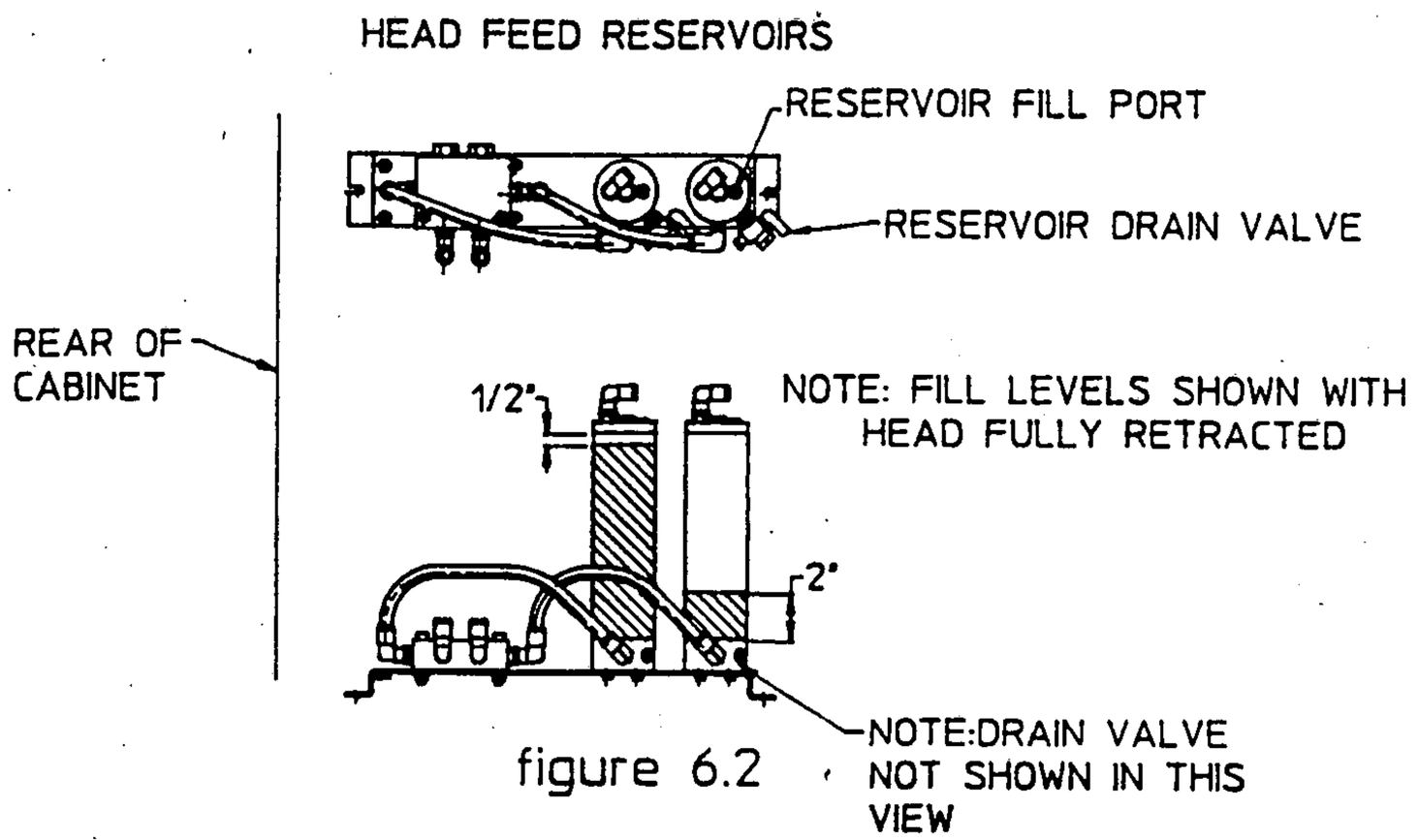


figure 6.2

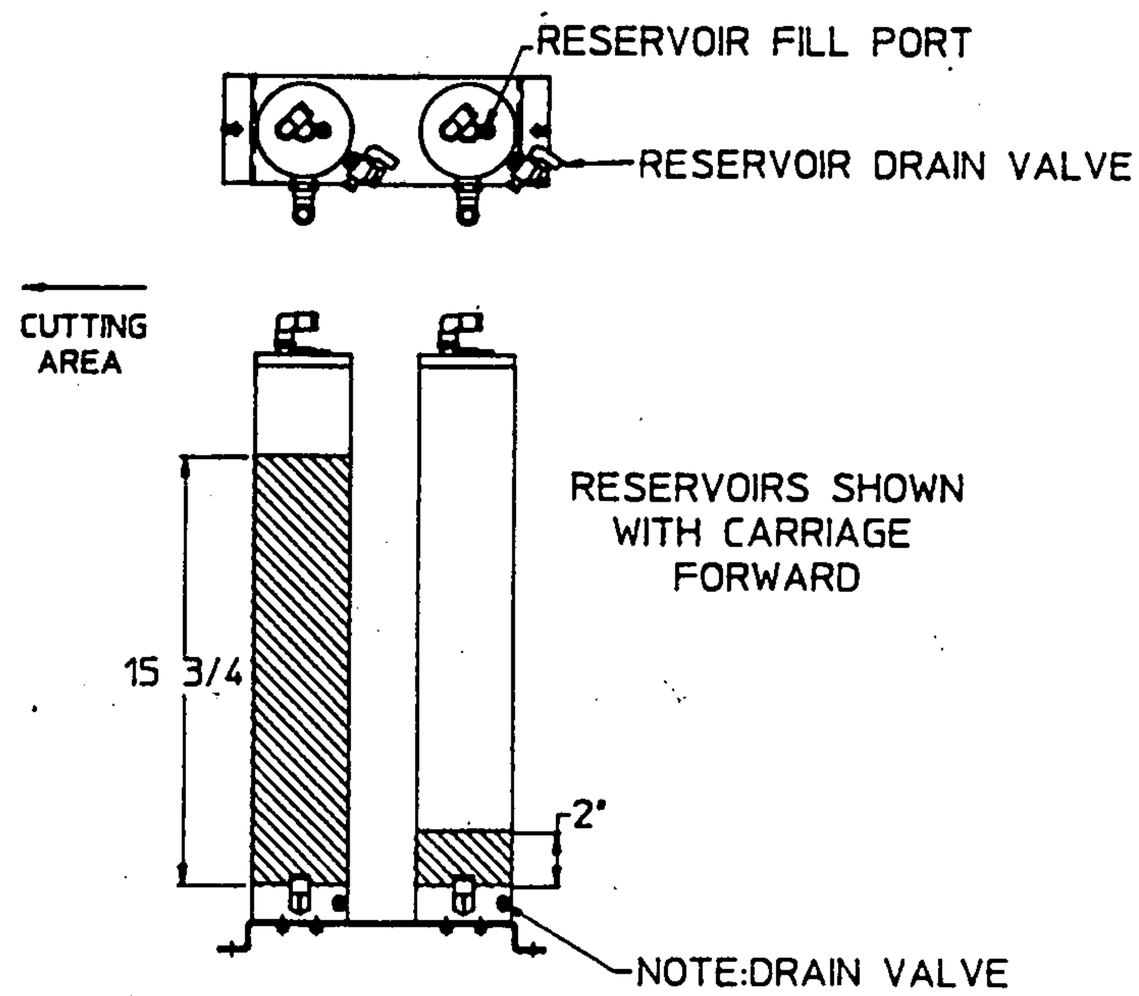


figure 6.3

To refill the reservoirs, remove the plugs shown in the top of the reservoirs, and refill to the levels shown. Be sure to tighten the plugs when replacing them. If you are filling the reservoirs with the saw head down, the fill heights should be opposite of what is shown. The reservoirs are filled with Mobil 'Velocite 10' oil, which is available from your local Mobil distributor.

Under normal conditions, there should be no need to drain and flush the reservoirs. If it should become necessary, remove the screws that mount the reservoir subassembly to the base so that the unit can be raised. Remove the drain plugs, and drain as needed.

ELECTRICAL MOTOR MAINTENANCE

LUBRICATION: Most electric motors are greased with a polyurea grease. Examples of this type of grease include Shell 'Dolium R', Chevron 'SRI #2', and Texaco 'Premium RB'. These greases are NOT compatible with lithium-based greases, and should not be mixed.

LUBRICATION INTERVALS:

5000 hours of operation/year (two shifts/day): every 5 years

Continuous Normal Duty: every 2 years

Seasonal Service: (Motor is idle 6 mos.): grease before each season's use

Continuous High Temperature, Dirty, or Damp Conditions: every 6 months

LUBRICATION PROCEDURE: Overgreasing the bearings can cause premature bearing failure. Clean the tip of the grease fitting and apply 1 or 2 full strokes from a grease gun.

CAUTION: Keep the grease clean. Lubricate the motor at standstill. DO NOT mix petroleum greases with silicone greases.

CHANGING DRIVE BELTS
FA-350 SAWS

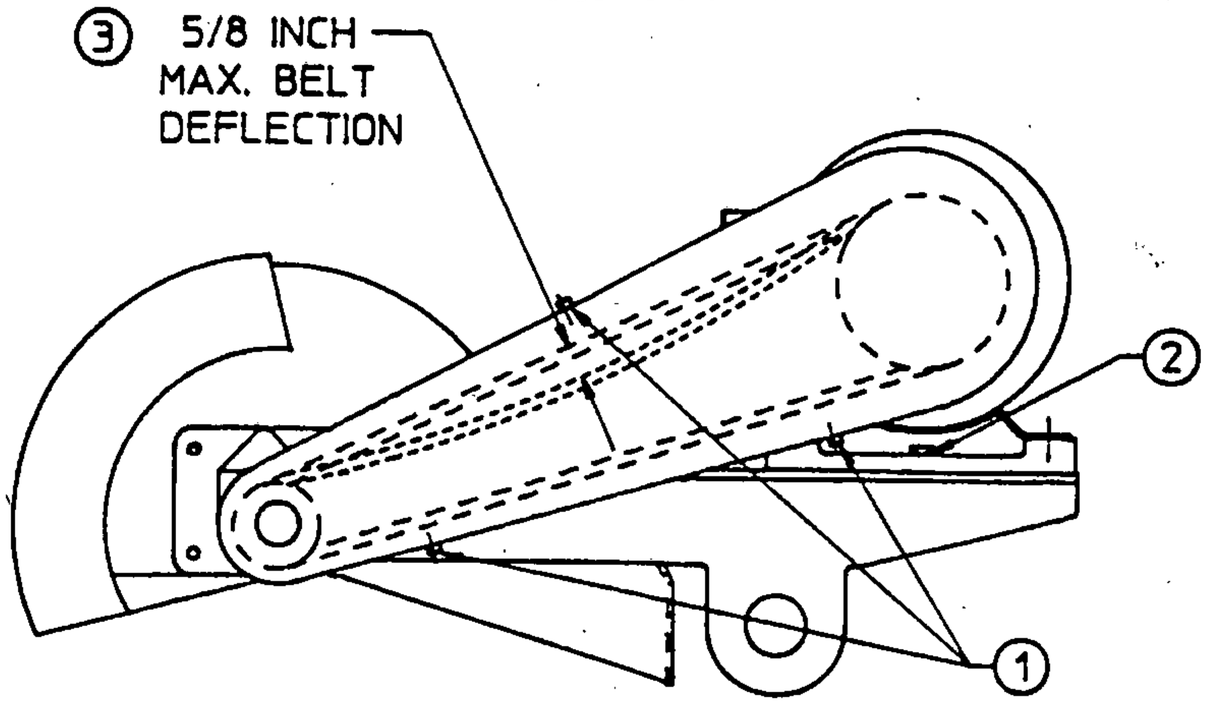


figure 6.4

1. Remove the three screws to the Belt Cover and remove it.

2. Loosen the two motor plate bolts (see illustration) and slide the motor towards the blade until the belts can be removed.

3. The belts are retensioned by pushing the motor away from the blade until a slight thumb pressure on the center of the belts produces a 5/8" deflection and then tightening the motor plate bolts.

Maintenance & Trouble-Shooting Guide

Seven Warning Signs of Short V-Belt Life (Causes and Suggested Corrections)

1 Rapid V-Belt Wear	Rubbing Belt Guard • Check guard clearance	Worn Sheave Grooves • Check groove sidewalls	Sheave Diameter Too Small • Redesign drive or use Cog-Belt	Overloaded Drive • Redesign drive or use Cog-Belt	Mismatched Belts • Replace with matched set	V-Belt Slipping • Increase tension or use Cog-Belt
	Improper V-Belt Installation, Belts Pried over Sheaves • Replace belts, do not pry belts over sheaves	Belts Improperly Stored or in Storage too Long • Use new set of V-Belts	Replacing one Belt in Multiple Drive • Replace Complete set of V-Belts	Improperly Designed Drive • Consult local distributor	Oil or Heat Condition • Use Cog-Belt	Sheave Misalignment • Correct alignment
2 V-Belts turned Over in Sheave Groove	Broken Cords in V-Belt, Belts Pried over Sheaves • Replace belts, do not pry belts over sheaves	Overloaded Drive • Redesign drive or use Cog-Belt	Impulse Loads • Use Vee-Band	Foreign Material in Grooves • Improve Belt Shield		
3 V-Belt Slippage	Insufficient Tension • Increase tension	Overloaded Drive • Redesign drive or use Cog-Belt	Sheave Worn, Belts Bottoming in Groove, Shiny sheave groove bottom • Replace Sheave	Oily Drive (Leaking Bearings) • Correct unnecessary oil or grease condition	Oily Drive Conditions • (Where oil condition cannot be eliminated) Use Cog-Belt	
4 V-Belt Squeal	Overloaded Drive • Redesign drive or use Cog-Belt	Insufficient Arc of Contact • Increase center distance or use Cog-Belt	Insufficient Tension • Increase tension use gauge	Belts Bottoming in Grooves • Replace sheave and/or belts		
5 Checked or Cracked V-Belts	Belt Slippage Causing Heat • Increase belt tension or use Cog-Belt	Excessive Heat (Ambient) • Provide adequate ventilation or use Cog-Belt	Sheaves Too Small • Redesign drive use Cog-Belt	Backside Idler • Use Cog-Belt		
6 Hot Bearings	Drive Over-Tensioned • Check sheaves for wear-check tension	Belt Slippage (causing heat) • Increase tension check sheaves	Sheaves Too Far Away From Bearing • Move sheaves closer to bearing	Sheaves Too Small • Check NEMA Min. Diameters	Poor Bearing Condition • Check design & maintenance	
7 Repeated V-Belt Fracture	Shock Loads • Check Design Use Cog-Belt	Improper V-Belt Installation, Belts Pried Over Sheaves • Replace belts, do not pry belts over sheaves	Misplaced Slack • Keep slack on one side when installing	Foreign Object in Groove • Improve Belt Shield		

COOLANT SYSTEM MAINTENANCE

SPRAY MIST UNITS (FA-350 SAWS)

CLEANING: Cleaning the reservoir occaisionally will keep the mist unit working properly. The unit can be cleaned as follows:

1. Shut off the air supply to the saw.

2. Separate the cover and the reservoir by removing the screws on both sides of the unit.

3. Wash the reservoir with warm soapy water. This solution can be run through the system to clean the lines and nozzles. Remove the pickup tube assembly by sliding the locking tab and pulling the assembly from the pump. Clean the filter screen with a solvent and blow air through the tube to clean it out.

4. Re-assemble the unit.

NOZZLE TIP REPLACEMENT:

1. Bend the nozzle sharply to snap the tip from the segmented casing.

2. Pull the tube from the barb inside the nozzle tip. DO NOT allow the tube to slip back into the casing.

3. Take the new tip and push the tube completely over the barb.

4. Snap the tip onto the casing.

FLOOD COOLANT MAINTENANCE

Keep the coolant tank filled with coolant. The pump uses the coolant to keep itself from burning up. If the coolant in the tank has built up with sludge, the pump can clog.

If further maintenance is required, see the section on 'Coolant' in the 'Maintenance and Repair' manual.

CHANGING INDICATOR LAMPS

REF: 'Cycle Start' light and 'Blade On' light (SA and A saws), and the 'Power On' light (A saws)

1. Turn off the power at the disconnect switch.

2. Unscrew the cover to the switch enclosure.

3. In the middle of one side of the contact block is a plastic loop with a metal wire. A screwdriver inserted into the loop and pried down will lift the wire and separate the contact block and lamp body from the switch operator.

4. The lamp should be visible on the front of the light module. It is removed by pushing down and rotating counter-clockwise.

5. The new bulb is inserted and turned clockwise.

6. The contact block/light module is reattached by lining up the side wires with the grooves in the switch operator or lens and pushing it into place. You will feel the light module snap into place.

7. Turn the power back on and test the light, then close up the switch enclosure.

SWITCH OPERATOR/CONTACT BLOCK REPLACEMENT

If it should become necessary to replace either the contact block or switch operator, they are both accessed and removed as described in steps 1-3 above. To remove the switch operator from the panel, loosen the plastic nut and slide the operator through the front of the panel. When replacing the operator, take note of the tab on one side. This tab should fit into the notch in the panel and overlay to prevent switch rotation.

The contact block is re-installed as above.

GEARBOX MAINTENANCE
CS-350/FS-350 SAWS

NOTE: Before performing any maintenance on the gearbox, turn the disconnect switch to the "OFF" position and lock it out for safety.

1. The gearbox oil level should be checked weekly and the recommended oil added as needed to maintain the proper level.

2. Oil changes should be done as indicated in the section on gearbox lubrication (page 6.2).

3. Keep the gearbox casting clean to allow maximum heat dissipation.

4. Check the mounting bolts for tightness after the first three months of use and annually thereafter.

BARFEED MAINTENANCE

LUBRICATION: Pump oil into the two oilers on the carriage vise and on the vise shafts and screw. Make sure the vise screw is free of chips. Clean and oil the barfeed ways regularly.

LIMIT SWITCHES: The Carriage Forward and Carriage Retracted limit switches can be adjusted by loosening the socket head screws on either side of the switch and sliding the switch and base as needed. The switches should be adjusted so that the switch just 'makes' as the carriage makes contact with the stop at either end of its travel.

The Carriage Out-of-Stock switch can be adjusted by loosening the screw in the switch arm. The arm should be set so that more than 3/16" to 1/4" of vise movement causes the switch to open (Input #200 on the programmable controller goes off)

The Barfeed Cover switch is adjusted in the same manner as the Out-of-Stock limit switch. It should be set so that the Barfeed Cover must be fully closed for the saw to operate.

VACUUM MAINTENANCE

NOTE: Before doing any maintenance or service, be sure that the vacuum unit is is disconnected from the power source to prevent accidental starting.

CAST ALUMINUM AND SHEET METAL FITTINGS:

The cast aluminum blower impeller, as well as all sheet metal fittings are maintenance free and should not require any maintenance during the life of the unit. In a very dirty environment the blower impeller should be cleaned with a wire brush to prevent a build-up that could unbalance the blower. After cleaning the impeller, inspect for possible cracks or excessive wear, which can cause an imbalance.

MOTOR MAINTENANCE:

1. REMOVING DUST AND DIRT: Blow off the motor with low pressure air to remove dust or dirt. Air pressure above 50 PSI should not be used as high pressure may damage insulation and blow dirt under loosened tape. The operator performing this maintenance should always wear eye protection. Dust can cause excessive insulation temperatures.

2. LUBRICATION: Under normal conditions ball bearing motors will operate for five years without re-lubrication. Under continuous operation at higher temperatures (above 104°F ambient), or in dusty atmospheres, re-lubricate after one year. To re-lubricate the motor bearings, dis-assemble the motor and housings. The bearings are located in the end shields of the motor. Re-pack each bearing and fill the cavity in the back of the bearings 1/3 full with 'Alvania Grease #2' (Shell Oil Co.)

TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTION
Unit will not operate	1. Improper electrical connection.	1. Turn the power off. Make sure the unit is wired per the electrical diagram.
	2. Loose blower wheel.	2. Disconnect the power. Turn the haed assembly over and spin the wheel by hand. Re-position and tighten the set screws as needed.
Low suction or flow rate	1. Incorrect Rotation	1. Turn the unit off and watch the motor cooling wheel rotation as it stops. Re-wire the motor if necessary.

TROUBLE SHOOTING CHART
(continued)

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTION
Low suction or flow rate	2. Suction hose too long	2. Place the unit closer to the saw and shorten the hose.
	3. Filter Plugged	3. See below

FILTER CLEANING:

If the air flow to the collector is reduced to the point that the pickup is marginal, the filter should be cleaned. The frequency of cleaning will depend on the size and type of material being picked up. Small and/or very fine chips may need cleaning more often.

Air flow and pickup will be retarded if the collection barrel is allowed to become too full. The level of dust/chips in the barrel should not be allowed to come closer than 12" from the bottom of the wire basket holder. Empty the barrel regularly. Check to see if chips have built up on the outside of the wire basket holder; brush these off with a brush. Do not use air; this may drive chips into the filter element. DO NOT use a wire brush; this may damage the filter element.

If the air flow is stii reduced after emptying the barrel and cleaning the wire basket, the filter element should be cleaned. Remove the wire basket from the underside of the lid, take out both pieces of the filter element, clean them, and re-assemble the unit.

Remove the wire basket by removing the four bolts holding it to the bottom of the lid. Remove the two pieces of filter from the wire basket holder. Place the filters in warm soapy water and gently swirl the filters so as to dislodge any chips. Be careful not to distort the filter shapes. Rinse the filters in clean water and air dry. Lightly oil them with a lightweight motor oil.

Re-assemble the filters and wire basket to the lid. Be sure there is a good seal between the lid and the wire basket.

If cleaning the filter does not restore the air flow, it may be necessary to replace the filter elements. Contact your dealer or the factory for the new elements (Part No. CS-9011).

SPARE PARTS LIST
FA-350 SAWS

Drive Belt (2 Req'd): CS-3468

Standard Vise Wear Plate (4 Total): CS-2470

Indicator Lamp Bulbs: CS-5031

Power Fuses (1-3FU): Bussman Type KTK-R
Gould Type ATMR
Littlefuse Type KLK_R

208V or 230V saws use 30A fuses; 460V saws use 12A

NOTE: Some early saws used Bussman type FNQ fuses.

Control Circuit Fuses:

4FU (Transformer): Bussman FNM 2 1/2
Gould TRM 2 1/2
Littlefuse FLM 2 1/2

5FU (Coolant Pump): Bussman FNM 1 1/4
Gould TRM 1 1/4
Littlefuse FLM 1 1/4

6FU (Worklight): Bussman AGC 3/10
Gould GGC 3/10
Littlefuse 3AG 3/10

8FU (Programmable controller): Bussman AGC 2
Gould GGC 2
Littlefuse 3AG 2

9FU (Programmable Counter): Bussman AGC 3/10
Gould GGC 3/10
Littlefuse 3AG 3/10

230V Motor Brake Fuses (If equipped): Bussman FWH-35
(Also work for 208V) Gould A25X35-4
Littlefuse KLB-35
(NOTE: 2 req'd)

460V Motor Brake Fuses (If equipped): Bussman FWH-15
Gould A50P15-1
Littlefuse KLB-15
(NOTE: 2 req'd)

SPARE PARTS LIST
FS-350 SAWS

Blade Brush: SP-47

Standard Vise Wear Plate (4 Total): CS-2470-S

Indicator Lamp Bulbs: CS-5031

Power Fuses (1-3FU): Bussman Type KTK-R
Gould Type ATMR
Littlefuse Type KLK-R

208V or 230V saws use 30A fuses; 460V saws use 12A

NOTE: Some early saws used Bussman type FNQ fuses.

Control Circuit Fuses:

4FU (Transformer): Bussman FNM 2 1/2
Gould TRM 2 1/2
Littlefuse FLM 2 1/2

5FU (Coolant Pump): Bussman FNM 1 1/4
Gould TRM 1 1/4
Littlefuse FLM 1 1/4

6FU (Worklight): Bussman AGC 3/10
Gould GGC 3/10
Littlefuse 3AG 3/10

8FU (Programmable controller): Bussman AGC 2
Gould GGC 2
Littlefuse 3AG 2

9FU (Programmable Counter): Bussman AGC 3/10
Gould GGC 3/10
Littlefuse 3AG 3/10

Gearbox Oil (5 qts/change): Mobilgear #634 or SHC 634

7

TROUBLESHOOTING GUIDE - GENERAL

1. MACHINE WILL NOT START

   a) Check the main and control fuses.
   b) Check your in-house wiring.
   c) Check that the incoming voltage matches the saw wiring.
   d) Check the motor brake fuses (if equipped).
   e) Overload relay tripped - fix cause and reset.

2. MOTOR WILL NOT START AND IS BLOWING FUSES

   a) Check for a short in the supply wiring.
   b) Check for a short in the motor windings or leads.
   c) Check for proper fuses or circuit breakers.

3. WORKLIGHT WILL NOT LIGHT (if equipped)

   a) Check the fuse inside the electrical enclosure (6FU).
   b) Check the bulb.

4. BLADE STRIPS TEETH

   a) Too many teeth, causing each tooth to overload.
   b) Blade too coarse.
   c) Head feed pressure too high.
   d) Blade speed too slow.
   e) Rectangular pieces should be cut on the shortest side.
   f) Vise clamping pressure too low.
   g) Head feed speed too high.
   h) Wrong blade for the job.

5. CROOKED CUTS

   a) Feed pressure too high.
   b) Wrong blade for the application.
   c) The blade grind may be worn on one side.
   d) Head feed speed too fast.
   e) Workpiece not squarely clamped in vise.
   f) The adjusting collar may be loose in the head support, allowing the head to shift on the pivot bar.

6. COOLANT WILL NOT FLOW

   a) Check the coolant level in the tank.
   b) Check the pump for blockage-clean if necessary (Refer to the maintenance sheets on the coolant pumps or spray mist units for details.
   c) Check for line blockage.
   d) Check the coolant pump fuse (5FU-flood coolant units)
   e) Make sure the flow valves are open (spray mist units)

TROUBLESHOOTING: SEMI-AUTOMATIC SAWS

7. CYCLE LIGHT WILL NOT LIGHT

   a) Check the light bulb.
   b) Make sure the Head Up limit switch is tripped.
   c) Blade brake is still energized (if equipped)

8. CYCLE WILL NOT START

   a) Blade brake is still energized (if equipped)
   b) Timer 2TR is still energized to stop the last cycle.
   c) The Head Down limit switch is still tripped.

9. HEAD WILL NOT FEED

   a) The Head Down limit switch is still tripped.
   b) The Feed Speed valve is closed.
   c) The Feed Pressure is too low for the application.
   d) Make sure the air supply is on.
   e) The Head Raise solenoid is still energized.

10. HEAD WILL NOT RAISE

   a) The Head Down limit switch is not tripped.
   b) The Head Feed solenoid is still energized.
   c) The Head Up limit switch is still tripped.
   d) Make sure the air supply is on.
   e) Air pressure too low.

11. VISE WILL NOT CLAMP

   a) Solenoid valve is not energizing.
   b) Make sure the air supply is on.
   c) Air pressure too low.
   d) Check lines and fittings for leaks.
   e) Check seals for tears.

12. VISE WILL NOT RELEASE

   a) Solenoid valve is not releasing.
   b) Timer 2TR is not energizing to stop the cycle.
   c) The Head Up limit switch is not tripped.

TROUBLESHOOTING: AUTOMATIC SAWS

13. CYCLE WILL NOT START

   a) Make sure the 'Operation' switch is in the 'Auto' position.
   b) The cycle will not start if the blade brake is on
   c) Make sure the Head Up limit switch is tripped.
   d) Make sure there is stock in the barfeed and that the
   e) The barfeed cover must be closed.
   f) The piece counter cannot read '0'

14. HEAD WILL NOT FEED

a) The Head Down limit switch is still tripped.
b) The Feed Speed valve is closed.
c) The Feed Pressure is too low for the application.
d) Make sure the air supply is on.
e) The Head Raise solenoid is still energized.
f) The blade brake is still energized (if equipped)
g) The Carriage Forward limit switch is not tripped
h) The Batch Counter has reached its preset value
i) The Stroke Counter has not reached its preset

15. HEAD WILL NOT RAISE

a) The Head Down limit switch is not tripped.
b) The Head Up limit switch is not releasing.
c) The Head Feed solenoid is still energized.
d) Make sure the air supply is on.
e) The air pressure is too low.

16. SAW VISE WILL NOT CLAMP

a) The Carriage Forward limit switch is not tripped
b) The blade brake is still energized
c) The Saw Vise Clamp solenoid is not energized.
d) Make sure the air supply is on.
e) The clamping pressure is too low.
f) Check lines and fittings for leaks.
g) Check seals for tears.

17. SAW VISE WILL NOT OPEN

a) The Saw Vise Clamp solenoid is still energized.
b) The Head Up limit switch is not tripped.
c) The Carriage Retracted limit switch was not tripped before feeding the stock.
d) The saw did not finish making the cut (The Head Down limit switch was not tripped).
e) The saw vise was manually clamped tight (No room for the cylinder to extend or retract).

18. CARRIAGE WILL NOT RETRACT

a) The Carriage Forward limit switch is not tripped
b) The blade brake is still energized
c) The Carriage Vise Clamp solenoid is energized.
d) Make sure the air supply is on.
e) The air pressure is too low.
f) The saw head is not feeding at the start of a cycle.
g) The Carriage Retracted limit switch is tripped.
h) The Stroke Counter has reached its preset value.
i) The Carriage Feed solenoid is still energized.
j) The Carriage Retract solenoid is not energized.

19. CARRIAGE WILL NOT FEED

a) The Carriage Forward limit switch is tripped
b) The Saw Vise Clamp solenoid is energized.
c) Make sure the air supply is on.
d) The air pressure is too low.
e) The Carriage Retract solenoid is energized.
f) The Head Up limit switch is not tripped.

20. CARRIAGE VISE WILL NOT CLAMP

a) The Head Up limit switch is not tripped.
b) The Carriage Retract solenoid is energized.
c) The saw did not finish making the cut (The Head Down limit switch was not tripped).
d) The Carriage Retracted limit switch is not tripped
e) Make sure the air supply is on.
f) The air pressure is too low.

21. CARRIAGE VISE WILL NOT OPEN

a) The Carriage Vise Clamp solenoid is not releasing
b) The Saw Vise Clamp solenoid is not energized.
c) The Carriage Retract solenoid is still energized.
d) The Carriage Vise is manually clamped tight (No room for the cylinder to extend or retract).

KALAMAZOO®

Metal Cutting Saws

Maintenance and Repair Manual

CA-350, CS-350, FA-350 and FS-350 Series Saws

Manual P/N KTS-04
Revised June, 1992

THIS OPERATING MANUAL SHOULD BE READ BY EVERYONE EXPECTED TO OPERATE OR SUPERVISE THE OPERATION OF THIS MACHINE. SPECIAL ATTENTION SHOULD BE FOCUSED ON THE PAGES CONCERNING SAFETY.

For your convenience when ordering parts,
please fill in the following information
when you receive your new KALAMAZOO saw.

MODEL _____

SERIAL NO. _____

KALAMAZOO has been committed to continuous product improvement since 1867. In keeping with this commitment, we reserve the right to change the information in this manual without notice. Every attempt has been made to insure the accuracy of this manual. Even so, KALAMAZOO assumes no responsibility for errors or omissions, nor is any liability assumed for damages resulting from the use of the information contained in this manual.

Kalamazoo Saw * 508 Harrison, Kalamazoo, MI 49007
(616) 345-2141 (MI) (800) 637-3371 (outside MI) (616) 345-3932 (FAX)

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SECTION 8 - ELECTRICAL SYSTEM

LUBRICATION POINTS
CIRCULAR SAWS

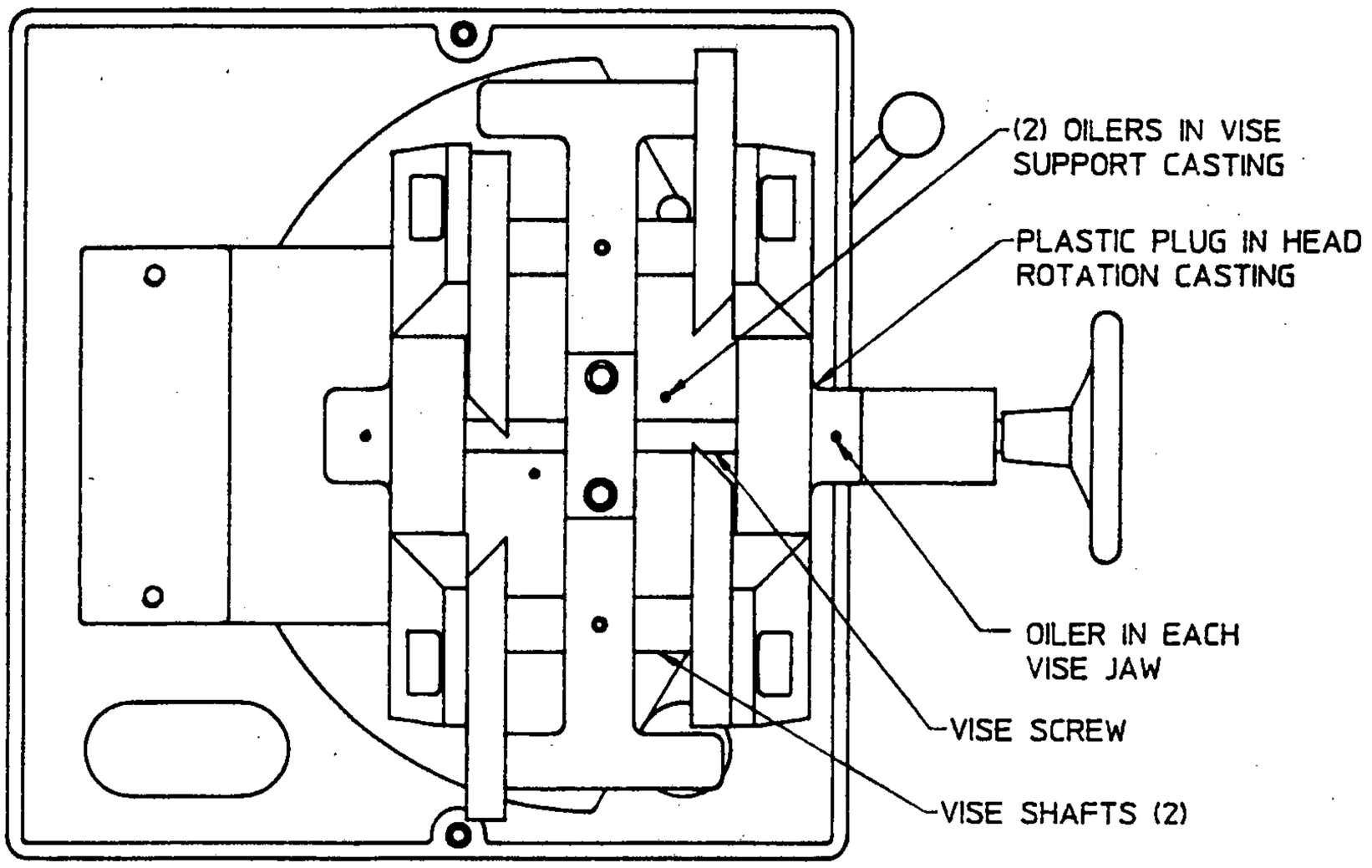


figure 1.1

DAILY:

* Check the filters on the incoming air. Drain as needed.

* Clean any chips off the machined surfaces of the saw base and OIL as needed to help head rotation.

* Make sure all chips are out of the vise area before starting a cut. Chips may prevent proper clamping of the vise and create an unsafe condition.

* Pull out the plastic plug in the front of the Head Rotation casting and squirt oil into the hole to prevent rusting of the saw bed.

* Pump oil into both of the flush oiler fittings on the base of the vise support casting. This will help keep the vise pivot shaft from rusting and binding.

* Oil the round vise ways to help the vise slide in and out. Also oil the vise screw threads.

* On automatic saws, pump oil into the two flush oilers on the carriage vise as well as onto the carriage vise shafts and screw threads.

* Make sure any vise screw threads are free of chips.

* Clean and oil the barfeed carriage shafts on automatic saws.

GEARBOX LUBRICATION

The gearbox oil in CS-350 and FS-350 saws should be drained at the end of two weeks operation, and the gearbox flushed with a light flushing oil. If it is filtered, the drained oil may be re-used; otherwise use new oil. After this first change, the oil should be changed every six months or 2500 operating hours, whichever comes first. Under severe conditions, such as rapidly changing temperatures, damp, or dirty atmospheres, it may be necessary to change the oil every one to three months.

DO NOT allow the gearbox oil to become contaminated with water or dirt. This will contribute to the build-up of sludge in the oil, which will greatly reduce the life of the gearbox.

OILS AND LUBRICANTS

* GEARBOX (CS-350/FS-350 saws): Mobilgear #634 or SHC 634
  (5 qts req'd)

* AIR/HYDRAULIC RESERVOIRS: Mobil 'Velocite #10' or equal
  (107 SUS @ 100°F)

  Head Feed: approx. 1 qt. for both

  Carriage Feed: approx. _ qts. for both

* PNEUMATIC LUBRICATOR (saws with power vise): Mobil 'Velocite #10'
  (5 ounces)

* OIL: 20W motor oil (as required for lubricating shafts, etc)

AIR/OIL RESERVOIRS

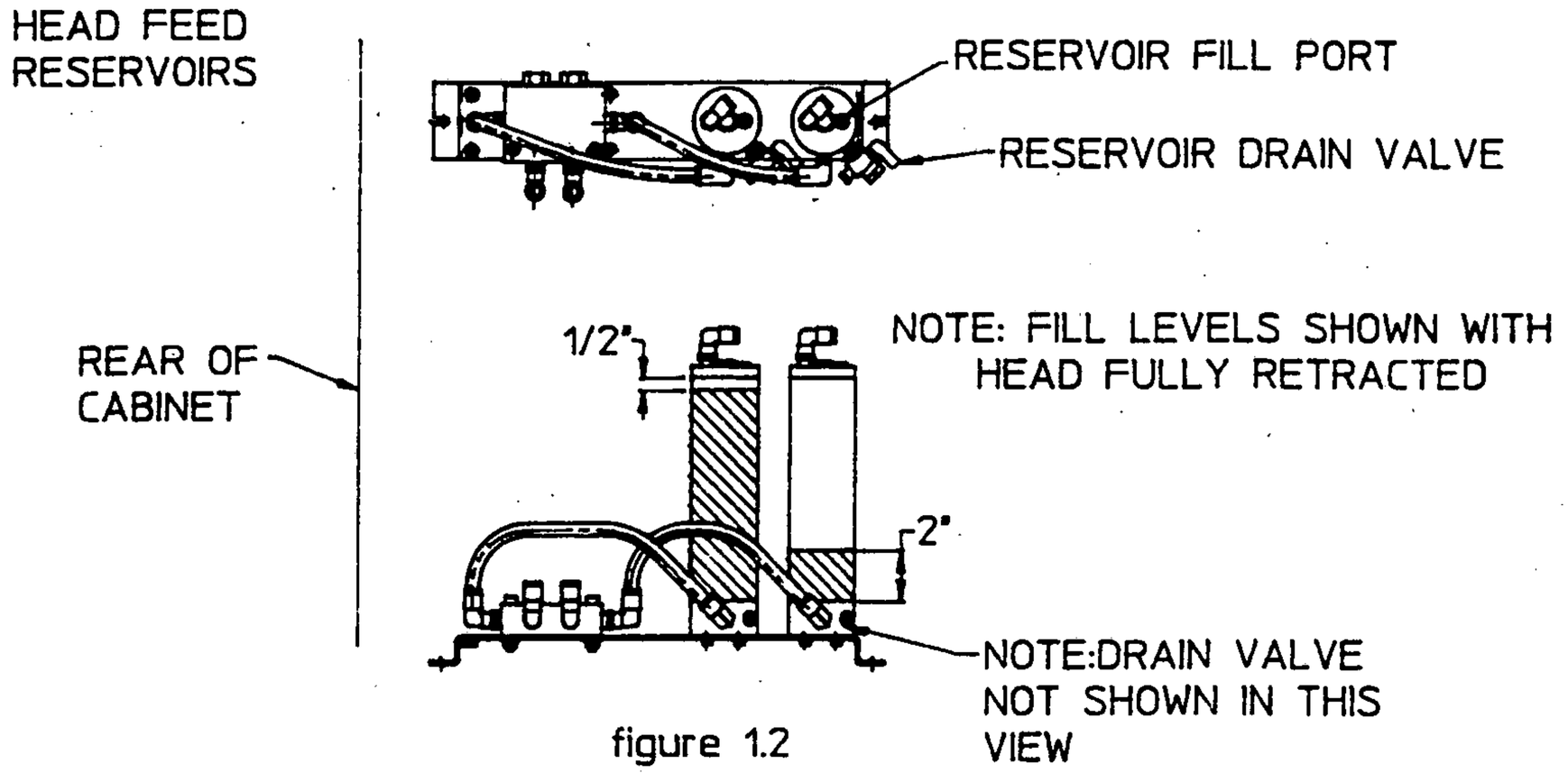


figure 1.2

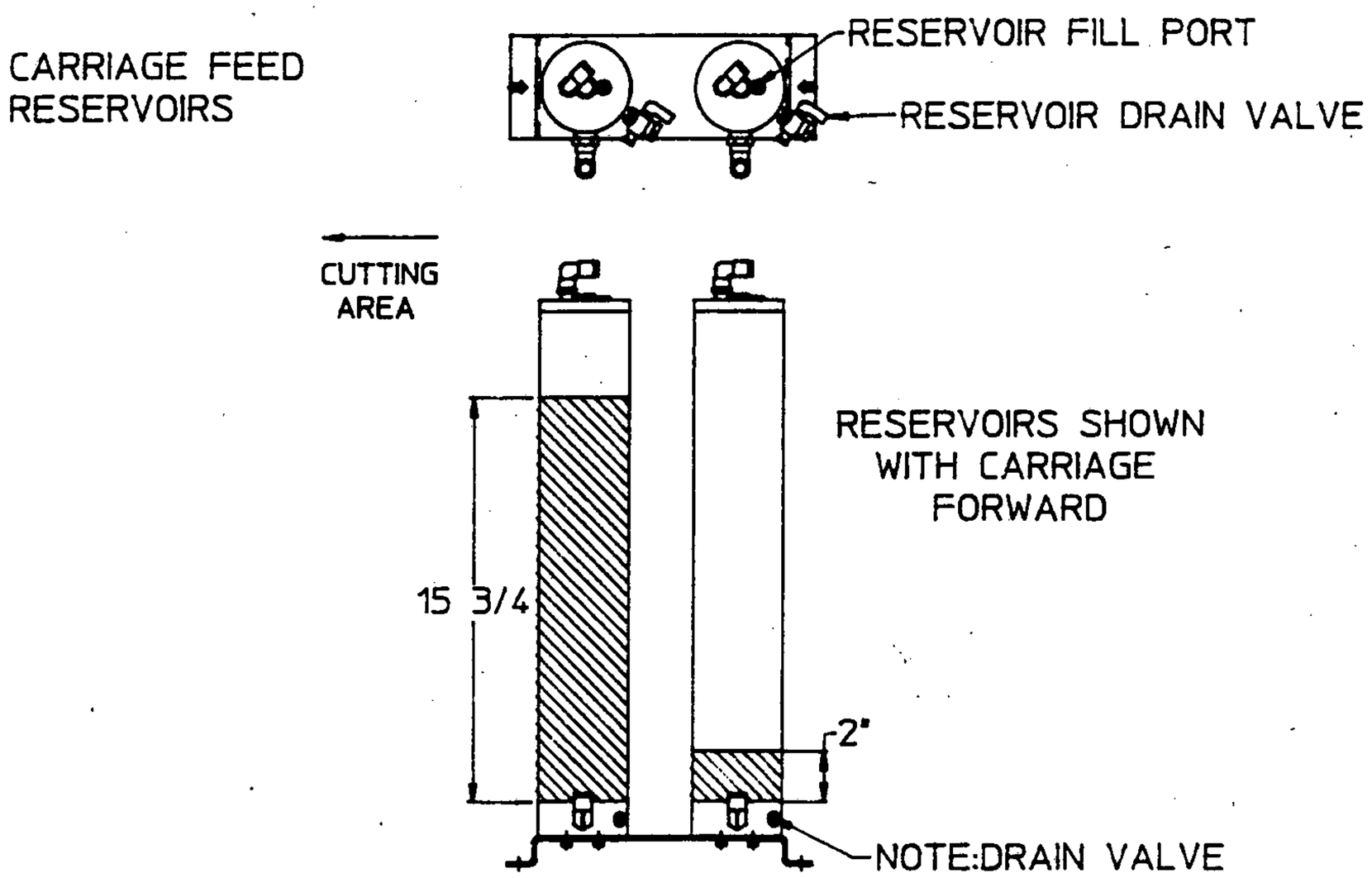


figure 1.3

To refill the reservoirs, remove the plugs shown in the top of the reservoirs, and refill to the levels shown. Be sure to tighten the plugs when replacing them. If you are filling the reservoirs with the saw head down, the fill heights should be opposite of what is shown. The reservoirs are filled with Mobil 'Velocite 10' oil, which is available from your local Mobil distributor.

Under normal conditions, there should be no need to drain and flush the reservoirs. If it should become necessary, remove the screws that mount the reservoir subassembly to the base so that the unit can be raised. Remove the drain plugs, and drain as needed.

ELECTRICAL MOTOR MAINTENANCE

LUBRICATION: Most electric motors are greased with a polyurea grease. Examples of this type of grease include Shell 'Dolium R', Chevron 'SRI #2', and Texaco 'Premium RB'. These greases are NOT compatible with lithium-based greases, and should not be mixed.

LUBRICATION INTERVALS:

5000 hours of operation/year (two shifts/day): every 5 years

Continuous Normal Duty: every 2 years

Seasonal Service: (Motor is idle 6 mos.): grease before each season's use

Continuous High Temperature, Dirty, or Damp Conditions: every 6 months

LUBRICATION PROCEDURE: Overgreasing the bearings can cause premature bearing failure. Clean the tip of the grease fitting and apply 1 or 2 full strokes from a grease gun.

CAUTION: Keep the grease clean. Lubricate the motor at standstill. DO NOT mix petroleum greases with silicone greases.

CHANGING DRIVE BELTS
CA-350/FA-350 SAWS

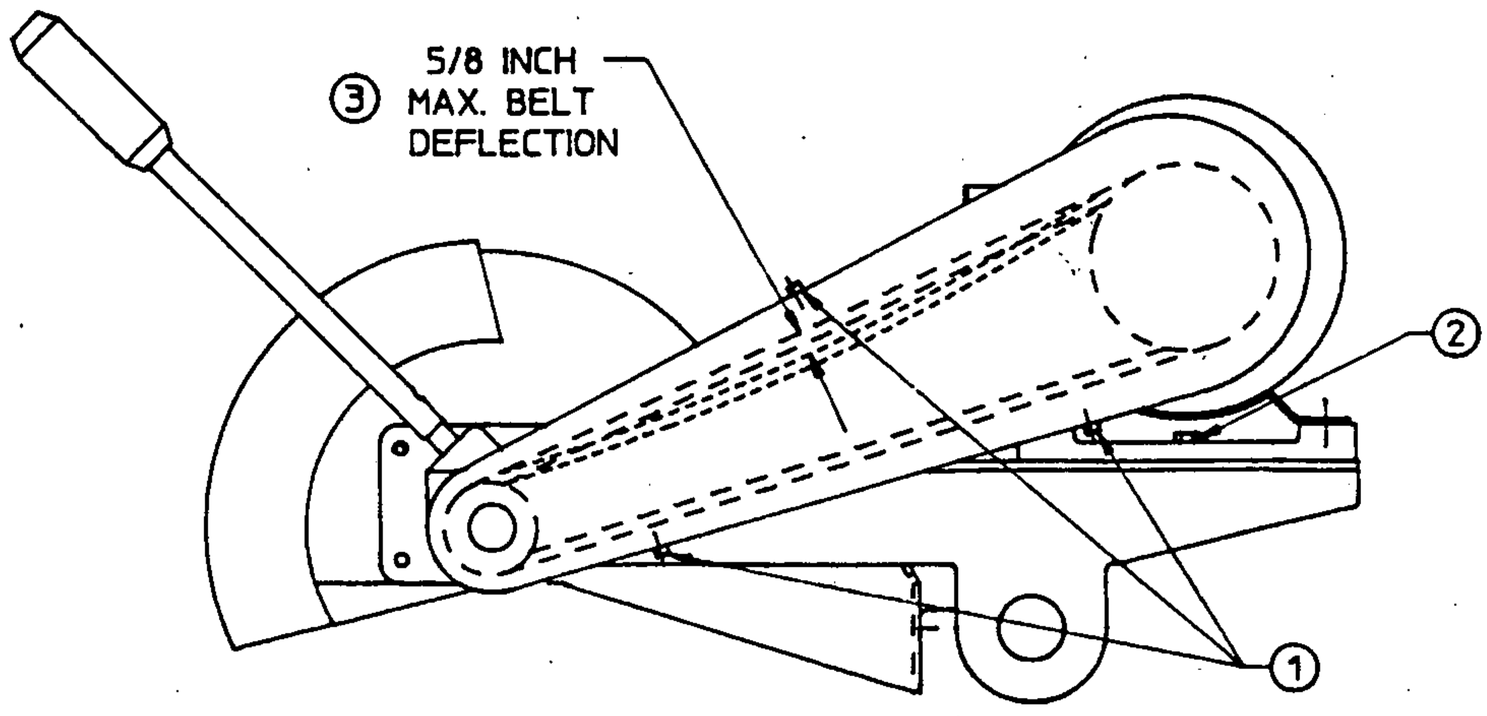


figure 1.4

1. Remove the three screws to the Belt Cover and remove it.

2. Loosen the two motor plate bolts (see illustration) and slide the motor towards the blade until the belts can be removed.

3. The belts are retensioned by pushing the motor away from the blade until a slight thumb pressure on the center of the belts produces a 5/8" deflection and then tightening the motor plate bolts.

Maintenance & Trouble-Shooting Guide

Seven Warning Signs of Short V-Belt Life (Causes and Suggested Corrections)

1 Rapid V-Belt Wear	Rubbing Belt Guard • Check guard clearance	Worn Sheave Grooves • Check groove sidewalls	Sheave Diameter Too Small • Redesign drive or use Cog-Belt	Overloaded Drive • Redesign drive or use Cog-Belt	Mismatched Belts • Replace with matched set	V-Belt Slipping • Increase tension or use Cog-Belt
	Improper V-Belt Installation, Belts Pried over Sheaves • Replace belts, do not pry belts over sheaves	Belts Improperly Stored or in Storage too Long • Use new set of V-Belts	Replacing one Belt in Multiple Drive • Replace Complete set of V-Belts	Improperly Designed Drive • Consult local distributor	Oil or Heat Condition • Use Cog-Belt	Sheave Misalignment • Correct alignment
2 V-Belts turned Over in Sheave Groove	Broken Cords in V-Belt, Belts Pried over Sheaves • Replace belts, do not pry belts over sheaves	Overloaded Drive • Redesign drive or use Cog-Belt	Impulse Loads • Use Vee-Band	Foreign Material in Grooves • Improve Belt Shield		
3 V-Belt Slippage	Insufficient Tension • Increase tension	Overloaded Drive • Redesign drive or use Cog-Belt	Sheave Worn, Belts Bottoming in Groove, Shiny sheave groove bottom • Replace Sheave	Oily Drive (Leaking Bearings) • Correct unnecessary oil or grease condition	Oily Drive Conditions • (Where oil condition cannot be eliminated) Use Cog-Belt	
4 V-Belt Squeal	Overloaded Drive • Redesign drive or use Cog-Belt	Insufficient Arc of Contact • Increase center distance or use Cog-Belt	Insufficient Tension • Increase tension use gauge	Belts Bottoming in Grooves • Replace sheave and/or belts		
5 Checked or Cracked V-Belts	Belt Slippage Causing Heat • Increase belt tension or use Cog-Belt	Excessive Heat (Ambient) • Provide adequate ventilation or use Cog-Belt	Sheaves Too Small • Redesign drive use Cog-Belt	Backside Idler • Use Cog-Belt		
6 Hot Bearings	Drive Over-Tensioned • Check sheaves for wear-check tension	Belt Slippage (causing heat) • Increase tension check sheaves	Sheaves Too Far Away From Bearing • Move sheaves closer to bearing	Sheaves Too Small • Check NEMA Min. Diameters	Poor Bearing Condition • Check design & maintenance	
7 Repeated V-Belt Fracture	Shock Loads • Check Design Use Cog-Belt	Improper V-Belt Installation, Belts Pried Over Sheaves • Replace belts, do not pry belts over sheaves	Misplaced Slack • Keep slack on one side when installing	Foreign Object in Groove • Improve Belt Shield		

COOLANT SYSTEM MAINTENANCE

SPRAY MIST UNITS

CLEANING: Cleaning the reservoir occaisionally will keep the mist unit working properly. The unit can be cleaned as follows:

1. Shut off the air supply to the saw.

2. Separate the cover and the reservoir by removing the screws on both sides of the unit.

3. Wash the reservoir with warm soapy water. This solution can be run through the system to clean the lines and nozzles. Remove the pickup tube assembly by sliding the locking tab and pulling the assembly from the pump. Clean the filter screen with a solvent and blow air through the tube to clean it out.

4. Re-assemble the unit.

NOZZLE REPLACEMENT (CA-350, CA-350PV, FA-350, and FA-350PV saws):

1. Remove the old or damaged nozzle by loosening the knurled nut at the end of the tubing.

2. Slide the black and yellow tubing from the end of the nozzle.

3. Take the new nozzle and slip the yellow tubing onto the shorter brass tube.

4. Slide the black tubing over the nozzle body and lock it in place by retightening the knurled nut over the black tubing.

NOZZLE TIP REPLACEMENT (FA-350SA and FA-350A saws):

1. Bend the nozzle sharply to snap the tip from the segmented casing.

2. Pull the tube from the barb inside the nozzle tip. DO NOT allow the tube to slip back into the casing.

3. Take the new tip and push the tube completely over the barb.

4. Snap the tip onto the casing.

COOLANT PUMP MAINTENANCE
(Flood Coolant Systems)

CAUTION: DISCONNECT THE POWER BEFORE ATTEMPTING TO SERVICE OR REPLACE ANY COMPONENT!

1. This unit is self-lubricating. Oiling is not required.

2. Periodic cleaning of the pump parts will prolong the life and efficiency of the pump. Refer to the drawing below for the assembly and disassembly of the pumping head.

3. Lightly clean any corrosion or debris which may clog the impeller. Use a brush and penetrating oil and lightly scrape. NOTE: Do not allow sediment to build up to within 2" of the pump.

4. Turn the impeller by hand to make sure it is free. Turn on the power to see if the impeller will turn. If it does, replace the front, and the pump should operate as good as new.

PUMP TROUBLESHOOTING

1. Should the pump fail to operate, check the following:

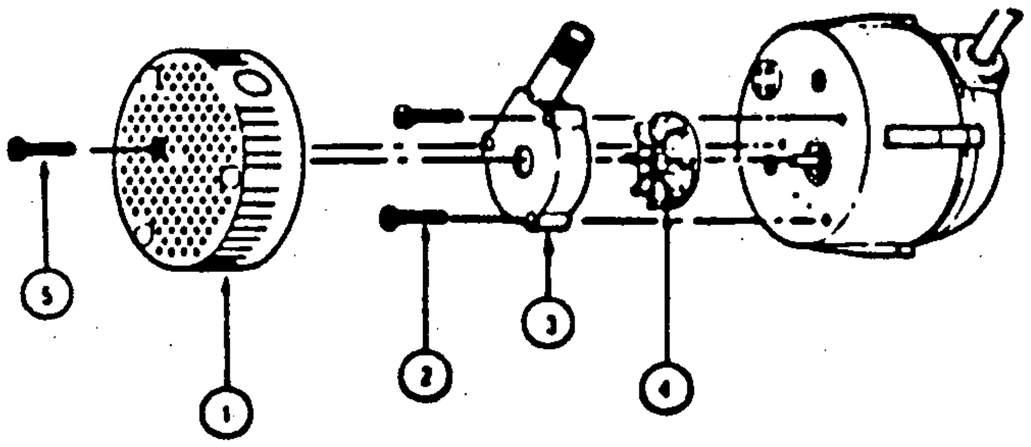
    a) Power supply and connections
    b) Is the pump below the coolant level in the tank?
    c) Is air trapped in the pump head?
    d) Is there sediment build-up over the pump inlet?

2. An Air lock or bubble will prevent the pump from pumping. Trapped air can usually be removed by:

    a) Turning the pump off and re-starting
    b) Make sure the discharge line is sloping upward to prevent the formation of air pockets.

3. If for any reason these operations do not restore the pump to full service, call your dealer or service technician.

4. Do not, in any case, open the sealed part of the pump or remove the screws. this will void your warranty.



REPLACEMENT PARTS LIST

ITEM NO.	DESCRIPTION
1	Screen
2	Screws 8-18 × 1"
3	Volute
4	Impeller Assembly
5	Screw 8-32 × 1-3/16"

GEARBOX MAINTENANCE
CS-350/FS-350 SAWS

NOTE: Before performing any maintenance on the gearbox, turn the disconnect switch to the "OFF" position and lock it out for safety.

1. The gearbox oil level should be checked weekly and the recommended oil added as needed to maintain the proper level.

2. Oil changes should be done as indicated in the section on gearbox lubrication (page 1.2).

3. Keep the gearbox casting clean to allow maximum heat dissipation.

4. Check the mounting bolts for tightness after the first three months of use and annually thereafter.

BARFEED MAINTENANCE

LUBRICATION: Pump oil into the two oilers on the carriage vise and on the vise shafts and screw. Make sure the vise screw is free of chips. Clean and oil the barfeed ways regularly.

LIMIT SWITCHES: The Carriage Forward and Carriage Retracted limit switches can be adjusted by loosening the socket head screws on either side of the switch and sliding the switch and base as needed. The switches should be adjusted so that the switch just 'makes' as the carriage makes contact with the stop at either end of its travel.

The Carriage Out-of-Stock switch can be adjusted by loosening the screw in the switch arm. The arm should be set so that more than 3/16" to 1/4" of vise movement causes the switch to open (Input #200 on the programmable controller goes off)

The Barfeed Cover switch is adjusted in the same manner as the Out-of-Stock limit switch. It should be set so that the Barfeed Cover must be fully closed for the saw to operate.

VACUUM MAINTENANCE

NOTE: Before doing any maintenance or service, be sure that the vacuum unit is is disconnected from the power source to prevent accidental starting.

CAST ALUMINUM AND SHEET METAL FITTINGS:

The cast aluminum blower impeller, as well as all sheet metal fittings are maintenance free and should not require any maintenance during the life of the unit. In a very dirty environment the blower impeller should be cleaned with a wire brush to prevent a build-up that could unbalance the blower. After cleaning the impeller, inspect for possible cracks or excessive wear, which can cause an imbalance.

MOTOR MAINTENANCE:

1. REMOVING DUST AND DIRT: Blow off the motor with low pressure air to remove dust or dirt. Air pressure above 50 PSI should not be used as high pressure may damage insulation and blow dirt under loosened tape. The operator performing this maintenance should always wear eye protection. Dust can cause excessive insulation temperatures.

2. LUBRICATION: Under normal conditions ball bearing motors will operate for five years without re-lubrication. Under continuous operation at higher temperatures (above 104°F ambient), or in dusty atmospheres, re-lubricate after one year. To re-lubricate the motor bearings, dis-assemble the motor and housings. The bearings are located in the end shields of the motor. Re-pack each bearing and fill the cavity in the back of the bearings 1/3 full with 'Alvania Grease #2' (Shell Oil Co.)

TROUBLE SHOOTING CHART

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTION
Unit will not operate	1. Improper electrical connection.	1. Turn the power off. Make sure the unit is wired per the electrical diagram.
	2. Loose blower wheel.	2. Disconnect the power. Turn the haed assembly over and spin the wheel by hand. Re-position and tighten the set screws as needed.
Low suction or flow rate	1. Incorrect Rotation	1. Turn the unit off and watch the motor cooling wheel rotation as it stops. Re-wire the motor if necessary.

TROUBLE SHOOTING CHART
(continued)

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTION
Low suction or flow rate	2. Suction hose too long	2. Place the unit closer to the saw and shorten the hose.
	3. Filter Plugged	3. See below

FILTER CLEANING:

If the air flow to the collector is reduced to the point that the pickup is marginal, the filter should be cleaned. The frequency of cleaning will depend on the size and type of material being picked up. Small and/or very fine chips may need cleaning more often.

Air flow and pickup will be retarded if the collection barrel is allowed to become too full. The level of dust/chips in the barrel should not be allowed to come closer than 12" from the bottom of the wire basket holder. Empty the barrel regularly. Check to see if chips have built up on the outside of the wire basket holder; brush these off with a brush. Do not use air; this may drive chips into the filter element. DO NOT use a wire brush; this may damage the filter element.

If the air flow is stii reduced after emptying the barrel and cleaning the wire basket, the filter element should be cleaned. Remove the wire basket from the underside of the lid, take out both pieces of the filter element, clean them, and re-assemble the unit.

Remove the wire basket by removing the four bolts holding it to the bottom of the lid. Remove the two pieces of filter from the wire basket holder. Place the filters in warm soapy water and gently swirl the filters so as to dislodge any chips. Be careful not to distort the filter shapes. Rinse the filters in clean water and air dry. Lightly oil them with a lightweight motor oil.

Re-assemble the filters and wire basket to the lid. Be sure there is a good seal between the lid and the wire basket.

If cleaning the filter does not restore the air flow, it may be necessary to replace the filter elements. Contact your dealer or the factory for the new elements (Part No. CS-9011).

SPARE PARTS LIST
CA-350/FA-350 SAWS

Drive Belt (2 Req'd): CS-3468

Standard Vise Wear Plate (4 Total): CS-2470

Indicator Lamp Bulbs: CS-5031

Power Fuses (1-3FU): Bussman Type KTK-R
(FA-350 saws) Gould Type ATMR
Littlefuse Type KLK_R

208V or 230V saws use 30A fuses; 460V saws use 12A

NOTE: Some early saws used Bussman type FNQ fuses.

Control Circuit Fuses (FA-350 saws):

4FU (Transformer): Bussman FNM 2 1/2
Gould TRM 2 1/2
Littlefuse FLM 2 1/2

5FU (Coolant Pump): Bussman FNM 1 1/4
(if equipped) Gould TRM 1 1/4
Littlefuse FLM 1 1/4

6FU (Worklight): Bussman AGC 3/10
(if equipped) Gould GGC 3/10
Littlefuse 3AG 3/10

8FU (Programmable controller): Bussman AGC 2
(FA-350A) Gould GGC 2
Littlefuse 3AG 2

9FU (Programmable Counter): Bussman AGC 3/10
(FA-350A) Gould GGC 3/10
Littlefuse 3AG 3/10

230V Motor Brake Fuses (If equipped): Bussman FWH-35
(Also work for 208V) Gould A25X35-4
Littlefuse KLB-35
(NOTE: 2 req'd)

460V Motor Brake Fuses (If equipped): Bussman FWH-15
Gould A50P15-1
Littlefuse KLB-15
(NOTE: 2 req'd)

Vise Screw Brush (2 Req'd): CS-2467

SPARE PARTS LIST
CS-350/FS-350 SAWS

Blade Brush: SP-47

Standard Vise Wear Plate (4 Total): CS-2470-S

Indicator Lamp Bulbs: CS-5031

Power Fuses (1-3FU): Bussman Type KTK-R
Gould Type ATMR
Littlefuse Type KLK-R

208V or 230V saws use 30A fuses; 460V saws use 12A

NOTE: Some early saws used Bussman type FNQ fuses.

Coolant Pump Fuse (CS-350 saws): Bussman FNM 1 1/4

Control Circuit Fuses (FS-350 saws):

4FU (Transformer): Bussman FNM 2 1/2
Gould TRM 2 1/2
Littlefuse FLM 2 1/2

5FU (Coolant Pump): Bussman FNM 1 1/4
Gould TRM 1 1/4
Littlefuse FLM 1 1/4

6FU (Worklight): Bussman AGC 3/10
(if equipped) Gould GGC 3/10
Littlefuse 3AG 3/10

8FU (Programmable controller): Bussman AGC 2
(FS-350A) Gould GGC 2
Littlefuse 3AG 2

9FU (Programmable Counter): Bussman AGC 3/10
(FS-350A) Gould GGC 3/10
Littlefuse 3AG 3/10

Gearbox Oil (5 qts/change): Mobilgear #634 or SHC 634

Vise Screw Brush (2 Req'd): CS-2467

SPARE PARTS LIST
CA-350/FA-350 SAWS
CS-350/FS-350 SAWS

CYLINDER SEAL KITS

CYLINDER P/N		SEAL KIT P/N
CS-2316	(Saw Vise Cylinder)	CS-2316-PRK
CS-4014	(Head Lift Cylinder)	
	Hydroline Cylinders	CS-4014-PRK
	Parker Cylinders	CS-4014P-PRK
CS-4014-1	Numatics Cylinders	CS-4014-1-PRK
CS-4015	(Carriage Feed Cylinder- 3 1/4" bore: handwheel is on side of barfeed)	CS-4016-PRK
CS-4016	(Carriage Vise Cylinder- Hydroline)	CS-4016-PRK
CS-4016-1	(Carriage Vise Cylinder- Parker)	CS-4016-1-PRK
CS-4016-2	(Carriage Vise Cylinder- Numatics)	CS-4016-2-PRK
CS-4034	(Carriage Feed Cylinder- Parker) 2 1/2" bore: handwheel is at end of barfeed	CS-4014P-PRK
CS-4034-1	(Carriage Feed Cylinder- Numatics)	CS-4014-1-PRK

TROUBLESHOOTING GUIDE - GENERAL

1. MACHINE WILL NOT START

   a) Check the main and control fuses.
   b) Check your in-house wiring.
   c) Check that the incoming voltage matches the saw wiring.
   d) Check the motor brake fuses (if equipped).
   e) Overload relay tripped-fix cause and reset.

2. MOTOR WILL NOT START AND IS BLOWING FUSES

   a) Check for a short in the supply wiring.
   b) Check for a short in the motor windings or leads.
   c) Check for proper fuses or circuit breakers.

3. WORKLIGHT WILL NOT LIGHT (if equipped)

   a) Check the fuse inside the electrical enclosure (6FU).
   b) Check the bulb.

4. BLADE STRIPS TEETH

   a) Too many teeth, causing each tooth to overload.
   b) Blade too coarse.
   c) Head feed pressure too high.
   d) Blade speed too slow.
   e) Rectangular pieces should be cut on the shortest side.
   f) Vise clamping pressure too low.
   g) Head feed speed too high.
   h) Wrong blade for the job.

5. CROOKED CUTS

   a) Feed pressure too high.
   b) Wrong blade for the application.
   c) The blade grind may be worn on one side.
   d) Head feed speed too fast.
   e) Workpiece not squarely clamped in vise.
   f) The adjusting collar may be loose in the head support, allowing the head to shift on the pivot bar.

6. COOLANT WILL NOT FLOW

   a) Check the coolant level in the tank.
   b) Check the pump for blockage-clean if necessary (Refer to the maintenance sheets on the coolant pumps or spray mist units for details.
   c) Check for line blockage.
   d) Check the coolant pump fuse (5FU-flood coolant units)
   e) Make sure the flow valves are open (spray mist units)
   f) Make sure the coolant switch is on (if equipped)

TROUBLESHOOTING: M & PV SAWS

7. BLADE WILL NOT START

   a) Overload relay tripped - fix cause and reset.
   b) Safety switch in the handle not making contact (F-series saws only).

8. VISE WILL NOT CLAMP (PV saws)

   a) Air valve not releasing as the head is lowered.
   b) Make sure the air supply is on and thr pressure regulator is set properly.

TROUBLESHOOTING: SEMI-AUTOMATIC SAWS

9. CYCLE LIGHT WILL NOT LIGHT

   a) Check the light bulb.
   b) Make sure the Head Up limit switch is tripped.
   c) Blade brake is still energized (if equipped)

10. CYCLE WILL NOT START

   a) Blade brake is still energized (if equipped)
   b) Timer 2TR is still energized to stop the last cycle.
   c) The Head Down limit switch is still tripped.

11. HEAD WILL NOT FEED

   a) The Head Down limit switch is still tripped.
   b) The Feed Speed valve is closed.
   c) The Feed Pressure is too low for the application.
   d) Make sure the air supply is on.
   e) The Head Raise solenoid is still energized.

12. HEAD WILL NOT RAISE

   a) The Head Down limit switch is not tripped.
   b) The Head Feed solenoid is still energized.
   c) The Head Up limit switch is still tripped.
   d) Make sure the air supply is on.
   e) Air pressure too low.

13. VISE WILL NOT CLAMP

   a) Solenoid valve is not energizing.
   b) Make sure the air supply is on.
   c) Air pressure too low.
   d) Check lines and fittings for leaks.
   e) Check seals for tears.

TROUBLESHOOTING: SEMI-AUTOMATIC SAWS (continued)

14. VISE WILL NOT RELEASE

a) Solenoid valve is not releasing.
b) Timer 2TR is not energizing to stop the cycle.
c) The Head Up limit switch is not tripped.

TROUBLESHOOTING: AUTOMATIC SAWS

15. CYCLE WILL NOT START

a) Make sure the 'Operation' switch is in the 'Auto' position.
b) The cycle will not start if the blade brake is on
c) Make sure the Head Up limit switch is tripped.
d) Make sure there is stock in the barfeed and that the carriage vise is set to within 3/32 to 1/8" of the stock to keep the Out of Stock limit switch tripped.
e) The barfeed cover must be closed.
f) The batch counter cannot read '0'

16. HEAD WILL NOT FEED

a) The Head Down limit switch is still tripped.
b) The Feed Speed valve is closed.
c) The Feed Pressure is too low for the application.
d) Make sure the air supply is on.
e) The Head Raise solenoid is still energized.
f) The blade brake is still energized (if equipped).
g) The Carriage Forward limit switch is not tripped.
h) The Batch Counter has reached its preset value.
i) The Stroke Counter has not reached its preset.

17. HEAD WILL NOT RAISE

a) The Head Down limit switch is not tripped.
b) The Head Up limit switch is not releasing.
c) The Head Feed solenoid is still energized.
d) Make sure the air supply is on.
e) The air pressure is too low.

18. SAW VISE WILL NOT CLAMP

a) The Carriage Forward limit switch is not tripped
b) The blade brake is still energized (if equipped).
c) The Saw Vise Clamp solenoid is not energized.
d) Make sure the air supply is on.
e) The clamping pressure is too low.
f) Check lines and fittings for leaks.
g) Check seals for tears.

19. SAW VISE WILL NOT OPEN

a) The Saw Vise Clamp solenoid is still energized.
b) The Head Up limit switch is not tripped.
c) The Carriage Retracted limit switch was not tripped before feeding the stock.
d) The saw did not finish making the cut (The Head Down limit switch was not tripped).
e) The saw vise was manually clamped tight (No room for the cylinder to extend or retract).

20. CARRIAGE WILL NOT RETRACT

a) The Carriage Forward limit switch is not tripped
b) The blade brake is still energized
c) The Carriage Vise Clamp solenoid is energized.
d) Make sure the air supply is on.
e) The air pressure is too low.
f) The saw head is not feeding at the start of a cycle.
g) The Carriage Retracted limit switch is tripped.
h) The Stroke Counter has reached its preset value.
i) The Carriage Feed solenoid is still energized.
j) The Carriage Retract solenoid is not energized.

21. CARRIAGE WILL NOT FEED

a) The Carriage Forward limit switch is tripped
b) The Saw Vise Clamp solenoid is energized.
c) Make sure the air supply is on.
d) The air pressure is too low.
e) The Carriage Retract solenoid is energized.
f) The Head Up limit switch is not tripped.

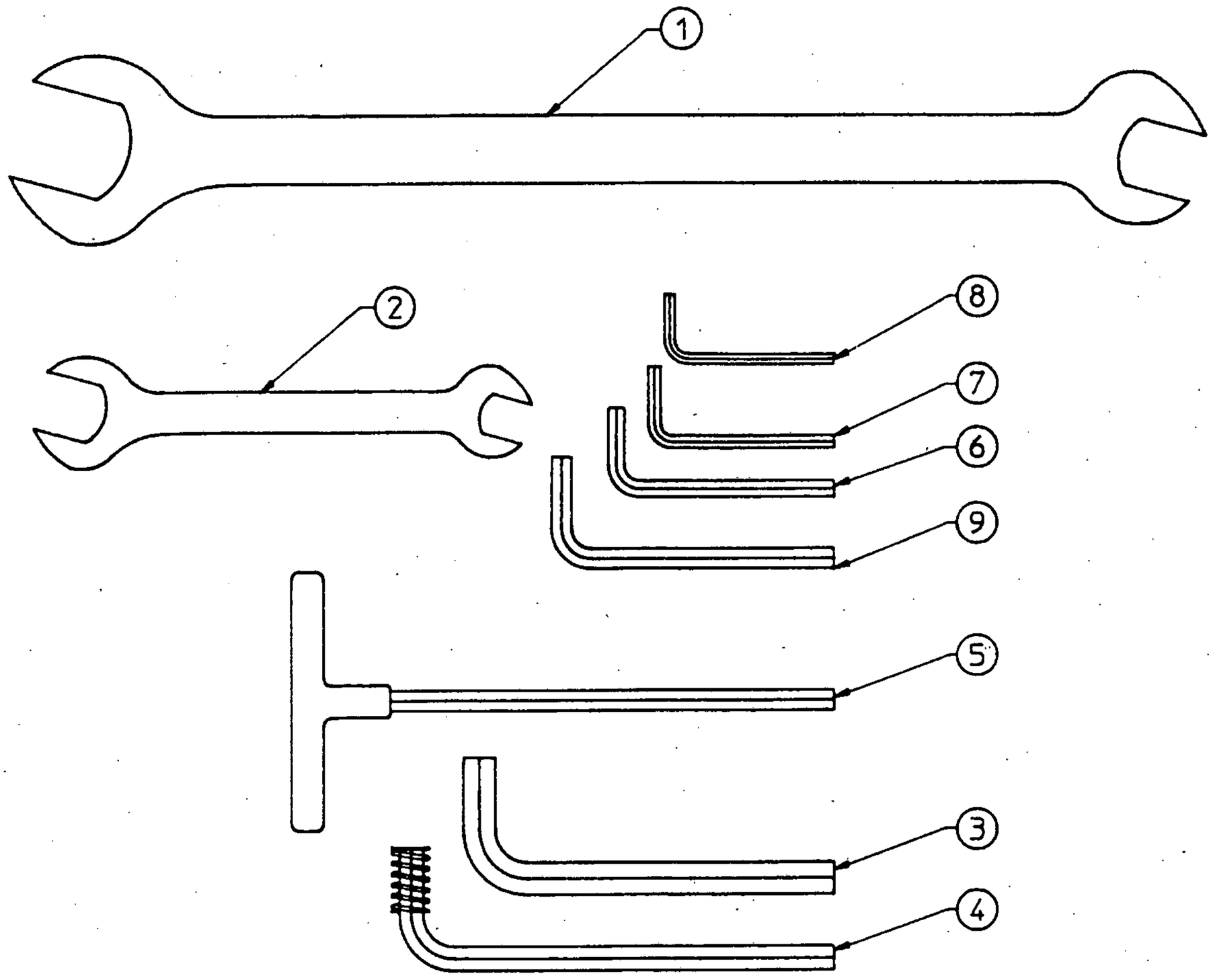
22. CARRIAGE VISE WILL NOT CLAMP

a) The Head Up limit switch is not tripped.
b) The Carriage Retract solenoid is energized.
c) The saw did not finish making the cut (The Head Down limit switch was not tripped).
d) The Carriage Retracted limit switch is not tripped
e) Make sure the air supply is on.
f) The air pressure is too low.

23. CARRIAGE VISE WILL NOT OPEN

a) The Carriage Vise Clamp solenoid is not releasing
b) The Saw Vise Clamp solenoid is not energized.
c) The Carriage Retract solenoid is still energized.
d) The Carriage Vise is manually clamped tight (No room for the cylinder to extend or retract).

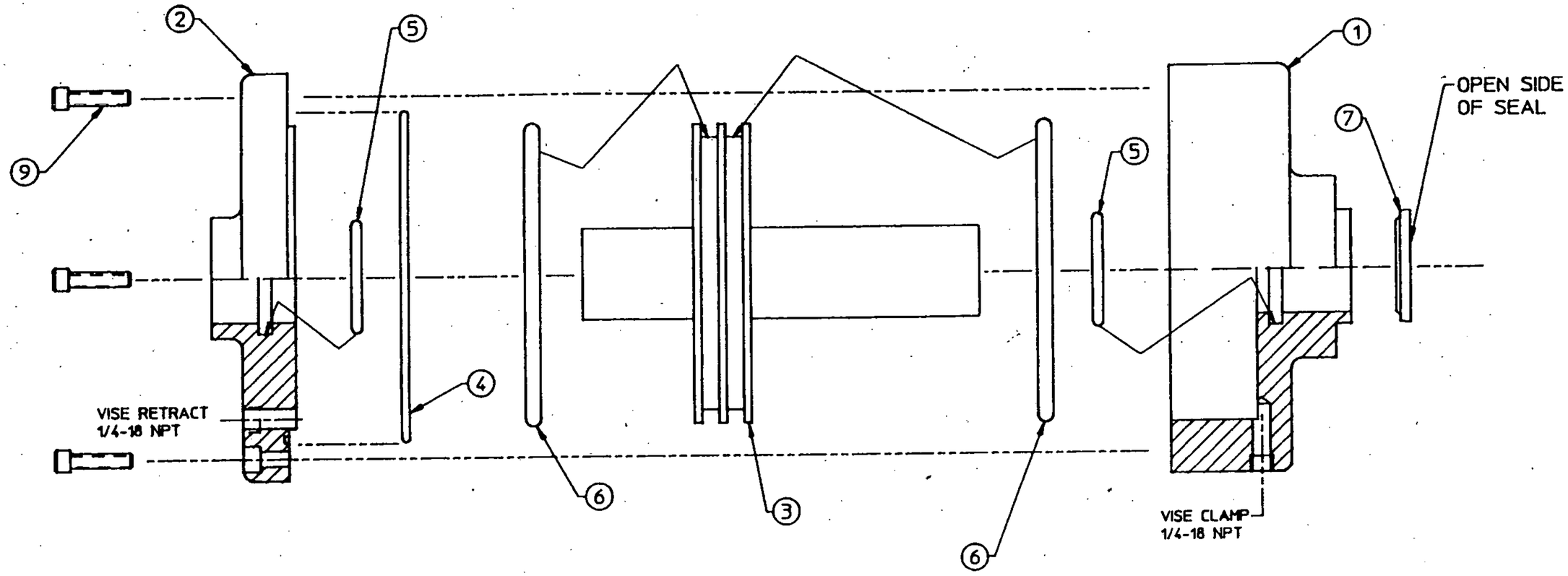
TOOL KIT
CIRCULAR SAWS



1	CS-1503	1 1/2 x 1 5/8 OPEN END WRENCH
2	CS-1504	5/8 x 3/4 OPEN END WRENCH
3	CS-1505	1/2" HEX KEY
4	CS-1506	3/8" HEX KEY W/SPRING
5	CS-1507	3/8" HEX KEY TEE WRENCH
6	CS-1508	1/4" HEX KEY
7	CS-1509	3/16" HEX KEY
8	CS-1510	5/32" HEX KEY
9	CS-1511	5/16" HEX KEY

CS-1500 FS SERIES AUTO/SEMI-AUTO	CS-1500-1 FA SERIES AUTO/SEMI-AUTO	CS-1500-2 FS/CS SERIES PV/MANUAL	CS-1500-3 FA/CA SERIES PV/MANUAL
CS-1504	CS-1503	CS-1507	CS-1503
CS-1505	CS-1504		CS-1506
CS-1511	CS-1505		
CS-1507	CS-1506		
CS-1508	CS-1508		
CS-1509	CS-1509		
CS-1510	CS-1510		
	CS-1511		

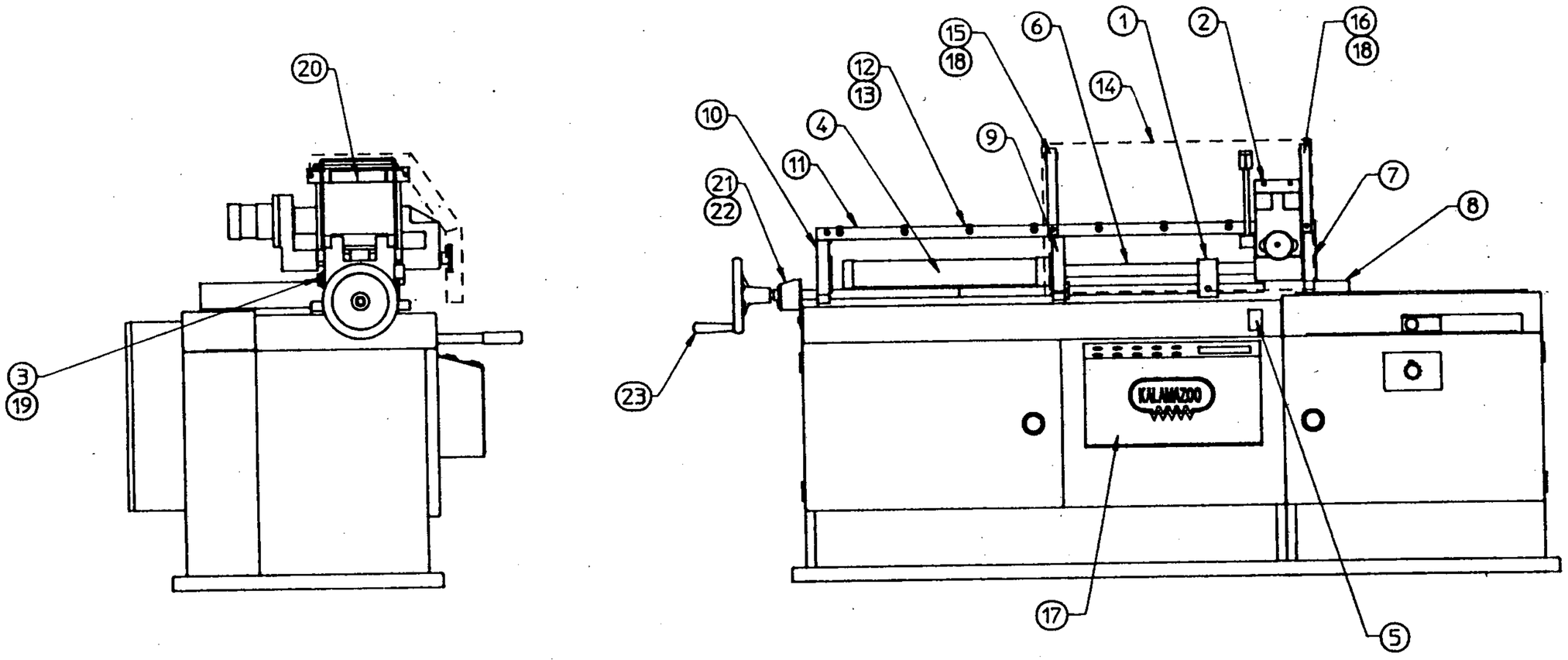
VISE CYLINDER ASSEMBLY
CIRCULAR SAWS



1	CS-2310	VISE CYLINDER BODY
2	CS-2311	VISE CYLINDER CAP
3	CS-2312	VISE CYLINDER PISTON (INCLUDES ROD)
4	CS-2313	O-RING: PARKER #2-160 N674-70
5	CS-2314	O-RING: PARKER #2-325 N674-70
6	CS-2315	O-RING: PARKER #2-426 N674-70
7	CS-2315A	ROD WIPER: PARKER #8600-0150-4181
8		
9		1/4-20 x 1 SHCS (6)

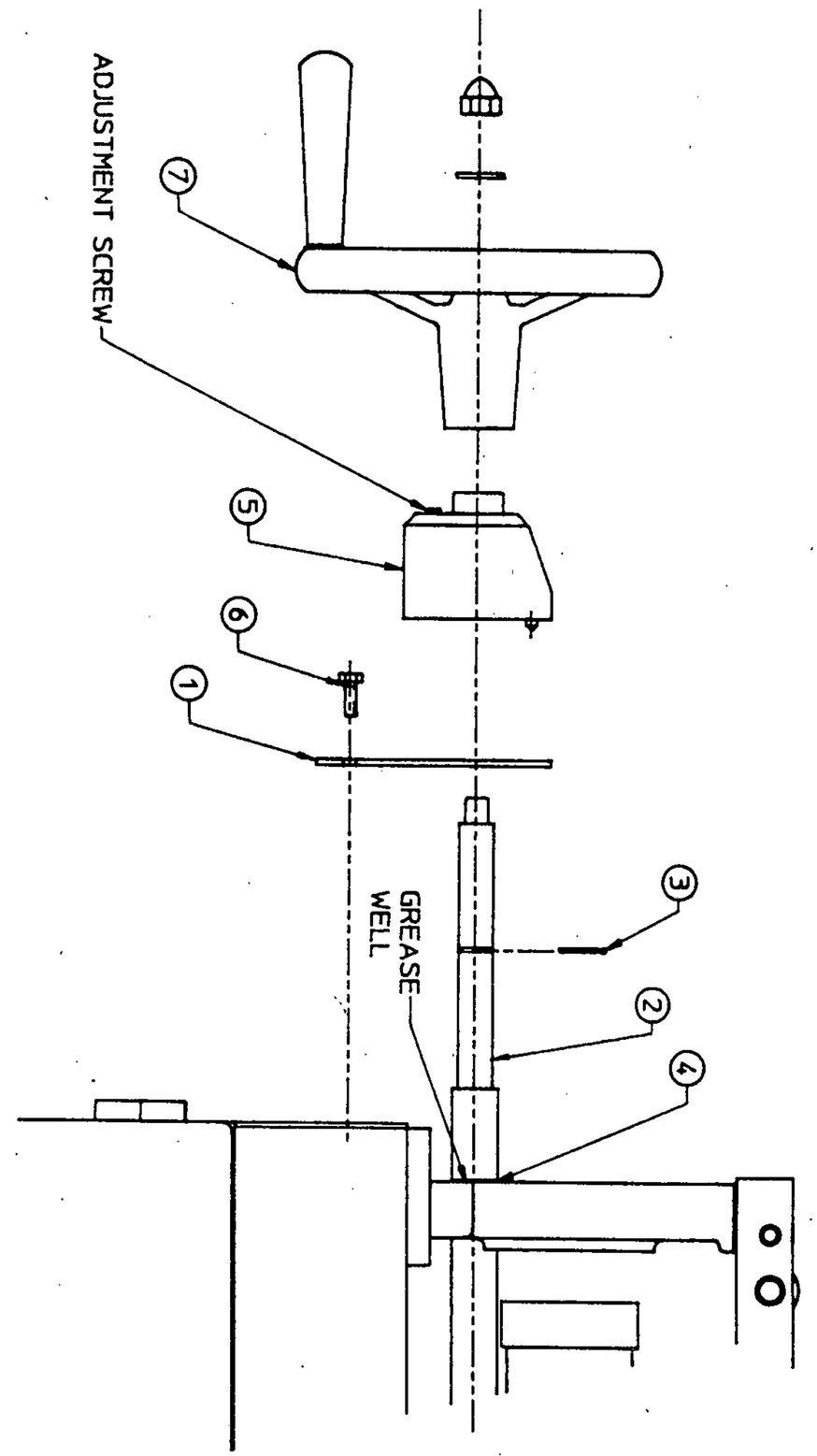
CS-2316-PRK	COMPLETE SEAL KIT: INCLUDES ITEMS 4, 5, 6, AND 7
CS-2316	COMPLETE CYLINDER ASSEMBLY

NOTE: CYLINDERS BUILT BEFORE MAY, 1991 HAVE 1/8-27 NPT PORTS



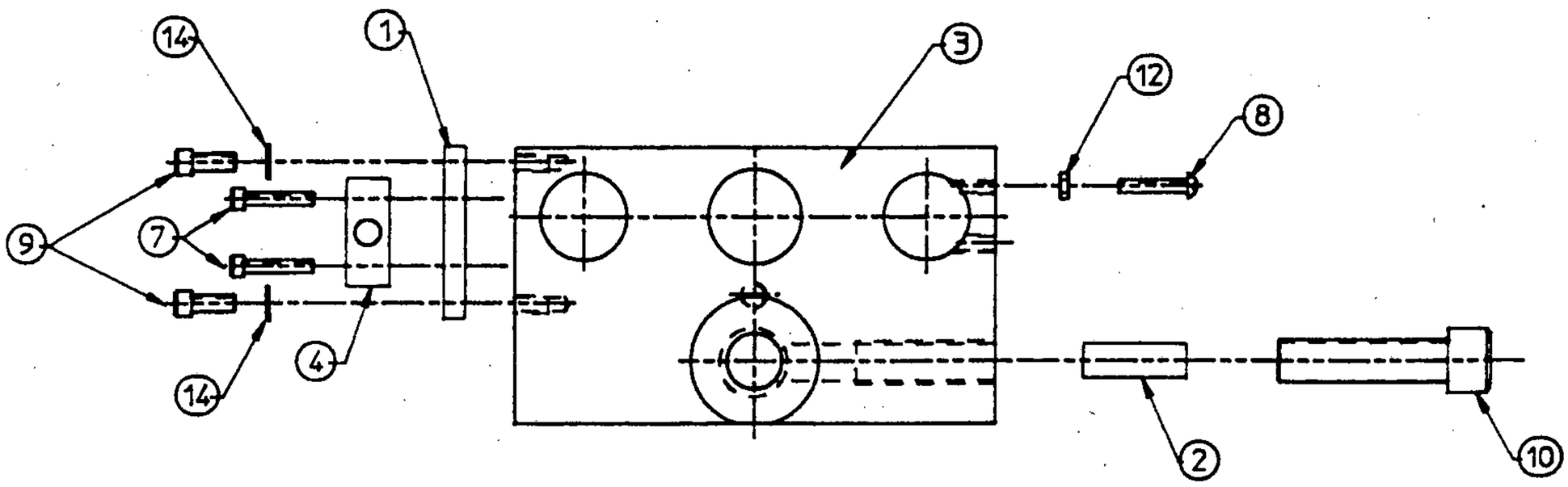
1		BACKSTOP ASSY (SEE FIG. 3.5)
2		CARRIAGE ASSY (SEE FIG. 3.6)
3	CS-3530	SWITCH MOUNT PLATE (2)
4	CS-4034	2 1/2 BORE x 18 STROKE CYLINDER
5	CS-5046	LIMIT SWITCH
6	CS-6150	CARRIAGE BEARING SHAFT
7	CS-6300	BARFEED WAY SUPPORT
8	CS-6305	WAY SUPPORT BASE
9	CS-6310	FRONT CYLINDER SUPPORT
10	CS-6320	REAR CYLINDER SUPPORT
11	CS-6330	ROLLER SUPPORT RAIL (2)
12	CS-6335	BARFEED ROLLER (8)
13	CS-6340	BRONZE BEARING (16)
14	CS-6770	BARFEED COVER ASSEMBLY
15	CS-6774	REAR COVER SUPPORT
16	CS-6775	FRONT COVER SUPPORT
17		OPERATOR CONSOLE (SEE FIG. 8.6)
18	CS-6776	BUMPER (2)
19	V20-6105	LIMIT SWITCH (2)
20	CS-6335A	OVERHEAD ROLLER ASSY. (SEE FIG. 3.7)
21	CS-6805	LENGTH COUNTER BRACKET
22	CS-6815	LENGTH COUNTER
23	CS-6440	BACKSTOP HANDWHEEL

LENGTH COUNTER PARTS
CIRCULAR SAWS



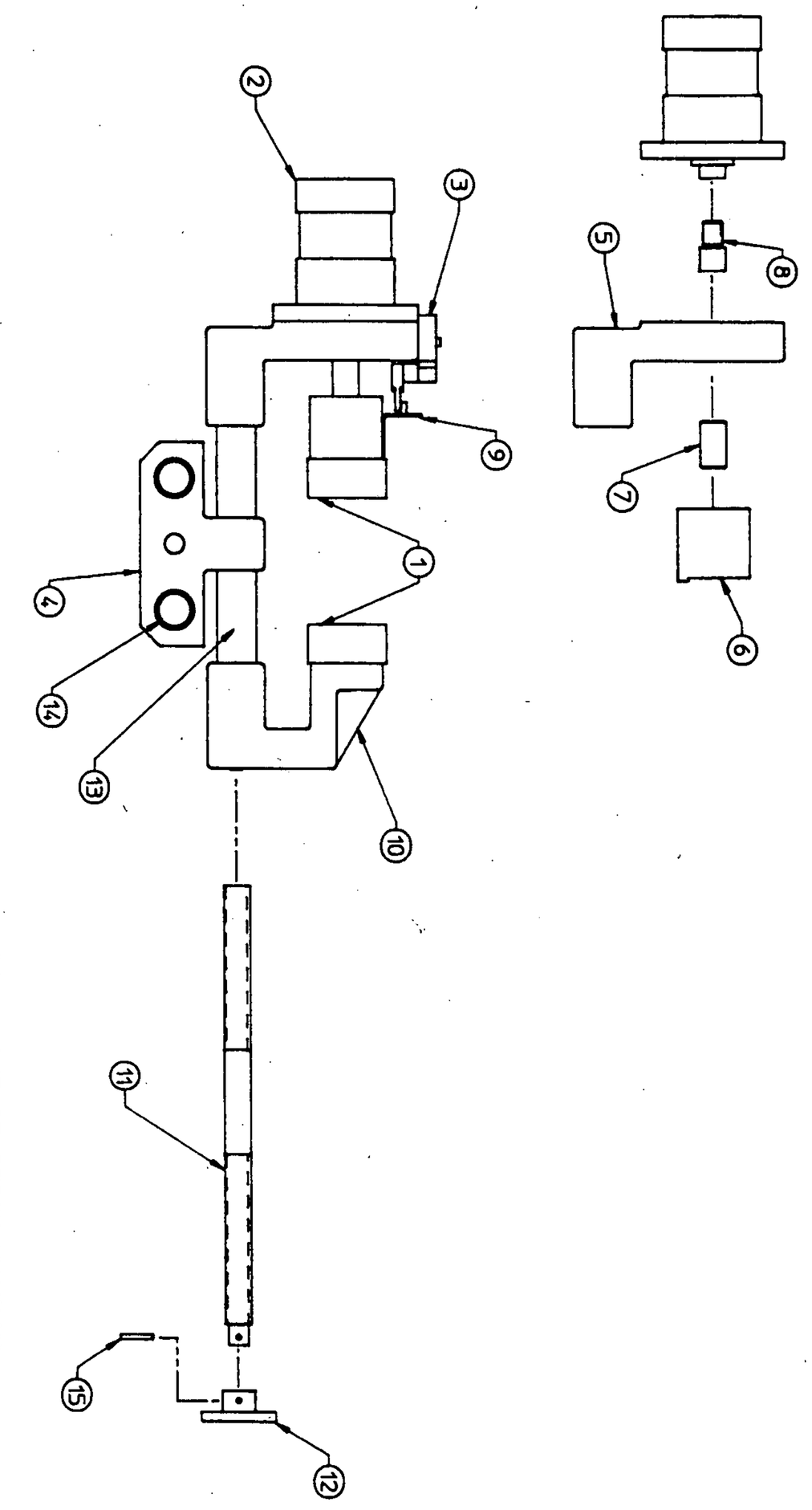
1	CS-6805	LENGTH COUNTER BRACKET
2	CS-6810	BACKSTOP SCREW
3	CS-6811	SNAP RING: TRUARC #5160-75
4	CS-6812	SNAP RING: TRUARC #5160-98
5	CS-6815	COUNTER: SIKO #0502-000-20-CCW-.750
6		1/4-20UNCx3/4 SELF TAPPING HEX HEAD SCREW (2)
7	CS-6440	BACKSTOP HANDWHEEL

BACKSTOP ASSEMBLY
CIRCULAR SAWS



1	CS-3530	SWITCH MOUNTING PLATE
2	CS-6432	INSERT
3	CS-6400-1	BACKSTOP
4	V20-6105	LIMIT SWITCH: OMRON #D4C-1631
5		
6		
7		#10-24x7/8 SOCKET HEAD CAP SCREW (2)
8		#10-24x1 ROUND HEAD MACHINE SCREW (BRASS)(2)
9		1/4-20 x 3/4 SOCKET HEAD CAP SCREW (2)
10		5/8-11x2 1/2 SOCKET HEAD CAP SCREW
11		
12		#10-24 BRASS HEX NUT (2)
13		
14		1/4 FLAT WASHER (MODIFIED) (2)

BARFEED CARRIAGE
CIRCULAR SAWS



1	CS-6252	VISE WEAR PLATE (2) (FA-350A ONLY)
	CS-6252-S	VISE WEAR PLATE (2) (FS-350A ONLY)
2	CS-4016	CARRIAGE VISE CYLINDER
3	CS-5046	LIMIT SWITCH
4	CS-6100-1	BARFEED CARRIAGE
5	CS-6200-1	CARRIAGE VISE REAR JAW
6	CS-6210	MOVING VISE BLOCK
7	CS-6215	VISE BLOCK GUIDE PIN (2)
8	CS-6220	VISE CYLINDER EXTENSION
9	CS-6230	OUT OF STOCK TRIGGER
10	CS-6250-1	CARRIAGE VISE FRONT JAW
11	CS-6255	CARRIAGE VISE SCREW
12	CS-6260	BARFEED HANDWHEEL
13	CS-6270-1	VISE SHAFT (2)
14	V21-3234	BRONZE BEARING (4)
15		3/16 x 1 1/4 ROLL PIN

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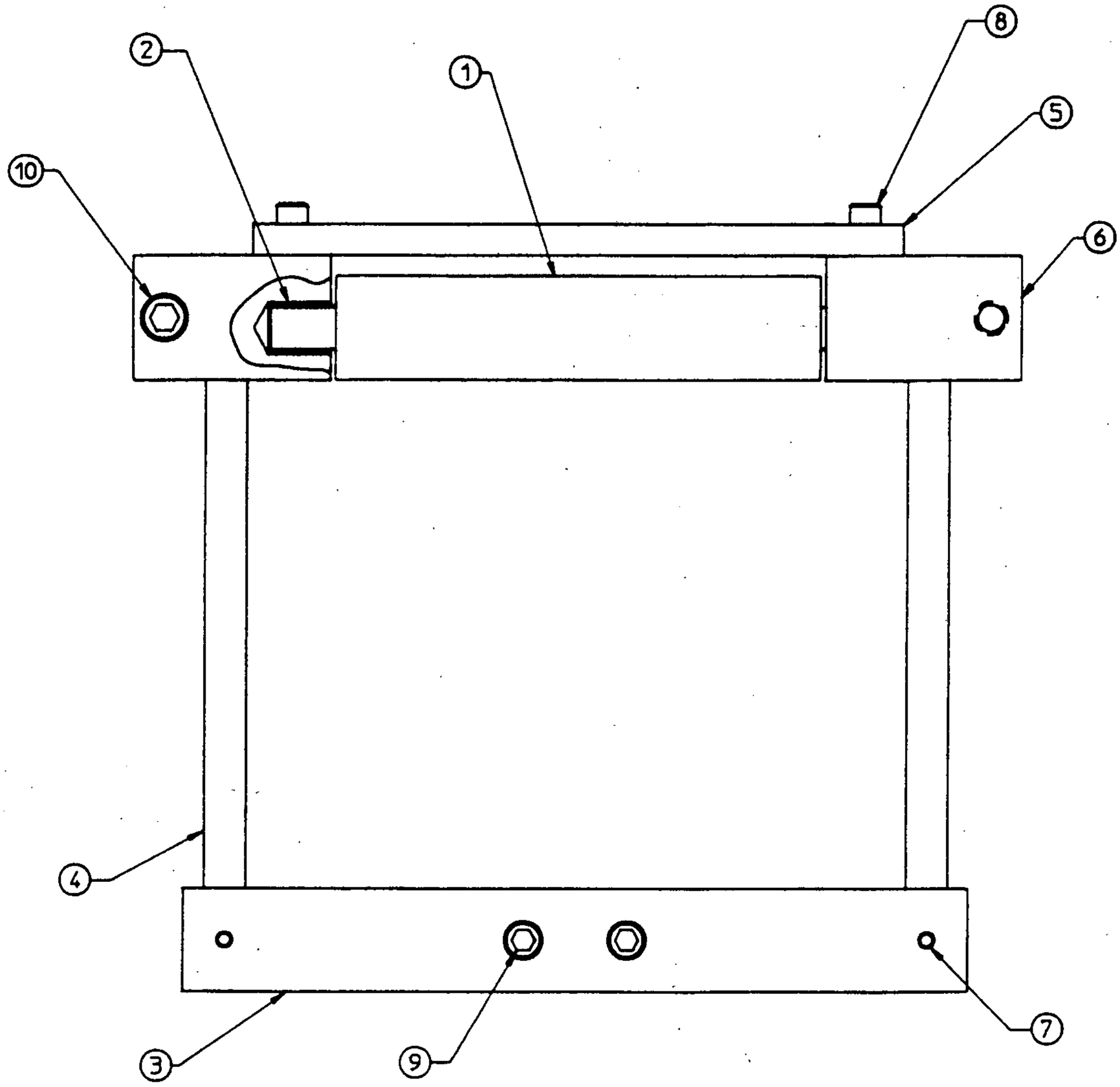
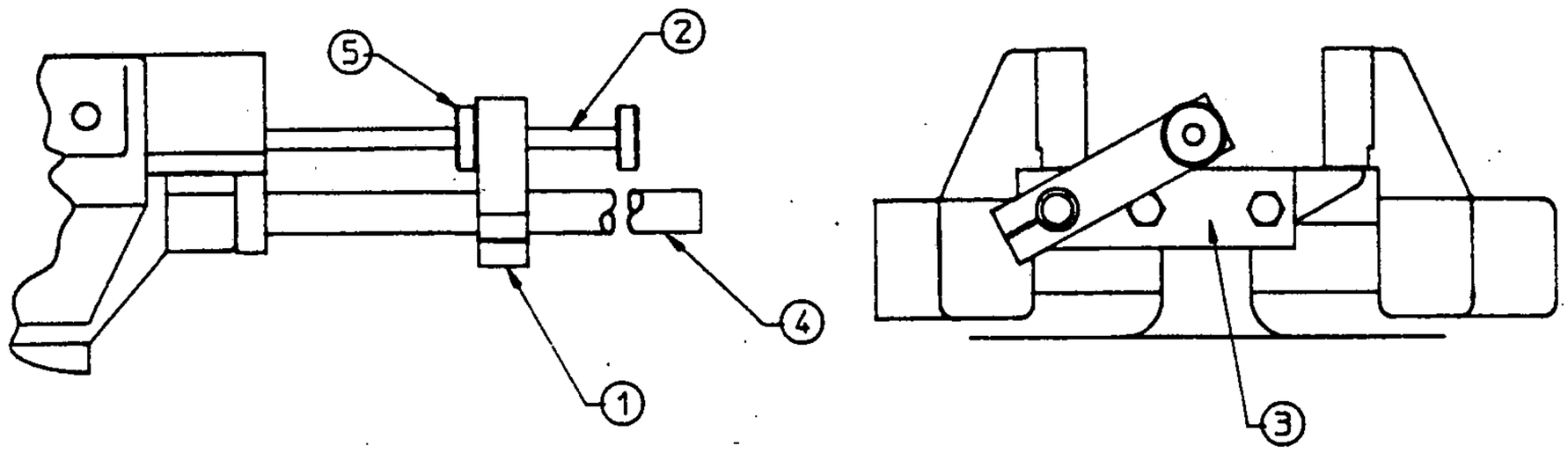
BARFEED CARRIAGE
OVERHEAD ROLLER
CIRCULAR SAWS



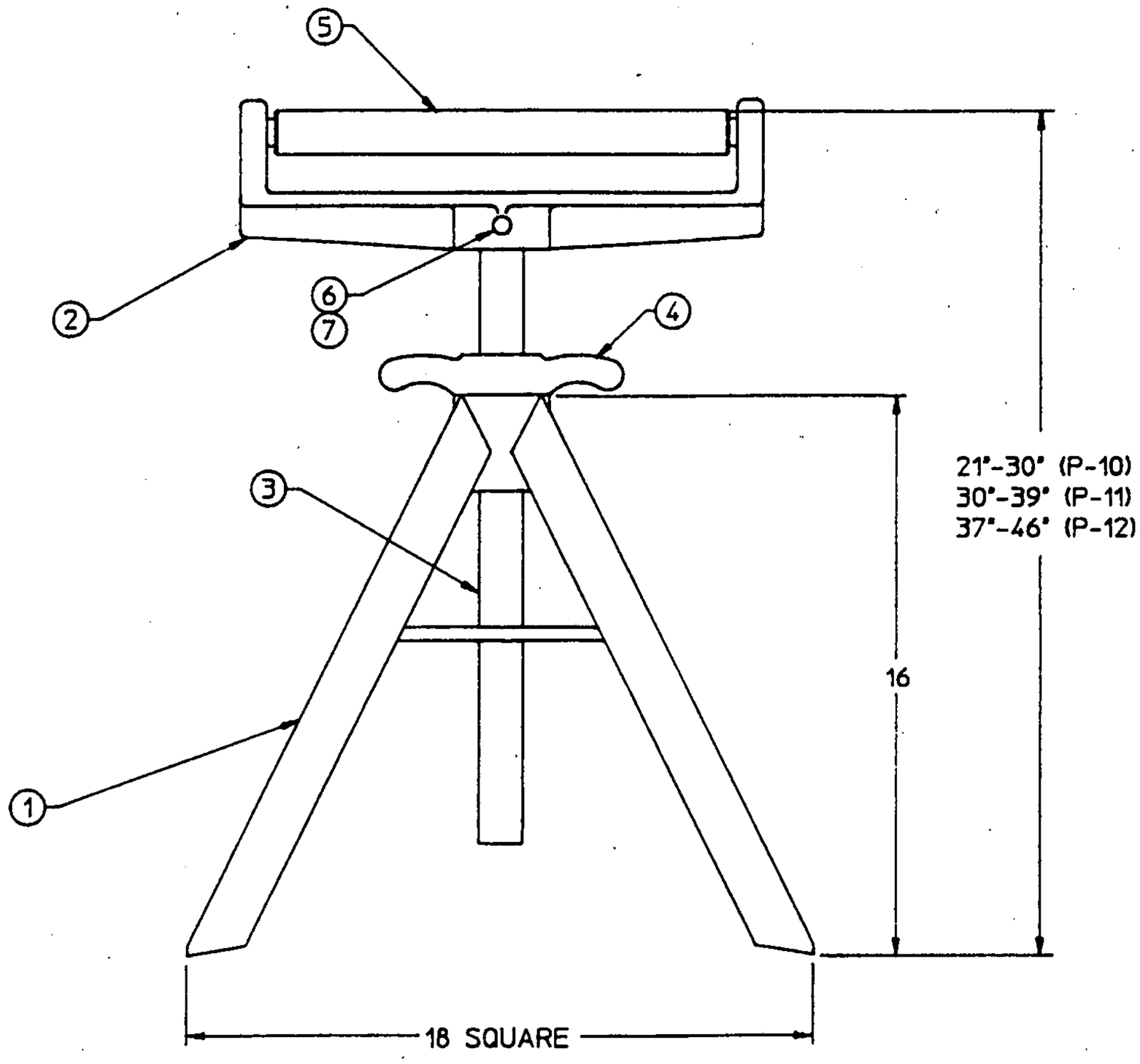
1	CS-6335	BARFEED ROLLER
2	CS-6340	BRONZE BEARING: BOSTON #P50-6 (2)
3	CS-6550	OVERHEAD ROLLER SUPPORT PLATE
4	CS-6555	OVERHEAD ROLLER GUIDE (2)
5	CS-6556	OVERHEAD ROLLER TOP PLATE
6	CS-6558	OVERHEAD ROLLER SUPPORT BLOCK (2)
7		1/8 x 1 1/4 ROLL PIN (2)
8		1/4-20 x 1/2 SHCS (4)
9		5/16-18 x 2 1/4 SHCS (2)
10		3/8-16 x 1 1/4 SHCS (2)

STOCK STOP ASSEMBLY
CIRCULAR SAWS

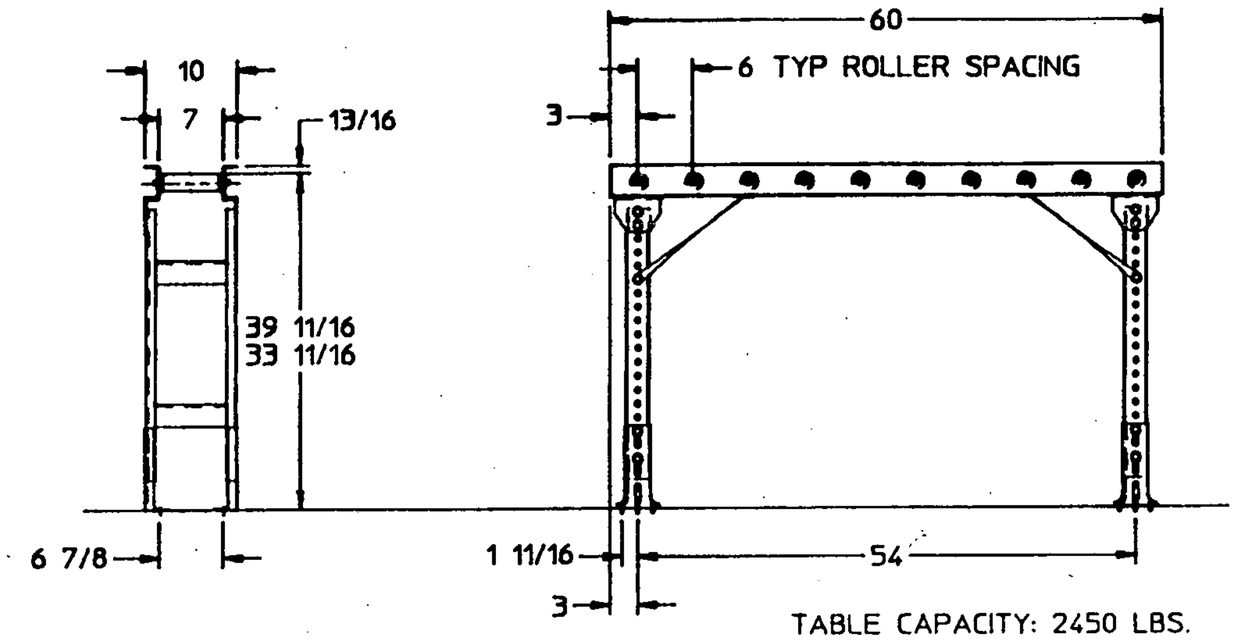


	CS-7000	COMPLETE ASSEMBLY
1	CS-7010	STOP BLOCK
2	CS-7015	STOP ROD ASSY.
3	CS-7030	STOP SUPPORT
4	CS-7040	STOP SHAFT
5	AB-18115	ADJUSTING KNOB

"P" SERIES STOCK STANDS

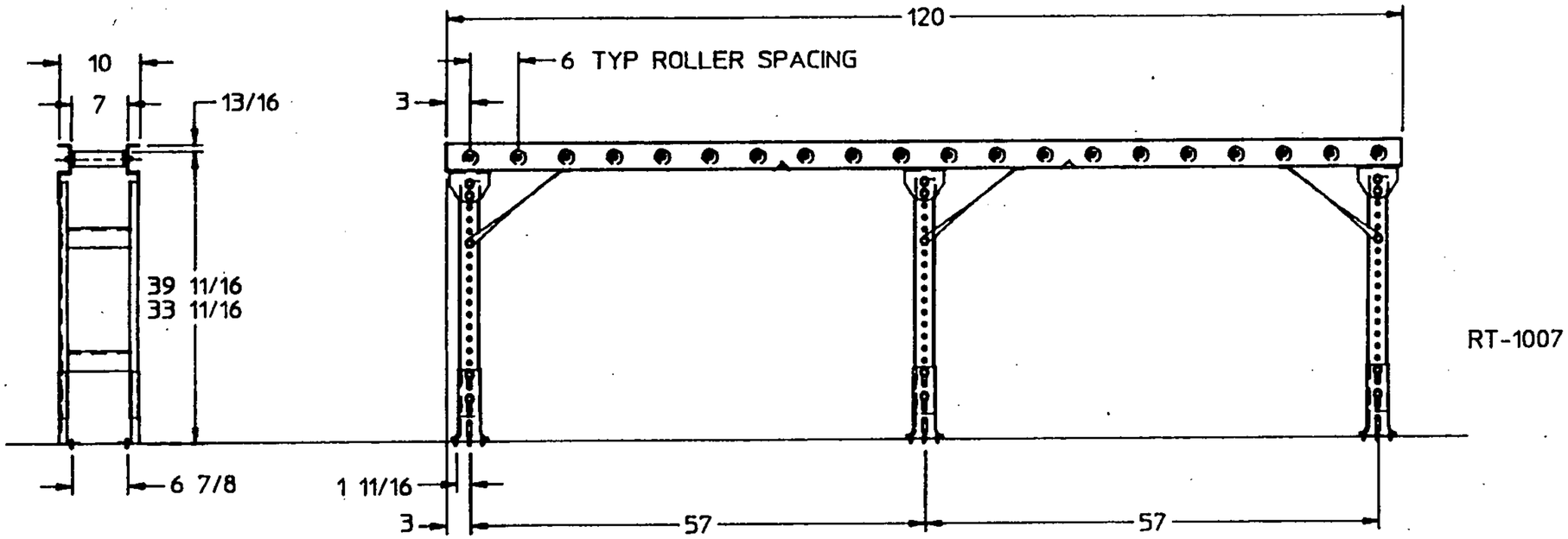


1	P-1001	STOCK STAND BASE
2	P-2	STOCK STAND YOKE
3	P-103	STOCK STAND NUT
4	P-104	STOCK STAND SCREW: 21°-30° STANDS
	P-114	STOCK STAND SCREW: 30°-39° STANDS
	P-124	STOCK STAND SCREW: 37°-46° STANDS
5	P-5	STOCK STAND ROLLER
6		1/2 x 3 STEEL CLEVIS PIN
7		1/8 x 1 COTTER PIN



RT-0507

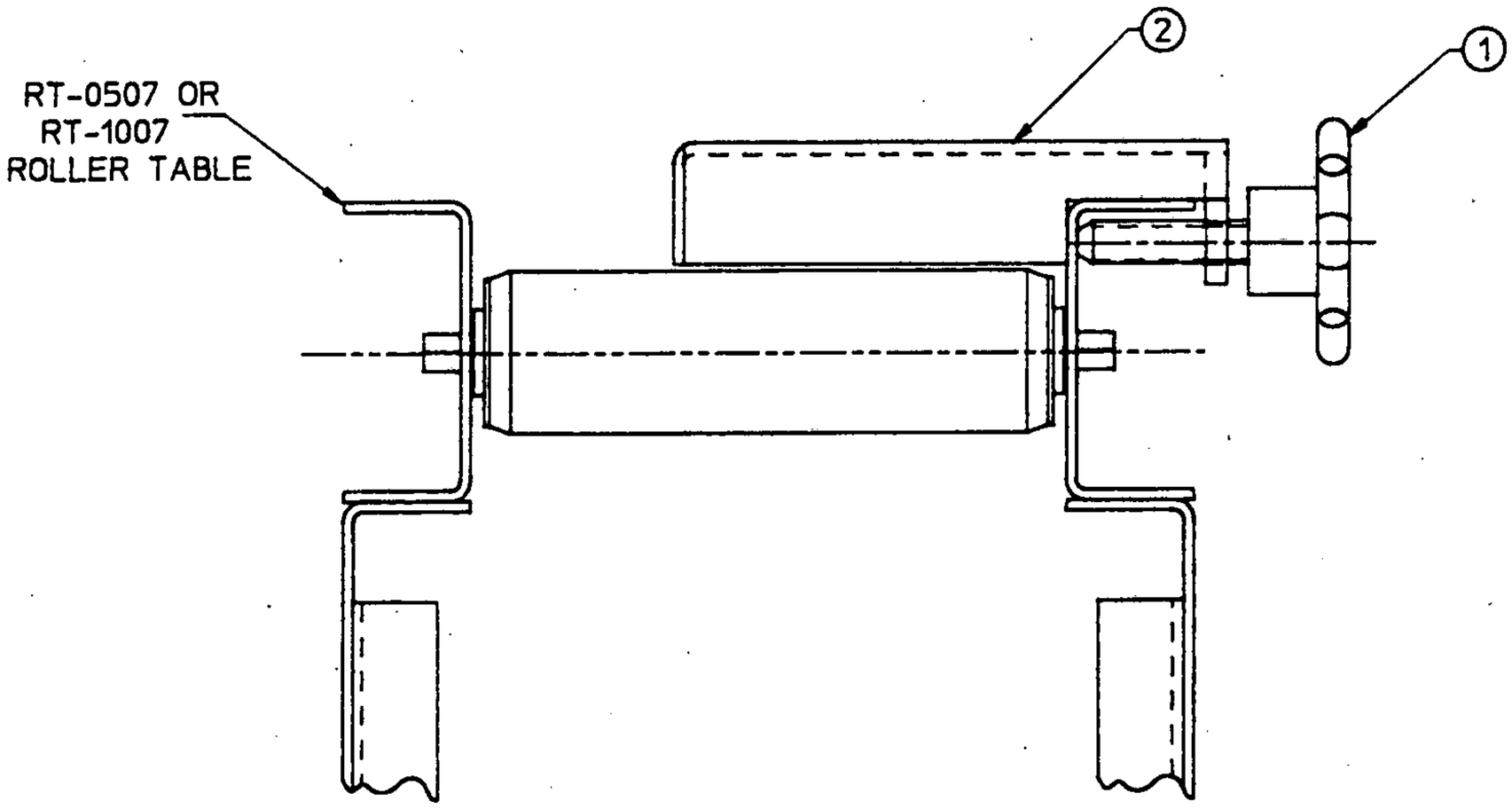
TABLE CAPACITY: 2450 LBS.



RT-1007

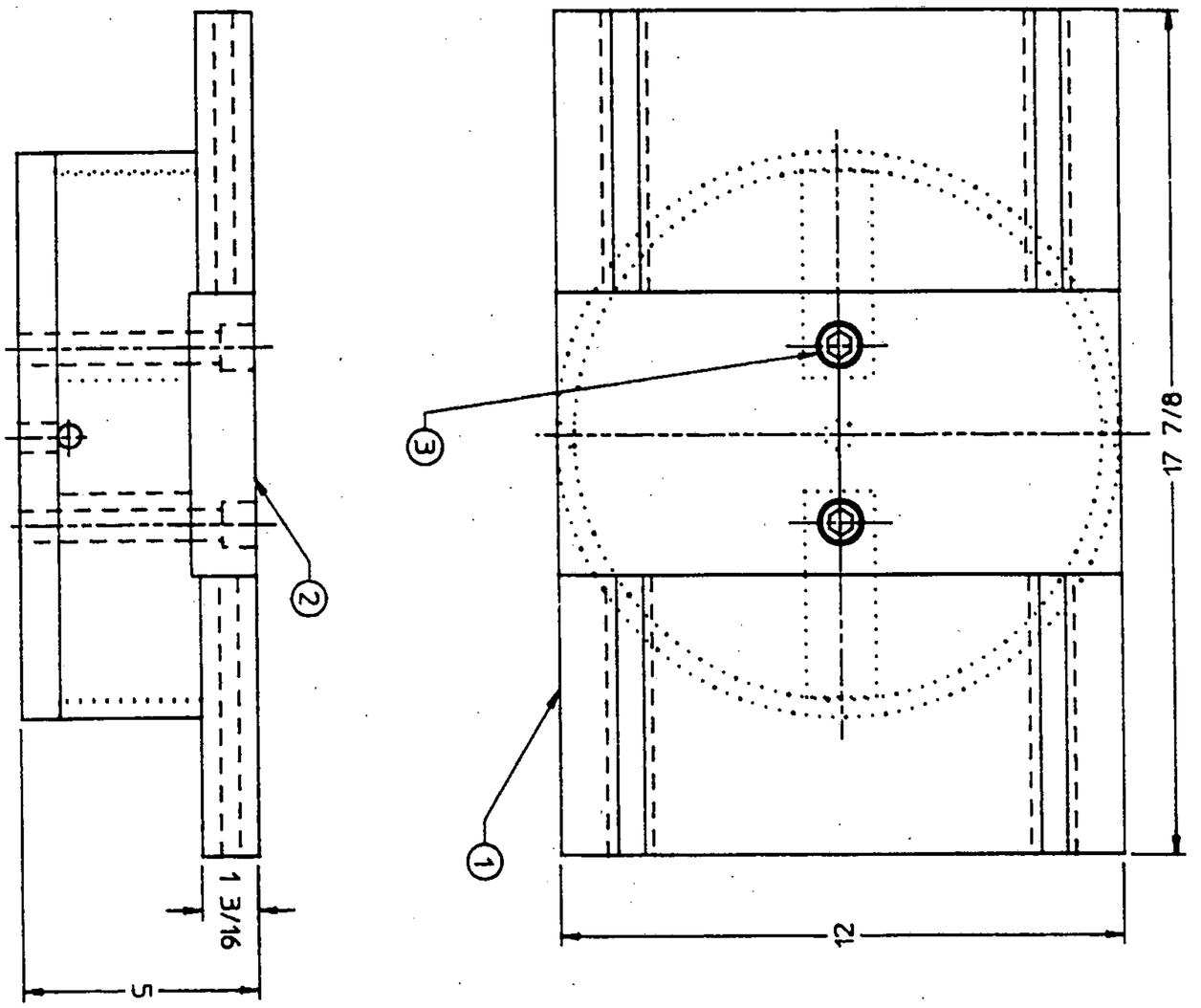
TABLE CAPACITY: 4900 LBS.

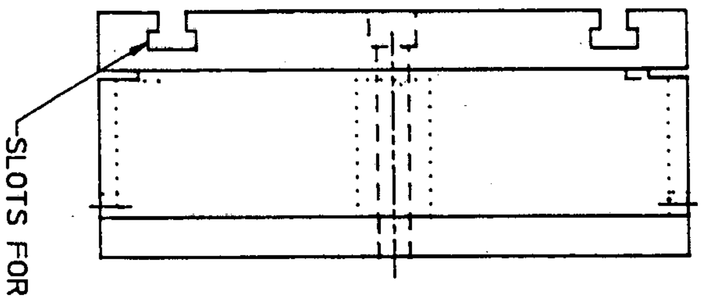
ROLLER TABLE
STOCK STOP
RTS-07



1	8C-1915	TIGHTENER KNOB
2	RTS-071	STOCK STOP WELDMENT

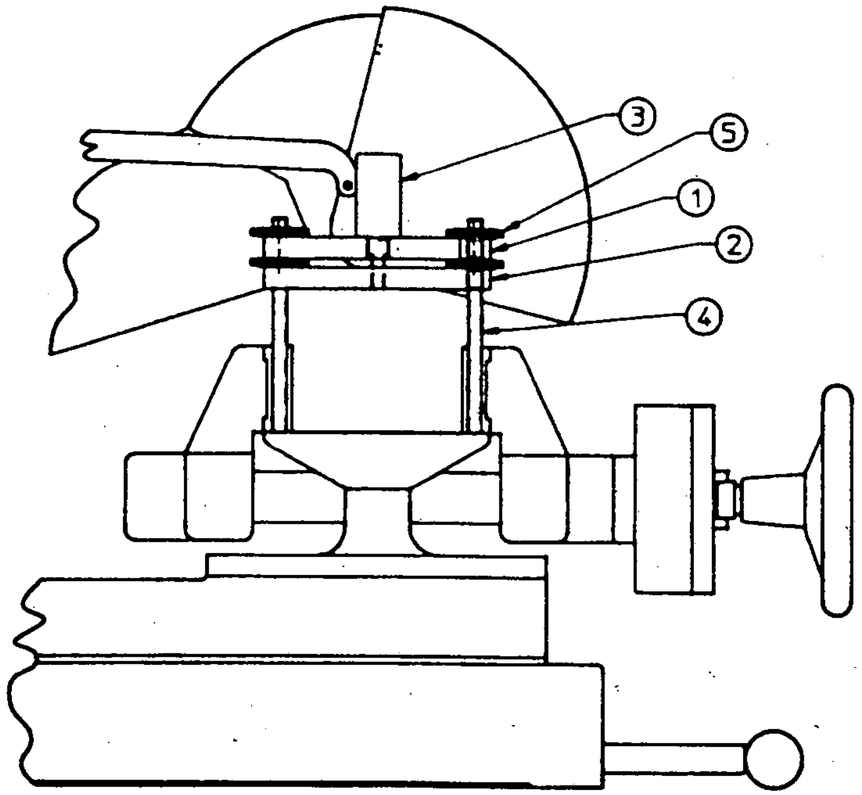
FIXTURE MOUNTING TABLE
CIRCULAR SAWS

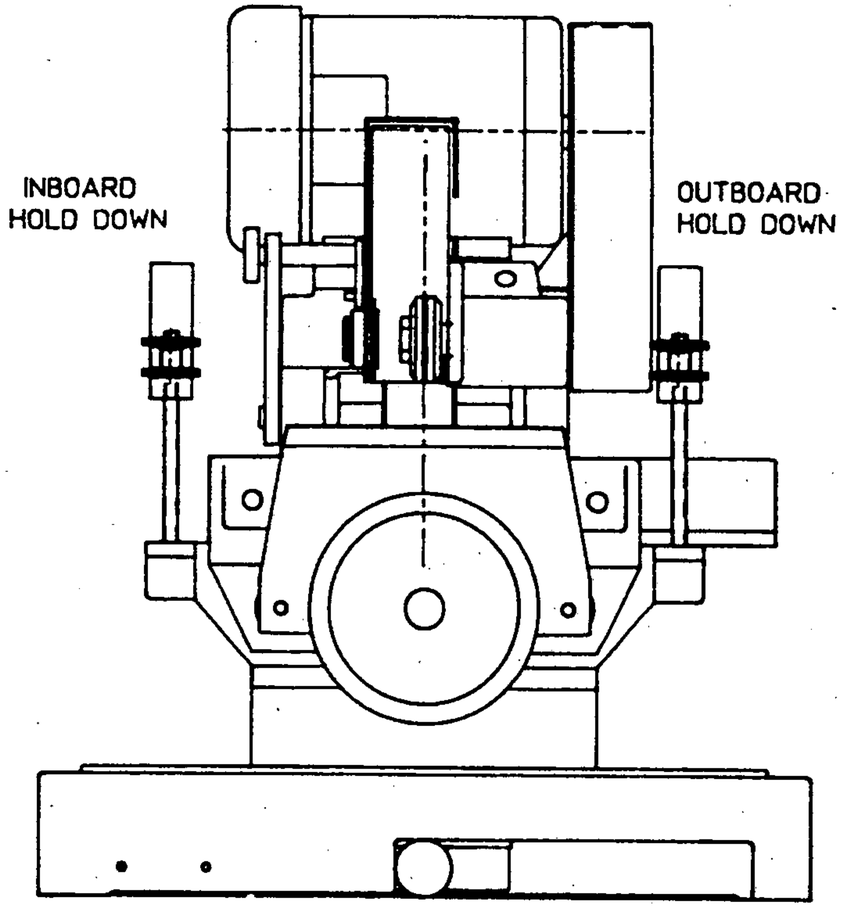




1	CS-7610	WORKTABLE WELDMENT
2	CS-7615	WORKTABLE CENTER PLATE
3		5/8-11 x 5 1/2 SHCS (2)

OVERHEAD CLAMP
CIRCULAR SAWS

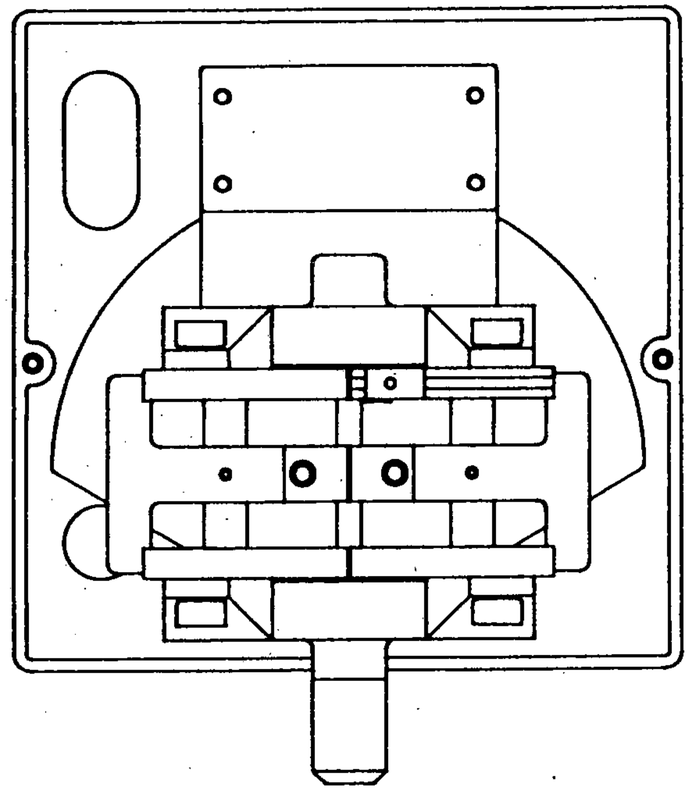




	CS-7500	COMPLETE ASSEMBLY
1	CS-7505	CYLINDER MOUNT
2	CS-7510	CLAMP BAR
3	CS-7515-1	CYLINDER: HUMPHREY #5-D-1/2
4	CS-7520	GUIDE RODS (2)
5	CS-7525	ADJUSTING NUT (4)

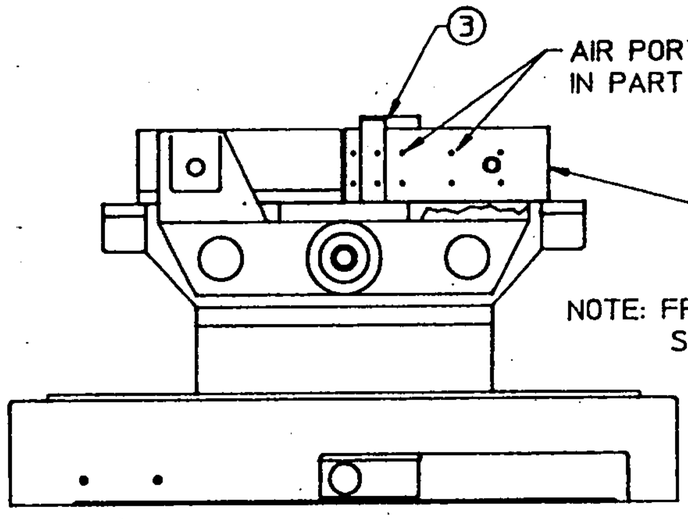
NOTE: SAWS BEFORE S/N 241 USE THE CS-7515 CYLINDER INSTEAD OF A CS-7515 CYLINDER

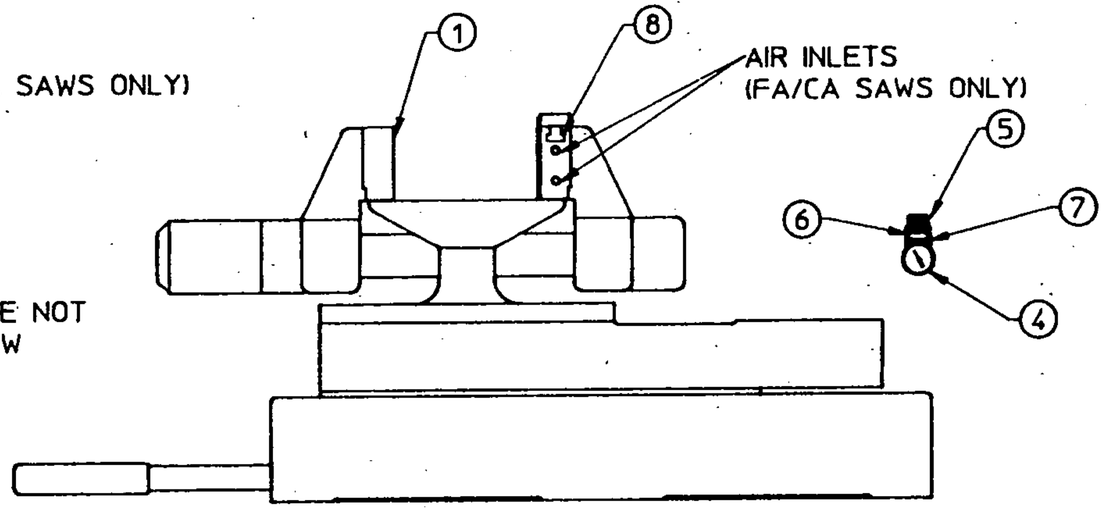
SHORT LENGTH STOCK STOP OPTION



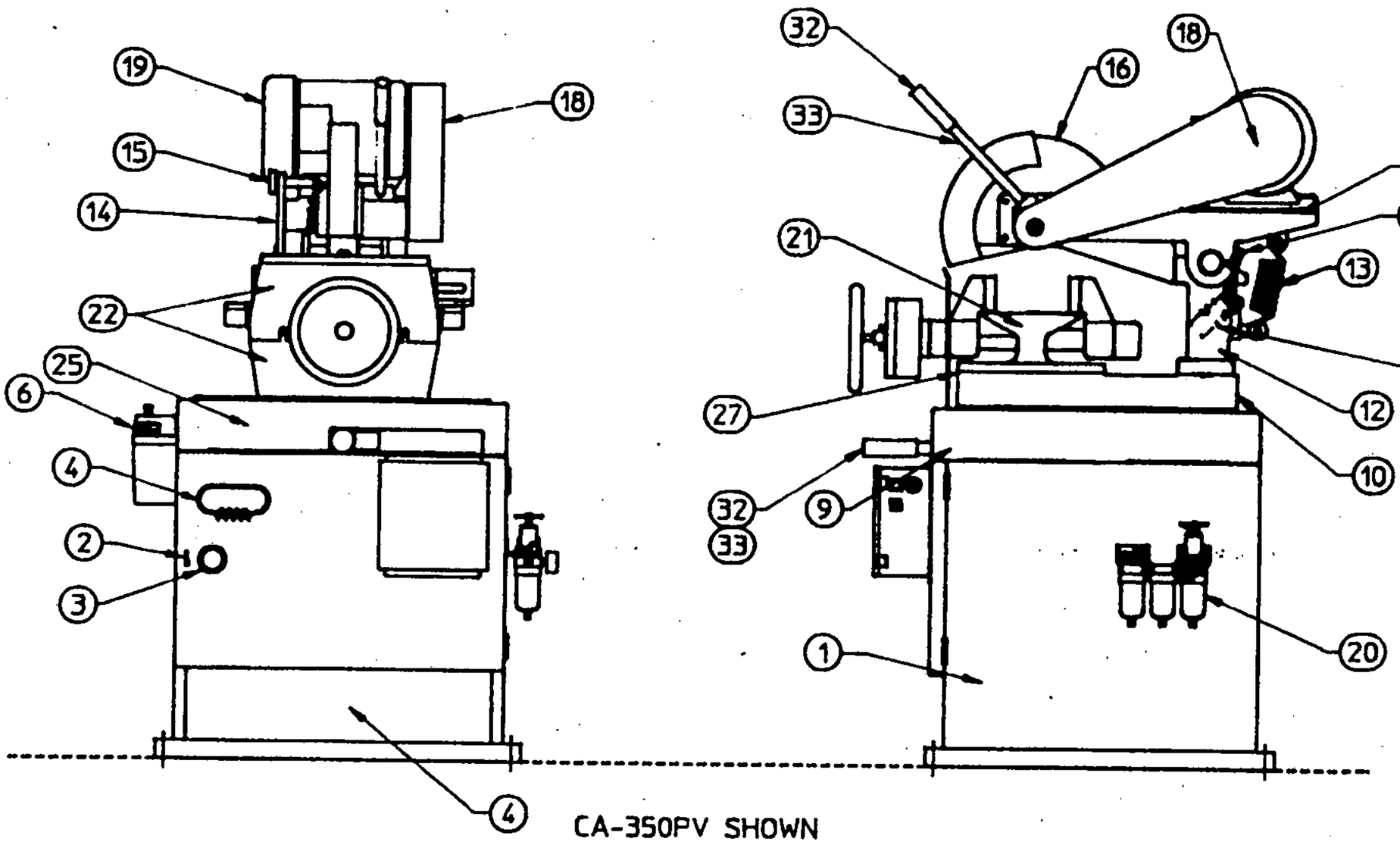
1	CS-7401	90 DEG. WEAR PLATE (FA/CA SAWS ONLY) (3)
	CS-7401-S	90 DEG. WEAR PLATE (FS/CS SAWS ONLY) (3)
2	CS-7402	STOCK STOP WEAR PLATE (FA/CA SAWS ONLY)
	CS-7402-S	STOCK STOP WEAR PLATE (FS/CS SAWS ONLY)
3	CS-7403	STOCK STOP WELDMENT
4	V20-7117A	PRESSURE GAUGE: PARKER #P77413 (FA/CA SAWS ONLY)
5	V20-7117B	PRESSURE REGULATOR: PARKER #14R113F (FA/CA SAWS ONLY)
6		MOUNTING BRACKET: PARKER #PS417B (FA/CA SAWS ONLY)
7	V20-7118	MOUNTING NUT: PARKER #P78652 (FA/CA SAWS ONLY)
8	V20-9032B	"T" NUT: REID #TN-2

STOCK STOP SLIDES IN T-SLOT TO ANY LENGTH DESIRED





BASE COMPONENTS
CA–350/CA–350PV



CA-350PV SHOWN

1	CS-1000	BASE CABINET
2	CS-1205	DOOR LATCH SPRING
3	CS-1208	DOOR GROMMET
4	8C-212	'KALAMAZOO' LOGO
5	9A-5040	MOTOR SWITCH ASSEMBLY (SEE PAGE 8.25)
6	V20-7300	SPRAY MIST UNIT- 1 QT. RESERVOIR
7	CS-2227	PLASTIC GRIP (CA-350/CA-350PV)
8	CS-2225	ARM
9	CS-2100	SAW BED
10	CS-2200	HEAD ROTATION CASTING
11		HEAD ASSEMBLY (SEE FIG. 4.6)
12	CS-3200	HEAD FRAME SUPPORT
13	CS-3582	HEAD RETURN SPRING
14	CS-3800	RETRACTOR BRACKET ASSEMBLY
15	CS-3810	RETRACTOR SHAFT ASSEMBLY
16	CS-3900	BLADE GUARD ASSEMBLY
17		
18	CS-3910	BELT GUARD ASSEMBLY
19	V20-2202	3 HP MOTOR, 1750 RPM, 184 FRAME
20	CS-4013	FILTER/REGULATOR/LUBRICATOR (PV MODELS)
21		VISE ASSEMBLY (SEE FIG. 4.5)
22	CS-2500	SPLASH GUARD - MANUAL VISE (2)
	CS-2510	SPLASH GUARD - POWERED VISE (2)
23	CS-5054-1	LIMIT SWITCH TRIGGER (CA-350PV)
24	CS-4020-1	VISE CLAMP AIR VALVE (CA-350PV)

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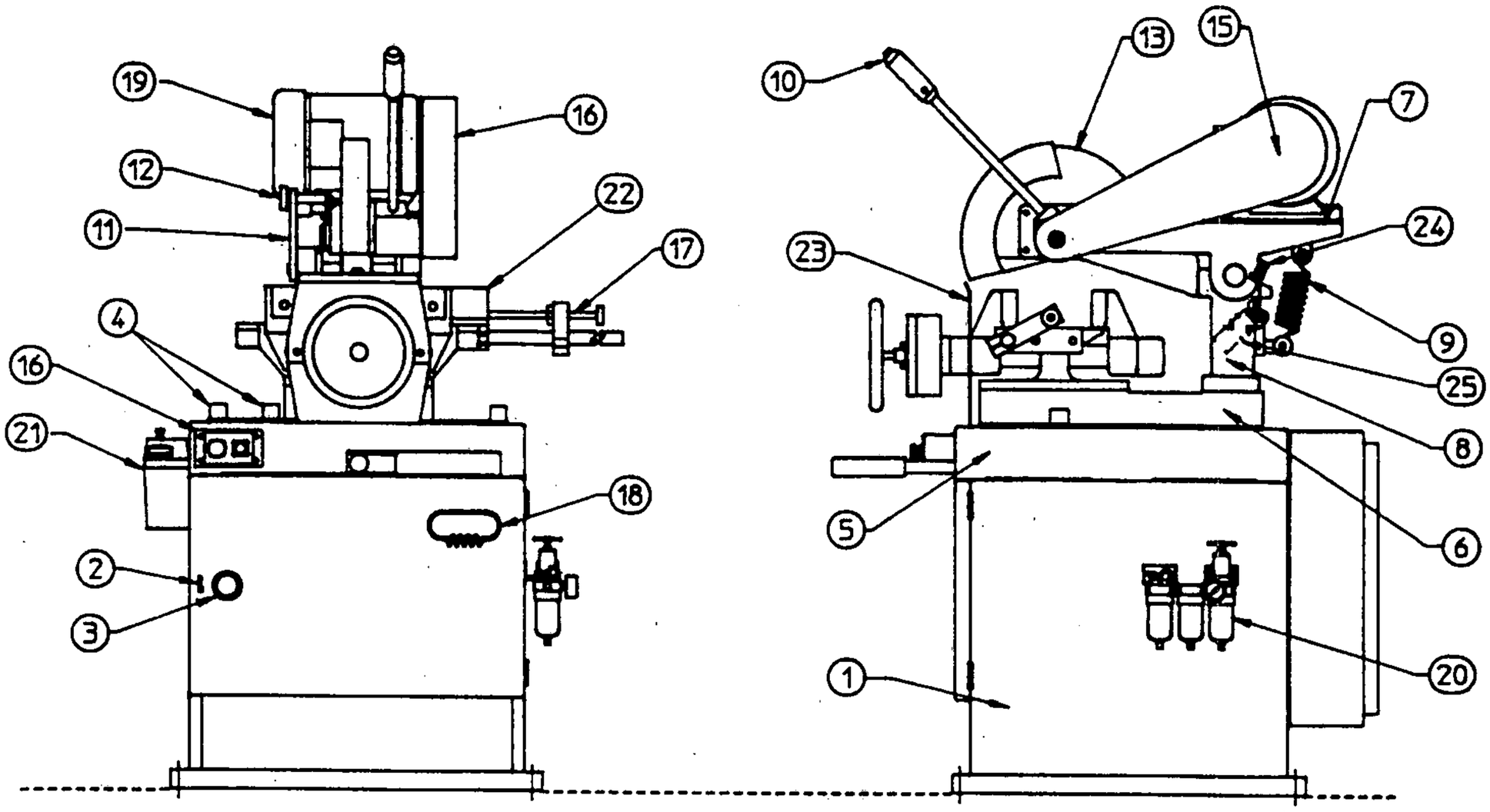
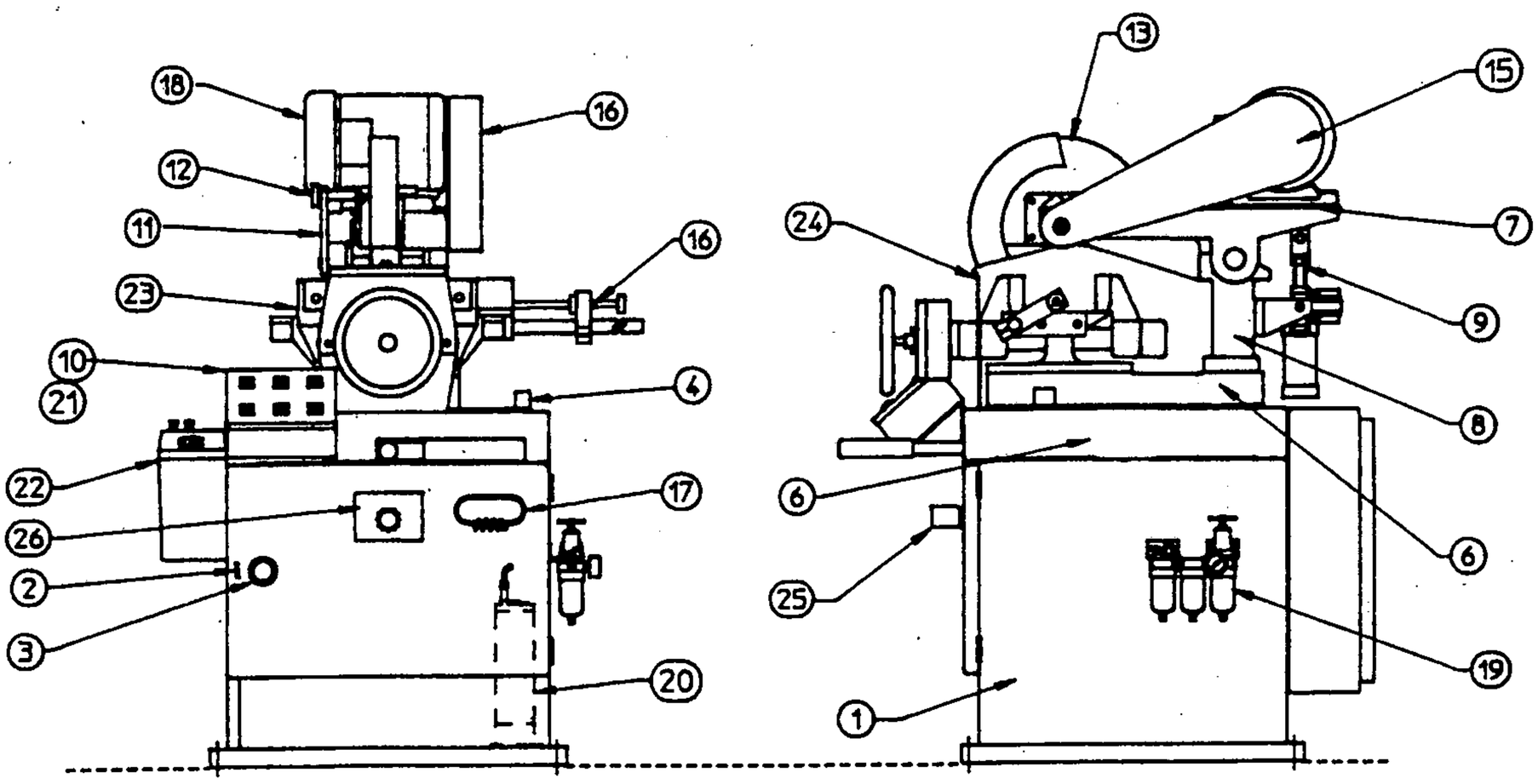
BASE COMPONENTS
FA-350/FA-350PV



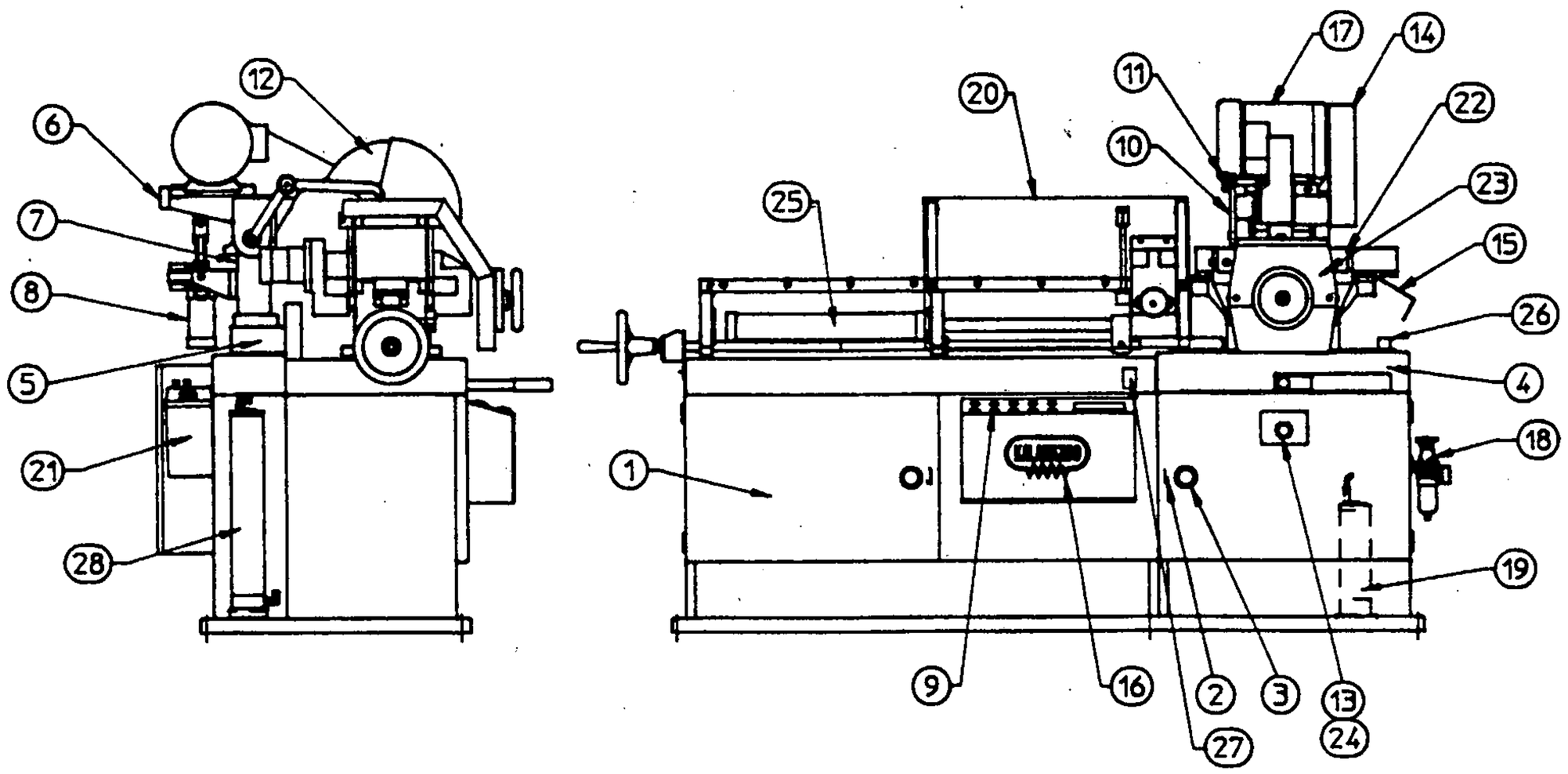
1	CS-1000	BASE CABINET
2	CS-1205	DOOR LATCH SPRING
3	CS-1208	DOOR GROMMET (3)
4	CS-2710	ANGLE STOP BLOCK (3)
5	CS-2100	SAW BED
6	CS-2200	HEAD ROTATION CASTING
7		HEAD ASSEMBLY (SEE FIG. 4.6)
8	CS-3200	HEAD FRAME SUPPORT
9	CS-3582	HEAD RETURN SPRING
10	CS-3600	HANDLE SWITCH ASSEMBLY
11	CS-3800	RETRACTOR BRACKET ASSEMBLY
12	CS-3810	RETRACTOR SHAFT ASSEMBLY
13	CS-3900	BLADE GUARD ASSEMBLY
14		
15	CS-3910	BELT GUARD ASSEMBLY
16	CS-5000	SWITCH PANEL ASSEMBLY (SEE FIG. 8.3)
17	CS-7000	STOCK STOP ASSEMBLY (SEE FIG. 3.8)
18	8C-212	'KALAMAZOO' LOGO
19	V20-2202	3HP MOTOR, 1750 RPM, 184 FRAME
20	CS-4013	FILTER/REGULATOR/LUBRICATOR ASS'Y
21	V20-7300	SPRAY MIST UNIT (1 QT RESERVOIR)
22	CS-PV	VISE ASSEMBLY (SEE FIG. 4.5)
23	CS-2510	SPLASH GUARD - POWERED VISE (2)
24	CS-5054-1	LIMIT SWITCH TRIGGER
25	CS-4020-1	AIR VALVE

BASE COMPONENTS
FA-350SA



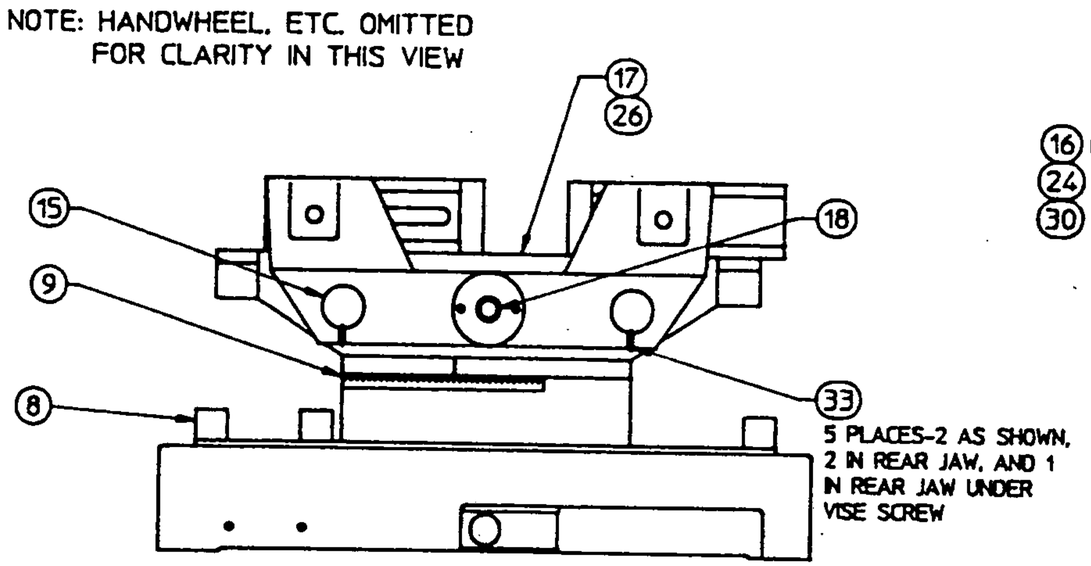
1	CS-1000	BASE CABINET
2	CS-1205	DOOR LATCH SPRING
3	CS-1208	DOOR GROMMET (3)
4	CS-2710	ANGLE STOP BLOCK (3)
5	CS-2100	SAW BED
6	CS-2200	HEAD ROTATION CASTING
7		HEAD ASSEMBLY (SEE FIG. 4.6)
8	CS-3200	HEAD FRAME SUPPORT
9		HEAD LIFT ASSEMBLY (SEE FIG. 4.9)
10	CS-5080	CONTROL CONSOLE ASS'Y (SEE FIG. 8.5)
11	CS-3800	RETRACTOR BRACKET ASSEMBLY
12	CS-3810	RETRACTOR SHAFT ASSEMBLY
13	CS-3900	BLADE GUARD ASSEMBLY
14		
15	CS-3910	BELT GUARD ASSEMBLY
16	CS-7000	STOCK STOP ASSEMBLY (OPTION-SEE FIG. 3.8)
17	8C-212	"KALAMAZOO" LOGO
18	V20-2202	3HP MOTOR, 1750 RPM, 184 FRAME
19	CS-4013	FILTER/REGULATOR/LUBRICATOR ASSEMBLY
20	CS-4003-1	AIR/OIR RESERVOIR ASS'Y (SEE FIG. 7.1)
21	CS-5081	CONTROL CONSOLE BRACKET
22	CS-9062	SPRAY MIST UNIT-1 GAL RESERVOIR
23	CS-PV	VISE ASSEMBLY (SEE FIG. 4.5)
24	CS-2510	SPLASH GUARD - POWERED VISE (2)
25	CS-4017-1	FEED SPEED VALVE
26	CS-4042	FEED SPEED OVERLAY

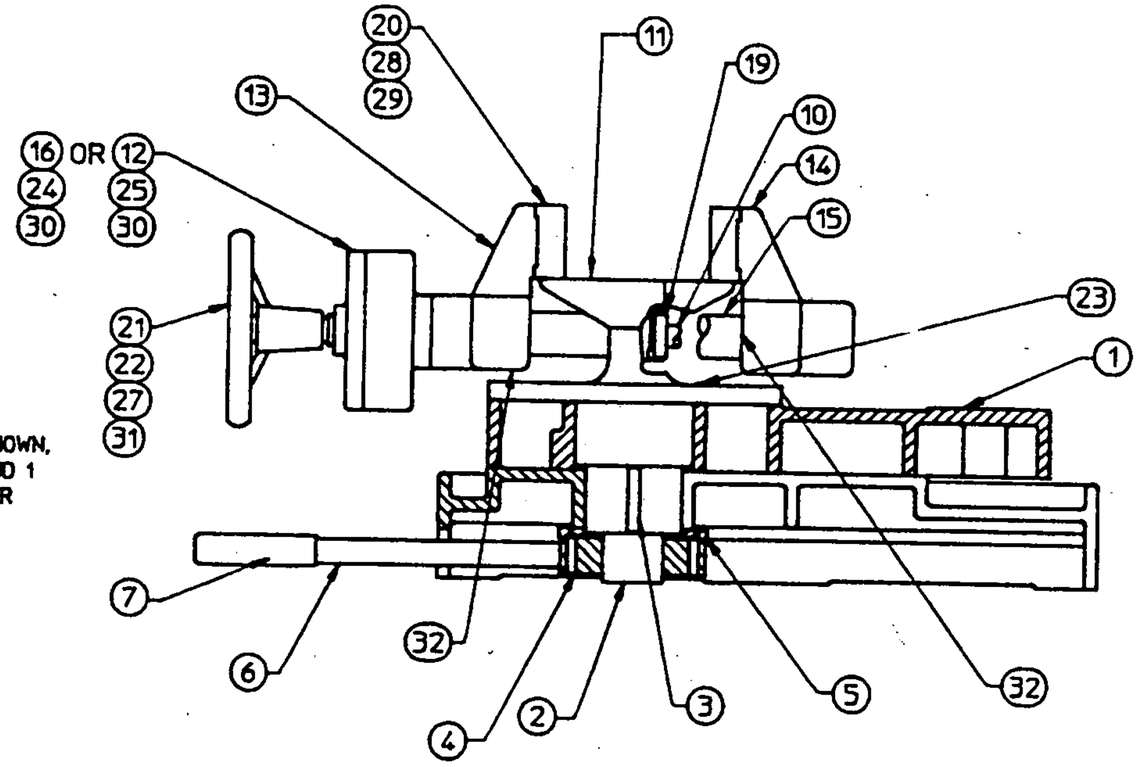
BASE COMPONENTS
FA-350A



1	CS-6700	BASE CABINET
2	CS-1205	DOOR LATCH SPRING (2)
3	CS-1208	DOOR GROMMET (4)
4	CS-2100	SAW BED
5	CS-2200	HEAD ROTATION CASTING
6		HEAD ASSEMBLY (SEE FIG. 4.6)
7	CS-3200	HEAD FRAME SUPPORT
8		POWERED HEAD LIFT PARTS (SEE FIG. 4.9)
9	CS-5002-1	CONTROL CONSOLE ASS'Y (SEE FIG. 8.6)
10	CS-3800	RETRACTOR BRACKET ASSEMBLY
11	CS-3810	RETRACTOR SHAFT ASSEMBLY
12	CS-3900	BLADE GUARD ASSEMBLY
13	CS-4042	FEED SPEED OVERLAY
14	CS-3910	BELT GUARD ASSY.
15	CS-7045	DISCHARGE SLIDE
16	H-15301	'KALAMAZOO' LOGO
17	V20-2202	3HP MOTOR, 1750 RPM, 184 FRAME
18	CS-4013	FILTER/REGULATOR/LUBRICATOR ASSEMBLY
19	CS-4003-1	HEAD LIFT AIR/OIR RESERVOIR ASS'Y (SEE FIG. 7.1)
20	CS-6770	BARFEED CARRIAGE COVER
21	CS-9062	SPRAY MIST UNIT-1 GAL RESERVOIR
22	$CS-PV	VISE ASSEMBLY (SEE FIG. 4.5)
23	CS-2510	SPLASH GUARD - POWERED VISE (2)
24	CS-4017-1	FEED SPEED VALVE
25	CS-6000	BARFEED ASSY. (SEE FIG. 3.3)
26	CS-2710	ANGLE STOP BLOCK (2)
27	CS-5046	LIMIT SWITCH
28	CS-4060	CARRIAGE FEED AIR/OIR RESERVOIR ASS'Y (SEE FIG. 7.2)

BED & VISE ASSEMBLY
CA-350/FA-350 SAWS





1	CS-2200	HEAD ROTATION CASTING
2	CS-2210	VISE PIVOT SHAFT
3	CS-2211	PIVOT SHAFT KEY
4	CS-2215	SHAFT LOCK BASE
5	CS-2220	SHAFT LOCK PLATE
6	CS-2225	SHAFT LOCK ARM
7	CS-2227	PLASTIC GRIP
8	CS-2710	ANGLE STOP BLOCK (3)
9	CS-2205	ANGLE SCALE
10	CS-8301	SCREW COVER (2)
11	CS-2300	VISE SUPPORT CASTING
12	CS-2316	VISE CYLINDER ASSY (MACHINES W/ POWER VISE)
13	CS-2320	FRONT VISE JAW
14	CS-2325	REAR VISE JAW
15	CS-2328	VISE SHAFT (2)
16	CS-2330	FRONT VISE JAW ADAPTER (MACHINES W/ MANUAL VISE)
17	CS-2450	VISE SCREW RETAINER
18	CS-2460	VISE SCREW ASSEMBLY
19	CS-2468	VISE SCREW COLLAR
20	CS-2470	WEAR PLATE (4) - ALUMINUM
21	9A-11502	VISE HANDWHEEL
22	9A-11504	HANDWHEEL NUT
23	H-40331B	FLUSH OILER (2)
24	CS-8302	BUSHING
25	CS-8303	BUSHING
26		5/8-11 x 4 1/2 SHCS (2)
27		1/2 FLATWASHER
28		5/8-11 x 2 SHCS (4)
29		5/8-11 SQUARE NUT (4)
30		1/4-20 x 3 1/2 SHCS (2)
31	S-113	KEY
32	CS-2467	VISE SCREW BRUSH (2)
33	CS-2322	DRAG SCREW (5)
34		1/4-20 x 1 1/4 SHSS

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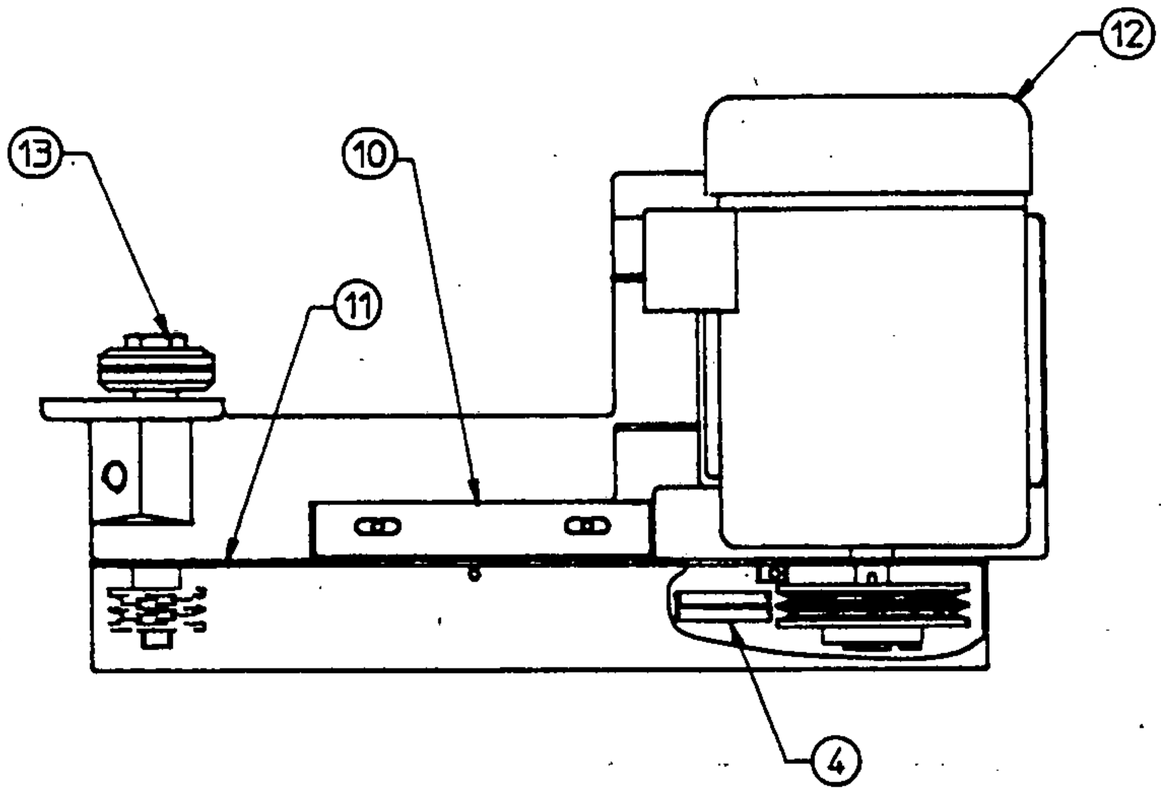
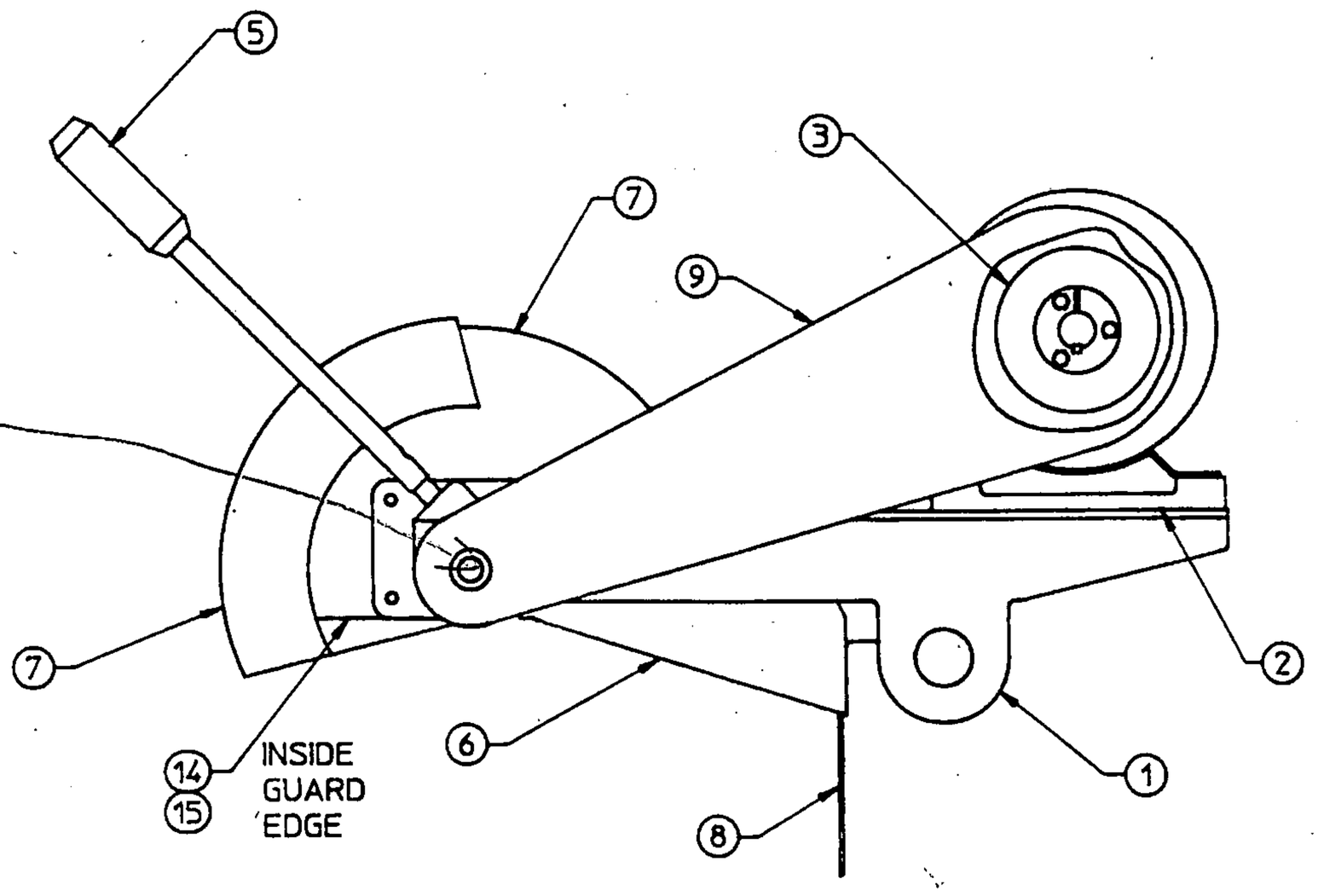
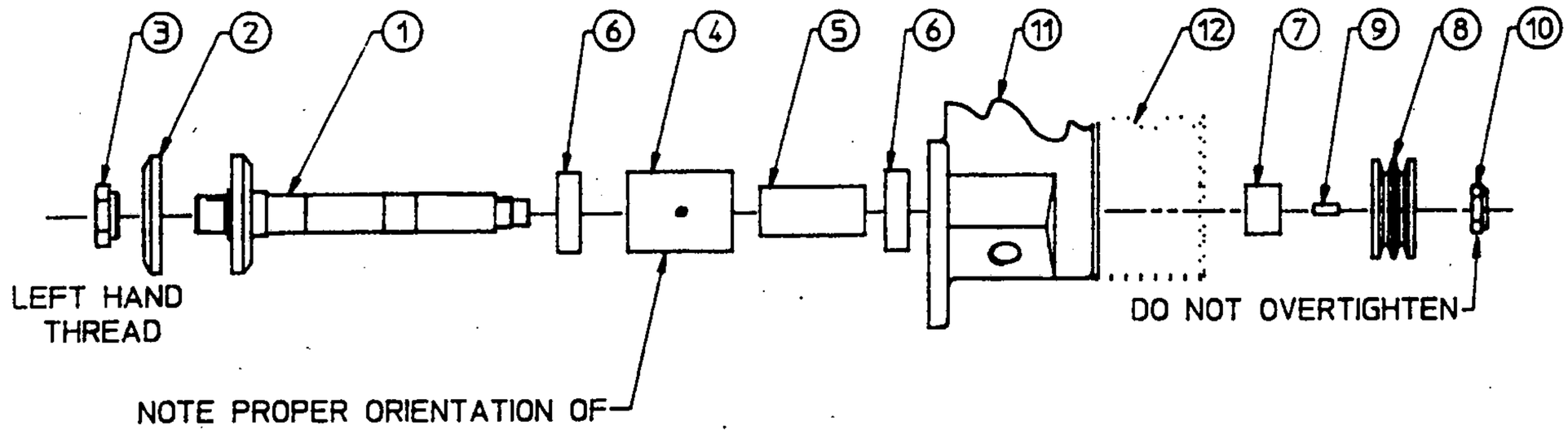
HEAD COMPONENTS
FA-350 SAWS





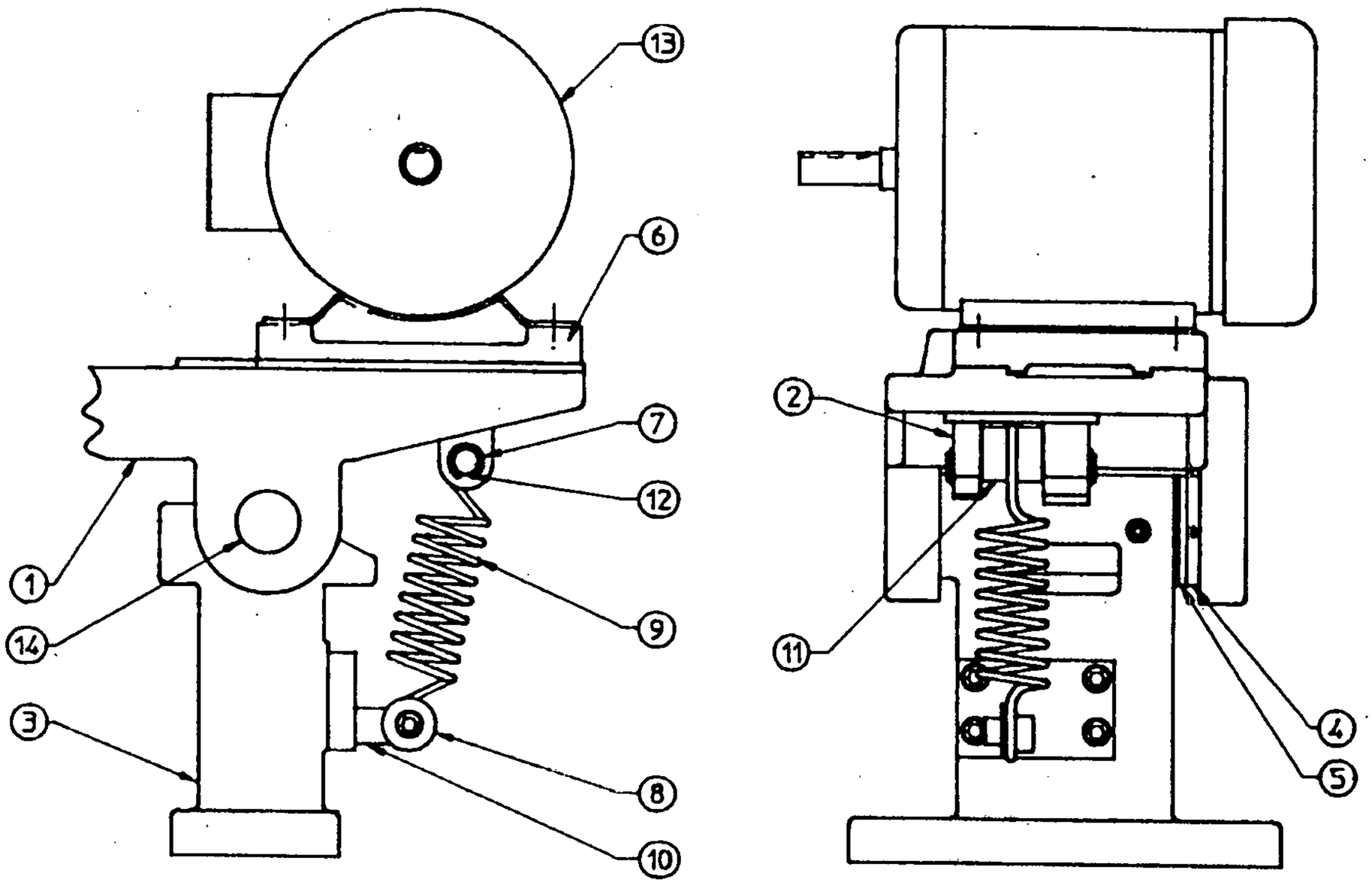
1	CS-3100	HEAD FRAME ASSEMBLY
2	CS-3300	MOTOR MOUNTING PLATE
3	CS-3465	DRIVE PULLEY
4	CS-3468	DRIVE BELT: DAYCO #3VX500 (2)
5	CS-3600	BLADE SWITCH HANDLE ASSEMBLY (FA-350/FA-350PV ONLY)
	CS-2225	SHAFT LOCK ARM (CA-350/CA-350PV)
	CS-2227	PLASTIC GRIP (CA-350/CA-350PV)
6	CS-3830	LOWER BLADE GUARD
7	CS-3900	BLADE GUARD ASSEMBLY
8	CS-3849	DEFLECTOR FLAP
9	CS-3910	BELT GUARD
10	CS-3920	BELT GUARD SUPPORT
11	CS-3930	BELT GUARD BACK PLATE
12	V20-2202	3 HP MOTOR: BALDOR #M3611
13		SPINDLE ASSEMBLY - SEE FIG 4.7
14	CS-3857	AIR BAFFLE
15	CS-3857A	AIR BAFFLE BLADE (PLASTIC)

SPINDLE ASSY
FA-350 SAWS



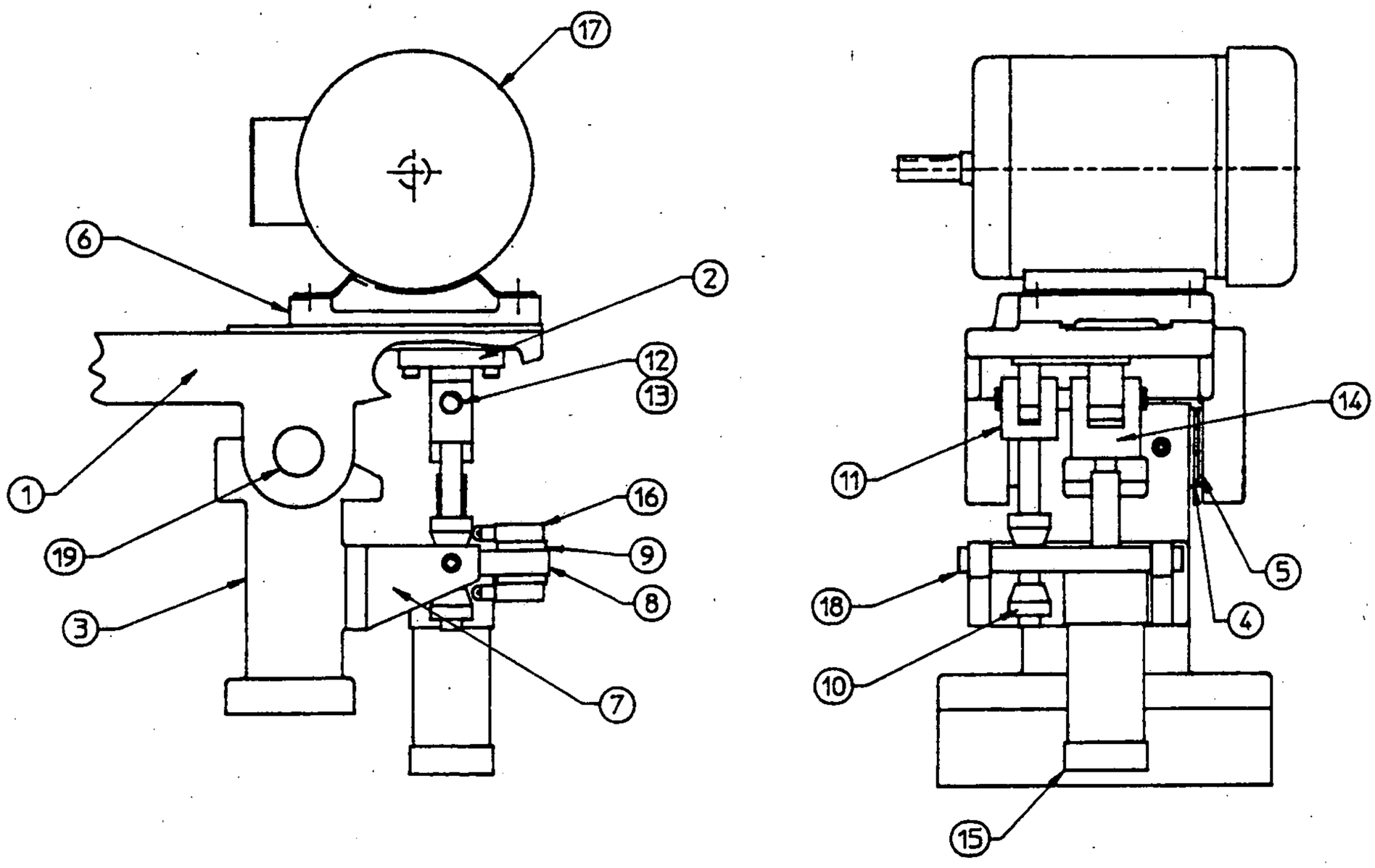
	CS-3401	BLADE SPINDLE SUB-ASSEMBLY (INCLUDES ITEMS 1, 4, 5, AND 6)
1	CS-3400	BLADE SPINDLE
2	CS-3410	SPINDLE WASHER
3	CS-3420	SPINDLE NUT (NOTE: LEFT HAND THREAD)
4	CS-3430	OUTER BEARING SPACER
5	CS-3440	INNER BEARING SPACER
6	CS-3445	BEARING: SKF #62052RS (2)
7	CS-3450	PULLEY SPACER
8	CS-3460	DRIVEN PULLEY
9	V20-2142	KEY: 1/4 SQUARE x 7/8 LONG
10	CS-3461	7/8-9 LOCK NUT
11	CS-3100	HEAD FRAME CASTING (REF)
12	CS-3910	BELT GUARD (REF)

MANUAL HEAD LIFT
FA-350M



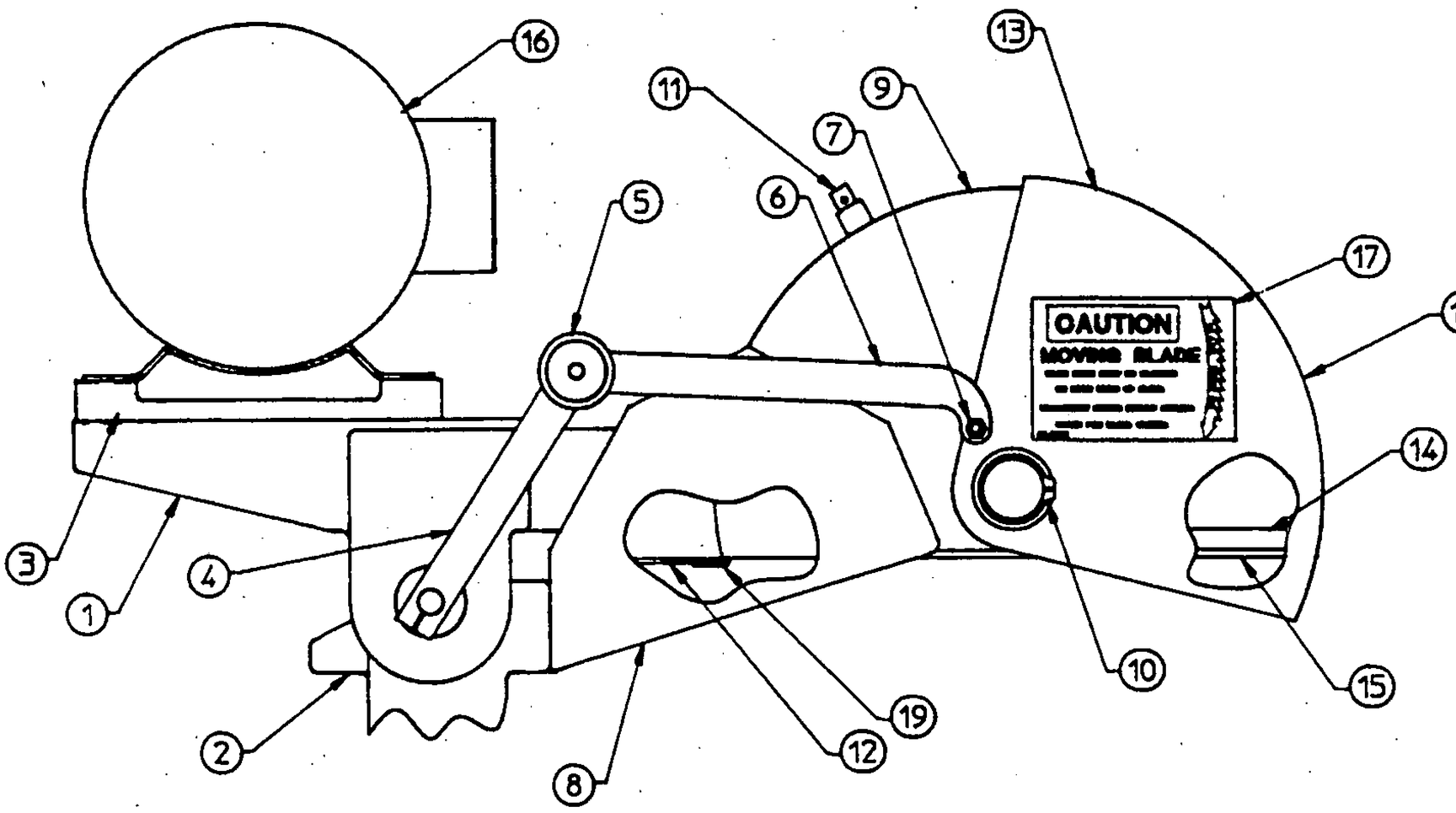
1	CS-3100	HEAD FRAME CASTING
2	CS-3150	CLEVIS BRACKET
3	CS-3200	HEAD SUPPORT CASTING
4	CS-3260	ADJUSTING RING COLLAR
5	CS-3265	ADJUSTING RING NUT
6	CS-3300	MOTOR MOUNTING PLATE
7	CS-3575	SNAP RING: TRUARC #X-5133-74
8	CS-3585	SPRING ROLLER
9	CS-3582	SPRING: ASSOCIATED #E1500-148-4500M
10	CS-3590	ROLLER BRACKET ASSEMBLY
11	CS-3596	SPRING SLEEVE
12	CS-3598	SPRING PIN
13	V20-2202	3 HP MOTOR
14	CS-3250	HEAD PIVOT SHAFT

POWERED HEAD LIFT
FA-350



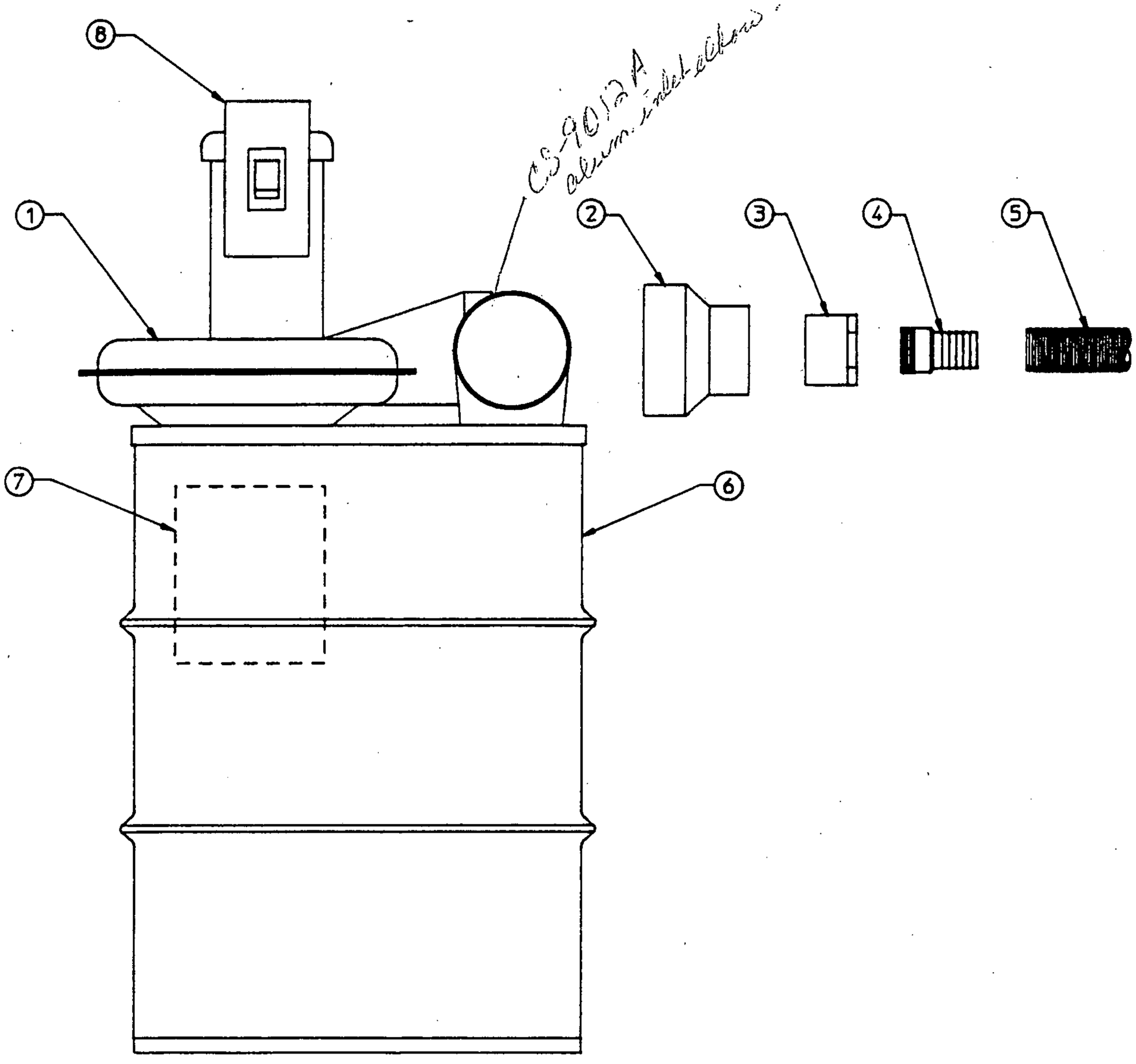
1	CS-3100	HEAD FRAME CASTING
2	CS-3150	CLEVIS BRACKET
3	CS-3200	HEAD SUPPORT CASTING
4	CS-3260	ADJUSTING RING COLLAR
5	CS-3265	ADJUSTING RING NUT
6	CS-3300	MOTOR MOUNTING PLATE
7	CS-3510	CYLINDER MOUNTING BRACKET
8	CS-3520	CYLINDER MOUNT
9	CS-3530	SWITCH MOUNTING PLATE (2)
10	CS-3550	STOP COLLAR (2)
11	CS-3560	STOP ROD CLEVIS ASSEMBLY
12	CS-3570	CLEVIS PIN
13	CS-3575	SNAP RING: TRUARC #X-5133-74
14	CS-3580	CYLINDER CLEVIS: PARKER #50942
15	CS-4014	CYLINDER: 2 1/2" BORE x 3 3/4" STROKE
16	CS-5057	LIMIT SWITCH: OMRON #D4C-1603
17	V20-2202	3 HP MOTOR: 1750 RPM, 184 FRAME
18		5/8 x 1 SOCKET HEAD SHOULDER SCREW
19	CS-3250	HEAD PIVOT SHAFT

BLADE GUARD PARTS
FA-350



1	CS-3100	HEAD FRAME CASTING (REF)
2	CS-3200	HEAD SUPPORT CASTING (REF)
3	CS-3300	MOTOR MOUNTING PLATE (REF)
4	CS-3800	RETRACTOR BRACKET ASSY
5	CS-3810	RETRACTOR SHAFT
6	CS-3820	RETRACTOR ARM
7	CS-3825	1/4-20 ELASTIC STOP NUT
8	CS-3830	LOWER BLADE GUARD
9		
10	CS-3847	SNAP RING: TRUARC #5100-150
11	CS-3848	COOLANT ADAPTER
12	CS-3849	FLAP
13	CS-3900	BLADE GUARD ASSEMBLY
14	CS-3857	AIR BAFFLE (METAL)
15	CS-3857A	AIR BAFFLE BLADE (PLASTIC)
16	V20-2202	3 HP MOTOR: 1750 RPM, 184 FRAME (REF)
17	CS-8222	BLADE CAUTION DECAL
18	CS-3839	WARNING DECAL
19	CS-3849A	FLAP BRACKET

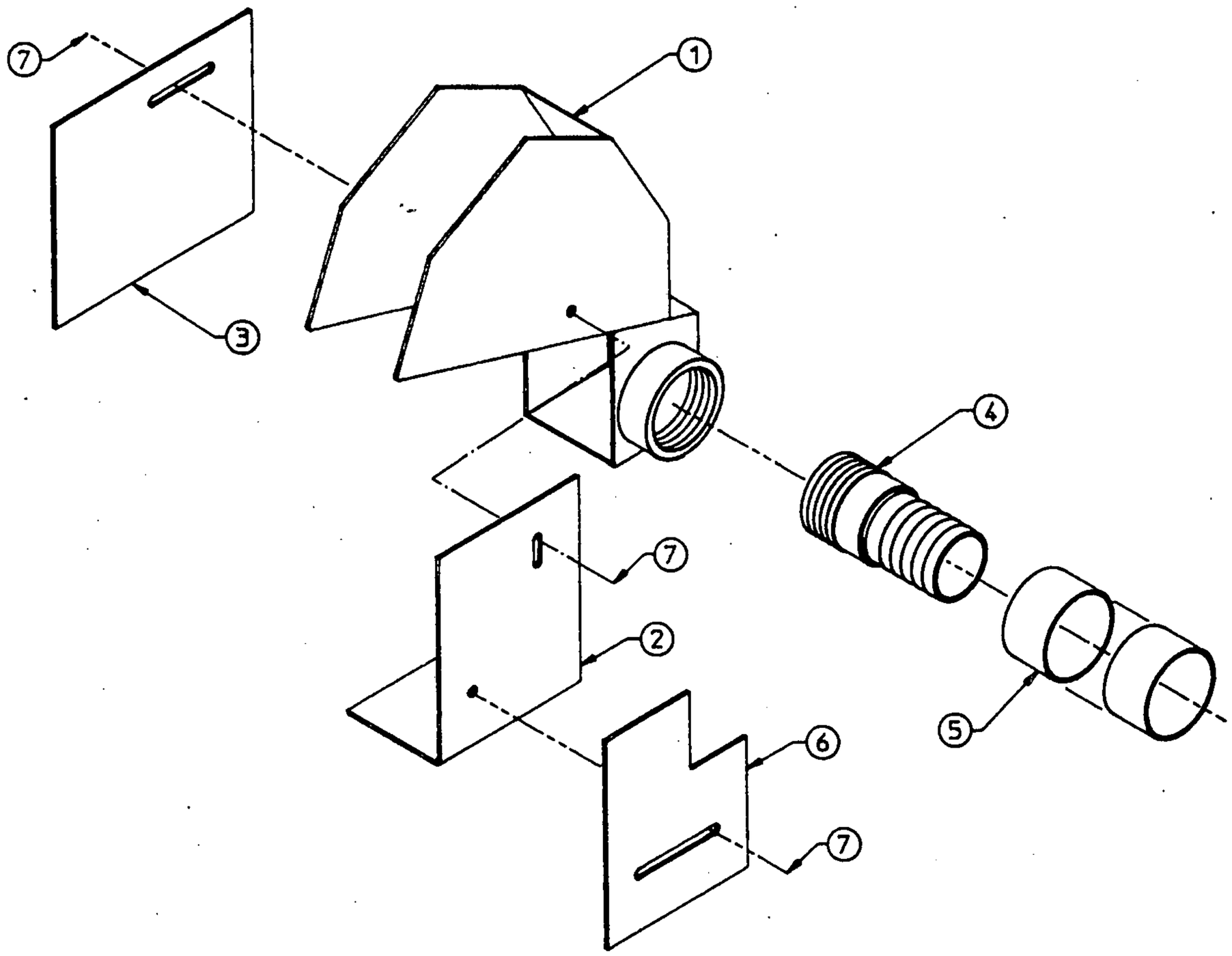
CHIP COLLECTOR PARTS
CA-350/FA-350 SAWS



1	CS-9005	CHIP COLLECTOR: CINCINNATI #300S
2	CS-9006	REDUCER: 6" x 4"
3	CS-9007	BUSHING: 4" x 2"
4	CS-9008	HOSE NIPPLE: 2"NPT x 2" HOSE
5	CS-9009	VACUUM HOSE: 2"ID x 6' LONG
6	CS-9010	55 GAL BARREL
7	CS-9011	REPLACEMENT FILTER ELEMENT
8	9A-220B	MOTOR SWITCH: 230V/3PH
	9A-220C	MOTOR SWITCH: 460V
	9A-220E	MOTOR SWITCH: 208V

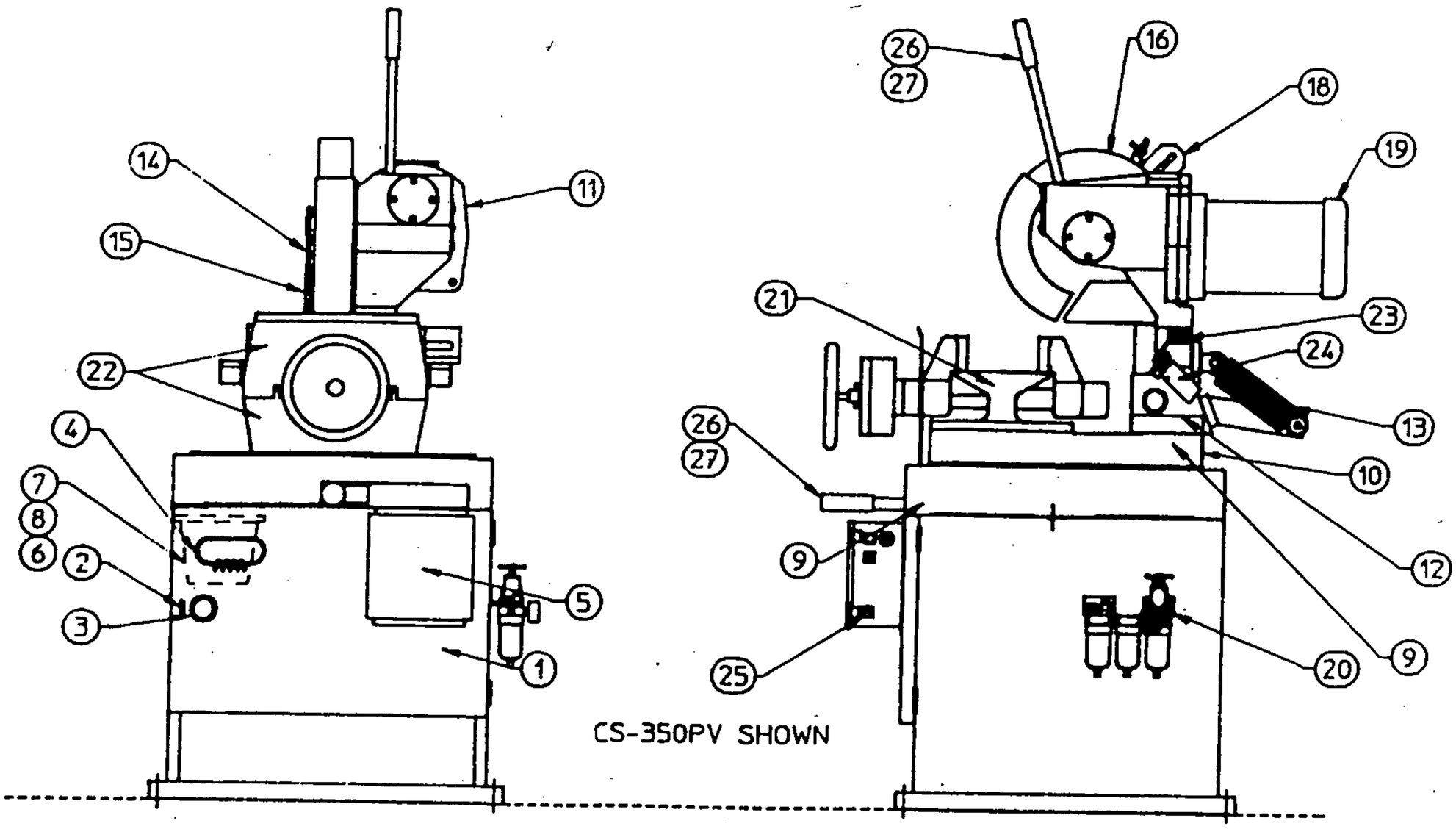
CS-9011A Cotton Replacement Bag

CHIP COLLECTOR GUARDS
FA-350



1	CS-9002	CHIP COLLECTOR
2	CS-9003	RH SIDE COVER
3	CS-9004	LH SIDE COVER
4	CS-9008	HOSE NIPPLE: 2"NPT x 2" HOSE
5	CS-9009	VACUUM HOSE: 2" ID x 6' LONG
6	CS-9003A	RH SIDE COVER EXTENSION
7		1/4-20 x 1/2 SHCS (3-NOT SHOWN)

BASE COMPONENTS
CS-350/CS-350PV



CS-350PV SHOWN

1	CS-1000	BASE CABINET
2	CS-1205	DOOR LATCH SPRING
3	CS-1208	DOOR GROMMET (3)
4	8C-212	'KALAMAZOO' LOGO
5	9A-5040	BLADE MOTOR SWITCH
6	CS-1705B	COOLANT TANK SHELF
7	CS-1730	COOLANT TANK
8	CS-1735	SPLASH GUARD (AROUND COOLANT TANK)
9	CS-2100	SAW BED
10	CS-2200	HEAD ROTATION CASTING
11		HEAD ASSEMBLY (SEE FIGS. 5.11 AND 5.12)
12	CS-3210	HEAD FRAME SUPPORT
13	CS-8201	HEAD RETURN SPRING (2)
14	CS-3820	RETRACTOR ARM
15	CS-3822	RETRACTOR EXTENSION
16	CS-3905	BLADE GUARD ASSEMBLY
17		
18	CS-8400-A	BLADE BRUSH ASSEMBLY (SEE FIG. 5.8)
19	CS-8205A	3/1.5 HP MOTOR, 208/230V
	CS-8205B	3/1.5 HP MOTOR, 460V
20	CS-4013	FILTER/REGULATOR/LUBRICATOR (PV MODELS)
21		VISE ASSEMBLY (SEE FIG. 5.5)
22	CS-2500	SPLASH GUARD - MANUAL VISE (2)
	CS-2510	SPLASH GUARD - POWERED VISE (2)
23	CS-5054-1	LIMIT SWITCH TRIGGER
24	CS-4020-1	VISE CLAMP AIR VALVE
25	CS-5064-1	MOTOR SPEED SWITCH (COMPLETE)
	CS-5064-1A	SPEED SWITCH OVERLAY
	CS-5064-1B	SPEED SWITCH OPERATOR
	CS-5064-1C	SPEED SWITCH CONTACT BLOCK
26	CS-2227	PLASTIC GRIP
27	CS-2225	ARM

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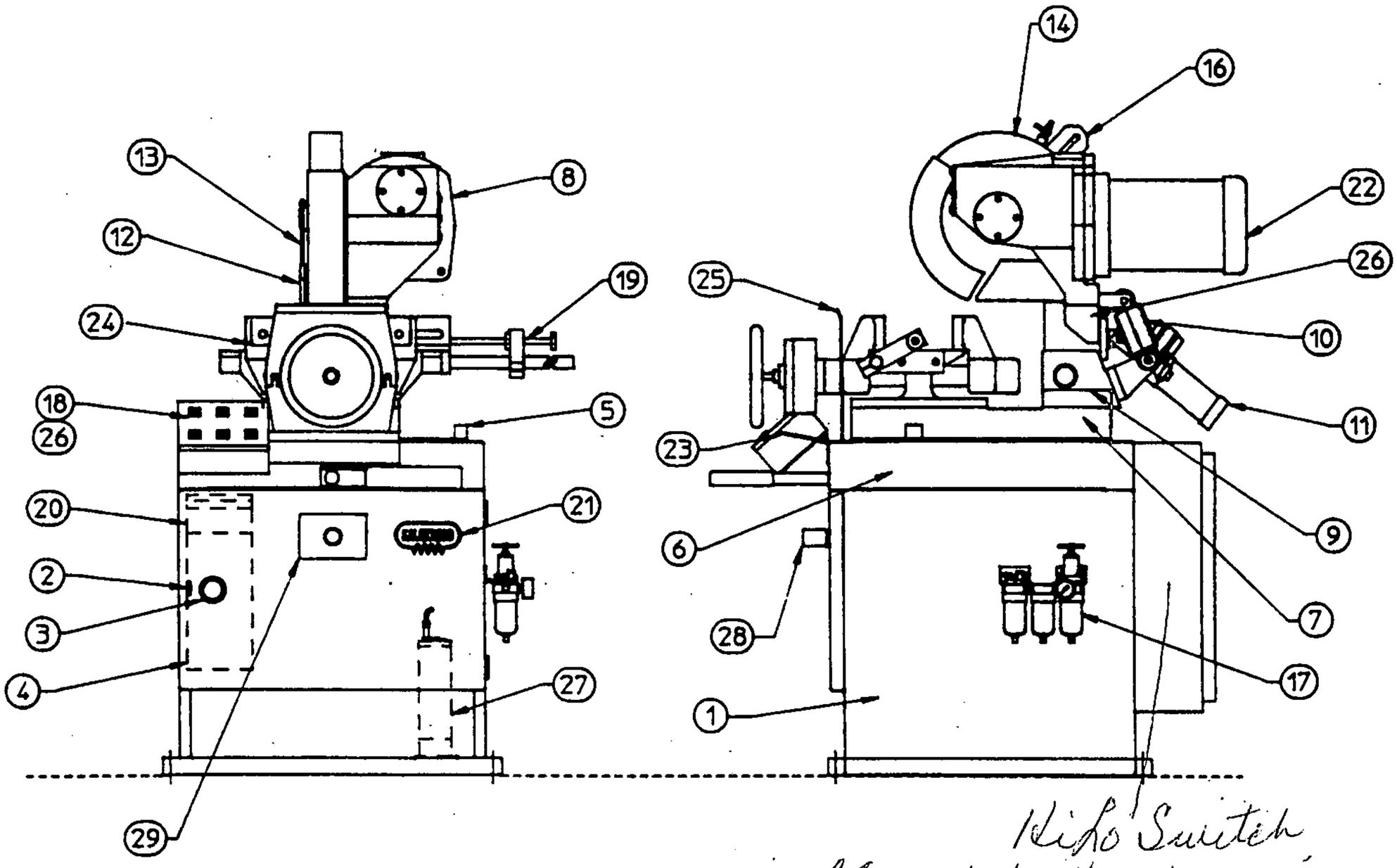
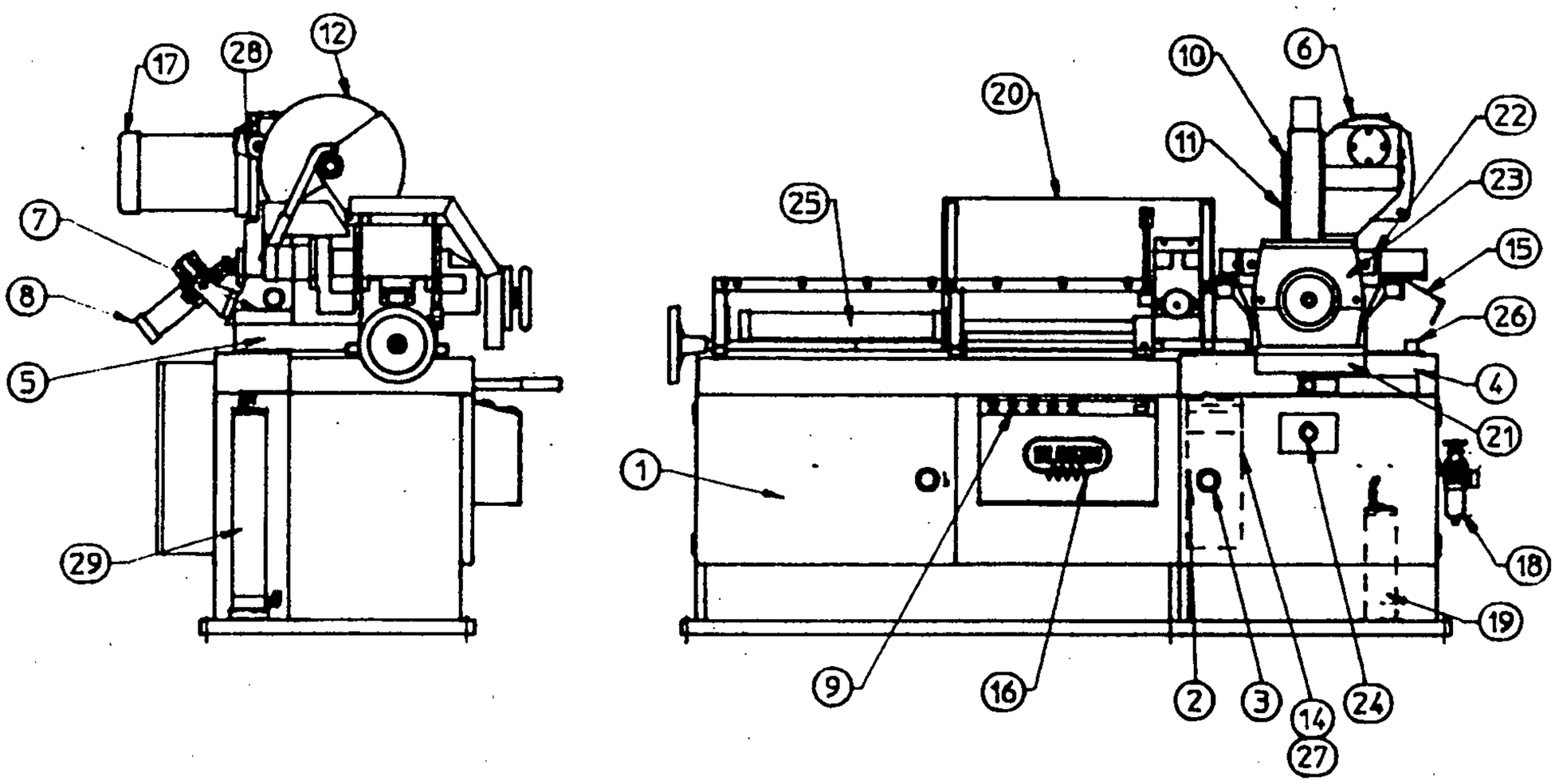
BASE COMPONENTS
FS-350SA



Micro Switch
CS-5064 Has screw in
Middle of Knob - Red & White
logo above it.
CS-5064-1 NO screw - Square
switch - Micro in switch

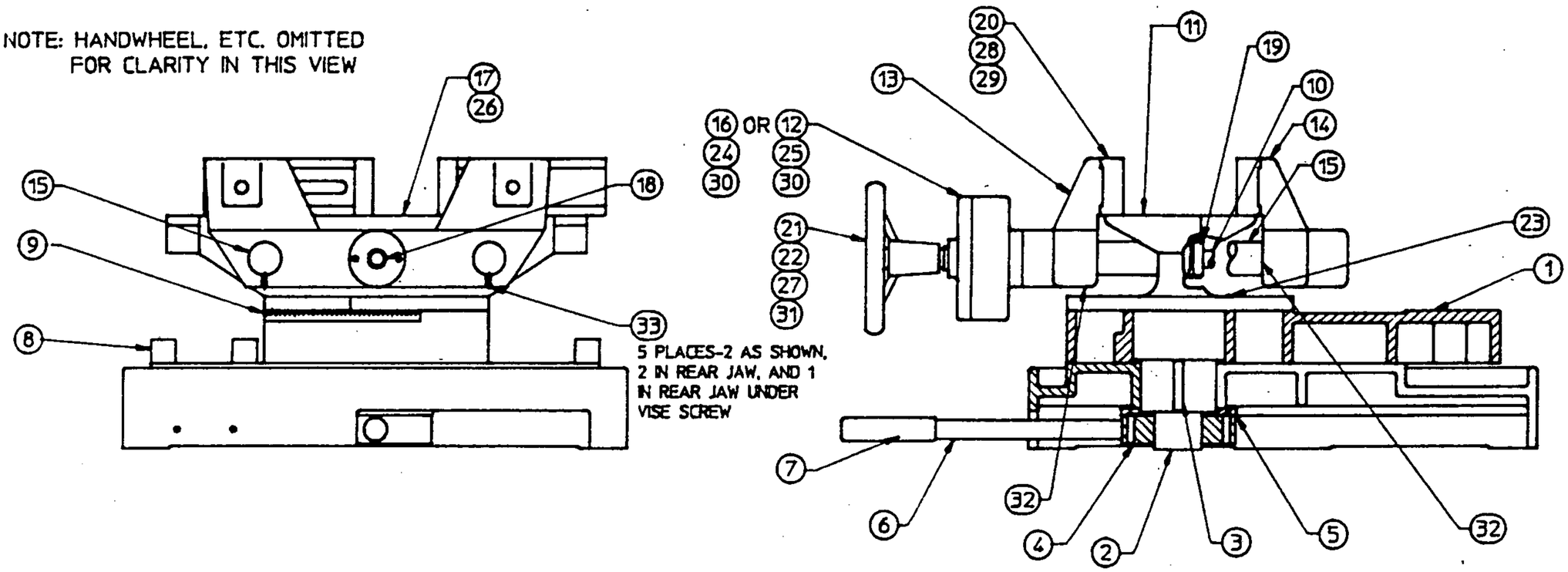
1	CS-1000	BASE CABINET
2	CS-1205	DOOR LATCH SPRING
3	CS-1208	DOOR GROMMET (3)
4	CS-1300S	COOLANT TANK ASSEMBLY (SEE FIG. 5.6)
5	CS-2710	ANGLE STOP BLOCK (3)
6	CS-2100	SAW BED
7	CS-2200	HEAD ROTATION CASTING
8		HEAD ASSEMBLY (SEE FIG. 5.11 AND 5.12)
9	CS-3210	HEAD FRAME SUPPORT
10	CS-8201	HEAD RETURN SPRING
11		HEAD LIFT ASSY. (SEE FIG. 5.10)
12	CS-3822	RETRACTOR EXTENSION
13	CS-3820	RETRACTOR ARM
14	CS-8159	BLADE GUARD ASSEMBLY
15		
16	CS-8400-A	BLADE BRUSH ASSEMBLY (SEE FIG. 5.8)
17	CS-4013	FILTER/REGULATOR/LUBRICATOR ASSY.
18	CS-5080	CONTROL CONSOLE ASSEMBLY (SEE FIG. 8.5)
19	CS-7000	STOCK STOP ASSEMBLY (OPTION:SEE FIG. 3.8)
20	C-16	CHIP PAN
21	8C-212	'KALAMAZOO' LOGO
22	CS-8205A	3/1.5 HP MOTOR, 1750/825 RPM, 208/230V
	CS-8205B	3/1.5 HP MOTOR, 1750/825 RPM, 460V
23	CS-2517	DRIP GUARD
24	CS-PVS	VISE ASSEMBLY (SEE FIG. 5.5)
25	CS-2510	SPLASH GUARD - POWER VISE (2)
26	CS-5081	CONTROL CONSOLE BRACKET
27	CS-4003-1	AIR/OIL RESERVIOR ASSY.(SEE FIG. 7.1)
28	CS-4017-1	FEED SPEED VALVE
29	CS-4042	FEED SPEED OVERLAY

BASE COMPONENTS
FS-350A



1	CS-6700	BASE CABINET
2	CS-1205	DOOR LATCH SPRING (2)
3	CS-1208	DOOR GROMMET (4)
4	CS-2100	SAW BED
5	CS-2200	HEAD ROTATION CASTING
6		HEAD ASSEMBLY (SEE FIG. 5.11 AND 5.12)
7	CS-3210	HEAD FRAME SUPPORT
8		HEAD LIFT ASSEMBLY (SEE FIG. 5.10)
9	CS-5002-1	CONTROL CONSOLE ASS'Y (SEE FIG. 8.6)
10	CS-3820	RETRACTOR ARM
11	CS-3822	RETRACTOR EXTENSION
12	CS-3905	BLADE GUARD ASSEMBLY
13		
14	C-16	CHIP PAN
15	CS-7045	DISCHARGE SLIDE
16	H-15301	"KALAMAZOO" LOGO
17	CS-8205A	3/1.5 HP MOTOR, 1750/825 RPM, 208/230V
	CS-8205B	3/1.5 HP MOTOR, 1750/825 RPM, 460V
18	CS-4013-1	FILTER/REGULATOR/LUBRICATOR ASSEMBLY
19		HEAD AIR/OIR RESERVOIR ASS'Y (SEE FIG. 7.1)
20	CS-6770	BARFEED CARRIAGE COVER
21	CS-2517	DRIP GUARD
22	CS-PVS	VISE ASSEMBLY (SEE FIG. 5.5)
23	CS-2510	SPLASH GUARD - POWERED VISE (2)
24	CS-4017-1	FEED SPEED VALVE
25	CS-6000	BARFEED ASSY. (SEE FIG. 3.3)
26	CS-2710	ANGLE STOP BLOCK (2)
27	CS-1300S	COOLANT TANK ASSY. (SEE FIG. 5.6)
28	CS-8400A	BLADE BRUSH ASSY. (SEE FIG. 5.8)
29	CS-4060	CARRIAGE AIR/OIR RESERVOIR ASS'Y (SEE FIG. 7.2)

BED & VISE ASSEMBLY
CS-350/FS-350 SAWS



1	CS-2200	HEAD ROTATION CASTING
2	CS-2210	VISE PIVOT SHAFT
3	CS-2211	PIVOT SHAFT KEY
4	CS-2215	SHAFT LOCK BASE
5	CS-2220	SHAFT LOCK PLATE
6	CS-2225	SHAFT LOCK ARM
7	CS-2227	PLASTIC GRIP
8	CS-2710	ANGLE STOP BLOCK (3)
9	CS-2205	ANGLE SCALE
10	CS-8301	SCREW COVER (2)
11	CS-2300	VISE SUPPORT CASTING
12	CS-2316	VISE CYLINDER ASSY - Repair Kit CS-2316-PRK (MACHINES W/ POWER VISE)
13	CS-2320	FRONT VISE JAW
14	CS-2325	REAR VISE JAW
15	CS-2328	VISE SHAFT (2)
16	CS-2330	FRONT VISE JAW ADAPTER (MACHINES W/ MANUAL VISE)
17	CS-2450S	VISE SCREW RETAINER
18	CS-2460	VISE SCREW ASSEMBLY
19	CS-2468	VISE SCREW COLLAR
20	CS-2470S	WEAR PLATE (4)
21	9A-11502	VISE HANDWHEEL (POWER VISE)
	CS-8500	VISE HANDLE (MANUAL VISE)
22	9A-11504	HANDWHEEL NUT
23	H-40331B	FLUSH OILER (2)
24	CS-8302	BUSHING
25	CS-8303	BUSHING
26		5/8-11 x 4 1/2 SHCS (2)
27		1/2 FLATWASHER
28		5/8-11 x 2 SHCS (4)
29		5/8-11 SQUARE NUT (4)
30		1/4-20 x 3 1/2 SHCS (2)
31	S-113	KEY
32	CS-2467	VISE SCREW BRUSH (2)
33	CS-2322	DRAG SCREW (5)
34		1/4-20 x 1 1/4 SHSS

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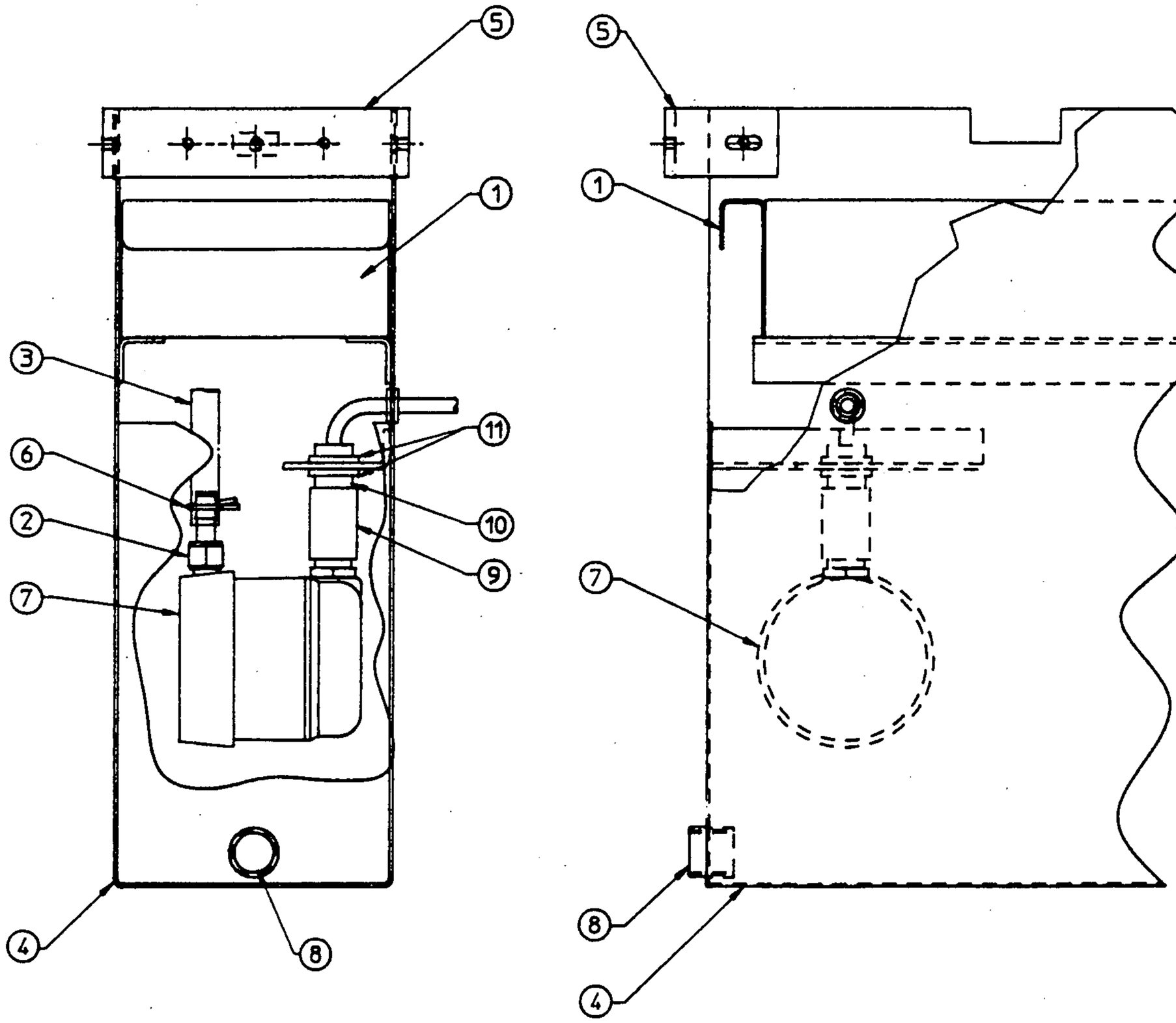
COOLANT TANK ASSEMBLY
CIRCULAR SAWS

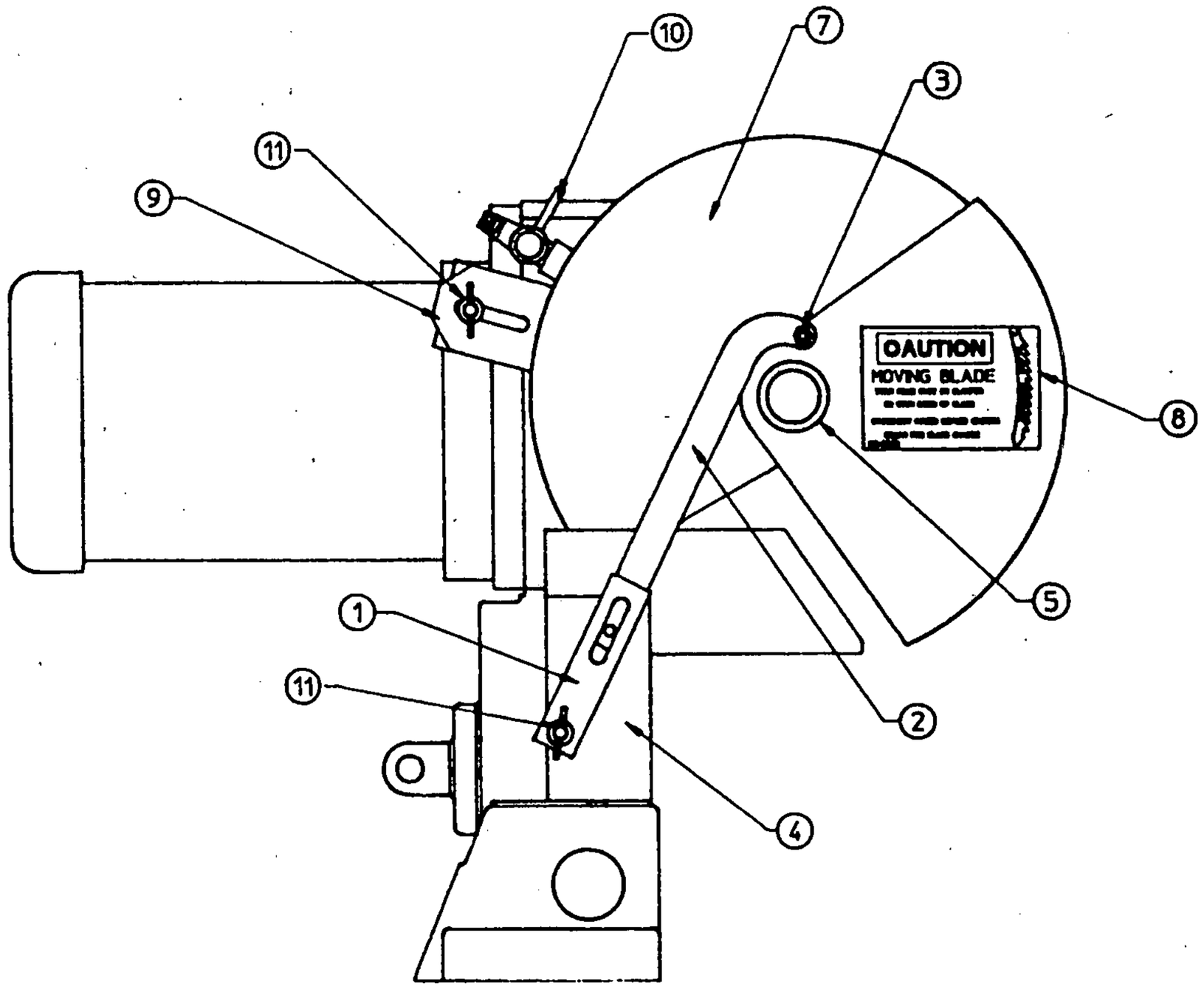
5-6



1	C-16	CHIP PAN
2	C-49	1/4 NPTF TO 3/8 HOSE FITTING
3	C-855	3/8 ID HOSE x 6' LONG
4	CS-1300	COOLANT TANK - NA Use: CS-1300-1 & CS-2700 CS-2705
5	CS-1308	COOLANT TANK SUPPORT
6	H3-3005	9/16 WIRE HOSE CLAMP (2)
7	JIC-431	COOLANT PUMP: LITTLE GIANT #1-YS (W/OUT SWITCH)
8		1/2 NPT PLUG
9		1/2 NPT PIPE COUPLING
10		1/2 NPT x 1 1/2 NIPPLE
11		1/2" CONDUIT NUT (2)

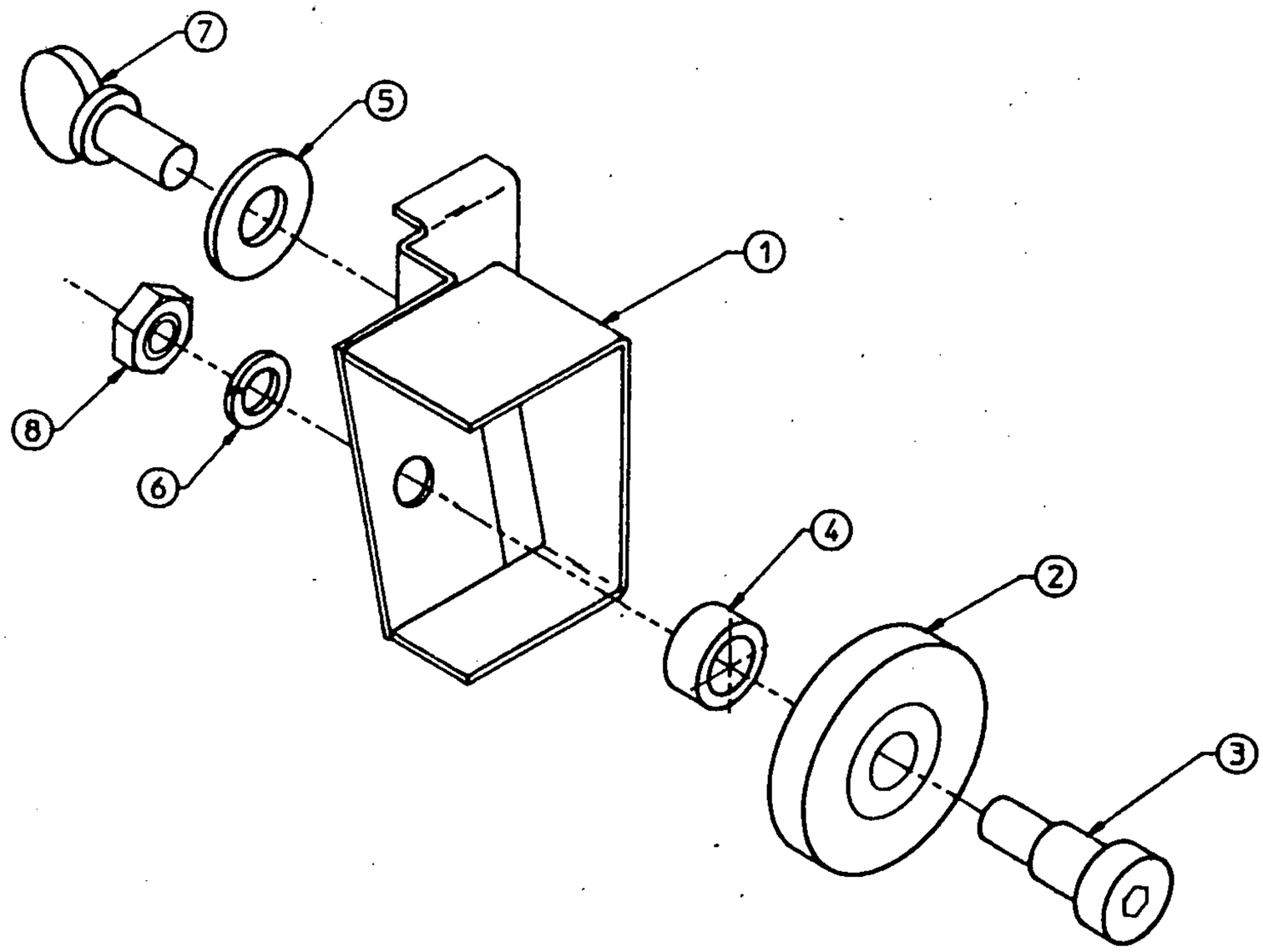
NOTE: UNITS WITH A FLUSHING HOSE USE
PUMP P/N H-106 IN PLACE OF P/N JIC-431

BLADE GUARD PARTS
CS-350/FS-350



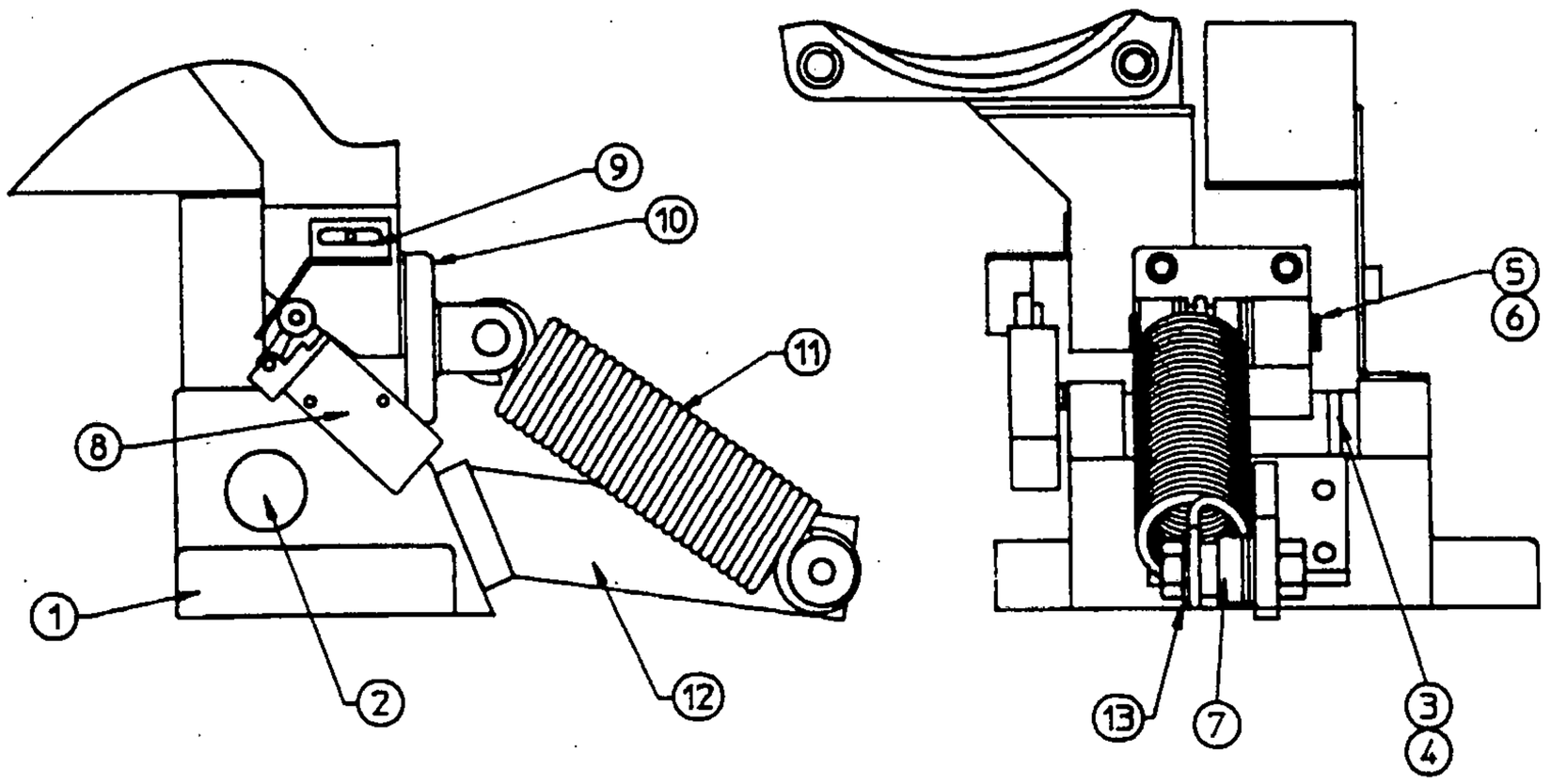
1	CS-3822	RETRACTOR EXTENSION
2	CS-3820	RETRACTOR ARM
3	CS-3825	1/4-20 ELASTIC STOP NUT
4	CS-8620	LOWER BLADE GUARD
5	CS-3847	SNAP RING: TRUARC #5100-0150
6		
7	CS-3905	BLADE GUARD ASSEMBLY
8	CS-8222	BLADE CAUTION DECAL
9	CS-8400-A	BLADE BRUSH ASSEMBLY (SEE FIG. 5.8)
10	C-12	COOLANT VALVE
11		3/8-16 THUMB SCREW (2)

BLADE BRUSH ASSEMBLY
CS-350/FS-350 SAWS



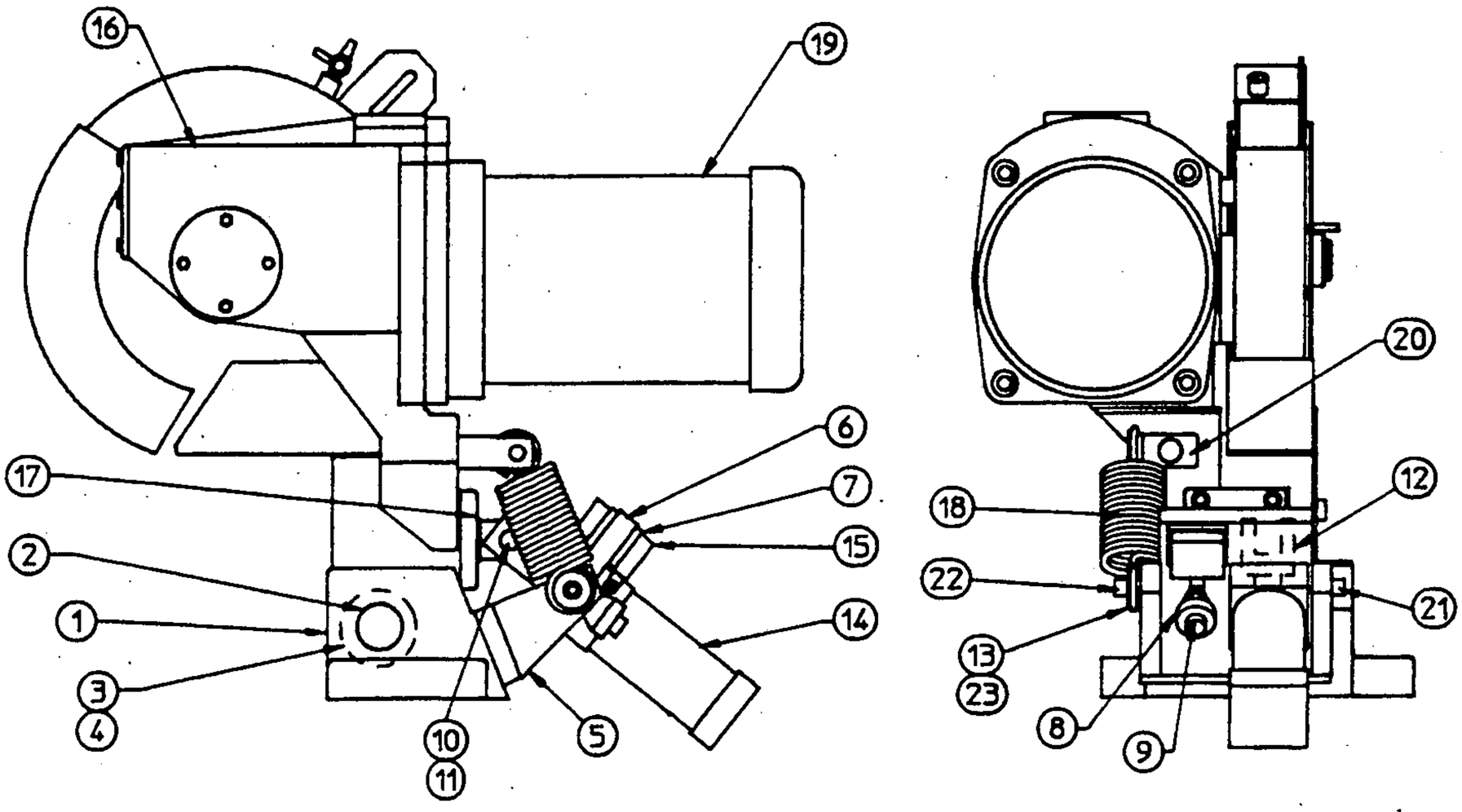
1	CS-8400	BLADE BRUSH BRACKET
2	SP-47	BLADE CLEANING BRUSH
3	9A-273	1/2 DIA x 5/8 LG. SOCKET HEAD SHOULDER SCREW
4	9A-272	BLADE BRUSH SPACER
5		3/8 FLAT WASHER
6		3/8 LOCK WASHER
7		3/8-16UNC x 3/4 WINGHEAD SHOULDER THUMB SCREW
8		3/8-16 UNC HEX NUT

HEAD FRAME PARTS
CS–350 / CS–350PV
FS–350 / FS–350PV



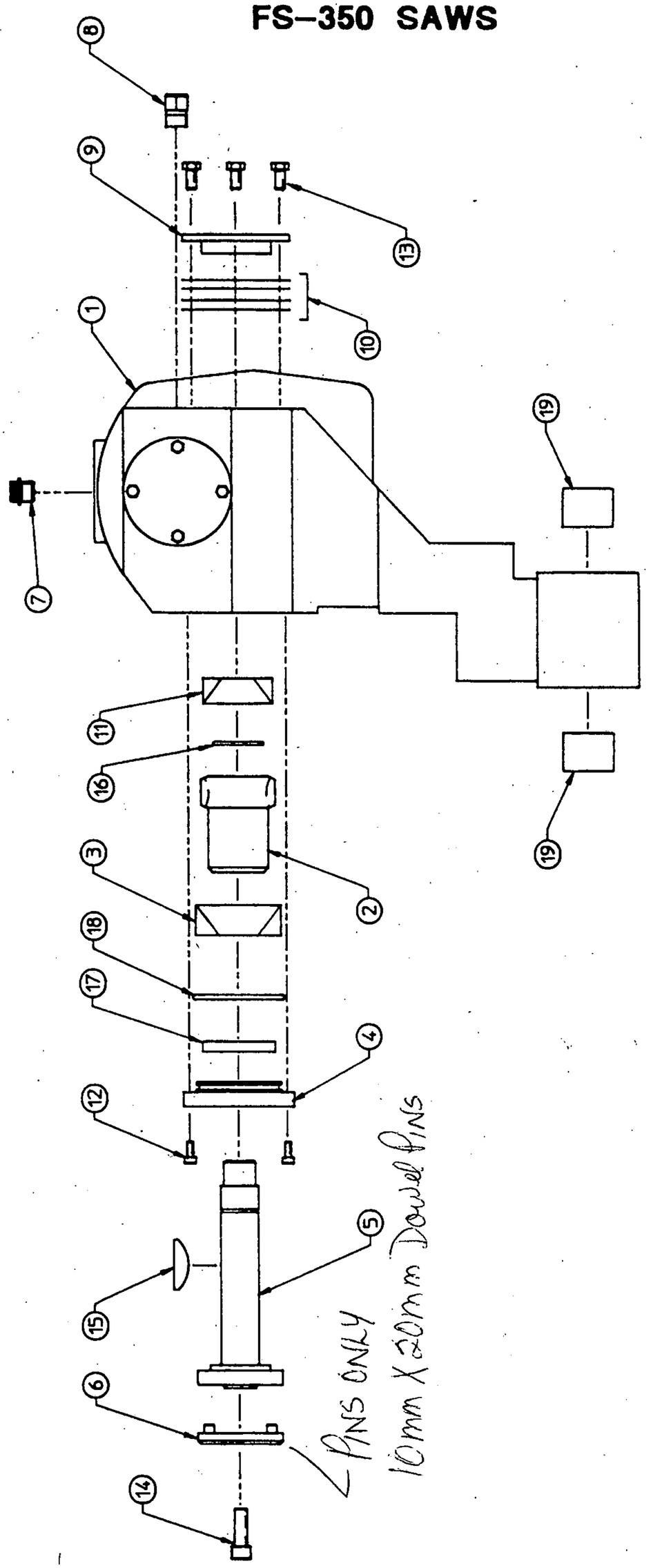
1	CS-3210	HEAD SUPPORT CASTING
2	CS-8610	PIVOT SHAFT
3	CS-3260	ADJUSTING RING COLLAR
4	CS-3265	ADJUSTING RING NUT
5	CS-3598	SPRING PIN
6	CS-3575	SNAP RING: TRUARC #X-5133-74 (2)
7	CS-3596	SPRING SLEEVE (2)
8	CS-4020-1	AIR VALVE (CS-350PV/FS-350PV ONLY)
9	CS-5054-1	LIMIT SWITCH TRIGGER (CS-350PV/FS-350PV ONLY)
10	CS-3150	CLEVIS BRACKET
11	CS-8201	HEAD RETURN SPRING
12	CS-8202-1	SPRING BRACKET
13		3/4 SAE FLAT WASHER (7)

POWERED HEAD PARTS
FS-350SA/FS-350A



1	CS-3210	HEAD SUPPORT CASTING
2	CS-8610	PIVOT SHAFT
3	CS-3260	ADJUSTING RING COLLAR
4	CS-3265	ADJUSTING RING NUT
5	CS-3510	CYLINDER MOUNT BRACKET
6	CS-3520	CYLINDER MOUNT
7	CS-3530	SWITCH MOUNTING PLATE (2)
8	CS-3550	STOP COLLAR (2)
9	CS-3560	STOP ROD CLEVIS ASSEMBLY
10	CS-3570	CLEVIS PIN
11	CS-3575	SNAP RING: TRUARC #X-5133-74
12	CS-3580	CYLINDER CLEVIS: PARKER #50942
13	CS-8230	SPRING ROLLER (2)
14	CS-4014	CYLINDER: 2 1/2" BORE x 3 3/4" STROKE
15	CS-5057	LIMIT SWITCH: OMRON #D4C-1603 (2)
16	CS-8100-1	GEARBOX CASTING
17	CS-3150	CLEVIS BRACKET
18	CS-8201	HEAD RETURN SPRING
19	CS-8205A	MOTOR: 1.5/3 HP (208/230V)
	CS-8205B	MOTOR: 1.5/3 HP (460V)
20	CS-8203	ASSIST SPRING BRACKET
21	X-143	5/8 x 1 SOCKET HEAD SHOULDER SCREW
22		5/8 x 1 1/2 SOCKET HEAD SHOULDER SCREW
23		5/8 SAE FLAT WASHER (2)

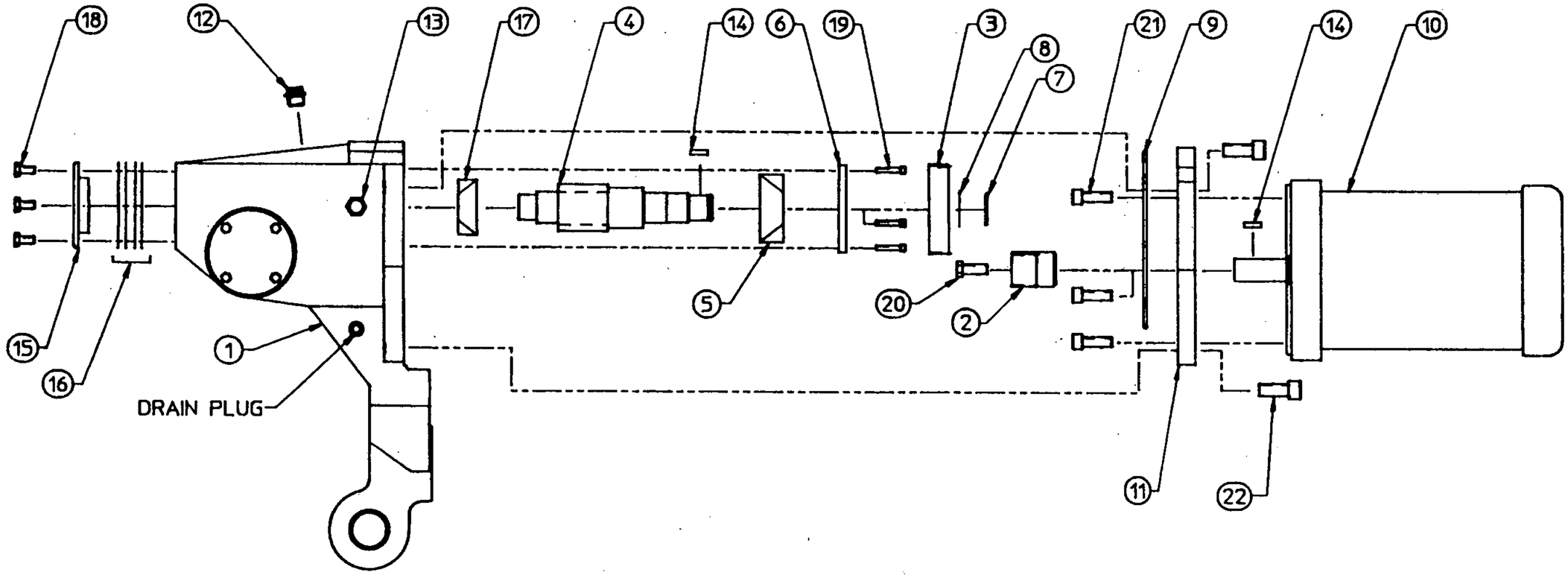
GEARBOX ASSEMBLY 1
FS-350 SAWS



10	X-124	BACK COVER SHIM
11	X-133	SMALL BEARING ASSEMBLY
12		1/4-20 x 7/8 SHCS (4)
13		3/8-16 x 7/8 HHCS (4)
14		1/2-13 x 1 1/2 SHCS
15	CS-8161	#TX WOODRUFF KEY (3/8 x 2 NOMINAL)
16	CS-8171	RETAINING RING
17	CS-8172	OIL SEAL
18	CS-8173	O-RING
19	CS-8600	BUSHING (2)

1	CS-8100	GEARBOX CASTING
2	CS-8154	WORM GEAR
3	CS-8156	LARGE BEARING ASSEMBLY
4	CS-8158	BEARING RETAINER
5	CS-8160	SPINDLE SHAFT
6	CS-8165	SPINDLE DRIVE PLATE
7	CS-8220	OIL FILLER PLUG
8	CS-8221	SIGHT LEVEL GAUGE
9	X-116	BACK COVER

GEARBOX ASSEMBLY 2
CS-350/FS-350 SAWS



1	CS-8100	GEARBOX CASTING
2	CS-8150	LOW SPEED DRIVE GEAR (20/40 RPM)
	CS-8152	HIGH SPEED DRIVE GEAR (30/60 RPM)
3	CS-8151	LOW SPEED DRIVEN GEAR (20/40 RPM)
	CS-8153	HIGH SPEED DRIVEN GEAR (30/60 RPM)
4	CS-8155	WORM SHAFT
5	CS-8156	LARGE BEARING ASSEMBLY
6	CS-8157	INTERNAL BEARING RETAINER
7	CS-8170	RETAINING RING
8		1.25 x 1.75 ARBOR SHIM
9	CS-8174	O-RING
10	CS-8205A	3/1.5 HP 2 SPEED MOTOR-208/230V
	CS-8205B	3/1.5 HP 2 SPEED MOTOR-460V
11	CS-8210	MOTOR PLATE
12	CS-8220	OIL FILLER PLUG
13	CS-8221	SIGHT LEVEL GAUGE
14	V20-2142	1/4 x 7/8 KEY (2)
15	X-116	BACK COVER
16	X-124	BACK COVER SHIM
17	X-133	SMALL BEARING ASSEMBLY
18		3/8-16 x 7/8 HHCS (4)
19		1/4-20 x 1 1/4 SHCS (4)
20		1/2-13 x 1 1/4 HHCS
21		1/2-13 x 1 1/2 SHCS (4)
22		5/8-11 x 1 1/2 SHCS (4)

SQUARING THE VISE
CIRCULAR SAWS

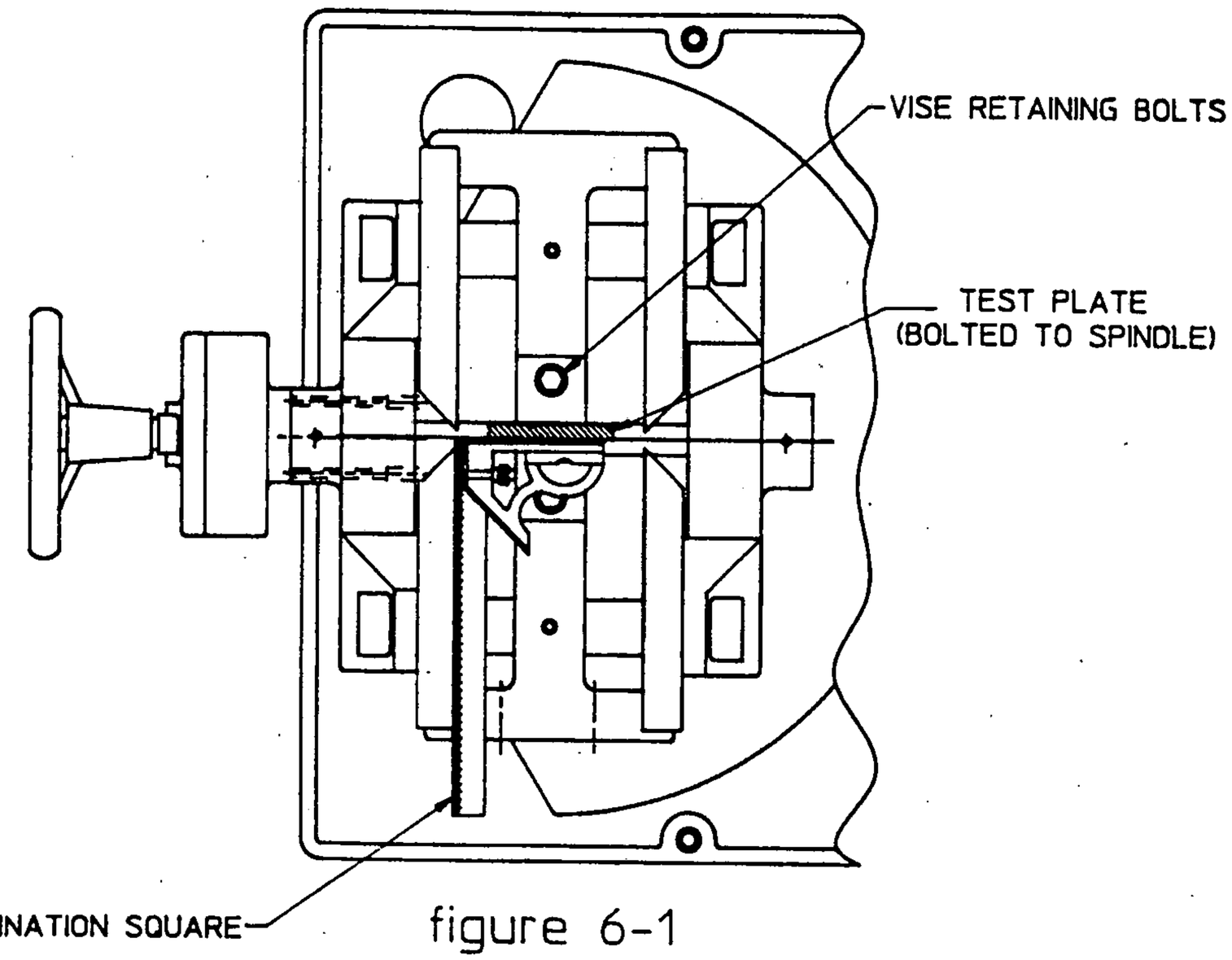


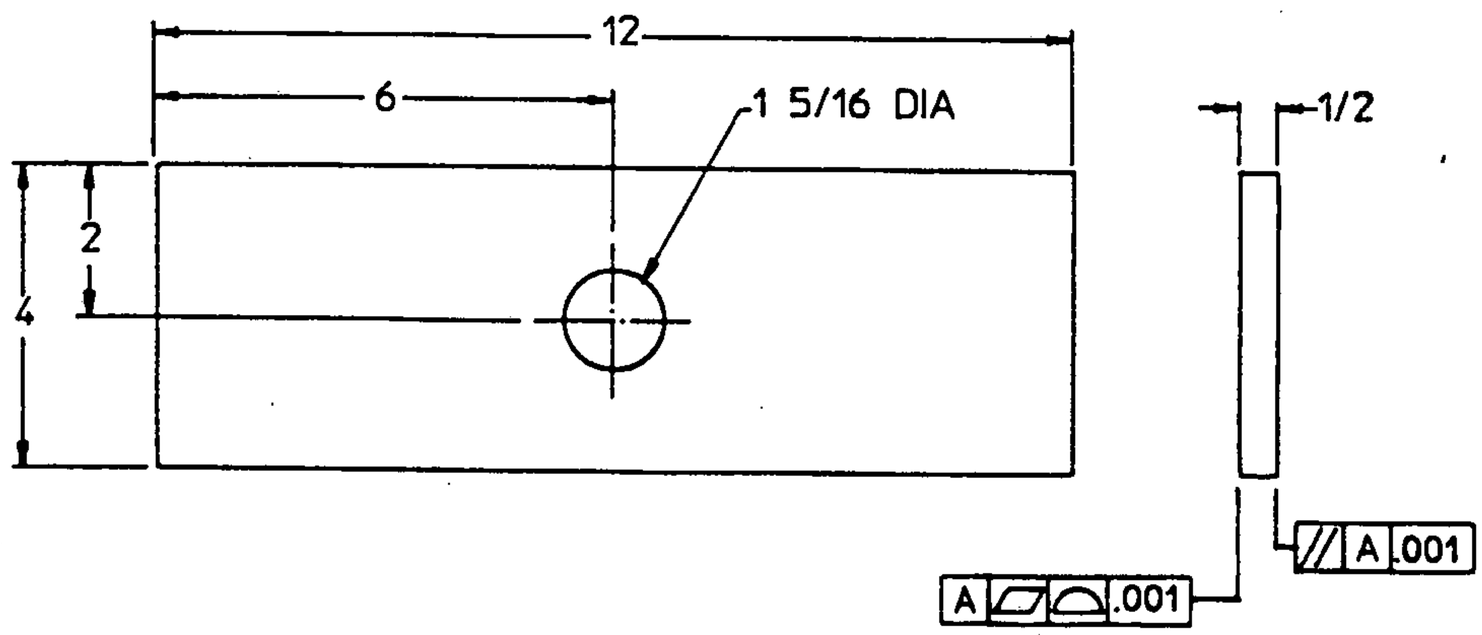
figure 6-1

1. Remove the saw blade and replace it with a plate similar to the one shown below. The critical dimensions for making this plate are those for the hole diameter and the flatness and parallelism.

2. The vise alignment may be adjusted by loosening the two vise retaining bolts. Once the vise jaws are square with the test plate as shown above, re-tighten the vise retaining bolts. Re-insert the rubber plugs over the retaining bolts to keep parts from 'catching' as stock feeds across the vise support.

figure 6-2

TEST PLATE (REPLACES BLADE)



SAW VISE CYLINDER REPLACEMENT

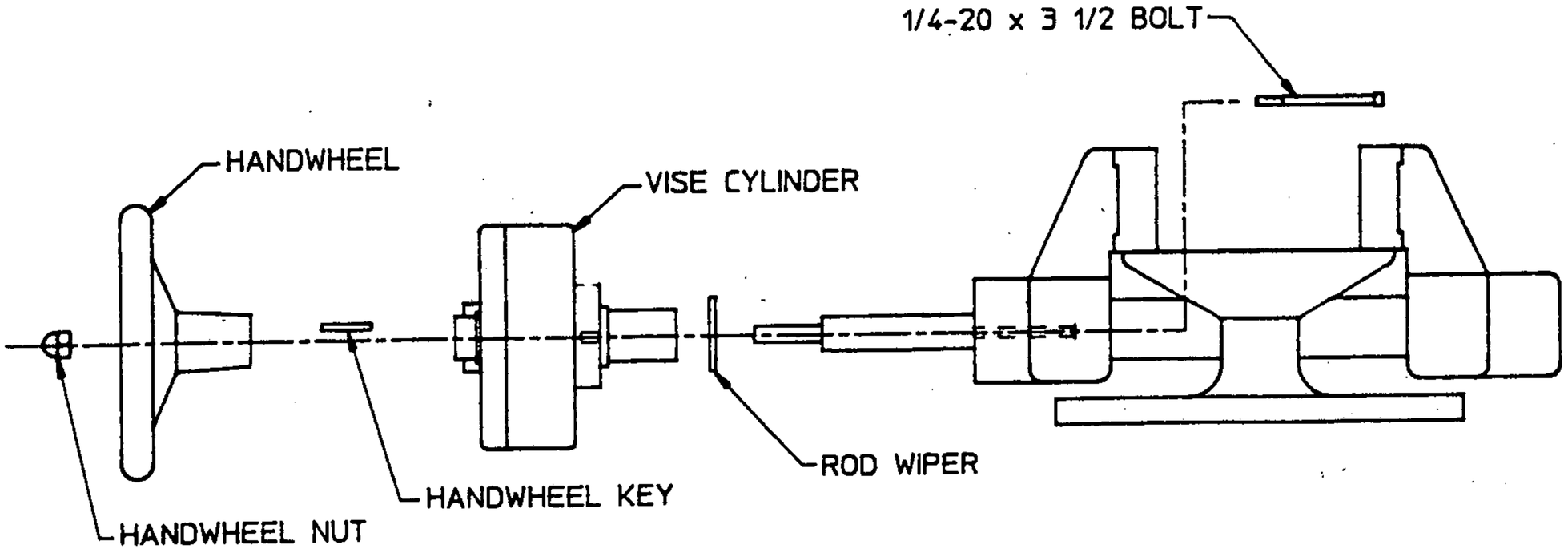


figure 6-3

TO REMOVE THE VISE CYLINDER:

1. Turn the electrical power off and remove the air supply to the saw.

2. Remove the handwheel nut, handwheel, key, and air lines from the vise.

3. Remove the 1/4-20 x 3 1/2" cap screws from inside the front vise jaw.

4. Rotate the vise cylinder counter-clockwise to unscrew the cylinder from the vise screw.

TO REPLACE THE VISE CYLINDER:

1. Make sure the cylinder rod is extending fully out of the front of the vise cylinder (port side).

2. Make sure the vise jaws are centered on the vise support.

3. Slide the rod wiper onto the cylinder rod as shown, up to the shoulder on the rod.

4. Screw the vise cylinder clockwise onto the vise screw until it makes contact with the vise jaw - make sure the ports are on the bottom of the cylinder.

5. Check to see that the vise jaws are still centered, and replace the 1/4-20 x 3 1/2 cap screws to connect the cylinder to the vise jaw.

6. Re-attach the air lines to the cylinder ports and turn the air supply back on. Check the vise operation to make sure the vise operates correctly. Reverse the lines if necessary.

7. If everything checks out correctly, remount the handwheel. The saw is again ready for operation.

VISE SCREW RETAINER REPLACEMENT

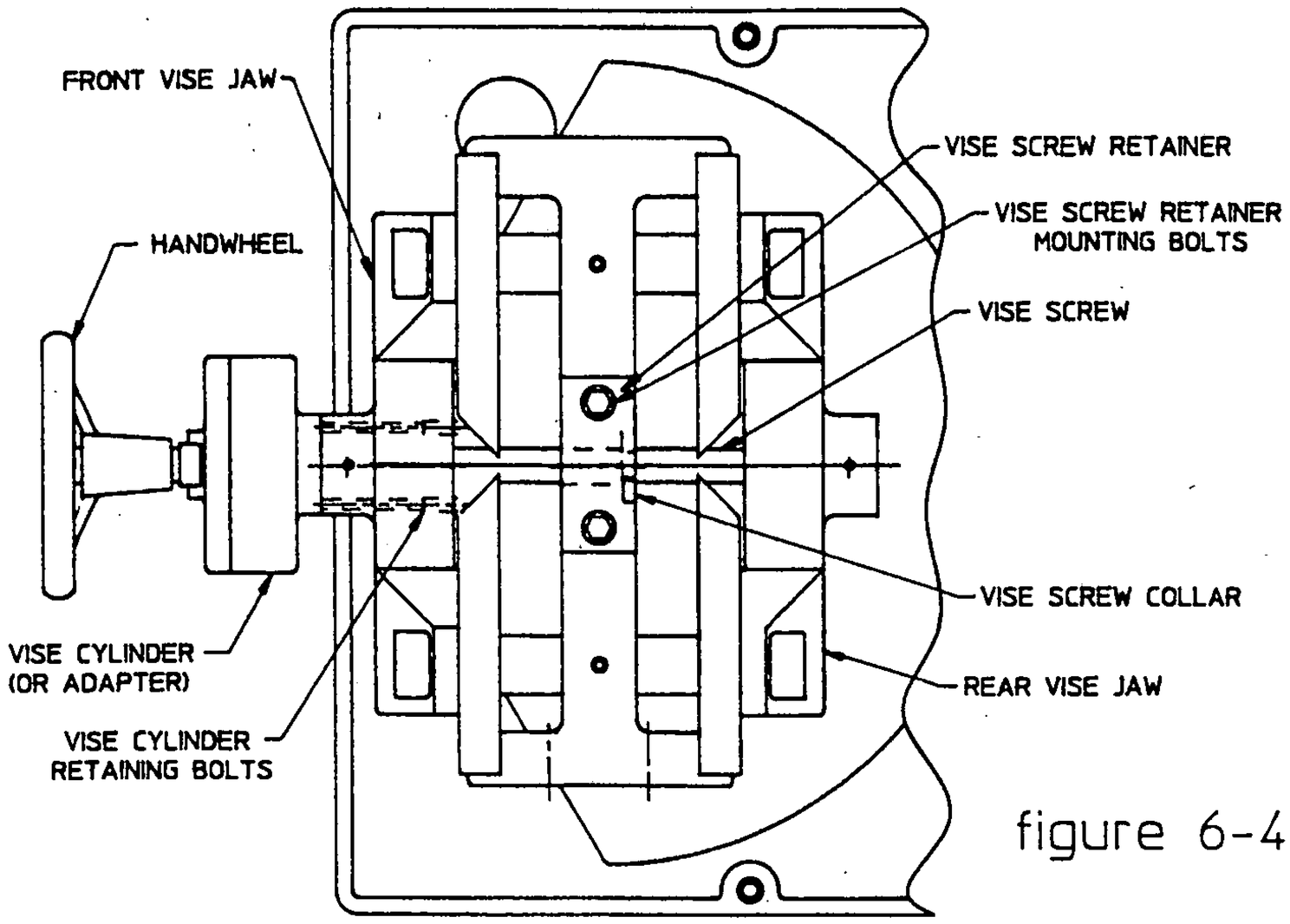


figure 6-4

1. Open the vise to allow access to the backside of the front vise jaw. Remove the two 1/4-20 x 3 1/2 cap screws that attach either the vise adapter (manual vise) or the vise cylinder (air vise) to the vise jaw.

2. Remove the handwheel and unscrew the vise adapter or vise cylinder (turn counter-clockwise).

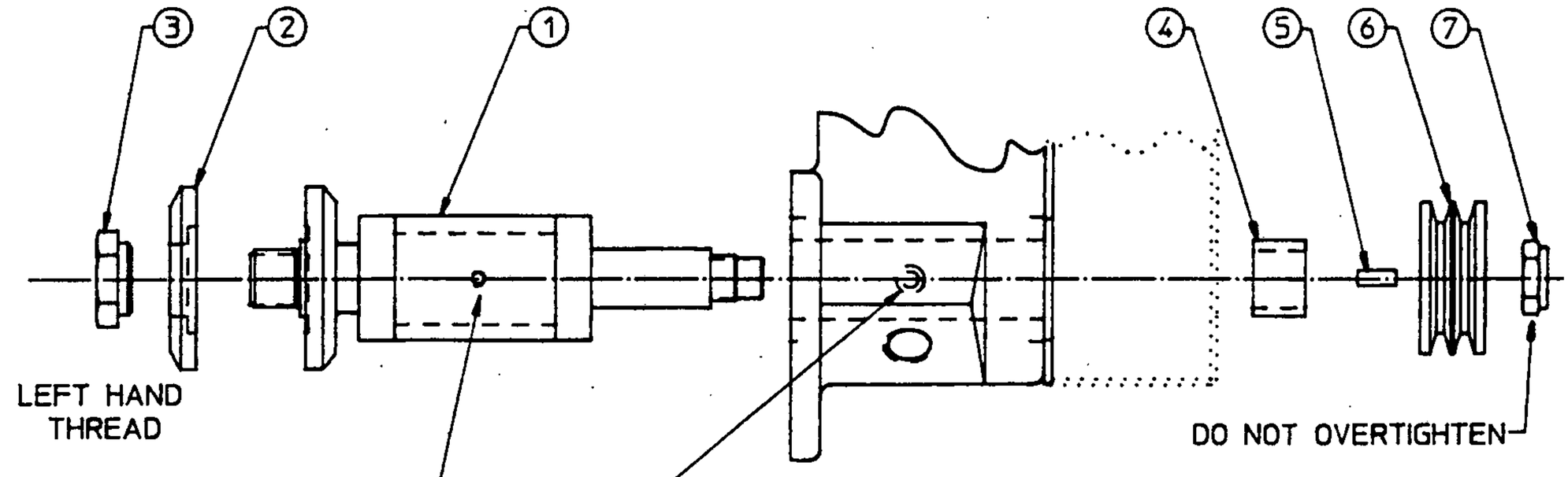
3. Loosen the socket head screw in the vise collar - it may be necessary to rotate the vise screw to align the screw with the relief in the retainer block.

4. Replace the handwheel and key. It should not be necessary to tighten the nut. Turn the handwheel counter clockwise until the rear vise jaw is off the screw. Pull the vise screw and front jaw off and set them aside.

5. Remove the two vise retaining bolts. Replace the retainer block, making sure that the top surface of the block is flush with the cutting surface of the vise support casting. Production variations may make it necessary to shim under the retaining block for proper alignment.

6. Reverse steps 1-4 to reassemble the vise. Check the vise alignment. If necessary, re-align the vise as shown in the section on 'Squaring the Vise' (page 6.1).

SPINDLE REPLACEMENT
FA-350 SAWS



1	CS-3401	SPINDLE/BEARING SUB-ASSEMBLY
2	CS-3410	SPINDLE WASHER
3	CS-3420	SPINDLE NUT
4	CS-3450	PULLEY SPACER
5	V20-2142	KEY: 1/4 SQUARE x 7/8" LONG
6	CS-3460	DRIVEN PULLEY
7		3/4-10 LOCK NUT

figure 6.5

1. Disconnect power to the saw.

2. Remove the blade guards, belt guard, drive belts, driven pulley, and pulley spacer.

3. Remove the socket head cap screw located in the bottom of the head casting under the spindle.

4. Using a rubber mallet, drive the old spindle assembly out of the casting, toward the blade flange. The right side bearing may stay in place when the spindle comes out - if this happens, finish removing the spindle, then drive the bearing out toward the belt guard side of the casting. NOTE: the belt guard back plate may need to be removed for this step.

5. Slide the new spindle in from the blade side of the casting. DO NOT USE EXCESSIVE FORCE. Be careful to align the hole in the center bearing spacer with the hole in the bottom of the head casting. When the holes align, replace the cap screw in the casting.

6. Replace the parts removed in step 2. Be careful to properly tighten the drive belts (see page 1.4 for details)

CHANGING THE DRIVE MOTOR
FS-350 SAWS

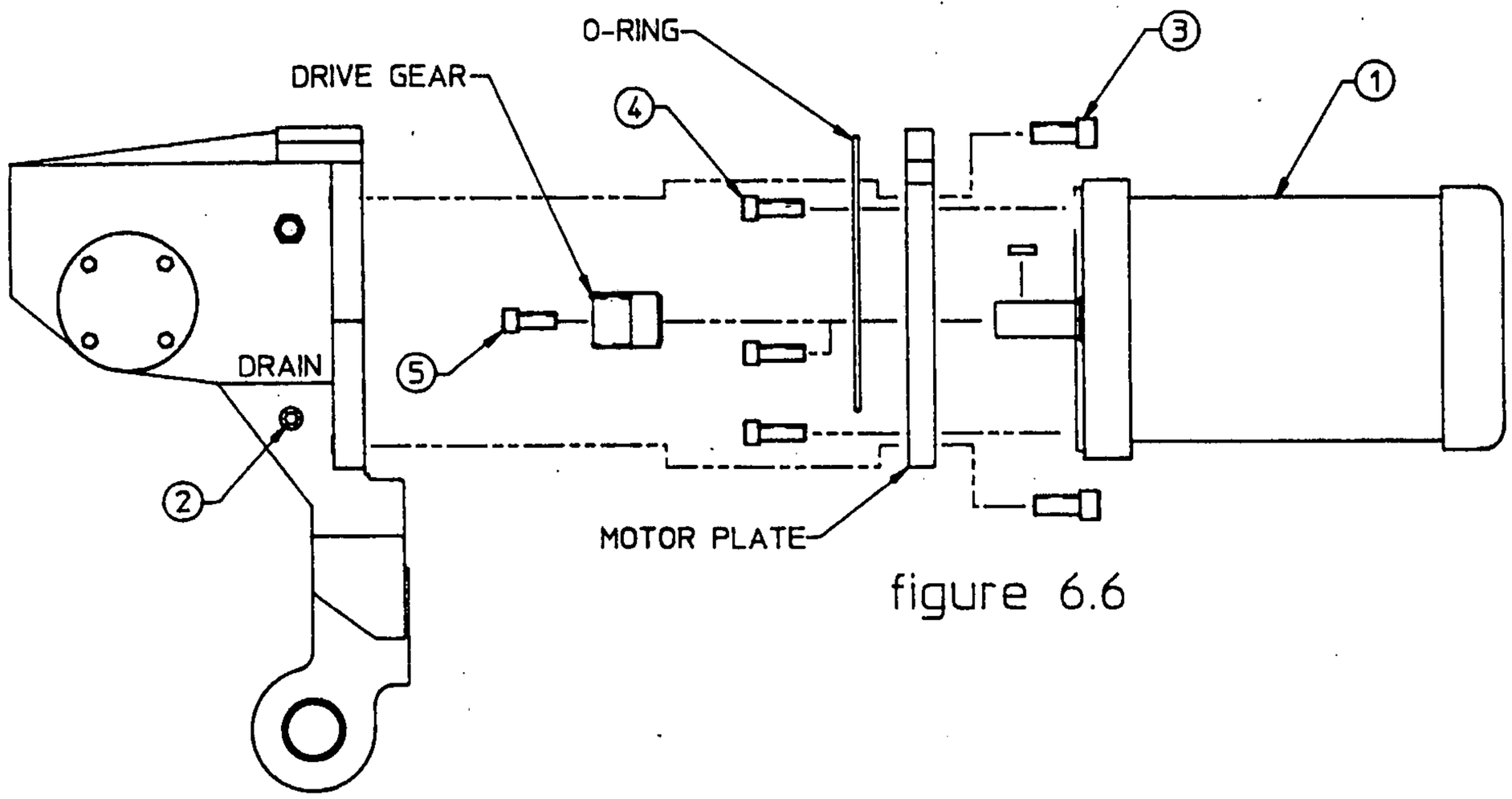


figure 6.6

1. Disconnect the power and open the wiring box on the side of the motor. Disconnect the wiring and remove the cable and fitting from the old motor.

2. Drain the gearbox by removing the drain plug on the right side of the casting. If it is not time to change the gearbox oil, it may be strained and reused. Refer to page 1.2 for the recommended change intervals.

3. Loosen the four bolts that hold the motor plate to the gearbox, and remove the motor/plate combination.

4. Separate the motor plate from the motor by removing the four bolts on the inside of the motor plate. It may be necessary to pry slightly to break the seal between the motor and plate.

5. Remove the bolt that holds the drive gear on the motor shaft and slide the gear off the shaft. Do not lose the key that may come off with the gear.

6. Reverse steps 1-5 to reassemble the saw.

NOTES:

a) Be sure to use removable 'Loctite' on the bolt that secures the drive gear to the motor shaft.

b) Scrape away the silicone sealer on the mating face of the motor and plate. Use fresh sealer at assembly to stop leaks.

c) Make sure the O-ring is securely in the groove on the motor plate face that mates to the gear box. If necessary, use a dab of grease to keep it in place.

d) Re-wire the motor according to the schematics included in section 8 of this manual.

CHANGING BLADE SPEEDS
FA-350 SAWS

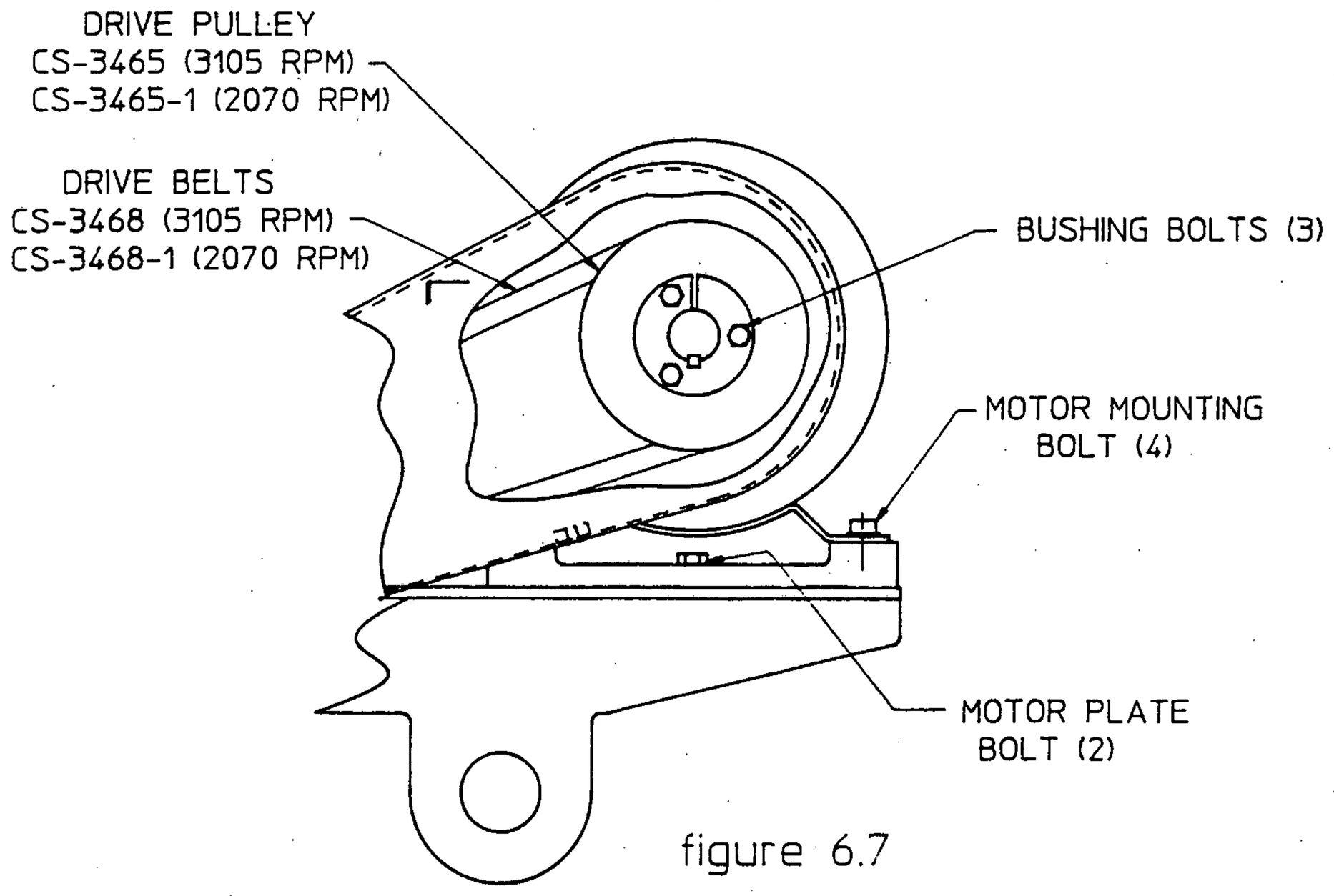


figure 6.7

1. Loosen the four motor mounting bolts and the two motor plate bolts.

2. Slide the motor towards the blade until the belts can be removed.

3. Remove the three bushing bolts from the drive pulley and slide the pulley off of the motor shaft.

4. Slide the new pulley on the motor shaft and tighten the bushing bolts.

5. Install the new drive belts.

6. The belts are retensioned by pushing the motor away from the blade until a slight thumb pressure on the center of the belts produces a 5/8" deflection and then tightening the motor plate bolts.

7. Re-tighten the motor mounting bolts.

CHANGING THE DRIVE GEARS
FS-350 SAWS

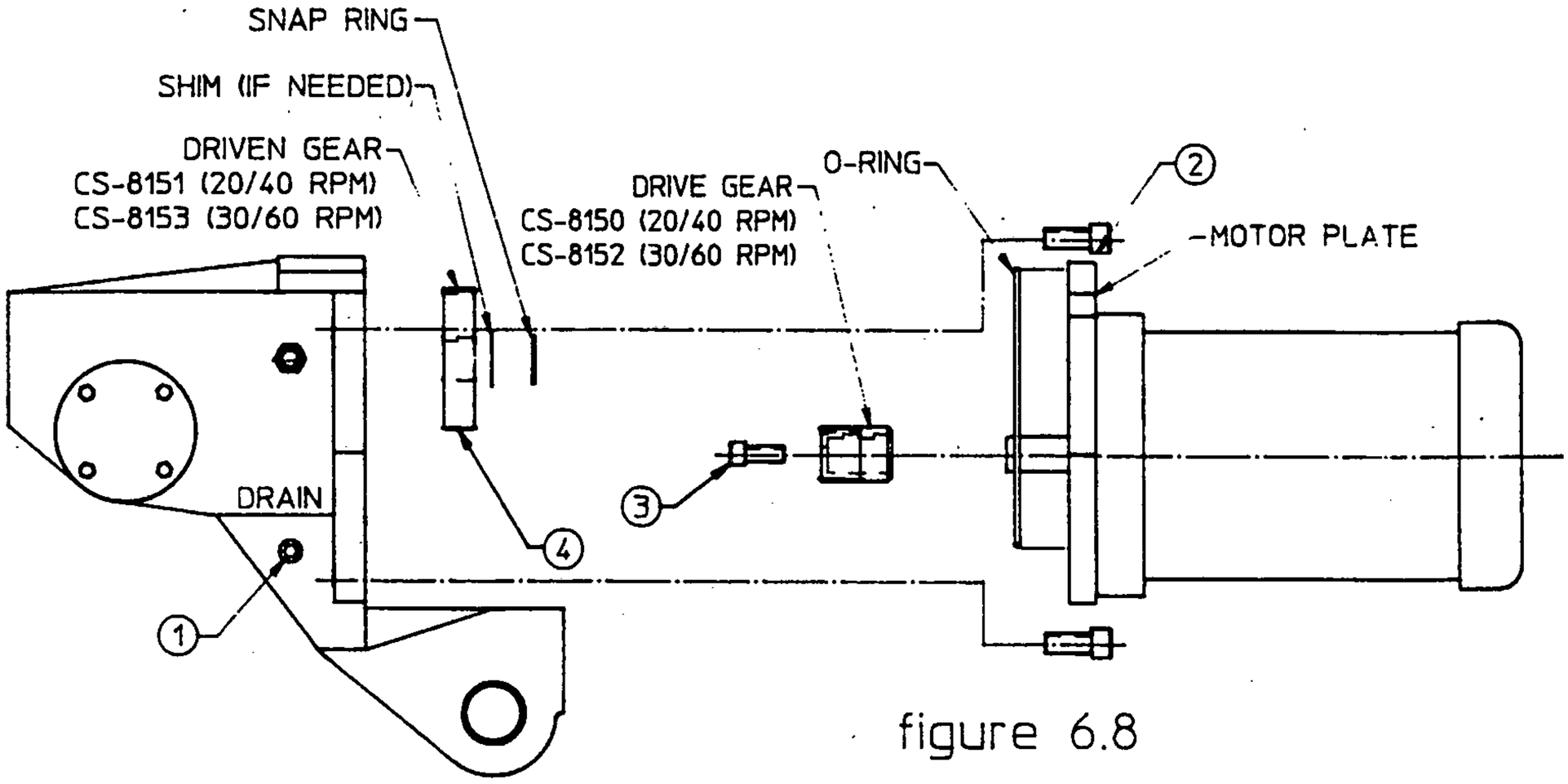


figure 6.8

1. Drain the gearbox by removing the plug on the right side of the casting. If it is not time to change the gearbox oil, it may be strained and reused. Refer to page 1.2 for the recommended oil change intervals.

2. Loosen the four bolts that hold the motor plate to the gearbox and separate the motor/plate from the gearbox.

3. Remove the bolt that holds the drive gear on the motor shaft and slide the gear off the shaft. Do not lose the key that may come off with the gear.

4. The driven gear is removed by removing the retaining ring from the worm shaft and sliding the gear off. Be careful not to lose the arbor space that may be used with the gear.

5. Reverse steps 2-5 to re-assemble the gear case. Only tighten the four bolts through the motor plate finger-tight with the motor/plate combination at the bottom of the mounting holes. Refill the gearbox with oil and start the motor on low speed. Using a prybar, pry up on the motor until gear noise is heard. Tap the motor down until the noise stops. Finish tightening the motor mounting bolts.

NOTES:

a) Be sure to use removable 'Loctite' on the bolt that secures the drive gear to the motor shaft.

b) Make sure the O-ring is securely in the groove on the motor plate face that mates to the gearbox. If necessary, use a dab of grease to keep it in place.

PARTS COUNTER CHANGING
AUTOMATIC SAWS

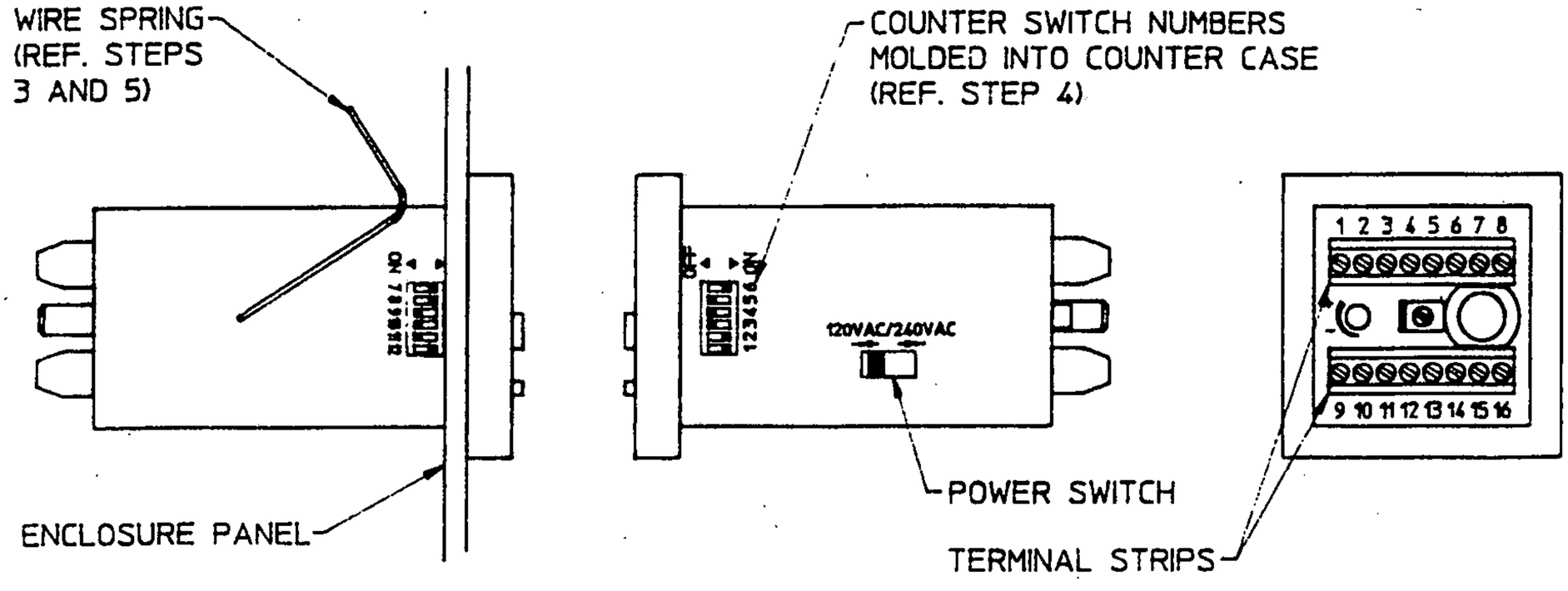


figure 6.9

1. Loosen the screws to open the counter enclosure.

2. Remove the wiring from the terminal strips. Note the position of the wires in the strip.

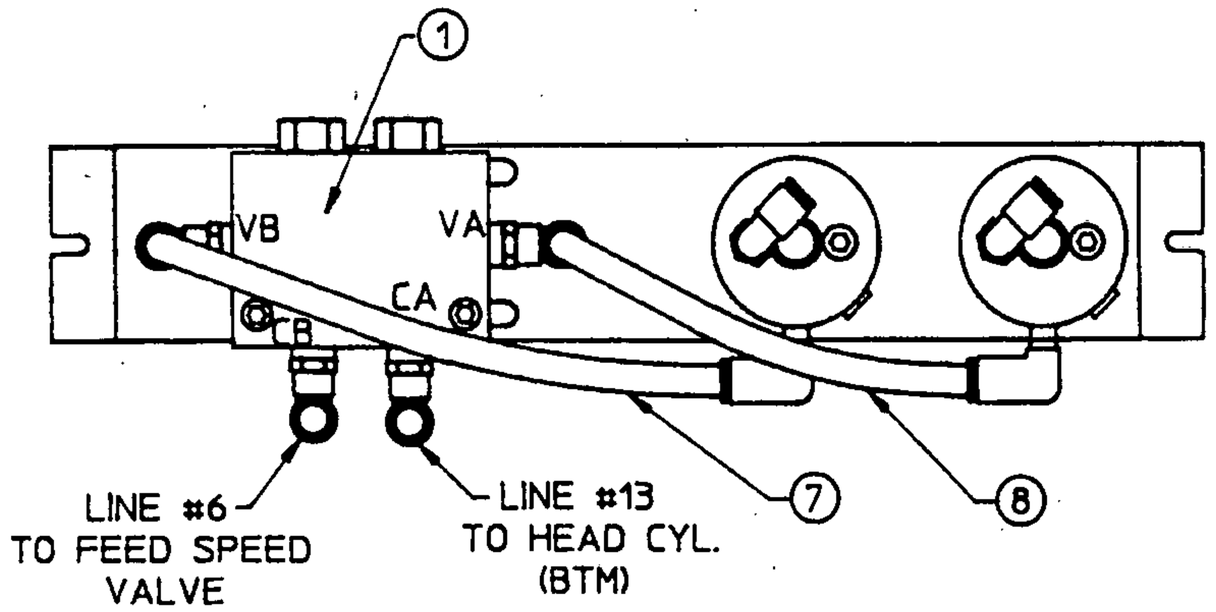
3. The counter is held against the panel by a wire spring. Release the spring by pushing up on the spring on each side of the counter. Pull the spring ends out of the counter to allow the counter to pass through the panel.

4. Set the switches on the sides of the counter (shown above). The switch numbers are molded into the counter case. Switches 1, 2, 9, 10, and 11 should be set 'on'-all others should be set 'off'. Set the power switch for 115V operation.

5. Remove the spring from the new counter and insert the counter through the panel opening. Re-install the spring in the counter and flip the spring against the panel, pushing it down to tension the counter against the panel.

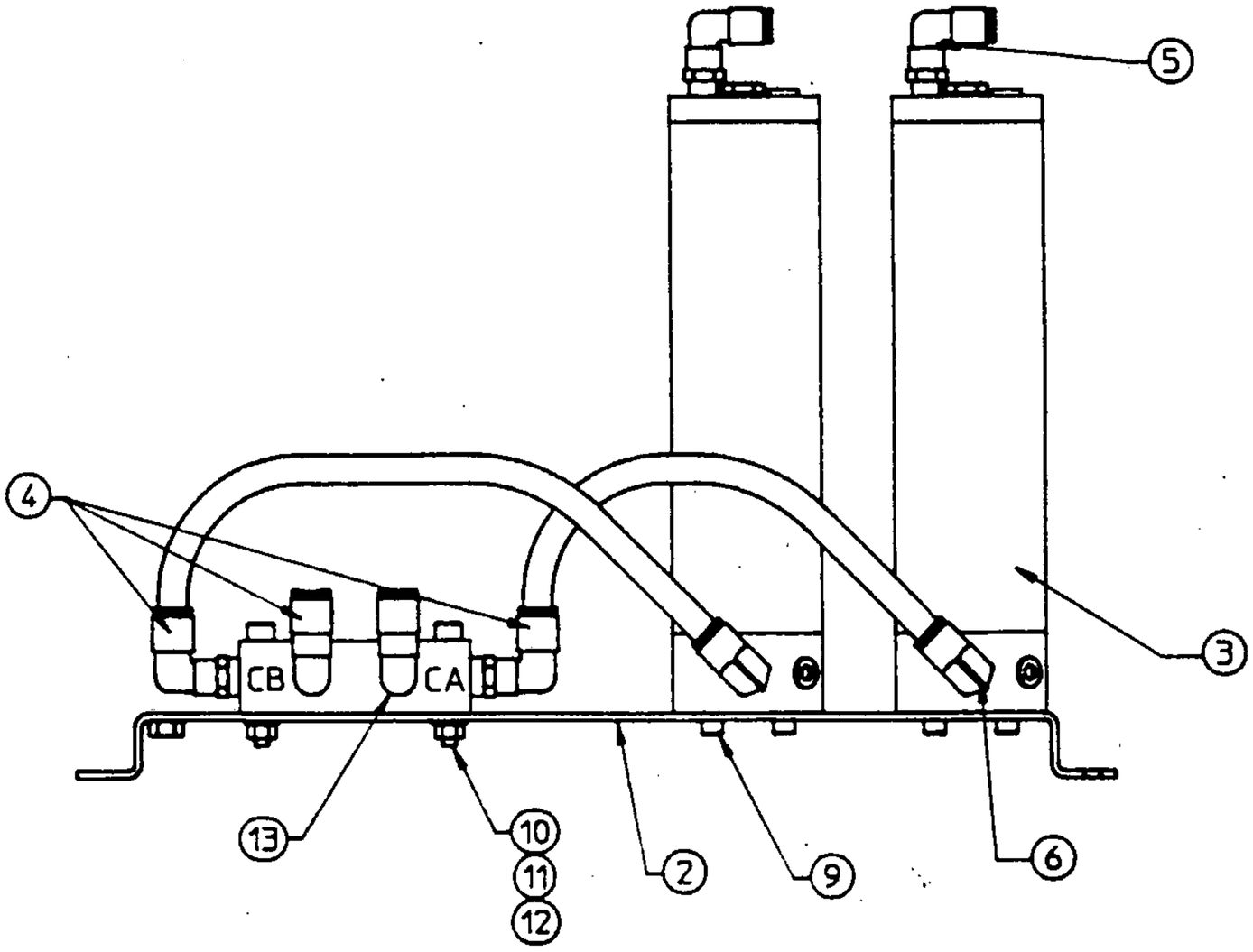
6. Re-connect the wiring (ref. page 8.13), close the panel, and tighten the screws.

HEAD FEED
RESERVOIR ASSEMBLY
CIRCULAR SAWS



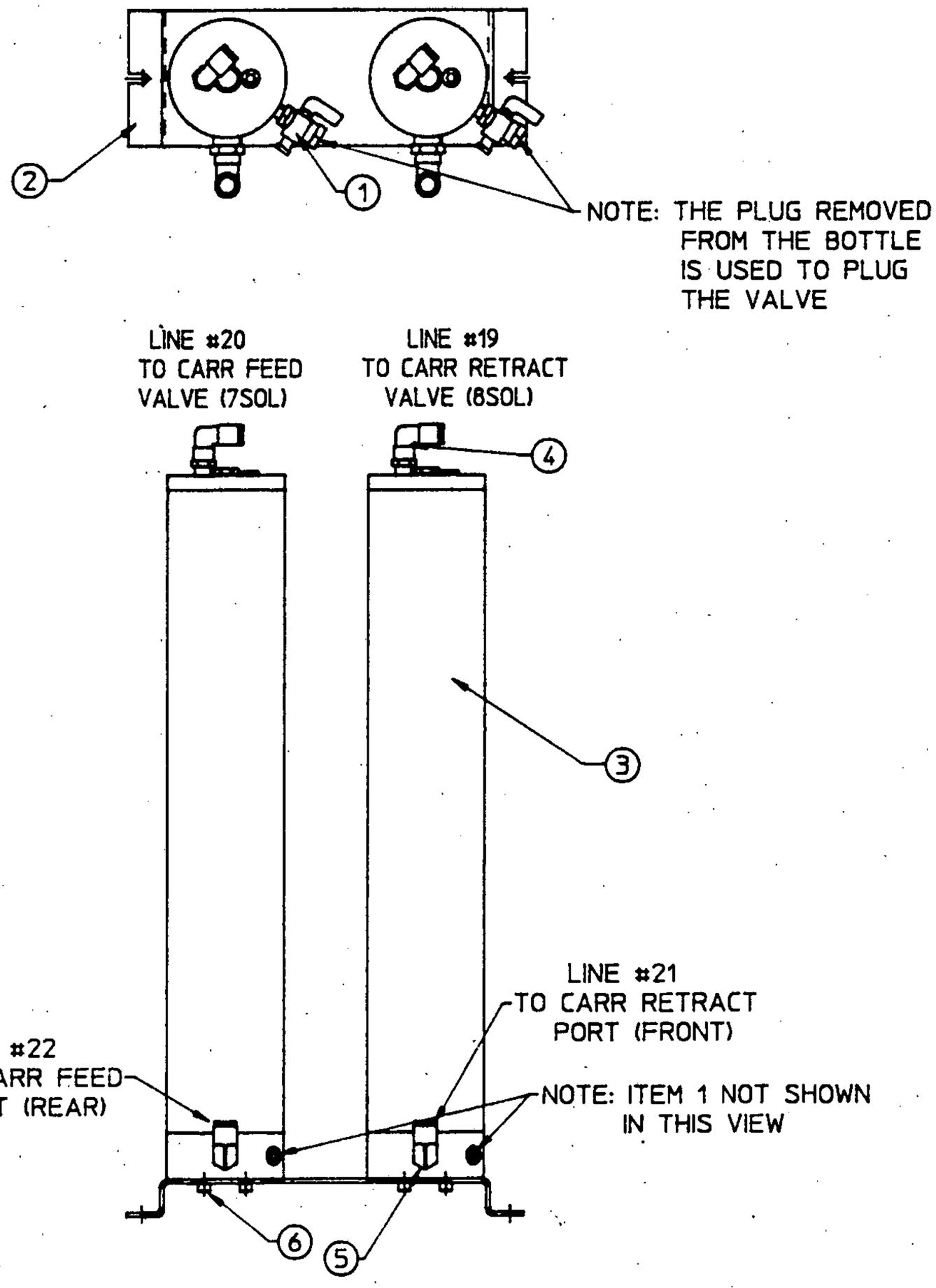
LINE #10A
TO HEAD FEED
PRESSURE VALVE

LINE #4A
TO HEAD LIFT
VALVE (1SOL)



1	CS-4043	DOUBLE P.O. CHECK VALVE: SUN #CKCC-XAN-YEB — USE CS-4003-1R CONV. KIT
2	V20-7114-1	VALVE MOUNTING PLATE
3	V20-7115	AIR/OIL RESERVOIR: LUBE DEVICES #A/OR 1030-2 (2)
4	V20-8019	3/8 NPT x 1/2 HOSE ELBOW: ALKON #AQ69-PS-8x6 (3)
5	V20-8028	1/4 NPT x 3/8 HOSE ELBOW: ALKON #AQ69-PS-6x4 (2)
6	V20-8029	1/4 NPT x 1/2 HOSE ELBOW: ALKON #AQ69-PS-8x4 (2)
7		1/2 PLASTIC TUBE x 12" LG (REF #5)
8		1/2 PLASTIC TUBE x 12" LG (REF #12)
9		1/4-20 x 3/4 SHCS (4)
10		5/16-18 x 1 3/4 SHCS (2)
11		5/16-18 HEX NUT (2)
12		5/16 FLAT WASHER (2)
13	V20-8019	3/8 NPT x 1/2 HOSE ELBOW: ALKON #AQ69-PS-8x6 (FA-350 SAWS)
	V20-8032	3/8 NPT x 1/4 HOSE ELBOW: ALKON #AQ69-PS-4x6 (FS-350 SAWS)

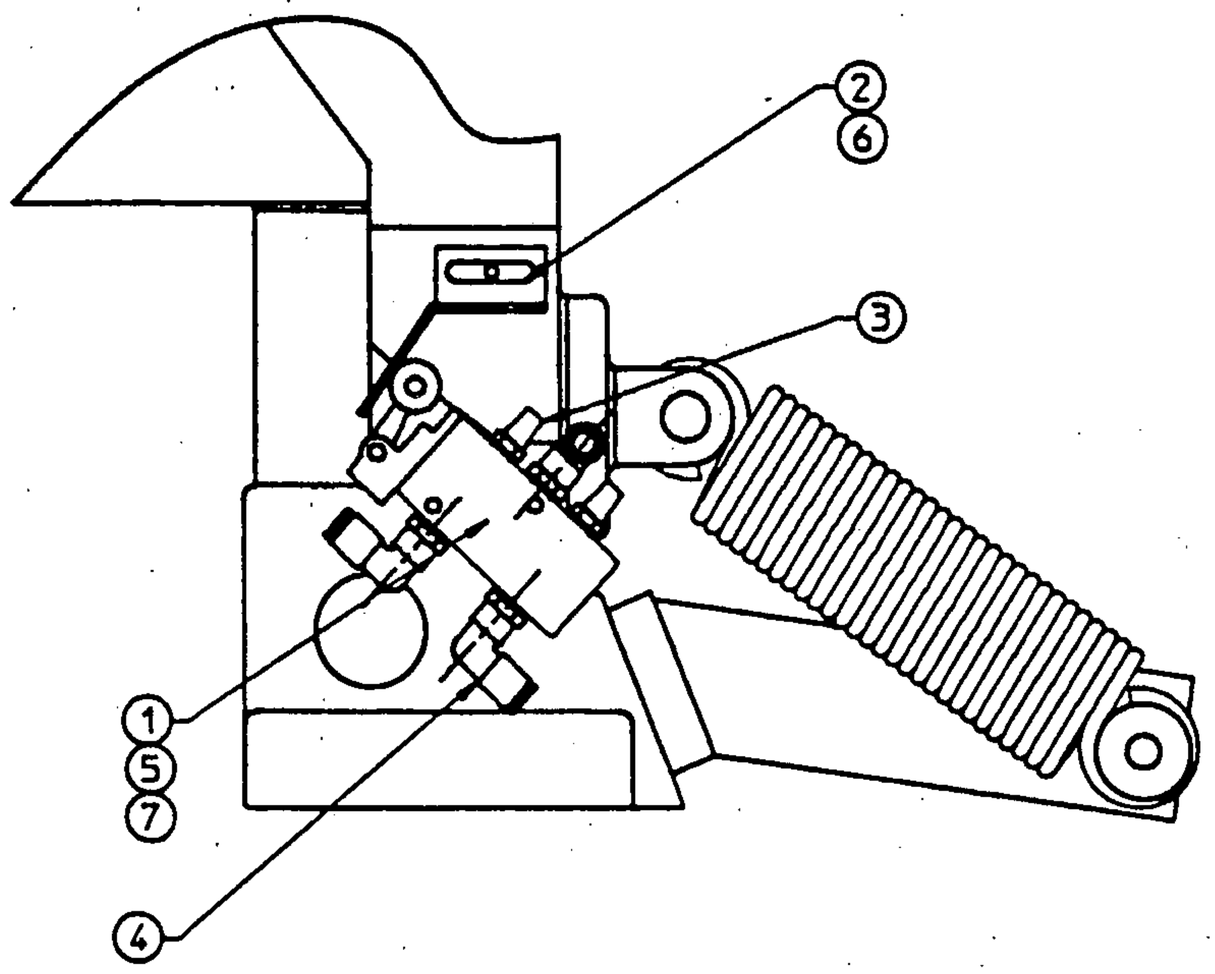
CARRIAGE FEED
RESERVOIR SUB-ASSEMBLY



1	C-11	SHUTOFF VALVE: PARKER #V402P-4-4 (2)
2	CS-4055	VALVE MOUNTING PLATE
3	CS-4056	AIR/OIL RESERVOIR: LUBE DEVICES #A/OR 2150-4 (2)
4	V20-8028	1/4 NPT x 3/8 HOSE ELBOW: ALKON #AQ69-PS-6x4 (2)
5	V20-8030	1/2 NPT x 1/2 HOSE ELBOW: ALKON #AQ69-PS-8x8 (2)
6		1/4-20 x 3/4 SOCKET HEAD CAP SCREW (4)

EFFECTIVE FOR MACHINES BUILT AFTER S/N 241

PNEUMATIC VALVE PARTS
CS-350PV / FS-350PV



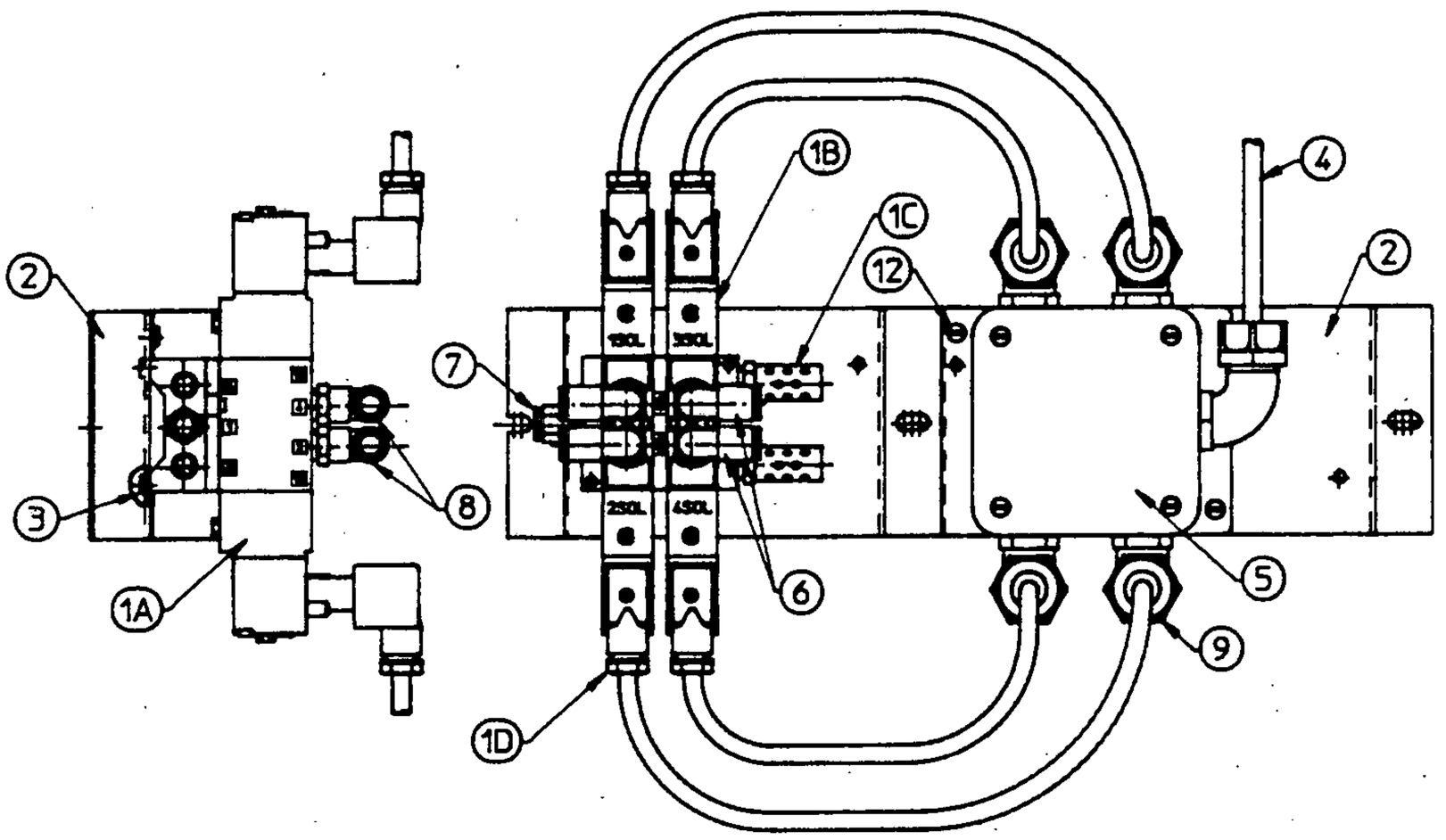
1	CS-4020-1	AIR VALVE
2	CS-5054-1	LIMIT SWITCH TRIGGER
3	V20-7122-1	MUFFLER: PARKER #EM12 (2)
4	V20-8027	1/8 NPT x 3/8 HOSE ELBOW: ALKON #AQ69-PS-6x2
5		10-24UNC x 1 1/2 SOCKET HEAD CAP SCREW (2)
6		1/4-20UNC x 3/8 SOCKET HEAD CAP SCREW
7		#10 FLAT WASHER (12) - 6 LOCATED BETWEEN THE VALVE AND THE HEAD FRAME ON EACH MOUNTING SCREW (ITEM 5)

NOTE: SOME EARLY SAWS USED 1/4" TUBING, THE FITTING FOR THIS TUBING IS:

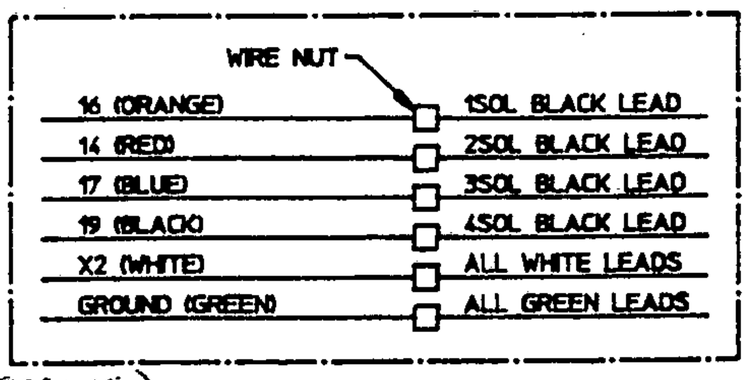
4	V20-8002	1/8 NPT x 1/4 HOSE ELBOW: ALKON #AQ69-PS-4x2

CS-4022 Humphrey 0626I-3-10-36-80

VALVE MANIFOLD ASSEMBLY
SEMI-AUTOMATIC SAWS



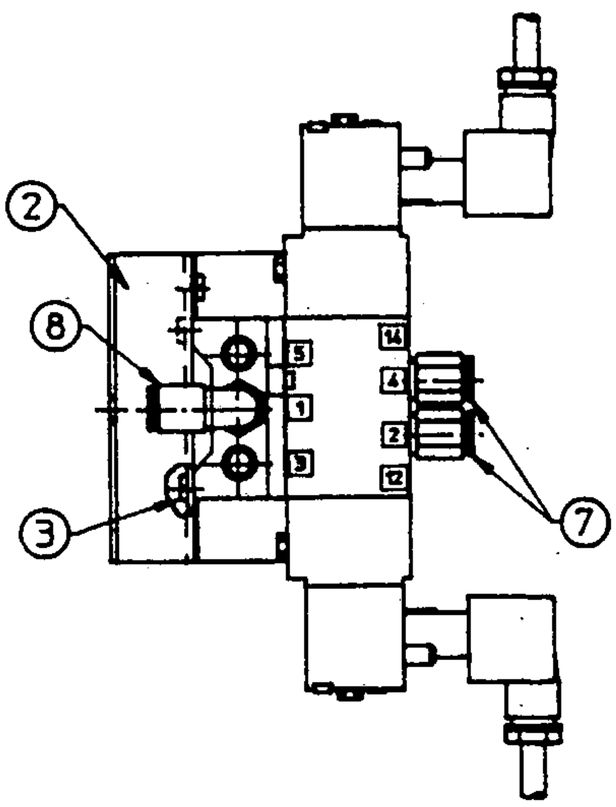
VALVE WIRING

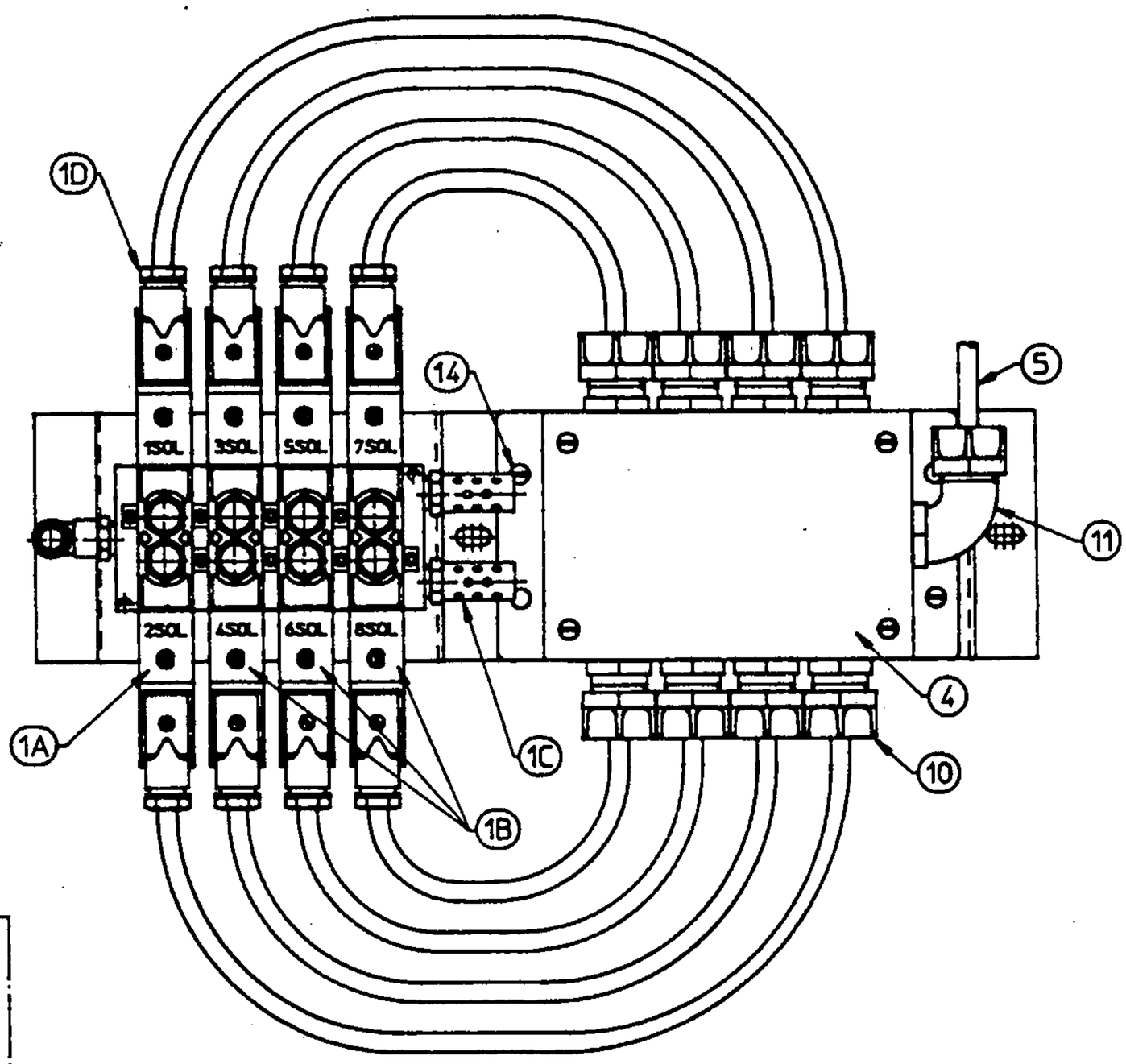


CS-4035G (MTG BLOCK, 6 orings, 6 screws)
CS-4035F Orings (6 req'd)
CS-4035E COIL ONLY FOR CS-4035A

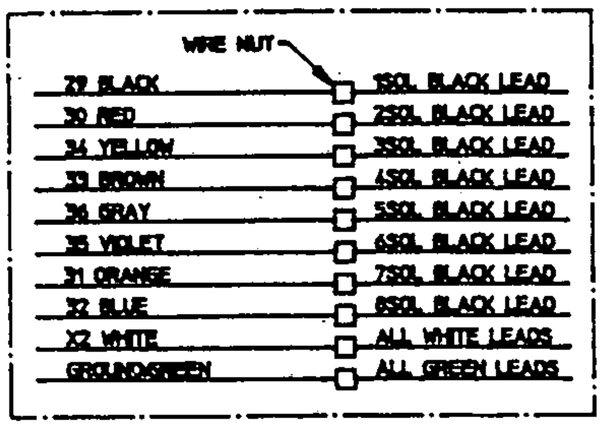
1	CS-4035	VALVE MANIFOLD WITH MUFFLERS
1A	CS-4035A	NUMATICS #L12BB5520 SOLENOID VALVE
1B	CS-4035B	NUMATICS #L12BB6520 SOLENOID VALVE
1C	CS-4035C	NUMATICS #B-28 1/4 NPT MUFFLER
1D	CS-4035D	NUMATICS #230-366-SP 3 PIN PLUG W/LITE AND CORD
2	CS-4044	VALVE MOUNTING PLATE
3	CS-4045	M4 x 12 MM PHMS: MC MASTER CARR #90353A214 (2)
4	CS-5056A	6 COND 20AWG CABLE: ALPHA #5056C (8')
5	HA-15303	JUNCTION BOX: APPLETON #JIC-2
6	V20-8001	1/4 NPT x 1/4 HOSE ELBOW: ALKON #AQ69-PS-4X4 (2)
7	V20-8026	1/4 NPT x 3/8 HOSE CONN: ALKON #AQ68-P-6X4
8	V20-8028	1/4 NPT x 3/8 HOSE ELBOW: ALKON #AQ69-PS-6X4 (2)
9		REMKE #RSR-9106 CORD GRIP (5)
10		
11		
12		#8-32 x 3/8 SELF-TAPPING SCREW (2)

VALVE MANIFOLD ASSEMBLY
AUTOMATIC SAWS



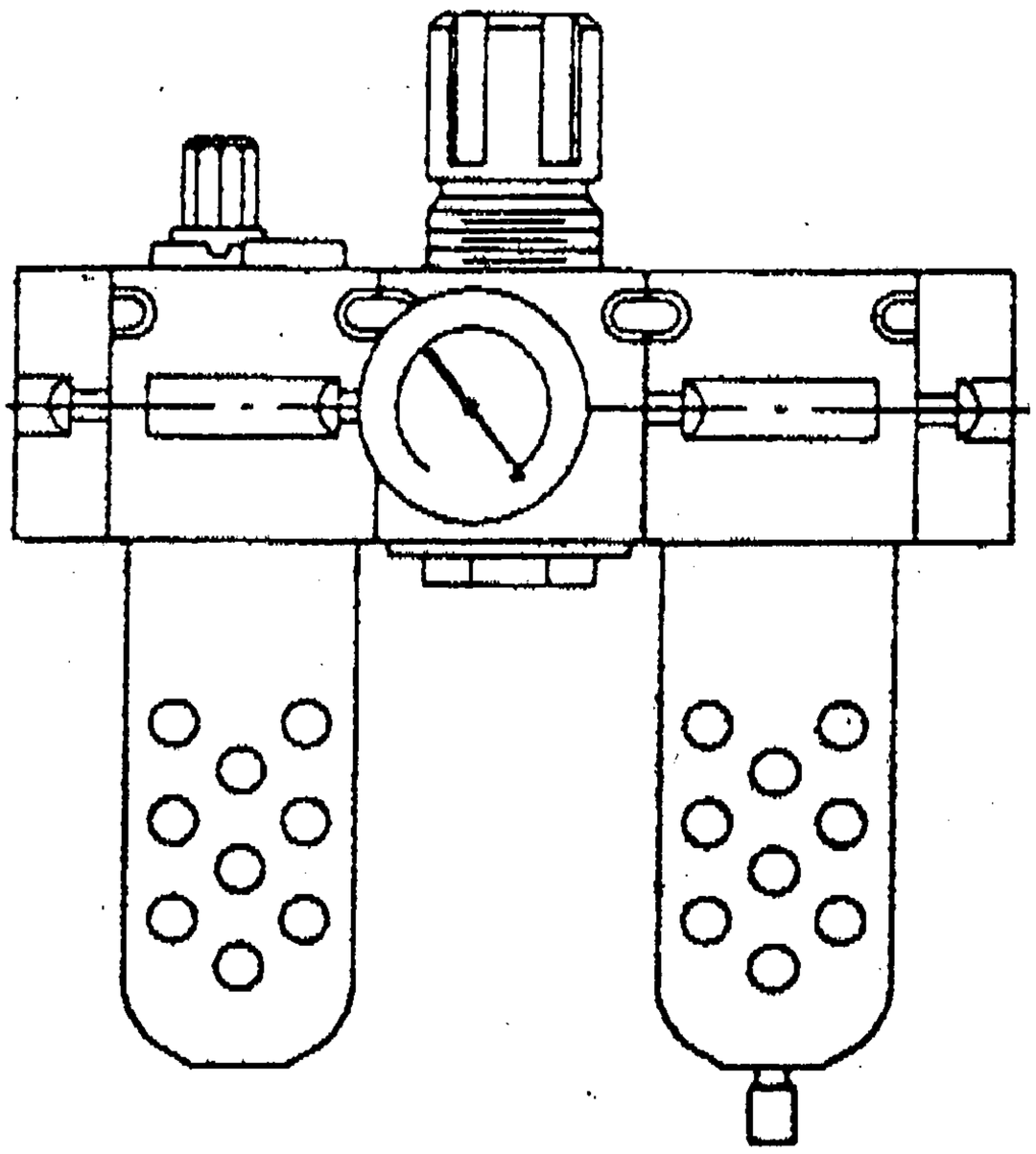


VALVE WIRING



1	CS-4036	VALVE MANIFOLD WITH MUFFLERS
1A	CS-4035A	NUMATICS #L12BB5520 SOLENOID VALVE
1B	CS-4035B	NUMATICS #L12BB6520 SOLENOID VALVE — Coil only 237-569
1C	CS-4035C	NUMATICS #B-28 1/4 NPT MUFFLER
1D	CS-4035D	NUMATICS #230-366-SP 3 PIN PLUG W/LITE AND CORD
2	CS-4044	VALVE MOUNTING PLATE
3	CS-4045	M4 x 12 MM PHMS: MC MASTER CARR #90353A214 (2)
4	H3-3230	JUNCTION BOX: HOFFMAN #A604SC
5	H3-5037	10 COND 18AWG CABLE: ALPHA #5070C (8')
6		
7	V20-8026	1/4 NPT x 3/8 HOSE CONN: ALKON #AQ68-P-6X4 (8)
8	V20-8028	1/4 NPT x 3/8 HOSE ELBOW: ALKON #AQ69-PS-6X4
9		
10		REMKE #RSR-106 CORD GRIP (8)
11		REMKE #RSR-9106 CORD GRIP
12		
13		
14		#8-32 x 3/8 SELF-TAPPING SCREW (2)

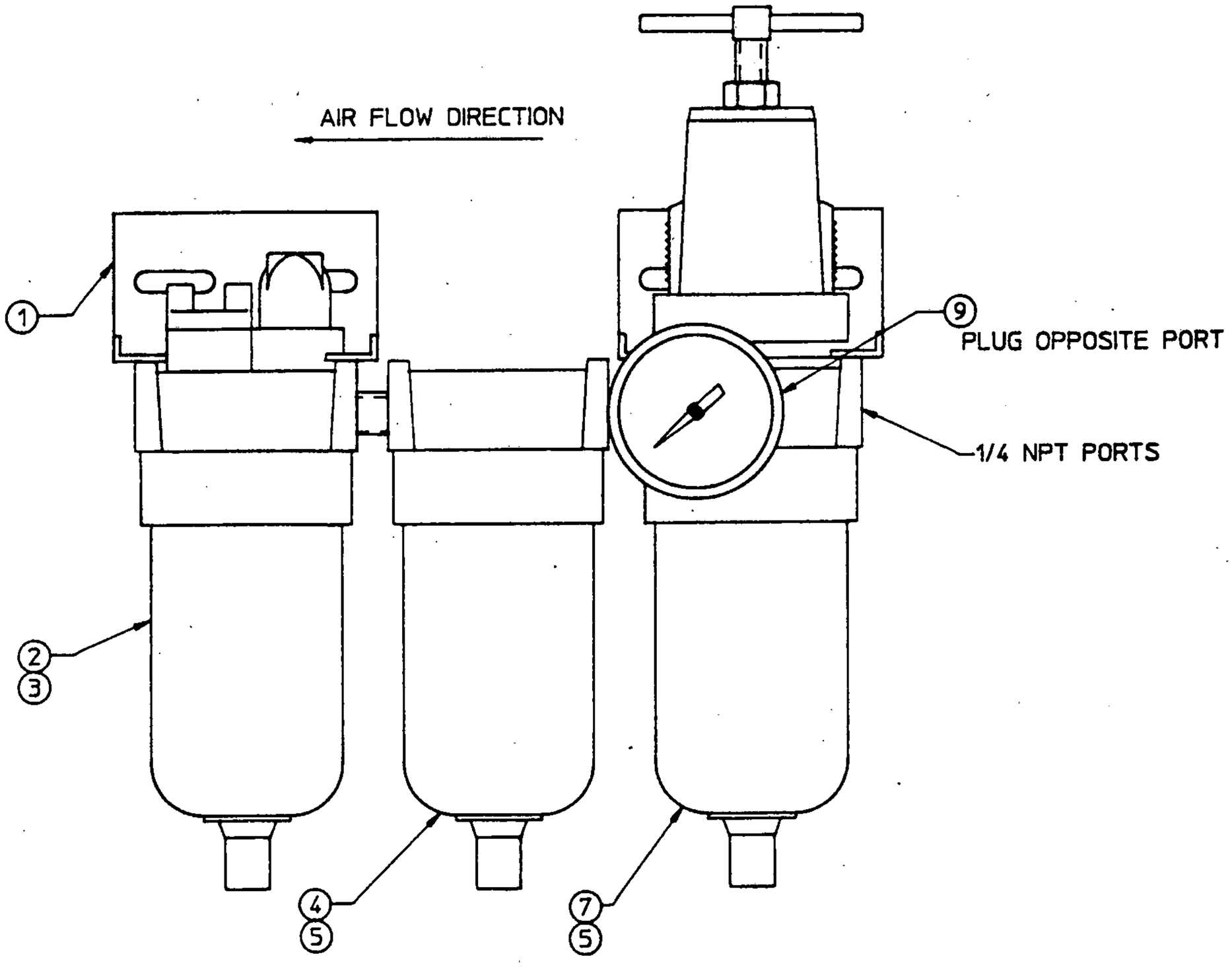
Filter/Regulator/Lubricator Assembly



Item	Part No.	Description	Qty.
	CS-4013-1	Complete Filter/Regulator/Lubricator Assembly	
1		Coalecsing Filter Assembly: Numatics #F21D-02D	1
2	CS-4013-1-RE	Replacement Filter Element: Numatics #EKF20DD	1
3	CS-4013-1-FB	Filter Bowl Replacement Kit: Numatics #BKF20	1
4		Pressure Regulator Assembly: Numatics #R21R-02G	1
5	CS-4013-1-RK	Regulator Diaphragm Repair Kit: Numatics #RKR21R	1
6	CS-4013-E	0-160 PSI Pressure Gauge Numatics #GA160	1
7		Lubricator Assembly: Numatics #L21L-02	1
8		Lubricator Bowl Replacement Kit: Numatics #BKL20	1

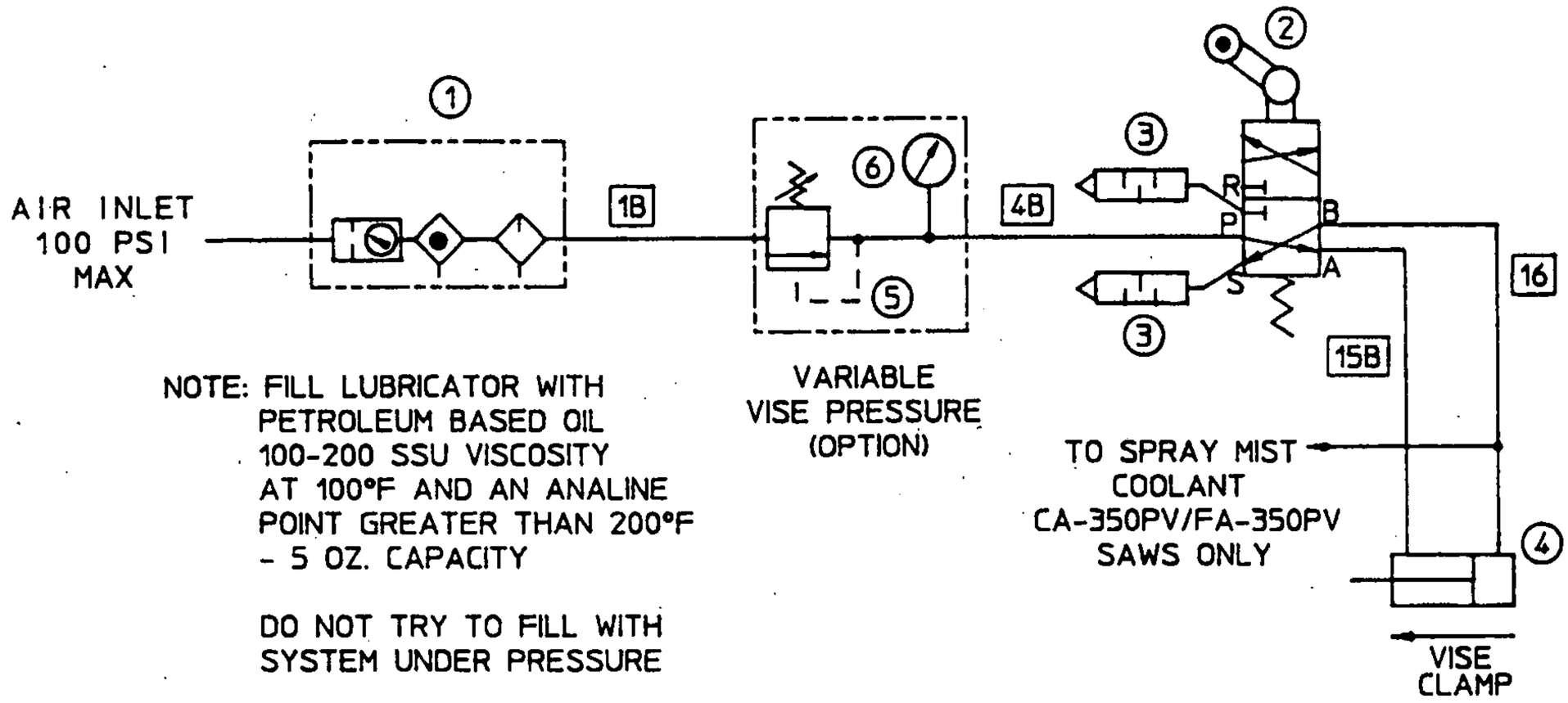
Note: Items 2, 3, 5, and 8 are repair parts only

FILTER/REGULATOR/LUBRICATOR ASSEMBLY



1	CS-4013A	PARKER #PS109 MOUNTING BRACKET (2)
2	CS-4013B	PARKER #16L11BC LUBRICATOR
3	CS-4013B1	PARKER #PS125 BOWL KIT
4	CS-4013C	PARKER #11F11EA OIL REMOVAL FILTER
5	CS-4013C1	PARKER #PS105 BOWL KIT (2)
6		
7	CS-4013D	PARKER #06E11A13AA FILTER/REGULATOR
8		
9	CS-4013E	PARKER #P781642 0-160 PSI 2" DIAL GAUGE
	CS-4013REK	FILTER ELEMENT KIT-INCLUDES THE FOLLOWING: PARKER #PS101 FILTER ELEMENT PARKER #PS146 OIL REMOVAL FILTER ELEMENT

PNEUMATIC DIAGRAM
CA-350PV/CS-350PV
FA-350PV/FS-350PV



NOTE: FILL LUBRICATOR WITH
PETROLEUM BASED OIL
100-200 SSU VISCOSITY
AT 100°F AND AN ANALINE
POINT GREATER THAN 200°F
- 5 OZ. CAPACITY

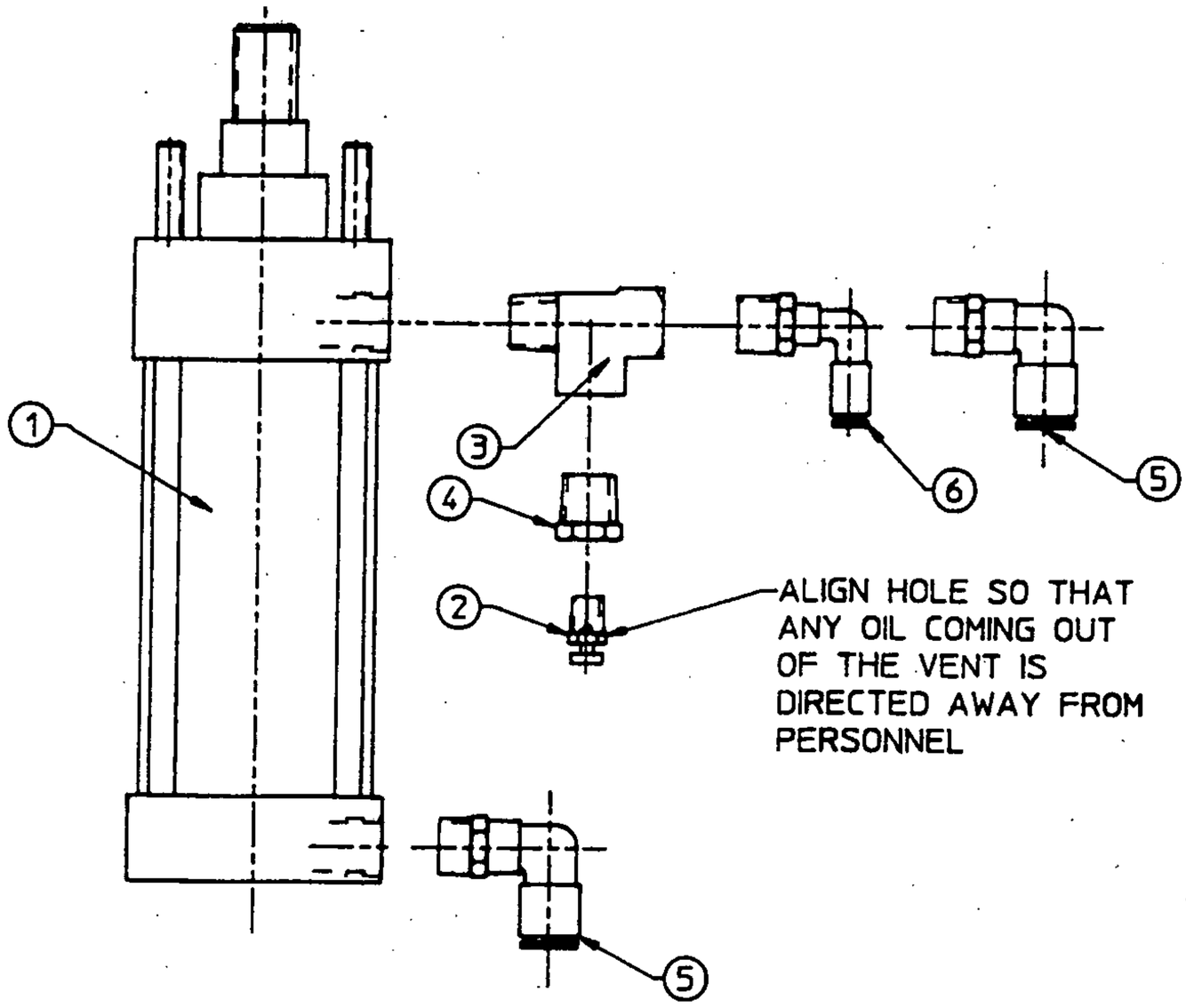
DO NOT TRY TO FILL WITH
SYSTEM UNDER PRESSURE

DRAIN FILTERS REGULARLY

1	CS-4013	FILTER/REGULATOR/LUBRICATOR
2	CS-4022-1	CAM-OPERATED VALVE: WABCO #GB15002-0955
3	V20-7122-1	EXHAUST MUFFLER: PARKER #EM12
4	CS-2316	VISE CYLINDER: 5" BORE x 3/8" STROKE
5	V20-7117B	PRESSURE REDUCING VALVE: PARKER #14R113F
6	V20-7117A	PRESSURE GAUGE: PARKER #77413

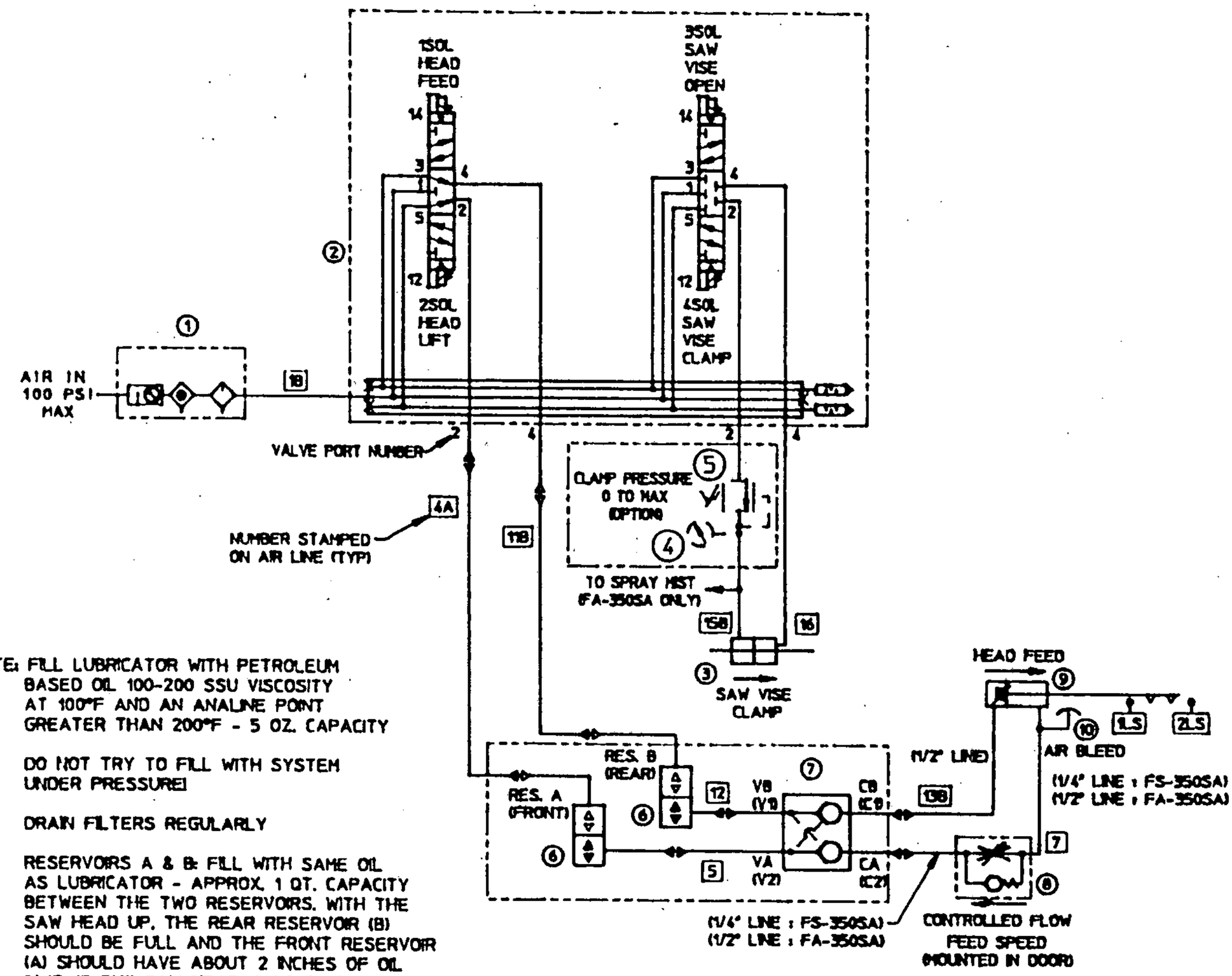
NOTE: SAWS WITH SERIAL NUMBERS BELOW 104 USE PRESSURE GAUGE P/N CS-4025
INSTEAD OF P/N V20-7117A

HEAD LIFT CYLINDER
FITTINGS
CIRCULAR SAWS



1	CS-4014	HEAD LIFT CYLINDER (REF)
2	CS-4046	AIR VENT: WEATHERHEAD #705
3	CS-4047	STREET TEE: WEATHERHEAD #3750x6
4	CS-4048	3/8NPT x 1/8NPT BUSHING: WEATHERHEAD #3220x6x2
5	V20-8019	3/8NPT x 1/2 HOSE ELBOW: ALKON #AQ69-PS-8x6
6	V20-8032	3/8NPT x 1/4 HOSE ELBOW: ALKON #AQ69-PS-4x6

PNEUMATIC DIAGRAM
FA-350SA/FS-350SA



NOTE: FILL LUBRICATOR WITH PETROLEUM BASED OIL 100-200 SSU VISCOSITY AT 100°F AND AN ANALINE POINT GREATER THAN 200°F - 5 OZ. CAPACITY

DO NOT TRY TO FILL WITH SYSTEM UNDER PRESSURE!

DRAIN FILTERS REGULARLY

RESERVOIRS A & B: FILL WITH SAME OIL AS LUBRICATOR - APPROX. 1 QT. CAPACITY BETWEEN THE TWO RESERVOIRS. WITH THE SAW HEAD UP, THE REAR RESERVOIR (B) SHOULD BE FULL AND THE FRONT RESERVOIR (A) SHOULD HAVE ABOUT 2 INCHES OF OIL IN IT. IF THE SAW HEAD IS DOWN, THE LEVELS SHOULD BE REVERSED. DO NOT OVERFILL

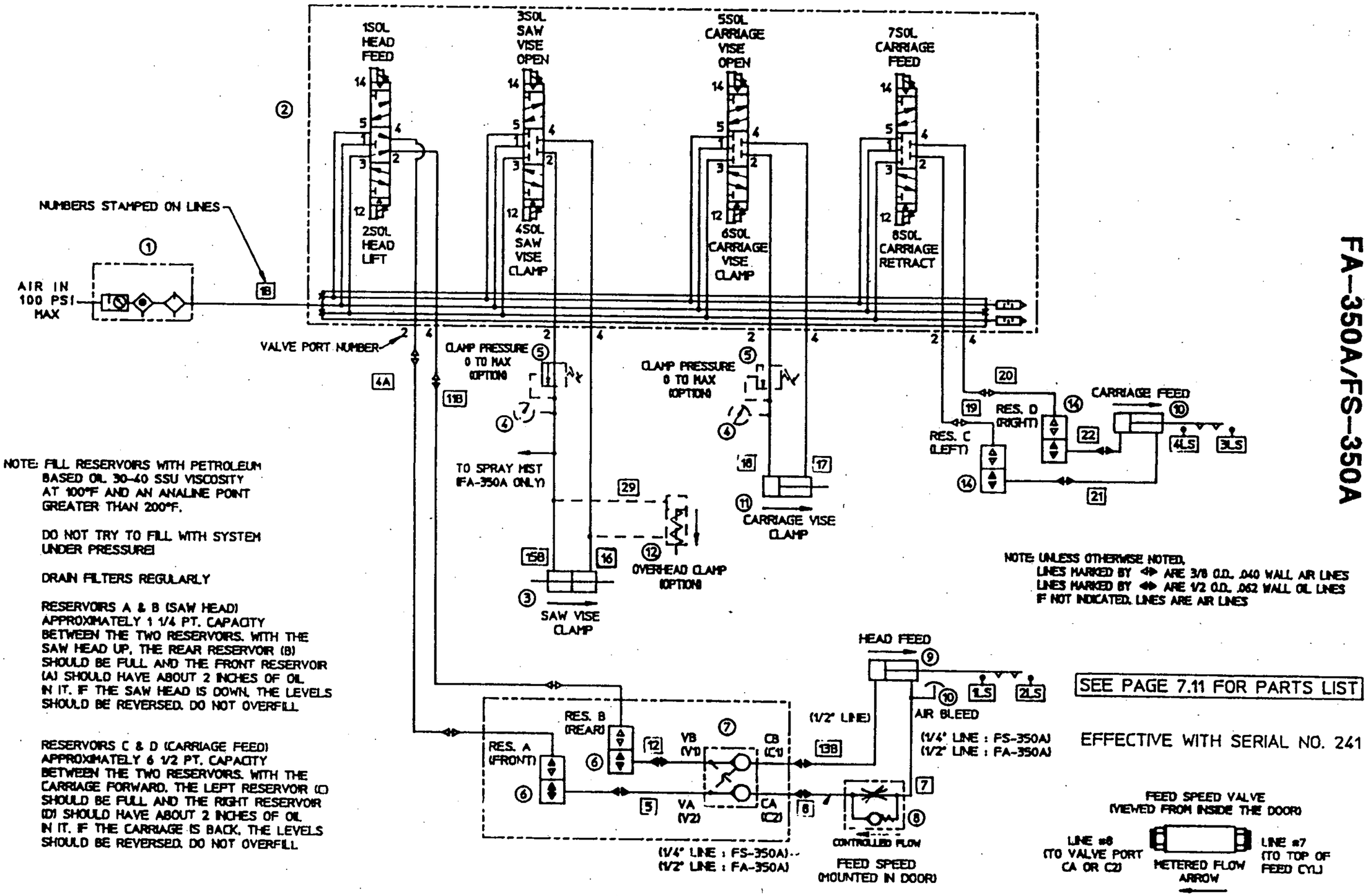
NOTE: LINES MARKED BY ⟨⟩ ARE 3/8 O.D. .040 WALL AIR LINES
LINES MARKED BY ⟨⟩ ARE OIL LINES
IF NOT INDICATED, LINES ARE AIR LINES

1	CS-4013-1	FILTER/REGULATOR/LUBRICATOR ASSEMBLY
2	CS-4035	VALVE MANIFOLD ASSEMBLY
3	CS-2316	VISE CYLINDER ASSEMBLY: 5" BORE x 3/8" STROKE x 1 1/2" THRU ROD
4	V20-7117A	PRESSURE GAUGE: PARKER #P77413 (OPTION)
5	V20-7117B	PRESSURE REGULATOR: PARKER #04R113F (OPTION)
6	V20-7115	AIR/OIL RESERVOIR: LUBE DEVICES #1030-2 (2)
7	CS-4043	DOUBLE P. O. CHECK VALVE: PARKER # CDP1010A206P — use qty (2) of CS-4043-1
8	CS-4017-1	FLOW CONTROL VALVE: DELTROL #EDF-258
9	CS-4014-1	PNEUMATIC CYL: 2 1/2" BORE x 3 3/4" STROKE x 1" ROD-NFPA STYLE MX-3
10	CS-4046	AIR VENT: WEATHERHEAD #705

DOES NOT WORK probably - use (~~2~~) ~~CS-4043-1~~ CS-4003-1R

EFFECTIVE WITH SERIAL NO. 240

PNEUMATIC DIAGRAM FA-350A/FS-350A



NOTE: FILL RESERVOIRS WITH PETROLEUM BASED OIL 30-40 SSU VISCOSITY AT 100°F AND AN ANALINE POINT GREATER THAN 200°F.

DO NOT TRY TO FILL WITH SYSTEM UNDER PRESSURE!

DRAIN FILTERS REGULARLY

RESERVOIRS A & B (SAW HEAD) APPROXIMATELY 1 1/4 PT. CAPACITY BETWEEN THE TWO RESERVOIRS. WITH THE SAW HEAD UP, THE REAR RESERVOIR (B) SHOULD BE FULL AND THE FRONT RESERVOIR (A) SHOULD HAVE ABOUT 2 INCHES OF OIL IN IT. IF THE SAW HEAD IS DOWN, THE LEVELS SHOULD BE REVERSED. DO NOT OVERFILL.

RESERVOIRS C & D (CARRIAGE FEED) APPROXIMATELY 6 1/2 PT. CAPACITY BETWEEN THE TWO RESERVOIRS. WITH THE CARRIAGE FORWARD, THE LEFT RESERVOIR (C) SHOULD BE FULL AND THE RIGHT RESERVOIR (D) SHOULD HAVE ABOUT 2 INCHES OF OIL IN IT. IF THE CARRIAGE IS BACK, THE LEVELS SHOULD BE REVERSED. DO NOT OVERFILL.

NOTE: UNLESS OTHERWISE NOTED,
LINES MARKED BY ◀▶ ARE 3/8 O.D. .040 WALL AIR LINES
LINES MARKED BY ◀▶ ARE 1/2 O.D. .062 WALL OIL LINES
IF NOT INDICATED, LINES ARE AIR LINES

SEE PAGE 7.11 FOR PARTS LIST

EFFECTIVE WITH SERIAL NO. 241

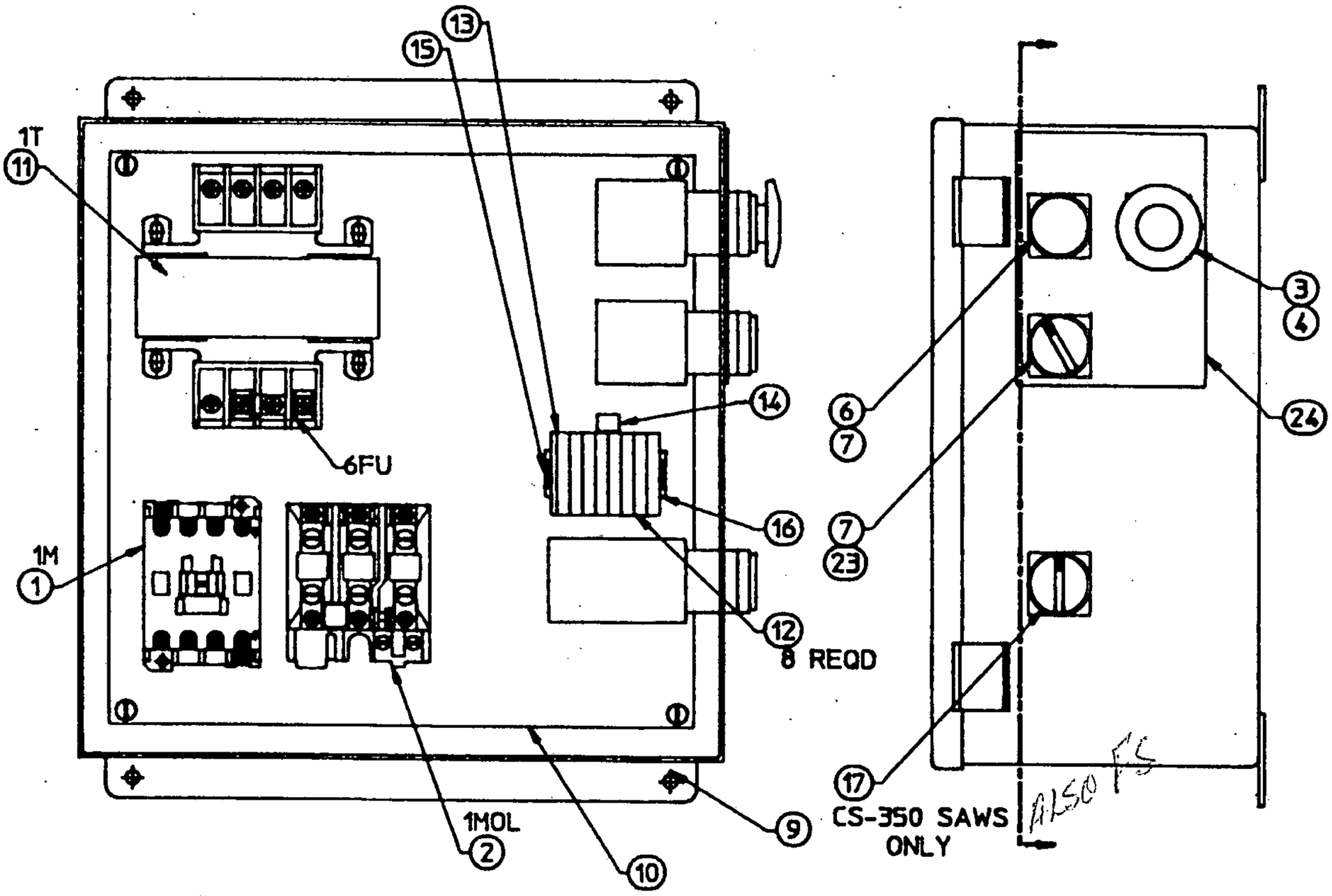
PARTS LIST
PNEUMATIC DIAGRAM
FA-350A/FS-350A

1	CS-4013-1	FILTER/REGULATOR/LUBRICATOR ASSEMBLY
2	CS-4036	VALVE MANIFOLD ASSEMBLY
3	CS-2316	VISE CYLINDER ASSEMBLY: 5" BORE x 3/8" STROKE x 1 1/2" THRU ROD
4	V20-7117A	PRESSURE GAUGE: PARKER #P77413 (OPTION)
5	V20-7117B	PRESSURE REGULATOR: PARKER #O4R113F (OPTION)
6	V20-7115	AIR/OIL RESERVOIR: LUBE DEVICES #A/OR1030-2
7	CS-4043	DOUBLE P. O. CHECK VALVE: PARKER #CDP101A206P
8	CS-4017-1	FLOW CONTROL VALVE: DELTROL #EDF-25B
9	CS-4014-1	PNEUMATIC CYL: 2 1/2 BORE x 3 3/4 STROKE x 1 ROD - NFPA STYLE MX-3
10	CS-4034-1	PNEUMATIC CYL: 2 1/2 BORE x 18 STROKE x 1 ROD - NFPA STYLE MX-3
11	CS-4016-1	PNEUMATIC CYL: 3 1/4 BORE x 1/2 STROKE x 1 ROD - NFPA STYLE MF-1
12	CS-7515-1	PNEUMATIC CYL: HUMPHREY #5-D-1/2: 1 1/2 BORE x 1/2 STROKE x 7/16 ROD (OPTION)
13	CS-4046	AIR VENT: WEATHERHEAD #705
14	CS-4056	AIR/OIL RESERVOIR: LUBE DEVICES #A/OR2150-4

NOTES

ELECTRICAL CONTROLS
CA–350/CA–350PV
CS–350/CS–350PV

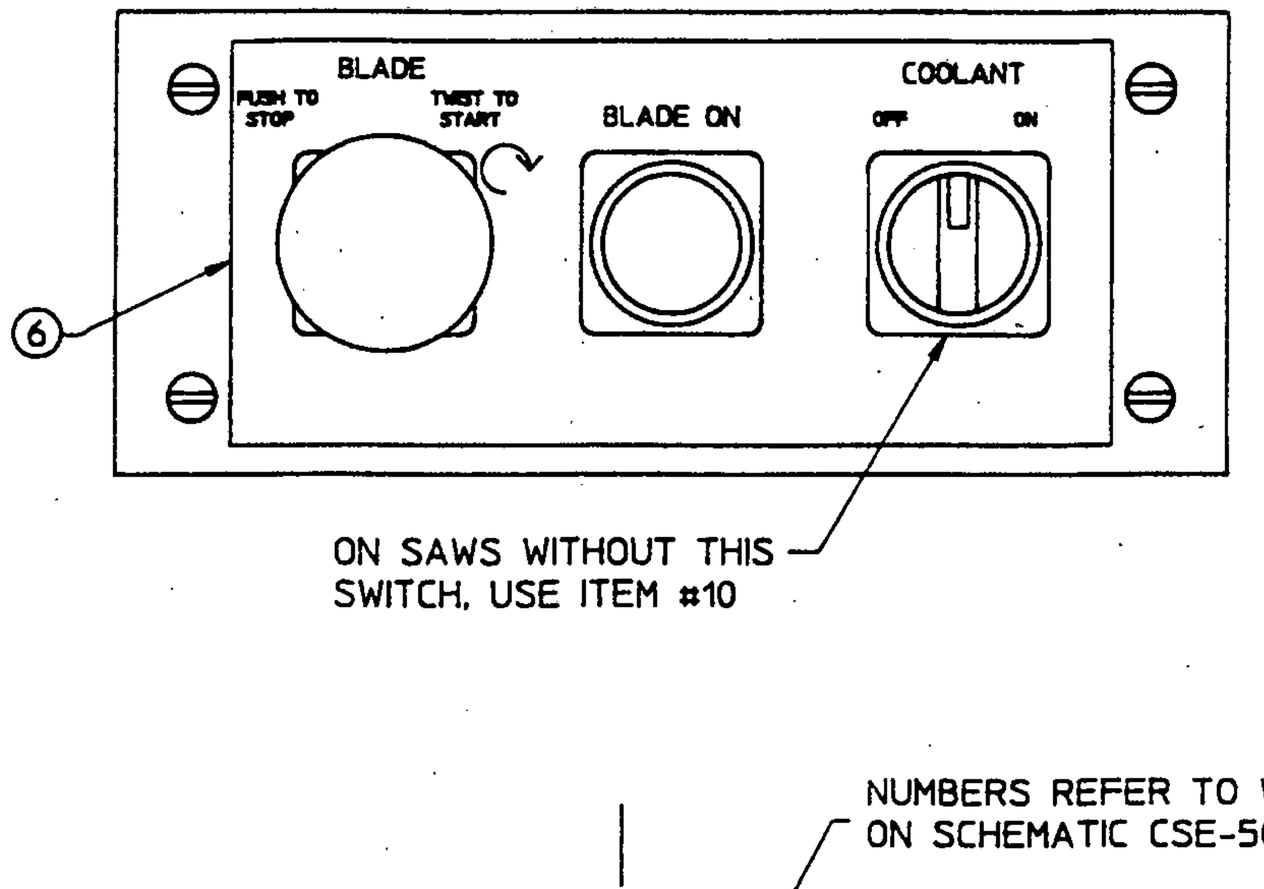
EFFECTIVE WITH S/N 382 (JUNE, 1992)

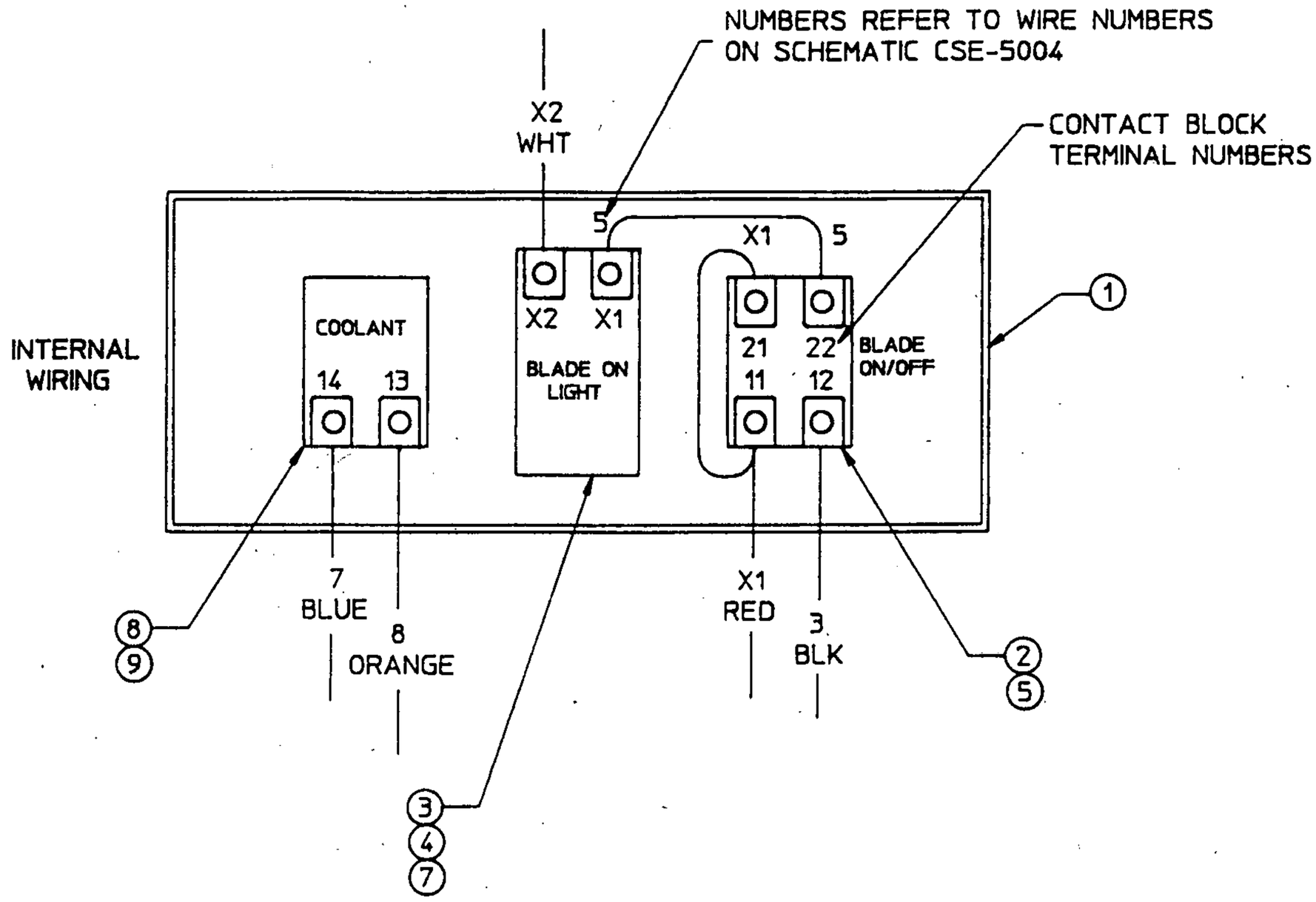


1	9A-5040A	ALLEN-BRADLEY #100-A24ND3 CONTACTOR (120V)
2	9A-5040B	ALLEN-BRADLEY #592-JOV16 OVERLOAD RELAY
3	9A-5040C	ALLEN-BRADLEY #800E-MT4 MUSHROOM HEAD OPERATOR
4	9A-5040D	ALLEN-BRADLEY #800E-XL01 1-N.C. CONTACT BLOCK
5		
6	9A-5040F	ALLEN-BRADLEY #800E-F3 GREEN PB OPERATOR
7	9A-5040G	ALLEN-BRADLEY #800E-XL10 1-N.O. CONTACT BLOCK
8		
9	9A-5040J	HOFFMAN #A1212CH CLAMP COVER ENCLOSURE
10	9A-5040K	HOFFMAN #A12P12 ENCLOSURE PANEL
11	CS-5019	DONGAN #HC-0250-44 FKPS2S TRANSFORMER
12		ALLEN-BRADLEY #1492-H1 TERMINAL BLOCK
13		ALLEN-BRADLEY #1492-N36 END BARRIER
14		ALLEN-BRADLEY #1492-N42 INSULATED JUMPER
15		ALLEN-BRADLEY #1492-N2 RETAINING CLIP
16		ALLEN-BRADLEY #1492-N1 MOUNTING CHANNELx2 1/4"
17	CS-5064-1	MOTOR SPEED SWITCH ASSEMBLY (CS-350 SAWS ONLY: INCLUDES CS-5064-1A-1C BELOW)
	CS-5064-1A	MOTOR SPEED SWITCH LEGEND PLATE
	CS-5064-1B	MOTOR SPEED SWITCH OPERATOR HANDLE
	CS-5064-1C	MOTOR SPEED SWITCH CONTACT BLOCK
18		
19		
20		
21		
22		
23	9A-5040N	ALLEN-BRADLEY #800E-SM21 2 POS SS OPERATOR
24	9A-5040R	SWITCH BOX OVERLAY

SWITCH PANEL ASSY
FA-350/FA-350PV
FS-350/FS-350PV

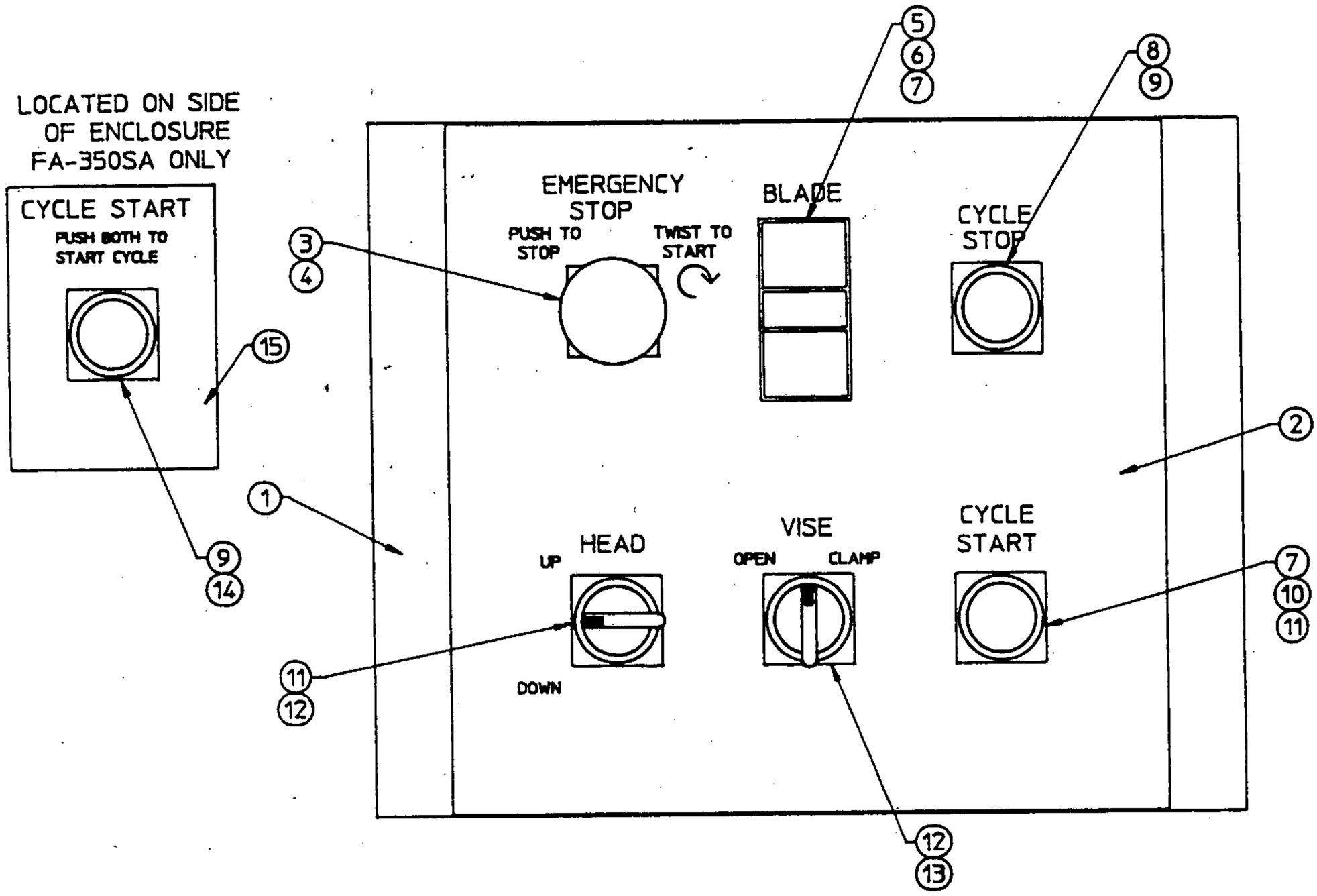
71





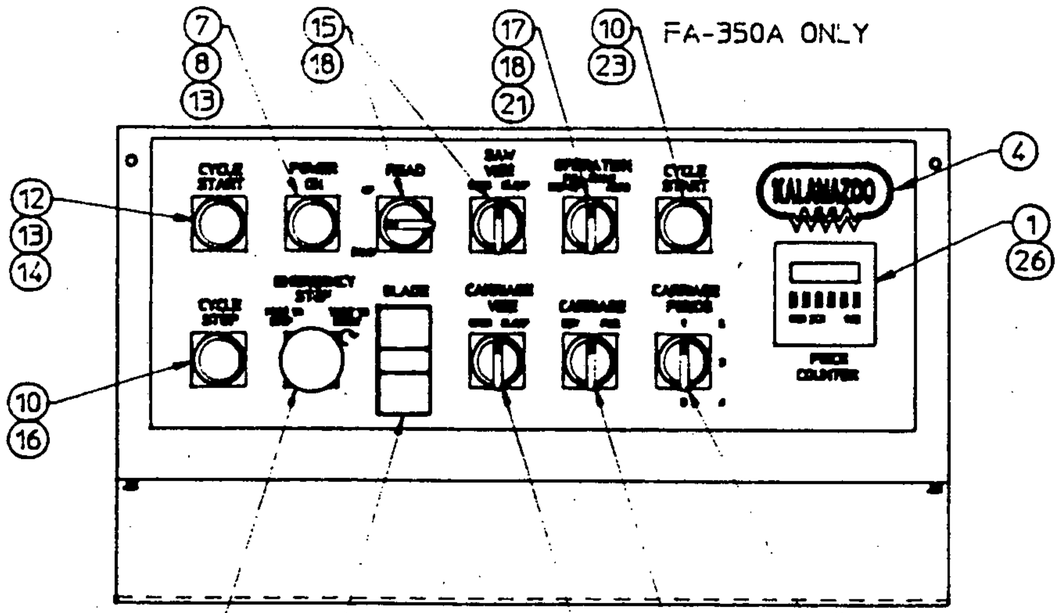
1	CS-5047	3 POS ENCLOSURE- HOFFMAN #E-3PBGX
2	CS-5022	SWITCH OPERATOR- SQUARE D #9001-D1C1R
3	CS-5024	PILOT LIGHT BODY- SQUARE D #9001-D1V1Y
4	CS-5025	LIGHT MODULE- SQUARE D #9001-DTSC
5	CS-5053	CONTACT BLOCK- SQUARE D #9001-DA02
6	CS-8207	PANEL OVERLAY- FS-350M/PV
7	CS-5031	LAMP- GE #1866
8	CS-5028	CONTACT BLOCK- SQUARE D #9001-DA10
9	CS-5034	SWITCH OPERATOR- SQUARE D #9001-D1G2S
10	CS-5062	CLOSING PLATE- SQUARE D #9001-Z33

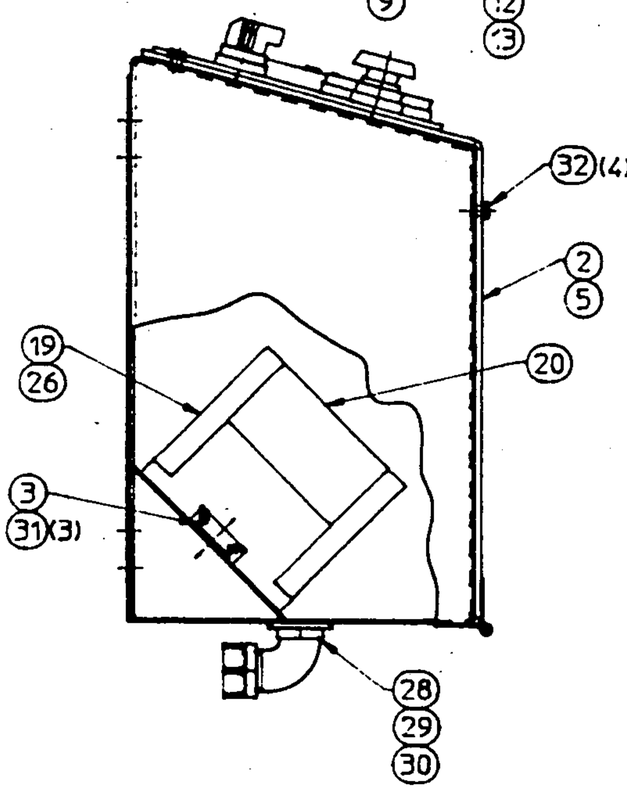
FA-350SA/FS-350SA
SWITCH PANEL ASSEMBLY

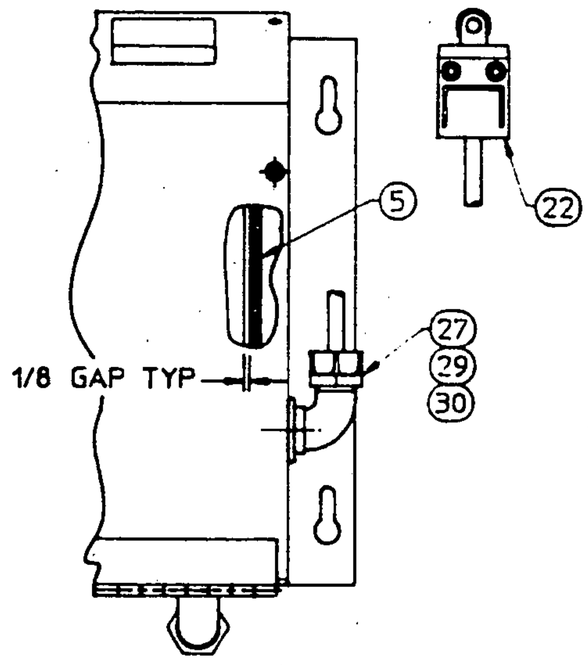


1	CS-5080	SWITCH ENCLOSURE: HOFFMAN #E-9PBGX
2	CS-5082	SWITCH ENCLOSURE OVERLAY
3	CS-5022	SQUARE D #9001-D1C1R MUSHROOM HEAD SW. OPER.
4	CS-5027	SQUARE D #9001-DA01 N.C. CONTACT BLOCK
5	CS-5029	SQUARE D #9001-D1M3U DUAL FUNCTION OPERATOR
6	CS-5030	SQUARE D #9001-DTSC11 LIGHT MOD. (INCL. 1LT)
7	CS-5031	G.E. #1866 LAMP (2)
8	CS-5035	SQUARE D #9001-D1A3R RED PUSH BUTTON OPERATOR
9	CS-5028	SQUARE D #9001-DA10 N.O. CONTACT BLOCK (2)
10	CS-5032	SQUARE D #9001-D1Y1G GREEN PUSH BUTTON OPER.
11	CS-5030	SQUARE D #9001-DTSC11 LIGHT MOD. (INCL. 2LT)
12	CS-5033	SQUARE D #9001-D1G4S 3 POS. MOM. SWITCH OPER.(2)
13	CS-5037	SQUARE D #9001-DA20 2-N.O. CONTACT BLOCK (2)
14	CS-5065	SQUARE D #9001-D1A1U GREEN PUSH BUTTON OPER. (FA-350SA)
15	CS-5075	SECOND CYCLE START OVERLAY (FA-350SA).

CONSOLE ASSEMBLY
FA-350A / FS-350A



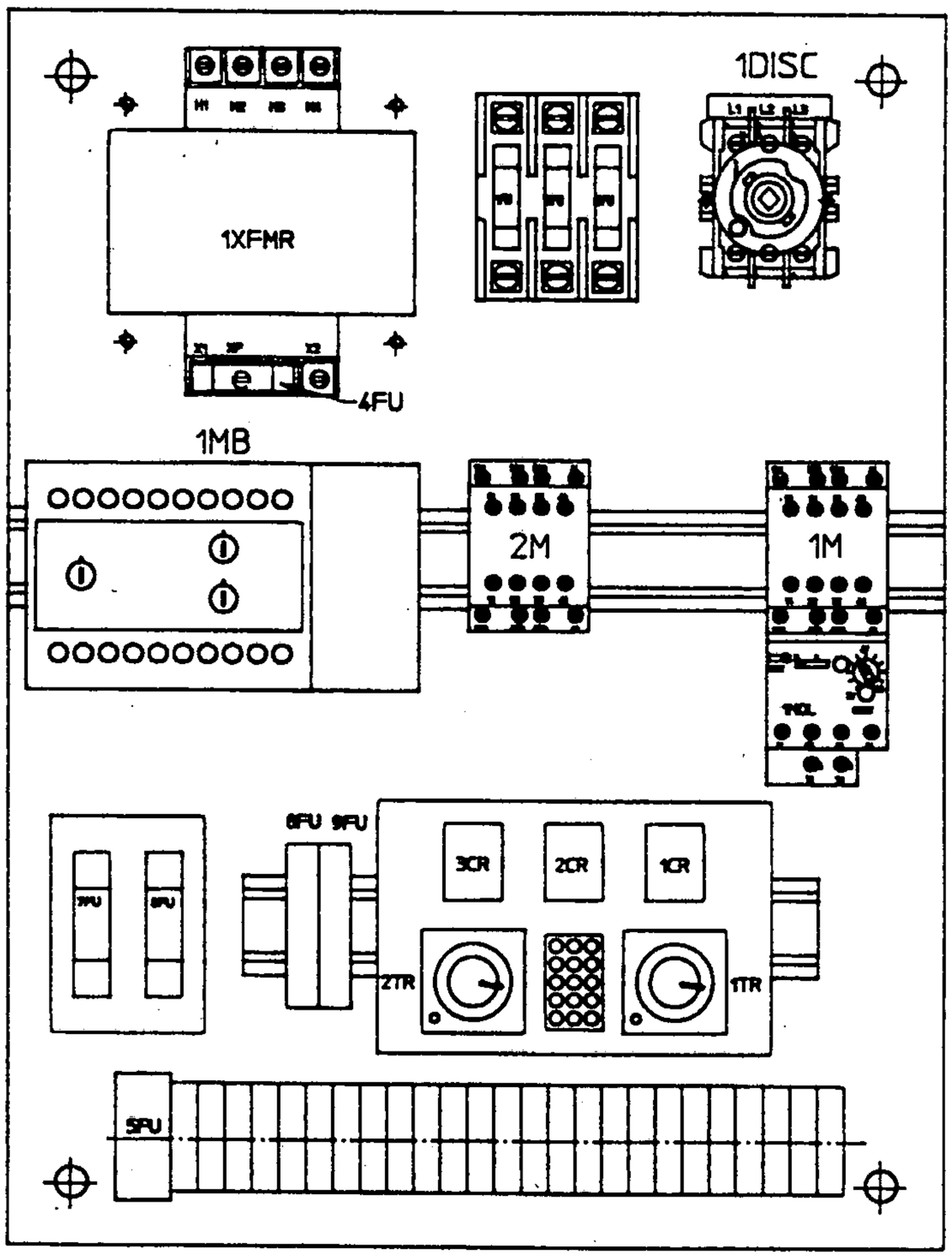




1	AB-17130	PRESET COUNTER: DURANT #45610-400
2	CS-1415	CONSOLE WELDMENT
3	CS-1415H	CONTROLLER MOUNTING SPAR
4	CS-1416	CONSOLE OVERLAY (FA-350A)
	CS-1416S	CONSOLE OVERLAY (FS-350A)
5	CS-1417	FOAM SEAL TAPE (68")
6	CS-5022	MUSHROOM HD SW. OPERATOR:SQUARE D #9001-D1C1R
7	CS-5024	AMBER PILOT LIGHT BODY:SQUARE D #9001-D1V1Y
8	CS-5025	LIGHT MODULE:SQUARE D #9001-DTSC
9	CS-5027	N.C. CONTACT BLOCK:SQUARE D #9001-DA01
10	CS-5028	N.O. CONTACT BLOCK:SQUARE D #9001-DA10 (2)
11	CS-5029	DUAL FUNCTION SW. OPER.:SQUARE D #9001-D1M3U
12	CS-5030	LIGHT MODULE:SQUARE D #9001-DTSC11 (2)
13	CS-5031	LIGHT BULB: GE #1866 (3)
14	CS-5032	GREEN LIGHTED SW. OPER.:SQUARE D #9001-D1Y1G
15	CS-5033	3-POS.MOMENTARY SW. OPER.:SQUARE D #9001-D1G4S (4)
16	CS-5035	RED PUSHBUTTON SW. OPER.:SQUARE D #9001-D1A3R
17	CS-5036	3-POS.MAINTAINED SW. OPER.:SQ. D #9001-D1G3S
18	CS-5037	2-N.O. CONTACT BLOCK:SQUARE D #9001-DA20 (5)
19	CS-5042	PROGRAMMABLE CONTROLLER: OMRON #C40K-CDR-A
20	CS-5044	EEPROM CHIP: OMRON #8ROM-H
21	CS-5045	2-N.C. CONTACT BLOCK:SQUARE D #9001-DB02
22	CS-5057	LIMIT SW.: OMRON D4C-1603
23	CS-5065	GREEN PUSHBUTTON SW. OPER.:SQ. D #9001-D1A1U
24	CS-5084	5-POS.MAINTAINED SW. OPER.:SQ. D #9003-KAB1A
25	CS-5085	5-POS. CONTACT BLOCK: SQUARE D #9003-K2D0040A
26	H3-5023	VARISTOR: CKE #Z150LA20A (2)
27		1/2 NPT CORD GRIP: REMKE #RSR-9106
28		1/2 NPT CORD GRIP: REMKE #RSR-9110
29		1/2" CONDUIT SEALING RING (2)
30		1/2" CONDUIT LOCKNUT (2)
31		#6-32 x 1/2 THREAD CUTTING SCREW (3)
32		#10-24 x 1/2 THREAD CUTTING SCREW (4)

Blade Speed Control:
CS-5064-1 Complete Assembly —
Consists of: CS-5064-1A Legend Plate
CS-5064-1B Switch Handle
CS-5064-1C Switch

ELECTRICAL ENCLOSURE PANEL
'F' SERIES CIRCULAR SAWS



1M	CS-5020A	MOTOR CONTACTOR: SQUARE D #8502 PE5.22E
1DISC	CS-5020D	DISCONNECT SWITCH BODY: STROMBERG #OETL-NF30
		DISC. SWITCH HANDLE: STROMBERG #OETLZX 44/90
	CS-5020F	FUSE BLOCK: MARATHON #6M30A3SP
1XFMR	CS-5019	TRANSFORMER: 250VA. 440/220/208V PRI-120V SEC
1MB	CS-7150C	MOTOR BRAKE: SQUARE D #8922 EMB-20 440V/120V
	CS-7150B	MOTOR BRAKE: SQUARE D #8922 EMB-36 220V/120V
2M	CS-5020A	MOTOR CONTACTOR: SQUARE D #8502 PE5.22E
1MOL	CS-5020B1	OVERLOAD RELAY: SQUARE D #9065-TE3.7 (440V)
	CS-5020B2	OVERLOAD RELAY: SQUARE D #9065-TE8 (220/208V)
1-3FU		BUSSMAN #KTK-R-30 FUSE (208/230V)
1-3FU		BUSSMAN #KTK-R-12 FUSE (460V)
4FU		BUSSMAN #FNM-2 1/2 FUSE
5FU		BUSSMAN #FNM-1 1/4 FUSE
8FU		BUSSMAN #AGC-2 FUSE
9FU		BUSSMAN #AGC-3/10 FUSE
10-11FU	CS-7151	BUSSMAN #FWH-15 SEMICONDUCTOR FUSE (440V)
10-11FU	CS-7151B	BUSSMAN #FWH-35 SEMICONDUCTOR FUSE (208/220V)
1-3CR	CS-5011	4PDT RELAY: OMRON #MY4US-AC120
1-2TR	CS-5013-1	TIMER: OMRON #H3G-8C-AC1105S
	CS-5070	CIRCUIT BOARD (SEMI-AUTOMATIC SAWS ONLY)

1MB, 2M, 7FU, AND 8FU ARE ONLY USED ON MACHINES WITH THE ELECTRONIC MOTOR BRAKE OPTION

FUSES 8FU AND 9FU ARE ONLY USED ON AUTOMATIC SAWS

FUSES 10FU & 11FU ARE SHOWN AS 7FU & 8FU ON SEMI-AUTOMATIC SAWS

1-3CR AND 1-2TR ARE ONLY USED ON SEMI-AUTOMATIC SAWS (FA-350SA AND FS-350SA)

CHANGING OPERATING VOLTAGES
CA-350/CS-350 SAWS

To change between 208/230 and 460 volts, you must change the motor wiring (shown on the motor nameplate), the overload heater elements (shown on page 8.25), and the transformer wiring (shown on a decal on the transformer and on page 8.9). It is not necessary to change the transformer fusing

NOTE: On CS-350 saws, the motor itself must be changed. See page 6.5 for directions.

CHANGING OPERATING VOLTAGES

If it should become necessary to change the operating voltage of your new KALAMAZOO circular saw, please note the following:

1. TURN OFF POWER AT THE SUPPLY!

2. POWER FUSES (1-3FU): Whenever voltages are changed, the fuse values should be adjusted accordingly. Improper fusing can lead to nuisance tripping or unprotected electrics.

   208V or 230V machines use Bussman KTK-R-30 fuses (or equal)
   460V machines use Bussman KTK-R-12 fuses (or equal)
   575V machines use Bussman KTK-R-10 fuses (FA-350 saws only)

3. TRANSFORMER (1XFMR): The standard transformer in your saw has a 'tri-voltage' primary. It can operate on 208V, 230V, or 460V by simply changing the primary leads. The four leads or terminals (depending on the transformer) are marked H1, H2, H3, and H4 and are at the top of the transformer. Proper connections are shown on page 8.9 and on the transformer nameplate. If there is any discrepancy between the manual and the nameplate, ALWAYS follow the nameplate instructions. If the transformer has primary leads, any unused leads should be insulated (separately) to prevent them from making electrical contact with the enclosure.

   The secondary leads (X1 and X2) do not change for different voltages.

4. OVERLOAD RELAY (1MOL): Depending on the operating voltage, the following overload relays are used:

   460V and 575V: KALAMAZOO P/N CS-5020B1 (Marked TE3.7)
   208V and 230V: KALAMAZOO P/N CS-5020B2 (Marked TE8)

   Changing between 208/230V and 460/575V requires a change of overload relays. Changing between 208V and 230V or between 460V and 575V requires only an adjustment of the trip current setting. Those settings are as follows:

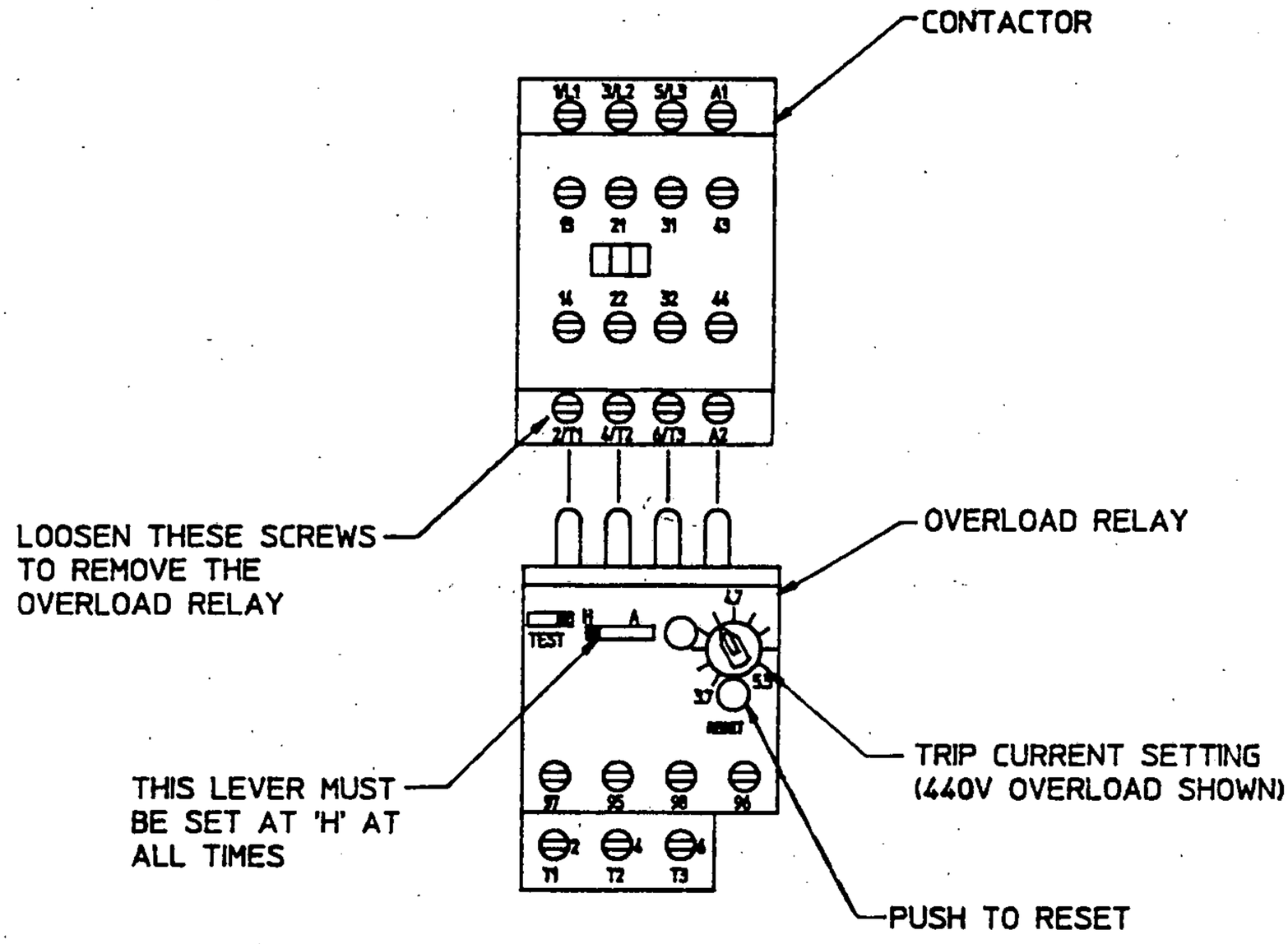
FA-350 saws	FS-350 saws
208V: 9.5	208V: 8.0
230V: 9.0	230V: 8.0
460V: 4.5	460V: 4.0
575V: 3.7	not available at this voltage

   Correct adjustment of the trip current setting will prevent nuisance tripping of the overload while protecting the motor.

   To replace the overload relay, undo the wires from the bottom two rows of terminals on the overload, then loosen the four lower contactor screws (see illustration on page 8.8). The relay will drop away from the contactor. When installing the new contactor, make sure all screws are tight.

CHANGING OPERATING VOLTAGES
(continued)

If the overload relay is changed, the blue 'Reset' button must be pushed before the motor will operate.



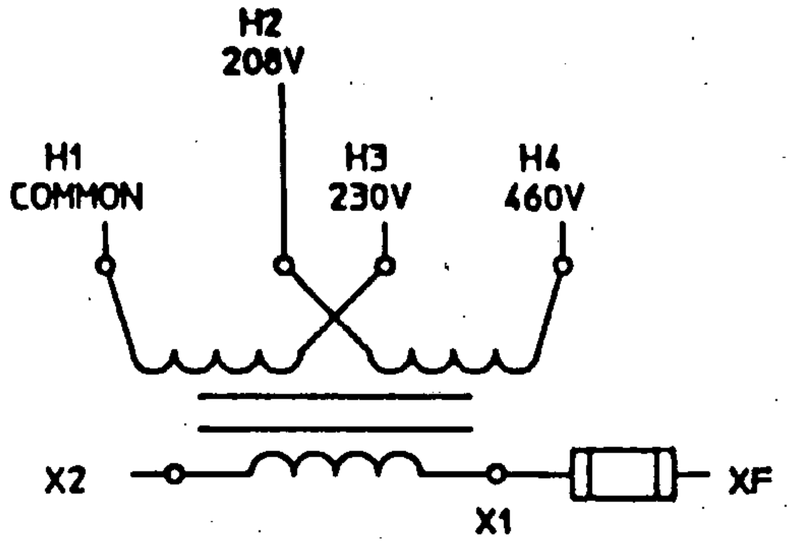
5. ELECTRONIC MOTOR BRAKE (1MB): If your machine has a motor brake, it must be changed if you are changing between 460V and 208/230V. No changes are required between 208V and 230V. Consult the factory for help in making this change.

CHANGING OPERATING VOLTAGES
(continued)

6. CS-350/FS-350 SAWS: To change these saws between 208V and 230V operation, just change the transformer primary connection.

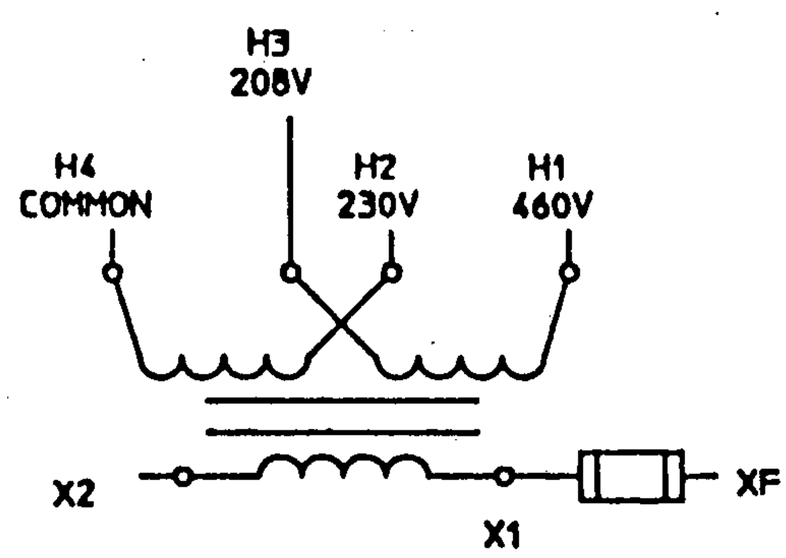
   To change between 208/230V and 460v operation, you must change the power fuses, overload relay, and transformer primary connections, and set the overload trip current as explained in steps 1-4 above. In addition, the drive motor must be changed. Refer to page 6.5 for details.

TRANSFORMER CONNECTIONS



DONGAN #HC-0250-44 TRANSFORMER

208V OPERATION: CONNECT TO H1 AND H2
230V OPERATION: CONNECT TO H1 AND H3
460V OPERATION: CONNECT TO H1 AND H4



MICRON #V250M8T13XK TRANSFORMER

208V OPERATION: CONNECT TO H3 AND H4
230V OPERATION: CONNECT TO H2 AND H4
460V OPERATION: CONNECT TO H1 AND H4

CHANGING INDICATOR LAMPS
FA-350/FS-350 SAWS

REF: 'Blade On' light (M and PV models), 'Cycle Start' light (SA and A saws), 'Blade On' light (SA and A saws), and the 'Power On' light (A saws)

1. Turn off the power at the disconnect switch.

2. Unscrew the cover to the switch enclosure.

3. In the middle of one side of the contact block is a plastic loop with a metal wire. A screwdriver inserted into the loop and pried down will lift the wire and separate the contact block and lamp body from the switch operator.

4. The lamp should be visible on the front of the light module. It is removed by pushing down and rotating counter-clockwise.

5. The new bulb is inserted and turned clockwise.

6. The contact block/light module is reattached by lining up the side wires with the grooves in the switch operator or lens and pushing it into place. You will feel the light module snap into place.

7. Turn the power back on and test the light, then close up the switch enclosure.

SWITCH OPERATOR/CONTACT BLOCK REPLACEMENT

If it should become necessary to replace either the contact block or switch operator, they are both accessed and removed as described in steps 1-3 above. To remove the switch operator from the panel, loosen the plastic nut and slide the operator through the front of the panel. When replacing the operator, take note of the tab on one side. This tab should fit into the notch in the panel and overlay to prevent switch rotation.

The contact block is re-installed as above.

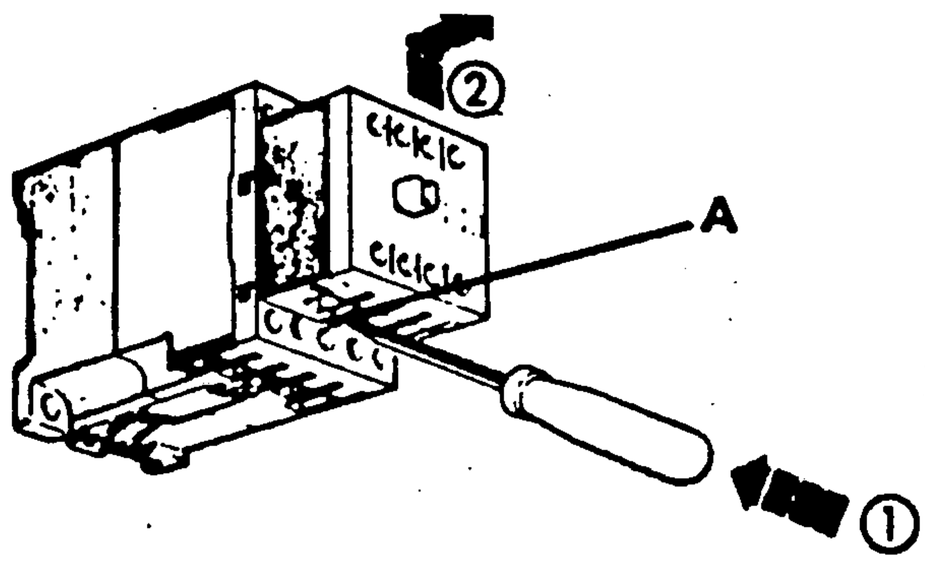
MOTOR CONTACTOR MAINTENANCE
FA-350/FS-350 SAWS

INSTALLATION AND REMOVAL

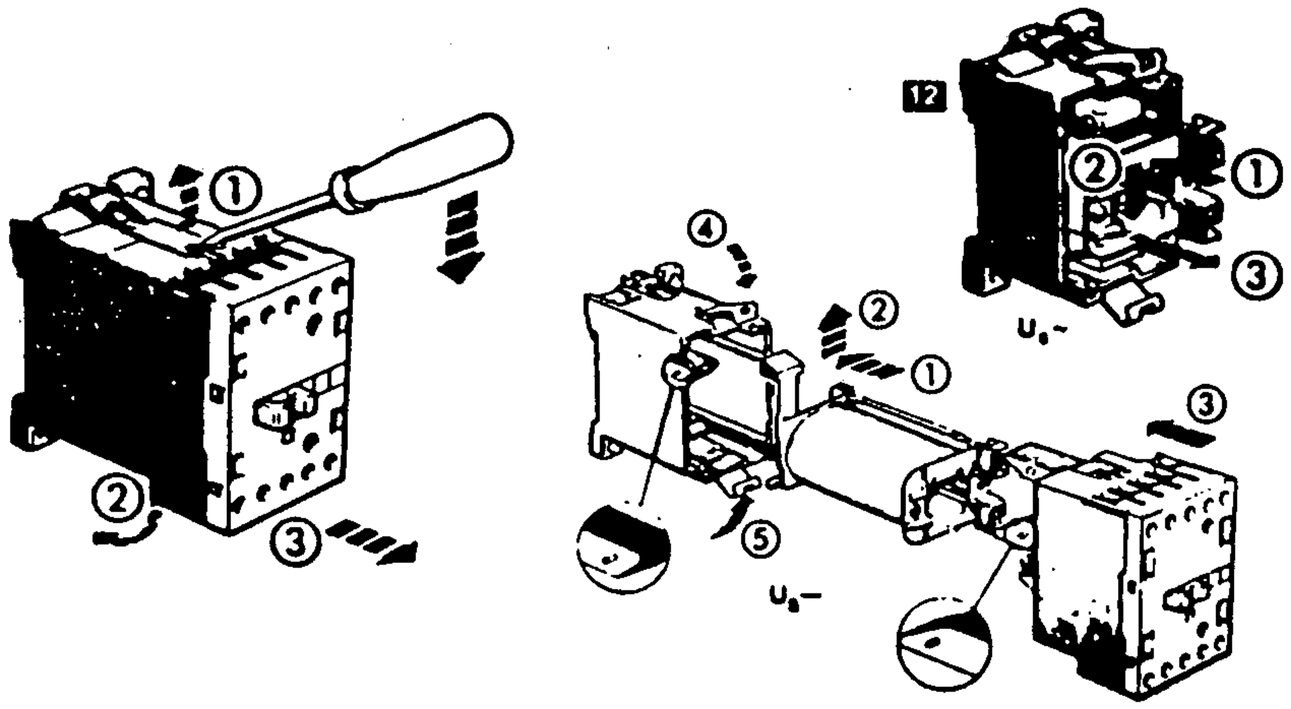
To remove a contactor from the DIN rail, insert a screwdriver into the red clip at the top back of the contactor and pry downward to lift the clip. This will loosen the contactor from the rail. To replace the contactor, place the contactor over the top lip of the DIN rail and push down while rotating the bottom of the contactor down toward the rail.

COIL REPLACEMENT

The first step in replacing the contactor coil is removing the auxilary contact block. Depress the red lever shown below and slide the block up. To replace, slip the tabs on the back of the block into the holes on the contactor face and push down.

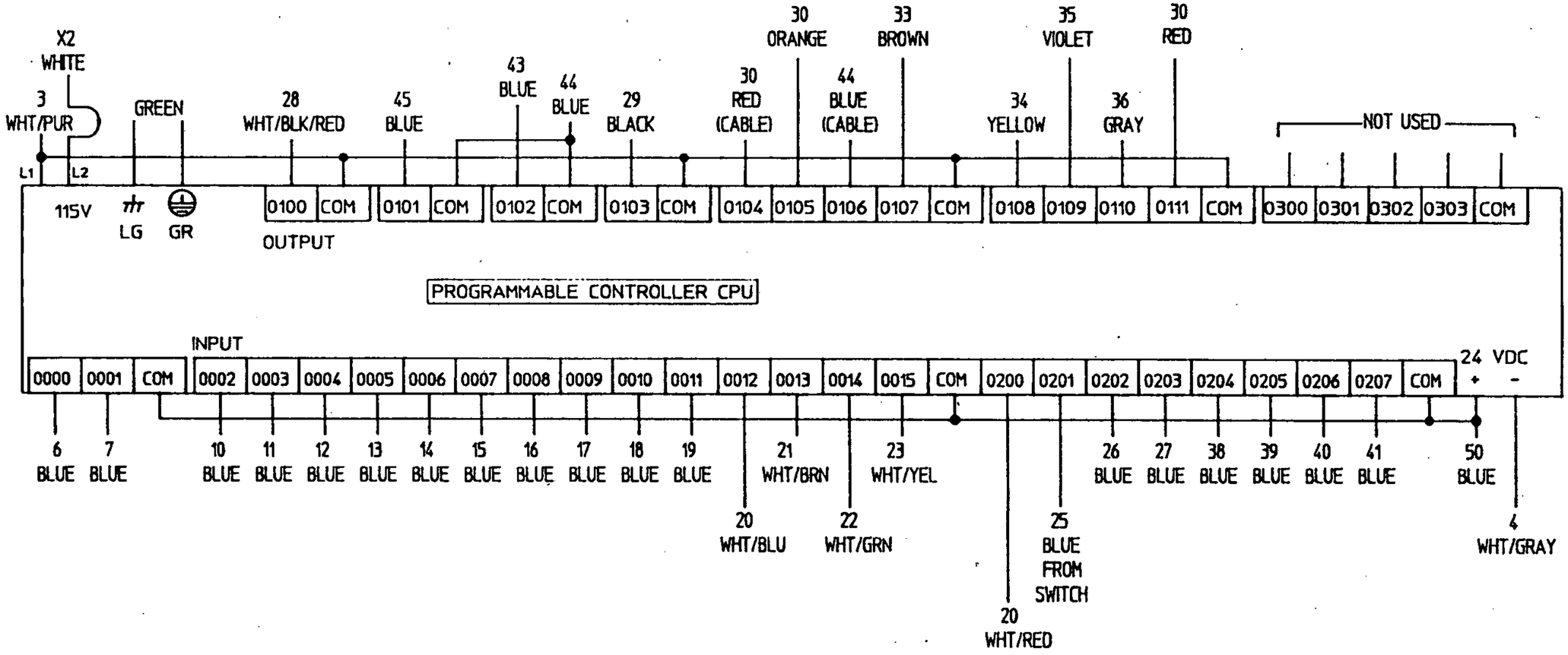


To remove the coil, use a screwdriver to release the two metal clips as shown below and lift the housing assembly. Depress the coil and slide it down. Replace with Square D P/N 9998PD2C110A.



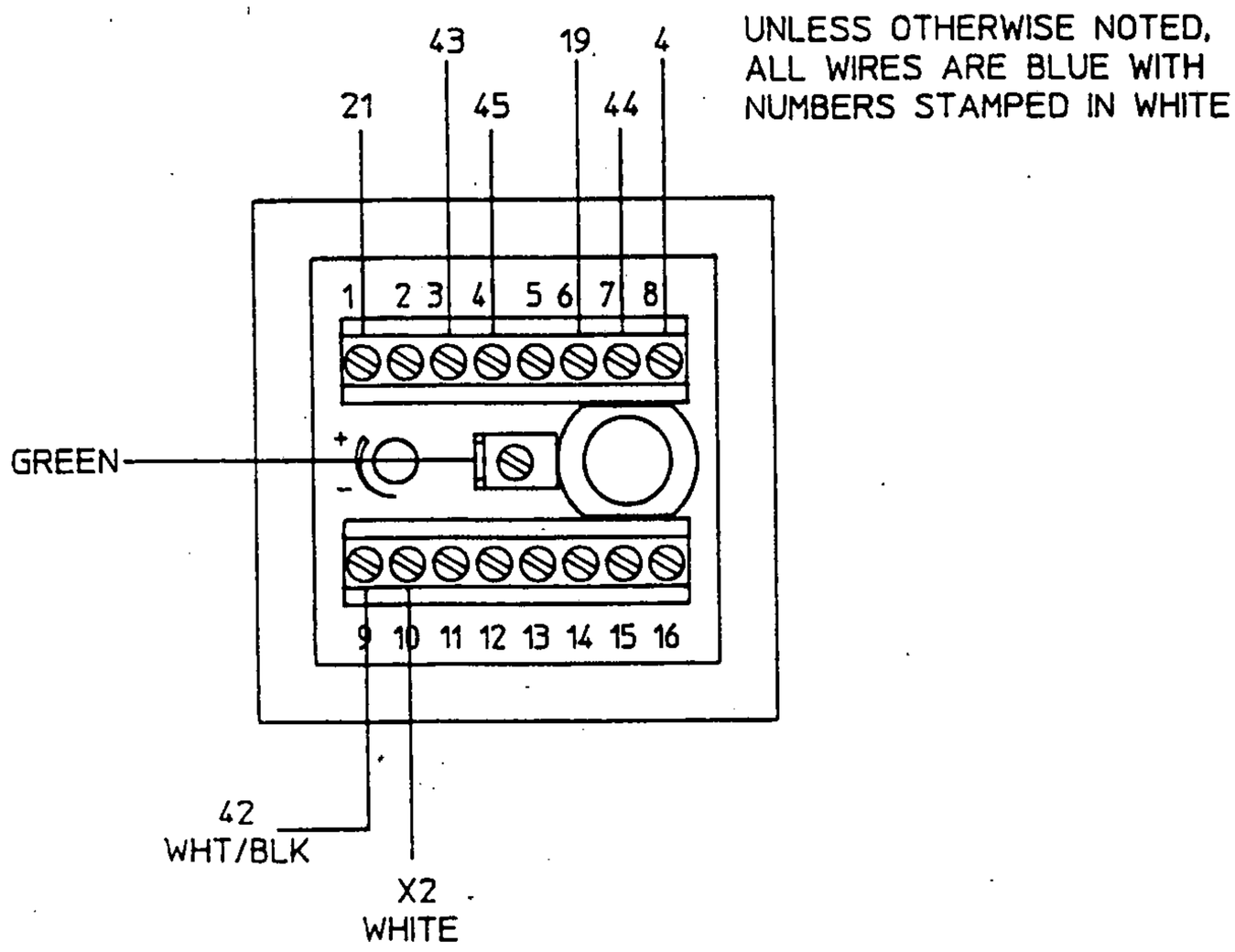
LOGIC CONTROLLER WIRING
FA-350A / FS-350A

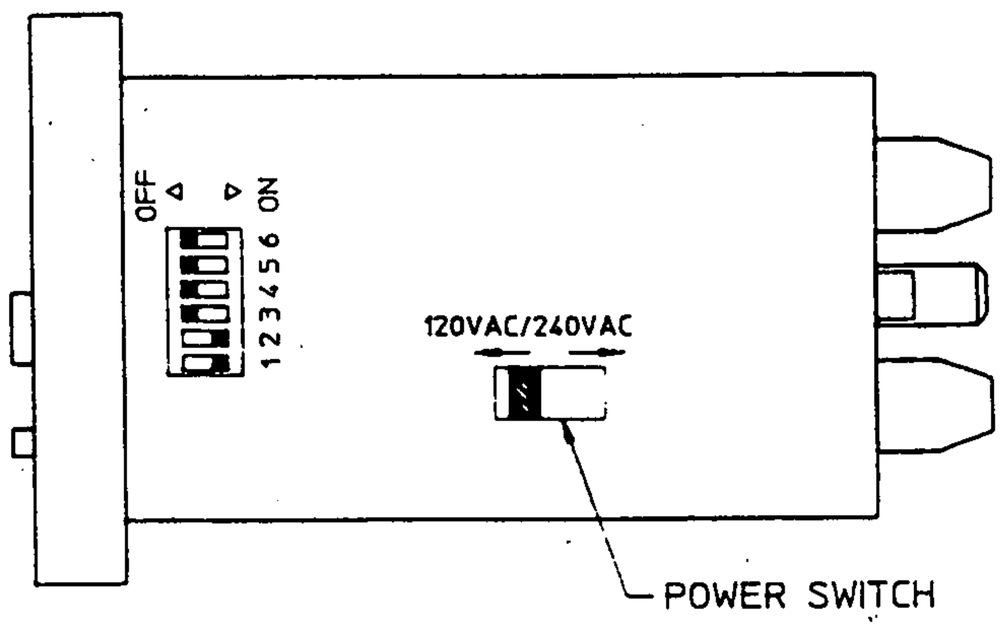
WIRE NUMBERS AND COLORS ARE REFERENCED ON THE ELECTRICAL SCHEMATICS



NOTE: A VARISTOR (P/N H3-5023) IS CONNECTED BETWEEN THE AC INPUT TERMINALS

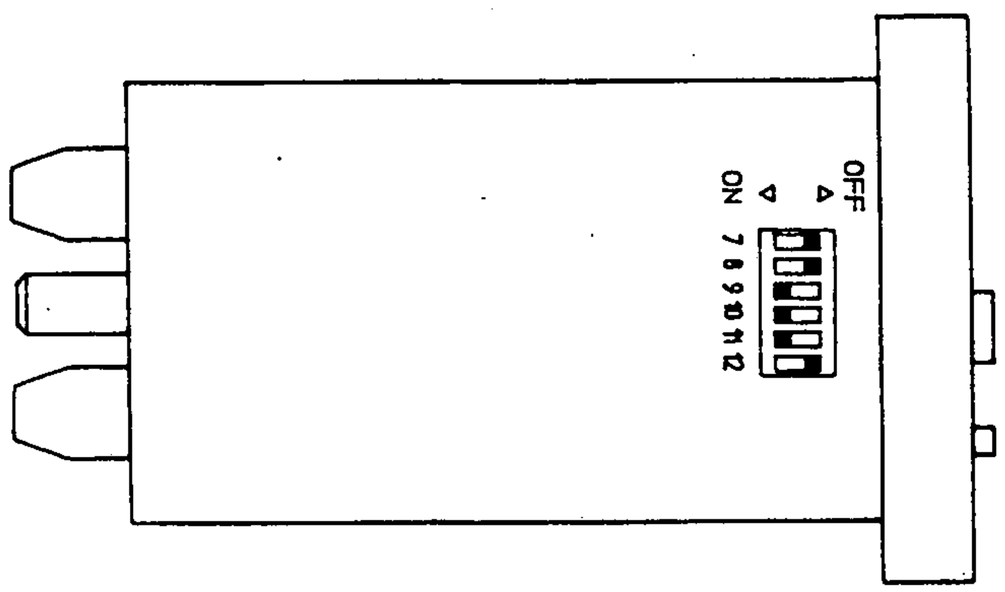
PARTS COUNTER WIRING
FA–350A/FS–350A





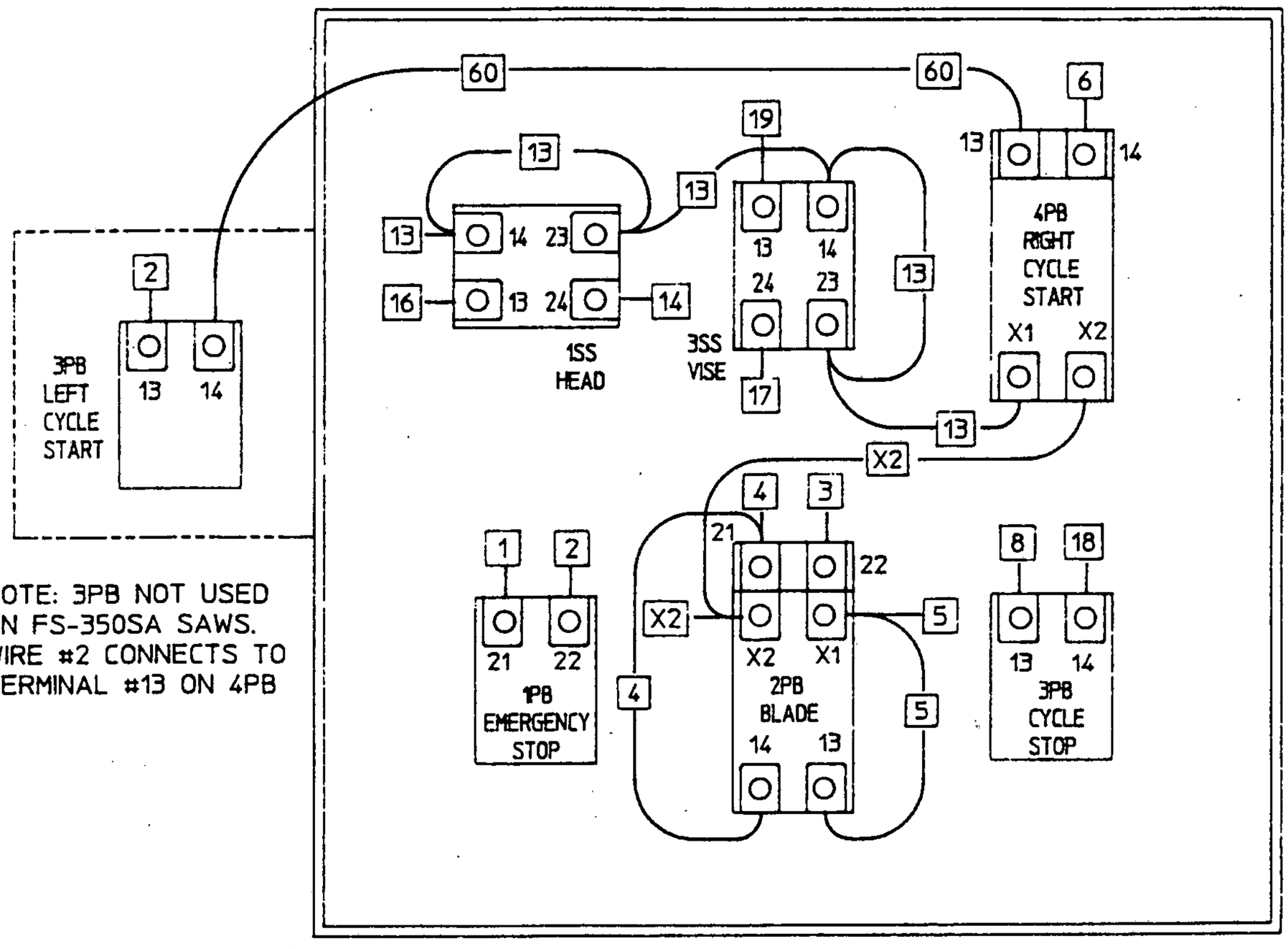
SWITCH SETTINGS ON SIDE OF COUNTER
SWITCHES 1, 2, 9, 10, 11 SHOULD BE 'ON'
ALL OTHER SWITCHES SHOULD BE 'OFF'

POWER SWITCH SHOULD BE SET FOR 120V



FA-350SA/FS-350SA
SWITCH PANEL ASSEMBLY

CONTROL PANEL WIRING
(VIEWED WITH COVER HINGED DOWN)

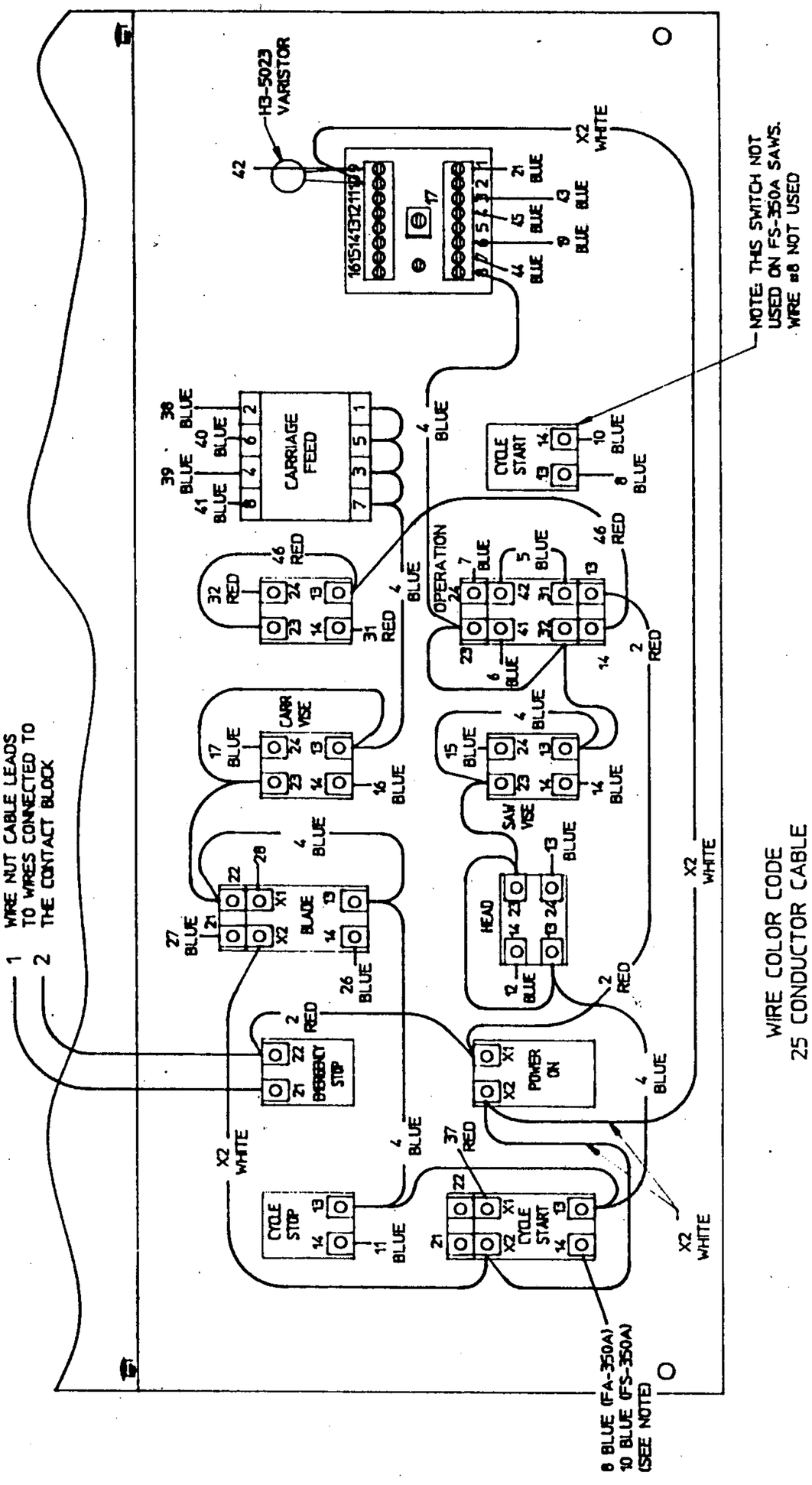


NOTE: 3PB NOT USED ON FS-350SA SAWS. WIRE #2 CONNECTS TO TERMINAL #13 ON 4PB

WIRE COLOR CODE
(WIRE COLOR/STRIPE COLOR(S))

X2	WHITE
1	WHITE/BLACK
2	RED/YELLOW
3	WHITE/BLACK & RED
4	WHITE/BLUE
5	WHITE/GRAY
6	WHITE/RED
8	WHITE/ORANGE
13	GRAY
14	RED
16	ORANGE
17	BLUE
18	RED/BLACK
19	BLACK

FA-350A/FS-350A
WIRING CONNECTIONS

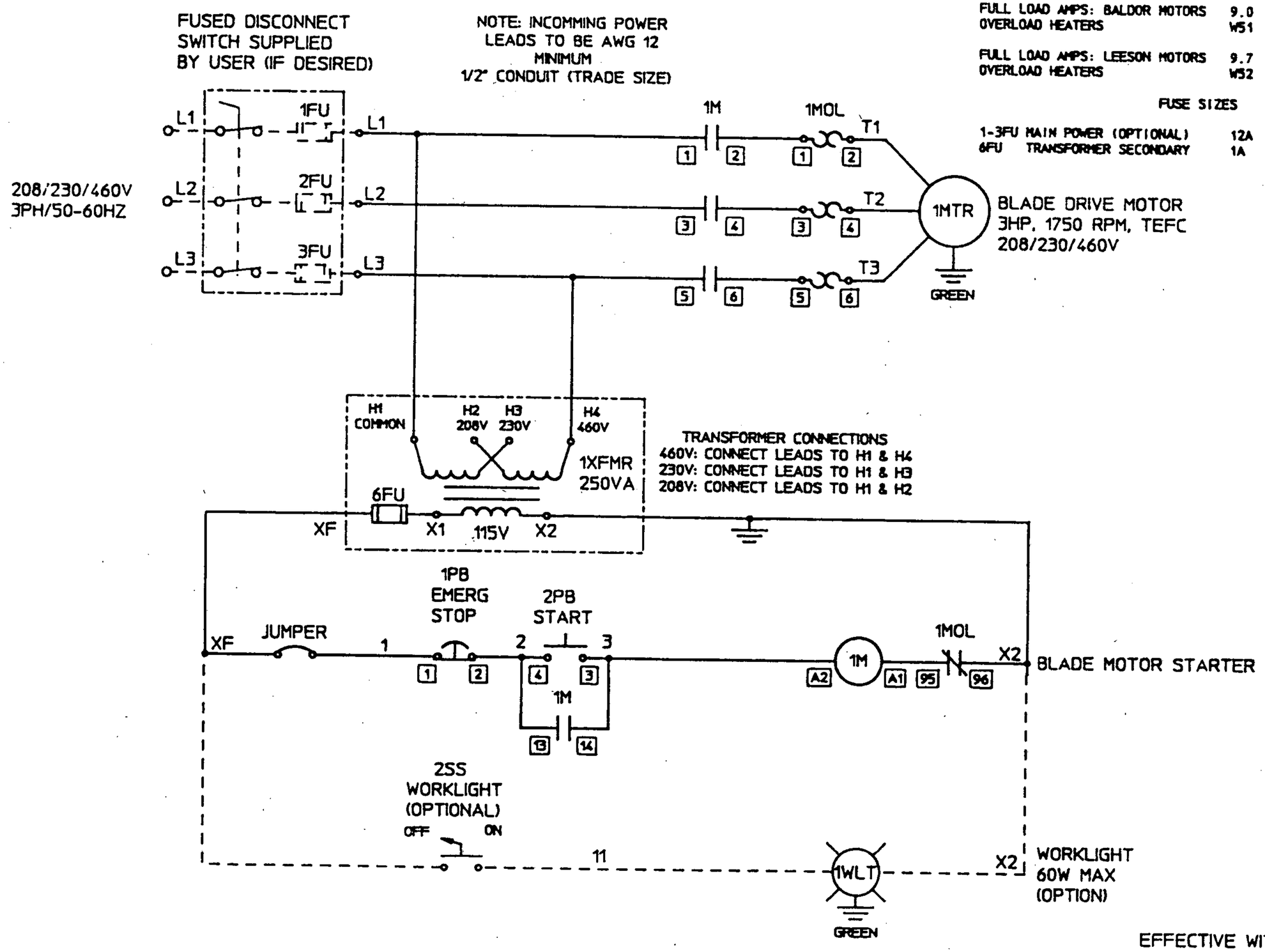


WIRE COLOR CODE
25 CONDUCTOR CABLE

X2	WHITE	
1	PINK	
2	WHITE W/ORANGE	TRACER
3	WHITE W/PURPLE	
4	WHITE W/GRAY	
20	WHITE W/BLUE	
21	WHITE W/BROWN	
22	WHITE W/GREEN	
23	WHITE W/YELLOW	
24	WHITE W/RED	
28	WHITE W/BLACK &	RED
29	BLACK	

30	RED
31	ORANGE
32	BLUE
33	BROWN
34	YELLOW
35	VIOLET
36	GRAY
42	WHITE W/BLACK
GND	GREEN

ELECTRICAL SCHEMATIC
CA-350/CA-350PV SAWS
WITH MAGNETIC STARTER



	208V	230V	460V
FULL LOAD AMPS: BALDOR MOTORS	9.0	8.6	4.3
OVERLOAD HEATERS	W51	W51	W44
FULL LOAD AMPS: LEESON MOTORS	9.7	8.8	4.4
OVERLOAD HEATERS	W52	W51	W44
FUSE SIZES			
1-3FU MAIN POWER (OPTIONAL)	12A	12A	6A
6FU TRANSFORMER SECONDARY	1A	1A	1A

EFFECTIVE WITH SERIAL NO. 377

ELECTRICAL SCHEMATIC
CS-350M/CS-350PV

FUSED DISCONNECT SWITCH SUPPLIED BY USER (IF DESIRED)

208/230/460V 3PH/50-60HZ

1FU 2FU 3FU

208/230V-12 AMP
460V-6 AMP

NOTE: INCOMMING POWER LEADS TO BE AWG 12 MINIMUM 1/2" CONDUIT (TRADE SIZE)

1SS SPEED SELECT
OFF LOW HIGH

1M 1MOL

T1 T2 T3

RED WHITE BLACK ORANGE BLUE WHITE/BLACK

1MTR

3 HP, 1725 RPM
1.5 HP, 850 RPM

NOTE: DIFFERENT MOTORS REQUIRED FOR 230 OR 460V OPERATION

FULL LOAD AMPS

LEESON MOTORS	1725 RPM	850 RPM	OVERLOAD HEATERS
208/230V	7.6	6.9	W49
460V	3.8	3.5	W42
BALDOR MOTORS			
8.8 F.L.A. @ 208/230V			W51
4.4 F.L.A. @ 460V			W44

H1 COMMON H2 208V H3 230V H4 460V

1XFMR 250VA

TRANSFORMER CONNECTIONS
460V: CONNECT LEADS TO H1 & H4
230V: CONNECT LEADS TO H1 & H3
208V: CONNECT LEADS TO H1 & H2

6FU 1.25A

XF X1 115V X2

1PB EMERG STOP

2PB START

JUMPER

1M 1MOL

BLADE MOTOR STARTER

COOLANT

2 MTR

BROWN BLUE GREEN

COOLANT PUMP
1/15 HP, 1.15 AMP

2SS WORKLIGHT (OPTIONAL)
OFF ON

7FU 5 AMP

1WLT

WORKLIGHT
60W MAX
(OPTION)

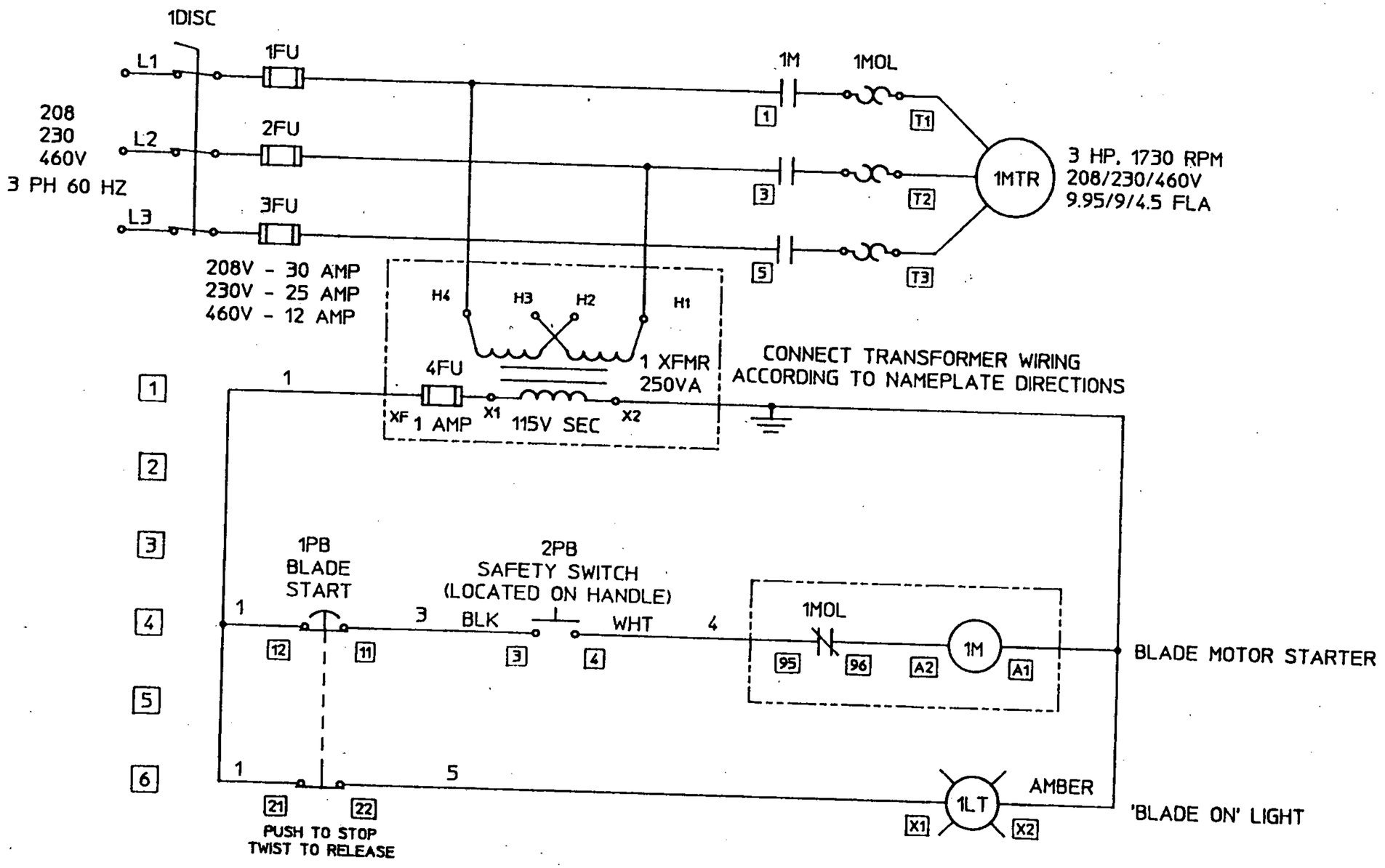
EFFECTIVE WITH S/N 382

REVISED 6/92

ELECTRICAL SCHEMATIC
FA-350M/FA-350PV

NOTE: INCOMMING POWER LEADS
TO BE AWG 10 MINIMUM

1/2" CONDUIT (TRADE SIZE)



NOTE: INCOMMING POWER LEADS
TO BE AWG 14 MINIMUM

1/2" CONDUIT (TRADE SIZE)

1DISC

208
230
460V
3 PH 60 HZ

L1
L2
L3

1FU
2FU
3FU

208/230V - 30 AMP
460V - 12 AMP

1M
1MOL

1SS
SPEED SELECT
OFF
LOW
HIGH

RED
WHITE
BLACK
ORANGE
BLUE
WHITE/BLACK

1MTR

FULL LOAD AMPS

LEESON MOTORS

	1725 RPM	850 RPM
208/230V	7.6	6.9
460V	3.8	3.5

BALDOR MOTORS
8.8 F.L.A. @ 208/230V
4.4 F.L.A. @ 460V

3 HP, 1725 RPM
1.5 HP, 850 RPM

NOTE: DIFFERENT MOTORS REQUIRED FOR 230 OR 460V OPERATION

CONNECT TRANSFORMER WIRING ACCORDING TO NAMEPLATE DIRECTIONS (440V WIRING SHOWN)

H1 H2 H3 H4

1 XFMR
250VA

4FU
XF 2 AMP X1 115V SEC X2

1PB
BLADE
START

2PB
SAFETY SWITCH
(LOCATED ON HANDLE)

BLK
WHT (OR RED)

1MOL
1M
BLADE MOTOR STARTER

AMBER
1LT
'BLADE ON' LIGHT

PUSH TO STOP
TWIST TO RELEASE

2SS
COOLANT
OFF
ON

5FU
1 1/4A

2MTR
BROWN
BLUE
GREEN/YELLOW
FLOOD COOLANT PUMP

NOTE - INCOMING POWER LEADS TO BE AWG 10 MINIMUM

1/2" CONDUIT (TRADE SIZE)

208V
230V
460V
60HZ/3PH

1DISC
1FU
2FU
3FU
L1
L2
L3
208/230V - 30 AMP
460V - 12 AMP
8FU
7FU
1M
1MOL
1MTR
3 HP, 1730 RPM
208/230/460V
9.95/9/4.5 F.L.A.
L1
L+
L2
L-
29
30
2M
MOTOR BRAKE

CONNECT TRANSFORMER WIRING ACCORDING TO NAMEPLATE DIRECTIONS (460V WIRING SHOWN)

H4 H3 H2 H1
1 XFMR 250 VA
4FU
2.5 AMP
X1 115 VAC X2
XF
1PB EMERG STOP
PUSH TO STOP TWIST TO RELEASE

2PB BLADE
3 WHITE/ RED & BLACK
STOP
START
1MOC
BLADE MOTOR STARTER (4, 5, 7)
BLADE ON (PART OF 2PB SWITCH)
2LT
WHITE
BRAKING CONTACTOR (3) (OPTION)
4 WHITE /BLUE
5 WHITE /GRAY
1CR
PIN NUMBERS ON 15 PIN CONNECTOR

4PB LEFT CYCLE START
4PB RIGHT CYCLE START
WHITE/RED
2TR
4PDT X2
CYCLE START RELAY (9, 13, 14, 15, 20)

1FTS CYCLE START (OPTION)
NOT USED IF BRAKE OPTION IS INSTALLED
2CR
BOXED COMPONENTS LOCATED ON PRINTED CIRCUIT BOARD

2 RED/YELLOW
3CR
1TR
.75 SEC
HEAD FEED TIMER (18)

19 BLACK
6 WHITE/RED
CYCLE END TIMER (10)

HEAD UP 1LS
BLK GRN BLU
8 WHITE/ORANGE
END OF CYCLE RELAY (11, 15)

14 RED
16 ORANGE
17 BLUE
END OF CUT RELAY (13, 16, 19, 20)

3PB CYCLE STOP
2LS HEAD DOWN

2SS HEAD
UP
DOWN
2SOL
HEAD FEED

1SOL
HEAD RAISE

3SS VISE
OPEN
CLAMP
3SOL
VISE CLAMP

4SOL
VISE OPEN

1LT
GREEN
POWER ON LIGHT (PART OF 4PB)

ELECTRICAL SCHEMATIC
FA-350SA

EFFECTIVE WITH SERIAL NO. 241

FOR PANEL LAYOUTS AND PARTS LIST, SEE SHEET 2

8.20

NOTE - INCOMING POWER LEADS TO BE AWG 10 MINIMUM

1/2" CONDUIT (TRADE SIZE)

208V
230V
460V
60HZ/3PH

1DISC
1FU
2FU
3FU
L1
L2
L3

208/230V - 30 AMP
460V - 12 AMP

1M
1MOL

1SS
SPEED SELECT
OFF
LOW
HIGH

RED
WHITE
BLACK
ORANGE
BLUE
WHITE/BLACK

1MTR

FULL LOAD AMPS

LEESON MOTORS

	1725 RPM	850 RPM
208/230V	7.6	6.9
460V	3.8	3.5

BALDOR MOTORS
8.8 F.L.A. @ 208/230V
4.4 F.L.A. @ 460V

3 HP, 1725 RPM
1.5 HP, 850 RPM

NOTE: DIFFERENT MOTORS REQUIRED FOR 230 OR 460V OPERATION

CONNECT TRANSFORMER WIRING ACCORDING TO NAMEPLATE DIRECTIONS (460V WIRING SHOWN)

H4 H3 H2 H1
1 XFMR
250 VA
4FU
2.5 AMP
X1 115 VAC X2

1PB
EMERG STOP
PUSH TO STOP
TWIST TO RELEASE
XF

2PB
BLADE
STOP
START
1MOL
1M
2LT
WHITE

BLADE MOTOR STARTER (4, 5, 7)

BLADE ON (PART OF 2PB SWITCH)

5FU
1 1/4A
2MTR
BROWN
BLUE
GREEN

COOLANT PUMP

4 WHITE /BLUE
5 WHITE /GRAY

1CR

PIN NUMBERS ON 15 PIN CONNECTOR

4PB
CYCLE START

6 WHITE/RED

2TR
1CR
4PDT X2

CYCLE START RELAY (9, 13, 14, 15, 20)

1FTS
CYCLE START
(OPTION)

2CR

BOXED COMPONENTS LOCATED ON PRINTED CIRCUIT BOARD

2 RED/YELLOW

1CR
3CR
1TR
.75 SEC

HEAD FEED TIMER (18)

19 BLACK

6 WHITE/RED

HEAD UP
1LS
BLK
BLU
GRN

8 WHITE/ORANGE

14 RED

16 ORANGE

2CR
3CR
2TR
4PDT

CYCLE END TIMER (10)

END OF CYCLE RELAY (11, 15)

END OF CUT RELAY (13, 16, 19, 20)

18 RED/BLACK

3PB
CYCLE STOP

2LS
HEAD DOWN

2SS
HEAD
UP
DOWN

3SS
VISE
OPEN
CLAMP

1SOL
2SOL
4SOL
3SOL

HEAD FEED
HEAD RAISE
VISE CLAMP
VISE OPEN

GREEN
1LT

POWER ON LIGHT (PART OF 4PB)

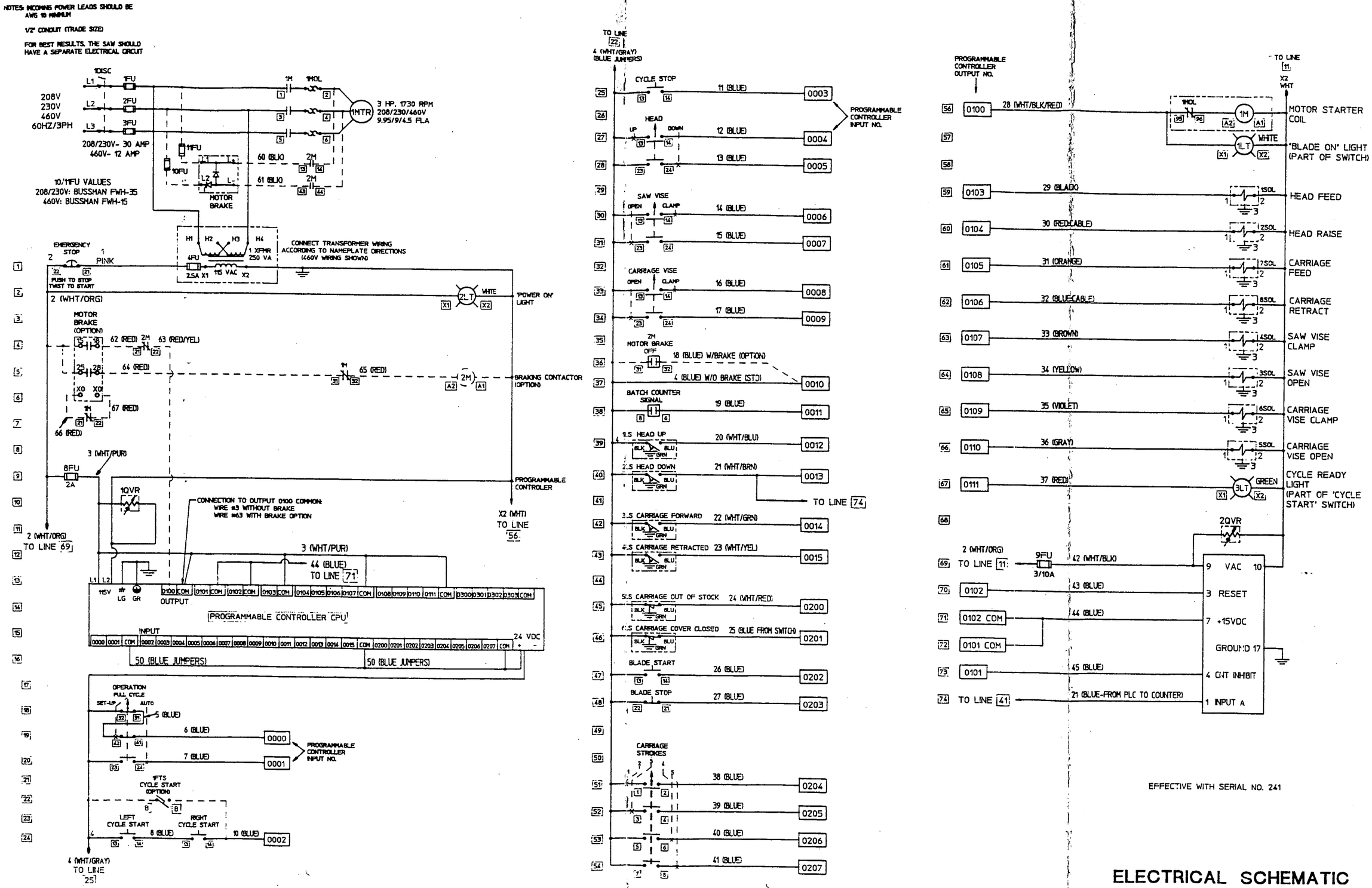
ELECTRICAL SCHEMATIC
FS-350SA

EFFECTIVE WITH SERIAL NO. 241

NOTES: INCOMING POWER LEADS SHOULD BE AWG 10 MINIMUM

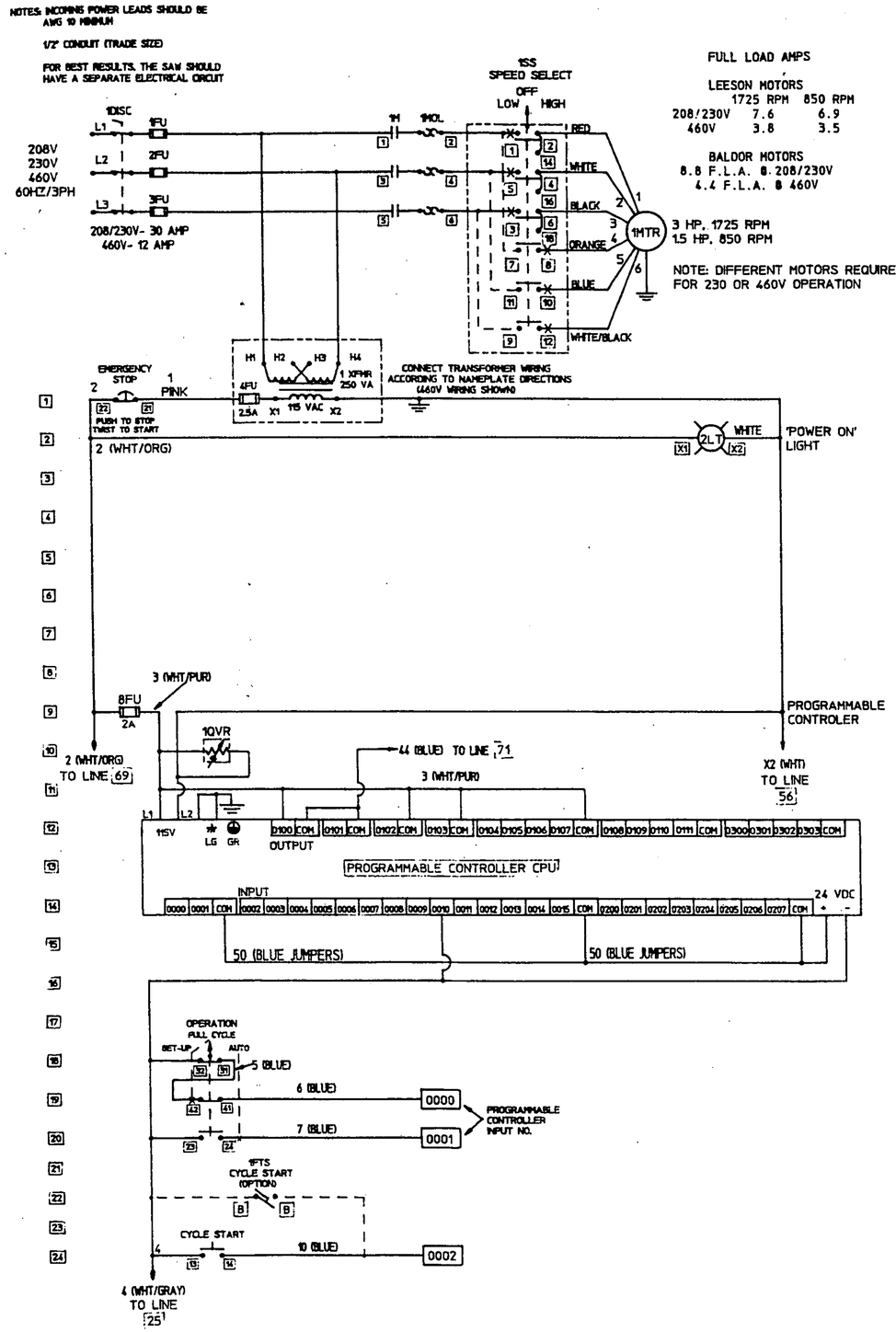
1/2" CONDUIT (TRADE SIZE)

FOR BEST RESULTS, THE SAW SHOULD HAVE A SEPARATE ELECTRICAL CIRCUIT

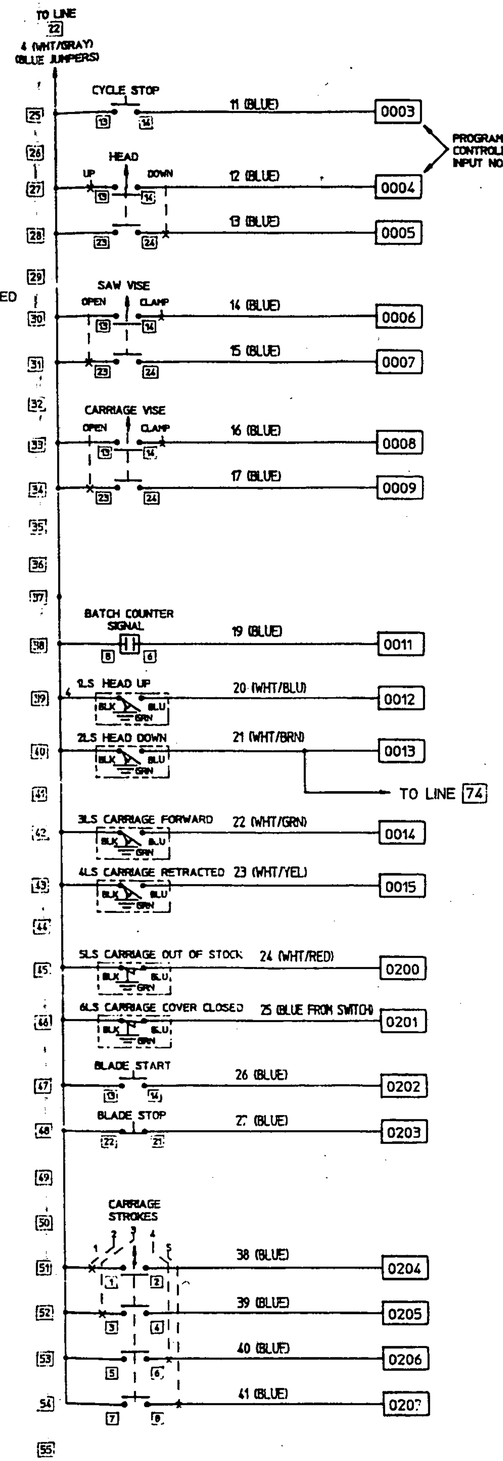


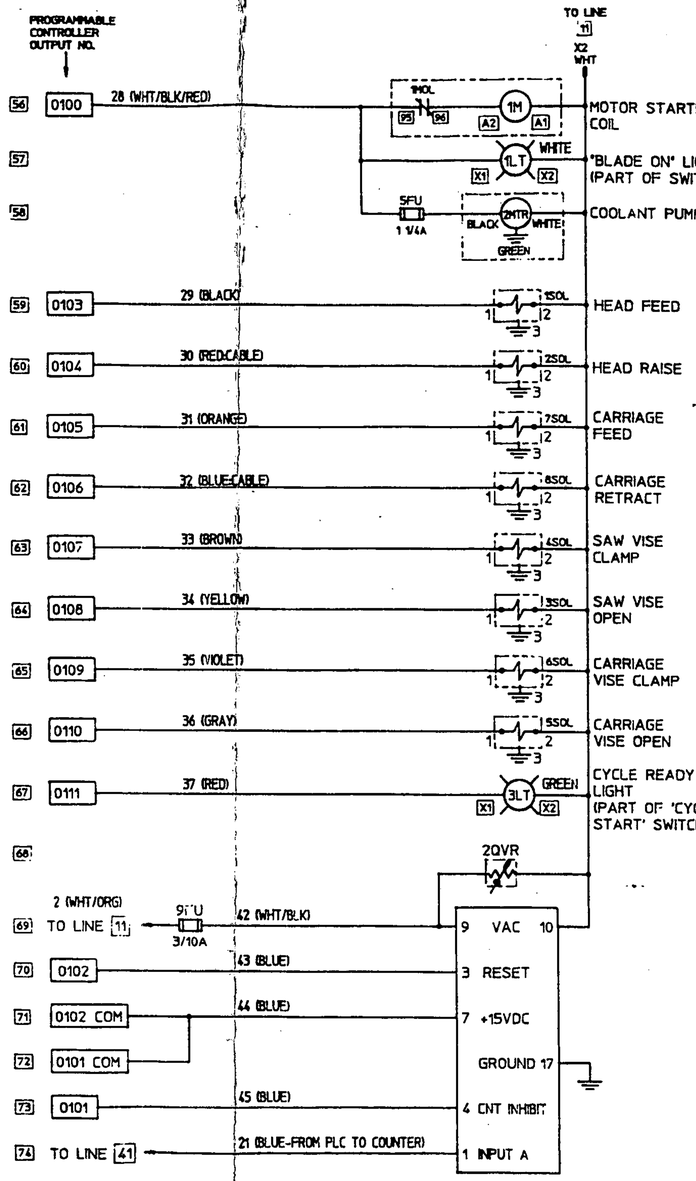
EFFECTIVE WITH SERIAL NO. 241

ELECTRICAL SCHEMATIC
FA-350A



8.23





EFFECTIVE WITH SERIAL NO. 241

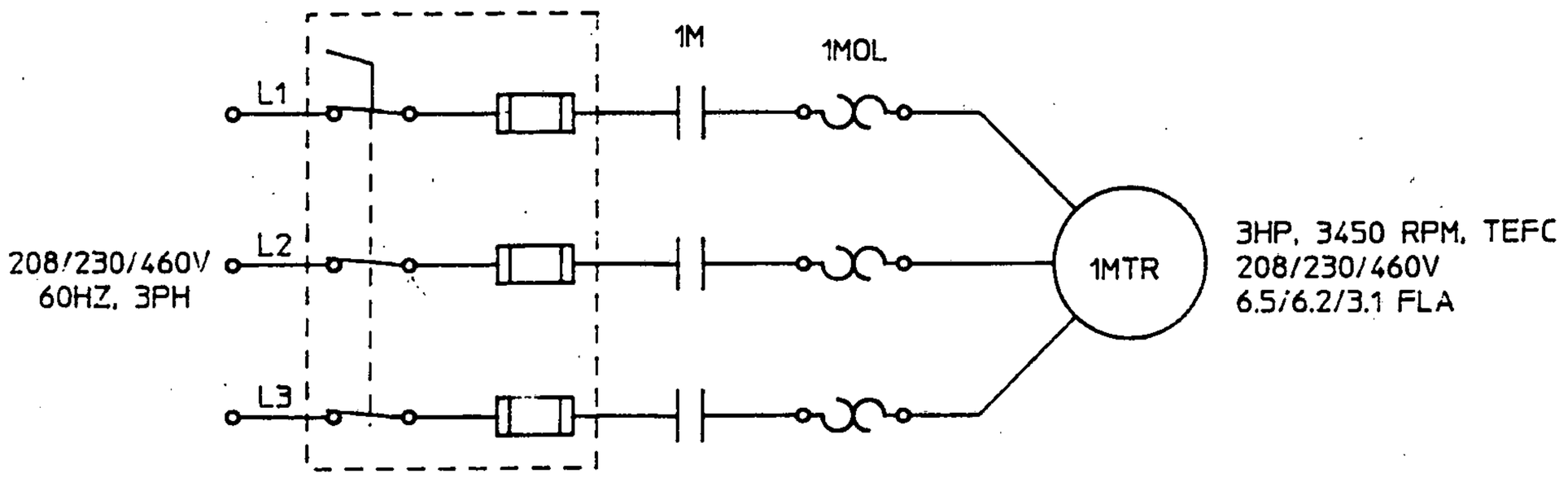
ELECTRICAL SCHEMATIC
FS-350A

3 PHASE ELECTRICAL SCHEMATIC
CHIP COLLECTION SYSTEM

NOTE: INCOMING LEADS TO BE AWG 14 MINIMUM
1/2" CONDUIT (TRADE SIZE)

MACHINE SHOULD BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS ANY STATE OR LOCAL CODES THAT APPLY.

FUSED DISCONNECT RECOMMENDED
(INSTALLED BY USER)



1MTR		BALDOR #35J395-672 3HP MOTOR 56C FRAME
1M	9A-220E	ALLEN-BRADLEY #609TU-AAH STARTER (208V)
	9A-220B	ALLEN-BRADLEY #609TU-AAA STARTER (230V)
	9A-220C	ALLEN-BRADLEY #609TU-AAB STARTER (460V)
1MOL		ALLEN-BRADLEY #W47 HEATER ELEMENT (208/230V)
		ALLEN-BRADLEY #W40 HEATER ELEMENT (460V)

OVERLOAD HEATER ELEMENTS
ALLEN-BRADLEY 609TU SWITCHES
SAWS WITH LEESON MOTORS

MODEL(S)	VOLTAGE	HEATER(S)	FUSE SIZE AT SAW DISCONNECT	FUSE SIZE FOR WALL DISCONNECT
CS-350	208/230	W50	NONE	9 AMP
(ALL)	460	W42	NONE	5 AMP
CA-350	208	W52	NONE	10 AMP
(ALL)	230	W51	NONE	10 AMP
	460	W43	NONE	5 AMP

SAWS WITH BALDOR MOTORS

CS-350	208/230	W51	NONE	10 AMP
(ALL)	460	W42	NONE	6 AMP
CA-350	208	W52	NONE	10 AMP
(ALL)	230	W51	NONE	10 AMP
	460	W43	NONE	5 AMP

OVERLOAD HEATER ELEMENTS
SQUARE D CONTACTORS
SAWS WITH LEESON MOTORS

FS-350	208/230	TE5.5	30AMP	10 AMP
(ALL)	460	TE3.7	12AMP	6 AMP
FA-350	208	TE8	30AMP	10 AMP
(ALL)	230	TE8	30AMP	10 AMP
	460	TE3.7	12AMP	6 AMP

SAWS WITH BALDOR MOTORS

FS-350	208/230	TE8	30AMP	10 AMP
(ALL)	460	TE3.7	12AMP	6 AMP
FA-350	208	TE8	30AMP	10 AMP
(ALL)	230	TE8	30AMP	10 AMP
	460	TE3.7	12AMP	6 AMP