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MODEL CPO-315-HFA-CNC
COLD SAW**

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MODEL
CPO-315-HFA-CNC
COLD SAW

PRINTED MARCH 2023

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE #
1.0	INTRODUCTION	4
2.0	SAFETY PRECAUTIONS	4
3.0	WARRANTY	5
4.0	INSTALLATION & SET-UP	6
4.1	Physical Dimensions	6
4.2	Machine Installation	8
4.3	Electrical Requirements	10
4.4	Mist Coolant System	11
5.0	MACHINE START-UP	11
5.1	Control Panel Functions	12
5.1A	Recipe Setup Screen	13
5.1B	Manual Screen 1	14
5.1C	Manual Screen 2	15
5.1D	Auto Run Screen	16
5.1E	E-Stop Screen	17
5.1F	Security For Maintenance	18
5.1G	Machine Setup	19
5.1H	Controller	20
5.1I	Machine Faults & I/O	21
6.0	MACHINE OPERATION	22
6.1	Selecting The Proper Blade and Cutting Speed	22
6.2	Blade Installation	22
6.3	Saw Capacities	25
6.4	Material Main Vise	26
6.5	Shuttle Vise	28
6.6	Power Down Feed	30
6.7	Material Clamping	32
6.8	Stroke Control Adjustment	32
7.0	MAINTENANCE	34
7.1	Lubrication	34
7.2	Cutting Oils and Lubricants	35
7.3	Scheduled Maintenance	35
7.4	Gear Replacement (Saw Head)	36
7.5	Spindle Replacement (Main Vise)	38
7.6	Seal Replacement (Main Vise)	39
7.7	Shuttle Vise Maintenance	40
7.8	Optional Coolant Pump Maintenance	42

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE #
8.0	OPTIONAL EQUIPMENT	44
8.1	Special Vise Jaws	44
8.2	Optional In Feed Supply Tracks	44
9.0	TROUBLE SHOOTING GUIDE	46
9.1	Electrical Trouble Shooting	46
9.2	Breakage or Excessive Dulling of Blades	46
9.3	Part Length Is Not Consistent	47
9.4	Coolant System	47
9.5	Pneumatic System	48
10.0	PARTS LISTS	50
10.1	Saw Head	50
10.2	Main Vise Assembly	52
10.3	Shuttle Vise Assembly	54
10.4	Shuttle Assembly	56
10.5	Power Down Feed Assembly	58
10.5A	Power Down Feed Valves	60
10.5B	Air Controls	62
10.6	Air Valve Assembly	64
10.7	Blade Guard Assembly	66
10.8	Motor Assembly	68
10.9	Mist Coolant System	70
10.10	Electrical Unit-Line Circuit	72
10.11	Base Assembly	74
10.12	Optional Coolant Pump	76
10.13	Stroke Control Assembly	78
10.14	Hood Assembly	80
11.0	OPTIONAL EQUIPMENT PARTS LISTS	82
11.1	Ten Foot Supply Track	82
11.2	Coolants and Lubricants	84
12.0	STOCK BLADES	84
13.0	WIRING DIAGRAMS	85

1.0 INTRODUCTION

The CPO-315 HFA/CNC Fully Automatic Cold Saw is designed to cut solids, tubes, flats and other profiles in grades of material that range from hot and cold rolled steel, annealed tool steels, stainless, aluminum, brass, copper, synthetics and extrusions.

Cold sawing is a process similar to a milling process. In most cases, this, combined with the variable speed feature, gives a finished cut that does not require any secondary machining or de-burring.

Since milling spindle speeds are used in cold sawing, there are several things that are required to achieve quality results. The selection of the proper pitch (number of teeth) on the blade and the proper spindle speed for the type of material being cut are critical. Proper material clamping and a good quality coolant are also important.

Cold sawing has several advantages over band saws and abrasive saws. Besides the mill quality cut, cold saws have the ability to generate faster cutoff times than band saws. There are no sparks and excessive noises that are associated with abrasive cutoff saws. There is no work hardening of the workpiece.

Cold saws also offer the advantage of blades that can be re-sharpened until the diameter of the blade will no longer cut through the material. The vise allows for easy changeover to special clamping jaws for profiles and extrusions. Having variable motor speed control enables the user to cut a wide range of materials.

2.0 SAFETY PRECAUTIONS

1. The operators of this machine must be qualified and well trained in the operation of this machine. The operators must be aware of the capacities and the proper use of this machine.
2. This manual is not intended to teach untrained personnel how to operate equipment.
3. **NEVER OPERATE THIS MACHINE WITH ANY OF THE PROTECTIVE GUARDS OR HOODS OPEN OR REMOVED!**
4. Wear the appropriate personal protective equipment. Safety glasses are required at all times when operating or observing this machine in operation.
5. Never place any part of your body into the path of the saw blade, material vises or shuttle cylinder.
6. Do not wear loose fitting clothing, gloves or jewelry when operating this machine.
7. All electrical connections shall be made by a qualified electrician. This machine must be grounded in accordance with the National Electric Code.
8. Disconnect the machine from the power source before performing maintenance or changing blades.

9. **Strictly comply with all of the warning labels and decals on the machine. Never remove any of the labels. Promptly replace worn or damaged labels.**
10. **Practice good housekeeping. Keep the area around the machine clean and dry. Do not obstruct the operator's position by placing anything around the machine that would impede the operator's access to any of the machine's functions.**
11. **When sawing, always support long pieces and make sure that the material is properly clamped.**
12. **Keep the guards, as well as all other parts of the saw, in good working condition. Replace worn parts promptly.**
13. **Do not alter or modify this machine in any way without written permission from the manufacturer.**
14. **Set up a program of routine inspections and maintenance for this machine. Make all repairs and adjustments in accordance with the manufacturer's recommendations.**

3.0 WARRANTY

Scotchman Industries, Inc. will, within 2 years of date of purchase, replace F.O.B. the factory or refund the purchase price for any goods which are defective in materials or workmanship and, at the seller's option, returns the defective goods, freight and delivery prepaid, to the seller, which shall be the buyer's sole and exclusive remedy for defective goods.

Hydraulic and electrical components are subject to their respective manufacturer's warranties.

This warranty does not apply to machines or components which have been altered, changed or modified in any way or subjected to abusive or abnormal use, inadequate maintenance or lubrication or subjected to use beyond the seller's recommended capacities and specifications.

In no event shall seller be liable for labor costs expended on such goods or consequential damages.

Seller shall not be liable to purchaser or any other person for loss or damage directly or indirectly arising from the use of the goods or from any other cause.

No officer, employee or agent of the seller is authorized to make any oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on the seller.

Any electrical changes made to the standard machine to comply with local electrical codes must be paid by the purchaser.

As we constantly strive to improve our products, we reserve the right to make changes without notification.

4.0 INSTALLATION AND SET-UP

⊠ CAUTION: THIS SECTION DISCUSSES INSTALLATION AND SET-UP PROCEDURES. PLEASE READ ALL SECTIONS OF THIS MANUAL THOROUGHLY BEFORE OPERATING THIS MACHINE.

4.1 PHYSICAL DIMENSIONS

SEE FIGURE 1 ON THE FOLLOWING PAGE.

	DIMENSIONS	INCHES	CM
A	HEIGHT	65	165
B	FLOOR TO VISE	38.5	98
C	BASE HEIGHT	35	89
D	WISE OPENING	3-5/8	9.2
E	WISE DEPTH	2-1/4	5.7
F	BASE WIDTH	61	155
G	BASE DEPTH	25	64
H	WIDTH	100	254
I	DEPTH	44	112
	WEIGHT	1,750 LB.	795 KG.

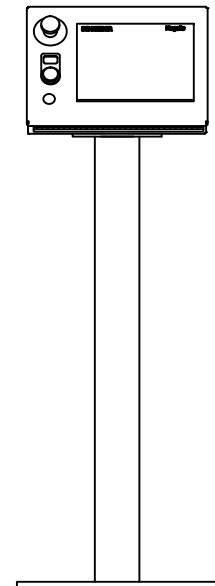
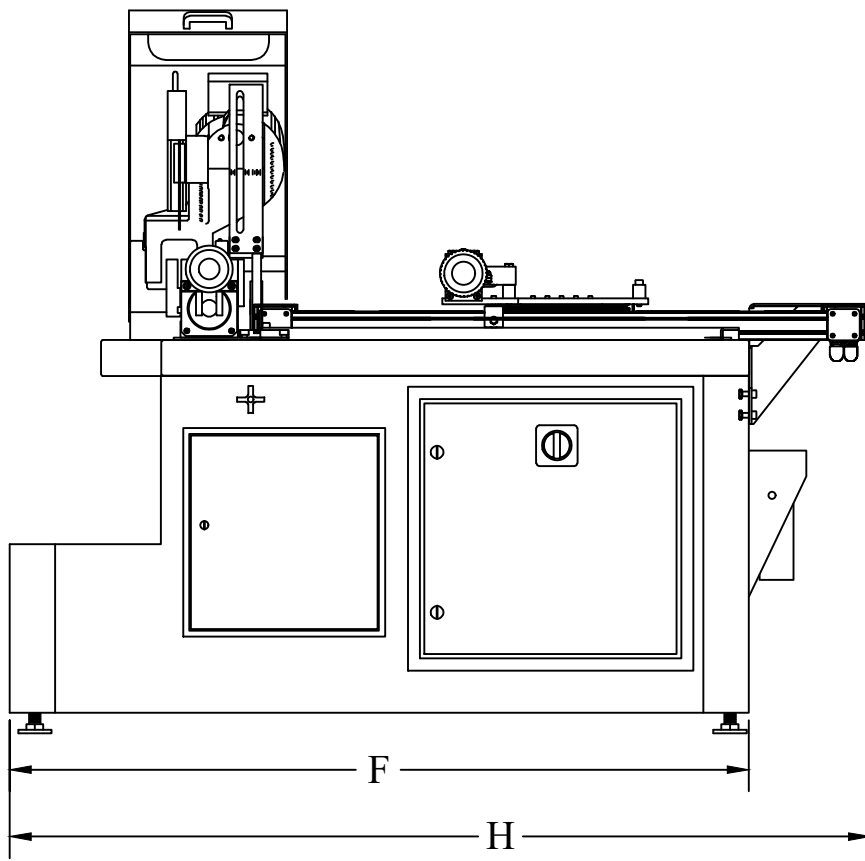
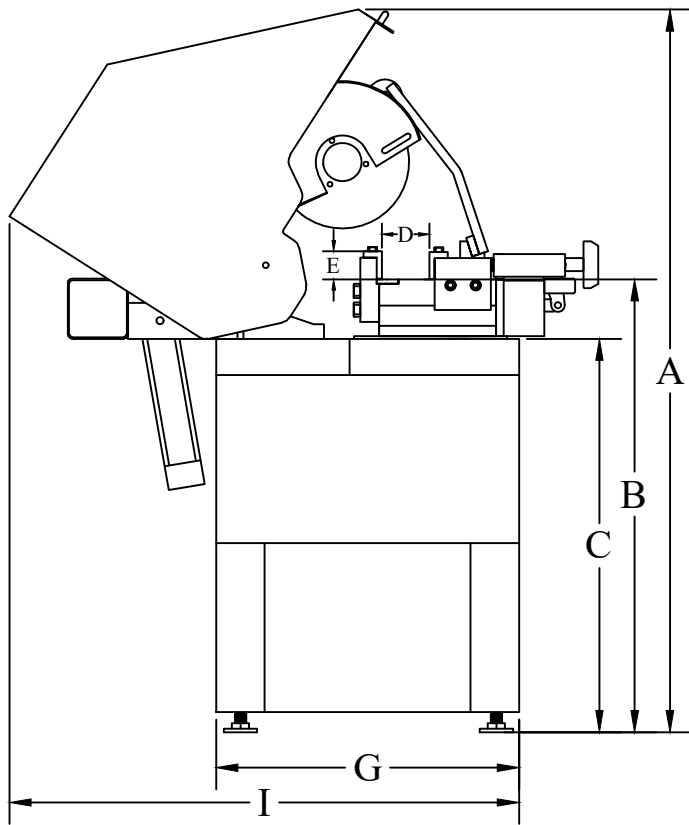


FIGURE 1

4.2 MACHINE INSTALLATION

SEE FIGURE 2 ON THE FOLLOWING PAGE.

This machine is shipped on a pallet and can be moved to the installation location by means of a fork lift.

⊠ **CAUTION: THIS MACHINE IS TOP HEAVY AND MUST BE MOVED WITH CARE, ON HARD FLAT SURFACES, ONLY.**

USE THE FOLLOWING STEPS TO INSTALL THE MACHINE:

1. Select a location for the machine that allows adequate room for any length of material that you may want to cut. Leave adequate space behind the machine and on either end, for set-up and maintenance.
2. Lift the machine off of the shipping pallet, using a fork lift.
3. Place the machine in its final location and level it, using the leveling pads. For this machine to function properly, it is very important that it is level. Any supply tracks used with this machine must also be level and aligned with the vises on the machine.
4. We strongly recommend that you anchor the machine and supply tracks to the floor, with the anchor plates provided with the machine.
5. Connect the main air and electrical supply lines to the machine. To connect the air, slide the shuttle valve down to the closed position and connect the incoming supply line. (DO NOT TURN THE AIR ON YET.) This machine requires a minimum of 90 PSI and may require up to 130 PSI, depending on your application. The electrical supply lines must be connected by a qualified electrician. The supply lines connect to the top of the main disconnect switch, located in the lower base cabinet. Make sure that your plant phase and voltage correspond to the phase and voltage of the machine before connecting the electrical supply.

⊠ **CAUTION: DO NOT POWER THE MACHINE UNTIL THE MACHINE INSTALLATION IS COMPLETE AND YOU HAVE READ ALL OF THE SECTIONS OF THIS MANUAL!**

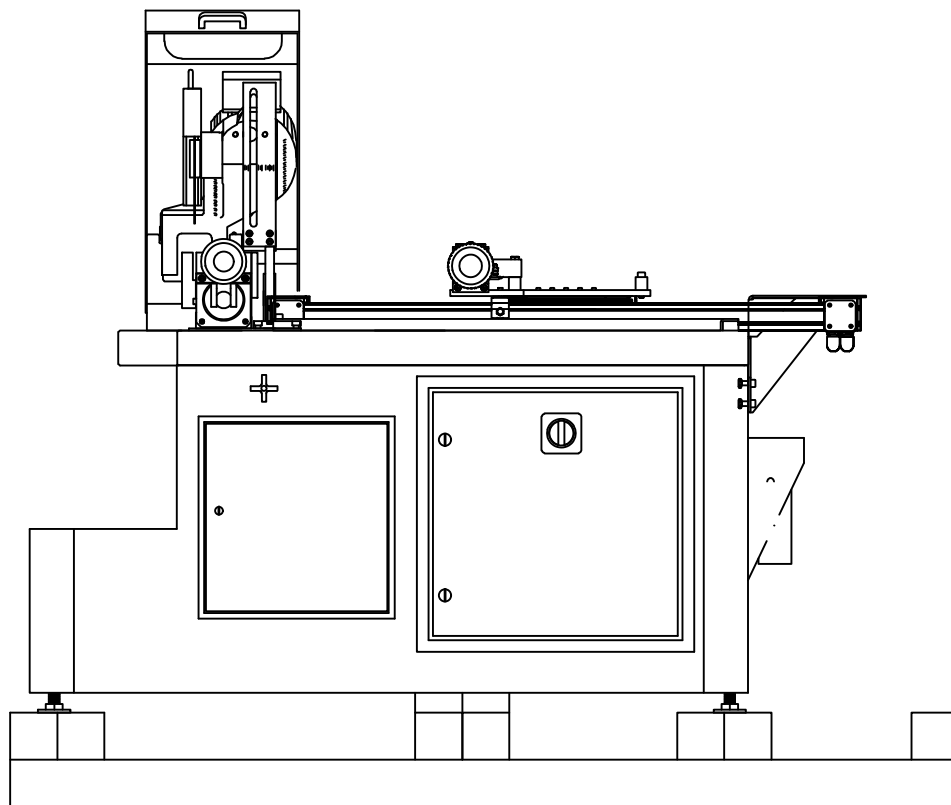
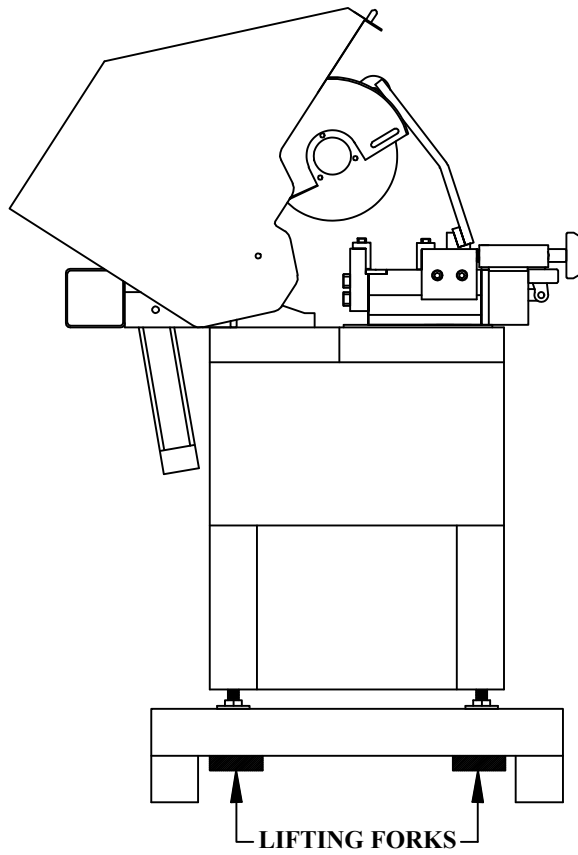


FIGURE 2

4.3 ELECTRICAL REQUIREMENTS

⊠ **CAUTION: TO PREVENT DAMAGE TO THE MACHINE AND DANGER TO THE OPERATOR, ALL ELECTRICAL CONNECTIONS MUST BE MADE BY A QUALIFIED ELECTRICIAN. THIS MACHINE OPERATES WITH LIQUID COOLANT AND MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL ELECTRIC CODES.**

All machines are wired for three phase power. If the machine is not the same voltage as your plant voltage, you will have to purchase a transformer to either step up or down to the correct voltage for the machine as the linear drive components are voltage specific. Check the motor data tag for full load current requirements. Single phase motors are not available.

THE ELECTRICAL DIAGRAM FOR THIS MACHINE IS IN SECTION 14.0.

For supply lines ten feet (304 cm) or shorter, we recommend 12 gauge wire. For lines longer than ten feet (304 cm), we recommend 10 gauge wire. We do not recommend supply lines over twenty feet (609 cm) in length.

CPO-315-HFA-CNC (11-177 RPM)		
<u>MOTOR VOLTAGE</u>	<u>FULL LOAD CURRENT</u>	<u>HORSEPOWER</u>
208	18	5
230	17.3	5
460	10	5

4.4 MIST COOLANT SYSTEM

The coolant system on this machine is a pneumatic mist type. We recommend using only pure, synthetic, water soluble, cutting oils. One gallon of coolant is shipped with each machine. Under normal cutting conditions, it should be mixed in a ratio of one part coolant to ten parts water. In conditions of heavier cutting, the ratio of water should be reduced to seven parts. We recommend premixing the coolant before filling the reservoir. The pressure regulator for the mister should be set at 15 PSI (1 BAR). The amount of air is regulated by the adjustment knob (A) on the top of the mister unit. The amount of coolant is regulated by the nozzle (B) on the end of the mister unit. The mist spray should be evenly distributed on both sides of the blades.

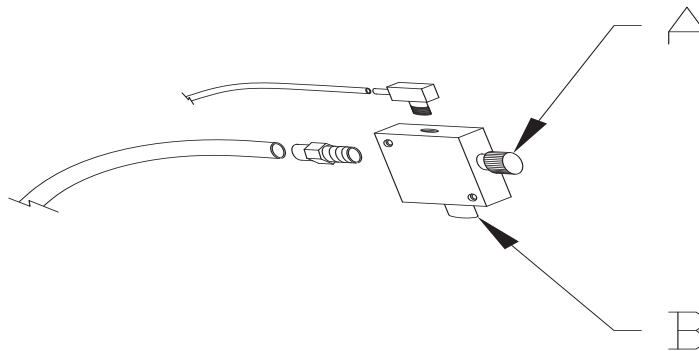


FIGURE 3

5.0 MACHINE START-UP

Before starting this machine, take the time to review the operator's manual thoroughly, to familiarize yourself with all of the functions of the machine.

We strongly urge you to follow OSHA directive CFR-1910.147 (effective 09-09-90) regarding lock-out, tag-out procedures. Keep in mind that the directive refers to all hazardous energy sources, not just electrical. The air supply must also be disconnected and locked or tagged.

Do not install a blade on the saw until after it has been powered and cycled several times.

Once the machine has been powered, check the rotation of the spindle. There is an arrow on the guard showing the proper rotation. If the rotation is not correct, the electrician will have to switch two of the three line wires.

5.1 CONTROL PANEL FUNCTIONS

HOME SCREEN: This is the home screen for this model. This screen will come up when the saw is powered. You can navigate all of the other screens from this screen. On the initial setup of the saw, move to the Recipe Setup screen next.

SEE FIGURE 4 BELOW.



FIGURE 4

5.1A RECIPE SETUP SCREEN

On this screen, you can set up your cut jobs. To set a job:

1. Press the recipes field and enter the name for the job you are setting up. Enter the length of the part and the number of parts that you want to cut in the appropriate fields.
2. Enter the blade RPM in the proper field. The saw has an RPM range from 11 to 177. The heavier the material you are cutting, the lower the RPM should be set. The thinner the material, the higher the RPM should be set. The best RPM for your material will probably take a little trial and error.
3. By touching the recipe field, you can name this cut job by the part number or the part name. The machine will store up to 50 cut jobs. Once you have saved a cut job, you can select it anytime by touching the down arrow and selecting the job that you want. Once you have set up a cut job, go to the manual screen.



FIGURE 5

5.1B MANUAL SCREEN 1

There are two screens in the manual screen. This is the first screen. From this screen, you set the main vise and the shuttle vise to the size of the material that you are cutting. Open both the material vise and the shuttle vises and place a piece of your material in the vises. Manually adjust both vises to within 1/8 of an inch of the material. On the manual screen, close the vises one at a time and verify that the material is firmly clamped.

You can also set the stroke of the blade from this screen. See Section 6.8 on setting the stroke.

You can make manual cuts from this screen. To make a manual cut, place the material in the vise and clamp the material. Press the blade button and press the head down button. The saw will make one cut. Set the stroke of the machine before making manual cuts.

You also use this screen to start the coolant pump if your saw is equipped with the optional flood coolant. All of the functions on the manual screen can be performed with the hood open, except for the blade start. If you press the blade start with the hood open, the machine will automatically go to the E-stop. This feature allows you to do many of the set-up functions with the hood open.



FIGURE 6

5.1C MANUAL SCREEN 2

This is the second screen on the manual screens. To reach this screen, just toggle the arrow on the right hand side of the manual screen. On this screen, you can manually jog the shuttle vise forward and reverse. You can also home the shuttle vise. To jog or home the shuttle, the shuttle vise has to open. If the shuttle won't move, go back to the manual screen 1 and open the shuttle vise.

You can also set the feed rates of the shuttle vise from this screen. The feed rates are preset at the factory and should not need to be changed for most applications. The feed velocity is set at 12 in/s. If you are cutting solid or heavy wall pipe or tubing, you may have to slow the in-feed rate down to prevent the velocity and mass of the material affecting the cut length. The maximum speed velocity is 15 in/s.



FIGURE 7

5.1D AUTO RUN SCREEN

Before starting an auto operation, make sure that you have all of your setup done. Make sure that the vises are adjusted to your material size, the machine's stroke is set for your material and that you have the correct cut job selected.

Place a piece of material in the machine, with at least 1/2 inch of material extended past the blade.

Press the trim start button. The machine will make the trim cut and start the auto operation.

The operation will continue until the preset amount on the counter is reached, the machine runs out of material or you stop the operation by pressing either the E-Stop or the cycle stop buttons.

Unless there is an emergency, press the cycle stop button. When you press the cycle stop button, the machine will complete the cut it is making and stop at the end of the cycle. You can then press the cycle start button and continue the operation.

If you press the E-Stop, you will have to start the operation over after you have powered the machine back up.

The cut reset button on this machine will reset the cut quantity. If you had the quantity set at 100 and you have cut 50 pieces, push the cut count reset and it will reset the count back to 100 pieces.

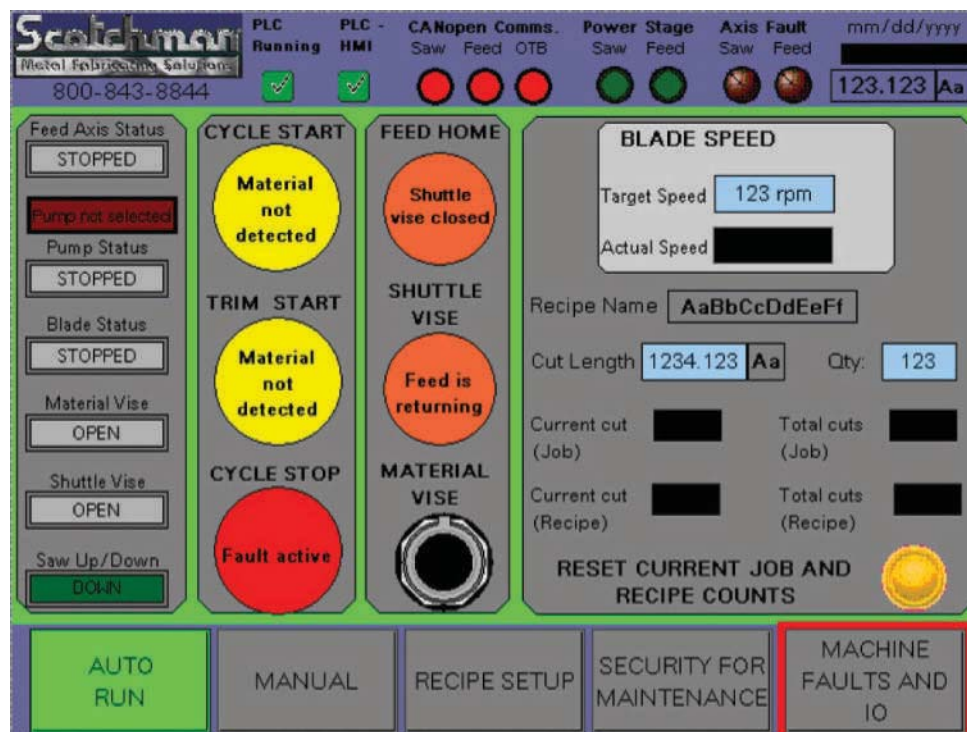


FIGURE 8

5.1E E-STOP SCREEN

This screen appears anytime that the E-Stop is pressed or the saw hood is opened when the machine is powered. If the hood has been opened, you have to press the E-Stop after the hood has been closed or the faults will not reset.



FIGURE 9

5.1F SECURITY FOR MAINTENANCE

On this screen, a username and password are required to access the machine setup and controller menus. To add a username and password, type in the master password "wade" and press the users setup button. Follow the prompts to create a profile for a user.

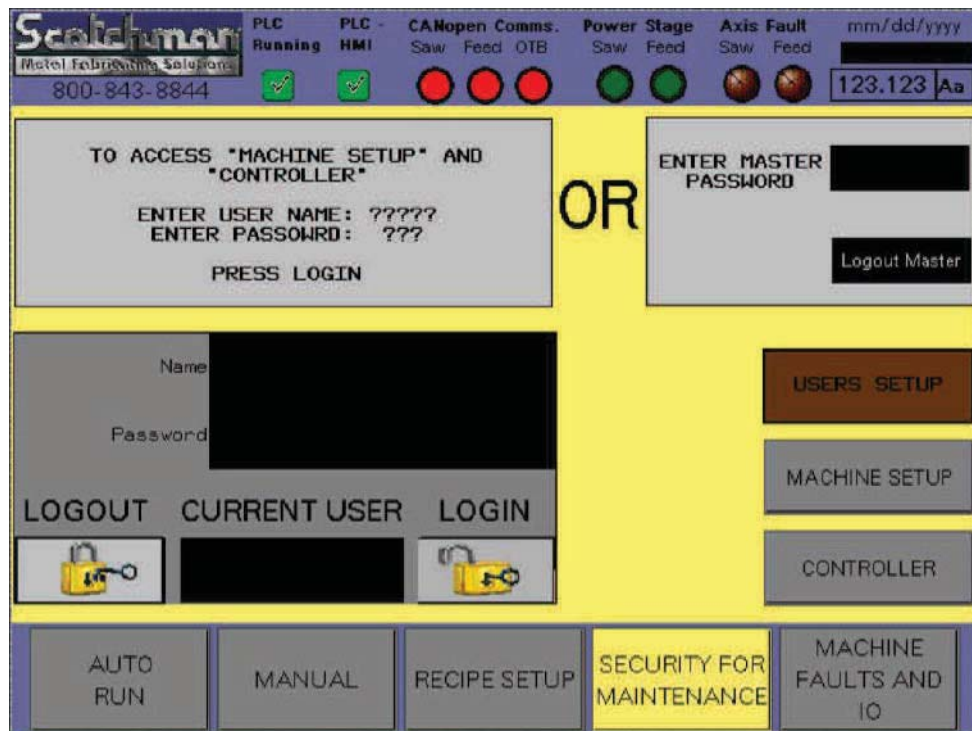


FIGURE 10

5.1G MACHINE SETUP

On this screen, you can set the shuttle vise feed rates and see the current position of the shuttle vise in reference to the full out hard stop.

These parameters are again set at the factory and should not need to be changed for most applications.

The same applies to the in-feed velocity as for manual screen 2. The return velocity for the shuttle is set at 15 in/s. This is the highest setting you can use. If the return velocity is set any higher, the shuttle vise may not stop quick enough on the return, which will affect the cut lengths of your part.

The cut adjust feature on this screen allows you to make fine adjustments to your cut length without re-setting the whole cut program. The maximum adjustment you can make here is plus or minus .100.

As an example, if you are cutting a part 62.5 inches and it is coming out 62.475 inches, go to the 60-90 inch field and insert .025. This will add .025 to 62.475 and bring your cut length back to 62.500.

You can also add a negative value if your part is too long.

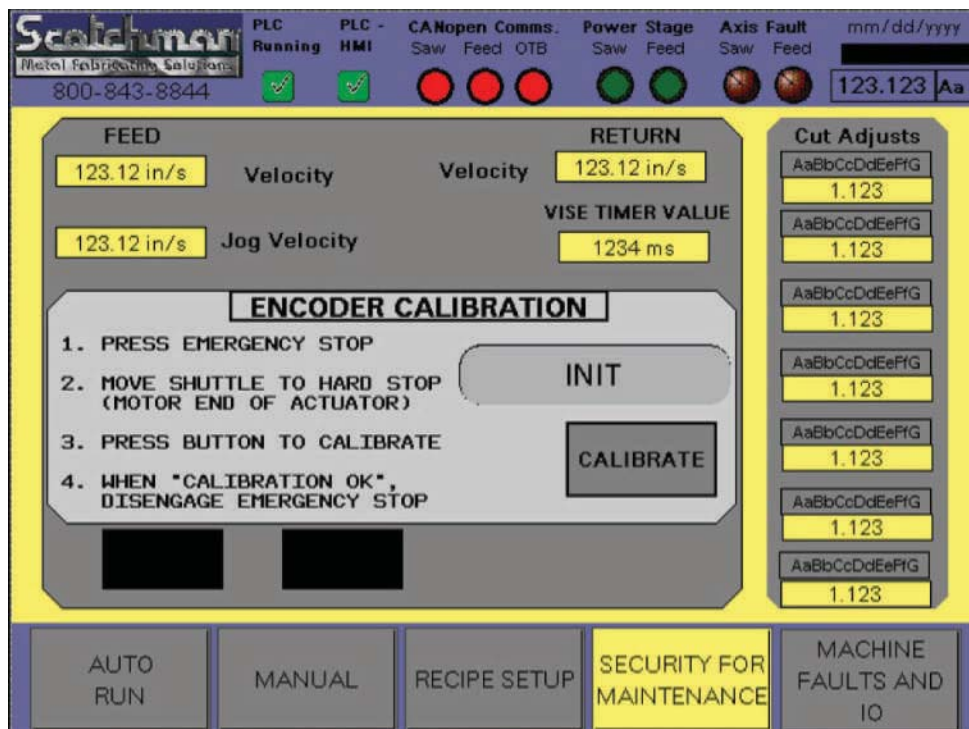


FIGURE 11

5.1H CONTROLLER

On this screen, you can change the brightness of the display screen. You can also empty the event log.



FIGURE 12

5.1I MACHINE FAULTS & IO

The machine faults section shows if the variable speed drive or the linear drive are faulted and their error code. Press the clear button to re-set. The inputs/outputs section shows all the inputs and outputs of the PLC. This screen is generally used for troubleshooting.

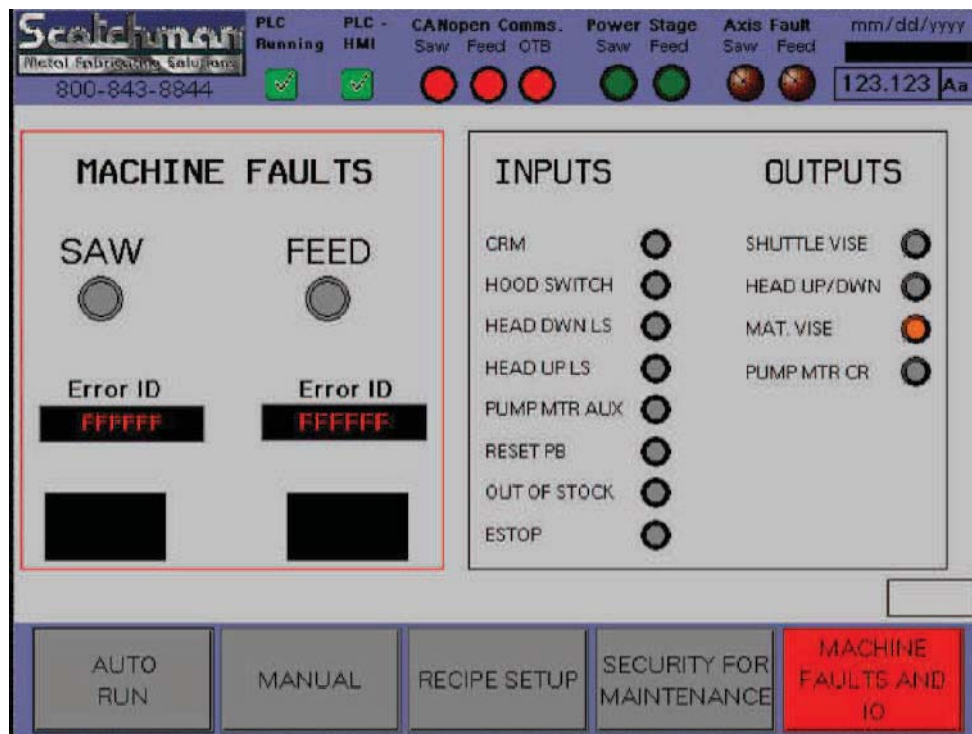


FIGURE 13

6.0 MACHINE OPERATION

6.1 SELECTING THE PROPER CUTTING SPEED

In cold sawing, there is no such thing as a general purpose blade. To achieve the best results from your saw, proper blade selection is important. Each saw is shipped with a pitch (number of teeth) calculator, which will help to determine the proper blade for your application.

When sawing flat stock or rectangular solid sections, determine the thickest section that will be cut and use the equivalent square size on the pitch calculator to determine the proper blade.

The CPO-315-HFA-CNC is designed to use a maximum 12-1/2 inch (315mm) diameter blade. 10-3/4 inch blades are also available for this machine.

The chart below gives the surface feet per minute for the various spindle RPMS:

<u>BLADE DIAMETER</u>		<u>SURFACE FEET PER MINUTE</u>		
INCH	MM	11	88	176 - BLADE RPMS
10-3/4	275	31	249	499 - SFM
12-1/2	315	36	286	572 - SFM

The proper blade speed is also important. The High speed (176 RPM) is recommended for thin walled tubes and nonferrous tubes and profiles. Some materials will require test cuts at both speeds to determine the best speed for the application. The Low speed, 11 RPM, is recommended for solid sections of mild steel and alloy tubes.

6.2 BLADE INSTALLATION

SEE FIGURE 14 ON PAGE 24.

CAUTION: USE ONLY HIGH SPEED STEEL BLADES DESIGNED FOR THIS MACHINE. DO NOT MODIFY ANY BLADE TO FIT THIS MACHINE. DO NOT USE BLADES DESIGNED FOR THIS MACHINE ON ANY OTHER EQUIPMENT. THE MAXIMUM RPM'S FOR THESE BLADES ARE 600 FOR THE 12-1/2" AND 700 FOR THE 10-3/4".

The CPO-315-HFA saw is designed to use a maximum 12-1/2 inch (315mm) diameter blade. The arbor size is 40mm with four 12mm pins spaced at 65mm.

BEFORE INSTALLING THE BLADE, make sure that the power to the machine is off.

USE THE FOLLOWING STEPS TO INSTALL A BLADE:

An 8mm hex key wrench (D), shipped with each machine, is required to change blades.

1. Raise the movable hood guard to the open position.
2. Release the upper stroke control stop (H) and allow the head to travel to its full up position.
3. Back off the blade guide bolts (G), if they are being used, and slide them out to the end of the slots.
4. Remove the blade bolt (B) and the blade flange (C).
5. Check the blade flange, the blade and the saw spindle for any chips or nicks that will affect the way the blade seats.
6. Install the blade. Make sure that the pin holes in the blade line up to the holes in the spindle.
7. Replace the blade flange (C) and start the bolt (B) into the spindle.
8. Before locking the blade in position, the back lash must be taken up. To take up the back lash, rotate the bottom of the blade toward you until it seats against the drive pins.

CAUTION: THE BLADES ARE VERY SHARP AND CARE MUST BE TAKEN WHEN REMOVING THE BACK LASH. DO NOT GRIP THE CUTTING EDGE OF THE BLADE BARE HANDED. THE BACK LASH MUST BE TAKEN UP EVERY TIME A BLADE IS CHANGED.

9. After taking up the back lash, tighten the blade bolt (B).
10. Adjust the blade guide bolts (G), if required. These guides are required only when the blade has a small amount of deflection in it or when a very exact cut is required. Adjust the inside, or right hand bolt, first. The bolt should be adjusted up to where it just touches the blade as close to the teeth as possible and lock the retaining nut. Do not adjust the bolt to where it deflects the blade. Over adjustment of the guide bolt will cause the blade not to run true and will cause excessive wear. After the inside bolt is adjusted, move the outside bolt to where it is straight across from the inside one. Adjust the outside bolt up to where it just touches the blade and then, lock the retaining nut.
11. Reset the upper stroke control and return the movable hood guard to the down position.
12. Break in the saw blade. The teeth on new or re-sharpened blades have a very sharp edge and should be fed through the first three or four cuts, very slowly, before starting normal cutting.

Besides taking up the back lash and breaking in the blade, it is very important to keep the blade flange, the spindle and the blade clean and free from nicks. Failure to do these things will result in broken or damaged blades.

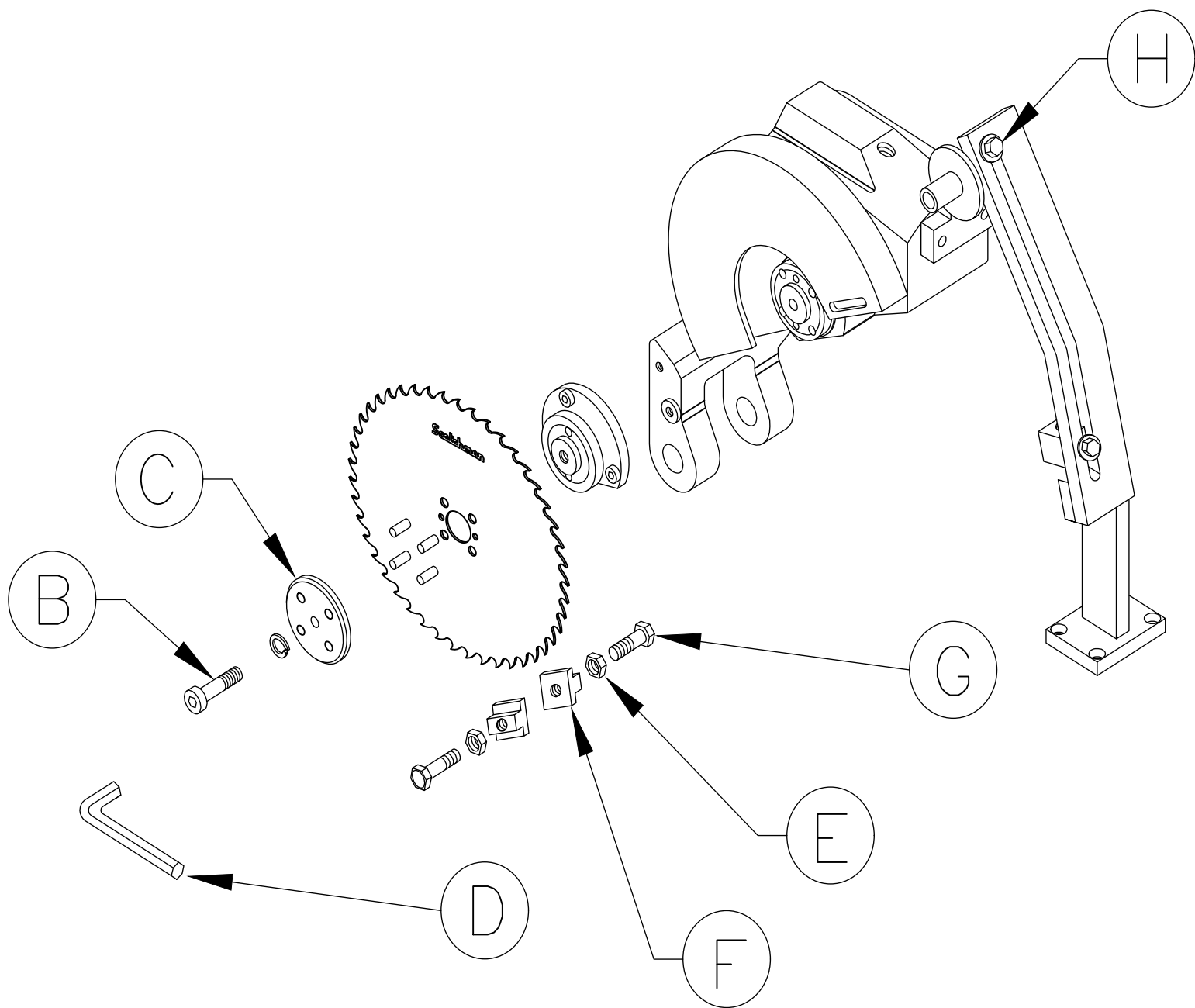
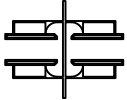
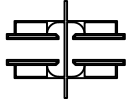
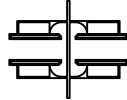











FIGURE 14

6.3 SAW CAPACITIES

SEE FIGURE 15 BELOW.

Figure 15 is a chart showing the maximum capacities of this machine in various materials.

CAPACITIES WITH MAXIMUM DIAMETER BLADES 315 MM		HFA 90° ONLY 	RFA/ST 90° ONLY 	RFA/ST BUNDLE FEED 
	INCHES MM	Ø3-1/2 Ø89	Ø3 Ø76	Ø3 Ø76
	INCHES MM	3-1/8 X 3-1/8 79 X 79	2-1/2 X 2-1/2 63 X 63	2-1/2 X 2-1/2 63 X 63
	INCHES MM	3-1/8 X 3-1/8 79 X 79	2-1/2 X 2-1/2 63 X 63	N/A
	INCHES MM	3-1/8 X 3-1/8 79 X 79	2-1/2 X 2-1/2 63 X 63	N/A
	INCHES MM	3-1/2 X 2-3/4 89 X 70	3 X 2-1/2 76 X 63	3 X 2-1/2 76 X 63
 FERROUS	INCHES MM	Ø1-3/4 Ø44	Ø1-3/4 Ø44	Ø1-3/4 Ø44
 FERROUS	INCHES MM	1-1/2 X 1-1/2 38 X 38	1-1/2 X 1-1/2 38 X 38	1-1/2 X 1-1/2 38 X 38
 NF	INCHES MM	Ø3-1/2 Ø89	Ø3 Ø76	Ø3 Ø76
 NF	INCHES MM	3-1/8 X 3-1/8 79 X 79	2-1/2 X 2-1/2 63 X 63	2-1/2 X 2-1/2 63 X 63

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#047200

FIGURE 15

6.4 MATERIAL MAIN VISE

SEE FIGURE 16 BELOW.

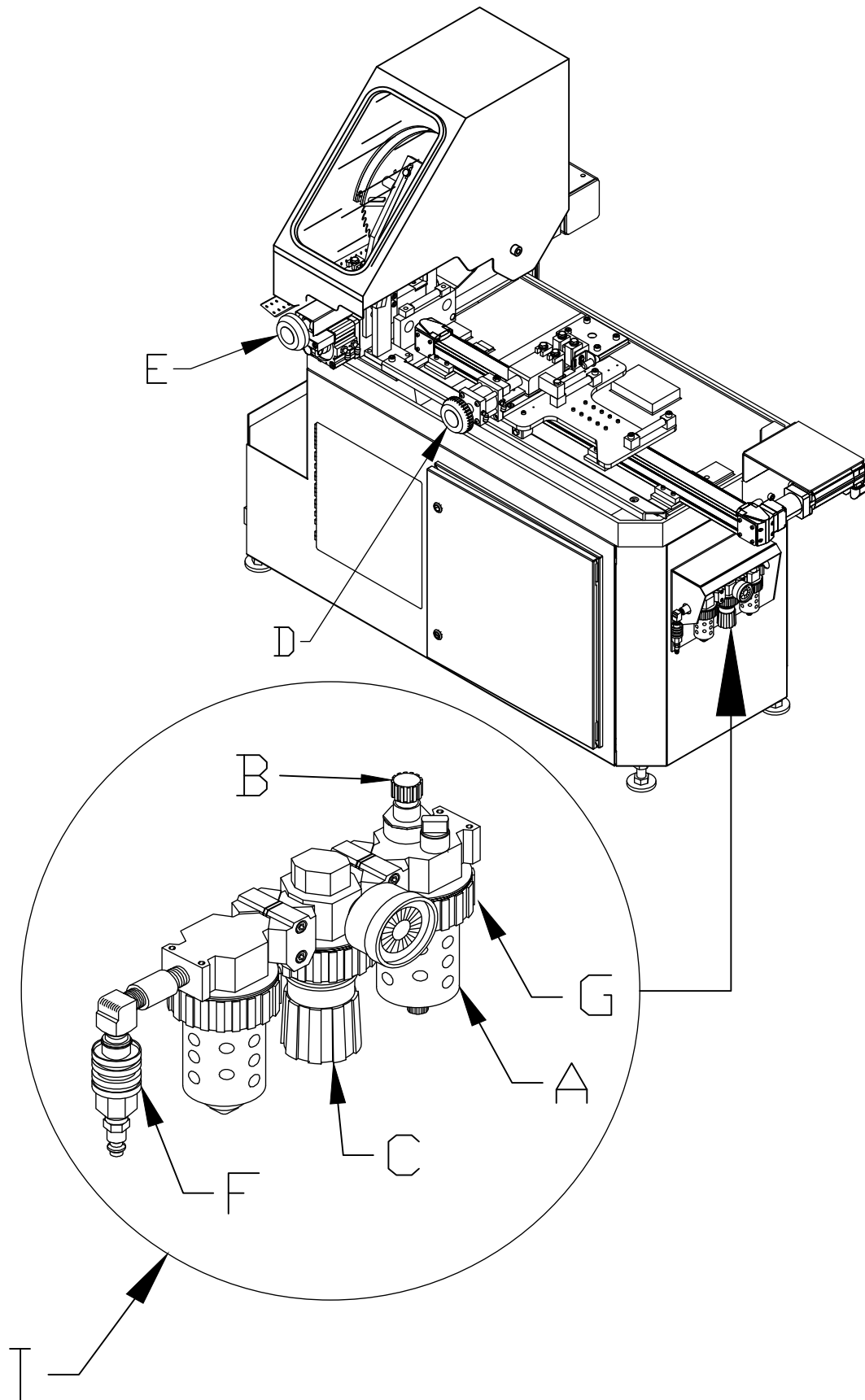


FIGURE 16

The following are set-up and maintenance instructions for the material main vise.

- 1. Make sure that the filter/lubricating device (A) is full of oil.**
- ⊗ NOTE: Use a quality (ISO 22) air line lubricant designed for automatic oilers.**
- 2. Slide the shuttle valve (F) on the filter/lubricator device down to the closed position.**
- 3. Connect the air supply to the shuttle valve. Make sure that the vise is clear and that the head is in the UP position.**
- 4. Slide the shuttle valve up to open the valve. Whenever the shuttle valve is closed, it bleeds the air pressure out of the system automatically.**
- 5. Adjust the air pressure regulator (C). 90 PSI (6.2 BAR) is the minimum operating pressure. 130 PSI (9 BAR) is the maximum.**
- 6. The vise is activated by the top proximity switch on the saw head.**
- 7. The lubricating device (A) should release one drop of oil every 5 to 10 cycles. On top of the lubricating device is a clear plastic dome with a small tube inside. The oil should drop out of the tube. The lubricating device is adjusted by turning the knob (B) on the top of the lubricator.**
- 8. To add oil to the lubricating device, disconnect the air supply and remove the plastic bowl. The bowl is threaded and is removed by turning the threaded collar (G). Fill the bowl approximately 3/4 full of oil designed for air lubricators and screw it back onto the lubricator.**

TO ADJUST THE VISE TO THE SIZE OF MATERIAL BEING CUT:

- 1. Open the vise, using the positioning handle (E), and place the material in the vise.**
- 2. Crank the vise closed to within approximately 1/8 of an inch (3mm) from the material.**
The power vise has approximately 1/4 of an inch (6mm) of stroke.
Proper clamping is very important and special jaws may be required for some materials.

FOR MORE INFORMATION CONTACT YOUR LOCAL DEALER OR THE FACTORY.

6.5 SHUTTLE VISE & CYLINDER

REFER TO FIGURE 16 ON PAGE 26.

The following are set-up and maintenance instructions for the shuttle assembly.

- 1. Steps 1 through 8 are the same for the shuttle vise as they are for the material vise.**

TO ADJUST THE VISE TO THE SIZE OF MATERIAL BEING CUT:

- 2. Open the vise, using the positioning handle (D), and place the material in the vise.**
- 3. Crank the vise closed to within approximately 1/8 of an inch (3mm) from the material.**

The shuttle vise has approximately 1/4 of an inch (6mm) of stroke. Proper clamping is very important and special jaws may be required for some materials.

FOR MORE INFORMATION ABOUT SPECIAL JAWS PLEASE CONTACT YOUR LOCAL DEALER OR THE FACTORY.

MODEL CPO-315-HFA-CNC



- FULLY AUTOMATIC CYCLE (available In ferrous or non-ferrous)
- TOUCH SCREEN CONTROLS
- PRECISION CNC CONTROLLED
- INTERLOCKING SAFETY HOOD
- EMERGENCY STOP BUTTON
- CLAMPING BOTH SIDES OF BLADE FOR HIGHEST QUALITY, BURR-FREE CUTS
- BLADE GUIDES FOR ACCURATE TOLERANCES (FERROUS MODEL ONLY)
- MIST COOLANT LUBRICATION SYSTEM
- ADJUSTABLE STROKE CONTROL ON THE SAW HEAD
- ADJUSTABLE INDEXING FEED SPEEDS
- ADJUSTABLE DOWN FEED CONTROL ON THE SAW HEAD FOR FEED RATE
- PROGRAM UP TO FOUR SEPARATE CUT LENGTHS IN EACH JOB
- 100 PROGRAM JOB STORAGE
- 30" SINGLE SHUTTLE LENGTH (UNLIMITED SHUTTLES)
- PIECE COUNTER
- ONE SAW BLADE
- ONE GALLON COOLANT
- COMPLIES WITH ANSI B11.10 SAFETY STANDARDS
- WARRANTY: TWO YEARS ON PARTS
- MADE IN USA

FIGURE 17

SCOTCHMAN IND. - 180 E US HWY 14 - PO BOX 850 - PHILIP, SD 57567 Call: 1-605-859-2542

6.6 POWER DOWN FEED

REFER TO FIGURE 18 BELOW.

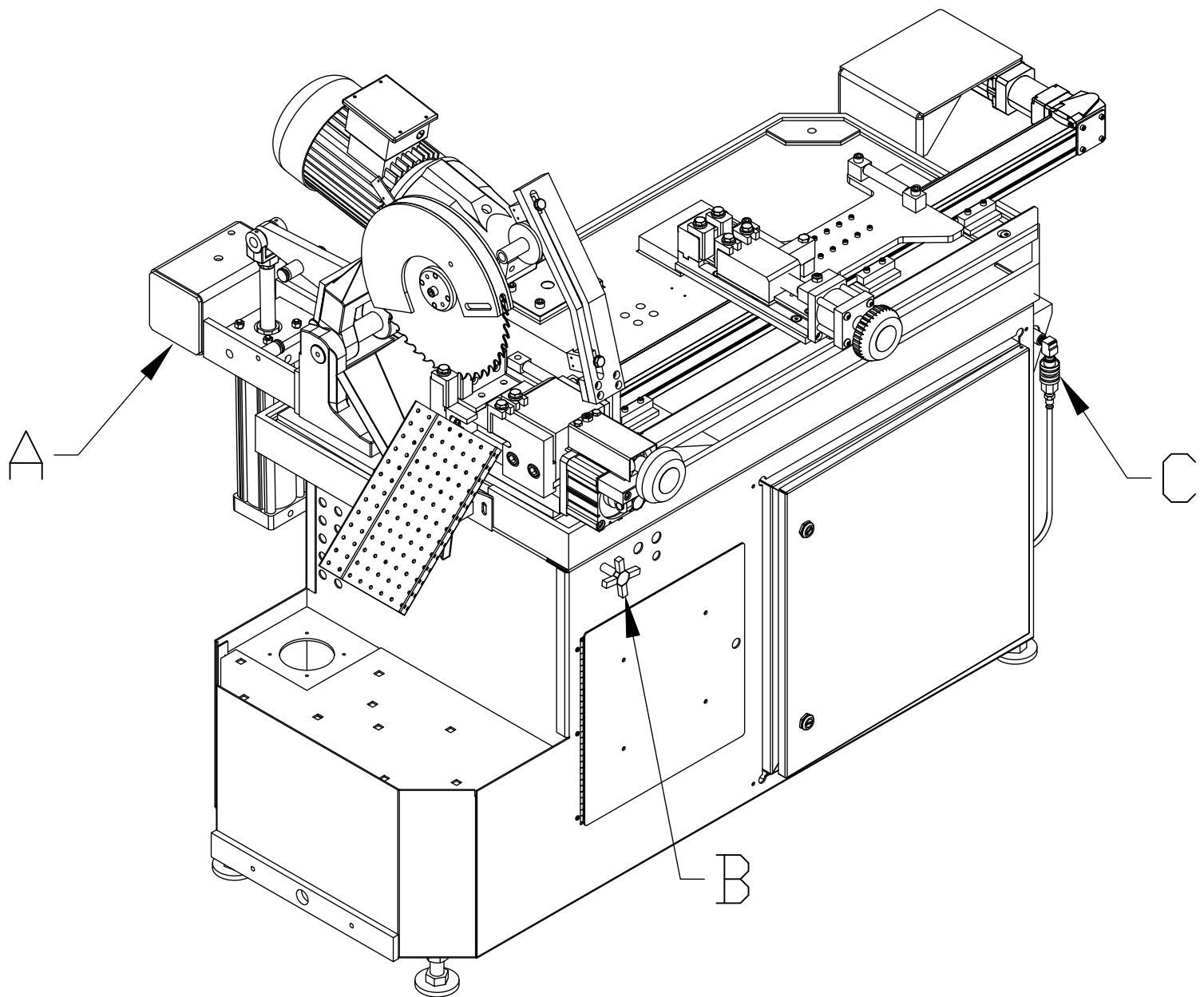


FIGURE 18

⊗ **CAUTION: ALWAYS DISCONNECT THE AIR SUPPLY BEFORE REMOVING THE FILLER PLUG FROM THE RESERVOIR. IF THE FILLER PLUG IS REMOVED WHILE THE MACHINE IS CONNECTED TO AIR PRESSURE, THE FLUID IN THE TANK WILL BE PURGED THROUGH THE OPENING UNDER PRESSURE.**

1. Before powering the saw, check the oil level in the reservoir (A). There is a sight glass in the back of the reservoir. The head must be in the full UP position. Use a SAE 10W (ISO 32) non-foaming hydraulic oil, such as Mobil DTE 10 or equivalent.
2. Slide the shuttle valve (C) to its CLOSED position and connect the air supply.
3. Slide the shuttle valve to its OPEN position and shut the flow control valve off. Then open it one turn.
4. The down feed rate is adjusted using the flow control valve (B). The down feed rate should be set during the setup of an operation while the AUTOMATIC/MANUAL switch is in the MANUAL position. The setting of the down feed rate is done by sound. Slowly adjust the rate as the saw makes a cut. Once the blade starts to chatter or the saw starts to load up, back off by a 1/4 of a turn.

Many things, including the type of material being cut, the blade RPM and the condition of the blade, will affect the down feed rate.

6.7 MATERIAL CLAMPING

All work pieces must be clamped securely in the vise. Any slippage of the material can result in broken or damaged blades. The material should be clamped so that the contact surface between the material and the blade is as small as possible. For this reason, when cutting flat stock material, we recommend standing it up and cutting it through the thinnest section, whenever possible. We also recommend cutting square tubing through the diagonal section and angle iron with the web up. Some thin walled round sections and profiles will require special jaws to hold them.

FOR EXAMPLES, SEE FIGURE 17 ON PAGE 28.

6.8 STROKE CONTROL ADJUSTMENT

SEE FIGURE 19 ON THE FOLLOWING PAGE.

TO ADJUST THE UP AND DOWN STROKE OF THE SAW HEAD, USE THE FOLLOWING STEPS:

1. With the machine's power off, raise the hood of the saw.
2. Using a 17mm wrench, loosen the bolt (A) on the lower stroke control (B) and let the stroke control rest at the bottom of the slot.
3. Place a piece of the material that you are going to cut in the saw vise and manually clamp it in a position so that the saw blade will not contact the material when the head comes down.
4. Close the hood. The saw will not run with the hood open. Go to the manual screen and press the head down button.
5. When the blade has passed the material in the vise by approximately 1/8 of an inch (3mm), stop the head movement by turning off the flow control valve (F) and turn off the air pressure by sliding the shuttle valve (G) down.
6. Turn the power off. Raise the hood and bring the lower stroke control (B) up to the head stop and lock it in place.
7. Bring the upper stroke control (C) down to the head stop and lock it in place.
8. Turn the air back on by moving the shuttle valve (G) up and open the flow control valve (F) one turn.
9. Loosen the bolt (A) on the upper stroke control (C) and allow the head to move slowly up until the blade is approximately 1/8 of an inch (3mm) above the material in the vise. Tighten the bolt in the upper stroke control.

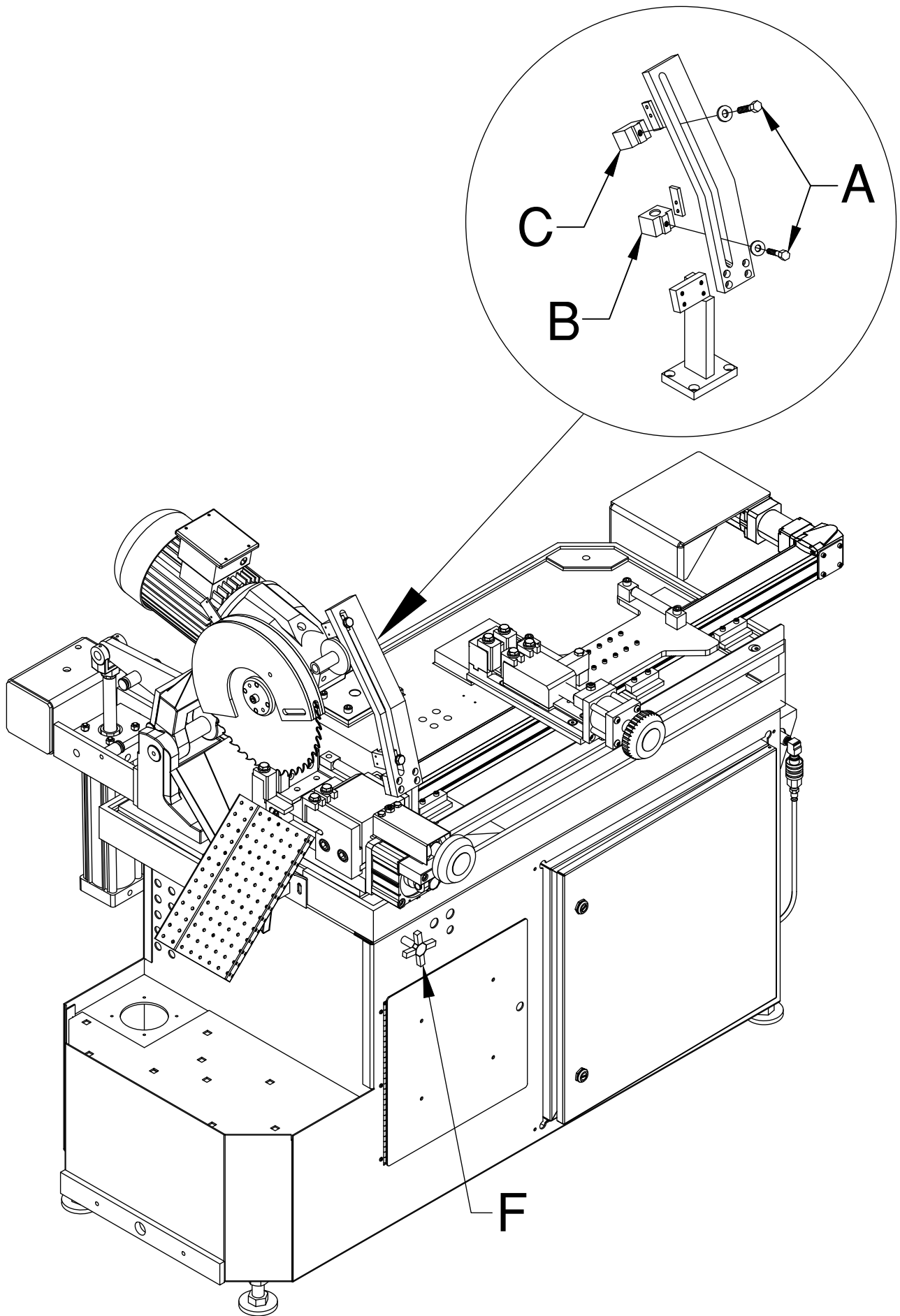


FIGURE 19

7.0 MAINTENANCE

7.1 LUBRICATION

SEE FIGURE 20 BELOW.

Grease the head pivot pin (C) and the spindle shaft with a high pressure, high temperature, bearing grease daily. Apply oil to the shuttle vise guide shafts daily.

Clean the chips out of the vise at least once a day, more often if needed. Apply penetrating oil to the spindle and guide pins. Clear the chips with a brush or similar device. DO NOT use compressed air.

Check the oil level in the air lubricator device daily.

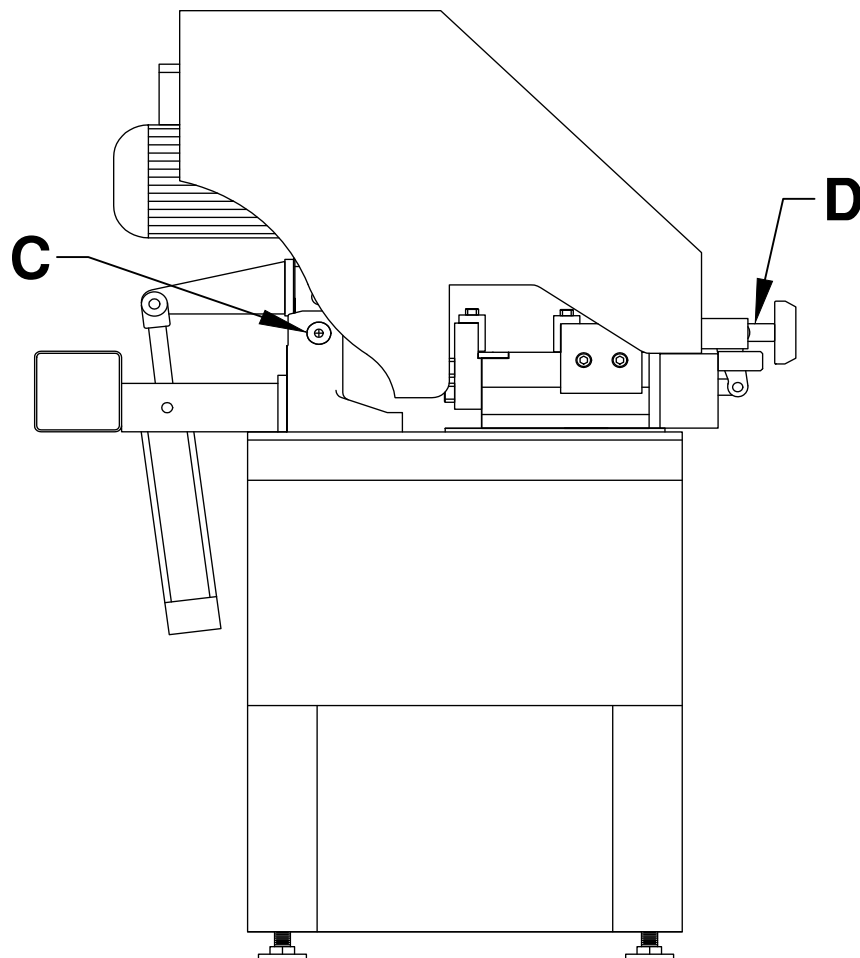


FIGURE 20

7.2 CUTTING OILS AND LUBRICANTS

SECTION 11.2 lists Scotchman.s parts numbers for cutting oils and lubricants. Using high quality lubricants and oils will greatly increase the life of this equipment.

We recommend using only pure, synthetic, water soluble, cutting oil for coolant.
The coolant reservoir holds 8 gallons.

For the saw head, use a non-EP additive ISO-460 gear oil specified for worm gears. Oils containing EP additives may degrade or damage bronze gears and must be avoided. Mobile 600WSuper Cylinder Oil is highly recommended and available from the factory under P/N 075758.

For the power down feed reservoir, use a SAE 10W (ISO 32) non-foaming hydraulic oil, such as Mobil DTE 10 or equivalent.

For the air lubricators, use a quality (ISO 22) air line lubricant designed for automatic oilers.

7.3 SCHEDULED MAINTENANCE

A program of scheduled maintenance should be set up and documented according to your application and the frequency you use this machine. The following is a list of some important things that should be included in a scheduled maintenance program.

1. EVERY 250 HOURS OR 3 MONTHS:

If your saw is equipped with the optional flood coolant system, drain the coolant reservoir and flush it Refill the coolant reservoir with new coolant. The coolant reservoir has a capacity of eight (8) gallons (37.3 liters). This will extend the life of the coolant pump considerably. Check the level of the hydraulic fluid in the power down feed reservoir.

⊗ **CAUTION: ALWAYS DISCONNECT THE AIR SUPPLY BEFORE REMOVING THE FILLER PLUG FROM THE RESERVOIR. IF THE FILLER PLUG IS REMOVED WHILE THE MACHINE IS CONNECTED TO AIR PRESSURE, THE FLUID IN THE TANK WILL BE PURGED THROUGH THE OPENING UNDER PRESSURE.**

2. EVERY 750 HOURS OR 6 MONTHS:

Drain the gear oil from the saw head and flush with a petroleum product. Refill the saw head with use a non-EP additive ISO-460 gear oil specified for worm gears. Mobile 600W Super Cylinder Oil is highly recommended and available from the factory under P/N 075758. Check the condition of the pivot pins on the head and on the guard. Check the complete saw for loose connections in the electrical and air systems. Since every application is different, each user must design and implement a scheduled maintenance program that fits his applications.

7.4 GEAR REPLACEMENT (SAW HEAD)

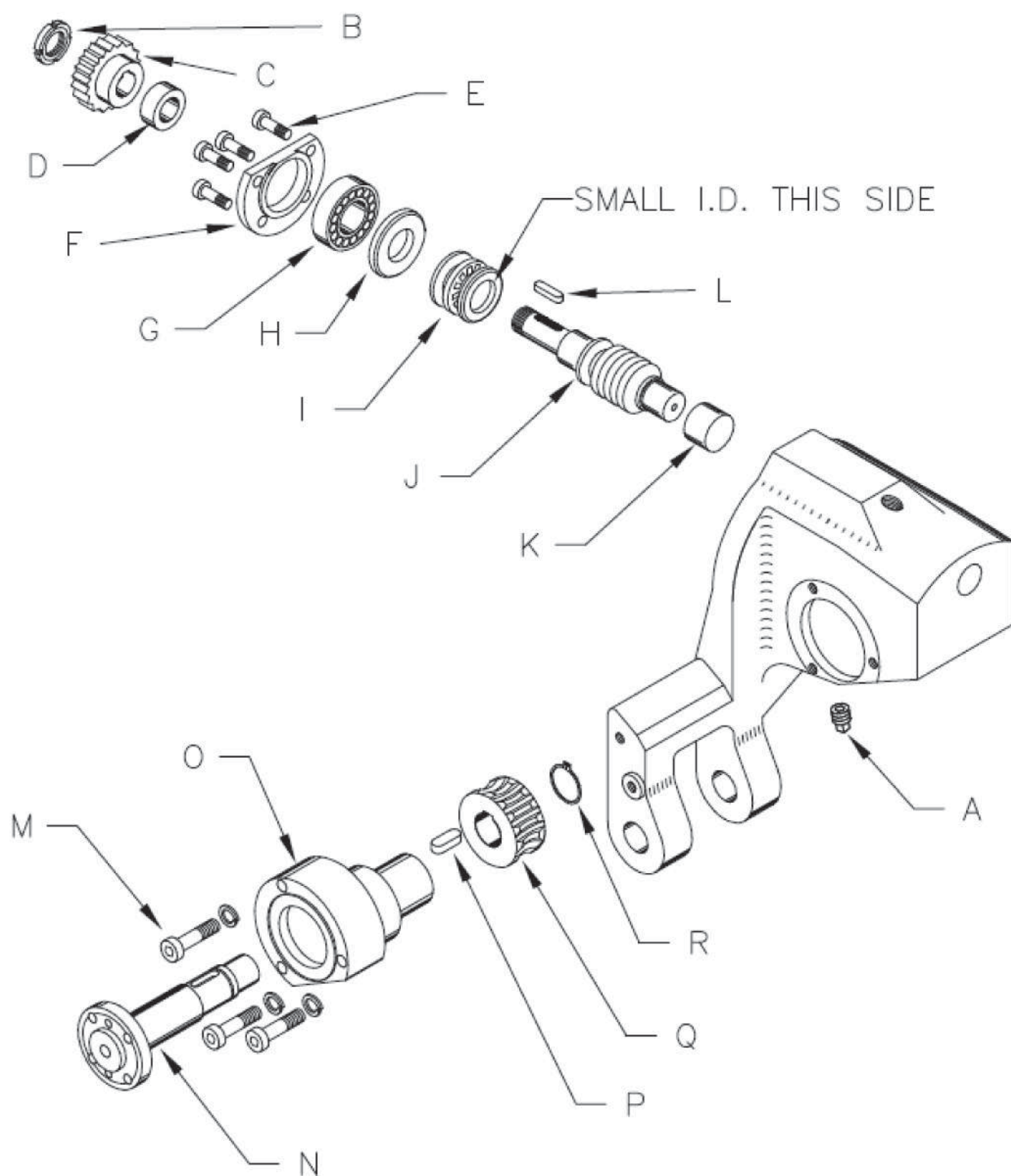
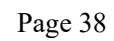


FIGURE 21

- 1. Remove the drain plug (A) from the head casting and allow the fluid to drain.**
- 2. Remove the motor from the head.**
- 3. Remove the four bolts (E) from the bearing retainer (F).**
- 4. Remove the worm shaft assembly (J). The worm shaft has a 10mm threaded hole in the end of it for a slide hammer. This is the preferred method of removing the shaft. If you do not have a slide hammer, the shaft can be removed by driving it out with a brass drift pin.**
- 5. Inspect the worm shaft, drive gear and bearings for wear.**
- 6. After the worm shaft has been removed, remove the three bolts (M) from the bearing housing (O).**
- 7. Remove the spindle shaft (N) with a slide hammer. This shaft can also be removed by driving it out of the head casting with a brass drift pin.**
- 8. Remove the snap ring (R).**
- 9. The brass worm gear (Q) can now be pressed off of the shaft.**
- 10. Check the condition of the bearings and seals before re-assembling the head.**
- 11. Check the condition of the key (P) and the key-way in the gear and spindle shaft.**

SEE FIGURE 22 BELOW.



1. **Disconnect the machines power and the air supply.**
2. **Remove the vise guard (X) and the spring (Y) and ball (HH).**
3. **Remove the bolts (A & B) and the retainer (D).**
4. **Remove the clevis pin (F) and remove the clevis (E) and the forks (CC).**
5. **The spindle can now be removed from the machine.**
6. **If the spindle is locked up in the machine, remove the bolts (II) and the side plate (GG).**
7. **The vise block (L) and the spindle can now be removed as one piece.**
8. **Install the new spindle and reassemble the vise, reversing the above steps.**

7.6 SEAL REPLACEMENT (MAIN VISE)

SEE FIGURE 14 ON THE PRECEDING PAGE.

SEAL KIT IS P/N 045631

1. **Make sure that the power and air supply to the machine are both off.**
2. **Remove the bolts (A & B) and the retainer (D).**
3. **Remove the clevis pin (F) and the cylinder clevis (E) and the forks (CC).**
4. **Remove the two lower bolts (C) and remove the cylinder (H) from the machine.**
5. **Place the cylinder in a vise and remove the snap ring from the front of the cylinder.**
6. **Pull the cylinder apart and remove all of the old seals. Check the end casting, cylinder tube and piston for nicks or scratches.**
7. **Install the new seals and reassemble the vise, reversing the above procedures.**

7.7 SHUTTLE VISE MAINTENANCE

SEE FIGURE 23 BELOW.

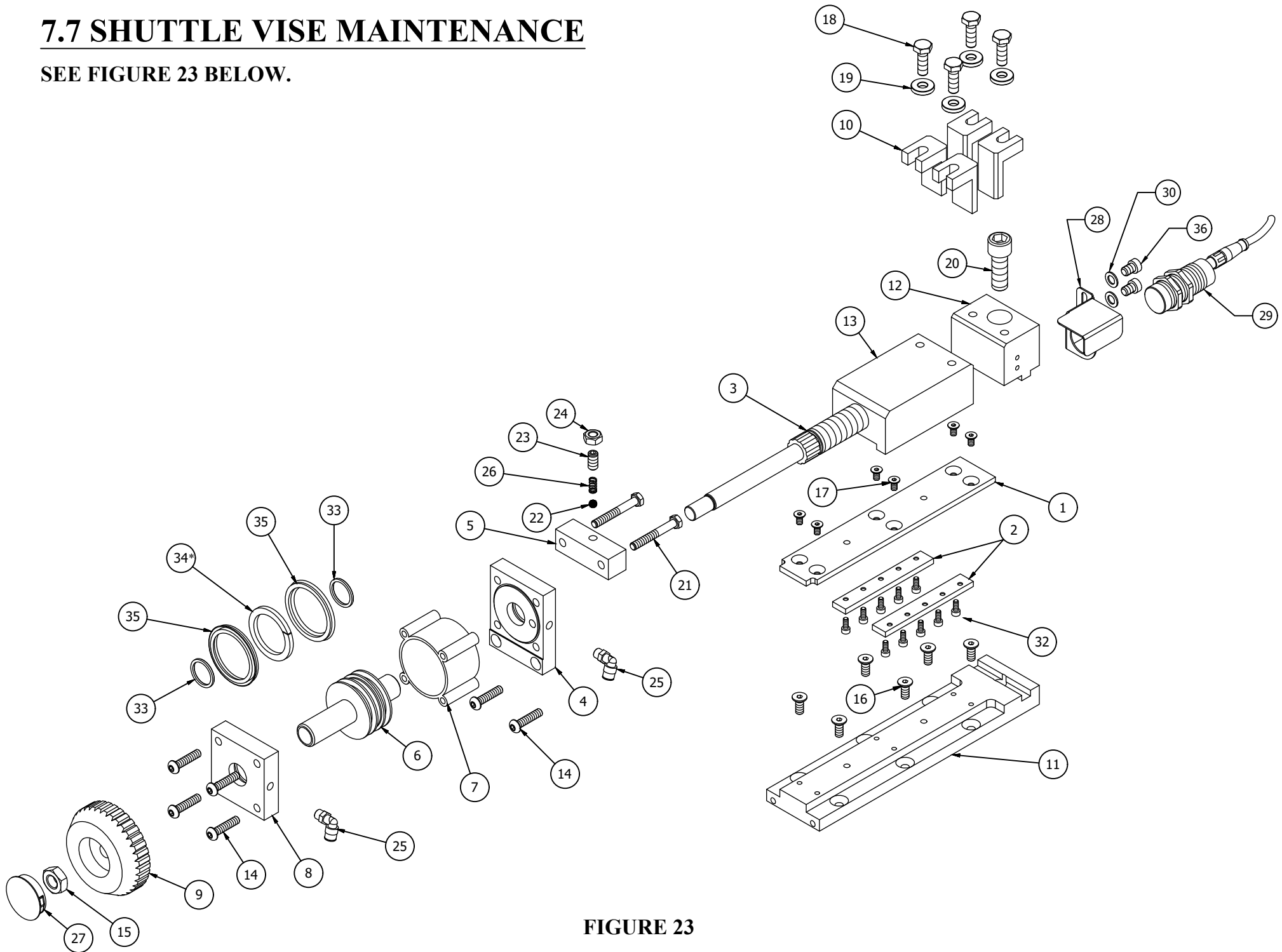


FIGURE 23

TO REPLACE THE VISE SPINDLE:

1. Remove the jam nut (24), the set screw (23), the spring (26) and the ball (22)
2. Remove cover (27) and jam nut (15) and the boss (9), from the end of the spindle.
3. Disconnect the air lines. The air connections on the cylinder are snap connectors. To release the air connections, push the collar around the hose into the fitting and pull the hose out. To reconnect the lines, simply push the air line into the fitting as far as it will easily go.
4. Remove the two bolts (14) from the cylinder mount plate (4) and remove the cylinder assembly from the machine.
5. Slide the vise spindle (3) and vise block (13) off of the machine and replace either part, as needed.
6. Reassemble the vise, reversing the above steps.

IF YOU NEED TO REPLACE THE SEALS IN THE AIR CYLINDER:

SEAL KIT IS P/N 045654

1. After step number 4 above, clamp the mount plate (4) in a vise and remove the four bolts (14).
2. Slide the end plate (8) off and remove the piston (6) and the cylinder tube (7).
3. Replace the seals and reassemble, reversing the above steps.

**NOTE: (34) may or may not be included in the piston assembly.
It is not needed for the CPO-315-HFA-CNC machine.**

7.8 OPTIONAL COOLANT PUMP MAINTENANCE

(OPTINAL FLOOD COOLANT)

SEE FIGURE 24 BELOW.

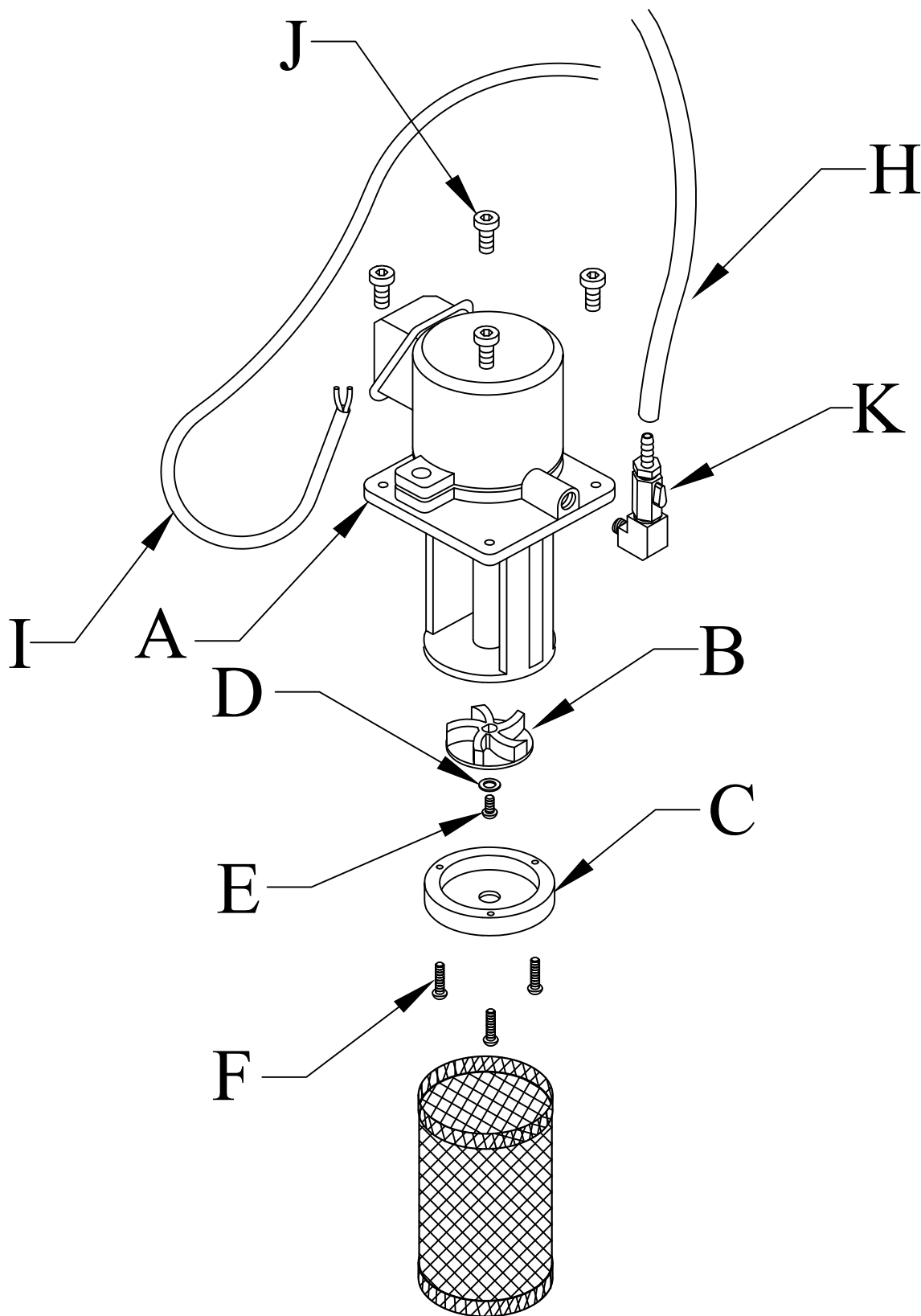


FIGURE 24

IF YOUR COOLANT PUMP IS LEAKING OR LACKS POWER, USE THE FOLLOWING STEPS:

NOTE: WE RECOMMEND REPLACING THE PUMP SEAL (D) P/N 060151 ANYTIME THE PUMP IS DISMANTLED.

FOR PART IDENTIFICATION, SEE THE FOLLOWING PAGE

- 1. Make sure that the power to the machine is off.**
- 2. Remove the four bolts (J) and remove the pump from the machine.**
- 3. Remove the coolant line (H) and the fittings (K). Clean any sludge out of the line and fittings.**
- 4. Remove the three bolts (F) and remove the end plate (C).**
- 5. Remove the screw (E), seal (D) and the impeller (B) from the pump.**
- 6. Clean the sludge out of the impeller, end cap and passage way from the bottom of the pump to the outlet port.**
- 7. Reassemble the pump, reversing the above steps.**
- 8. Clean out the reservoir and fill with new coolant. We recommend our P/N 075751 saw coolant mixed in a ratio of one part coolant to seven parts water. The capacity is 8 gallons.**

8.0 OPTIONAL EQUIPMENT

8.1 SPECIAL VISE JAWS

Special vise jaws for holding thin wall round tubes, profiles and bundles are available on a made-to-order basis. For prices and delivery on special jaws, contact your local dealer or the factory.

FOR MORE INFORMATION CONTACT YOUR LOCAL DEALER OR THE FACTORY.

8.2 OPTIONAL IN FEED SUPPLY TRACKS

A ten foot roller supply track, that can be installed on the input side of the saw to support longer pieces of material, is an available option for this saw.

The supply tracks can also be bolted end to end, to supply longer tracks, if needed.

SEE FIGURE 17 ON THE FOLLOWING PAGE.

1. What is shown is our P/N 029242 - 10' ROLLER CONVEYER W/LEGS that is fully assembled with our optional P/N 076938 - 13" GUIDE ASSEMBLY mounted to it.
2. The conveyors can be bolted together to make longer lengths if needed.
3. Adjust the conveyor so that the rollers are at the same level as the bed of the material vise on the saw. The conveyor height is adjusted via the slots in the legs.
4. For additional stability, we strongly recommend anchoring the conveyor to the floor.
5. The vertical rollers on the Guide Assembly are adjustable for width and can be adjusted to keep the material toward the front or back of the conveyor.
6. Several Guide Assemblies can be mounted to the conveyor if needed.

EXPLODED VIEW

DETAIL VIEW

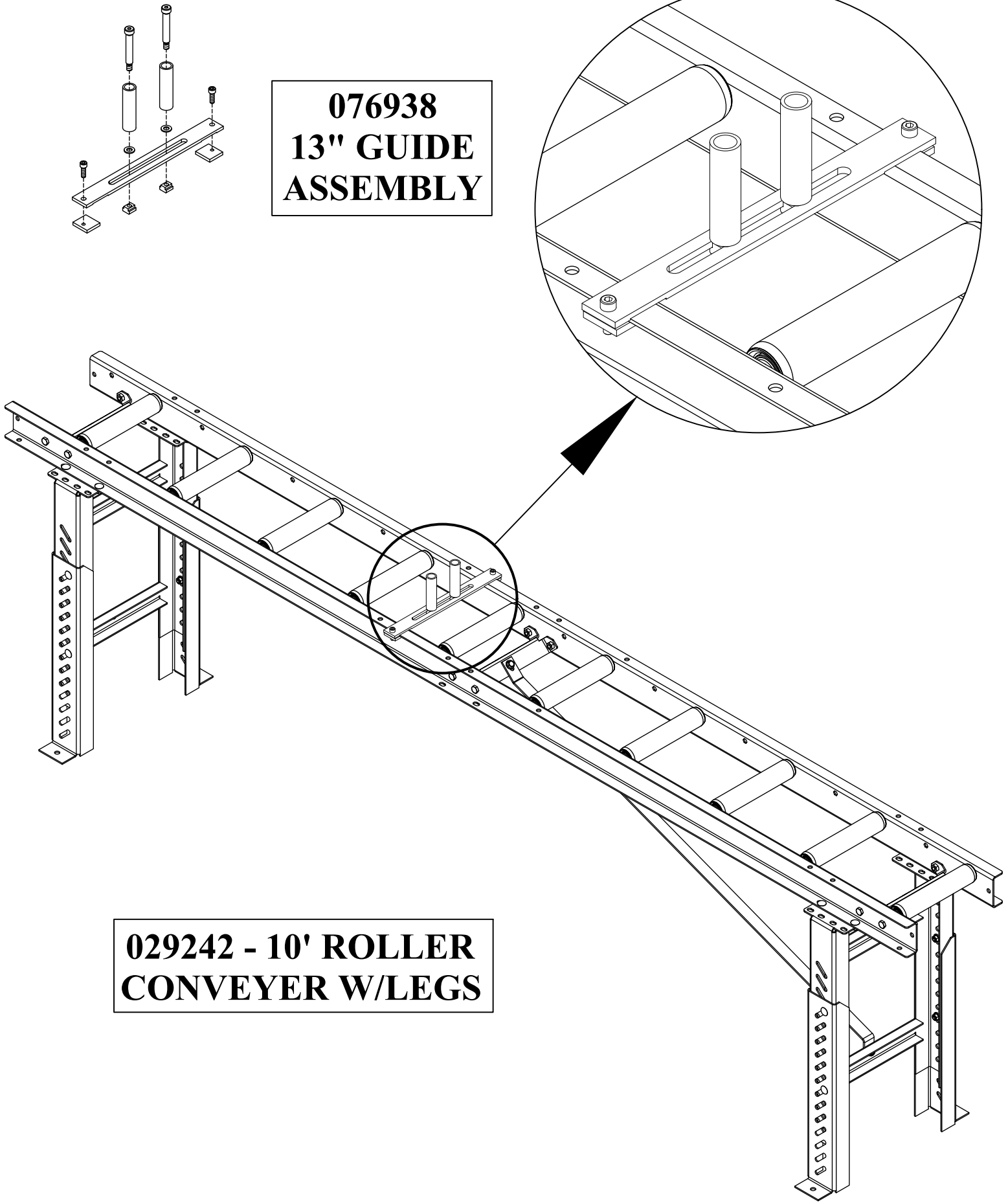


FIGURE 25

9.0 TROUBLE SHOOTING GUIDE

9.1 ELECTRICAL TROUBLE SHOOTING

1. **THE SAW MOTOR RUNS BUT DOES NOT HAVE ADEQUATE POWER.**
 - A. **Make sure that the supply voltage and phase correspond to the saw motor's voltage and phase.**
 - B. **Disconnect the machine from the power source and check for any loose or disconnected wires.**
 - C. **The supply lines to the machine must be of adequate size to handle the load.
FOR RECOMMENDED SIZES AND LENGTHS, SEE SECTION 4.3.**
 - D. **The worm gears in the head may be damaged. With the power to the machine disconnected, check the blade spindle for any free travel. If free play is present, drain the oil from the head and remove the motor. Check both worm gears for wear and replace, if necessary. We recommend replacing the worm gears as a set, if either shows wear.
FOR REPLACEMENT INSTRUCTIONS, SEE SECTION 7.4.**
2. **THE MACHINE WILL NOT RUN IN THE AUTOMATIC MODE.**
 - A. **The counter must have a pre-set quantity displayed. If the counter reads zero, the machine will not run in the automatic mode.**
 - B. **There must be material in the shuttle vise and the vise must be adjusted to the material.**
 - C. **If the machine has reached the end of a bar, you need to reset the machine before starting the automatic operation again. REFER TO SECTION 5.1D.**

9.2 BREAKAGE OR EXCESSIVE DULLING OF BLADES

1. **Select the proper blade and spindle speed for the material being cut.
FOR RECOMMENDATIONS, REFER TO SECTION 6.1.**
2. **Always break in the blade before you start normal cutting.**
3. **Do not apply excessive down pressure on the workpiece. Excessive down pressure will cause the teeth to remove too large of a chip, resulting in premature dulling or breakage.**
4. **Use a good quality, synthetic coolant and maintain the proper ratio of coolant to water as recommended in SECTION 4.4.**
5. **Have your blades re-sharpened by someone who has the right equipment for circular cold saw blades. Improper re-sharpening is one of the most common problems encountered in cold sawing.**
6. **Keep the blade flange, the face of the blade spindle and the blade clean and free from nicks. Any contamination or nicks on the flange, spindle or the blade will cause the blade to run out of alignment.**

7. Always remove the back lash when installing a blade. For instructions, REFER TO SECTION 6.2. Also, check the condition of the drive pins when replacing the blade. If the drive pins are broken or worn, replace them.
8. Any of the above problems may cause a condition known as pick-up. Pick-up is caused when small pieces of the material being cut adhere themselves to the blade. When pick-up is present, you will notice a jerking or jumping motion in the saw head while cutting. This is caused by the blade being pinched as it goes through the material where the pickup is present.
Pick-up can be removed by using a fine honing stone or a very fine file. When removing pick-up, care must be taken not to remove any part of the blade. After the pick-up has been removed, review the above items to determine what caused the problem.

9.3 PART LENGTH NOT CONSISTENT

1. Check your air pressure. This machine requires a minimum of 90 pounds of pressure to function properly. When cutting solid materials, the pressure may have to be set as high as 130 PSI to prevent the material from slipping in the jaws.
2. The bolts in the adjustable stop may not be tight enough, allowing the stop to move.
3. The main vise or shuttle vise may be adjusted too tight, causing the material to drag or bind before the vise is seated against the stop.
4. Check for chip build-up between the main vise and the shuttle vise.

9.4 COOLANT SYSTEM

1. IF THE COOLANT WILL NOT FLOW:
 - A. Check the nozzle on the end of the mister and make sure that it is turned on.
 - B. Check the suction line between the reservoir and the mister unit. If there are any cracks or poor connections on the line, it will not siphon the coolant out of the reservoir.
 - C. Check the level of the coolant in the reservoir.
 - D. Check the reservoir for contamination or sludge build-up that may be blocking the inlet.
 - E. Remove the coolant line from the guard and make sure that it is clear. Also, make sure that the valve on the guard is open.

9.5 PNEUMATIC SYSTEM

REFER TO FIGURE 26 BELOW.

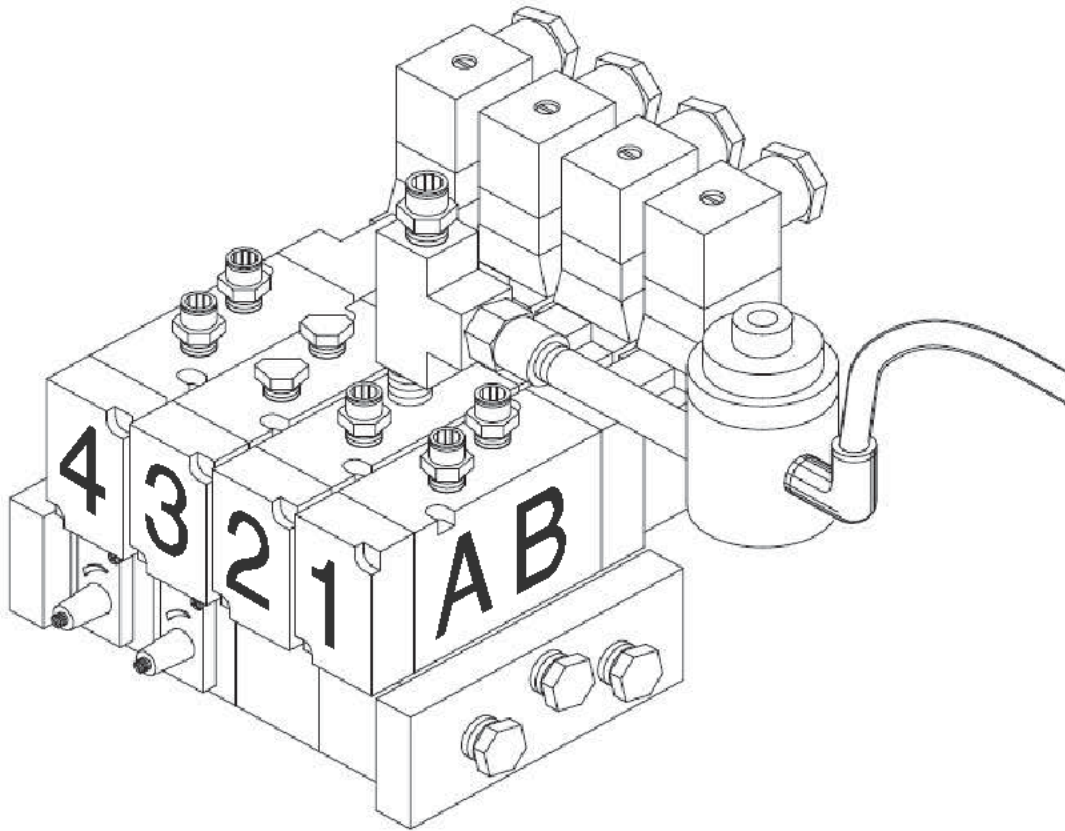


FIGURE 26

1A - 5/16" BLACK TO SAW VISE BACK

1B - 5/16" BLACK TO SAW VISE FRONT

2A - 1/4" RED TO TOP OF POWER DOWN HYD. TANK

2B - 1/4" GREEN TO BOTTOM OF POWER DOWN CYL.

3A - 1/4" BLUE TO RIGHT END OF SHUTTLE CYLINDER

3B - 5/16" BLACK TO TOP OF SHUTTLE HYD. TANK

4A - 1/4" BLACK TO BACK OF SHUTTLE VISE

4B - 1/4" YELLOW TO FRONT OF SHUTTLE VISE

FLOW CONTROL VALVE - POWER DOWN - SAW VISE

RIGHT SIDE - 3/8" BLACK TO TEE UNDER POWER DOWN HYD. TANK

LEFT SIDE - 3/8" BLACK TO STRAIGHT FITTING UNDER POWER DOWN HYD. TANK

3/8" BLACK FROM TEE UNDER POWER DOWN HYD. TANK TO CYL. TOP

FLOW CONTROL VALVE - SHUTTLE

1/2" BLACK FROM VALVE TO LEFT END SHUTTLE CYLINDER

(AS VIEWED FROM FRONT OF MACHINE.)

THE MOST COMMON PNEUMATIC/HYDRAULIC PROBLEMS ARE:

- A. Low levels of fluid in the reservoirs:** The fluid level in the power down feed reservoir should be approximately 1-1/2 inches below the top of the reservoir with the head in the **DOWN** position and 2-1/2 inches below the top of the reservoir when the head is in the **UP** position.

- ⊗ CAUTION: THE AIR SUPPLY TO THE MACHINE MUST BE DISCONNECTED BEFORE YOU REMOVE THE FILLER PLUG FROM THE RESERVOIRS. FAILURE TO DISCONNECT THE AIR WILL CAUSE THE FLUID TO BE PURGED OUT THROUGH THE OPENING UNDER PRESSURE!**

- B. Worn seals in the vise cylinder:** For seal kit installation instructions, **REFER TO SECTION 7.5.**

- C. Loose connections in the air lines:** All of the air lines on this machine are the snap in connector type. To remove the hose, push in on the slide connector while pulling out on the hose. To reconnect the hose, simply push the hose into the connector as far as it will go. If there are any questions about where the hoses connect, **REFER TO FIGURE 26 ON THE PRECEDING PAGE.**

10.0 PARTS LISTS

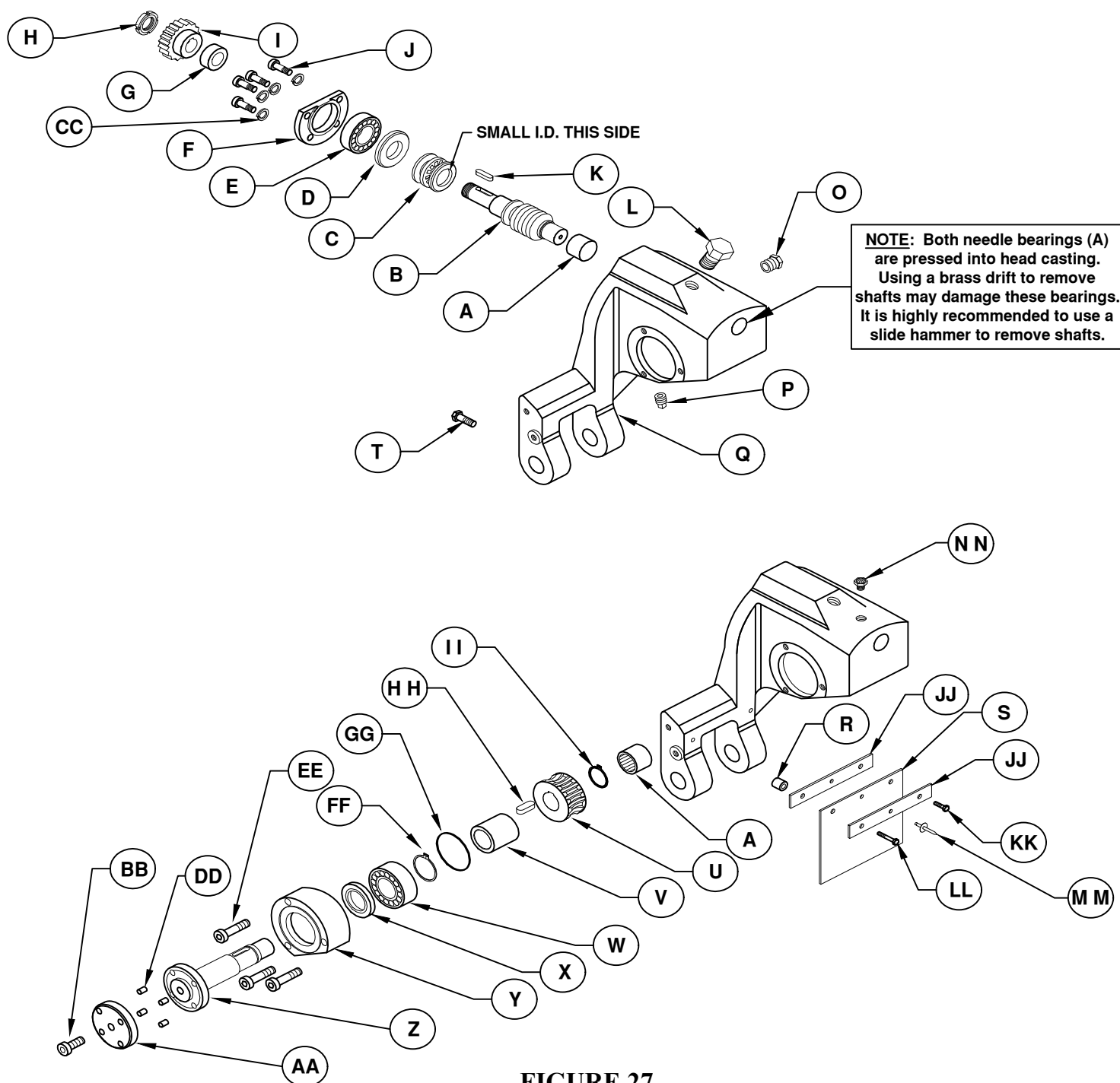
**THE FOLLOWING SECTIONS CONTAIN THE SAW AND OPTIONAL EQUIPMENT
PARTS LISTS AND DRAWINGS. FOR YOUR CONVENIENCE, ALWAYS GIVE YOUR
COMPLETE SERIAL NUMBER WHEN ORDERING PARTS!**

10.1 SAW HEAD

ITEM	PART #	DESCRIPTION
A	077150	Needle Bearing
B	077322	Worm Shaft
C	077323	Pivot Bearing
D	077324	Spacer Ring
E	077325	Bearing
F	077330	Hub
G	077326	Spacer Ring
H	077321	Lock Nut
I	077328	Gear Wheel
J	060250	M-10 SHCS
K	075080	Key 8 x 7 x 32
L	077630	Vent
O	077152	Sight Gauge
P	077153	Drain Plug
Q	045380	Head Casting
R	045328	Spacer
S	045324	Chip Shield Assembly
T	073326	M-8 SHCS
U	077333	Worm Wheel
V	077334	Bushing
W	075076	Bearing
X	075075	Seal
Y	077628	Bearing Housing
Z	077624	Saw Spindle
AA	077626	Saw Flange (Includes DD)
BB	221212	M-10 x 30 SHCS
DD	073920	Dowel Pins
EE	073641	M-10 SHCS
FF	077335	Snap Ring
GG	077337	O-Ring
HH	077340	Key 10 x 8 x 32

II	075081
JJ	045327
KK	201120
LL	201135
MM	154004
NN	077630
	045382

O-Ring
 Straps
 M-6 x 20 HHCS
 M-6 x 35 HHCS
 Rivet
 Vent
 Complete Head Assembly



10.2 MAIN VISE ASSEMBLY

ITEM	PART #	DESCRIPTION
A	221245	10 x 160mm SHCS
B	221240	10 x 140mm SHCS
C	221235	10 x 100mm SHCS
D	045311	Clevis Guide
E	045312	Clevis
F	045317	Clevis Pin
G	046655	Snap Ring
H	045630	Cylinder
I	045631	Cylinder Seal Kit
J	045313	Cylinder Mount
K	045301	Vise Body
L	045302	Push Block
M	045306	Hold down Plate
N	221210	M-10 x 25 SHCS
O	045304	Vise Side Plate
P	221412	M-16 x 35 SHCS
Q	045307	Upper Wear Plate
R	230005	M-6 x 12 FSHCS
S	077100	M-10 Dowel Pin
T	045303	End Plate
U	201620	M-16 x 55 HHCS
V	045308	Lower Wear Plate
W	073458	M-6 x 10 SHCS
X	045325	Lead Screw Cover
Y	045602	Spring
Z	201160	M-8 x 60 HHCS
AA	045314	Detent Block
BB	045309	Lead Screw
CC	045198	Drive Forks
DD	045310	Boss
EE	077121	M-20 Jam Nut
FF	045030	1169 x 5 x 65 90 Degree Elbow
GG	045305	Guide Plate
HH	046652	Detent Ball
II	221210	M-10 x 25 SHCS

JJ	218044	M-10 x 10 Set Screw
KK	077798	Vise Jaws
LL	203212	M-10 x 25 HHCS
MM	045224	Clevis Wear Plate
OO	045329	Angle Shelf
PP	221005	M-6 x 12 SHCS
	045300	Complete Vise Assembly

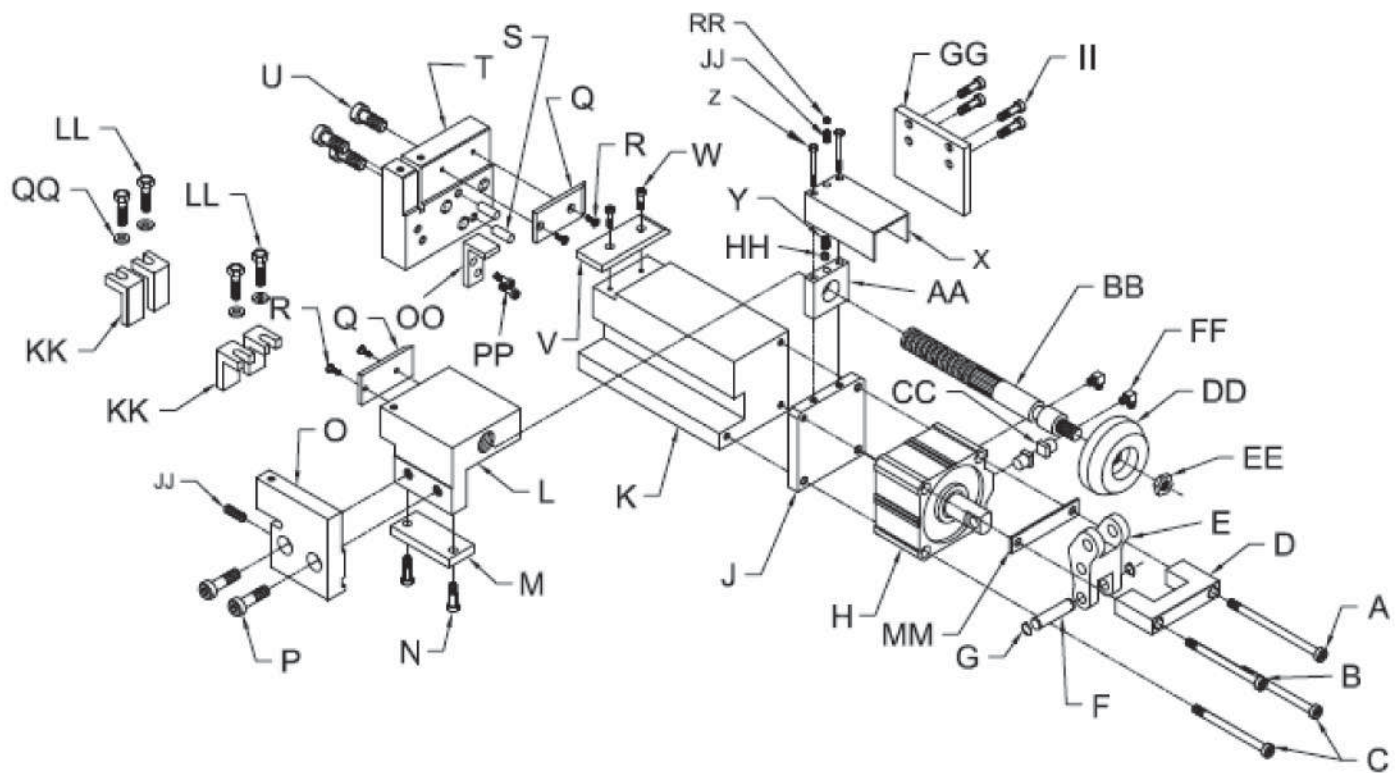


FIGURE 28

10.3 SHUTTLE VISE ASSEMBLY

ITEM	QTY	PART #	DESCRIPTION
1	1	045214	Slide Plate
2	2	045211	Keeper Plate
3	1	045212	Lead Screw
4	1	045668	Cyl. Mounting Plate
5	1	045221	Ball Detente Block
6	1	045199	Piston
7	1	045659	Cylinder Body
8	1	045222	End Plate
9	1	045219	Boss
10	4	077799	Grip Cheek
11	1	045672	Vise Body
12	1	045213	End Block
13	1	045210	Push Block
14	6	220027	M-8 x 35 BSHCS
15	1	111015	5/8 - 11 Hex Jamb Nut
16	6	230110	M-8 x 20 DIN 7991 FSHCS
17	6	230005	M-6 x 12 FSHCS
18	4	203212	M-10 x 30 DIN 933 HHCS
19	4	114020	3/8 Hard Washer
20	1	221417	M-16 x 45 DIN 912 SHCS
21	2	201160	M-8 x 60 DIN 931 HHCS
22	1	046652	M-8 Plain Ball DIN 5401
23	1	218048	M-10 x 20 DIN 916 Set Screw
24	1	210012	M-10 DIN 439 Jamb Nut
25	2	077743	1/8 NPT x 1/4 90 ELL
26	1	045602	Detente Spring - Short
27	1	060270	1 3-4 Hole Plug 2773-01
28	1	045679	Sensor Bracket
29	1	045486	Hyde Pard Prox Sens - VM18PNCQ
30	2	201120	M-6 x 12 DIN 933 HHCS

32	10	077864	M5 x 12 DIN 912 SHCS
33	2	046667	1/8" 214 O-RING
34*	1	045660	Magnet
35	2	045654	PISTON SEAL KIT (44578)

34* May or may not be included in the piston assembly.
It is not needed for the CPO-315-HFA-CNC machine.

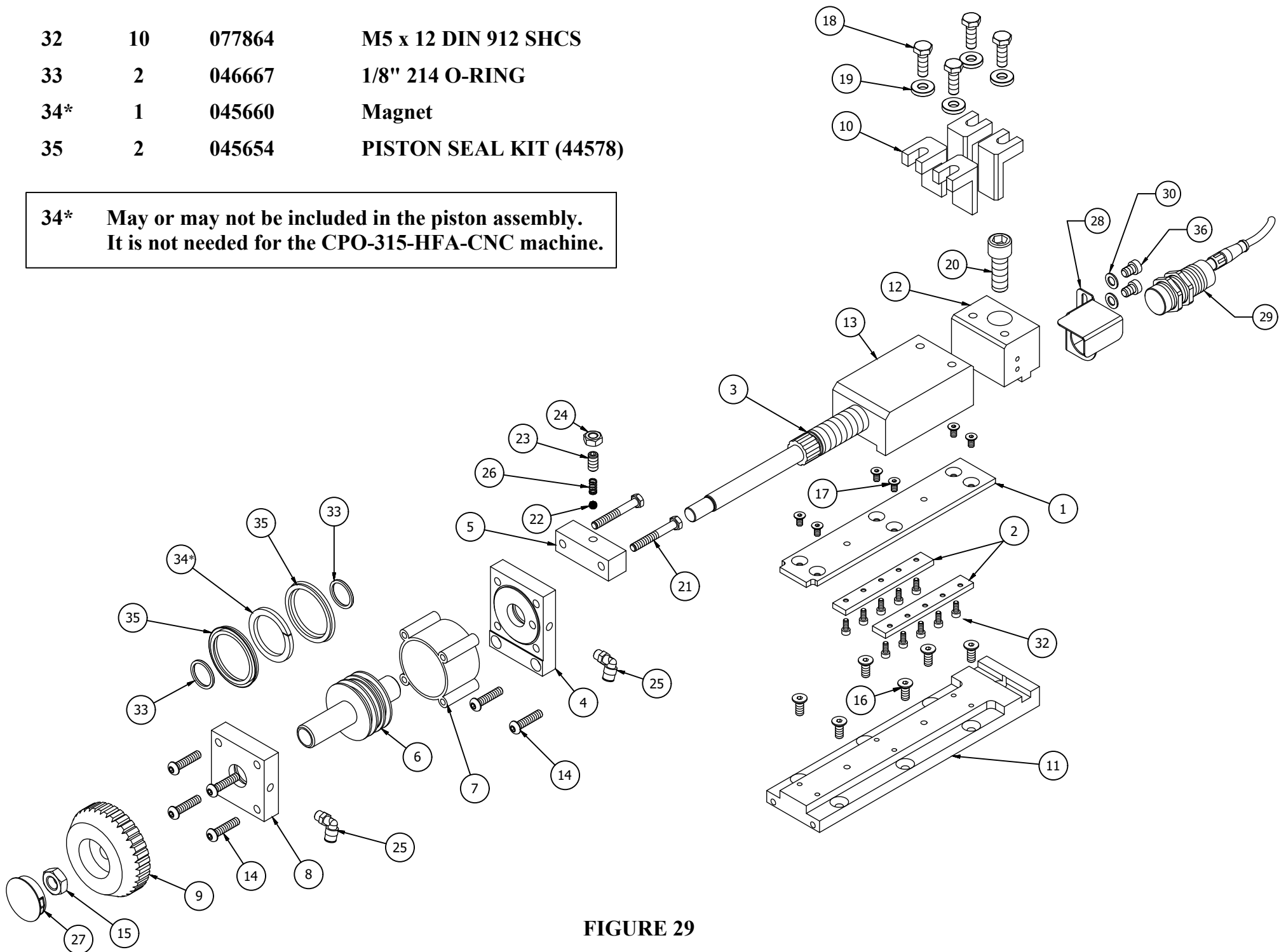


FIGURE 29

10.4 SHUTTLE ASSEMBLY

ITEM	QTY	PART #	DESCRIPTION
7	1	045670	T-Plate Alum
8	10	073455	M-5 x 20 DIN 912 SHCS
9	4	045669	Roller Block - Tall
10	4	045233	Bearing INA #SCE68
11	2	047254	HFA Roller
12	1	045680	Sensor Target
13	3	221220	M-10 x 40 DIN 912 SHCS
15	3	045673	Spacer - Linear Drive
16	6	045671	Hold Down - Linear Rail
17	12	073619	M-6 x 20 DIN 912 SHCS
18	10	073626	M-10 x 20 DIN 912 SHCS
19	6	214012	M-10 DIN 125 Flat Washer
20	1	045676	Actuator Motor Cover
22	4	208012	M-10 DIN 934 Hex Nut
23	9	218022	M-6 x 20 DIN 916 Set Screw
24	1	045209	Shuttle Vise
25	3	045261	Linear Drive End Cover
26	12	077864	M-5 x 12 DIN 912 SHCS
27	1	044790	Actuator Cover Strip 6 Meter (strip is made of metal)
28	2	044795	Actuator Bumper Cap

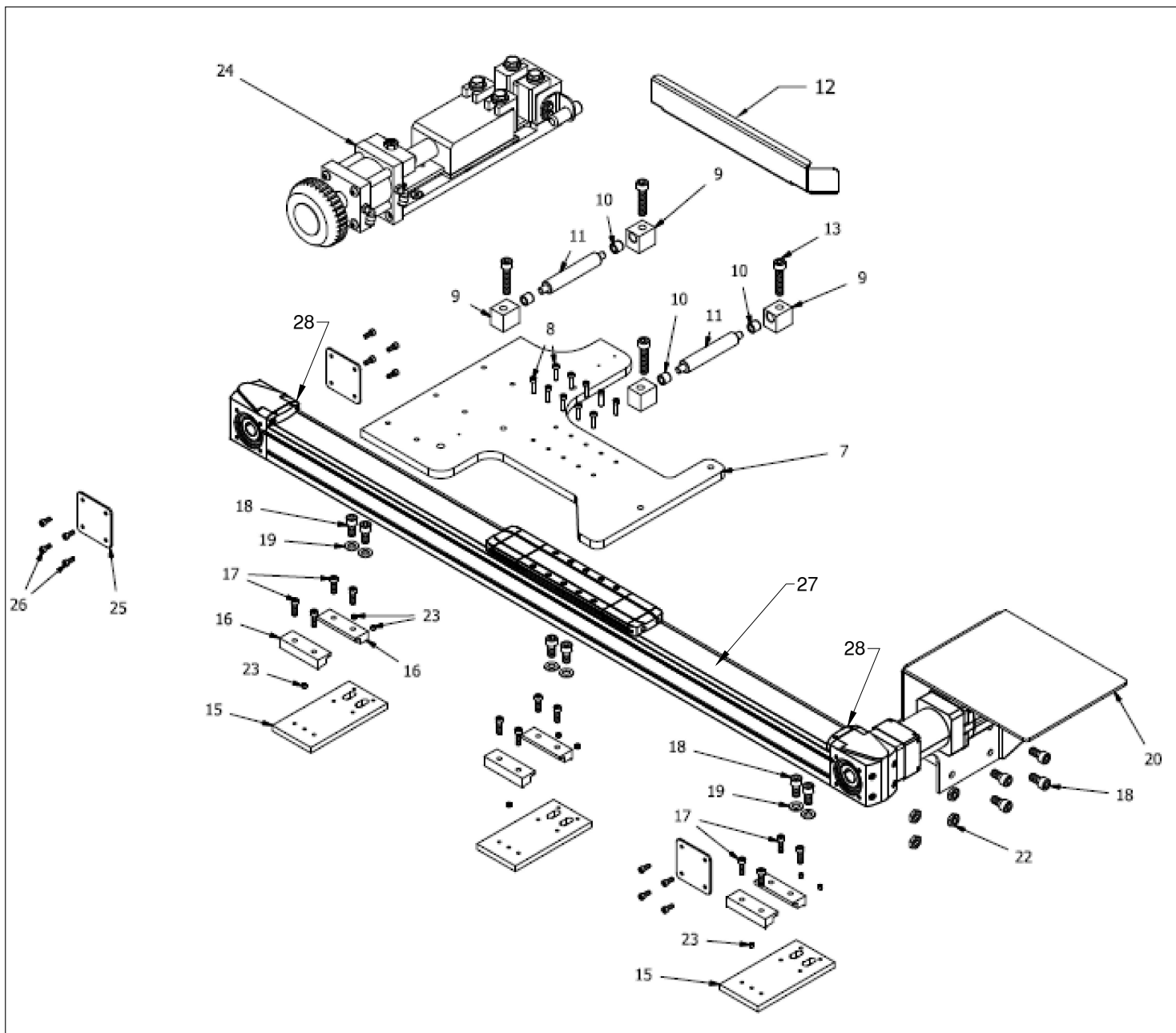


FIGURE 30

10.5 POWER DOWN FEED ASSEMBLY

ITEM	QTY	PART #	DESCRIPTION
1	1	045230	Power Down Bracket (Upper)
2	1	045425	Power Down Reservoir
*3	1	045692	CPO315 PD Cylinder Assembly (Includes Items 3-14)
4	1	045031	3/8" NPT X 1/4" 90° Swivel
5	1	045054	3/8" NPT X 1/2" 90° Swivel
6	1	045593	Pivot Pin (Includes Items 6-7)
7	2	016402	Snap Ring
8	1	045594	PD Clevis Drill
9	1	045693	Bellow Clamp For 045697
10	1	045696	Bellow Retainer
11	1	045697	Bellow For *045699
12	1	077715	Cylinder Pivot Bolt (2)
13	2	218022	M6 X 6MM DIN916 Set Screw
14	2	220014	M6 X 10MM DIN BN19 BHCS
15	1	045698	Cylinder Seal Kit For *045699
16	2	077211	Return Spring
17	8	221210	M10 X 25MM DIN912 SHCS

***P/N 045699 Cylinder- Only available as 045692 Assembly**

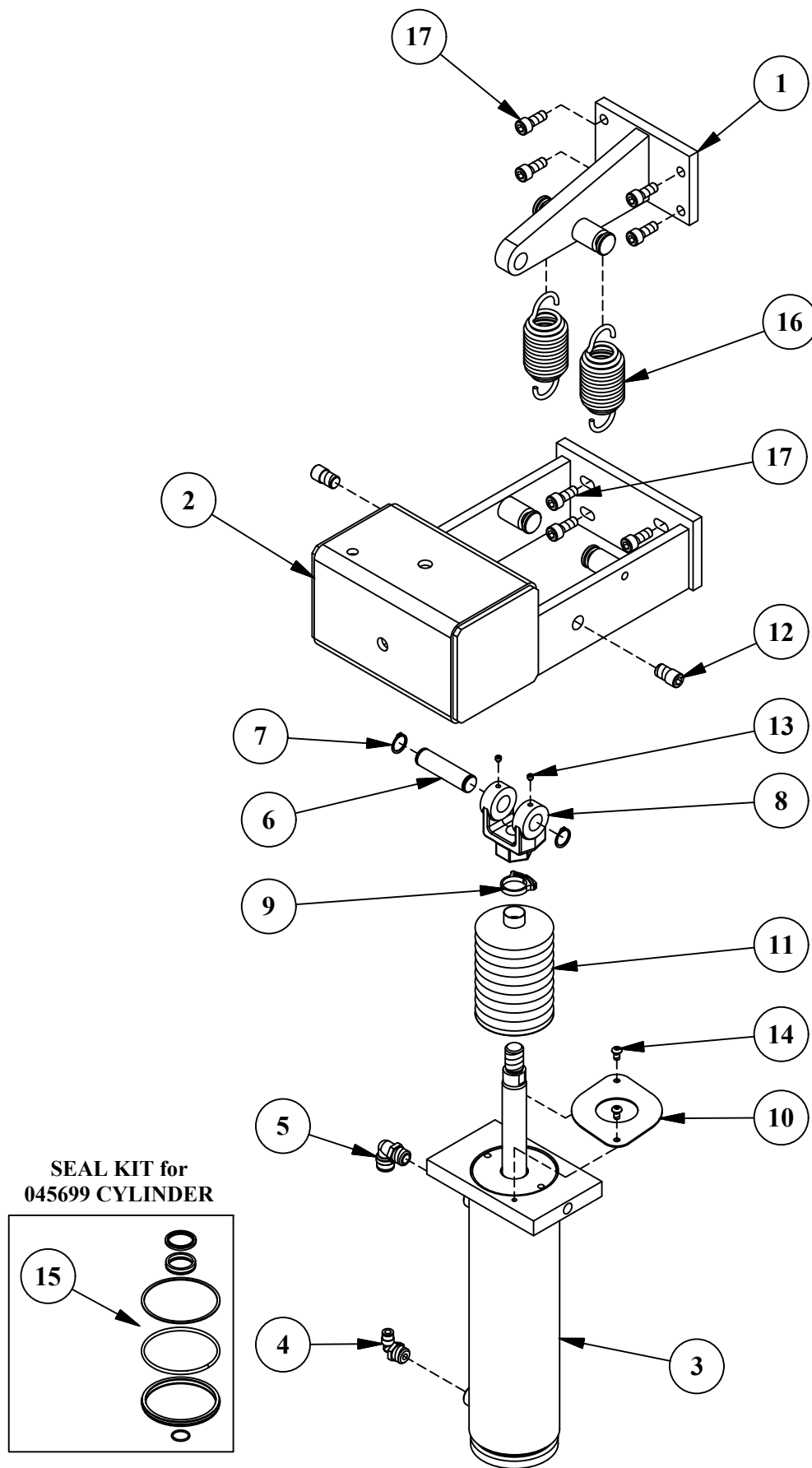


FIGURE 31

10.5A POWER DOWN FEED VALVES

ITEM	PART #	DESCRIPTION
A	077746	1/4" NPT x 169 PL
B	077701	Baffle
C	077777	3/8" NPT Plug
D	045054	Ninety Degree Swivel
E	077536	Check Valve
F	045042	Return Line Fitting
G-H-I		MVK6 Mounting Kit
J	047535	Flow Control Valve
K	045054	1/4 NPT x 1/2 PL Ninety Degree Swivel
L	045041	Brass 3-Way
M	077779	1/4 NPT Nipple
N	077771	Reducer
O	078455	Sight Glass

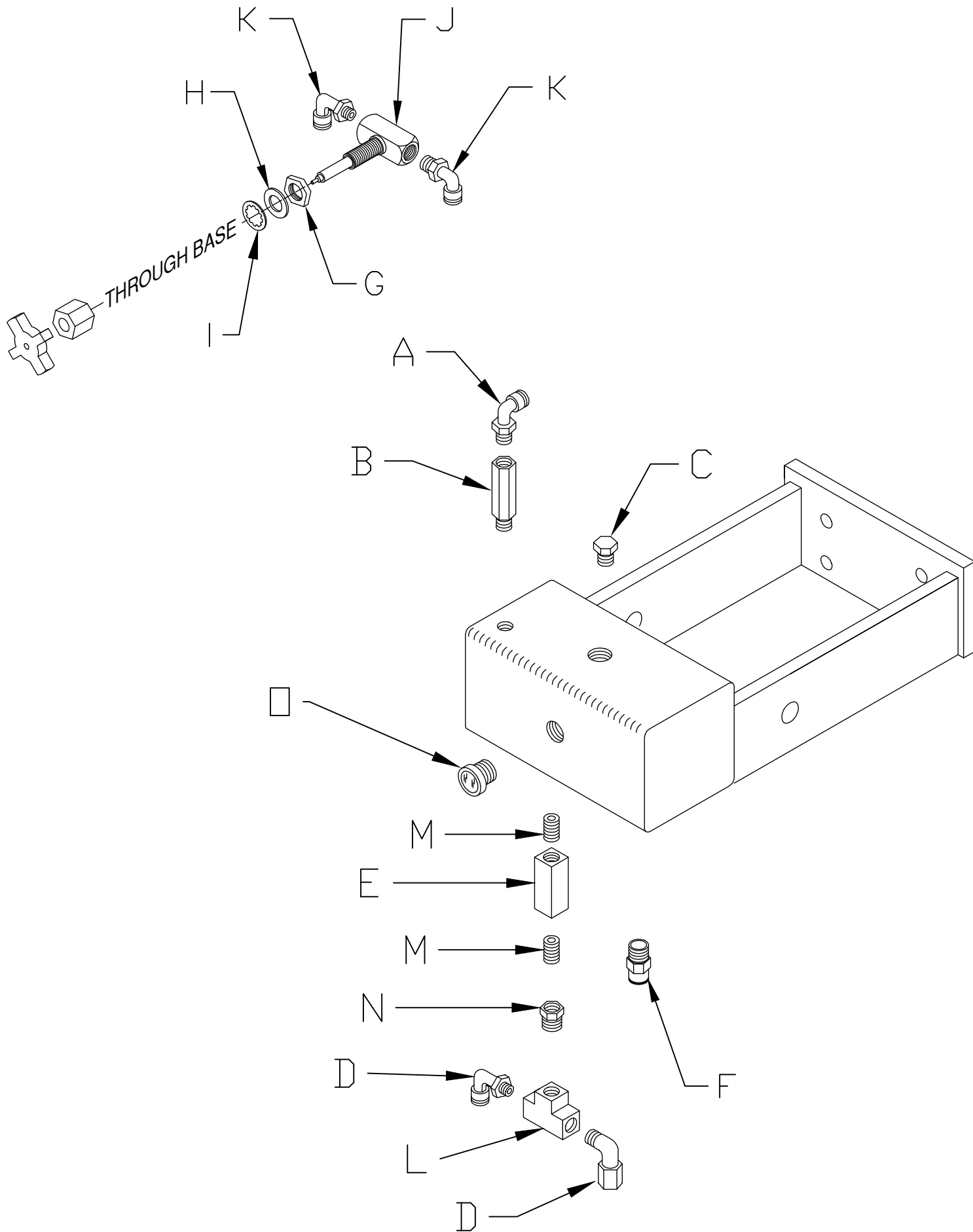


FIGURE 32

10.5B AIR CONTROLS

ITEM	PART #	DESCRIPTION
A	N/A	Provided by Customer
B	077719	Shuttle Valve
C	077737	1/4 NPT Brass Street Elbow
D	077780	Brass NPT Coupler
E	077779	1/4" NPT Nipple
F	045604	Complete Filter/Regulator/Lubricator
G	045605	Mounting Brackets
H	077738	90 Degree Fitting
I	045609	Replacement Bowls
J	045610	Filter Seal Kit
K	045612	Regulator Seal Kit
L	045613	Lubricator Seal Kit
M	045176	Valve Mount
N	045606	Gauge

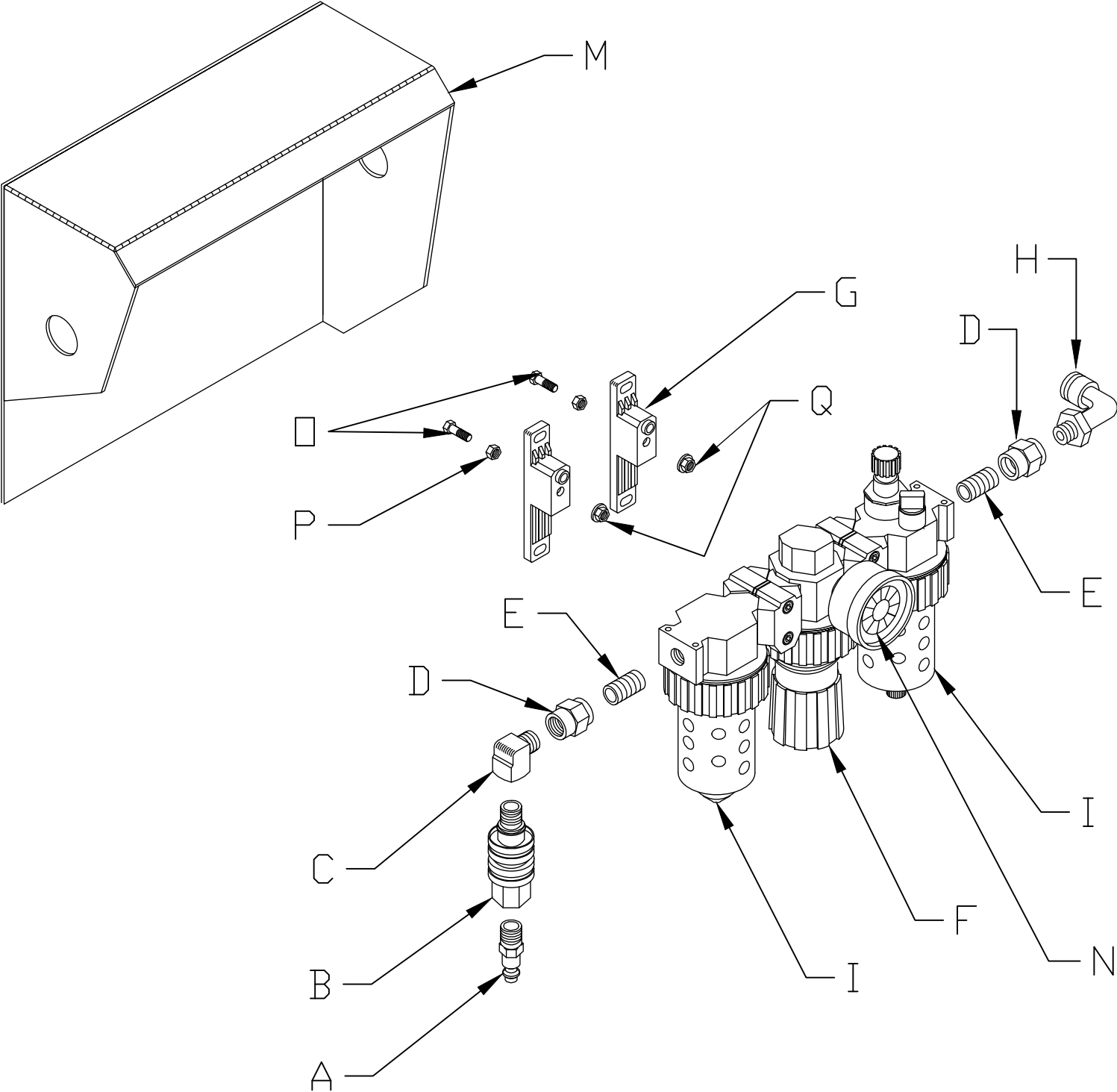


FIGURE 33

10.6 AIR VALVE ASSEMBLY

ITEM	PART #	DESCRIPTION
A	046047	DIN Connector for 060040
B	077744	Fitting (5/16 PL to 1/4 NPT)
C	077777	Plug (3/8 NPT)
D	045045	ASP-3BV Breather)
E	077740	3/8" 90 DEG Male Swivel
F	045650	Solenoid 24VDC
G	045655	Valve (Includes F)
H	677728	Fitting (1/4 NPT to 1/4 Hose)
I	077779	1/4" X Close Brass Nipple
J	077741	1/8" Male SW x 169 PL
K	077750	1/8" NPT X 2-1/2" Nipple
L	077721	1/8" X 1/4" Brass Bushing
M	677745	1/4" Brass Tee
N	045653	4 Station Valve Assembly All Except: H, I, J, K, L, M, & O
O	077930	Mister Regulator

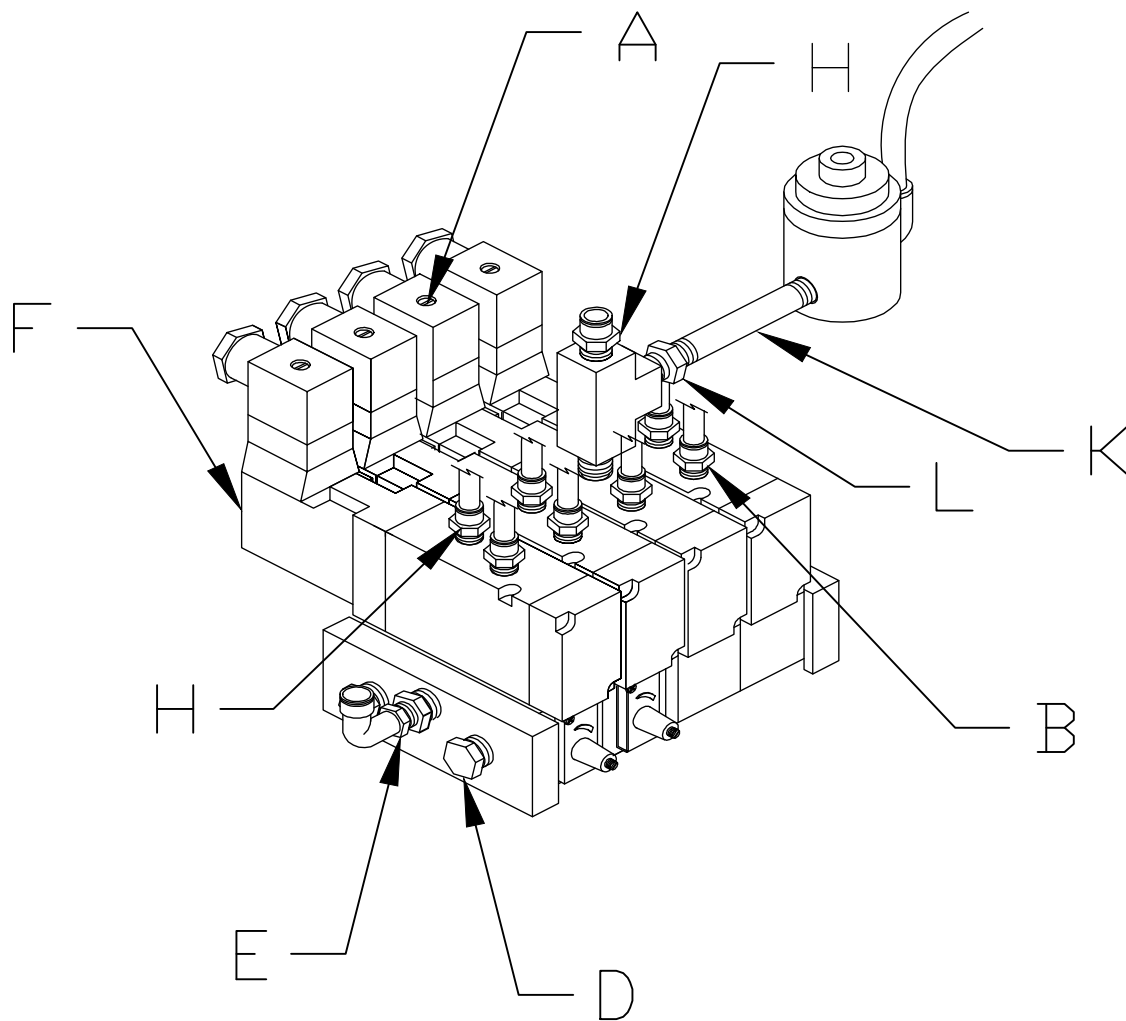
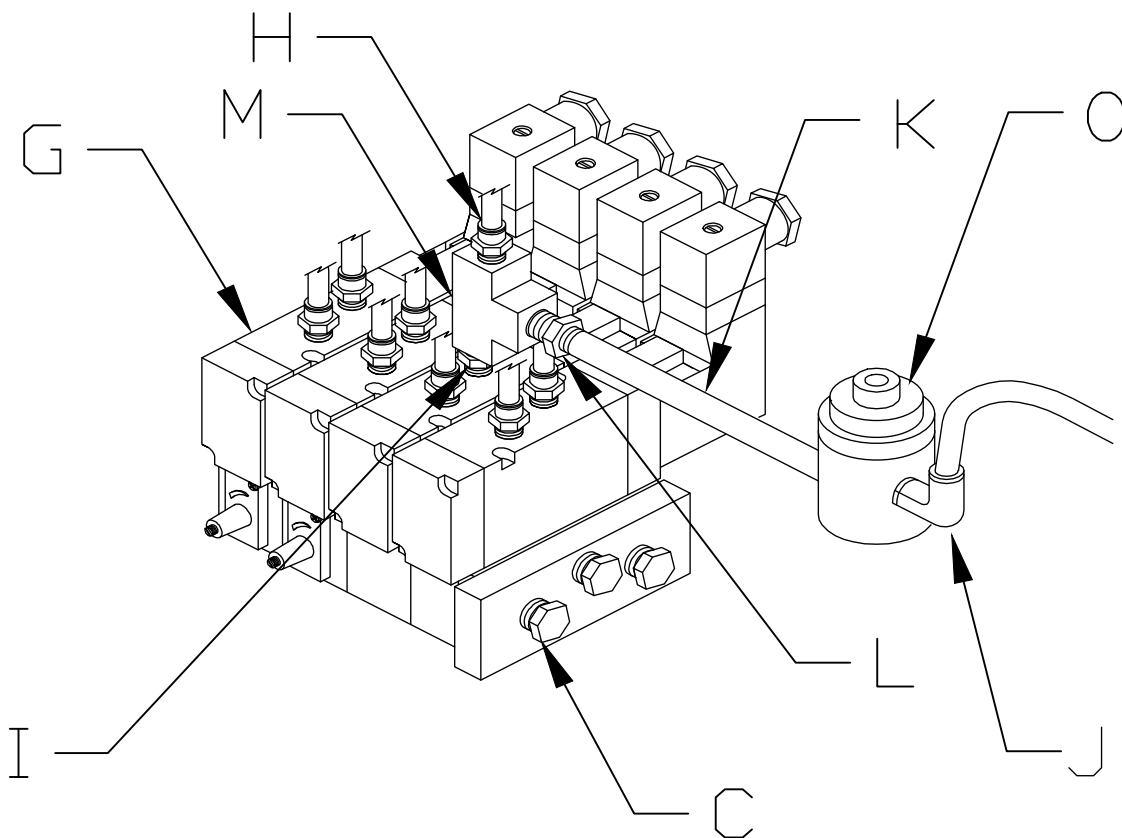


FIGURE 34

10.7 BLADE GUARD ASSEMBLY

ITEM	PART #	DESCRIPTION
A	045267	Guard Shell
B	073641	M-10 SHCS
C	040087	M-10 Brass HHCS
D	208012	M-10 Jam Nut
E	026621	M-10 Tee Nut
F	073766	Coolant Line
G	046269	Hose Barb
H	073450	M-4 x 16 SHCS
*I	076839	Mister Unit (Standard)
J	676842	Hose Barb
K	077926	Coolant Line
L	060501	5/16 Air Line
M	676844	Fitting
N	073095	M-4 Washer
O	073415	M-4 SHCS
P	046267	Elbows
Q	073766	Coolant Line
R	046268	T Mount
S	026619	M-10 Tee Nut

*** Mister is standard equipment - Flood Coolant is optional**

10.8 MOTOR ASSEMBLY

ITEM	PART #	DESCRIPTION
A	046358	Angled Fan Cover
B	073407	M-5 x 8 SHCS
C	N/A	Fan
D	N/A	End Casting
E	077325	Motor Bearing
F	N/A	Snap Ring
G	076369	Key
H	203210	M-10 SHCS
I	077370	Key 6 x 4 x 32mm
J	N/A	Seal
K	N/A	Spacer Washer
L	N/A	Snap Ring (30mm Only)
M	N/A	End Casting (Front)
N	077375	Pinion Gear
O	077189	Lock Nut
P	077860	350 Head Gasket
Q	077855	Switch Box Gasket (Not Shown)

COMPLETE MOTORS

A	076993	11-177 RPM/230/460 Volt
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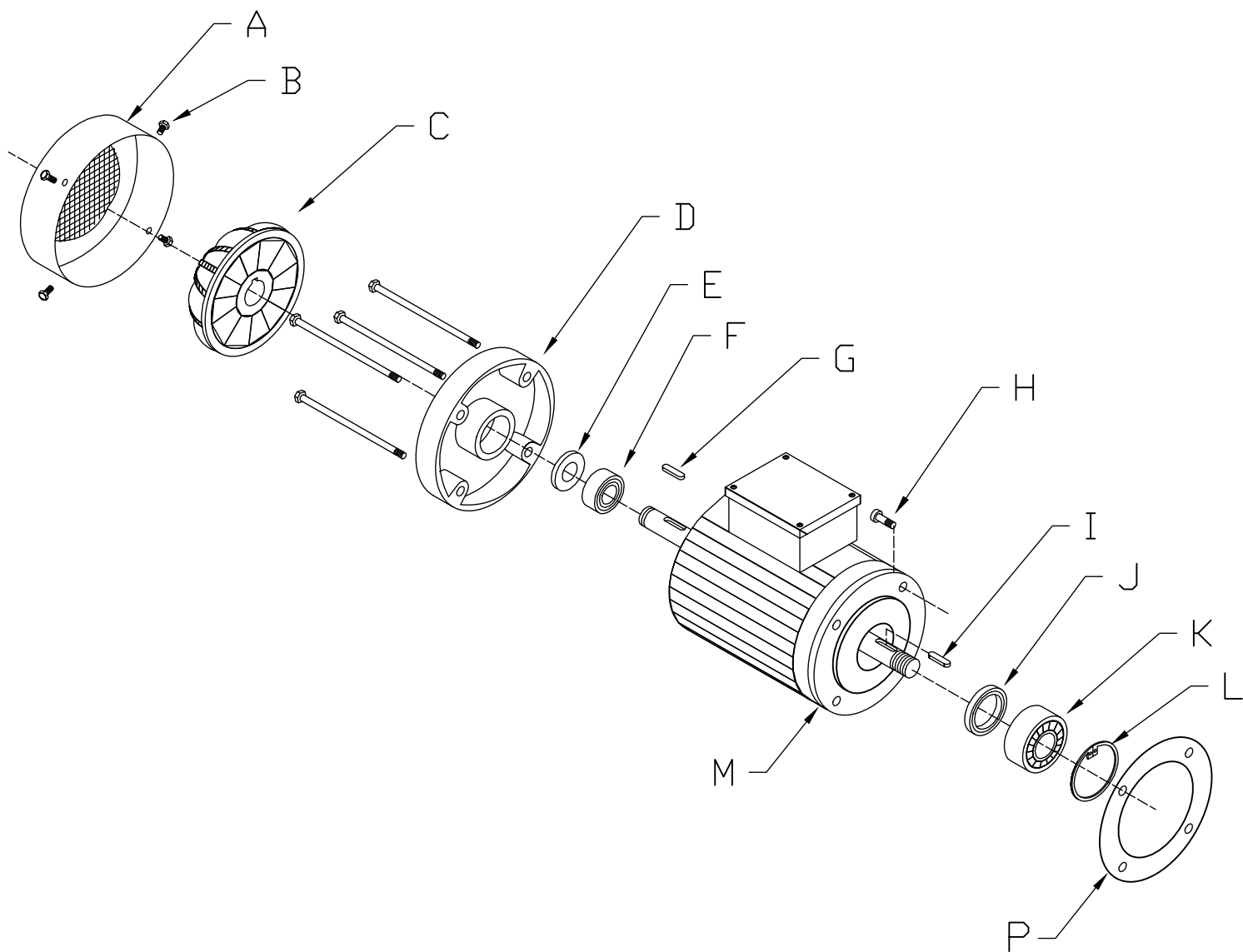


FIGURE 36

10.9 MIST COOLANT SYSTEM

ITEM	PART #	DESCRIPTION
A	677728	1/4 NPT x 1/4 Hose
B	677745	1/4 Brass Tee
C	077721	1/4 To 1/8 NPT Reducer
D	077750	1/8 x 2-1/2 Pipe Nipple
E	077930	Mister Regulator
F	677933	Mister Reservoir
G	077779	1/4 Brass Nipple
H	077741	5/16 Swivel Fitting
I	045740	Check Valve
J	077926	Line

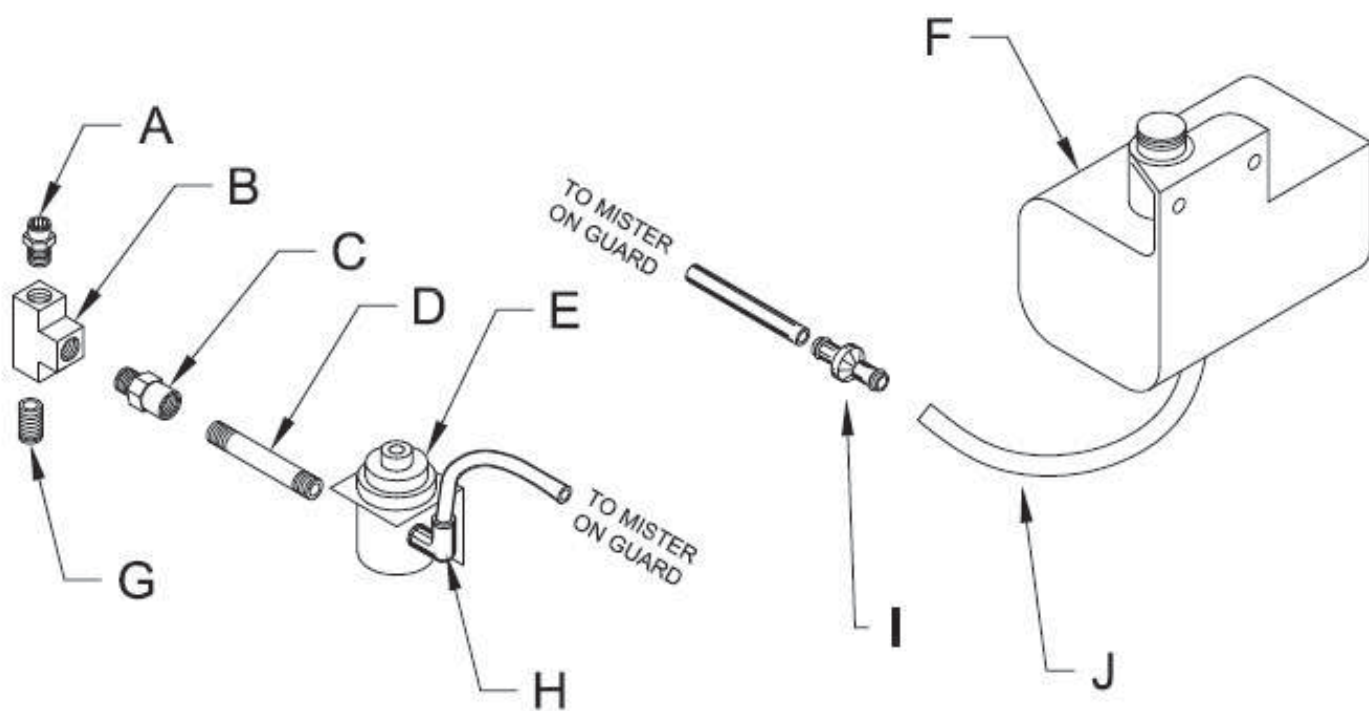


FIGURE 37

10.10 ELECTRICAL UNIT - LINE CIRCUIT

ITEM	PART #	DESCRIPTION
A	045483	230 Volt Power Supply
B	045485	Mini Circuit Breaker
C	045491	Manual Starter
D	045508	9 Amp Contactor
E	045512	24 Volt DC Relay
F	045490	Manual Starter 17-25 Amp
G	045481	Manual Starter 4-6.3 Amp
H	045537	Can Open Bus Master Module
I	045487	Safety Relay
J	048212	PLC
J1	075209	DIN Rail
K	078285	5HP 230V VFD-PROGRAMMED
K1	078286	5HP 460V VFD-PROGRAMMED
L	045546	Linear Motor Drive

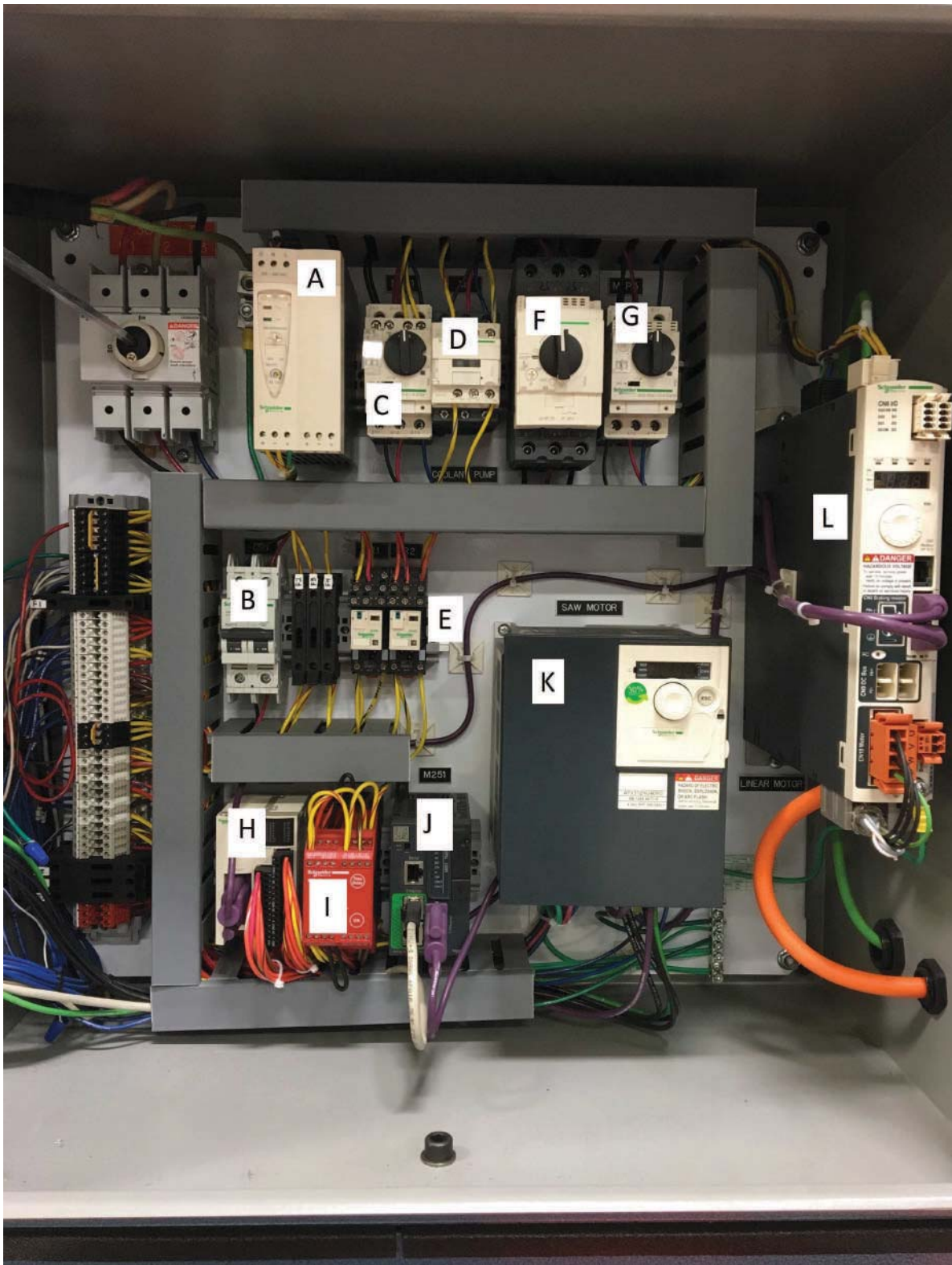


FIGURE 38

10.11 BASE ASSEMBLY

ITEM	PART #	DESCRIPTION
A	045171	Base Cabinet
B	045415	Base Casting
C	045476	Lower Enclosure
D	045172	Door Assembly
E	045257	Reservoir Screen
F	060150	Optional 230 Coolant Pump
F1	060158	Optional 460 Coolant Pump
F2	060160	Optional 575 Volt Coolant Pump
G	049217	Leveling Pads
H	073350	M-10 x 100 HHCS
I	221005	M-6 x 12 SHCS
J	N/A	
K	221002	M-4 x 12 SHCS
L	045475	Chip and Parts Chute
M	221120	M-8 x 25 SHCS
N	045052	Chip Bucket
O	060149	Pump Screen
P	046018	Handle
Q	049330	Brackets

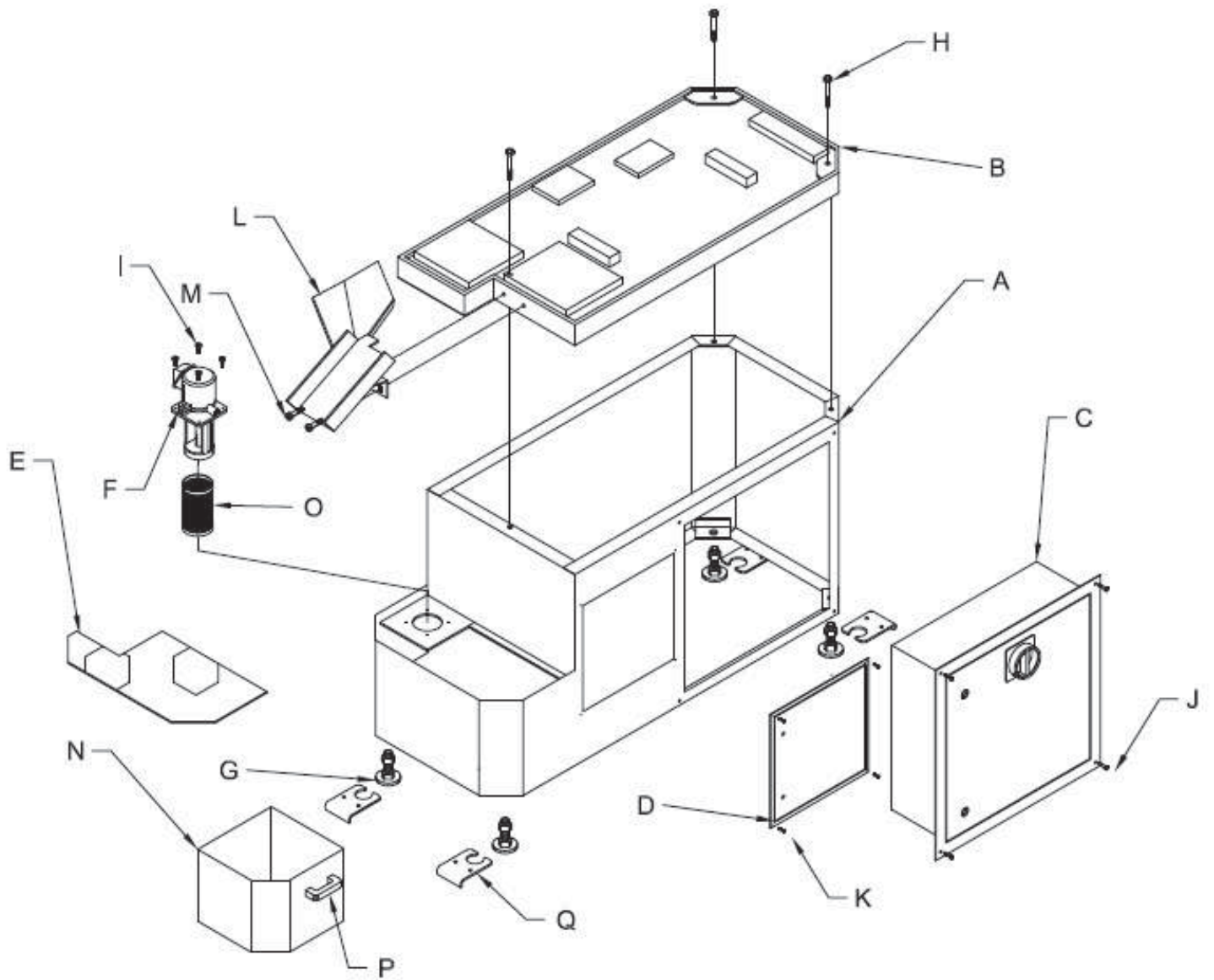


FIGURE 39

10.12 OPTIONAL COOLANT PUMP

(OPTIONAL FLOOD COOLANT)

ITEM	PART #	DESCRIPTION
A	060150	230 Volt Coolant Pump
A1	060158	460 Volt Coolant Pump
A2	060160	575 Volt Coolant Pump
B	060152	Impeller (obsolete)
C		N/A
D	060151	Pump Oil Seal
E	N/A	Bolt
F	N/A	Bolt
G	060080	90 Degree Elbow (Not Shown)
H	060140	Coolant Line
I	060095	Pump Cable
J	221005	M-6 x 12 SHCS
K1	072354	3/8 NPT Hose Barb
K2	072322	3/8" Ball Valve
K3	077774	3/8 NPT Close Nipple
K4	046271	Elbow
L	046300	Hose Clamp (Not Shown)
M	060149	Pump Screen

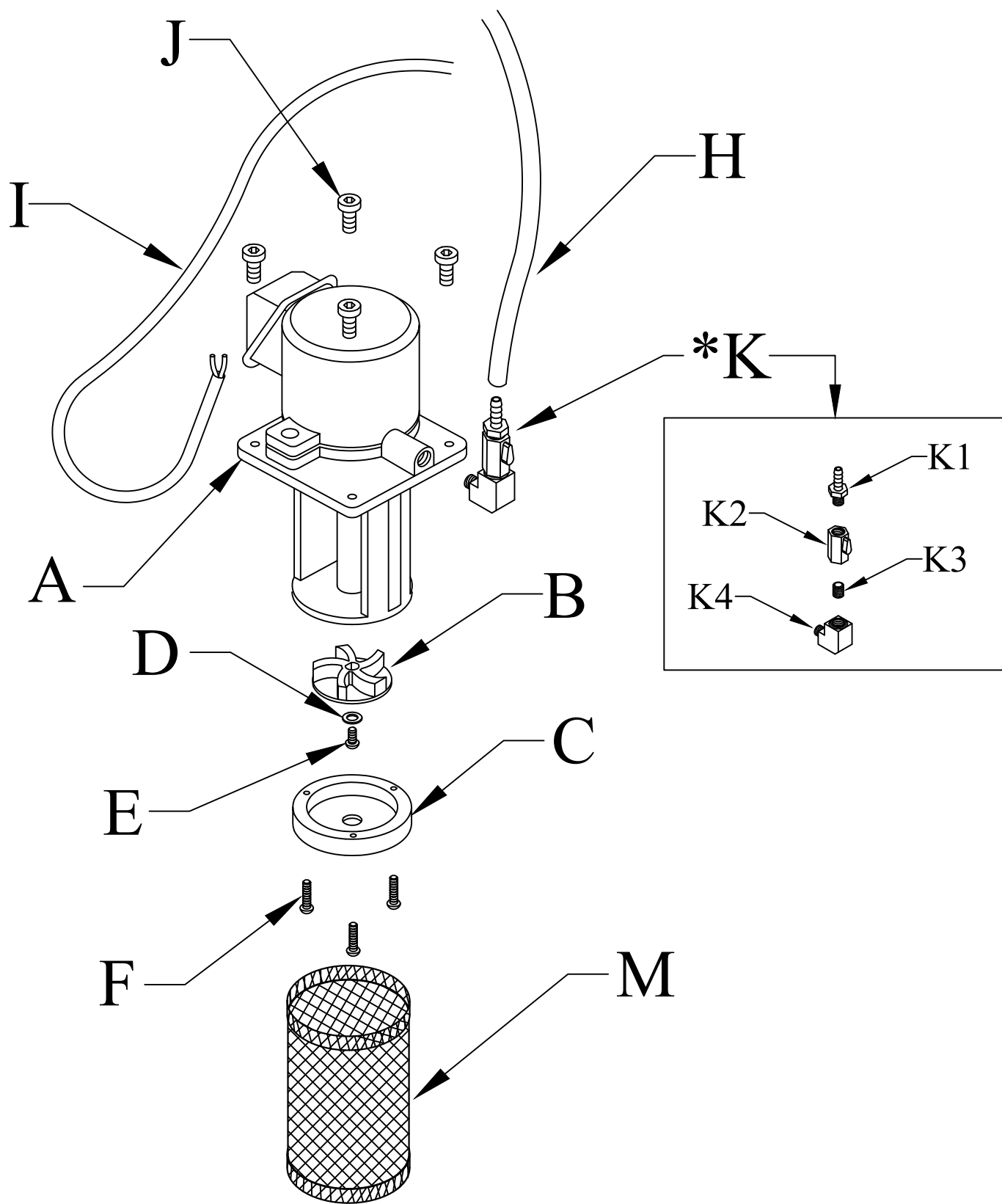


FIGURE 40

10.13 STROKE CONTROL ASSEMBLY

ITEM	PART #	DESCRIPTION
A	045253	Stroke Adjustment Plate
B	045249	Stroke Control Stand
C	045299	Stop Block
D	045320	Stroke Sensor Mount
E	045330	Stop Guide
F	220010	M4 X 10MM BHCS
G	203212	M-10 x 30 HHCS
H	114020	3/8" Hard Washer
I 1	077796	Proximity Sensor (OLD M18 - One Used)
I 2	077795	Inductive Prox. Sensor (NEW M12 - Two Used)
		<u>NOTE: Verify Size Before Ordering!!</u>
J	221212	M-10 x 30 SHCS
K	221210	M-10 x 25 SHCS
L	221120	M-8 x 25 SHCS
M	158202	Bumper
N	073095	M-4 Washer

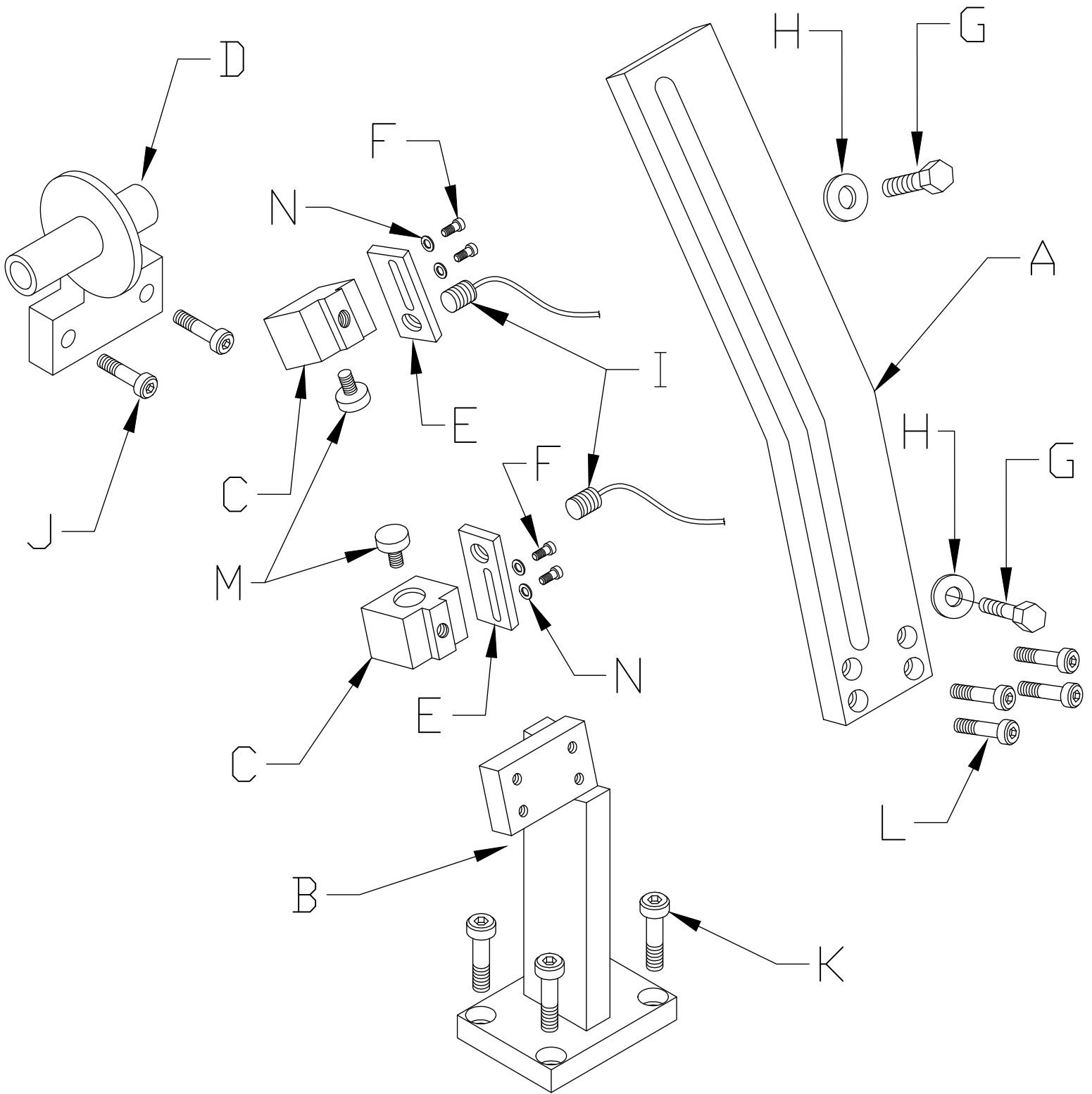


FIGURE 41

10.14 HOOD ASSEMBLY

ITEM	PART #	DESCRIPTION
A	203217	M-10 x 45 HHCS
B	045196	Pedestal
C	045285	Pivot Pin
D	046018	Hood Handle
E	045464	Extension
F	045322	Sight Glass
G	046645	Sight Glass Seal
H	201120	M-6 x 20 HHCS
I	077157	M-6 Nylon Loc Nut
J	229415	M-10 x 12 x 16 Shoulder Bolt
K	045255	Hood
L	077142	Grease Nipple
M	077100	M-10 Dowel Pin
N	073617	M-6 x 12 BHCS
O	040012	Bumpers
P	047110	Interlock Switch
P1	047115	Switch Mount
P2	220010	M-4 x 12 BHCS
P3	21500	M-4 Nylon Loc Nut
Q	047160	Hood Assembly (Includes D, E, F, G, H, I, K, N, O, P, R)
R	215013	M-8 Nylon Loc Nut
S	077907	Shroud Edge

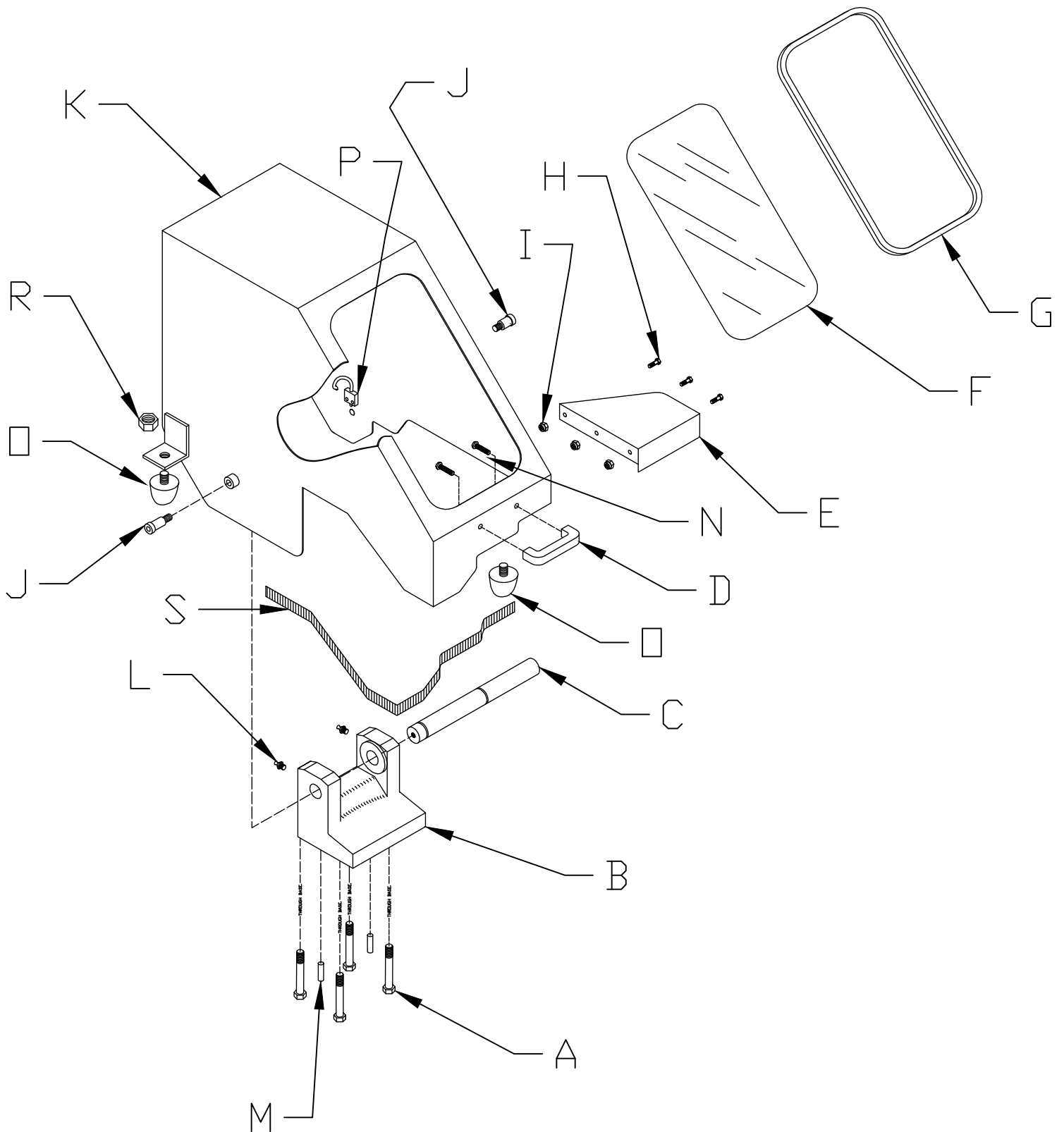


FIGURE 42

11.0 OPTIONAL EQUIPMENT PARTS LISTS

11.1 TEN FOOT SUPPLY TRACK

ITEM	QTY	PART #	DESCRIPTION
1	1	029242	10' Roller Conveyor W/Legs (Complete Assy.)
2	2	029243.1	10' Roller Conveyor Side
3	2	029244	Leg Roller Conveyor
4	10	029245	Replacement Rollers For #29243
5	1	029300	Conveyor Brace
6	3	029621	Conveyor Support Bracket
7	12	201205	M10 X 16MM DIN933 HHCS
8	12	208012	M10 DIN 934 Hex Nut
9	2	216015	M10 BN190 Flange Nut
10	2	224205	M10 X 16MM DIN-BN73 WLCS

***076938 - 13" GUIDE ASSEMBLY (Optional)**

ITEM	QTY	PART #	DESCRIPTION
1	2	026619	SMALL TEE NUT (M10)
2	2	043003	NYLON ROLLER 3.25
3	2	076941	BASE CLIP
4	1	076943	BASE MATERIAL GUIDE 13" PAINT
5	2	214012	M10 DIN125 REGULAR WASHER
6	2	221120	M8 X 25 DIN9121580 12.9 SHCS
7	2	229225	M10 X 12 X 70 SB912

* 076935 - Optional Guide Assembly for older conveyors

11.2 COOLANTS AND LUBRICANTS

UNIT	PART	DESCRIPTION
1 Gal.	075751	Saw Coolant
5 Gal.	075752	Saw Coolant
55 Gal.	075754	Saw Coolant
1 Gal.	075756	Stainless Coolant
5 Gal.	075757	Stainless Coolant
1 Qt.	075753	Air Line Lubricant
1 Gal.	075759	Air Line Lubricant
1 Gal.	075758	Gear Oil - Head

12.0 STOCK BLADES

315 MM-12-1/2" - HSS-DM05 - 40 MM BORE - 2/8/55 & 4/12/64 PIN SPACING

Part No.	Thickness	Teeth
74355	.100	90
74356	.100	100
74357	.100	110
74345	.100	120
74348	.100	150
74350	.100	180
74352	.100	220
74354	.100	280

275 MM-10-3/4" - HSS-DM05 - 40 MM BORE - 2/8/55 & 4/12/64 PIN SPACING

Part No.	Thickness	Teeth
74309	.100	90
74308	.100	100
74310	.100	120
74311	.100	150
74312	.100	180
74313	.100	220
74314	.100	260

BELOW THE DIFFERENT STYLES OF BLADES AVAILABLE ARE EXPLAINED

ROUND GRIND

Teeth are the same Height.
There is No Bevel. Typically used
on Blades with a 3.5 Pitch or Less,
as Teeth this small are extremely
difficult to bevel. This works best
for thinner walled Tube.
Also used for soft materials such as
Nylon, Plastic, PVC, etc. in most
any shape or size and with
whatever tooth size works the best.

ALTERNATE

Teeth are the same Height.
All the Teeth have a Bevel.
Every Other Tooth is Beveled
on Every Other Side. Used on
Blades with a 4.5 Pitch or Less,
Generally, 220 Teeth or more.
More Teeth = Smaller Pitch
Used on thinner walled Tube &
Angle and Small Solids.

TRIPLE CHIP

Every other Tooth is Taller.
Often said to have a "High-Low".
The High-Tooth has a Bevel on Both
Sides. The Low Tooth has
NO Bevel at all. Hi-Tooth cuts the
Middle out of the Cut and Low
Tooth is the Tooth that leaves Finish.
Generally used on Blades
with a 4.5 Pitch or more.
Less Teeth = Larger Pitch.
Best for Solids and Thick Wall Tube.

NOTCH GRIND

Teeth are the same Height.
All the Teeth have a Notch.
Notches are Offset from Each
Other and breaks up the Chip
made during the Cut. Typically
used on Blades with a 4.5 Pitch or
Less, Generally, 220 Teeth or more.
More Teeth = Smaller Pitch
Best for thinner walled Tube &
Blade RPM should be increased.

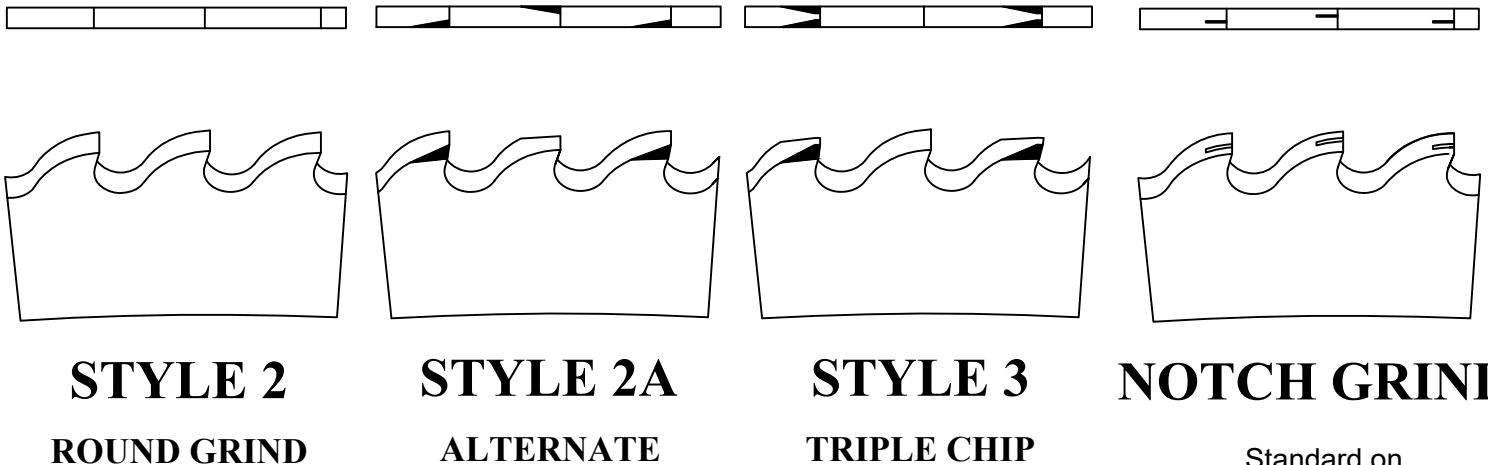


FIGURE 44

13.0 WIRING DIAGRAMS

The wiring diagrams (FIGURES 45 - 52) for the CPO-315-HFA-CNC saw are on the following
pages. FIGURES 45-48 are for the 230v saws and FIGURES 49-52 are for the 480v saws.

SCOTCHMAN HFA 230V

POWER DIAGRAM

PAGE 1

Drawing 3757A

PROVIDE UPSTREAM PROTECTION
PER NEC TABLE 430-52
230V AC 3 PHASE POWER

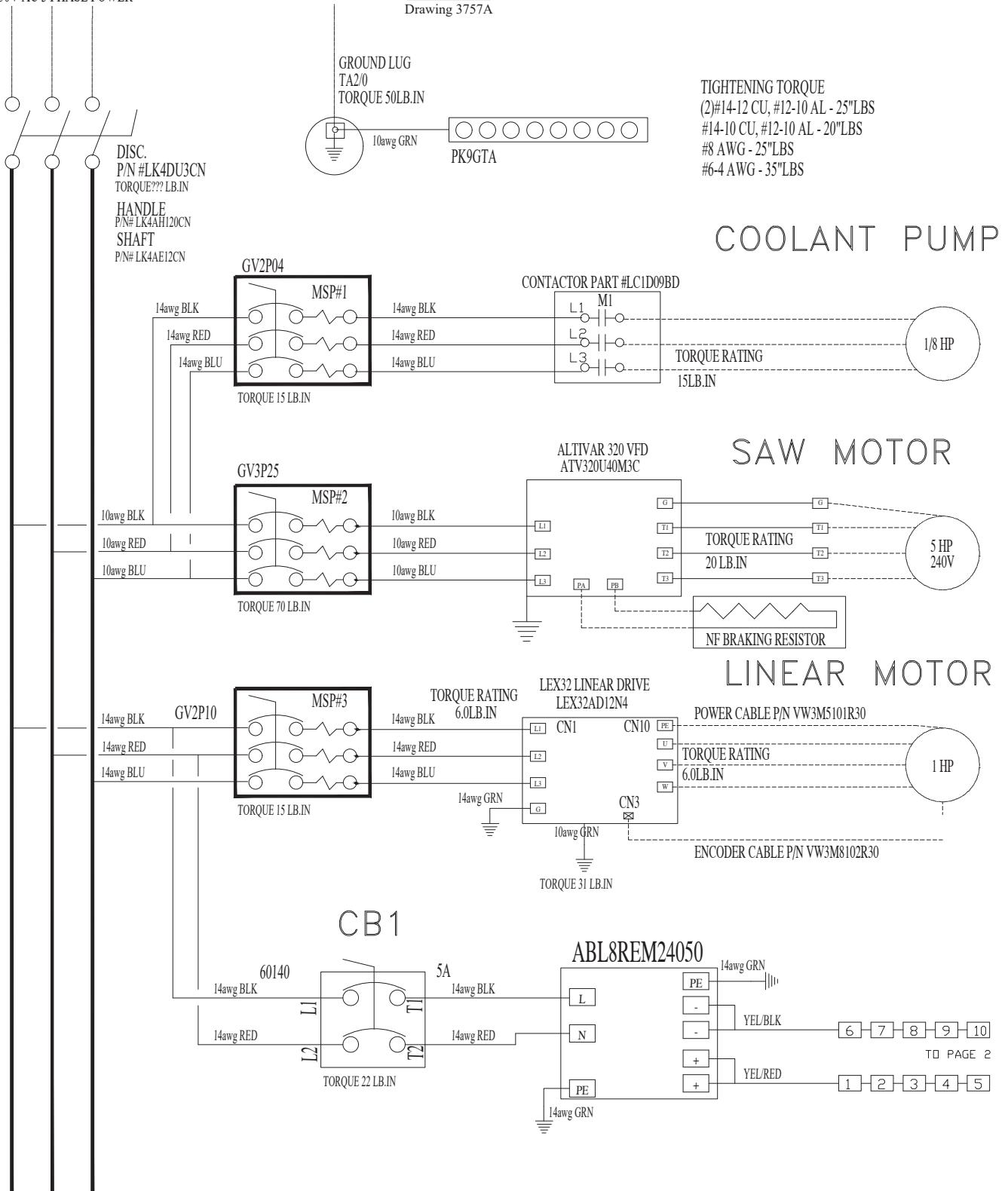


FIGURE 45

NSYTRV42 SERIES
TERMINAL SPECS.
600V 30A MAX.
22-10 AWG. WIRE
TORQUE 5.3 TO 7.08 LB.IN

TERMINAL
— CONNECTED ITEMS
- - - FIELD WIRING

#	TERMINAL
————	CONNECTED ITEMS
-----	FIELD WIRING

Page 88

SCOTCHMAN HFA 230V

CONTROL WIRING

PAGE 4

Drawing 3757A

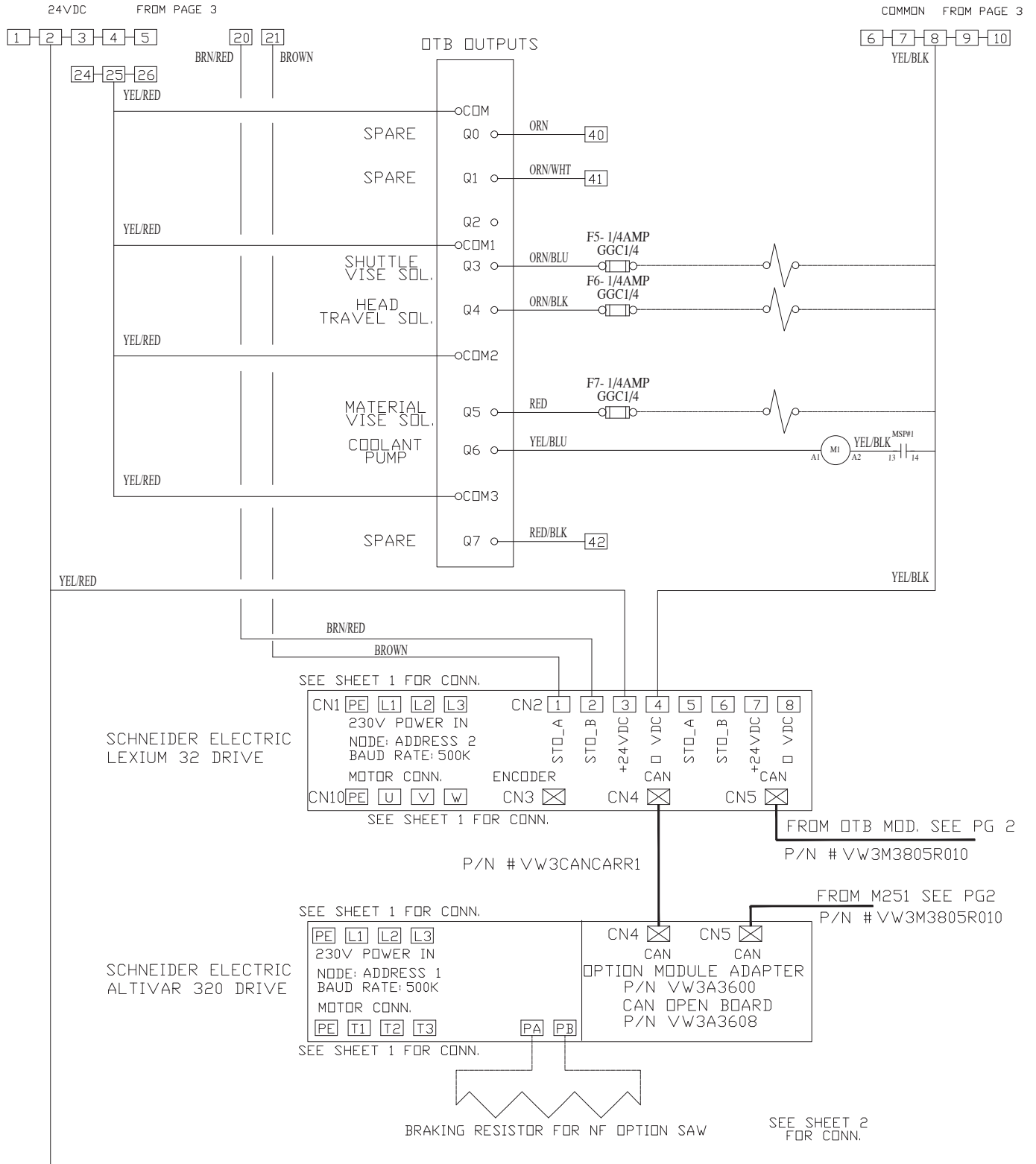


FIGURE 48

NSYTRV42 SERIES
TERMINAL SPECS.
600V 30A MAX.
22-10 AWG. WIRE
TORQUE: 5.3 TO 7.08 LB.IN

TERMINAL
— CONNECTED ITEMS
- - - - - FIELD WIRING

SCOTCHMAN HFA 480V

POWER DIAGRAM

PAGE 1

Drawing 3847A

PROVIDE UPSTREAM PROTECTION
PER NEC TABLE 430-52
480V AC 3 PHASE POWER

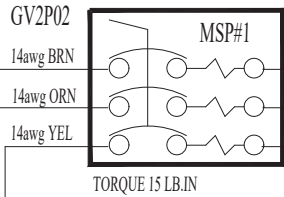
DISC.
P/N #LK4DU3CN
TORQUE 35.4 LB.IN
HANDLE
P/N# LK4AH120CN
SHAFT
P/N# LK4AE12CN (CUT 10 1/8")

GROUND LUG
TA2/0
TORQUE 50LB.IN

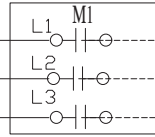
10awg GRN
PK9GTA

TIGHTENING TORQUE
(2)#14-12 CU, #12-10 AL - 25"LBS
#14-10 CU, #12-10 AL - 20"LBS
#8 AWG - 25"LBS
#6-4 AWG - 35"LBS

COOLANT PUMP

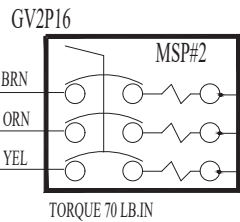


CONTACTOR PART #LC1D09BD

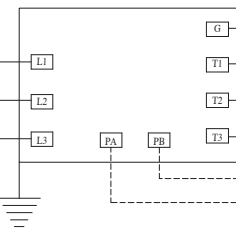


TORQUE RATING
15LB.IN

1/8 HP



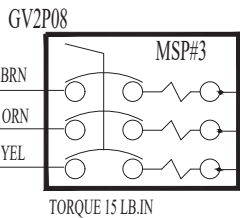
ALTIVAR 320 VFD
ATV320U40N4C



TORQUE RATING
20 LB.IN

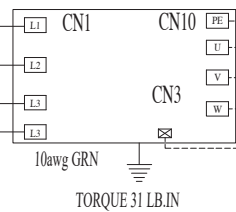
5 HP
480V

SAW MOTOR



TORQUE RATING
6.0LB.IN

LEX32 LINEAR DRIVE
LEX32AD12N4



POWER CABLE P/N VW3M5101R30

TORQUE RATING
6.0LB.IN

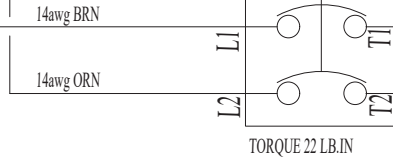
1 HP

ENCODER CABLE P/N VW3M8102R30

LINEAR MOTOR

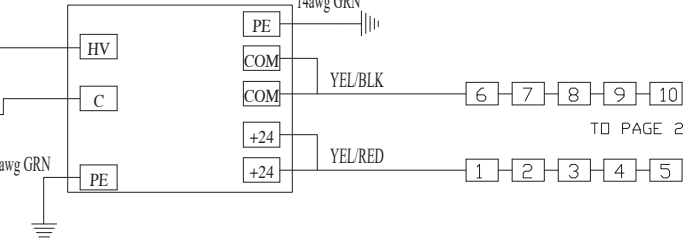
CB1

MGN61313



2A

ABL8RPS24050



TO PAGE 2

NSYTRV42 SERIES
TERMINAL SPECS.
600V 30A MAX.
22-10 AWG. WIRE
TORQUE 5.3 TO 7.08 LB.IN

TERMINAL
— CONNECTED ITEMS
--- FIELD WIRING

FIGURE 49

SCOTCHMAN HFA 480V

CONTROL WIRING

PAGE 2

Drawing 3847A

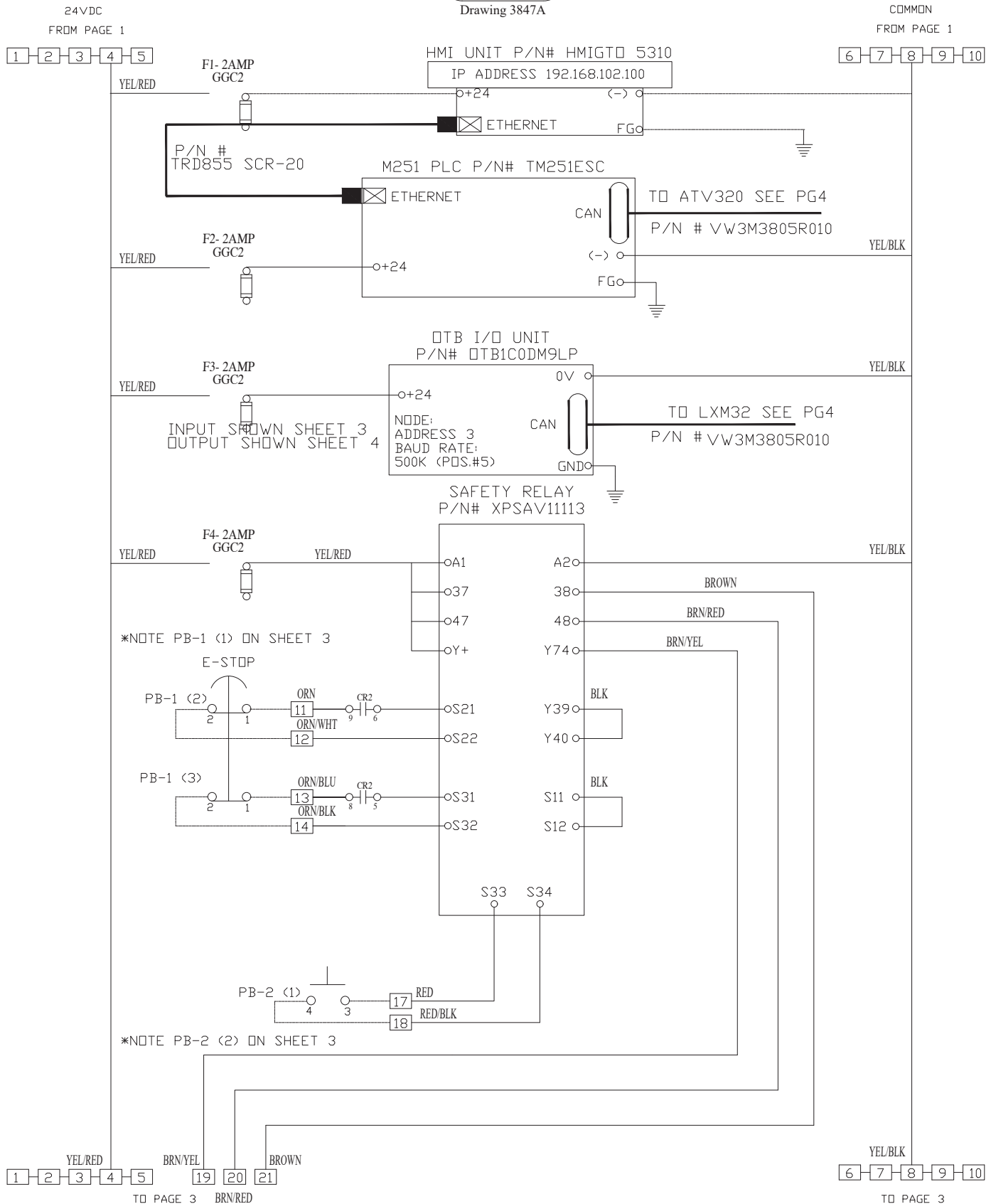


FIGURE 50

NSYTRV42 SERIES
TERMINAL SPECS.
600V 30A MAX.
22-10 AWG. WIRE
TORQUE 5.3 TO 7.08 LB.IN

#	TERMINAL
—	CONNECTED ITEMS
----	FIELD WIRING

Page 93