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SERIAL NO —

MODEL —

SAFETY ALERT



This safety alert symbol means CAUTION OR WARNING-PERSONAL SAFETY INSTRUCTION. Personal injury may result if safety precautions are not carefully read before attempting to operate or repair this machine. See Safety Precautions inside front cover.

- This machine is designed for **ONE PERSON OPERATION ONLY!**
- Always **DISCONNECT THE POWER** before working on this machine.
- **DO NOT OPERATE WITH ANY GUARDS REMOVED!** Replace all guards before operating.

Instruction Manual and Parts List



Model EH-3A Paper Drilling Machine

This manual replaces manual F.352-G and covers serial numbers 73123 & up.

ALWAYS GIVE THE SERIAL NUMBER OF YOUR MACHINE WHEN WRITING.

Sold and serviced by

THE CHALLENGE MACHINERY COMPANY

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Fax: 231/798-1275 • Phone: 231/799-8484 • www.challengemachinery.com

F. 352-H
revision 0596

SAFETY PRECAUTIONS

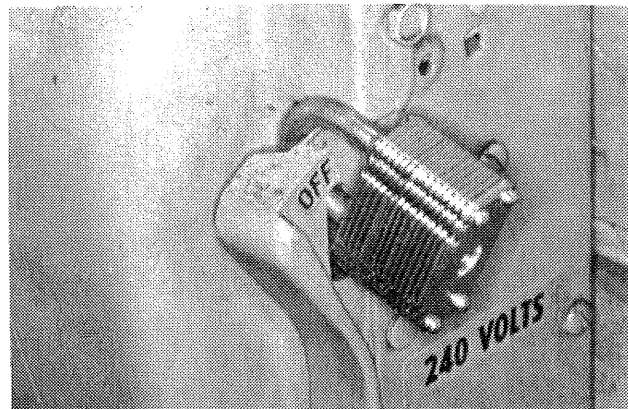


This safety symbol means **CAUTION – PERSONAL SAFETY INSTRUCTION**. Read the instructions because it has to do with safety. Failure to comply with the following instructions may result in personal injury.

- This machine is designed and safeguarded for **ONE PERSON** operation. **NEVER** operate the machine with more than one person.
- Safety of this machine is the responsibility of the user and operator. Use good judgement and common sense when working with and around this machine.
- **READ** and understand all instructions thoroughly before using the machine. If questions still remain, call your Authorized Challenge Dealer – Failure to understand operating instructions may result in personal injury.
- Only trained and authorized persons should operate the machine.
- **DO NOT ALTER SAFETY GUARDS OR DEVICES**, they are for your protection and should not be altered or removed. Severe lacerations or dismemberment could result.
- **DISCONNECT POWER** before cleaning, lubricating, servicing, or making adjustments not requiring power. Lock the disconnect switch in the **OFF** position, see Power Lockout Procedure below.
- **HIGH SPEED DRILL** – Keep rags, loose clothing and long hair away from rotating drills. Personal injury could result from items being caught on rotating drill mechanisms.
- Have your electrician make sure the machine is properly grounded, see Power Hookup, page 5.
- **OBSERVE ALL CAUTION LABELS** mounted on this machine. Do not remove, cover, alter, or paint over caution labels.
- **KEEP FOREIGN OBJECTS** off table and away from drill.
- **BE EXTREMELY CAREFUL** when handling and changing the drills. Severe lacerations or dismemberment could result from careless handling procedures, see instructions page 5.
- Keep the floor around machine free of trim, debris, oil and grease.
- When replacing hydraulic parts, **LOOSEN HYDRAULIC CONNECTIONS SLOWLY** to release pressure. Never loosen connections with the machine running, see instructions, page 8.
- If the machine sounds or operates unusually, turn it off and consult the Trouble Shooting Section of this manual, page 8. If the problem cannot be corrected have it checked by a qualified service person or your Authorized Challenge Dealer.
- **CRUSH HAZARD** – keep feet off the pedal, page 6, when handling paper under the clamp. **DO NOT REST FOOT ON PEDAL** at any time!
- **DO NOT REACH UNDER THE DRILL AND CLAMP AREA AT ANY TIME!**
- **DO NOT OPERATE WITH ANY GUARDS REMOVED!** Replace all guards after adjusting, lubricating, or servicing the machine.
- **SEVERE LACERATIONS** –Contact with high speed drills could cause severe personal injury. Always turn the machine off and wait for drills to stop before removing drill bits. Keep hands away from drill when lowering drill head.

CAUTION: POWER LOCK-OUT PROCEDURE

For maximum safety when making adjustments or repairs to your machine, be sure to lock out the main power control switch to which the machine is connected. The switch should be thrown to the **OFF** position and a padlock placed in the loop. The key should be held by the person servicing the machine.



(fig. 1)

INTRODUCTION

WELCOME to the family of Challenge® users. Challenge has been developing and manufacturing Graphics Arts Equipment for over 100 years and is today one of the world's leading producers and distributors of Paper Cutters, Paper Drills and Bindery Equipment.

THE CHALLENGE REPUTATION is important to you as a user for the continuous, ready availability of parts and service.

THIS MANUAL is designed to help you get the most from your Challenge equipment. Keep this manual in a safe, convenient place for quick reference by operators and service personnel.



SAFETY ALERT! This symbol means, **CAUTION OR WARNING: Personal safety instructions!** Pay special attention to the instructions in bold type. Personal injury may result if the precautions are not read and followed.

READ THIS MANUAL BEFORE OPERATING! Follow precautions and instructions given and you should have years of trouble-free operation. If after reading the manual questions still remain, contact your Authorized Challenge Dealer or the Challenge Service Department. For the dealer nearest you or for service questions, call 231-799-8484

FOR PARTS OR SERVICE contact the Authorized Challenge Dealer from whom you purchased your machine. Use the illustrations and parts lists at the back of this manual to identify the correct parts needed. **Always give the SERIAL NUMBER and MODEL** of your machine to insure that the correct parts are sent as soon as possible.

Take a few moments right now and **RECORD YOUR MACHINE SERIAL NUMBER** in the space provided on the front cover of this manual. Also be sure to fill out the warranty card accompanying this manual and return it **DIRECT TO CHALLENGE**.

If you bought a used machine, it is important to have the following information on record at Challenge. Copy this page, fill in the information and send it care of: The Challenge Service Department, 6125 Norton Center Dr, Norton Shores, MI 49441. Fax (231) 798-1275/Phone (231) 799-8484

CHALLENGE MODEL _____ SERIAL NUMBER _____
ATTN _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE _____ DATE INSTALLED _____
DEALER'S NAME AND CITY _____

WARRANTY INFORMATION

PLEASE SEE ENCLOSED WARRANTY!

A separate flyer accompanied this manual with warranty details. It is **VERY IMPORTANT** that you read and understand the conditions of the warranty.

The **Warranty Information Sheet** must be filled out correctly, completely, and **must be on file at The Challenge Machinery Company** for warranty claims to be honored for this machine.

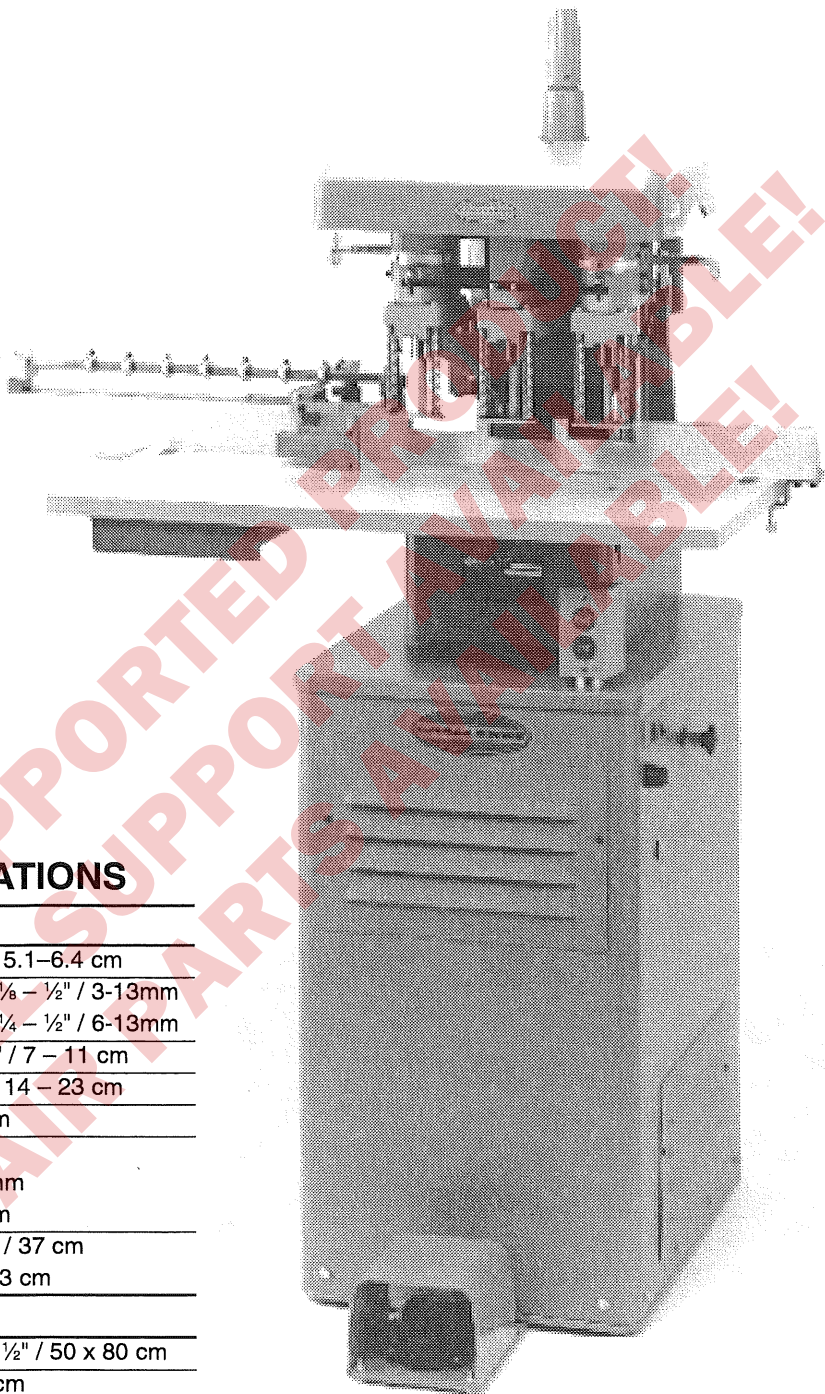
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PACKING LIST

<u>Part No.</u>	<u>Description</u>	<u>Qty.</u>
	Basic Machine	1
A-4615-8	Backgage Assembly	1
A-5874	Chip Bag	1
KK-281-2	Knockout, Cutting Block	1
KK-473-3	Drill Blocks, 3" (1 doz.)	1
CD-4-2½"	Drill Bit, ¼"	3
A-4950	Drill Sharpener (Hand)	1
4685	Drill Cleaner	1
4688	Lubrication Stick	1
4687	Drill Drift	1
W-141	⅛" Allen Wrench	1
W-130	⅜" Allen Wrench	1
W-137	⅝" Allen Wrench	1
5841	.018" Shim	3
5841-1	.035" Shim	3
A-4728-1	Ext. Side Guide Assembly	1



EH-3A DRILL SPECIFICATIONS

Drilling

Maximum Drill Capacity *	2 – 2½" / 5.1–6.4 cm
Drill Sizes Available **	2": 13 sizes ⅛ – ½" / 3-13mm 2½": 4 sizes ¼ – ½" / 6-13mm
Range Between Drills	2¾ – 4½" / 7 – 11 cm
Range Between Outside Drills	5½ – 9" / 14 – 23 cm
Vertical Head/Individual Head Adj.	¼" / 6 mm
Minimum Distance Between Holes	
- with adjustable stops	⅜" / 10 mm
- with fixed gages	¼" / 6 mm
Adj. Range- left drill to side guide	0 – 14½" / 37 cm
- drill to backgage	0 – 5" / 13 cm

Dimensions

Table Size	19½ x 31½" / 50 x 80 cm
Table Height	37" / 94 cm
Overall Machine Height	59¼" / 151 cm
Floor Space Needed	36 x 41½" / 91 x 105 cm
Net Weight (approximate)	525 lbs / 236 kgs
Shipping Weight (approximate)	570 lbs / 257 kgs

Electrical

60 Hz, Single Phase, AC. Pump: ½ H.P. Spindle: 1 H.P.
208/230 Volts/18 Amps. Service size 30 Amps.

* 2" / 51 mm drill bits can be used.

** ½" / 13 mm drill bits not recommended for three hole drilling.

The EH-3A must be wired to an individual line through a disconnect box with the proper voltage at the machine.

Challenge reserves the right to make changes to any product or specification without notice and without incurring responsibility to existing units.

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Fig. 2

INSTALLATION INSTRUCTIONS

Refer to the parts lists and drawings in the back of this manual for part identification and orientation, as necessary.

All guards and instruction plates are installed for your safety and information and must remain on the machine as shipped from the factory.

UNCRATING THE PAPER DRILL

This machine is shipped on a wooden skid and is enclosed with a protective corrugated cover. It is held onto the skid with plastic straps. Remove the straps and carefully cut the corrugated cover down the side and unwrap it from around the machine. The table, backage, and other accessories are packed in separate boxes and are secured to the machine. Remove these and carefully position the machine on the floor. Immediately after uncrating, check off parts received against the packing list. Also, examine for any physical signs of damage incurred during shipping. The machine is inspected before and after it is crated at our plant. The responsibility for filing a claim against the carrier for damages incurred during shipment rests with the receiver of goods (FOB our factory).

Clean all parts with a commercial cleaning solvent before installing or using the machine.

COVER MOUNTING INSTRUCTIONS

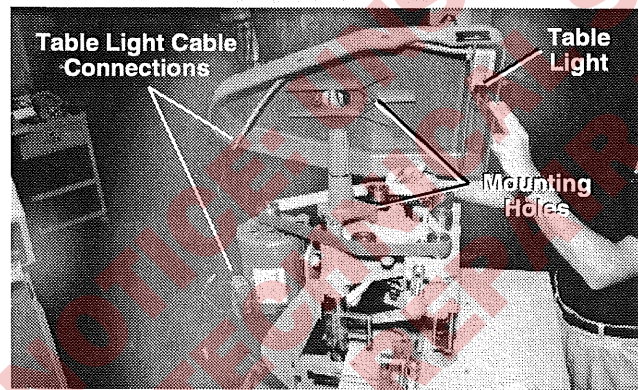


Fig. 3

Tools Required:

$\frac{5}{32}$ " Hex Wrench
Slotted Screwdriver

Hardware Supplied:

(2) $\frac{1}{4}$ -20 x $1\frac{1}{4}$ " Butt. Head Cap Screws
(2) $\frac{1}{4}$ " Internal Tooth Lockwasher

1. Remove cover from protective bag and locate hardware taped to inside of cover. Place cover on the machine with the light positioned to the front, and align mounting holes, fig. 3. Insert lockwashers on screws and install in mounting holes and tighten with a $5/32$ " Allen wrench.

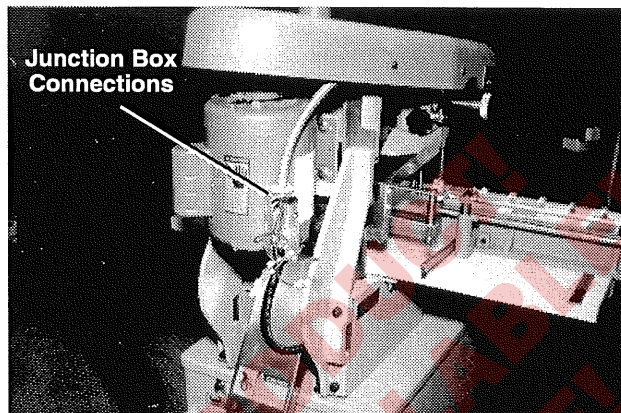


Fig. 4

2. Remove the junction box cover from box mounted on rear left side of motor, fig. 4. Loosen cable clamp from top of junction box and insert table light power cable. Remove wire nut connections from inside junction box. Twist together numbered wires from table light to like numbered wires in the junction box. Replace the wire nuts.
3. Push wires back into junction box and replace junction box cover. Tighten cable clamp on top of junction box.

INSTALLING THE TABLE/BACKAGE

Locate four (4) table mounting bolts shipped in the backage box [(2) $\frac{5}{16}$ -18 x 1" shoulder bolts; (2) $\frac{1}{4}$ -20 x $1\frac{3}{4}$ " carriage bolts]. The two carriage head bolts go into the rear table mounting holes and the two shoulder bolts go into the front mounting holes. Mount the table, but leave the hardware loose. Slide the backage on the table and align the backage face to "0" on both of the scales; fasten the backage to the table with the thumbscrews provided.

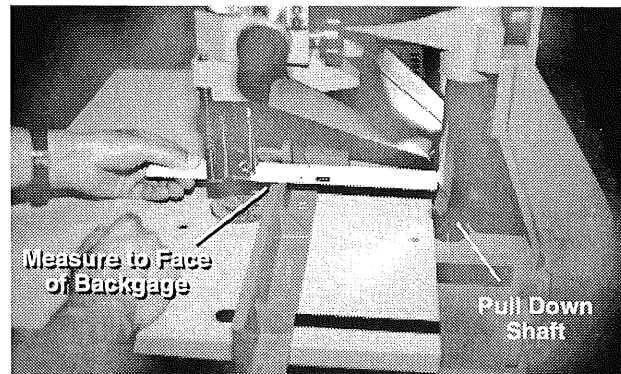


Fig. 5

Next, position the table so that the face of the backage measures exactly the same distance from the front of each pull down shaft. When this is accomplished tighten the table mounting hardware.

Mount the side guide latch arm assembly to the back of the backage with (1) $\frac{1}{4}$ -20 x $\frac{3}{4}$ " socket head

continued on page 5

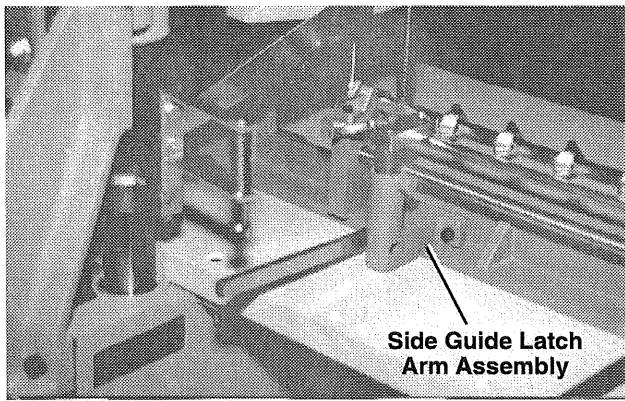


Fig. 6

cap screw. Insert the side guide face in the side guide roller assembly. (see page 21 for identification of parts).

SPINDLE SCALE

To prevent damage to the spindle scale during shipment and uncrating, the scale is removed and shipped inside the table drawer.

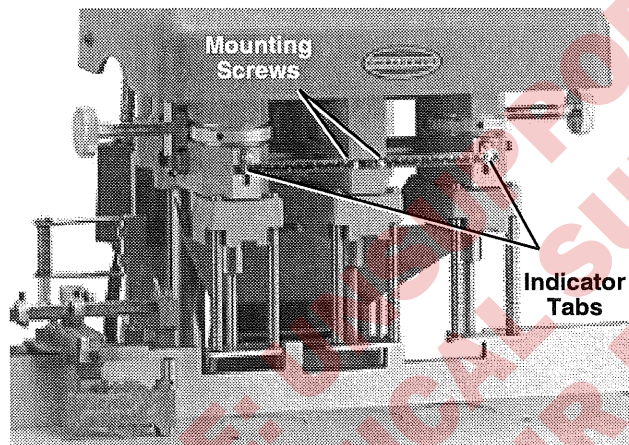


Fig. 7

Remove the two mounting screws in the face of the center spindle head. Position the scale behind the indicator tabs on the outside heads and secure with the two mounting screws, fig. 7.

INSTALLING THE CHIP BAG

The chip container bag is installed by simply slipping it over the two hooks provided on the rear of the machine.

FINAL ASSEMBLY

Place the cutting stick knockouts (ref #79, page #10) in position. Place the three drill blocks in the table.

Insert the tapered head of the hollow drills into the spindles. Be sure that the drift hole covers are in place before operation.



CAUTION: Always handle drills with care to avoid severe lacerations, even dull drills are sharp enough to cause lacerations.

HYDRAULIC FLUID CHECK

Check the level of the oil in the hydraulic reservoir. This check is made by first removing the louvered panel at the left side of the stand (two screws hold it in place) and locating the breather cap on the top of the reservoir. The breather cap has a dip stick attached for checking the oil. When screwed in (and then removed to check) there should be approximately an 1/8" of oil on the stick. Recommended oils are found in the Maintenance section of this manual. These oils are cross referenced.



CAUTION: Always disconnect the power when cleaning, servicing or lubricating your drill, see Lock Out Procedure, page 4.

HOOKING UP THE POWER LINE

The machine is factory wired to the customer's specification. It is the customer's responsibility to wire the motor for the current and voltage specified on the name plate. It is important that the line voltage specified by maintained. Failure to do so will result in improper operation of the machine (see trouble shooting section for specific problems). It may be necessary to provide a separate branch power line for the machine.

Since our standard machine is intended for a single phase hookup, simply fasten either wire of the power cord to either terminal of the starter and the ground wire to the designated terminal.

The standard machine is 208/230 volt and should be on a 30 amp circuit. The recommended wire size for this hookup is #10 gauge.

OPERATING INSTRUCTIONS

STARTING THE MACHINE

The power for this machine is supplied by two motors; one is for the hydraulic power pack; the other is for the spindle. They are both started and stopped simultaneously by a single start-stop station, located on top of the stand, under the table. The START and STOP positions are clearly indicated by both word and color. Be sure both motors are operating before trying to drill paper.

OPERATING THE DRILL

This machine incorporates three drilling heads operating on three belt driven spindles. The center head is stationary while the two outside heads have a lateral adjustment of one and three-quarter inches each.

This provides an adjustment range of from two and three-quarter inches to four and one-half inches between the center drill and either of the outside drills, or a range of from five and one-half inches to nine inches between the two outside drills.

The lateral adjustment is accomplished by loosening the clamp knob (a black, plastic hand knob) located at the rear of each outside head and turning the knurled knob located at the outside of each head. This moves the heads along a shaft, and a scale and pointer located at the front of the heads gives a reading in inches and millimeters of the center line relationship to the center head. When a setting is made, make certain that the clamp knob is tightened again.

Any combination of three heads can be used, that is, one, two, or three holes may be drilled if desired. It is recommended, however that no more than two half inch hollow drills be used at the same time.

A slight pressure on the foot switch brings the drill heads down through the stock. The pedal must be released and depressed again before drilling the next set of holes, assuring full control and allowing no repeat stroke. By releasing the pedal, the operator can stop the drill in its downward stroke allowing it to return to its normal up position, thus preventing costly errors.

The vertical movement of the spindles is activated the hydraulic unit. Depressing the foot switch sets the hydraulic unit into action. Keeping your foot on the foot switch allows the drills to drill through the entire lift of stock and reach the bottom of their stroke. At this point, release the foot switch to relieve the pressure from the cylinder and allow the heads to return to their up position. **NEVER REST YOUR FOOT ON THE TREADLE WITHOUT INTENDING TO BRING DOWN THE DRILLS.**

USING THE AUTO TRIP SIDE GUIDE

In addition to the versatility provided by the three heads of the EH-3A, this machine is equipped with the Challenge automatic trip side guide. This allows drilling of one, two, or three holes at a time, then the automatic trip on the side guide permits step and repeat type of operation with a minimum between holes of three-eighths of an inch with the standard stops or one quarter inch minimum by the use of a fixed gage, available as optional equipment.

As each set of holes are drilled, the side guide is automatically tripped, and as soon as the drills clear the stock on their upstroke, the guide is free to move to its next stop. This is accomplished by pushing the stock to the left and moving the guide at the same time. When drilling one, two, or three holes only, that fall within the nine inch limitations of the machine, the automatic trip bracket (located at the left of the machine) can be turned so that it does not engage the trip lever.

SETTING THE SIDE GUIDE STOPS

First set the rear gage to the desired back margin. Be sure both sides are set to the same dimension and tighten the two thumbscrews. Next, remove the guide shaft and set the guide stops to the desired distance between holes (a scale in the guide shaft is provided for this purpose). The guide shaft is then replaced in the rear gage and final adjusting or centering of holes is accomplished with the knurled screws at the extreme left end of the guide shaft.

The automatic trip gage comes equipped with seven stops. Additional stops can be purchased at a very nominal price. Challenge fixed index gages are recommended where the same job is to be handled over and over again. They are easily and quickly attached and removed. See page 24 for details and descriptions. NOTE: When drilling narrow strips, the side guide roller assembly should be mounted on the inside of the side guide assembly.

SETTING UP THE BACKGAGE

The backgage is set up by lining the front edge to the same position on the two scales mounted in the table top. When the gage is set to "0" on both ends, you will be drilling half holes on the edge of the paper. The scales read in inches and millimeters and will give you the dimension from the back of the sheet to the center line of the holes.

The non-glare composition table features a drawer for storing tools and accessories.

ROUTINE ADJUSTMENTS

Adjusting the Vertical Stroke

Always raise the spindle to its highest point when changing drills. Adjust the spindle so that the drills will just cut through the bottom sheet of a lift before returning on its upstroke.

The two outside heads are provided with independent height adjustment while the center head works from the central overall adjusting screw located at the top center of the machine. This is necessary because of the variance in length of the hollow drills. The center head must be adjusted first. It is recommended that a single sheet of paper (of the type that is to be drilled) is set under the heads with the drills in the spindles. The center spindle should then be adjusted so that the drill just cuts through the paper. Too deep a drill will cause a ragged hole in the bottom sheets of a lift. After the center drill is adjusted, each outside spindle is adjusted by turning the knurled ring on the head with the use of the drift in the holes provided. Turn counter-clockwise to lower and clockwise to raise. There is no locking necessary. For drilling a full lift of stock, a slight adjustment of the central overall adjusting screw may be necessary.

Adjusting the Stroke Speed

The hydraulic unit is equipped with an adjustable valve for regulating the speed of the drill stroke (up and down travel). Soft stocks such as mimeographs, etc., are apt to wrinkle at high speeds, and the speed should, therefore, be regulated to a point where the best results are obtained. This is found mostly by "trial and error."

This adjustment is made by turning the adjustable valve (located on the right side of the drilling machine stand) counter-clockwise to reduce speed and clockwise to increase speed.

Removing the Cutting Blocks

Each cutting block is removed by inserting your fingers in the hole provided in the frame (under the table) and pushing up on the cutting stick knock out. There are three holes; one on each side of the frame and one in the front.

Removing Drills From the Chuck

Insert the drill drift, flat side down, into the hole in the chuck, and lift upward. The upward movement forces the drill down and releases it from the chuck. The spring clip on the end of the chuck is provided to cover the drift hole and prevent chips from flying out when drilling small diameter holes.

ROUTINE MAINTENANCE



Caution: Always disconnect the power when cleaning, servicing or lubricating your drill, see Lock Out Procedures, page 4.

General

Production losses can be reduced if good practices of maintenance are followed. The following suggestions may be helpful in initiating good practices.

1. Recognize the fact that the user of hydraulic equipment has more control over maintenance than the manufacturer.
2. Operators should be familiar with use, care, and limitations of the equipment.
3. Use only properly trained maintenance personnel.
4. Have a program of systematic preventive care for your equipment.
5. Analyze and isolate trouble before having any part of the equipment dismantled.
6. Be aware of how your machine should sound and perform. If the machine is not operating properly or if it doesn't "sound right", stop running your job immediately and try to identify the problem.
7. Call the dealer for any problems that cannot be handled by your own personnel.

Daily

1. Sharpen the hollow drills often and reset the spindle adjusting knobs if needed.
2. Lubricate the hollow drills frequently with the Drill-ease provided.
3. For better hollow drill life, remove drill when not in use and soak in light oil or kerosene. Wipe drills clean before using.

Weekly

1. Clean the guide bar shafts around frame and oil with No. 30 oil.
2. Clean and oil the rear support brackets.
3. Clean the side guide shaft and oil with light oil.

Monthly

1. Check the drive belt for tightness. The drive belt must be kept tight or it will stall the motor and plug or break hollow drills. To tighten belt, loosen two set screws, Ref. No. 62, Pg. 10 then turn knob, Ref. No. 15, Pg. 10, clockwise until belt feels tight. Retighten set screws.
2. Check the level of the oil in the hydraulic reservoir. This check is made by first removing the louvered

continued on page 8

panel at the left side of the stand (two screws hold it in place) and locating the breather cap on the top of the reservoir. The breather cap has a dip stick attached for checking the oil. When screwed in (and then removed to check) there should be approximately 1/8" of oil on the stick.

YEARLY

1. Change hydraulic oil in reservoir. Oil may have to be changed more often if contamination of any kind gets in the oil. (Capacity approximately 1½ qts.)
2. Grease lift springs


HYDRAULIC

Through normal use, hydraulic systems gum up and seals wear. Signs of wear are hydraulic leaks and erratic operation of the vertical speed.

RECOMMENDED OILS

Use only one of the recommended oils or an ISO VG 100 Hydraulic Fluid equivalent. (Tank capacity approximately 1½ qts.) **Oils other than the recommended type will cause seals, cups and O-rings to deteriorate. See CAUTION.**

Oil Name	Distributor
Rykon No. 100	AMOCO
Duro AW Oil 465	Arco
AW Machine Oil 100	Chevron
Pacemaker XD No. 100	Citgo
Super Hydraulic 100	Conoco
Nuto H-100	Exxon
Harmony 100 AW	Gulf
HO 2A Hydraulic Oil	Lubriplate
DTE No. 18	Mobil
Pennzoil AW 100	Pennzoil
Magnus A Oil 215	Phillips
Tellus 100	Shell
Energol HLP 100	Sohio
Industron 100	Std. Oil Indiana/Boron
Sunvis 851 WR	Sun Oil Co.
Rando HD 100	Texaco
Unax AW 100	Union Oil Co.




CAUTION: NEVER USE Automatic transmission oil or brake fluid as a substitute! Oils other than the recommended type will cause seals, cups and O-rings to deteriorate. Unsafe operating conditions will result.


TROUBLE SHOOTING

(Refer to parts lists, pages 10 thru 16 for part location, number, and description.)

Problem	Area to Check	Solution
1. Lack of power.	Relief valve in pump may be bad or have dirt in it. Check oil level - may be low Check voltage at machine - may be low.	Clean or replace relief valve or pump. Add oil. Remove other machinery on line or provide a separate branch circuit.
2. Drill head won't return.	Check lift springs - may be broken or stuck. (replace springs if necessary) Pull down shafts froze in frame.	Pry up head, clean & oil shafts. "Ditto"
3. Drill head will not come down.	Check for broken lift spring - may be jammed. Speed control valve out of adjustment or defective.	Replace spring. Try to readjust, may have to replace.
4. Spindle motor stalls.	Dull drills Check for low voltage. Check drive belt tightness Check for paper plugging drills	Sharpen drills. (See above) (See main. section for adjustment) Clean out hollow drills - We recommend cleaning and soaking drills in oil overnight.



CAUTION: Loosen connections slowly to bleed off any trapped pressure!



CAUTION: Several of the above tests require the machine to be operational for checking and adjusting. Be very careful that tools and other people are clear of moving parts and that the drill is not accidentally operated while adjustments are being made. Disconnect the power and lock it out, see Safety Precautions page 4, whenever working on the machine unless the directions specifically require the machine to be powered.

DRILLING TIPS

Important! To prevent the drill from overheating, always avoid drilling too slowly. The spindle should be brought down as rapidly as the drill will easily cut through the paper. Also, return the spindle to the up position as rapidly as possible to avoid spinning the drill in the stock on the upstroke.

Slotted Holes - Instead of punching slotted holes for five and seven hole universal binding work, save time and cost by drilling a 1/2 inch diameter hole in place of the slot. The slot is only intended to allow the post or ring to be used in either location, and the large hole permits this.

Plastic Bindings - Drilling holes for plastic bindings, instead of punching them, is practical and saves a great deal of time, particularly on long run jobs.

Keep Drills Clean - A dirty and rusty drill will not permit the free upward passage of the drill chips. Pressure built up by a clogged drill will split or break the drill. To keep it free from dirt or rust, clean the drill of all chips after each use and apply a light oil to the inside and outside. Drills should be cleaned out immediately after each use. This is particularly true if a coated or varnished stock has been drilled. On these jobs the coating on the chips frequently fuse the chips into one solid mass when the drill cools, causing breakage the next time the drill is used.

Lubricate Drills - Lubrication assists in the passage of the chips and helps avoid overheating of the drills. Use "Drill-eze" stick lubricants for this purpose. Care must always be taken when handling drills. Hold the end of the stick against the side of the drill and rotate drill slowly by hand. Be sure to touch the cutting edge with the lubricant also. Wipe off any excess lubricant before drilling.

Keep Spindle Clean - Clean out the drill spindle frequently. This will prevent any buildup in the spindle of the drill.

Set the Drills Correctly - Do not cut too deeply into the cutting block. The drill should just touch the block and cleanly cut through the bottom sheet. During drilling, do not set the drill deeper into the block but change the position of the block frequently. Drilling deeper into the block dulls the drills quickly. Use a piece of chipboard underneath your stock. This will make handling the stock easier and will ensure that the last sheet is cut cleanly through.

Check for Drill Wobble - If spindles are badly worn or bent through misadjustment, have them replaced immediately. A wobbly or loosely held drill will break.

Check Your Drill Sharpener - The cutting edge of the sharpening bit should be inspected frequently to make certain that it is sharp and free of nicks. Never let a drill drop onto the sharpening bit. It will chip the sharpening edge. Use gentle pressure when sharpening - let the sharpening bit do the work. Check the sharpness of the drill after sharpening. The cutting edge should be razor sharp.

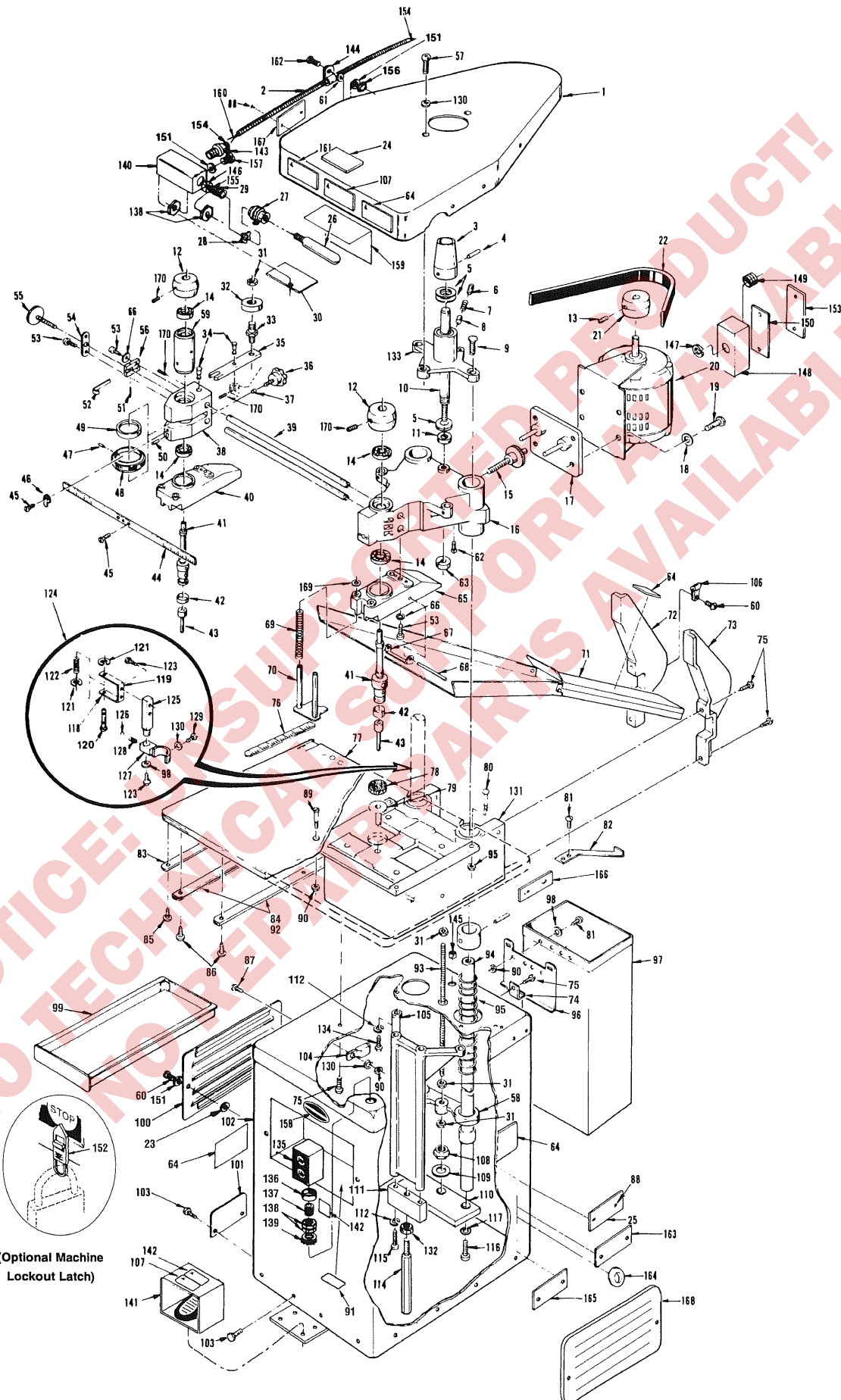
Check Belts on the Drilling Machine - Belts should be kept tight to assure proper speed of the drill. When the drill slows down it acts more like a punch which results in poor quality work and drill breakage.

Just a little time and effort taken with each use of your paper drilling machine should result in trouble free operation over many years.

Fixed Gages - Having fixed gages for all frequently repeated standard jobs, or even special ones, is a good way to save set-up time and assure that all runs will have identical hole spacing.

MAIN ASSEMBLY

A-5846-8

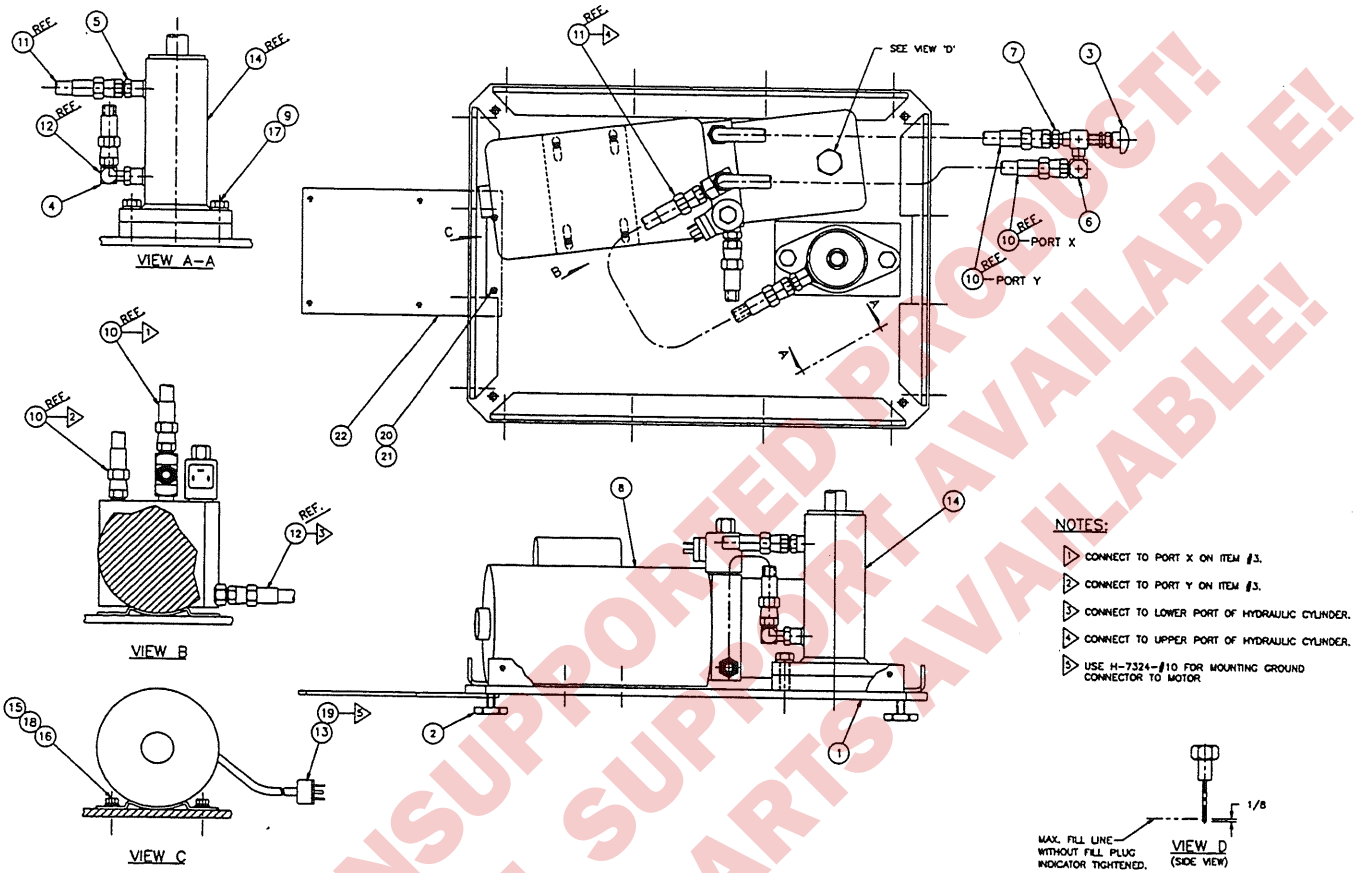


MAIN ASSEMBLY A-5846-8

Ref. Part No. No.	Part Name	Qty.	Ref. Part No. No.	Part Name	Qty.
1. A-5868-3	Belt Guard Cover Assembly	1	88. H-6924-004	#0 x 1/4" Round Head Drive Screw	8
K-257-10	Cover Only, Belt Guard	1	89. H-5254-508	Screw, 5/16 x 1" Shoulder	2
2. E-649	Conduit, 3/8" Flex 26" long	1	90. H-6423-4	Nut, 1/4-20 Hex	16
3. K-784-2	Screw, Head Spindle Adj.	1	91. E-1437-4	Label, Electrical	1
4. H-21S-250-1750	Pin, 1/4 dia. x 1-3/4" Roll	1	92. 16501	Filler, Drawer Guide	2
5. H-7322-12	Washer, 3/4" Polished	3	93. K-251-3	Rod, Lift Spring Adjusting	1
6. H-6951-808	Set Screw, Nylok 1/2-13 x 1/2" Flat Point Soc.	1	94. KK-440-16	Guide Bar, Assembled	2
7. S-1255-1	Spring	1	K-252-17	Guide Bar ONLY	2
8. 6609	Plunger, Teflon	1	H-6633-620	Pin ONLY, #6 x 2-1/2" Taper	2 ref
9. H-6913-814	Screw, 1/2-13x1-3/4" Hex Head Cap	2	K-344-1	Collar ONLY, Guide Bar	2 ref
10. K-780-1	Stud, Spindle Lift	1	95. K-250-8	Spring, Lift	2
11. S-1818-2	Collar	1	96. A-5874	Chip Bag Assembly	1
12. 4693-1	Pulley, Spindle, 5/8" Bore	3	5876	Bracket, Chip Bag Back	1
13. H-6938-408	Screw, 1/4-20 x 1/2" Socket Set	8	97. A-5877	Chip Bag ONLY	1
14. S-706	Bearing	6	98. H-7321-4	Washer, 1/4" Polished	5
15. AA-6098	Screw, Belt Tightener	1	99. KK-260	Drawer, Index Rod	1
16. K-2-22	Bracket, Spindle	1	100. K-480-2	Grille, Stand	1
17. KK-265-3	Bracket, Motor Assembled	1	101. 4979	Plate, Cover	1
18. H-7322-5	Washer, 5/16" Polished	4	102. KK-289-29	Wrapper (stand)	1
19. H-6913-504	Screw, 5/16-18 x 1/2" Hex Head Cap	4	103. H-6894-405	Screw, 1/4-20 x 5/8" Whiz-Lock	16
20. E-1600-69	Motor, 1 H.P.	1	104. S-1506	Clip, 11/16" Double Insulated	1
21. S-694-4	Pulley, 5/8" Bore Spindle	1	105. K-5-2	Bracket, Frame to Brace	1
22. S-1661-1	Belt, Flat	1	106. E-986-5	Clip, Wire	1
23. S-1864-2	Retaining Device, Captive	6	107. S-1781-3M	Plate, Caution	2
24. S-1842	Plate, Instruction	1	108. H-5239-12	Nut, Hex Lock, 3/4-10 Thin Height	1
25. S-1236-6	Plate, Serial Number	1	109. H-7321-12	Washer, 3/4"	1
26. E-933-4	Lamp, 40 watt Clear	1	110. K-836-3	Bracket, Guide Rod	1
27. E-964-2	Socket	1	111. K-857	Block, Jack Screw	1
28. E-439	Nut, 1/8" Brass Nipple	1	112. H-7327-12	Lockwasher, 3/8" Medium	4
29. E-436	Nipple, 1/8" Short Brass	1	113.		
30. E-1369-5	Cover	1	114. K-856	Jack Screw, Top Support	1
31. H-6424-8	Nut, 1/2-13 Hex Jam	5	115. H-6918-618	Screw, 3/8-16 x 2-3/4" Soc.Hd.Cap	2
32. A-5887-1	Pulley Assembly, Idler	2	116. H-6918-808	Screw, 1/2-13 x 1" Soc.Hd.Cap	2
33. 5889	Stud, Idler Pulley	2	117. H-7327-16	Lockwasher, 1/2"	2
34. 5860	Pin, Idler Arm Retaining	4	118. KK-689-3	Side Guide Trip Assembly	1
35. 5861-1	Arm Idler Pulley	2	119. K-700-2	Holder, Side Guide Trip Plunger	1
36. S-1602	Knob, Spindle Lock	2	120. K-697	Plunger, Side Guide Trip	1
37. 5857	Plug, Clamp Screw	2	121. S-1193-37	3/8" Retaining Ring	2
38. 5863-1-5	Spindle Block, LH (shown)	1	122. K-701-2	Spring, Side Guide Trip Plunger	1
5848-1-5	Spindle Block, RH (not Shown)	1	123. S-671	Capscrew, 1/4 x 3/8" Plated	3
39. 5856	Shaft, Spindle Block Guide	2	124. KK-735-2	Side Guide Assembly, Complete	1 ref
40. 5873-2	Chip Chute, LH (shown)	1	125. K-702-4	Spacer, Side Guide Latch Lift	1
5872-2	Chip Chute, RH (not shown)	1	126. S-766	Ball, 1/4" Steel	1
41. K-16-4	Spindle	3	127. KK-458-2	Arm, Guide Rod	1
42. K-85	Cover, Drift Hole	3	128. K-694-1	Spring, Side Guide Latch	1
43. CD-4-21/2	Drill, 1/4" Hollow	3	129. H-6913-406	Screw, 1/4-20 x 3/4" Hex Hd. Cap	10
44. 5859	Scale, Spindle Locating	1	130. H-7324-8	Lockwasher, 1/4" Shakeproof	1
45. H-6925-63206	Screw, #6-32 x 3/8" Truss Head Machine	4	131. K-1-32	Frame	1
46. 5858	Indicator, Center	2	132. H-6424-8	Nut, 5/8-11 Hex	1
47. H-5246-204	Pin, 1/8" dia. x 1/2" Dowel	2	133. K-246-8	Bracket, Spindle Adjusting Screw	1
48. 5855-1	Nut, Adjustment	2	134. H-6913-614	Screw, 3/8-16 x 1-3/4" Hex Hd.Cap	2
49. 5854	Collar, Bearing Housing	2	135. E-671-2	Start/Stop Station	1
50. H-5246-408	Pin, 1/4" dia. x 1" Dowel	2	136. S-1850	Spacer	1
51. H-21S-125-1000	Pin, 1/8" dia. x 1" Roll	2	137. S-1139	Nipple, 1/2 x 1-1/2"	1
52. 4692	Spring, Spindle Lock	2	138. E-519	Nut, Lock	4
53. H-6918-406	Screw, 1/4-20 x 3/4" Socket Head Cap	10	139. E-1459	Bushing, 1/2"	2
54. 5851	Plate, Adjusting Screw	2	140. E-2249-1	Junction Box	1
55. A-5849	Adjusting Screw Assembly	2	141. E-1719	Guard, Treadle	1
56. 5852	Block Adjusting Screw	2	E-875-2	Foot Switch ONLY	ref.
57. H-6910-410	Screw, 1/4-20 x 1-1/4" Button Head Cap	2	EE-2353	Footswitch Conduit Assembly ONLY	ref.
58. K-249	Bracket, Lift Spring	1	E-1172-8	Bushing, Snap-in Conduit	1
59. 5853	Sleeve, Bearing Housing	2	142. E-1781-11	Label, Caution	2
60. H-6910-102403	Screw, #10-24 x 3/8" Button Hd.Socket Cap	8	143. K-87-1	Connector, 3/8" Conduit	1
61. H-7322-#10	Washer, 3/16" Polished	8	144. E-968-6	Clip, Wire	2
62. H-6951-612	Set Screw, Nylok 3/8-16x3/4" Flat Pt.Socket	2	145. E-1172-4	Bushing, Plastic Snap-in	2
63. H-6433-8	Nut, 1/2-13 Hex Jam, LH Thread	2	146. H-264-1	Bushing, Reducer	1
64. S-1781-16	Label, Caution	4	147. H-7324-28	Lockwasher, 7/8" Shakeproof	1
65. K-57-19	Chip Chute, Center	1	148. E-1370-5	Junction Box	1
66. H-7327-8	Lockwasher, 1/4" Medium	16	149. E-1458	Nipple, 1/2" Bushed Conduit	1
67. A-5879-1	Floating Chip Pan Assembly	1	150. E-1369-5	Cover, Junction Box	1
68. H-21S-187-0375	Pin, 3/16" x 1/2" Roll	2	151. H-7324-#10	Lockwasher, #10 Shakeproof	9
69. 4629-1	Pressure Foot Spring	2	152. A-8668	Latch, Mach. Lockout, Push Button Box (Opt.)	1
70. A-4625	Pressure Foot Assembly (complete)	1	153. S-1781-12	Decal, Caution	1
A-4626-7	Pressure Foot Assembly	1	154. S-1122-1	Sleeve, 3/8" Insuliner	2
71. A-5878-1	Chip Chute Assembly	1	155. S-1122-3	Sleeve, 1/4" Insuliner	1
72. K-479-4	Brace, LH Guide Bar	1	156. H-6423-#10	Nut, #10-24 Hex	2
73. K-478-3	Brace, RH Guide Bar	1	157. H-6925-102406	Screw, #10-24 x 3/8" Truss Head Machine	1
74. 5870	Hook, Chip Bag	2	158. 4956-1	Decal, Challenge Oval	1
75. H-6918-608	Screw, 3/8-16 x 1" Socket Head Cap	10	159. S-2015	Tape, Alum. Foil 8.5" long	2
76. 4636-2	Scale	2	160. E-709-R	Wire, #18 ga. 37" long	2
S-1792	Nails	4	161. S-1781-31	Label, Caution	1
77. K-46-30	Table Assembly	1	162. H-6910-102406	Screw, #10-24 x 3/8" Button Head Socket	2
78. K-54-4	Drill Block	3	163. E-2134	Plate, Electrical Spec.	1
79. KK-281-2	Cutting Block Knockout	3	164. S-1684	Decal, Speed Control	1
80. H-5241-416	Bolt, 1/4-20 x 1-3/4" Carriage	2	165. E-1503-M	Plate, Fuse	1
81. H-6923-404	Screw, 1/4-20 x 1/2" Round Head Machine	6	166. S-1880	Plate, Oil	2
82. 5886	Hinge, Chip Bag	1	167. E-1501-M	Plate, Lamp	1
83. K-93-2	Table Side Strip	2	168. K-480-1	Grill, Stand	2
84. 16500	Cover, Drawer Guide	4	169. S-1518-37	Retaining Ring, 3/8"	2
85. H-6961-605	Screw, #6 x 5/8" Flat Head Wood	8	170. H-6951-406	Screw, 1/4-20 x 3/8" Nylok Set	3
86. H-6962-1006	Screw, #10 x 3/4" Round Head Wood	7			
87. H-6923-410	Screw, 1/4-20 x 5/8" Round Head Machine	1			

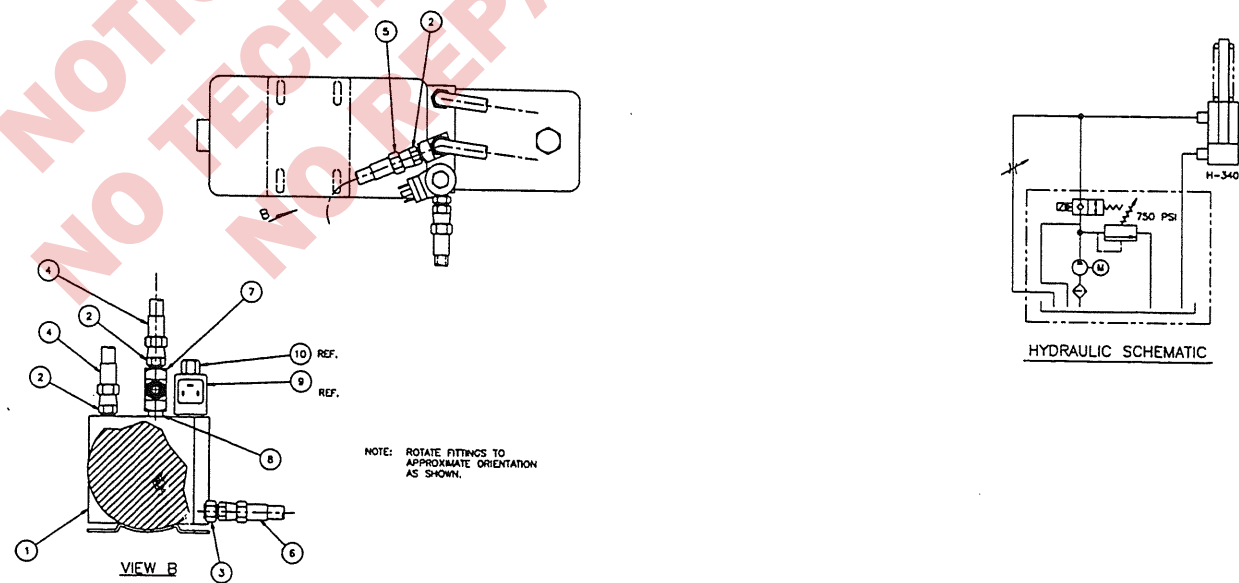
HYDRAULIC POWER UNIT ASSEMBLY

16541 (S/N 73123-75198)



HYDRAULIC POWER UNIT ASSEMBLY

H-356 (50/60 HZ) (S/N 73123-75198)



HYDRAULIC POWER UNIT ASSEMBLY 16541 (S/N 73123-75198)

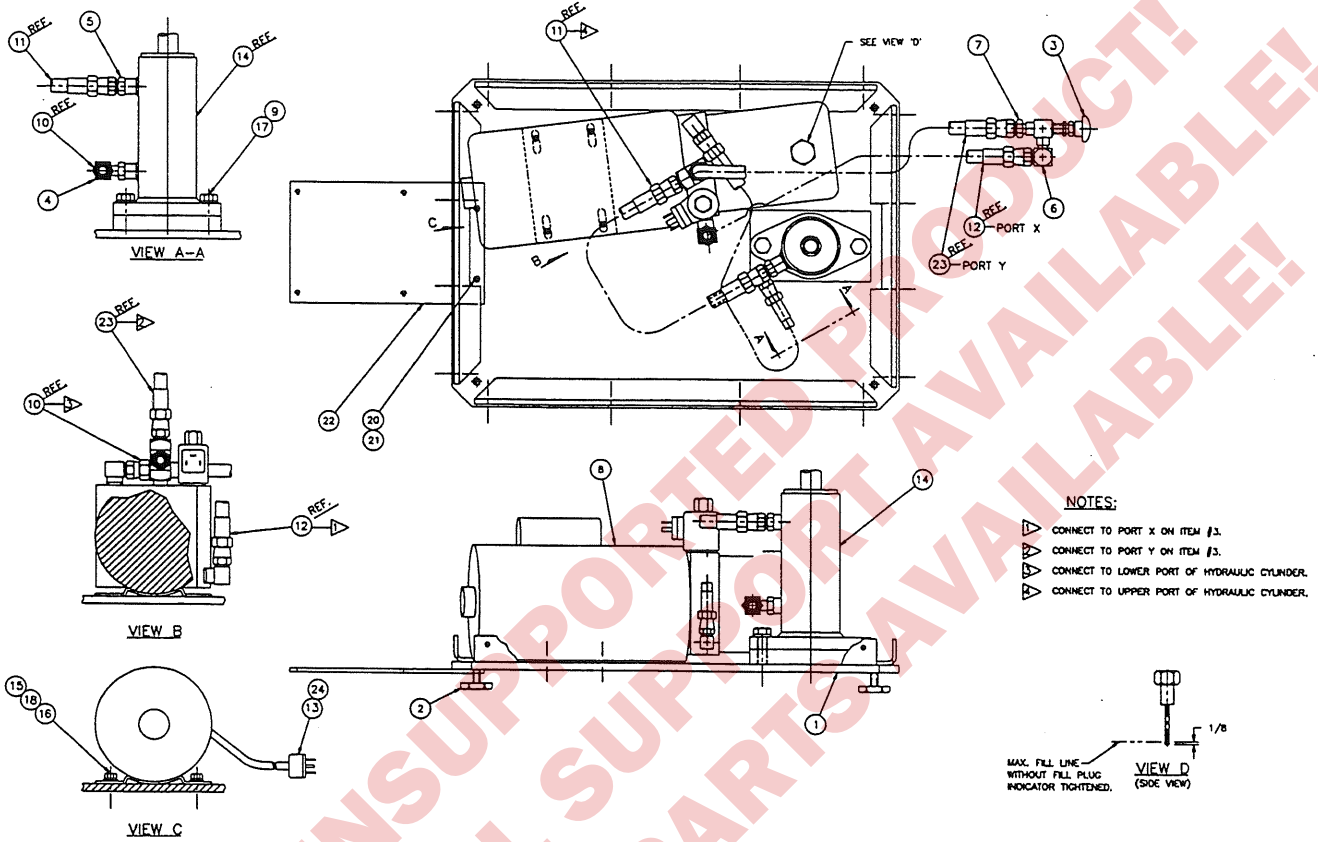
Ref. No.	Part No.	Part Name	Qty.
1.	16540	Weldment, Power Pack Base	1
2.	16543	Foot, Base	4
3.	4771-1	Valve, Needle	1
4.	H-230-5	Elbow, 7/16" O Ring to 7/16" Tube	1
5.	H-236-5	Elbow, 7/16" O Ring to 9/16" Tube	1
6.	H-237-5	Elbow, Pipe to Tube	1
7.	H-241-5	Adapter, 1/8" NPT to 9/16" Tube	1
8.	H-356	Hyd.Pwr.Unit 115/208/230v 50/60c 1PH ...	1
9.	H-7327-16	Lockwasher, 1/2" Medium	2
10.	H-242-41	Hose Assembly, 25" long	ref.
11.	H-242-2	Hose Assembly, 15" long	ref.
12.	H-242-32	Hose Assembly, 18" long	ref.
13.	EE-1364-2	Connector Assembly	1
14.	H-340	Hydraulic Cylinder Assembly	1
15.	H-7327-10	Washer, 5/16" Medium Lock	4
16.	H-6913-505	Screw, 5/16-18 x 5/8" Hex Hd Cap	4
17.	H-6913-810	Screw, 1/2-13 x 1-1/4" Hex. Hd. Cap (s/n 73123-73411)	2
	H-6913-812	Screw, 1/2-13 x 1-1/2" Hex Hd Cap (s/n 73412 & up)	2
18.	H-7321-5	Washer, 5/16" Plain	4
19.	H-7324-#10	Washer, #10 Internal Toothlock	1
20.	H-7327-8	Washer, 1/4" Medium Lock	2
21.	H-6913-406	Screw, 1/4-20 x 3/4" Hex Hd Cap	2
22.	16542	Bracket, Foot Switch	1

HYDRAULIC POWER UNIT ASSEMBLY H-356 (50/60 HZ) (S/N 73123-75198)

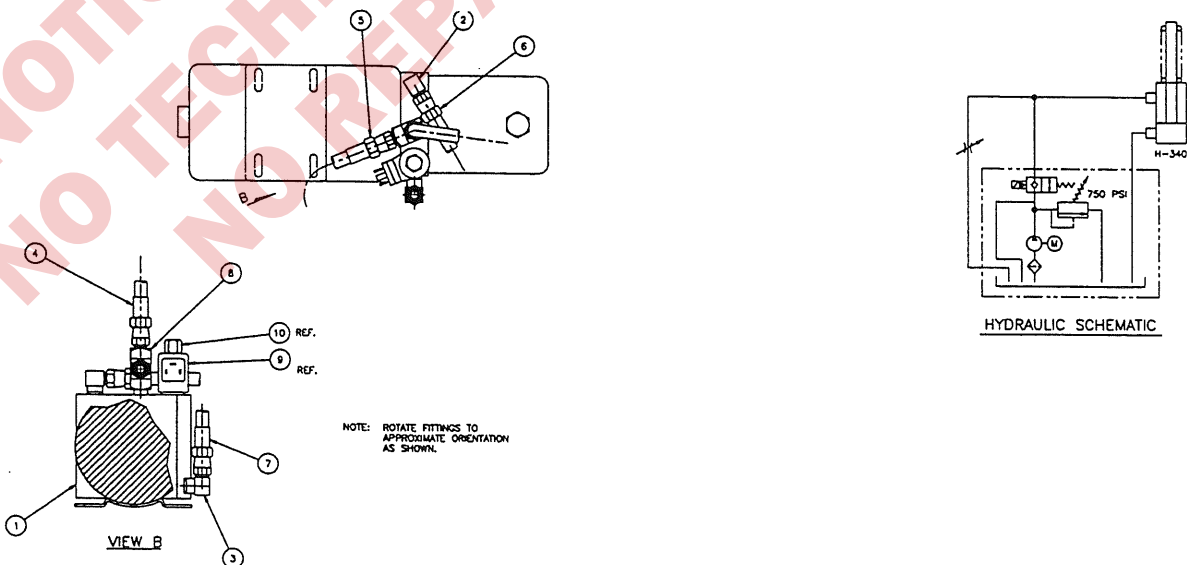
Ref. No.	Part No.	Part Name	Qty.
1.	H-372	Hyd.Pwr.Unit 115/208/230v 50/60c 1PH ...	1
2.	H-241-8	Adapter, 3/8" NPT to 9/16" Tube	3
3.	H-241-14	Adapter, 3/8" NPT to 7/16" Tube	1
4.	H-242-41	Hose Assembly, 25" long	2
5.	H-242-2	Hose Assembly, 15" long	1
6.	H-242-32	Hose Assembly, 18" long	1
7.	H-277-1	Tee, 3/8" NPT	1
8.	H-6405-608	Nipple, 3/8 x 1" NPT	1
9.	E-1069-13	Coil	ref.
10.	H-200-5	Cartridge, Solenoid	ref.
11.	H-451	Pump Repair Kit	ref.
12.	HH-299-14	Pump Seal Kit	ref.

NOTE: Hydraulic Cylinder repairs on machine s/n 66782 to 67513
Require Cylinder H-340 (No. 14) AND fittings H-230 (No. 4) &
H-236-5 (No. 5).

HYDRAULIC POWER UNIT ASSEMBLY 16541 (S/N 75199 & UP)



HYDRAULIC POWER UNIT ASSEMBLY H-356 (50/60 HZ) (S/N 75199 & UP)



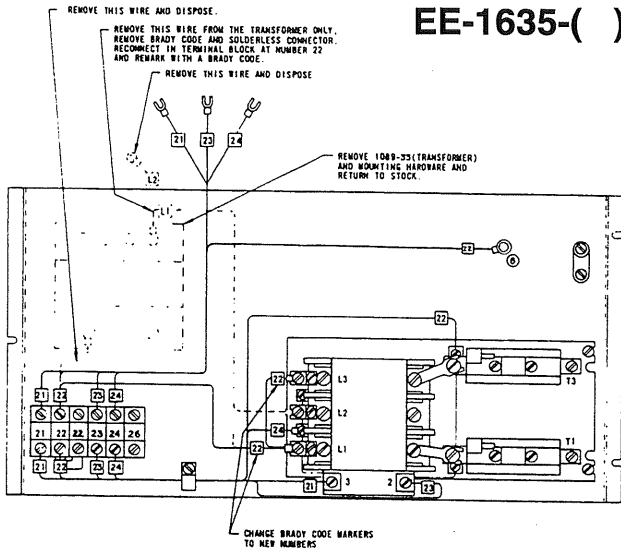
HYDRAULIC POWER UNIT ASSEMBLY 16541 (S/N 75199 & UP)

Ref. No.	Part No.	Part Name	Qty.
1.	16540	Weldment, Power Pack Base	1
2.	16543	Foot, Base	4
3.	4771-1	Valve, Needle	1
4.	H-230-5	Elbow, 7/16" O Ring to 7/16" Tube	1
5.	H-236-5	Elbow, 7/16" O Ring to 9/16" Tube	1
6.	H-237-5	Elbow, Pipe to Tube	1
7.	H-241-5	Adapter, 1/8" NPT to 9/16" Tube	1
8.	H-356	Hyd.Pwr.Unit 115/208/230v 50/60c 1PH ...	1
9.	H-7327-16	Lockwasher, 1/2" Medium	2
10.	H-242-32	Hose Assembly, 18" long	ref.
11.	H-242-2	Hose Assembly, 15" long	ref.
12.	H-242-42	Hose Assembly, 30" long	ref.
13.	EE-2555	Cord Assembly, Power Plug	1
14.	H-340	Hydraulic Cylinder Assembly	1
15.	H-7327-10	Washer, 5/16" Medium Lock	4
16.	H-6913-505	Screw, 5/16-18 x 5/8" Hex Hd Cap	4
17.	H-6913-812	Screw, 1/2-13 x 1-1/2" Hex Hd Cap	2
18.	H-7321-5	Washer, 5/16" Plain	4
19.			
20.	H-7327-8	Washer, 1/4" Medium Lock	2
21.	H-6910-406	Screw, 1/4-20 x 3/4" Button Hd Cap	2
22.	16542	Bracket, Foot Switch	1
23.	H-242-41	Hose Assembly, 25" long	ref.
24.	E-1237-6	Wire Nut	2

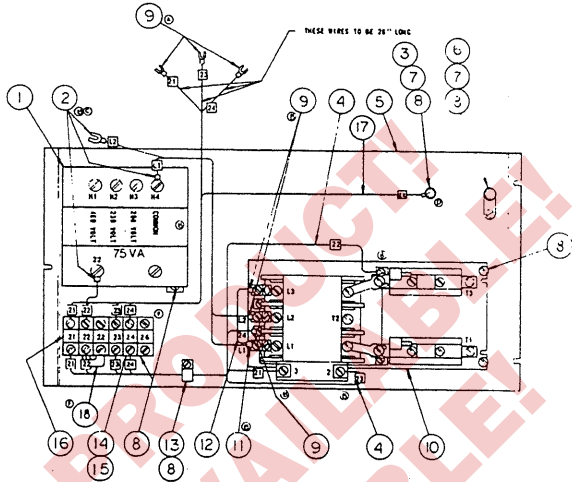
HYDRAULIC POWER UNIT ASSEMBLY H-356 (50/60 HZ) (S/N 75199 & UP)

Ref. No.	Part No.	Part Name	Qty.
1.	H-372	Hyd.Pwr.Unit 115/208/230v 50/60c 1PH ...	1
2.	H-237-3	Elbow, 3/8-18 NPT x 7/16-20 Tube	1
3.	H-237-4	Elbow, 1/4 NPT x 9/16-18 Tube	1
4.	H-242-41	Hose Assembly, 25" long	1
5.	H-242-2	Hose Assembly, 15" long	1
6.	H-242-32	Hose Assembly, 18" long	1
7.	H-242-42	Hose Assembly, 30" long	1
8.	H-263-2	Tee, 3/8-18 NPT x 9/16-18 Tube	1
9.	E-1069-13	Coil	ref.
10.	H-200-5	Cartridge, Solenoid	ref.
11.	H-451	Pump Repair Kit	ref.
12.	HH-299-14	Pump Seal Kit	ref.

POWER PANEL ASSEMBLY EE-1635-() (S/N 73123-954341)



E-1635-1:
115V 1PH 50/60Hz



E-1635-2:
208/230V 1PH 50/60Hz

WIRE NO.	LENGTH	CONNECTOR	QUANTITY	UNLESS OTHERWISE SPECIFIED
24	26"	E-1100-6	1	#18 GA.
24	6"	E-1100-6	1	#18 GA.
25	6"	E-1100-6	1	#18 GA.
25	10-1/2"	E-1100-6	1	#18 GA.
22	10-1/2"	E-1214-5	1	#18 GA.
22	10-1/2"	E-1214-5	1	#18 GA.
21	26"	E-1100-6	1	#18 GA.
21	6"	E-1100-6	1	#18 GA.
L1	11"	E-1100-6	1	#18 GA.
L2	11"	E-1100-6	1	#18 GA.
L3	11"	E-1100-6	1	#18 GA.
T1	6"	E-1100-6	1	#18 GA.
T2	6"	E-1100-6	1	#18 GA.
T3	6"	E-1100-6	1	#18 GA.

NOTE:
CUT ALL WIRES TO LENGTH AS NOTED UNLESS OTHERWISE SPECIFIED.
STRIP WIRE 1/2" BOTH ENDS.
MARK ALL WIRES WITH BRADY CODE MARKERS WITH PROPER NUMBERS.
CHANGE STARTER FROM MANUAL RESET TO AUTOMATIC RESET.

IMPORTANT NOTICE!
When installing new transformer, follow wiring instructions on new transformer.

CAUTION: Due to supplier changes or component improvement, instruction manual diagrams **MAY NOT MATCH** the machine. When replacing electrical parts, check the replacement component wiring.

EE-1635-1 Single Phase 115V

Ref. No.	Part No.	Part Name	Qty.
-	EE-1635-2	Power Panel Assembly	1

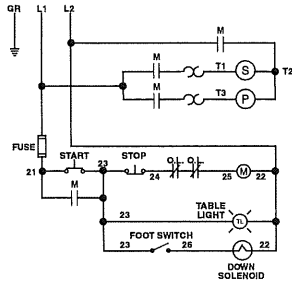
EE-1635-2 Single Phase 208V/230V Parts List

Ref. No.	Part No.	Part Name	Qty.
1.	E-1089-33	Transformer	1
2.	E-1214-1	#10 Insulated Fork	3
3.	E-1214-8	Connector, #10 Ring	1
4.	E-709-R	Wire, #18 MTW - 12 Feet	1
5.	E-1052-10	Panel	1
6.	E-640-1	Ground Lug	1
7.	H-7324-#10	Lockwasher, #10 Shakeproof	2
8.	H-6923-102404	Screw, #10-24 NC x 1/4" Rd.Hd.Mach.	12
9.	E-1100-6	Spade, Machine Applied	6
10.	E-1579	Starter	1
11.	E-1214-11	#6 INS Ring	1
12.	E-849-R	#16 GA. MTW Wire 6" long	1
13.	E-968-4	Clamp, 3/8" dia. Plastic Cable	1
14.	E-1271	Terminal Mounting Strip	1
15.	E-1270	Terminal Block	2
16.	E-1356-59	Terminal Marking Strip	1
17.	E-849-G	Wire, #16 Ga. MTW - 10-1/2" long	1
18.	E-1355-1	Jumper	1

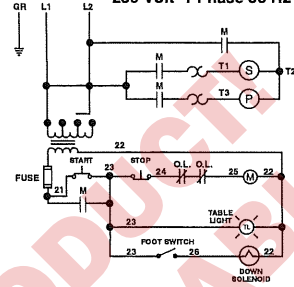
WIRING ASSEMBLY & SCHEMATIC

A-5846-8 (S/N 73123-954341)

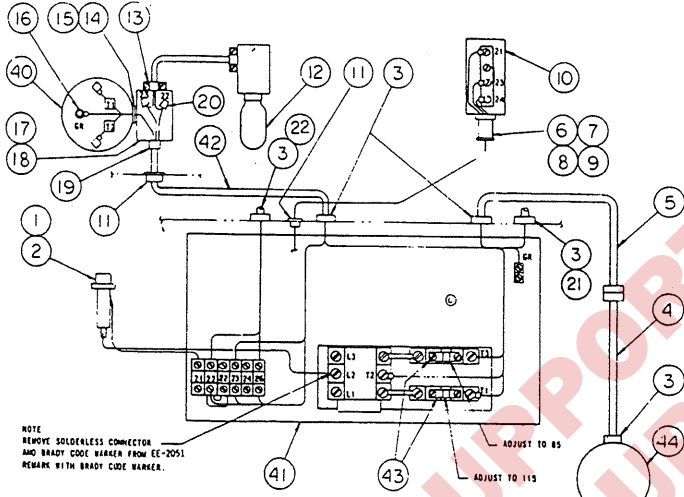
SCHEMATIC
115 Volt 1 Phase 60 Hz
115 Volt 1 Phase 50 Hz



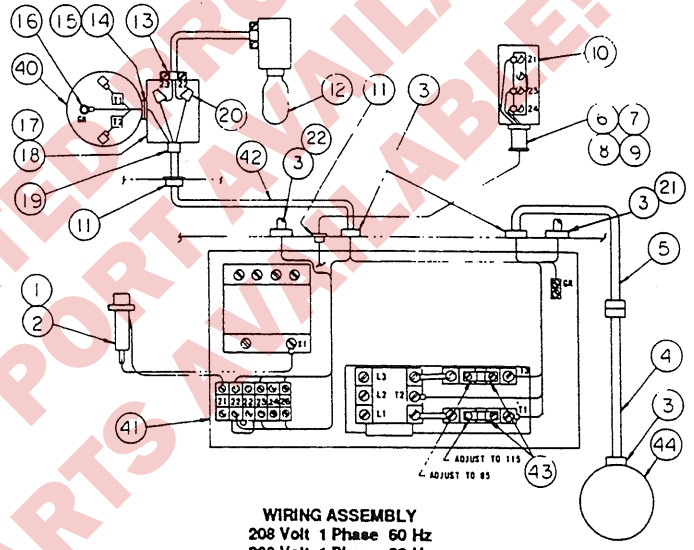
SCHEMATIC
208 Volt 1 Phase 60 Hz
230 Volt 1 Phase 60 Hz
230 Volt 1 Phase 50 Hz



NOTE: HOOK-UP OF TRANSFORMER WILL BE PER SPECIFIED VOLTAGE. HOOK UP L2 TO CORRECT VOLTAGE TERMINAL



WIRING ASSEMBLY
115 Volt 1 Phase 60 Hz
115 Volt 1 Phase 50 Hz



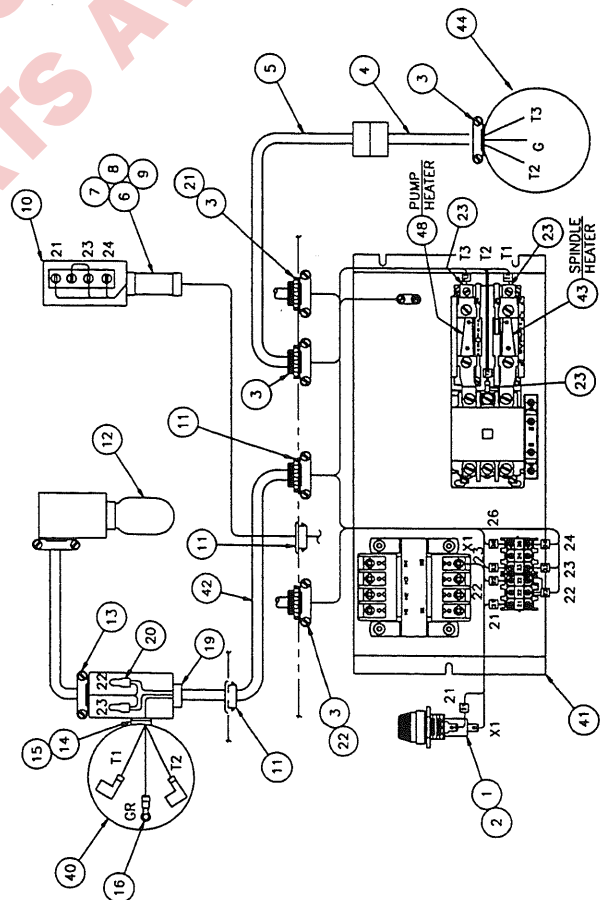
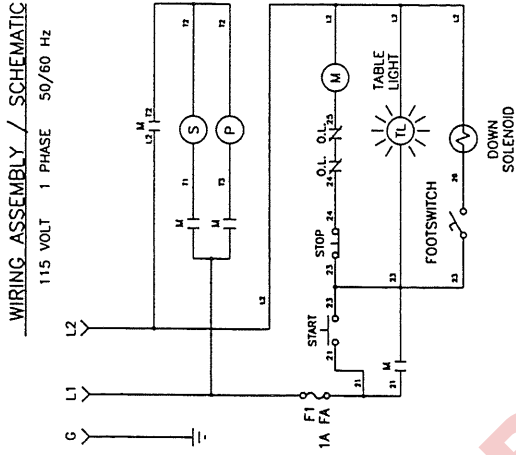
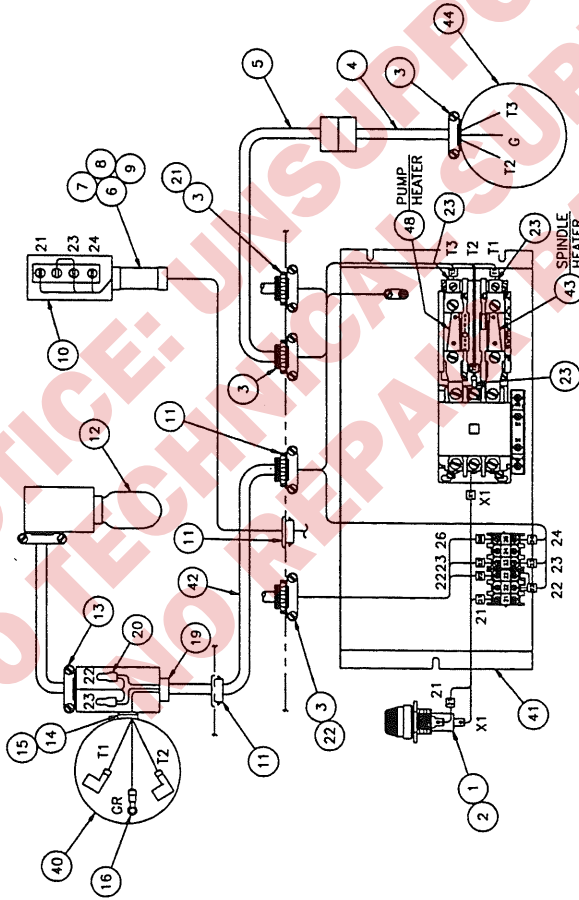
WIRING ASSEMBLY
208 Volt 1 Phase 60 Hz
230 Volt 1 Phase 60 Hz
230 Volt 1 Phase 50 Hz

CAUTION: Due to supplier changes or component improvement, instruction manual diagrams **MAY NOT MATCH** the machine. When replacing electrical parts, check the replacement component wiring.

Ref. No.	Part No.	Part Name	Qty.
1.	EE-2150	Fuse Holder Ass'y	1
2.	E-1075-1	Fuse, 1 Amp	1
3.	E-894	Cord Grip	3
4.	EE-1364-2	Connector Ass'y. (P.P. Motor to Socket)	1
5.	EE-1363-2	Connector Assembly	1
6.	E-1459	Bushing, 1/2"	2
7.	E-519	Locknut	2
8.	S-1139	Nipple, 1/2 x 1-1/2"	1
9.	S-1850	Spacer	1
10.	E-671-2	Start-Stop Station	1
11.	E-1172-4	Bushing, Plastic Snap-in	2
12.	E-933-4	Lamp	1
13.	K-87-1	Connector, 3/8" Str. Conduit	1
14.	H-7324-28	Lockwasher, 7/8" Shakeproof	1
15.	E-1458	Nipple, 1/2" Bushed Cond.	1
16.	S-1099-3	Screw, #10-24 x 3/8 Pan Hd	1
17.	E-1370-5	Junction box	1
18.	E-1369-5	Cover, Junction Box	1
19.	E-1350-1	Heyco Bushing	1
20.	E-1237-1	Wire Nut	2
21.	EE-2353	Footswitch Assembly	1
22.	EE-2354	Cable Assembly, Solenoid	1
115V 1 PH 50 HZ			
40.	E-1600-69	Motor, 3/4 HP (Spindle)	1
41.	EE-1635-1	Power Panel Assembly	1
42.	EE-1650-1	Table Light Wire Ass'y	1
43.	E-1578-40	Heater G30T40	2
44.	E-1600-54	Motor, 1/2 HP (Hydraulic)	1
45.	E-1504-M-1	Specification Plate (Not Shown)	1
46.	E-1100-4	Eyelet, Machine Applied	2
47.	E-1437-3	Label, Starter (Not Shown)	1
115V 1 PH 60 HZ			
40.	E-1600-69	Motor, 3/4 HP (Spindle)	1
41.	EE-1635-1	Power Panel Assembly	1
42.	EE-1650-1	Table Light Wire Ass'y	1
43.	E-1578-40	Heater G30T40	2

Ref. No.	Part No.	Part Name	Qty.
44.	E-1600-54	Motor, 1/2 HP (Hydraulic)	1
45.	E-1504-M-1	Specification Plate (Not Shown)	1
46.	E-1100-4	Eyelet, Machine Applied	2
47.	E-1437-3	Label, Starter (Not Shown)	1
230V 1 PH 50 HZ			
40.	E-1600-66	Motor, 3/4 HP (Spindle)	1
41.	EE-1635-2	Power Panel Assembly	1
42.	EE-1650-1	Motor-Table Light Wire Ass'y.	1
43.	E-1578-35	Heater G30T35	2
44.	E-1600-54	Motor, 1/2 HP (Hydraulic)	1
45.	E-1504-M-1	Specification Plate (Not Shown)	1
46.	E-1100-4	Eyelet, Machine Applied	2
47.	E-1437-3	Label, Starter (Not Shown)	1
230V 1 PH 60 HZ			
40.	E-1600-61	Motor, 3/4 HP (Spindle)	1
41.	EE-1635-2	Power Panel Assembly	1
42.	EE-1650-1	Motor-Table Light Wire Ass'y.	1
43.	E-1578-35	Heater G30T35	2
44.	E-1600-43	Motor, 1/2 HP (Hydraulic)	1
45.	E-2143	Specification Plate (Not Shown)	1
46.	E-1100-4	Eyelet, Machine Applied	2
47.	E-1437-4	Label, Starter (Not Shown)	1
208V 3 PH 60 HZ			
40.	E-1600-61	Motor, 3/4 HP	1
41.	EE-1635-2	Power Panel Assembly	1
42.	EE-1650-1	Table Light Wire Assembly	3
43.	EE-1578-35	Heater G30T35	3
44.	E-1600-43	Motor, 1/2 HP (Hydraulic)	1
45.	E-2143	Specification Plate (Not Shown)	1
46.			
47.	E-1437-4	Label, Starter (Not Shown)	1

MAIN ASSEMBLY POWER PANEL, VOLTAGE OPTIONS A-5846-8 (S/N 954342 & UP)



NOTE: HOOK-UP OF TRANSFORMER WILL BE PER SPECIFIED VOLTAGE. HOOK UP L2 TO THE CORRECT VOLTAGE TERMINAL ON THE TRANSFORMER



**MAIN ASSEMBLY POWER PANEL, VOLTAGE OPTIONS
A-5846-8 (S/N 954342 & UP)**

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
40	E-1600-69	MOTOR - 1 HP (SPINDLE)	1
41	EE-1635-2	POWER PANEL ASSEMBLY	1
42	EE-1650-1	WIRE ASSEMBLY - TABLE LIGHT	1
43	E-2195-E47	HEATER - SPINDLE (6.37 TRIP AMP)	1
44	E-1600-43	MOTOR - 1/2 HP (HYDRAULIC)	REF
45	E-2134	SPECIFICATION PLATE (NOT SHOWN)	1
46	E-1214-48	CONNECTOR - #10 INS. RING	2
47	E-1437-4	LABEL - STARTER & TRANSFORMER (NOT SHOWN)	1
48	E-2195-E42	HEATER - HYDRAULIC (4.77 TRIP AMP)	1
(39-1-011) 208/230 VOLT 1 PHASE 60 HERTZ			
40	E-1600-66	MOTOR - 3/4 HP (SPINDLE)	1
41	EE-1635-2	POWER PANEL ASSEMBLY	1
42	EE-1650-1	WIRE ASSEMBLY - TABLE LIGHT	1
43	E-2195-E44	HEATER - SPINDLE (5.32 TRIP AMP)	1
44	E-1600-54	MOTOR - 1/2 HP (HYDRAULIC)	REF
45	E-1504-M-1	SPECIFICATION PLATE (NOT SHOWN)	1
46	E-1214-48	CONNECTOR - #10 INS. RING	2
47	E-1437-3	LABEL - STARTER & TRANSFORMER (NOT SHOWN)	1
48	E-2195-E41	HEATER - HYDRAULIC (4.26 TRIP AMP)	1
(39-1-014) 230 VOLT 1 PHASE 50 HERTZ			
40	E-1600-69	MOTOR - 1 HP (SPINDLE) (60 Hz ONLY)	1
41	EE-1635-1	POWER PANEL ASSEMBLY	1
42	EE-1650-1	WIRE ASSEMBLY - TABLE LIGHT	1
43	E-2195-E55	HEATER - SPINDLE (12.30 TRIP AMP) (60 Hz)	1
43	E-2195-E53	HEATER - SPINDLE (10.30 TRIP AMP) (50 Hz)	1
44	E-1600-43	MOTOR - 1/2 HP (HYDRAULIC)	REF
44	E-1600-54	MOTOR - 1/2 HP (HYDRAULIC)	REF
45	E-1504-M-1	SPECIFICATION PLATE (NOT SHOWN)	1
46	E-1214-48	CONNECTOR - #10 INS. RING	2
47	E-1437-3	LABEL - STARTER & TRANSFORMER (NOT SHOWN)	1
47	E-2195-E53	HEATER - HYDRAULIC (10.30 TRIP AMP) (60 Hz)	1
48	E-2195-E51	HEATER - HYDRAULIC (8.38 TRIP AMP) (50 Hz)	1
(39-1-016)/(39-1-015) 115 VOLT 1 PHASE 50/60 HERTZ			

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	EE-2051	FUSE HOLDER ASSEMBLY	1
2	E-1075-1	FUSE - 1 AMP FAST-ACTING	1
3	E-894	CORD GRIP	5
4	EE-1364-2	CONNECTOR ASSEMBLY	1
5	EE-1363-2	CONNECTOR ASSEMBLY	1
6	E-1459	BUSHING - 1/2"	1
7	E-519	LOCKNUT - 1/2" CONDUIT	1
8	S-1139	NIPPLE - 1/2" x 1-1/2"	1
9	S-1850	SPACER	1
10	E-671-2	START-STOP STATION	1
11	E-1172-4	BUSHING - SNAP-IN	1
12	E-933-4	LAMP - TABLE LIGHT	1
13	K-87-1	CONDUIT CONNECTOR - 3/8" STRAIGHT	1
14	H-7324-2B	WASHER - 7/8" SHAKEPROOF LOCK	1
15	E-1458	NIPPLE - 1/2" BUSHED CONDUIT	1
16	S-1099-3	SCREW - #10-24 x 3/8 PAN HD SELF-TAP	1
17	E-1370-5	JUNCTION BOX	1
18	E-1369-5	COVER - JUNCTION BOX	1
19	S-1350-1	BUSHING - HEYCO	1
20	E-1237-1	WIRE NUT	2
21	EE-2353	FOOTSWITCH ASSEMBLY	1
22	EE-2354	CABLE ASSEMBLY - SOLENOID	1
23	E-1214-1	CONNECTOR - INS. LOCKING FORK	3

POWER PANEL ASSEMBLY EE-1635-() (S/N 954342 & UP) EE-1635-1

REMOVE L1 WIRE FROM THE TRANSFORMER ONLY. REMOVE THE WIRE TAG AND RING CONNECTION FROM THE TRANSFORMER AT NUMBER 22 AND RETAG WIRE AS #22.

REMOVE THIS WIRE AND DISPOSE.

REMOVE TRANSFORMER (E-1089-33) AND MOUNTING HARDWARE AND RETURN TO STOCK.

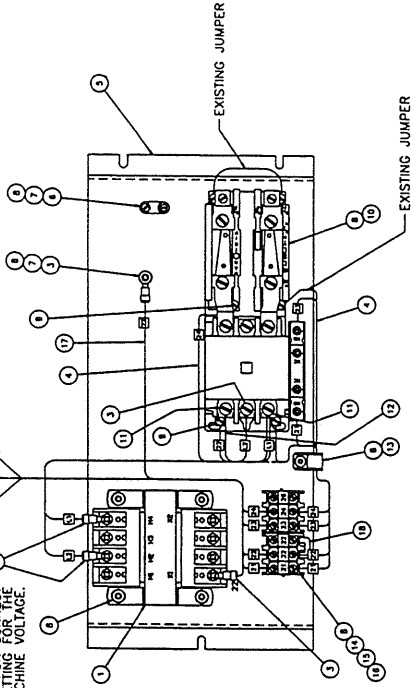
REMOVE THIS WIRE AND DISPOSE.

REMOVE THIS WIRE AND DISPOSE.

EE-1635-2

CHECK L2 FOR CORRECT TAP FOR MACHINE VOLTAGE.

WIRES TO BE 26" LONG



IMPORTANT NOTICE

When installing new transformer, follow the wiring instructions on the new transformer.

CAUTION: Due to supplier changes or component improvement, instruction manual diagrams **MAY NOT MATCH** the machine. When replacing electrical parts, check the replacement component wiring.

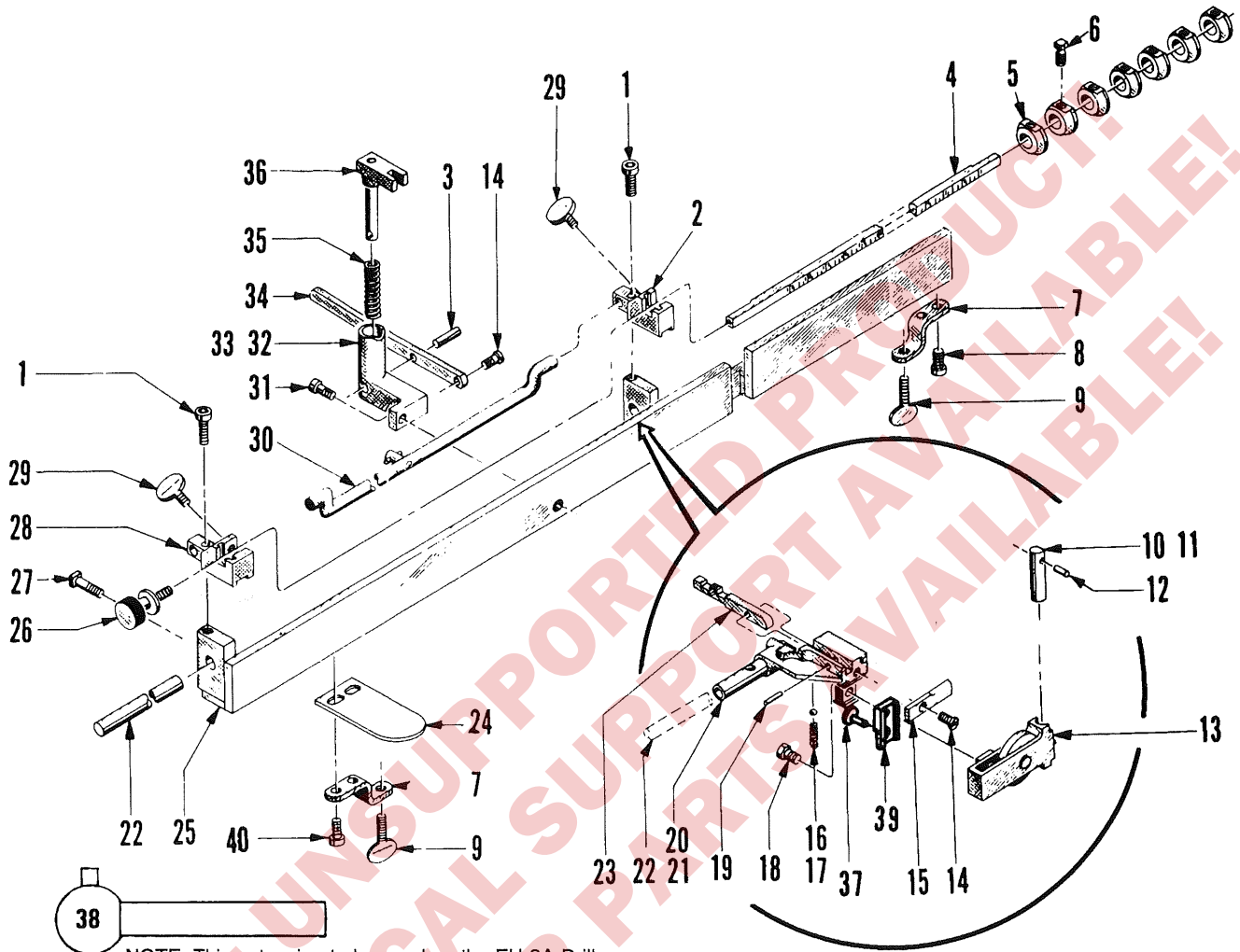
EE-1635-1 SINGLE PHASE 115V PARTS LIST

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	EE-1635-2	POWER PANEL ASSEMBLY	1

EE-1635-2 SINGLE PHASE 208/230V PARTS LIST

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	E-1089-33	TRANSFORMER, 75VA - 208/230/480V	1
2	E-1214-59	CONNECTOR, #10 INS. TORK, 16-22 GA.	5
3	E-208-R	WRE, #18 GA. RED MTH (AS REQ'D)	12/1
4	E-1089-10	PANEL - ELECTRICAL	1
5	E-404-1	CONDUIT, 1/2"	1
6	E-2324-#10	WASHER, #10 SHAKEROFF	2
7	H-8810-102403	SCREW, #10-24 X 3/8 BUT HD	11
8	E-1214-57	CONNECTOR, #8 INS. LOCKING TORK	5
9	E-2194-1	STARTER - MOTOR	1
10	E-1214-1	CONNECTOR, #10 INS. TORK, 14-18 GA.	2
11	E-849-R	WRE, #18 GA. RED MTH 6" LONG	1
12	E-968-4	CABLE CLAMP	1
13	E-1271	MOUNTING RAIL - 2-1/2" LONG	1
14	E-1270	TERMINAL BLOCK - 3 POLE	2
15	E-1356-59	MARKING STRIP - TERMINAL BLOCK	1
16	E-849-G	WRE, #18 GA. GREEN MTH 10-1/2" LONG	1
17	E-1355-1	JUMPER - TERMINAL BLOCK	1

AUTO TRIP GAGE ASSEMBLY A-4615-8

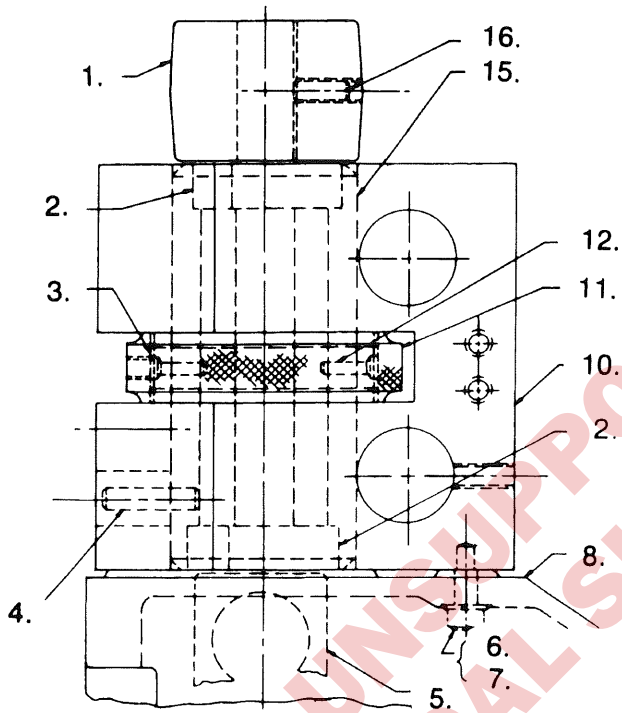


NOTE: This extension to be used on the EH-3A Drill.
When LH spindle is set at 2-3/4" using a 1/4" drill, it will
leave approx. a 1/4" margin.

Ref. No.	Part No.	Part Name	Qty.
1.	H-6918-102408	Screw, #10-24 x 1" Soc.Hd.Cap	2
2.	4634	Index Rod Holder	1
3.	S-784-1	Pin, 3/16 x 1-1/16"	1
4.	4633-1	Shaft, Side Guide	1
5.	4654	Side Guide Stop	7
	R-4654	Extra Side Guide Stop & Set Screw	1 ref
6.	H-6940-408	Set Screw, 1/4-20 x 1/2" Flat Pt.Soc.	7
7.	4655	Clamp, Backgage	2
8.	H-6918-404	Screw, 1/4-20 x 1/2" Soc.Hd.Cap	2
9.	H-6955-508	Thumbscrew, 5/16-18 x 1"	2
10.	A-4791-1	Side Guide Face Assembly	1
11.	4790-2	Side Guide Face	1
12.	H-21S-125-0750	Pin, 1/8 x 3/4" Roll	1
13.	A-4785	Roller, Side Guide	1
14.	H-6903-405	Screw, 1/4-20x5/8" Butt.Hd.Cap(nylon)	2
15.	4788-1	Finger, Side Guide Latch	1
16.	S-766	Ball, 1/4" Steel	1
17.	4789	Spring, Latch	1
18.	H-6913-405	Screw, 1/4-20x5/8" Hex Head Cap	1
19.	S-761	Pin, .095 x 7/8" Straight	1
20.	A-4787	Side Guide Assembly	1

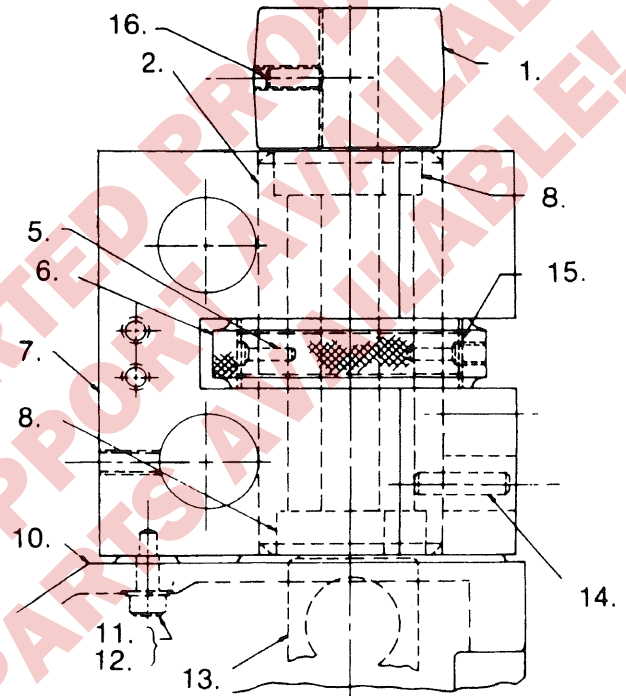
Ref. No.	Part No.	Part Name	Qty.
21.	4781	Holder, Side Guide	1
22.	4792-1	Shaft, Rear Gage	1
23.	A-4780	Ratchet, Side Guide Index	1
24.	4794	Plate, Rear Gage Guide	1
25.	4776-8	Rear Gage	1
26.	4632	Screw, Side Guide Shaft Adjusting	1
27.	H-6938-408	Set Screw, 1/4-20 x 1/2"	1
28.	4799	Bracket, Side Guide Shaft, LH	1
29.	H-6955-404	Thumbscrew, 1/4-20 x 1/2" Plated	2
30.	KK-695-8	Side Guide Latch Lift Shaft Asm.	1
31.	H-6918-406	Screw, 1/4-20 x 3/4" Soc.Hd.Cap	1
32.	K-423-4	Connector, Side Guide Trip	1
33.	KK-411-7	Assembled Side Guide Latch Arm	1
34.	K-426-3	Trigger, Side Guide Latch	1
35.	K-710-1	Spring, Side Guide Trip Holder	1
36.	KK-425-5	Arm, Side Guide Latch	1
37.	H-6910-404	Screw, 1/4-20 x 1/2" Butt.Hd.Cap	1
38.	A-4728-1	Extension for Side Guide	1
39.	4827-1	Shim	1
40.	H-6918-405	Screw, 1/4-20 x 5/8" Soc.Hd.Cap	2

**SPINDLE HEAD ASSEMBLY
RIGHT HAND
A-5847-1-5-R**

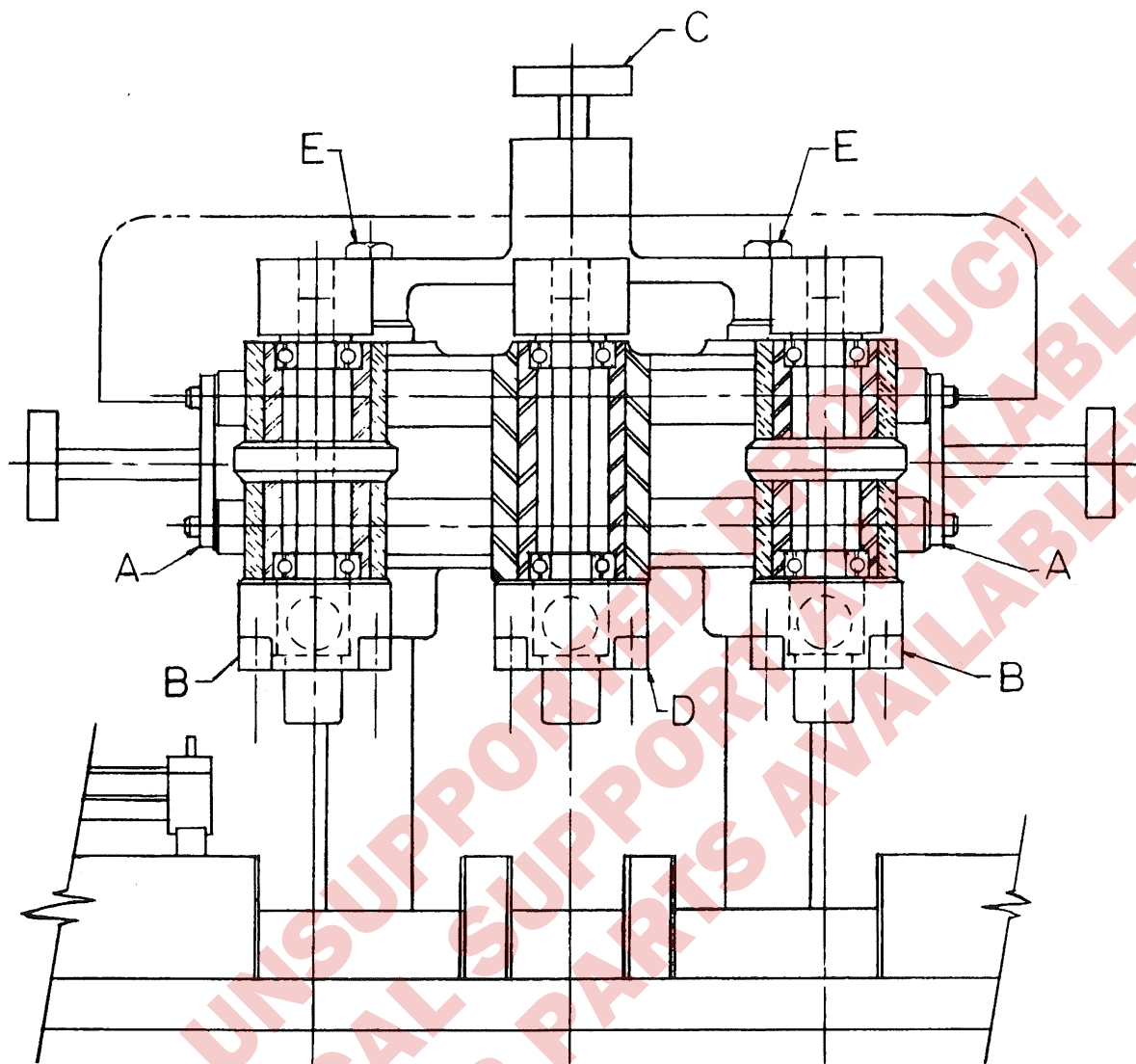



Ref. No.	Part No.	Part Name	Qty.
1.	4693-1	Pulley, Crowned	1
2.	S-706	Ballbearing	2
3.	5854	Collar, Bearing Housing	1
4.	H-5246-408	Pin, 1/4 x 1" Dowel	1
5.	K-16-4	Spindle	1
6.	H-6918-406	Screw, 1/4-20 x 3/4" Soc Hd Cap	2
7.	H-7327-8	Washer, 1/4" Medium Lock	2
8.	5872-2	Chip Chute, RH	1
9.			
10.	5848-1-5	Spindle Block, RH	1
11.	5855-1	Nut, Adjustment	1
12.	H-5246-204	Pin, 1/8 x 1/2" Dowel	2
13.			
14.			
15.	5853	Sleeve, Bearing House	1
16.	H-6951-406	Screw, 1/4-20 x 3/8" Nyloc Set	1

**LH SPINDLE HEAD ASSEMBLY
LEFT HAND
A-5862-1-5-R**



Ref. No.	Part No.	Part Name	Qty.
1.	4693-1	Pulley, Crowned	1
2.	5853	Sleeve, Bearing House	1
3.			
4.			
5.	H-5246-204	Pin, 1/8 x 1/2" Dowel	2
6.	5855-1	Nut, Adjustment	1
7.	5863-1-5	Spindle Block, LH	1
8.	S-706	Ballbearing	2
9.			
10.	5873-2	Chip Chute, LH	1
11.	H-6918-406	Screw, 1/4-20 x 3/4" Soc Hd Cap	2
12.	H-7327-8	Washer, 1/4" Medium Lock	2
13.	K-16-4	Spindle	1
14.	H-5246-408	Pin, 1/4 x 1" Dowel	1
15.	5854	Collar, Bearing Housing	1
16.	H-6951-406	Screw, 1/4-20 x 3/8" Nyloc Set	1



 **Caution: Always disconnect the power when cleaning, servicing or lubricating your drill, see Lock Out Procedures, page 4.**

PROCEDURE FOR REPLACING BEARINGS

1. Remove Cover.
2. Remove Belt.
3. Remove pressure feet.
4. Remove chip pan assembly.

SIDE HEAD BEARING REPLACEMENT

1. Remove end plate "A" from shaft.
2. Slide head off of shafts.
3. Remove chip chute "B" from head.
4. Remove pulley from spindle.
5. Tap spindle out from head.
6. Tap out bearings (Must use rod from opposite end of each bearing.)
7. To install new bearings, tap lightly around outer race.
8. Tap in spindle.
9. Replace chip chute and pulley and assemble to original position on shafts.

CENTER HEAD BEARING REPLACEMENT

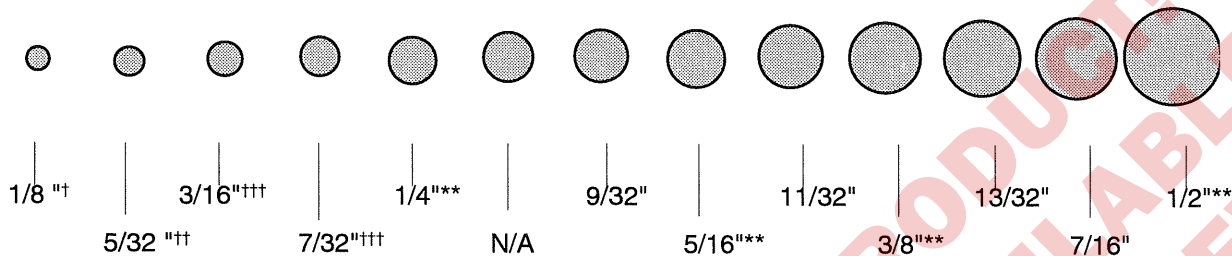
1. Raise head as far as possible by turning knob "C".
2. Remove pulley.
3. Remove chip chute "D".
4. Remove cutting block from table.
5. Back off bolts "E" approximately 1/2" and slide head up on rods so there is enough clearance between table and bottom of head to allow spindle to be removed. (Place block between table and head to hold in up position.)
6. Tap out spindle. (Down)
7. Tap out bearings. (Must use rod from opposite end of each bearing.)
8. To install new bearings, tap lightly around outer race.
9. Tap in spindle.
10. Replace chip chute and pulley and slide to original position on rods.
11. Adjust head for drill depth.

ACCESSORIES FOR CHALLENGE PAPER DRILLING MACHINES

Genuine Challenge Drill Bits

In 13 Standard Sizes For Every Drilling Need

(2" drill capacity unless otherwise noted.)



17/32" & 9/16" available by special order

Drill Capacity: †=5/8"; ††=1-1/8"; †††=1-5/8"
 ** Available in 2" **and** 2-1/2" Capacity.

This wide range of standard drill sizes is available to meet your every ordinary drilling need. Carried in stock by local Challenge dealers.

Challenge Drill-Ease Lubricant Stick

Cat. No. 4688

This lubricating stick provides a dry stainless lubricant which has many uses throughout the printing plant. It is specially recommended for use on hollow drills for easier drilling, particularly when drilling clay coated stock. It eliminates binding and excessive heating of the drill. Will not discolor the stock.

CARE MUST ALWAYS BE TAKEN WHEN USING STICK AND HANDLING DRILLS.

Challenge Drilling Blocks

Cat. No. KK-473-3

These Challenge 3" End-Wood Drilling Blocks are for round hole drilling operations. Sold in lots of 12.

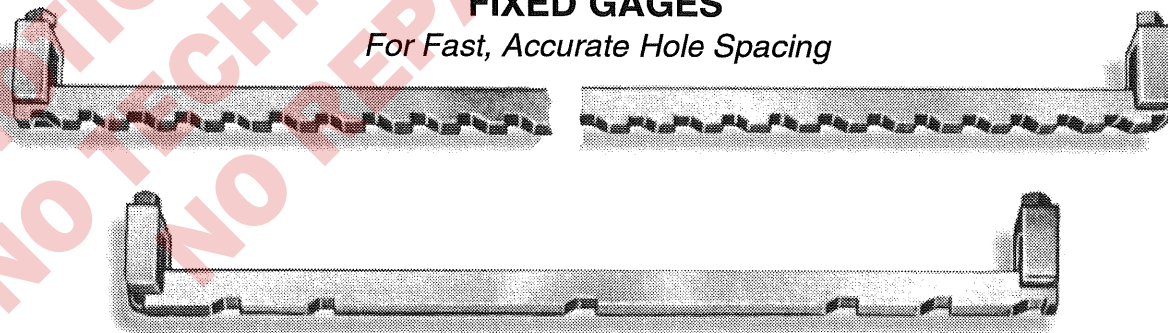
Extra Backgauge Stops

In addition to the stops supplied with each Challenge Paper Drilling Machine, extra stops are available at a nominal price.

Always specify the model and machine serial number.

FIXED GAGES

For Fast, Accurate Hole Spacing



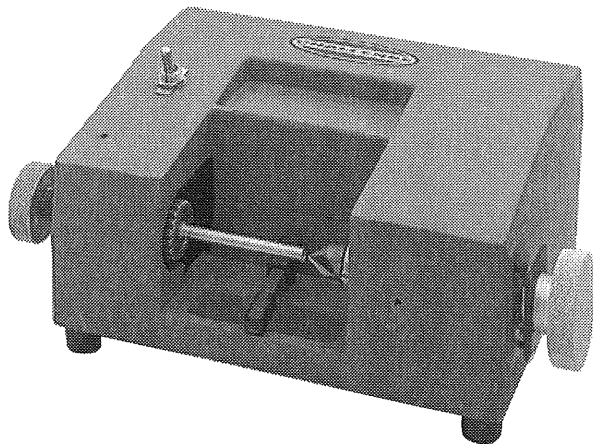
These fixed gages with pre-cut hole spacings fit on the side guide in place of the moveable stops. To use, position the gage so that the right end lines up with the dimension on the scale for the centerline of the first hole to be drilled. Use of the stops on fixed gages is the same as using the adjustable stops.

In addition to 2—5 hole patterns, fixed gages are available from stock in the following standard types:

- 22-stop Gage, 1/2" Centers for Multi-Ring Binders
- 25-stop Gage, 3/8" Centers
- 25-stop Gage, 1/4" Centers
- 34-stop Gage, 1/2" Centers
- 46-stop Gage, 3/8" Centers
- 50-stop Gage, 1/4" Centers

Custom patterns can also be supplied, call for details.

ACCESSORIES FOR CHALLENGE PAPER DRILLING MACHINES



POWER DRILL SHARPENER

Cat. No. A-6450

A moderate cost power drill sharpener. Plugs into any standard 115 volt, 60 cycle, AC outlet. Handles Challenge and other taper-shank drill bits.

Item	Part No.
Replacement Cutting Bit	6469
Resharpen Service – your old bit	6469-R

HOLLOW DRILL SHARPENER *For fast . . . easy . . . drill sharpening*

Cat. No. A-4950



CAUTION: Drills are sharp even after use. Be careful to keep edge away from your body. To prevent personal injury and/or damage to the drill, ALWAYS keep drills in protected area.

Here's a unit that really makes drill sharpening easy. All you do is place the drill bit in the end of the drill holder . . . insert the unit on the cylinder . . . then turn two or three times . . . and you have a perfectly sharpened drill.

This Challenge Drill Bit Sharpener can pay for itself many times over through longer drill life . . . easier, faster drilling . . . and less sharpening time. All sizes of drills from 1/8 to 1/2 inch in diameter can be handled.

The drill sharpener automatically puts just the right amount of bevel on the hollow drill for best drilling results. It's self centering, too, so the center of the sharpening bit exactly meets the center of the hollow drill. A replaceable sharpening bit is available also.

Items	Part No.
Challenge Drill Bit Sharpener	A-4950
Extra Cutting Bit	4952

Instructions:

NOTE: Always handle carefully

1. Be sure to wipe off all grease before using the sharpener.
2. Remove any paper chips from the hollow drill.
3. Place the hollow drill in the drillholder section. Insert the sharpening section, being very careful to bring the drill and cutting tool together without bumping.

CAREFUL: The cutting tool is made of a glass hard material and may be chipped by careless handling.

4. Turn the cutting unit clockwise, maintaining an even pressure until the hollow drill is sharpened (usually two or three turns). The cutting tool seldom requires regrinding, but when this does become necessary, the bit should be sent to the factory as regrinding must be done on a diamond wheel.

**NOTICE: UNSUPPORTED PRODUCT!
NO TECHNICAL SUPPORT AVAILABLE!
NO REPAIR PARTS AVAILABLE!**

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NO REPAIR PARTS AVAILABLE!**