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This manual may not be complete in all aspects of product maintenance and repair. **All products should be used only by qualified and properly trained personnel, following proper safety procedures.** All products should be regularly inspected and maintained, and their condition, application and use should be periodically evaluated by qualified personnel. Only qualified and properly trained technicians should perform maintenance, repair and replacement procedures. Attempting these procedures without proper training may cause machine damage or operator injury!

Products may be unsupported by The Challenge Machinery Company due to age or the unavailability of parts from their original manufacturer. No parts or product support will be available to repair or maintain unsupported products. Older products may not be UL listed (if the product does not have a UL label it is not a listed product), and may not comply with applicable installation or other regulations or requirements if relocated to a new facility. Many municipalities require a product to be UL listed before an electrician will connect power to them. Often the cost of updating an older product to comply with current safety regulations is greater than the value of the product.

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, page 3.

- 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.
- **CRUSH HAZARD** - Keep hands, hair, cleaning rags, & loose clothing away from drills.

Instruction and Parts Manual



MODEL MS-5 Paper Drilling Machine

This manual covers serial numbers 75237 & up.
ALWAYS GIVE THE SERIAL NUMBER OF YOUR MACHINE WHEN WRITING.

Sold and serviced by

THE CHALLENGE MACHINERY COMPANY

1433 Fulton Avenue/Grand Haven, Michigan 49417-1594 U.S.A.
Phone: 616/842-8300 • Fax: 616/842-6511 • www.challengemachinery.com

F.300-A

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 (616)-842-8300.

FOR PARTS AND 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 minutes right now to **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, 1433 Fulton Avenue, Grand Haven, MI 49417-1594. Fax (616) 842-6511. Phone (616) 842-8300.

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

WARRANTY INFORMATION

PLEASE REVIEW THE ENCLOSED WARRANTY SHEET!

It is **very important** that you read and understand the conditions outlined in the Warranty Information Sheet included with the manual information package.

The Warranty Information Sheet must be filled out completely, returned, and be **ON-FILE** at **THE CHALLENGE MACHINERY COMPANY** in order for the warranty to be issued for this machine.

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SAFETY PRECAUTIONS

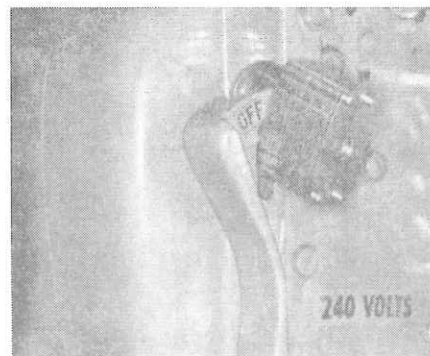


This safety symbol means **CAUTION/WARNING - PERSONAL SAFETY INSTRUCTION**. Read the instructions because it has to do with safety. Failure to comply with the following instructions may result in personal injury.

- 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 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 drill. Personal injury could result from items being caught on drill.
- Have your electrician make sure the machine is properly grounded, see Power Hookup, page 8.
- Have your electrician check for sufficient power to operate the machine properly, see page 8.
- **OBSERVE ALL CAUTION PLATES AND LABELS** on this machine.
- **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 procedure.
- **KEEP THE FLOOR** around the machine free of trim, debris, oil and grease.
- When replacing hydraulic parts, loosen the connections slowly to release pressure. Never loosen connections with the machine running.
- If the machine sounds or operates abnormally, turn it off and consult the Trouble Shooting section of this manual. 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 when handling paper under the clamp. **DO NOT REST FOOT ON PEDAL** at any time!
- **DO NOT REACH UNDER THE DRILL AND CLAMP AREA!**
- **DO NOT OPERATE WITH ANY GUARDS REMOVED!** Replace all guards after adjusting, lubricating or servicing the machine.
- **SEVERE LACERATIONS** - Contact with high speed drill could cause severe injury. Always turn machine off and wait for drill to stop before removing drill bits. Keep hands away from drill(s) when operating.

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)

SPECIFICATIONS

Drilling

Number of Drill Heads	2 to 5
Drill Bit Sizes Available	1/8" to 1/2" (3 mm to 13 mm)
Center To Center Maximum	15" (38 cm)
Minimum Center Distance Between Heads	1 7/8" (8.7 cm)
Maximum Drilling Capacity (Pile Height)	2 1/2" (63 mm)
Strokes per Minute (Adjustable)	Up to 18
Backage Adjustment	0 to 5" (0 to 13 cm)
Vertical Adjustment of Individual Heads	1/4" (6mm)

Dimensions

Table	17 3/4" x 34" (45 cm x 86.4 cm)
Table Height	37" (94 cm)
Overall Height	56" (142 cm)
Floor Space Needed	36" x 36" (92 cm x 92 cm)
Net Weight (Approximate)	830 lbs (373.5 kg)
Shipping Weight (Approximate)	1000 lbs (453.6 kg)

Electrical

208/230 Volts ($\pm 10\%$)/18 Amps, 1 Phase, 60 Hz, AC. Service size 30 Amps.

Pump: 1/2 H.P. Spindle: 1 1/2 H.P.

Optional Motor: 208/230 Volts ($\pm 10\%$)/10 Amps, 3 Phase, AC. Service size 20 Amps.

460 Volts ($\pm 10\%$)/5 Amps, 3 Phase, AC. Service size 15 Amps.

Sound Emission

A-weighted sound pressure level measured in an enclosed room at 6 feet (183 cm) above floor:

Machine running: Less than 70 dB

Machine drilling paper: 71 dB

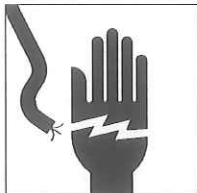
Challenge reserves the right to make changes to any product or specification without notice and without incurring responsibility to existing units.

WARNING LABEL DEFINITIONS



SINGLE OPERATOR

Do not operate with more than one person.



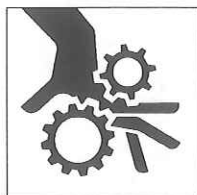
SHOCK HAZARD

Disconnect power before removing cover. Replace cover before operation.



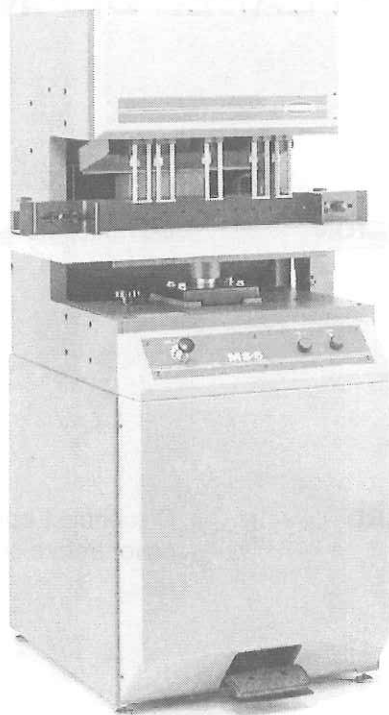
SHOCK HAZARD

Disconnect power before removing cover. Replace cover before operation.



HAZARDOUS AREA

Disconnect power before cleaning, servicing, or making adjustments not requiring power. Do not alter safety guards or devices, they are for your protection. Replace all guards, do not operate with any guards removed.



(fig. 1)

PACKING LIST

Part No.	Description	Qty.
	Basic Machine	1
W-105-1	Allen Wrench, 1/4" 'T' Handle	1
A-6588	Wrench, 'T' Handle Drill Drift	1
4688	Lubrication Stick, Drill Ease	1
A-4950	Drill Sharpener, Hand	1
6564	Drill Block	3
45067	Backgage Filler Block Asm. (magnetic)	2
45163	Spring - Drill Block	1
8278-1	Knob	2
	Drill Head(s)-as ordered Includes as Standard	(per head)
CD-4-2 1/2	1/4" (64mm) Hollow Drill	1
K-85	Drift Hole Cover	1

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INSTALLATION

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

Unpacking

Unless otherwise specified, this machine is packaged completely assembled. The drill head(s) specified on the order are shipped already installed. The machine should be unpacked carefully by removing the packaging materials without damaging any of the machine parts.

Immediately after uncrating, check off parts received against the packing list. Also, examine for any physical signs of damage incurred during shipment. The machine is inspected before and after crating at our plant. The responsibility for filing a claim against the carrier for damages incurred during shipment rests with the receiver of the goods (FOB our factory).

The machine is held in place on its shipping skid with plastic strapping material. The machine weighs approximately 850 lbs. (380 kg.), so be sure you have sufficient equipment and manpower to handle the machine safely. Contact your Authorized Challenge Dealer to arrange for installation.

Remove the protective coating of light oil from the machined surfaces with a cleaning solvent, such as type wash. Clean all other surfaces with a solvent such as C.R.C.

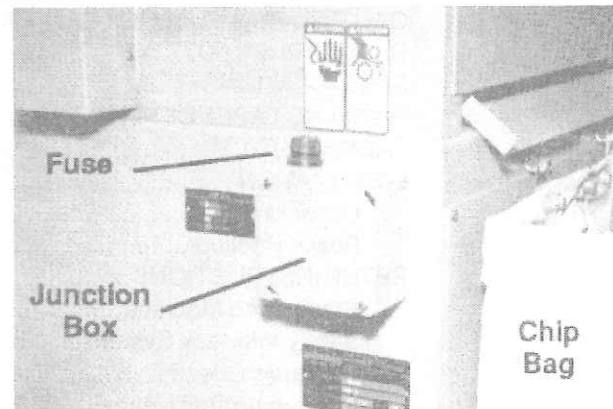
Power Hookup

WARNING: DISCONNECT POWER before cleaning, lubricating, servicing, or making adjustments not requiring power. Lock the disconnect switch in the OFF position (see Power Lockout Procedure, pg. 3).

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 be 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 dedicated line for the machine.

The standard motor for this machine is a 208/230 single phase. This machine should be on a 30 amp circuit

and wired with #10 gauge wire. Optional three phase motors are available also; 230/208 three phase, 20 amp circuit, #12 GA. wire; and 460 volt three phase, 15 amp circuit, with #14 GA. wire. A junction box is provided on the side of the machine for making the hookup to the power source. Remove one of the knockout plugs and run your power line into the box using a standard conduit connector. A ground lug is provided inside the junction box. Replace the box cover after wiring is complete. (fig. 2)



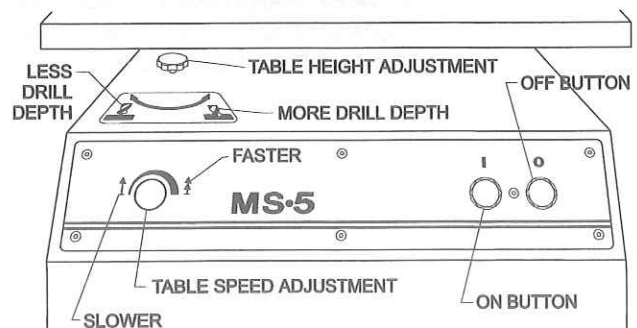
(fig.2)

On three phase machines, check to see that the motor turns in the proper direction. Briefly turn the machine on and off then look at the belt. If it turns in the opposite direction of the arrow on top of the motor, disconnect power to the machine and switch the connection of any one wire with another. Check the rotation of the motor again to be sure it turns in the proper direction.

SETUP INSTRUCTIONS

Starting the Machine

The power for this machine is supplied by two motors; one is for the hydraulic power pack and the other is for the spindle. The hydraulic motor drives the pump directly while the spindle motor drives the drill heads. The two motors are started and stopped simultaneously by "ON" and "OFF" push-buttons located on the control panel. (fig. 3) The ON button has a collar guard to reduce the possibility of accidental contact. Be sure both motors are operating before trying to drill paper.



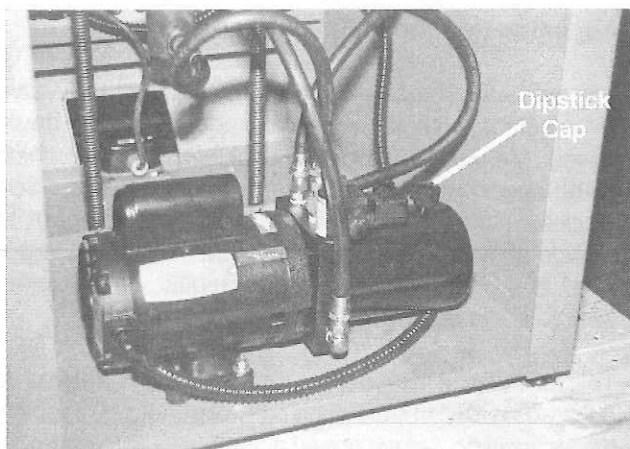
(fig.3)

Safety Interlock System

The MS-5 paper drill is equipped with a safety interlock system which prevents the machine from being started with the front cover open. If the cover is opened when the drill is in operation, the motors will shut off and must be restarted when the cover is back in place. This is a safety feature provided to prevent accidental contact with moving parts and must not be tampered with. (fig. 5)

Hydraulic Check

Check the hydraulic oil supply for the proper level. This check is made by removing the rear panel and unscrewing the dip stick located on the hydraulic tank (fig. 4). The oil level should be no higher than $\frac{1}{2}$ " (13 mm) up from the bottom of the dip stick to allow room for expansion of the oil when running. Recommended oils and a cross-reference chart are found in the maintenance section of this manual.

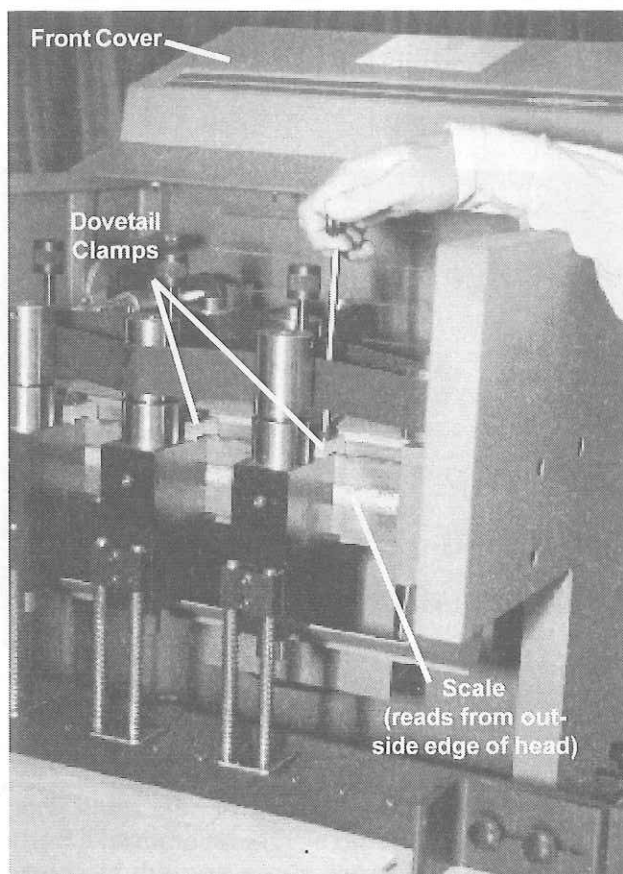


(fig. 4)

Positioning Drill Heads

Drill heads ordered with your machine have been installed at the factory. One $\frac{1}{4}$ " drill is supplied as standard equipment with each head unless otherwise specified. The MS-5 handles two to five drilling heads mounted on a dovetail. Each head is independently adjustable allowing a minimum center-to-center distance of $1\frac{7}{8}$ " (47.6 cm) to a maximum center-to-center distance of 15" (381 mm). Any number of heads (up to five) or combination of drill hole sizes can be drilled at one time. However, when using $\frac{1}{2}$ " (13 mm) drills, it is recommended that no more than three heads be used at the same time.

Always position heads so that the lift of paper being drilled is centered on the table. Drill heads are mounted on a dovetail and positioned by a scale mounted on the front of the dovetail (fig. 5).



(fig. 5)

To move heads: raise the front cover and release the drive belt tension by lifting the belt lever. Loosen the socket head screws holding the head to the dovetail and position the heads according to the scale (fig. 5). The dovetail scale is calibrated from the center of the table and is setup to give readings to the center of the holes. The scale is read from the outside edge of the drill heads. (Heads mounted to the right of center read the scale from the right side, heads to the left of center are read to the left of the head.) Once the heads are in the desired position, tighten the socket head screws in the dovetail.

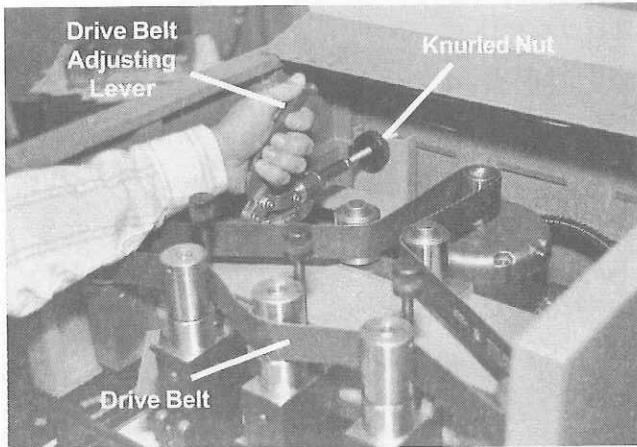
Drive Belt Adjustment

Whenever changing head configurations or repositioning heads, reset the drill head belt tension. This is done by backing off the knurled adjusting nut (fig. 6) with the belt lever in the up position. Lower the lever and turn the knurled nut out until it is tight. Raise the lever and turn the knurled nut out an additional $1\frac{1}{2}$ to 2 turns. Lower the lever and close the front cover.

Drill Installation

Insert the tapered head of the hollow drills into the spindles. Press the drills firmly into place so they do not fall out when the motor is first started. To prevent

drill chips from flying out be sure that the drift hole covers (black bands) are in place before operation (fig. 7). Make sure the cutting stick blocks are in position before trying to drill paper.



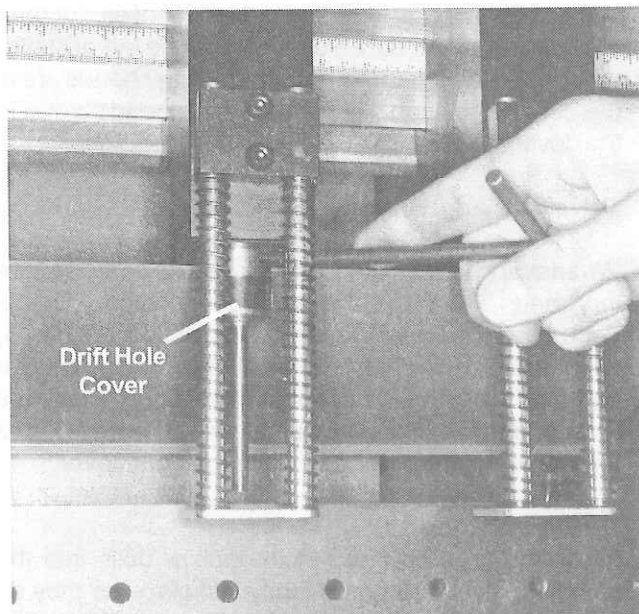
(fig. 6)

Drill Removal



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

After use, drills may become seated making it difficult to remove them. Use the T-handled drill drift tool to free stuck drills. Uncover the drill drift hole by sliding the cover down. Insert the drill drift with the flat edge down and lift up to force the drill out of the head (fig. 7).



(fig. 7)

Stroke Adjustment (Table Height Adjustment)

Whenever installing new or resharpened drills, the table stroke and drill height must be adjusted. Turn in (clockwise) the table height adjustment to lower the table (fig. 3). Next, lift the front cover and back off the drill head adjustment on each head. Place a single sheet of paper under the drills and raise the table with the foot treadle. Gradually raise the table height by turning the table height knob out (counterclockwise) and pressing the foot treadle to check the table height. Continue to do this until the first drill cuts through the paper. Once the table height has been set, adjust the drill heads individually until all the drills now cut through the paper. When cutting full lifts, any further stroke adjustment can now be made with the table height adjustment knob.

Note: The MS-5 uses 2" and 2½" long drills. Be sure to adjust the table stroke and/or drill height accordingly when changing from one drill length to another.

Adjusting the Stroke Speed

The hydraulic unit is equipped with an adjustable valve for regulating the table stroke speed (up and down travel). Maximum speed is 18 strokes per minute which is the speed used on the average run of work. Soft stocks such as mimeographs, NCR, etc., are apt to wrinkle at high speeds, and the speed should 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 left side of the control panel, fig. 3) counterclockwise to reduce speed and clockwise to increase speed.

Never turn the speed control knob more than 2½ turns counterclockwise (slow speed) as the drill will not bottom and engage the return cycle. Less than one turn counterclockwise should suffice for all drilling operations. Slow speeds may also cause the drills to "burn" through the paper. If burning occurs, either increase the vertical speed, sharpen the drills or check for proper belt tension.

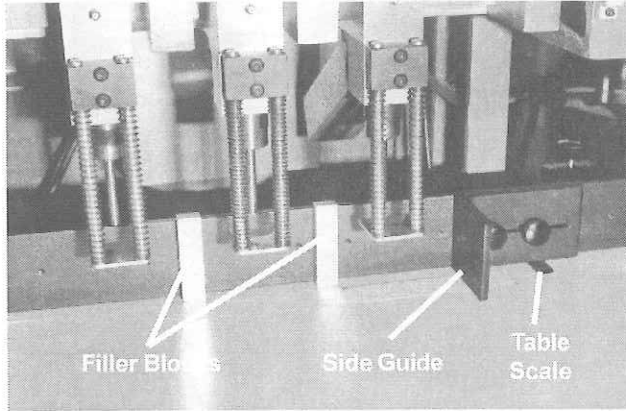
Slower vertical speeds are recommended when drilling with the maximum number of heads.

Setting Up the Backgag

Scales are provided in the table for setting up the backgag. The scales read in inches/mm and will give you the dimension from the back of the sheet to the centerline of the holes. Two magnetic filler blocks are provided if it is necessary to drill within 1" of the edge of the sheet, fig. 8. The blocks are ½" (13 mm) thick and when used,

$\frac{1}{2}$ " (13 mm) must be **subtracted** from the scale reading to give the set up dimension. Example: To drill $\frac{3}{4}$ " (19 mm) from the edge of the sheet, install the filler blocks and set the backgauge to $1\frac{1}{4}$ " (32 mm) on the scale.

Using the Side Guide(s)



(fig. 8)

The adjustment for the location of the holes to the top or bottom edge of the sheet is provided by a sturdy side guide. The backgauge has a series of threaded holes to which the side guide is attached with two threaded knobs. In addition, the side guide is slotted to fine adjust the position of the paper. When setting up drill head positions and side guides, always try to keep the paper centered on the table as much as possible.

Two side guides are provided as standard equipment so stock may be drilled to the left or right or for setting up multiple drilling sequences for more than five holes.

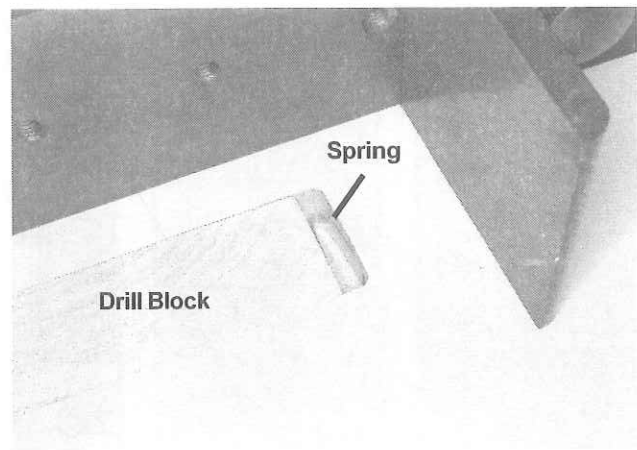
Drill Blocks

Place the drill blocks in the slot in the table. They are held tightly in place by pinching the drill block spring and placing it in the slot in the table at the end of the drill blocks (fig 9).

The drill blocks are removed by simply lifting them from their groove in the table. They should set flush with the table and may be shimmed if necessary. For best use and longest life, turn them end for end, top and bottom.

Emptying the Drill Chips

A large capacity chip bag attached to the rear of the machine, can be easily taken off and emptied by slipping it off the two hooks provided.



(fig. 9)

OPERATION

Pressing the foot treadle activates the hydraulic unit bringing the table and stock up to the drills and returning back again automatically. The pedal must be released and depressed again before the next drill cycle assuring full control and allowing no repeat stroke. Releasing the pedal at any time stops the table movement and returns it to its normal down position, thus preventing costly errors.



CAUTION: NEVER REST YOUR FOOT ON THE TREADLE WITHOUT INTENDING TO BRING UP THE TABLE.

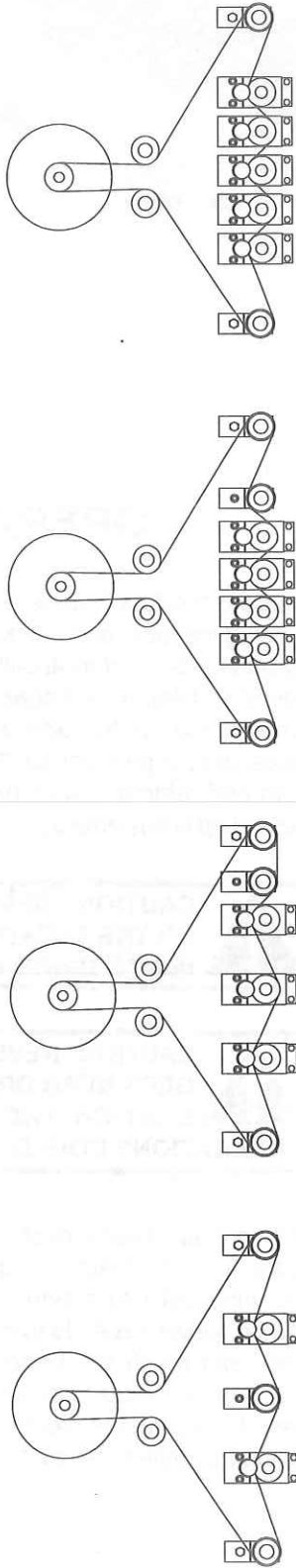


CAUTION: NEVER PUT HANDS OR FINGERS NEAR DRILL HEADS WHEN OPERATION THE MACHINE. SEVERE LACERATIONS COULD RESULT.

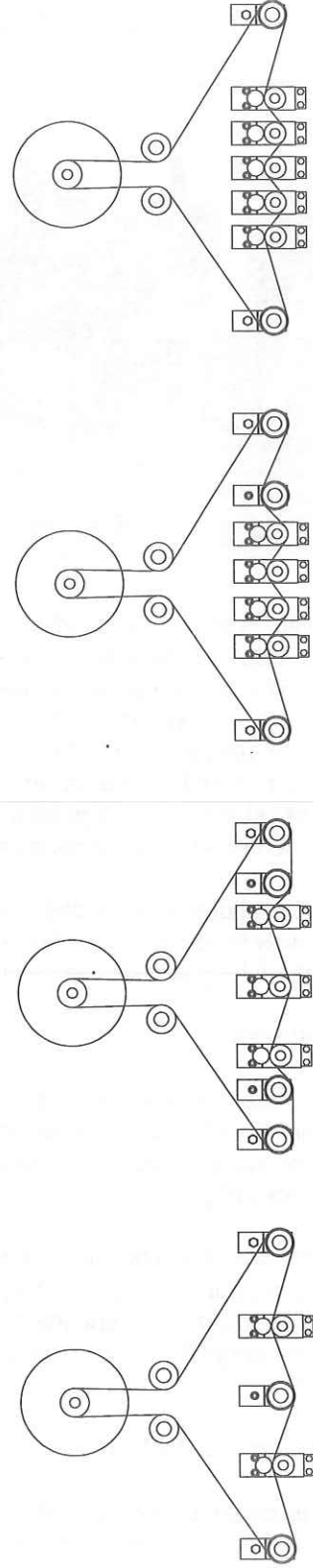
The vertical movement of the table is actuated by the hydraulic unit. Depressing the foot treadle sets the hydraulic unit into action. Keeping your foot on the treadle allows the drills to drill through the entire lift of stock and reach the bottom of their stroke. At this point, the solenoid is de-energized and the valve released, relieving the pressure off of the cylinder and allowing the table to return to the down position.

BELT INSTALLATION

STANDARD DRILL HEADS



NARROW DRILL HEADS



DRILLING TIPS

Important! To prevent the drill from overheating, always avoid drilling too slowly. The table should be brought up as rapidly as possible allowing the drills to easily cut through the paper. Also, adjust the vertical table guide to return the table to the down position as rapidly as possible to avoid spinning the drills in the stock.

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 Sharp - A dull drill is the major cause of drill breakage and production tie-ups. Usually after three hours of drilling, depending on the type of paper being processed, the drill should be sharpened. A dull drill results in poor quality work.

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 readily available stick lubricants for this purpose. Hold the end of the stick against the side of the rotating drill. Be sure to touch the cutting edge with the lubricant also. Wipe off excess oil before drilling. **CARE MUST ALWAYS BE TAKEN WHEN HANDLING DRILLS.**

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.

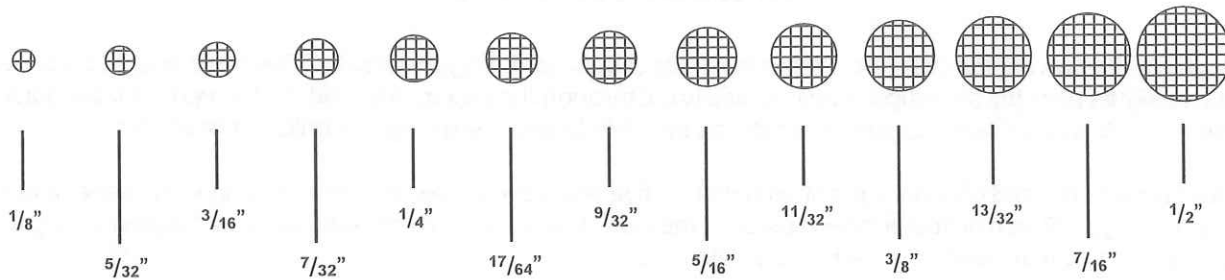
Check for Drill Wobble - If spindles are badly worn or bent through misadjustment, have them replaced immediately. A wobbly or loosely held drill will break.

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.

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

ACCESSORIES FOR CHALLENGE PAPER DRILLING MACHINES

Genuine Challenge Hollow Drills In 13 Standard Sizes For Every Drilling Need



All drills carried in stock by local Challenge dealers ($17/32$ " & $9/16$ " available by special order).

HOLLOW DRILLS

Diameter x Drill Capacity	Cat. No.
$1/8$ " x $5/8$ " (3.2 x 16 mm)	CD-2-3
$5/32$ " x $1 1/8$ " (4 x 29 mm)	CD-52
$3/16$ " x $1 5/8$ " (4.8 x 41 mm)	CD-3
$7/32$ " x 2" (5.6 x 51 mm)	CD-72
$1/4$ " x 2" (6.3 x 51 mm)	CD-4
$1/4$ " x $2 1/2$ " (6.3 x 63.5 mm)	CD-4-2 $1/2$
$17/64$ " x 2" (6.7 x 51 mm)	CD-174
$9/32$ " x 2" (7.1 x 51 mm)	CD-92
$5/16$ " x 2" (7.9 x 51 mm)	CD-5
$5/16$ " x $2 1/2$ " (7.9 x 63.5 mm)	CD-5-2 $1/2$
$11/32$ " x 2" (8.7 x 51 mm)	CD-112
$3/8$ " x 2" (9.5 x 51 mm)	CD-6
$3/8$ " x $2 1/2$ " (9.5 x 63.5 mm)	CD-6-2 $1/2$
$13/32$ " x 2" (10.3 x 51 mm)	CD-132
$7/16$ " x 2" (11.1 x 51 mm)	CD-7
$1/2$ " x 2" (12.7 x 51 mm)	CD-8
$1/2$ " x $2 1/2$ " (12.7 x 63.5 mm)	CD-8-2 $1/2$
Special order drills	
$17/32$ " x 2" (13.5 x 51 mm)	CD-172
$9/16$ " x 2" (14.3 x 51 mm)	CD-9

TEFLON COATED HOLLOW DRILLS

Diameter x Drill Capacity	Cat. No.
$1/8$ " x $5/8$ " (3.2 x 16 mm)	TCD-2-3
$5/32$ " x $1 1/8$ " (4 x 29 mm)	TCD-52
$3/16$ " x $1 5/8$ " (4.8 x 41 mm)	TCD-3
$7/32$ " x 2" (5.6 x 51 mm)	TCD-72
$1/4$ " x 2" (6.3 x 51 mm)	TCD-4
$1/4$ " x $2 1/2$ " (6.3 x 63.5 mm)	TCD-4-2 $1/2$
$17/64$ " x 2" (6.7 x 51 mm)	TCD-174
$9/32$ " x 2" (7.1 x 51 mm)	TCD-92
$5/16$ " x 2" (7.9 x 51 mm)	TCD-5
$5/16$ " x $2 1/2$ " (7.9 x 63.5 mm)	TCD-5-2 $1/2$
$11/32$ " x 2" (8.7 x 51 mm)	TCD-112
$3/8$ " x 2" (9.5 x 51 mm)	TCD-6
$3/8$ " x $2 1/2$ " (9.5 x 63.5 mm)	TCD-6-2 $1/2$
$13/32$ " x 2" (10.3 x 51 mm)	TCD-132
$7/16$ " x 2" (11.1 x 51 mm)	TCD-7
$1/2$ " x 2" (12.7 x 51 mm)	TCD-8
$1/2$ " x $2 1/2$ " (12.7 x 63.5 mm)	TCD-8-2 $1/2$

Challenge Drill-Ease Lubricant Stick

Cat. No. 4688

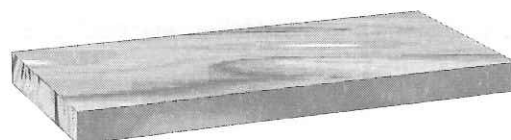
This lubricating stick provides a dry stainless lubricant which has many uses throughout the printing plant. It is specially recommended for use on hollow drills for easier drilling, particularly when drilling clay coated stock. It eliminates binding and excessive heating of the drill. Will not discolor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

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

Challenge Drilling Blocks

Cat. No. A-6626-24

These Challenge $1 1/4$ x 6" End-Wood Drilling Blocks are for round hole drilling operations. Sold in packages of 24.



ACCESSORIES FOR CHALLENGE PAPER DRILLING MACHINES



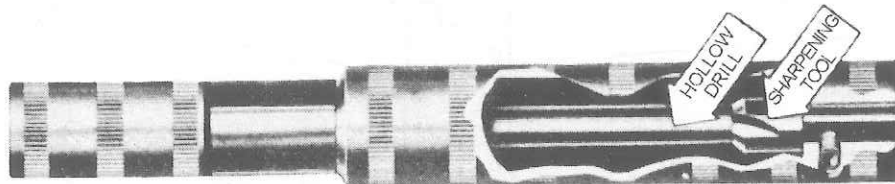
Challenge Power Sharpener

(115 Volt / 60 HZ only)
Cat. No. A-6450

A power drill sharpener. Plugs into any standard 115 volt, 60 cycle, AC outlet. Handles Challenge and other taper shank drills. Adaptors also available for handling practically all other makes.

Item	Cat. No.
Replacement Cutting Bit	6469
Resharpener Service - Your Old Bit	6469-R

HOLLOW DRILL SHARPENER *For fast, easy drill sharpening*



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 hollow drill in the tapered 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 Hollow Drill 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 sharpened.

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

Item	Cat. No.
Challenge Hollow Drill 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 drill holder section. Insert the sharpening section, being very careful to bring the drill and cutting tool together without bumping.

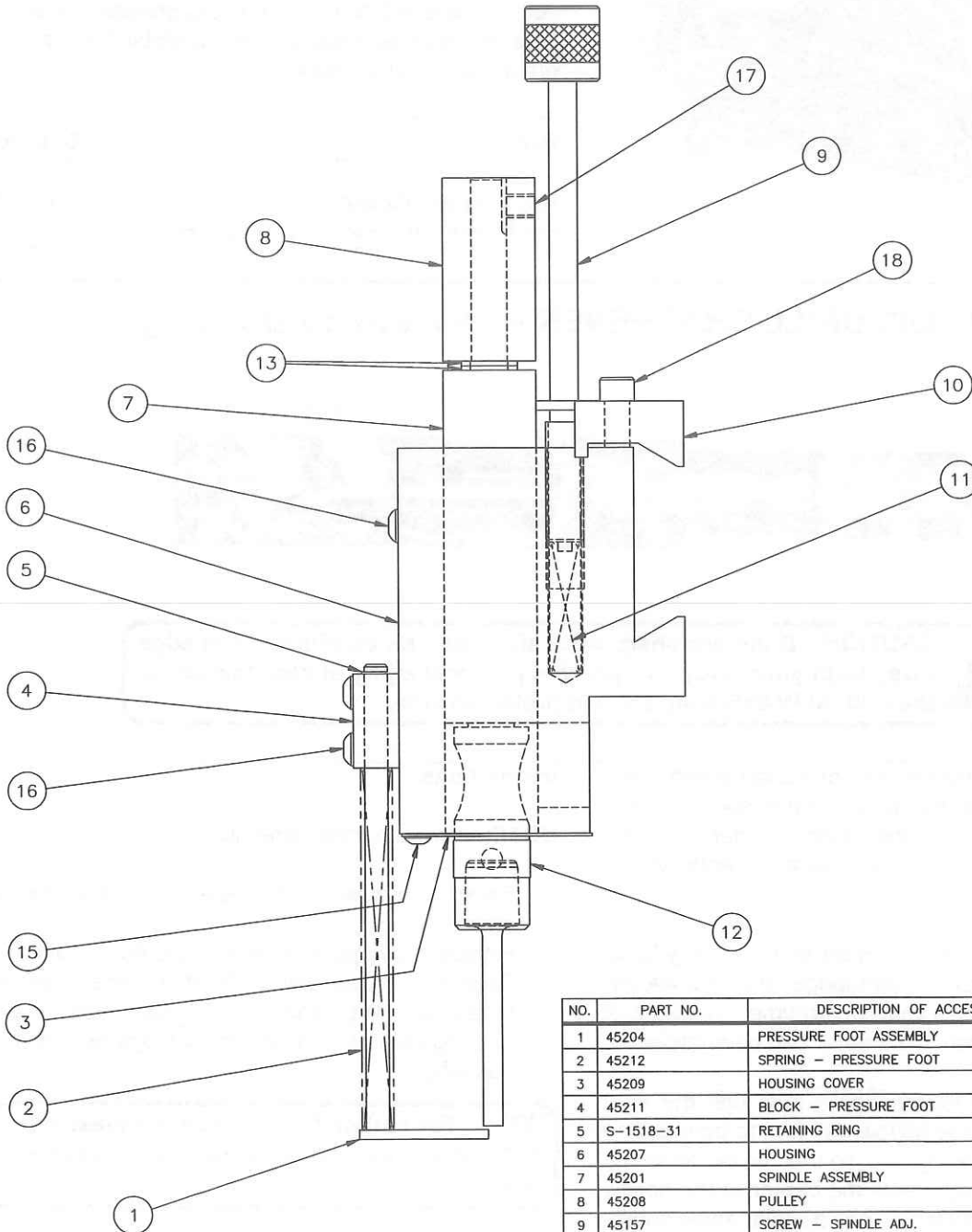
NOTE: The cutting tool is made of a glass hard material and may be chipped by careless handling.

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 it does, the bit should be sent to the factory as regrinding must be done on a diamond wheel.

ACCESSORIES FOR CHALLENGE PAPER DRILLING MACHINES

Optional Narrow Drill Head Assembly, p/n: 45200

For drilling holes with a center to center distance as low as 1-3/8"/3.5 cm



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	45204	PRESSURE FOOT ASSEMBLY	1
2	45212	SPRING - PRESSURE FOOT	2
3	45209	HOUSING COVER	1
4	45211	BLOCK - PRESSURE FOOT	1
5	S-1518-31	RETAINING RING	2
6	45207	HOUSING	1
7	45201	SPINDLE ASSEMBLY	1
8	45208	PULLEY	1
9	45157	SCREW - SPINDLE ADJ.	1
10	45210	CLAMP	1
11	35048-4	SPRING	1
12	K-85	COVER - DRILL DRIFT HOLE	1
13	20075-10	STEEL SHIM	2
14			
15	H-6910-102403	SCREW - #10-24 x 3/8 BUTTON HEAD CAP	2
16	H-6910-407	SCREW - 1/4-20 x 7/8 BUTTON HEAD CAP	3
17	H-6938-503	SCREW - 5/16 x 3/16 SOCKET SET	1
18	H-6918-510	SCREW - 5/16-18 x 1-1/4 SOCKET HEAD	2

▲ NOTICE ▲

The instructions on the following pages are for the use of trained service personnel only!

Attempting to perform repair and replacement procedures without proper training may cause machine damage or operator injury!

PARTS CUSTOMERS: The Challenge Machinery Company provides parts with the express understanding that they are to replace parts found missing or no longer serviceable on equipment designed and/or manufactured by Challenge. The Challenge Machinery Company assumes no liability for any modification or alteration to any Challenge products, and any such modification or alteration to any Challenge products is not authorized by The Challenge Machinery Company. Any modification or alteration of any Challenge product will void any remaining warranty.

TROUBLESHOOTING

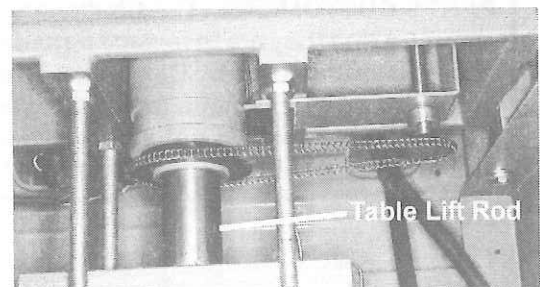


WARNING: DISCONNECT THE POWER AND LOCK IT OUT whenever working on the machine unless the instructions specifically require the machine to be powered (see Power Lockout Procedure, page 3). Several of the following tests may require the machine to be operational for checking and adjusting. Be very careful that tools and other people are clear of moving parts, and that the drill is not accidentally operated while adjustments are being made.



CAUTION: Whenever repairing hydraulic components, loosen connections slowly to bleed off any trapped pressure.

Problem	Area to Check	Solution
1. No power	Power to machine	Connect Power
	Main Disconnect Switch	Turn to ON position
	Interlocking Guards	Replace guards
	Fuse blown	Replace fuse - see fig. 2 page 8
2. Lack of power	Relief valve in pump may be bad or have dirt in it.	Clean or replace relief valve or pump.
	Check oil level - may be low.	Add oil.
	Check voltage at machine - may be low.	Remove other machinery on line or provide a dedicated line.
3. Spindle motor stalls	Dull drills.	Sharpen drills.
	Check for low voltage.	(See above).
	Check drive pulley and belt for tightness.	(See SETUP INSTRUCTIONS in main section for adjustment).
	Check for paper plugging drills	Clean out hollow drills - We recommend cleaning and soaking drills in oil overnight.
4. Table stroke won't adjust	Stroke Adjustment Chain off sprockets.	Remove back panel and replace chain (fig. 10).



(fig. 10)

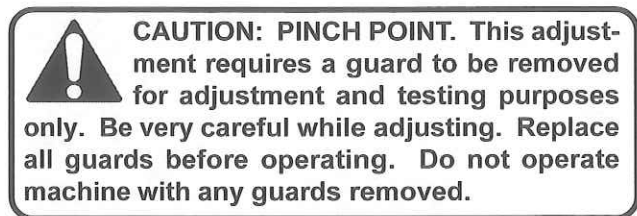
ROUTINE MAINTENANCE

General

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

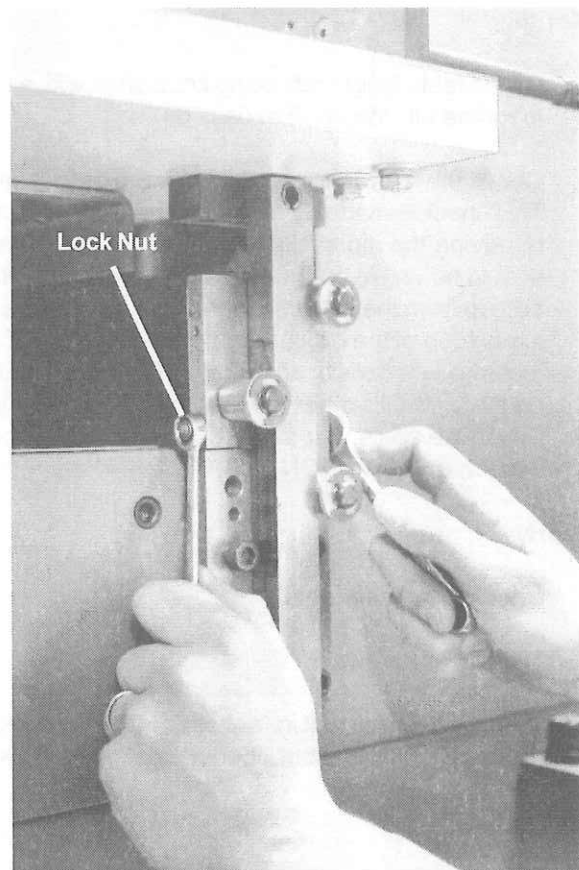
1. Recognize the fact that the user of hydraulic equipment has more control over maintenance than the manufacturer.
2. Operators should be familiar with use, care, and limitations of the equipment. **ALL OPERATORS SHOULD READ THIS MANUAL COMPLETELY.**
3. Use properly trained maintenance personnel.
4. Establish a program of systematic preventative care for your equipment or put this machine on an existing preventative maintenance program.
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.

Vertical Table Guide



The vertical table guide is located on the right side of the machine beneath the table and may need periodic adjustment to keep the table steady yet allow it and stock to fall away from the drills as rapidly as possible. The table down stroke is controlled by a return spring.

Remove the guide block cover guard. Tighten the two guide block lock nuts (fig. 11) and power the table up by pressing the foot treadle. Gradually back the lock-nuts off evenly until the table releases freely. Retest the upstroke and table return, and check the table for side play. Replace the guard.



▲ CAUTION: PINCH POINT.
Replace guard after adjusting.

(fig. 11)

SERVICE CHECKLIST

Daily

1. Keep drills sharp!
2. Lubricate the hollow drill frequently with the lubricating stick provided.
3. For better hollow drill life, remove the drills when not in use and soak in light oil. Wipe off excess oil before drilling.
4. Wipe off excess grease from the drill heads and idlers.

Weekly (or every 40 hours of operation)

1. Check belt wear/tension.
2. Oil the table lift rod between the table and stand with light oil (fig. 10).

Monthly

1. Oil the table height adjusting knob shaft with a light machine oil. Wipe off excess oil.
2. Check the hydraulic oil supply for the proper level. This check is made by removing the rear panel and removing the dip stick/plug (pg. 9, fig. 4). The oil should be visible on the dip stick but no higher than 1/2" up from the bottom when cool. This allows for expansion of the oil when hot. Use only one of the recommended oils or an ISO VG 100 Hydraulic Fluid equivalent. Oils other than the recommended type will cause seals, cups and O-rings to deteriorate. See Chart & CAUTION.

Super Hydraulic 100
Nuto H-100
Harmony 100 AW
HO 2A Hydraulic Oil
DTE No. 18
Pennzoil AW 100
Magnus A Oil 215
Tellus 100
Energol HLP 100
Industron 100
Sunvis 851 WR
Rando HD 100
Unax AW 100

Conoco
Exxon
Gulf
Lubriplate
Mobil
Pennzoil
Phillips
Shell
Sohio
Std. Oil Indiana/Boron
Sunoco
Texaco
Union Oil Co.

Yearly

1. Check all adjustments.
2. Tighten all screws.
3. Change hydraulic oil in reservoir. Oil may have to be changed more often if contamination of any kind gets in the oil.

Hydraulic

Through normal use, hydraulic systems gum up and seals wear. Signs of wear are hydraulic leaks and erratic operation of the vertical speed. Check with your Authorized Challenge Dealer for a current repair and/or replacement policy.

Drill Heads

Through normal use, bearings will wear and need replacing. Signs of wear are excessive noise, heat, or loose spindles.



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.

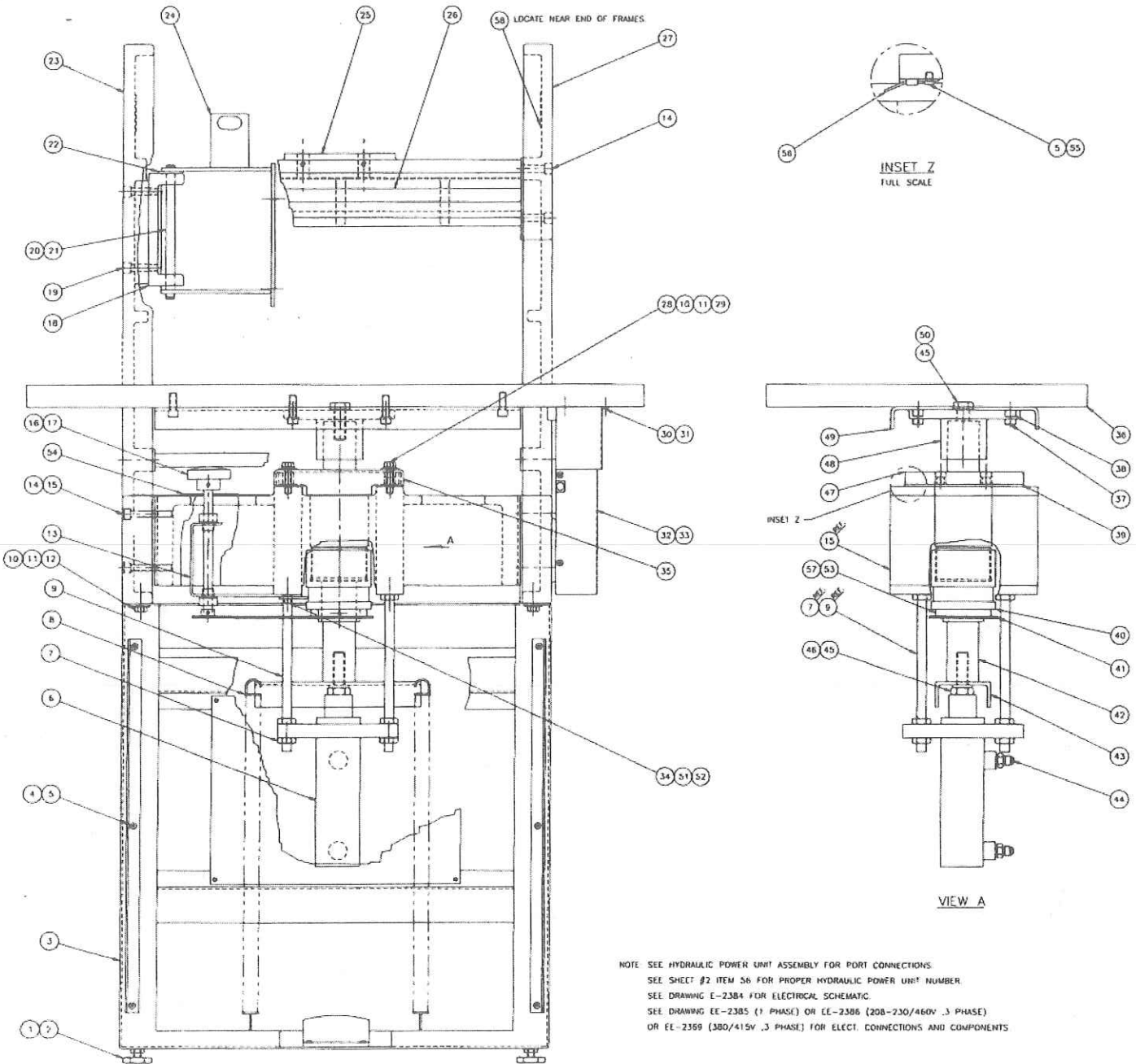
Recommended Oils

Oil Name	Distributor
Rykon No. 100	AMOCO
Duro AW Oil 465	Arco
AW Machine Oil 100	Chevron
Pacemaker XD No. 100	Citgo

NOTES

MAIN ASSEMBLY - FRONT VIEW

45000 SHEET 1

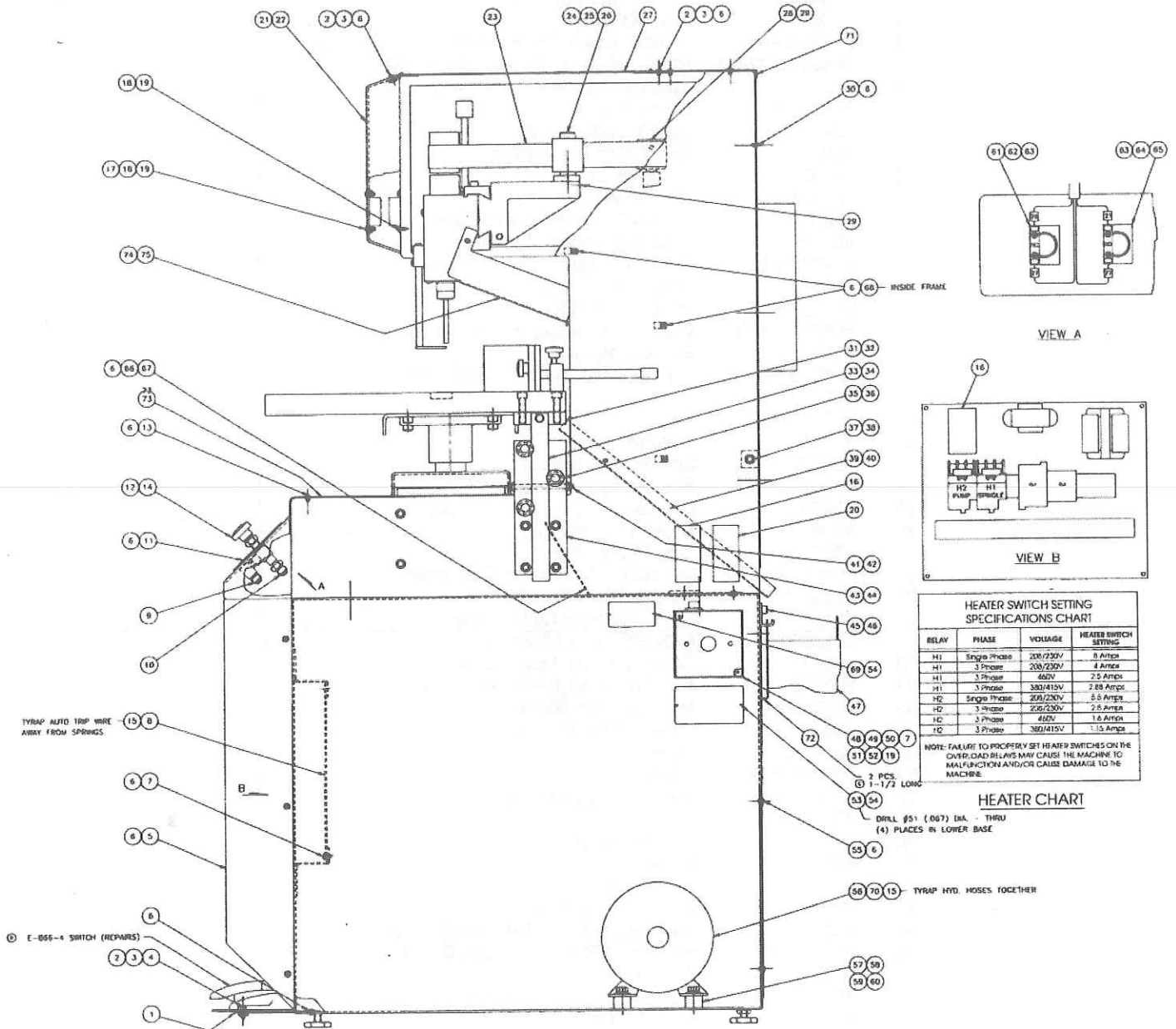


NOTE: SEE HYDRAULIC POWER UNIT ASSEMBLY FOR PORT CONNECTIONS.
 SEE SHEET #2 ITEM 56 FOR PROPER HYDRAULIC POWER UNIT NUMBER.
 SEE DRAWING E-2384 FOR ELECTRICAL SCHEMATIC.
 SEE DRAWING EE-2385 (1 PHASE) OR EE-2386 (208-230/460V, 3 PHASE)
 OR EE-2389 (380/415V, 3 PHASE) FOR ELECT. CONNECTIONS AND COMPONENTS.

MAIN ASSEMBLY - FRONT VIEW 45000 SHEET 1

Ref. No.	Part No.	Part Name	Qty.
1.	16543	Leveler	4
2.	H-6424-6	3/8-16" Hex Jam Nut	4
3.	45051	Base Assembly	1
4.	H-7324-#8	Bracket, Lower Base Cover	1
5.	H-6910-102404	10-24x1/2" Butt.Hd.Soc.Cap Screw	7
6.	H-377	Hydraulic Cylinder	1
7.	H-6424-8	1/2-13" Hex Jam Nut	12
8.	8843-1	Spring, Table Return	2
9.	45007	Rod, Cylinder Mounting	4
10.	H-7327-12	3/8" Med. Lockwasher	8
11.	H-7321-5	38" Flat Washer	8
12.	H-6913-606	3/8-16x1" Hex Hd.Cap Screw	4
13.	45136	Table Adjustment Assembly	1
14.	H-6918-616	3/8-16 x 2" Soc.Hd. Cap Screw	14
15.	45073	Brace, Cross	1
16.	S-1753	Knob, Table Adj.	1
17.	H-6939-103204	#10-32NFx1/4"Cup Pt.Soc.Set Screw	1
18.	45070	Bracket, Motor	1
19.	H-6918-612	3/8-18x1-1/2" Soc.Hd.Cap Screw	2
20.	45001	Pin, Motor	1
21.	S-1139-50	1/2" E-ring	2
22.	11288	Washer, Nylon	1
23.	45077	Side Frame, L.H.	1
24.	45002	Bracker Asm., Motor	1
25.	45079	Dovetail	1
26.	45065	Scale, Drill Head	1
27.	45075	Side Frame, R.H.	1
28.	H-6913-612	3/8-16x1-1/2" Hex Hd. Cap Screw	4
29.	11288-1	Washer, Nylon	4
30.	45117	Cover, Vertical Table Guide	1
31.	S-1088-5	#10x5/8" Type AB Screw	2
32.	45017	Cover, Vertical Table Guide	1
33.	H-6910-102404	#10-24x1/4" Butt.Hd.Cap Screw	4
34.	H-7319-4	1/4" USS Flat Washer	2
35.	45092	Cover, Table Rod Guide	1
36.	45011-1	Table	1
37.	H-6918-610	3/8-18x1-1/4" Soc.Hd.Cap Screw	4
38.	H-6918-608	3/8-18x1" Soc.Hd.Cap Screw	4
39.	43084	Isolator	2
40.	45131	Nut, Adjusting	1
41.	45135	Chain	1
42.	45115-1	Rod, Table	1
43.	45037	Bracket, Return Spring	1
44.	H-238-3	Adapter, 9/16-18" SAE O-ring Tube	2
45.	H-6913-1012	5/8-11x1-1/2" Hex Hd. Cap Screw	2
46.	H-7327-20	5/8" Med. Lockwasher	1
47.	45137	Guide Assmbly, Table Rod	1
48.	45116	Bracket, Table Mounting	1
49.	45120-1	Bracket, Table Support	1
50.	H-7324-20	5/8" Internal Tooth Lockwasher	1
51.	45118	Stop, Table Travel	1
52.	H-6918-405	1/4-20x5/8" Soc.Hd.Cap Screw	2
53.	45138	Sprocket, Table Adjustment	1
54.	45142	Decal, Table Adjustment	1
55.	H-7330-#10	#10 Ext. Tooth Lockwasher	1
56.	EE-2425	Wire Assembly, Auto Trip	ref.
57.	H-6938-102404	1/4-20x1/4" Soc.Set Screw	2
58.	S-1781-16	Lable, Caution	2

MAIN ASSEMBLY - SIDE VIEW 45000 SHEET 2



HEATER SWITCH SETTING SPECIFICATIONS CHART

RELAY	PHASE	VOLTAGE	HEATER SWITCH SETTING
H1	Single Phase	220/230V	8 Amps
H1	3 Phase	208/230V	4 Amps
H1	3 Phase	460V	2.5 Amps
H1	3 Phase	380/415V	2.88 Amps
H2	Single Phase	220/230V	5.5 Amps
H2	3 Phase	208/230V	2.8 Amps
H2	3 Phase	460V	1.6 Amps
H2	3 Phase	380/415V	1.15 Amps

NOTE: FAILURE TO PROPERLY SET HEATER SWITCHES ON THE OVERLOAD RELAYS MAY CAUSE THE MACHINE TO MALFUNCTION AND/OR CAUSE DAMAGE TO THE MACHINE.

HEATER CHART

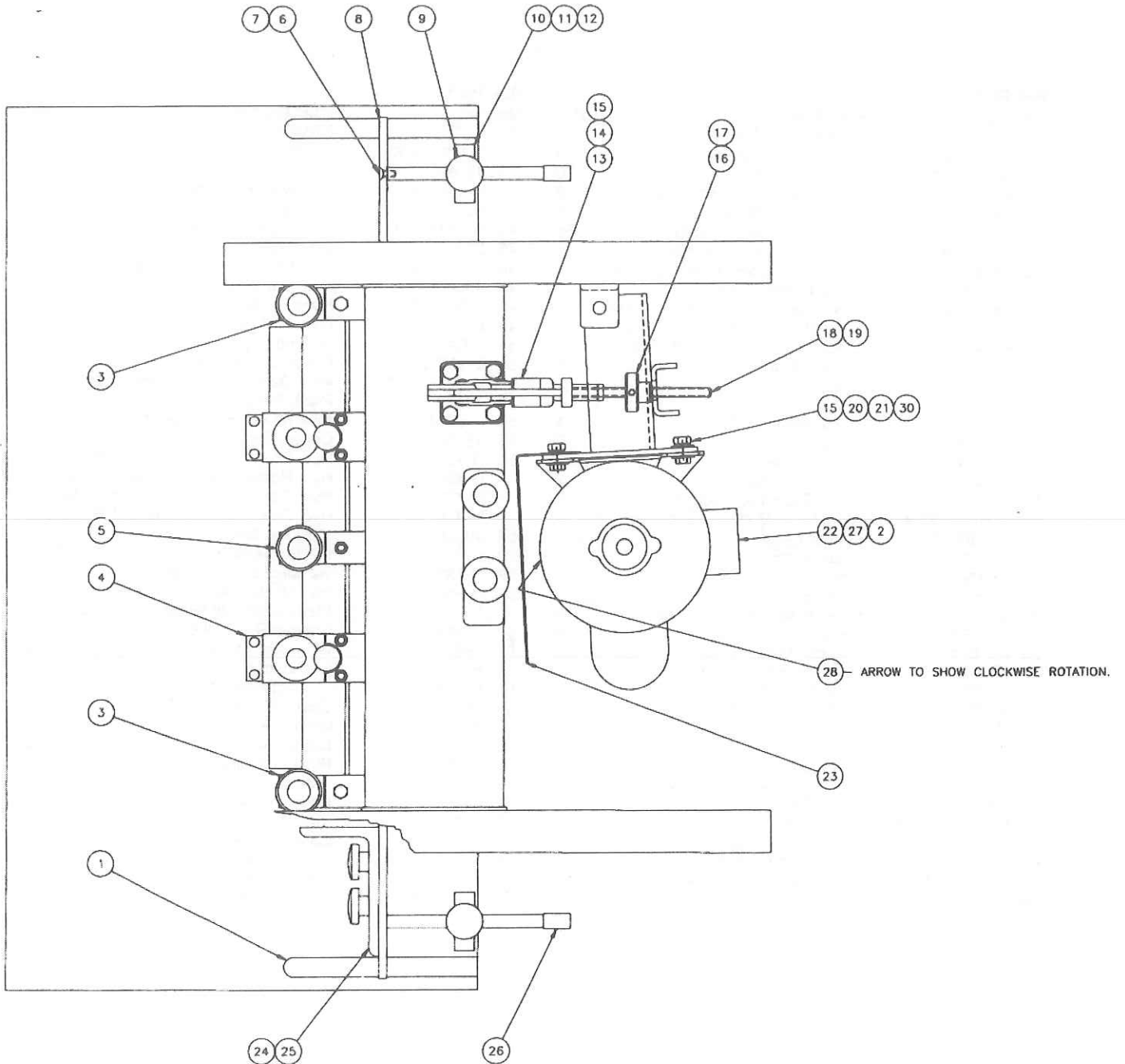
DRILL #51 (.067) DIA. - THRU
(4) PLACES IN LOWER BASE

MAIN ASSEMBLY - SIDE VIEW

45000 SHEET 2

Ref. Part No. No.	Part Name	Qty.	Ref. Part No. No.	Part Name	Qty.
1. 45078	Bracket, Foot Treadle	1	39. 45032	Chip Chute, Lower	1
2. H-7324-#10	#10 Int. Tooth Lockwasher	10	40. H-5254-408	¼ - 20 x ¾" Soc. Shoulder Scr.	2
3. H-6423-#10	#10 - 24 Hex Nut	10	41. 45080-1	Stud, Table Guide	1
4. H-6918-102406	#10 - 24 x ¼" Soc. Hd. Cap. Scr.	2	42. H-5248-4	¼ - 28 Flex Lock Nut	2
5. 45048	Cover, Lower Base	1	43. 45012	Vertical Table Guide Assembly	1
6. H-6910-102404	#10 - 24 x ½" Butt. Hd. Soc. Cap. Scr.	54	44. H-6918-808	¾ - 16 x 1" Soc. Hd. Cap. Scr.	4
7. H-7330-#10	#10 Ext. Tooth Lockwasher	5	45. 5870	Hook, Chip Bag	2
8. EE-2369	Power Panel (380/415V) 3 phase	1	46. H-6918-504	¾ - 18 x ½" Soc. Hd. Cap. Scr.	2
EE-2385	Power Panel - 1 phase	1	47. 45061	Chip Bag Assembly	1
EE-2386	Power Panel (208-230V.) 3 phase	1	48. E-530-10	Fuse Holder	1
9. H-237-5	Elbow 90°, ½ NPT x ¾ - 18 Tube	1	49. E-1075-1	Fuse, 1 Amp	1
10. H-241-5	Adapter, ½ NPT x ¾ - 18" Tube	1	50. E-640-1	Ground Lug	1
11. 45110	Panel, Console	1	51. E-1369-1	Cover, Junction Box	1
12. 4771-1	Valve	1	52. H-6927-103204	#10 - 32 x ¼" Rd. Hd. Mach. Scr.	1
13. 45081	Cover	1	53. 14050	Plate, Serial Number	1
14. H-7322-8	½" Polished Washer	1	54. H-6924-004	#0 x ¼" Rd. Hd. Drive Scr.	4
15. S-1694	Tyrap	2	55. 45056	Cover, Rear	1
16. S-1781-12	Caution Label	2	56. H-407	Hyd. Power Unit Assembly (3 Ph 60 C) 1	1
17. H-6423-#8	#8 - 32 Hex Nut	2	H-408	Hyd. Power Unit Assembly (3 Ph 50 C) 1	1
18. H-7324-#8	#8 Int. Tooth Lockwasher	4	H-379	Hyd. Power Unit Assembly (1 Ph 50 C) 1	1
19. H-6910-83204	#8 - 32 x ½" Butt. Hd. Soc. Cap. Scr.	4	H-378	Hyd. Power Unit Assembly (1 Ph 60 C) 1	1
20. S-1781-15	Caution Label	1	57. 40016-2	Vibration Mount	4
21. 45047	Cover, Front	1	58. H-7321-5	⅝" Flat washer	4
22. 45109	Label	1	59. H-7327-10	⅝" Med. Lockwasher	4
23. 45160	Drive belt	1	60. H-6423-5	⅝ - 18 Hex Nut	4
24. 45129	Pulley Assembly (uncrowned)	2	61. E-2074-1	Pushbutton, Off (Red)	1
25. 20075-7	Shim	2	62. E-1839-8	Contact Block, N.C.	1
26. 45040-1	Pin, Idler Pulley	2	63. 16520	Ring, Anti-rotation	2
27. 45043	Cover Assembly, Top	1	64. E-2074	Pushbutton, On (Green)	1
28. 45103	Drive Pulley, 60hz	1	65. E-1839-9	Contact Block, N.O.	1
45103-1	Drive Pulley, 50hz	1	66. 45147	Cover, Power Base Top	1
29. H-6938-404	¼ - 20 x ¼" Cup Pt. Soc. Set Scr.	3	67. 8254-2	Grommet	1
30. 45145-1	Cover Assembly, Rear	1	68. S-1694-2	Cable Tie	3
31. 45015	Block, Guide	1	69. E-1503-M	Fuse Specification Plate	1
32. H-6918-612	¾ - 16 x 1½" Soc. Hd. Cap. Scr.	2	70. E-1237-2	Wire Nut (3 Phase Only)	3
33. 45016	Guide, Vertical	1	71. 45150	Cover - Corner	1
34. H-21S-500-1750	½ x 1½" Roll Pin	1	72. 7032-M	Trim - Plastic	3
35. S-1073-50	½" Retaining Ring	3	73. S-1781-16	Caution Label	1
36. A-10257-8	Bearing, Flanged (bronze)	1	74. H-215-250-1250	¼ x 1½ Roll Pin	2
37. H-6918-616	¾ - 16 x 2" Soc. Hd Cap. Scr.	2	75. 45159	Chip Chute	1
38. 45107	Tiebar	1	76. S-1781-31	Label, Single Operator	1

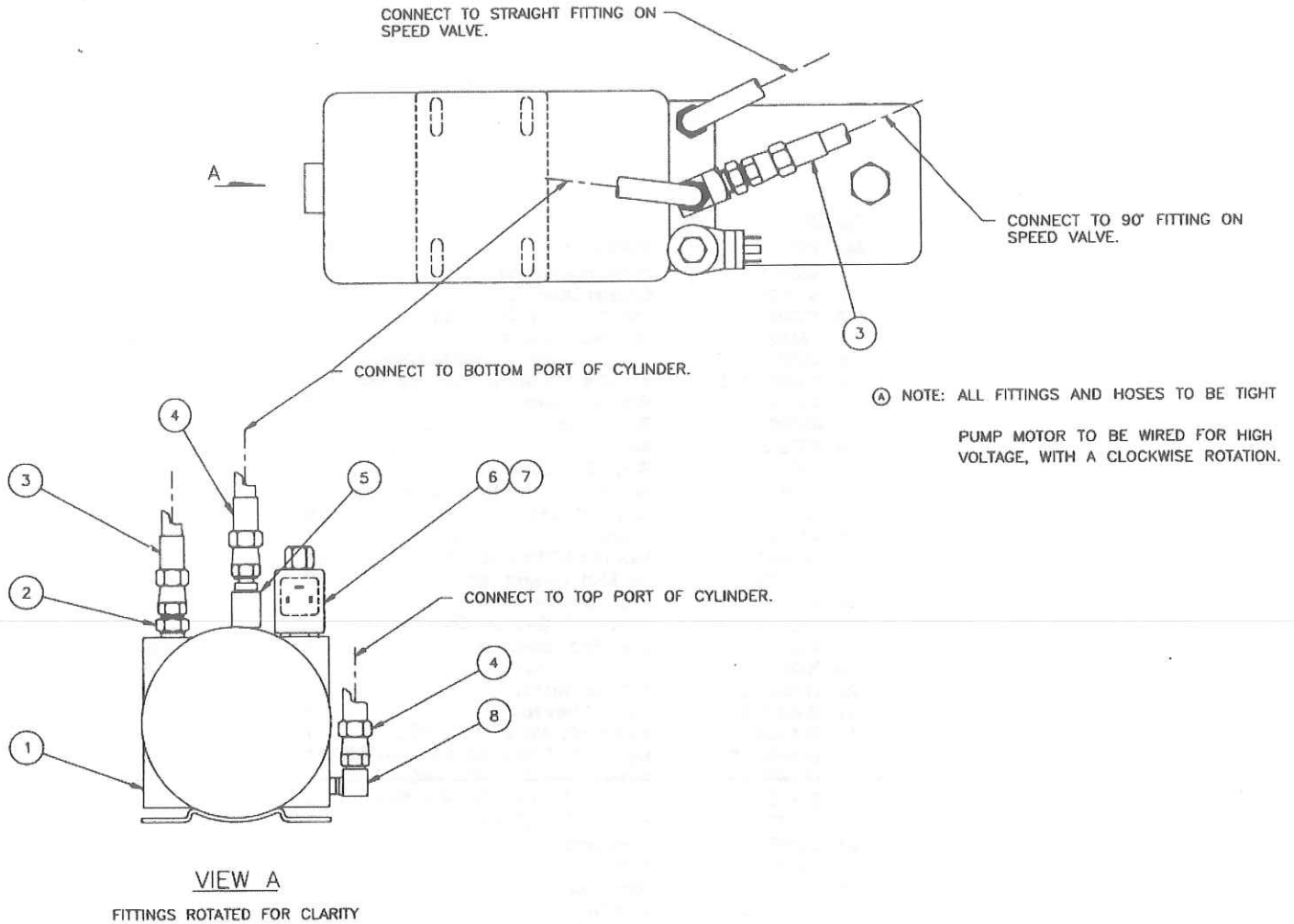
MAIN ASSEMBLY - TOP VIEW
45000 SHEET 3



MAIN ASSEMBLY - TOP VIEW 45000 SHEET 3

Ref. Part No. No.	Part Name	Qty.
1. 4636-3	Scale, B/G Position	2
2. S-1781-12	Caution Label	1
3. 45035	Idler Assembly, Stationary	2
4. 45152	Drill Head Assembly	3
5. 45161	Idler Assembly, 2 Head Machine	1
6. H-6909-405	1/4 - 20 x 3/8" Flat Hd. Soc. Cap. Scr.	2
7. 45018	Rod, B/G Guide	2
8. 45020	Backgauge	1
9. 8273-3	Knob	2
10. 45019	Block, B/G Guide	2
11. H-6913-614	3/8 - 18 x 1 1/4" Hex Hd. Cap. Scr.	4
12. H-7321-6	3/8" Flat Washer	4
13. 45006	Clamp	1
14. H-6913-506	3/16 - 18 x 3/4" Hex Hd. Cap Scr.	4
15. H-7327-10	3/16" Med. Lockwasher	8
16. 45060	Knob, Belt Tensioner	1
17. H-6964-404	1/4 - 20 x 1/4" Soc. Set Scr. (brass tip)	1
18. 45059	Stud, Belt Tensioner	1
19. H-6423-8	3/8 - 16" Hex Nut	1
20. H-7321-5	3/16" Flat Washer	4
21. H-6423-5	3/16 - 18" Hex Nut	4
22. E-1600-190	Motor (208-230 V. 1PH. 50C.)	1
E-1600-189	Motor (200-230/380-415 V. 3PH. 50C.)	1
E-1600-192	Motor (208-230 V. 1PH. 60C.)	1
E-1600-191	Motor (208-230/460V. 3PH. 60C.)	1
23. 45146	Bracket, Chip Deflector	1
24. 45066	Sideguide	2
25. 8278-4	Knob	4
26. 45143	Vinyl Cap	2
27. E-1237-2	Wire Nut	3
28. S-1106	Decal, Motor Arrow	1
29. 45106-1	Tool Kit	(Not Shown)
30. H-6913-508	3/16-18 x 1" Hex Hd. Cap Screw	4

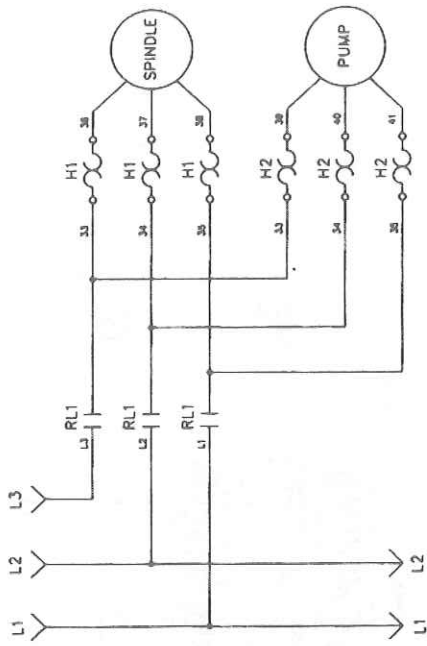
HYDRAULIC POWER UNIT ASSEMBLY
H-378 (60 HZ 1 PHASE); H-379 (50HZ 1 PHASE)
H-407 (60 HZ 3 PHASE); H-408 (50HZ 3 PHASE)



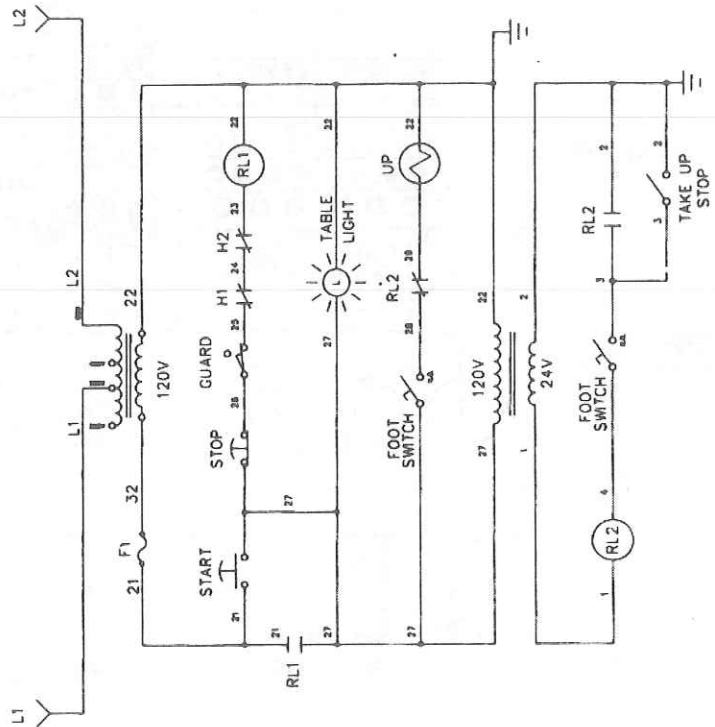
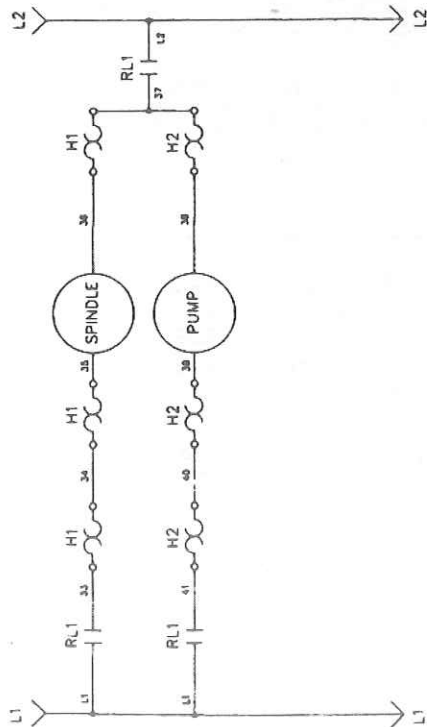
Ref. Part No. No.	Part Name	Qty.
1. H-372	Hyd. Power Unit, 208/230V 60C 1 Ph	ref.
H-373	Hyd. Power Unit, 208/230V 50C 1 Ph	ref.
H-405	Hyd. Power Unit, 208-230/460V 60C 3 Ph	ref.
H-406	Hyd. Power Unit, 208-230/380-415V 50C 3 Ph	ref.
2. H-241-6	Adapter, 3/8" NPT to 1/4" Tube	1
3. H-242-10	Hydraulic Hose Assembly 39" long	2
4. H-242-41	Hydraulic Hose Assembly 25" long	2
5. H-263-2	Tee	1
6. H-200-5	Solenoid Cartridge	ref.
7. E-1069-13	Coil	ref.
8. H-237-4	Elbow 1/4" NPT to 1/4" Tube	1

BASIC MACHINE SCHEMATIC E-2384

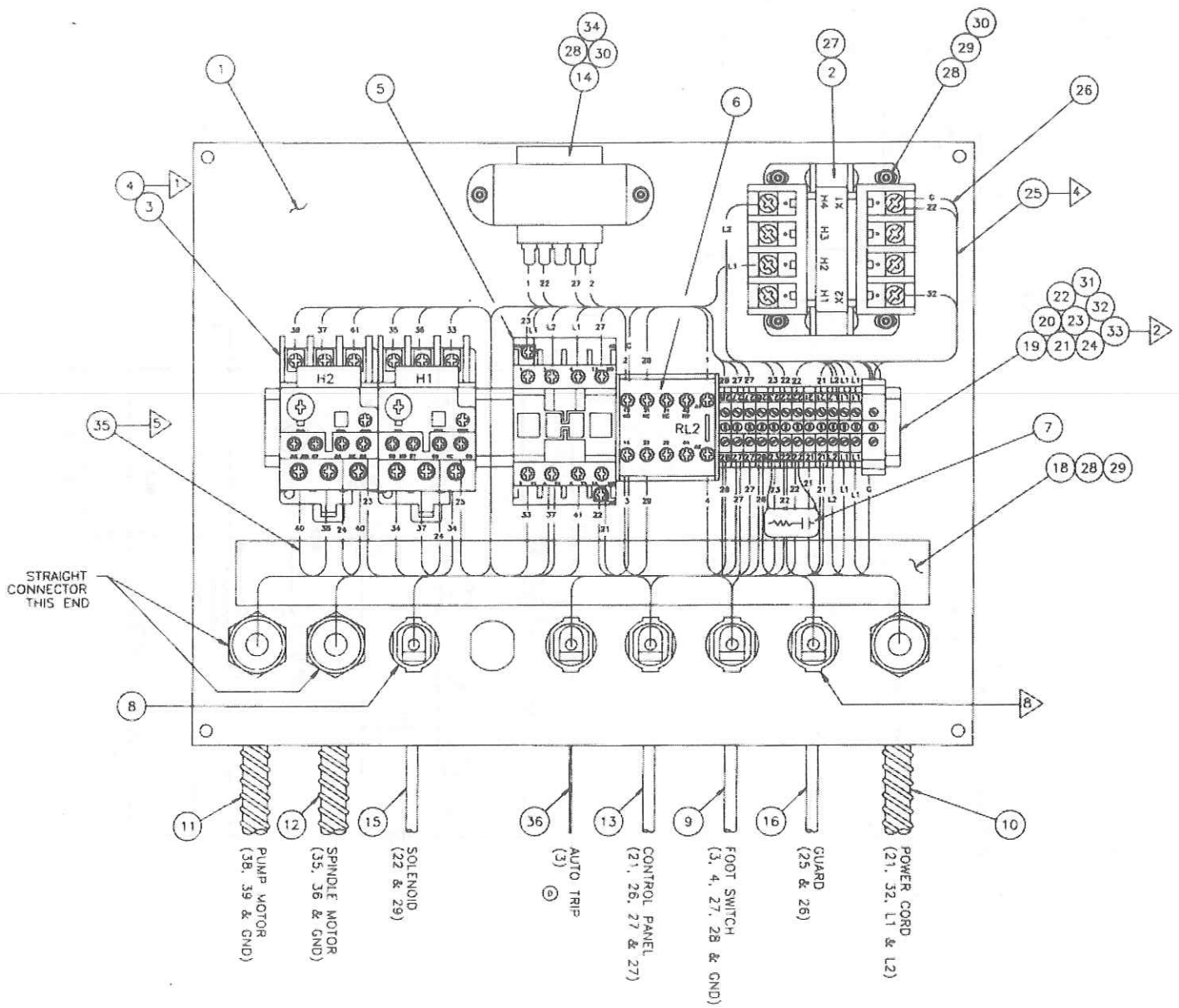
THREE PHASE
HOOK-UP



SINGLE PHASE
HOOK-UP



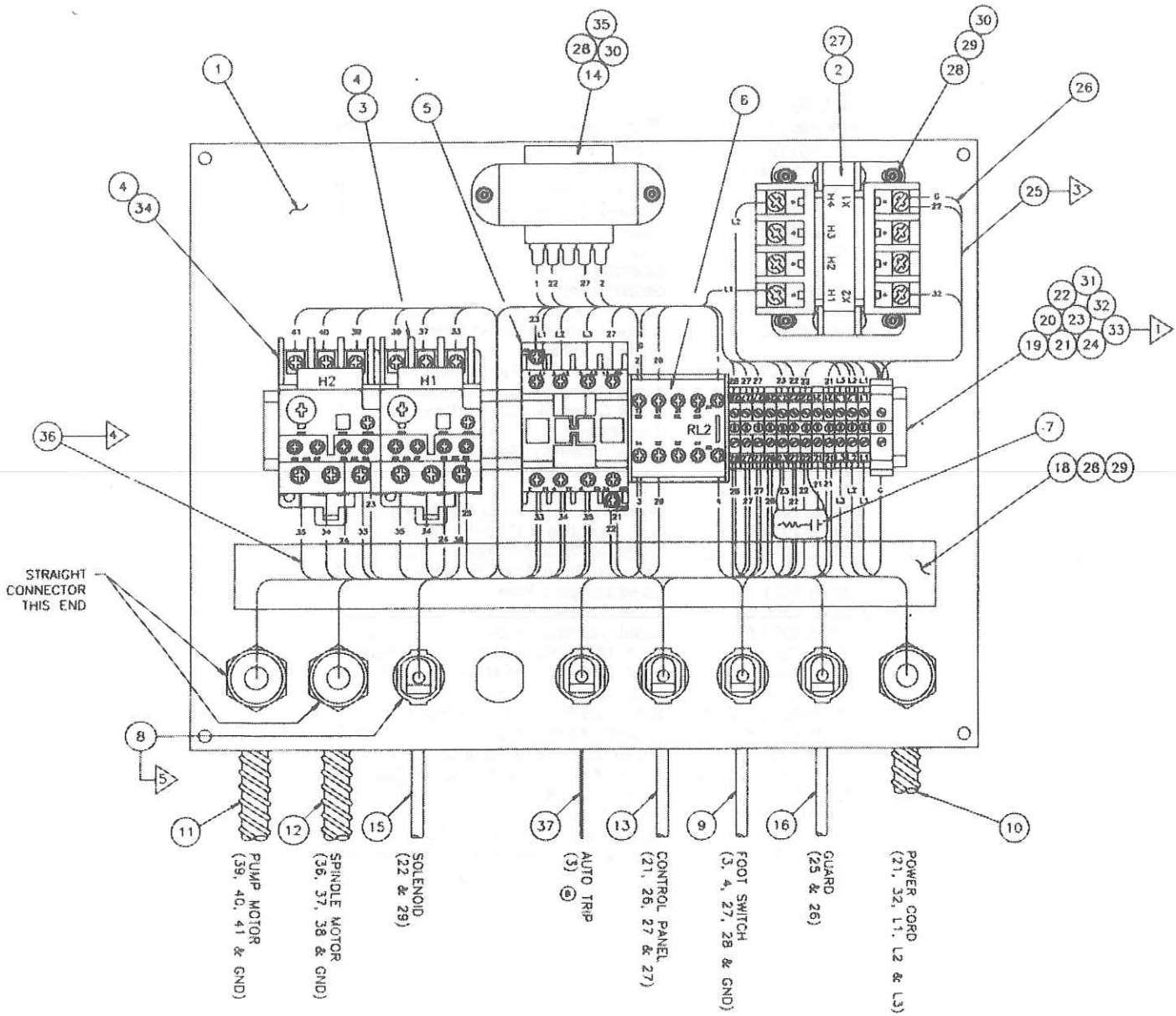
POWER PANEL ASSEMBLY 1 PH
208/230 V - 60 Hz
EE-2385



POWER PANEL ASSEMBLY 1PH
208/230 V - 60 Hz
EE-2385

Ref. Part No. No.	Part Name	Qty.
1. 45119	Panel, Electrical	1
2. E-1089-33	Transformer	1
3. E-2441	Overload Relay	2
4. E-2445	Bracket, Overload Relay	2
5. E-2400	Starter	1
6. E-2403	Relay	1
7. E-1736	Quencharc	1
8. S-1350-16	Strain Relief	5
9. EE-2399	Cable Assembly, Footswitch	1
10. EE-2391	Cable Assembly, Power Cord /Fuse (1 Phase)	1
11. EE-2392	Cable Assembly, Pump Motor	1
12. EE-2393	Cable Assembly, Spindle Motor	1
13. EE-2394	Cable Assembly, Control Panel	1
14. E-1623-4	Transformer	1
15. EE-2396	Cable Assembly, Solenoid	1
16. E-2397	Switch, Magnetic Position	1
17.		
18. E-1429-4	Wiring Duct and Cover (12" Long)	1
19. E-1977-7	Rail, Mounting (11" Long)	1
20. E-2068-3	Terminal Block, Ground	1
21. E-2068-4	Terminal Block, Feed Through	12
22. E-2071-2	Fixed Bridge, 2 Pole	4
23. E-1336-58	Label, Terminal Block	1
24. E-1356-57	Label, Terminal Block	1
25. E-709-R	Wire, 18 Ga. Red MTW	as needed
26. E-709-G	Wire, 18 Ga. Green MTW	as needed
27. E-1214-4	Fork, Insulated, Locking	7
28. H-6910-83202	Screw, #8-32 x 1/4" But Hd Soc Cap	9
29. H-7321-#8	Washer, #8 USS Flat	7
30. H-7330-#8	Lockwasher, #8 Shakeproof	6
31. H-6910-102402	Screw, #10-24 x 1/4" But Hd Soc Cap	4
32. H-7330-#10	Lockwasher, #10	4
33. H-7321-#10	Washer, #10 USS Flat	4
34. E-1214-51	Connector, .187 Fully Ins. Quick Disc.	4
35. E-849-R	Wire, #18 Ga. Red MTW	as needed
36. EE-2425	Wire Assembly, Auto Trip	1

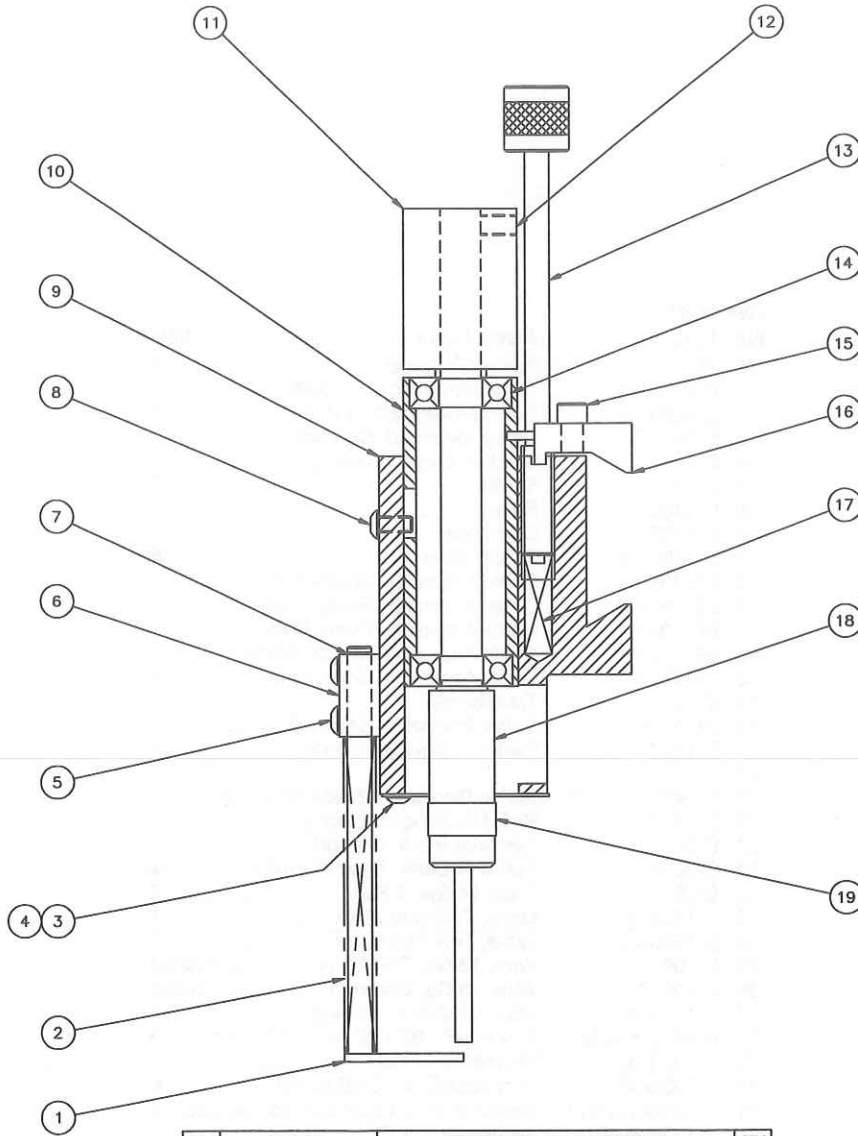
POWER PANEL ASSEMBLY 3PH
EE- 2386 (3PH 208-230V/460 V 60 Hz)
EE-2369 (3PH (380/415 V. 50HZ))



POWER PANEL ASSEMBLY
EE- 2386 (3PH 208-230V/460 V 60 Hz)
EE-2369 (3PH 380/415 V. 50HZ)

Ref. Part No. No.	Part Name	Qty.
1. 45119	Panel, Electrical	1
2. E-1089-33	Transformer (208 - 230/460 V.)	1
E-1089-35	Transformer (380 - 415 V.)	1
3. E-2441-3	Relay, Overload (Spindle)	1
4. E-2445	Bracket, Overload Relay	2
5. E-2400	Starter	1
6. E-2403	Relay	1
7. E-1736	Quencharc	1
8. S-1350-16	Strain Relief	5
9. EE-2399	Cable Assembly, Footswitch	1
10. EE-2391-1	Cable Assembly, Power Cord	1
11. EE-2392-1	Cable Assembly, Pump Motor	1
12. EE-2393-1	Cable Assembly, Spindle Motor	1
13. EE-2394	Cable Assembly, Control Panel	1
14. E-1623-4	Transformer	1
15. EE-2396	Cable Assembly, Solenoid	1
16. E-2397	Switch, Magnetic Location	1
17.		
18. E-1429-4	Wiring Duct and Cover (12" Long)	1
19. E-1977-7	Rail, Mounting (11" Long)	1
20. E-2068-3	Terminal Block, Ground	1
21. E-2068-4	Terminal Block, Feed Through	12
22. E-2071-2	Fixed Bridge, 2 Pole	3
23. E-1336-60	Label, Terminal Block	1
24. E-1356-61	Label, Terminal Block	1
25. E-709-R	Wire, 18 Ga. Red MTW	as needed
26. E-709-G	Wire, 18 Ga. Green MTW	as needed
27. E-1214-4	Fork, Insulated, Locking	7
28. H-6910-83202	Screw, #8 - 32 x 1/4" But Hd Soc Cap	9
29. H-7321-#8	Washer, #8 USS Flat	7
30. H-7330-#8	Lockwasher, #8 Shakeproof	6
31. H-6910-102402	Screw, #10 - 24 x 1/4" But Hd Soc Cap	4
32. H-7330-#10	Lockwasher, #10	4
33. H-7321-#10	Washer, #10 USS Flat	4
34. E-2441-2	Relay, Overload (Pump)	1
35. E-1214-51	Connector, .187 Fully Ins. Quick Disc.	4
36. E-849-R	Wire, #18 Ga. Red MTW	as needed
37. EE-2425	Wire Assembly, Auto Trip	1

DRILL HEAD ASSEMBLY 45152



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	45126	PRESSURE FOOT ASSEMBLY	1
2	4629-1	SPRING - PRESSURE FOOT	2
3	45158	COVER - HOUSING	1
4	H-6910-102403	#10-24 X 3/8 BUTTON HEAD CAP SCREW	2
5	H-6910-407	1/4-20 X 7/8 BUTTON HEAD CAP SCREW	2
6	45125	BLOCK PRESSURE FOOT	1
7	S-1518-37	RETAINING RING	2
8	H-6910-404	1/4-20 X 1/2 BUTTON HEAD CAP SCREW	1
9	45153	HOUSING	1
10	45156	SLEEVE	1
11	45154	PULLEY	1
12	H-6938-506	5/16-18 X 3/8 SOCKET SET SCREW	1
13	45157	SCREW - SPINDLE ADJUSTING	1
14	S-706	BEARING	2
15	H-6918-510	5/16-18 X 1-1/4 SOCKET HEAD CAP SCREW	2
16	45090	CLAMP - HOUSING	1
17	35048-4	SPRING	1
18	45155	SPINDLE	1
19	K-85	COVER - DRILL DRIFT HOLE	1

NOTES

