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These manuals are for reference only. These manuals include products which are non-current, unsupported or no longer produced by The Challenge Machinery Company, and are provided solely as an accomodation to our customers. By providing these manuals, The Challenge Machinery Company makes no representation or warranty as to the products, their current condition, or their suitability or fitness for use in any particular application, which are the sole and independent responsibility of the product owner and user.

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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 Numbers 995774 & Up

# TECHNICAL SERVICE AND PARTS MANUAL



**The Challenge Machinery Company**  
6125 Norton Center Drive  
Norton Shores, MI 49441-6081 USA

ChallengeMachinery.com

## MODEL EH-3C PAPER DRILLING MACHINE

*Sold and Serviced by*

**F. 352-KT**

August 2003

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# 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.



**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. See SAFETY PRECAUTIONS, page v.

- 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.

**FOR PARTS AND SERVICE** contact the Authorized Challenge Dealer from whom you purchased your machine. **Always give the SERIAL NUMBER and MODEL** of your machine to insure that the correct parts are sent as soon as possible.

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# TABLE OF CONTENTS

INTRODUCTION .....	ii
SAFETY PRECAUTIONS .....	v
CAUTION: POWER LOCK-OUT PROCEDURE .....	v
WARNING LABEL DEFINITIONS .....	vi
1.0 MAINTENANCE .....	1-1
1.1 TROUBLESHOOTING .....	1-2
1.2 ROUTINE MAINTENANCE .....	1-3
1.2.1 Daily .....	1-3
1.2.2 Weekly .....	1-3
1.2.3 Monthly .....	1-3
1.2.4 Yearly .....	1-3
1.3 ADJUSTMENTS .....	1-3
1.3.1 Table Position Adjustment .....	1-3
1.3.2 Belt Tightness Adjustment .....	1-4
1.4 DRILL HEAD REPLACEMENT .....	1-5
1.4.1 Side Head Bearing Replacement .....	1-5
1.4.2 Center Head Bearing Replacement .....	1-6
1.5 HYDRAULIC .....	1-6
1.5.1 Recommended Oils .....	1-6
2.0 PARTS LISTS .....	2-1
MAIN ASSEMBLY - FRONT VIEW .....	2-2
MAIN ASSEMBLY - UPPER RIGHT VIEW .....	2-4
MAIN ASSEMBLY - LOWER RIGHT VIEW .....	2-6
MAIN ASSEMBLY - TOP VIEW .....	2-7
MAIN ASSEMBLY - WIRING .....	2-8
ELECTRICAL POWER PANEL ASSEMBLY .....	2-10
HYDRAULIC/BASE ASSEMBLY .....	2-12
HYDRAULIC POWER UNIT ASSEMBLY .....	2-14
HYDRAULIC POWER UNIT .....	2-15
TABLE ASSEMBLY .....	2-16
BACKGAUGE ASSEMBLY .....	2-18
OPTIONAL AUTO-TRIP BACKGAUGE ASSEMBLY .....	2-20
SPINDLE HEAD ASSEMBLY, RIGHT HAND .....	2-22
SPINDLE HEAD ASSEMBLY, LEFT HAND .....	2-23
OPTIONAL DRILL SHIELD KIT .....	2-24

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# NOTES

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# SAFETY PRECAUTIONS

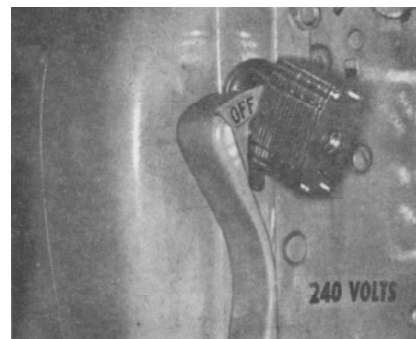


This safety symbol means CAUTION/WARNING - PERSONAL SAFETY INSTRUCTION. Read the instructions because it has to do with safety. Failure to comply with the following instructions may result in personal injury.

- 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. 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.
- ALWAYS WEAR SAFETY GLASSES when operating the drill machine.
- Have your electrician make sure the machine is properly grounded.
- Have your electrician check for sufficient power to operate the machine properly.
- 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

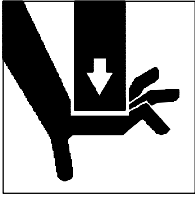
For maximum safety when making adjustments or repairs to your machine, be sure to lock out the main power control switch to which the machine is connected. The switch should be thrown to the OFF position and a padlock placed in the loop. The key should be held by the person servicing the machine.



(fig. i)

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## WARNING LABEL DEFINITIONS



### CUT/CRUSH HAZARD

Keep hands from under drills.



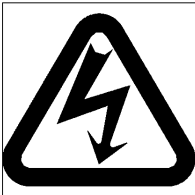
### SINGLE OPERATOR

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.

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## 1.0 MAINTENANCE

# ⚠ 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.



## 1.1 TROUBLESHOOTING



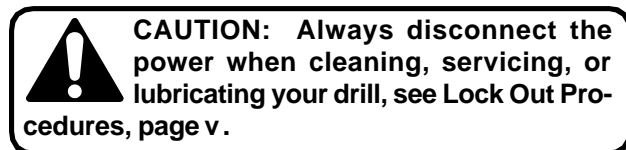
**WARNING: DISCONNECT THE POWER AND LOCK IT OUT** whenever working on the machine unless the instructions specifically require the machine to be powered (see Power Lockout Procedure, page v). Some of the following tests may require the machine to be operational for checking and adjusting. Be very careful 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
	Fuse blown	Replace fuse
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. Drill head won't return	Check lift springs - may be broken or stuck (replace if necessary).	Pry up head, clean & oil shafts.
	Pull down shafts froze in frame.	Pry up head, clean & oil shafts.
4. Drill head won't come down	Check for broken lift spring - may be jammed.	Replace spring.
	Speed control valve out of adjustment or defective.	Try to readjust, may have to replace.
5. Spindle motor stalls	Dull drills.	Sharpen drills.
	Check for low voltage.	(See above).
	Drive belt may be loose.	Adjust belt tension. (See Adjustment section of this manual).
	Check for paper plugging drills	Clean out hollow drills - We recommend cleaning and soaking drills in oil overnight.

## 1.2 ROUTINE MAINTENANCE



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.

### 1.2.1 Daily

1. Sharpen the hollow drills often and reset the spindle adjusting knobs if needed.
2. Lubricate the hollow drill frequently with the lubricating stick provided.
3. For better hollow drill life, remove the drills when not in use, clean out, and soak in light oil. Wipe off excess oil before drilling.

### 1.2.2 Weekly

(or every 40 hours of operation)

1. Check the drive belt tightness and wear. The drive belt must be kept tight or it will stall the motor and plug or break the drills. See Section 1.3.2 for instructions on how to tighten the belt.

2. Clean and oil the guide bar shafts around frame.
3. Clean and oil the rear support brackets.

### 1.2.3 Monthly

1. Check the hydraulic oil supply for the proper level. This check is made by removing the rear panel and visually inspecting the level of the oil in the clear reservoir. The oil should be filled to the fill line on the tank. If your machine is equipped with a dip stick on the breather cap, remove the cap and check the dip stick. There should be approximately 1/8" (3 mm) of oil on the stick.

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 Section 1.5.

### 1.2.4 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. (Capacity: 1 1/2 Quarts/1.4 liters)
4. Grease lift springs.

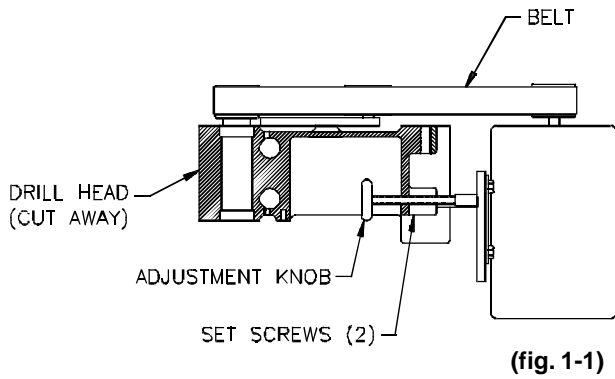
## 1.3 ADJUSTMENTS

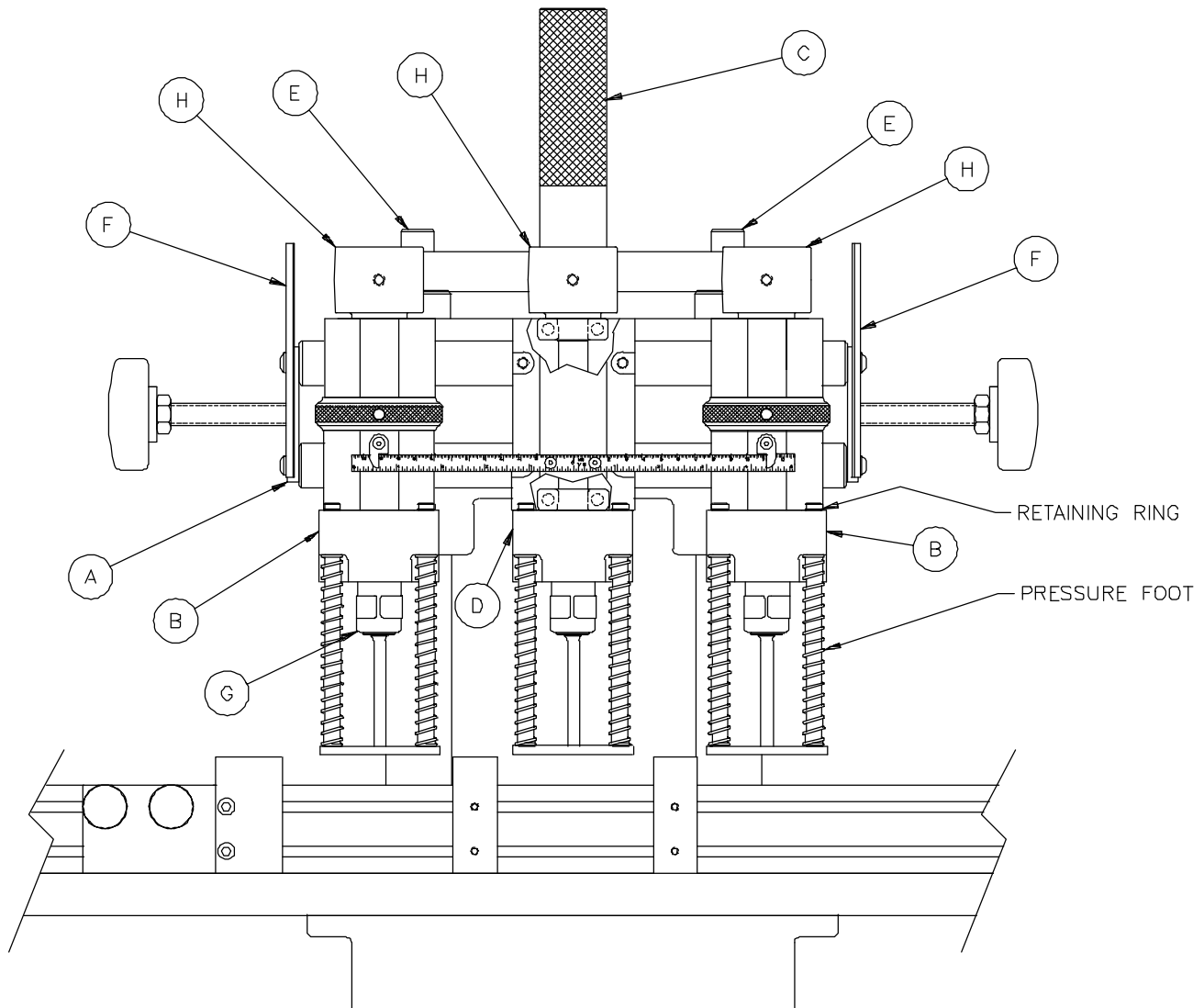
### 1.3.1 Table Position Adjustment

Set the backgauge to the 1" position. Drill a few sheets of paper and measure the distance between the center of each hole to the edge of the paper. If it is not 1" (2.5 cm), loosen the (4) screws that mount the table to the base and carefully move the table to compensate for the error. Tighten the screws and drill some more paper. Repeat this procedure until the holes measure 1" (2.5 cm).

### 1.3.2 Belt Tightness Adjustment

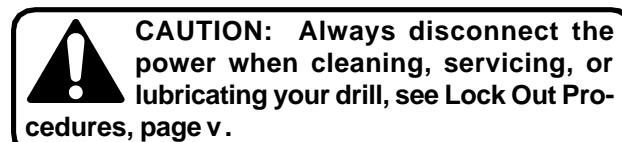
Loosen the two set screws (fig. 1-1). Turn the Adjustment Screw (fig. 1-1) to move the motor in and out as needed. The belt must be tight enough that it does not slip. Tighten both set screws when finished.





(fig. 1-2)

## 1.4 DRILL HEAD REPLACEMENT



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

Replacement Procedure:

1. Remove cover.
2. Remove belt.
3. Remove chip pan assembly.

### 1.4.1 Side Head Bearing Replacement

1. Remove end plate "A" and shield "F" from shaft.
2. Slide head off shafts.
3. Remove chip chute "B" from head.
4. Remove pulley "H" from spindle.
5. Tap spindle "G" out from head.
6. Tap out bearings (must use rod from opposite end of each bearing).
7. Tap the upper bearing (S-706) in place using a piece of wood between the hammer and the bearing (an old drill block works fine).
8. Place the lower bearing (S-706) on the spindle and tap in the spindle and bearing simultaneously. Use the wood block from the previous step to protect the spindle.
9. Replace the chip chute and pulley.

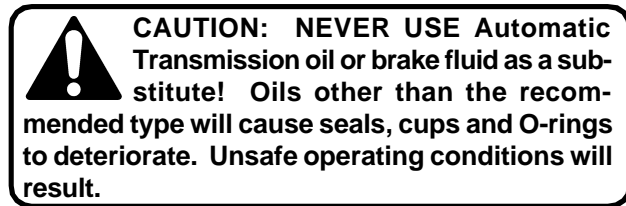
**1.4.2 Center Head Bearing Replacement**

1. Raise head as far as possible by turning knob "C".
2. Remove pulley "H".
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. Tap the upper bearing (S-706) in place using a piece of wood between the hammer and the bearing (an old drill block works fine).
9. Place the lower bearing (S-706) on the spindle and tap in the spindle and bearing simultaneously. Use the wood block from the previous step to protect the spindle.
10. Replace the chip chute and pulley.
11. Adjust head for drill depth.

Energol HLP 100 .....	Sohio
Industron 100 .....	Std. Oil Indiana/Boron
Sunvis 851 WR .....	Sunoco
Rando HD 100 .....	Texaco
Unax AW 100 .....	Union Oil Co.

**1.5 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. Replace oil yearly. (Capacity: 1 1/2 Quarts/1.4 liters)



**1.5.1 Recommended Oils**

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

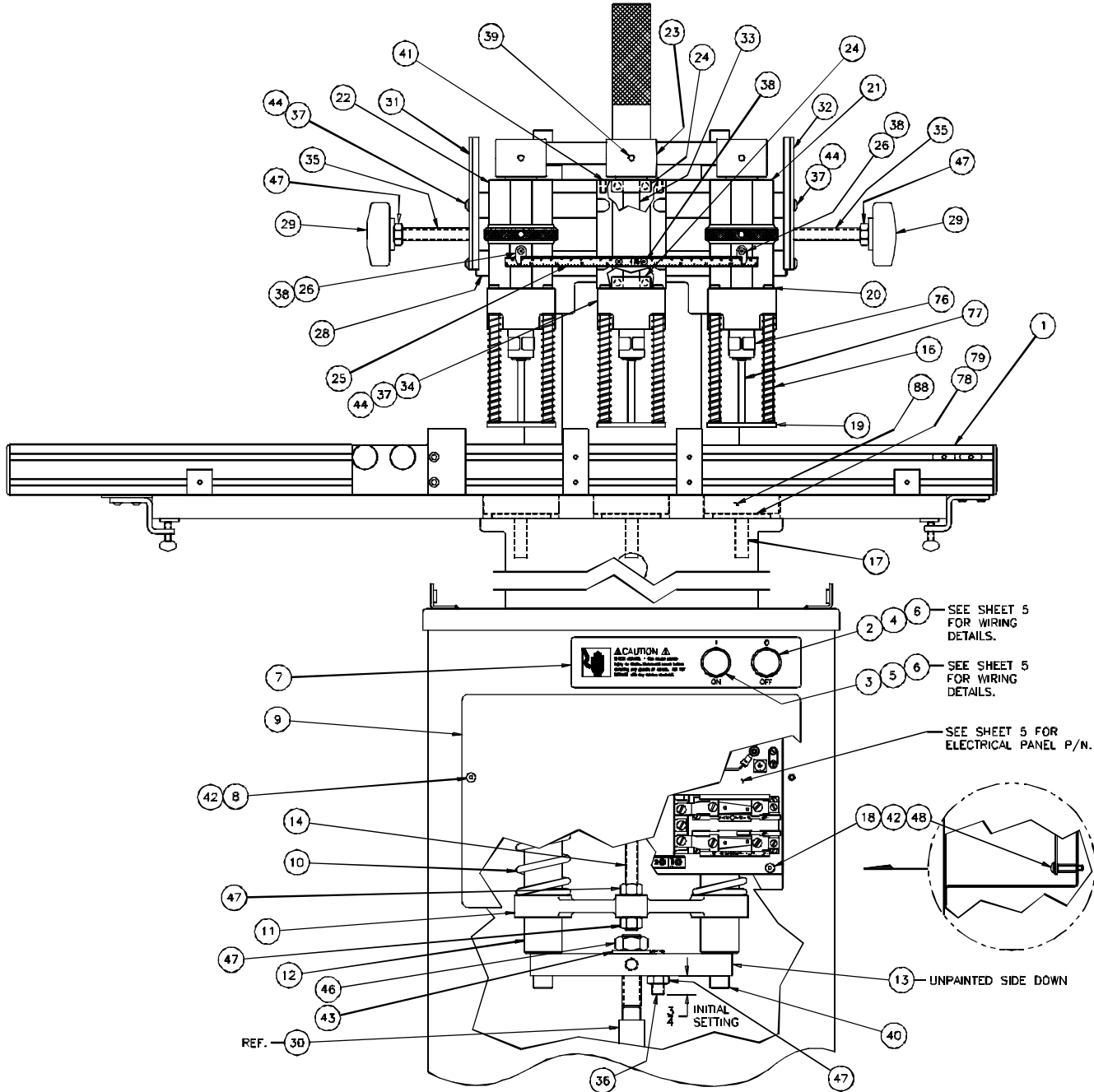
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## 2.0 PARTS LISTS

MAIN ASSEMBLY - FRONT VIEW .....	2-2
MAIN ASSEMBLY - UPPER RIGHT VIEW .....	2-4
MAIN ASSEMBLY - LOWER RIGHT VIEW .....	2-6
MAIN ASSEMBLY - TOP VIEW .....	2-7
MAIN ASSEMBLY - WIRING .....	2-8
ELECTRICAL POWER PANEL ASSEMBLY .....	2-10
HYDRAULIC/BASE ASSEMBLY .....	2-12
HYDRAULIC POWER UNIT ASSEMBLY .....	2-14
HYDRAULIC POWER UNIT .....	2-15
TABLE ASSEMBLY .....	2-16
BACKGAUGE ASSEMBLY .....	2-18
OPTIONAL AUTO-TRIP BACKGAUGE ASSEMBLY .....	2-20
SPINDLE HEAD ASSEMBLY, RIGHT HAND .....	2-22
SPINDLE HEAD ASSEMBLY, LEFT HAND .....	2-23
OPTIONAL DRILL SHIELD KIT .....	2-24

# MAIN ASSEMBLY - FRONT VIEW

## A-5846-9 SHEET 1 OF 5 (REV. G)



## MAIN ASSEMBLY - FRONT VIEW A-5846-9 SHEET 1 OF 5 (REV. G)

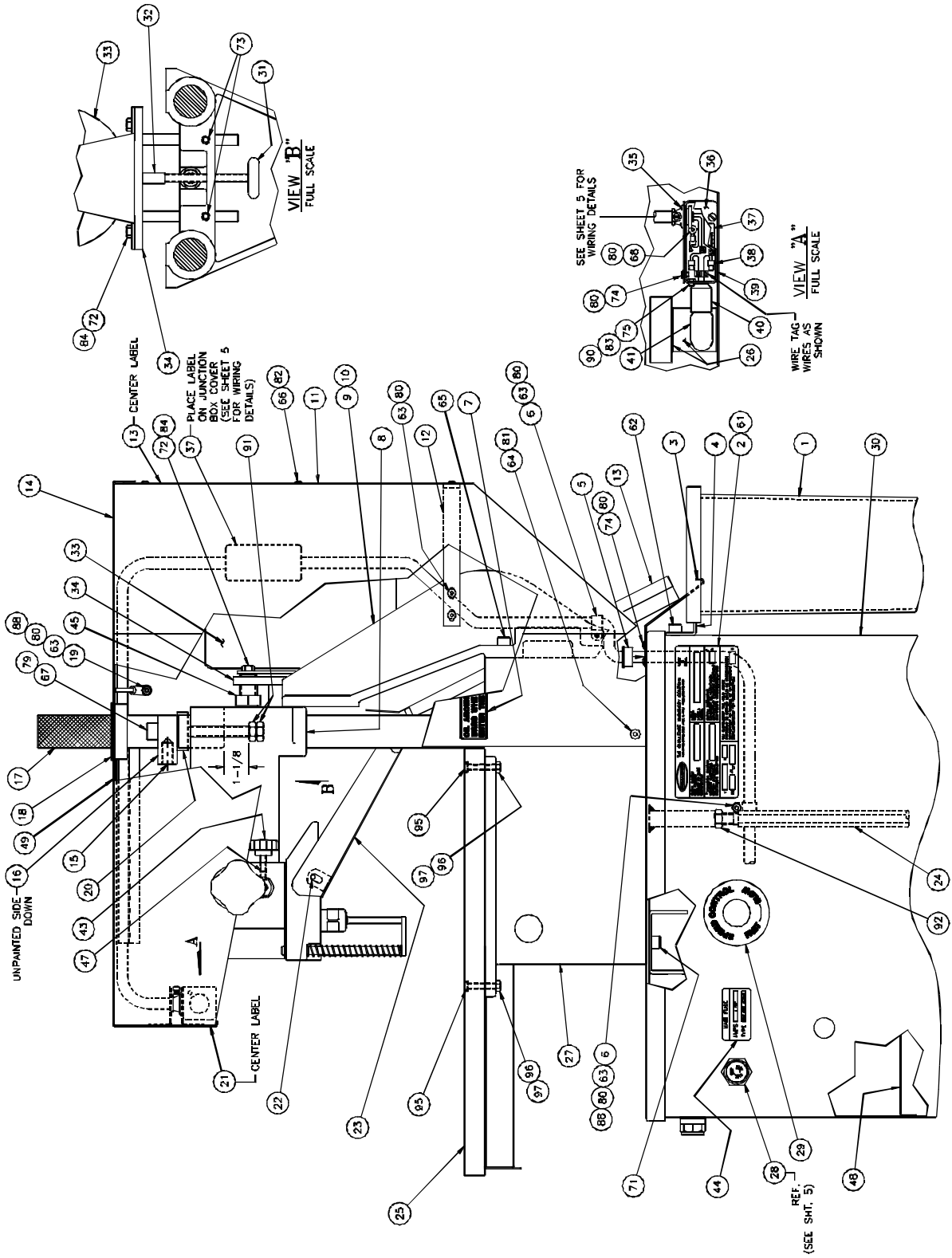
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	5700	BACKGAUGE ASM.	1
2	E-2074-1	PUSHBUTTON - OFF (RED)	1
3	E-2074	PUSHBUTTON - ON (GREEN)	1
4	E-1839-8	CONTACT BLOCK - N.C.	REF.
5	E-1839-9	CONTACT BLOCK - N.O.	REF.
6	16520	RING - ANTI ROTATION	2
7	5712	LABEL - ON/OFF	1
8	S-1864-2	CAPTIVE RETAINING DEVICE	2
9	K-480-3	FRONT GRILL	1
10	K-250-8	SPRING	2
11	K-249	LIFT SPRING BRACKET	1
12	KK-440-16	GUIDE BAR ASM	2
13	K-836-4	GUIDE ROD BRACKET	1
14	K-251-3	ROD - LIFT SPRING	1
15			
16	4629-1	SPRING - PRESSURE FOOT	6
17	KK-281-2	CUT STICK KNOCK OUT	3
18	E-1152-61	STANDOFF - 3/4"	4
19	A-4626-7	PRESSURE FOOT ASM.	3
20	S-1518-37	RETAINING RING	6
21	A-5847-1-6-R	SPINDLE BLOCK ASM. - R.H.	1
22	A-5862-1-6-R	SPINDLE BLOCK ASM. - L.H.	1
23	4693-1	PULLEY	1
24	S-706	BEARING	2
25	5859	SCALE - SPINDLE LOCATION	1
26	5858	INDICATOR	2
27			
28	5856	SHAFT - SPINDLE BLOCK GUIDE	2
29	5710	ADJ. SCREW KNOB	2
30	16541-2	HYDRAULIC POWER UNIT ASM.	REF.
31	5716-2	GUARD - L.H.	1
32	5717-2	GUARD - R.H.	1
33	K-16-4	SPINDLE	1
34	K-57-19	CHIP CHUTE - CENTER	1

NO.	PART NO.	ADDITIONAL ACCESSORIES SHIPPED W/ MACHINE	QTY
35	5711	ADJ. SCREW	2
36	H-6953-828	SCREW - 1/2-13 X 1-3/4 OVAL PT. SOC SET	1
37	H-6910-406	SCREW - 1/4-20 X 3/4 BUT. HD. CAP	6
38	H-6910-63203	SCREW - #6-32 X 3/8 BUT. HD. CAP	4
39	H-6938-408	SCREW - 1/4-20 X 3/8 SET	1
40	H-6918-814	SCREW - 1/2-13 X 1-3/4 SOC. CAP	2
41	H-6938-408	SCREW - 1/4-20 X 1/2 SOC. SET	4
42	H-6910-102403	SCREW - #10-24 X 3/8 BUT. HD. CAP	6
43	H-7321-12	WASHER - 3/4 USS FLAT	1
44	H-7327-8	WASHER - 1/4 MEDIUM LOCK	4
45	H-7327-16	WASHER - 1/2 MEDIUM LOCK	4
46	H-5239-12	NUT - 3/4 LIGHT FLEX LOCK	1
47	H-6424-8	NUT - 1/2 HEX JAM	5
48	H-7324-#10	WASHER - #10 INT. TOOTH	4

NO.	PART NO.	ADDITIONAL ACCESSORIES SHIPPED W/ MACHINE	QTY
76	K-85	COVER - DRIFT HOLE	3
77	CD-4-2-1/2	DRILL - 1/4" X 2-1/2	3
	CD-5-2-1/2	DRILL - 5/16" X 2-1/2	3
78	5841	SHIM - 26 GAGE	3
79	5841-1	SHIM - 20 GAGE	3
80			
81	4687	DRILL DRIFT (NOT SHOWN)	1
82	4688	DRILL EASE STICK (NOT SHOWN)	1
83	S-1615	CORK - FOR DRILL CLEANER (NOT SHOWN)	1
84	W-130	3/16" HEX ALLEN WRENCH (NOT SHOWN)	1
85	W-137	5/32" HEX ALLEN WRENCH (NOT SHOWN)	1
86	W-141	1/8" HEX ALLEN WRENCH (NOT SHOWN)	1
87			
88	KK-473-3	1 DOZEN WOOD DRILL BLOCKS	1
89	A-4950-2	DRILL SHARPENER/CHIP REMOVER (NOT SHOWN)	1
90			



**MAIN ASSEMBLY - UPPER RIGHT VIEW**  
**A-5846-9 SHEET 2 OF 5 (REV. J)**



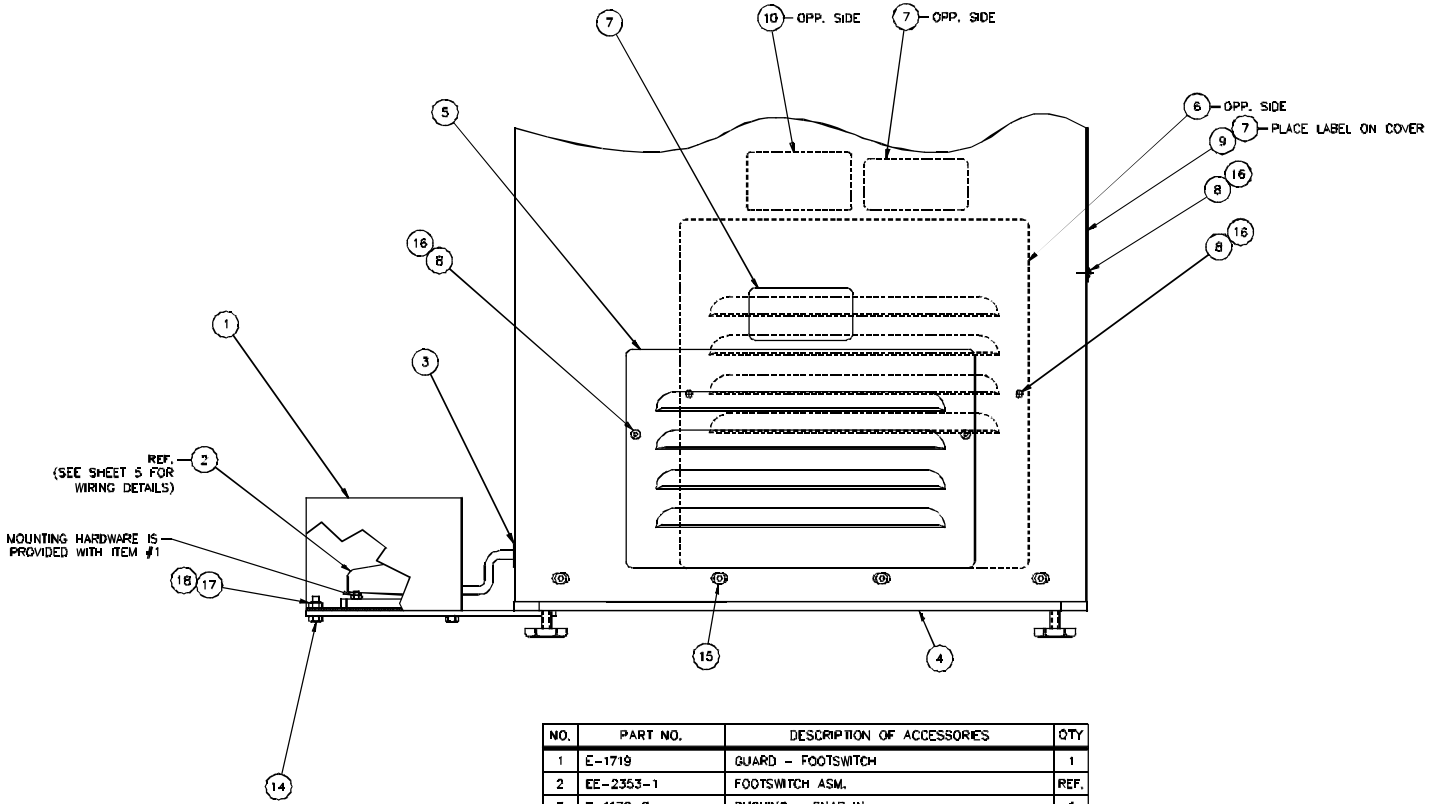
MAIN ASSEMBLY - UPPER RIGHT VIEW  
A-5846-9 SHEET 2 OF 5 (REV. J)

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY.
1	5739	WASTE BIN	1
2	41130	SERIAL PLATE	1
3	5886	HINSE	1
4	5870	HOOK - CHIP BAG	2
5	E-1172-4	SNAP IN BUSHING	1
6	E-968-5	CLAMP - 1/2" CABLE	2
7	S-1880	LABEL - OIL	2
8	K-2-24	SPINDLE BRACKET	1
9	K-478-3	BRACE - R.H. GUIDE	1
10	K-478-4	BRACE - L.H. GUIDE	1
11	5725	BACK COVER	1
12	5733	HOOD SUPPORT	1
13	S-1781-16	LABEL - CAUTION	2
14	5720-2	HOOD ASM.	1
15	S-2021	SPRING PLUNGER	1
16	K-836-4	GUIDE ROD BRACKET	1
17	K-780-2	SPINDLE ADJ. ROD	1
18	E-1172-11	SNAP IN BUSHING	1
19	S-1684-2	TYRAP - #10	1
20	S-1818-2	THREADED COLLAR	1
21	5729	LABEL - FRONT PANEL	1
22	A-215-187-0500	FRN - 3/16 X 1/2 ROLL	2
23	A-5878-1	CHIP CHUTE SWING ASM.	1
24	5715	JACK SCREW	1
25	5734	TABLE ASM.	1
26	S-2015	TAPE - ALUM. FOL (3-3/4" LONG)	1
27	K-1-33	FRAME	1
28	EE-2051	FUSE HOLDER ASM.	REF.
29	S-1064	LABEL - SPEED CONTROL	1
30	KK-289-51	STAND ASM.	1
31	AA-6098	BELT ADJ. ASM.	1
32	16075	SPACER - MOTOR BELT ADA.	1

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY.
33	E-1600-68	MOTOR - SPINDLE, 60 HZ	1
34	E-1600-70	MOTOR - SPINDLE, 50 HZ	1
34	KK-285-4	MOTOR BRACKET ASM.	1
35	S-1360-16	STRAIN RELIEF	1
36	E-1369-5	COVER	1
37	S-1781-11A	LABEL - CAUTION	2
38	E-1237-8	WIRE NUT	2
39	E-2249-1	JUNCTION BOX	1
40	E-984-3	SOCKET	1
41	E-933-4	CLEAR LAMP	1
42			
43	S-1602	KNOB - SPINDLE LOCK	2
44	S-1781-55	FUSE RATING LABEL	1
45	5738	ADJUSTING SCREW	2
46			
47	5857	PLUG	2
48	E-1437-4	LABEL - WIRE CONNECTION	1
49	S-1781-86	LABEL - DRILL DEPTH ADJ.	1
50			

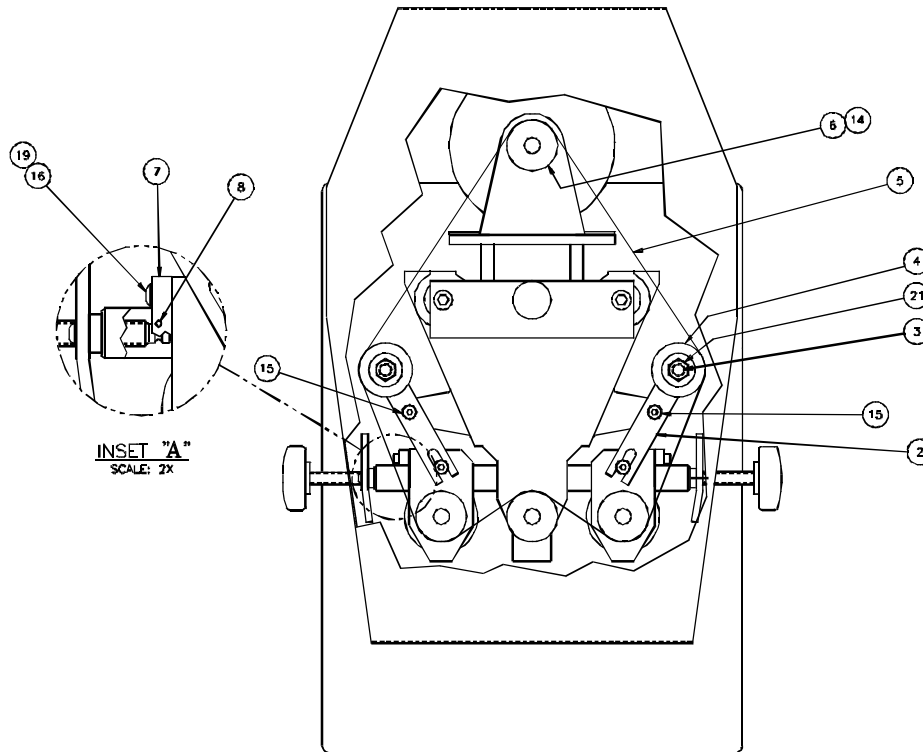
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY.
61	H-6924-004	SCREW - #0 X 1/4 DRIVE	2
62	H-6918-606	SCREW - 3/8-16 X 3/4 SOC. HD. CAP	2
63	H-6910-102404	SCREW - #10-24 X 1/2 BUT. HD. CAP	7
64	H-6910-404	SCREW - 1/4-20 X 1/2 BUT. HD. CAP	4
65	H-6918-610	SCREW - 3/8-16 X 1-1/4 SOC. HD. CAP	4
66	H-6910-83204	SCREW - #8-32 X 1/2 BUT. HD. CAP	8
67	H-6918-814	SCREW - 1/2-13 X 1-3/4 SOC. HD. CAP	2
68	H-6910-102402	SCREW - #10-24 X 1/4 BUT. HD. CAP	1
69			
70			
71	H-6918-608	SCREW - 3/8-16 X 1" SOC. HD. CAP	4
72	H-6913-504	SCREW - 5/16-18 X 1/2 HEX HD. CAP	4
73	H-6951-612	SCREW - 3/8-16 X 3/4 NYLOC SOC. SET	2
74	H-6910-102403	SCREW - #10-24 X 3/8 BUT. HD. CAP	3
75	H-6918-63203	SCREW - #6-32 X 3/8 SOC. HD. CAP	1
76			
77			
78			
79	H-7327-16	WASHER - 1/2 MED. LOCK	2
80	H-7324-#10	WASHER - #10 INT. TOOTH	11
81	H-7324-8	WASHER - 1/4 INT. TOOTH	4
82	H-7324-#8	WASHER - #8 INT. TOOTH	8
83	H-7324-#6	WASHER - #6 INT. TOOTH	1
84	H-7322-5	WASHER - 5/16" PLAIN	4
85			
86			
87			
88	H-6423-#10	NUT - #10-24 HEX	2
89			
90	H-6423-#6	NUT - #6-32 HEX	1
91	H-8433-8	NUT - 1/2-13 HEX JAM. L.H. THREAD	2
92	H-6424-8	NUT - 1/2-13 HEX JAM	1
93			
94			
95	H-6910-416	SCREW - 1/4-20 X 2" BUTTON HD.	REF.
96	H-7324-8	WASHER - 1/4 INT. TOOTH	REF.
97	H-6423-4	NUT - 1/4-20 HEX	REF.

## MAIN ASSEMBLY - LOWER RIGHT VIEW A-5846-9 SHEET 3 OF 5 (REV. A)



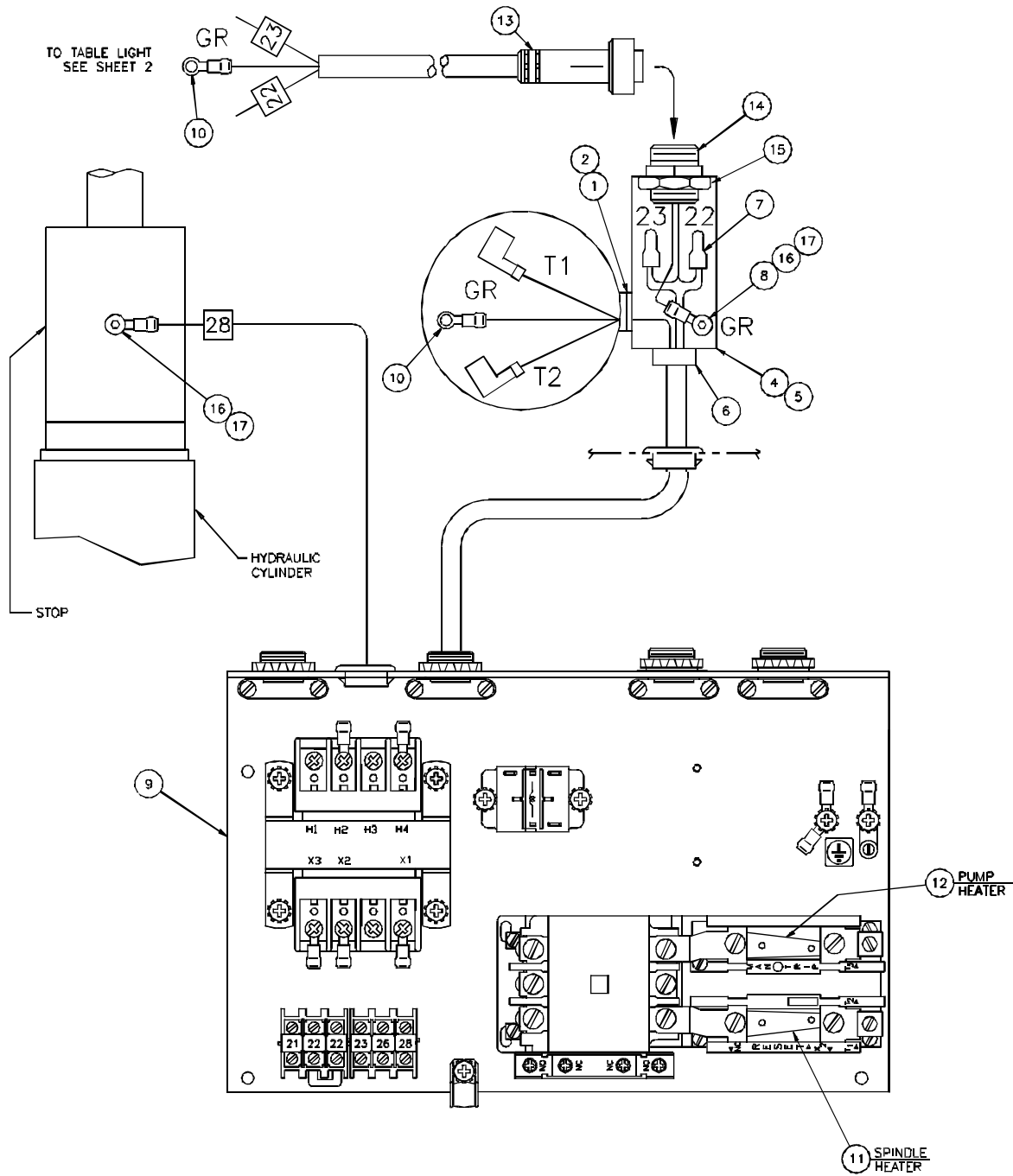
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	E-1719	GUARD - FOOTSWITCH	1
2	EE-2353-1	FOOTSWITCH ASM.	REF.
3	E-1172-8	BUSHING - SNAP IN	1
4	16541-2	HYD. POWER UNIT ASM.	1
5	K-480-1	COVER	1
6	K-480-2	COVER	1
7	S-1781-16	LABEL - CAUTION	3
8	S-1864-2	CAPTIVE RETAINING DEVICE	6
9	K-480-3	COVER	1
10	S-1842	LABEL - HYD. FLUID	1
11			
12			
13			
14	H-6913-406	SCREW - 1/4-20 x 3/4 HEX	4
15	H-6894-405	SCREW - 1/4-20 x 5/8 WHIZ LOCK	16
16	H-6910-102403	SCREW - #10-24 x 3/8 BUT. HD. SOC.	6
17	H-7324-8	WASHER - 1/4 INT. TOOTH	4
18	H-6423-4	NUT - 1/4-20 HEX	4

## MAIN ASSEMBLY - TOP VIEW A-5846-9 SHEET 4 OF 5 (REV. D)



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1			
2	5861-1	ARM - IDLER PULLEY	2
3	5889	STUD - IDLER PULLEY	2
4	A-5887-1	PULLEY ASM. - IDLER	2
5	S-1661-1	BELT - FLAT	1
6	S-894-4	PULLEY - MOTOR	1
7	5852	BLOCK - ADJUSTING SCREW	2
8	H-21S-125-1000	PIN - 1/8 X 1" ROLL	2
9			
10			
11			
12			
13			
14	H-6938-408	SCREW - 1/4-20 X 1/2 SOC. SET	1
15	H-5254-604	SCREW - 3/8 X 1/2 SOC. SHOULDER	2
16	H-6910-406	SCREW - 1/4-20 X 3/4 BUT. HD.	4
17			
18			
19	H-7327-8	WASHER - 1/4 MEDIUM LOCK	4
20			
21	H-6424-8	NUT - 1/2-13 HEX JAM	2

# MAIN ASSEMBLY - WIRING A-5846-9 SHEET 5 OF 5 (REV. G)

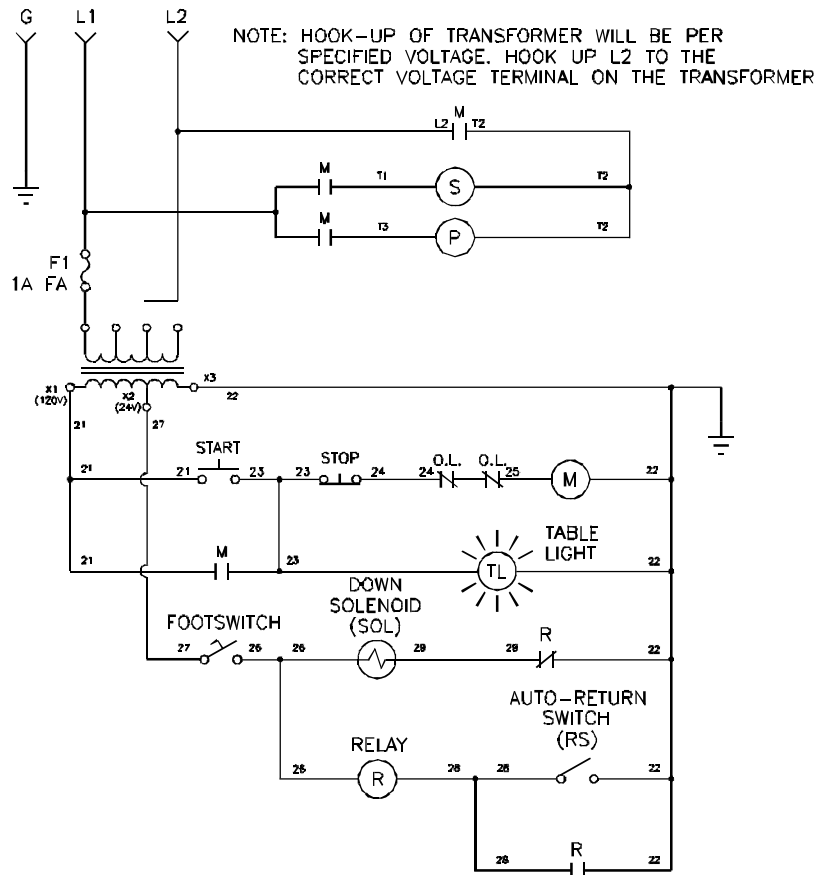


# MAIN ASSEMBLY - WIRING A-5846-9 SHEET 5 OF 5 (REV. G)

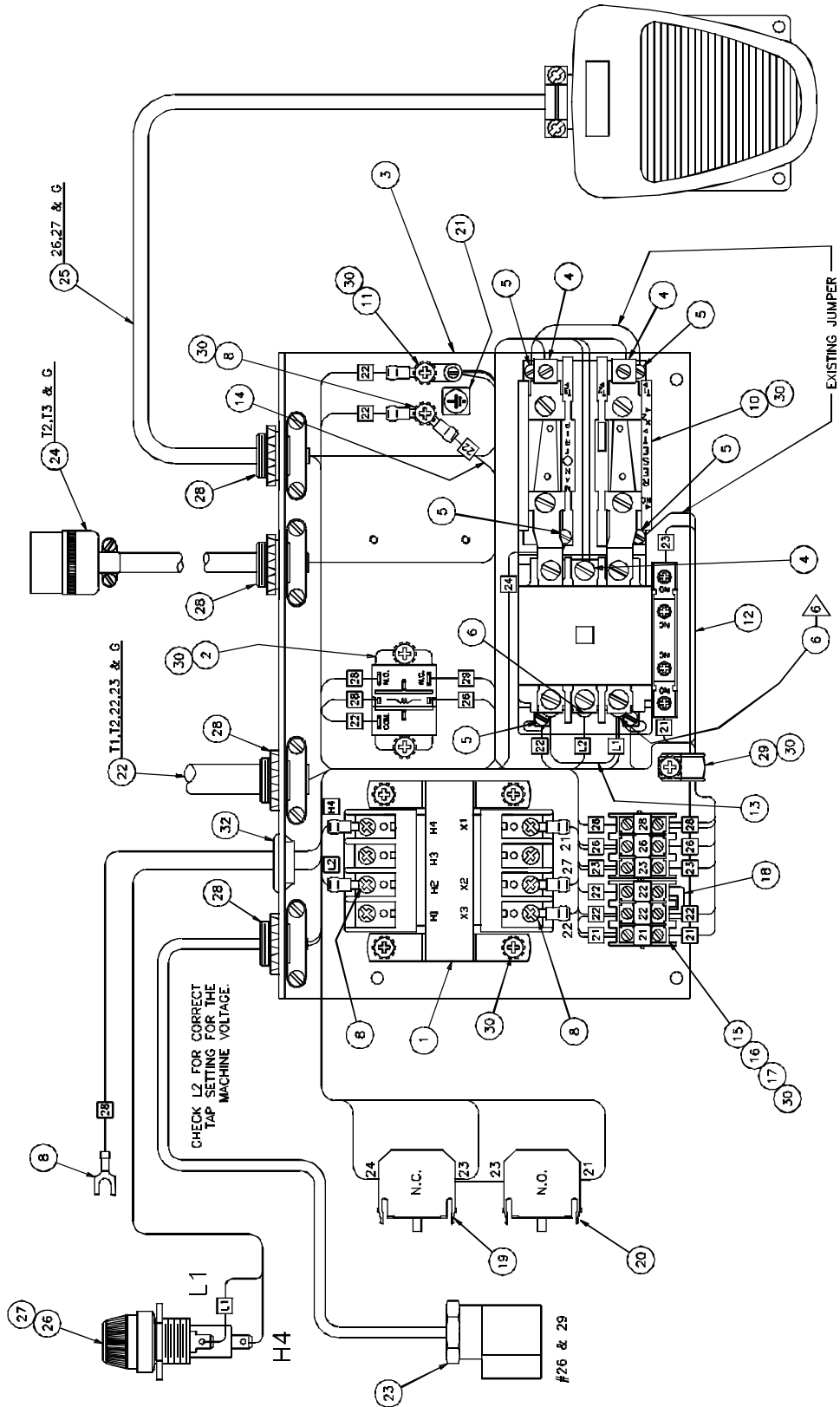
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	H-7324-28	WASHER - 7/8" SHAKEPROOF LOCK	1
2	E-1458	NIPPLE - 1/2" BUSHED CONDUIT	1
3			
4	E-1370-5	JUNCTION BOX	1
5	E-1369-5	COVER - JUNCTION BOX	1
6	S-1350-1	BUSHING - HEYCO	1
7	E-1237-6	WIRE NUT	2
8	E-1214-1	CONNECTOR - INS. LOCKING FORK	1
9	EE-2929	POWER PANEL ASSEMBLY	1
10	E-1214-48	CONNECTOR - #10 INS. RING	3
11	E-2195-E44	HEATER - SPINDLE (5.32 TRIP AMP) - 50 HZ	1
	E-2195-E47	HEATER - SPINDLE (6.37 TRIP AMP) - 60 HZ	
12	E-2195-E41	HEATER - HYDRUALIC (4.26 TRIP AMP) 50 HZ	1
	E-2195-E42	HEATER - HYDRUALIC (4.77 TRIP AMP) 60 HZ	
13	E-2451-4	CABLE ASM W/ CONNECTOR	1
14	E-2450-2	CABLE CONNECTOR PIGTAIL	1
15	E-519	1/2" NUT	1
16	H-6910-102403	SCREW - #10-24 X 3/8 BUT. HD. CAP	2
17	H-7324-#10	WASHER - #10 INT. TOOTH	2

## WIRING ASSEMBLY / SCHEMATIC

208 VOLT    1 PHASE    60 Hz  
 230 VOLT    1 PHASE    60 Hz  
 230 VOLT    1 PHASE    50 Hz



# ELECTRICAL POWER PANEL ASSEMBLY EE-2929 (REV. B)



## ELECTRICAL POWER PANEL ASSEMBLY EE-2929 (REV. B)

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	E-1089-40	TRANSFORMER, 75VA - 208/230/460V	1
2	E-2232-1	RELAY	1
3	E-1052-12	PANEL - ELECTRICAL	6
4	E-1214-1	CONNECTOR - INS. LOCKING FORK	3
5	E-1214-4	CONNECTOR, #6 INS. LOCKING FORK	6
6	E-1214-2	CONNECTOR - #6 INS. RING	3
7	E-1214-51	CONNECTOR - 3/16 FULLY INS. Q.D.	5
8	E-1214-59	CONNECTOR, #10 INS. FORK, 16-22 GA.	1
9	E-1214-65	CONNECTOR - 1/4 FULLY INS. Q.D.	2
10	E-2194-1	STARTER - MOTOR	1
11	E-640-1	GROUND LUG	1
12	E-709-R	WIRE, #18 GA. RED MTW (AS REQ'D)	18ft
13	E-849-R	WIRE, #16 GA. RED MTW 6" LONG	1
14	E-849-G	WIRE, #16 GA. GREEN MTW 10-1/2" LONG	1
15	E-1271	MOUNTING RAIL - 2-1/2" LONG	1
16	E-1270	TERMINAL BLOCK - 3 POLE	2
17	E-1356-115	MARKING STRIP - TERMINAL BLOCK	1
18	E-1355-1	JUMPER - TERMINAL BLOCK	1
19	E-1839-8	CONTACT BLOCK - N.C.	1
20	E-1839-9	CONTACT BLOCK - N.O.	1
21	S-1781-42	LABEL - EARTH GROUND	1
22	EE-1650-1	CABLE ASM. - TABLE LIGHT	1
23	EE-2354-1	CABLE ASM. - SOLENOID	1
24	EE-1363-2	CABLE ASM. - HYD. MOTOR W/CONNECTOR	1
25	EE-2353-1	CABLE ASM. - FOOTSWITCH	1
26	EE-2051-1	FUSE HOLDER ASSEMBLY	1
27	E-1075-1	FUSE - MIDGET, 1A FAST ACTING	1
28	E-984	STRAIN RELIEF - CABLE	4
29	E-968-4	CABLE CLAMP	1
30	H-6883-102403	SCREW, #10-24 X 3/8 PHILLIP W/LOCKWASHER	13
31	H-7324-#6	WASHER - #6 INT. TOOTH	3
32	E-1172-4	HOLE BUSHING - SNAP-IN	1

### NOTES:

1) CUT ALL WIRES TO LENGTH AS NEEDED UNLESS OTHERWISE SPECIFIED.

2) STRIP WIRE INSULATION BACK 3/8" BOTH ENDS - ALL WIRES.

3) WIRE TAG ALL WIRES AS SHOWN - BOTH ENDS.

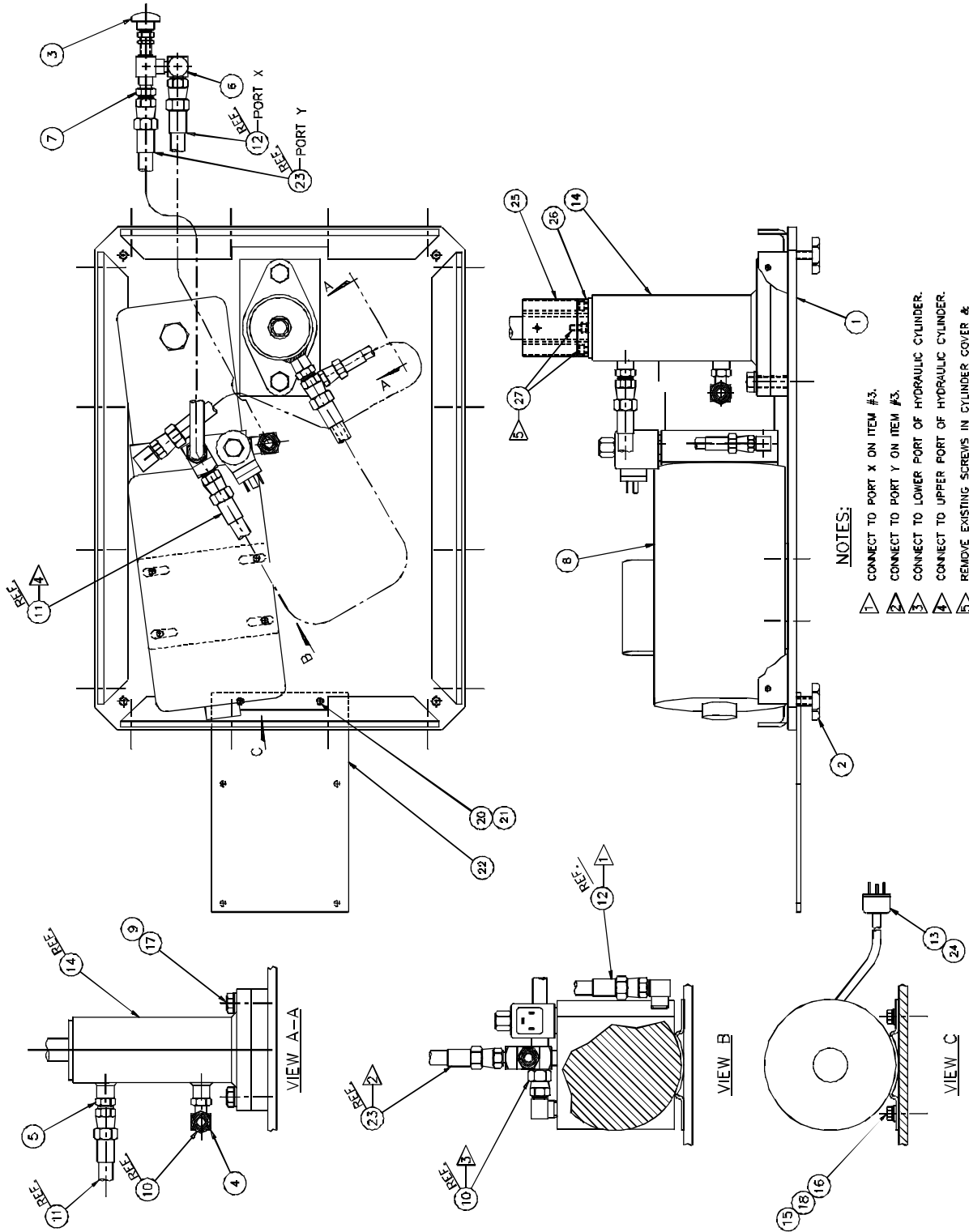
4) CHANGE STARTER FROM MANUAL RESET TO AUTOMATIC RESET.

5) MOVE FACTORY INSTALLED JUMPERS ON STARTER TO POSITIONS SHOWN.

6) ADD ITEM #31 LOCKWASHER BEHIND EACH ITEM #6 INS. RING ON STARTER.



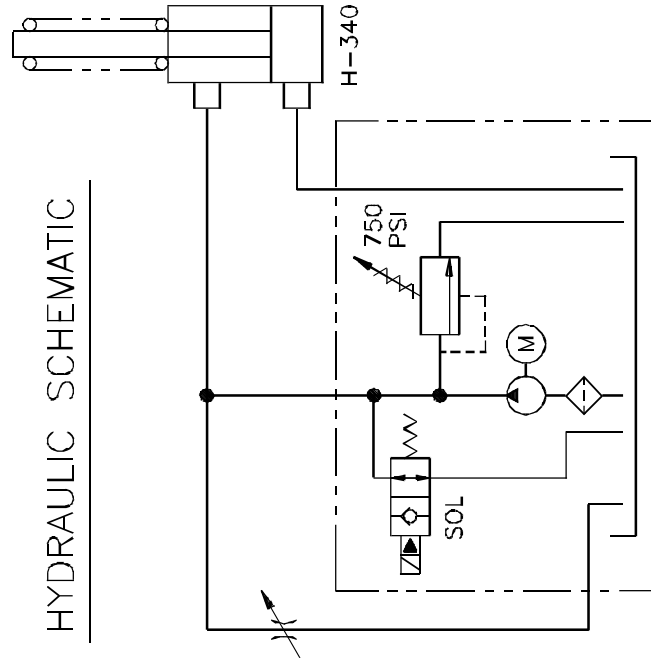
# HYDRAULIC/BASE ASSEMBLY 16541-2 (REV. B)



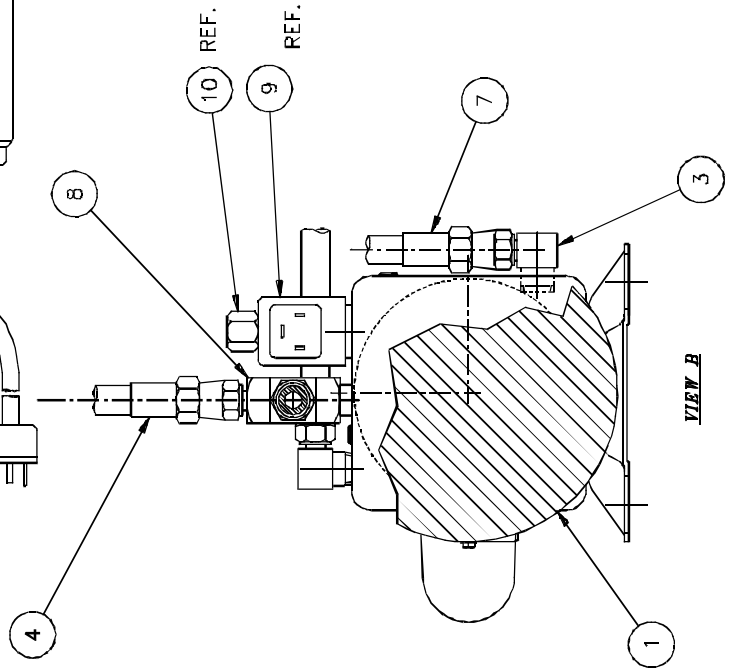
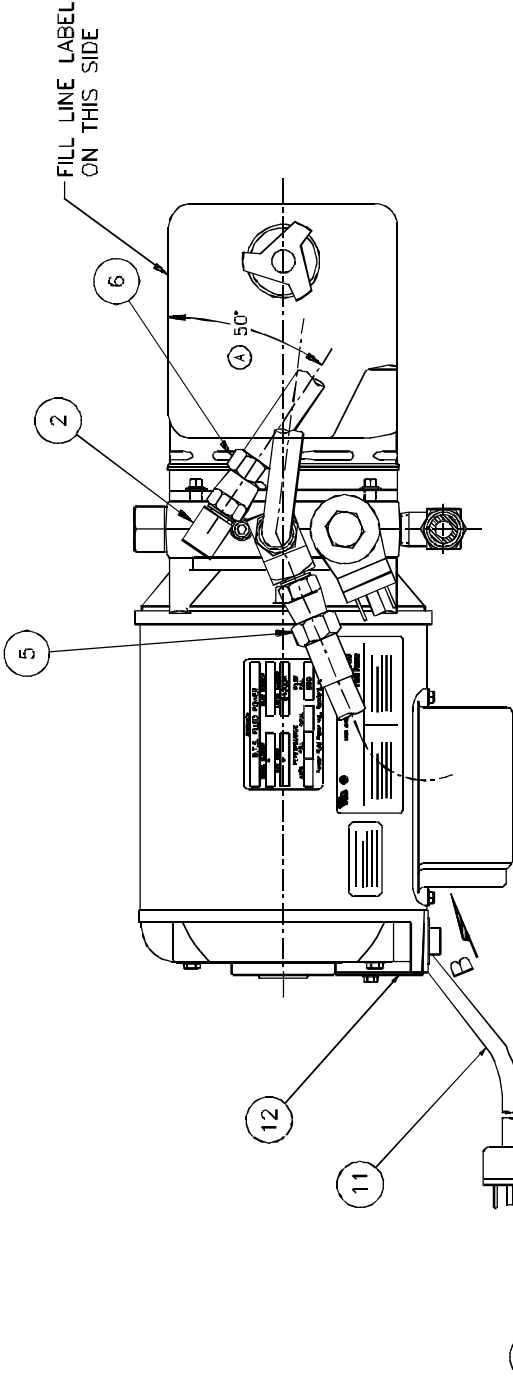
# HYDRAULIC/BASE ASSEMBLY 16541-2 (REV. B)

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	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	ADAPTER - 7/16 O-RING TO 9/16 TUBE	1
6	H-237-5	ELBOW - 1/8 NPT TO 9/16 TUBE	1
7	H-241-5	ADAPTER - 1/8 NPT TO 9/16 TUBE	1
8	H-358-3	HYD. POWER 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	EF-2555-1	CORD ASSEMBLY - POWER PLUG	1
14	H-340	CYLINDER - HYDRAULIC	1
15	H-7327-10	LOCKWASHER - 5/16 MEDIUM	4
16	H-6913-505	SCREW - 5/16-18 X 3/8 HEX	4
17	H-6913-812	SCREW - 1/2-13 X 1-1/2 HEX	2
18	H-7321-5	WASHER - 5/16 PLAIN	4
19			
20	H-7327-8	WASHER - 1/4 MED. LOCK	2
21	H-6910-406	SCREW - 1/4-20 X 3/4 BUTT. HD.	2
22	16542	BRACKET - FOOTSWITCH	1
23	H-242-41	HOSE ASSEMBLY - 25" LONG	REF.
24	E-1237-1	WIRE NUT	REF.
25	5718-1	STOP	1
26	5719	ISOLATOR	1
27	H-6918-405	SCREW - 1/4-20 X 5/8 SOC. HD. CAP	4

## HYDRAULIC SCHEMATIC

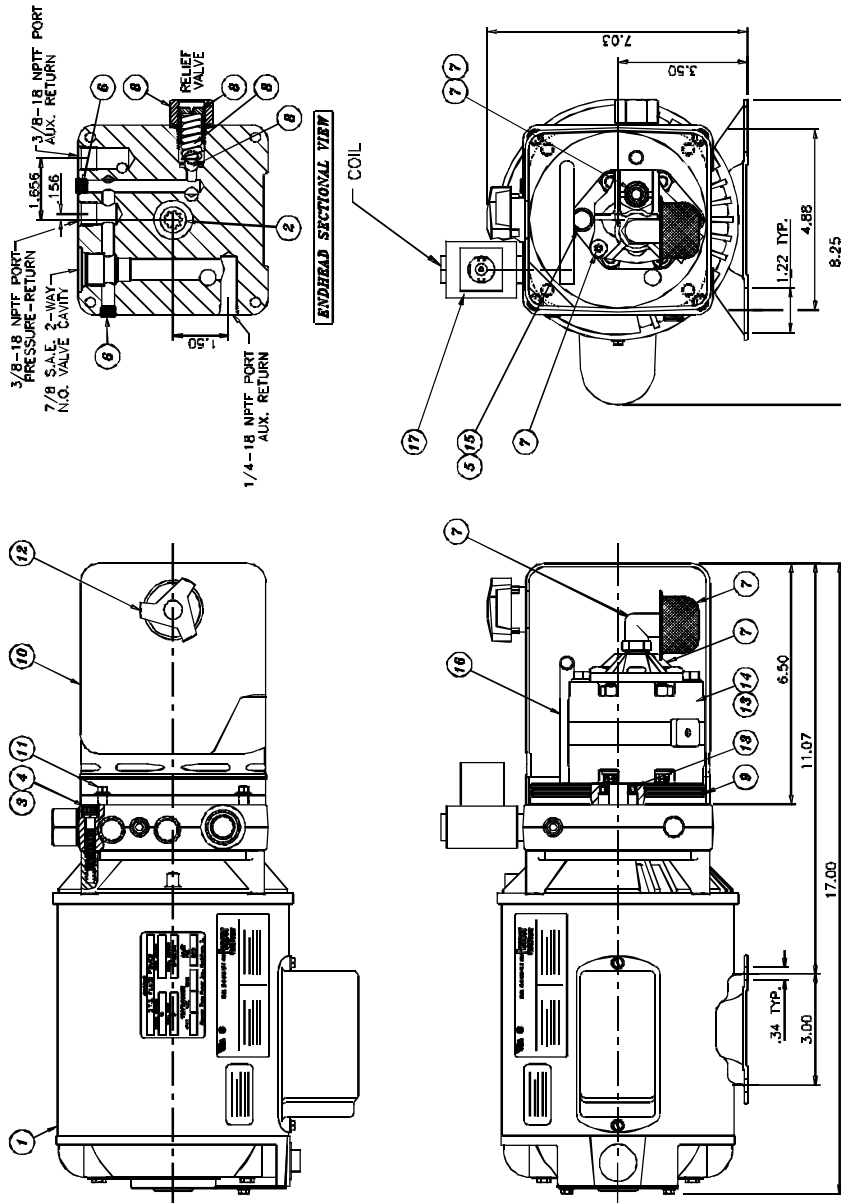


# HYDRAULIC POWER UNIT ASSEMBLY H-356-3 (REV. B)



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	H-372-5	HYD. POWER 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-1069-17	24 V. COIL	REF.
10	H-200-5	CARTRIDGE SOLENOID	REF.
11	EE-2555-1	CORD ASM.	1
12	E-1237-1	WIRE NUT	2

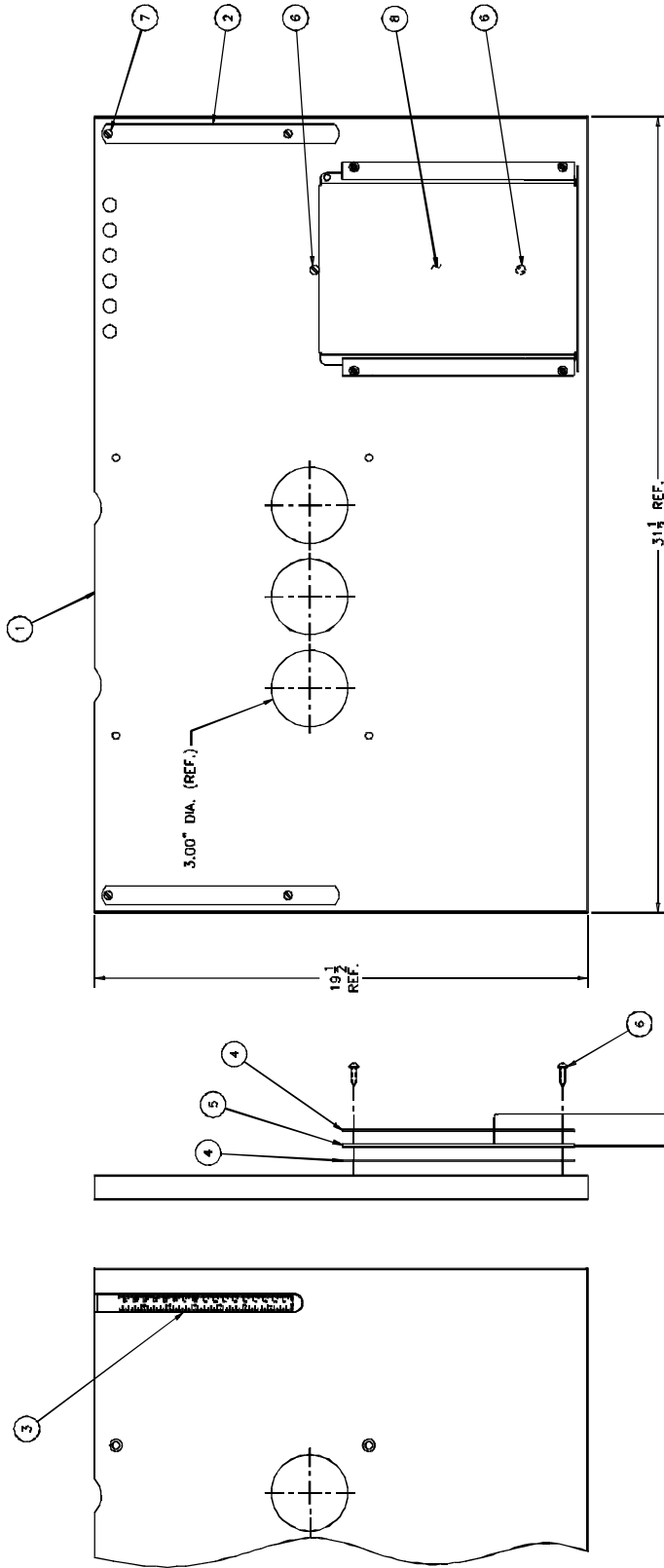
# HYDRAULIC POWER UNIT H-372-5



## REPAIR PARTS

NO.	CMC P/N	DESCRIPTION OF ACCESSORIES	QTY
1	H-531	MOTOR AC 115/208-230	1
2	H-532	COUPLING	1
3	N/A	1/4 LOCKWASHER	4
4	N/A	M6x1.0 35MM SHCS	4
5	H-533	WASHER	2
6	H-534	PLUG 1/8 N.P.T.	2
7	H-535	INLET PLUMBING KIT	1
8	H-536	ADJ. RELIEF VALVE ASM.	1
9	H-537	RESERVOIR O-RING	1
10	H-538	RESERVOIR	1
11	H-539	RESERVOIR SCREW	4
12	H-540	BREATHER	1
13	H-541	PUMP O-RING KIT	1
14	H-542	PUMP ASSEMBLY	1
15	H-543	PUMP MOUNTING BOLT	2
16	H-544	3/8 RETURN TUBE	1
17	E-1069-17	24 V. COIL	1
18	H-200-5	CARTRIDGE-SOLENOID (N/S)	1
19	H-545	ADAPTER - DAYCO (NOT SHOWN)	1
20	H-546	TEE - DAYCO (NOT SHOWN)	1

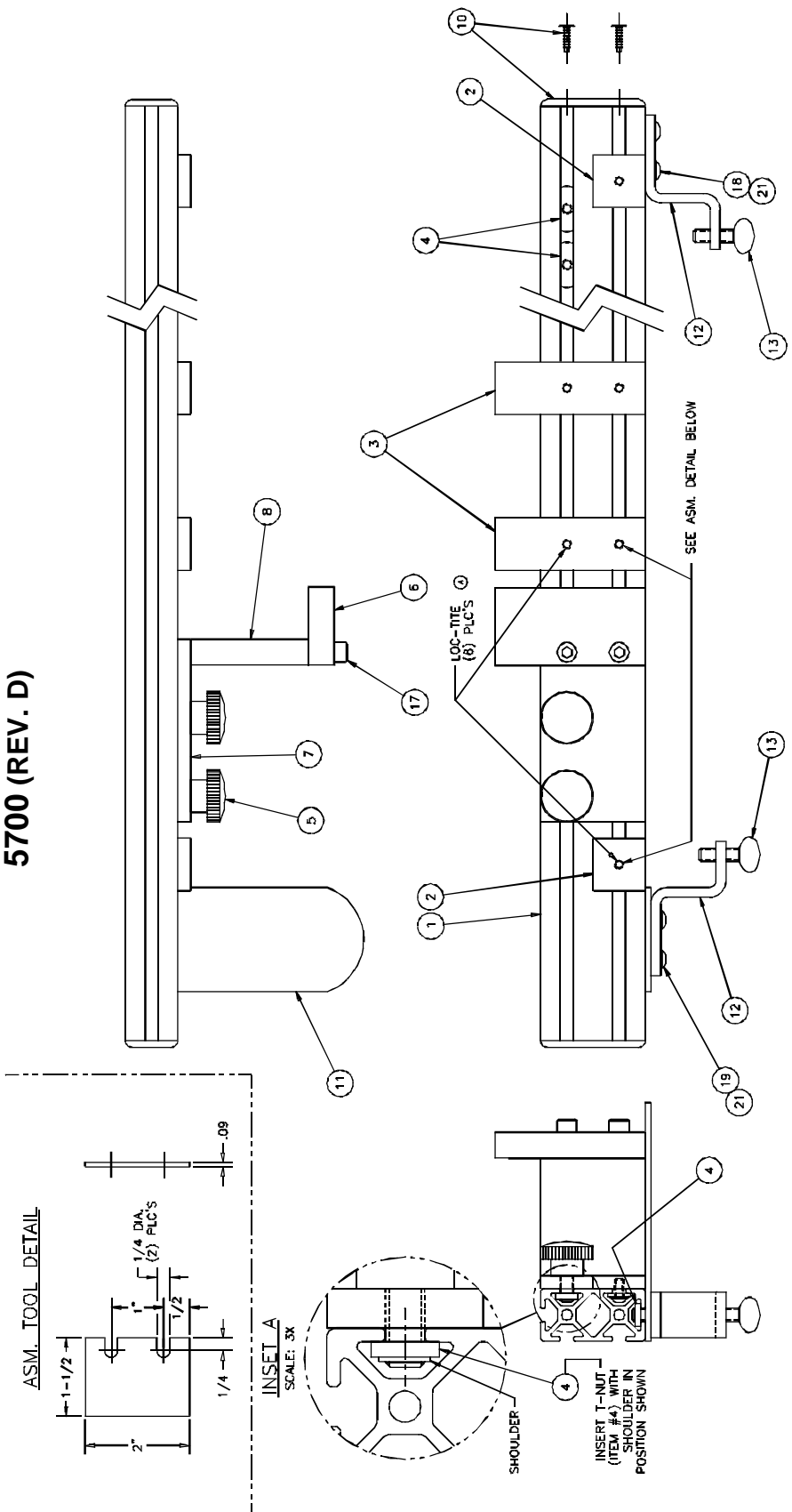
**TABLE ASSEMBLY  
5734 (REV. A)**



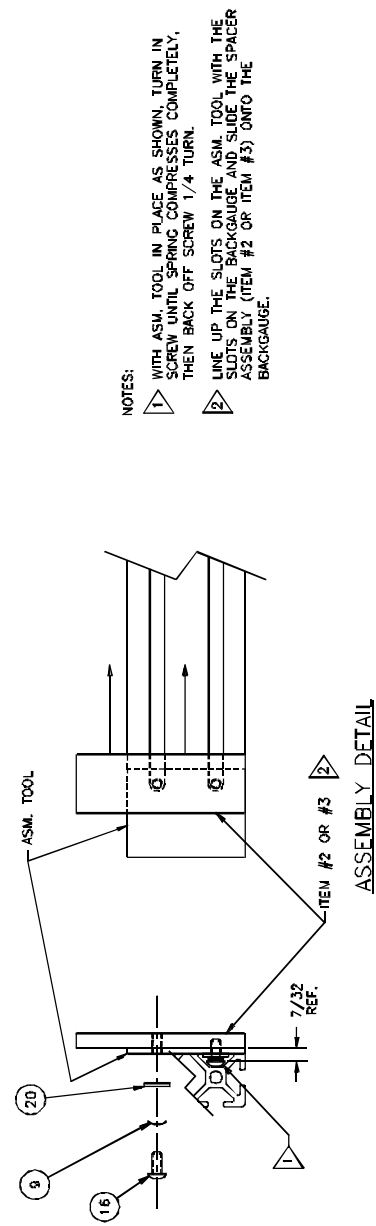
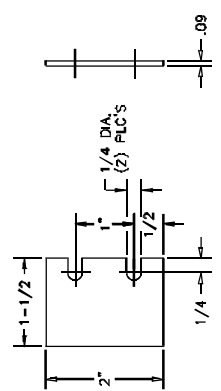
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	5735	TABLE	1
2	K-93-2	TABLE SIDE STRIP	2
3	5736	SCALE	2
4	16500	DRAWER GUIDE COVER	4
5	16501	DRAWER GUIDE FILLER	2
6	H-6962-1006	#10 X 3/4 R.H. WOODSCREW	6
7	H-6961-605	#6 X 5/8 F.H. WOODSCREW	4
8	KK-260	DRAWER ASSEMBLY	1
9			
10			
11	H-6910-416	SCREW - 1/4-20 X 2" BUTION HD.	4
12	H-7324-8	WASHER - 1/4 INT. TOOTH	4
13	H-6423-4	NUT - 1/4-20 HEX	4

**INTENTIONALLY BLANK**

# BACKGAUGE ASSEMBLY 5700 (REV. D)



ASM. TOOL DETAIL



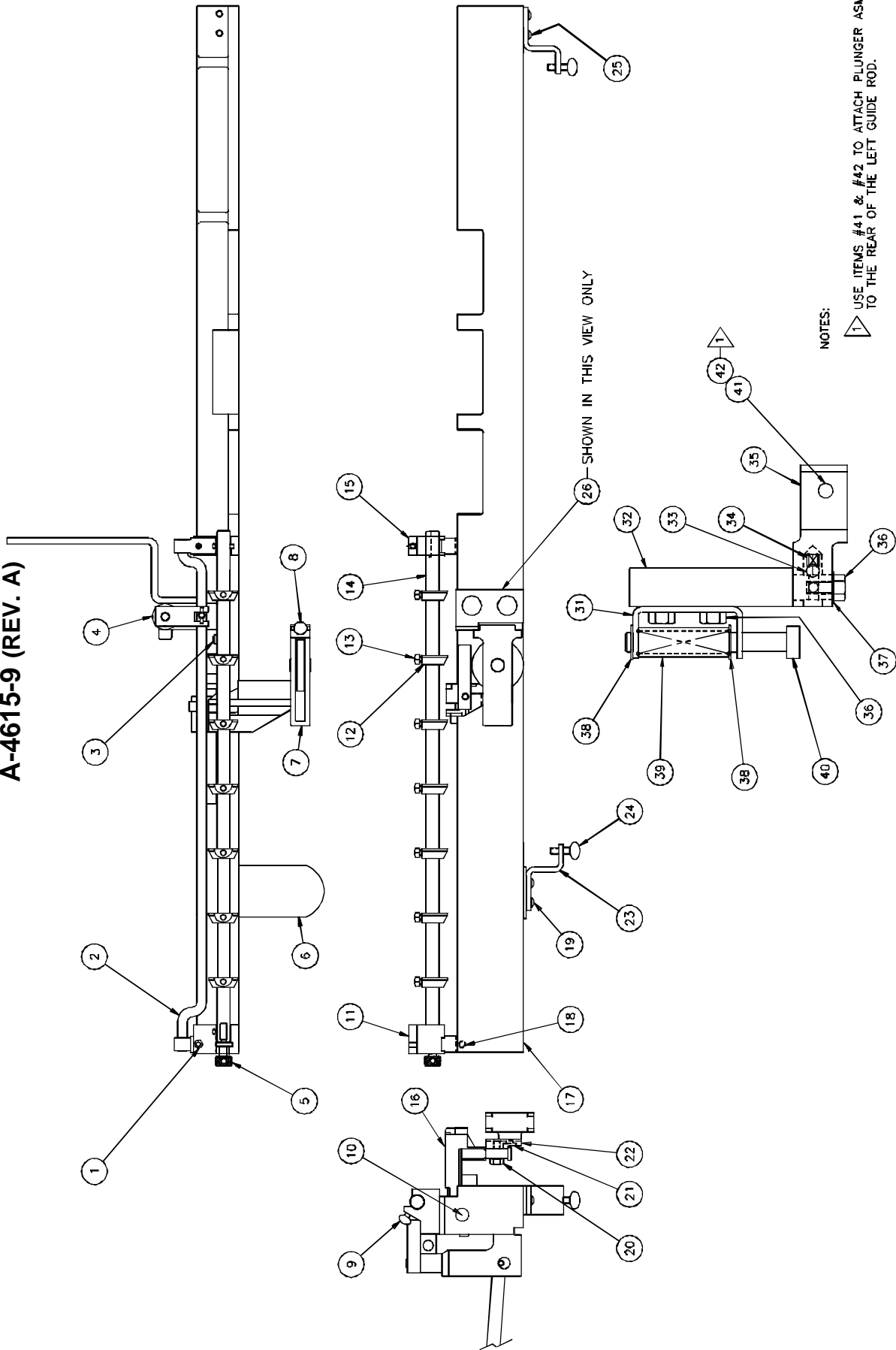
- NOTES:
- 1 WITH ASM. TOOL IN PLACE AS SHOWN, TURN IN SCREW UNTIL SPRING COMPRESSES COMPLETELY, THEN BACK OFF SCREW 1/4 TURN.
  - 2 LINE UP THE SLOTS ON THE ASM. TOOL WITH THE SLOTS ON THE BACKGAUGE AND SLIDE THE SPACER ASSEMBLY (ITEM #2 OR ITEM #3) ONTO THE BACKGAUGE.

## BACKGAUGE ASSEMBLY 5700 (REV. D)

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	5701	BACKGAUGE	1
2	5706	BACKGAUGE SCALE SPACER	2
3	5705	BACKGAUGE SPACER	2
4	5708-1	T-NUT - #10-32	8
5	8278-1	KNURLED KNOB	2
6	5704	SIDEGUIDE	1
7	5703	SIDEGUIDE PLATE	1
8	5702	SIDEGUIDE EXTENSION	1
9	11115	SPRING WASHER	6
10	5707	END CAP W/PLUGS	2
11	4794	BACKGAUGE GUIDE PLATE	1
12	4655	BACKGAUGE CLAMP	2
13	H-6955-508	THUMBSCREW - 5/16-18 X 1"	2
14			
15			
16	H-6910-83203	SCREW - #8-32 X 3/8 BUT. HD.	6
17	H-6918-424	SCREW - 1/4-20 X 3" SOC. HD. CAP	2
18	H-6920-103204	SCREW - #10-32 X 1/2 BUT. HD.	2
19	H-6920-103205	SCREW - #10-32 X 5/8 BUT. HD.	2
20	H-7321-#8	WASHER - #8 PLAIN	6
21	H-7324-#10	WASHER - #10 INT. TOOTH	4



**OPTIONAL AUTO-TRIP BACKGAUGE ASSEMBLY  
A-4615-9 (REV. A)**



NOTES:  
 1 USE ITEMS #41 & #42 TO ATTACH PLUNGER ASM.  
 TO THE REAR OF THE LEFT GUIDE ROD.

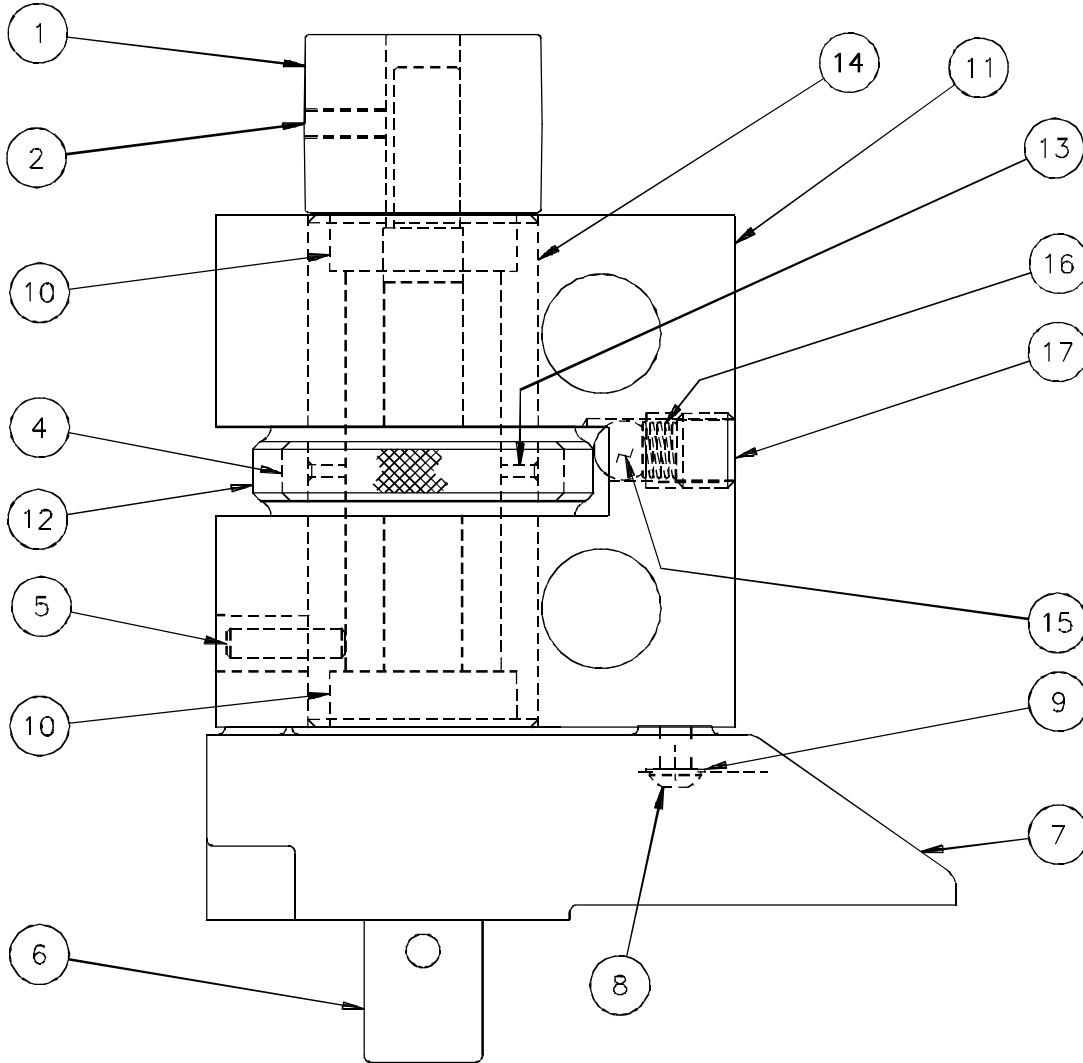
PLUNGER ASM.  
 SCALE: 2X

## OPTIONAL AUTO-TRIP BACKGAUGE ASSEMBLY A-4615-9 (REV. A)

NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
24	H-6955-508	5/16-18 NC X 1 THUMB SCREW	2
25	H-6918-404	1/4-20 NC X 1/2 SOC. HD. CAP. SCREW	2
26	A-4728-1	SIDE GUIDE EXTENSION	1
27			
28			
29			
30			
31	K-700-3	SIDE GUIDE TRIP PLUNGER HOLDER	1
32	K-702-4	SIDE GUIDE LATCH LIFT SPACER	1
33	S-766	1/4 STEEL BALL	1
34	K-694-1	LATCH SIDE SPRING	1
35	KK-458-2	ASSEM. GUIDE ROD ARM	1
36	H-6913-404	1/4 X 1/2 PLATED CAP SCREW	3
37	H-7322-4	1/4 POLISHED WASHER	1
38	S-1193-37	RETAINING RING	2
39	K-701-2	SIDE GUIDE TRIP PLUNGER SPRING	1
40	K-697	SIDE GUIDE TRIP PLUNGER	1
41	H-6913-406	1/4-20 X 3/4 HEX HEAD SCREW	1
42	H-7324-8	1/4 INT. TOOTH LOCKWASHER	1

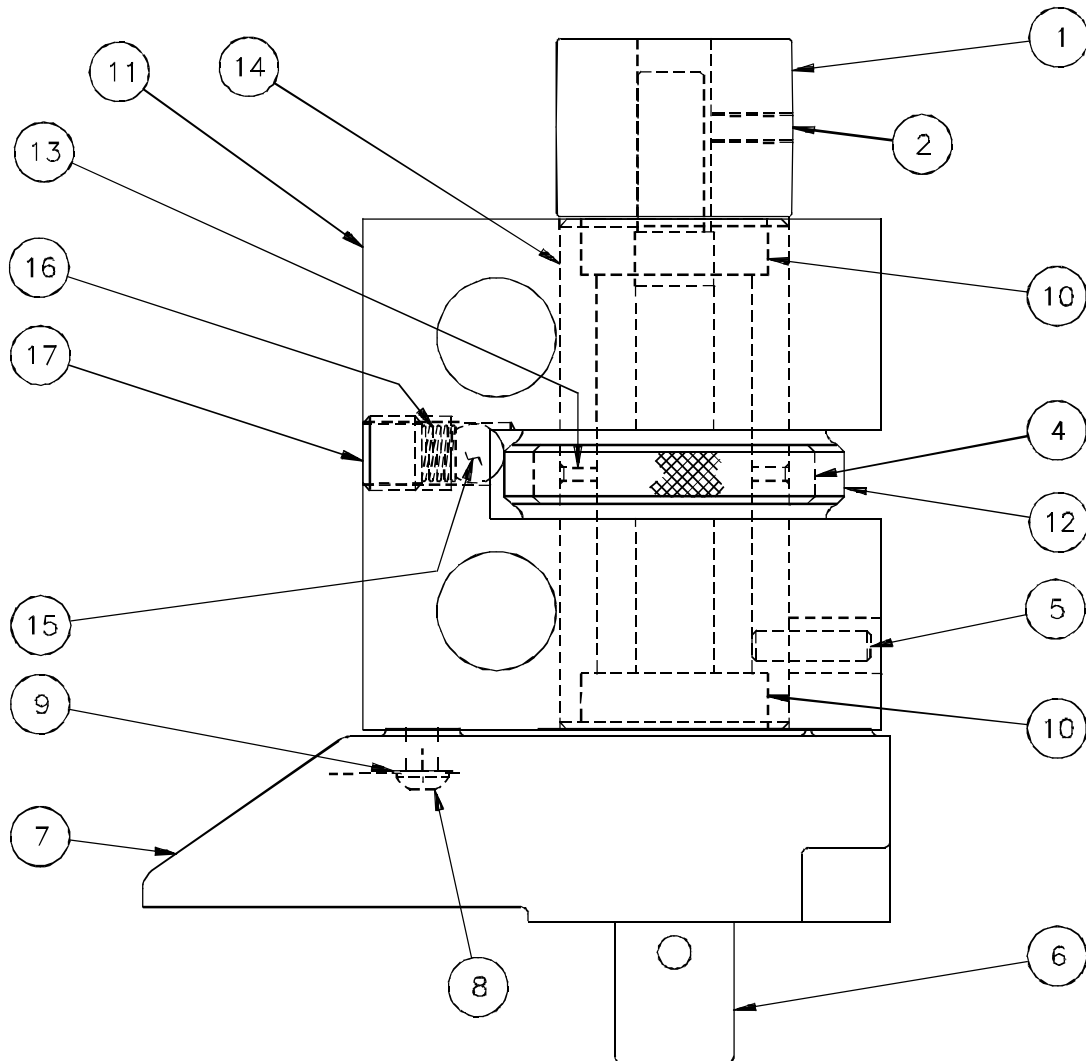
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	H-6918-102408	#10-24NCX1 SOC HD CAP SCREW	2
2	KK-695-8	S.G. LATCH LIFT SHAFT ASSEM.	1
3	H-6918-406	1/4-20 NC X3/4 SOC HD CAP SCREW	1
4	KK-411-8	ASSEM. SIDE GUIDE LATCH ARM	1
5	4632	S.G. SHAFT ADJUSTING SCREW	1
6	4794	REAR GAUGE GUIDE PLATE	1
7	A-4785	ASSEM. SIDE GUIDE ROLLER	1
8	A-4791-1	SIDE GUIDE FACE ASSEM.	1
9	H-6955-404	1/4 X 1/2 PLATED THUMBSCREW	2
10	4792-1	REAR GAUGE SHAFT	1
11	4799	SIDE GUIDE SHAFT BRKT..LH	1
12	4654	SIDE GUIDE STOP	7
13	H-6940-408	1/4-20 X 1/2 FL PT SOC SET SCREW	7
14	4633-1	SIDE GUIDE SHAFT	1
15	4634	INDEX ROD HOLDER	1
16	A-4787	SIDE GUIDE ASSEM.	1
17	4776-8	REAR GAUGE	1
18	H-6938-408	1/4-20 NC X 1/2 SET SCREW	1
19	H-6918-405	1/4 X 5/8 SOC. HD. CAP. SCREW	2
20	H-6913-405	1/4 X 5/8 HEX HEAD CAP SCREW	1
21	H-6910-404	1/4-20 X 1/2 BUTTON HD CAP.SCREW	1
22	4827-1	SHIM FOR SIDE GUIDE	1
23	4655	BACK GAUGE CLAMP	2

## SPINDLE HEAD ASSEMBLY, RIGHT HAND A-5847-1-6-R



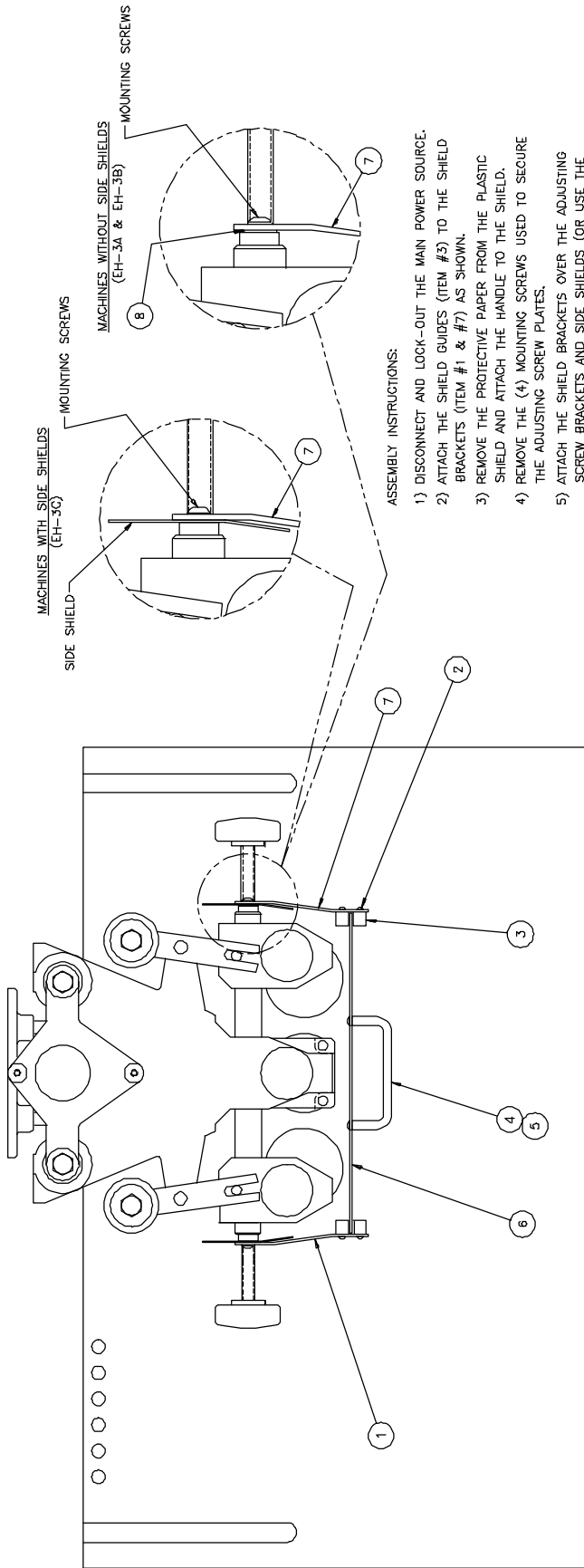
NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	4693-1	CROWNED PULLEY	1
2	H-6938-408	SCREW - 1/4 X 1/2 SOCKET SET	1
3			
4	5854	COLLAR - BEARING HOUSING	1
5	H-5246-408	1/4 - 1 DOWEL PIN	1
6	K-16-4	SPINDLE	1
7	5872-2	CHIP CHUTE RH	1
8	H-6910-406	1/4 X 3/4 BUT HD CAP SCREW	2
9	H-7327-8	1/4 MED LOCK WASHER	2
10	S-706	6693 BALL BEARING	2
11	5848-1-5	SPINDLE BLOCK RH	1
12	5855-1	ADJUSTMENT NUT	1
13	H-5246-204	1/8 X 1/2 DOWEL PIN	2
14	5853	SLEEVE - BEARING HOUSING	1
15	5737	1/2" DIA. STEEL BALL	1
16	35048-2	SPRING	1
17	H-6938-1004	SCREW - 5/8-11 X 1/2 SOC SET	1
18			
19			

## SPINDLE HEAD ASSEMBLY, LEFT HAND A-5862-1-6-R



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	4693-1	CROWNED PULLEY	1
2	H-6938-408	SCREW - 1/4 X 1/2 SOCKET SET	1
3			
4	5854	COLLAR - BEARING HOUSING	1
5	H-5246-408	1/4 - 1 DOWEL PIN	1
6	K-16-4	SPINDLE	1
7	5873-2	CHIP CHUTE RH	1
8	H-6910-406	1/4 X 3/4 BUT HD CAP SCREW	2
9	H-7327-8	1/4 MED LOCK WASHER	2
10	S-706	6693 BALL BEARING	2
11	5863-1-5	SPINDLE BLOCK RH	1
12	5855-1	ADJUSTMENT NUT	1
13	H-5246-204	1/8 X 1/2 DOWEL PIN	2
14	5853	SLEEVE - BEARING HOUSING	1
15	5737	1/2" DIA. STEEL BALL	1
16	35048-2	SPRING	1
17	H-6938-1004	SCREW - 5/8-11 X 1/2 SOC SET	1
18			
19			

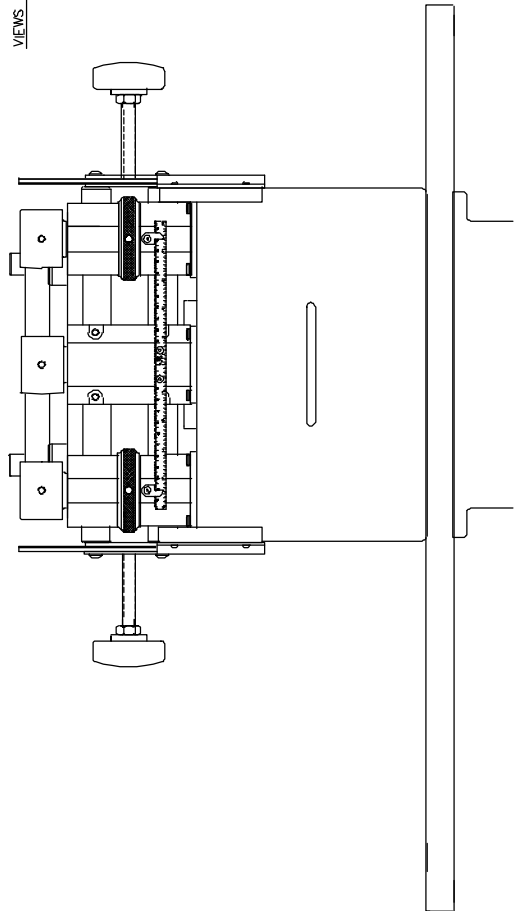
# OPTIONAL DRILL SHIELD KIT 48004



**ASSEMBLY INSTRUCTIONS:**

- 1) DISCONNECT AND LOCK-OUT THE MAIN POWER SOURCE.
- 2) ATTACH THE SHIELD GUIDES (ITEM #3) TO THE SHIELD BRACKETS (ITEM #1 & #7) AS SHOWN.
- 3) REMOVE THE PROTECTIVE PAPER FROM THE PLASTIC SHIELD AND ATTACH THE HANDLE TO THE SHIELD.
- 4) REMOVE THE (4) MOUNTING SCREWS USED TO SECURE THE ADJUSTING SCREW PLATES.
- 5) ATTACH THE SHIELD BRACKETS OVER THE ADJUSTING SCREW BRACKETS AND SIDE SHIELDS (OR USE THE WASHERS PROVIDED IF YOUR MACHINE DOES NOT HAVE SIDE SHIELDS), REUSING THE SAME HARDWARE. (DO NOT TIGHTEN THE HARDWARE)
- 6) INSERT THE SHIELD BETWEEN THE PLASTIC GUIDES, MAKING SURE THE SHIELD IS SQUARE TO THE TABLE AND SLIDES UP FREELY AT LEAST 6".
- 7) TIGHTEN THE ADJUSTING SCREW PLATE MOUNTING HARDWARE.

VIEWS SHOWN WITH HOOD REMOVED



NO.	PART NO.	DESCRIPTION OF ACCESSORIES	QTY
1	48001-1	BRACKET - SHIELD, L.H.	1
2	S-1088-3	#6 X 3/8 PN HD S.M. SCREW	8
3	48002-1	GUIDE - SHIELD	4
4	13940	HANDLE	1
5	H-6910-83202	#8-32 X 1/4 BUTTON HD CAP SCREW	2
6	48003-1	SHIELD	1
7	48001-2	BRACKET - SHIELD, R.H.	1
8	H-7321-4	WASHER - 1/4 PLAIN	4
9			
10			

## NOTES

