



**Maintenance
and
Operators Handbook
for T17 Lathe**

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MACHINE SPECIFICATIONS

KESTREL		17"
SWING OVER BED		17"
SWING OVER CROSS-SLIDE		10"
CENTER DISTANCE		40", 60", 100"
SPINDLE NOSE		D1-6"
SPINDLE BORE		2.06"
SPINDLE SPEEDS - 3 RANGES		40 - 2500
SPINDLE DRIVE - STANDARD		10 HP
SPINDLE DRIVE - OPTIONAL		15 HP
CROSS-SLIDE TRAVEL (X)		8.5"
LONGITUDINAL TRAVEL (Z)		36", 56", 96"
RAPID TRAVERSE (X-AXIS) I.P.M.		250
RAPID TRAVERSE (Z-AXIS) I.P.M.		250
POSITIONING		.00025"
REPEATABILITY		.0002"
TAILSTOCK QUILL DIAMETER		2.875"
TAILSTOCK QUILL TAPER		MT4
TAILSTOCK QUILL STROKE		6"

STANDARD EQUIPMENT

TOOLPOST	QUICK CHANGE
TOOL HOLDERS (5 PC. SET)	1.0 SQ.
3-JAW UNIVERSAL CHUCK	10"
WORKLIGHT	✓
COOLANT	10 GALLON

OPTIONAL

PNEUMATIC CHUCK	10"
8-STATION DISK TURRET	✓
4-JAW INDEPENDENT CHUCK	12"

1. LIFTING AND INSTALLATION INSTRUCTIONS

1.1 Lifting the machine.

The machine should be lifted using a forklift truck as illustrated in Figure 1, page 3. Ensure that the forklift truck has sufficient capacity. Approximate machine weights are as follows:-

1740.....	3,400 lb
1760.....	3,600 lb
17/100.....	4,000 lb

With reference to Figure 1, page 3, ensure that wooden blocks placed between the forks and the bed are sized to provide clearance in the areas indicated; under no circumstances are the forks to contact the sheet metal covers when lifting the machine.

1.2 Inspection

Check your delivery slip against the accessories that were ordered with the machine. If there is a shortage or error, report it to **ORIGINAL MACHINE TOOLS INC.** immediately, giving the serial number which is stamped in the recessed face on top of the bed at the tailstock end of the machine.

1.3 Cleaning

All unpainted parts of the machine have been coated with an anti-rust compound. This should be thoroughly removed after the machine is installed and before moving the carriage, cross slide or tailstock.

To remove anti-rust compound, wipe with a clean cloth.

All unpainted surfaces should be coated immediately with a film of light machine oil to prevent rust.

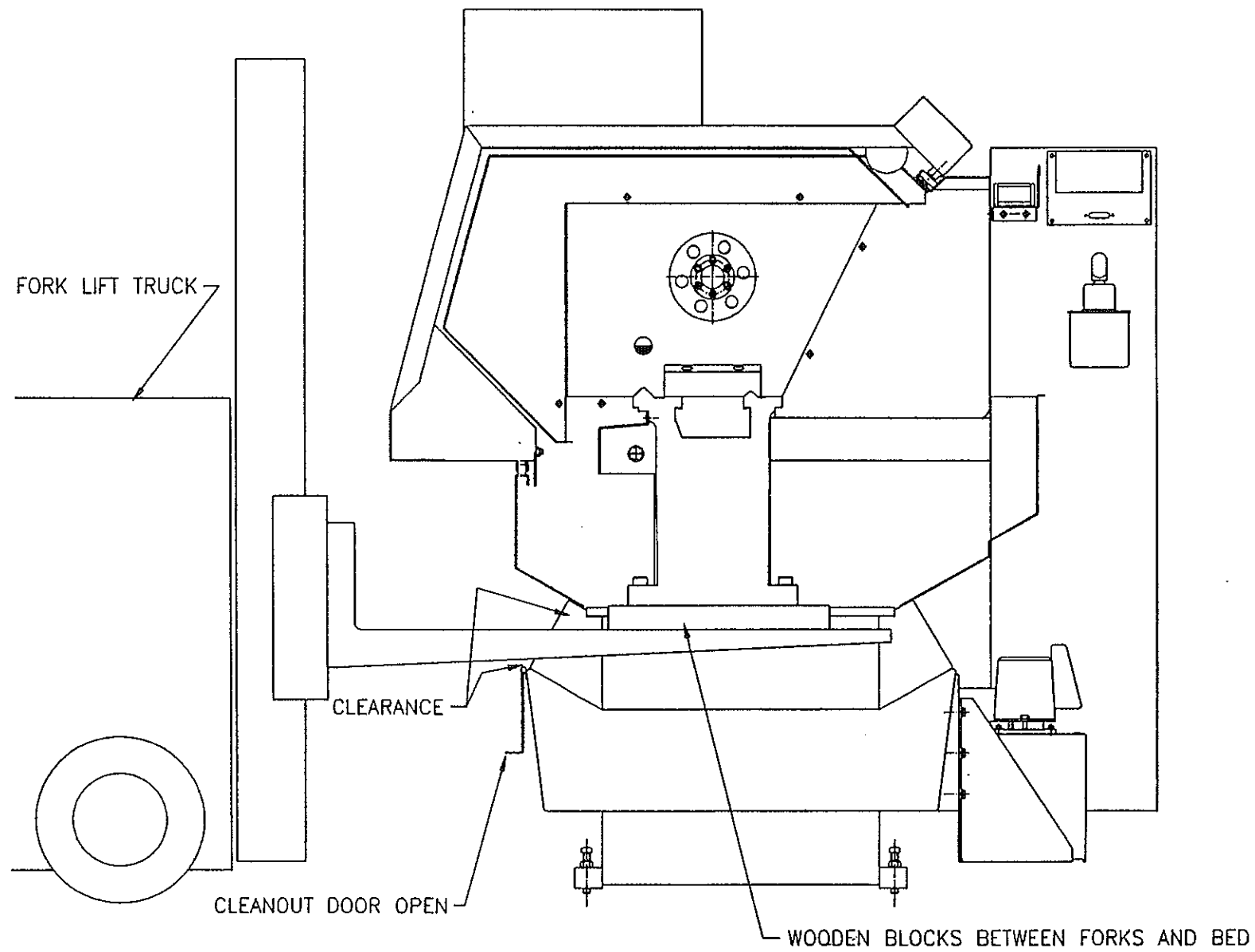


FIGURE 1 — LIFTING THE MACHINE

1.4 Installation

For proper operation, the machine should be set on a substantial floor capable of supporting a uniform pressure of 50 P.S.I. To secure the machine on its foundation, use anchor bolts or lag screws as shown on Floor Plan, Figure 2, page 5.

After the machine is in position, it must be levelled by use of the square head set screws provided, before tightening the lag screws. It will be necessary to use 4" square steel plates, about $\frac{3}{4}$ " thick, under the levelling screws to prevent the ends of the screws from sinking into the floor.

Use a precision level placed lengthwise and crosswise on the bed. To take a reading of the level for the crosswise levelling of the bed, use parallel bars placed on the flats of the bed.

After levelling within 0.0005 in/ft, the pedestals should be lagged to the floor and the levelling rechecked. Recheck the level of the machine at regular intervals.

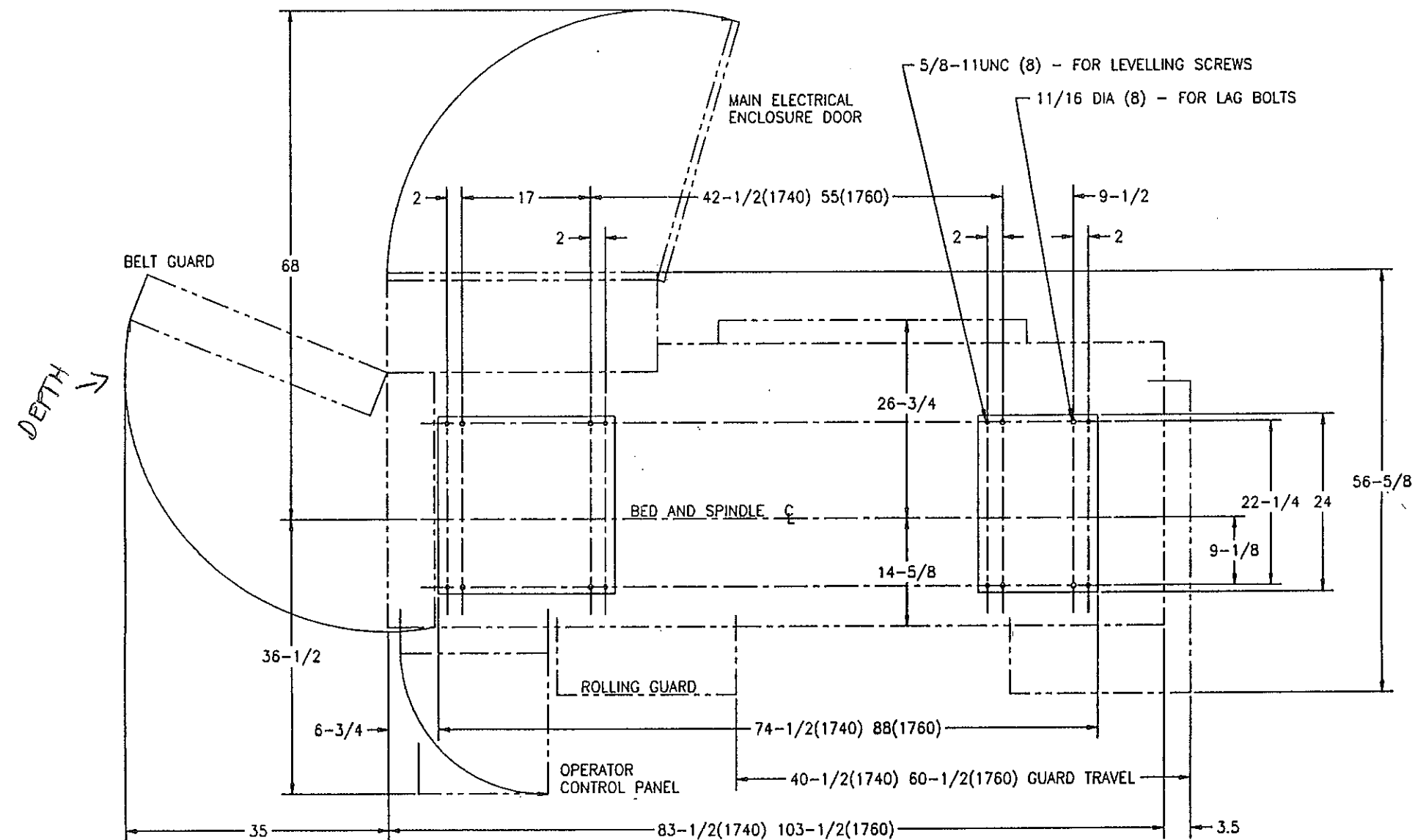


FIGURE 2 - FLOOR PLAN - 1740/1760 CNC LATHE

A-116187

17100 - 143 1/2" long

2. LUBRICATION

2.1 Headstock

The headstock is lubricated by a self contained recirculating system, powered by an electric pump. In the event of pump failure, operation of the spindle will be disabled automatically.

Depending on operating conditions, usually every six months, the headstock should be drained and refilled to the level shown in the oil window adjacent to the spindle nose.

Light mineral oil with a viscosity of 100 SUS at 100° F, is recommended.

UNDER NO CIRCUMSTANCES IS AN OIL EXCEEDING THE RECOMMENDED VISCOSITY TO BE USED.

Access to the oil filler and drain plugs is obtained by opening the belt guard. For locations see Figure 3, page 8.

NOTE: Always turn the main disconnect switch to OFF before opening the belt guard.

2.2 Tailstock

The tailstock is lubricated by one oiler located on top of the tailstock housing and by applying lubricant directly to the bedway surfaces.

At least every eight hours, clean and lubricate way surfaces and top up the oiler.

A way lubricant (Sunoco "WAYLUBE 68" or equivalent) with a viscosity of 300 - 350 SUS at 100° F is recommended.

2.3 Ballscrews and Way surfaces

Ballscrew bearings are pre-lubricated with grease and sealed, so require no additional lubrication.

Ballnuts and way surfaces are automatically lubricated at timed intervals by a lubricator located on the side of the main electrical enclosure at the rear of the machine.

2. LUBRICATION Cont'd

2.3 Ballscrews and Way surfaces cont'd

A way lubricant (Sunoco "WAYLUBE 68" or equivalent) with a viscosity of 300 - 350 SUS at 100° F is recommended.

If the lubricant in the reservoir is not replenished, a level switch will automatically disable the automatic mode of the machine and display an alarm message. It is recommended that the lubricator be topped up every eight hours.

Discharge volume of the lubricator can be reduced if desired by adjusting as indicated in Figure 4 below.

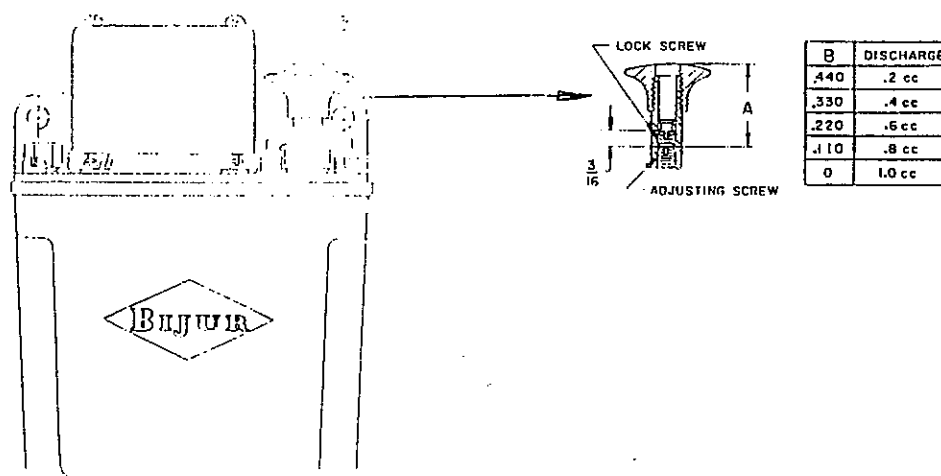


Figure 4

The lubricator is supplied set at maximum stroke, i.e. maximum discharge. For reduced delivery, remove lock screw, measure A, turn adjusting screw clockwise increasing A by B dimension.

The lubricator is fitted with an inlet filter located inside the reservoir. The filter should be inspected periodically and cleaned or replaced as required.

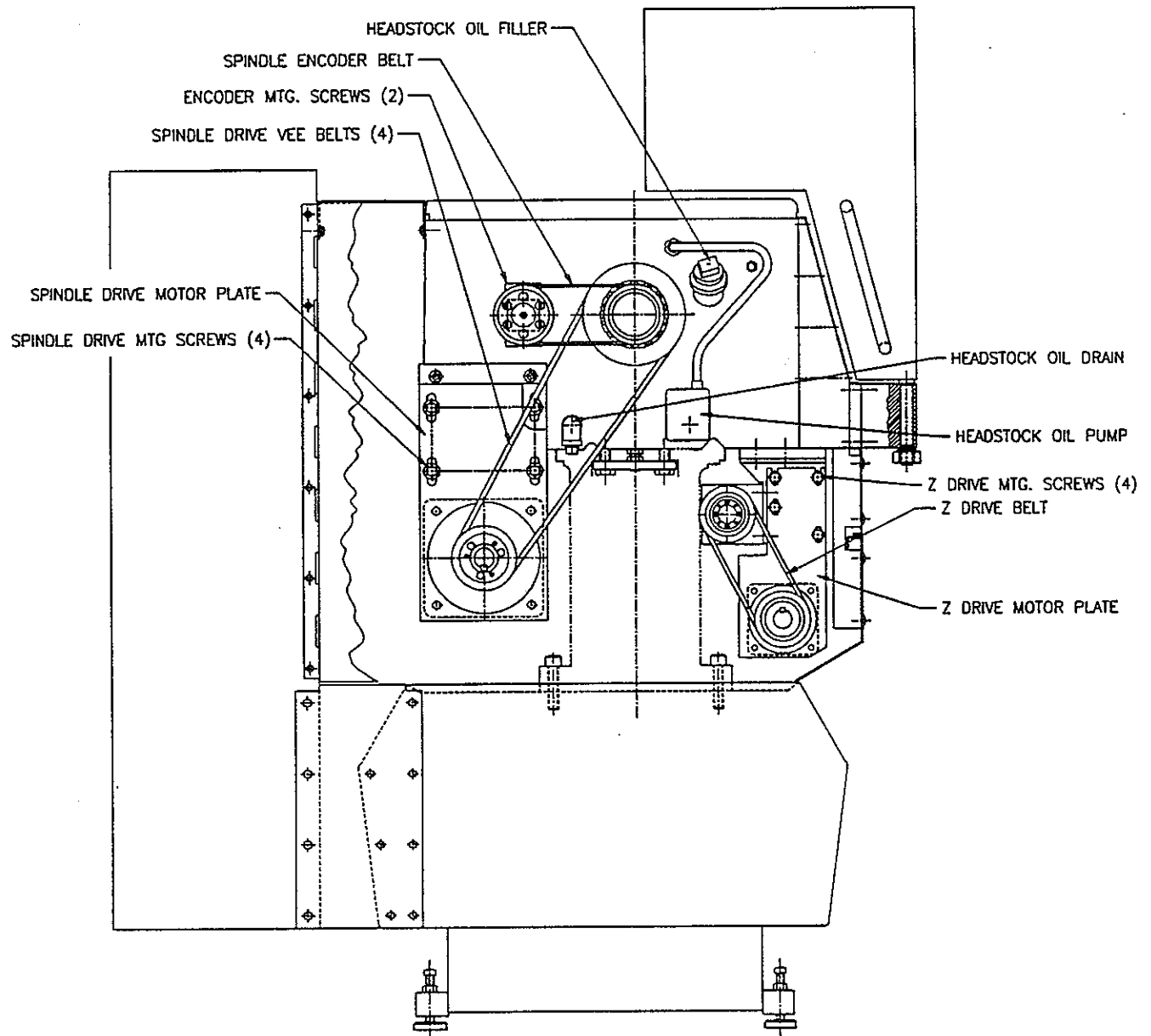


FIGURE 3 - HEADSTOCK LUBRICATION AND DRIVE BELTS

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3. MAINTENANCE

3.1 Vee belt replacement and tensioning

The spindle is driven by four (4) vee belts which should be tensioned to the lowest tension at which the belts will not slip under maximum loading.

With reference to Figure 3, page 8, slacken the four spindle drive mounting screws just enough to allow movement of the motor plate. Apply upward or downward pressure to slacken or tighten the belts and retighten the mounting screws. If belts are being replaced, the spindle encoder belt must first be removed. See para. 3.2.

Check the tension of new vee belts frequently during the first few days of operation and periodically thereafter.

If a vee belt slips under load, TIGHTEN it, bearing in mind that excessive tension shortens belt life.

3.2 Toothed belt replacement and tensioning

The Z drive ballscrew, X drive ballscrew and spindle encoder are all driven by toothed belts. Locations of the Z drive and spindle encoder belts are shown on Figure 3, page 8.

The X drive belt is located in the rear of the saddle assembly and is accessed by removing the guard B-115828 (see page 30 in the parts section.)

Toothed belts should only be tensioned just enough to remove any slack; further tightening is of no benefit and only results in belt life reduction and unnecessary load on bearings.

The Z drive belt is tensioned thus:-

Slacken the four Z drive mounting screws, slide the motor plate to achieve the correct tension, then retighten the screws. Check the tension and re-adjust if necessary.

The encoder belt is tensioned similarly, except that there are only two mounting screws.

The X drive belt is tensioned by slackening the four motor mounting screws and sliding the motor to achieve the correct tension; the screws are then retightened.

3. MAINTENANCE Cont'd

3.3 Cross Slide Ways

Wear in the cross slide ways may be taken up by carefully tightening (clockwise) the seven set screws located along the lower right hand side of the cross slide. Care must be taken to ensure that the screws are tightened gradually and evenly whilst maintaining free movement of the cross slide.

4. PARTS ORDERING PROCEDURE

1. Always quote the machine serial number.
This is found stamped in the recessed face on top of the bed at the tailstock end.
2. Refer to the appropriate assembly and individual part numbers taken directly from the illustrations.

5. LATHE SAFETY

Every effort has been made in the design and production of the lathe to comply with statutory safety requirements and to provide a fundamentally safe machine tool. In the further interests of safety, attention should be given to the following notes:

5.1 Machine use

Responsibility for the following points with respect to machining a component must inevitably rest with the user.

- (1) Ensure that the operator has had suitable training and possesses the required degree of skill and experience to undertake the work.
- (2) Provide suitable work holding and/or supporting equipment: chucks, steadies, revolving centers etc.
- (3) Ensure that suitable tooling is provided and correctly mounted.
- (4) Ensure that suitable feeds and speeds are selected.
(If in doubt select low).
- (5) Use guard provided at all times.

5.2 Lathe Safety Rules

- (1) Read and understand operation notes before attempting to use the machine.
- (2) Keep lathe work areas clean.
- (3) Keep area surrounding machine tidy.
- (4) **KNOW HOW TO STOP THE MACHINE BEFORE STARTING IT.**
- (5) DO NOT interchange chucks or other spindle mounted items between lathes without checking for correct locking.
- (6) We recommend only high speed chucks.
- (7) Before operating the lathe, note the maximum rated speed for chucks and face plates as supplied by the manufacturer.
- (8) Remove chuck key immediately after use.
- (9) Check load capacity of revolving centers.
- (10) Ensure guard is in position before starting machine.
- (11) DO NOT use cracked or chipped tools.
- (12) **STOP MACHINE IMMEDIATELY IF ANYTHING UNEXPECTED HAPPENS.**
- (13) DO NOT touch revolving chuck, spindle or workpiece.
- (14) DO NOT remove work from the machine without retracting tool to a safe position.
- (15) Use E-STOP button when leaving machine unattended.

5. LATHE SAFETY cont'd

5.3 Personal Safety Rules

- (1) Report any accident as soon as it happens.
- (2) Wear safety glasses.
- (3) Wear safety shoes.
- (4) Use barrier creams provided.
- (5) Wear your overalls buttoned up.
- (6) Roll sleeves up or button the cuffs.
- (7) Keep hair short or wear a cap.
- (8) Use the correct size wrench at all times.
- (9) Be careful of, and remove, all burrs and sharp edges.
- (10) When lifting a heavy workpiece, use the correct type of sling, ensuring that it is not worn or damaged and that its safe working load is not exceeded.
- (11) Stand clear when lifting workpieces or equipment by crane.
- (12) Obtain assistance when mounting heavy or awkwardly shaped workpieces.
- (13) DO NOT wear rings, watches, ties, etc.
- (14) DO NOT keep tools (scribers, etc.) in overall pockets.
- (15) DO NOT wash hands in coolant.
- (16) DO NOT remove chips with bare hands; use a rake or brush.
- (17) DO NOT manually lift heavy equipment.
- (18) DO NOT use files, scrapers, etc., on machine tools.
- (19) DO NOT lean on the machine.
- (20) DO NOT tamper with electrical equipment.

6. TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	CORRECTION
Vibration	Loose levelling screws	Set all screws so that they bear evenly on levelling plates.
	Torn or mismatched V-belts.	Replace V-belts with matched set.
	Work or chuck out of balance operating at high spindle speeds.	Balance chuck or reduce spindle speed.
Chatter	Tool bit improperly ground or not on center	Regrind tool bit or adjust tool holder so that area of contact between tool bit and work is decreased. Avoid extreme negative rake.
	Tool overhang too great	Keep point of tool bit as close as possible to tool holder.
	Using improper cutting speed.	Reduce or increase spindle speed.
	Feed rate too high or too low.	Reduce or increase feed.
	Gib of cross slide loose.	Adjust gib.
	Spindle bearings worn or loose.	Adjust spindle bearings.
	Work improperly supported	Adjust tailstock center. Use steady rest or follow rest for long slender shafts. Minimize tailstock barrel extension.
	Vibration	See "Vibration" trouble above.

6. TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	CORRECTION
Work not turned straight	Headstock and tailstock not aligned.	Align tailstock center.
	Work improperly supported.	Use steady rest or follow rest. Reduce overhang from chuck.
	Bed not level.	Re-level bed using precision level.
Work out of round.	Work loose between centers.	Adjust tailstock center.
	Centers excessively worn. Work centers out of round.	Regrind centers. Lap work centers.
	Loose headstock spindle bearings.	Adjust headstock spindle bearings.
Cross slide movement does not coincide with control.	Gib setting too tight or too loose.	Adjust gibs.
	Work is too long and slender.	Use steady rest or follow rest for long slender shafts.

Power On

Push the control on button on the main control panel.

When the main CNC screen appears the **RESET** button will flash, push **RESET** to clear the message.

Manual Operation

In order to perform any axis movements the machine axis must be sent to home position.

Home sequence:

F1 HOME (Main Home)

After power off the control must be homed. To initiate a home sequence push **ESC** until the Main screen is reached, then push **F1 HOME**. A message requesting that **Cycle Start** button be pushed will appear on the screen and the **Cycle Start** button will start flashing. Pushing **Cycle Start** will start the home sequence and when it is finished the **Main** screen will return.

F10 HOME - HERE

Occasionally the machine may be shut down in a position where a full home sequence cannot be performed because of part or tool interference. The function of **F1 HOME - F10 HERE** will enable the machine to be homed at its current position without moving the slides. This function allows the operator to move the slides manually without doing a complete home sequence to clear the work or tool interference. The machine should not be run until a complete home is performed as all limits are based on the home position.

Jog:

F2 JOG

Upon pressing F2 JOG from the Main screen the following screen will appear:

Runtime: 0:00:00	Main-Jog	Active :04587																
<table style="margin: auto;"> <thead> <tr> <th></th> <th>Current</th> <th>Next</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>+00.0000</td> <td>+00.0000</td> </tr> <tr> <td>Z</td> <td>+20.0000</td> <td>+20.0000</td> </tr> </tbody> </table>				Current	Next	X	+00.0000	+00.0000	Z	+20.0000	+20.0000							
	Current	Next																
X	+00.0000	+00.0000																
Z	+20.0000	+20.0000																
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">↖ -Z-X</td> <td style="text-align: center;">↑ -X</td> <td style="text-align: center;">↗ +Z-X</td> <td style="width: 40px;"></td> </tr> <tr> <td style="text-align: center;">← -Z</td> <td></td> <td style="text-align: center;">+Z →</td> <td></td> </tr> <tr> <td style="text-align: center;">↙ -Z+X</td> <td style="text-align: center;">↓ +X</td> <td style="text-align: center;">↘ +Z+X</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>		↖ -Z-X	↑ -X	↗ +Z-X		← -Z		+Z →		↙ -Z+X	↓ +X	↘ +Z+X						<pre> Comp : Cancelled * Tool : 01(01) XLength: 00.0000 ZLength: 00.0000 Radius : 00.0469 WorkCord: 1 (G54) Interp : Linear (Feed) Feed : 000.0150 ipr (100%) 000.0150 ipr Units : Abs/English Cycle : Cancelled Dwell : 0000.00 sec Spindle : 0000.0 rpm [3] (100%) : 0000.0 rpm(OFF) Coolant : Off </pre>
↖ -Z-X	↑ -X	↗ +Z-X																
← -Z		+Z →																
↙ -Z+X	↓ +X	↘ +Z+X																
<table style="margin: auto; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; padding: 2px;">F1 Slow</td> <td style="border: 1px solid black; padding: 2px;">F2 Rapid</td> <td style="border: 1px solid black; padding: 2px;">F3 ↔</td> <td style="border: 1px solid black; padding: 2px;">F4 1</td> <td style="border: 1px solid black; padding: 2px;">F5 .1</td> <td style="border: 1px solid black; padding: 2px;">F6 .01</td> <td style="border: 1px solid black; padding: 2px;">F7 .001</td> <td style="border: 1px solid black; padding: 2px;">F8 .0001</td> <td style="border: 1px solid black; padding: 2px;">F9 G54-Z</td> <td style="border: 1px solid black; padding: 2px;"></td> <td style="border: 1px solid black; padding: 2px;">ESC Exit</td> <td style="border: 1px solid black; padding: 2px;"></td> </tr> </table>			F1 Slow	F2 Rapid	F3 ↔	F4 1	F5 .1	F6 .01	F7 .001	F8 .0001	F9 G54-Z		ESC Exit					
F1 Slow	F2 Rapid	F3 ↔	F4 1	F5 .1	F6 .01	F7 .001	F8 .0001	F9 G54-Z		ESC Exit								

Note: The F9 key may be changed by parameter to store the Z axis (G50) offset.

The F keys across the bottom of the screen are used to select the type of jog.

F1 SLOW JOG

The FEED OVERRIDE switch on the main or remote panel is used to control the feed-rate.

F2 RAPID JOG

F3 CONTINUOUS JOG

In this mode the axis will continue to move until the axis key is released.

F4 - F8 INCREMENTAL JOG

In this mode the axis will move the selected amount each time the axis key is pushed.

F9 G54 Z

This key sets a work offset (G54) for the Z axis at the current machine position. The ESC (escape) key exits the jog mode and returns to the Main screen

KEYBOARD

The keyboard diagram on the jog screen represents the numeric keyboard on the main panel and shows the axis direction for the corresponding key.

Handwheel:

F3 HDW

The Handwheel mode is used to move the axis around using the electronic handwheel on the remote panel. It is used to accurately position the axis while setting tool offsets floating zeroes and part alignment. Upon pushing the F3 HDW key from the Main menu the following screen is displayed:

Runtime: 0:00:00		Main-Hdw		Active :04587	
	Current		Next		
X	+00.0000		+00.0000		
Z	+20.0000		+20.0000		
				Comp : Cancelled * Tool : 01(01) XLength: 00.0000 ZLength: 00.0000 Radius : 00.0469 WorkCord: 1 (G54) Interp : Linear (Feed) Feed : 000.0150 ipr <100%> : 000.0150 ipr Units : Abs/English Cycle : Cancelled Dwell : 0000.00 sec Spindle : 0000.0 rpm [3] <100%> : 0000.0 rpm(OFF) Coolant : Off	
F1 X	F2 Z			F7 XTool	ESC Exit

Note: The increment value may be changed by parameter.

The F keys F1 and F2 at the bottom of the screen and the 4 jog keys on the remote panel are used to select which axis will be moved by the handwheel. The feedrate override switch will determine the value of the move for each increment on the handwheel.

PROCEDURE FOR SETTING TOOL LENGTH AND WORK OFFSETS

F7 XTOOL ZTOOL

The F7 XTOOL or ZTOOL is used to set tool length offsets into the tool table. In the handwheel mode a tool can be moved to a desired position. When F7 XTOOL is pressed the control will ask for the tool number. It then asks for the position of the tool (i.e. Z position for the Z axis or diameter for the X axis).

Procedure

1. Make sure all G50 offsets are zero. They are zeroed on power up or can be zeroed by using **F7 (PARMS) - F2 (COORD)** and editing the G50 offsets.
2. Make sure the G54 X offset is zero. It can be zeroed by using **F7(PARMS) F3 (COORD)** and editing the G54 offset. (This relates to the material length.)
3. Make sure tool #1, Z length , is zero. It can be zeroed by using **F7(PARMS)- F4 (TOOLS)** and editing the tool table.
4. Make sure all tool wear offsets are zero. They can be zeroed by using **F7 (PARMS) - F4 (WEAR)** and editing the wear offset table.
5. Make tool #1 active. Do an **MDI T0101 M6**.
6. Using the handwheel, touch the tip of the tool to the face of the material (or line up the center of the tool tip to the face of the part for diamond shaped turning tools). Then press **F8 (G54 - Z)**. This relates to the material length entered in programs for the graphics.
7. Using the handwheel, make a light turning cut on the diameter of the material. Press **F7 (XTOOL)** and enter "1" for the tool number. Then enter the measured diameter of the cut.

For drills, center the drill at the center of the material. Press **F7 (XTOOL)** and enter "1" for the tool number. Then enter "0" for the position.

The X offset for diamond shaped facing tools can be set like a drill or by lining up the center of the tool tip to a diameter on the part. Press **F7 (XTOOL)**, and then enter the tool number and position.

8. Make the next tool active. Do an **MDI T#### M6**.

9. Using the handwheel, touch the tip of the tool to the face of the material (or line up the center of the tool tip to the face of the part for diamond shaped turning tools). Then press **F7 (ZTOOL)** and enter the tool number, then enter "0" for the tool position.
10. Using the handwheel, make a small turning cut on the diameter of the material. Press **F7 (XTOOL)** and enter the tool number. Then enter the diameter of the cut for the position.

For drills, center the drill at the center of the material. Press **F7 (XTOOL)** and enter the tool number. Then enter "0" for the position.

The X offset for diamond shaped facing tools can be set like a drill or by lining up the center of the tool with a diameter on the part. Press **F7 (XTOOL)**, and then enter the tool number and position.

11. Go to step #8 for the next tool.
12. Enter the tool types and tool nose radii in the tool table by pressing **F7 (PARMS) - F3 (TOOLS)** and then editing the tool table. **F1 (TOOL>)** toggles the tool type.

Some sample tool types:

- 1- inside turning (from the chuck to the tailstock)
- 2- inside turning (from the tailstock to the chuck)
- 3- outside turning (from the tailstock to the chuck)
- 4- outside turning (from the chuck to the tailstock)
- 5- ???
- 6- inside threading
inside turning using diamond insert
boring tools using a diamond insert
- 7- drills
face grooving
facing tools
- 8- outside threading
outside turning using diamond insert
cut off tools
outside diameter grooving

note : The tool type relates to the imaginary tool tip and how the tool offsets are set.

Automatic operation

F4 RUN

Run is used to execute the active program. Upon pushing the RUN button the following screen appears.

Runtime: 0:00:00		Main-Run		Active :04587																			
<table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">Current</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">Next</td> <td style="width: 10%;"></td> <td style="width: 30%;"></td> </tr> <tr> <td>X</td> <td>+00.0000</td> <td></td> <td>+00.0000</td> <td></td> <td></td> </tr> <tr> <td>Z</td> <td>+20.0000</td> <td></td> <td>+20.0000</td> <td></td> <td></td> </tr> </table>							Current		Next			X	+00.0000		+00.0000			Z	+20.0000		+20.0000		
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Z	+20.0000		+20.0000																				
Comp : Cancelled * Tool : 01(01) XLength: 00.0000 ZLength: 00.0000 Radius : 00.0469 WorkCord: 1 (G54) Interp : Linear (Feed) Feed : 000.0150 ipr (100%) : 000.0150 ipr Units : Abs/English Cycle : Cancelled Dwell : 0000.00 sec Spindle : 0000.0 rpm [3] (100%) : 0000.0 rpm(OFF) Coolant : Off																							
F1 Start	F2 Old	F3 Block	F4 OStop	F5 BSkip	F6 Displ																		
F7 Menu	F8 Dry			ESC Esc																			

After the above screen appears, **F1 START** would be pushed to run the active program shown in the upper right hand box and the following screen would appear.

Runtime: 0:00:00		Main-Run -Start		Active :04587																			
<table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">Current</td> <td style="width: 10%;"></td> <td style="width: 20%; text-align: center;">Next</td> <td style="width: 10%;"></td> <td style="width: 30%;"></td> </tr> <tr> <td>X</td> <td>+00.0000</td> <td></td> <td>+00.0000</td> <td></td> <td></td> </tr> <tr> <td>Z</td> <td>+20.0000</td> <td></td> <td>+20.0000</td> <td></td> <td></td> </tr> </table>							Current		Next			X	+00.0000		+00.0000			Z	+20.0000		+20.0000		
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X	+00.0000		+00.0000																				
Z	+20.0000		+20.0000																				
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F1 First	F2 Block	F3 Tool																					
				ESC Abort																			

The **F1 FIRST** key is automatically selected when entering this screen. Therefore if it is desired to run the active program from the beginning, all that is necessary is to push the **CYCLE START** button. If **F2 BLOCK** is pushed, the control will request that the desired block or sequence number (to start the program from) be typed in, followed by **ENTER**. If the **CYCLE START** button is pressed the program will start running from the selected block number. If **F3 TOOL** is pressed, the control will request a tool number to start from.

*Note: If the block or tool number is not found in the active program, a message will say it was not located and **CYCLE START** will start the program from the beginning.*

Runtime: 0:00:00		Main-Run		Active :04587	
Current		Next			
X	+00.0000	X	+00.0000		
Z	+20.0000	Z	+20.0000		
				Comp : Cancelled * Tool : 01(01) XLength: 00.0000 ZLength: 00.0000 Radius : 00.0469 WorkCord: 1 (G54) Interp : Linear (Feed) Feed : 000.0150 ipr (100%) : 000.0150 ipr Units : Abs/English Cycle : Cancelled Dwell : 0000.00 sec Spindle : 0000.0 rpm [3] (100%) : 0000.0 rpm(OFF) Coolant : Off	
Block 13 G00 X123.4567					
	F3 Block	F4 OStop	F5 BSkip	F6 Displ	F8 Dry
					F9 Halt
					ESC Esc

This screen is the basic run screen after **CYCLE START** has been pressed. It has two new additions, a block number display and **F9 HALT**. The block number display shows the current line being executed as the program runs. The **HALT** key is similar to **FEEDHOLD** in that when pushed the machine will stop. However unlike **FEEDHOLD**, the **HALT** also exits the **RUN** mode and allows a new program to be started.

Once a program has been **HALTED** the **RESUME** feature of the control becomes active. The **F9 RESUM** key will now be displayed on the **RUN** screen instead of the **F9 HALT** key. A program may be **RESUMED** as long as one of the following functions has not been performed: **VERIFY**, **MDI**, **HOME**, **E-STOP** or modifying parameters. If not the axis may be moved away from the work by **JOG** or **HANDWHEEL** and the **RESUME** remains active.

Note: For further information on the resume function, refer to the programming manual section 5.5.1

MDI Mode

The MDI mode is for manual data input. All programmable functions may be entered from this mode. When the **F5 MDI** key is pressed from the Main menu the following screen will appear:

Runtime: 0:00:00		Main-MDI		Active :04587	
Current		Next			
X	+00.0000	X	+00.0000		
Z	+20.0000	Z	+20.0000		
				Comp : Cancelled Tool : 01(01) XLength: 00.0000 ZLength: 00.0000 Radius : 00.0469 WorkCord: 1 (G54) Interp : Linear (Feed) Feed : 000.0150 ipr (100%) : 000.0150 ipr Units : Abs/English Cycle : Cancelled Dwell : 0000.00 sec Spindle : 0000.0 rpm [3] (100%) : 0000.0 rpm(OFF) Coolant : Off	
<MDI> G00 X123.4567 Z123.4567 M03 S400					
F1 GCode	F2 MCode	F3 	F4 	F5 Displ	F6
F7 	F8 	F9 	F10 	F11 	F12
				ESC Done	

The line above the softkey template will display the entered MDI command. When the data is entered and the **ENTER** key is pressed, the control will prompt you to push **CYCLE START** to execute the command.

F1 GCODE

The **F1 GCODE** key will display a list of all usable G-Codes.

F2 MCODE

The **F2 MCODE** key will display a list of all usable M-Codes.

To change spindle ranges in MDI. Push **F5 MDI** from the main screen. Type **M41 ENTER**. At this time the control will prompt for **CYCLE START**. Push **CYCLE START**, the text line will be cleared and **CYCLE START** lamp will go out when the command is completed.

To start the spindle in a clockwise direction.
Type **M03 S400 ENTER. CYCLE START**

Note : A spindle range must be selected before a range is selected.

Spindle Horsepower

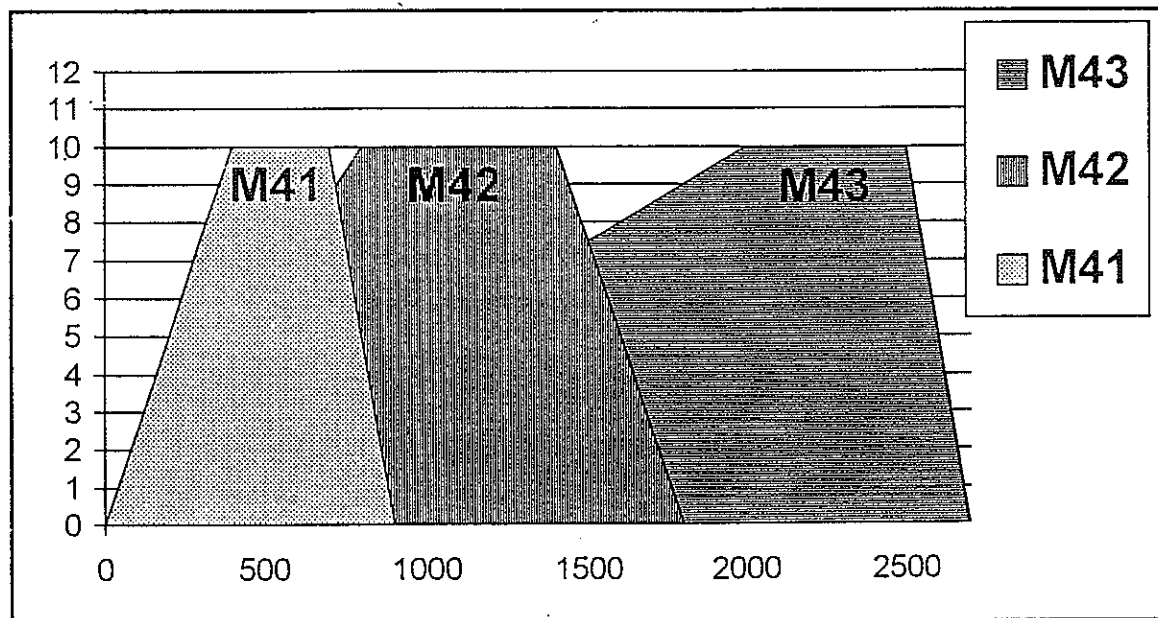
The Kestrel series lathes are equipped with a multi range variable speed spindle motor and drive. It is the machine programmers responsibility to program the correct speed / horsepower range for the cut required. This is accomplished by using a M-CODE (miscellaneous code) to select the correct range.

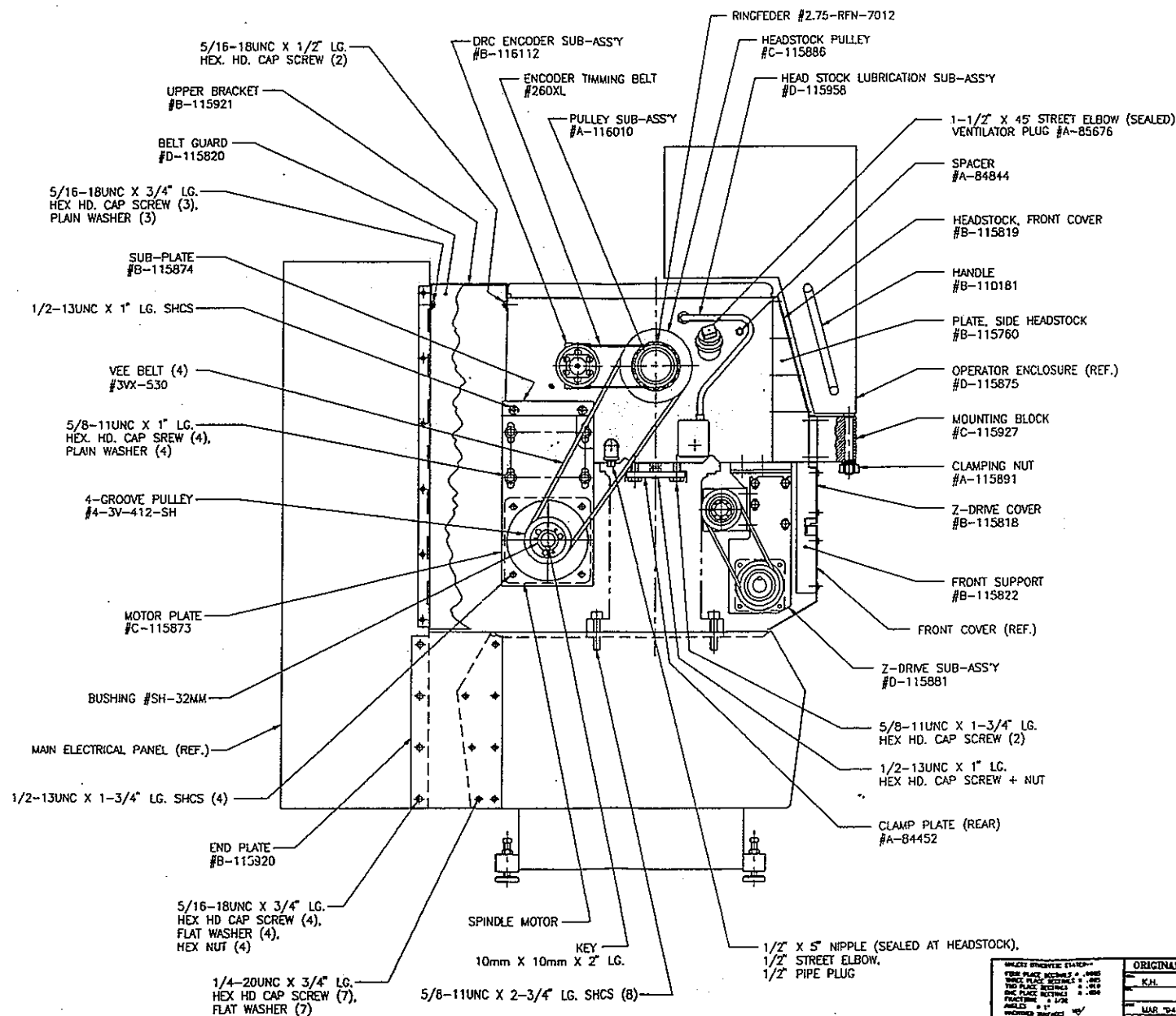
Spindle Ranges:

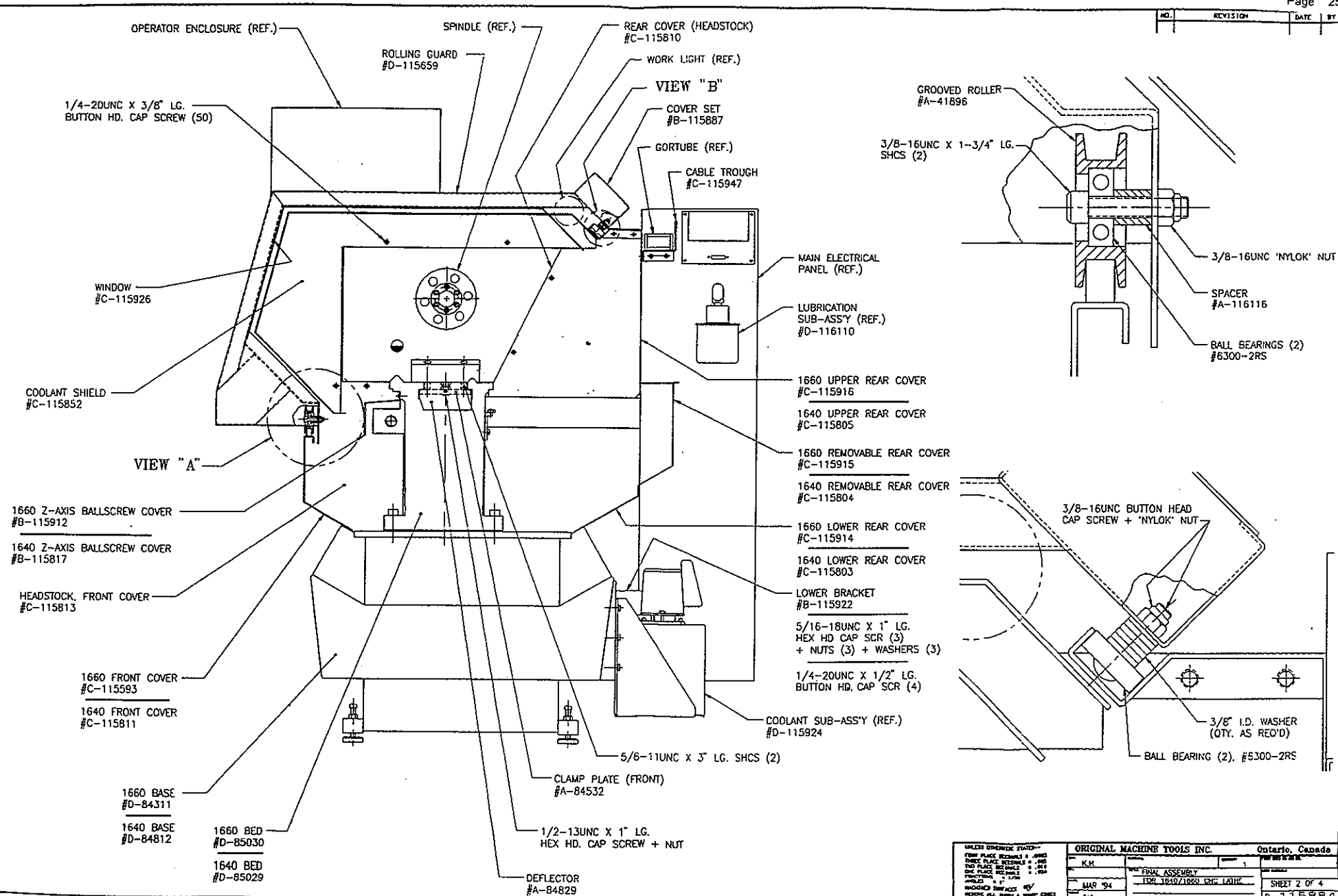
			Kestrel 17"	Kestrel 20"
M41	LOW SPEED	HIGH TORQUE	30-700 RPM	30-500 RPM
M42	MED SPEED	MED TORQUE	50-1400 RPM	50-1000 RPM
M43	HIGH SPEED	LOW TORQUE	100-2500 RPM	100-2000 RPM

It is very important to select the spindle range with sufficient horsepower to obtain the desired cut. Material depth of cut, spindle speed and tooling must be taken into account when making the range selection. The following chart shows the available horsepower in the three ranges. Available horsepower is the intersection point of spindle speed with the hatched area under the curve.

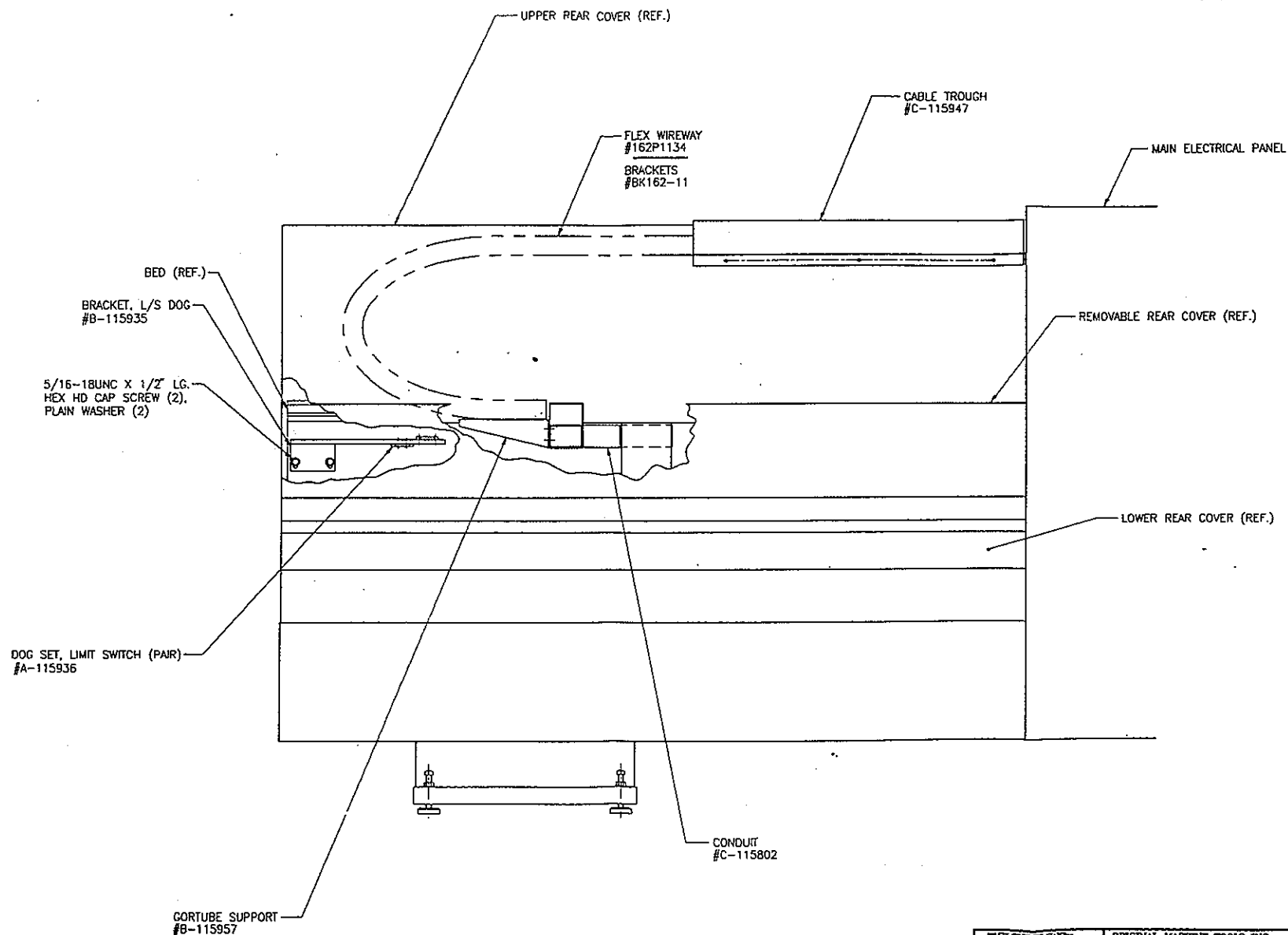
Spindle Horsepower Chart

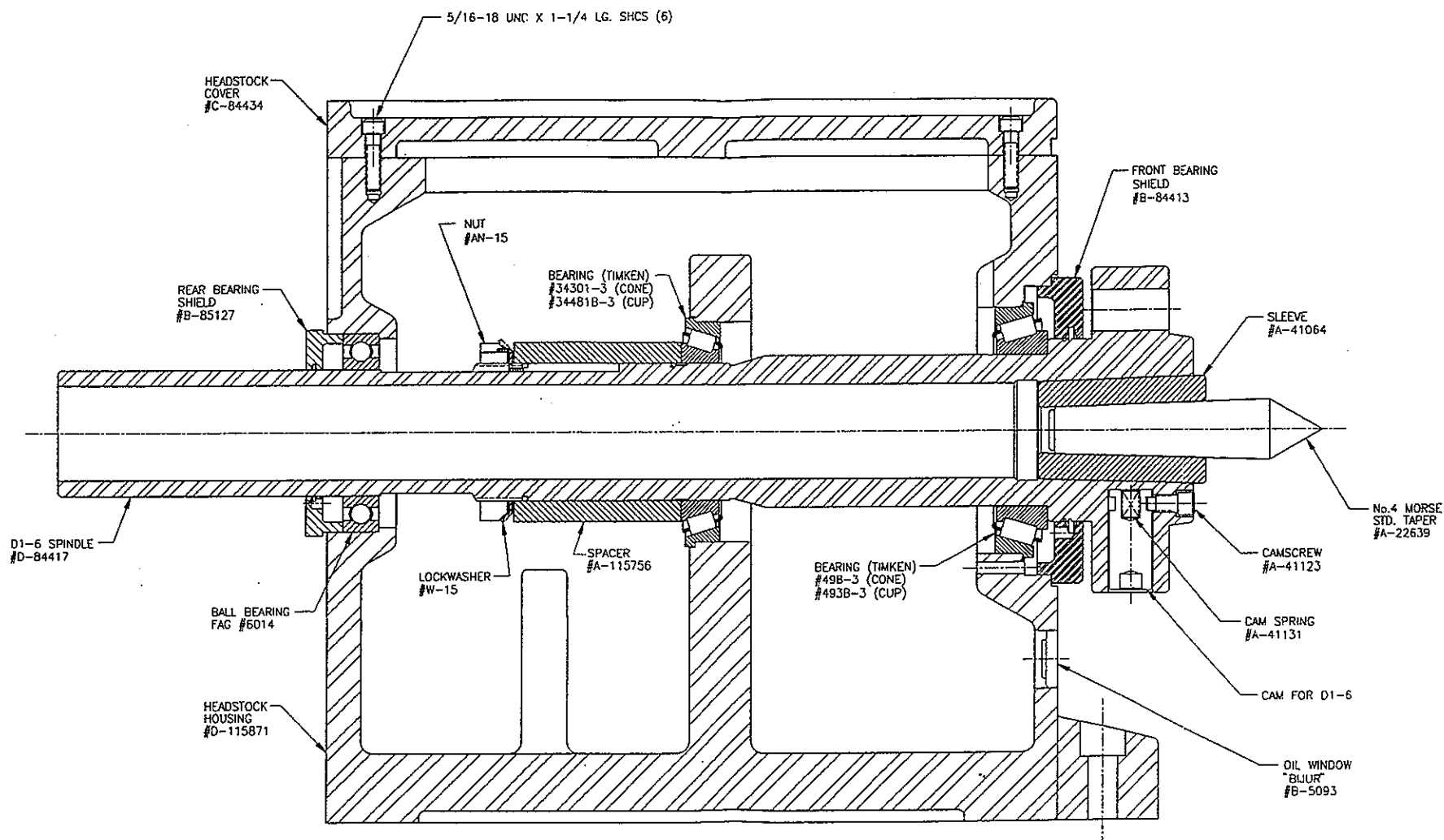






NO.	REVISION	DATE	BY

[illegible]



UNLESS OTHERWISE SPECIFIED:
 FOUR PLACE DECIMALS = .0001
 THREE PLACE DECIMALS = .001
 TWO PLACE DECIMALS = .01
 ONE PLACE DECIMALS = .1
 FINISHING: .001
 ANGLES: 1/2°
 UNLESS OTHERWISE SPECIFIED:
 REMOVE ALL BURRS & SHARP EDGES

ORIGINAL MACHINE TOOLS INC.

Ontario, Canada

K.H.

HEADSTOCK ASSEMBLY

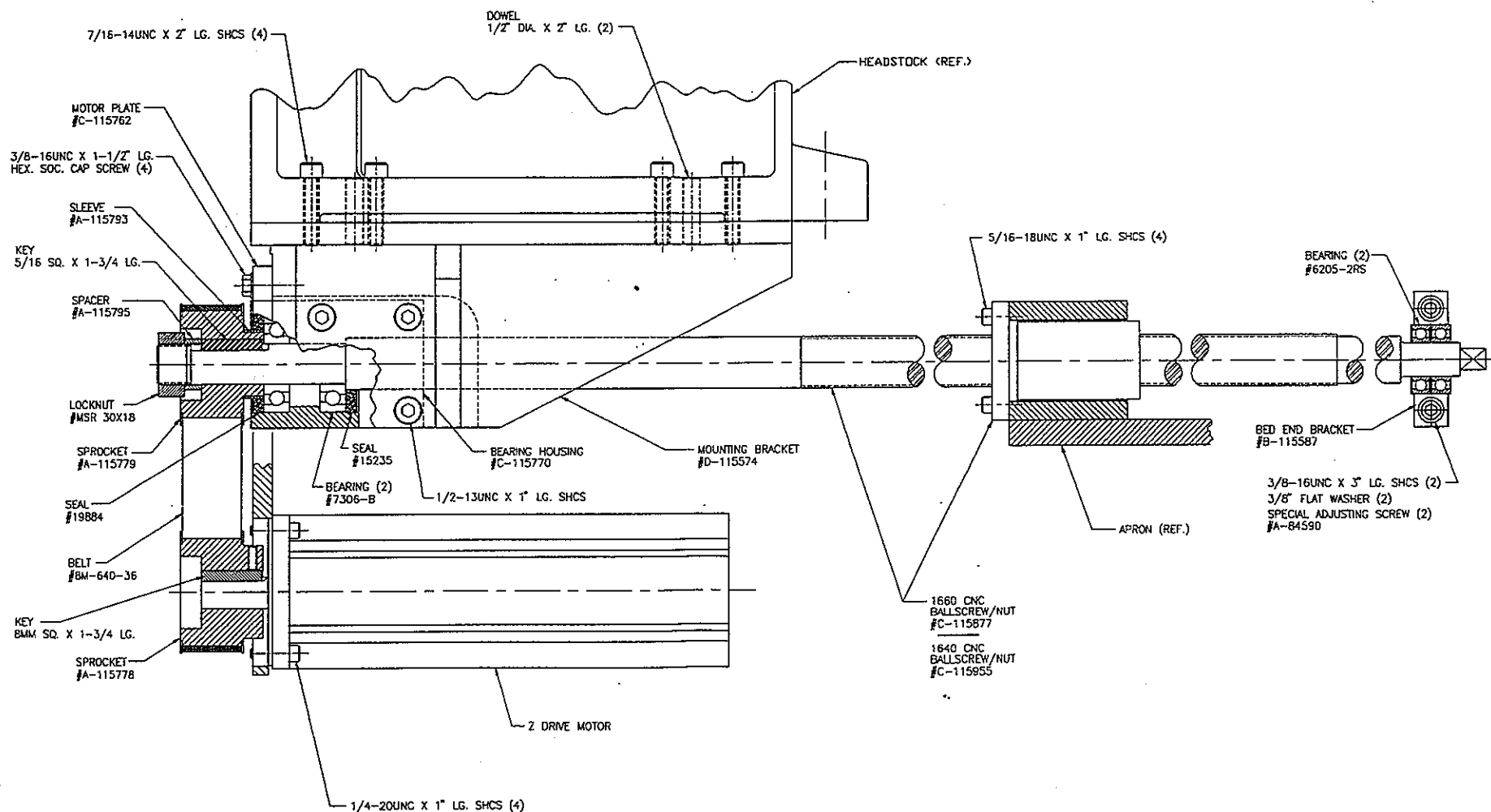
NOV '93

16" CNC LATHE

FULL

D-11587B

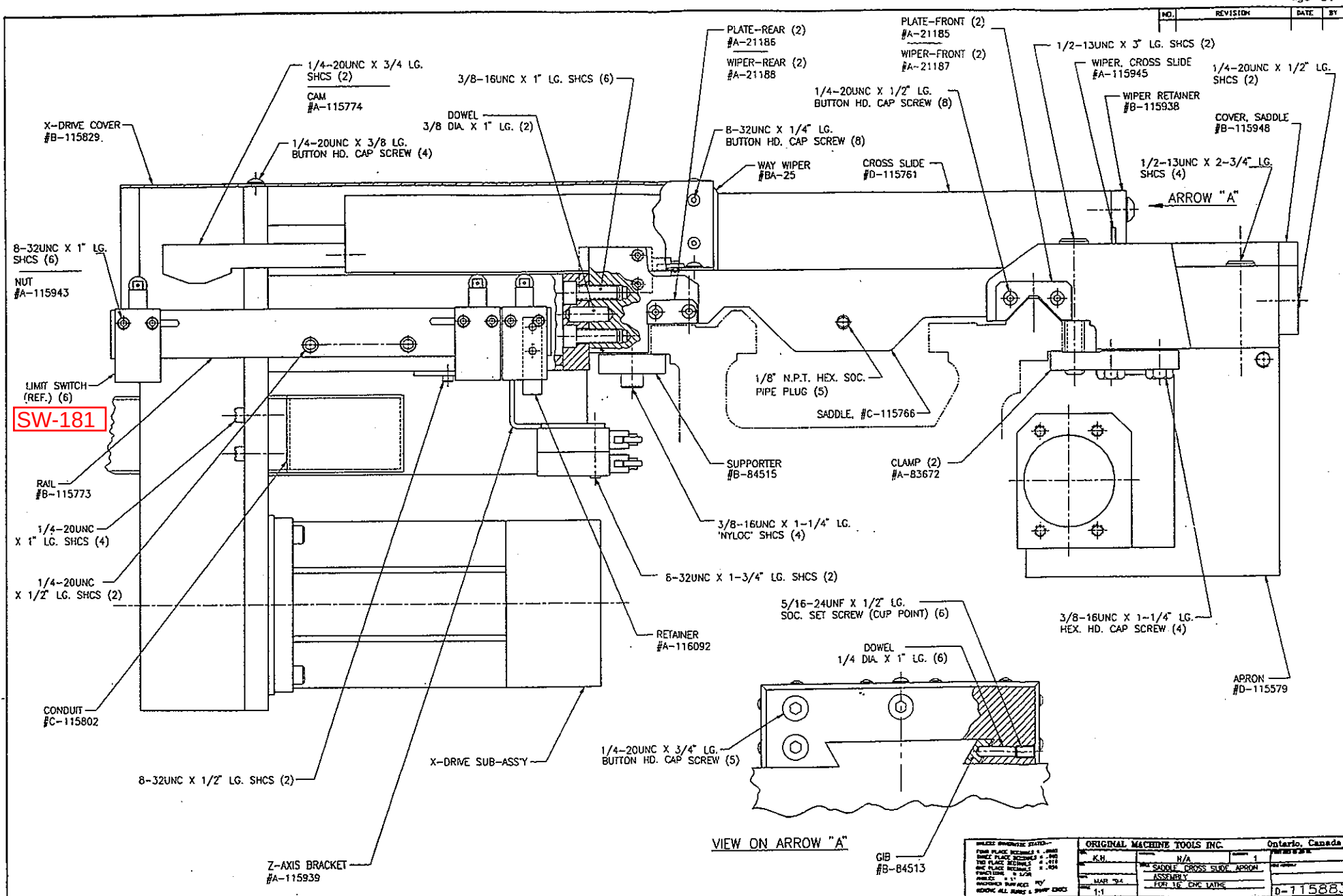
NO.	REVISION	DATE	BY
-----	----------	------	----

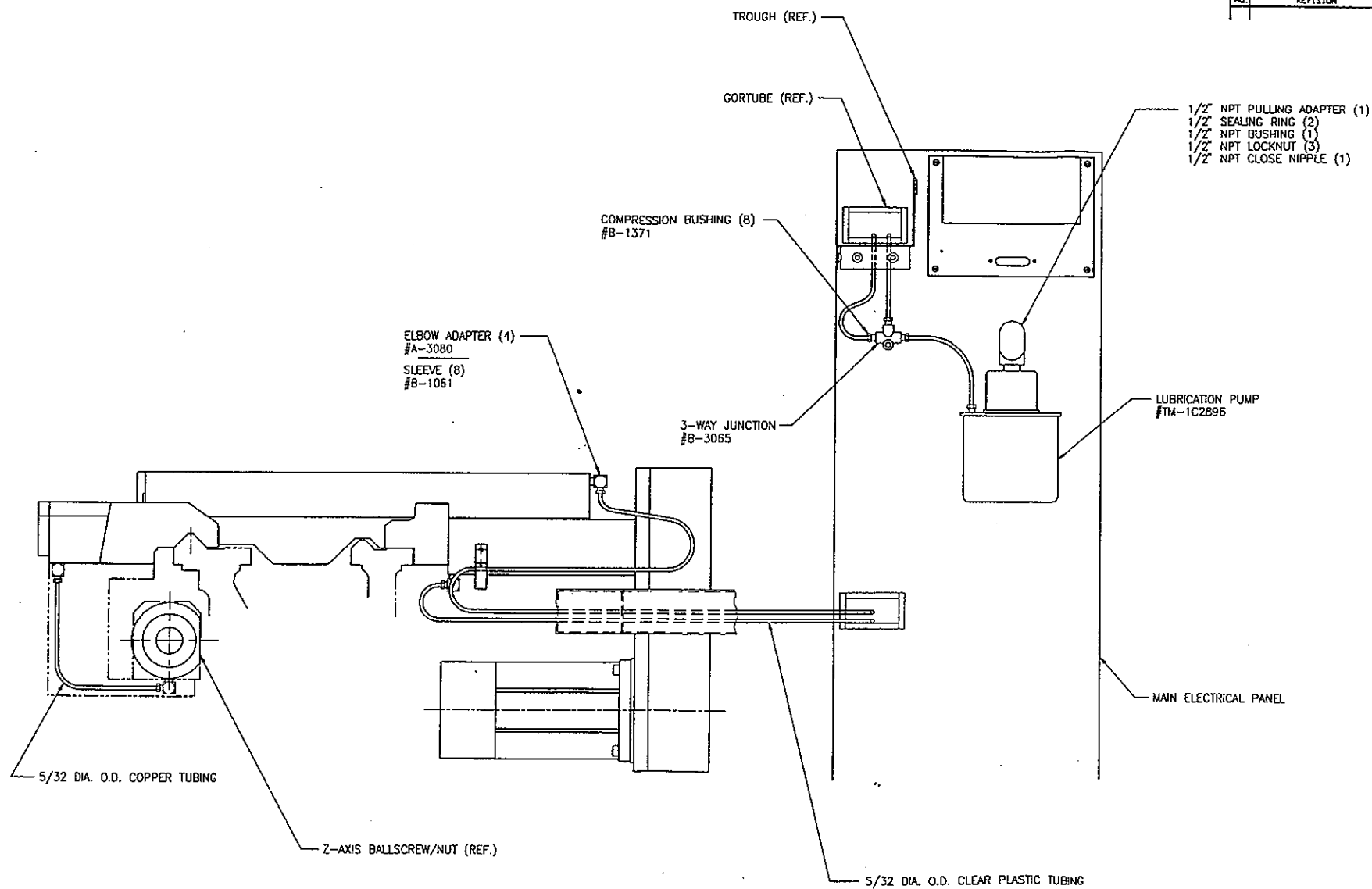


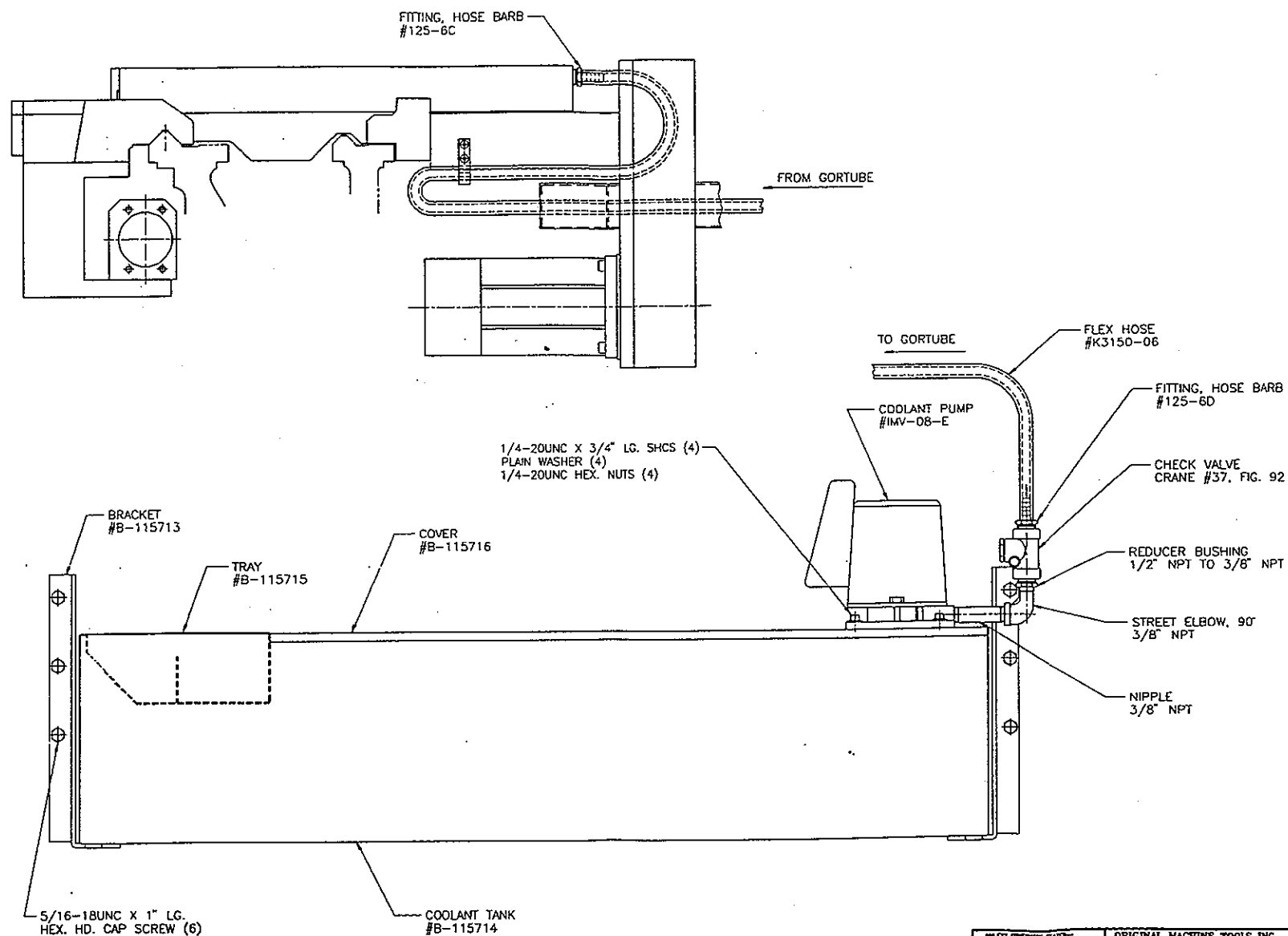
ORIGINAL MACHINE TOOLS INC.		Ontario, Canada
KH	1	
7 DRIVE ASSY		
FUEL 16" CNC LATHE		
1/3/8		0-115881

Z axis belt BT-11

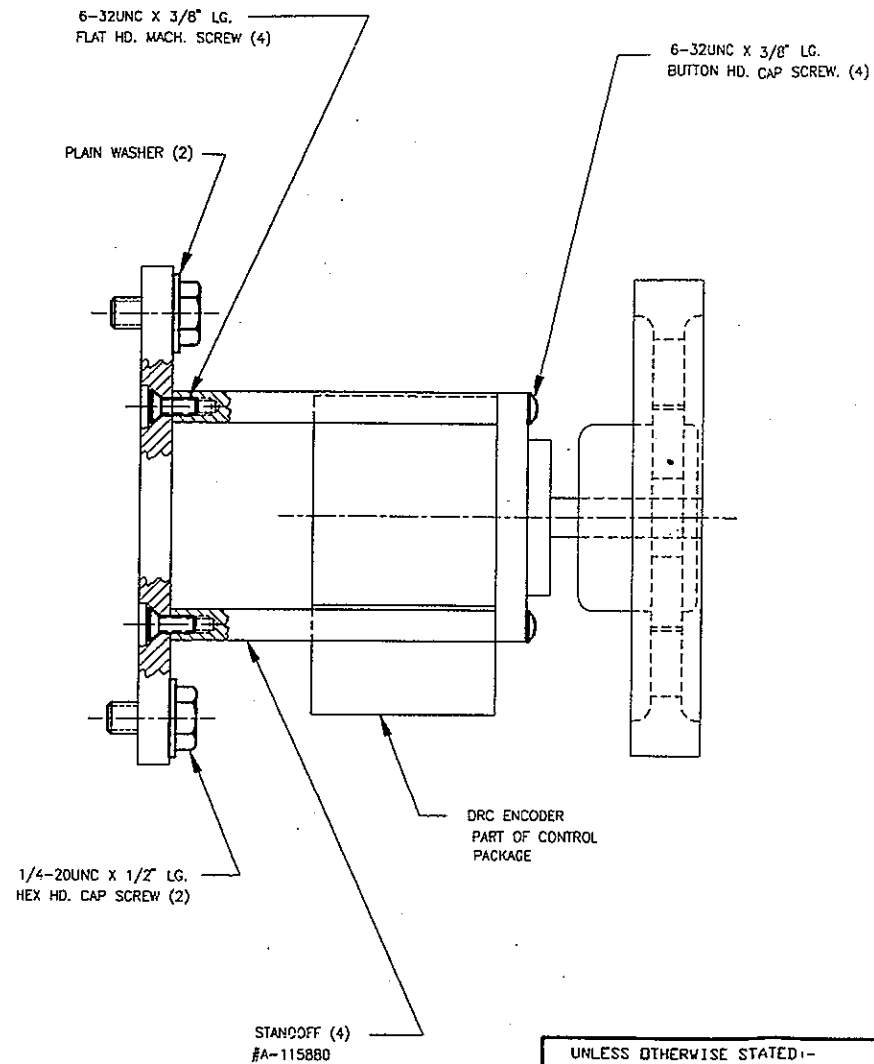
Page 31



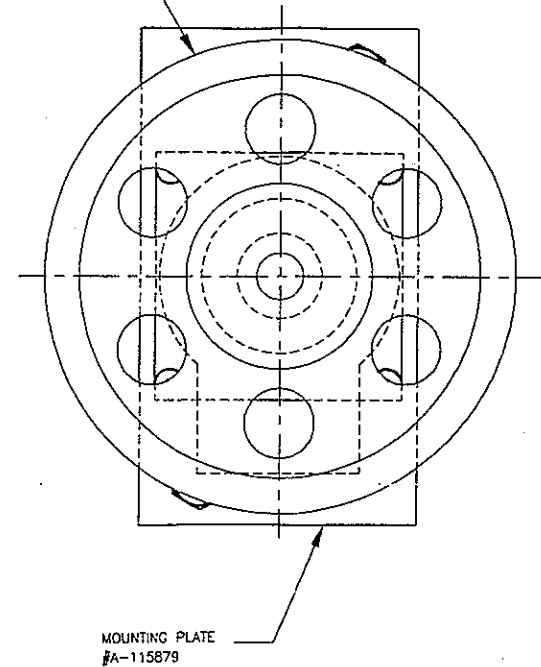




MAKING ENGINEER: K.H.		ORIGINAL MACHINE TOOLS INC.		Ontario, Canada	
DATE: MAR 74		REV: 1		PART NO. B-0-115924	
DRAWN BY: K.H.		CHECKED BY: K.H.		APPROVED BY: K.H.	
TITLE: COOLANT ASSEMBLY		FOR: J.C. G.C. LANE		DATE: MAR 74	
SCALE: 1:2		SHEET: 1		TOTAL: 1	



NO.	REVISION	DATE	BY

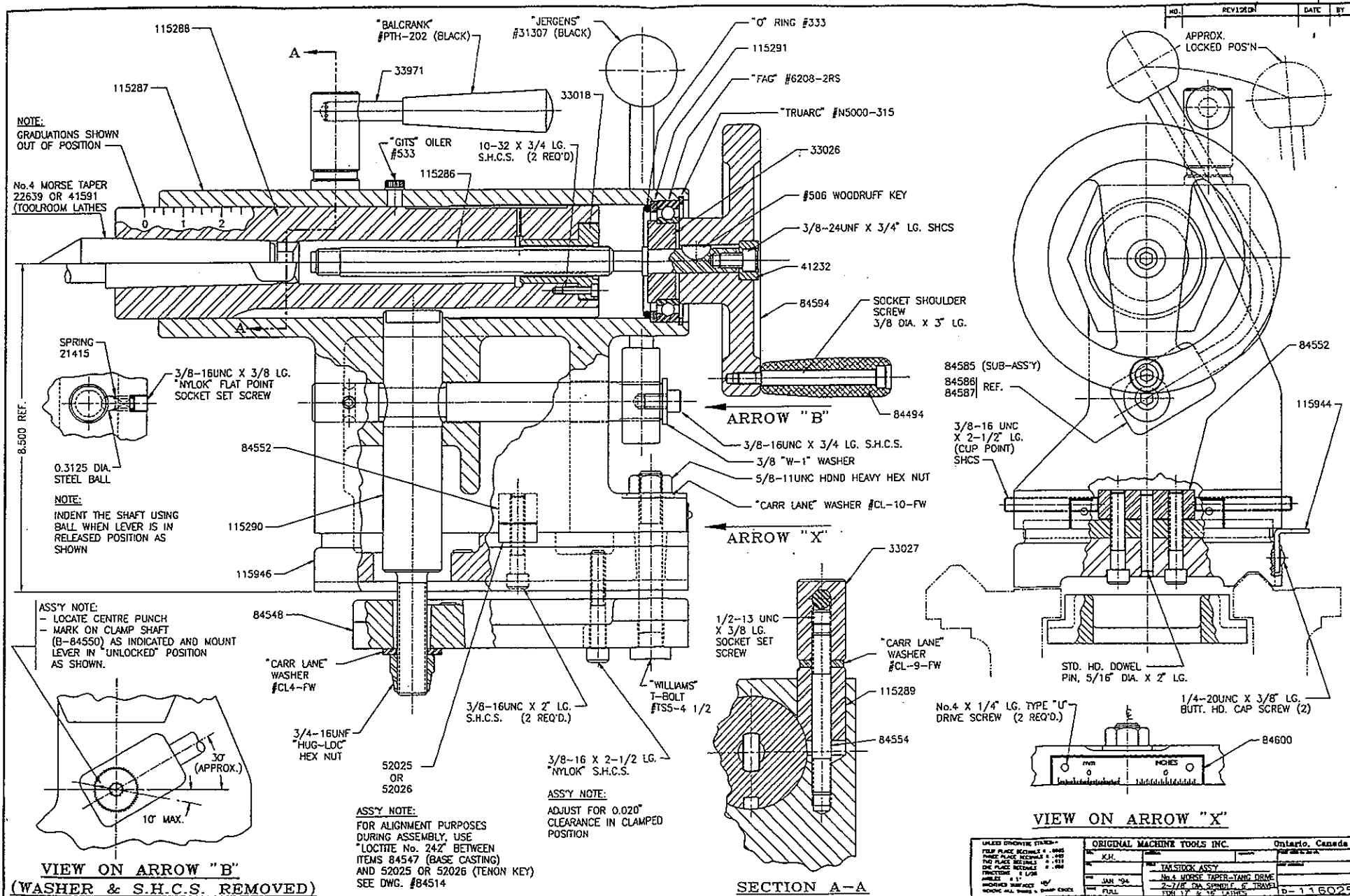


UNLESS OTHERWISE STATED:-
 FOUR PLACE DECIMALS $\pm .0005$
 THREE PLACE DECIMALS $\pm .005$
 TWO PLACE DECIMALS $\pm .010$
 ONE PLACE DECIMALS $\pm .050$
 FRACTIONS $\pm 1/32$
 ANGLES $\pm 1^\circ$
 MACHINED SURFACES $\sqrt{125}$
 REMOVE ALL BURRS & SHARP EDGES

ORIGINAL MACHINE TOOLS INC.

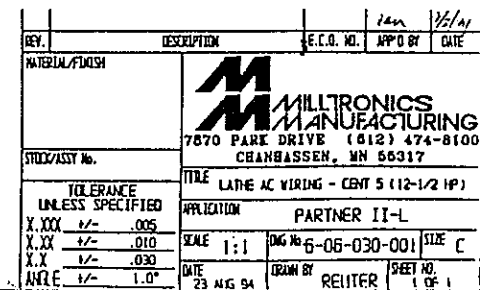
Ontario, Canada

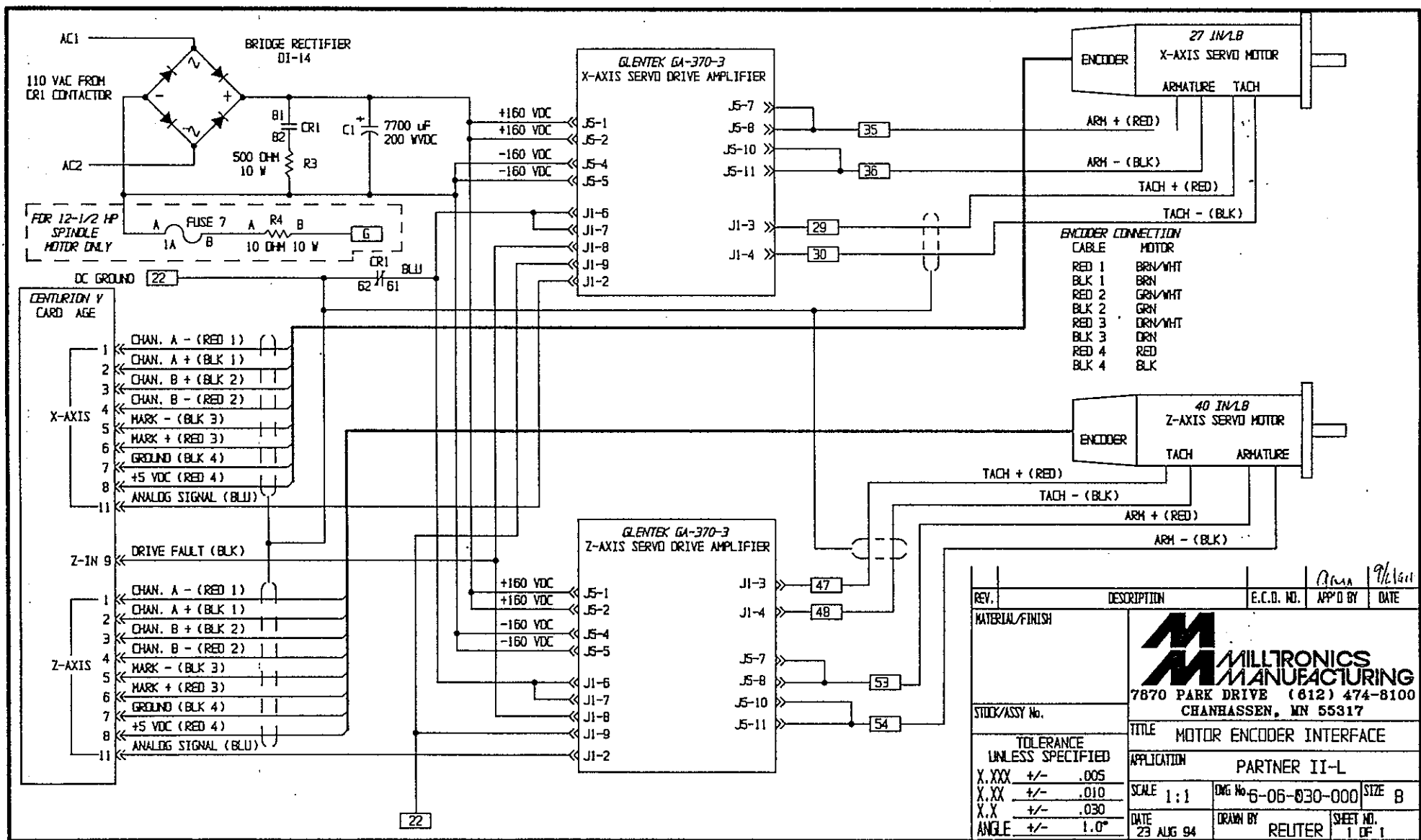
DRN. K.H.	MATERIAL	QUANTITY 1	FIRST USED ON JOB NO.
CH.	TITLE ASSEMBLY	NEXT ASSEMBLY D-115884	
DATE MAR '94	DRC ENCODER		
SCALE 1:1	FOR 16" CNC LATHE		
			B- 116112

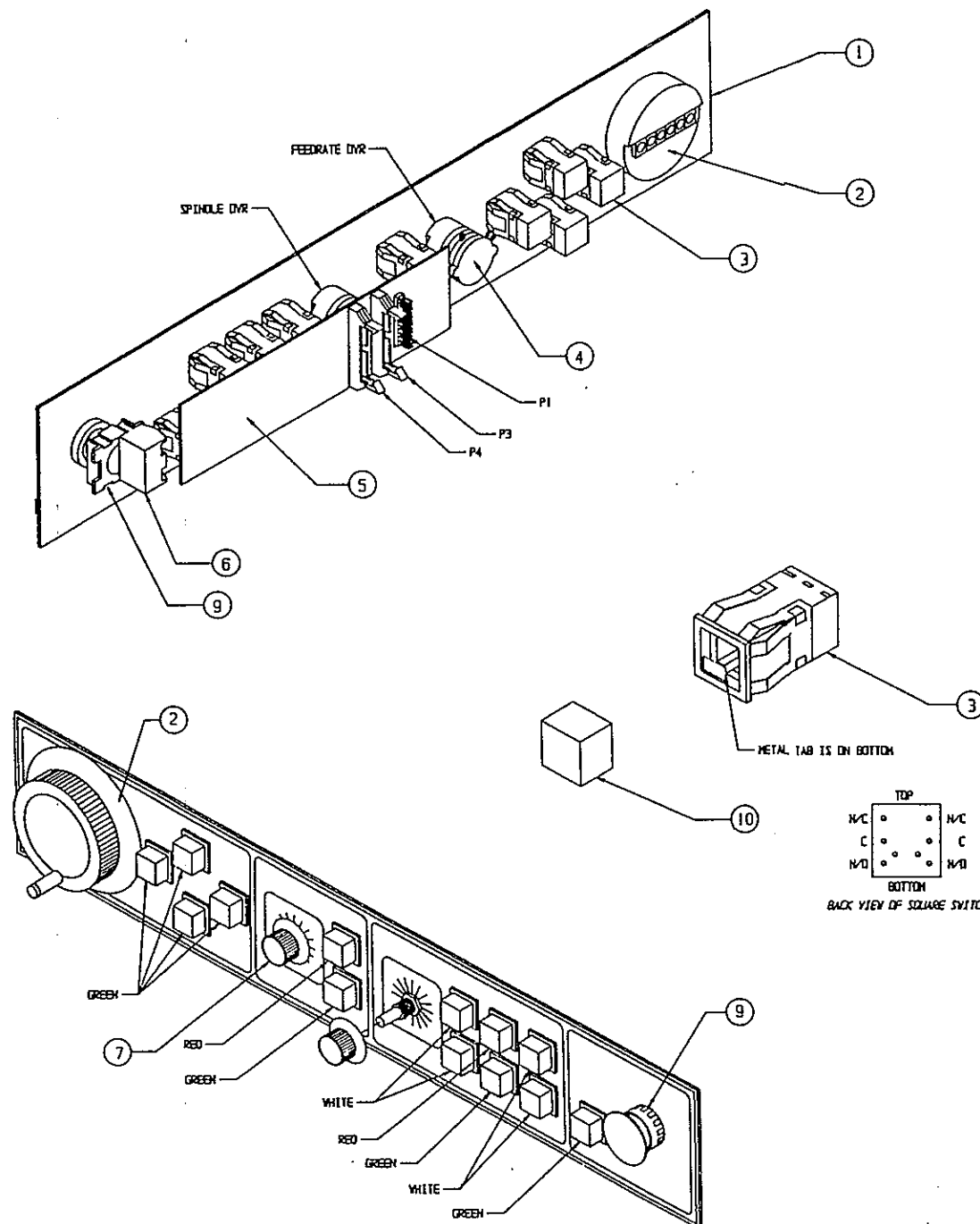


PARTNER T SERIES CNC LATHES
Electrical Drawings

1. Lathe AC Wiring (Centurion 5) 12½ HP Spindle
2. Lathe AC Wiring (Centurion 5) 7½ HP Spindle
3. Lathe DC Wiring (Centurion 5) 12½ HP Spindle
4. Lathe DC Wiring (Centurion 5) 7½ HP Spindle
5. Axis Drive Schematic
6. Centurion 5 Front Panel Wiring (1-2)
7. Lathe Remote Control Panel Interface
8. Centurion 5 Front Panel Assembly - Front
9. Centurion 5 Front Panel Assembly - Rear
10. Centurion 5 Card Cage Assembly (1-5)
11. CNC Lathe Remote Control Panel Assembly
12. Mag Panel Parts Layout - 12½ HP Spindle
13. Mag Panel Parts Layout - 7½ HP Spindle
14. Centurion 5 I/O Specifications for CNC Lathe







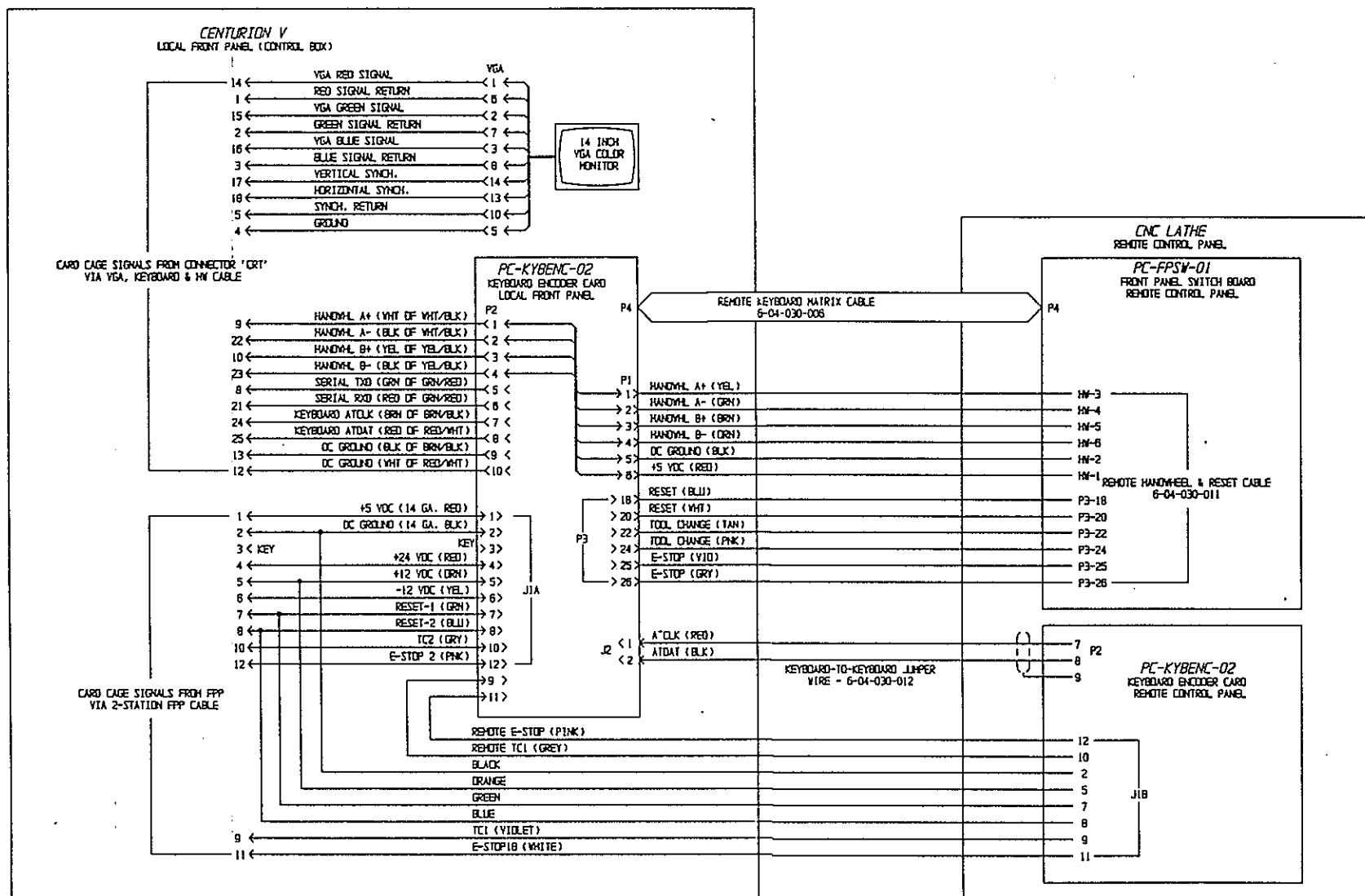
- PARTS LIST -

ITEM	STOCK No.	QTY.	DESCRIPTION
1	NONE	1	LATHE REMOTE CONTROL PANEL (SUPPLIED WITH THE LATHE)
2	ED-30	1	HANDWHEEL ENCODER, 100 COUNT SUTAK No. LGF-022-100
3	SV-87	13	SWITCH, MOMENTARY CONTACT, DPDT HONEYWELL MICROSWITCH No. AML21CB3AC
4	NONE	1	ROTARY SWITCH ASSEMBLY (FEEDRATE & SPINDLE) DNG No. 6-04-004-020
5	ASSY 7300	1	FRONT PANEL SWITCH BOARD, MODIFIED, PC-FPSW-01 SEE 6-03-030-002 FOR MODS.
6	SV-38	1	SWITCH CONTACT BLOCK, N/C (RED) ALCO No. V-40
7	SV-35	2	ROTARY SWITCH KNOB, COMPOSITE BLACK ALCOKNOB No. PCA-P708-1/4
9	SV-23	1	SWITCH ACTUATOR, RED HUSH-RIDON TOP ALCO No. 12050-2
10	SV-88	2	SQUARE KEYTOP, RED HONEYWELL MICROSWITCH No. AML51A10R
	SV-88	7	SQUARE KEYTOP, GREEN HONEYWELL MICROSWITCH No. AML51A10G
	SV-90	4	SQUARE KEYTOP, WHITE HONEYWELL MICROSWITCH No. AML51A10W

- ORDER OF ASSEMBLY -

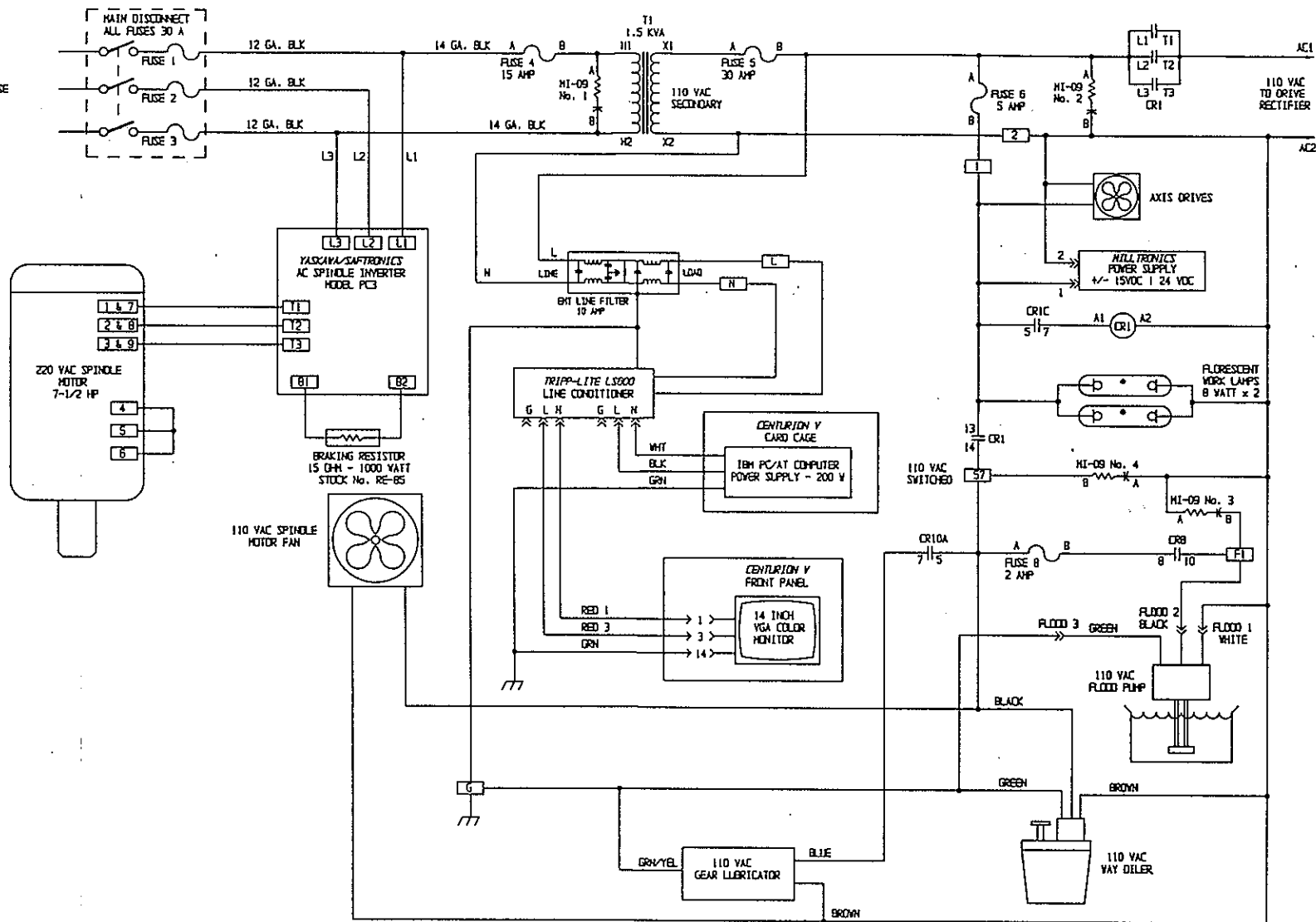
1. THE HOLES FOR MOUNTING THE HANDWHEEL MUST BE ENLARGED. USE A No. 7 BIT TO DRILL OUT THESE HOLES. THEN MOUNT THE HANDWHEEL TO THE PANEL WITH THE HARDWARE PROVIDED WITH THE HANDWHEEL.
2. INSERT THE SQUARE FRONT PANEL SWITCHES. OBSERVE PROPER ORIENTATION OF THESE SWITCHES WHEN INSTALLING.
3. INSERT THE E-STOP SWITCH ACTUATOR AND LOOSELY SECURE IT TO THE PANEL WITH HARDWARE PROVIDED WITH THE ACTUATOR. TURN THE SWITCH SO THAT THE CONTACT BLOCK WILL FACE INWARDS AS SHOWN. TIGHTEN DOWN THE ACTUATOR AND THE CLIP ON THE CONTACT BLOCK.
4. INSTALL THE ROTARY SWITCHES INTO THE PANEL AS A CABLE ASSEMBLY. THE SWITCHES ARE LABELED FOR CORRECT PLACEMENT. USE HARDWARE PROVIDED WITH THE ROTARY SWITCHES.
5. ATTACH THE MODIFIED FRONT PANEL SWITCH CARD INTO THE SQUARE SWITCHES. IF THE SWITCHES ARE NOT ORIENTED CORRECTLY, THE BOARD WILL NOT FIT.
6. CONNECT THE JDC SWITCHES WITH THE ADDITIONAL SOCKETS HANGING FROM PC-FPSW-01. SEE THE DRAWING SPECIFIED IN THE PARTS LIST FOR THESE SWITCH CONNECTIONS.
7. BE SURE THAT THE ROTARY SWITCH SHAFTS ARE TURNED COMPLETELY COUNTER-CLOCKWISE TO THE STOP. SLIDE THE KNOBS ONTO THE SHAFTS. TURN THE KNOB SO THAT THE MARK POINTS TO ZERO. (6 O'CLOCK POSITION), THEN TIGHTEN THE KNOBS WITH SETSCREWS PROVIDED.
8. PLACE SQUARE COLORED KEYTOPS ONTO FRONT PANEL SWITCHES. NOTE THE COLORS OF THE KEYTOPS.

REV.	DESCRIPTION	E.C.O. NO.	APPRO BY	DATE
MATERIAL/FINISH				
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	1/16	.005		
X.XX	1/32	.010		
X.X	1/64	.030		
INCH	1/8	1.0"		
MILLTRONICS MANUFACTURING		7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
TITLE		LATHE REMOTE CONTROL PANEL ASSEMBLY		
APPLICATION		PARTNER II-L		
SCALE	2:1	DWG No. 6-10-030-000	SIZE	C
DATE	14 SEP 94	DRAWN BY	REUTER	SHEET NO. 1 OF 1

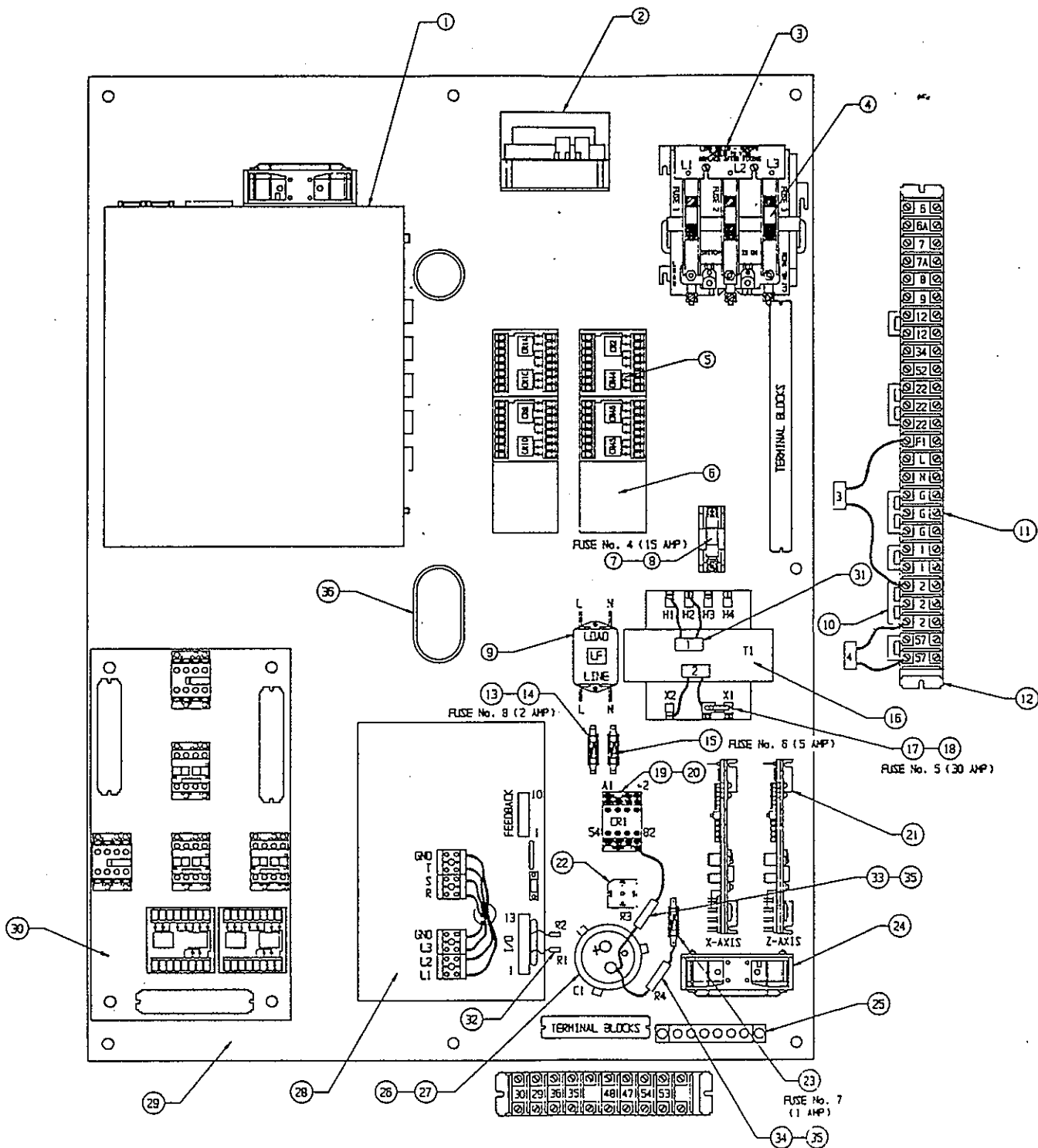


REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
PATENT/FINISH				
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	±	.005		
X.XX	±	.010		
X.X	±	.030		
ANGLE	±	1.0°		
 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (512) 474-8100 CHANDLER, AZ 85009				
TITLE FRONT PANEL INTERFACE				
APPLICATION PARTNER II-L				
SCALE 1:1	DATE 6-06-030-004	SIZE C		
DATE 20 SEP 94	DRAWN BY REUTER	SHEET NO. 2 OF 2		

INPUT POWER
220 VAC - 3 PHASE



REV.	DESCRIPTION	E.C.O. NO.	APP'D BY	DATE
MATERIAL/FINISH				
STOCK/ISSY No.				
TOLERANCE UNLESS SPECIFIED				
X.XXX	+/-	.005		
X.XX	+/-	.010		
X.X	+/-	.030		
ANGLE	+/-	1.0°		
MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANDLASSON, MN 55317				
TITLE: LATHE AC WIRING - CENT 5 (7-1/2 HP) APPLICATION: PARTNER II-L SCALE: 1:1 DATE: 27 SEP 94 DRAWN BY: REITER SHEET NO.: 1 OF 1				

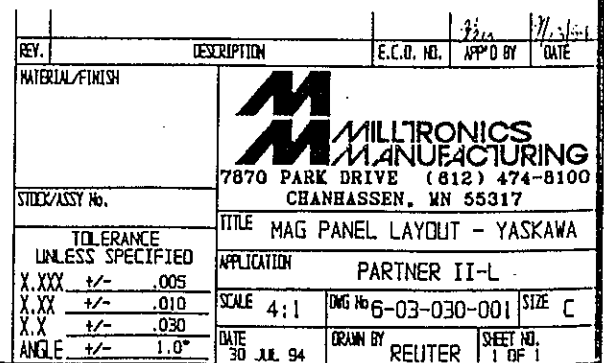


REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH	 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317			
STOCK/ASSY No.				
TOLERANCE UNLESS SPECIFIED	TITLE MAG PANEL LAYOUT - 12-1/2 HP			
X.XXX +/- .005	APPLICATION PARTNER II-L			
X.XX +/- .010	SCALE 4:1			
X.X +/- .030	DATE 20 JUL 94			
ANGLE +/- 1.0°	DRAWN BY REUTER			
	SHEET NO. 1 OF 1			

- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION	QTY.
1	ASSY	CENTURION 5-T CNC CARD CAGE	1
2	ASSY 8177	POWER SUPPLY, 15/24 VDC 6-10-018-003	1
3	SW-	SWITCH, MAIN DISCONNECT GENERAL ELECTRIC No. TH32	1
4	FU-	FUSE, FRNR, 60 AMP	3
5	ASSY 9107	DOUBLE RELAY CARD, PC-REL-01 6-03-018-003	2
6	WC-64	SNAP-TRACK CARD CARRIER 6 IN. LENGTH	2
7	FU-37	FUSE, FRNR, 15 AMP	1
8	FU-45	FUSE BLOCK, SINGLE FRN-R	1
9	MI-10	EMI LINE FILTER, 10 AMP	1
10	TB-16	TERMINAL BLOCK JUMPER	2
11	TB-01	TERMINAL BLOCK, 2 POST	36
12	TB-02	TERMINAL BLOCK END PIECE	2
13	FU-28	FUSE, MOL GLASS, 2 AMP	1
14	FU-09	FUSE CLIP, SINGLE MOL	3
15	FU-01	FUSE, MOL GLASS, 5 AMP	1
16	TR-26	TRANSFORMER, 220/110 VAC 1.5 KVA G.E. No. 9T5883396	1
17	FU-51	FUSE, MOL GLASS, 30 AMP	1
18	FU-11	FUSE CLIP KIT, SINGLE MOL	1
19	RL-49	CONTACTOR RELAY, 5 HP TELEMECHANIQUE No. LC1018L0	1
20	RL-50	AUXILIARY CONTACTOR RELAY TELEMECHANIQUE No. LA10N13	1
21	AM-25	AXIS DRIVE AMPLIFIER BOARD WITH BRACKET GLENTEK No. GA370-3	2
22	DI-14	BRIDGE RECTIFIER MOA3502	1
23	FU-46	FUSE, MOL GLASS, 1 A	1
24	FA-01	FAN, 110 VAC	1
	FA-04	FAN GUARD WFG 473	1
	FA-03	FAN POWER CABLE, (NOT SHOWN)	1
	BR-09	FAN MOUNTING BRACKET 6-02-018-003	1
25	TB-	BUSSBAR, 5 POST	1
26	CA-51	CAPACITOR, ELECTROLYTIC 7700 uF - 200 WVDC	1
27	CA-30	CAPACITOR MOUNTING RING	1
28	PS-30	SPINDLE MOTOR CONTROL UNIT CUSTOM SERVO MOTORS No. PRE-50	1
29	PL-50	PARTNER II-L MAG PANEL 6-01-030-004	1
30	ASSY	12-1/2 HP SPINDLE MOTOR CONTACTOR PANEL 6-03-027-003	1
31	MI-09	NOISE SUPPRESSOR, 1/2 uF - 600 V 220 OHM 1/2 W 10%	4
32	RE-15	RESISTOR, 1K 1/4W	2
33	RE-90	RESISTOR, 500 OHM 10 W	1
34	RE-15	RESISTOR, 10 OHM 10 W	1
35	WC-60	SHRINK TUBE, 3/8 x 5 IN.	2
36	WX-85	HOLE LINER GROMMET	2

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (612) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE MAG PANEL LAYOUT - 12-1/2 HP		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER II-L		
X.XXX	+/- .005	SCALE 4:1	DWG No 6-03-030-000	SIZE C
X.XX	+/- .010	DATE 20 JUL 94	DRAWN BY REUTER	SHEET NO. 1 OF 1
X.X	+/- .030			
ANGLE	+/- 1.0°			



- PARTS LIST -

ITEM	STOCK No.	DESCRIPTION	QTY.
1	ASSY 8080	CENTURION S-T CNC CARD CAGE	1
2	ASSY 8177	POWER SUPPLY, 15/24 VDC 6-10-018-003	1
3	SW-42	SWITCH, MAIN DISCONNECT GENERAL ELECTRIC No. THC32	1
4	FU-37	FUSE, FRNR, 30 AMP	3
5	FU-35	FUSE CLIP KIT, FRNR	1
6	ASSY 9107	DOUBLE RELAY CARD, PC-REL-01 6-03-018-003	5
7	WC-64	SNAP-TRACK CARD CARRIER 6 IN. LENGTH	2
8	FU-37	FUSE, FRNR, 15 AMP	1
9	FU-45	FUSE BLOCK, SINGLE FRN-R	1
10	MI-09	NOISE SUPPRESSOR, 1/2 uF - 600 V 220 OHM 1/2 W 10%	4
11	TB-01	TERMINAL BLOCK, 2 POST	36
12	TB-16	TERMINAL BLOCK JUMPER	2
13	WX-85	HOLE LINER GROMMET	2
14	MI-10	EMI LINE FILTER, 10 AMP	1
15	FU-28	FUSE, MOL GLASS, 2 AMP	1
16	FU-09	FUSE CLIP, SINGLE MOL	2
17	TB-02	TERMINAL BLOCK END PIECE	2
18	TR-26	TRANSFORMER, 220/110 VAC 1.5 KVA G.E. No. 9T5883396	1
19	FU-01	FUSE, MOL GLASS, 5 AMP	1
20	FU-51	FUSE, MOL GLASS, 30 AMP	1
21	FU-11	FUSE CLIP KIT, SINGLE MOL	1
22	RL-49	CONTACTOR RELAY, 5 HP TELEMECHANIQUE No. LC1D18L0	1
23	RL-50	AUXILIARY CONTACTOR RELAY TELEMECHANIQUE No. LA1DN13	1
24	DI-14	BRIDGE RECTIFIER MOA3502	1
25	AM-25	AXIS DRIVE AMPLIFIER BOARD WITH BRACKET GLENTEK No. GA370-3	2
26	FA-01 FA-04 FA-03 BR-09	FAN, 110 VAC FAN GUARD WFG 473 FAN POWER CABLE, (NOT SHOWN) FAN MOUNTING BRACKET 6-02-018-003	1
27	TB-	BUSSBAR, 5 POST	1
28	PS-17	YASKAWA/SAFTRONICS AC SPINDLE INVERTER MODEL PC3	1
29	PL-50	PARTNER II-L MAG PANEL 6-01-030-004	1
30	RE-20	RESISTOR, 4.7K, 1/4 WATT	2
31	CA-51	CAPACITOR, ELECTROLYTIC 7700 uF - 200 WVDC	1
32	CA-30	CAPACITOR MOUNTING RING	1
33	RE-90	RESISTOR, 500 OHM 10 W	1
34	WC-60	SHRINK TUBE, 3/8 x 5	1
J1	CD-24	DRIVE CONTROL SIGNALS (18 PIN)	2
J5	CD-73	DRIVE POWER (12 PIN)	2
35	WX-45	RING LUG, 1/4 10-12 GA.	1
36	WX-41	RING LUG, No. 10 10-12 GA.	24

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
				7/1/94
MATERIAL/FINISH		 MILLTRONICS MANUFACTURING 7870 PARK DRIVE (812) 474-8100 CHANHASSEN, MN 55317		
STOCK/ASSY No.		TITLE MAG PANEL LAYOUT - YASKAWA		
TOLERANCE UNLESS SPECIFIED		APPLICATION PARTNER II-L		
X.XXX	+/- .005	SCALE 4:1	DWG No 6-03-030-001	SIZE C
X.XX	+/- .010	DATE 30 JUL 94	DRAWN BY REUTER	SHEET NO. 1 OF 1
X.X	+/- .030			
ANGLE	+/- 1.0°			