KINGSTON

OPERATING MANUAL & PARTS LISTS

HP/HPX Series

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HP / HPX Series

KINGSTON MACHINE TOOL
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MAINTENANCE

PARTS LIST

SAFETY

Only authorized and trained personnel should operate this machine. All operators must read and familiarize themselves with the Operator's Manual, safety decals, and safety procedures and instructions for safe machine operation before turning on the lathe. Improper operation can lead to serious injury, can damage the machine, and will void the warranty.

GENERAL RULES OF SAFETY

- Appropriate eye, ear, and foot protection should be used at all times when operating this lathe. Consult your local safety codes and regulations before operating the machine.
- Keep the ground near the lathe clean and dry. Leave the passageways around the machine clear.
- The machine uses a high voltage system and some components operate at high temperature, so extreme caution is required. Keep the electrical panel closed and locked at all times except during installation and service. Only properly trained and skilled electricians or technicians should have access to the control box. During maintenance the main power must be shut off.
- Identify the **FOOT BRAKE** on the machine. In case of an emergency, press the **FOOT BRAKE** until the spindle comes to a complete stop.
- Inspect the lathe, its components, and all tooling for improper wear and damage. **DO NOT** operate the machine if any components or tools do not appear to function properly. Any component or tool that is damaged should be properly repaired or replaced by authorized personnel before beginning operation. Replace damaged or severely scratched windows immediately.

- **DO NOT** touch or place any part of your body near or on any rotating or moving components of the machine.
- **DO NOT** place a tool, workpiece or any other items on any part of the machine during operation.
- **DO NOT** wear gloves when operating this machine to avoid incorrect activation of switches.
- **DO NOT** start the lathe until the workpiece is balanced, centered, and secured properly. (See Workholding Safety)
- **DO NOT** touch the chips. Use the proper tools or brushes to remove chips from the machine.
- **DO NOT** leave a running machine unattended.
- Avoid unsafe and excessive feed rates and ultra-high speed spindle rotation.
- Shut down all power and tag "Out of Service" before cleaning or repairing the machine.
- **DO NOT** modify or alter this lathe without prior authorization from Kingston. Any unauthorized modification or alteration of any Kingston lathe could lead to personal injury and/or mechanical damage and will void your warranty.
- During a power failure, turn OFF the machine to prevent damage to the machine and for the safety of individuals around the machine.
- When transporting the machine, special measures should be taken to properly secure and cover the machine and it's components.
- For optimal machine performance, regular cleaning and maintenance is required. Please use manufacturer's suggested fluids and oil (p. 20).
- Protect and regularly inspect cables for damage by chips and coolant.
- The ultimate responsibility for safety rests with the shop owner and the individuals who work with the machine. Please make sure that only skilled and trained individuals work on this machine and that everyone involved in the installation and operation of the machine has read and understood all instructions provided with the machine **BEFORE** they begin.

WORKHOLDING SAFETY

- Review the care and safety guidelines from the work holder manufacturer. Follow all manufacturer warnings regarding the chuck and workholding procedures.
- Do not modify workholding equipment.
- Service chucks regularly as well as grease daily for optimal performance.
- The power switch must be in the **OFF** position when chucking a work piece.
- Use the correct chuck size and never extend the chuck jaws past the body (diameter) of the chuck.
- Check that the chuck and work piece turn without interference with the carriage or any other parts of the lathe. Interference between the moving parts will cause damage to both. **DO NOT** machine parts larger than the chuck.
- Before beginning work, please ensure the work piece is securely fastened in the chuck and properly supported by the tailstock. **DO NOT** start the lathe until the workpiece is balanced, centered, and secured properly. Improperly clamped parts may be ejected with deadly force and can cause serious injury and damage.
- Longer parts must be held in two or more places before turning and cutting.
- Heavy parts and out of round parts may need to be held with two or more supports before turning and cutting.
- Use only the proper chuck wrench supplied with the chuck.
- **DO NOT** leave the chuck wrench or anything else on the radius of the chuck.
- **DO NOT** hit the workpiece with a hammer, or any improper tooling, while held by the chuck. This can cause a loss of accuracy and shorten the life of the chuck.
- Keep a safe distance from the chuck when the machine is running.
- Never exceed the maximum speed of the chuck.
- Remove the workpiece from the chuck when the machine will not be in use for an extended period of time.
- In the event of a crash of your tooling due to improper operation, press the foot brake to stop the spindle immediately.

WARNING DECALS

IMPORTANT!

Only authorized personnel trained to operate high-speed lathes should work on this machine. **ALL OPERATORS MUST READ** and familiarize themselves with the safety procedures and instructions in **THE OPERATING MANUAL** before turning on the lathe. Improper operation can cause injury, can damage the machine and will void the warranty.

GENERAL SAFETY PROCEDURES

- Only skilled and trained technicians should install and operate this lathe.
- Carefully read and understand the Operating Manual, all warning signs and identify the safety features (chart below) on the machine BEFORE beginning operation. Failure to do so will result in misuse and seriously bodily injury.
- Appropriate eye, ear and foot protection should be used at all times when operating this lathe.
- Keep the ground near the lathe clean and dry. Leave the passageways around the machine clear.
- Do not touch chips or any rotating or moving components on the machine.
- Do not leave a running machine unattended.
- Shut down all power and tag "Out of Service" before cleaning or repairing the machine.

BEFORE TURNING ON YOUR LATHE

- Place all levers to the OFF position and check that all operating controls and switches are functioning properly.
- Inspect the lathe and all its components for improper wear and damage. Do not operate the machine if any components do not appear to function properly.
- HK/HG MODELS ONLY, identify the RED EMERGENCY BUTTON on the hanging control panel. In case of emergency, press this button to stop the spindle.
- All other Kingston models, identify the FOOT BRAKE on your machine. In the case of emergency, hold the foot brake down until the spindle comes to a complete stop.

POWERING UP AND DOWN YOUR LATHE

- The power source for your lathe must be grounded.
- Inspect and confirm all cables are connected before powering up the machine.
- Beware of high voltage around the machine.
- When the power switch is ON, the power indicator lamp with light up.
- During a power failure, turn OFF the machine to prevent damage to the machine and for safety to those around it.
- Turn the power OFF when leaving the machine.

WORKHOLDING SAFETY

- Review the care and safety guidelines from the workholder manufacturer.
- Use the correct chuck size and never extend the chuck jaws past the body of the chuck.
- Be careful not to drop the chuck when mounting or removing it.
- The power switch must be in the OFF position when chucking a work piece.
- Check that the chuck and work piece turn without interference with the carriage or any other parts of the lathe. Interference between the moving parts will cause damage to both.
- Do not start the lathe until the workpiece is balanced, centered, and secured properly.
- Longer parts must be held in two or more places before turning and cutting.
- Heavy parts and out of round parts may need to be held with two or more supports before turning and cutting.
- Use only the proper chuck wrench supplied with the chuck.
- Never leave the chuck wrench or anything on the radius of the chuck.
- Do not modify workholding equipment.
- Keep a safe distance from the chuck when the machine is running.
- Never exceed the maximum speed of the chuck.

SAFETY FEATURES

These features are designed to protect both the operator from injury and the machine from damage:

FEATURE	LOCATION
Emergency Stop	Foot Brake or Hanging Control Panel (HK/HG)
Overload Protection Device	Apron
Thermal Overload Device	Electrical Control Panel
Fuse	Electrical Control Panel

- Damage can result when shifting levers while the spindle is running.
- Make sure the spindle comes to a complete stop before shifting.

DANGER

High voltage.
Turn power off
before servicing.

TAILSTOCK

- Avoid hanging the tailstock over the end of the bed.
- Clamp the tailstock to the bed firmly.
- Do not touch the handwheel while the machine is running.
- Apply a seizure-proof grease when using a dead center.
- The center and the work center hole should have the same taper angle.
- Insert the center firmly into the workpiece.
- Avoid excessive overhang of the center sleeve.

ELECTRICAL SAFETY CAUTIONS

(1) Don't touch switches with wet hands.
(2) Avoid using fuses other than those specified.
(3) Turn the main switch OFF whenever replacing fuses.

Clamp tools and tool posts securely.

MACHINE OVERVIEW

DESCRIPTION OF THE DRIVING UNIT - HP MODEL

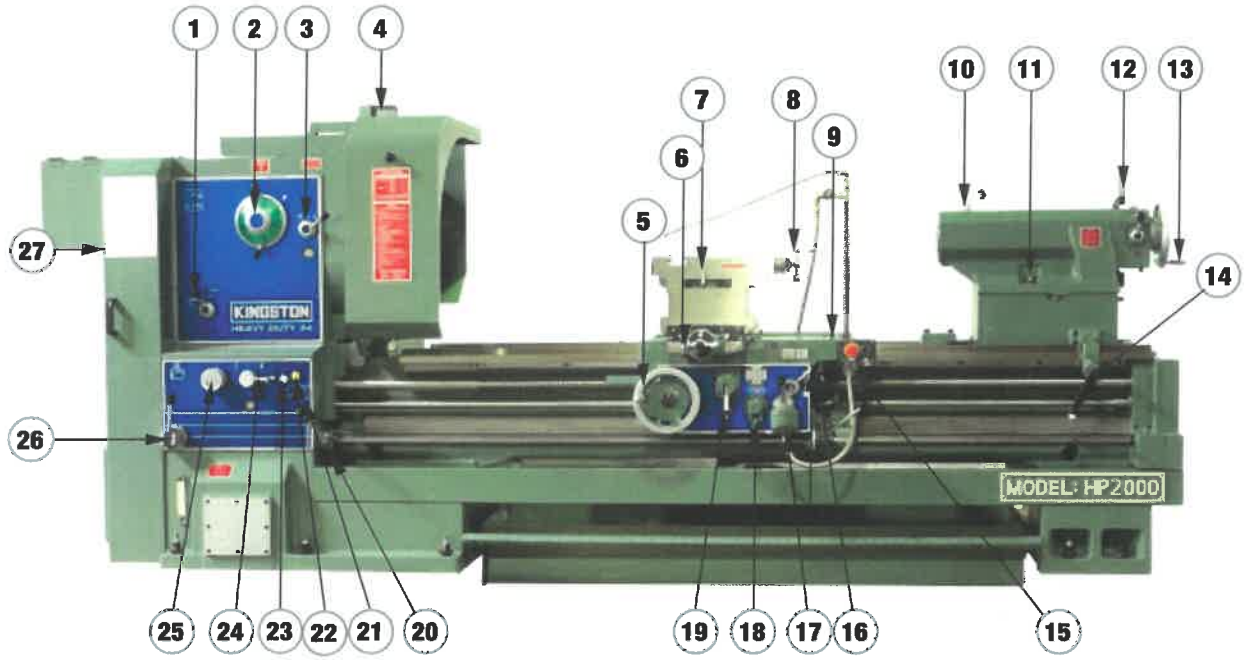


Figure A

1. Forward and reverse lever for feed and thread
2. Spindle speed change lever
3. Spindle speed change lever
4. Amp meter
5. Hand-wheel for longitudinal feed
6. Handle for cross feed
7. Toolslide clamping lever
8. Handle for tool slide feed
9. Clamping bolt for carriage
10. Clamping lever for tailstock quill
11. Clamping nut for tailstock body
12. Clamping lever for tailstock body
13. Hand-wheel for tailstock quill movement
14. Tailstock body crank
15. Thread chasing dial
16. Half nut lever
17. 4 way rapid traverse
18. Change lever for longitudinal, cross feed, and half nut
19. Feeds engaging and disengaging lever
20. Starting lever
21. Main switch (Multi-purpose select)
22. Jog push button
23. Pilot light
24. Feed and thread change lever
25. 4 Step change knob
26. 10 Step Norton system lever
27. Feed and thread table

DESCRIPTION OF THE DRIVING UNIT - HPX MODEL

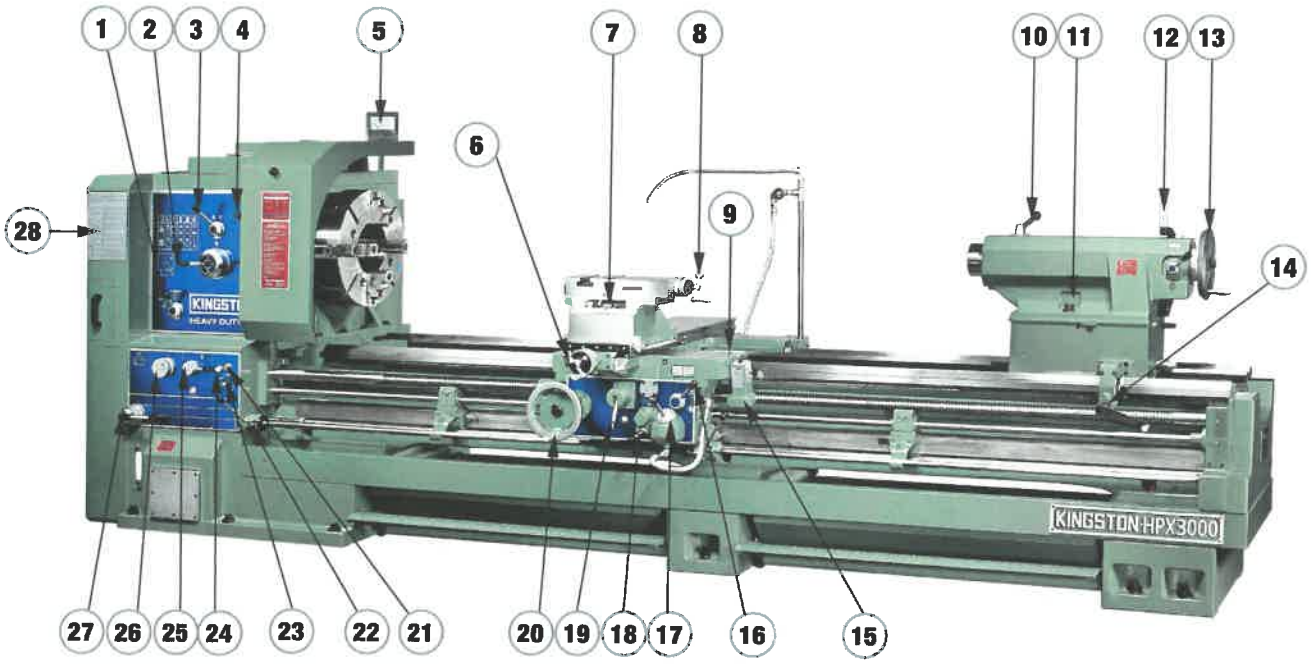


Figure B

1. Forward and reverse lever for feed and thread
2. Spindle speed change lever (I, II, III, IV)
3. Spindle speed change lever (A, B)
4. Spindle speed change lever (H, N, L)
5. Amp meter
6. Handle for cross feed
7. Toolslide clamping lever
8. Handle for tool slide feed
9. Clamping belt for carriage
10. Clamping lever for tailstock quill
11. Clamping nut for tailstock body
12. Clamping lever for tailstock body
13. Hand-wheel for tailstock quill movement
14. Tailstock body crank
15. Threading chasing dial
16. Half nut lever
17. 4 way rapid traverse
18. Change lever for longitudinal, cross feed, and half nut
19. Feed engaging and disengaging lever
20. Hand-wheel for longitudinal feed
21. Jog push button
22. Starting lever
23. Main switch (Multi-purpose select)
24. Pilot light
25. Feed and thread change lever
26. 4 step change knob
27. 10 Step norton system lever
28. Feed and thread chart

MACHINE SPECIFICATIONS

		HP-34	HP-40	HPX-34	HPX-40
CAPACITY					
Swing Over Bed		34" (870 mm)	40" (1020 mm)	34" (870 mm)	40" (1020 mm)
Swing Over Cross slide		25 1/8" (638 mm)	31" (788 mm)	25 1/8" (638 mm)	31" (788 mm)
Distance Between Centers		80"(2032 mm)) / 120"(3048 mm)	160"(4064 mm) / 200"(5080 mm)	240"(6096 mm)	280"(7000 mm)
Width of Bed		22" (559 mm)			
Height of Center from Leg Bottom		48 5/8" (1235 mm)	51 5/8" (1310 mm)	48 5/8" (1235 mm)	51 5/8" (1310 mm)
HEADSTOCK					
Spindle Bore		7 1/8" (180 mm)		9 1/4" (235mm)	
Taper of Spindle Bore & Center		3/4 Taper per Foot			
Type of Spindle Nose		ASA A2-15			
Number of Spindle Speeds		16			
Spindle Speed		8-700 RPM		9-600 RPM	
GEAR BOX					
Number of Feed Changes		40 kinds			
Range of Longitudinal Feed per Rev		0.0024" - 0.0337" (0.06 mm - 0.89 mm)			
Cross Feed		1/2 of Longitudinal Feed			
Leadscrew diameter & threads per inch		1 7/8" (48 mm) / 2TPI (P=12mm)			
Threading Range	**Whitworth**	1 to 28 TPI (50 kinds)			
	Metric	1 to 28 mm pitch (41 kinds)			
	Module	0.5 to 7 M (20 kinds)			
	D.P.	4 to 56 D.P. (40 kinds)			
TOOL SLIDE					
Maximum Travel of Compound		9 3/4" (240 mm)			
Maximum Travel of Cross Slide		21 1/4" (540 mm)			
TAILSTOCK					
Tailstock Quill Travel		11 3/4" (300 mm)			
Tailstock Quill Diameter		5 1/8" (130 mm)			
Taper in Tailstock Quill		M.T. #6			
MOTOR					
Main Drive Motor		30 HP (15KW)			
Rapid Traverse Motor		1 HP			
Coolant Pump Motor		1/4 HP			

DIMENSIONS	83" W (2100 mm)	198" (5020)	205" (5920)	245" (6952)	285" (7922)	325" (9042)	365" (10000)
HP 34" Swing	lbs (kg)	13655 (6200)	15200 (6900)	17730 (8050)	19270 (8750)	21810 (9900)	23855 (10830)
HP 40" Swing		13920 (6320)	15460 (7020)	17995 (8170)	19540 (8870)	22070 (10020)	24120 (10950)
HPX 34" Swing		13985 (6350)	15540 (7050)	18060 (8200)	19600 (8900)	22135 (10550)	24185 (10980)
HPX 40" Swing		14320 (6500)	15860 (7200)	18325 (8320)	19930 (9050)	22465 (10200)	24515 (11130)

INSTALLATION

Only authorized personnel or a qualified electrician should perform any electrical work on the lathe. Prior to repair or inspection, disconnect the main power supply. Refer to local code requirements before wiring machines.

ELECTRICAL REQUIREMENTS

The electrical power must meet the specifications listed. Running the machine from any other source can cause severe damage and will void the warranty. Ground the machine and use only properly rated wires.

The HP / HPX Model Main Motor is 30 HP (22.5KW). Coolant pump is ¼ HP (180W). Rapid Motor is 1HP.

AC Power Requirements

3 phase, 230/460V only 60Hz

Input power to the machine must be grounded.

All other voltage will require the use of a transformer.

Power Cable

AWG#6 or larger

Cables should be connected with terminals R.S.T. in the electrical box.
Once connected, you must check and confirm the rotation of the main motor.

NOTE: If the voltage drops down to less than 70% of the required voltage, the magnetic contactor may fail and the main motor will stop running.

☑ **TIP** Routinely check for exposed cables which can be damaged by moving parts or exposure to chips. Repair damaged cables immediately.

MACHINE PLACEMENT

Place machine in a well-ventilated location, away from direct sun exposure, heat, humidity, and welding & high electric discharge machining (EDM) areas.

Operating Room Temperature

50 - 104° F (10° - 40° C)

Storage and Transport Temperature

14 - 122° F (-10° - 50° C)

Ambient Humidity

20 - 90% RH

Make sure there is adequate space around the machine to allow for opening the electrical cabinet doors for maintenance and easy cleaning.

FOUNDATION LAYOUT

Preparing a firm and stable foundation is essential to reaching optimal performance from your lathe. We recommend using a high quality concrete with a depth of at least 22.5" (570mm) and installing the machine with foundation bolts in the locations shown on the following (p.12a,12b) to avoid excessive vibration and maintain your machine's accuracy.

Leave adequate space around the machine for operator safety, cleaning and maintenance. We recommend a minimum distance of 24" from the rear electrical control box to any wall or obstacle, and a minimum of 20" on both head and tailstock sides for easier access to the headstock's side cover for maintenance.

LIFTING THE LATHE

Check and confirm the machine weight and rope strength before lifting.

Movement of the lathe should be done by an experienced and licensed crane or forklift operator.

Step 1 Firmly clamp Tailstock and Carriage at the extreme right hand position for a properly balanced machine.

Step 2 Place two solid steel bars of 2 1/4" diameter and minimum 60" length into the lifting holes (**Fig. C**). The steel bar should extend at least 6" on each side of lathe for the sling. **DO NOT** use hollow steel pipes!

Step 3 Use minimum ½" steel wire rope or cable. When securing your cable slings, place wood blocks or cloth between the sling and the machine to prevent any damage to the spindle, lead screw, hand wheels and paint while lifting.

Step 4 Lift machine gradually keeping the lathe in an equilibrium state at all times. Sudden jerks can damage the slings and may effect the machine.

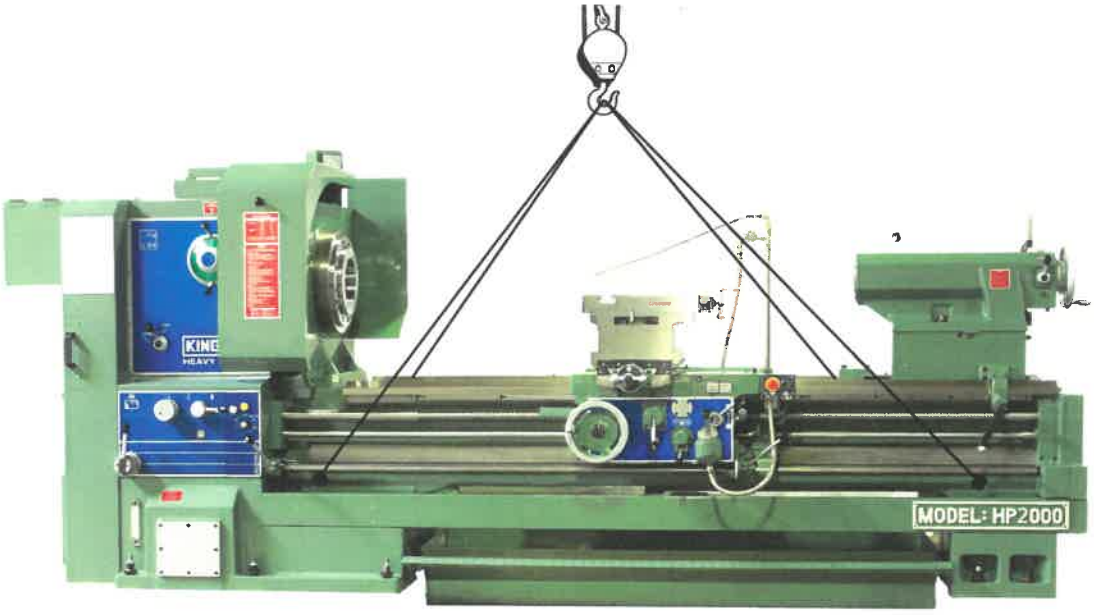


Figure C

LEVELING THE LATHE

Once your lathe is set on the prepared foundation and the bed ways and slides are cleaned thoroughly, the machine is ready to be leveled. Leveling your machine will not only enhance performance but also help to keep your machine's accuracy.

Step 1 Place two precision levels (**Fig. D-1 & D-2**) on the cross slide of the lathe. The accuracy of the level should be a minimum of 0.02mm/m.

Step 2 Using the hand wheel on the apron, move the apron from spindle side to tailstock side and adjust the foundation bolts to achieve tolerances.

Step 3 After you complete your adjustments and your lathe is correctly level, check and tighten the lock nuts.

☑ **TIP** For optimal performance, check the level of your lathe periodically.

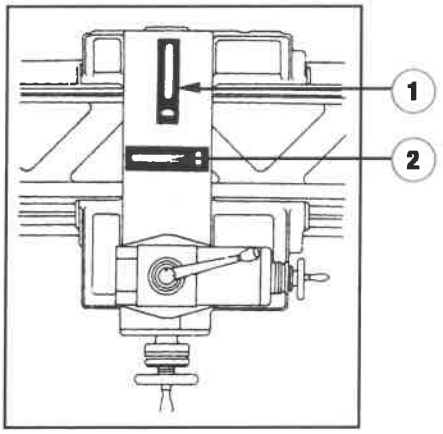


Figure D

CLEANING THE LATHE

All machine surfaces are coated with an anti-rust protection. Before operating the machine, clean all parts thoroughly, especially the lead screw, rack, and all ground surfaces with a soft brush or cloth soaked with cleaning solvent.

Lubricate the machine properly before use. To lengthen the life of your machine, clean and lubricate the machine regularly. See the lubrication chart on p. 20 for scheduled maintenance.

ELECTRICAL

Only authorized personnel or a qualified electrician should perform any electrical work on the lathe. Prior to repair or inspection, disconnect the main power supply. Refer to local code requirements before wiring your lathe.

ELECTRICAL REQUIREMENTS

The electrical power must meet the specifications listed. Running the machine from any other source can cause severe damage and will void the warranty. Ground the machine and use only properly rated wires.

The HP / HPX Model Main Motor is 30HP (22.5KW). Coolant pump is ¼ HP (180W). Rapid Motor is 1HP.

AC Power Requirements

3 phase, 230/460V only 60Hz

Input power to the machine must be grounded.

All other voltage will require the use of a transformer.

Power Cable

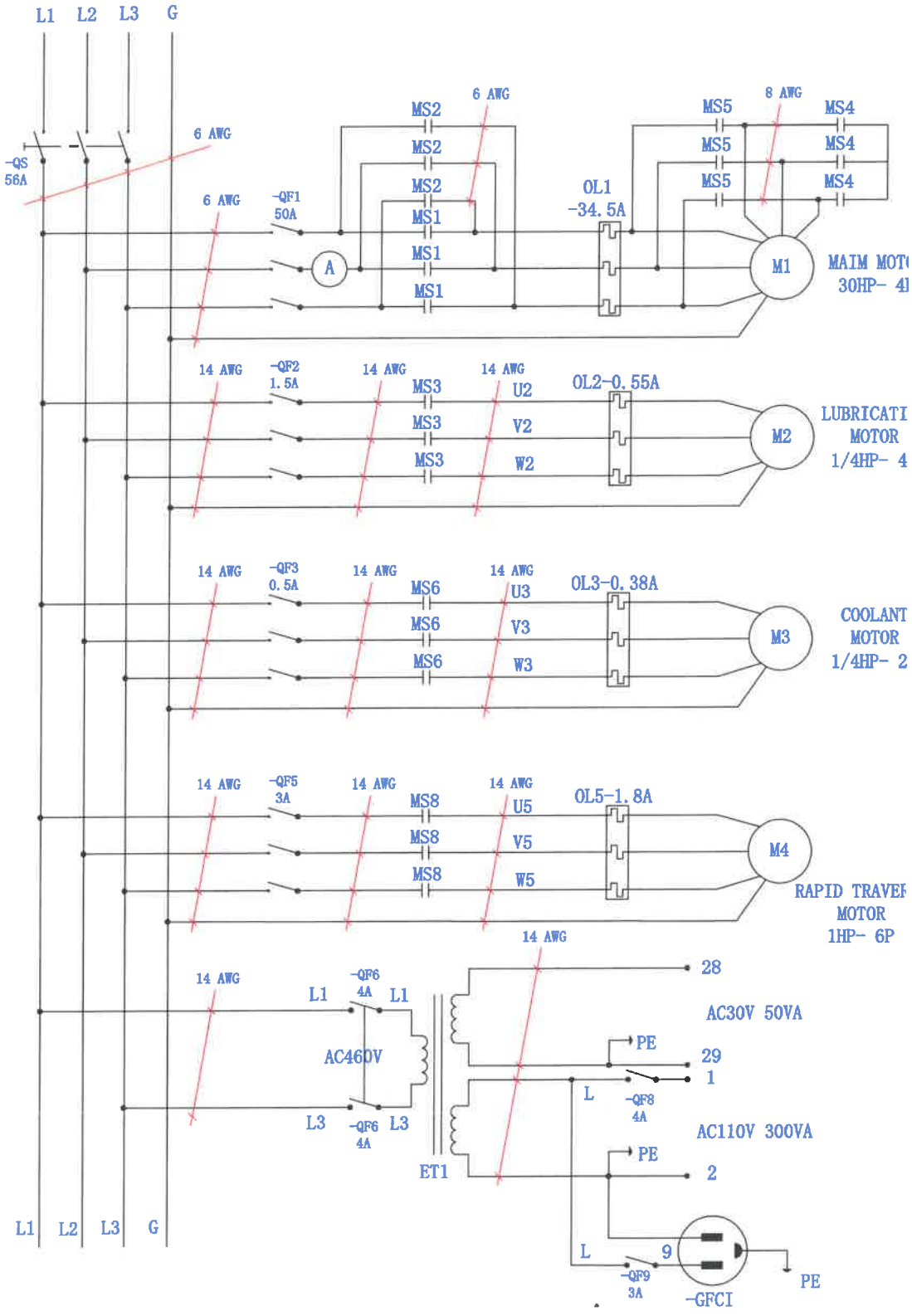
AWG#6 or larger

Cables should be connected with terminatls R.S.T. in the electrical box. Once connected, you must check and confirm the rotation of the main motor.

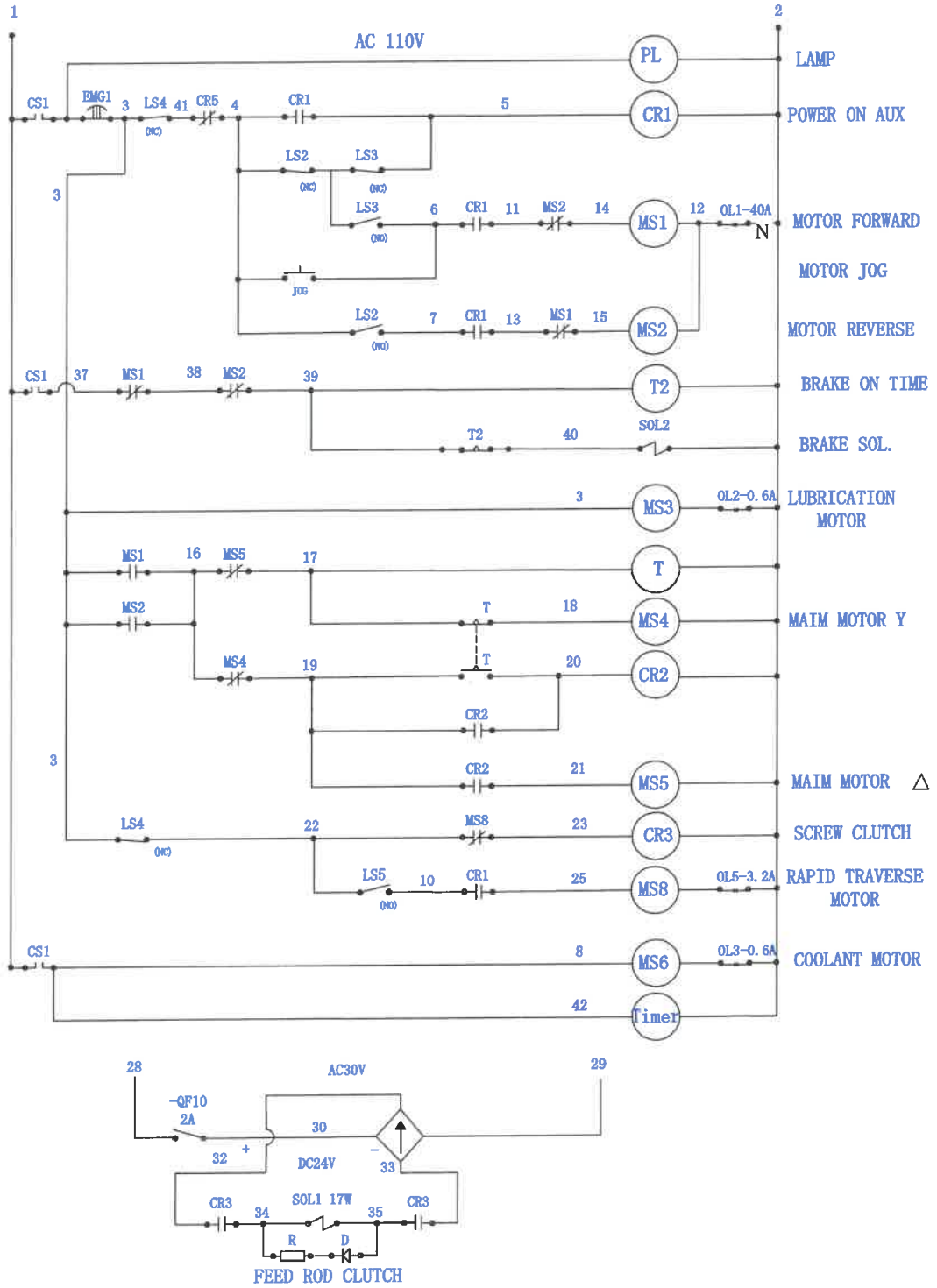
NOTE: If the voltage drops down to less than 70% of the required voltage, the magnetic contactor may fail and the main motor will stop running.

☑ **TIP** Routinely check for exposed cables which can be damaged by moving parts or exposure to chips. Repair damaged cables immediately.

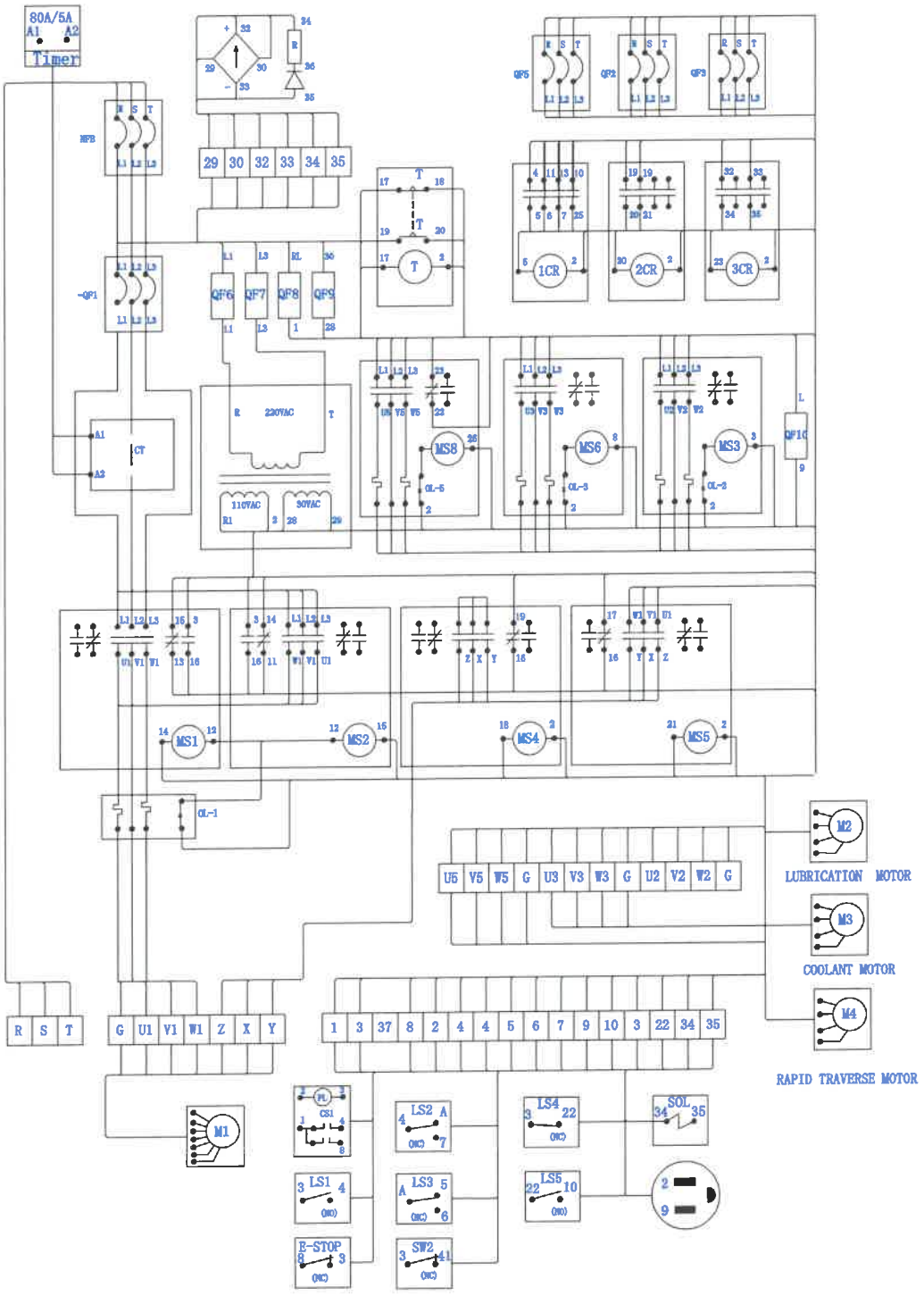
HP / HPX ELECTRICAL WIRE DIAGRAM



HP / HPX ELECTRICAL WIRE DIAGRAM



HP / HPX ELECTRICAL WIRE DIAGRAM FOR AIR THREADING SYSTEM CONTROL



LUBRICATION

Oil levels should be strictly observed. Regularly scheduled maintenance and proper lubrication of the lathe will ensure optimal performance and a long service life. Please refer to the charts on p. 20 for the recommended oil and maintenance schedules.

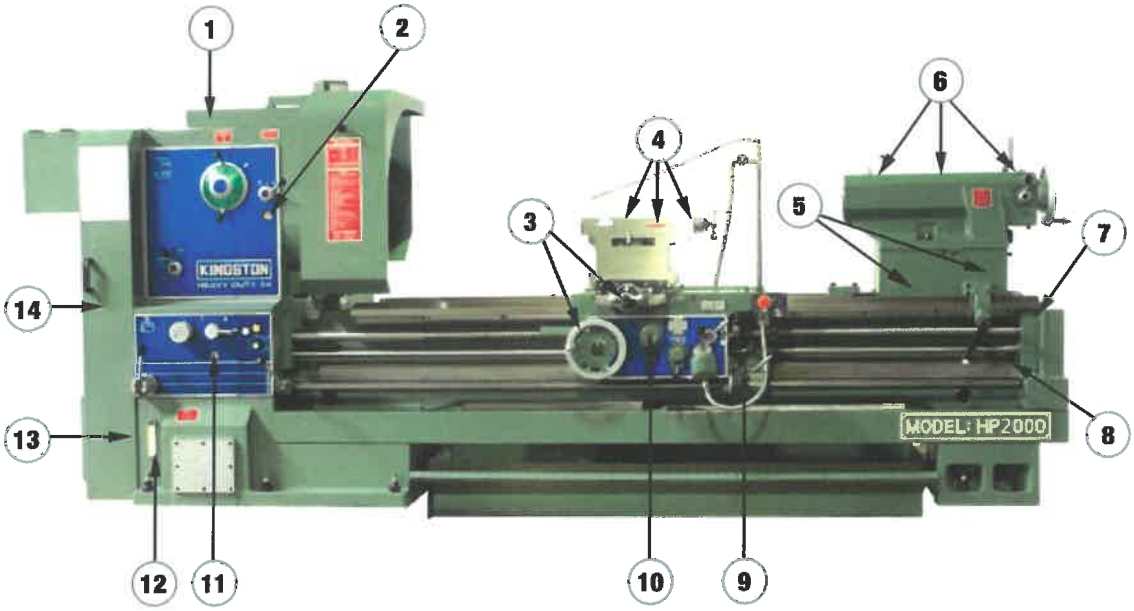


Figure E

1. Oil inlet for oil tank
2. Head stock oil sight glass
3. Hand wheel oil inlet
4. Compound oil inlet
5. Tail stock bed oil inlet
6. Quil oil inlet
7. Lead srew oil inlet
8. Feed rod oil inlet
9. Apron oil inlet
10. Apron oil window
11. Feed box oil sight glass
12. Oil tank gauge
13. Drain plug
14. Quadrant oil inlet

OIL LUBRICATION CHART AND SCHEDULE

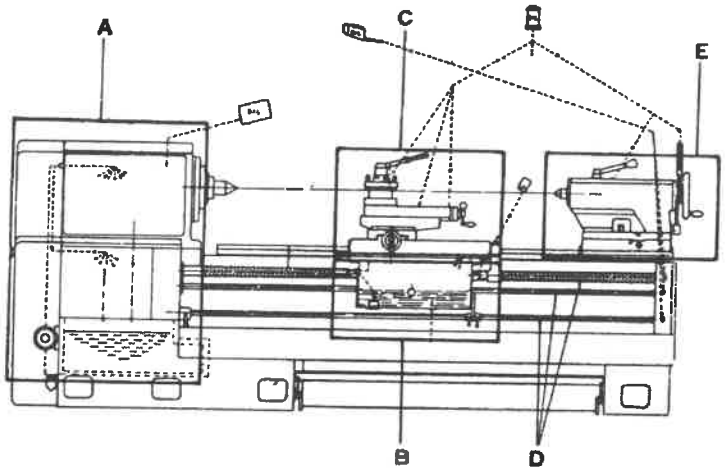


Figure F

	Lubrication Point	Oil Change and/or replenish	Quantity	Viscosity S.S.U. 100° F
A	Headstock	Twice a year	48 liters	160
B	Apron & Carriage	Twice a month	6.5 liters	320
C	Cross slide	Once a day		320
D	Other parts	Once a day		320
E	Tailstock	Once a day		320

RECOMMENDED OIL

	Headstock & Feed gear box (48 liters)	Apron (6.5 liters)
SHELL	TELLUS 27	Tonna 33
ESSO	TERESSO 43	Teresso 52
CALTEX	REGAL R & O 68	Uni-way Oil 70
MOBIL	D.T.E LIGHT	Vactora No.2

HEADSTOCK AND FEED GEAR BOX LUBRICATION

☑ **TIP** When starting the machine, check the oil windows on the head stock and feed gear box to ensure the lubrication system is functioning properly. Oil should be visibly running down the window.

The lubrication of the Kingston HP / HPX headstock and feed gear box is provided by an oil pump. (**Fig. G**) Oil is collected in the oil tank found below the gear box, filtered, and then pumped back up to the headstock and gearbox.

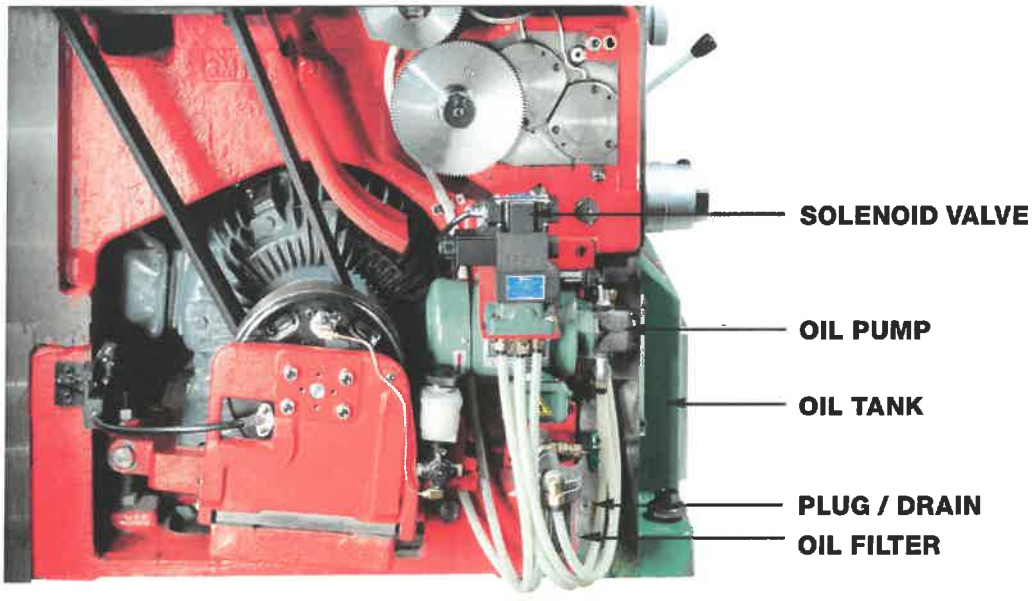


Figure G

To add oil, take away the plug on the top cover of headstock (**Fig. G**) and pour the recommended oil into the headstock. The oil will run down through the headstock and drop into the oil tank. Make sure you check the oil level gauge and do not overfill the tank.

☑ **TIP** Change the oil twice a year or when oil appears dirty.

CARRIAGE AND APRON LUBRICATION

Within the apron there is a cam device that automatically lubricates all gears, shafts, bearings and running parts. This device also supplies lubricant to the carriage and cross slide.

If a machine has not been in use for some time, pump the manual plunger pump (Fig. H-1) several times before you begin use.

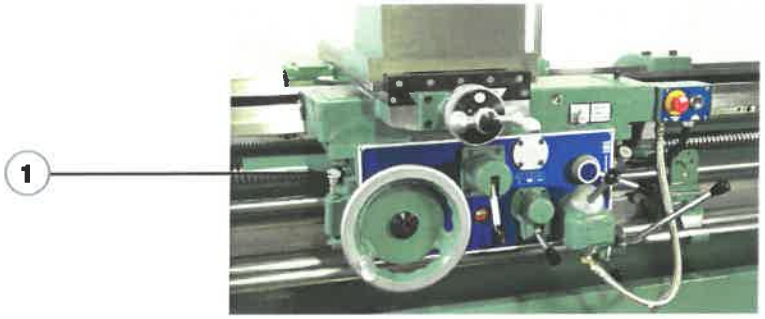


Figure H

LEAD SCREW AND FEED ROD LUBRICATION

Lubricate your lead screw and feed rod at least once or twice a day using an oil gun. Use only the grade of oil recommended (Oil Lubrication Chart p. 20).
Lubricate the starting rod regularly as well.

TAILSTOCK LUBRICATION

Daily lubrication should be done on the tailstock before operating the machine. Three oil inlets are located on the top of the tailstock (**Fig. I-1**) to add lubrication for the quill. Additional inlets are located on the front (**Fig. I-2**) and back side of the tailstock to lubricate the slide way. Use recommended oil (Oil Lubrication Chart, p. 36).

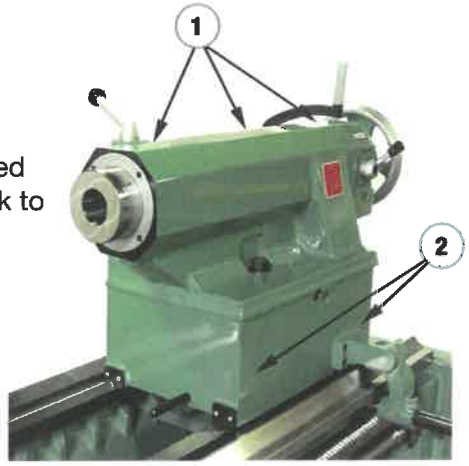


Figure I

OPERATION

Only authorized and trained personnel should operate this machine. All operators must read and familiarize themselves with the Operator's Manual, safety decals, and safety procedures and instructions for safe machine operation before turning on the lathe. Improper operation can lead to serious injury, can damage the machine, and will void the warranty.

Identify the foot brake on your lathe. The foot brake is your emergency stop and will overide any and all start commands. In case of emergency, press the foot brake until the spindle comes to a complete stop.

Before starting the lathe, check the following things:

- ☑ **Make sure your lathe is clean and properly lubricated** (see Lubrication Chart, p.20).
- ☑ **Check the spindle rotation**. When pushing the Jog Button, the main spindle rotation should be counter clockwise. If the direction of rotation is incorrect, interchange any two of the three phase lines to the power source.
- ☑ **Run the spindle at low speed for a few minutes**. Check the oil sight gauge to ensure the headstock lubrication pump is working.

STARTING AND STOPPING

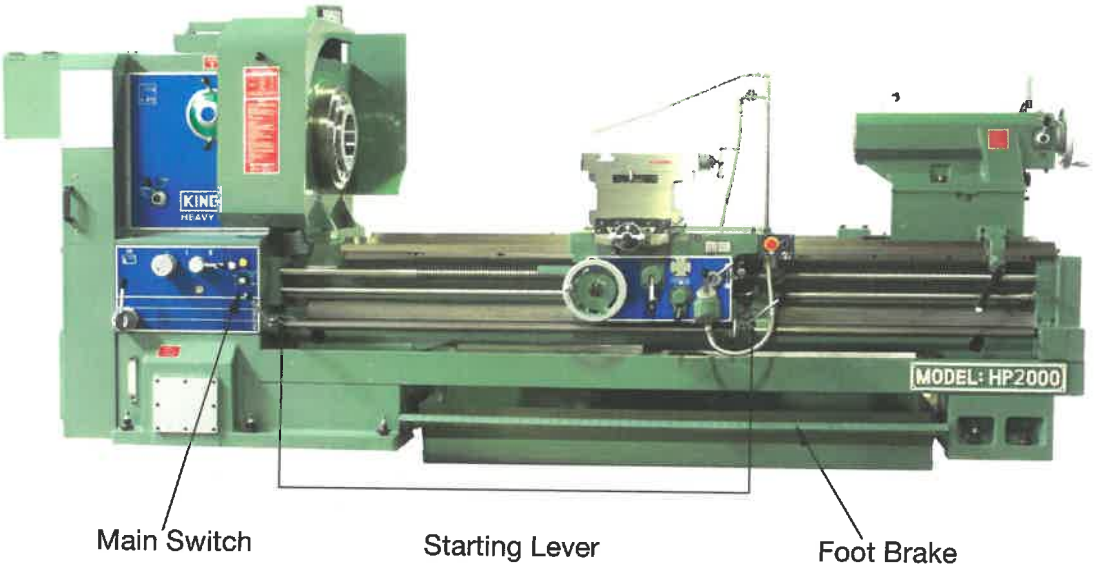


FIGURE J

Step 1 Place the starting levers in the neutral position.

Step 2 Turn the power switch ON. The power indicator should light up.

Step 3 To start the main spindle, hold and push the starting lever LEFT and then DOWN for forward revolution, or UP for reverse revolution.

Step 4 The foot brake can also be used to stop the spindle. The foot brake will override any start commands. After releasing the brake, use the starting lever to restart the spindle.

- ☑ The main spindle incorporates a safety pin to prevent abrupt starts. When the lever returns to the neutral position it engages the safety pin and the main spindle will stop.
- ☑ To jog the spindle, place the starting lever in the neutral position, then press and release the JOG button or hold down the button to run.
- ☑ A thermal relay is provided to protect the motor from overheating or from power surges. If the spindle does not run when moving the starting lever, please open the rear electrical cabinet and reset the thermal relay.

SELECTING SPINDLE SPEEDS - HP MODEL

Do not change the spindle speed while the spindle is rotating. Doing so will result in damage to the lathe and will void your warranty.

The HP model is equipped with a 16 step spindle speed range from 8 – 800 RPM.

Select the desired spindle speed (**Fig. K**) also located around the spindle speed lever (**Fig. L-1**). Select H or L (**Fig. L-2**) for High or Low.

H	275	370	500	700	24	30	45	60
L	95	130	175	243	8	11	15	20

FIGURE K

FIGURE L

☑ **TIP** Make sure the spindle speed dial lever is in the vertical position after the selected speed is in line with the indicating arrows. Do not turn the select lever while gears are running.

SELECTING SPINDLE SPEEDS - HPX MODEL

Do not change the spindle speed while the spindle is rotating. Doing so will result in damage to the lathe and will void your warranty.

The HPX model is equipped with a 16 step spindle speed range from 9 – 600 RPM.

Select your desired speed by looking at the chart on the headstock (**Fig. M-1**), then set the lever to either the H or L position (**Fig. M-2**) for high or low speed range. Shift-lever (**Fig M-3**) to either A or B, and finally shift lever (**Fig. M-4**) to the correct position I, II, II or IV.

Note: Select dial (**Fig. M-4**) can be turned in either direction.

FIGURE M

SELECTING FEEDS

Determine the proper feed rate using the Feed and Thread Chart.

Step 1 Place lever (**Fig. N-1**) to position III for feeding.

Step 2 Select and turn dial (**Fig. N-2**) to H, S, T or L.

Step 3 Pull down the 10 step change lever (**Fig. N-3**) to disengage the gear and turn to select Step 1-10 for desired feed rate. Push back the lever to engage the gear.

Note: Fine & Coarse feeds can be adjusted by lever (A/B) on the headstock.

☑ **TIP** The cross feed is 1/2 of the longitudinal feed.

SELECTING THREADS

Place Lever (**Fig. N-1**) to position I or II for threading

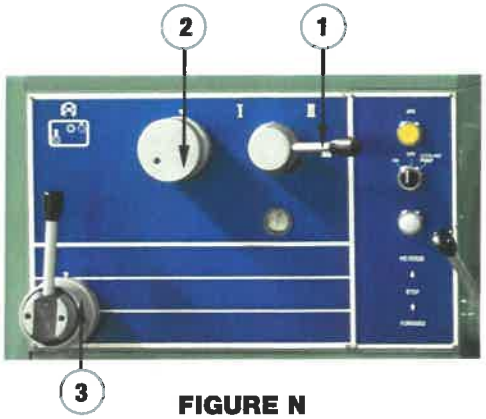


FIGURE N

SELECTING MULTI START THREAD

To cut a regular multi start thread (**Fig. O & P**) such as a 2 start thread, pull out the inner index gear (C) and turn the main spindle so that the gear tooth at the 0 position indicated on the plate (B) is turned to the 30 position. Then, push the gear back in to reengage the gear.

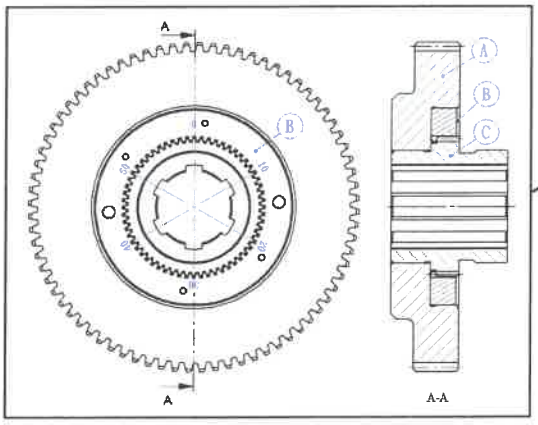


FIGURE O

FIGURE P

FEED AND THREAD CHARTS

LEAD SCREW = 2TPI

	M	N1	N2	O			LEAD SCREW 2 TPI FEED GEAR BOX LEVER POSITION 1	2	3	4	5	6	7	8	9	10
	76	84		114	II	L	1	–	–	1.25	–	–	1.5	–	–	1.75
						T	2	2.25	–	2.5	2.75	–	3	3.25	–	3.5
						S	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
						H	8	9	9.5	10	11	11.5	12	13	13.5	14
	76	114		57		H	16	18	19	20	22	23	24	26	27	28
1"	76	84		114	I	H	2	2¼	2⅜	2½	2¾	2⅞	3	3¼	3⅜	3½
						S	4	4½	4¾	5	5½	5¾	6	6½	6¾	7
						T	8	9	9½	10	11	11½	12	13	13½	14
						L	16	18	19	20	22	23	24	26	27	28
	76	114		57		H	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	1⅞	1¾
π	76	76	110	105	II	L	.5	–	–	–	–	–	.75	–	–	–
						T	1	–	–	1.25	–	–	1.5	–	–	1.75
						S	2	2.25	–	2.5	2.75	–	3	3.25	–	3.5
						H	4	4.5	–	5	5.5	–	6	6.5	–	7
π	76	76	110	105	I	H	4	4¼	4⅜	5	5½	5¾	6	6½	6¾	7
						S	8	9	9½	10	11	11½	12	13	13½	14
						T	16	18	19	20	22	23	24	26	27	28
						L	32	36	38	40	44	46	48	52	54	56
	76	84		114	III	L	.0024	.0027	.0029	.0030	.0033	.0035	.0036	.0039	.0041	.0042
						T	.0048	.0054	.0057	.0059	.0066	.0069	.0072	.0078	.0081	.0084
						S	.0096	.0108	.0114	.0120	.0132	.0138	.0144	.0156	.0162	.0168
						H	.0192	.0216	.0228	.0240	.0265	.0277	.0289	.0313	.0325	.0337

LEAD SCREW P = 12mm

	M	N1	N2	O			LEAD SCREW P= 12mm FEED GEAR BOX LEVER POSITION 1	2	3	4	5	6	7	8	9	10
	76	87	84	104	II	L	1	–	–	1.25	–	–	1.5	–	–	1.75
						T	2	2.25	–	2.5	2.75	–	3	3.25	–	3.5
						S	4	4.5	4.75	5	5.5	5.75	6	6.5	6.75	7
						H	8	9	9.5	10	11	11.5	12	13	13.5	14
	76	87	126	78		H	16	18	19	20	22	23	24	26	27	28
1"	76	87	84	104	I	H	2	2¼	2⅜	2½	2¾	2⅞	3	3¼	3⅜	3½
						S	4	4½	4¾	5	5½	5¾	6	6½	6¾	7
						T	8	9	9½	10	11	11½	12	13	13½	14
						L	16	18	19	20	22	23	24	26	27	28
	76	87	126	78		H	1	1¼	1⅜	1½	1¾	1⅞	1½	1¾	1⅞	1¼
π	76	78	99	87	II	L	.5	–	–	–	–	–	.75	–	–	–
						T	1	–	–	1.25	–	–	1.5	–	–	1.75
						S	2	2.25	–	2.5	2.75	–	3	3.25	–	3.5
						H	4	4.5	–	5	5.5	–	6	6.5	–	7
π	76	78	99	87	I	H	4	4¼	4½	5	5¼	5½	6	6¼	6½	7
						S	8	9	9½	10	11	11½	12	13	13½	14
						T	16	18	19	20	22	23	24	26	27	28
						L	32	36	38	40	44	46	48	52	54	56
	76	87	84	104	III	L	.06	.07	.07	.08	.08	.09	.09	.10	.10	.11
						T	.12	.13	.14	.15	.16	.17	.18	.19	.20	.21
						S	.24	.27	.29	.30	.33	.35	.36	.39	.41	.42
						H	.48	.54	.57	.60	.66	.69	.72	.78	.81	.84

CARRIAGE AND APRON

Lever (**Fig. Q-1**) engages and disengages the longitudinal and cross feeds.

Select lever (**Fig. Q-2**) changes the longitudinal feeds, cross feeds and thread cutting.

Lever **(Fig.Q-3**) the 4 way rapid traverse. If you push up on the lever you can have three times the normal feed.

Lever (**Fig. Q-4**) engages and disengages the thread cutting.

An interlocking device is incorporated so that the feed and the half nut engagement will not work at the same time.

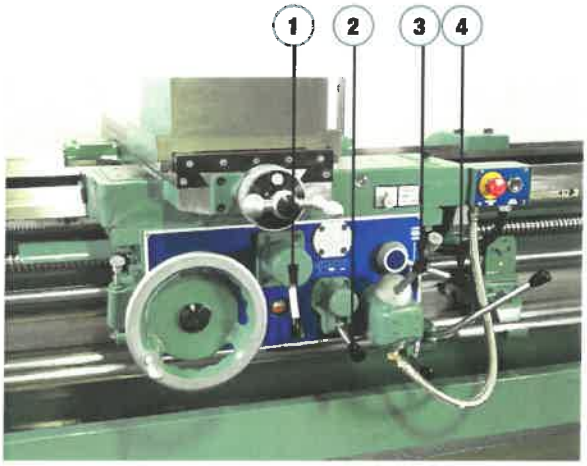


FIGURE Q

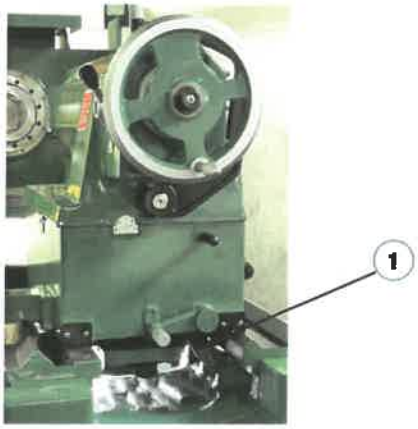


FIGURE R

TAILSTOCK

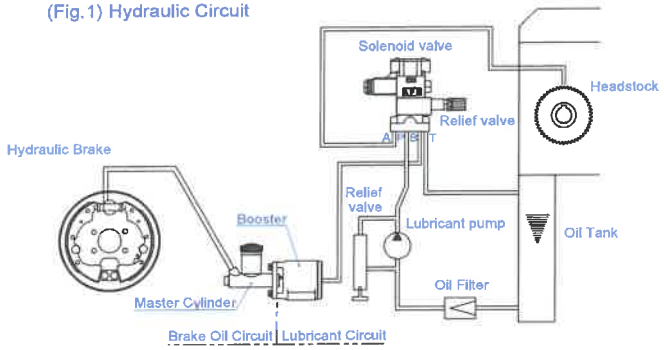
The diameter of the tailstock quill is 5 1/8" (130mm) for heavy duty loading and cutting. A uniguely designed stopper (**Fig. Q-1**) beneath the tailstock can be locked to avoid any slippage while cutting.

HYDRAULIC BRAKE SYSTEM

When pressing the spindle stop button to cut off the main motor, the hydraulic brake system stops the spindle automatically. The circuit diagram of this system is shown in Figure R.

When the main spindle is running, the solenoid valve (**Fig. S**) is in the OFF position and the lubrication system will continue to run. When the main spindle is stopped, the solenoid valve turns ON and the hydraulic brake system is ON.

(Fig.1) Hydraulic Circuit



(Fig.3) Brake System

(Fig.2) Solenoid-valve

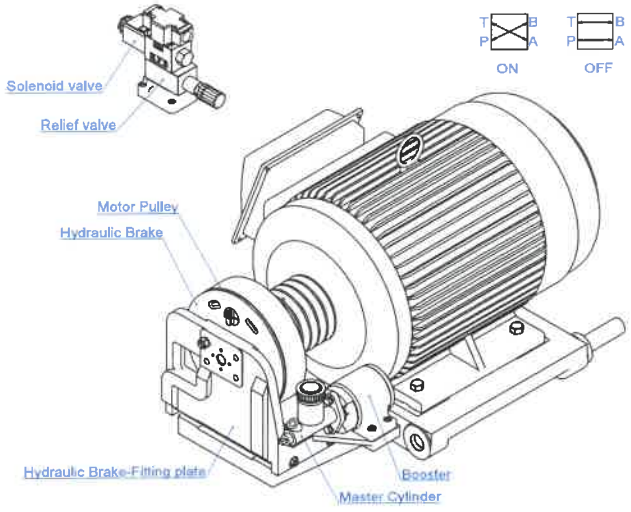


FIGURE S

☑ **TIP** Hydraulic pressure can be adjusted from 3kg/cm² to 10kg/cm².

☑ **TIP** Automotive brake fluid, such as DOT 3 can be used in this hydraulic brake system.

SEMI-AUTOMATIC AIR THREADING ATTACHMENT (OPTION)

The Semi-Automatic Air Threading Attachment is an optional feature on the HP and HPX models. Please find a sample procedure below and the diagram on p. 32 - 34 to help you understand how to operate this useful feature.

Procedure to thread an oil pipe at 4 threads per inch and ¾ inch taper per foot:

Step 1 Adjust the regulator pressure (**Fig. T**).

Step 2 Set the taper attachment to ¾" taper per foot.

Step 3 Select 4 TPI from the feed gear box.

Step 4 Select the main spindle speed.

Step 5 Move the carriage until the tool almost touches the end of the thread.

Step 6 Set the micrometer carriage until it is lightly touching the micro switch on the carriage that will actuate air cylinders when threading.

Step 7 Turn on the spindle.

Step 8 Select Internal or External thread.

Step 9 Make the first thread cut by pushing the thread button that actuates the system. This will cause the cross feed to move toward the center of the lathe for external threads or away from the center of the lathe for internal threads and simultaneously close the half nuts. When the carriage has moved towards the headstock far enough, it will engage the micro switch of the Micrometer Carriage Stop and actuate the cross slide to retract away from the lathe center for external threads or towards the center for internal threads and open the half nuts. (**Fig. U**)

Step 10 Using the hand wheel, move the carriage back into position for the second thread cut.

Step 11 Turn the cross feed handle to the desired depth of cut for the next thread cut. While the carriage is following the lead toward the headstock, the operator can adjust the Micrometer Carriage Stop, if necessary.

Step 12 Repeat step #11 as many times as necessary until the thread cut is completed.

☑ **TIP** The kick-out / kick-in cross slide stroke is properly set at about ¼" by the factory. To adjust this stroke see **Fig. U**. Air flow can also be adjusted see **Fig. V**.

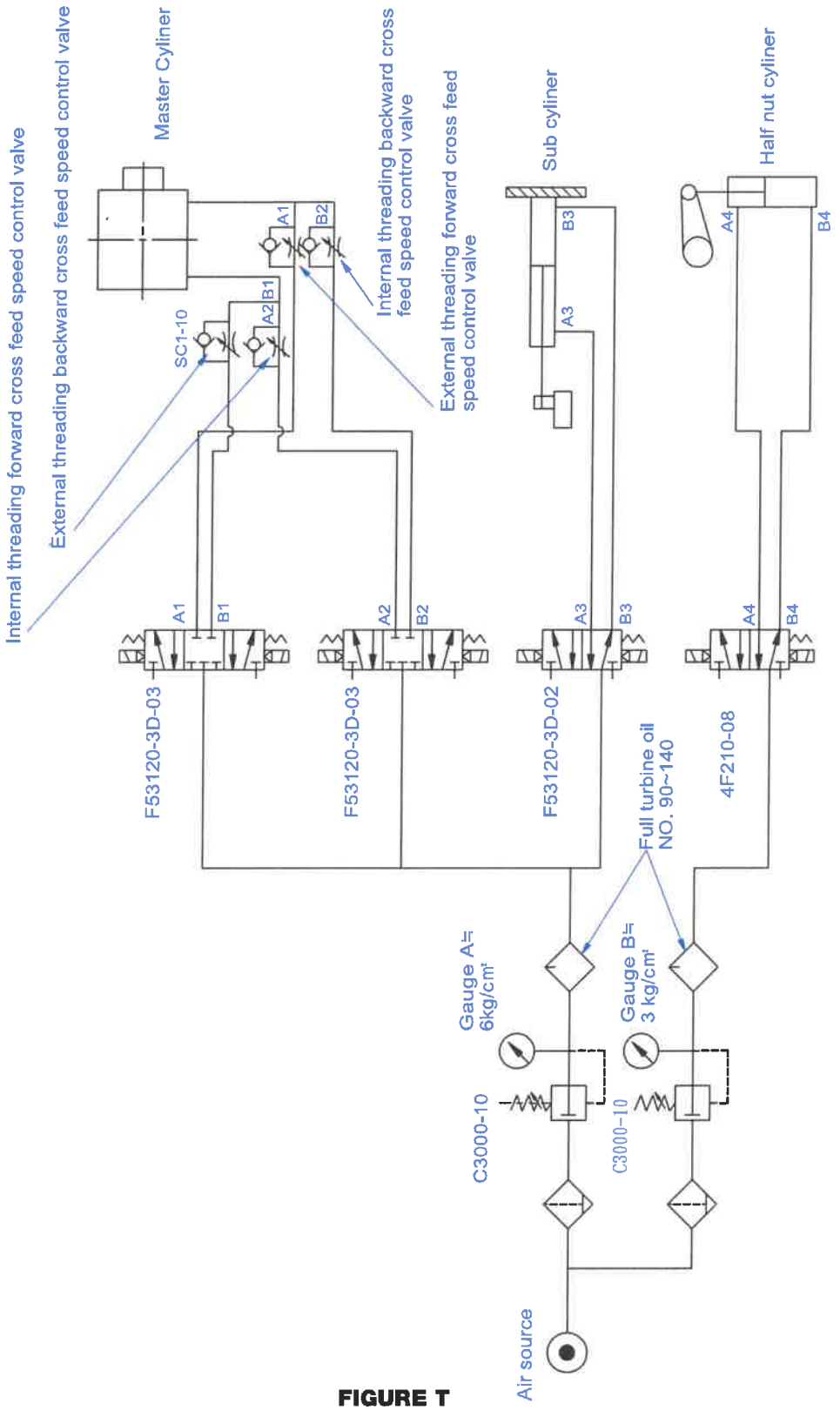

Internal threading forward cross feed speed control valve
External threading backward cross feed speed control valve
Master Cyliner
Internal threading backward cross feed speed control valve
External threading forward cross feed speed control valve
Sub cyliner
Half nut cyliner
SC1-10
A1
B1
A2
B2
A3
B3
A4
B4
F53120-3D-03
F53120-3D-03
F53120-3D-02
4F210-08
Full turbine oil NO. 90~140
Gauge A≒ 6kg/cm²
Gauge B≒ 3 kg/cm²
C3000-10
C3000-10
Air source

FIGURE T

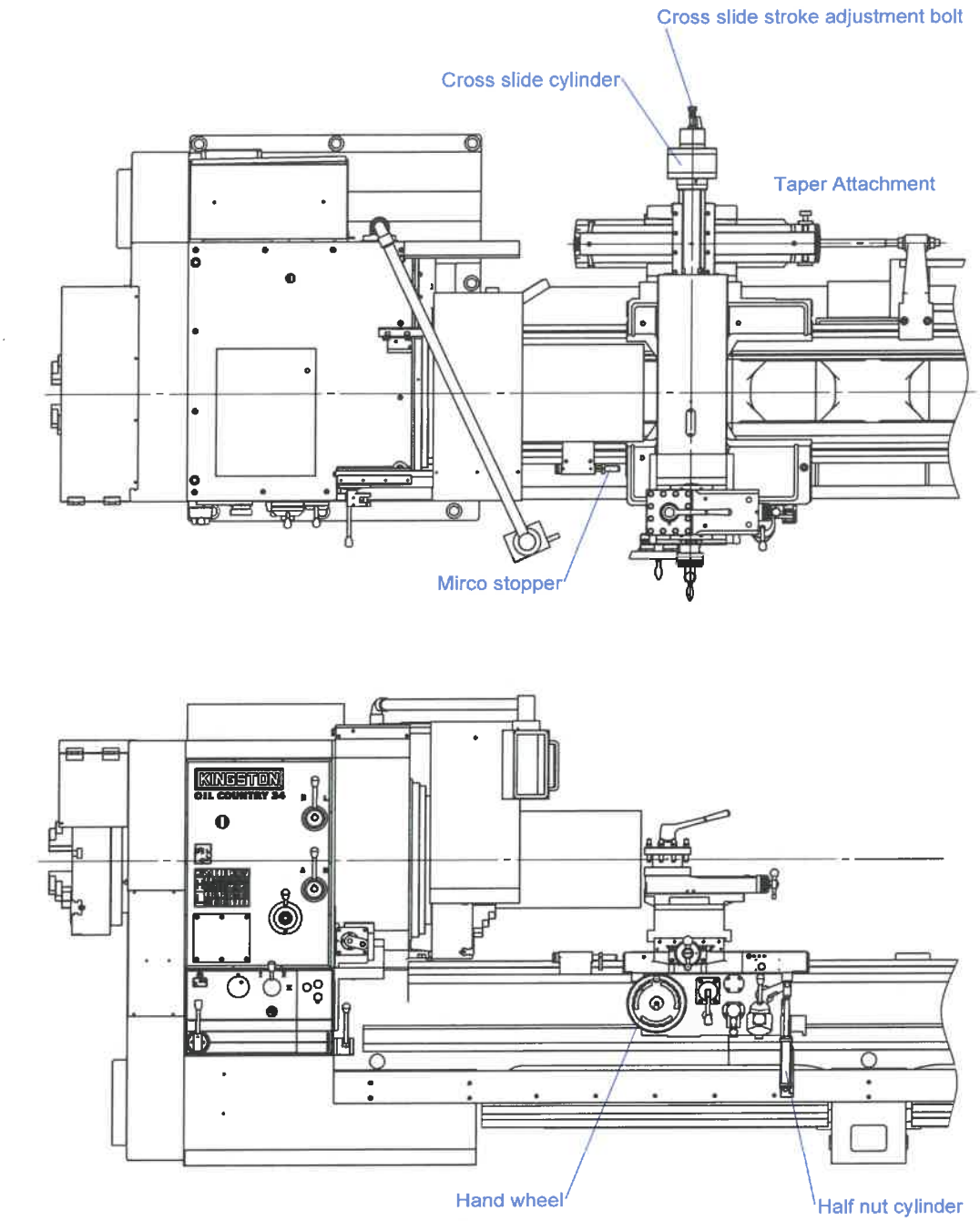

Cross slide stroke adjustment bolt
Cross slide cylinder
Taper Attachment
Mirco stopper
KINGSTON
OIL COUNTRY 24
Hand wheel
Half nut cylinder

FIGURE U

SEMI-AUTO THREADING SPEED CONTROL

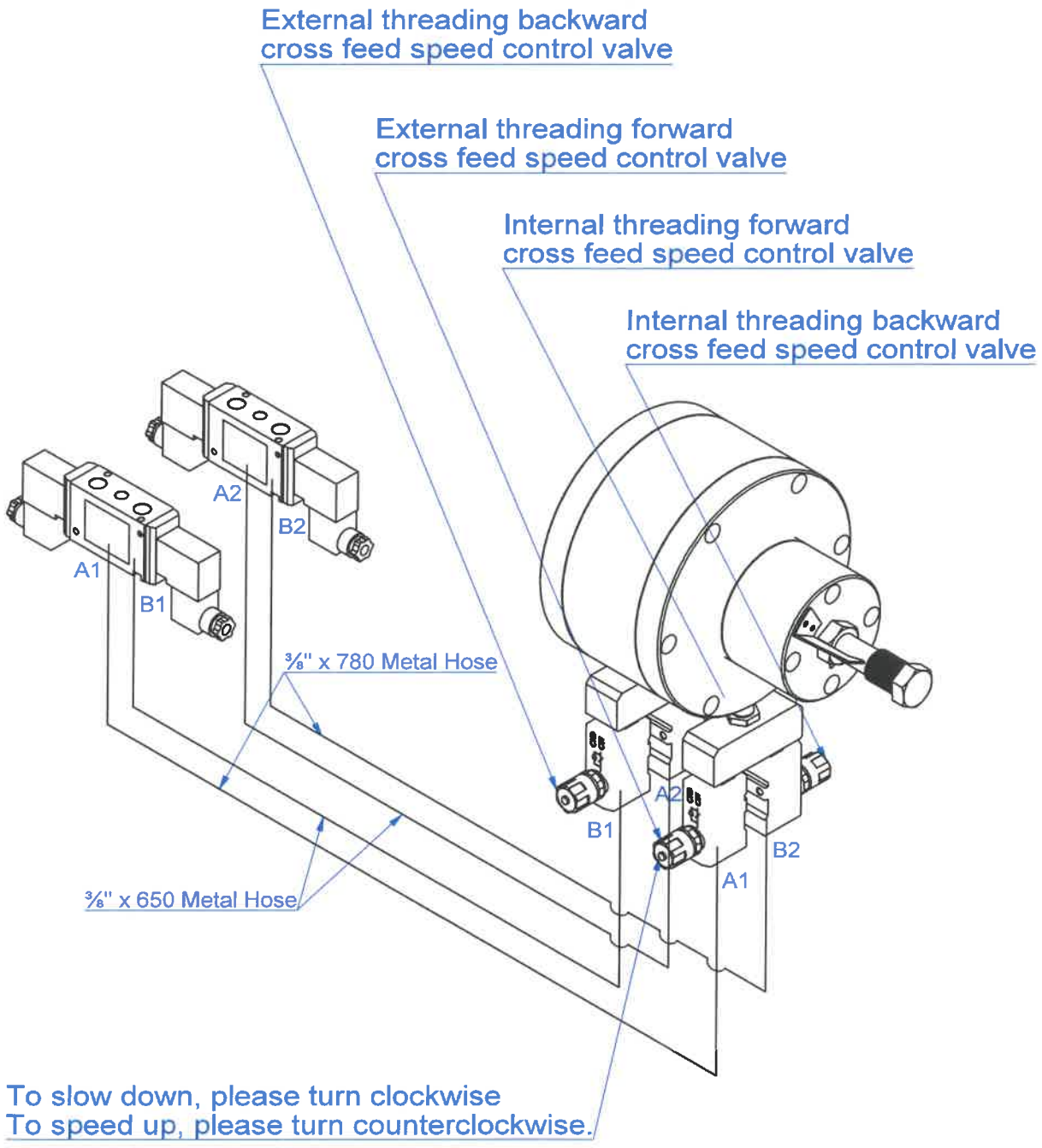


FIGURE V

MAINTENANCE

SPINDLE BEARING ADJUSTMENT

Do not adjust bearings unless absolutely necessary. Spindle bearings are adjusted and set by the factory prior to delivery. If you must adjust, only authorized personnel or qualified technicians should perform any adjustments.

After long time use, chatter may occur on the cutting surface which may be caused by loss of pre-load pressure on the bearings. If an adjustment is unavoidable, follow the steps below:

Step 1 Place lever to the neutral position so that all gears disengage from the main spindle.

Step 2 Remove the spindle end cover and tighten lock nuts (**Fig.W-1 & Fig.W-1**) carefully to pre-load the bearings. Check the resistance of the spindle rotation by hand as you gradually tighten the nuts.

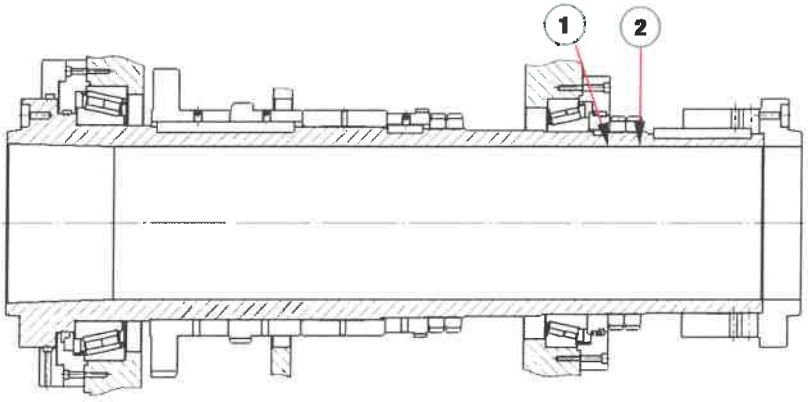


FIGURE W

Excessive pressure can cause serious damage to the bearings. Too much pre-load on the bearing may cause it to overheat, make an abnormal noise, or damage the spindle bearings.

GIB ADJUSTMENT

There is a gib in the cross slide and another in the tool slide.

To adjust the gib in the tool slide (**Fig. X**), loosen adjusting screw (B) and tighten adjusting screw (A). Move the tool slide and check the adjustment. When satisfied with the adjustment, then tighten screw (B).

To adjust the gib in the cross slide, remove the felt cover at the front and loosen the adjusting screw beneath. Tighten the adjusting screw at the rear of the cross slide until satisfied, then retighten the front screw and replace felt cover.

ADJUSTING THE FEMALE SCREW ON CROSS SLIDE

To adjust the backlash for the cross slide female screw (**Fig. Y**), remove screw (A) and take off the cover (B). Loosen bolt (E) and tighten bolt (D). This should minimize the backlash. When finished, then retighten (C), (D) & (E.) Then replace the cover (B) and replace screw (A).

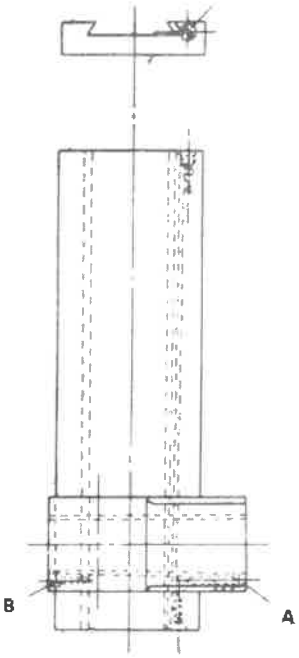


FIGURE X

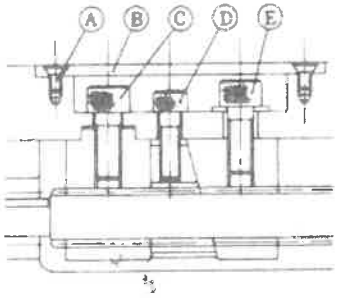


FIGURE Y

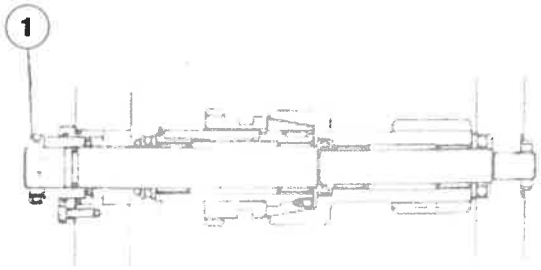


FIGURE Z

ADJUSTING THE OVERLOAD SAFETY DEVICE

A cone clutch is incorporated in the apron (**Fig.Z**). To adjust, tighten the clamping nut (**Fig. Z-1**) located at the left of the apron. Do not over-tighten the nut to extend the life of your lathe's cone clutch.

PARTS LIST

HEADSTOCK I - HP

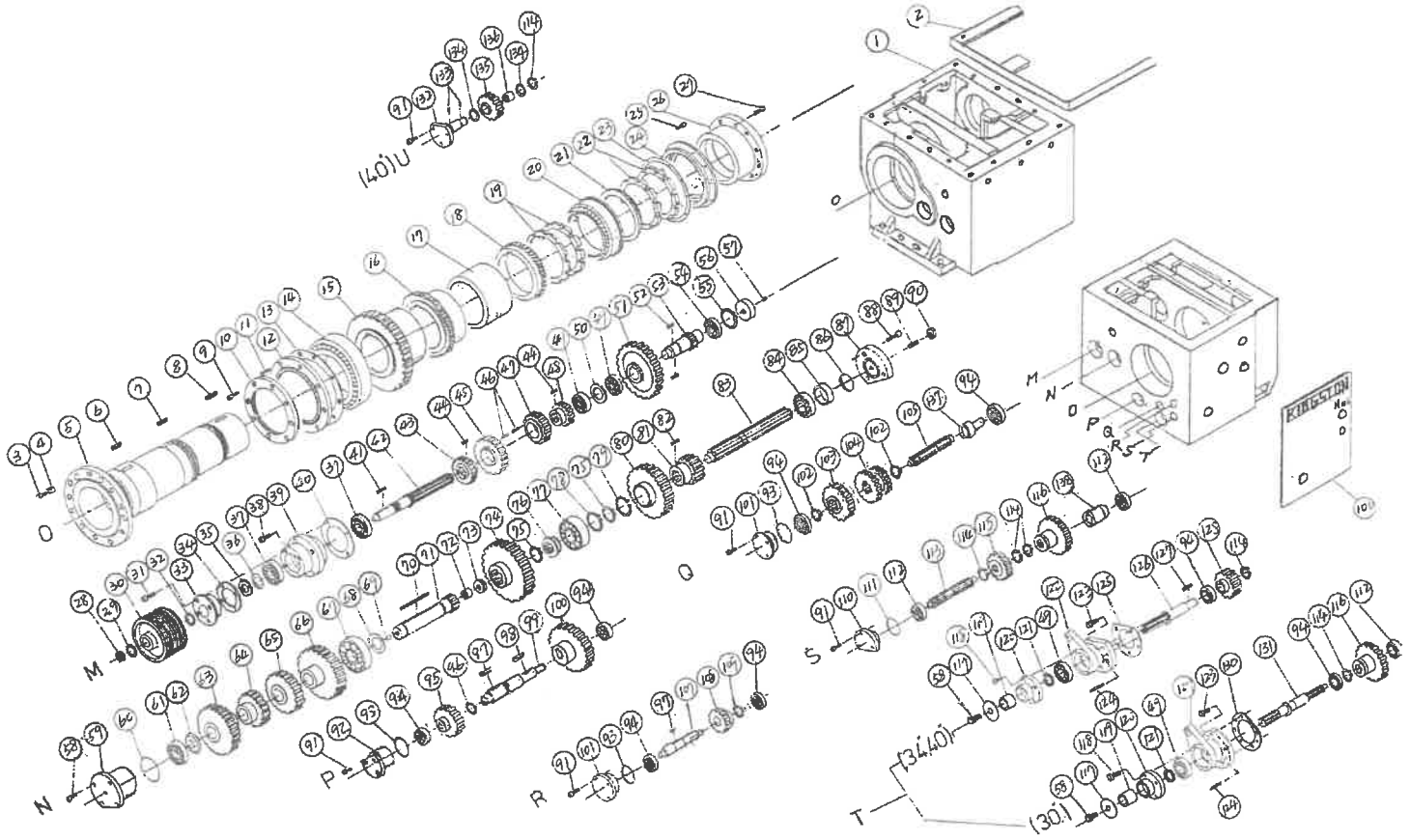
Diagram on page 42A

No.	Part No	Part Name	Dimension
1	AG9H00601004	Headstock body	
2	AG9H00606009	Headstock cover	
3	21021M1203001	Hexagon socket bolt	M12×30L
4	AG9H000200003	Spindle pin	
5	AG9H006020005	Spindle (A2-15)	
6	2180024162107	Key	24×16×210L
7	2180020130553	Key	20×13×55L
8	2180024161005	Key	24×16×100L
9	21021M0804508	Hexagon socket bolt	M8×45L
10	AG9H006040007	Cover	
11	21021M0804003	Hexagon socket bolt	M8×40L
12	AG9H006030006	Cover	
13	AG9H006030105	Packing	
14	BG0HR32048XJ8	Taper roller bearing	HR32048XJ
15	AG9H006080001	Gear	M4.5×93T
16	AG9H006090002	Gear	M3.5×84T
17	AG9H006100000	Spacer	
18	AG9H006110001	Gear	M2.5×110T
19	AG9H006120002	Nut	
20	BG0HR32044XJ6	Taper roller bearing	HR32044XJ
21	AG9H006130003	Spacer	
22	AG9H006140004	Nut	
23	AG9H006050107	Packing	
24	AG9H006050008	Cover	
25	21021M0805000	Hexagon socket bolt	M8×50L
26	AG9H006410002	Flange	
27	21021M1007009	Hexagon socket bolt	M10×70L
28	2130103C01608	Hexagon nut	W3/4"
29	AE9H000060108	Washer	
30	AG9H006230000	V-Pulley	
31	21021M0602502	Hexagon socket bolt	M6×25L
32	22000SB426094	Oil seal	SB42609

No.	Part No	Part Name	Dimension
33	AE9H000030006	Cover	
34	AE9H000030105	Packing	
35	20200AN09P150	Nut	AN09
36	20100000AW094	Washer	AW09
37	BG0000302093	Taper roller bearing	30209
38	2102103D003C3	Hexagon socket bolt	W3/8"×3/4"L
39	AE9H000040007	Housing	
40	AE9H000040106	Packing	
41	218002080457	Key	12×8×45L
42	AG9H006220009	Spline shaft	
43	AE9H000070000	Gear	M3×32T
44	2180010080206	Key	10×8×20L
45	AE9H000090002	Gear	M3×46T
46	21041M0801002	Hexagon socket set screw	M8×10L
47	AE9H000100000	Gear	M3×39T
48	AE9H000110001	Gear	M3×26T
49	BG00000062074	Ball bearing	6207
50	AE9H000120002	Spacer	
51	AE9H000130003	Gear	M3×70T
52	2180010080305	Key	10×8×30L
53	AG9H006210107	Shaft with gear	M4×15T
54	BG00000052073	Ball bearing	5207
55	2170000RTW720	Snap ring	RTW-72
56	AE9H000160006	Cover	
57	2104103D001B2	Hexagon socket set screw	W3/8"×1/2"L
58	21021M0802506	Hexagon socket bolt	M8×25L
59	AG9H006200007	Cover	
60	22100000G1153	O ring	G-115
61	BG00000322095	Taper roller bearing	32209
62	AE9H000180008	Collar	
63	AE9H000190009	Gear	M3×60T
64	AE9H000200007	Gear	M3×46T
65	AE9H000210008	Gear	M3×53T
66	AE9H000220009	Gear	M3×66T
67	BG00000063114	Ball bearing	6311
68	AE9H000230000	Collar	

No.	Part No	Part Name	Dimension
69	AE9H000250101	Union	
70	2180012081504	Key	12×8×150L
71	AE9H000250002	Shaft gear	M3×22T
72	BG0000HK30203	Needle bearing	HK3030
73	BG0000511064	Thrust bearing	51106
74	AG9H000260108	Gear	M3×22T, M4×54T
75	2170000STW550	Snap ring	STW-55
76	AE9H000270004	Bushing	
77	BG00000062135	Ball bearing	6213
78	2170000STW659	Snap ring	STW-65
79	2170000STW901	Snap ring	STW-90
80	AG9H006180008	Gear	M35×70T
81	AG9H006170007	Gear	M4.5×27T
82	2180020130454	Key	20×13×45L
83	AG9H006190009	Spline shaft	
84	BG00000323098	Taper roller bearing	32309
85	AG9H006160006	Spacer	
86	221000000G954	O ring	G-95
87	AG9H006150005	Cover	
88	21021M1002509	Hexagon socket bolt	M10×25L
89	21041M1206004	Hexagon socket set screw	M12×60L
90	31201M120100	Nut	M12
91	21021M0802001	Hexagon socket bolt	M8×20L
92	AG9H006270004	Cover	
93	221000000G558	O ring	G-55
94	BG00000062067	Ball bearing	6206
95	AG9H006260003	Gear	M2.5×37T
96	2170000STW406	Snap ring	STW-40
97	2180010080405	Key	10×8×40L
98	2180010080504	Key	10×8×50L
99	AG9H006250002	Shaft	
100	AG9H006240001	Gear	M2.5×74T
101	AG9H006300004	Cover	
102	2170000STW385	Snap ring	STW-38
103	AG9H006280005	Gear	
104	AE9H000370001	Gear	M2.5×44T

No.	Part No	Part Name	Dimension
105	AG9H006290006	Spline shaft	
106	AG9H006420003	Name plate	
107	AG9H006320006	Shaft	
108	AG9H006310005	Gear	
109	2170000STW354	Snap ring	STW-35
110	AG9H006340008	Cover	
111	221000000G459	O ring	G-45
112	BG00000062050	Ball bearing	6205
113	AG9H006330007	Spline shaft	
114	2170000STW307	Snap ring	STW-30
115	AE9H000470008	Gear	M2.5×32T
116	AE9H000480009	Gear	M2.5×44T
117	AE9H000490000	Washer	
118	21021M0802001	Hexagon socket bolt	M8×20L
119	AE9H000500008	Collar	
120	AE9H001610005	Cover	
121	2200SB3552129	Oil seal	SB355212
122	AE9H001600004	Bracket	34"
	AE9H00054A005	Bracket	40"
123	2102103D1A1C9	Hexagon socket bolt	W3/8"×1 1/4"L
124	2195000604005	Taper pin	
125	AE9H001600103	Packing	
126	AE9H000530001	Shaft	
127	2180007070304	Key	7×7×30L
128	AE9H000560004	Gear	M2.5×32T
129			
130	AE9H001740104	Packing	
131			
132	AE9H001570004	Shaft	
133	2192000300803	Pin	ψ3×8L
134	AE9H001580005	Washer	
135	AE9H001590006	Gear	
136	BG0HK3038ZWD1	Needle bearing	HK3038ZWD
137	AG9H006440005	Spacer	
138	AG9H006450006	Spacer	


(40)U
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KINGSTON

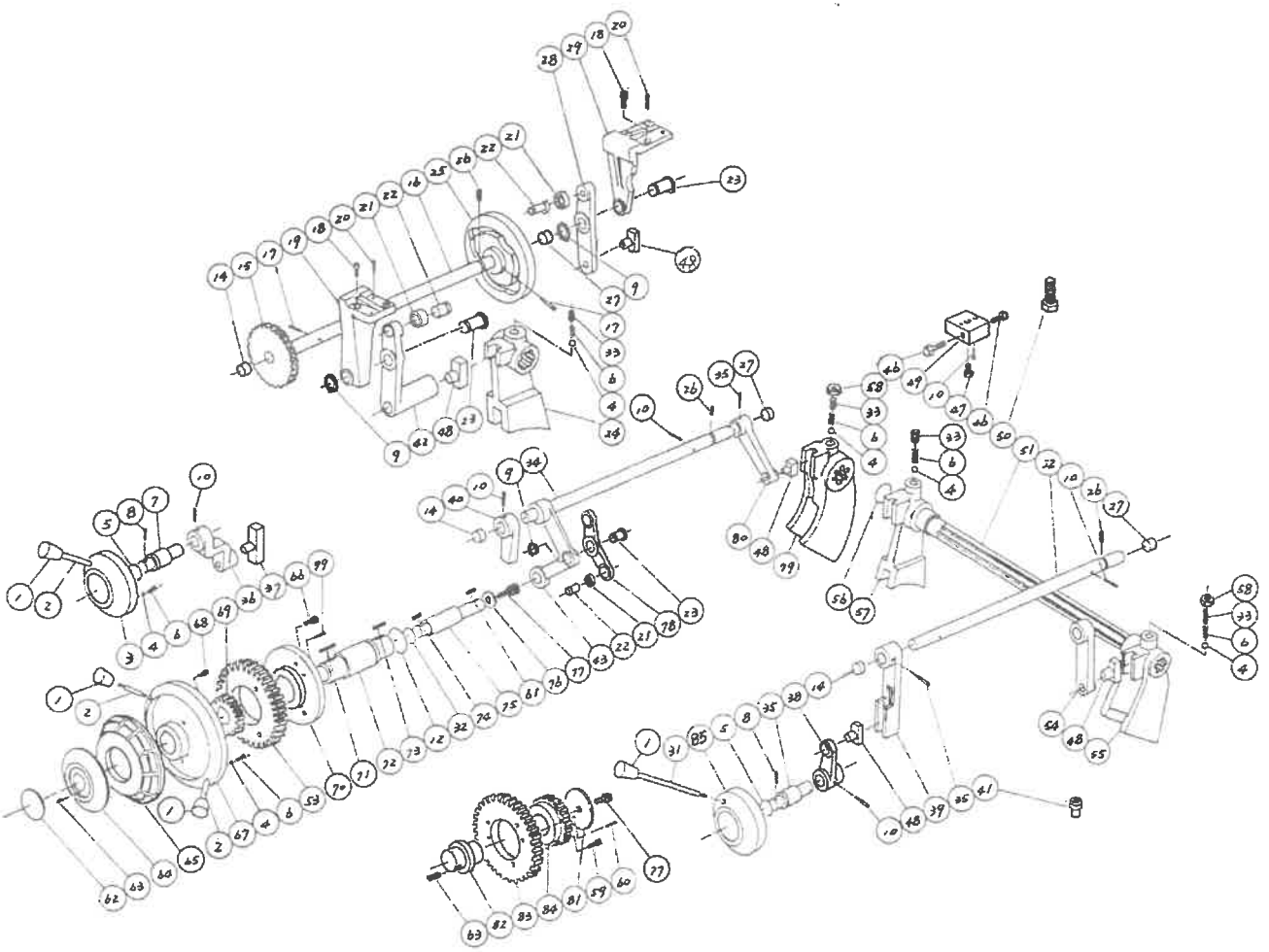
HP HEADSTOCK II

Diagram on page 46A

No.	Part No	Part Name	Dimension
1	AB9H100770001	Grip	
2	AE9H001320005	Lever	
3	AE9H00133B002	Handle boss	
4	2804003D00009	Steel ball	3/8"
5	221000000P210	O ring	P-21
6	AE9H000820001	Spring	
7	AE9H00134A000	Shaft	
8	2193000607000	Taper pin	ψ6×70L
9	217000STW154	Snap ring	STW-15
10	2195000504008	Taper pin	ψ5×40L
12	221000000P388	O ring	P-38
14	AG9H006380002	Plug	
15	AG9H001020109	Gear	M2×70T
16	AG9H006360000	Shaft	
17	2193000604001	Taper pin	ψ6×40L
18	21021M0602502	Hexagon socket bolt	M6×25L
19	AE9H00113B008	Lever supporter	
20	2195000603507	Taper pin	ψ6×35L
21	AE9H001090001	Roller	
22	AE9H001080000	Pin	
23	AE9H001060008	Pin	
24	AE9H001150004	Shifter	
25	AG9H00103B106	Cam	
26	21041M0803008	Hexagon socket set screw	M8×30L
27	AE9H001040006	Plug	
28	AE9H00107B005	Lever	
29	AE9H00105B003	Lever supporter	
31	AE9H000750008	Lever	
32	221000000P205	O ring	P-20
33	2104101B1A1B4	Hexagon socket set screw	W1/2"×1 1/2"L
34	AG9H006350009	Shaft	
35	AE9H00125A004	Shaft	

No.	Part No	Part Name	Dimension
36	AE9H00139A005	Lever	
37	AE9H001400000	Sliding piece	
38	AE9H00126A005	Lever	
39	AG9H001280109	Lever	
40	AG9H001190103	Lever	
41	AE9H001490009	Knock pin	
42	AE9H00114B009	Lever	
43	AG9H001160100	Lever support	
46	AF9H001220001	Special bolt	
47	2100101B1A3C1	Hexagon bolt	W1/2"×1 3/4"L
48	AE9H001100009	Sliding piece	
49	AF9H001210000	Adjusting metal	
50	AE9H001640008	Hexagon bolt	
51	AG9H006390003	Spline shaft	
52	AG9H006350009	Shaft	
53	AE9H000920008	Gear	M2×70T
54	AG9H001300108	Lever	
55	AG9H006370001	Shifter	
56	221000000P241	O ring	P-24
57	AE9H001120001	Shifter	
58	2130101B01009	Hexagon nut	W1/2"
59	21021M0601509	Hexagon socket bolt	M6×15L
60	2191000602001	Spring pin	ψ6×20L
61	2180005050205	Key	5×5×20L
62	AE9H000760008	Cover	
63	21041M0601008	Hexagon socket set screw	M6×10L
64	AE9H000770009	Dial supporter	
65	AG9H006400001	Dial	
66	21021M0801206	Hexagon socket bolt	M8×12L
67	AE9H00079A004	Dial supporter	
68	2114203E001C6	Cross recessed round head	W3/16"×1/4"L
69	AE9H000870006	Spur gear	M2×28T
70	AE9H000910007	Cam	
71	2180007070304	Key	7×7×30L
72	AE9H000840003	Shaft	
73	2180007070151	Key	7×7×15L

No.	Part No	Part Name	Dimension
74	2180007070205	Key	7×7×20L
75	AE9H000880007	Shaft	
76	AE9H000940000	Washer	
77	21021M0801503	Hexagon socket bolt	M8×15L
78	AE9H01170006	Lever	
79	AE9H001210007	Shifter	
80	AG9H001200101	Lever	
81	AE9H000490000	Washer	
82	AE9H000950001	Pin	
83	AE9H000970003	Spur gear	M2×84T
84	AE9H000960002	Spur gear	M2×42T
85	AG9H00133B107	Handle boss	



HEADSTOCK I – HPX 34"

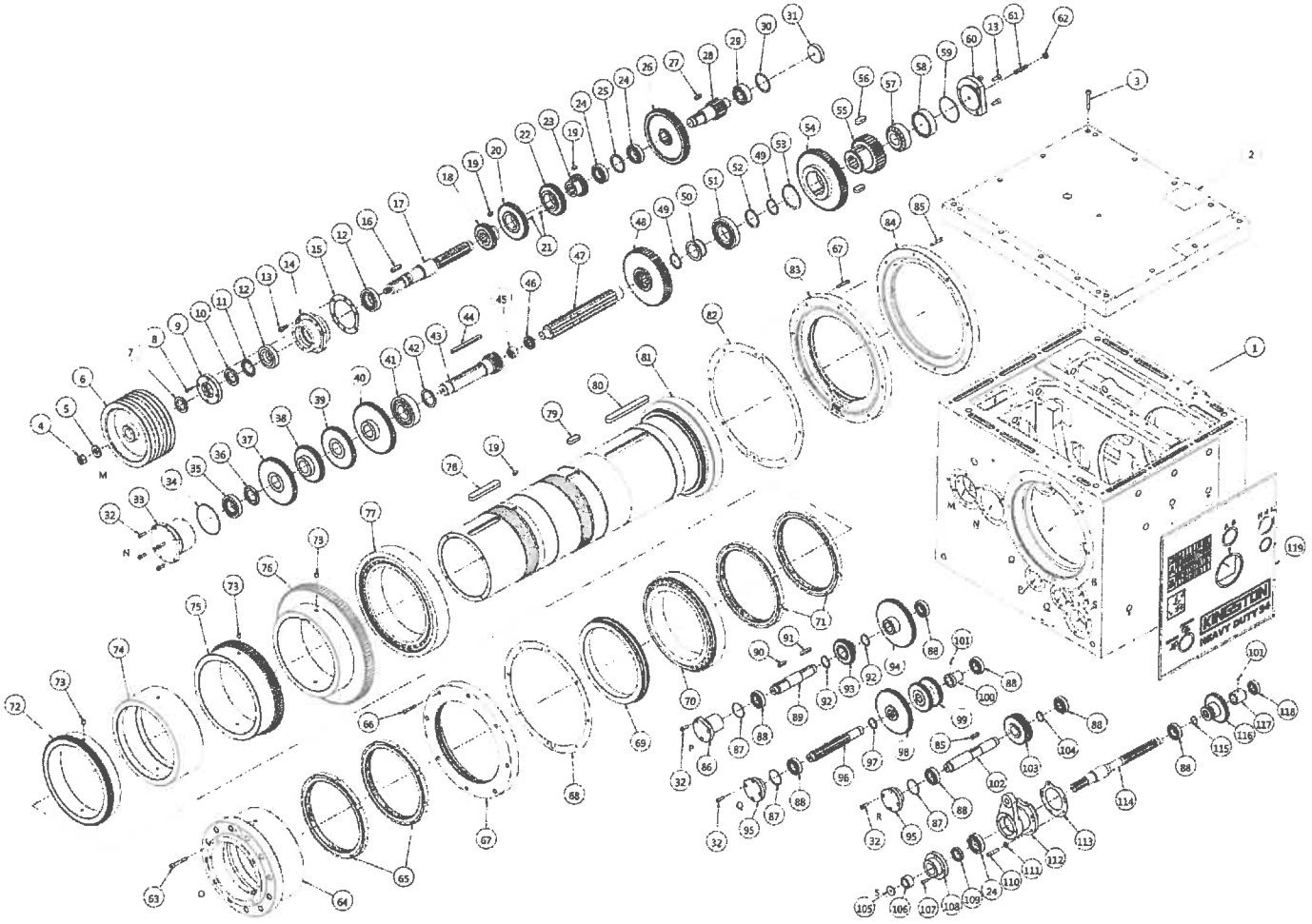
Diagram on page 50A

No.	Part No	Part Name	Dimension
1	AJ9H00701A005	Headstock body	34"
2	AJ9H007060007	Cover	
3	21021M1007009	Hexagon socket bolt	M10 x 70L
4	2130103C01608	Hexagon Nut	W3/4" x 16t
5	AE9H000060108	Washer	
6	AG9H006230000	V-pulley	
7	22000SB426094	oil seal	42609
8	21021M0602502	Hexagon socket bolt	M6 x 25L
9	AE9H000030006	Cover	
10	20200AN09P150	Bearing lock Nut	AN-09
11	20100000AW094	Bearing lock washer	AW-09
12	BG00000302093	Taper roller bearing	30209
13	21021M1002509	Hexagon socket bolt	M10 x 25L
14	AE9H000040007	Housing	
15	AE9H000040106	Packing	
16	218001208045 7	Key	12 x 8 x 45L
17	AG9H006220010	Spline shaft	
18	AE9H000070000	Gear	M3 x 32T
19	218001008020 5	Key	10 x 8 x 20L
20	AE9H000090002	Gear	M3 x 46T
21	21041M0801002	Set screw	M8 x 10L
22	AE9H000100000	Gear	M3 x 39T
23	AE9H000110001	Gear	M3 x 26T
24	BG00000062074	Ball bearing	6207
25	AE9H000120002	Spacer	
26	AE9H000130003	Gear	M3 x 70T
27	218001008030 5	Key	10 x 8 x 30L
28	AG9H006210109	Shaft with gear	M4 x 15T
29	BG00000052073	Ball bearing	5207
30	2170000RTW720	Snap ring	RTW-72
31	AE9H000160006	Cover	
32	21021M0802506	Hexagon socket bolt	M8 x 25L

No.	Part No	Part Name	Dimension
33	AG9H006200007	Cover	
34	22100000G1151	O-ring	G-115
35	BG00000322095	Taper roller bearing	32209
36	AE9H000180008	Collar	
37	AE9H000190009	Gear	M3 x 60T
38	AE9H000200007	Gear	M3 x 46T
39	AE9H000210008	Gear	M3 x 53T
40	AE9H000220009	Gear	M3 x 66T
41	BG00000063114	Ball bearing	6311
42	AE9H000230000	Collar	
43	AE9H000250002	Shaft with gear	M3 x 22T
44	218001208150 4	Key	12 x 8 x 150L
45	BG0000HK30203	Needle bearing	HK3020
46	BG00000511064	Thrust bearing	51106
47	AG9H006190108	Spline shaft	
48	AG9H000260108	Gear	M4 x 54T
49	2170000STW550	Snap ring	STW-55
50	AE9H000270004	Bushing	
51	BG00000062135	Ball bearing	6213
52	2170000STW659	Snap ring	STW-65
53	2170000STW901	Snap ring	STW-90
54	AJ9H007180006	Gear	M3.5 x 66T
55	AJ9H00717A008	Gear	M4.5 x 29T
56	218002012045 3	Key	20 x 12 x 45L
57	BG00000323098	Taper roller bearing	32309
58	AG9H006160006	Spacer	
59	221000000G954	O-ring	G-95
60	AG9H006150005	Cover	
61	21041M1206004	Hexagon socket set screw	M12 x 60L
62	21301M1201008	Hexagon Nut	M12
63	21021M1006501	Hexagon socket bolt	M10 x 65L
64	NJ9H00053A002	Housing	
65	NJ9H000110009	Nut	
66	NJ9H000120000	Cover	
67	21021M0805000	Hexagon socket bolt	M8 x 50L
68	NJ9H000120109	Packing	

No.	Part No	Part Name	Dimension
69	NJ9H000100008		
70	BG00HR32956J4	Taper roller bearing	HR32956-J
71	NJ9H000090000	Nut	
72	NJ9H000080009	Gear	M2.5 x 138T
73	21041M1206004	Set screw	M12 x 15L
74	NJ9H000070008	Distance collar	
75	AJ9H007090000	Gear	M3.5 x 103T
76	AJ9H00708A002	Gear	M4.5 x 103T
77	BG00HR32960J3	Taper roller bearing	HR32960-J
78	218002416150 0	Key	24 x 16 x 150L
79	218002012055 2	Key	20 x 12 x 55L
80	218002416210 7	Key	24 x 16 x 210L
81	NJ9H000020003	Spindle	
82	AJ9H007030103	Packing	
83	AJ9H007030004	Cover	
84	AJ9H007040005	Cover	
85	21021M0804508	Hexagon socket bolt	M8 x 45L
86	AJ9H007270002	Cover	
87	221000000G558	O-ring	G-55
88	BG00000062067	Ball bearing	6206
89	AG9H006250002	Shaft	
90	218001008040 4	Key	10 x 8 x 40L
91	218001008050 3	Key	10 x 8 x 50L
92	2170000STW406	Snap ring	STW-40
93	AJ9H007260001	Gear	M2.5 x 37T
94	AG9H006240001	Gear	M2.5 x 74T
95	AJ9H007300002	Cover	
96	AG9H00629A009	Spline shaft	
97	2170000STW383	Snap ring	STW-38
98	AJ9H00728A006	Gear	M2.5 x 69T
99	AE9H000370001	Gear	M2.5 x 44T
100	AJ9H007440003	Distance collar	
101	21041M0600609	Set screw	M6 x 6L
102	AJ9H007320004	Shaft	
103	AG9H006310005	Gear	M2.5 x 44T
104	2170000STW352	Snap ring	STW-35

No.	Part No	Part Name	Dimension
105	AE9H000490000	Washer	
106	AE9H000500008	Spacer	
107	21021M0802001	Hexagon socket bolt	M8 x 20L
108	AE9H001610005	Housing	
109	2200TC3552123	Oil seal	TC-35-52-12
110	21021M1004000	Hexagon socket bolt	M10 x 40L
111	21502M100020	Washer	M10x 2T
112	AE9H001740005	Spacer	
113	AE9H001740104	Packing	
114	AJ9H00733A008	Spline shaft	
115	2170000STW307	Snap ring	STW-30
116	AE9H000480009	Gear	M2.5 x 44T
117	AJ9H007450004	Distance collar	
118	BG00000062050	Ball bearing	6205
119	AJ9H00742B007	Name plate	34"



HEADSTOCK I – HPX 40"

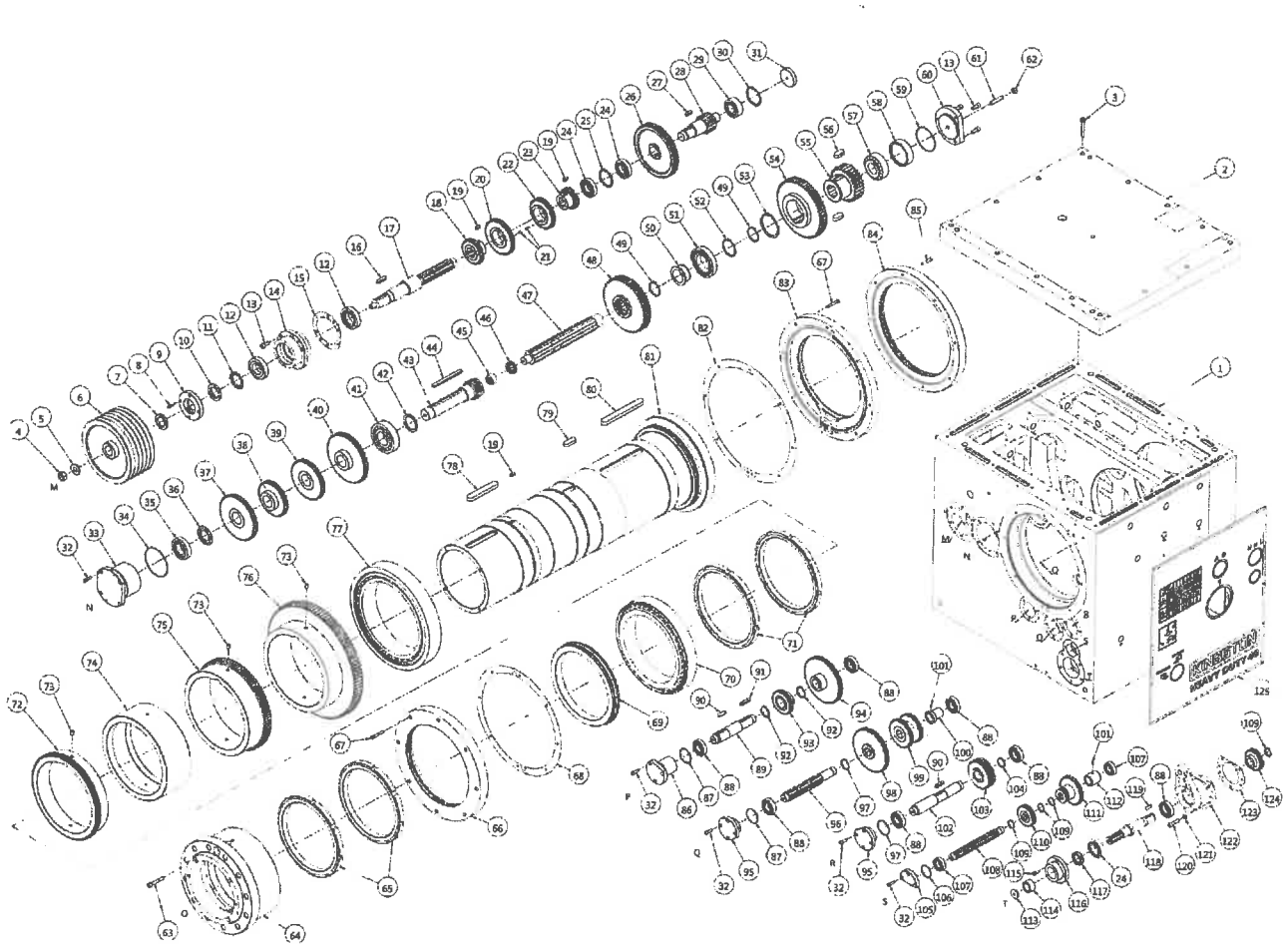
Diagram on page 54A

No.	Part No	Part Name	Dimension
1	AJ9H00701A104	Headstock body	40"
2	AJ9H007060007	Cover	
3	21021M1007009	Hexagon socket bolt	M10 x 70L
4	2130103C01608	Hexagon Nut	W3/4" x 16t
5	AE9H000060108	Washer	
6	AG9H006230000	V-pulley	
7	22000SB426094	oil seal	42609
8	21021M0602502	Hexagon socket bolt	M6 x 25L
9	AE9H000030006	Cover	
10	20200AN09P150	Bearing lock Nut	AN-09
11	20100000AW094	Bearing lock washer	AW-09
12	BG00000302093	Taper roller bearing	30209
13	21021M1002509	Hexagon socket bolt	M10 x 25L
14	AE9H000040007	Housing	
15	AE9H000040106	Packing	
16	218001208045 7	Key	12 x 8 x 45L
17	AG9H006220010	Spline shaft	
18	AE9H000070000	Gear	M3 x 32T
19	218001008020 5	Key	10 x 8 x 20L
20	AE9H000090002	Gear	M3 x 46T
21	21041M0801002	Set screw	M8 x 10L
22	AE9H000100000	Gear	M3 x 39T
23	AE9H000110001	Gear	M3 x 26T
24	BG00000062074	Ball bearing	6207
25	AE9H000120002	Spacer	
26	AE9H000130003	Gear	M3 x 70T
27	218001008030 5	Key	10 x 8 x 30L
28	AG9H006210109	Shaft with gear	M4 x 15T
29	BG00000052073	Ball bearing	5207
30	2170000RTW720	Snap ring	RTW-72
31	AE9H000160006	Cover	
32	21021M0802506	Hexagon socket bolt	M8 x 25L

No.	Part No	Part Name	Dimension
33	AG9H006200007	Cover	
34	22100000G1151	O-ring	G-115
35	BG00000322095	Taper roller bearing	32209
36	AE9H000180008	Collar	
37	AE9H000190009	Gear	M3 x 60T
38	AE9H000200007	Gear	M3 x 46T
39	AE9H000210008	Gear	M3 x 53T
40	AE9H000220009	Gear	M3 x 66T
41	BG00000063114	Ball bearing	6311
42	AE9H000230000	Collar	
43	AE9H000250002	Shaft with gear	M3 x 22T
44	218001208150 4	Key	12 x 8 x 150L
45	BG0000HK30203	Needle bearing	HK3020
46	BG00000511064	Thrust bearing	51106
47	AG9H006190108	Spline shaft	
48	AG9H000260108	Gear	M4 x 54T
49	2170000STW550	Snap ring	STW-55
50	AE9H000270004	Bushing	
51	BG00000062135	Ball bearing	6213
52	2170000STW659	Snap ring	STW-65
53	2170000STW901	Snap ring	STW-90
54	AJ9H007180006	Gear	M3.5 x 66T
55	AJ9H00717A008	Gear	M4.5 x 29T
56	218002012045 3	Key	20 x 12 x 45L
57	BG00000323098	Taper roller bearing	32309
58	AG9H006160006	Spacer	
59	221000000G954	O-ring	G-95
60	AG9H006150005	Cover	
61	21041M1206004	Hexagon socket set screw	M12 x 60L
62	21301M1201008	Hexagon Nut	M12
63	21021M1006501	Hexagon socket bolt	M10 x 65L
64	NJ9H00053A002	Housing	
65	NJ9H000110009	Nut	
66	NJ9H000120000	Cover	
67	21021M0805000	Hexagon socket bolt	M8 x 50L
68	NJ9H000120109	Packing	

No.	Part No	Part Name	Dimension
69	NJ9H000100008		
70	BG00HR32956J4	Taper roller bearing	HR32956-J
71	NJ9H000090000	Nut	
72	NJ9H000080009	Gear	M2.5 x 138T
73	21041M1201504	Set screw	M12 x 15L
74	NJ9H000070008	Distance collar	
75	AJ9H007090000	Gear	M3.5 x 103T
76	AJ9H00708A002	Gear	M4.5 x 103T
77	BG00HR32960J3	Taper roller bearing	HR32960-J
78	218002416150 0	Key	24 x 16 x 150L
79	218002012055 2	Key	20 x 12 x 55L
80	218002416210 7	Key	24 x 16 x 210L
81	NJ9H000020003	Spindle	
82	AJ9H007030103	Packing	
83	AJ9H007030004	Cover	
84	AJ9H007040005	Cover	
85	21021M0804508	Hexagon socket bolt	M8 x 45L
86	AJ9H007270002	Cover	
87	221000000G558	O-ring	G-55
88	BG00000062067	Ball bearing	6206
89	AG9H006250002	Shaft	
90	218001008040 4	Key	10 x 8 x 40L
91	218001008050 3	Key	10 x 8 x 50L
92	2170000STW406	Snap ring	STW-40
93	AJ9H007260001	Gear	M2.5 x 37T
94	AG9H006240001	Gear	M2.5 x 74T
95	AJ9H007300002	Cover	
96	AG9H00629A009	Spline shaft	
97	2170000STW383	Snap ring	STW-38
98	AJ9H00728A006	Gear	M2.5 x 69T
99	AE9H000370001	Gear	M2.5 x 44T
100	AJ9H007440003	Distance collar	
101	21041M0600609	Set screw	M6 x 6L
102	AJ9H007320004	Shaft	
103	AG9H006310005	Gear	M2.5 x 44T
104	2170000STW352	Snap ring	STW-35

No.	Part No	Part Name	Dimension
105	AG9H006340008	Cover	
106	221000000G459	O-ring	G-45
107	BG00000062050	Ball bearing	6205
108	AG9H00633B003	Spline shaft	
109	2170000STW307	Snap ring	STW-30
110	AE9H000470008	Gear	M2.5 x 32T
111	AE9H000480009	Gear	M2.5 x 44T
112	AJ9H007450004	Distance collar	
113	AE9H000490000	Washer	
114	AE9H000500008	Spacer	
115	21021M0802001	Hexagon socket bolt	M8 x 20L
116	AE9H001610005	Housing	
117	2200TC3552123	Oil seal	TC-35-52-12
118	AE9H000530001	Spline shaft	
119	218000707030 4	Key	7 x 7 x 30L
120	21021M1004000	Hexagon socket bolt	M10 x 40L
121	21502M1000208	Washer	M10x 2T
122	AE9H00054A005	Spacer	
123	AE9H000540101	Packing	
124	AE9H000560004	Gear	M2.5 x 32T
125	AJ9H00742B106	Name plate	40"

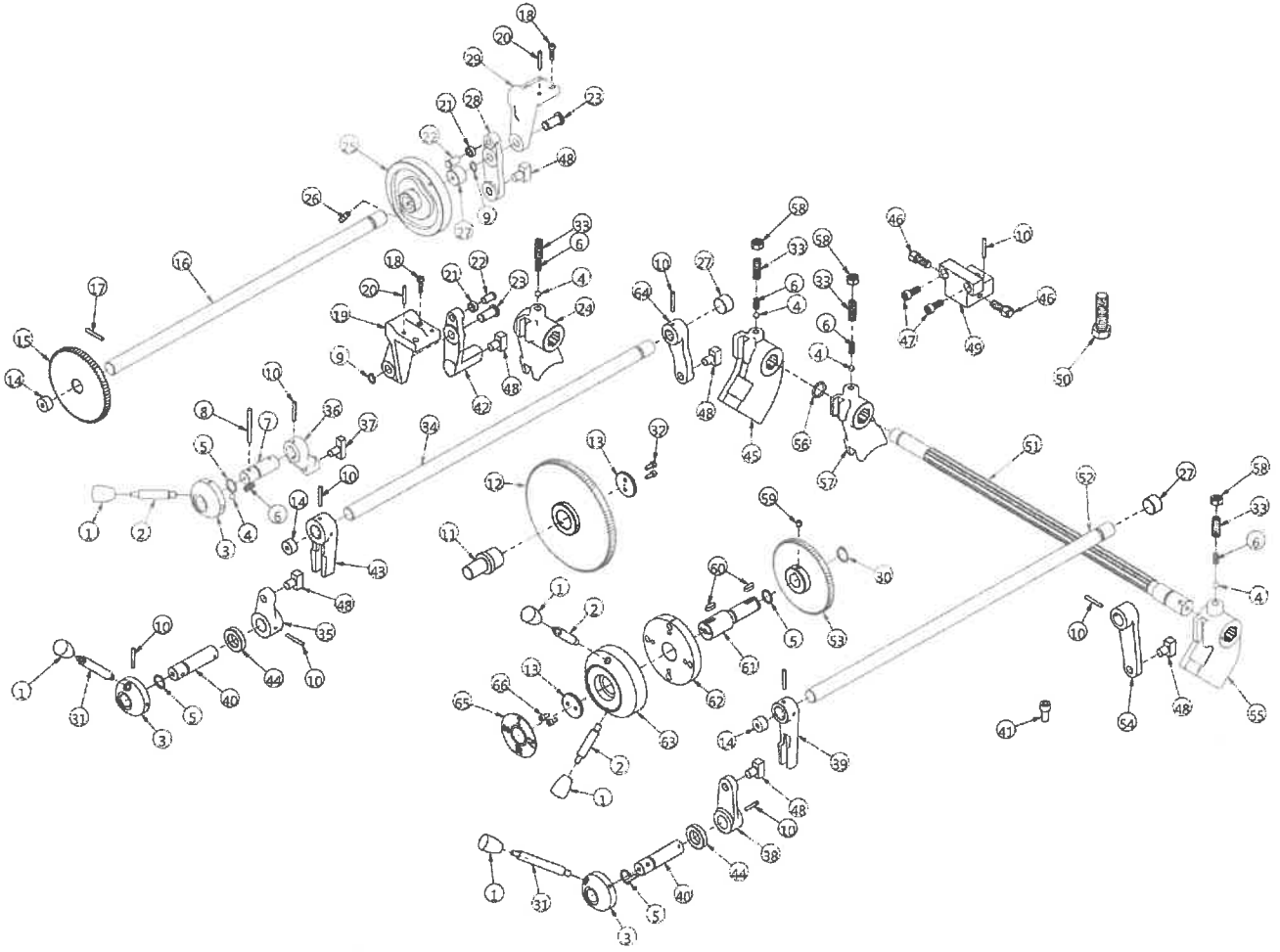


HEADSTOCK II - HPX

Diagram on page 56A

No.	Part No	Part Name	Dimension
1	AB9H100770001	Grip	
2	AE9H001320005	Lever	
3	AE9H00133B002	Handle boss	
4	2804003D00009	Steel ball	3/8"
5	221000000P210	O ring	P-21
6	AE9H000820001	Spring	
7	AE9H00134A000	Shaft	
8	219300060700 0	Taper pin	Φ6 x 70L
9	217000STW154	Snap ring	STW-15
10	219500050400 8	Taper pin	Φ5 x 40L
11	AJ9H00757A006	Shaft	
12	AJ9H00758A007	Gear	M2 x 105T
13	AJ9H007540000	Cover	
14	AG9H006380002	Plug	
15	AG9H001020109	Gear	M2 x 70T
16	AJ9H007360008	Shaft	
17	219300060400 1	Taper pin	Φ6 x 40L
18	21021M0602502	Hexagon socket bolt	M6 x 25L
19	AE9H00113B008	Lever supporter	
20	219500060350 7	Taper pin	Φ6 x 35L
21	AE9H001090001	Roller	
22	AE9H001080000	Pin	
23	AE9H001060008	Pin	
24	AE9H001150004	Shifter	
25	AJ9H007430002	Cam	
26	21041M0803008	Hexagon socket set screw	M8 x 30L
27	AE9H001040006	Plug	
28	AE9H00107B005	Lever	
29	AE9H00105B003	Lever supporter	
30	2170000STW253	Snap ring	STW-25
31	AE9H000750008	Lever	
32	21021M0601509	Hexagon socket bolt	M6 x 15L

No.	Part No	Part Name	Dimension
33	2104101B1A1B4	Hexagon socket set screw	W1/2" x 1 1/2"L
34	AJ9H007350007	Shaft	
35	AJ9H007610004	Lever	
36	AE9H00139A005	Lever	
37	AE9H001400000	Sliding piece	
38	AE9H00126A005	Lever	
39	AG9H001280109	Lever	
40	AJ9H007590005	Shaft	
41	AE9H001490009	Knock pin	
42	AE9H00114B009	Lever	
43	AJ9H007620005	Lever	
44	AJ9H007600003	Washer	
45	AE9H001210007	Shifter	
46	AF9H001220001	Special bolt	
47	2100101B1A3C1	Hexagon bolt	W1/2" x 1 3/4"L
48	AE9H001100009	Sliding piece	
49	AF9H001210000	Adjusting metal	
50	AE9H001640008	Hexagon bolt	
51	AG9H006390003	Spline shaft	
52	AJ9H007350007	Shaft	
53	AJ9H007560002	Gear	M2 x 70T
54	AG9H001300108	Lever	
55	AG9H006370001	Shifter	
56	221000000P241	O ring	P-24
57	AE9H001120001	Shifter	
58	2130101B01009	Hexagon bolt	
59	21041M0801002	Set screw	M8 x 10L
60	218000707020 5	Key	7 x 7 x 20L
61	AJ9H007530009	Shaft	
62	AJ9H007510007	Cover	
63	AJ9H007520008	Handle boss	
64	AG9H001200101	Lever	
65	AJ9H00755A004	Name plate	
66	21021M0601202	Hexagon socket bolt	M6 x 12L



Feed Gear Box I

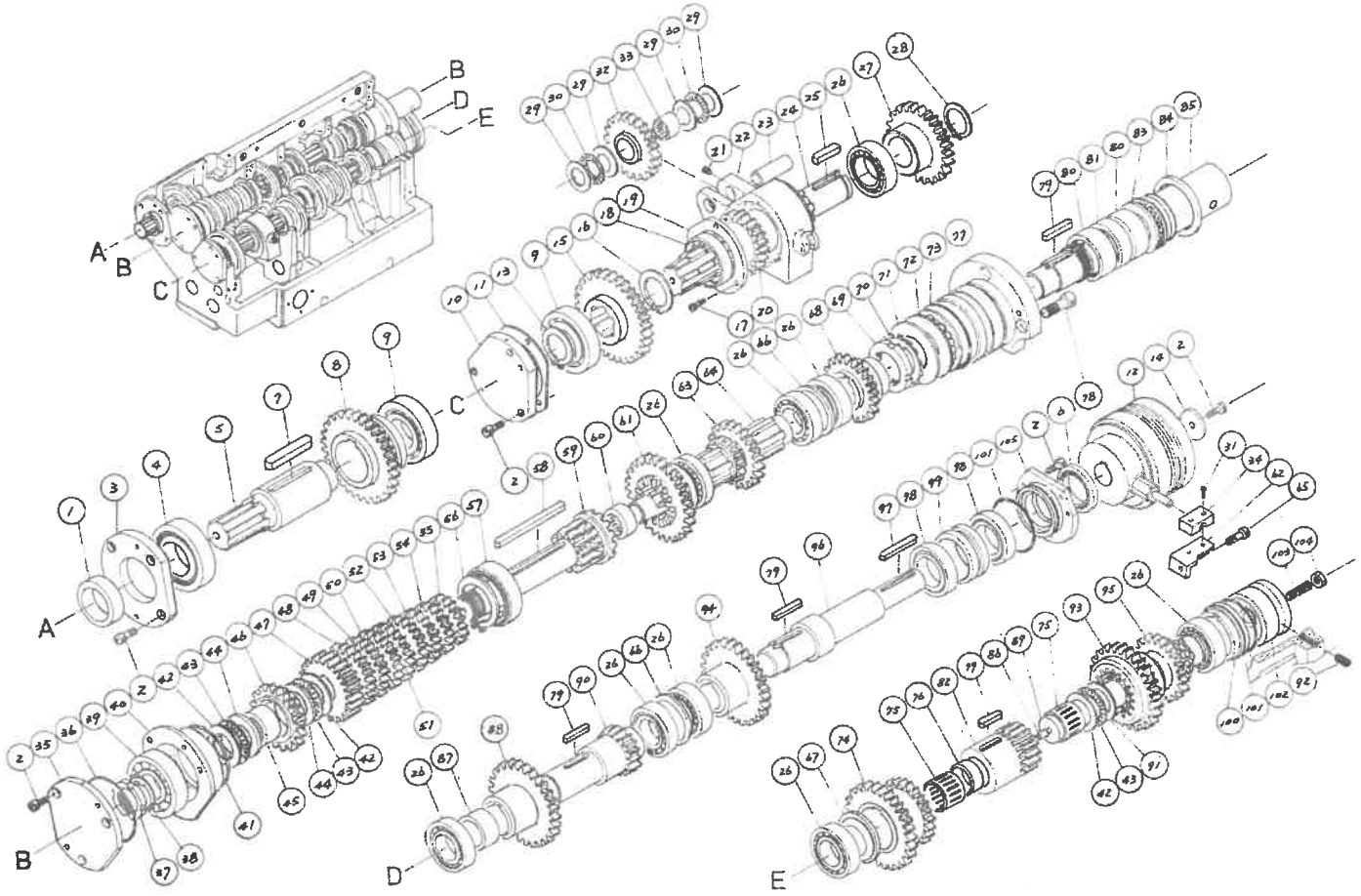
Diagram on page 60A

No.	Part No	Part Name	Dimension
1	AE9F002090006	Collar	
2	21021M0601509	Hexagon socket bolt	M6×15L
3	AE9F002070004	Cover	
4	BG00000062081	Ball bearing	6208
5	AE9F002120006	Shaft	
6	22000TB354882	Oil seal	TB35488
7	2180012080709	Key	12×8×70L
8	AE9F002110005	Spur gear	M2.75×39T
9	BG00000062074	Ball bearing	6207
10	AE9F002270008	Cover	
11	AE9F002270107	Packing	
12	29000JKA25SK0	Dry electromagnetic clutch	MDC2.5
13	2170000STW352	Snap ring	STW35
14	AE9F002490004	Collar	
15	AE9F002280009	Spur gear	M2.75×39T
16	2170000STW383	Snap ring	STW38
17	21021M0401000	Hexagon socket bolt	M4×10L
18	BG000HMK50129	Needle bearing	HMK5012
19	AE9F002290000	Housing	
20	AE9F002300008	Spur gear	M2.75×24T
21	21041M0600807	Hexagon socket set screw	M6×8L
22	AE9F002310009	Bracket	
23	AE9F002320000	Shaft	
24	AE9F002360004	Spline shaft	
25	2180010080350	Key	10×8×35L
26	BG00000062067	Ball bearing	6206
27	AE9F002350003	Spur gear	DP16×58T
28	2170000STW307	Snap ring	STW30
29	BG0000AS11030	Thrust washer	AS1103
30	BG000AXK11034	Thrust bearing	AXK1103
31	2113203E003D4	Cross recessed round head	W 3/16"ø×3/8"L
32	AE9F002330001	Spur gear	M2.75×28T

No.	Part No	Part Name	Dimension
33	BG000HMK17157	Needle bearing	HMK1715
34	29000JKA25SK0	Clutch stopper	
35	AE9F002130007	Cover	
36	221000000G657	O ring	G65
37	20200AN06P157	Nut	AN06
38	20100000AW063	Washer	AW06
39	BG000006306Z4	Ball bearing	6306Z
40	AE9F002140008	Housing	
41	221000000G800	O ring	G80
42	BG0000AS11061	Thrust washer	AS1106
43	BG000AXK11065	Thrust bearing	AXK1106
44	BG000GS811067	Thrust washer	GS81106
45	BG000HMK30202	Needle bearing	HMK3020
46	AE9F002150009	Spur gear	M2.75×28T
47	AE9F002160000	Spur gear	M2.75×28T
48	AE9F002170100	Spur gear	M2.75×27T
49	AE9F002170209	Spur gear	M2.75×26T
50	AE9F002170308	Spur gear	M2.75×24T
51	AE9F002170407	Spur gear	M2.75×23T
52	AE9F002170506	Spur gear	M2.75×22T
53	AE9F002170605	Spur gear	M2.75×20T
54	AE9F002170704	Spur gear	M2.75×19T
55	AE9F002170803	Spur gear	M2.75×18T
56	2170000STW50	Snap ring	STW50
57	BG00SL0249102	Cylindrical roller bearing	SL02-4910
58	2180007071055	Key	7×7×105L
59	AE9F002180002	Shaft with gear	
60	BG0000NK24161	Needle bearing	NK2416
61	AE9F002200001	Gear with clutch	
62	AE9FA01110007	Clutch stopper base	
63	AE9F002210002	Spur gear	M2.5×20T,30T
64	AE9F002220003	Spline shaft	
65	21021M0601004	Hexagon socket bolt	M6×10L
66	AE9F002430008	Collar	
67	AE9F002510003	Thrust collar	
68	AE9F002230004	Spur gear	M2.5×30T

No.	Part No	Part Name	Dimension
69	20200AN08P159	Nut	AN08
70	20100000AW087	Washer	AW08
71	AE9F002250204	Inner race for thrust bearing	
72	BG00000812082	Thrust bearing	81208
73	221000000G701	O ring	G70
74	AE9F002520004	Spur gear	M2.5×30T,40T
75	BG000K3035278	Needle bearing	K30×35×27
76	AE9F002540006	Collar	
77	AE9F002260007	Housing	
78	2102101B001A9	Hexagon socket bolt	W½"ø×1"L
79	2180007070403	Key	7×7×40L
80	BG0000NK40208	Needle bearing	NK4020
81	AE9F002240005	Collar	
82	AE9F002530005	Spur gear	M2.5×20T
83	BG00000811089	Thrust washer	81108
84	22000OS556743	Oil seal	OS55674
85	AE9F002250006	Shaft	
86	AE9F002580109	Bush	
87	AE9F002400005	Collar	
88	AE9F002410006	Spur gear	M2.5×40T
89	AE9F002580000	Spline shaft	
90	AE9F002420007	Shaft with gear	M2.5×20T
91	BG000WS811065	Thrust washer	WS81106
92	21041M0802500	Hexagon socket bolt	M8×25L
93	AE9F002550007	Spur gear	M2.5×20T,40T
94	AE9F002440009	Spur gear	M2.5×40T
95	AE9F002210002	Spur gear	M2.5×20T,30T
96	AE9F002500002	Shaft	
97	2180008080502	Key	8×8×50L
98	BG000006007Z0	Ball bearing	6007Z
99	AE9F002450000	Collar	
100	AE9F002560008	Bearing retainer	
101	221000000G558	O ring	G55
102	AE9F002570009	Bearing retainer	
103	2104103D1A1B6	Hexagon socket set screw	W ⅜"ø×1½"L
104	2130103D00800	Hexagon nut	W ⅜"ø

No.	Part No	Part Name	Dimension
105	AE9F002470002	Cover	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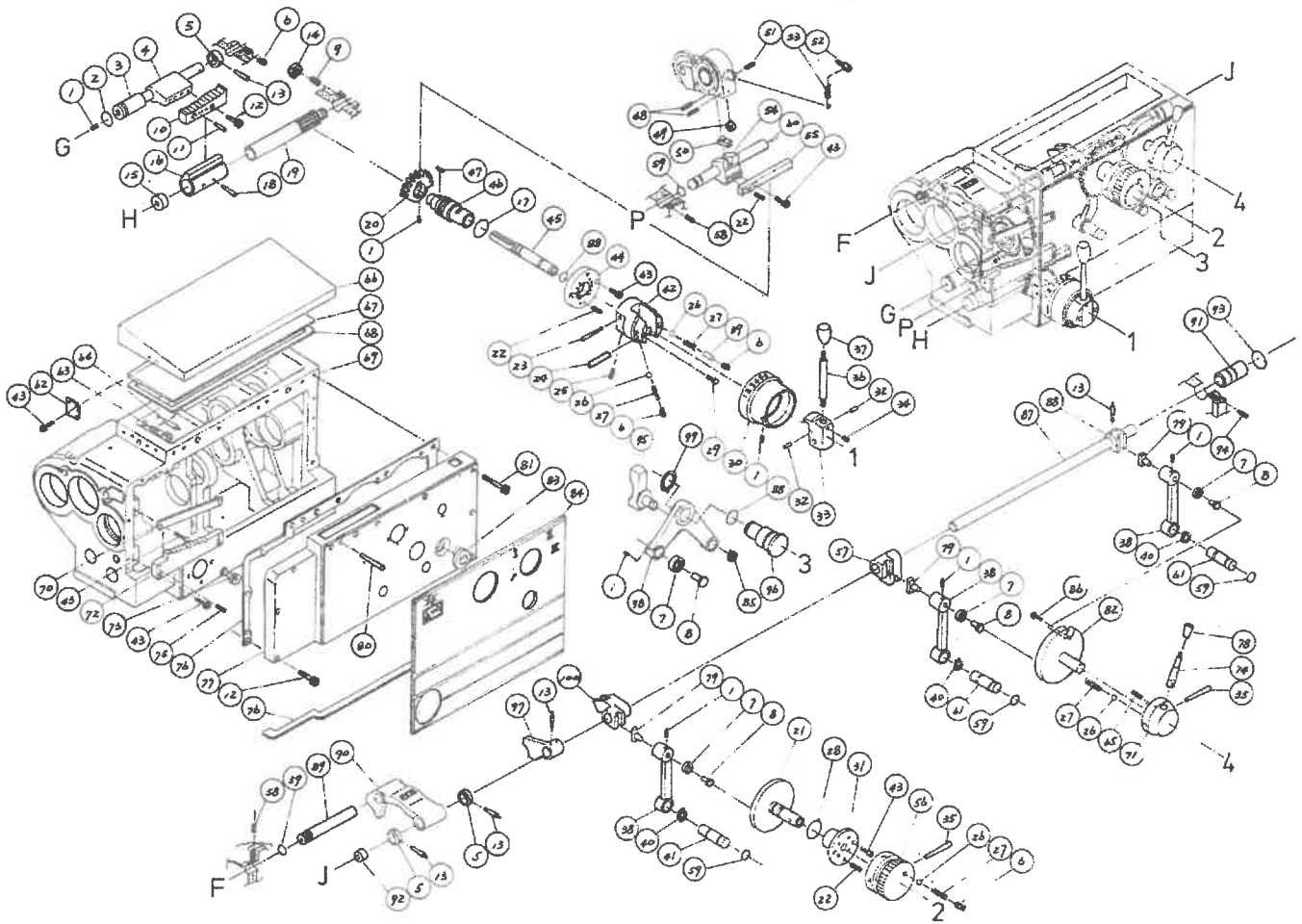
FEED GEAR BOX II

Diagram on page 64A

No.	Part No	Part Name	Dimension
1	21041M0600807	Hexagon socket set screw	M6×8L
2	221000000G251	O ring	G25
3	AE9F002770003	Clamping bolt	
4	AE9F002780004	Clamping lever	
5	AE9F002800003	Collar	
6	2104103D001A5	Hexagon socket set screw	W ⅜"ø×1"L
7	AE9F002940004	Roller	
8	AE9F002930003	Pin	W ⅜"ø×38L
9	AE9F002741A02	Hexagon socket set screw	
10	AE9F002790005	Clamping plate	
11	2191000503007	Spring pin	5ø×30L
12	21021M0803004	Hexagon socket bolt	M8×30L
13	2195000503500	Taper pin	5ø×35L
14	2130103D00800	Hexagon nut	W ⅜"ø
15	AE9F002760002	Blind plug	
16	AE9F002750001	Clamping lever	
17	221000000P340	O ring	P34
18	2193000704504	Taper pin	7ø×45L
19	AE9F002740000	Clamping shaft	
20	AE9F002700006	Segment gear	M1.5×60T
21	AE9F002920002	Cam	
22	2191000402007	Spring pin	4ø×20L
23	2193000505502	Taper pin	5ø×55L
24	2192001005509	Pin	10ø×55L
25	2104103D003D4	Hexagon socket set screw	W ⅜"ø× ⅜"L
26	2804005E00004	Steel ball	5⁄16"ø
27	AE9F002660005	Spring	
28	221000000P364	O ring	P36
29	AE9F002650004	Pin	
30	AE9F002630002	Scale ring	
31	AE9F002910001	Bush	
32	AE9F002610208	Pin	8ø×10L

No.	Part No	Part Name	Dimension
33	AE9F002610000	Handle boss	
34	21041M0600609	Hexagon socket set screw	M6×6L
35	2193000607000	Taper pin	6ø×70L
36	AF9H000790004	Lever	
37	AB9H100770001	Grip	
38	AE9F002950005	Lever	
39	2192000802804	Pin	8ø×28L
40	2170000STW208	Snap ring	STW20
41	AE9F002960006	Shaft	
42	AE9F002640003	Handle boss	
43	21021M0601509	Hexagon socket bolt	M6×15L
44	AE9F002670006	Plate	
45	AE9F002680007	Shaft with rack	
46	AE9F002690008	Sleeve	
47	2180005050106	Key	5×5×10L
48	2191000302406	Spring pin	3ø×24L
49	AE9F002380006	Pin	
50	AE9F002390007	Slide piece	
51	2191000302000	Spring pin	3ø×20L
52	AE9F003150008	Special screw	
53	AE9F00237A008	Tension spring	
54	AE9F002720008	Shifter	
55	AE9F002710007	Rack	
56	AE9F002900000	Grip	
57	AE9F002860009	Shifter	
58	21041M0801507	Hexagon socket set screw	M8×15L
59	221000000P166	O ring	P16
60	AE9F002730009	Shaft	
61	AE9F003040000	Shaft	
62	AE9F003070003	Fitting plate	
63	2102101B1A1B0	Hexagon socket bolt	W1/2"ø×1 1/2"L
64	2195000804504	Taper pin	8ø×45L
66	AE9F002040001	Top cover	
67	AE9F00206A006	Cover	
68	AE9F002040100	Packing	

No.	Part No	Part Name	Dimension
69	AE9F002010008	Feed box body	
70	AE9F003060002	Guide plate	
71	AE9F003010007	Handle boss	
72	AE9F003050001	Sub clamp plate	
73	2102101B8A1C4	Hexagon socket bolt	W1/2"ø×81/4"L
74	AD9F000690007	Lever	
75	2191000602001	Spring pin	6ø×20L
76	AE9F002020108	Packing	
77	AE9F002020009	Front cover	
78	AB9H100770001	Grip	
79	AE9F002970007	Pawl	
80	2196000706500	Taper pin	7ø×65L
81	21021M0806003	Hexagon socket bolt	M8×60L
82	AE9F003030009	Cam	
83	AB9A000770001	Oil window	
84	AE9F002030000	Name plate	
85	2170000STW123	Snap ring	STW12
86	21021M0401000	Hexagon socket bolt	M4×10L
87	AE9F002880001	Shaft	
88	AE9F002870000	Shifter	
89	AE9F002810004	Shaft	
90	AE9F002820005	Shifter	
91	AE9F002890002	Bush	
92	AE9F002830006	Blind plug	
93	221000000P296	O ring	P29
94	21041M0801002	Hexagon socket set screw	M8×10L
95	AE9F003000006	Pawl	
96	AE9F002990009	Shaft	
97	AE9F002840007	Shaft	
98	AE9F002980008	Lever	
99	2170000STW154	Snap ring	STW15
100	AE9F002850008	Shifter	



APRON

Diagram on page 70A

No.	Part No	Part Name	Dimension
1	AE9EF00010009	Feed rod	2000 Type
	AE9EF00010108		3000 Type
	AE9EF00010207		4000 Type
	AE9EF00010306		5000 Type
	AE9EF00010405		6000 Type
	AE9EF00010504		7000Type
2	22000SB426094	Oil seal	SB42609
3	21021M0602007	Hexagon socket bolt	M6×20L
4	AE9A000870007	Housing	
5	BG0000NK43207	Needle bearing	NK4320
6	AE9A000890009	Spacer	
7	AE9A000880008	Special key	
8	AE9A000880107	Special Key	
9	21041M0801200	Hexagon socket set screw	M8×12L
10	AE9A000020105	Adjusting bolt	
11	2191000601602	Spring pin	6ø×16L
12	AE9A00002A009	Gib (left)	
	AE9A00002B002	Gib (right)	
13	21041M0802500	Hexagon socket set screw	M8×25L
14	AE9A00001A008	Apron body	
15	AE9A000710103	Bracket for half nut	
16	AE9A000720203	Stop pin	
17	AE9A000710202	Half nut	2 T.P.I
	AE9A000710301		P=12mm
18	AE9A000030007	Bushing	
19	AE9A000820002	Joint	
20	AE9A000810001	Half nut pin	
21	AB9A000900008	Pin	
22	AE9A00073A009	Shaft	
23	AE9A00079A005	Lever	
24	AE9A000770000	Bushing	
25	AE9A00076A002	Handle boss	

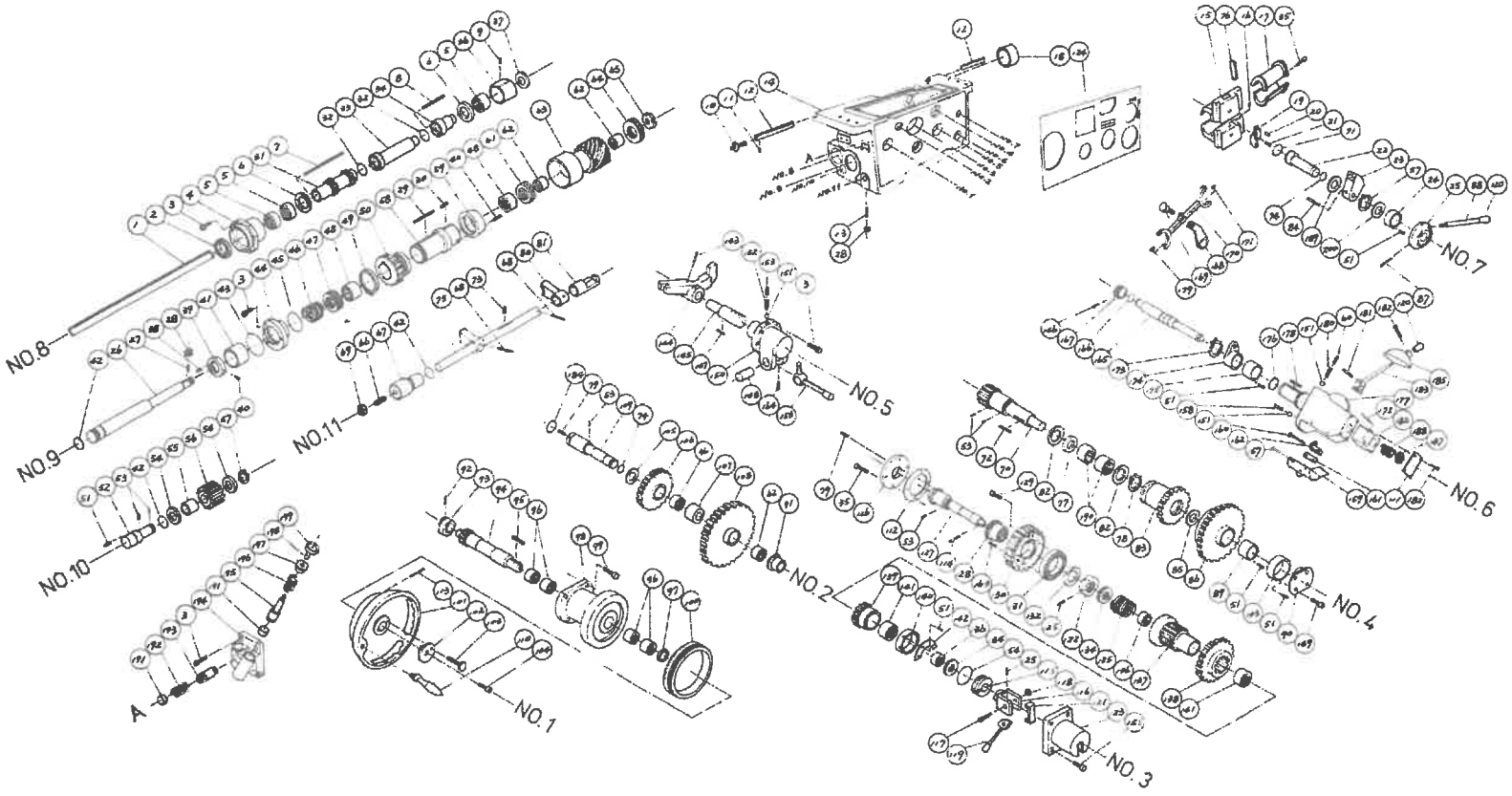
No.	Part No	Part Name	Dimension
26	AE9A000950002	Shaft	
27	AE9A00127000	Hexagon socket set screw	M8×40L
28	21301M0800657	Hexagon nut	M8
29	2180007070700	Key	7×7×70L
30	2180005050151	Key	5×5×15L
31	AE9A000900007	Gear	M2.5×20T
32	221000000P401	O ring	P40
33	AE9A000910008	Collar	
34	AE9A000920009	Collar	
35	21021M0601509	Hexagon socket bolt	M6×15L
36	AE9A000930000	Bushing	
37	22000SB405594	Oil seal	SB40559
38	AE9A000960102	Set screw	
39	AE9A000960003	Round nut	
40	21041M0600807	Hexagon socket set screw	M6×8L
41	AE9A000970004	Collar	
42	221000000P241	O ring	P24
43	221000000P456	O ring	P45
44	AE9A000980005	Housing	
45	221000000P494	O ring	P49
46	AE9A000990006	Spring	
47	BG00000511064	Thrust bearing	51106
48	BG0000HK30265	Needle bearing	HK3026
49	2170000STW505	Snap ring	STW50
50	AE9A001020005	Gear	M2.5×32T
51	21041M0801002	Hexagon socket set screw	M8×10L
52	AE9A001050008	Shaft	
53	2192000300605	Pin	3ø×6L
54	AE9A001060009	Spacer	
55	AE9A001080001	Bushing	
56	AE9A001070000	Gear	M2.5×20T
57	2170000STW253	Snap ring	STW25
58	AE9A001000003	Shaft	
59	AE9A001010004	Taper bushing	
60	2104103D001A5	Hexagon socket set screw	W ⅜"ø× 1"L
61	BG00000511057	Thrust bearing	51105

No.	Part No	Part Name	Dimension
62	BG0000HK25269	Needle bearing	HK2526
63	AE9A00103B002	Worm gear	
64	BG00000512050	Thrust bearing	51205
65	20200AN04P100	Nut	AN04
66	2104103D1A1C3	Hexagon socket set screw	W3⁄8"ø×1 1⁄4"L
67	AE9A001110001	Bushing	
68	2195000503203	Taper pin	5ø×32L
69	2130103D00800	Hexagon nut	W3⁄8"ø
70	AE9A000410102	Pinion shaft	DP10×14T
	AE9A000410201		M2.5×14T
71	221000000P340	O ring	P34
72	2180007070458	Key	7×7×45L
73	AE9A001290006	Hexagon socket set screw	M10×23L
74	221000000P210	O ring	P21
75	AE9A001100000	Shaft	
76	AE9A000720104	Gib	
77	220000G283743	Oil seal	G28ø×37ø×4
78	2170000STW284	Snap ring	STW28
79	21041M0800801	Hexagon socket set screw	M8×8L
80	AE9A001120002	Shifter	
81	AE9A00113A006	Bushing	
82	AE9A000490001	Spacer	
83	AE9A000460008	Gear	M2×51T
84	2195000503500	Taper pin	5ø×35L
85	AE9A000470009	Spacer	
86	AE9A000420004	Gear	M2.5×66T,M2×51T
87	2193000607000	Taper pin	6ø×70L
88	AE9A000750008	Handle lever	
89	AE9A000450007	Bushing	
90	AE9A000430005	Cover	
91	AE9A00020A001	Bushing	
92	2193000403004	Taper pin	4ø×30L
93	AE9A00014A008	Cam	
94	AE9A00013A007	Shaft with gear	M2.5×15T
95	2180007070250	Key	7×7×25L
96	BG0000HK25207	Needle bearing	HK2520

No.	Part No	Part Name	Dimension
97	220000G253245	Oil seal	G25324
98	AE9A00008A005	Bracket	
99	2102103D001A1	Hexagon socket bolt	W⅜"ø×1"L
100	AE9A00012A006	Micro collar	.005"
	AE9A000120102		0.1mm
101	AE9A000050009	Handle wheel	
102	AE9A000110002	Washer	
103	AE9A000100001	Clamping bolt	
104	21021M0802506	Hexagon socket bolt	M8×25L
105	AE9A000160007	Spacer	
106	AE9A000190000	Gear	M2×56T
107	AE9A000180009	Bushing	
108	AE9A000170008	Gear	M2.5×70T
109	AE9A000151A08	Shaft	
110	AB3A00001A005	Grip	
111	AE9A00058A109	Cover	
112	AE9A000380102	Packing	
113	AE9A000090003	Pin	
114	2193000502503	Taper pin	5ø×25L
115	AE9A00029A000	Collar	
116	AE9A00030A008	Lever holder	
117	AE9A000270005	Crank pin	
118	21301M1000803	Hexagon nut	M10
119	AE9A00026A007	Lever	
120	AB9H100770001	Grip	
121	AE9A000280006	Clamping plate	
122	AE9A000330206	Round nut	
123	AE9A00022A003	Cover	
124	AE9A00118B004	Name plate	
125	21041M0500800	Hexagon socket set screw	M5×8L
126	AE9A00038B009	Cover	
127	AE9A00023B007	Shaft	
128	BG00000NKX257	Thrust and needle bearing	NKX25
129	21021M0801206	Hexagon socket bolt	M8×12L
130	AE9A00025C002	Worm wheel	
131	AE9A00037A005	Clutch	

No.	Part No	Part Name	Dimension
132	AE9A00033A001	Spacer	
133	AE9A000440006	Bushing	
134	BG00000511040	Thrust bearing	51104
135	AE9A00036A004	Spring	
136	BG0000HK20202	Needle bearing	HK2020
137	AE9A00024A005	Clutch with gear	M2.5×22T
138	AE9A00035B006	Gear	M2×59T,M2.5×22T
139	AE9A00034A002	Gear	M2.5×22T
140	AE9A00031A009	Bushing	
141	BG0000HK35028	Needle bearing	HK3520
142	AE9A00032A000	Washer	
143	2195000505001	Taper pin	5ø×50L
144	AE9A00052A004	Shifter	
145	AE9A00053A005	Shaft	
146	2193000502503	Taper pin	5ø×25L
147	2180007125172	Special key	7×12.5×17L
148	AE9A000550004	Pin	
149	21122M0601509	Cross recessed flat head screw	M6×15L
150	AE9A000510000	Bracket	
151	2804005E00004	Steel ball	5/16"ø
152	AE9A001240001	Spring	
153	2104103D003D4	Hexagon socket set screw	W 3/8"ø×3/8"L
154	221000000P449	O ring	P44
155	21021M0802001	Hexagon socket bolt	M8×20L
156	AE9A000560005	Lever	
157	21132M0400806	Cross recessed round head	M4×8L
158	AE9A001230000	Spring	
159	AE9A000600006	Limit stand	
160	2113205G001A7	Cross recessed round head	W5/32"ø×1"L
161	AE9A000600006	Isolator	
162		Micro switch	
163	2191000502004	Spring pin	5ø×20L
164	21041M0601503	Hexagon socket set screw	M6×15L
165	AE9A000610007	Slide rod	
166	221000000P111	O ring	P11
167	AE9A000680004	Guide ring	

No.	Part No	Part Name	Dimension
168	AE9A00080A003	Bracket	
169	AE9A00084A007	Special bolt	
170	AE9A00074A000	Shifter	
171	AE9A000850005	Jaw	
172	AE9A000650001	Pin	
173	2170000STW307	Snap ring	STW30
174	AE9A00067A006	Shifter	
175	AE9A00066A005	Bushing	
176	221000000P302	O ring	P30
177	AE9A00058B003	Bracket	
178	2180005050205	Key	5x5x20L
179	AE9A000850100	Jaw	
180	AE9A001220009	Spring	
181	AE9A000640000	Pin	
182	2114201D001C1	Cross recessed round head	W⅛"ø×¼"L
183	AE9A000590008	Handle lever	
184	221000000P265	O ring	P26
185	AE9A000690005	Cover	
186	AE9A000630009	Stopper	
187	21301M1201008	Hexagon nut	M12
188	AE9A000620008	Spring	
189	AE9A000780001	Spacer	
190	BG000NK2820R8	Needle bearing	NK2820R
191	AB9A000820003	Plug	
192	AB9A00061A001	Spring	
193	AB9A00062A002	Pin	
194	AB9A00063A003	Pump body	
195	AB9A000590009	Shaft	
196	AB9A000850006	Spring	
197	AB9A000600007	Adjusting bolt	
198	2193000301506	Taper pin	3ø×15L
199	AB9A000580008	Grip	
200	AE9A000780100	Spacer	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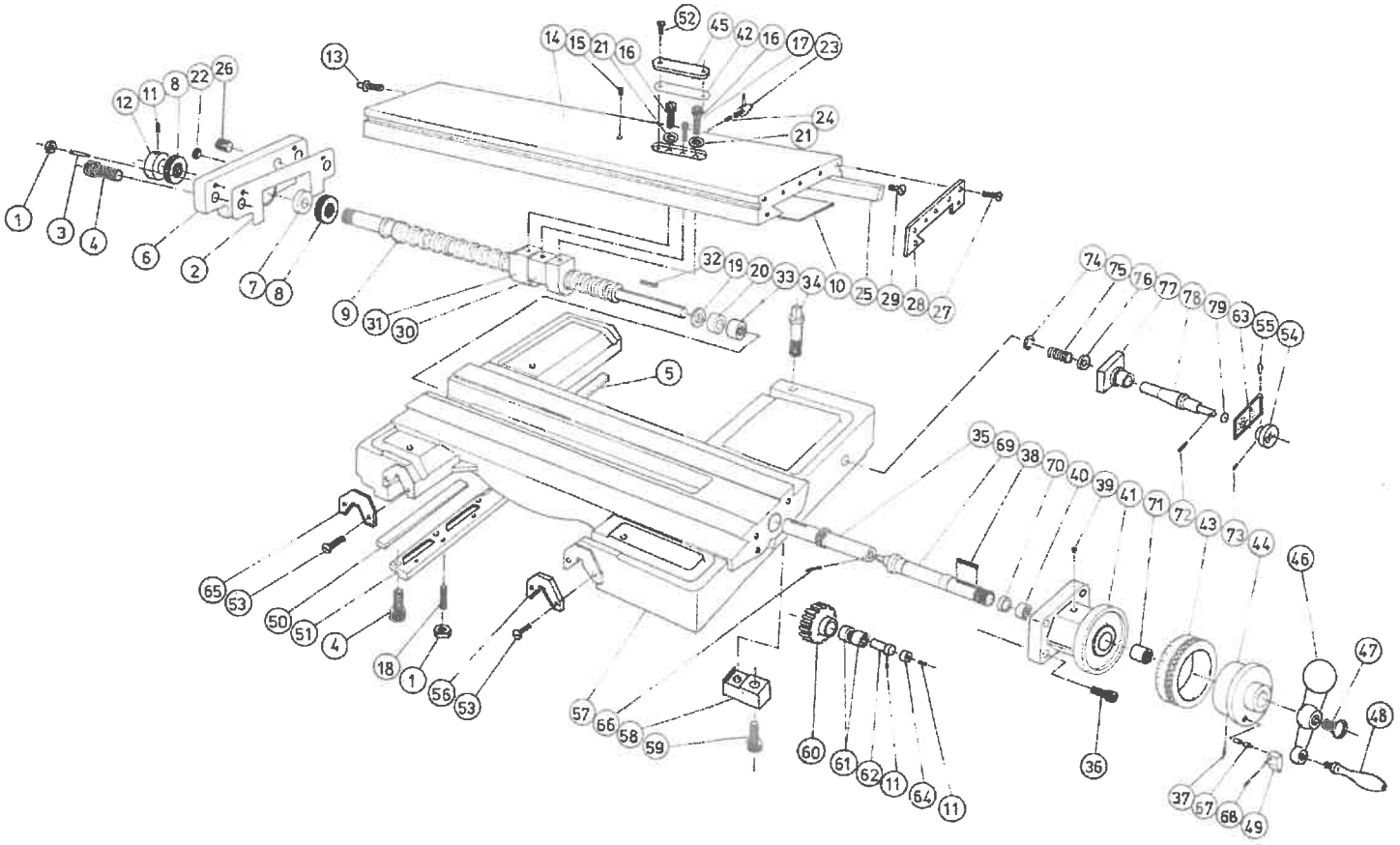
CARRIAGE

Diagram on page 74A

No.	Part No	Part Name	Dimension
1	21301M0800657	Hexagon nut	M8
2	AE9C002180001	Packing	
3	2195000805002	Taper pin	8ø×50L
4	2102101B1A1C7	Hexagon socket bolt	W1/2"ø×1/4"L
5	AE9C002280008	Bottom gib	
6	AE9C002170000	Bracket	
7	22000SB152872	Oil seal	SB15287
8	BG00000511029	Thrust bearing	51202
9	AE9C002130006	Male screw	5 T.P.I
	AE9C002130105		P=5mm
10	AE9C002520003	Cover	
11	21041M0801002	Hexagon socket set screw	M8×10L
12	AE9C000200002	Round nut	
13	AE9C000370006	Adjusting bolt	
14	AE9C002020008	Cross slide	
15	21041M0800801	Slotted set screw	M8×8L
16	2102101B003C1	Hexagon socket bolt	W1/2"ø×¾"L
17	21021M0802506	Hexagon socket bolt	M8×25L
18	21041M0804001	Hexagon socket set screw	M8×40L
19	22000SB283882	Oil seal	SB28388
20	AE9C002460000	Bushing	
21	2150101B00233	Washer	W½"ø
22	1500101500001	Oil window	15ø
23	AB9LP00230203	Special bolt	
24	AE9C002220002	Pin	
25	AE9C002230003	Gib	
26	4151003DPT109	Bolt	⅜"øPT×10L
27	21122M0601509	Cross recessed flat head screw	M6×15L
28	AE9C00225B001	Felt cover	
29	AE9C000360005	Adjusting bolt	
30	AE9C002140007	Wedge	
31	AE9C002150008	Female screw	5 T.P.I

No.	Part No	Part Name	Dimension
	AE9C002150107		P=5mm
32	2180005100207	Key	5×10×20L
33	BG000HMK29208	Needle bearing	HMK2920
34	AE9C000070005	Special bolt	
35	AE9C002110004	Shaft with gear	M2×16T
36	2102103D001A1	Hexagon socket bolt	W⅜"ø×1"L
37	AE9C002070003	Pin	
38	2180005050809	Key	5×5×80L
39	2803005E00007	Oil cup	5/16"
40	BG0000HK25160	Needle bearing	HK2516
41	AE9C002090005	Bracket	
42	AE9C00220000	Packing	
43	AE9C002080004	Micro collar	0.025mm(P=5mm)
	AE9C00208A007		.001"(5 T.P.I)
44	AE9C002040000	Lock metal micro collar	
45	AE9C002190002	Cover	
46	AE9C002030009	Handle grip	
47	AE9C000240006	Set screw for handle grip	
48	AB3A00001A005	Grip	
49	AE9C002050001	Adjusting plate	
50	AE9C002270007	Bottom gib	
51	AE9C002260006	Lock plate	
52	21122M0501007	Cross recessed flat head screw	M5×10L
53	21132M0601506	Cross recessed round head	M6×15L
54	AE9C002390006	Cover	
55	AE9C002400004	Indicator	
56	AE9C00233BR08	Felt cover	
	AE9C00233BL04		
57	AE9C002010007	Carriage	
58	AE9C002290009	Lock plate	
59	2102103D003C3	Hexagon socket bolt	W⅜"ø×¾"L
60	AE9C002310008	Gear	M2×40T
61	BG0000HK18168	Needle bearing	HK1816
62	AE9C000400002	Shaft	
63	AE9C002490003	Name plate	
64	AE9C000050003	Plug	

No.	Part No	Part Name	Dimension
65	AE9C00235B008	Felt cover	
66	2193000502800	Taper pin	5ø×28L
67	AE9C002060002	Special pin	
68	2191000301205	Spring pin	3ø×12L
69	AE9C002100003	Shaft	
70	220000G253245	Oil seal	G25324
71	BG0000HK25207	Needle bearing	HK2520
72	2191000301007	Spring pin	3ø×10L
73	21041M0500602	Hexagon socket set screw	M5×6L
74	21700000ETW86	Snap ring	ETW6
75	AE9C002420006	Spring	
76	AE9C002430007	Washer	
77	AE9C002440008	Base	
78	AE9C002410005	Special pin	
79	221000000P128	O ring	P12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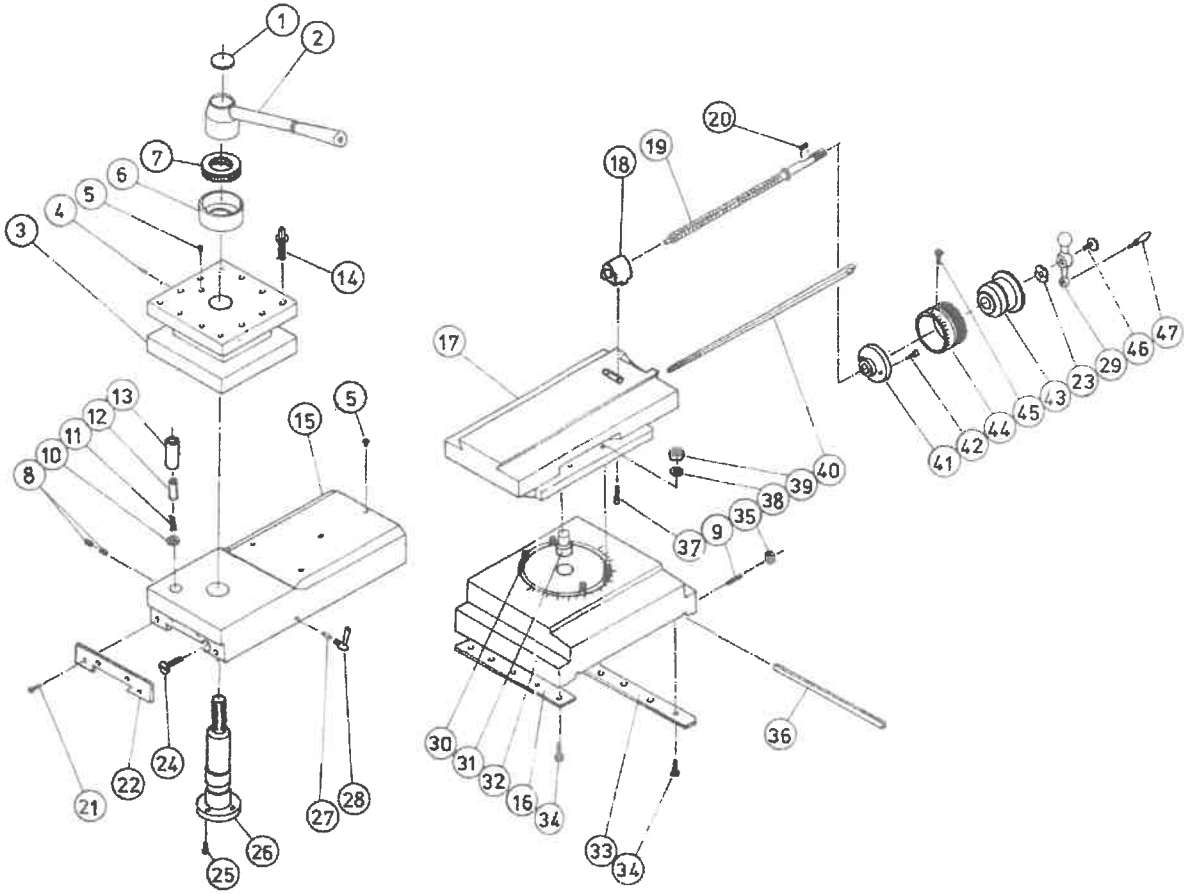
TOOL SLIDE

Diagram on page 76A

No.	Part No	Part Name	Dimension
1	AE9TO02340005	Plate	
2	AE9TO02110008	Lever	
3	AE9TO02080008	Square turret tool post	
4	AE9TO02080107	Plug	
5	2803005E00007	Oil cup	5/16"
6	AE9TO02090009	Spacer	
7	BG00000512067	Thrust bearing	51206
8	21041M0801002	Hexagon socket set screw	M8×10L
9	21041M0803008	Hexagon socket set screw	M8×30L
10	AE9TO00040006	Washer	
11	AE9TO00150004	Coil spring	
12	AE9TO00140003	Knob	
13	AE9TO02030003	Bushing	
14	AE9TO0210A000	Headed bolt	
15	AE9TO02020002	Tool slide	
16	AE9TO02170004	Clamping plate	
17	AE9TO02010001	Tool slide base	Swing 30",34",40"
	AE9TO02230007		Swing 25"
18	AE9TO00160005	Female screw	5 T.P.I
	AE9TO00160104		P=5mm
19	AE9TO00170006	Male screw	5 T.P.I
	AE9TO00170105		P=5mm
20	2180005050281	Key	5×5×28L
21	21122M0601509	Cross recessed flat head screw	M6×15L
22	AE9TO0214B007	Felt cover	
23	AE9TO02070007	Nut	
24	AE9TO00130002	Adjusting bolt	
25	21021M0802506	Hexagon socket bolt	M8×25L
26	AE9TO02040004	Shaft	
27	AE9TO00110000	Clamping pin	
28	AB9LP00230203	Special bolt	
29	AE9TO00220008	Grip handle	

No.	Part No	Part Name	Dimension
30	AE9TO02120009	Special bolt	
31	AE9TO00070009	Pin	
32	AE9TO02220006	Slide base	Swing 25"
	AE9TO02190006		Swing 30"
	AE9TO02200004		Swing 34"
	AE9TO02200103		Swing 40"
33	AE9TO02180005	Clamping plate	
34	2100103D1A1B8	Hexagon bolt	W⅜"ø×1½"L
35	21301M0800657	Hexagon nut	M8
36	AE9TO02130000	Gib	
37	21021M0803509	Hexagon socket bolt	M8×35L
38	2150101B00233	Washer	W½"ø
39	2130101B01009	Hexagon nut	W½"ø
40	AE9TO02150002	Gib	
41	AE9TO00180007	Bracket	
42	21021M0802001	Hexagon socket bolt	M8×20L
43	AE9TO02060006	Bushing	
44	AE9TO02050005	Micro collar	0.05mm(P=5mm)
	AE9TO0205A008		.001"(5 T.P.I)
45	AE9TO02210005	Special bolt	
46	AE9TO00240000	Special bolt	
47	AB8C00002A104	Grip	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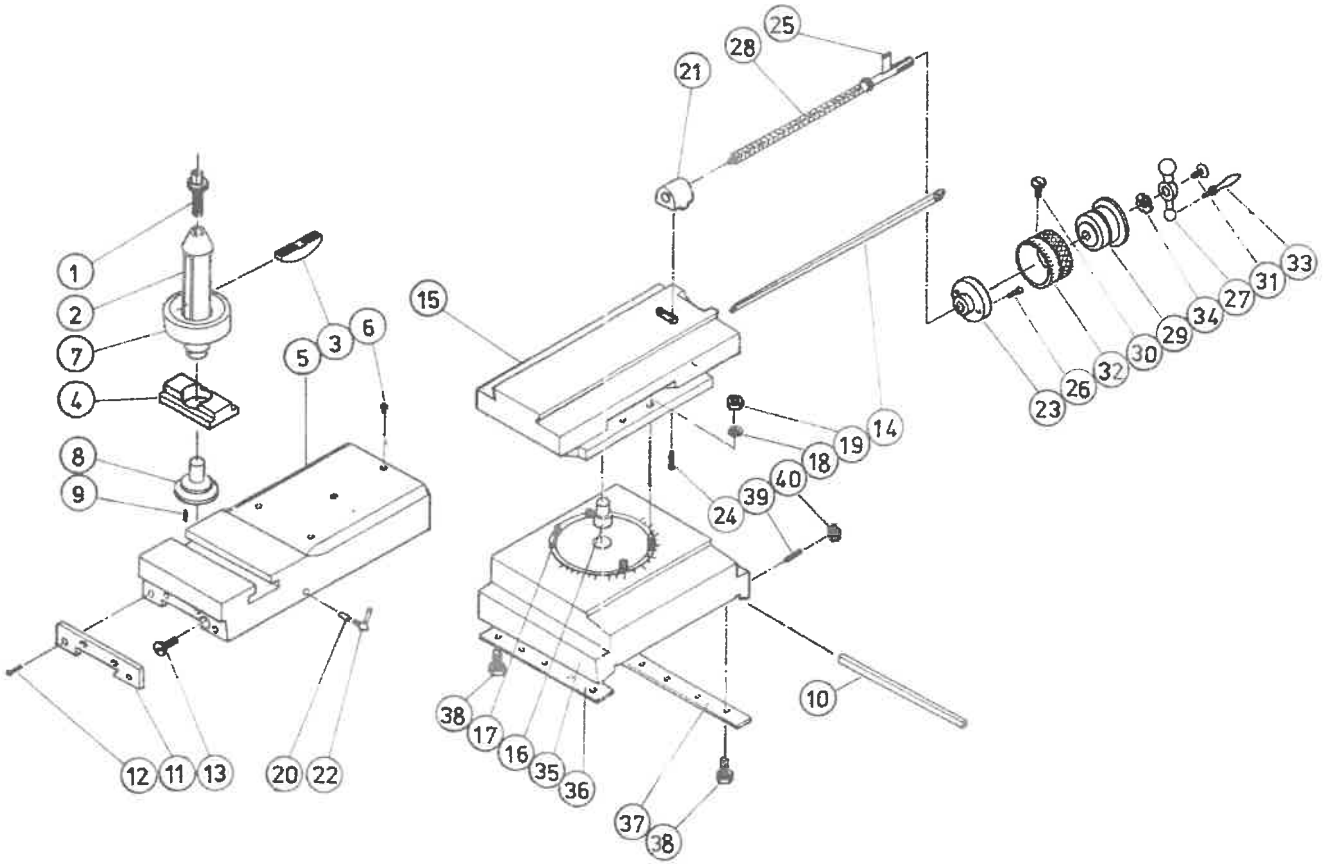
TOOL SLIDE (AMERICAN TYPE)

Diagram on page 78A

No.	Part No	Part Name	Dimension
1	AE9TO00390002	Headed bolt	
2	AE9TO00340007	American tool post	
3	AE9TO00380001	Rocket base	
4	AE9TO00360009	Block	
5	AE9TO00330006	Tool slide	
6	2803005E00007	Oil cup	5/16"
7	AE9TO00370000	Tool post collar	
8	AE9TO00350008	Washer	
9	2192000602008	Straight pin	6ø×20L
10	AE9TO02130000	Gib	
11	AE9TO214B0007	Felt cover	
12	21122M0601509	Cross recessed flat head screw	M6×15L
13	AE9TO00130002	Adjusting bolt for gib	
14	AE9TO02150002	Gib	
15	AE9TO02010001	Tool slide base	Swing 30",34",40"
	AE9TO02230007		Swing 25"
16	AE9TO00070009	Pin	
17	AE9TO02120009	Special bolt	
18	2150101B00233	Washer	W½"ø
19	2130101B01009	Hexagon nut	W½"ø
20	AE9TO00110000	Pin	
21	AE9TO00160005	Female screw	5 T.P.I
	AE9TO00160104		P=5mm
22	AB9LP00230203	Special bolt	
23	AE9TO00180007	Bracket	
24	21021M0803509	Hexagon socket bolt	M8×35L
25	2180005050281	Key	5×5×28L
26	21021M0802001	Hexagon socket bolt	M8×20L
27	AE9TO00220008	Grip handle	
28	AE9TO00170006	Screw shaft	5 T.P.I
	AE9TO00170105		P=5mm
29	AE9TO02060006	Bushing	

No.	Part No	Part Name	Dimension
30	AE9TO02210005	Special bolt	
31	AE9TO00240000	Special bolt	
32	AE9TO02050005	Micro collar	0.05mm(P=5mm)
	AE9TO0205A008		.001"(5 T.P.I)
33	AB8C00002A104	Grip handle	
34	AE9TO02070007	Nut	
35	AE9TO02220006	Slide base	Swing 25"
	AE9TO02190006		Swing 30"
	AE9TO02200004		Swing 34"
	AE9TO02200103		Swing 40"
36	AE9TO02170004	Clamping plate	
37	AE9TO02180005	Clamping plate	
38	2100103D1A1B8	Hexagon bolt	W⅜"ø×1½"L
39	21041M0803008	Hexagon socket set screw	M8×30L
40	21301M0800657	Hexagon nut	M8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TAILSTOCK

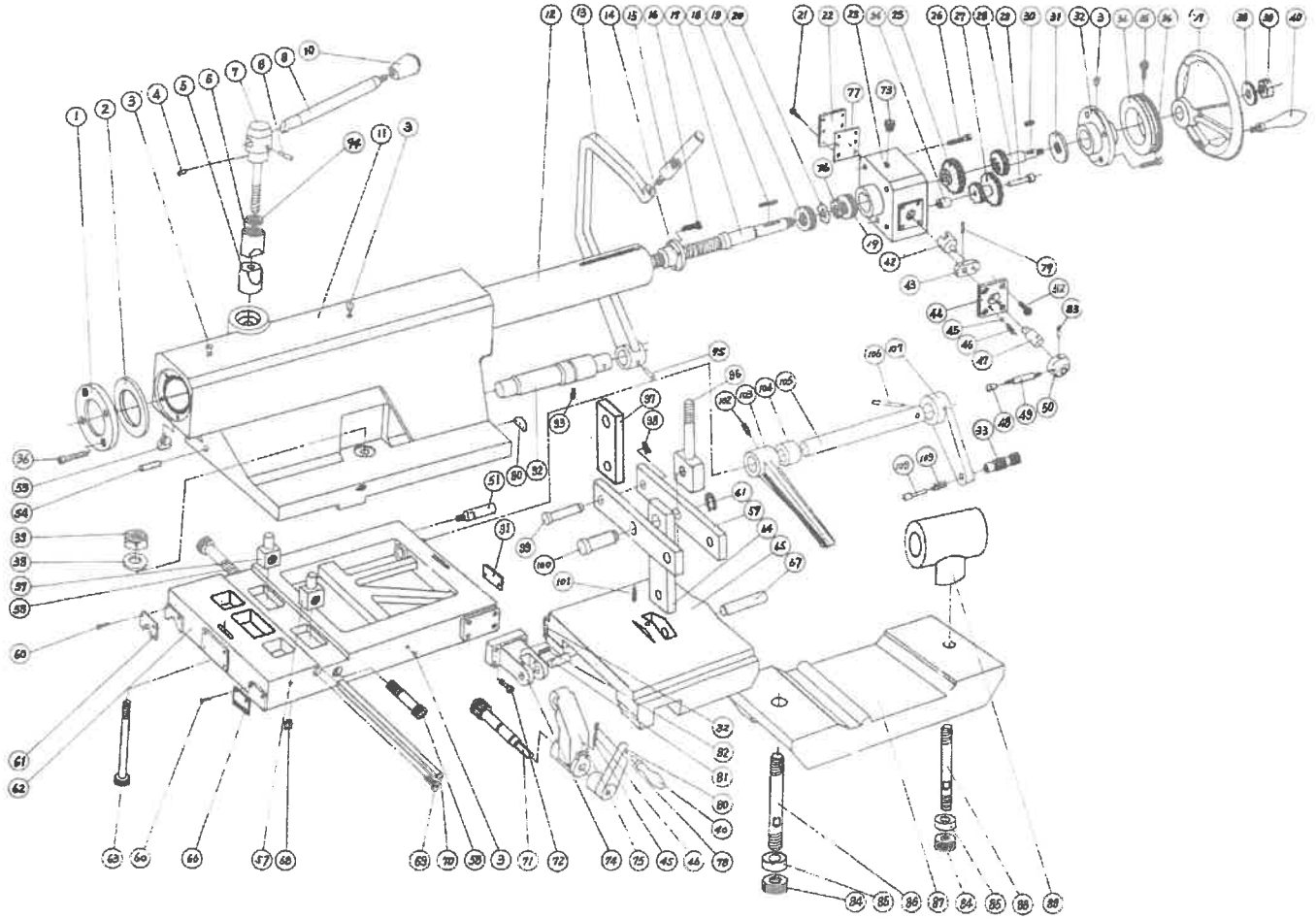
Diagram on page 82A

No.	Part No	Part Name	Dimension
1	AE9T002300006	Felt cover	
2	AE9T002290008	Felt	
3	2803005E00007	Oil cup	5/16"
4	2191000501209	Spring pin	5ø×12L
5	AE9T001070003	Clamping nut for sleeve	
6	AE9T001060002	Bushing	
7	AE9T001050001	Shaft for handle	
8	2193000604001	Taper pin	6ø×40L
9	AE9T000070004	Lever	
10	AE9FA00420003	Grip	W3/8"øTAP×40ø
11	AE9T00201A009	Tail stock body	
12	AE9T002270006	Sleeve	MT6
13	AE9T002680005	Clamping lever	
14	AE9T002250004	Famale screw	5 T.P.I
	AE9T002250103		P=5mm
15	AE9T000500002	Grip	
16	21021M0802506	Hexagon socket bolt	M8×25L
17	AE9T002260005	Male screw	5 T.P.I
	AE9T002260104		P=5mm
18	2180007070403	Key	7×7×40L
19	BG00000512067	Thrust bearing	51206
20	201000000AW063	Washer	AW06
21	21132M0501202	Cross recessed round head	M5×12L
22	AE9T002110003	Plate	
23	AE9T002090004	Gear box	
24	AE9T002210000	Bushing	
25	AE9T002240003	Gear	M2.5×35T
26	21021M1212009	Hexagon socket bolt	M12×120L
27	AE9T002200009	Gear	M2.5×14T,32T
28	AE9T002230002	Gear	M2.5×16T
29	AE9T002190001	Shaft	
30	2180007070304	Key	7×7×30L

No.	Part No	Part Name	Dimension
31	AE9T002220009	Washer	
32	AE9T002080000	Bracket	
33	AE9T000790005	Grip	
34	AE9T002060001	Micro collar	0.1mm～0.5mm
	AE9T00206A004	Micro collar	.002"～.01"
35	AE9T000340002	Clamping bolt	
36	21021M0602007	Hexagon socket bolt	M6×20L
37	AE9T002040009	Handle wheel	
38	2150103C00320	Washer	W¾"ø
39	2130103C01608	Nut	W¾"ø
40	AB3A00001A005	Grip	
41	2170000STW208	Snap ring	STW20
42	AE9T00218B006	Sliding piece	
43	AE9T002170009	Shifter	
44	AE9T002150007	Cover	
45	2804005E00004	Steel ball	5/16"ø
46	AE9T002350001	Spring	
47	AE9T002160008	Shaft	
48	AB9H000770001	Grip	
49	AE9T002130005	Lever	
50	AE9T002140006	Handle boss	
51	AE9T00025A009	Stop pin	
52	21122M0501502	Cross recessed flat head screw	M5×15L
53	AE9T002280007	Special key	
54	AE9T000180002	Shaft	
55	AE9T00082A008	Adjusting nut	
56	AE9T000820104	Washer	
57	AE9T000170001	Famale screw	
58	21021M1610001	Hexagon socket bolt	M16×100L
59	AE9T000210002	Plate	
60	21132M0601506	Cross recessed round head	M6×15L
61	AE9T00013B003	Duster	
62	AE9T00233A200	Tail stock base	Swing 25"
	AE9T00233A002		Swing 30"
	AE9T00233A101		Swing 34"
	AE9T00233A309		Swing 40"

No.	Part No	Part Name	Dimension
63	2102103D005A7	Hexagon socket bolt	W⅜"ø×5"L, Swing 25"
	2102103D007A5		W⅜"ø×7"L, Swing 30"
	2102103D9A1B0		W⅜"ø×9½"L, Swing 34"
	2102103D12AB5		W⅜"ø×12½"L, Swing 40"
64	AE9T000200209	Plate	Swing 25"
	AE9T000200001		Swing 30"
	AE9T000200100		Swing 34"
	AE9T000200308		Swing 40"
65	AE9T000290000	Clamping plate	
66	AE9T00026B003	Duster	
67	AE9T000280009	Pin	
68	AE9T000810004	Felt	
69	AB9T000430009	Clamping bolt for gib	
70	AE9T000330001	Gib	
71	AE9T002430006	Pinion shaft	DP10×14T
	AE9T002430105		M2.5×14T
72	2102103D001A1	Hexagon socket bolt	W⅜"ø×1"L
73	AE9T002120004	Special bolt	
74	AE9T002450008	Bracket	
75	AE9T002420005	Bracket	
76	20200AN06P157	Nut	AN06
77	AE9T002110102	Packing	
78	2104103D003D4	Hexagon socket set screw	W⅜"ø×⅜"L
79	2191000402403	Spring pin	4ø×24L
80	AE9T002410004	Lever handle	
81	AE9T002440007	Pin	
82	21041M0802005	Hexagon socket set screw	M8×20L
83	2193000505007	Taper pin	5ø×50L
84	AE9T002730007	Special nut	
85	AE9T002720006	Special washer	
86	AE9T002710203	Clamping bolt	Swing 25"
	AE9T002710005		Swing 30"
	AE9T002710104		Swing 34"
	AE9T002710302		Swing 40"
87	AE9T000300008	Clamping plate	
88	AE9T00271A206	Clamping bolt	Swing 25"

No.	Part No	Part Name	Dimension
	AE9T00271A008		Swing 30"
	AE9T00271A107		Swing 34"
	AE9T00271A305		Swing 40"
89	AE9T002700004	Bracket	
90	AE9T000830006	Plate	
91	AE9T000860009	Plate	inch
	AE9T002530003		mm
92	AE9T000480002	Clamping shaft	
93	AE9T000840007	Hexagon socket set screw	
94	AE9T001080004	Bushing	
95	2193000705605	Taper pin	7ø×56L
96	AE9T000310009	Clamping bolt	
97	AE9T000190003	Plate	
98	2170000STW154	Snap ring	STW15
99	AE9T000160000	Pin	
100	AE9T000150009	Pin	
101	21041M0802500	Hexagon socket set screw	M8×25L
102	21041M0801507	Hexagon socket set screw	M8×15L
103	AE9T000740000	Hook lever	
104	AE9T000750001	Collar	
105	AE9T000760002	Shaft	
106	2193000604506	Taper pin	6ø×45L
107	AE9T000770003	Lever	
108	AE9T000800003	Pin	
109	AE9T000780004	Spring	

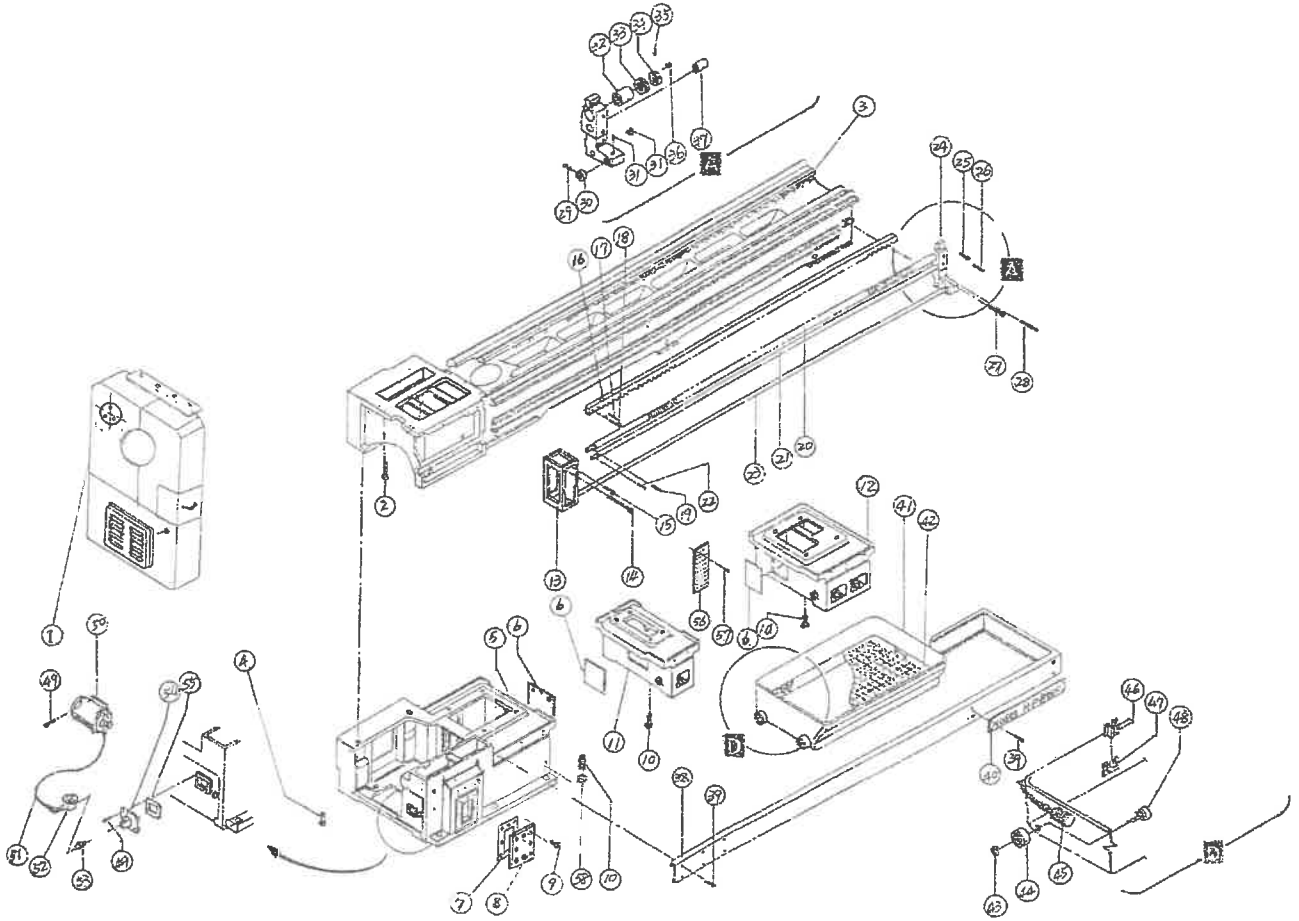


ASSEMBLY OF BED AND LEG

Diagram on page 84A

No.	Part No	Part Name	Dimension
1	AG9FA06040008	Side cover	
2	AE9H001640008	Hexagon bolt	
3	AG9FA06010005	Bed	
4	2100103C2A3C7	Hexagon bolt	W3/4"×2 3/4"L
5	AG9FA06030007	Cabinet (Left)	
6	AE9FA00640006	Cover	
7	AG9FA06020105	Packing	
8	AG9FA06020006	Oil tank cover	
9	21021M0802001	Hexagon socket bolt	M8×20L
10	AB9FA001190007	Jack bolt	
11	AE9FA00050005	Center cabinet	
12	AE9FA00040004	Cabinet (Right)	
13	AE9FA00061A08	Switch box	
14	2102103D8A1B9	Hexagon socket bolt	W3/8"×8 1/2"L
15	2102103D0011A1	Hexagon socket bolt	W3/8"×1"L
16	AE9FA0051A009	Rack	Inch
	AE9FA00510005		mm
17	2193000603800	Taper pin	ψ6×38L
18	21021M0803509	Hexagon socket bolt	M8×35L
19	2193000805008	Taper pin	ψ8×50L
20	AE9FA0011A001	Leading screw	Inch
	AE9FA0011B004		mm
21	AE9EF00010009	Feed rod	
22	2193000704503	Taper pin	ψ7×45L
23	AE9FA00170004	Starting rod	
24	AE9EF00020000	Tail bracket	
25	2102101B1A1B0	Hexagon socket bolt	W1/2"×1 1/2"L
26	2196000805009	Taper pin	ψ8×50L
27	2102101B3A1B2	Hexagon socket bolt	W1/2"×3 1/2"L
28	2196000810005	Taper pin	ψ8×100L
29	21041M0800801	Set screw	M8×8L
30	AE9FA00340005	Collar	

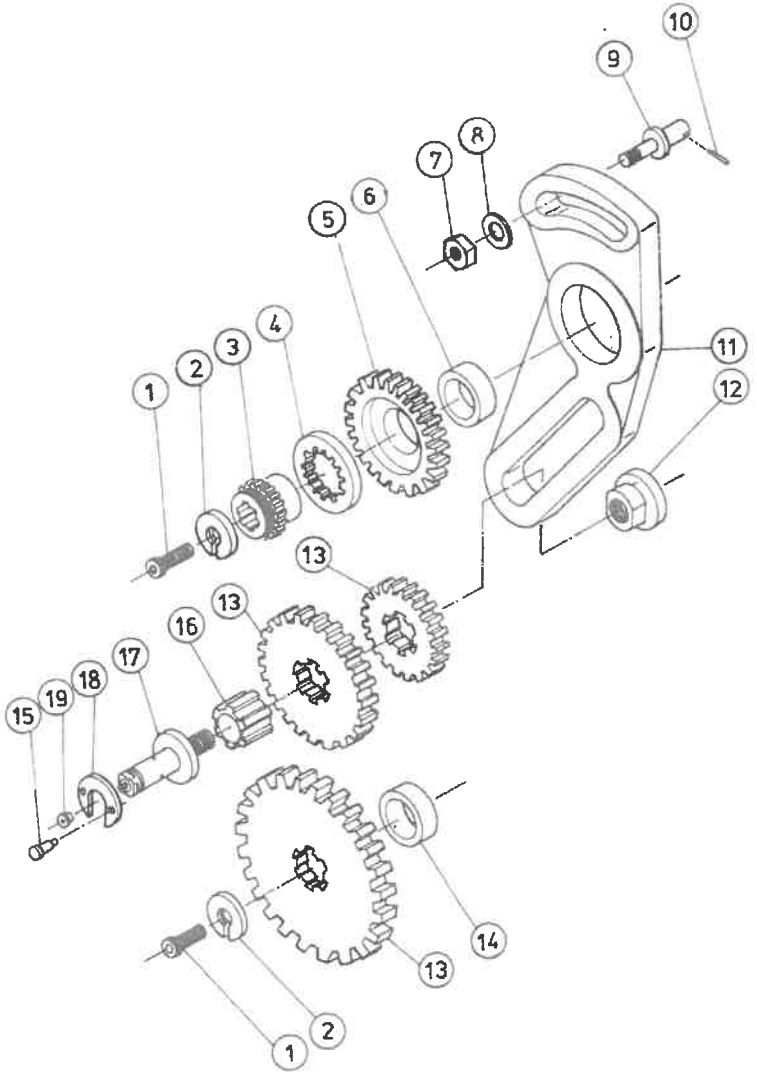
No.	Part No	Part Name	Dimension
31	2803005E00007	Oil cup	
32	AE9EF00020208	Bushing	
33	BG00000512081	Thrust bearing	51208
34	AE9FA00140001	Nut	
35	2104103D005E9	Set screw	W3/8"×5/16"L
36	AE9FA00130000	Stop pin	
37	AE9EF00050003	Bushing	
38	AE9FA0071A003	Make up plate	
39	21122M0602502	Cross recessed headed oval	M6×25L
40	AG9FA00050001	Name plate	Model HP3000
41	AE9FA01590003	Oil pan	HP3000
42	AE9FA01650006	Oil plate	HP3000
43	2170000ETW156	Snap ring	ETW-15
44	AE9FA00370002	Roller wheels	
45	AE3FA01700004	Oil filter	
46	AD9L000020000	Supporter	
47	AD9L000030001	Supporter	
48	AD9L000050003	Shaft for wheel	
49	21021M0601509	Hexagon socket bolt	M6×15L
50	4611MT20013MA	Pump with motor	1/4 HP 13MA
51	4320001B00004	Flexible tube	ψ1/2"
52	4602003D003D6	Filter	3/8"PT×3/8"PT
53	4120003DPT006	Nipple	3/8"PT
54	AE9FA00920005	Cock body	
55	AE9FA00930008	Packing	
56	AE9FA002030505	Plate	
57	2113201D003E6	Round head bolt	W1/8"×3/16"L
58	AB9FA00200005	Hexagon nut	



QUADRANT

Diagram on page 86A

No.	Part No	Part Name	Dimension
1	21021M0802001	Hexagon socket bolt	M8×20L
2	AE9F002080005	Washer	
3	AE9F001140009	Indexing gear wheel	M0.8×60T
4	AE9F003180001	Interior gear	M0.8×60T
5	AE9F003410005	Gear wheel	M1.5×95T, Swing 25"
5	AE9F003170000	Gear wheel	M1.5×76T, Swing 30", 34",40"
6	AE9F002090006	Collar	
7	2130103C01608	Hexagon nut	W¾"ø
8	2150103C00450	Washer	W¾"ø
9	AE9H001650009	Pin	
10	2193000607000	Taper pin	6ø×70L
11	AE9F003430007	Bracket	Swing 25"
	AE9F003160009		Swing 30",34",40"
12	AE9F001120007	Special nut	
13		Gear	
14	AE9F002090006	Collar	
15	AE9F001060004	Pin	
16	AE9F001100005	Special collar	
17	AE9F001110006	Shaft	
18	AE9F001070005	Special collar	
19	2803005E00007	Oil cup	5⁄16"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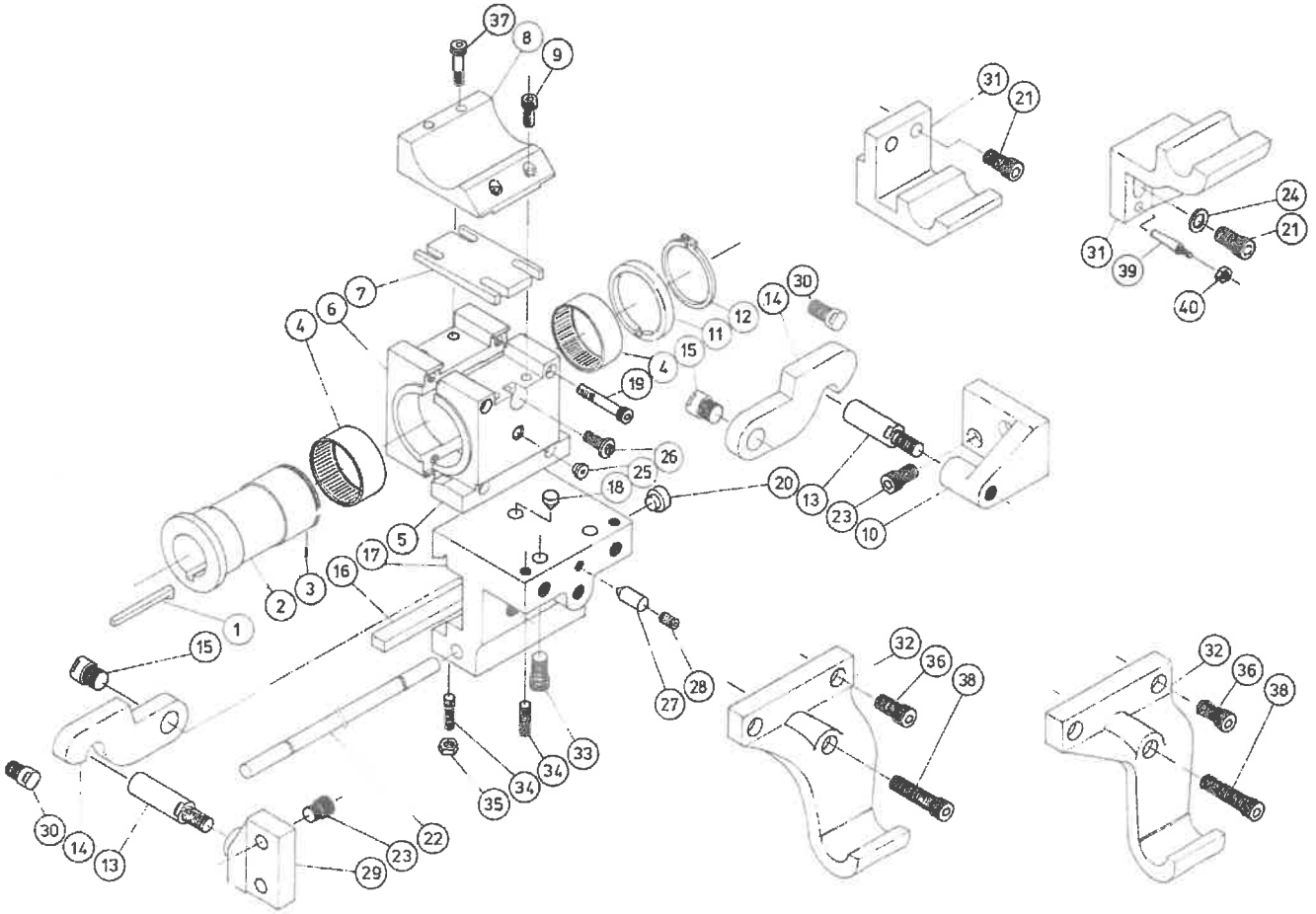
SUPPORT FOR LEAD SCREW, FEED ROD, & STARTING ROD

Diagram on page 88A

No.	Part No	Part Name	Dimension
1	AE9ES02010000	Special key	
2	AE9ES02030002	Sleeve	
3	219102P500602	Spring pin	2.5ø×6L
4	BG000NK45209	Needle bearing	HK4520
5	AE9ES0204A006	Rod supporter	
6	AE9ES0204B009	Rod supporter	
7	AE9ES02060005	Taper plate	
8	AE9ES02050004	Supporter plate	
9	21021M0603000	Hexagon socket bolt	M6×30L
10	AE9ES00100008	Bracket	3000～7000 Type
11	AE9ES02020001	Collar	
12	2170000STW451	Snap ring	STW45
13	AE9ES02110007	Gride pin	
14	AE9ES0008A002	Lever	2000～4000 Type
	AE9ES00190007		5000～7000Type
15	AE9ES00200005	Pin	
	AE9ES00210006		5000～7000Type
16	AE9ES00020003	Gib	
17	AE9ES0016AR09	Rod supporter body	2000～7000Type
	AE9ES0016AL05		
	AE9ES0017AR00		5000～7000Type
	AE9ES0017AL06		5000～7000Type
18	AE9ES02090008	Pin	
19	21021M0604508	Hexagon socket bolt	M6×45L
20	AE9ES00180006	Pin	5000～6000Type
21	2102103D001A1	Hexagon socket bolt	W⅜"ø×1"L
22	AE9ES00240009	Shaft	5000 Type
	AE9ES00240108		6000 Type
	AE9ES00240207		7000 Type
23	21021M0801503	Hexagon socket bolt	M8×15L
24	2150103D00167	Washer	W⅜"ø, 5000～7000Type

No.	Part No	Part Name	Dimension
25	2803005E00007	Oil cup	5/16"
26	AE9ES02070006	Adjusting bolt	
27	AE9ES00230008	Pin	
28	21041M0602001	Hexagon socket set screw	M6×20L
29	AE9ES00120000	Bracket	
30	AE9ES0013B007	Pin	2000～4000 Type
	AE9ES00210105		5000～7000Type
31	AE9FA00500005	Stopper rod supporter	2000～4000 Type
	AE9FA0050B001		5000～7000Type
32	AE9ES0022A000	Rod supporter	
	AE9ES0022A109		5000～7000Type
33	21021M0803004	Hexagon socket bolt	M8×30L
34	21041M0602506	Hexagon socket set screw	M6×25L
35	21302M0600500	Hexagon nut	M6
36	21021M0802001	Hexagon socket bolt	M8×20L
37	21021M0605006	Hexagon socket bolt	M6×50L
38	21021M0805000	Hexagon socket bolt	M8×50L
39	2195000502507	Taper pin	5ø×25L, 5000～7000Type
40	21302M0500404	Hexagon nut	M5, 5000～7000Type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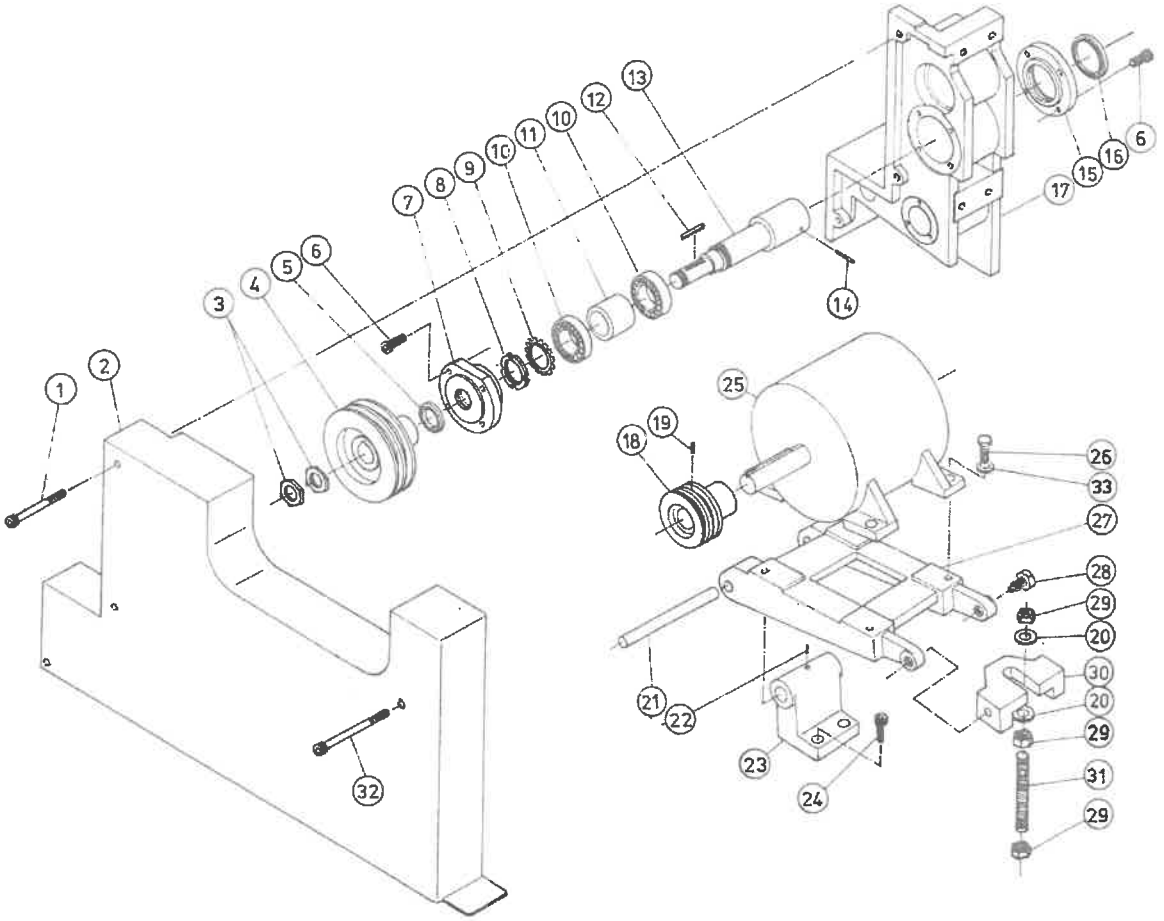
RAPID TRAVERSE ATTACHMENT

Diagram on page 90A

No.	Part No	Part Name	Dimension
1	21021M0606504	Hexagon socket bolt	M6×65L
2	AE9EF0014A002	Side cover	
3	AE9EF00030308	Hexagon nut	
4	AE9EF00070005	V pulley	
5	22000Z2538556	Oil seal	Z-25×38×5.5
6	21021M0601509	Hexagon socket bolt	M6×15L
7	AE9EF00040002	Cover	
8	20200AN06P157	Grooved nut	AN06
9	20100000AW063	Washer	AW06
10	BG00000062067	Ball bearing	6206
11	AE9EF00050003	Spacer	
12	2180007070403	Key	7×7×40L
13	AE9EF00030001	Shaft	
14	2193000703807	Taper pin	7ø×38L
15	AE9EF00060004	Cover	
16	22000Z4558556	Oil seal	Z-45×58×5.5
17	AE9EF00020000	Tail bracket	
18	AE9EF00130008	V pulley	
19	21041M0601206	Hexagon socket set screw	M6×12L
20	2150105D00325	Washer	W⅝"ø
21	AD9H000730002	Shaft	
22	21041M0801002	Hexagon socket set screw	M8×10L
23	AE9EF00080006	Bracket	
24	2102103D003C3	Hexagon socket bolt	W⅜"ø×¾"L
25		Quick traverse motor	1HP×6P
26	21001M0802502	Hexagon bolt	M8×25L
27	AE9EF00100005	Motor base	
28	AB9FA00060007	Special bolt	
29	2130105D01306	Hexagon nut	W⅝"ø
30	AB9FA00850002	Base supporter	
31	AB9FA00860003	Adjusting bolt	
32	21021M0608500	Hexagon socket bolt	M6×85L

No.	Part No	Part Name	Dimension
33	21511M0800201	Spring washer	M8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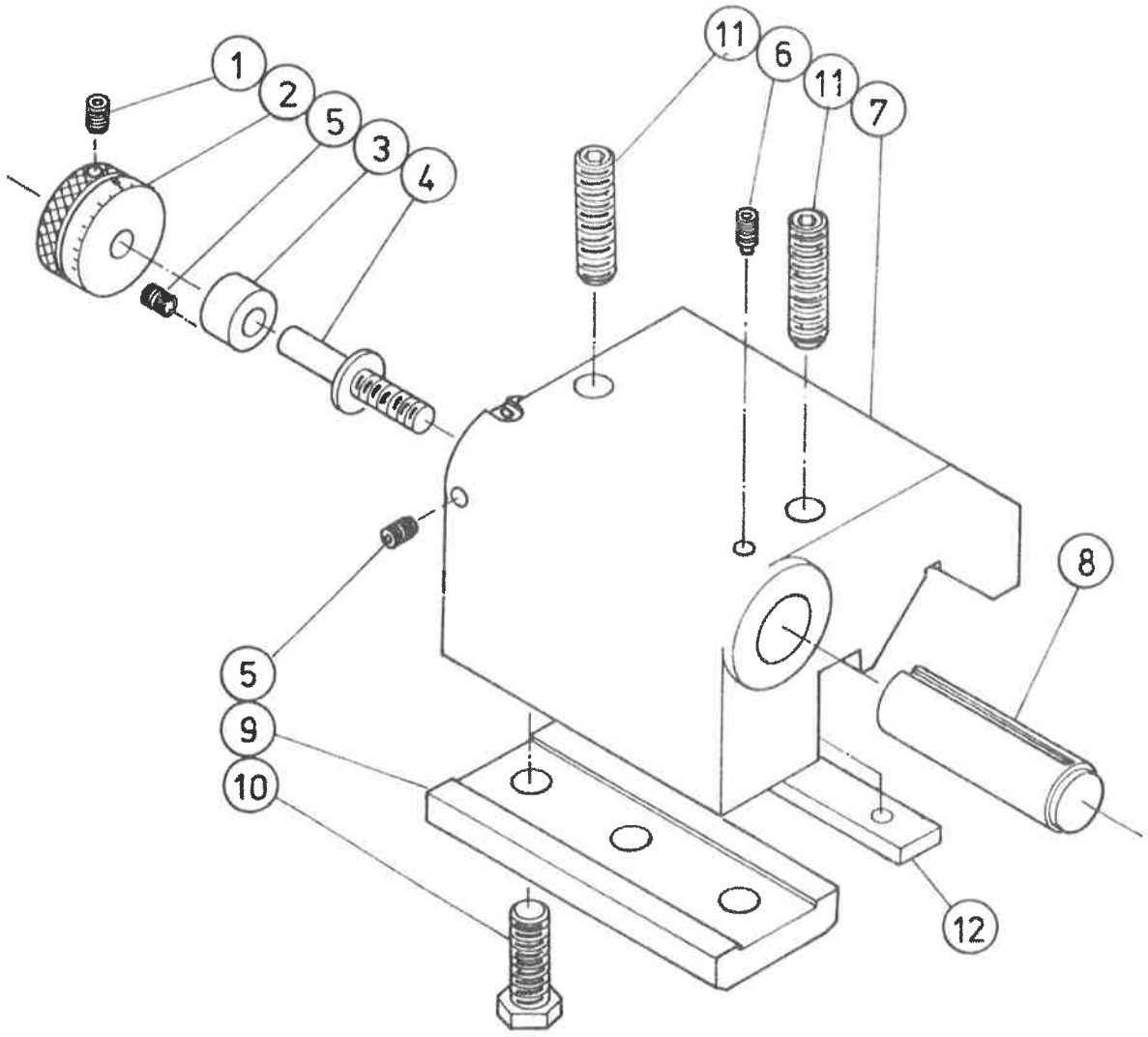
MICRO CARRIAGE STOP

Diagram on page 93

No.	Part No	Part Name	Dimension
1	21041M0501605	Hexagon socket bolt	M5×16L
2	AE9EF0021A006	Graduated grip	0.025mm
	AE9EF0021B009		.001"
3	AE9EF0020A005	Bushing	
4	AE9EF0019A007	Screw	M10, P=1.25
	AE9EF0019B000		W10, 20 T.P.I
5	21041M0601206	Hexagon socket set screw	M6×12L
6	AE9EF00220004	Hexagon socket set screw	
7	AE9EF0016B007	Micro stop body	
8	AE9EF0018A006	Stopper	M10, P=1.25
	AE9EF0018B009		W10, 20 T.P.I
9	AE9ET0004A009	Clamping rod	
10	2100101B1A1C3	Hexagon bolt	
11	2104101B002A2	Hexagon socket set screw	W½"ø×2"L
12	AE9EF00171B03	Adjusting plate	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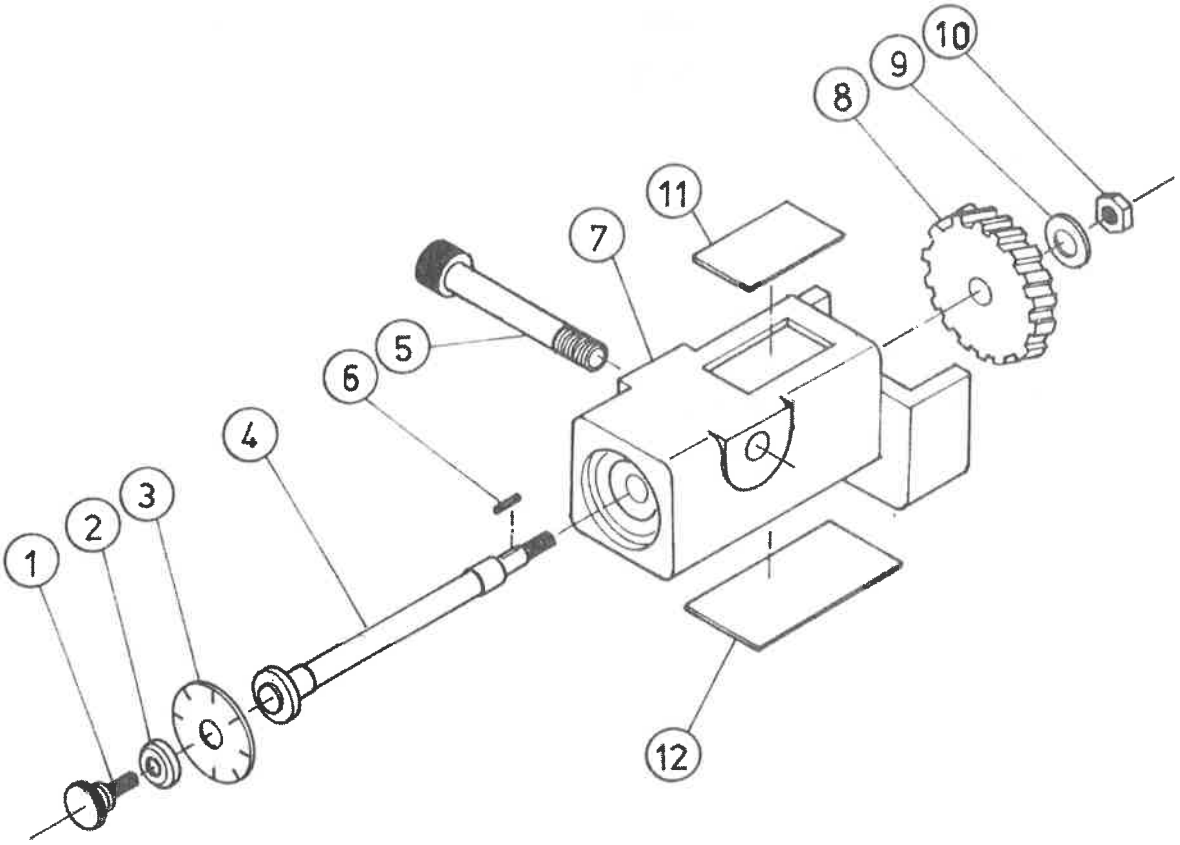
THREAD CHASING DIAL

Diagram on page 95

No.	Part No	Part Name	Dimension
1	AB9AT00010006	Special bolt	
2	AB9AT00020007	Washer	
3	AB9AT00030008	Graduated dial plate	inch
	AB9AT00040009		mm
4	AE9C000400006	Shaft	
5	2102103D003A9	Hexagon socket bolt	W⅜"ø×3"L
6	2180004040069	Key	4×4×6L
7	AE9C000390008	Chasing body	
8	AE9C000450001	Gear	M4×16T(inch)
	AE9C000450100		M4×15T(mm)
9	2150103D00167	Washer	W⅜"ø
10	2130103D00800	Hexagon nut	W⅜"ø
11	AE9C000440000	Cover	
12	AB9AT00090004	Name plate	mm
	AB9AT00100002		inch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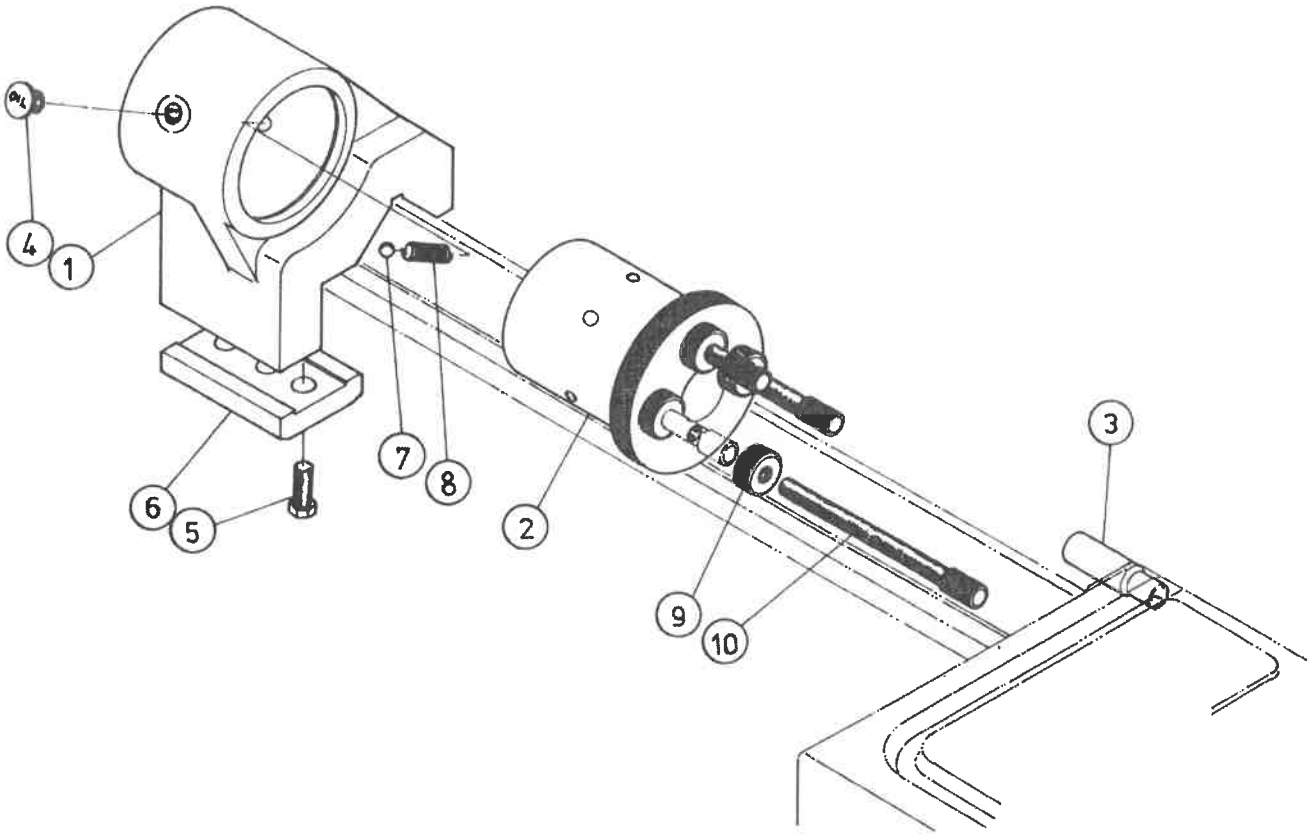
TURRET CARRIAGE STOP

Diagram on page 97

No.	Part No	Part Name	Dimension
1	AE9ET0001A006	Turret body	
2	AE9ET0002A007	Revolving body	
3	AE9C002470001	Pin	
4	2803005E00007	Oil cup	5/16"
5	2100101B1A1C3	Hexagon bolt	W½"ø×1¼"L
6	AE9ET0004A009	Clamping plate	
7	2804005E00004	Steel ball	5/16"
8	AB9ET00060009	Spring	
9	AB9ET00050008	Round nut	
10	AB9ET00040007	Stop bolt	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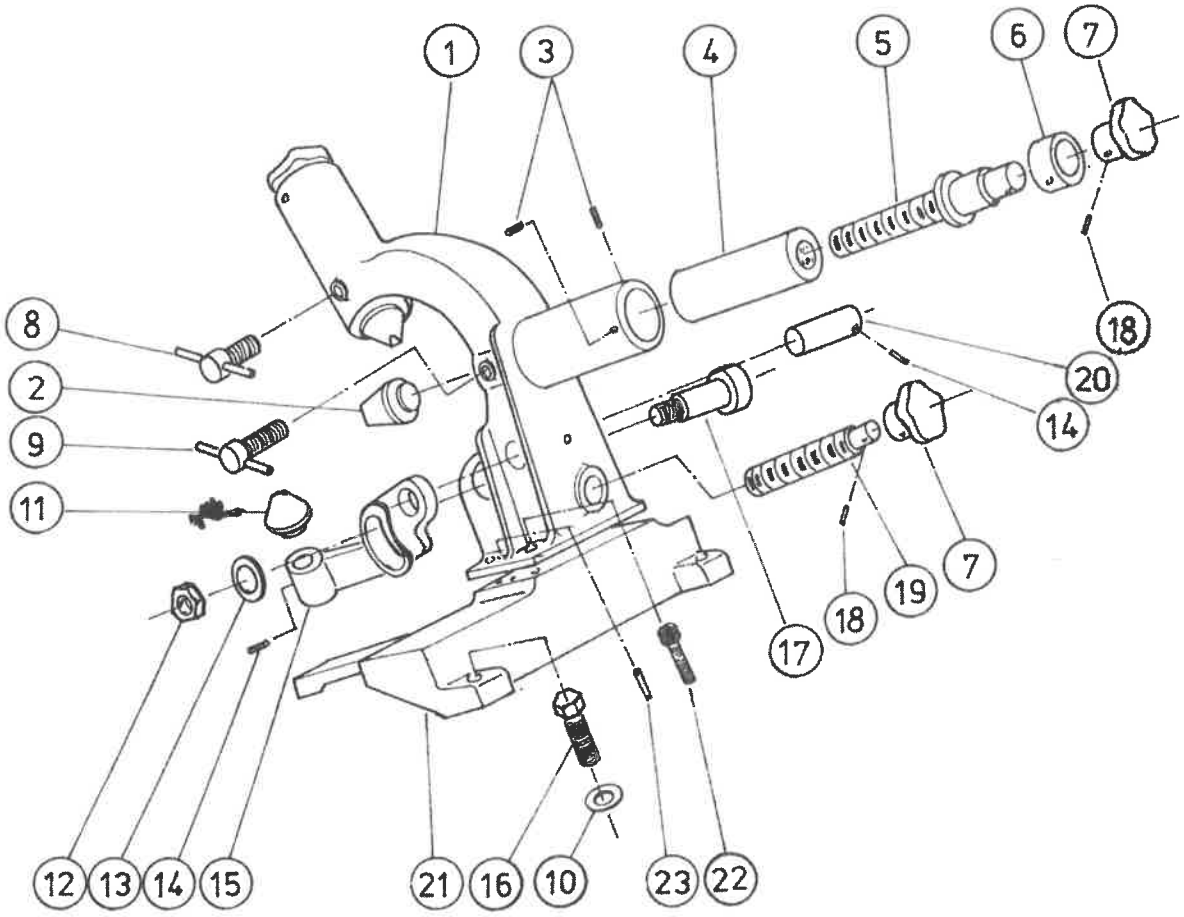
FOLLOW REST

Diagram on page 99

No.	Part No	Part Name	Dimension
1	AE9ER0026A003	Body of follow rest	Swing 30"
	AE9ER0026B006		Swing 34"
	AE9ER0026C009		Swing 40"
2	AE9ER00310002	Claw	
3	21041M0802005	Hexagon socket set screw	M8×20L
4	AE9ER00290003	Female screw	
5	AE9ER00300001	Special bolt	
6	AE9ER00350006	Bushing	
7	AD9S000310009	Grip	
8	AE9ER00370008	Special bolt	
9	AE9ER00370008	Special bolt	
10	2115105D00407	Spring washer	W⅝"ø
11	AE9ER00320003	Claw	
12	2130105D01306	Hexagon nut	W⅝"ø
13	2150105D00325	Washer	W⅝"ø
14	21041M0801507	Hexagon socket set screw	M8×15L
15	AE9ER00280002	Lever	
16	2100105D003A3	Hexagon bolt	W⅝"ø×3"L
17	AE9ER00390000	Special bolt	
18	2193000504509	Taper pin	5ø×45L
19	AE9ER00330004	Special bolt	
20	AE9ER00380009	Pin	
21	AE9ER00270001	Body of follower rest	
22	2102101B1A1C7	Hexagon socket bolt	W½"ø×1¼"L
23	2193000604506	Taper pin	6ø×45L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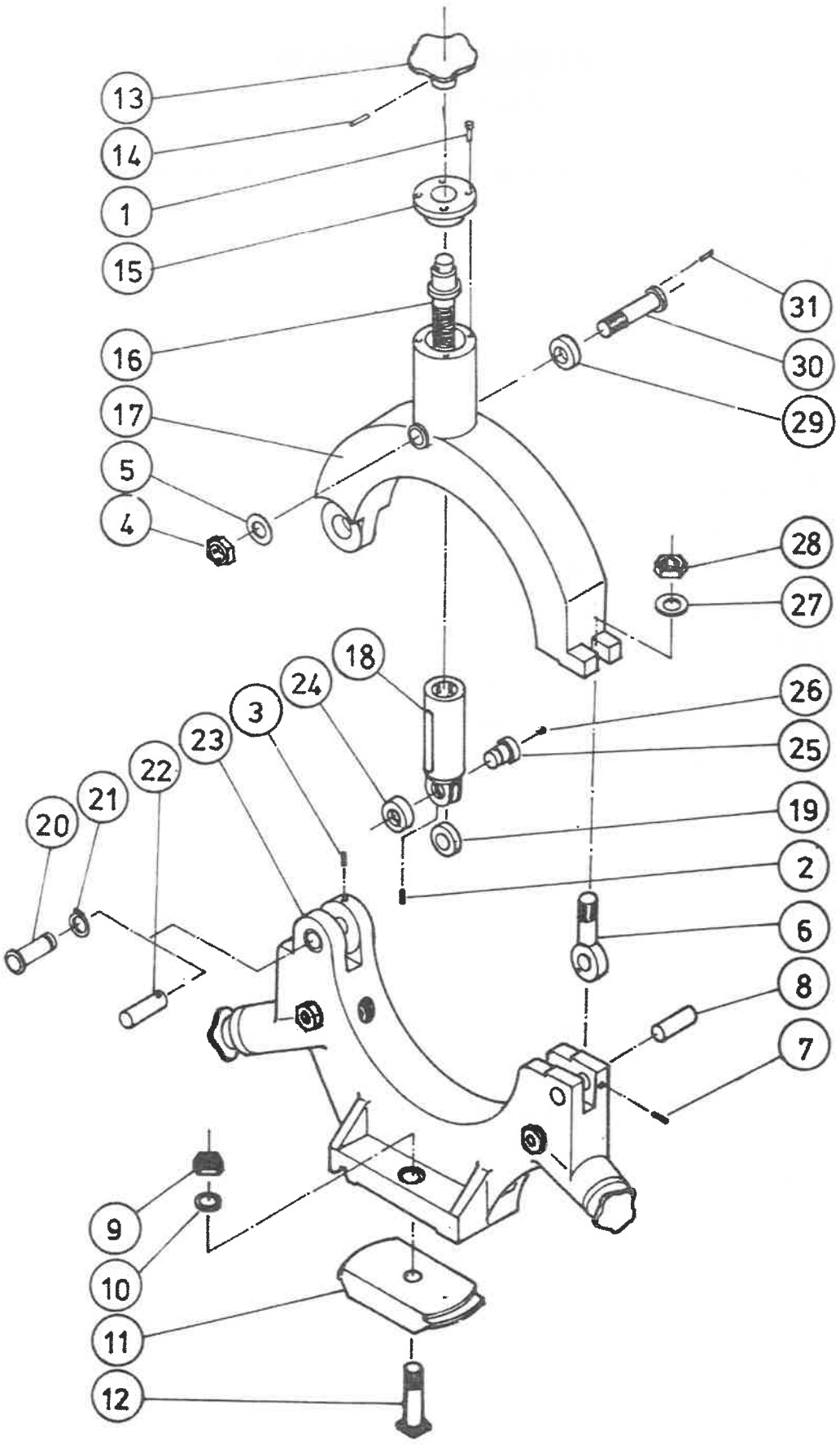
STEADY REST

Diagram on page 103

No.	Part No	Part Name	Dimension
1	21021M1003007	Hexagon socket bolt	M10×30L
2	21041M0801002	Hexagon socket set screw	M8×10L
3	21041M0803008	Hexagon socket set screw	M8×30L(300ø)
4	2130103C01608	Hexagon nut	W¾"ø
5	2150103C00450	Washer	W¾"ø
6	AE9ER00030003	Special bolt	(300ø)
	AE9ER00150002		(400ø, 500ø)
7	21041M0601503	Hexagon socket set screw	M6×15L (300ø)
	21041M1001203		M10×12L (400ø, 500ø)
8	AE9ER00890005	Pin	(300ø)
	AE9ER00160003		(400ø, 500ø)
9	2130107D01809	Hexagon nut	W⅞" ø
10	2150107D00323	Washer	W⅞" ø
11	AE9ER0023A000	Clamp plate	
12	AE9ER00240008	T bolt	
13	AE9ER00090009	Grip	
14	2193000504004	Taper pin	5ø×40L
15	AE9ER00820008	Bushing	(300ø)
	AE9ER0011A001		(400ø, 500ø)
16	AE9ER0012B005	Special bolt	(300ø)
	AE9ER0012A002		(400ø, 500ø)
17	AE9ER0090B009	Steady rest	(300ø)
	AE9ER00930006		(400ø)
	AE9ER0006A009		(500ø)
18	AE9ER0085A004	Female screw	(300ø)
	AE9ER0010C006		(400ø, 500ø)
19	BG00NAST25ZZ4	Bearing	NAST-25ZZ (300ø)
	BG00NAST30ZZ0		NAST-30ZZ (400ø, 500ø)
20	AE9ER00170004	Pin	(400ø, 500ø)
21	2170000STW406	Snap ring	STW40 (400ø, 500ø)
22	AE9ER00880004	Pin	(300ø)
23	AE9ER00911B05	Steady	Swing 25" (300ø)

No.	Part No	Part Name	Dimension
	AE9ER00912B08		Swing 30" (300ø)
	AE9ER00913B01		Swing 34" (300ø)
	AE9ER00914B04		Swing 40" (300ø)
	AE9ER00940007		Swing 25" (400ø)
	AE9ER0007A000		Swing 30" (500ø)
	AE9ER0041A002		Swing 34" (500ø)
	AE9ER00410108		Swing 40" (500ø)
24	AE9ER00870003	Bushing	(300ø)
	AE9ER00770006		(400ø, 500ø)
25	AE9ER00860002	Pin	(300ø)
	AE9ER0072A004		(400ø, 500ø)
26	2803005E00007	Oil cup	5/16"
27	2150105D00325	Washer	W5/8"ø (300ø)
	2150107D00453		W7/8"ø (400ø, 500ø)
28	2130105D01306	Hexagon nut	W5/8"ø (300ø)
	2130107D01809		W7/8"ø (400ø, 500ø)
29	AE9ER00830009	Bushing	(300ø)
	AE9ER0071A003		(400ø, 500ø)
30	AE9ER00840000	Pin	(300ø)
	AE9ER0070A002		(400ø, 500ø)
31	2192000501503	Pin	5ø×15L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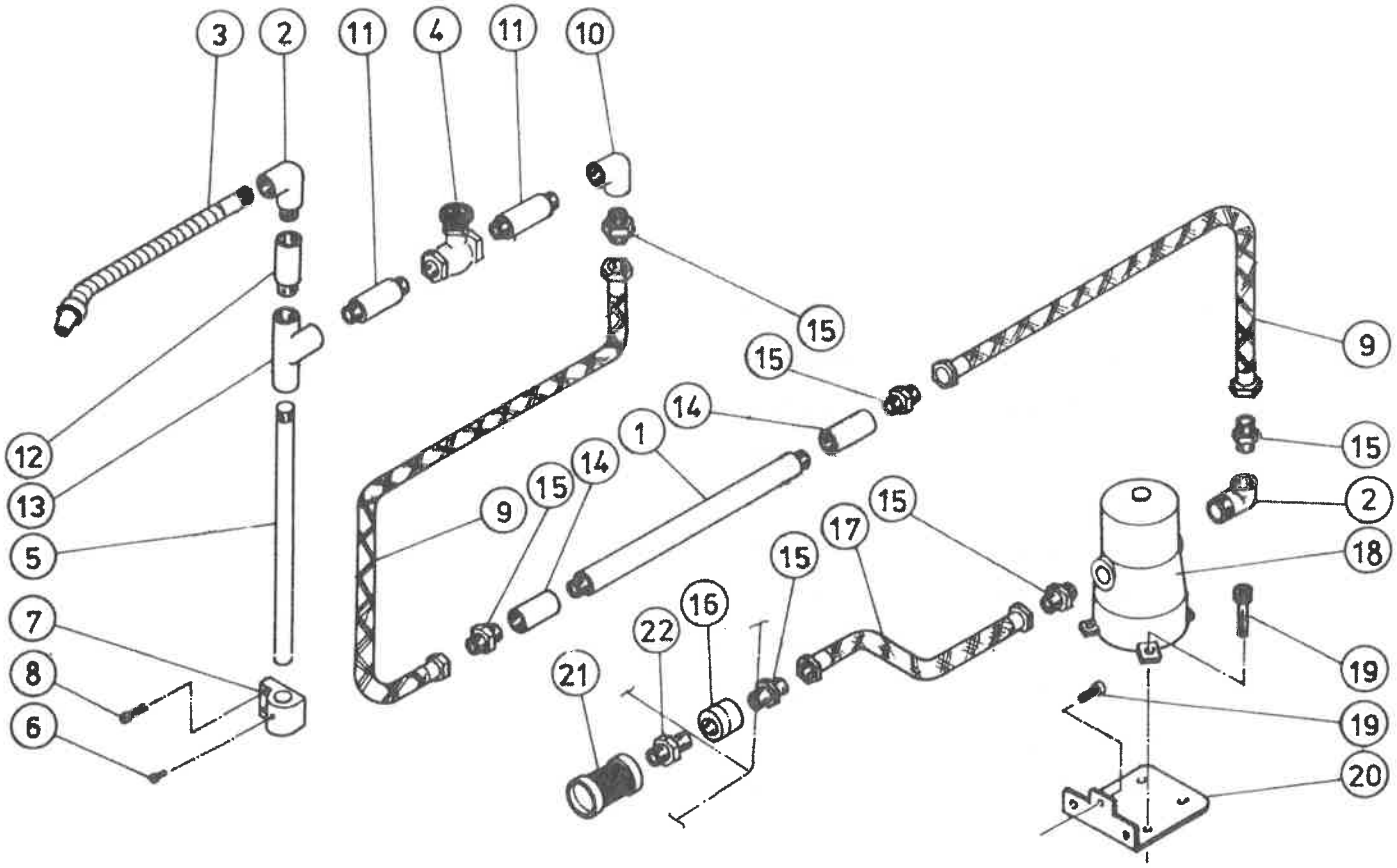
COOLANT SYSTEM

Diagram on page 105

No.	Part No	Part Name	Dimension
1	AB9LP00210102	Pipe	2000 Type
	AE9FA01490402		3000 Type
	AE9FA01491009		4000 Type
	AE9FA01491108		5000 Type
	AE9FA01491207		6000 Type
	AE9FA01491306		7000 Type
2	4102001BPT00	90° Elbow	½"PT
3	447001B30APT8	Nozzle	½"PT×30L
4	4901001BPT007	Valve	½"PT
5	AE9FA01560000	Rod	
6	21021M0801503	Hexagon socket bolt	M8×15L
7	AB9LP00230104	Bracket	
8	21021M0802001	Hexagon socket bolt	M8×20L
9		Flexible tube	½"PS
10	4100001BPT006	90° Elbow	½"PT
11	4121001BPT001	Nipple of round	½"PT
12	4450001BPT000	Alive connect	½"PT
13	4110001BPT005	Tee	½"PT
14	4130001B50PT6	Nipple	½"PT×50L
15	4480001BPTPS4	Nipple	½"PT*PS
16	AD9L000070005	Bushing	
17	4310PS1B06501	Flexible tube	½"PS×650L
18		Pump	¼HP×4P
19	21021M0802506	Hexagon socket bolt	M8×25L
20	AF9FA00770009	Pump seat	
21	AE3FA01700004	Oil filter	
22	4120001BPT004	Nipple	½"PT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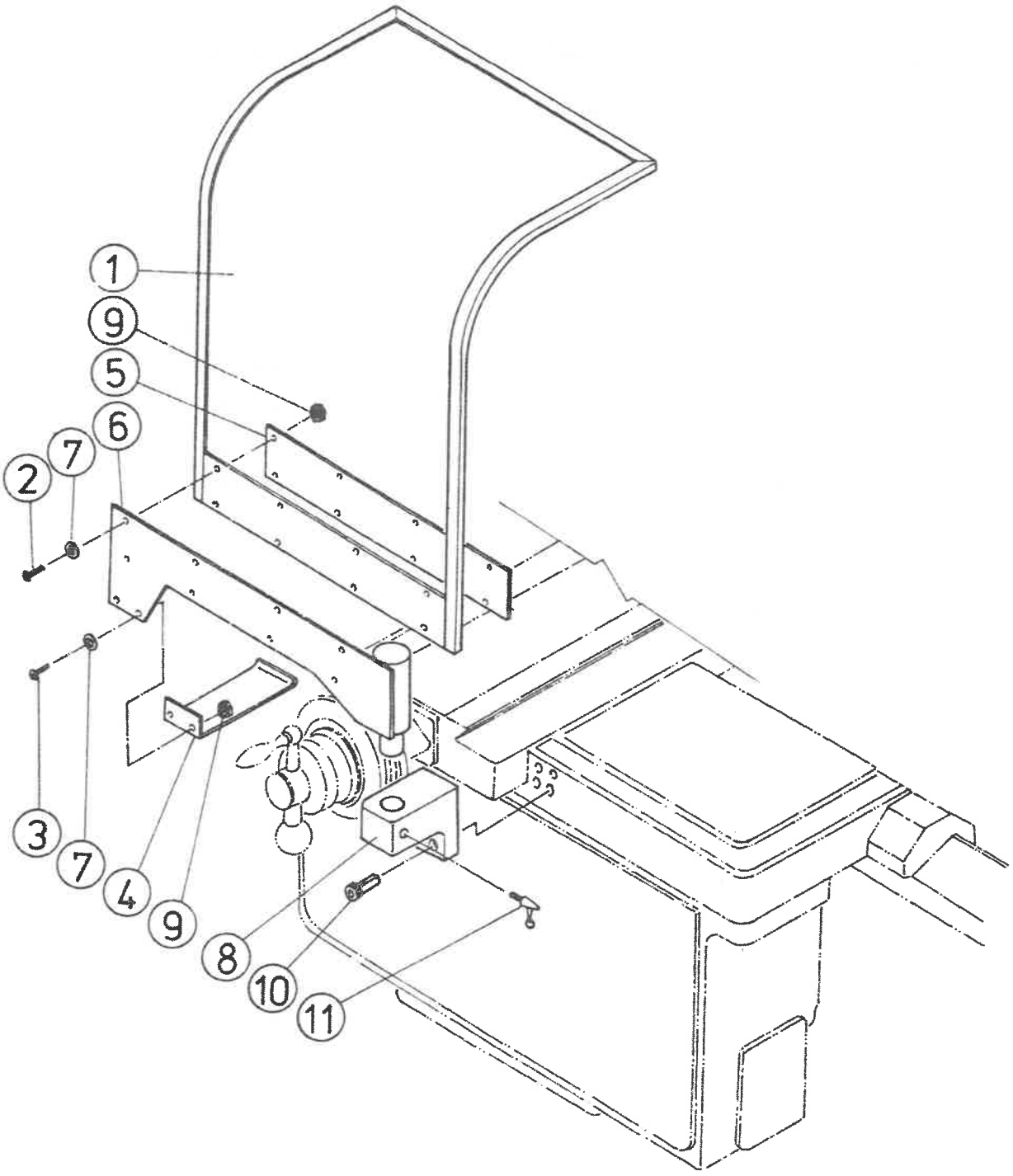
CHIP COVER

Diagram on page 107

No.	Part No	Part Name	Dimension
1	AE9ECP0030006	Cover	
2	21132M0602004	Cross recessed round head	M6×20L
3	21132M0601209	Cross recessed round head	M6×12L
4	AE9ECP0050008	Supporting plate	
5	AE9ECP0040007	Fitting plate for cover	
6	AE9ECP0020005	Fitting plate for cover	
7	21511M0601503	Spring washer	M6
8	AE9ECP0010004	Auxiliary cover	
9	21302M0600500	Hexagon nut	M6
10	21021M0602502	Hexagon socket bolt	M6×25L
11	AB9LP00230203	Special bolt	
1	AE9ECP0030006	Cover	
2	21132M0602004	Cross recessed round head	M6×20L
3	21132M0601209	Cross recessed round head	M6×12L
4	AE9ECP0050008	Supporting plate	
5	AE9ECP0040007	Fitting plate for cover	
6	AE9ECP0020005	Fitting plate for cover	
7	21511M0601503	Spring washer	M6
8	AE9ECP0010004	Auxiliary cover	
9	21302M0600500	Hexagon nut	M6
10	21021M0602502	Hexagon socket bolt	M6×25L
11	AB9LP00230203	Special bolt	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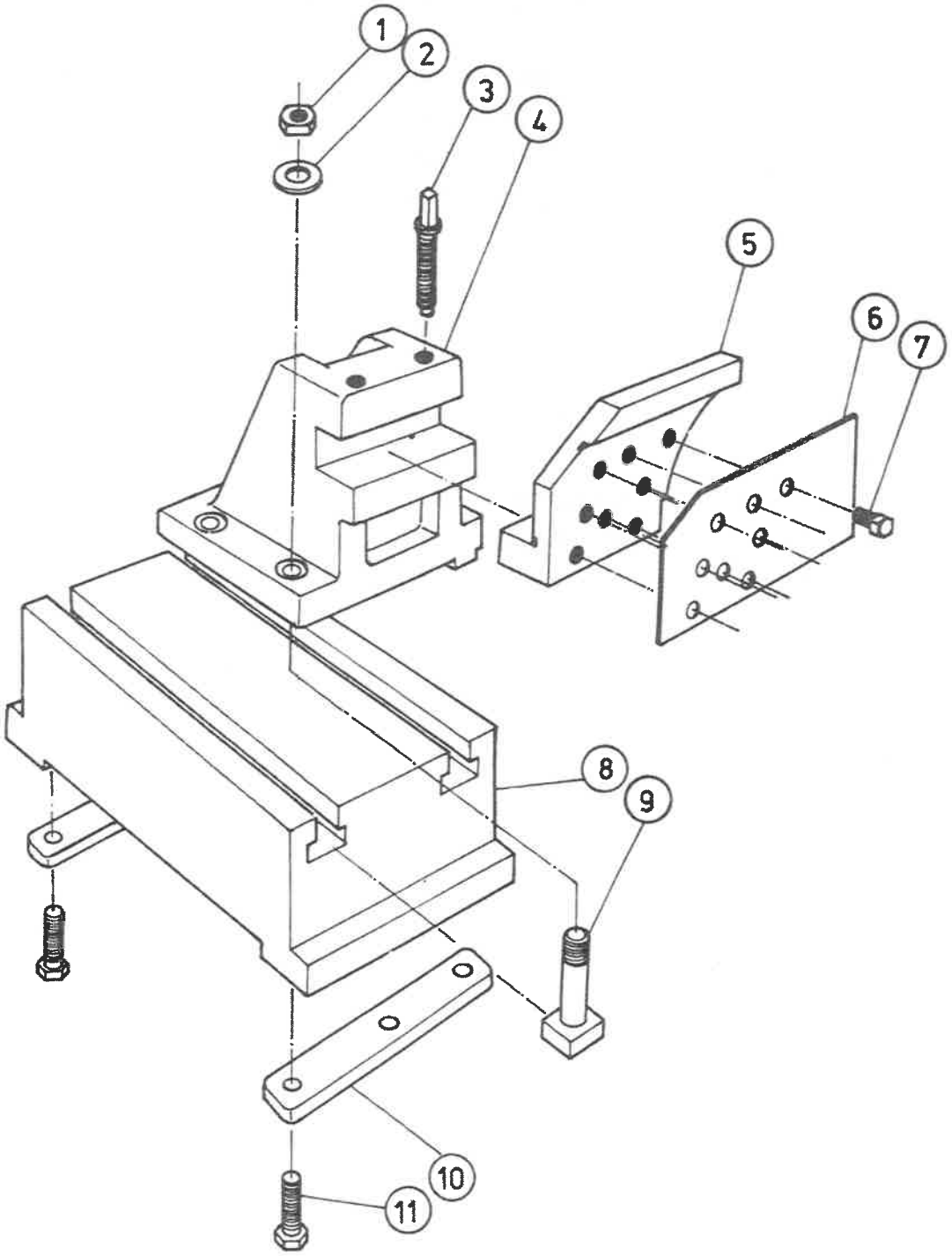
INFEED PLUNGE CUTTING ATTACHMENT

Diagram on page 109

No.	Part No	Part Name	Dimension
1	2130101B01009	Hexagon nut	W½"ø
2	1250101B00233	Washer	W½"ø
3	AB9T00005A001	Special bolt	
4	AE9E000020004	Tool post of cutting attachment	
5	AE9E000030005	Bit holder	
6	AE9E000040006	Bit	
7	2100103D003C9	Hexagon bolt	W⅜"ø×¾"L
8	AE9E000010201	Base of cutting attachment	Swing 25"
	AE9E000010003		Swing 30"
	AE9E000010102		Swing 34"
	AE9E000010300		Swing 40"
9	AE9EI00040006	T bolt	
10	AE9E000050007	Clamping plate	
11	2100103D1A1B8	Hexagon nut	W⅜"ø×1½"L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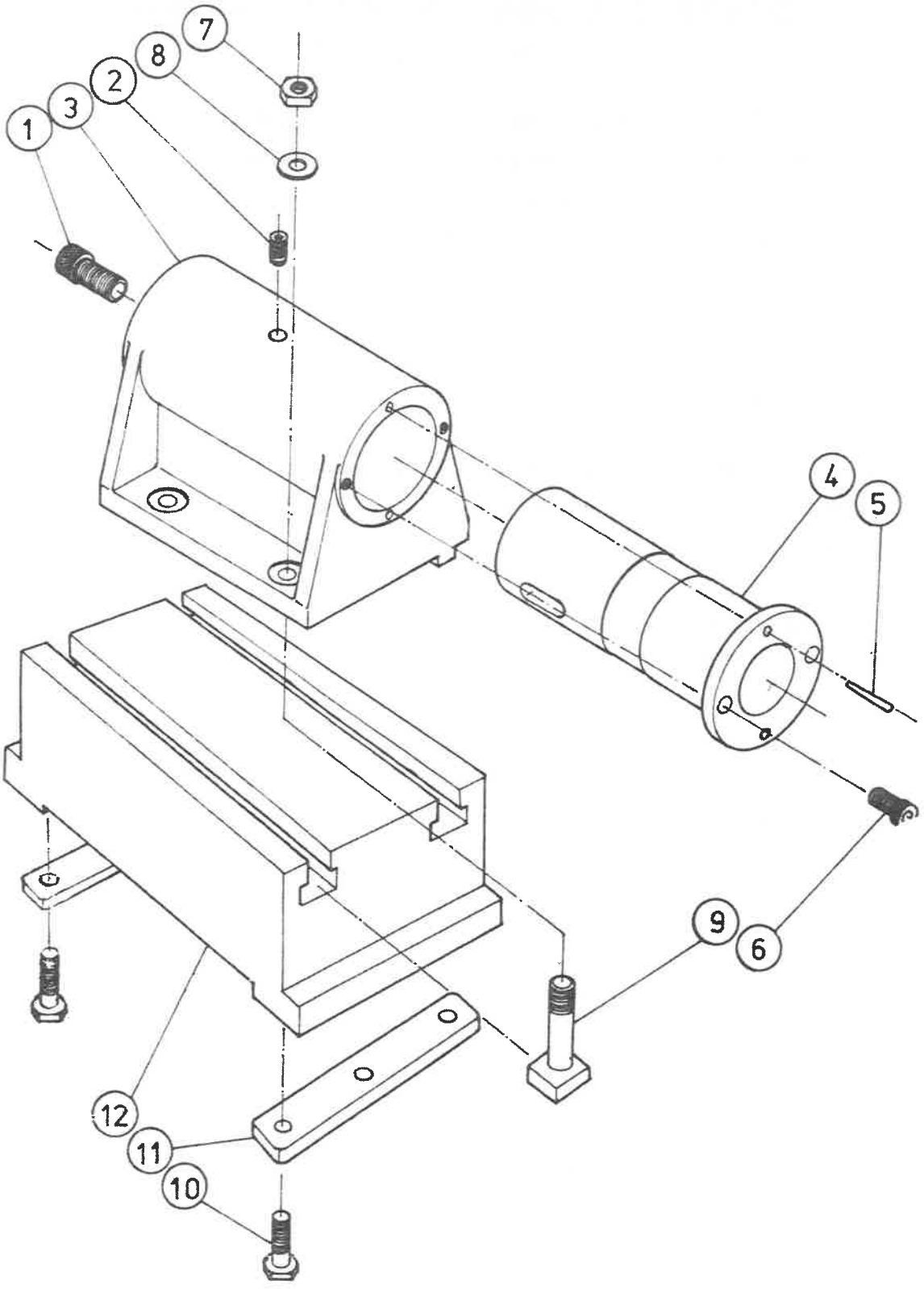
DRILLING ATTACHMENT

Diagram on page 111

No.	Part No	Part Name	Dimension
1	2102101B1A1B0	Hexagon socket bolt	W½"ø×1½"L
2	2104103D003C7	Hexagon socket set screw	W⅜"ø×¾"L
3	AE9E000070009	Drill attachment body	
4	AE9E000080000	Sleeve	
5	2193001004503	Taper pin	10ø×45L
6	21021M0802001	Hexagon socket bolt	M8×20L
7	2130101B01009	Hexagon nut	W½"ø
8	2150101B00233	Washer	W½"ø
9	AE9EI00040006	T bolt	
10	2100103D1A1B8	Hexagon bolt	W⅜"ø×1½"L
11	AE9E000050007	Clamping plate	
12	AE9E000010201	Base of drilling attachment	Swing 25"
	AE9E000010003		Swing 30"
	AE9E000010102		Swing 34"
	AE9E000010300		Swing 40"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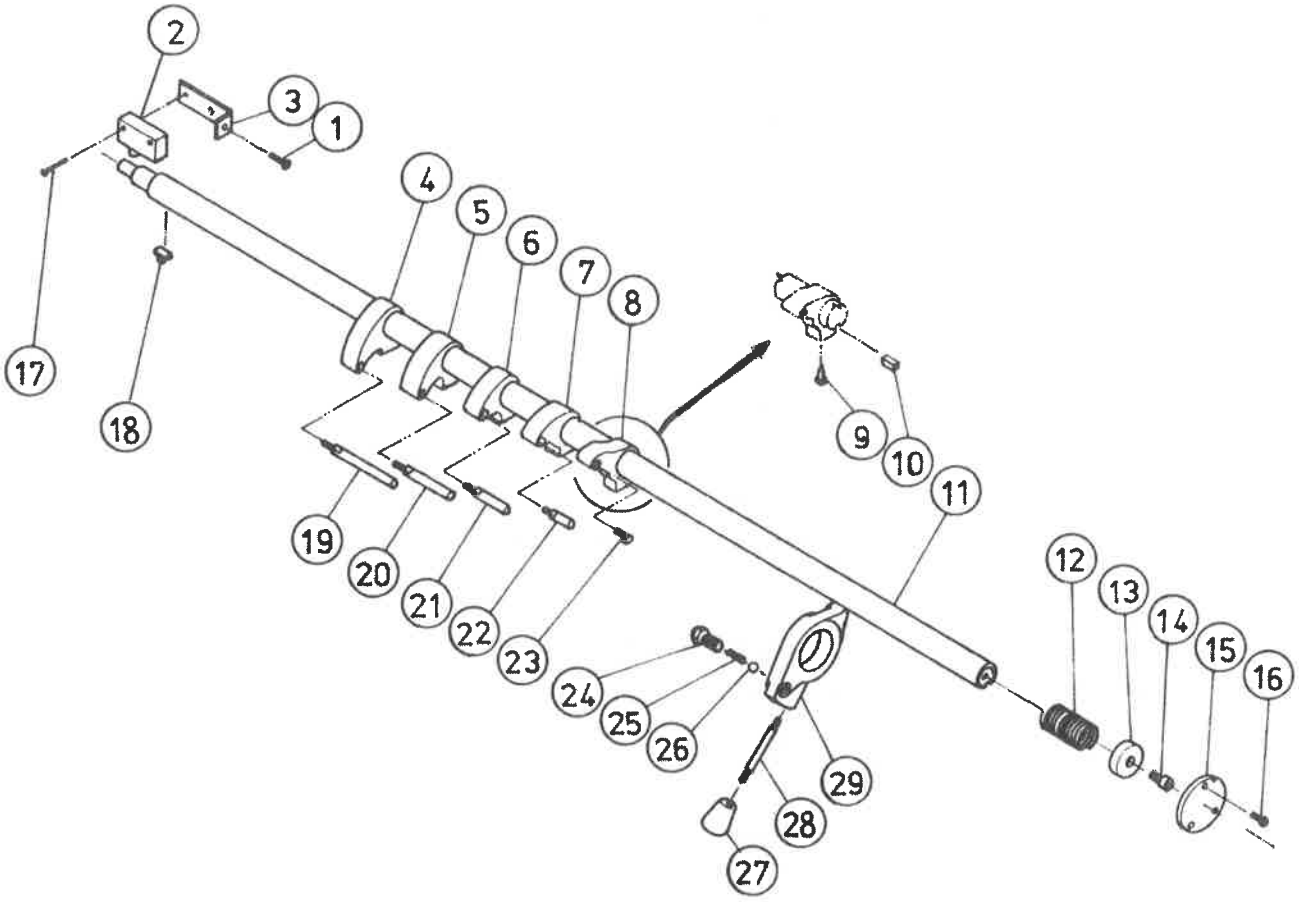
MULTIPLE AUTOMATIC FEED STOP BAR

Diagram on page 113

No.	Part No	Part Name	Dimension
1	21122M0601509	Cross recessed flat head screw	M6×15L
2		Limit switch	
3	AE9FA01140000	Base for limit switch	
4	AE9FA00450102	Stopper	
5	AE9FA00450201	Stopper	
6	AE9FA00450300	Stopper	
7	AE9FA00450409	Stopper	
8	AE9FA00450508	Stopper	
9	AB9T00048A007	Hexagon socket set screw	
11	AE9FA00440002	Stopper rod	
	AE9FA00440101		
	AE9FA00440200		
	AE9FA00440309		
	AE9FA00440408		
12	AE9FA00480006	Spring	
13	AE9FA00490007	Clamping plate	
14	21021M0802001	Hexagon socket bolt	M8×20L
15	AE9FA00530008	Cover	
16	21122M0501502	Cross recessed flat head screw	M5×15L
17	2113205G001A7	Cross recessed round head	W5⁄32"ø×1"L
18	AE9FA00520106	Special key	
19	AE9FA00460509	Pin	
20	AE9FA00460400	Pin	
21	AE9FA00460301	Pin	
22	AE9FA00460202	Pin	
23	AE9FA00460103	Pin	
24	AE9FA00200004	Special bolt	
25	AE9FA00210005	Spring	
26	2804005E00004	Steel ball	5⁄16"ø
27	AB9A000890000	Grip	
28	AD9F000690007	Lever	
29	AE9FA00190006	Dog	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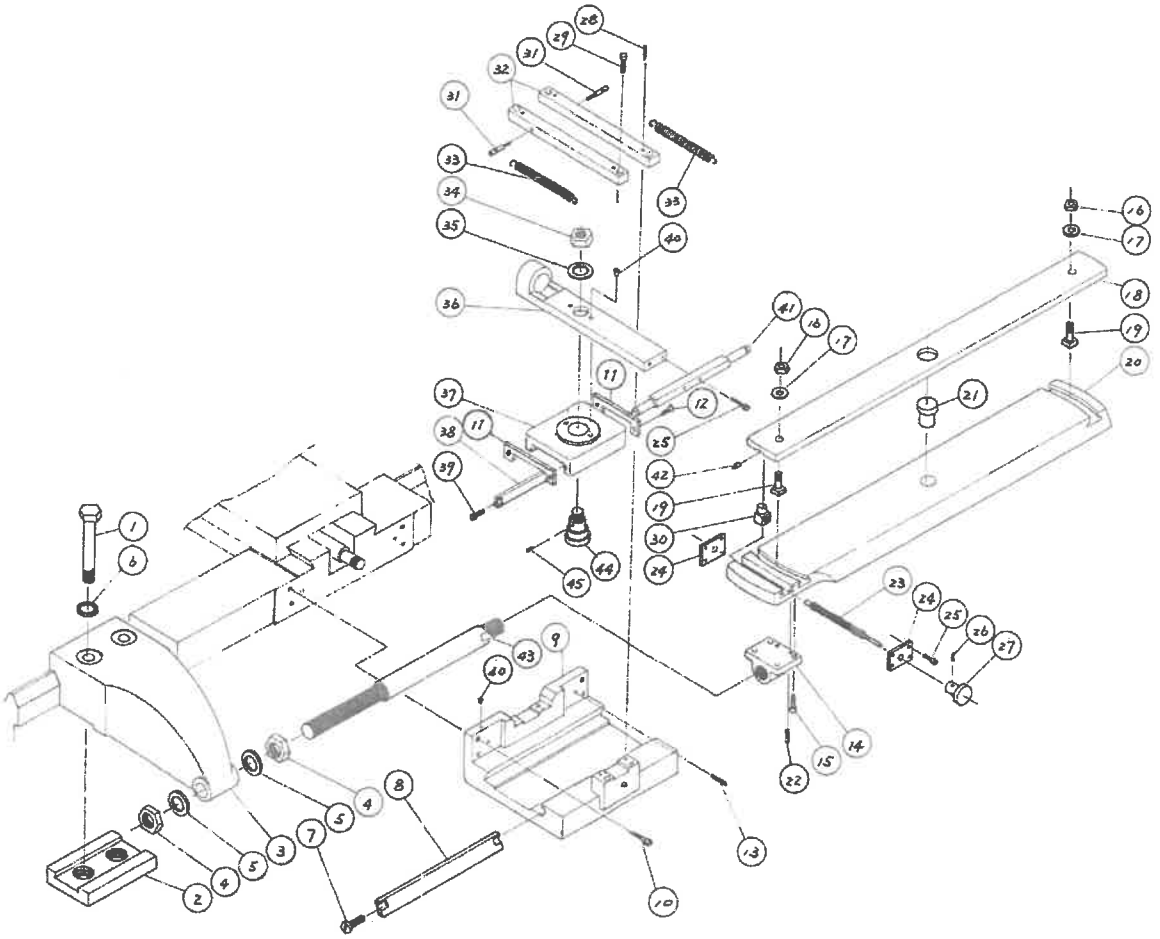
TAPER TURNING ATTACHMENT

Diagram on page 116A

No.	Part No	Part Name	Dimension
1	2100105D4A1B9	Hexagon bolt	W⅝"ø×4½"L
2	AE9EP00180003	Look plate	
3	AE9EPT2160002	Bracket	
4	AE9EP00510004	Hexagon nut	
5	AE9T002720006	Special washer	
6	AD9EP0019K004	Washer	
7	AE9EP00450001	Adjusting bolt	
8	AF9EPT2020001	Gib	
9	AE9EP0042A001	Slide base	
10	2102103D1A1B2	Hexagon socket bolt	W⅜"ø×1½"L
11	AF9EPT2070006	Felt cover	
12	21132M0601506	Cross recessed round head	M6×15L
13	2196M60804502	Taper pin	8ø×45L
14	AE9EP00220004	Female screw bracket	
15	2102103D003C3	Hexagon socket bolt	W⅜"ø×¾"L
16	2130101B01009	Hexagon nut	W½"ø
17	AD9EP0009K007	Washer	
18	AF9EPT2040003	Guide plate	8°× 500, 8°× 550
	AF9EPT2040102		7°× 600
19	AF9EPT2090008	Square bolt	
20	AE9EP00230005	Base	8°× 500
	AE9EP0023A008		8°× 500 (AMERICAN)
	AE9EP0023B001		8°× 550
	AE9EP00460002		7°× 600
21	AF9EPT2030002	Shaft	
22	2193000503001	Taper pin	5ø×30L
23	AE9EP00250007	Angle adjuster screw	
24	AE9EP00240006	Bracket	
25	21021M0602007	Hexagon socket bolt	M6×20L
26	2191000401806	Spring pin	4ø×18L
27	AE9EP00270009	Grip	
28	2193000504004	Taper pin	5ø×40L

No.	Part No	Part Name	Dimension
29	2102103D001A1	Hexagon socket bolt	W⅜"ø×1"L
30	AE9EP00260008	Special nut	
31	AE9EP00390008	Special bolt	
32	AE9EP00380007	Stay guide	
33	AE9EP00410007	Spring	
34	2130105D01306	Hexagon nut	w⅝"ø
35	AE9EP00330002	Washer	
36	AE9EP00370006	Guide plate	
37	AE9EP0034A006	Sliding saddle	
38	AF9EPT2060005	Gib	
39	AE9EP00360005	Adjusting bolt	
40	2803005E00007	Oil cup	5⁄16"
41	AE9EP00400006	Clamp shaft	
42	AD9EP0007K302	Indicator	
43	AE9EP0021A006	Clamp shaft	
44	AE9EP0032A004	Clamp shaft	
45	2192000400602	pin	4ø×6L



TAPER ATTACHMENT WITH SEMI-AUTO THREADING DEVICE

Diagrams on page 122A & 122B

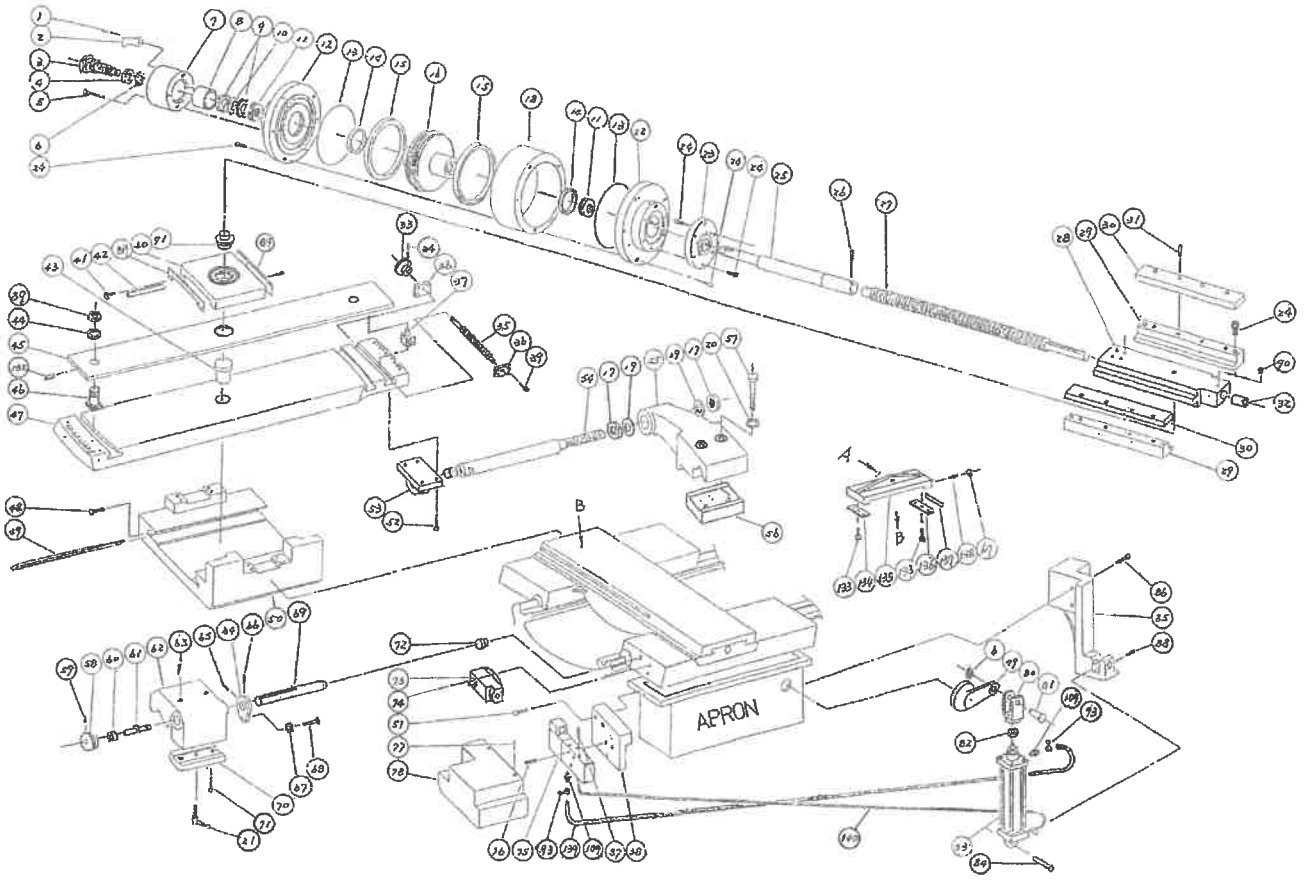
No.	Part No	Part Name	Dimension
1	2113201D005E4	Cross recessed headed screw	W⅛"x5⁄16"L
2	AF9EPT0230003	Plate	
3	AF9EPT0220007	Adjusting bolt	
4	AF9EPT0210006	Hexagon nut	
5	2102103D003A9	Hexagon hollow bolt	W⅜"x3"L
6	2170000STW154	Snap ring	STW-15
7	AF9EPT0200005	Cover	
8	AF9EPT0190007	Adjusting washer	
9	AF9EPT018A009	Grooved nut	
10	20100000AW032	Washer	AW03
11	BG00000512036	Thrust bearing	51203
12	AF9EPT0170005	Cover	
13	22100000P1501	O ring	P-150
14	22000000UP533	Oil seal	
15	2200000UP1356	Oil seal	
16	AF9EPT0130001	Piston stem	
17	AE9EP00510004	Special nut	
18	AF9EPT0160004	Cylinder	
19	AE9T002720006	Special washer	
20	AD9EP0019K004	Washer	
21	AE9EF00260008	Special bolt	
22	AF9EPT0120000	Cover	
23	AF9EPT0110009	Flange plate	
24	2102103D001A1	Hexagon hollow bolt	W⅜"x1"L
25	AF9EPT0090000	Feed rod	
26	2193000502503	Taper pin	5x25L
27	AF9EPT0080009	Screw	
28	AF9EPT0050006	Guide plate	
29	AF9EPT003R008		
	AF9EPT003L009	Stay guide	
30	AF9EPT0030005	Clamping plate	

No.	Part No	Part Name	Dimension
31	21021M0802001	Hexagon hollow bolt	M8×20L
32	AF9EPT0240009	Bushing	
33	AE9EP00270009	Grip	
34	2191000401806	Spring pin	4×18L
35	AE9EP00250007	Adjusting bolt	
36	AE9EP00240006	Cover	
37	AE9EP00260008	Special nut	
38	AE9EPT045A007	Plate	
39	21021M0602007	Hexagon hollow bolt	M6×20L
40	AF9EPT2050004	Sliding saddle	
41	AE9EP00360005	Adjusting bolt	
42	AF9EPT2060005	Gib	
43	AF9EPT2030002	Pin	
44	AD9EP0009K007	Washer	
45	AF9EPT2040003	Guide plate	8×500, 550
	AF9EPT2040102		7×600
46	AF9EPT2090008	T bolt	8×500
47	AE9EP00230005		8×500
	AE9EP0023A008		8×550
	AE9EP0023B001		7×500
	AE9EP00460002		
48	AE9EP00450001	Adjusting bolt	
49	AE9EPT2020001	Gib	
50	AF9EPT2010000	Slide base	
51	21021M0803004	Hexagon hollow bolt	M8×30L
52	2102103D003C3	Hexagon hollow bolt	W⅜"×¾"L
53	AE9EP00220004	Bracket	
54	AE9EP0021A006	Special bolt	
55	AF9EPT2160002	Bracket	
56	AE9EP00180003	Lock plate	
57	2100105D4A1B9	Hexagon bolt	W⅝"×4½"L
58	AE9EF0021A006	Micro collar	0.025mm
	AE9EF0021B007		0.01
59	21041M0501605	Hexagon hollow set screw	M5×16L
60	AE9EF0020A005	Bushing	
61	AE9EF0019A007	Screw	M10, P=1.25

No.	Part No	Part Name	Dimension
	AE9EF0019B000		W10-20TPI
62	AE9EF0016B007	Micro stop body	
63	AE9EF00220004	Hexagon hollow set screw	
64	AF9EPT0340006	Bracket	
65	2191000504000	Spring pin	5x40L
66	21041M0601008	Hexagon hollow set screw	M6x10L
67	21301M0800657	Hexagon nut	M8x6.5L
68	21001M0802502	Hexagon bolt	M8x25L
69	AF9EPT0330005	Screw shaft	M10, P=1.25
	AF9EPT0330104		W10-20TPI
70	AF9ET0004A009	Clamping plate	
71	AE9EF00230005	Special bolt	
72	AE9C002470001	Pin	
73	520140MRZVQ29	Limit switch	ZV-Q-2
74	21132M0401007	Cross recessed headed screw	M4x10L
75	453004F210083	Directional control valve	4F210-08
76	2113205G002A6	Cross recessed headed screw	W5/32"x2"L
77	21132M0601001	Cross recessed headed screw	M6x10"L
78	AF9EPT0470006	Cover	
79	AF9EPT026A004	Lever	
80	AF9EPT028A006	Bracket	
81	AF9EPT027A005	Pin	
82	21301M1400801	Hexagon nut	M14x8L
83	45200CA401006	Mini cylinder	CA40x100
84	AF9EPT029A007	Pin	
85	AF9EPT031A006	Bracket	
86	21021M0803509	Hexagon hollow bolt	M8x35L
87	4590001C00000	Noise silencer	1/4"
88	21041M0601503	Hexagon hollow set screw	M6x15L
89	AF9EPT2070006	Duster	
90	2803005E00007	Oil cap	5/16"
91	AF9EPT2080007	Pin	
92	AF9EPT056B008	Base plate	
93	4460001900002	Pipe casing	19
94	AF9EPT215B007	Support	
95	4500003D00004	Service unite	C3000-10

No.	Part No	Part Name	Dimension
96	4611000WEA8R5	Lubrication pump	WEA-8(R)
97	45300VV5FS336	Base	VV5FS3-31-031-03
98	4120003DPT008	Nipple	⅜"PT×⅜"PT
99	4110003DP0076	Tee	⅜"PT
100	AF9EPT041A003	Special nipple	⅜"PT
101	4481C0183DPT1	Nylon elbow	CIN½"×⅜"PT
102	4590003C00008	Noise silencer	⅜"PT
103	4151003DPT000	Plug	⅜"PT
104	448003DPTPS66	Nipple	⅜"PT×⅜"PS
105	413000002DPT2	Socket	¼"PT×¼"PS
106	4102000DPTPS2	90° elbow	¼"PT×¼"PS
107	4103000DPT002	90° elbow	⅜"PT×⅜"PT
108	4120003DPTPS3	Bushing	⅜"PT×¼"PT
109	4101002DPT006	Special nipple	¼"PT
110	44320000WDB62	Duster unit	WDB-6
111	44300000WPD48	Male connector	WPD-4
112	44200000WPB41	Sleeve	WPB-4
113	4316000400007	Aluminum pipe	4ø
114	4316000400007	Aluminum pipe	4ø
115	4316000400007	Aluminum pipe	4ø
116	4316000400007	Aluminum pipe	4ø
117	4316000400007	Aluminum pipe	4ø
118	43160WFHC4039	Flexible hose	WFAHC-403
119	AF9EPT3160001	Duster unit	⅜"PT
120	4151001OPT002	plug	
121	41500CKDCS103	Flow control valve	CS1
122	4320001B00042	Nylon tube	½"
123	4310PS3P07803	Flexible tube	⅜"PS×780L
124	4520MA2530009	Mini cylinder	MA25×300-S-CA
125	4100PS2DPT002	90° elbow	⅛"PT×¼"PS
126	4310PS2D11906	Flexible tube	¼"PS×1190L
127	AF9EPT0440003	Pipe	
128	4310PS3D06503	Flexible tube	⅜"PS×650L
129	4310PS2D02403	Flexible tube	¼"PS×240L
130	45300VFS33209	Directional control valve	VFS-3320-3D-03
131	45300VFS31203	Directional control valve	VFS-3120-3D-02

No.	Part No	Part Name	Dimension
132	4310PS2D07903	Flexible tube	¼"PS×790L
133	21001M0803000	Hexagon bolt	M8×30L
134	AF9EPT2140000	Lock plate	
135	AF9EPT2110007	Bracket	
136	AF9EPT2110009	Lock plate	
137	AF9EPT2120008	Gib	
138	21041M0803008	Hexagon socket head screw	M8×30L
139	4310PS2D09008	Flexible tube	¼"PS×900L
140	4310PS2D10309	Flexible tube	¼"PS×1030L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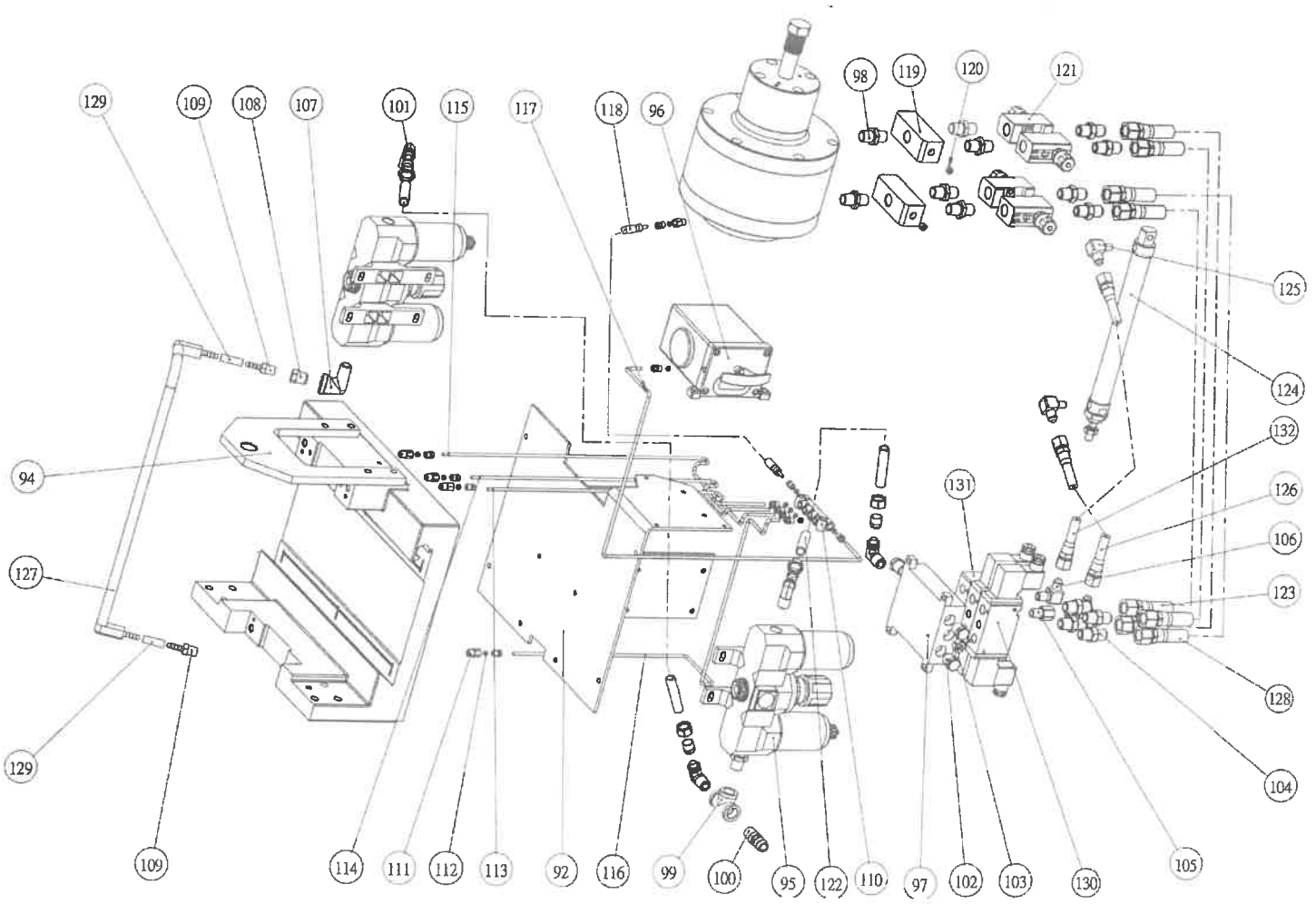
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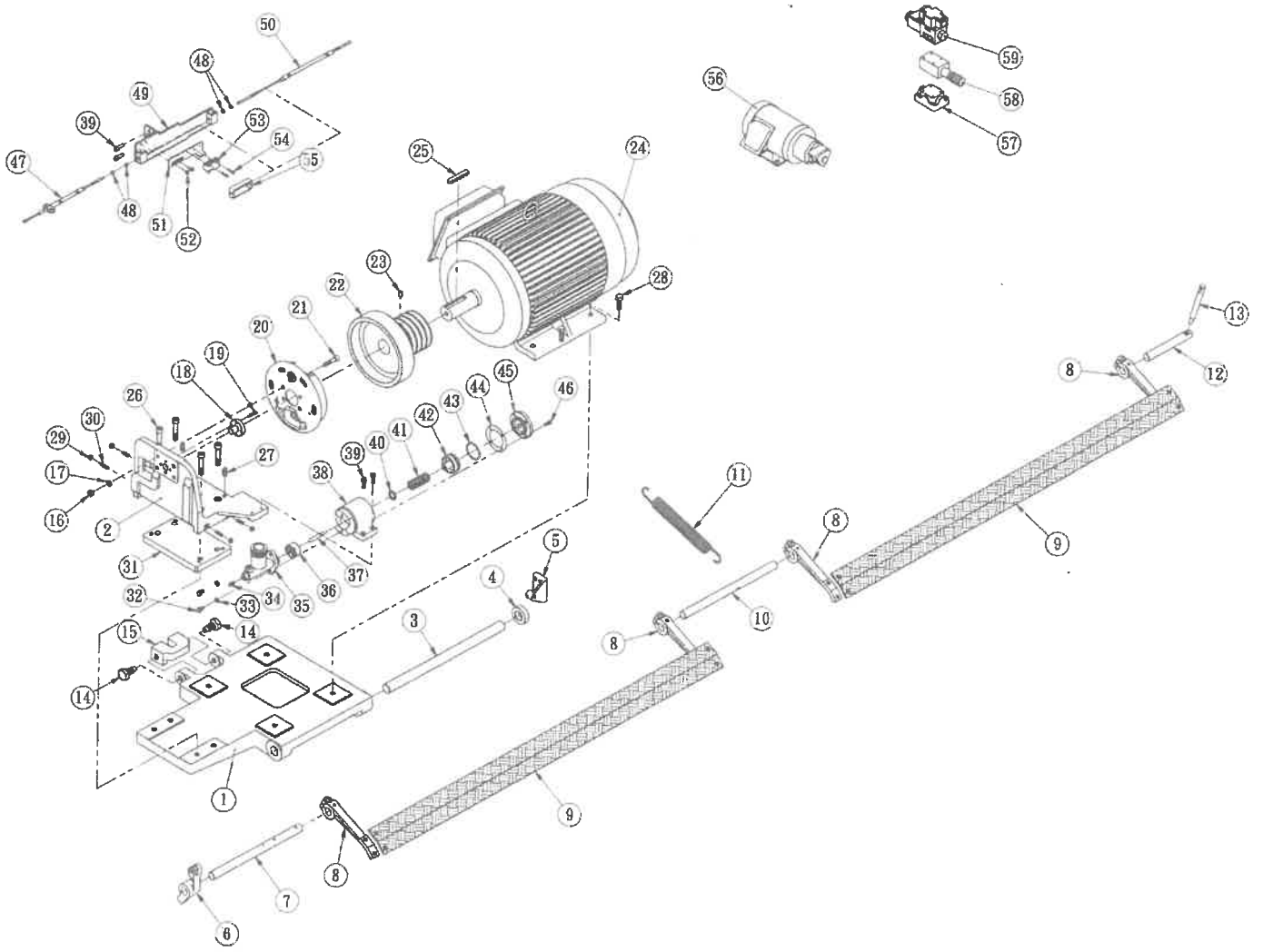
HYDRAULIC BRAKE SYSTEM

Diagram on page 124A

No.	Part No	Part Name	Dimension
1	AE9FA00740102	Moter base	
2	AE9FA0201A002	Brake base	
3	AE9FA00750004	Shaft	
4	AE9FA00760005	Collar	
5	AE9FA00890005	Bracket for wire	
6	AE9FA00900003	Lever for wire	
7	AE9FA00570002	Shaft	
8	AE9FA00560001	Brake arm	
9	AE9FA00550000	Brake pedal	2000×1
	AE9FA00550109	Brake pedal	3000×2＆7000×2
	AE9FA00550208	Brake pedal	4000×2
	AE9FA00550307	Brake pedal	4000×1
	AE9FA00550406	Brake pedal	5000×2&6000×5&7000×3
	AE9FA00550505	Brake pedal	2000×2
10	AE9FA01120107	Shaft	3000
	AE9FA01120206	Shaft	4000~7000
11	AE9FA00600002	Spring	
12	AE9FA00580003	Spring holder	
13	AE9FA00590004	Spring holder shaft	
14	AE9FA00780007	Special bolt	
15	AE9FA00770006	Suppoter for motor base	
16	21301M1000803	Hexagon Nut	M10 x 8T
17	21511M1000259	Spring washer	M10 x 2.5T
18	AE9FA02020000	Shaft	
19	21021M0602007	Hexagon socket bolt	M6 x 20L
20	29030011314E 9	Brake choe complete	70821
21	21001M1004501	Hexagon bolt	M10 x 45L
22	AE9FA02210607	V pulley With brake drum	30HP x 4P 60Hz
	AG9FA02210115	V pulley With brake drum	30HP x 4P 50Hz
23	2104103D005D2	Set screw	W3/8" x 5/8"L
24	51303046240T0	Main motor	30HP-4P-60Hz-240V
	51303045220T7	Main motor	30HP-4P-50Hz-220V

No.	Part No	Part Name	Dimension
25	218001409080 7	Key	14 x 9 x 80L
26	2102101B2A1B1	Hexagon socket bolt	W½"x 2½"L
27	21041M1202507	Hexagon socket set screw	M12 x 25L
28	2100101B1A1B6	Hexagon bolt	W½" x 1½"L
29	21301M0800657	Hexagon Nut	M8 x 6.5T
30	21041M0802500	Hexagon socket set screw	M8 x 25L
31	AE9FA02230005	Plate	
32	21001M0801509	Hexagon bolt	M8 x 15L
33	21511M0800201	Spring washer	M8 x 2T
34	4150001DPT005	Plug	1/8" PT
35	AE9FA02040002	Master cyinder	
36	AE9FA02090007	Adjusting nut	
37	AE9FA02050003	Pin	
38	AE9FA02060004	Booster	
39	21021M0802506	Hexagon socket bolt	M8 x 25L
40	AE9FA02100005	Washer	
41	AE9FA02080006	Spring	
42	AE9FA02070005	Collar	
43	221000000P50 0	O ring	P-50
44	AE9FA02120007	Packing	
45	AE9FA02110006	Cover	
46	21021M0601509	Hexagon socket bolt	M6 x 15L
47	AE9FA01730100	brake cable	
48	21302M0600500	Hexagon Nut	M6
49	AE9FA02250007	Bearer	
50	AE9FA01730001	brake cable	
51	AE9FA02270009	Limit switch bracket	
52	21021M0601202	Hexagon socket bolt	M6 x 12L
53	520140MRZVQ29	Limit switch	
54	2113205G003C9	Cross recessed round head	W5/32" x 20L
55	AE9FA02260008	Box	
56	4611MT2013MV0	oil pump with Relief valve	ROP-1MT200-13mA +1VB
57	46507JS01M029	base	
58	4650702B040K5	Relief valve	MRF-02B-0-40-K
59	46507G02B2A13	Solenoid valve	SWH-G02-B2-A110-10(HR)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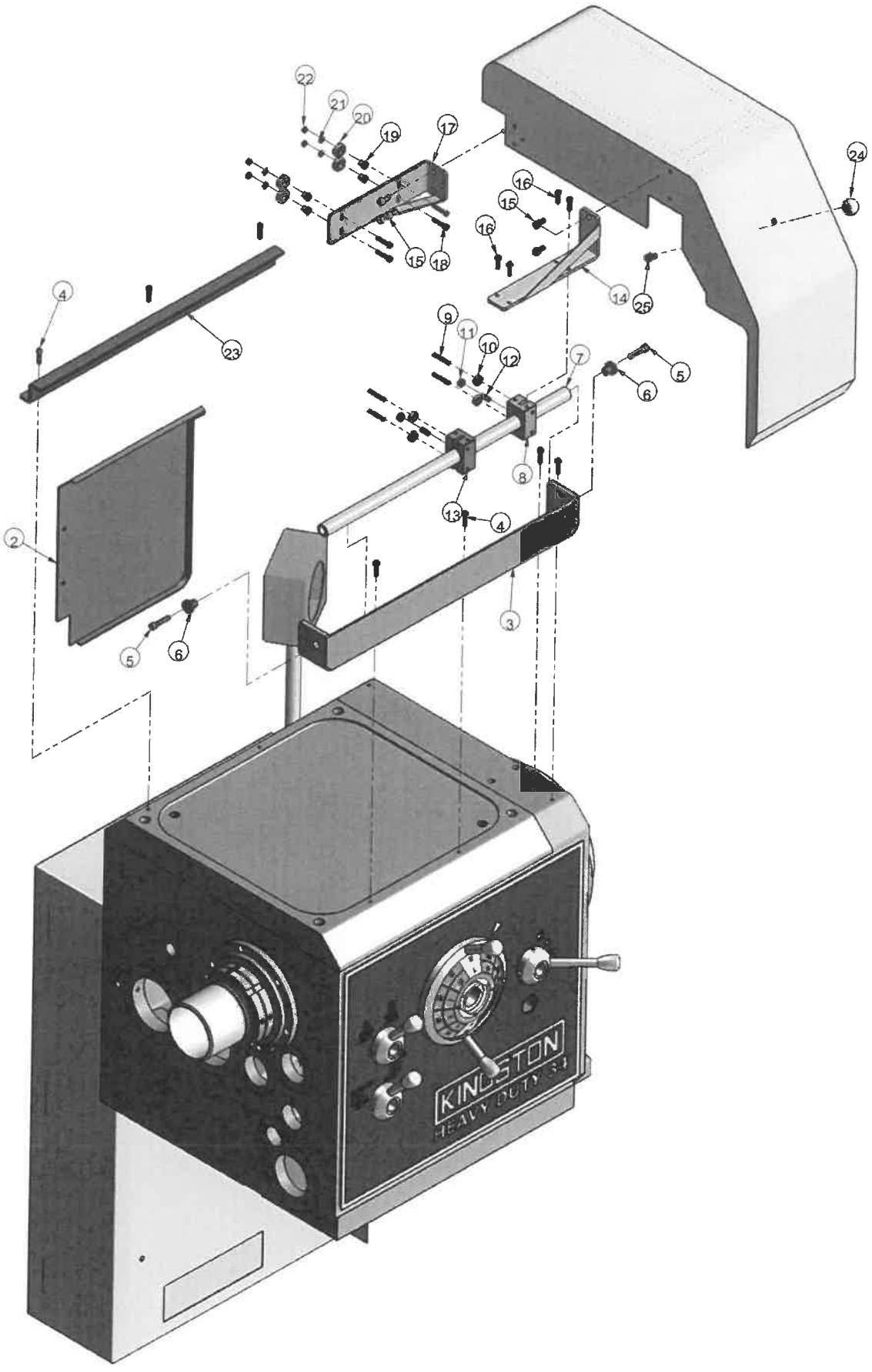
CHUCK GUARD

Diagram on page 127

No.	Part No	Part Name	Dimension
1	AE9FA0305A005	Cover	
2	AE9FA0309A108	Cover	
3	AG9FA0702A004	Bearer	
4	21021M0602502	Hexagon socket bolt	M6×25L
5	21021M0803509	Hexagon socket bolt	M8×35L
6	AG9FA07090008	Bush	
7	AG9FA07030002	Shaft	
8	AG9FA0701A003	Slider	
9	21041M0604007	Hexagon socket set screw	M6×40L
10	BG00000626ZZ1	Bearing	626ZZ
11	21302M0800658	Hexagon Nut	M8
12	21041M0802005	Hexagon socket set screw	M8×20L
13	AG9FA0710A009	Slider	
14	AE9FA03060003	Bracket	
15	21021M0801503	Hexagon socket bolt	M8×15L
16	21021M0602007	Hexagon socket bolt	M6×20L
17	AE9FA0307A007	Bracket	
18	21021M0603000	Hexagon socket bolt	M6×30L
19	AG9FA070980007	Bush	
20	BG00000060009	Bearing	6000ZZ
21	21502M0600164	Washer	M6
22	21302M0600500	Hexagon Nut	M6
23	AE9FA03080005	Slider rail	
24	AE9FA03110005	Grip	
25	2102103D003C3	Hexagon socket bolt	W3/8"×3/4"L


KINGSTON
HEAVY DUTY