

YCM-1½ VS

Operation, Maintenance, and Parts Manual

Turret Milling Machine

SUPERMAX

H. H. Roberts Machinery Ltd.

~~1½ VS mill~~

Mississauga, Ontario

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SUPERMAX®

**DO NOT OPERATE
WITHOUT
EYE PROTECTION**

**DO NOT OPERATE
WITHOUT GUARDS**

CAUTION
KEEP HANDS OUT
OF MACHINE

CAUTION
**DISCONNECT
POWER BEFORE
SERVICING**

前 言 FOREWORD

I 公司概況：

Outline of Yeong Chin

1. 名稱：永進機械工業股份有限公司

Full Name: Yeong Chin Machinery Industries Co., Ltd.

2. 地址：台中縣神岡鄉新庄村和睦路639號 電話：(045)623211(10線)

Address: 639 Ho Mu Road, Hsin Kang, Shen Kang, Taichung, Taiwan.
R.O.C. TEL:(045)623211(10 LINES)

3. 董事長：陳金森

Chairman: Chin-Shun Chen

4. 資本額：新台幣 2 億元

Capital: NT\$: 200,000,000.00

5. 產品項目：各式銑床

Products: Milling Machines

6. 廠房面積：42570方公尺

Floor Space: 42570m²

7. 廠區面積：158400方公尺

Land Space: 158400m²

8. 員工人數： 590人

Employees: 590人

9. 各地營業所：台北、高雄、豐原

Offices: Taipei, Kaoshung, Feng-Yuan

II 公司沿革：

History:

1. 民國43年本公司前身永進鐵工廠成立，製造包裝機。

In 1954, Yeong Chin Iron Works (Yeong Chin's Precedent Name) was founded.

2. 民國58年 4 月，改組成立永進機械工業股份有限公司，當時登記資本額新台幣320萬元，計劃專門生產高級精密銑床。

In April, 1969, Yeong Chin Machinery Industries Co., Ltd. was reorganized, its capital was NT\$3,200,000,- and planned to produce high class precision Milling Machines.

3. 民國59年遷至台中縣神岡鄉，增資登記資本額640萬元，擴建廠房。

In 1970, Our workshop was moved to Shen-Kang, Taichung for expanding plant space and capital was increased to NT\$6,400,000.

4. 民國61年，開拓東南亞市場外銷業務，鑄造廠遷移，更新設備，增資後資本額為1280萬元，為奠定外銷業務基礎，以品質為重，開始實施品質管制，使銑床精密度合於國際標準。

In 1972, export business was extended to South-East Asian countries. Casting workshop was expanded and increased new equipments. At this time, quality control was executed severely and proven to achieve international standard. Capital was also increased to NT\$12,800,000.

- 5 民國62~64年間，不斷地在擴充廠房及更新設備，資本額增至 7,000 萬元，並拓展美洲、歐洲、澳洲、南非外銷市場，開發P.C.程式控制 YCM-PV5 銑床成功，正式列入生產。
- From 1973 to 1975, Our Company's plant building and production equipment were expanded continuously. At the same time, the markets of America, Europe, Australia, South Africa were expanded, P.C. program Control YCM-PV5 Milling Machine was also developed successfully and produced. This time, capital was increased to NT\$ 70,000,000.-.
- 6 民國65年開發D.P.C.程式控制 YCM-3MAV 銑床成功，正式列入生產。
- In 1976, D.P.C. Program Control YCM-3MAV Milling Machine was developed successfully and produced.
- 7 民國66年開發D.P.C.程式控制 YCM-3MAH 銑床成功，正式列入生產。
- In 1977, D.P.C. Program Control YCM-3MAH Milling Machine was developed successfully and produced.
- 8 民國67年4月增資為 9,600 萬元，同時本公司產品榮獲經濟部商品檢驗局品管考核及輸出商品分等檢驗列為甲等，10月再增為 2 億元，擴建新廠及增購新設備。
- In April, 1978, capital was increased to NT\$ 96,000,000.-. At the same time, our products were evaluated by Bureau of Commodity Inspection & Quarantine under Ministry of Economic Affairs the First Class. In October, capital was increased again to NT\$ 200,000,000.- for expanding new factory building and increasing equipments.
- 9 民國69年本公司產品膝型立式、臥式銑床榮獲中央標準局^正字標記，同時開發數值控制銑床YCM-MK5成功，並正式列入生產。
- In 1979, Our products of Horizontal Milling Machines and Vertical Milling Machines were granted to use the Mark "^正", and N.C. Milling Machine YCM-MK5 was developed successfully and produced.
- 10 民國67年新廠第一期擴建完成，並進口歐美新式精密工作母機參加生產行列，同時推出無段變速銑床 YCM-1½VS, YCM-2GS 成功，並列入生產。
- In 1980, the first expanding project in our new factory building had been finished. Many newest European and American precision machine tools were imported and settled for production. At the same time, the infinitely variable speed turret milling machines Model YCM-1½VS and YCM-2GS were produced successfully.
- 11 民國70年新廠第二期擴建完成空調廠房，進口瑞士精密治具搪床及英國三次元檢驗機參加生產行列，同時開發 YCM-VMC-86A 床台型立式綜合加工中心機成功。電腦中心安裝 IBM 系統34之電腦，使管理科學化。
- In 1981, the second expanding project in air-conditioning shop was finished. We set up DIXI precision jig boring machine from Switzerland and Co-ordinate measuring machine from England, and developed Model YCM-VMC-86A bed type machining center successfully. By using IBM system 34 computer, Computer Center provided more scientific management.

12. 民國71年陸續推出YCM-20, YCM-60膝型綜合加工中心機，以及YCM-VMC-60A床台型綜合加工中心機成功，並正式列入生產。

In 1982, Model YCM-20 and YCM-60 knee type machining centers and Model YCM-VMC-60A bed type machining center have been developed and being produced successfully.

III 本機(YCM-1½VS)特點：Features:

1. 立銑、斜銑、鑽孔、搪孔、刻模、模具搪孔等作業均可於此型式的銑床完成，頭部可左右45°旋轉。

► The model YCM-1½VS, turret milling machine is suitable for vertical milling, angular milling, drilling, boring, diesinking, jig boring etc.. The vertical head may be tilted to 45° from the vertical position as necessary.

2. YCM-1½VS主軸無段變速從60~4200r.p.m.能滿足不同材質和切削條件的需要。YCM-1½VS spindle speed is infinite variable from 60 to 4200 r.p.m. The model can fit the requirements of various materials and working conditions.

3. 主軸具有自動升降機構

The quill is provided with 3 rates of feed, which can be used for both up feed and down feed.

4. 主軸經平衡校正具最佳之靈敏性。

Counter balanced quill and spindle provides extreme sensitivity.

5. 具有昇降深度指示其精度達0.025mm(0.001")。

Micrometer depth stop graduated in 0.025 millimeters or 0.001 inches.

6. 機體結構強韌，滑動面寬大，穩定性特佳。

The machine has a very strong construction and extra wide slidway offering maximum rigidity and stability.

7. 附有工作台自動進給裝置。

An accessory of table power feed unit.

IV 本書重要性 Purposes of this manual

機器在使用前，操作者應對機器之構造、各種操作方法、保養、潤滑要有深入的瞭解。本書即提供這方面的資料，請操作前詳讀本說明書，並遵照本書之說明，做正確之操作與保養，使機器能保持高精密度及延長使用壽命，而得以發揮最大工作效率。

We are greatly grateful to you for choosing our products, we are confident that our Milling Machines will satisfy your expectations for they have many outstanding features such as rigidity, high accuracy, versatility.....etc. In order to manifest thoroughly the performances of these Milling Machines, for it may be used for a long time without any trouble. We expect all operators and those who concerned with maintenance will READ THIS MANUAL CAREFULLY BEFORE STARTING THESE MACHINES for it describes operation, inspection, maintenance, lubrication and procedures of set up of these Machines. We hope all operators always consult this Manual, for these Machines long life.

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IMPORTANT

Attention is drawn to the requirement of the Health and Safety at Work Act, should always be operated to conform with the appropriate regulations.

Other safety precautions are discussed in the American National Standards Institute Standard entitled Safety Requirements for the Construction, Care, and Use of Drilling, Milling, and Boring Machines (ANSI B11.8-1974).

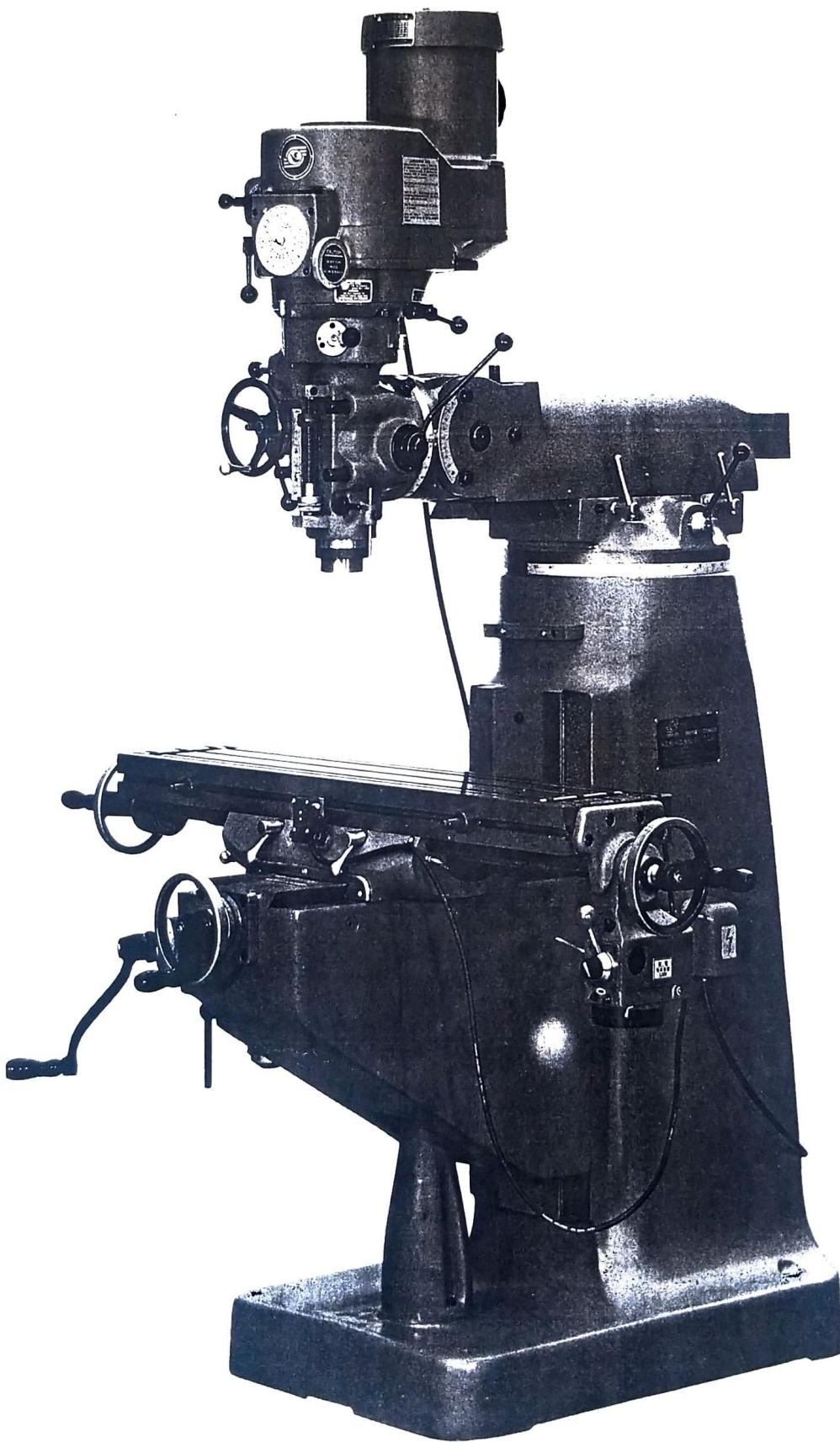
To assist machine users in designing point of operation safeguarding for their specific machine applications, the Occupational Safety and Health Administration has published a booklet entitled Concepts and Techniques of Machine Safeguarding (O.S.H.A. Publication Number 1910. 212).

General precautions for safe operation.

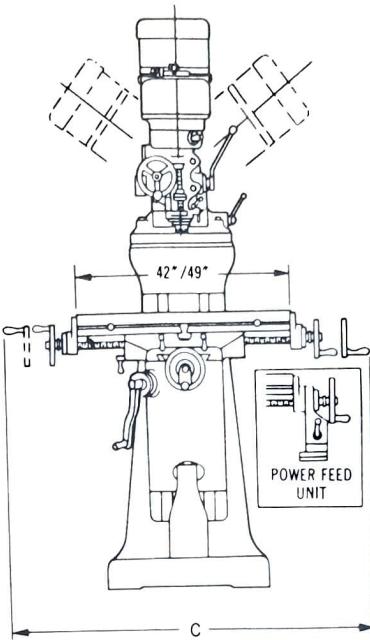
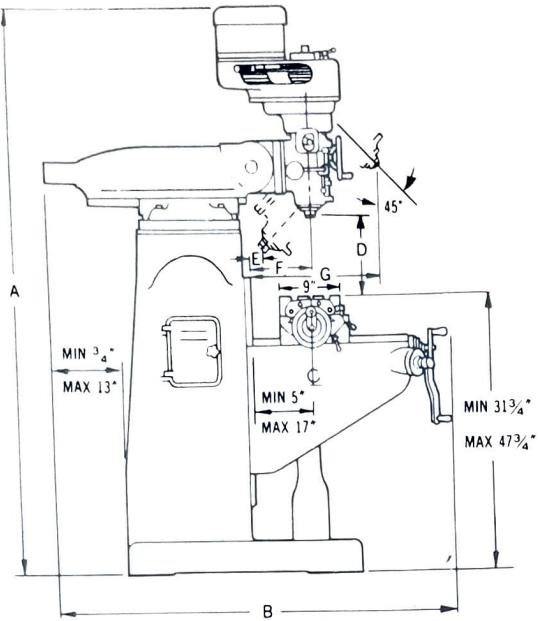
The general precautions to safety operate this machine are described below to supplement the operation technique and safety precautions explained by our engineer or dealer when the machine is installed. Our products are well designed to ensure the safety of all machine sections.

If the machine is used improperly, however, a serious accident may occur. The basic safety precautions are described below.

- (1) Safeguarding for protection at the point of operation can only be designed and constructed when the parameters of the particular operation have been determined. As a result, ANSI B11.8-1974.
 - (2) The machine should be operated by a trained operator familiar with the machine. Operators not familiar with the machine should be trained before operating the machine.
 - (3) The operator should not come close to, touch, or bring an object close to any rotation or moving part.
- * Carefully read the manuals listed below to fully understand their contents.
- * FOR SAFETY AND CORRECTION OPERATION, TO READ THIS MANUAL BEFORE OPERATING THIS MACHINE IS STRONGLY REQUESTED!



規格 Specification



規 格 SPECIFICATIONS

項 目 ITEM

	IN	MM
工作台長度 Table length	42	1067
工作台左右進給行程 Longitudinal travel(X)	29 $\frac{21}{64}$	745
工作台左右進給行程(附自動進給裝置) Longitudinal travel (with power feed unit)	26 $\frac{3}{16}$	665
工作台前後進給行程 Cross travel(Y)	12	305
工作台上下進給行程 Vertical travel of knee(Z)	16	406
A.全 高 A. Overall height	80 $\frac{1}{2}$	2045
B.全長(前後) B.Overall depth	63 $\frac{3}{4}$	1620
C.全寬(左右) C.Overall width	87 $\frac{3}{4}$	2230
D.工作台面至主軸端面距離(最小～最大) D. Spindle nose to table	min 0 max 17 $\frac{9}{16}$	0 446
E.頭部內傾45°與機身滑動面之距離(最小～最大) E. Head 45° inward	min 0 max 11 $\frac{1}{4}$	0 285
F.頭部正90°與機身滑動面之距離(最小～最大) F. Head 90°	min 6 $\frac{3}{4}$ max 19	171 482
G.頭部外仰45°與機身滑動面之距離(最小～最大) G. Head 45° outward	min 9 max 21	228 533

Spindle speeds 80 135 210 325 660 1115 1750 2720 (R.P.M.) (60Hz)

Power feed per spindle revolution .0017" .0032" .0053" (.04 .08 .13mm)

Special Accessories: Coolant System

Power Longitudinal Feed

※We reserve the right to modify and improve our products.

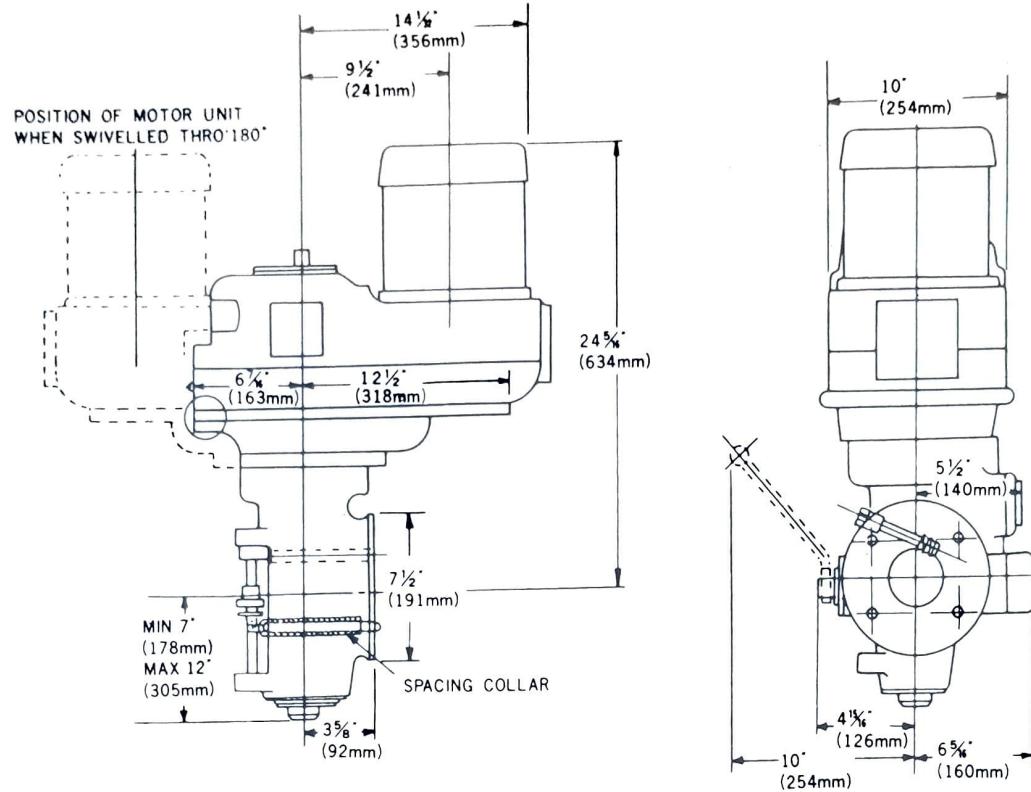
Spindle taper-R.8 or N.S.T. #30

Quill travel- 5" (127mm)

Motor- 2HP

Net weight: 2100 lbs (950 kgs)

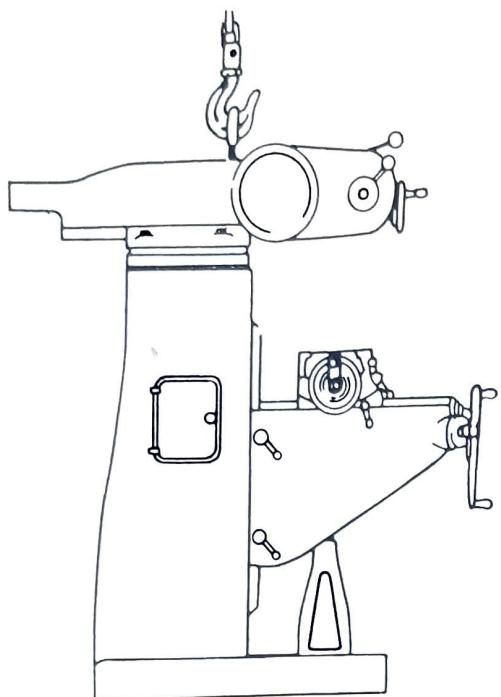
規格 Specification



頭部規格 Specification of head

主軸迴轉數(無段)(轉/每分) Spindle speeds R.P.M. (60 cycles)-60~4200 (Ininitely variable)
主軸一迴轉之自動進給量 Power feed per spindle revolution .0017" .0032" .0053" (.04 .08 .13mm)
主軸端孔斜度 Spindle taper-R 8 or N. S. T. #30
主軸昇降套之進給行程 Quill travel-5" (127mm)
夾持範圍 Collet capacity $\frac{1}{8}$ " to $\frac{3}{4}$ " (3mm-19mm)
馬達馬力數 H. P. of Motor - 2
重量 Weight-196 lbs. (89kgs)

安裝Installation



本機重量約為2200 lbs.(997kgs)

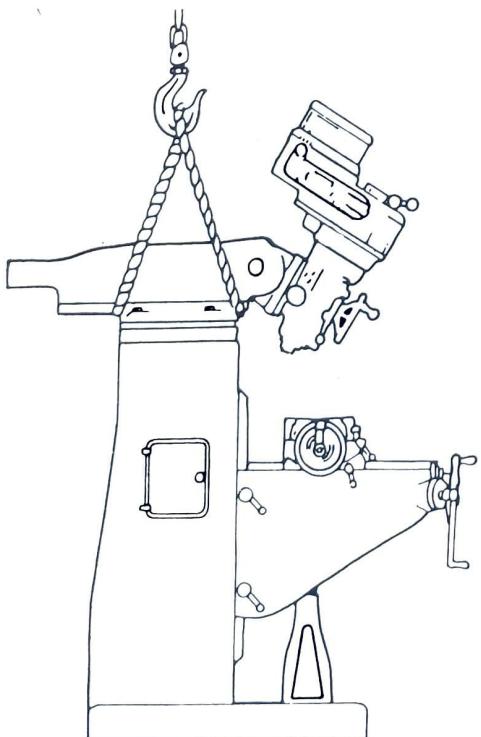
This machine approximately 2200
lb (997kgs)

方法 1

如左圖所示：在吊起機器之前，先將頭部迴轉並固定，然後用 $\frac{5}{8}$ "-11UNC 環首螺栓將其確實鎖牢於伸出臂之螺紋孔內再行吊動。

METHOD 1

Insert $\frac{5}{8}$ "-11UNC Whitworth eye bolt in tapped hole. Ensure bolt is fully secured before lifting. It is advisable to swivel head before lifting machine



方法 2

如左圖所示：在吊起機器之前，先將頭部前傾並固定，然後掛上適當的繩索，並在繩與機器接觸處墊上軟布墊，再行吊動。

METHOD 2

Use rope sling as illustrated. Insert pads of soft cloth between rope and machined edges. It is advisable to tilt the head before lifting machine.

安裝Installation

木箱搬運 Transfer package



當機器裝箱後，其搬運方法如圖示(利用堆高機)。

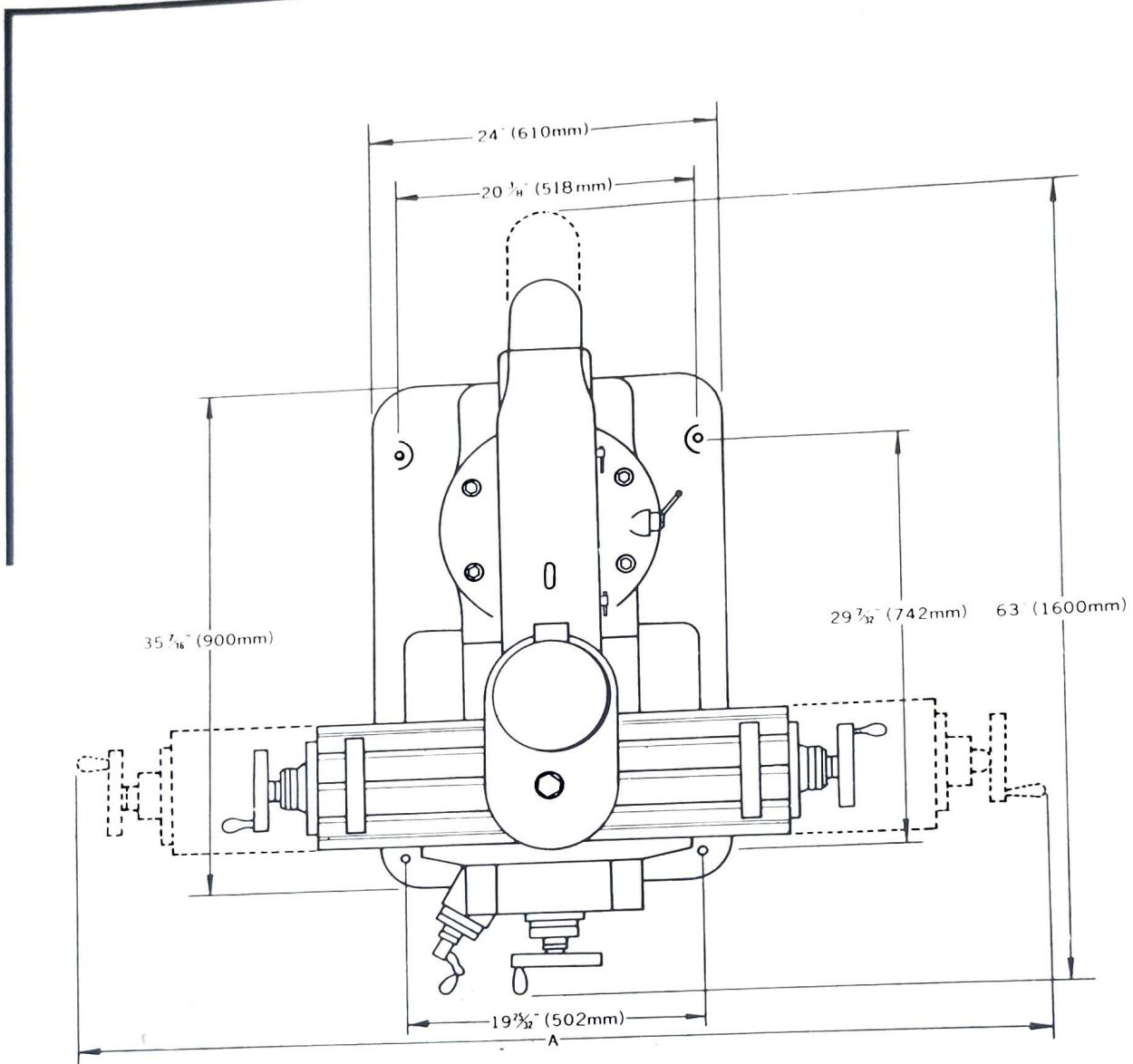
Using lift truck to transfer the package as picture.

機器之搬運Handling

安裝Installation

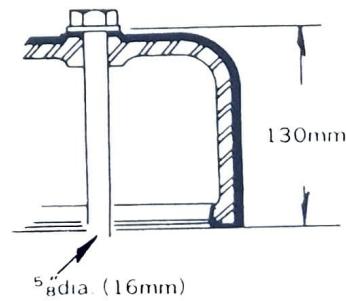
1. 移動任一滑道前先除去防銹劑。
1. Remove rust preventative before moving any slideways.
2. 防護層最好以清潔刷沾石蠟油除去之，當護層軟化後以清潔
破布擦乾淨。
2. The coating is best removed by using paraffin applied
with a clean brush. When the coating has softened, remove
with clean rags.
3. 以油或黃油潤滑潤滑點，參考此說明書的潤滑部份。
3. Oil or grease all lubrication points. Refer to the lubrication
section of this manual P21. P22

安裝 Installation



'A' 尺寸 'A' DIMENSION

工作台長度 Table size	機器長度 Plain machine
42"	87 3/4" (2230mm)
49"	94 3/4" (2408mm)

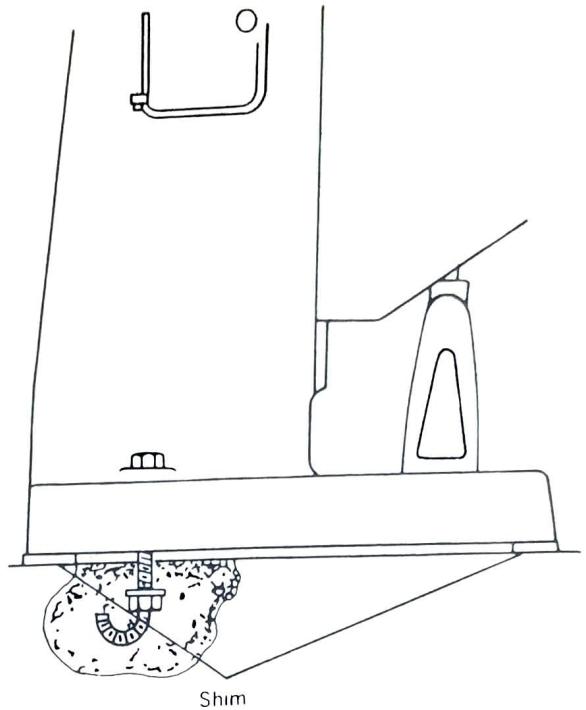


地 基 FOUNDATION

所有銑床應以螺栓鎖於一混凝土地基

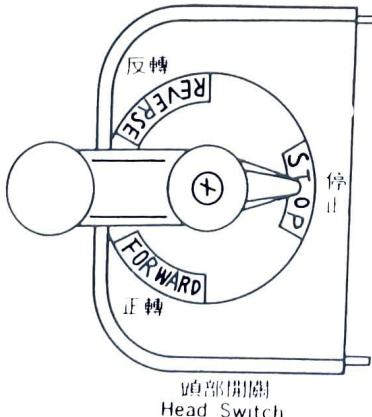
本機器應安裝於固體水平地板或防振墊片上以防止任何震動所產生的移動。

Ideally all milling machines should be bolted to a concrete foundation. The machines however should be placed on a solid level floor or anti-vibration pads to prevent any rocking movement.



電源供給 Power supply

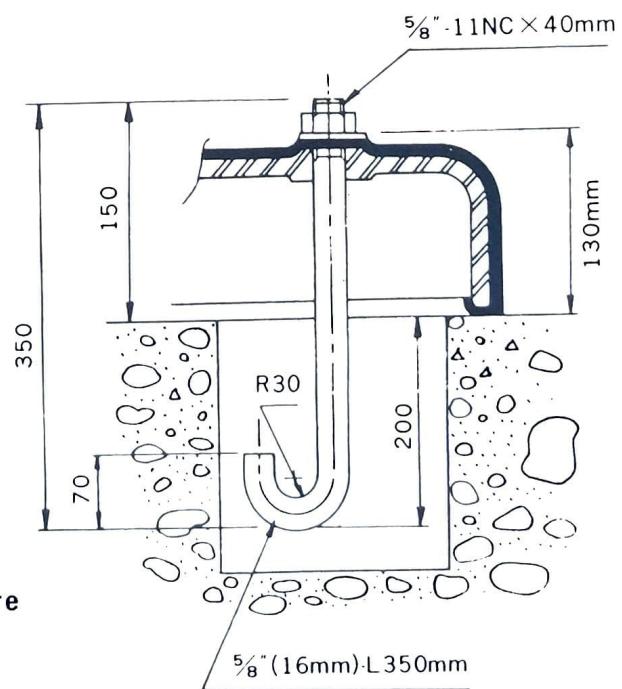
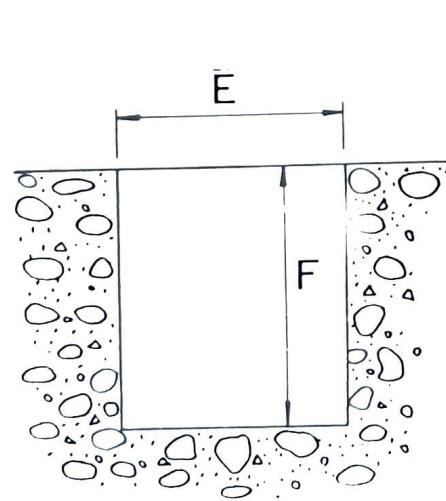
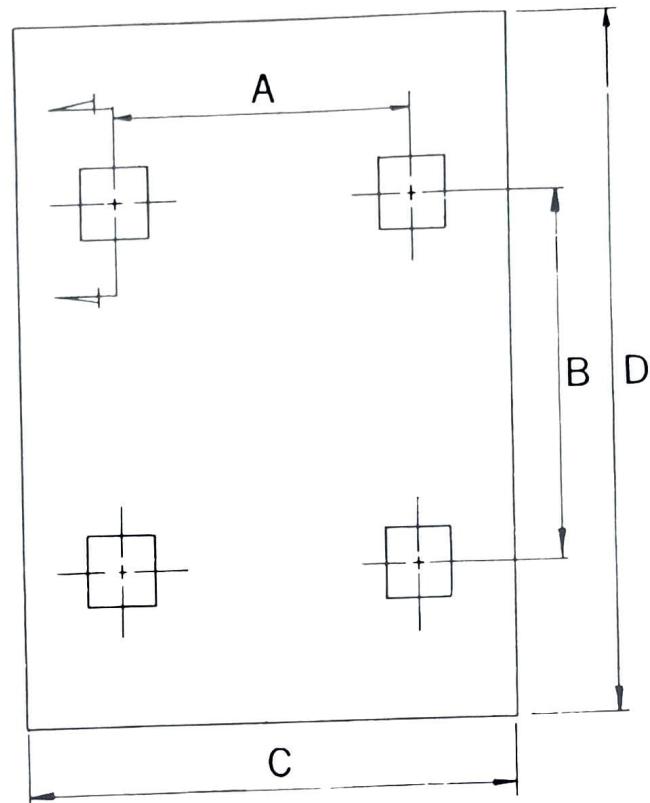
- a) 檢查馬達電源之電壓。
 - b) 確使電源連接符合當地安全規章。注意當未裝控制盤時，頭部開關無過負荷保護作用。
- a) Check motor voltages against supply.
b) Ensure that the supply is connected to comply with the local safety regulations. Note the Head switch has NO overload protection, when a control panel is not fitted.



安裝 Installation

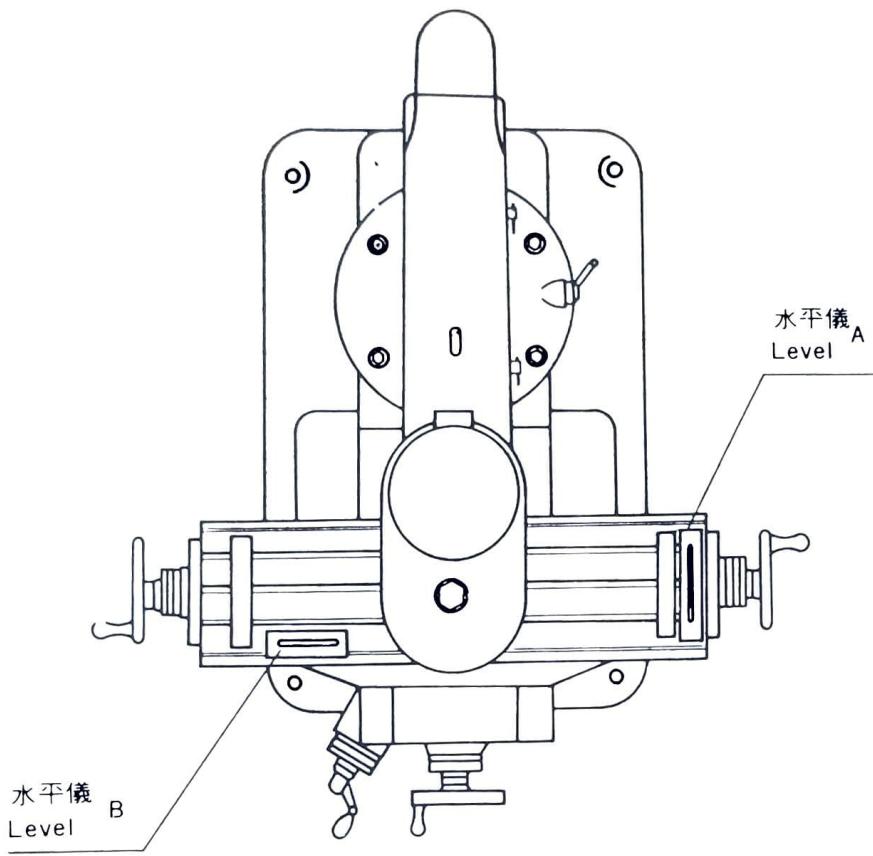
地基平面 Foundation plane

尺寸	
A	518mm($20\frac{3}{8}$ "")
B	742mm($24\frac{7}{32}$ "")
C	1020mm($40\frac{5}{16}$ "")
D	1242mm($48\frac{7}{8}$ "")
E	200mm($7\frac{7}{8}$ "")
F	250mm($9\frac{27}{32}$ "")



地基構築圖 Foundation Structure

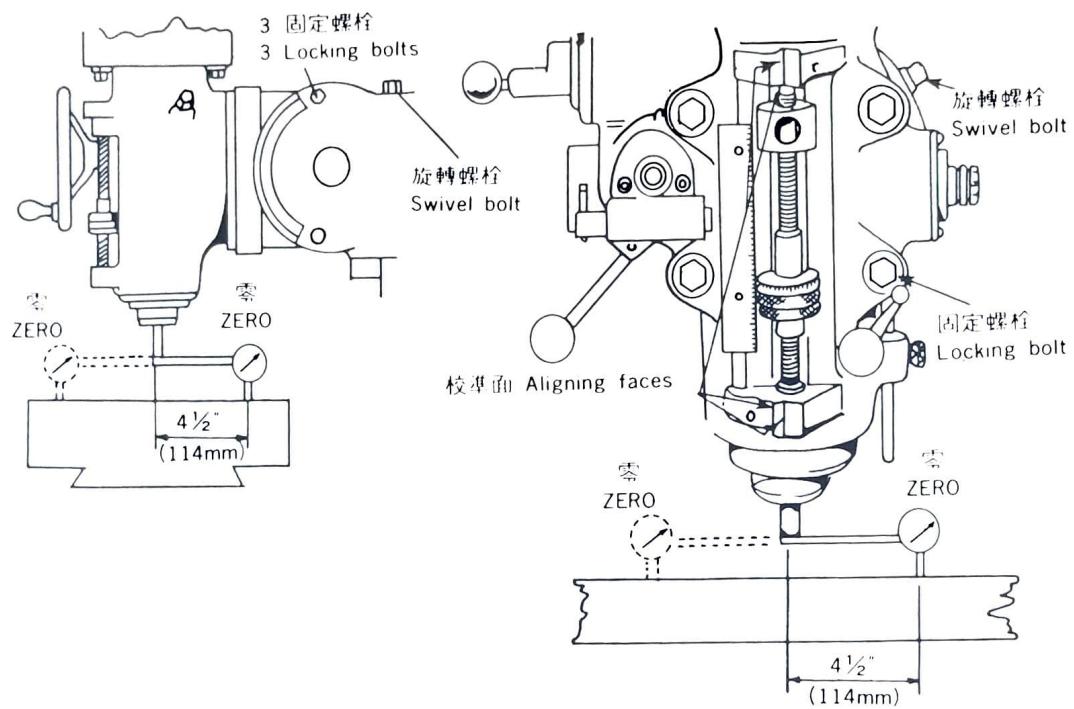
地基 Foundation



1. 用水平儀放在工作台上，如上圖示。
2. 檢查水平儀 A.B 的水平，其允許值 0.06mm/M .
3. 調整時用墊片墊入底床，調整畢鎖緊固定螺栓。

1. Putting levels on the table as illustrated.
2. Check the level A and B. The allowance approximate 0.06mm/M .
3. Putting the shims under the bed if necessary, lock the anchor bolt.

安裝 Installation



機器安裝後要校正頭部與工作台的垂直度，有兩個方法：

I . 用一大90°角尺放在工作台上。以此校正頭部的校準面，如上圖示。

II . 用百分錶裝在主軸端面上，以4½"半徑之圓轉動，如上圖示。

校正後每個螺栓需鎖緊。

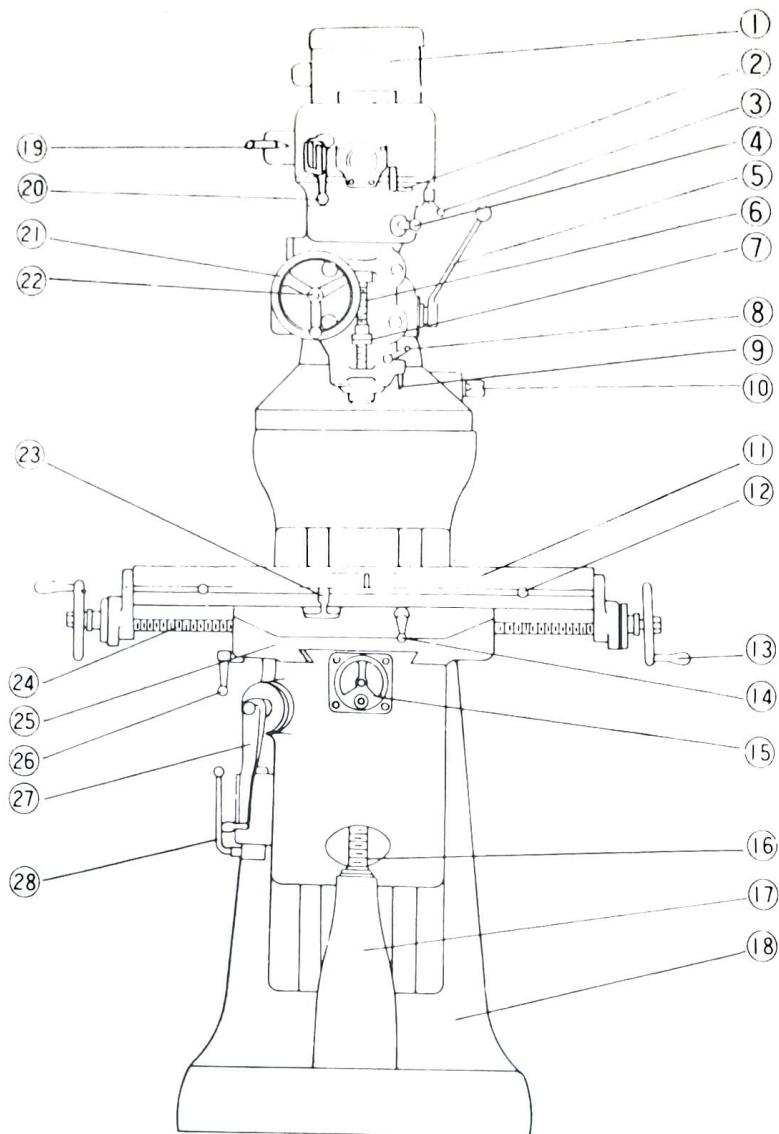
To set a milling head square to the table two methods are available:

I . Using a large 90° setsquare mounted on the table, align faces with square.

II . An indicator mounted in a spindle nose travelling in a 4½" radius.

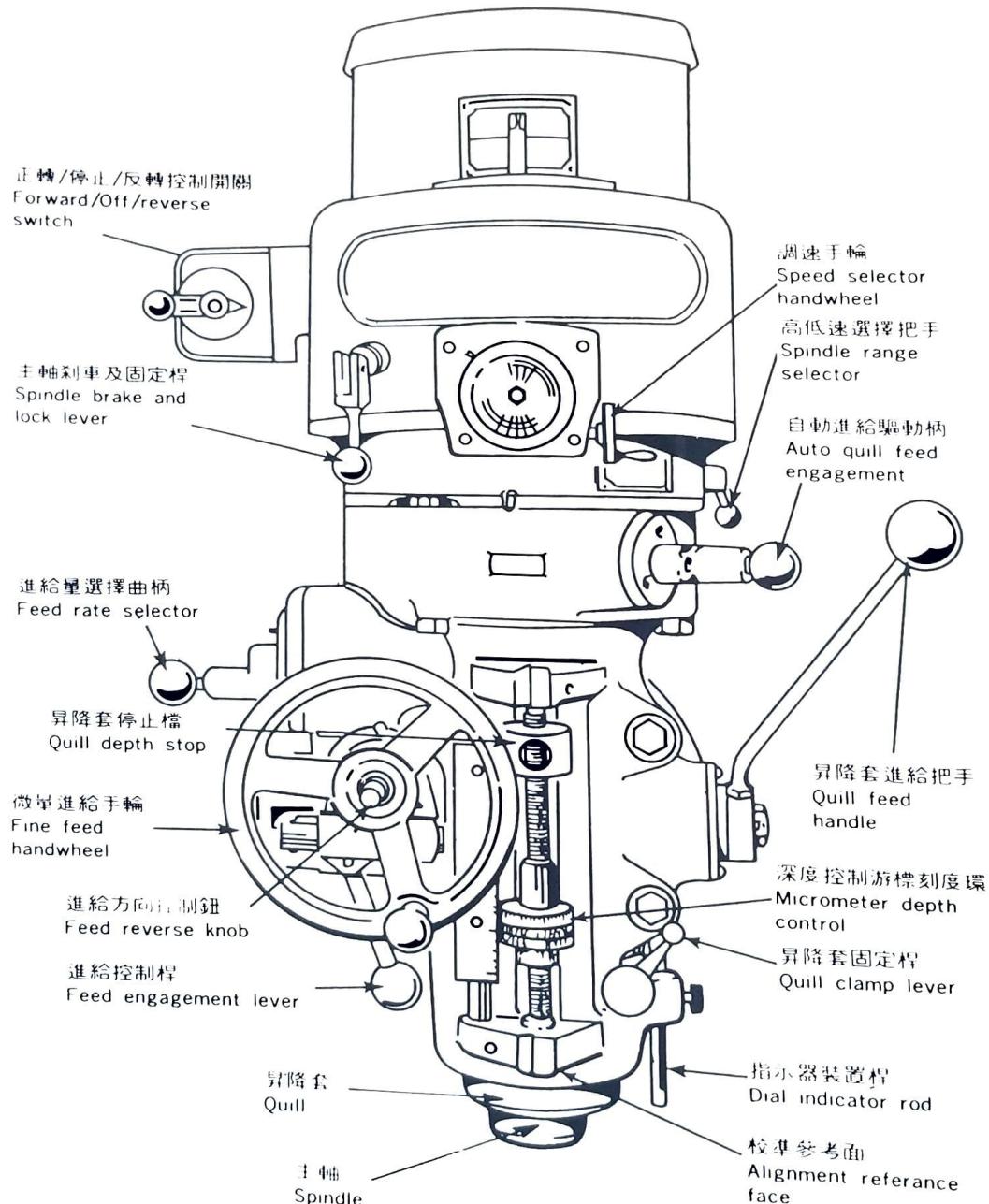
It is important that each axis is set separately and locked.

機器各部名稱Legend



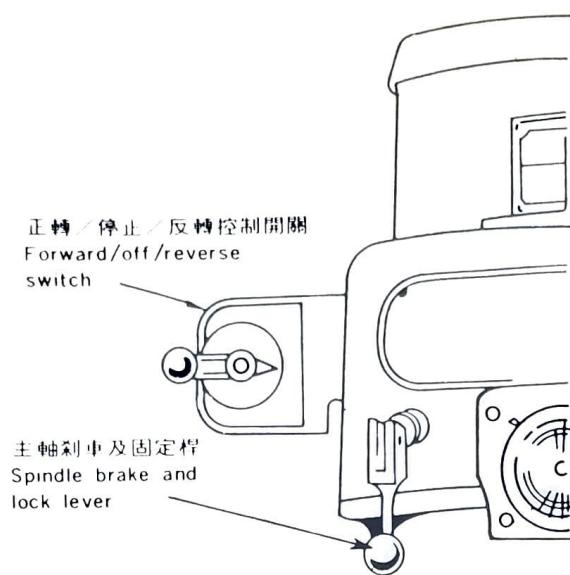
代號	名稱	英譯	代號	名稱	英譯
1	馬達 Motor		17	昇降螺程序 Elevating screw housing	
2	調速手輪 Speed selector handwheel		18	機身 Basic	
3	高低速選擇把手 Spindle-range selector		19	控制開關 Control Switch	
4	自動進給裝動柄 Auto quill feed engagement		20	主軸剎車及固定桿 Spindle brake and lock lever	
5	昇降套進給把手 Quill feed handle		21	手動微量進給手輪 Finefeed handwheel	
6	深度控制螺桿 Micrometer depth control screw		22	進給方向控制扭 Feed reverse knob	
7	深度控制游標刻度環 Micrometer depth control		23	橫向進給控制桿 Longitudinal feed control	
8	昇降套固定桿 Quill clamp lever		24	橫向進給螺桿 Longitudinal feed screw	
9	指小器裝置桿 Dial indicator rod		25	鞍座 Saddle	
10	伸出臂調整把手 Ram adjustment handle		26	鞍座固定把手 Saddle lock handle	
11	工作台 Table		27	昇降座進給把手 Elevating feed handle	
12	工作台停止檔 Table stop		28	給油把手 Oil feed lever	
13	橫向進給手輪 Longitudinal feed handwheel		29		
14	工作台固定桿 Table lock lever		30		
15	縱向進給手輪 Cross feed handwheel		31		
16	昇降座進給螺桿 Elevating screw		32		

機器各部名稱Legend



頭部 Head

操作 Operation



起動方法

- 1) 接通電源。
- 2) 扳動頭部左側的開關至
所需之轉向(正轉或反轉)。

Starting

- 1) Connect power.
- 2) Turn switch to required position
(Forward or Reverse).

停車方法

- 1) 停止進行中的進給。
- 2) 關掉電源開關。
- 3) 扳動主軸剎車桿，直到主軸
完全停止。

Stopping

- 1) Stop feed.
- 2) Turn switch to "off".
- 3) Turn spindle brake lever to
"brake" till spindle stop.

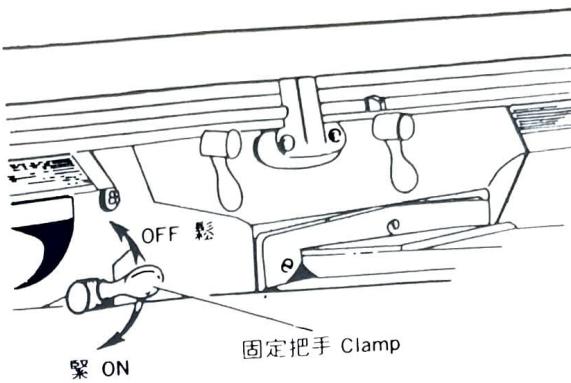
保養 Maintenance 操作 Operation

1. 固定鞍座與昇降座之滑動。

Clamping the saddle knee slide.

固定時，用適當的壓力即可，用力太大會使得工作台變形。

Moderate pressure is sufficient.
Excess pressure will cause distortion and make the table stiff to wind.

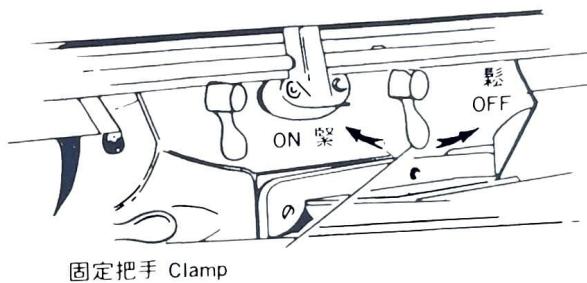


2. 固定工作台與鞍座間之滑動。

Clamping the table saddle slide.

固定時，用適當的壓力即可。

Moderate pressure is sufficient.

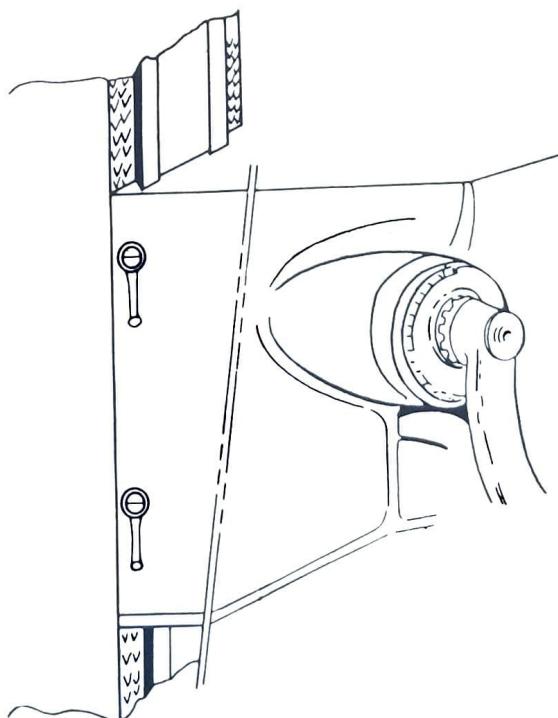


3. 固定昇降座與機身之滑動。

Clamping the knee column slide.

固定時，用適當的壓力即可。

Moderate pressure is sufficient.

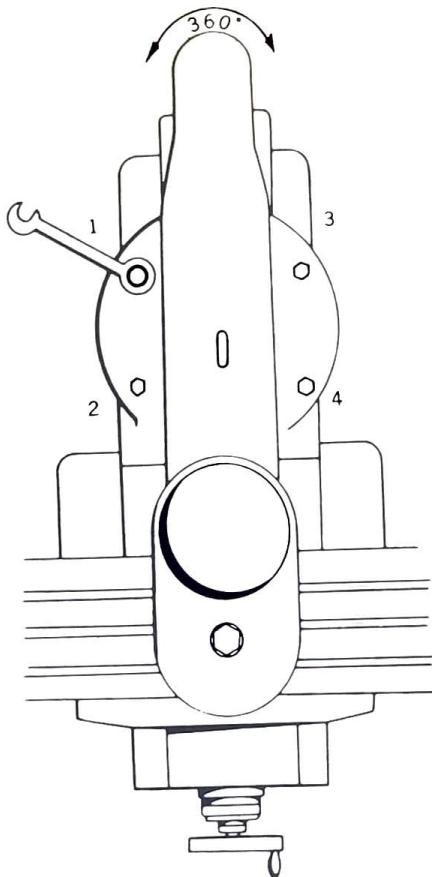


操作Operation

4. 轉塔之旋轉

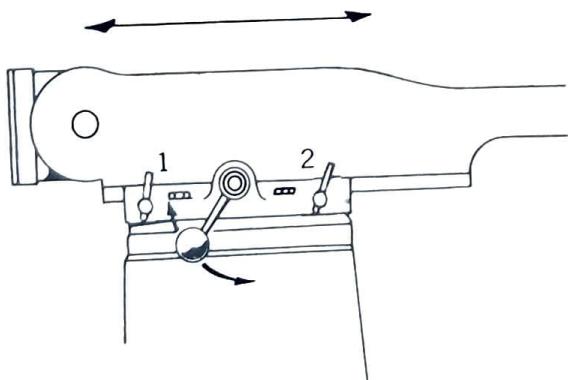
SWIVEL TURRET

- a) 用固定板手，放鬆四個螺栓，
 - b) 旋轉至所需要的角度。
 - c) 鎖緊四個螺栓。
- a) Use spanner and unlock the 4 bolts.
- b) Index to the required setting.
- c) Lock the 4 bolts.



5. 伸出臂之移動

MOVE RAM SLIDE



- a) 放鬆兩支固定把手桿。栓。
- b) 轉動控制把手至所需要之位

置。

- c) 固定(先固定後面的把手桿)。
- a) Loosen two lock levers.

b) Turn the handle to move the slide to the desired position.

c) Tighten, tightening the rear lock lever first.

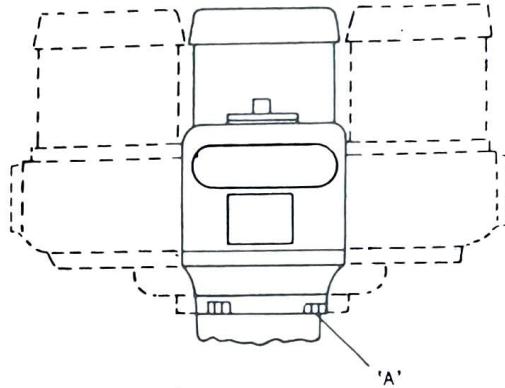
保養 Maintenance

操作 Operation

1. 皮帶箱旋轉

SWIVEL BELT HOUSING

- I. 放鬆三個固定螺帽'A' (完全地放鬆以避免束縛力存在)。
 - II. 旋轉至所需要之角度。
 - III. 鎖緊三個固定螺帽，最後鎖緊前轉動主軸使栓槽正確對準。
- I. Slacken 3 Locking Nuts 'A'
(Retain sufficiently to
stop binding).
- II. Swivel to required angular
setting.
- III. Tighten 3 Locking Nuts;
before finally securing, run
spindle, to give correct spline
alignment.

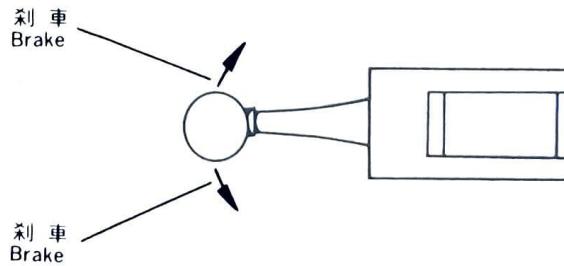


註：鎖固定螺帽時，若三個不均勻會使昇降套產生剛性變化，而造成昇降套內栓槽不正，使進給困難，此現象在操作昇降套進給時可感覺出來。

NOTE: Incorrect spline alignment can be caused by unequal tightening of the locking nuts 'A' causing varying stiffness of the quill feed which can be felt through the sensitive feed handle.

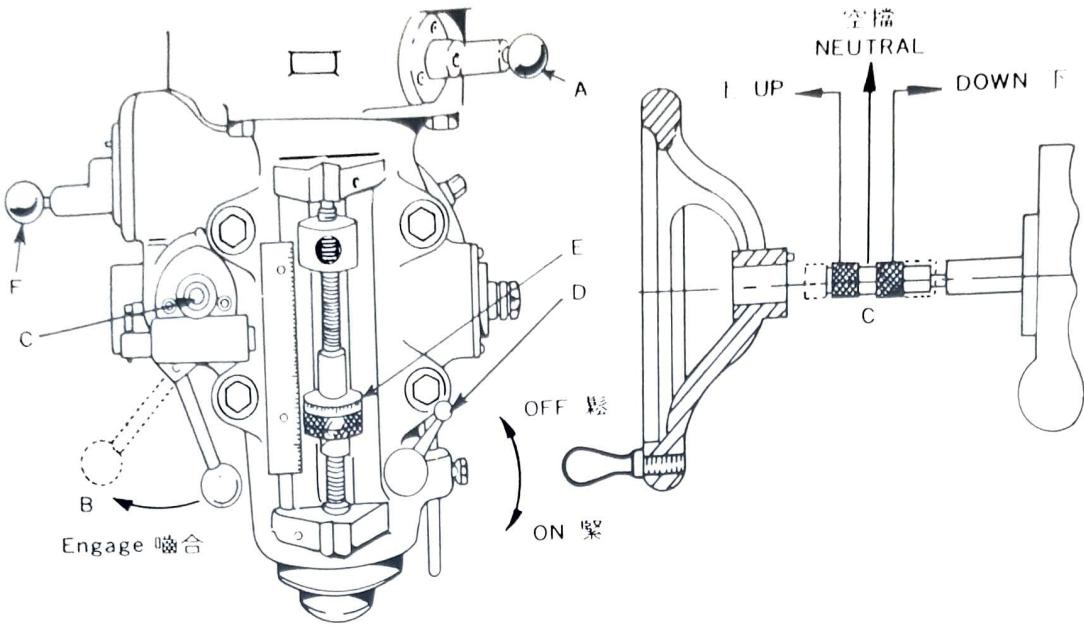
2. 主軸剎車

SPINDLE BRAKE



操作 Operation

3. 昇降套進給 3. QUILL FEED



a) 手動微量進給操作步驟

- I. 鬆開自動進給驅動柄'A'
- II. 將'C'置於中央(空擋)位置
- III. 板動進給控制桿'B'使離合器嚙合
- IV. 此時昇降套之進給即可用手輪來控制

a) FINE HAND FEED

- I. Disengage Auto Quill Feed 'A'
- II. Locate 'C' in mid (neutral) position.
- III. Engage Feed Trip Lever 'B'
- IV. The Quill is now under handwheel control.

b) 自動進給操作步驟

最大鈑孔徑為 $\frac{3}{8}$ " (9.5mm)

(材料：銅)

- I. 放鬆昇降套固定桿'D'
- II. 調整游標指示環'E'至所需要之深度
- III. 板動自動進給驅動柄'A'
- (馬達要停止)
- IV. 由進給量選擇柄'F'選擇進給量
- V. 由進給方向控制鈕'C'選定進給方向
- VI. 板動進給控制桿'B'
- VII. 這時昇降套即可行自動進給

注意：(當主軸速度超過3000轉／每分鐘時勿使用自動進給)

b) AUTOMATIC FEED

Maximum loading $\frac{3}{8}$ " (9.5mm) dia. drill in steel.

- I. Ensure quill lock is off 'D'.
- II. Set micrometer dial to required depth 'E'.
- III. Engage auto quill feed 'A'. (when motor has stopped).
- IV. Select feed rate 'F'.
- V. Select feed direction 'C'.
- VI. Engage feed trip lever 'B'.
- VII. The Quill is now automatic feed.

NOTE: (Do not engage quill feed 'A' over 3,000 R.P.M.)

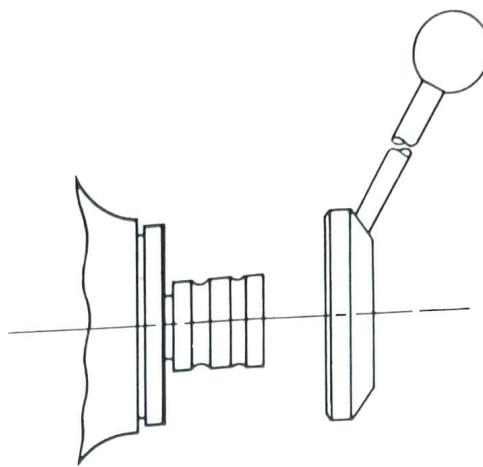
保養 Maintenance

操作 Operation

4. 昇降套快速手動進給 4. QUILL SENSITIVE HAND FEED

- I. 置手柄於輪轂上。
- II. 選擇適當之位置。
- III. 推動手柄直至定位銷喚合。

- I. Place the handle on the boss.
- II. Select the most suitable position.
- III. Push home until the locating pin engages.



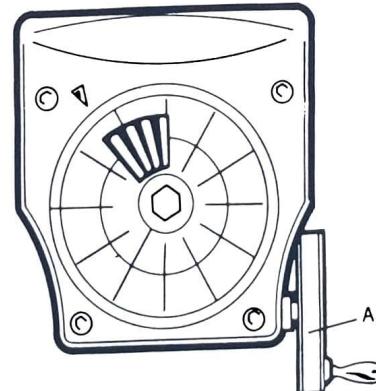
5. 主軸速度 (在主軸運轉時才可變速) 5. SPINDLE SPEED (Change only when spindle is running).

a) 範圍內之速度

- I. 啓動主軸。
- II. 轉動手輪'A'至選定所需速度。

a) Change Speed Within Range

- I. Start spindle.
- II. Turn handwheel 'A' to select required speed.
change only when spindle is running.



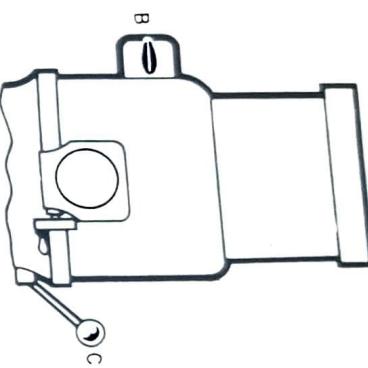
主軸停止時不可變速
DO NOT CHANGE SPEED
WHILST SPINDLE HAS STOPPED

保養 Maintenance

操作 Operation

- b) 變更速度 Change Range.

- I. 從直驅變至後列齒輪驅動：
 - I. 開關 'B' 扭至 off。
 - II. 移動桿 'C' 經過空擋至低速擋。
(這時主軸轉向相反)
 - III. 開關 'B' 扭至低速。



主軸在運轉中勿變換把手'C'之位置!
DO NOT CHANGE RANGE WHILE
THE SPINDLE IS RUNNING

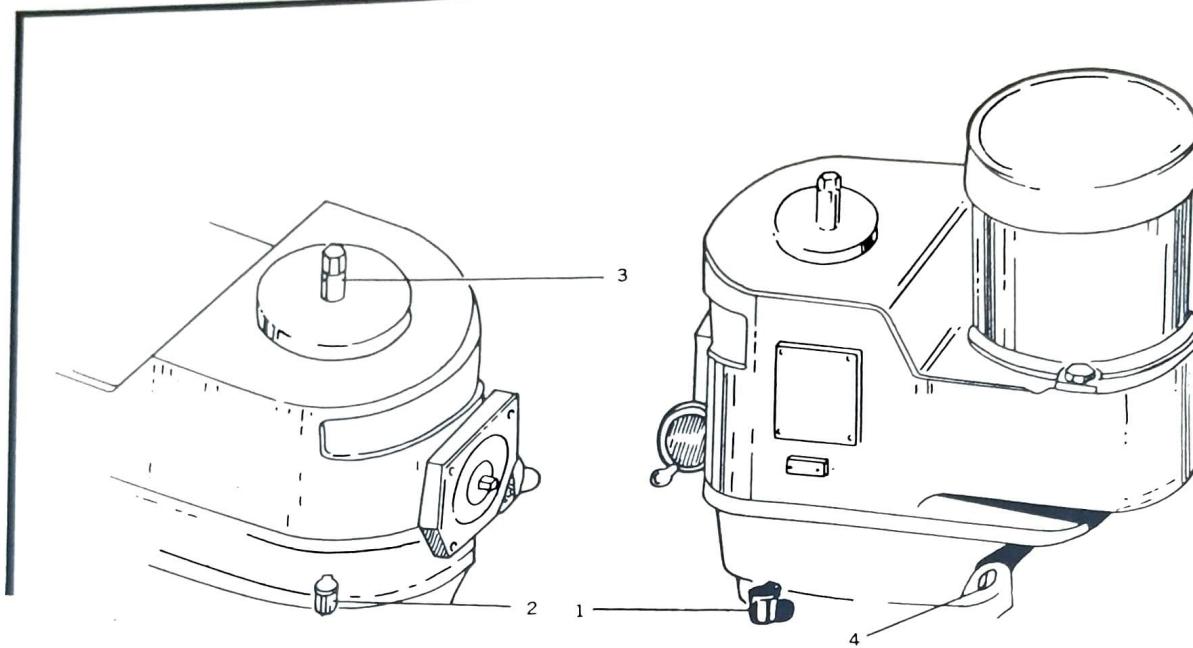
- I. FROM DIRECT TO BACK GEAR DRIVE:
 - I. Switch 'B' to OFF.
 - II. Move lever 'C' through neutral to LOW. (This reverses the spindle rotation).
 - III. Switch 'B' to LOW.

2. 從後列齒輪變至直驅：

- I. 開關 'B' 扭至 off。
- II. 移動桿 'C' 經過空擋至高速擋。
- III. 用手轉動主軸直至感覺離合器 啟合為止。
- IV. 開關 'B' 扭至高速。

2. FROM BACK GEAR TO DIRECT DRIVE:

- I. Switch 'B' to OFF
- II. Move lever 'C' through neutral to HIGH.
- III. Rotate spindle by hand until the clutches are felt to engage.
- IV. Switch 'B' to HIGH.

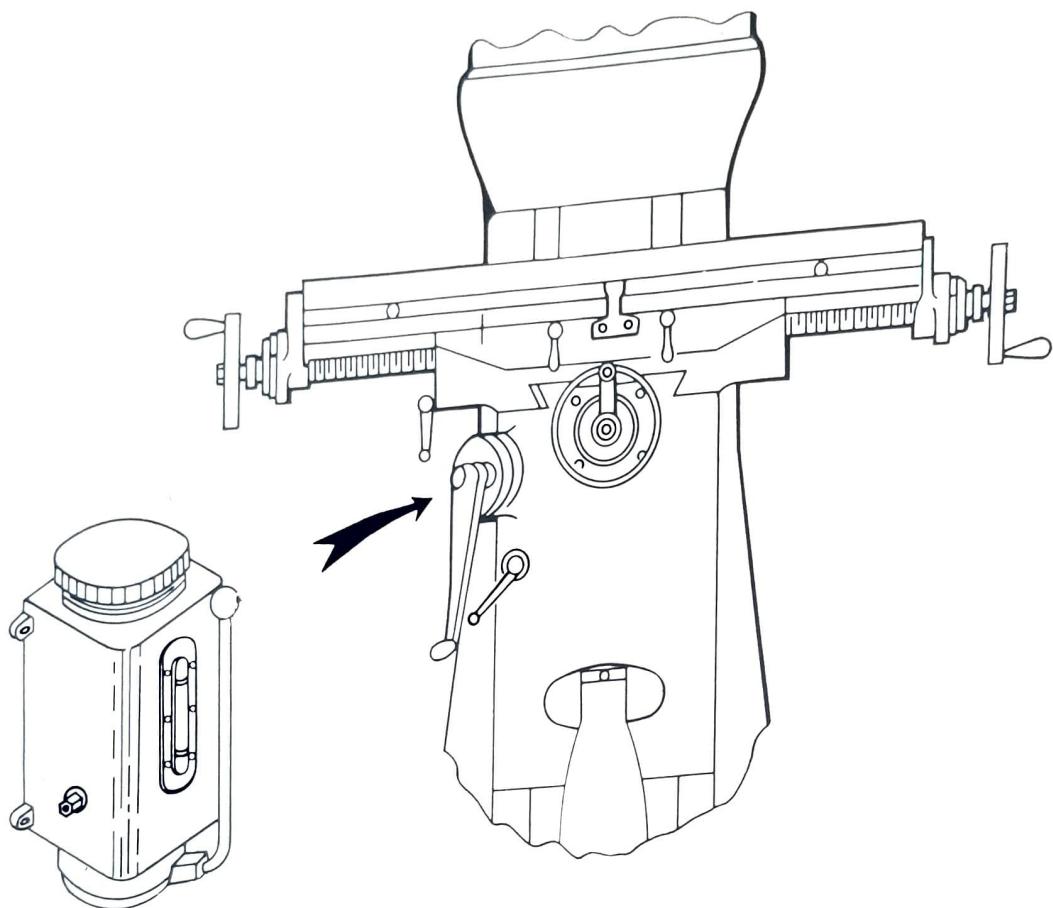


週期 FREQUENCY	潤滑 LUBRICATE	潤滑劑 LUBRICANT	數量 QUANTITY	潤滑代號 LUB. AT.
每天兩次 Twice Daily	昇降套軸承 Quill bearings	中國石油 R53 Vactra Heavy Medium S.A.E. 10 or 10W Light	5-10滴 5-10 drops	1
每天兩次 (當操作進給時) Twice Daily (When feed is in use)	主軸向下進給 Spindle Down Feed	中國石油 R53 Vactra Heavy Medium S.A.E. 10 or 10W Light	加滿 Top-Up	2
每週一次 Weekly	拉桿栓軸(將昇降套降下 2") Drawbar splines(move quill down 2")	中國石油 R53 Vactra Heavy Medium S.A.E. 10 or 10W Light	5 滴 5 drops	3

註：錯誤潤滑 1 “昇降套軸承” 會使昇降套太緊且使昇降套部份束縛於座內。

NOTE: Failure to lubricate "Quill bearings" at 1 can result in tight quills and partial seizure of quill in housing.

週期 FREQUENCY	潤滑 LUBRICATE	潤滑劑 LUBRICANT	數量 QUANTITY	潤滑代號 LUBRICATE AT.
每二個月一次 (正常使用下) Every 2 months (of normal use)	後列齒輪 Back gear	黃油 Grease	相當於一茶匙 Equivalent of 1 teaspoonful	4. 註：加黃油前將齒輪桿退向 'LO' 處並保持主軸停止。 NOTE: Before greasing put gear lever back to 'LO' & keep spindle stationary.



週期 FREQUENCY	潤滑 LUBERICATE	潤滑劑 LUBERICANT	數量 QUANTITY
每天注滿潤滑泵 Centralized Lub. Pump Daily	導螺桿 Lead Screw	Shell Cornea Oil 41 MOBIL X 2 Socony Gargoyle Vactra No.2	一分浦 One Pump
每週檢查油面高 Check Level Weekly	鞍座 工作台滑道 Saddle-Table Ways	"Sunoco" Waylube #80 MOBIL X 2	一分浦 One Pump
	鞍座 昇降座滑道 Saddle-Knee Ways	"Sunoco" Waylube #80 MOBIL X 2	一分浦 One Pump
	昇降座機身滑道 Knee Colum Ways	"Sunoco" Waylube #80 MOBIL X 2	一分浦 One Pump
每週兩次 Twice Weekly	升降螺桿 Elevating Screw	Shell Cornea Oil 41 MOBIL X 2 Socony Gargoyle Vactra No.2	油槍打 5 次 5 Shots (Oil Gun)

保養 Maintenance

預防保養 Preventive Maintenance

為了確保機器之精密與增加使用壽命，我們提供下列預防保養表給操作者。
For securing the accuracy and life of the machine, we offer the following
preventive maintenance charts.

週期 Frequency	項目 Item
每 日 Daily	<ol style="list-style-type: none">操作前必須依照潤滑說明把各部位加油。 It is necessary to oil each lubrication point before operation.檢查手動油泵的油量，不足須補充。 Check the level of the oil lubricator and fill if necessary.操作完畢，所有固定桿應放鬆，工作台面須清除乾淨並潤滑少許的油，以保護工作台面。 It is necessary to release the clamps, clean and lubricate the table after operation.
每 月 Monthly	<ol style="list-style-type: none">檢查各部調整楔之鬆緊情形，並作適當的調整。 Check all the gib and adjust if necessary.檢查所有螺桿與螺帽間之間隙，並作適當的調整。 Check all the backlash between screws and nuts, and adjust if necessary.
每 季 Quarterly	<ol style="list-style-type: none">根據精度檢查表核對各部精度，(看本說明書39頁到41頁並作調整)。 Check and adjust the machine accuracy. (manual P. 39 to P. 41).

敝公司真誠的向您建議：

當您欲保養機械前，為了您的安全，
請關掉機器之電源，且為了迅速之保
養請閱讀此手冊之相關部份。

May We Suggest That.

Before attempting any maintenance
in the interests of safety you isolate
the machine electrically and in the
interests of efficiency you read the
relevant section of this manual.

當訂購更換零件時請說明：

- 機器系列號碼。
註於機身左側門之上方。
- 頭部系列號碼。
於皮帶箱前方。
- 項目號碼。
- 零件號碼。
- 數量。
- 概述。

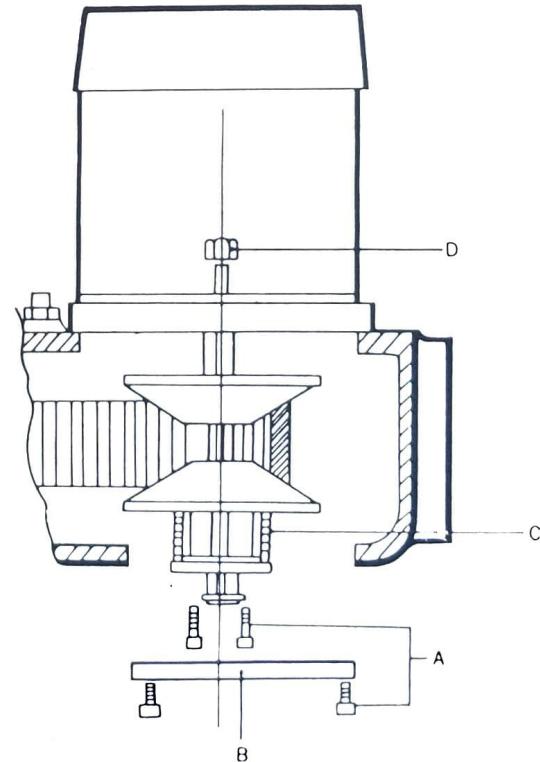
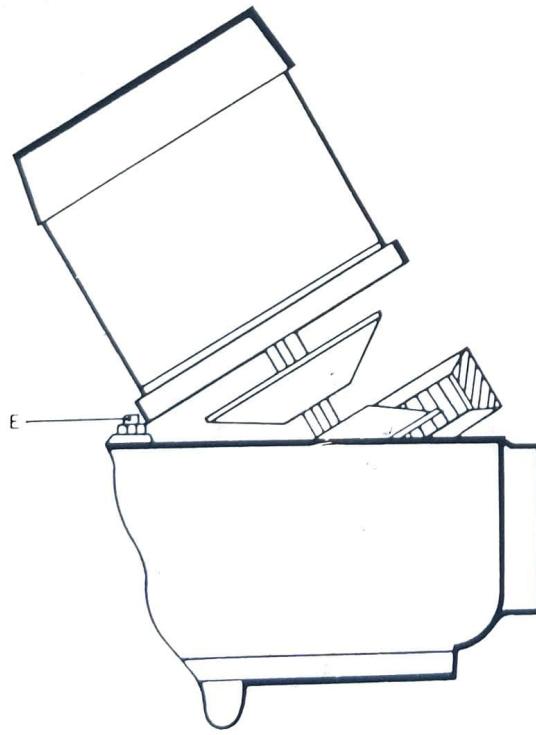
When ordering replacement parts
please quote:

- THE MACHINE SERIAL No.
situated above the door on the
left hand side of the column.
- THE HEAD SERIAL No.
found on the front of the Belt
Housing.
- ITEM NUMBER.
- PART NUMBER.
- QUANTITY.
- DESCRIPTION.

馬達拆卸步驟 MOTOR REMOVAL

1. 轉動頭部調整至最低速。
2. 關掉電源。
3. 取下三個螺絲'A'及蓋'B'。
4. 用兩個螺絲'A'壓住彈簧'C'。
5. 轉動變速器至最高速。
6. 從皮帶箱取下開關。
7. 取下兩個固定螺帽'D'。
8. 提起馬達，將馬達箱放在螺栓'E'上。
9. 放鬆皮帶，並繞過驅動盤，即可取下馬達。

1. Run head to adjust to lowest speed.
2. Isolate machine.
3. Remove 3 screws 'A' & cover 'B'.
4. Using the two screws 'A', compress spring 'C'.
5. Rotate the speed changer to the highest speed.
6. Remove the reversing switch from the belt housing.
7. Remove the two locking nuts 'D'.
8. Lift the motor and rest the case on stud 'E'.
9. Ease the belt over the lower drive disc and remove the motor.

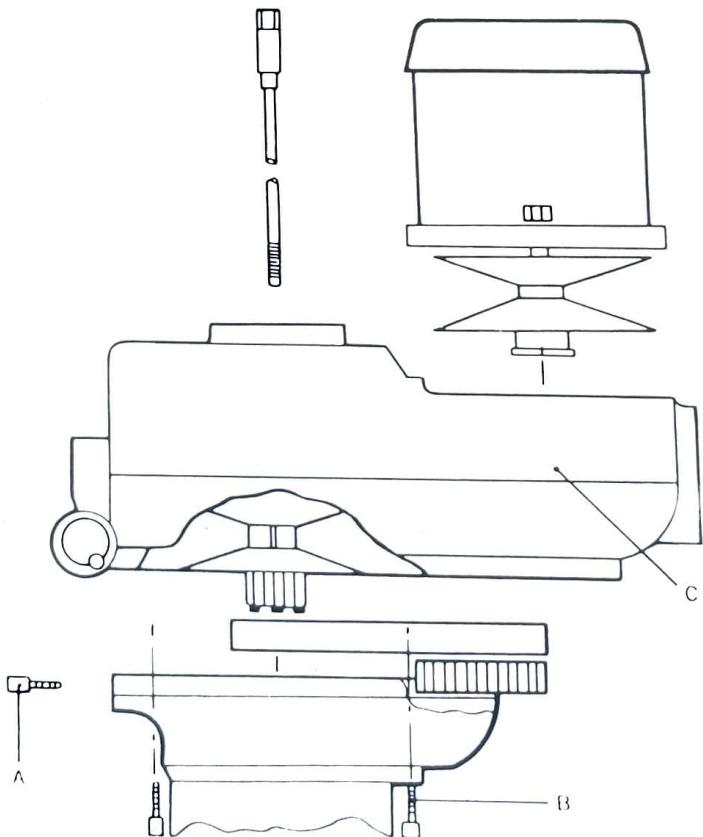


頭部頂座 Head top housing

齒型皮帶更換法
TIMING BELT REPLACEMENT

1. 如前頁所述取下馬達
2. 昇降套降至最低位置。
3. 從變速箱下方取出兩個螺絲'A'
4. 取下四個螺絲'B'。
5. 退出連結銷，使上部份'C'分離。
6. 此時即可更換皮帶。

1. Remove the motor.
2. Lower the quill to full extent.
3. Remove the two lower capscrews 'A' from the speed changer housing.
4. Remove the four cap screws 'B'.
5. Remove the top assembly 'C' and tap to clear dowels.
6. Replace the belt.

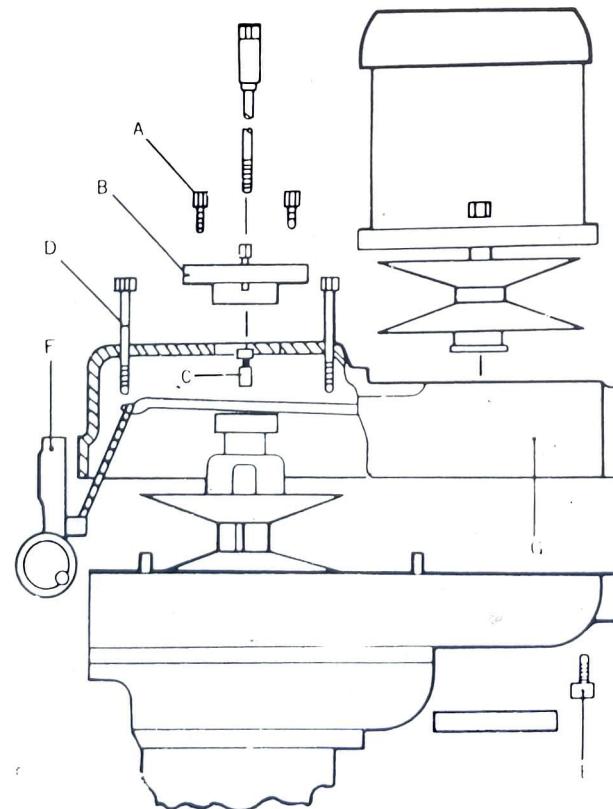


頭部頂座 Head top housing

驅動皮帶更換法 DRIVE BELT REPLACEMENT

1. 如25頁所述取下馬達。
2. 取下三個螺絲'A'，鎖進附近之牙孔，退出軸承座'B'。
3. 取下兩個螺絲及襯套'C'。
4. 取出四個螺絲'D'與一個螺絲'E'。
5. 取下四個固定變速器之螺絲'F'。
6. 退出連結銷，並移開頂座'G'。
7. 此時即可更換皮帶。

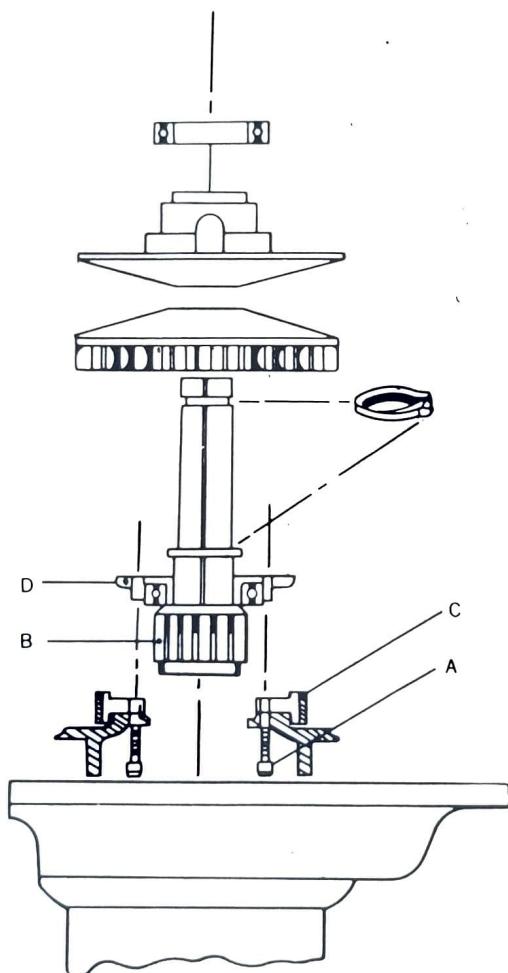
1. Remove the motor as described on page 25.
2. Remove the three screws 'A'; insert into the adjacent tapped holes and withdraw bearing housing 'B'.
3. Remove the two screws and the bushes 'C'.
4. Remove four screws 'D' and one screw 'E'.
5. Remove four screws securing the speed changer 'F'.
6. Remove top housing 'G'; tap to clear the dowels.
7. Replace the belt.



頭部頂座 Head top housing

剎車環更換步驟 BRAKE SHOE REPLACEMENT

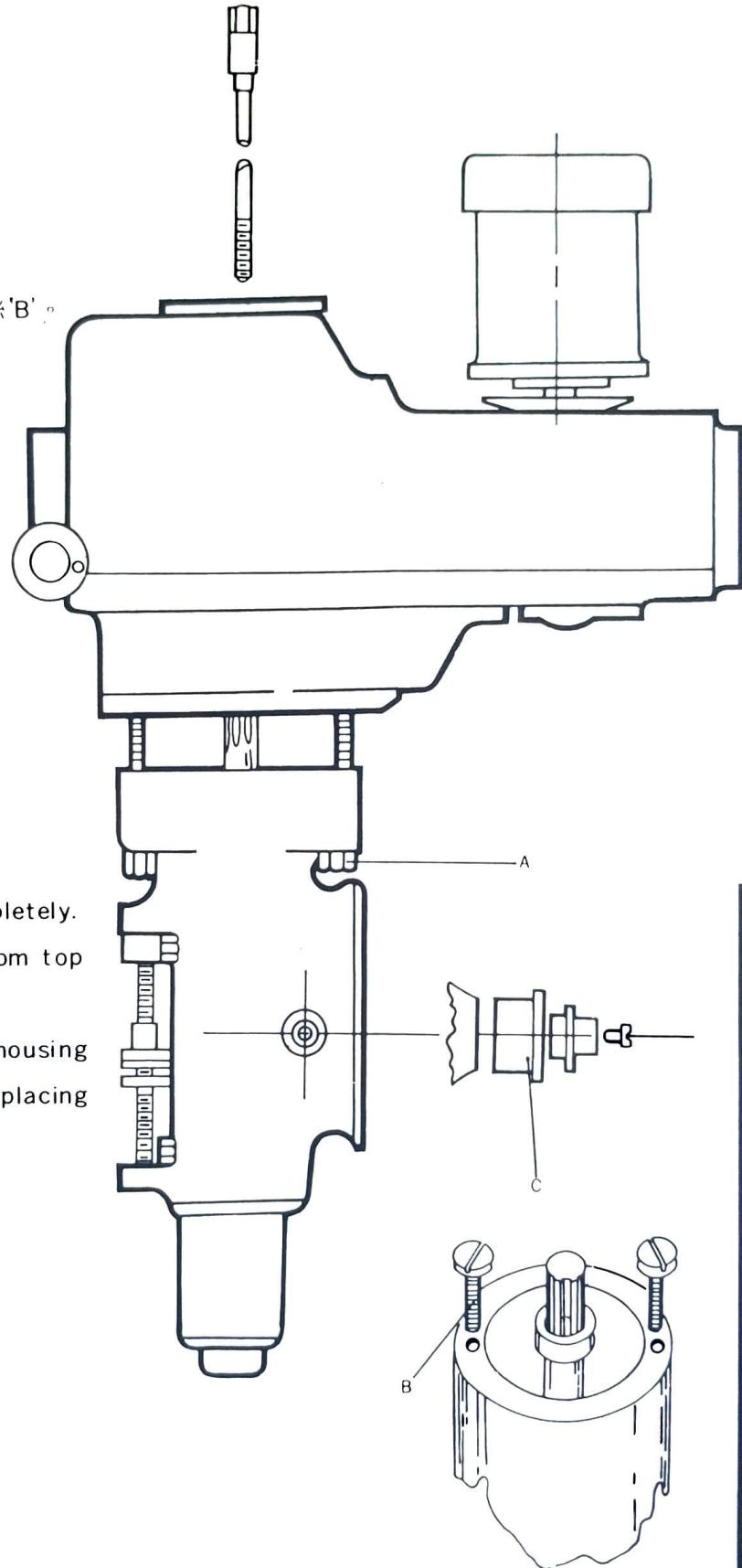
1. 拆下頂部。
 2. 取下兩個螺絲'A'。
 3. 取出離合器轂組件'B'和'D'。
 4. 更換剎車環'C'。
1. Remove the top section.
 2. Remove the two screws 'A'.
 3. Remove the clutch hub assembly 'B' & 'D'.
 4. Replace the brake shoes 'C'.



昇降套拆卸法 QUILL REMOVAL

1. 關掉電源。
2. 拆下馬達。
3. 取出拉桿。
4. 昇降套降至最低。
5. 取下三個螺帽'A'。
6. 頂部完全地拆出。
7. 取出昇降套頂部兩個螺絲'B'。
8. 拆下彈簧座'C'。

參看 31 頁更換彈簧說明。



9. 取下螺絲'D'與球形槓桿'E'。

10. 取下C形環'F'、螺絲'G'及
臂'H'。

11. 將螺桿軸'J'旋出微動螺帽
，並取下。

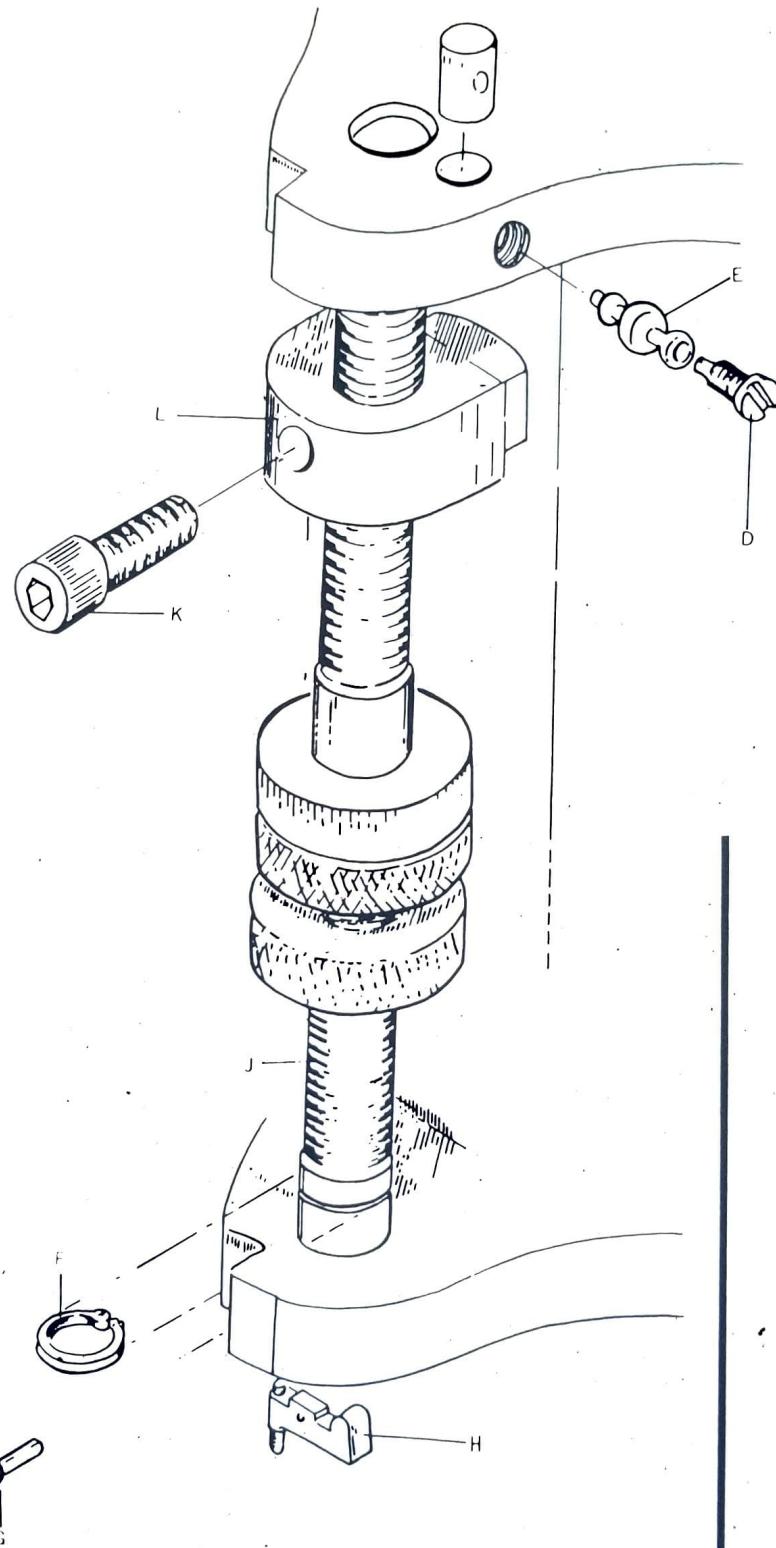
12. 取下螺絲'K'與停止板'L'。

13. 拆下昇降套。

14. 清潔所有表面，加油，並
重新組合。

15. 檢查進給控制桿是否正確
，看32頁之說明。

組合後栓槽之校準參看17
頁說明。



9. Remove screw 'D' and ball
reverse lever 'E'.

10. Remove circlip 'F', screw
'G' and arm 'H'.

11. Thread shaft 'J' through
micro nuts and remove.

12. Remove screw 'K' and
stop 'L'.

13. Remove quill.

14. Clean all areas, oil liberal
ly and reassemble.

15. Check correct operation
of feed trip linkage.

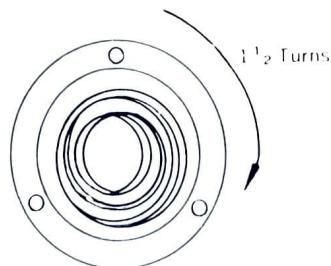
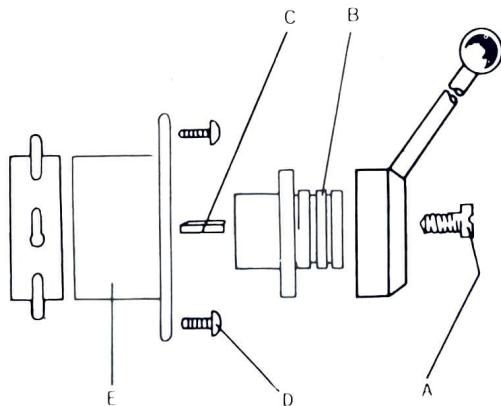
See instruction on page
32.

Re-assemble of spline
alignment. See page 17.

回覆彈簧更換法 BALANCE SPRING REPLACEMENT

1. 移動昇降套於頂部，並固定住。
2. 拆下螺絲'A'，轂'B'及鍵'C'。
3. 拆下螺絲'D'，慢慢轉動座'E'使彈簧張力得以釋放。
4. 將彈簧之一端從小齒輪軸的釘上提出。
5. 逆時針轉動座'E'（從頭部鑄件來看）。
6. 從座內取出彈簧並更換之。
7. 重新將彈簧組合於座之鑄件上，並應順時針轉動座，直到彈簧進入小齒輪軸之釘上。

1. With quill, at top of movement apply quill lock.
2. Remove screw 'A', hub 'B', and key 'C'.
3. Remove screws 'D', allowing housing to rotate slowly releasing spring tension.
4. Lift end of spring from peg on the pinion shaft.
5. Rotate housing 'E' anti-clockwise from head casting.
6. Remove spring from housing and replace.
7. Refit spring to main housing casting turning housing clockwise until spring locates on peg in pinion shaft.

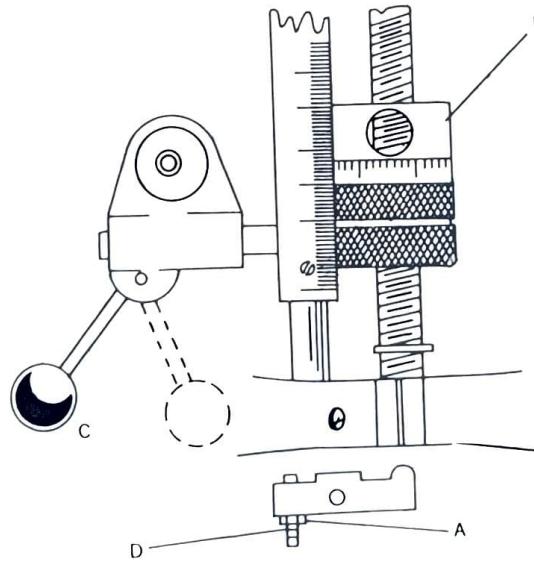


保養 Maintenance

進給控制調整法 FEED TRIP ADJUSTMENT

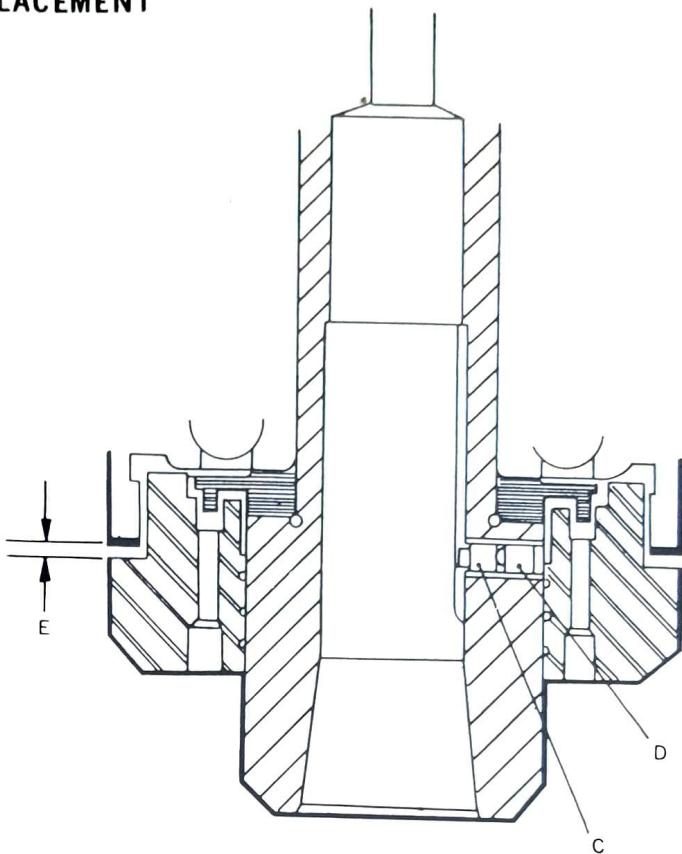
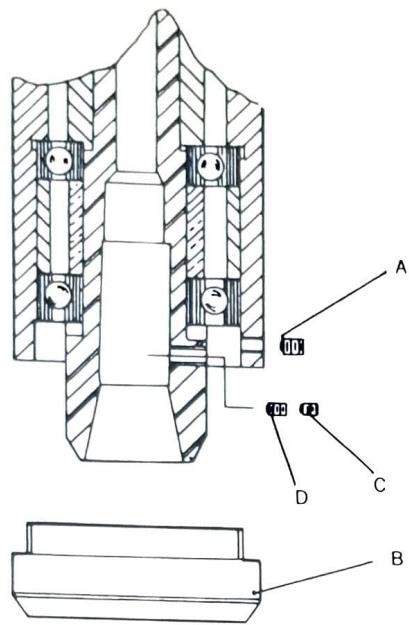
1. 放鬆固定螺帽'A'。
2. 嘴合把手'C'。
3. 調整微調螺帽至碰到昇降套停止塊'B'。
4. 慢慢轉動調整螺絲'D'直到桿'C'跳離。
5. 在此點鎖緊固定螺帽
6. 檢查跳動的動作是否正確。

1. Release locknut 'A'.
2. Engage trip handle 'C'.
3. Adjust micro nuts against quill stop 'B'.
4. Slowly turn adjusting screw 'D' until lever 'C' trips.
5. At this point secure locknut 'A'.
6. Check that smart trip action is obtained.



筒夾校準螺絲更換法

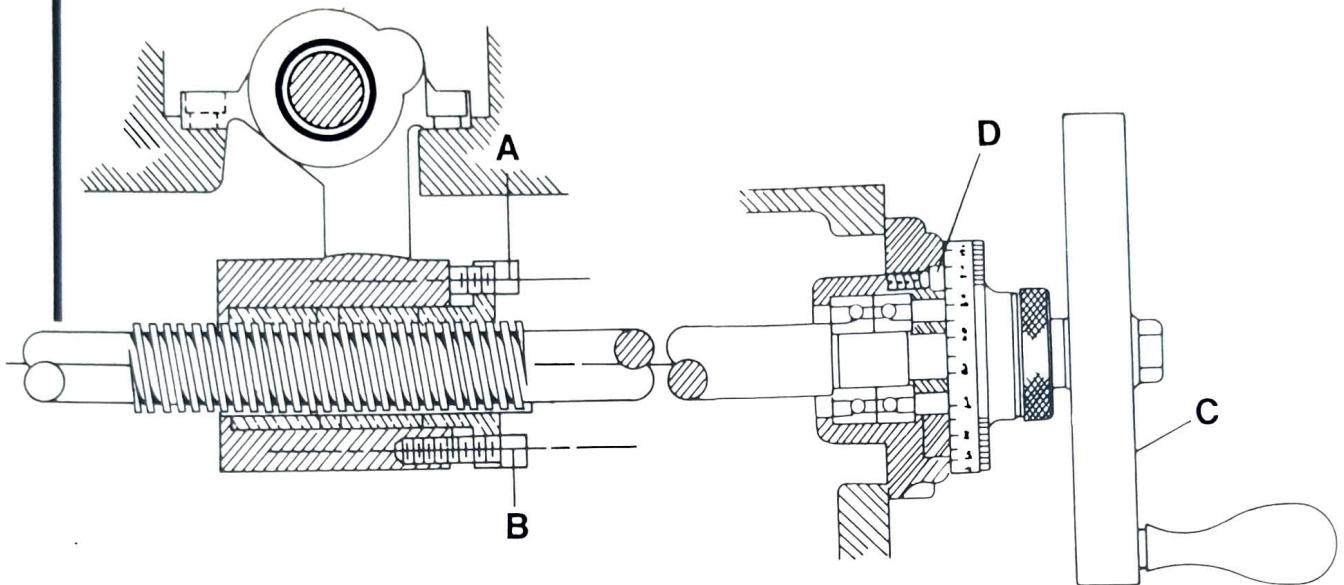
COLLET ALIGNING SCREW REPLACEMENT



1. 用氈筆在昇降套和主軸端蓋'B'劃一參考線。
2. 拆下固定螺絲'A'。
3. 取下端蓋'B'。
4. 取下固定螺絲'C'與筒夾校準螺絲'D'。
5. 更換'D'套入R.8筒夾，並檢查，勿使螺絲末端碰到導槽之底部。
6. 更換固定螺絲'C'。
7. 重新裝上'B'，檢查參考線是否對準。
8. 裝上固定螺絲'A'。
注意：不可鎖太緊免造成變型。
9. 檢查間隙'E'(0.003" = .08mm)

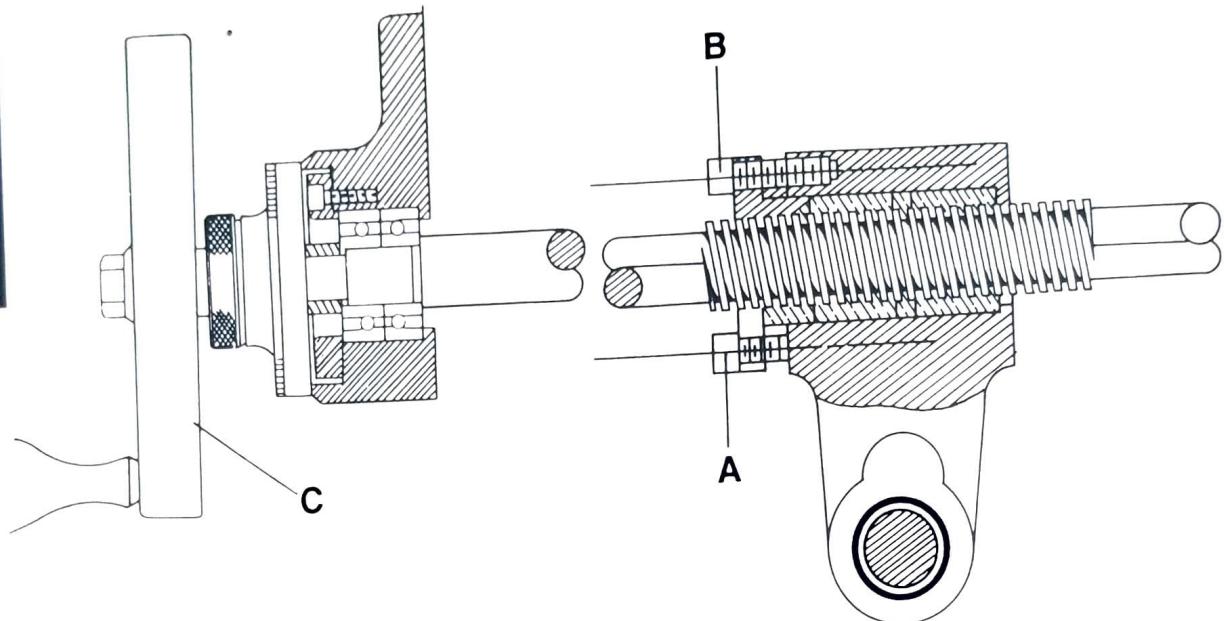
1. Use felt pen, mark reference line on quill and nose cap 'B'.
2. Remove set screw 'A'.
3. Unscrew nose cap 'B'.
4. Remove lock screw 'C' and collet aligning screw 'D'.
5. Replace 'D'; insert R.8 collet and check that the dog on the end of the screw does not foul on the bottom of the guide slot.
6. Replace lock screw 'C'.
7. Replace nose cap 'B'; check felt pen markings for correct alignment.
8. Replace set screw 'A'.
Caution: do not overtighten as this will cause distortion.
9. Check gap 'E'. (0.003" = .08mm)

前後進給螺桿間隙調整法 CROSS SCREW BACKLASH ADJUSTMENT



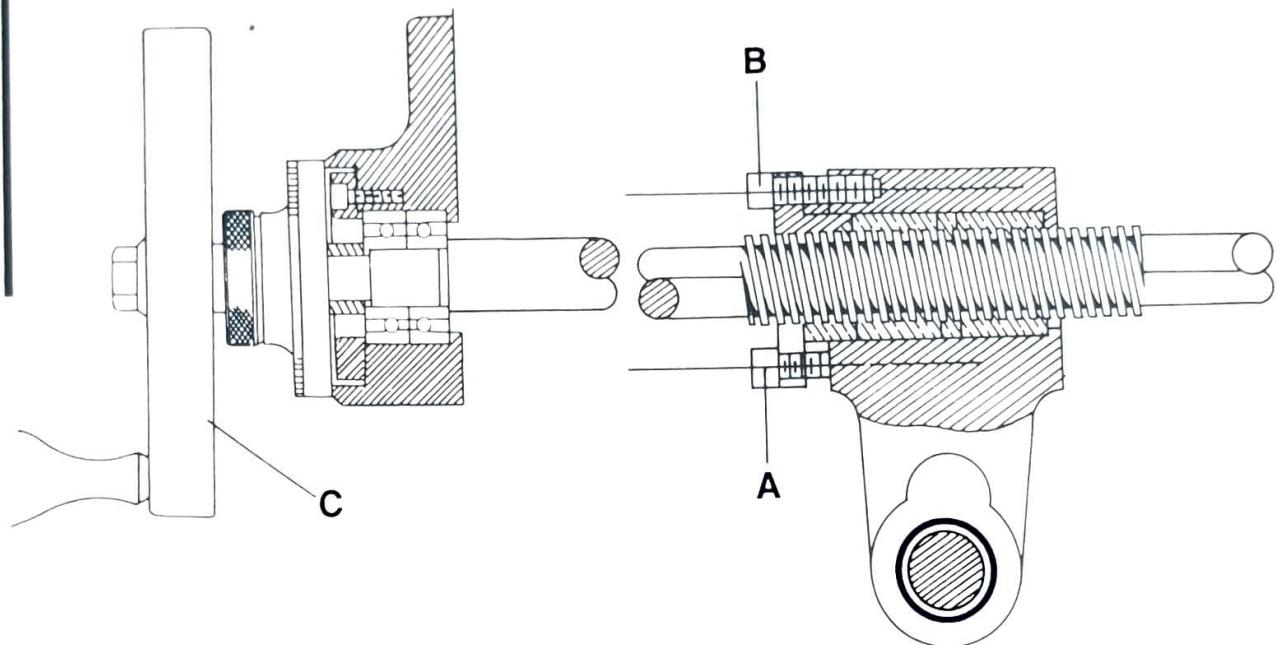
1. 轉動曲柄'C'使鞍座至中間位置
 2. 旋出四個螺絲'D'
 3. 將鞍座拉向前，以露出螺絲'A'與'B'
 4. 慢慢轉動手輪'C'，並鎖緊螺絲'B'直到間隙為0.004"或0.005"為止
 5. 鎖緊螺絲'A'
 6. 最後將鞍座移至昇降座之前方，重新組合四個螺絲'D'
-
1. Crank the saddle to mid position.
 2. Withdraw four screws "D".
 3. Pull the saddle forward to expose screws "A" and "B".
 4. Slowly turning handle "C", tighten screws "B" until 0.004" or 0.005" backlash is obtained.
 5. Lock screws "A".
 6. Finally crank the saddle to the front of the knee and replace four screws "D".

左右進給螺桿間隙調整法
TABLE SCREW BACKLASH ADJUSTMENT



1. 工作台移至左方
 2. 拆除右邊軸承座組
 3. 慢慢旋轉手輪'C'，並鎖緊螺絲'B'
，直到間隙0.004"或0.005"為止
 4. 鎖緊螺絲'A'
 5. 最後組合右邊軸承座組
-
1. Crank the table to the left.
 2. Remove the right side bearing support assembly.
 3. Slowly turning handle "C", while tightening screws "B"
until 0.004" or 0.005" backlash is obtained.
 4. Lock screws "A".
 5. Finally assemble the right side bearing support
assembly.

左右進給螺桿間隙調整法
TABLE SCREW BACKLASH ADJUSTMENT



1. 工作台移至左方
2. 拆除右邊軸承座組
3. 慢慢旋轉手輪'C'，並鎖緊螺絲'B'
，直到間隙0.004"或0.005"為止
4. 鎖緊螺絲'A'
5. 最後組合右邊軸承座組

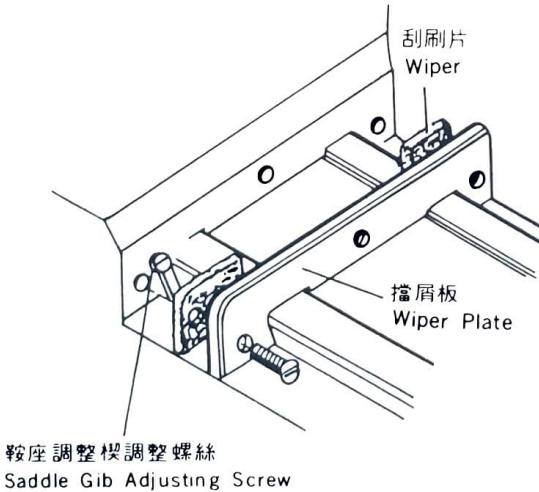
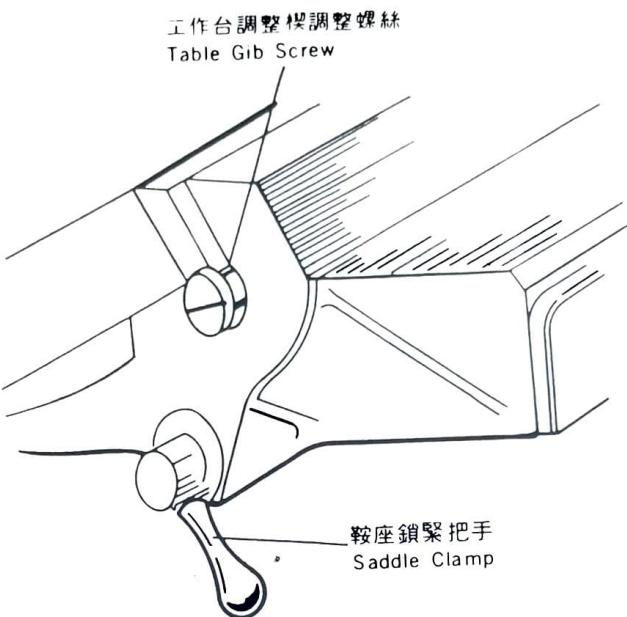
1. Crank the table to the left.
2. Remove the right side bearing support assembly.
3. Slowly turning handle "C", while tightening screws "B"
until 0.004" or 0.005" backlash is obtained.
4. Lock screws "A".
5. Finally assemble the right side bearing support
assembly.

a) 工作台鞍座滑道

1. 清除所有的切削屑。
2. 移動工作台時，順時針轉動工作台調整楔調整螺絲，直到感覺輕微阻力即可。

a) Table Saddle Ways

1. Remove all swarf from area.
2. Turn the table gib screw clockwise while moving the table until slight drag is felt.



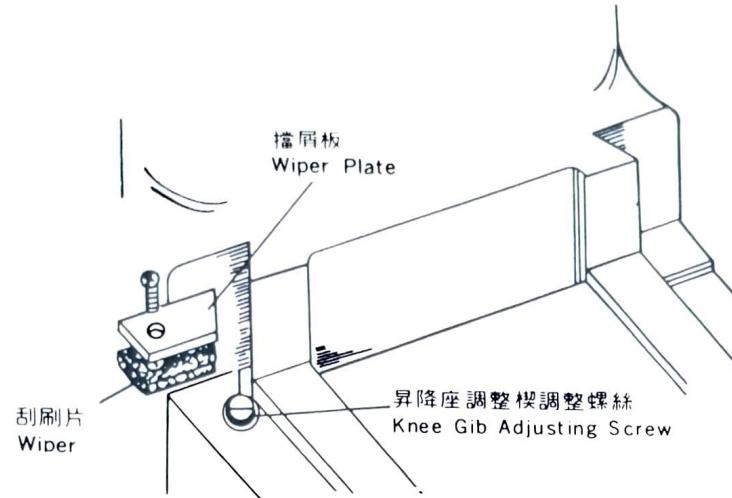
b) 鞍座、昇降座滑道

1. 清除所有切削屑。
2. 拆下擋屑板和刮刷片。
3. 移動鞍座時，順時針轉動調整楔螺絲，直至感覺輕微阻力為止。
4. 重新裝上擋屑板與刮刷片。

b) Saddle Knee Ways

1. Remove all swarf from area.
2. Remove wiper plate and wiper
3. Turn gib adjusting screw clockwise while moving the saddle until slight drag is felt.
4. Ensure chip wiper plate and wiper are replaced.

C) 昇降座機身滑道
C) Knee Column Ways



1. 清除所有切削屑。
2. 拆下擋屑板。
3. 拆下刮刷片。
4. 移動昇降座時，順時針轉動調整楔螺絲直至感覺輕微阻力為止。
5. 重新裝上擋屑板與刮刷片。

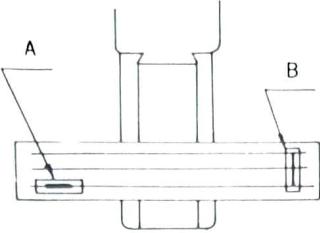
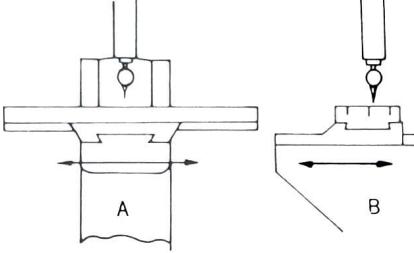
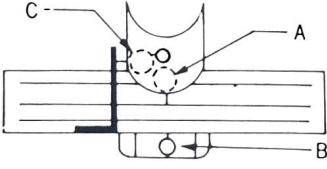
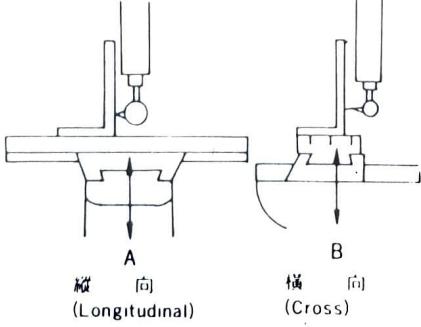
1. Remove all swarf from area.
2. Remove chip wiper plate .
3. Remove wiper
4. Turn gib adjusting screw clockwise while moving knee until slight drag is felt.
5. Ensure wiper plate and wiper are replaced.

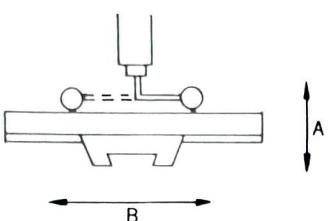
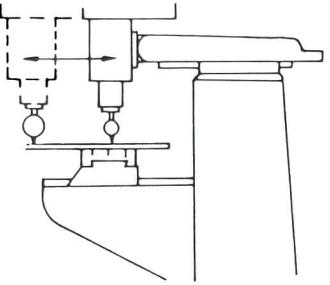
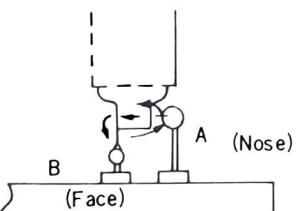
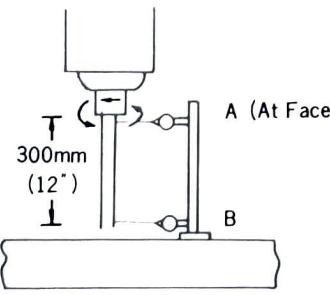
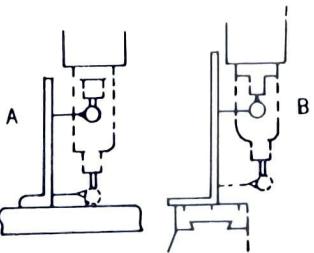
故障排除 Trouble-shooting

下表所列的是關於在操作時可能發生的故障，及其可能的原因與處理方法。
 The following chart contains some typical probable troubles of operation,
 along with the possible cause(s) and remedies for each.

故障 TROUBLE	可能的原因 POSSIBLE CAUSES	處理方法 REMEDY
主軸進給不順 Spindle feed un normal	昇降套固定桿未放鬆 Quill clamp lever unreleas.	放鬆固定桿 Release clamp lever.
主軸剎車失靈 Spindle brake brake down.	剎車環磨損 Brake shoe worn out	更換 Replace
主軸不轉 Spindle unrotate.	1. 開關接觸不良 Poor contact on the switch. 2. 皮帶太鬆 Drive belt too slack. 3. 馬達出毛病 Poor, motor.	1. 檢查電源開關 Check the switch. 2. 調整或更換 Adjust or replace. 3. 修理或更新 Repair or renew.
轉向錯誤 Incorrect rotation.	電源開關扭轉位置不對 The switch knob indicated at wrong position.	轉變開關指示位置 Change to correct position.
工作台上下、前後、左右進給不順。 Table vertical, cross, Longitudinal feed unsmooth.	1. 調整桿太緊 Gib strip too tight. 2. 螺帽與螺桿間隙不當 Unproper backlash between nut and screws. 3. 潤滑油未到達潤滑面 The lubricant not to lubrication point.	放鬆調整桿 Release 調整間隙 Adjust 檢查潤滑油路 Check lubrication.
切削時震動 Vibrative when machining.	1. 機械不穩固 Machine unstable. 2. 切削條件不適當 unsuitable cutting condition.	重新固定機械 Reclamp 依材質和銑刀大小選適當切削速度 Select proper cutting speed according to materials and cutter.

檢驗規格表 Inspection Chart

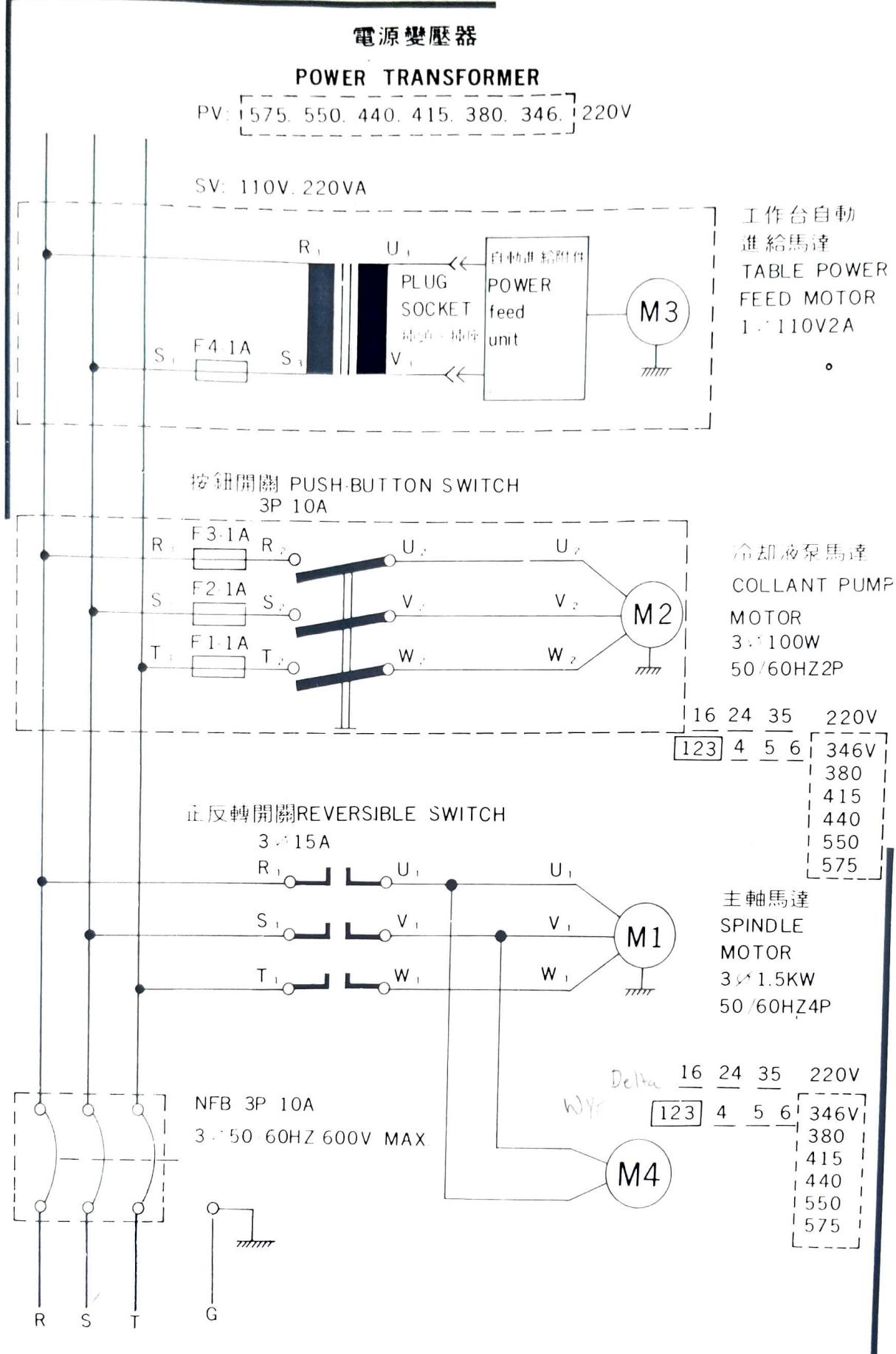
番號 No	檢查項目 Inspection Items	圖示 Illustrations	容許差 Tolerances	測定值 Measurements
1	工作台面水平 Plane of Surface Even Level.		Approx. Level 0.06mm/m 0.06mm/m	A. _____ B. _____
2	工作台移動平行度 Surface Parallel to its Movements.		A. 0.02mm/500mm (.0008°/20°) B. 0.02mm/300mm (.0008°/12°)	A. _____ B. _____
3	T 槽側面與縱向移動的平行度。與橫向移動的垂直度。 T-slots, Front Edge Parallel to Longitudinal Travel, Perpendicular to Cross Travel.		0.02mm/300mm (.0008°/12°)	T槽 A. T Slots _____ 縱向 B. Front Edge _____ 橫向 C. Cross _____
4	昇降座上、下移動與工作台的垂直度。 Vertical Movement of Knee Square to Table Surface.		0.02mm/300mm (.0008°/12°)	A. _____ B. _____

番號 No.	檢査項目 Inspection Items	圖示 Illustrations	容許差 Tolerances	測定值 Measurements
5	工作台面與主軸的直角度。 Table Sweep-Knee not Level, Spindle Perpendicular to top of table		0.02mm/300mm (.0008°/12°)	A. _____ B. _____
6	伸出臂與工作台面平行度。 Ram Slide Parallel with Table Top.		0.02mm/300mm (.0008°/12°)	_____
7	主軸、主軸端面振幅。 Spindle Nose and Face True.		A. 0.01mm (.0004°) MAX. B. 0.01mm (.0004°) MAX.	A. _____ B. _____
8	主軸孔偏轉。 Spindle Bore Runout.		A. 0.01mm (.0004°) MAX. B. 0.02mm (.0008°) MAX.	A. _____ B. _____
9	昇降套上、下與工作台垂直度。 Quill Travel Square to Table Surface.		A. 0.02mm/300mm (.0008°/12°) B. 0.02mm/300mm (.0008°/12°)	A. _____ B. _____

檢驗規格表Inspection chart

No.	項 目 Items
10	在刻度環讀出齒隙。 Backlash Read on Dials.
	允許最大值 0.127mm(0.005") MAX. 0.127mm (0.005") 測定讀數： A. 縱向導螺桿 B. 橫向導螺桿
	Test Readings: A. Long. Lead Screw A. _____ B. Cross Lead Screw B. _____
11	導螺桿：Leadscrews:
	最大誤差 Maximum Error: 0.02mm/300mm 0.02mm Per 300mm 或 0.0008"/12" or 0.0008" Per 12" 0.04mm 或 0.0016" 總工作長度 0.04mm or 0.0016" Total Overall A. 縱向：在 300mm(12") A. Longitudinal: At 300mm(12") _____ 總工作長度 Overall _____ B. 橫向：在 300mm(12") B. Transverse: At 300mm(12") _____ 總工作長度 Overall _____
12	手動操作 Manual
	1) 楔的調整 1) Gibs Adjusted _____ 2) 升降套昇降的鬆緊度 2) Quill Tight _____ 3) 主軸的齒隙 3) Spindle Backlash _____ 4) 所有移動體移動時的平穩性 4) All Movements Smooth _____ 5) 刀具夾頭裝置情形 5) Collet Fit _____
13	動態試驗 Power
	速度 SPEEDS 低 LOW 高 HIGH 1) 自動進給的動作 1) Powerfeed Kickouts _____ 2) 所有移動體移動時的平穩性 2) All Movements Smooth _____ 3) 震動 3) Vibration _____ 4) 噪音(最大 73DB) 4) Sound (73DB Max.) _____ 5) 切削試驗 5) Test Cuts A. 面銑 A. Face _____ B. 側銑 B. Side _____
14	外 觀 Visual
	1) 表面處理 1) Finishes A. 噴漆部份 A. Paint _____ B. 機械加工部份 B. Machined _____ C. 電鍍部份 C. Chrome _____ D. 塑膠部份 D. Plastic _____ E. 染黑部份 E. Black Oxide _____ 2) 防锈處理 2) Rustproofing _____
15	電氣方面 Electrical
	馬達電壓 Voltage for which Motors. _____ Volts 接頭 connected _____ 頭部 Head _____ 自動進給附件 Powerfeed _____ 冷卻油泵 Coolant Pump _____

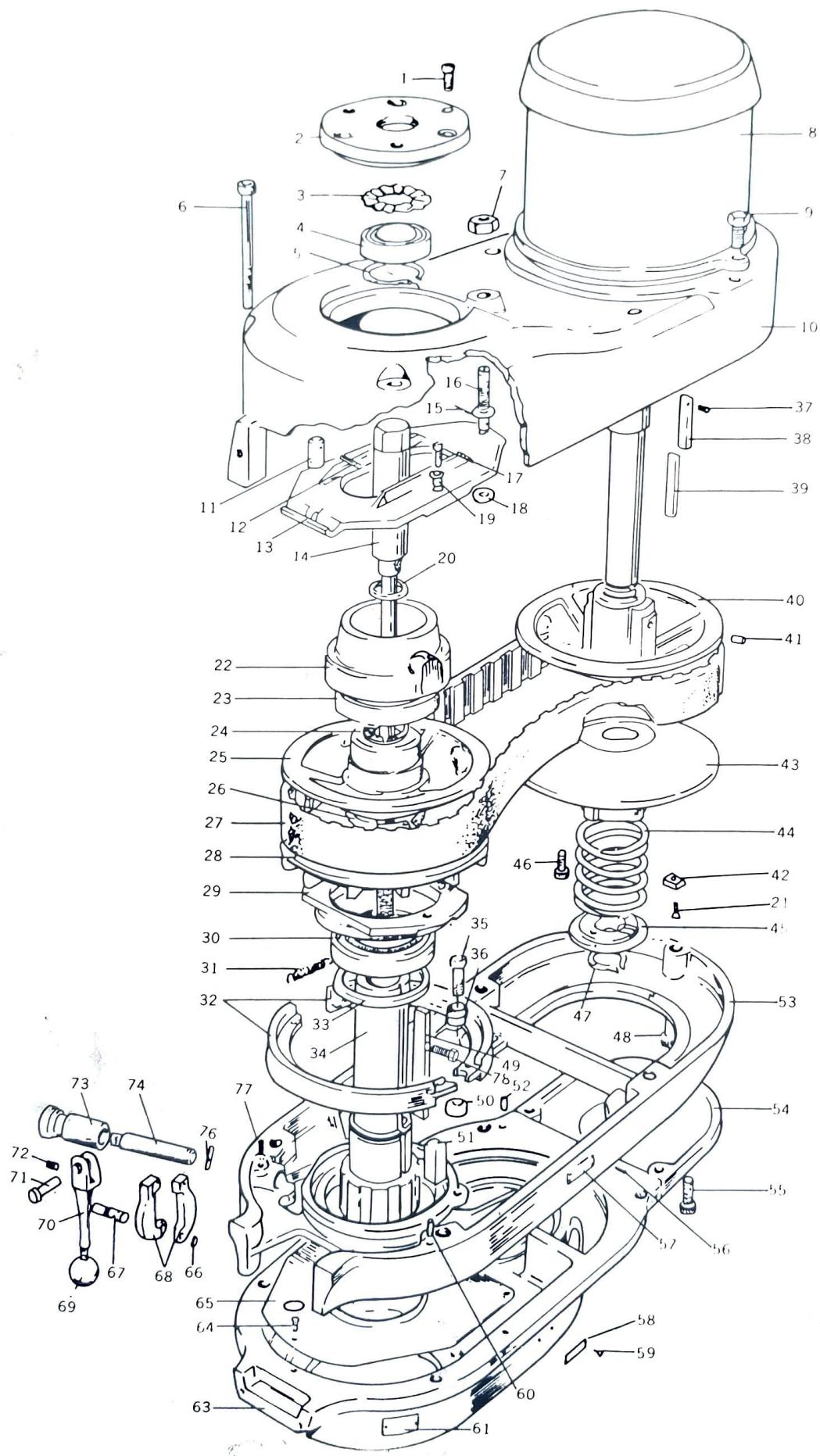
電氣回路圖 Electric circuit diagram



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Spare parts HEAD TOP HOUSING



PARTS LIST

HEAD TOP HOUSING

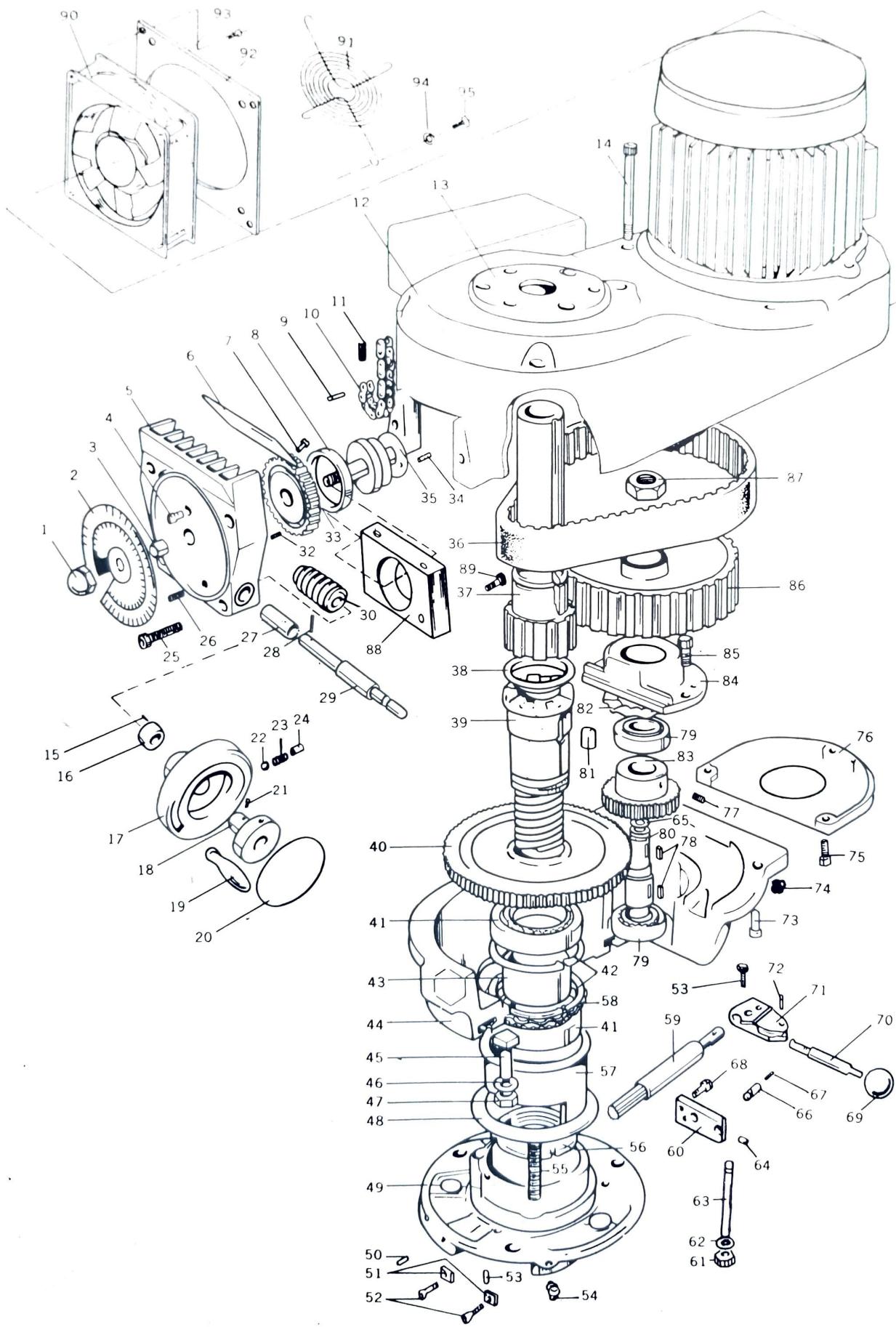
ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
1	600060200	M6X20 Hex-Socket Head Cap Screw	3
2	FB-006	Top Bearing Cap	1
3	FB-028	Wave Spring	1
4	701060072	Ball Bearing #6007 2Z	1
5	665035000	Snap Ring A-35mm(Outer Retaining Ring)	1
6	FB-078A	Socket Head Cap Screw	2
7	615038001	3/8"-16 UNC Nut	1
8	413012010	Motor 2HP 4P	1
9	602381041	3/8"-16 UNC x 1 1/4" Hex-Head Bolts	2
10	FB-001	Belt Housing	1
11	FB-059	Speed Change Chain Stud	1
12	622040030	4 1/2 X30 Spring Pin	1
13	FB-057	Speed Change Plate	1
14	FA-213A,213B	Drawbar 213A for #30, 213B for R8	1
15	633061001	(1/16" X 1" Split Pins)	1
16	FB-060	Speed Change Plate Pivot Stud	1
17	600050200	M5X20 Hex-Socket Head Cap Screw	2
18	FB-084	Washer for FB-060	1
19	FB-058	Pivot Sleeve	2
20	FA-212	Drawbar Washer	1
21	600080001	W 1/8"-40 NC Socket Cap Screw	1
22	FB-014	Spindle Pulley Bearing Sliding Housing	1
23	701060104	Ball Bearing #6010 2RS	1
24	FB-009	Bushing	1
25	FB-008	Adjustable-Driven Varidisc	1
26	665040000	A-40mm (Outer Retaining Ring)	1
27	FB-082	Belt	1
28	FB-012	Stationary Driven Varidisc	1
29	FB-007	Brake Bearing Cap	1
30	701060104	Ball Bearing #6010 2RS	1
31	FB-063	Brake Spring	2
32	FB-062	Brake Shoes	2
33	FB-016	Spindle Pulley Spacer	1
34	FB-015	Spindle Pulley Hub	1
35	602041001	1/4"-20 UNC X 1" Hex. Head Bolt	1
36	FB-069	Brake Shoe Pivot Sleeve	1
37	522016012	1.6 1/2 X12 Spring Pin	1
38	FB-033	Drive Key	1
39	FB-034	Key for ADJ Varidisc Motor Shaft	1
40	FB-030	Stationary Motor Varidisc	1
41	604060100	M6X10 Set Screw	1
42	FB-036A	Key for FB-036	1
43	FB-029	Adjustable Motor Varidisc	1
44	FB-035	Spring for Varidisc Motor Shaft	1
45	FB-036	Adjustable Varidisc Spring Collar	1
46	600050500	M5X50 Hex-Socket Head Cap Screw	2
47	665024000	A-24mm(Outer Retaining Ring)	1
48	600080200	M8X20 Hex-Socket Head Cap Screw	1
49	FB-010	Key for FB-008	1
50	615004001	Bracket Locknut 1/4"-20 UNC	1

PARTS LIST

HEAD TOP HOUSING

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
51	FB-013	Key for FB-015, FB 012	1
52	FB-079	Taper Pin	2
53	FB-002	Belt Housing	1
54	FB-037	Motor Pulley Cover	1
55	600050200	M5X20 Hex-Socket Head Cap Screw	3
56	625020006	Rivets	4
57	403012040	Lubrication Nameplate	1
58	403012030	HI-LOW Range Nameplate	2
59	625020006	Rivets	2
60	623040250	Taper Pin	2
61	403012050	Quill Feed Nameplate	1
62	625020006	Rivets	4
63	FB-003	Gear Housing	1
64	605360581	3 $\frac{1}{16}$ " X 5 $\frac{1}{8}$ " Round Head Machine Screw	3
65	FB-022	Gear Housing Plate	1
66	665006000	A-6mm (Outer Retaining Ring)	1
67	FB-068	Brake Finger Pivot Stud	1
68	FB-067A	Brake Operating Finger	2
69	EB-047	Ball Handle	1
70	FA-039	Brake Lock Handle	1
71	FA-038	Brake Lock Pin	1
72	604040060	M4X6 Socket Set Screw	1
73	FB-065	Sleeve for Brake Lock Shaft	1
74	FB-066A	Brake Lock Shaft	1
76	665012000	4 \times X25 Spring Pin	1
77	604060060	M6X6 Socket Set Screw	1
78	606530041	5 $\frac{1}{32}$ ~ 1 $\frac{1}{4}$ Pan Head Screw	1

Spare parts HEAD BACK GEAR



PARTS LIST

HEAD BACK GEAR

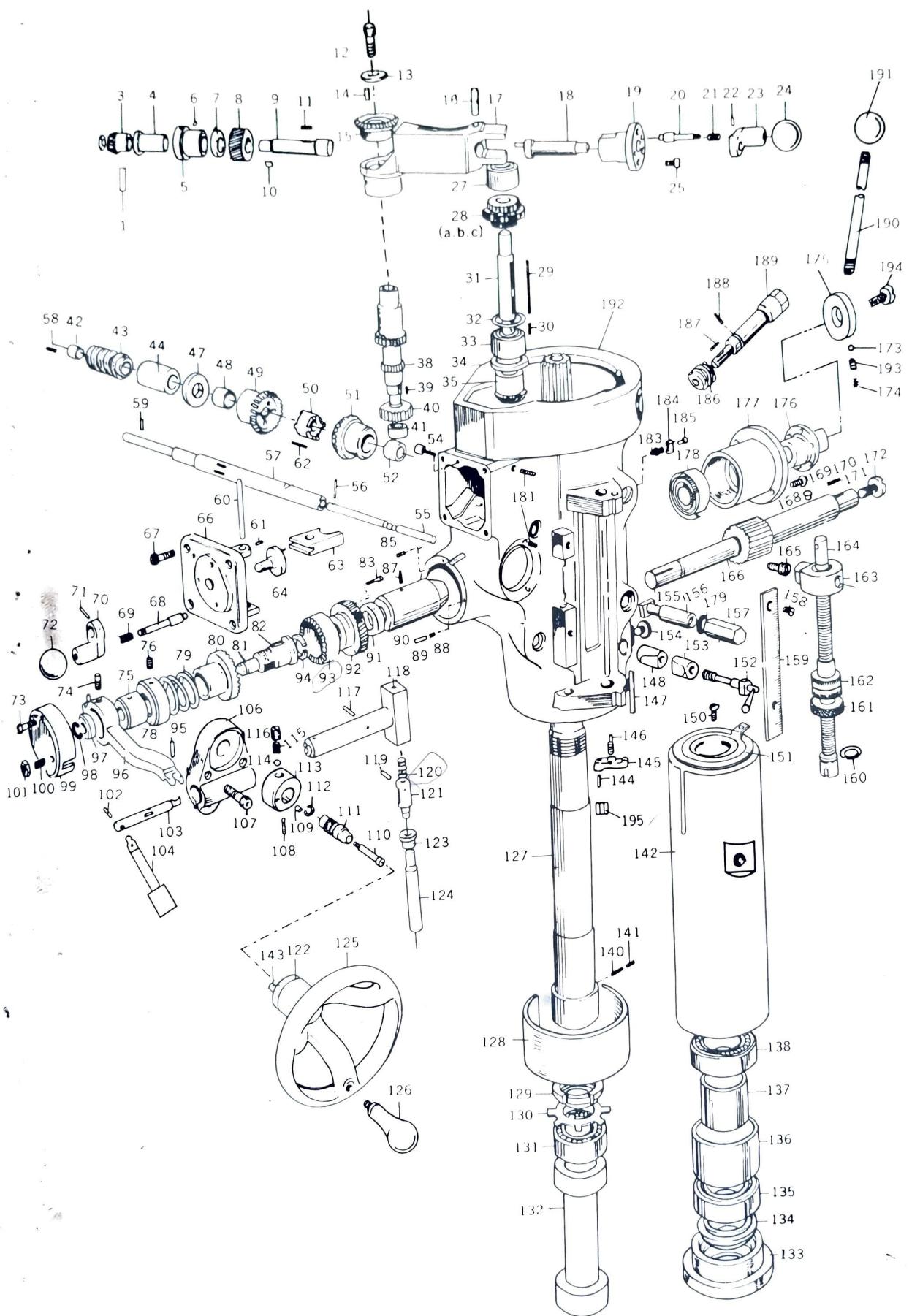
ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
1	FB-056	Hex. Cap Nut	1
2	403012020	Vari-Speed Dial	1
3	FB-047	Bushing	1
4	FB-085	Full Dog	1
5	FB-005	Speed Changer Housing	1
6	FB-046	Speed Changer Chip Shield	1
7	606360041	W $\frac{3}{16}$ " .24 NC X $\frac{1}{4}$ " Machine Screws	2
8	FB-045	Bushing	1
9		Chain Pin	1
10	FB-061	Speed Changer Chain	1
11		Split Link Supplied with FB-061	1
12	FB-001	Belt Housing	1
13	FB-006	Top Bearing Cap	1
14	FB-078B	Socket Head Cap Screw	2
15	622016008	1.6 \times 8 Spring Pin	1
16	FB-054	Washer	1
17	FB-052	Speed Change Hand Knob	1
18	FB-050	Flange Sleeve	1
19	FB-053	Machine Handle	1
20	403012010	Vari-Speed Dial	1
21	604050050	M 5X5 Socket Set Screw	1
22	035036000	$\frac{3}{16}$ " Steel Ball	1
23	FB-051	Spring	1
24	604060060	M6X6 Socket Set Screw	1
25	600060400	M6X40 Hex-Socket Head Cap Screw	4
26	604060080	M6X8 Socket Set Screw	1
27	FB-042	Bushing	1
28	622025012	2.5 \times 12 Spring Pin	1
29	FB-043	Speed Control Shaft	1
30	FA-139	Worm Gear	1
31			
32	622030020	3 \times 20 Spring Pin	1
33	FB-049	Speed Changer Spur Gear	1
34	622030024	3 \times 24 Spring Pin	1
35	FB-048	Speed Change Chain Drum	1
36	066225110	Timing Belt	1
37	FB-015	Spindle Pulley Hub	1
38	FB-017	Timing Pulley Clutch Sleeve	1
39	FB-018	Spindle Gear Hub	1
40	FB-021	Spindle Bull Gear	1
41	701069084	Ball Bearing #6908 2RS	2
42	666062000	B-62mm (Inner Retaining Rings)	2
43	FB-027	Bull Gear Bearing Spacer	1
44	FB-003	Gear Housing	1
45	FB-080	Vert. Tee Bolts	3
46	652076001	$\frac{7}{16}$ " Spring Washer	3
47	615076001	$\frac{7}{16}$ " Nut	3
48	FB-025	Ball Bearing Gear Sleeve Washer	1
49	FB-004	Fixed Clutch Bracket	1
50	604080140	M8 \times 14 Socket Set Screw	1

PARTS LIST

HEAD BACK GEAR

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
51	FB-026	Guide	2
52	606360001	3/16" 24NC Flat Head Socket Cap Screw	2
53	600050100	M5X10 Hex Socket Head Cap Screw	2
54	075008000	Oil Cup 1/8"-28PT	1
55	FB-024	Spring	3
56	FB-019	Bearing Locknut	1
57	FB-023	Bearing Sleeve	1
58	FB-028	Wave Spring Washer	1
59	FB-076	Bull Gear Shift Pinion	1
60	FB-073	HI-LOW Detent Plate	1
61	615038001	3/8" 16UNC Hex Nut	3
62	650038001	3/8" Lock Washer	3
63	FB-077	Studs	3
64	604050080	M5X8 Socket Set Screw	1
65	FB-090	Washer	1
66	FB-071	HI-Low Detent Plunger	1
67	FB-072	Spring	1
68	600050100	M5X10 Hex. Socket Head Cap Screw	2
69	FA-006	Bakelite Ball Handle	1
70	FB-070	HI-LOW Shift Crank	1
71	FB-075	HI-LOW Pinion Block	1
72	622030014	3/16" X 14 Spring Pin	1
73	600080200	M8X20 Hex. Socket Head Cap Screw	4
74	077004000	1/8"-28 PT Nipple	1
75	600050200	M5X20 Hex. Socket Head Cap Screw	3
76	FB-037	Motor Pulley Cover	1
77	604060060	M6X6 Socket Set Screw	1
78	630050180	5X5X18 Square Parallel Key.	2
79	701062034	Ball Bearing #6203 2RS	2
80	FB-039	Pinion Shaft	1
81	FB-020	Key for FB-018, FB-021	1
82	FB-038	Wave Spring Washer	1
83	FB-040	Pinion	1
84	FB-031	Pinion Bearing Cap	1
85	600050100	M5X10 Hex. Socket Head Cap Screw	2
86	FB-041	Timing Belt Pulley	1
87	615058001	5/8" Nut	1
88	FB-044	Bracket for FB-045, FB-048	1
89	600060200	M6X20 Hex. Socket Head Cap Screw	2
90	FB-089	FAN	1
91	FB-088	SAFETY NET	1
92	FB-091	FAN PLATE	1
93	600050100	M5X10 Hex. Socket Head Cap Screw	1
94		Ø4XØ8 Washer	1
95		1/8"-40NC Flat driver Screw	1

Spare parts HEAD ASSEMBLY



PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
1	622030016	Φ 3×16, spring pinead Screw	1
3	FA-160	Feed Bevel Pinion	1
4	FA-161	Feed Worm Gear Shaft Sleeve	1
5	FA-162	Worm Cradle Bushing	1
6	604060060	M6X6 Socket Set Screw	1
7	FA-163	Worm Gear Spacer	1
8	FA-164	Feed Drive Worm Gear	1
9	FA-165	Feed Drive Worm Gear Shaft	1
10	630030080	3X3X8 Square Parallel Key	1
11	630030200	3X3X20 Square Parallel Key	1
12	600080160	M8×16 Hex. Socket Head Cap Screw	1
13	FA-153	Washer	1
14	630030080	3X3X8.5 Square Parallel Key	1
15	FA-154	Feed Reverse Bevel Gear	1
16	FA-167	Feed Engage Pin	1
17	FA-166	Worm Gear Cradle	1
18	FA-001	Worm Gear Cradle Throw-out	1
19	FA-002	Shift Sleeve	1
20	FA-004	Gear Shift Plunger	1
21	FA-005	Compression Spring	1
22	622030020	Spring Pin 3/8X22	1
23	FA-003	Shift Crank	1
24	FA-006	Black Plastic Ball 1" Dia	1
25	600050100	M5X10 Hex.Socket Head Cap Screw	3
27	FA-147	Cluster Gear Shaft upper Bushing	1
28a	FA-146	Cluster Gear (Upper)	1

PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
28b	FA-145	Cluster Gear (Middle)	1
28c	FA-144	Cluster Gear (low)	1
29	630030460	Cluster Gear Key 3X3X46	1
30	630030150	Key 3X3X15	1
31	FA-143	Cluster Gear Shaft	1
32	665016000	Outer Retaining Ring (A-16)	1
33	FA-142	Bevel Gear Bushing	1
34	FA-141	Bevel Gear Thrust Spacer	1
35	FA-140	Feed Reverse Bevel Pinion	1
38	FA-156A	Cluster Gear Input Shaft	1
39	630030100	Key 3X3X10	1
40	FA-157	Feed Drive Gear	1
41	735000660	IKO BA-66 Needle Bearing	1
42	FA-168	Bushing	1
43	FA-139	Worm	1
44	FA-138	Feed Worm Shaft Bushing	1
47	FA-137	Feed Worm Shaft Thrust Washer	1
48	FA-134	Feed Reverse Bevel Gear Bushing	1
49	FA-135	Feed Reverse Bevel Gear	1
50	FA-136	Feed Reverse Clutch	1
51	FA-135	Feed Reverse Bevel Gear	1
52	FA-134	Feed Reverse Bevel Bushing	1
54	FA-171	Set Screw	1
55	FA-132	Reverse Clutch Rod	1
56	622025020	Spring Pin 2.5X20	1

PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
57	FA-133	Feed Worm Shaft	1
58	6040600060	Set Screw M6X6	1
59	622025012	Spring Pin 2.5 \times 12	1
60	FA-150	Feed Shift Rod	1
61	604050100	Set Screw M5X10	1
62	630030150	Key 3X3X15	1
63	FA-149	Feed Gear Shift Fork	1
64	FA-151	Cluster Gear Shift Crank	1
66	FA-148	Cluster Gear Cover	1
67	600050100	M5X10 Hex.Socket Head Cap Screw	4
68	FA-004	Gear Shift Plunger	1
69	FA-005	Compression Spring	1
70	FA-003	Shift Crank	1
71	622030020	Spring Pin 3 \times 20	1
72	FA-006	Black Plastic Ball 1" Dia	1
73	600050350	M5X35 Hex.Socket Head Cap Screw	2
74	FA-081	Clutch Ring Pin	2
75	FA-080	Clutch Ring	1
76	604060080	Set Screw M6X8	1
78	FA-082	Overload Clutch Locknut	1
79	FA-083	Safety Clutch Spring	1
80	FA-084	Overload Clutch	1
81	FA-085	Overload Clutch Sleeve	1
82	FA-085A	Key (5x5x15)	1
83	600040160	M4X15 Hex.Socket Head Cap Screw	3
85	604060200	Set Screw M6X20	1
87	604060120	Set Screw M6X12	1
88	FA-090	Compression Spring	1
89	FA-089	Overload Clutch lever Spring Plunger	1

PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q.T.Y.
90	FA-123	Quill Pinion Shaft Bushing	1
91	FA-122	Pinton Shaft Worm Gear Spacer	1
92	FA-087	Overload Clutch Worm Gear	1
93	FA-086	Overload Clutch Ring	1
94	6650015000	Outer Retaining Ring A-15	1
95	FA-077	Dowel Pin	1
96	FA-079	Overload Clutch Trip Lever	1
97	FA-078	Overload Clutch Washer	1
98	6650090000	Outer Retaining Ring A-9	1
99	FA-076	Clutch Arm Cover	1
100	600060160	Hex Socket Set Screw M6X16	1
101	6150060000	Locknut M6X1P	1
102	FA-077	Dowel Pin	1
103	FA-091	Cam Rod	1
104	FA-328	Trip Handle	1
106	FA-092	Feed Trip Bracket	1
107	600060200	M6X20 Cap Screw	2
108	604060100	Set Screw M6X10	1
109	630030100	Key 3X3X10	1
110	FA-130	Feed Reverse Knob Stud	1
111	FA-131	Reverse Knob	1
112	6650060000	Outer Retaining Ring A-6	1
113	FA-129	Handwheel Clutch	1
114	035036000	3/16" Steel Ball	1
115	FA-129B	Compression Spring	1
116	FA-129A	Handwheel Clutch Spring Screw	1
117	622030014	Spring Pin 3/4X14	1

PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
118	FA-093	Cam Rod Sleeve Assembly	1
119	622030012	Spring Pin 3/16X12	1
120	FA-094	Compression Spring	1
121	FA-095	Trip Plunger	1
122	FA-127	Handwheel Bushing	1
123	FA-121	Trip Plunger Bushing	1
124	FA-097	Feed Trip Plunger	1
125	FA-126	Handwheel	1
126	FA-125	Handwheel Handle	1
127	FA-50A	Spindle (Taper 30 #)	1
	FA-50B	Spindle (R8)	1
128	FA-060	Quill Skirt	1
129	617030000	Locknut Washer	1
130	653030000	Locknut Washer	1
131	726002060	(M206KDD) Bearing	1
132	FA-055	Sleeve	1
133	FA-051B	Nose-Piece	1
134	FA-052	Spindle Dirt Shield	1
135	762002070	JM207PP PRB DB Bearing	1
136	FA-054	Bearing Spacer (large)	1
137	FA-053	Bearing Spacer (small)	1
138	726002070	JM207PP PRB DB Bearing	1
140	FA-172	Special Socket Set Screw	1
141	604060060	M6X6 Collet Alignment Screw	1
142	FA-058	Quill	1
143	622030012	Spring Pin 3/16X12	1
144	604040200	Set Screw M4X20	1

PARTS LIST

HEAD ASSEMBLY

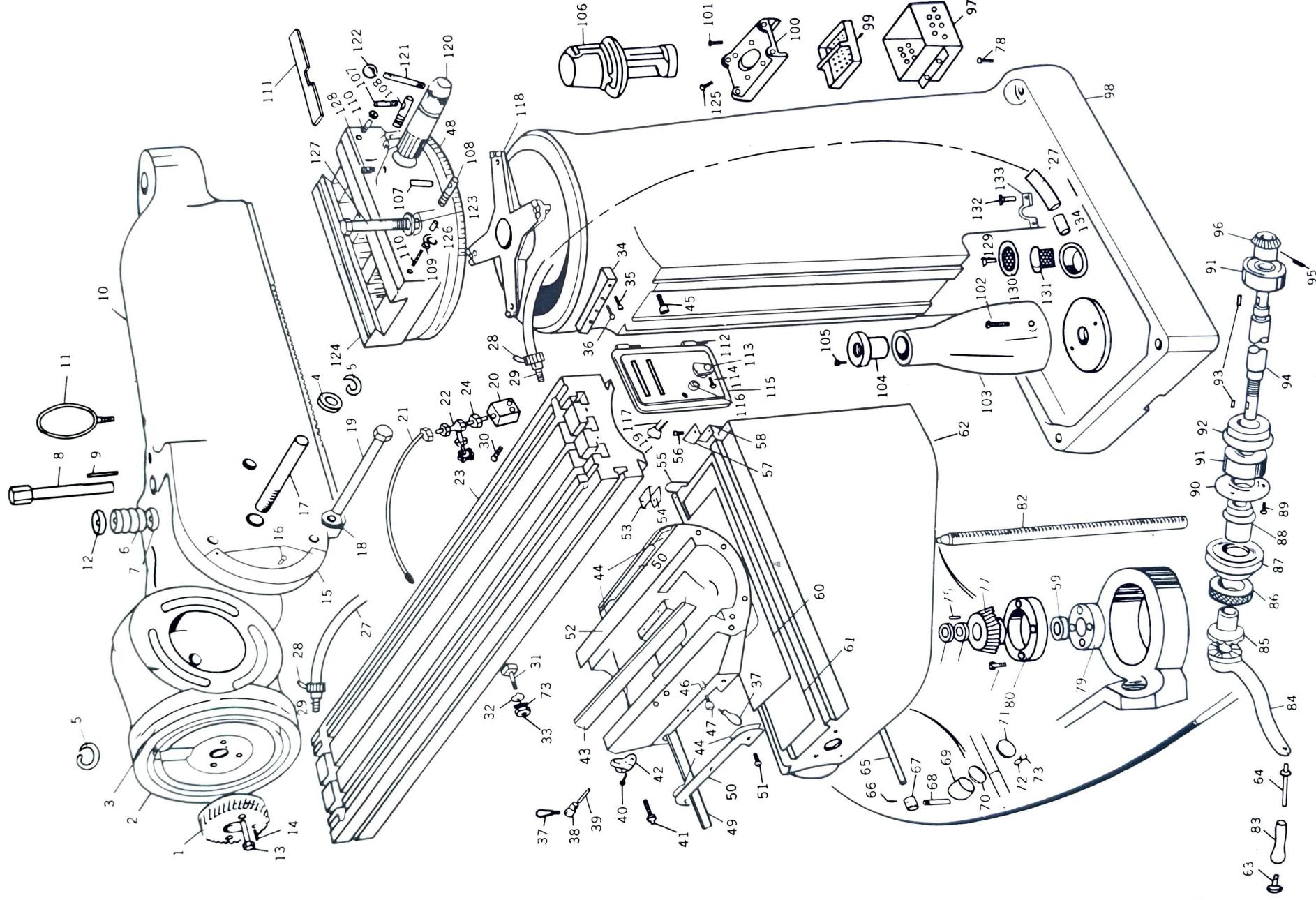
ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
145	FA-098	Feed Trip Lever	1
146	FA-099	Trip Lever Pin	1
147	FA-119	Indicator Rod	1
148	FA-111	Quill Lock Sleeve	1
150	.605050100	M5x10 Round Head Screw	2
151	FA-057	Oil Strainer for Quill Bearing	1
152	FA-088	Quill Lock Bolt	1
153	FA-110	Quill Lock Sleeve Tapped	1
154	FA-120	Indicator Rod Screw	1
155	FA 043	½"-12 NC Tee Bolt	4
156	FA-046	Lower Clamping Bolt Spacer	2
157	FA-040	½"-12 NC Adaptor Nut	4
158	605360381	W 3/16" X 1 ¼" Round Head Screw	2
159	403011050	Micrometer Scale (Metric)	1
	FA-118B	Micrometer Scale (Inch)	1
160	665016000	Outer Retaining Rings A-16	1
161	FA-115A	Quill Micro-Stop Nut (Metric)	1
	FA-115B	Quill Micro-Stop Nut (Inch)	1
162	FA-116A	Micro meter Nut (Metric)	1
	FA-116B	Micro meter Nut (Inch)	1
163	FA-117	Quill Stop Knob	1
164	FA-112A	Quill Stop Micro-Screw (Metric)	1
	FA-112B	Quill Stop Micro-Screw (Inch)	1
165	600100140	M10X14 Hex-Socket Head Cap Screw	1
166	FA-101	Quill Pinion Shaft	1
168	FA-101A	Pin	1
169	600050120	M5X12 Hex Socket Head Cap Screw	8
170	622050016	5/18" Spring Pin	1

PARTS LIST

HEAD ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	Q. T. Y.
171	630040180	Key 4X4X18	1
172	FA-107	Pinion Shaft Hub Screw	1
173	035040000	4 ✓ Steel Ball	1
174	FA-105A	Compression Spring	1
175	FA-106	Back Feed Handle Hub	1
176	FA-104	Pinion Shaft Hub Sleeve	1
177	FA-103	Spring Cover	1
178	FA-102	Clock Spring	1
179	FA-042	Washer	4
181	604060120	Set Screw M6X12	2
183	FA-113	Reverse Trip Ball Lever	1
184	FA-114	Feed Reverse Trip plunger	1
185	FA-124	Reverse Trip Ball Lever Screw	1
186	FA-018	Worm Gear	1
187	630040180	Key 4X4X18	1
188	FA-173	Socket Set Screw	1
189	FA-017	ADJ Worm Shaft	1
190	FA-106B	Pinion Shaft Hub Handle	1
191	FA-106A	Black Plastic Ball	1
192	FA-016	Quill Housing	1
193	FA-105B	Set Screw	1
194	FA-107	Set Screw	1
195	615004000	M4 Nut	1

Spare parts BASIC MACHINE



PARTS LIST BASIC MACHINE

ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
1	FD-001	Quill Housing Adjusting Gear	1
2	FD-002	Ram Adaptor	1
3	403011030	Adaptor Scale	1
4	FD-006	Washer Pivot Stud Locknut	1
5	665030000	Outer Retaining Ring A-30	2
6	FD-011	Vertical Adjusting Worm	1
7	FD-012	Worm Thrust Washer	1
8	FD-009	Vertical Adjusting Worm Shaft	1
9	637050480	Key 5X5X48	1
10	FD-004	Ram	1
11	FD-004B	Hook	1
12	FD-010	Worm Thrust Washer	1
13	600060250	M6X25 Hex Socket Head Cap Screw	2
14	622060030	6.5X30 Spring Pin	1
15	403013090	Angle Plate	1
16	625020006	2.5X6 Rivet	17
17	FD-005	Adaptor Pivot Stud	1
18	FD-008	Washer	3
19	FD-007	Adaptor Locking Bolt	3
20	FD-039	Tap Bracket	1
21	AD-036	Coolant Pipe	1
22	AD-035	Oil Valve	1
23	FC-009	Table (42")	1
	FC-009B	Table (49")	1
24	AD-031	Valve Adaptor	1
27	043034001	Plastic Hose	1
28	AD-028	Hose Clip	1
29	AD-027A	Hose Adaptor	1

PARTS LIST

BASIC MACHINE

ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
30	600050450	M5X45 Hex-Socket Head Cap Screw	2
31	FC-010	Stop Piece T-Bolt	2
32	FC-011	Table Stop Piece	2
33	615038001	3/8"-16NC Hexagon Nut	2
34	FD-063	Bracket for Neoprene Rearway Cover	1
35	600060300	M6X30 Hex-Socket Head Cap Screw	2
36	605360381	W ^{3/16} " X ^{3/8} " Cross-Recessed Head Machine Screw	4
37	FA-125	Table Lock Bolt Handle	3
38	FC-014	Saddle Lock Bolt	1
39	FC-015	Saddle Lock Plunger	1
40	600100200	M10X20 Hex-Socket Head Cap Screw	2
41	AC-90	Adjusting Screw	6
42	FC-016	Table Stop Bracket (Table 42")	1
	FC-016A	Table Stop Bracket (Table 49")	1
43	FC-013A	Saddle Table Gib (Table 42")	1
	FC-013B	Saddle Table Gib (Table 49")	1
44	FC-021A	Left Felt Wipers	2
	FC-021B	Right Felt Wipers	2
45	FE-034	Cap Screw	1
46	FC-019	Table Lock Plunger	2
47	FC-014A	Table Lock Bolt (Table 42")	2
	FC-014B	Table Lock Bolt (Table 49")	2
48	403013070	Turret Scale	1
49	FC-020A	Saddle Knee Gib (Table 42")	1
	FC-020B	Saddle Knee Gib (Table 49")	1
50	FC-022	Saddle Knee Wiper Plate	2
51	605360381	W ^{3/16} " X ^{3/8} " Cross-Recessed Head Machine Screw	6

PARTS LIST

BASIC MACHINE

ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
52	FC-017	Saddle (Table 42")	1
	FC-017B	Saddle (Table 49")	1
53	FE-001B	Wiper Holder (L)	1
54	FE-002B	Knee Wiper Felt	1
55	FE-003	Knee Column Gb	1
56	605040581	W $\frac{1}{4}$ " X $\frac{5}{8}$ " Cross-Recessed Head Machine Screw	2
57	FE-001A	Wiper Holder (R)	1
58	FE-002A	Knee Wiper Felt	1
59	FE-025	Sleeve	1
60	FE-004	Chip Guard (up)	1
61	FE-005	Chip Guard (down)	1
62	FE-006	Knee	1
63	AA-029	Set Screw	1
64	FC-002A	Handle Shaft	1
65	FE-012	Knee Lock Shaft	1
66	6220500025	5/8X25 Pin	2
67	FE-014	Lock Shaft boss	1
68	FE-013	Lock Shaft Handle	1
69	FE-009	Knee Lock Plunger	1
70	FE-010	Washer Distance/Spacer	1
71	FE-030	Knee Binder Plug (Plastic)	1
72	FE-011	Knee Binder Set Screw	1
73	FC-011A	Washer	2
74	615002003	1/2-20NF NUT	1
75	635050250	Key 5X5X25	1
76	FE-023	Washer	1
77	FE-024	Bevel Gear	1

PARTS LIST

BASIC MACHINE

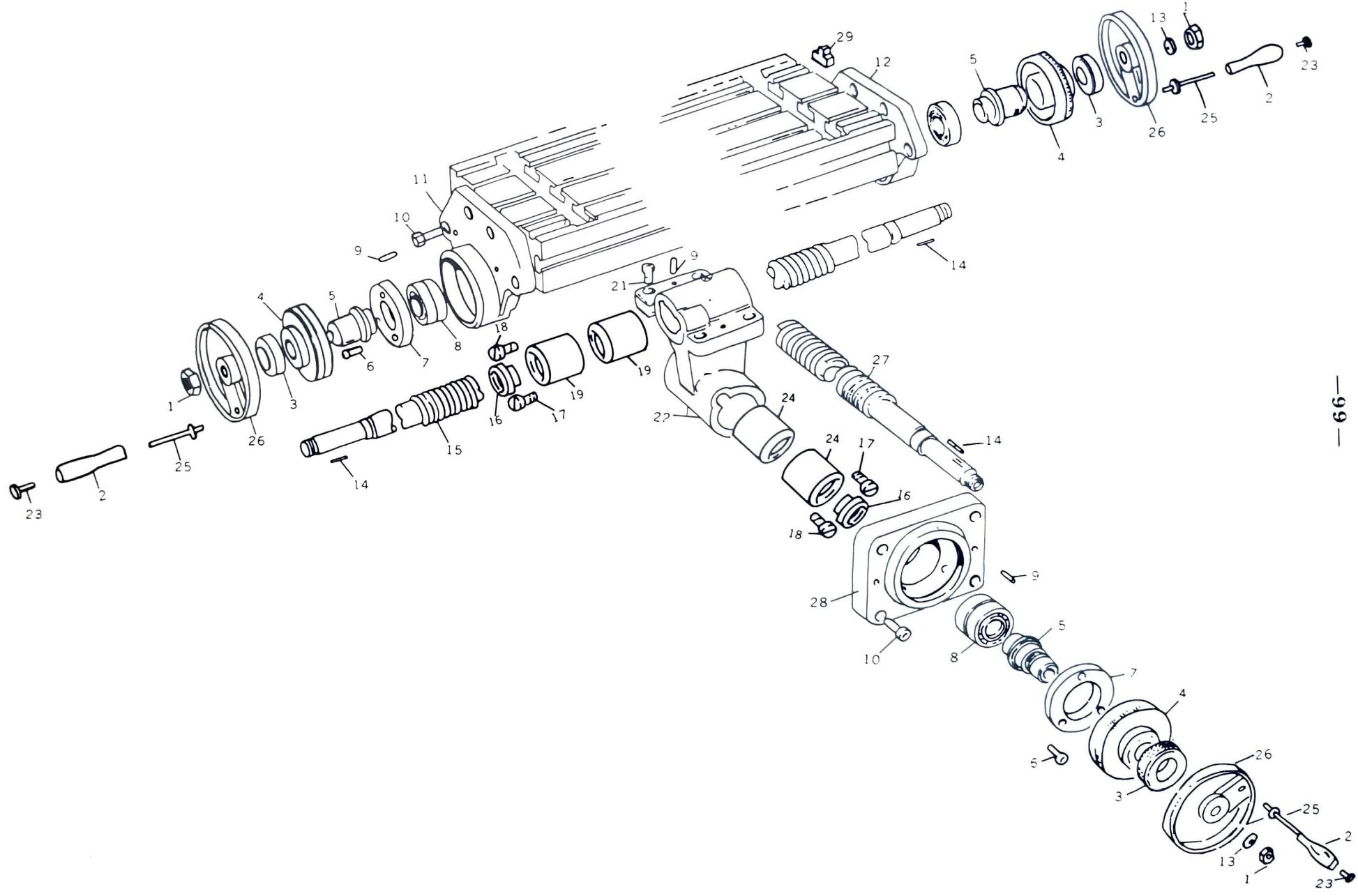
ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
78	600080120	M8X12 Hex-Socket Head Cap Screw	2
79	711073054	#3305 Bearing	1
80	FE-026	Bearing Retainer Ring	1
81	600100160	M10X14 Hex-Socket Head Cap Screw	3
82	FE-027A	Elevating Screw (Metric)	1
	FE-027B	Elevating Screw (inch)	1
83	AC-053	Black Plastic Handle	1
84	FE-021	Elevating Crank	1
85	FE-020	Gear Shaft Clutch Insert	1
86	FC-002	Dial Lock Nut	1
87	FE-19A	Dial With 125 Graduation	1
	FE-19B	Dial With 100 Graduation	1
88	FE-018	Dial Holder	1
89	600060200	M6X20 Hex-Socket Head Cap Screw	3
90	FC-005	Bearing Retainer Ring	1
91	701062044	#6204 2RS Bearing	2
92	FE-016	Bearing Cap	1
93	630040180	Key 4X4X18	2
94	FE-017	Elevating Shaft	1
95	604060060	M6X6 Socket Set Screw	1
96	FE-015	Bevel Pinion	1
97	FD-032	Strainer Case	1
98	FD-024	Column	1
99	FD-033	Strainer	1
100	FD-034	Coolant Pump Motor Set	1
101	600060200	M6X20 Hex-Socket Head Cap Screw	4
102	600100350	M10X35 Hex-Socket Head Cap Screw	2
103	FE-029	Elevating Screw Housing	1
104	FE-028A	Elevating Screw Nut (Metric)	1

PARTS LIST

BASIC MACHINE

ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
105	600060250	M6X25 Hex-Socket Head Cap Screw	3
106		Coolant Pump Motor	1
107	AC-024	Ram Lock Screw Handle	2
108	AC-040	Ram Lock Screw	2
109	6150100000	Gib Lock Nut M10	2
110	FD-038	Gib Lock Screw	2
111	FD-036	Turret-Ram Gib	1
112	6220500040	5/16"X40 Spring Pin	2
113	FD-025	Door Locking Cam	1
114	6040600060	M6X6 Grub Screw	1
115	FD-027	Door	1
116	FD-026	Spring	1
117	FD-028	Door Knob Shaft	1
118	FD-023	Spider	1
119	FD-029	Door Knob	1
120	FD-017	Ram Pinion	1
121	FD-016	Ram Pinion Handle	1
122	AA-39	35/64" Ball 3/8" X 16NC	1
123	FD-008	Spring Washer	4
124	FD-013	Turret	1
125	602382021	3/8" -16NC Hexagon Head Bolt	4
126	EA-111	Ram Lock Plunger	2
127	FD-022	Locking Bolt	4
128	FD-014	Ram Pinion Set Screw	1
129	606360381	W3/16"X3/8" Screw	6
130	FD-030	Strainer	2
131	FD-031	Strainer can	2
132	606360381	W3/16"X3/8" Screw	4
133	FD-042	Hose clip	2
134	FD-043	Pipe	2

Spare parts LEADSCREW ASSEMBLY



PARTS LIST

LEADSCREW ASSEMBLY

ITEM NO.	COMP. NO.	DESCRIPTION	Q. T. Y.
1	615002003	½" -20 NF Jam Nut	3
2	AC-53	Black Plastic Handle	3
3	FC-002	Dial Lock Nut	3
4	FC-003A	Dial With 250 Graduation (Metric)	3
	FC-003B	Dial With 200 Graduation (Inch)	3
5	FC-004	Dial Holder	3
6	600060200	M6X20 Hex-Socket Head Cap Screw	6
7	FC-005	Bearing Retainer Ring	3
8	701062044	#6204 2RS Ball Bearing	5
9	622050040	5/8X40 Spring Pin	8
10	600100250	M10X25 Hex-Socket Head Cap Screw	12
11	FC-006	Left Bearing Bracket	1
12	FC-006	Right Bearing Bracket	1
13	FC-01d	Washer	3
14	630040250	Key 4X4X25	3
15	FC-007A	Longitudinal Feed Screw (Metric Table 49")	1
	FC-007B	Longitudinal Feed Screw (Inch Table 49")	1
	FC-008A	Longitudinal Feed Screw (Metric Table 42")	1
	FC-008B	Longitudinal Feed Screw (Inch Table 42")	1
16	FE-322	Feed Nut Bracket Ring	2
17	600050200	M5X20 Hex-Socket Head Cap Screws	6
18	600060200	M6X20 Hex-Socket Head Cap Screws	6
19	FC-321A	Longitudinal Feed Nut (Metric)	2
	FC-321B	Longitudinal Feed Nut (Inch)	2
21	600100250	M10X25 Hex-Socket Head Cap Screw	4
22	FE-320	Feed Nut Bracket	1
23	AA-029	Set Screw	3

PARTS LIST

LEADSCREW ASSEMBLY

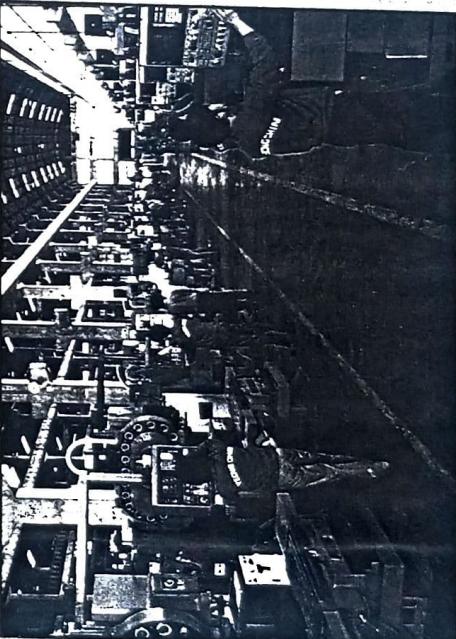
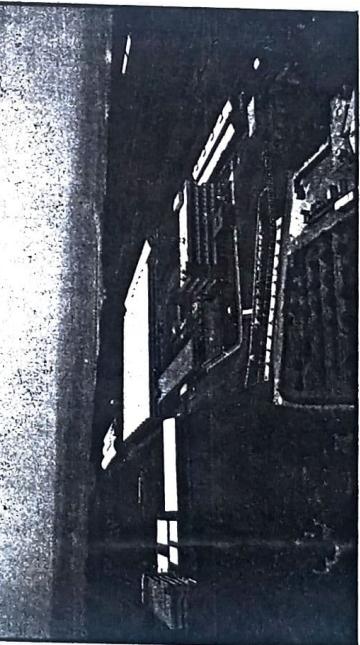
ITEM NO.	COMP. NO.	DESCRIPTION	Q. T.	Y.
24	FE-321A	Cross Feed Nut (Metric)	2	
	FE-321B	Cross Feed Nut (Inch)	2	
25	FC-002A	Handle Shaft	3	
26	FC-001b	Handle Wheel	3	
27	FE-007A	Cross Feed Screw (Metric)	1	
	FE-007B	Cross Feed Screw (Inch)	1	
28	FE-008	Cross Feed Bearing Bracket	1	
29	FC-028	T-Slot Plug	6	

ALWAYS MOVING ON

YEONG CHIN MACHINERY INDUSTRIES CO., LTD. was found in 1954 as a small Packing Machine Factory. In only thirty years, it has grown becoming one of the largest Milling Machine and Machine Center Manufacturers in Asia.

Quality Control System developed early in the company's history, it has enabled **YEONG CHIN** continuously to produce precise and reliable products. Without this quality assurance, **YEONG CHIN** is not able to be named the leadership in Machine Tools Industry.

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