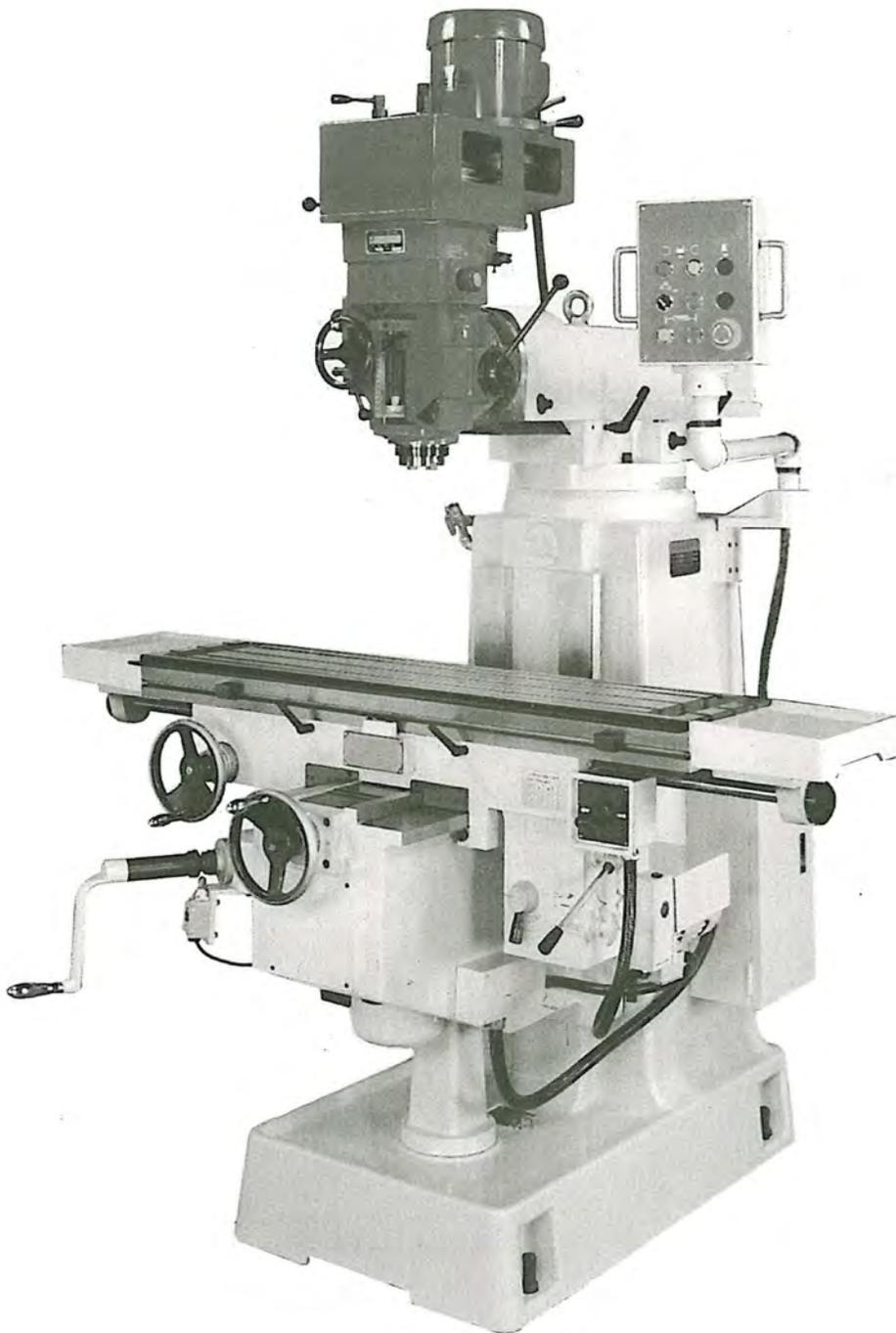


OPERATOR MANUAL VERTICAL MILLING MACHINE

**MODEL: VM-1258-3
(EVS300A)**



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1.Outling of machine (S-300,VS-300)

1-1 Appearance

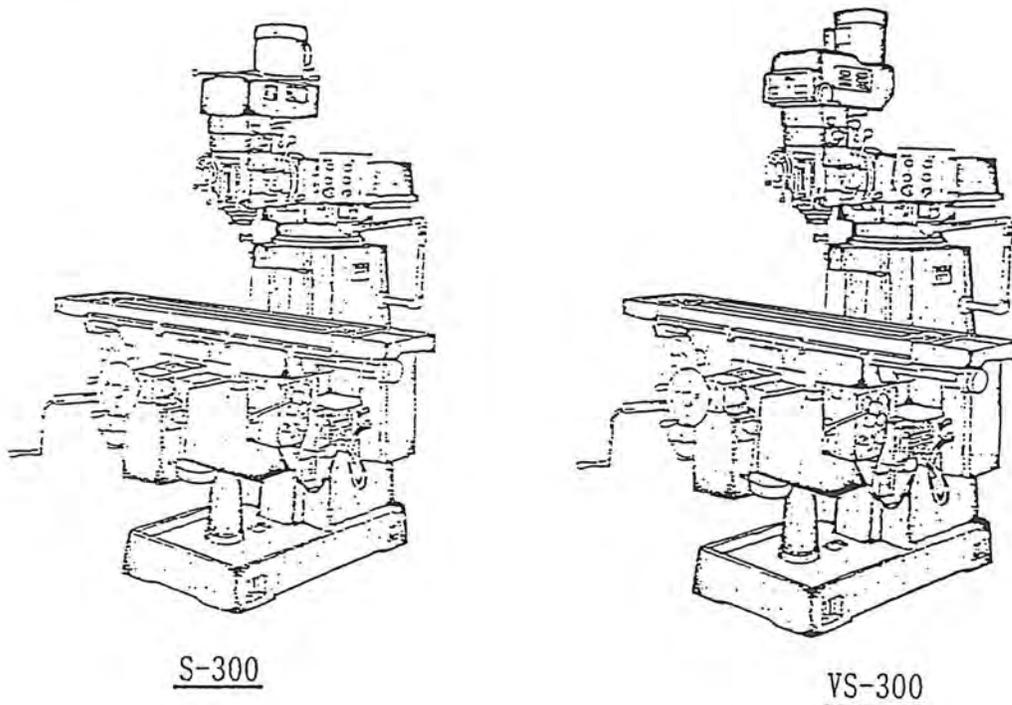


Fig-1

1-2. Features

- (1) This turret vertical milling machine is made of high class cast iron through the necessary treatment. It is able to do angular milling, drilling, boring, end milling ect....
- (2) The power and rapid feed movements in x Axis are operated by one motor through a feed gear unit.
- (3) The hardened and ground slide way assure that table will stay where it belongs. These symmetrical ways keep the table balanced as well as providing additional contact surface for superior accuracy and rigidity.
- (4) The feed selection levers are positioned in front of the knee to facilitate quick and simple operation.
- (5) Push button lubrication is provided for all three slide ways and can be checked by the narrow slot in front of the table.
- (6) All gears and shafts in the main spindle drive are hardened and ground.
- (7) High quality castings are used throughout ensuring excellent accuracy and finish on the slide ways.
- (8) It is easy to change the vertical spindle speed infinitely to suit good machining conditions.
- (9) Quill will automatic feed can do boring.

1-3 SPECIFICATIONS

UNIT: MM 60HZ

ITEMS		PBM-VS300	PBM-S300
TABLE	WORKING SURFACE	1270x300	
	TRAVEL(XxYxZ)	900x400x450	
	TSLOT(WxNO.xPITCH)	16x3x80	
	FEED(LONG) 6 STEPS	22-384 /min	
	RAPID TRAVERSE(LONG)	1250 /min	
	RAPID TRAVERSE(VERTICAL)	430 /min	
VARTICAL SPINDLE	SPINDLE NOSE	N.S.T 40	
	SPINDLE SPEED RPM	80-3800	60-3600
	STEPS	VARIABLE	10
	SPINDLE NOSE TO TABLE	35-485	
	SPINDLE CENTER TO COLUMN FACE	130-550	
	QUILL FEEDS /REV	0.04/0.08/0.15	
	SWIVELLING ANGLE	45° (R&L)	
	QUILL TRAVEL	127	
	HORIZONTAL ROTATION OF RAM	360°	
	CROSS TRAVEL OF RAM	420	
MOTOR	VERTICAL SPINDLE	5HP-4P	3HP-4P
	TABLE FEED(LONG)	3/4HP-4P	
	TABLE RAPID (VERTICAL)	1/2HP-4P(S:1/10)	
	COOLANT PUMP	1/8HP-2P	
SIZE	MACHINE(LxWxH)	1740x1540x2330	1740x1615x2310
	NET WEIGHT (KGS)	1700	1650

* SPECIFICATIONS MAY BE CHANGED OR IMPROVED WITHOUT NOTICE.

ITEMS		PBM-VS300A	PBM-S300A
TABLE	WORKING SURFACE	1270x300	
	TRAVEL(XxYxZ)	900x400x450	
	TSLOT(WxNO.xPITCH)	16x3x80	
	FEED(LONG) 6 STEPS	22-384 /min	
	RAPID TRAVERSE(LONG)	1250 /min	
	RAPID TRAVERSE(VERTICAL)	430 /min	
VARTICAL SPINDLE	SPINDLE NOSE	N.S.T 40	
	SPINDLE SPEED RPM	80-3800	60-3600
	STEPS	VARIABLE	16
	SPINDLE NOSE TO TABLE	35-485	
	SPINDLE CENTER TO COLUMN FACE	130-550	
	QUILL FEEDS /REV	0.035/0.07/0.14	
	SWIVELLING ANGLE	45° (R&L)	
	QUILL TRAVEL	140	
	HORIZONTAL ROTATION OF RAM	360°	
	CROSS TRAVEL OF RAM	420	
MOTOR	VERTICAL SPINDLE	5HP-4P	3HP-2P/4P
	TABLE FEED(LONG)	3/4HP-4P	
	TABLE RAPID (VERTICAL)	1/2HP-4P(S:1/10)	
	COOLANT PUMP	1/8HP-2P	
SIZE	MACHINE(LxWxH)	1740x1540x2300	
	NET WEIGHT (KGS)	1700	1650

* SPECIFICATIONS MAY BE CHANGED OR IMPROVED WITHOUT NOTICE.

2. Installation and transportation

2-1 Transportation of machine

This machine weight approximate 1650 kgs (3600 lbs) unpack wooden case. Loosen the 4 bolt from the skid. move the vertical head in vertical position, remove the ram forward to proper position (Fig 4)then lifting machine.

NOTE:

Before lifting machine, check machine in steady and safety condition. Also insert clothes or pieces of wood where wires touched the machine to absorb impacts which may influence of machine.

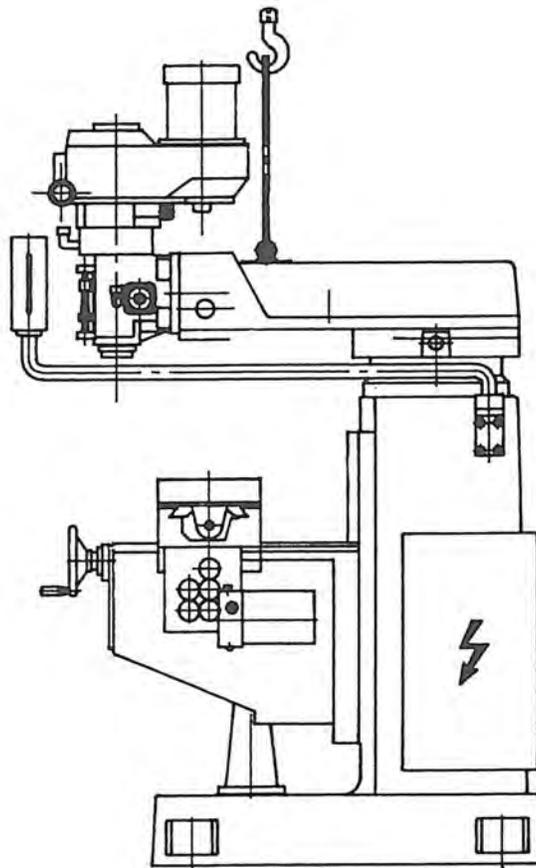


Fig-4

2-2 Inspection and cleaning

When the machine is delivered, check for damage or shortages in the number of attachments. Then wipe off dirt and protective coating.

2-3 Foundation

Before installation, construct a foundation of sufficient thickness (normally 450 mm) and pressure-supporting area (depending on the nature of the ground at the installation site) according to the floor plan introduced in Fig.3. However, if the installation site has a concrete floor of sufficient strength, the construction of a foundation is unnecessary. When installing, achieve leveling by using anchor bolts and wedges or by using a precision level in combination with wedges or leveling blocks.

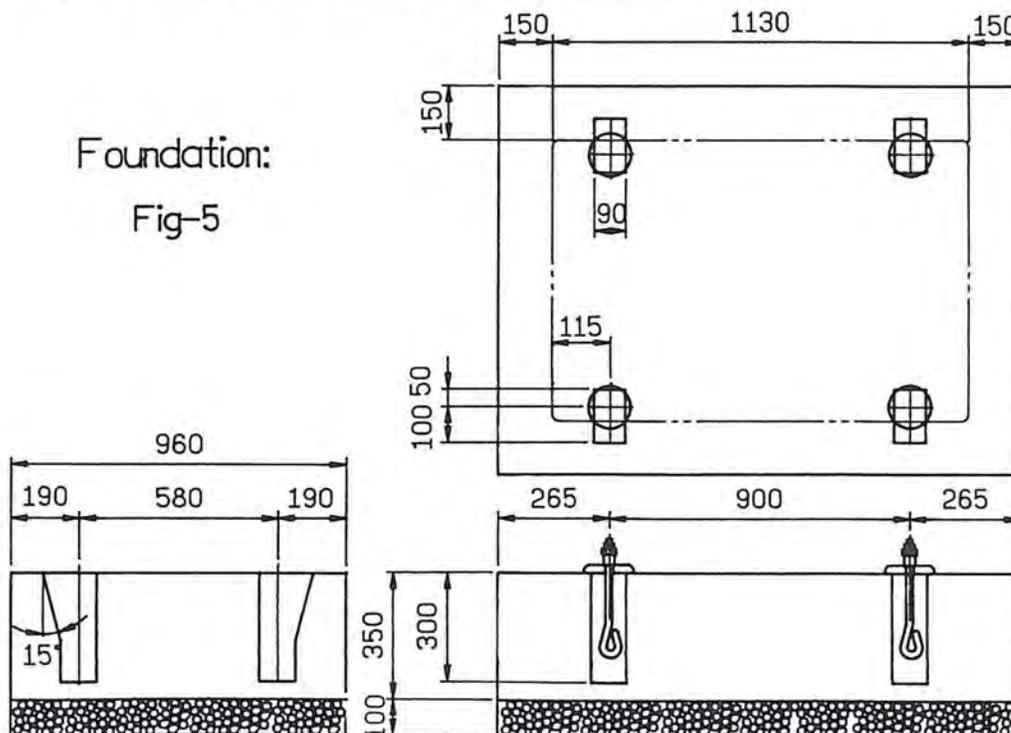
2-4 Installation

On the bottom of the machine base, dollies are provided at four corners as shown in (Fig 5). The machine should be balanced on the four points.

2-5 Maintenance and Inspection

(1) Precautions for operation

- 1) Always supply lubricating oil to designated oiling points before starting. See table 1. for your reference.
- 2) Confirm that the work and setting jigs do not strike anything before actuating table feed.
- 3) The power table longitudinal feed should not exceed the range limitations of the machine. Always set the automatic reversing dog on both sides within the moving range.



2-6 Cutting oil

There are two general types of cutting oil, i.e., water-soluble cutting oil and water-insoluble cutting oil, and these are further divided into many groups. As selection of the cutting oil depends on each cutting condition, particular trade names or groups cannot be specified here but it is necessary to observe the following:

(1) Use of water-insoluble cutting oil

Examples: Mineral oil light oil, machine oil and spindle oil
 Animal and Lard, olive oil, colza oil, soybean oil
 vegetable oil castor oil.

(2) Capacity of the cutting oil tank is about 8 gallon.

(3) Cutting oil should be supplied through an oil strainer into the cutting oil intake provided on the lower part of the column.

2-7 Wiring

The power cord should be connected to the terminals R.S.T. (Fig 6-2). On completion of the connection, turn on the power switch (Fig 6-1) located on the side of the power box.

After finishing the above preparations, start the main spindle. (See section for spindle starting, spindle stopping and spindle brake). If the rotation direction of the main spindle is clockwise, connections are correct. If rotation is counter-clockwise, exchange connections of two of the three wires R.S.T of the power cord.

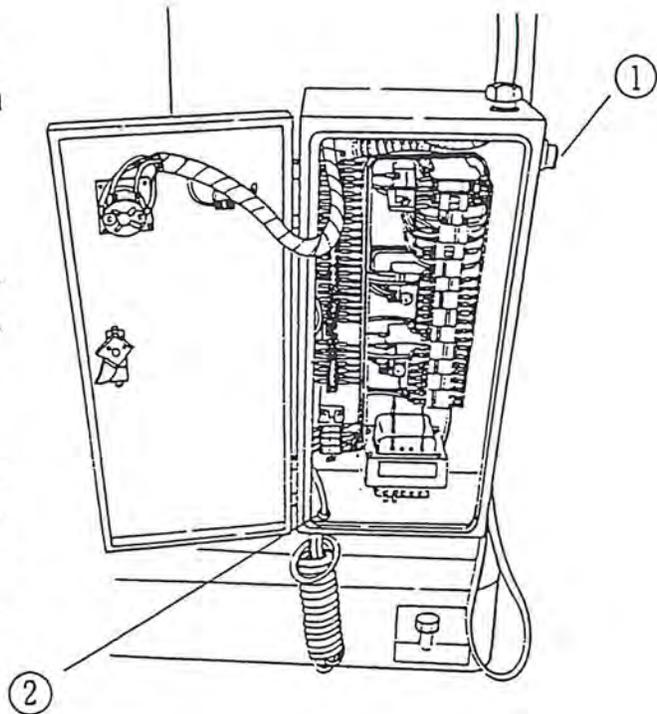


Fig-6

2-8 Lubrication

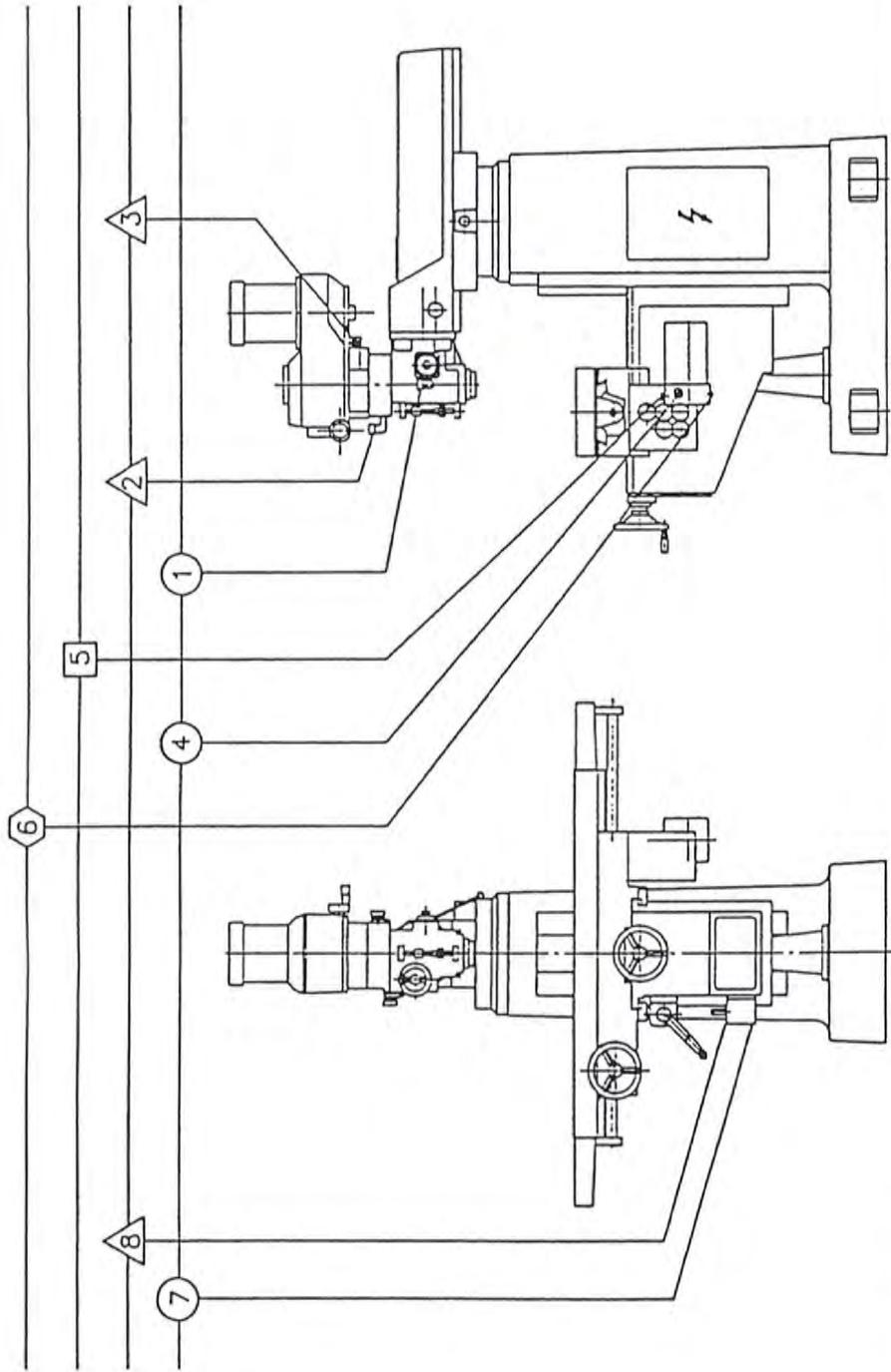
Prior to starting, each moving part must be lubricated with suitable lubricating oil. Refer to table.1 for instructions to lubricate the spindle head gears, quill and slide ways.

The lubrication oil to be used for each part is also listed in Tables 2, and 3. It can be used for selecting the correct lubricant to keep the machine in its best condition.

Table--1

LUBRICATION INSTRUCTIONS

- YEARLY
- MONTHLY
- △ WEEKLY
- DAILY



Machine components	Spindle gears (V)		Table feed gears		Slide ways			
	1	2	3	4	5	6	7	8
Check	Daily	Two Weekly	Weekly	Daily	Monthly	Yearly	Daily	Weekly
Clean & Replace								
Lubricant	CB68	CB68	GREES		CB68			G68
Capacity	0.04L	0.04L			4L			2L
Remarks								

Table -2

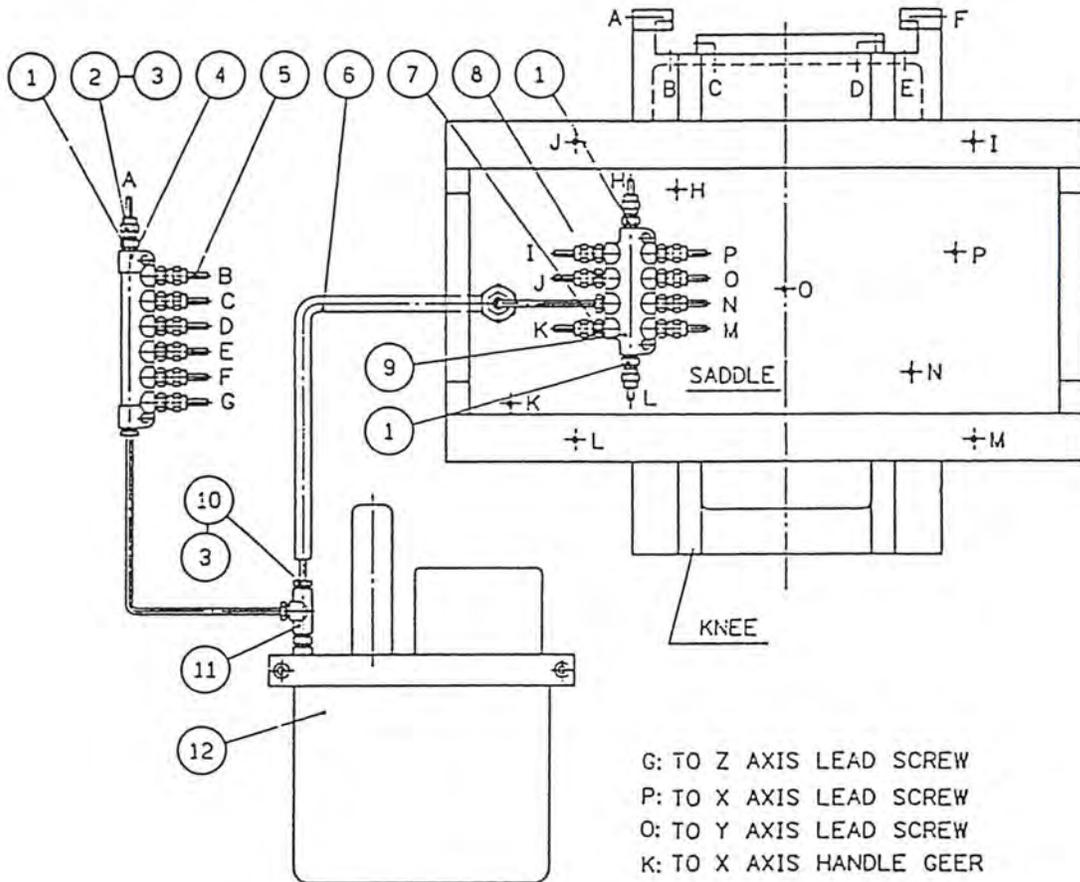
Instruction for correct lubricant

	Application Fields	Properties	Symbol and Viscosity Grade	Kinematic Viscosity CST (130°F)			REMARKS
				Mean.	min.	max.	
GEARS	Enclosed moderately loaded gear (spur gear, bevel gear) Enclosed heavily loaded gears (worm and wheel)	Refined mineral oils with good oxidation stability	CB 32	32	28.8	35.2	Pinion speeds (motor output) 2,000 – 5,000 rpm (within 5HP) 1,000 – 2,000 rpm (within 10HP) – 1,000 rpm (within 20HP)
			CB 68	68	61.2	74.8	
			CB 150	150	135	165	
BEARINGS	Spindles bearings and associated clutches	Refined oils with good oxidation stability and with improved load-carrying ability	CC 150	150	135	165	Worm speeds 2,000 – rpm 1,000 – 2,000 rpm – 1,000 rpm
			CC 320	320	288	352	
			CC 460	460	414	506	
SLIDEWAYS	Slide ways	Refined mineral oils with superior anticorrosion and anti-oxidation performances.	FC 2	2.2	1.98	2.42	Shaft speeds (shaft dia.) 10,000 – rpm (1/8 in) 2,000 – 10,000 rpm (1/8 – 5-7/8in) – 2,000 rpm (5-7/8in)
			FC 10	10	9.00	11.0	
			FC 22	22	19.8	24.2	
HYDRAULIC SYSTEMS	Hydraulic systems	Refined mineral oils with improved lubricity and tackiness performance preventing stick-slip	G 68	68	61.2	74.8	Slide way (surface pressure) Horizontal (under 57lb/in ²) Vertical (under 57lb/in ²)
			G 220	220	198	242	
			HL 32	32	28.8	35.2	
HYDRAULIC SYSTEMS	Hydraulic systems	Refined mineral oils with superior anti-corrosion and anti-oxidation performance	HL 68	68	61.2	74.8	Oil temperature (Rated pressure) 0 – 148°F (under 500lb/in ²) 85 – 175°F (under 500lb/in ²)
			HM 32	32	28.8	35.2	
			HM 68	68	61.2	74.8	
GREASE	Hydraulic and Slide ways	Refined mineral oils of HM type with anti-stick-slip properties	HG 32	32	28.8	32.2	Oil temperature (Rated pressure) 0 – 148°F (under 2000lb/in ²) 85°F – 175°F (under 2000lb/in ²)
			HG 68	68	61.2	74.8	
			Viscosity (102°F) SSU				
		Premium quality greases with superior anti-oxidation and anti-corrosion properties	XM 1 XM 2	310 – 340 265 – 295		Centralized systems Cup or hand gun	

Table 3 The general lubricants for machine tool

	SYMBOL	CPC	ESSO/EXXON	SHELL	MOBIL	DAPHNF
Gears	CB 32	R 32	Teresso 32	Tellus Oil C 32	DTE Oil Light	Mechanic Oil 32
	CB 68	R 68	Teresso 68	Tellus Oil C 68	DTE Oil Heavy Medium	Mechanic Oil 68
	CB 150	R 150	Teresso 150	Tellus Oil C 150	DTE Oil Extra Heavy	Mechanic Oil 150
Bearings	CC 150	R 150	Spartan EP 150	Omala Oil 150	Gear 629	CE Compound 150S
	CC 320	R 320	Spartan EP 320	Omala Oil 320	Gear 632	CE Compound 320S
	CC 460	R 460	Spartan EP 460	Omala Oil 460	Gear 634	CE Compound 460S
Bearing	FC 2			High spin oil C2	Velocite Oil No. 3	Mechanic Oil 2
	FC 10	R 12	Spinesso 10	Tellus Oil C 10	Velocite Oil No. 6	Mechanic Oil 10
	FC 22	R 22	Spinesso 22	Tellus Oil C 22	Velocite Oil No. 10	Mechanic Oil 22
Slide Ways	G 68	Slide way oil	Febis K 68	Tonna T 68	Vactra Oil No. 2	Multiway 68C
	G 220	Slide way oil	Febis K 220	Tonna T 220	Vactra Oil No. 4	Multiway 220C
Hydraulic System	HL 32	R 32	Teresso 32	Tellus Oil C 32	DTE Oil Light	Hydraulic Fluid 32
	HL 68	R 68	Teresso 68	Tellus Oil C 68	DTE Oil Heavy Medium	Hydraulic Fluid 68
	HM 32	32 AW	Nuto HP 32	Tellus Oil 32	DTE 24	Super Hydraulic Fluid 32
	HM 68	68 AW	Nuto HP 68	Tellus Oil 68	DTE 26	Super Hydraulic Fluid 68
	HG 32	—	Powerex DP 32	Tonna Oil T 32	Vacuoline Oil 1405	Multiway 32
	HG 68	—	Powerex DP 68	Tonna Oil T 68	Vacuoline Oil 1408	Multiway 68
Grease	XM 1	Gulfcrown Grease E.P. No.1	Listan 1	Alvania Grease 1	Mobilux EP 1	Cornex Grease No. 1
	XM 2	Gulfcrown Grease E.P. No.2	Listan 2	Alvania Grease 2	Mobilux 2	Cornex Grease No. 2

LUBRICATION SYSTEM



G: TO Z AXIS LEAD SCREW
 P: TO X AXIS LEAD SCREW
 O: TO Y AXIS LEAD SCREW
 K: TO X AXIS HANDLE GEER

NO	PART NAME	SPECIFICATION	QTY
1	JOINT OF RATIO DISTRIBUTION CONTROLLER	PSB4	9
2	NUT	PAN4	16
3	SLEEVE	PB4	24
4	DISTRIBUTOR	DB-8	1
5	ALUMINUM PIPE	∅4	
6	OUTSIDE STEEL WIRE SOFT TUBE	∅4x500L	1
7	JOINT OF RATIO DISTRIBUTION CONTROLLER	PSB3	1
8	JOINT OF RATIO DISTRIBUTION CONTROLLER	PSB5	6
9	DISTRIBUTOR	DA-10	1
10	SET PLUG	PA4	8
11	T-JOINT	PKD4	1
12	LUBRICATION PUMP	SMA-601-15	1

3. Handling the main operation parts. (S-300, VS-300)

3-1 Name of each part

- 1) Draw-in bolt
- 2) Brake
- 3) Feed rate selector
- 4) Feed engage/disengage lever
- 5) Fine feed handwheel
- 6) Feed reverse knob
- 7) Quill clamping lever

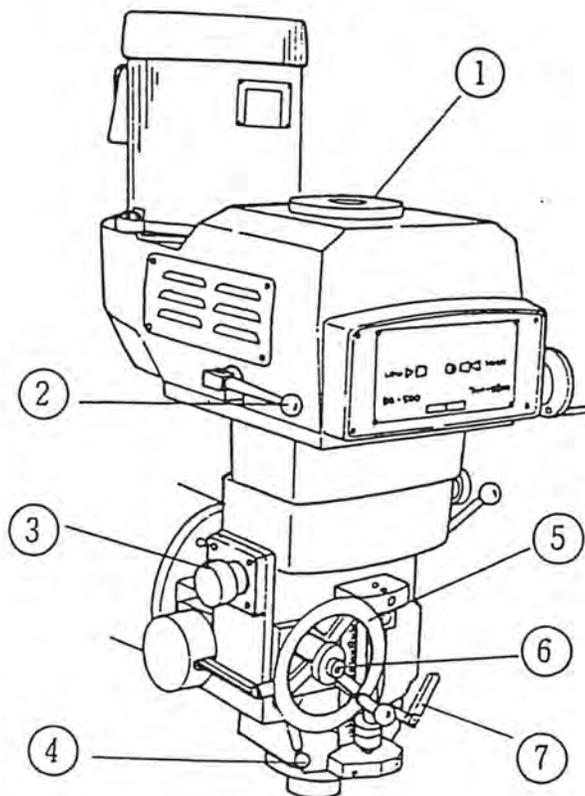


Fig-7

VARIABLE SPEED

- 1) Speed select handwheel
(can be rotated only when spindle is running)
- 2) Hi-low speed change lever
(can be operated only when spindle is stopped)
- 3) Vertical head fasten bolt
- 4) Quill auto/manual feed selector
(can be operated only when spindle is stopped)
- 5) Vertical head rotation shaft (L&R)
- 6) Quill up-down manual handle
- 7) Micrometer depth control

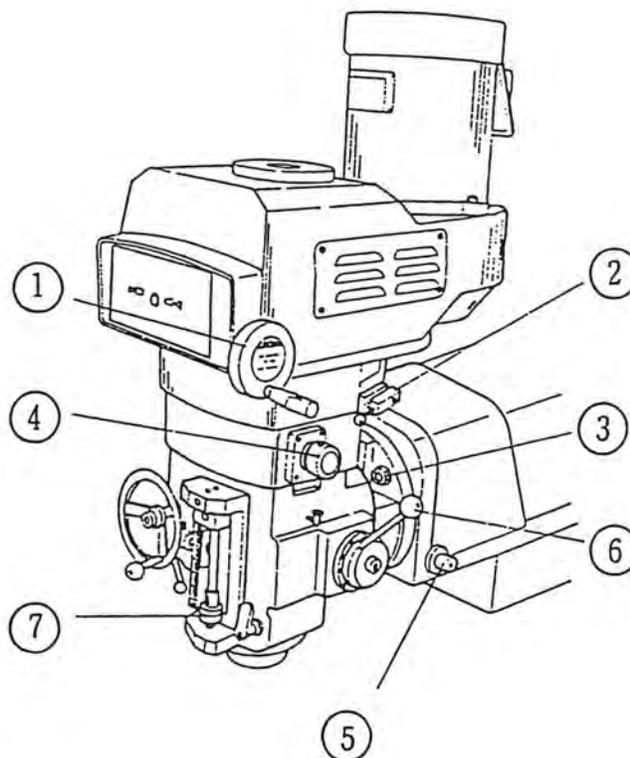


Fig-8

- 1) Spindle fix handle
(Handle in vertical position when spindle fixed for clamp the tools)
- ※ Attention: The handle must be in the horizontal position before starting the spindle.
- 2) Motor adjust lever

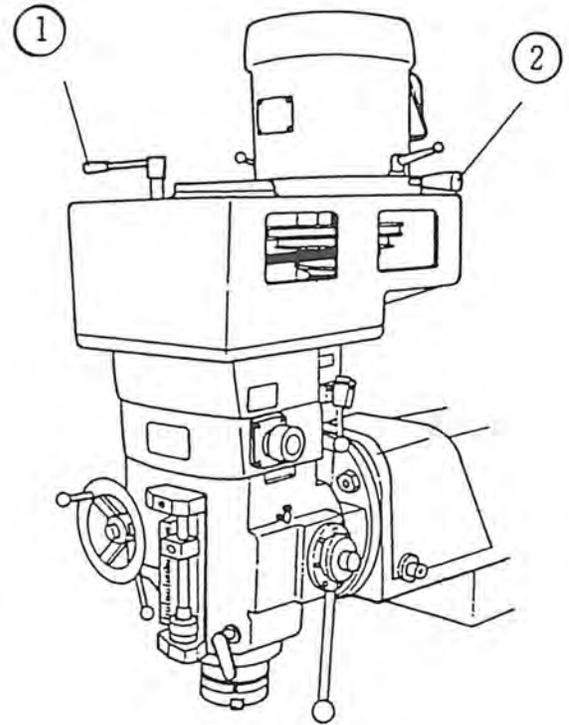


Fig-9

STEP SPEED

- 1) Spindle fix handle
(Handle in horizontal position when spindle disengage before starting the spinple)
- 2) Motor fix bolt
Fasten the two bolt at both side of motor after motor and pulley at proper position.

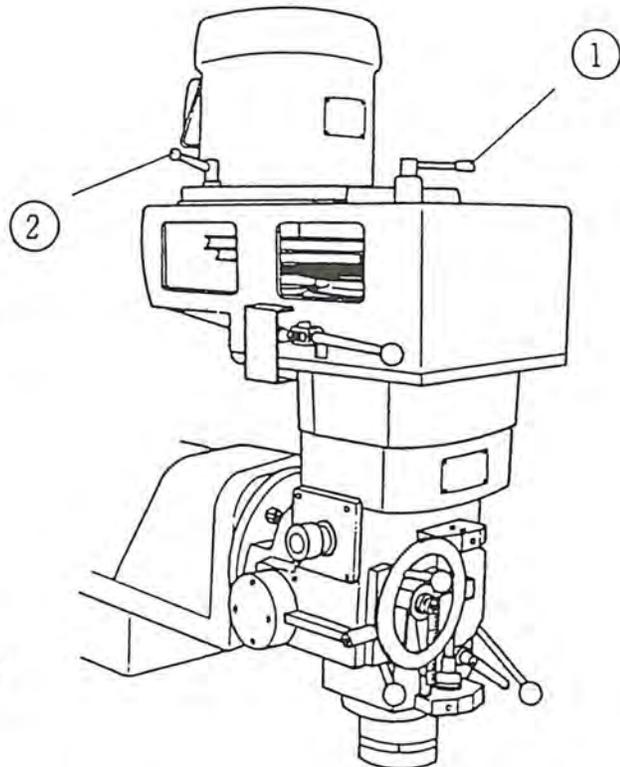


Fig-10

3-2 Electric operation panel

- 1: Power on& lamp
- 2: Cross rapid
- 3: Speeded adjuster for cross feed
- 4: Vertical spindle forward
- 5: Vertical spindle revers
- 6: Horizontal start button
- 7: Coolant pump
- 8: Vertical spindle stop button
- 9: Horizontal spindle stop button
- 10: Z axis down button
- 11: Z axis up button
- 12: Emergency stop button

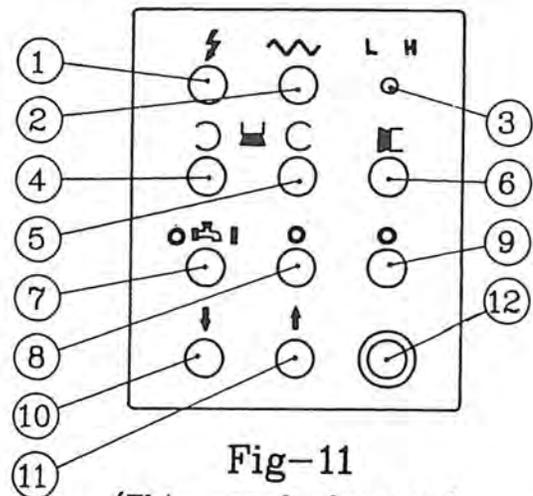


Fig-11

(This panel also good for horizontal type)

3-3 Start and stop spindle

Steps to rotate the spindle: Check if the hi-low speed change level is engaged, press the vertical spindle start button to start the spindle running.

Stop spindle: Press the vertical spindle stop button(Fig 11-8)and the spindle will be gradually slow down and stop.

3-4 Change of vertical spindle speed

The vertical spindle speed should be chosen according to work piece material, cutter diameter and cutter material table 5 and 6 for your reference.

To change the vertical spindle speed operate the high-low speed change lever (Fig 8-2) and rotating speed select handwheel (Fig 8-1) .R.P.M can be read out from the indicator.

Attention:the speed select hand wheel (Fig 8-1) can be rotated only when the spindle is running.

Hi-low speed slecting:(Do not operate when spindle is running) move the hi-low speed change lever (Fig 8-2) to high or low speed positon as selected. if can not be moved, rotateing the spindle slightly by hand, Then press the vertical spindle start button. (Fig 11-4)

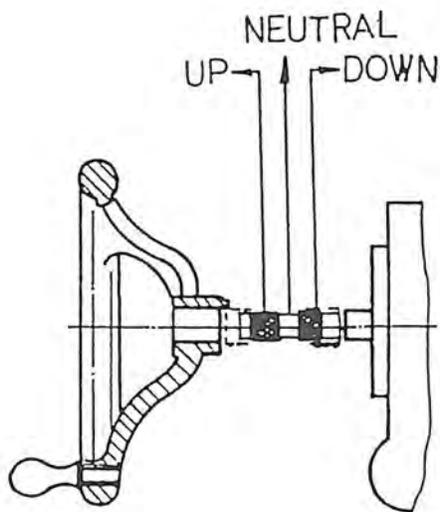


Fig-12

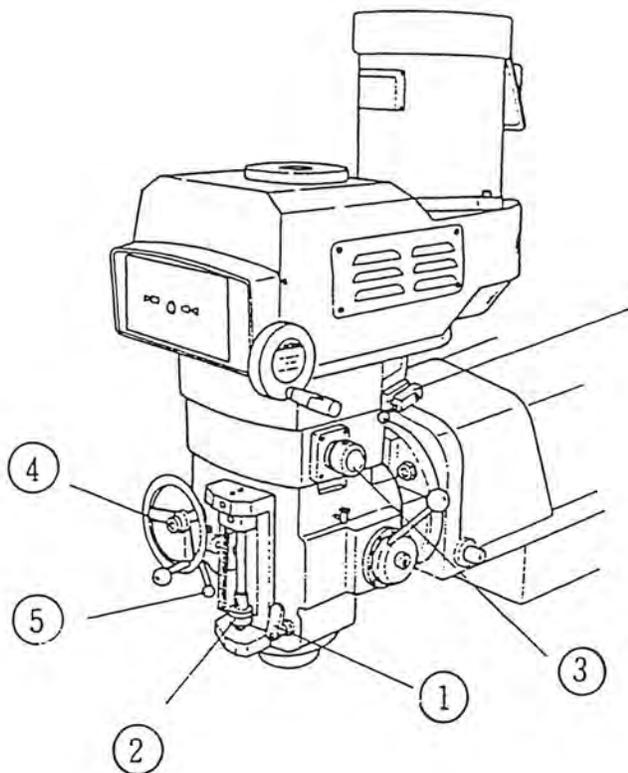


Fig-13

3-5 Operation of power quill up-down feed.

The power quill up-down feed should be carried out in the following manner.

1. Loosen the quill clamping lever (Fig 13-1)
2. Set the micrometer to the required depth (Fig 13-2)
3. Place the quill auto/manual feed selector (Fig 13-3) to auto position. (When motor is stoped)
4. Select feed direction from feed reverse knob (Fig 13-4), the detail drawing as (Fig 12), pull or push the knob for up-down feed.
5. Select feed rate from. feed rate selector (Fig 7-3) leftward.
6. Rightward feed lever (Fig 13-5) to engage the feed clutch. then the quill will be automaticly up-down feed.

Attention:

1. Maximun loading. 3/8" (9.5 mm) dia.drilling in steel.
2. Do not use auto quill feed when spindle speed is over 2700 rpm.
3. The quill auto/manual feed selector (Fig 13-3) must be always at the manual position when automatic feed is not in use.

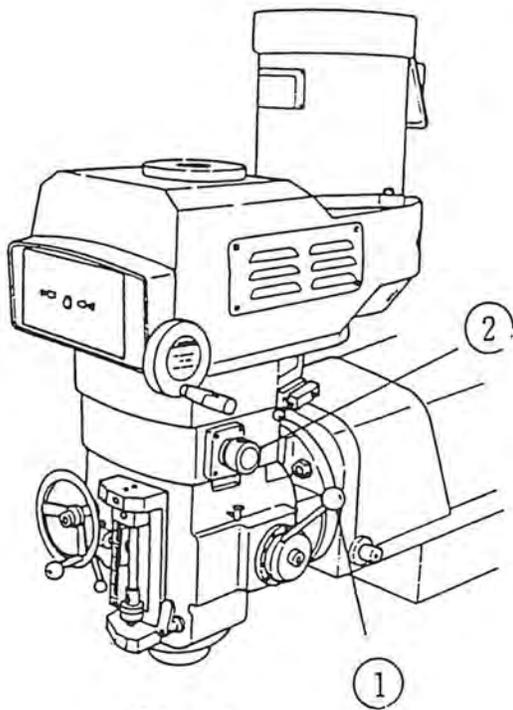


Fig-14

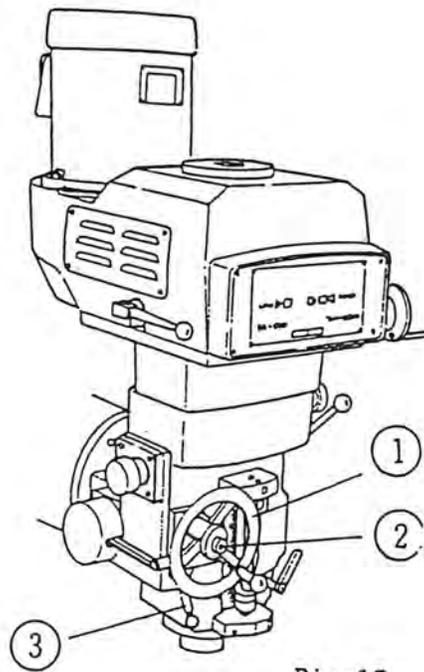


Fig-15

3-6 Operation by hand wheel (fine hand feed Fig 15-1)

1. Disengage quill auto/manual feed selector (Fig 14-2) to manual position.
2. Locate feed reverse knob (Fig 12, Fig 15-2) to neutral position.
3. Engage the feed lever (Fig 15-3) move leftward to engage the fine feed clutch.
4. The quill can be moved up-down by hand wheel (Fig 15-1)

Operation by feed handle (rapid movement Fig 14-1)

1. Disengage quill auto/manual feed selector (Fig 14-2) to manual position.
2. Locate feed reverse knob (Fig 12 , Fig 15-2) to neutral position.
3. Leftward the feed lever (Fig 15-3) to disengage the fine feed clutch positioning exactly as (Fig 15-3)
4. Place the quill up-down manual handle (Fig 14-1) into the boss.
5. Pull the handle up-down for rapid movement.

The main vertical spindle rapid feed lever and handwheel for the vertical spindle feed may not be used simultaneously.

3-7 Vertical spindle feed adjusting stopper.

The stopping position for the spindle downfeed is set by the spindle adjustment stop (Fig 8-7) located in the front of the headstock.

By setting the stop at the required position and locking it with a lock nut (Fig 8-7), products of uniform size may be obtained without individually measuring the work. The stop is provided with graduations on its periphery, one division of which indicates 0.01mm. A full rotation of the scale shows 1 mm. The scale may also be used as a micrometer for fine adjustment.

3-8 Vertical spindle quill clamping

The spindle quill clamp lever (Fig 7-7) clamps the quill when turned to right and release the quill when turned to the left.

3-9 Clamping-unclamping tools from spindle:

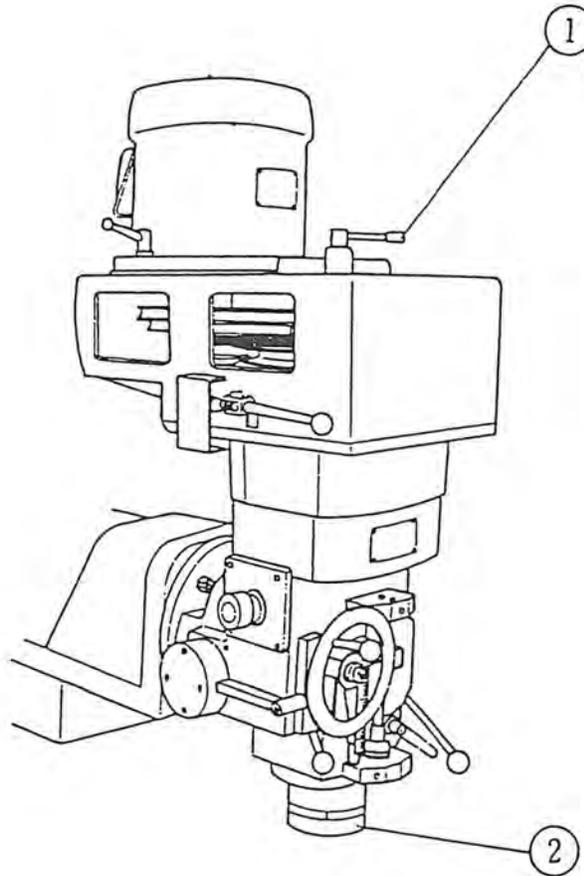


Fig-16

For variable speed drive (VS 300 SERIES)

- 1) Locate the hi-low speed change Lever (Fig 8-2) to low speed position.
- 2) Clamping-unclamping the tools.

For step speed drive (S 300 SERIES)

- 1) Locate spindle fix handle. (Fig 16-1) in vertical position, rotate the spindle (Fig 16-2) slightly by hand. Until the spindle fix Handle is fixed.
- 2) Clamping-unclamping the tools.
- 3) Locate the spindle fix handle (Fig 16-1) in horizontal position.

"ATTENTION"

The spindle fix handle (Fig 16-1) must be in the horizontal position before spindle running.

3-10 Vertical spindle head swivelling

Swivelling within the vertical plane of the spindle head is necessary when milling slanted work. Up to 45° of longitudinal swivelling is possible. The spindle head should be swivelled in the following manner:

- 1) Loosen the 4 bolts (Fig 8-3) at the rear of the spindle head rotation shaft.
- 2) Turn the spindle head swivelling worm (Fig 8-5) with a wrench to swivel the spindle head to the required angle while observing the scale.
- 3) Tighten the 4 bolts after obtaining the required swivel.

Attention: Loosen 4 bolts only. Do not take off the bolts.

3-11 Swivelling of overarm on horizontal plane

The overarm can be swivelled by turning the swivel base (Fig 17-2) located on the top of the column.

Procedure for horizontal swivelling:

- 1) Loosen the four bolts (Fig 17-1) on the left and right which secure the swivel base to the column top.
- 2) Push the overarm for the required angle either to left or right to swivel.
- 3) After it has been swiveled to the required angle, secure the swivel base with the four bolts which were loosened previously.

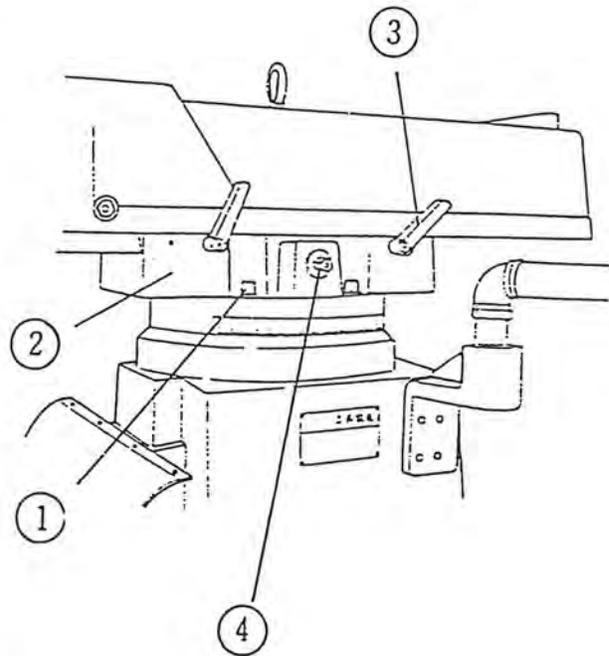


Fig-17

3-12 Overarm transverse movement

The overarm may be moved transversely within a range of about 500 mm.

This cross movement should be carried out in the following manners:

- 1) Loosen the 2 bolts.(Fig 17-3).
- 2) Move the overarm, transversely by turning the pinion rotation shaft (Fig 17-4) with a wrench.
- 3) Retighten the 2 bolts after obtaining the necessary movement to fix the overarm.

3-13 Part's name of table feed

1. Longitudinal feed hand wheel (hand adjustment)
2. vertical feed (hand adjustment) handle
3. Cross feed (hand adjustment) hand wheel
4. Longitudinal feed limit switch.
5. Vertical rapid traverse limit switch.
6. Longitudinal power and rapid traverse engagement lever.
7. Longitudinal feed R & L selector.
8. Feed selection lever A feed selection rod.
9. Feed selection lever B hi-low feed selector.
10. Feed box
11. Clamp lever
12. Cross feed engage/diengage lever.
- 13.
14. Cable entry

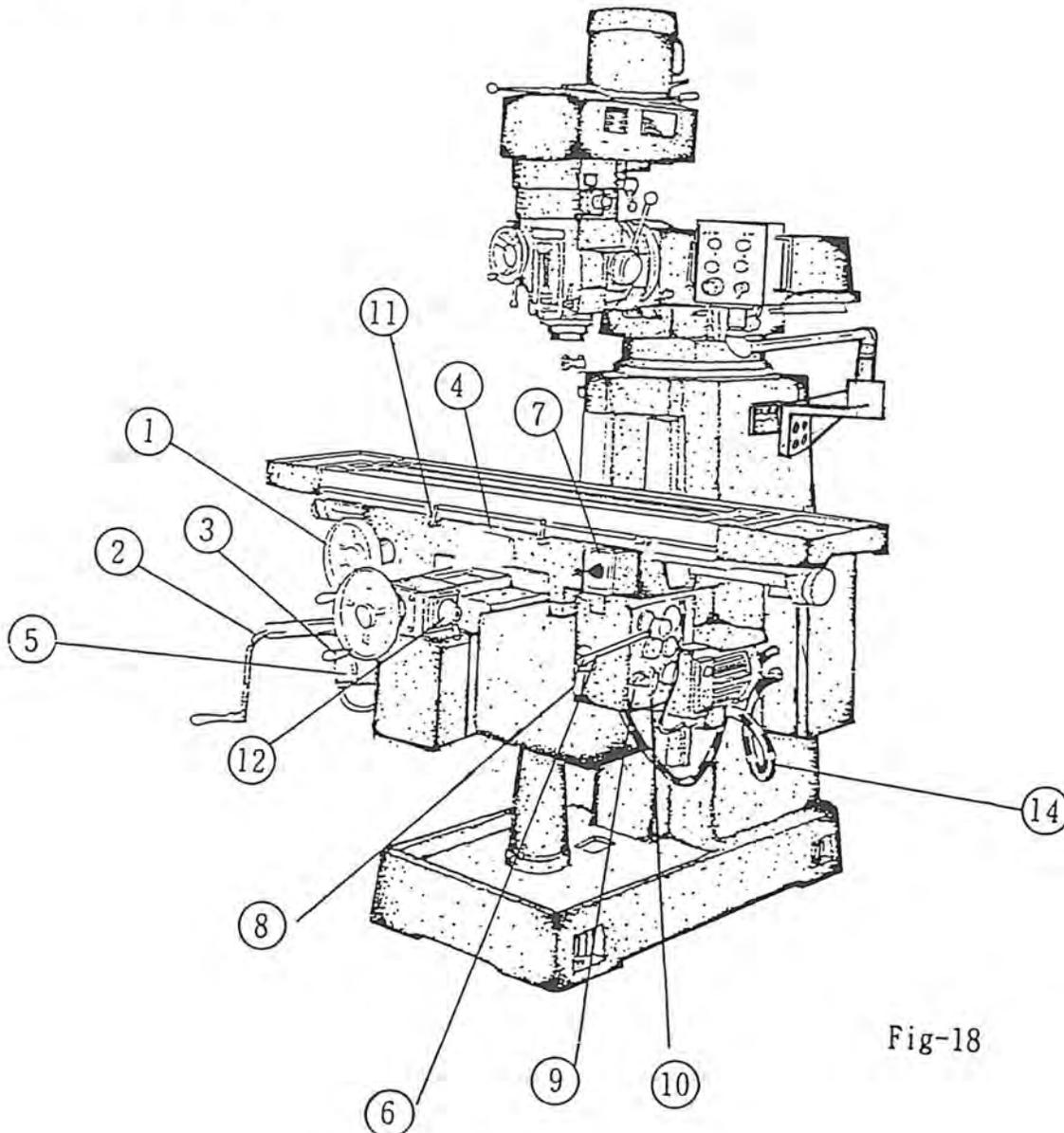


Fig-18

3-14 Operation of manual feeding

Operate longitudinal feed by hand wheel (Fig18-1), cross feed by hand wheel (Fig18-3), and vertical feed by hand lever (Fig 18-2).

If directional engage lever (Fig 18-6) at engagement position, longitudinal manual feed can not be operated.

Chart of rotation of manual feed handwheel and moving direction of working table.

Hand wheel Table	Rotation direction (clockwise)	Displacement one division	Scale collar one revolution
Longitudinal feed	Righthand	0.02 mm	2.50 mm
Cross feed	Forward (go far from operator)	0.02 mm	5.00 mm
Vertical feed	Upward	0.02 mm	2.50 mm

3-14-1 Operation of cross feed

Unclamp the 2 clamp lever on right side of saddle, and rotate cross hand wheel clockwise or counter clockwise for moving in-out.

3-14-2 Operation of table vertical rapid traverse

Unclamping the 2 clamping lever at rear side of knee to loose the knee, Start feed motor by pressing button(Fig 11-7-8) To lift-up the knee or downward knee.

3-14-3 Operation of table longitudinal power feed

Loosen the two clamping lever(Fig 18-11) on the table before engaging the auto longitudinal feed.

Push down the engagement lever(Fig 18-6), Toward the feed R & L selector (Fig 18-7) to Right for right movement and left for left movement.

Lift the engagement lever(Fig 18-6) upward for auto longitudinal rapid traverse according to the feed direction from feed R & L selector(Fig 18-7), Set the engagement level(Fig 18-6) in the middle position for manual feed by handwheel in front of sandle(Fig 18-1)

3-14-4 Choice of feed speed

Feeding speed is dependent on the spindle speed material of work piece tips of cutter and diameter of cutters.

With this machine 6 steps of cutting feed and rapid traverse are carried out from the feed box (Fig 18-10).

Move the feed selection rod (Fig 18-8) to position A.B.C to choose the right feed. Pull the hi-low feed selector (Fig 18-9) out and push it in for to choose the hi-low speed.

3-14-5 Operation of IN/cross feed

1. Select the feed direction lever (Fig 19-7) to needed position. Either or forward or backward.
2. Toward feed engage/diengage lever (Fig 19-12) to auto position for automatic cross feeding.
3. Adjust the correct speed from the speed adjuster (Fig 11-3)
4. Put feed engage/diengage lever (Fig 19-12) in manual position for cross manual movement.

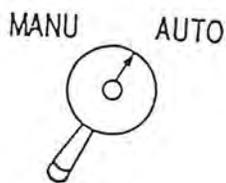


Fig 19-12

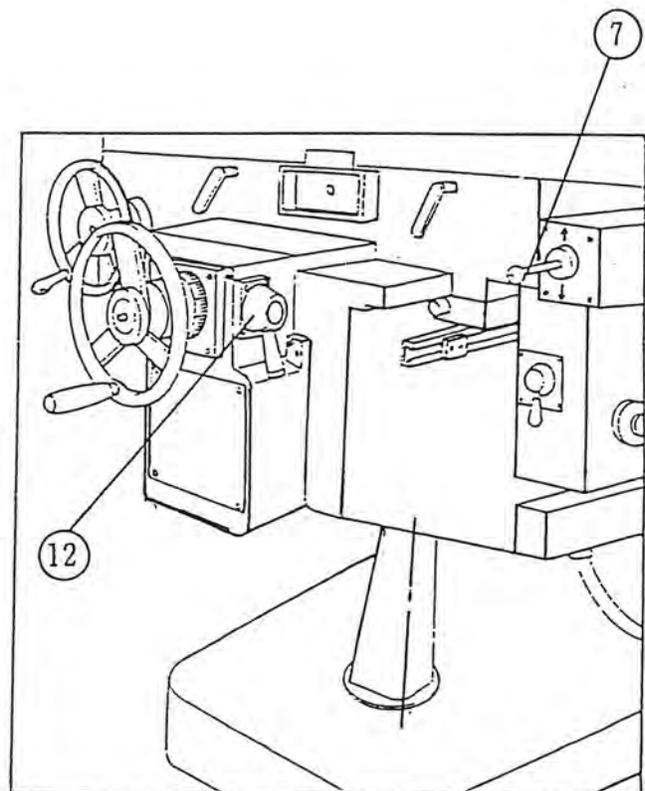


Fig-19

4 Safety devices

4-1 Thermal relay

When electric current exceeding the rating, the thermal relay (Fig 20) is actuated automatically to stop the driving motor. If the thermal relay is actuated, locate and correct the cause and reset the thermal relay by pressing the thermal relay reset push button.

4-2 Fuse

Fuses (Fig 20) are installed in the control box to protect electric circuits. If the machine does not start operation with the power source connected and no abnormality is indicated in each safety device, check the fuses. If fuses are blown, remove the cause before replacing the fuse.

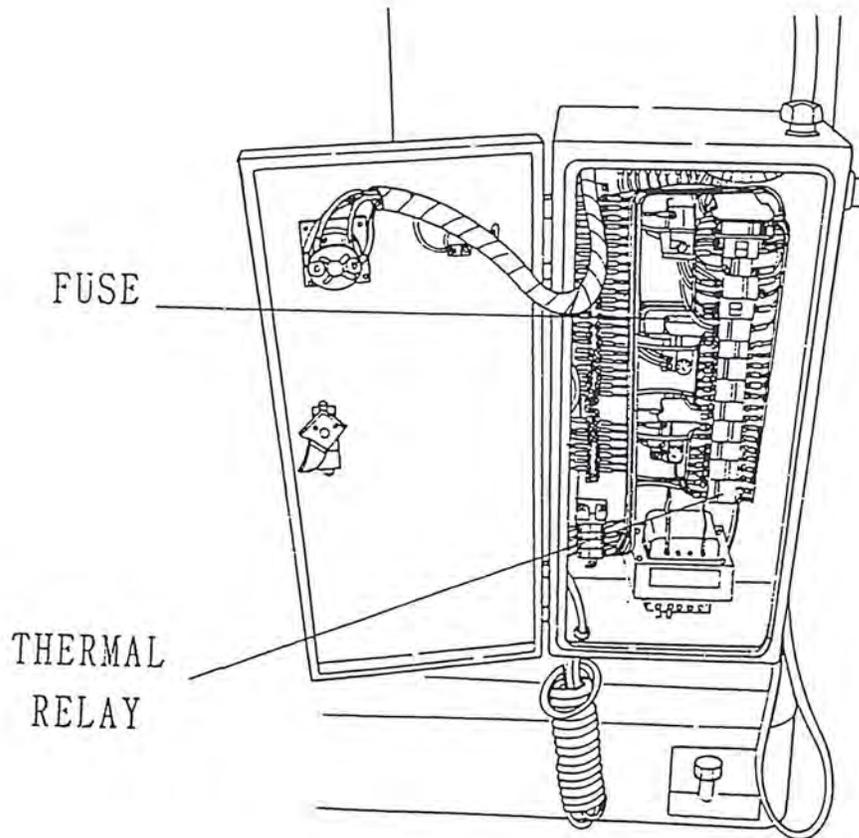
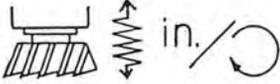
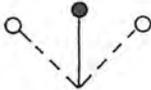
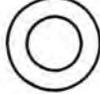
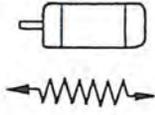
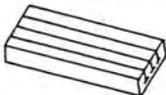
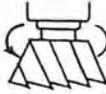


Fig-20

5. Symbols

The various movements and corresponding symbols used on this machine are indicated in

Table 4.

NO.	DESCRIPTION	SYMBOL	NO.	DESCRIPTION	SYMBOL
1	Main spindle		12	Rapid feed	
2	Revolution per minute		13	Power pilot lamp	
3	Feed amount per revolution		14	Start	
4	Neutral		15	Stop	
5	Main spindle brake		16	Emergency stop	
6	Main spindle without brake		17	Table feed motor	
7	Table		18	Cutting oil pump	
8	Feed (normal)		19	Vertical spindle clockwise rotation	
9	Low speed feed		20	Vertical spindle counter clockwise rotation	
10	Longitudinal feed		21	Vertical spindle automatic feed	
11	Vertical feed				

6-1 Carbide cutters

Suggested starting speed and feeds

Table 5

CARBIDE CUTTERS							
MATERIAL		FACE MILLS	SLAB MILLS	END MILLS	FULL & HALF SIDE MILLS	SAWS	FORM MILLS
MALLEABLE SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.005-.015 200-300	.005-.015 200-300	.005-.010 200-350	.005-.010 200-300	.003-.004 200-350	.005-.010 175-275
CAST STEEL SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.008-.015 150-350	.005-.015 150-350	.003-.010 150-350	.005-.010 150-350	.002-.004 150-300	.005-.010 150-300
100-150 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.010-.015 450-800	.008-.015 450-600	.005-.010 450-600	.008-.012 450-800	.003-.006 350-600	.004-.010 350-600
150-250 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.010-.015 300-450	.008-.015 300-450	.005-.010 300-450	.007-.012 300-450	.003-.006 300-450	.004-.010 300-450
250-350 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.008-.015 180-300	.007-.012 150-300	.005-.010 150-300	.005-.012 160-300	.002-.005 150-300	.003-.008 150-300
350-450 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.008-.015 125-180	.007-.012 100-150	.004-.008 100-150	.005-.012 125-180	.001-.004 100-150	.003-.008 100-150
CI HARD 225-350BR.	FEED PER TOOTH FEET PER MIN.	.005-.010 125-200	.005-.010 100-175	.003-.008 125-200	.003-.010 125-200	.002-.003 125-200	.005-.010 100-175
CI MED. 180-225BR.	FEED PER TOOTH FEET PER MIN.	.008-.015 200-275	.008-.015 175-250	.005-.010 200-275	.005-.012 200-275	.003-.004 200-250	.006-.012 175-250
CI SOFT 150-180 BR.	FEED PER TOOTH FEET PER MIN.	.015-.025 275-400	.010-.020 250-350	.005-.012 275-400	.008-.015 275-400	.003-.004 250-350	.008-.015 250-350
BRONZE SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.020 300-1000	.010-.020 300-800	.005-.010 300-1000	.008-.012 300-1000	.003-.004 300-1000	.008-.015 200-800
BRASS SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.020 500-1500	.010-.020 500-1500	.005-.010 500-1500	.008-.012 500-1500	.003-.004 500-1500	.008-.015 500-1500
ALUM. AL. SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.040 2000 UP	.010-.030 2000 UP	.003-.015 2000 UP	.008-.025 2000 UP	.003-.006 2000 UP	.008-.015 2000 UP

Generally lower end of range used for inserted blade cutters, higher end of range for indexable insert cutters.

Suggested starting speed and feeds

Table 6

HIGH SPEED STEEL CUTTERS							
MATERIAL		FACE MILLS	SLAB MILLS	END MILLS	FULL & HALF SIDE MILLS	SAWS	FORM MILLS
MALLEABLE SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.005-.015 60-100	.005-.015 60-90	.003-.010 60-100	.006-.012 60-100	.003-.006 60-100	.005-.010 60-80
CAST STEEL SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.015 40-60	.010-.015 40-60	.005-.010 40-60	.005-.010 40-60	.002-.005 40-60	.008-.012 40-60
100-150 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.015-.030 80-130	.008-.015 80-130	.003-.010 80-140	.010-.020 80-130	.003-.006 70-100	.008-.010 70-100
150-250 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.010-.020 50-70	.008-.015 50-70	.003-.010 60-80	.010-.015 50-70	.003-.006 50-70	.006-.010 50-70
250-350 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.005-.010 35-60	.005-.010 35-50	.003-.010 40-60	.005-.010 35-50	.002-.005 35-50	.005-.010 35-50
350-450 BR. STEEL	FEED PER TOOTH FEET PER MIN.	.003-.008 20-35	.005-.008 20-35	.003-.010 20-40	.003-.008 20-35	.001-.004 20-35	.003-.008 20-35
CI HARD 225-350 BR.	FEED PER TOOTH FEET PER MIN.	.005-.012 40-60	.005-.010 35-50	.003-.008 40-60	.005-.010 40-60	.002-.004 35-60	.005-.010 35-50
CI MED. 180-225 BR.	FEED PER TOOTH FEET PER MIN.	.010-.020 60-80	.008-.015 50-70	.003-.010 60-90	.008-.015 60-80	.003-.005 60-70	.008-.012 50-60
CI SOFT 150-180 BR.	FEED PER TOOTH FEET PER MIN.	.015-.030 80-120	.010-.025 70-110	.004-.010 80-120	.010-.020 80-120	.002-.005 70-110	.010-.015 60-80
BRONZE SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.025 50-225	.008-.020 50-200	.003-.010 50-250	.008-.015 50-225	.003-.005 50-250	.008-.015 50-200
BRASS SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.025 150-300	.008-.020 100-300	.005-.015 150-350	.008-.015 150-350	.003-.005 150-300	.008-.015 100-300
ALUM. AL. SOFT/HARD	FEED PER TOOTH FEET PER MIN.	.010-.040 300-1200	.015-.040 300-1200	.005-.020 300-1200	.010-.030 300-1200	.004-.008 300-1000	.010-.020 300-1200

7. PREVENTIVE MAINTENANCE

For securing the accuracy and life of the machine, we offer the following preventive maintenance charts.

Frequency	Item
Daily	1. It is necessary to oil each lubrication point before operation. 2. Check the level of the oil lubricator and fill if necessary. 3. It is necessary to release the clamps, clean and lubricate the table after operation.
Monthly	1. Check all the gibs and adjust if necessary. 2. Check all the backlash between screws and nuts, and adjust if necessary.
Quarterly	1. Check and adjust the machine accuracy.

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.

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.

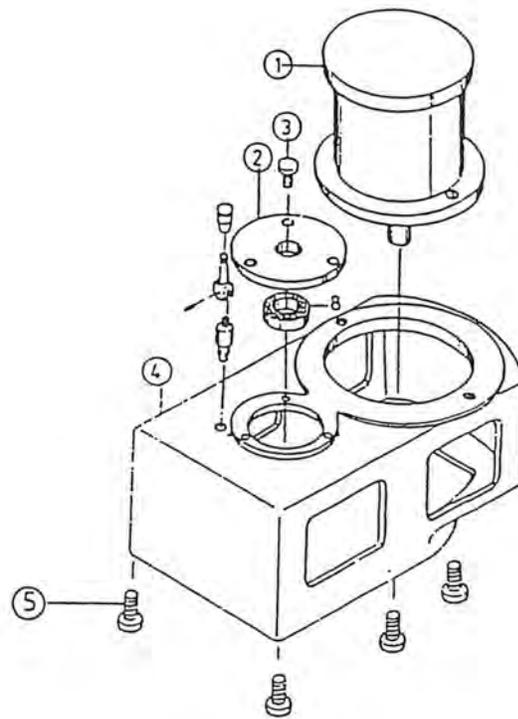
. Part number.

. Description.

. Quantity.

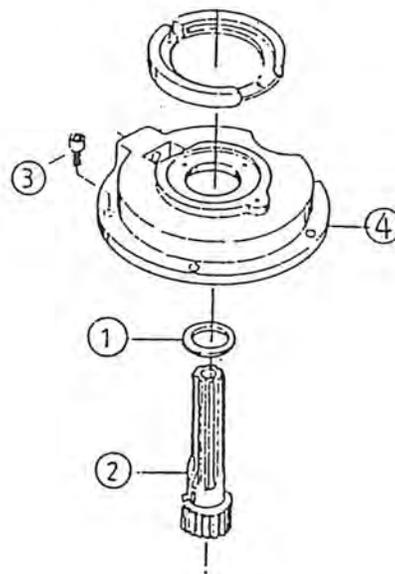
7-1 BELT REPLACEMENT (FOR S-300)

1. Switch power off.
2. Remove motor No.1.
3. Remove drawbar.
4. Remove 3 screws NO.3 from plate NO.2
5. Remove 6 screw NO.5 beneath motor case NO.4
6. Belt can be changed.



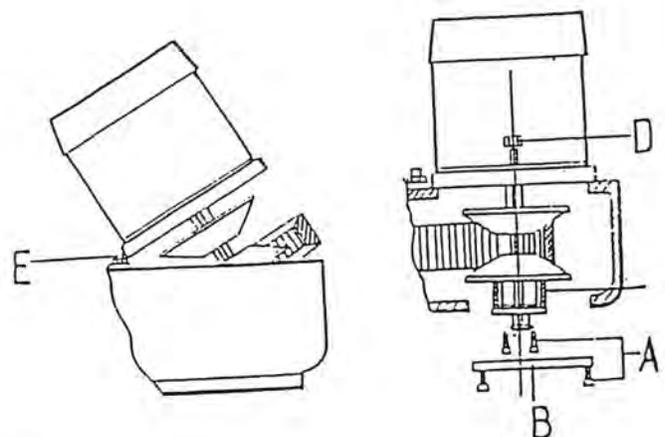
7-2 BRAKE SHOE REPLACEMENT

1. Process the sequence above 1 to 5.
2. Remove the tighten nut NO.1 on top of clutch NO.2.
3. Remove the brake shoe case NO.4
4. Remove 3 screws NO.3 from brake shoe case NO.4
5. Remove 4 screws beneath brake shoe case.
6. Brake shoe can be changed.



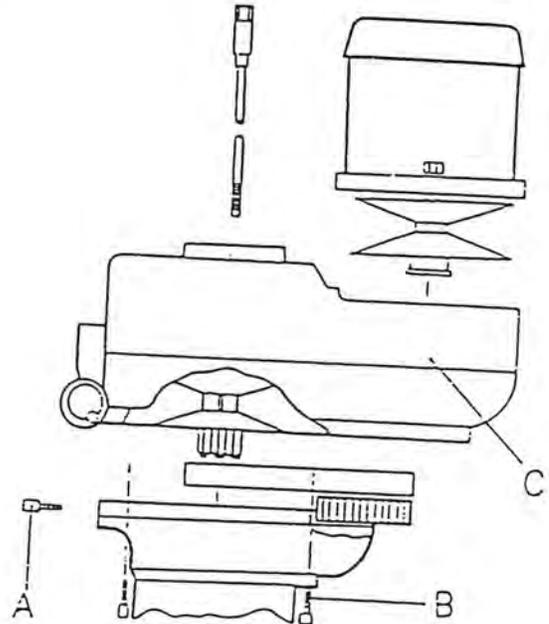
7-3 MOTOR REMOVAL (FOR VS-300)

1. Adjust the head speed 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.



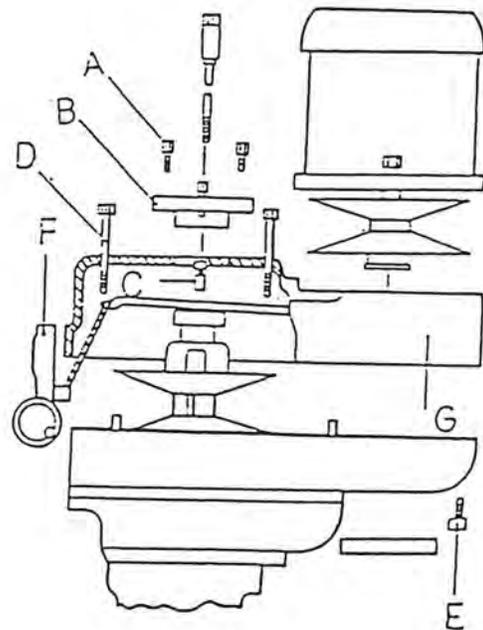
7-4 TIMING BELT REPLACEMENT (FOR VS-300)

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.



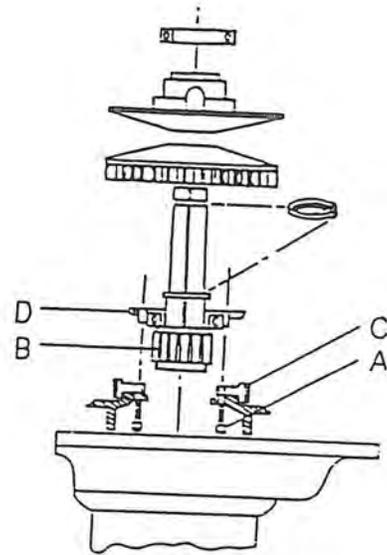
7-5 DRIVE BELT REPLACEMENT (FOR VS-300)

1. Remove the motor as described on page.
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.



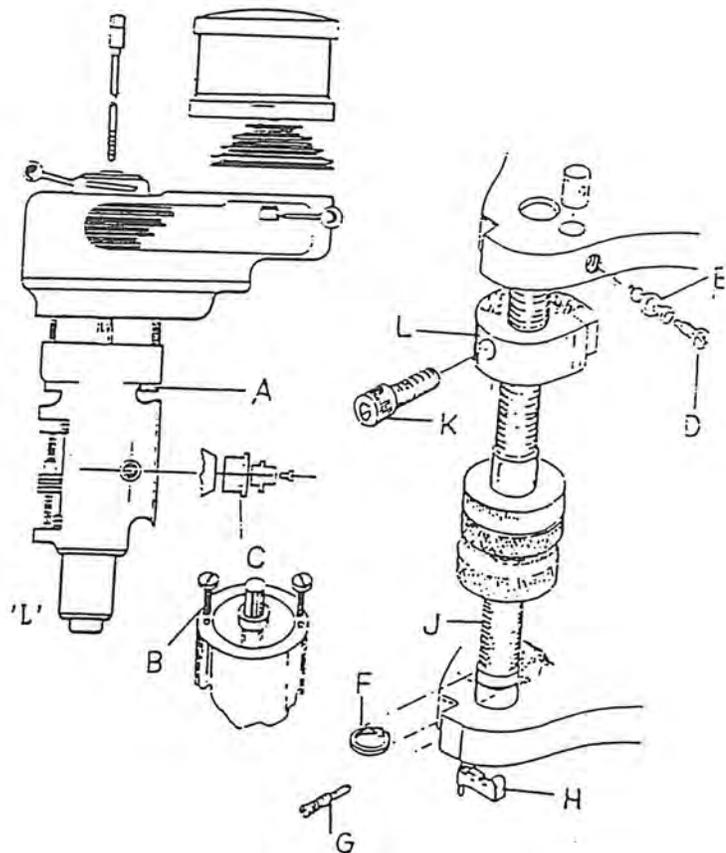
7-6 BRAKE SHOE REPLACEMENT (FOR VS-300)

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'.



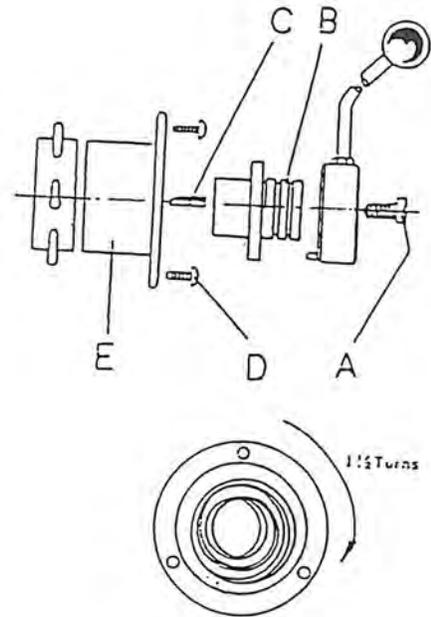
7-7 QUILL REMOVAL

1. Isolate machine.
2. Remove motor.
3. Remove drawbar.
4. Fully extend quill.
5. Remove 3 nuts 'A'.
6. Remove top section completely.
7. Remove 2 screws 'B' from top of quill.
8. Remove clock spring housing 'C'.
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 liberally and reassemble.
15. Check correct operation of feed trip linkage.



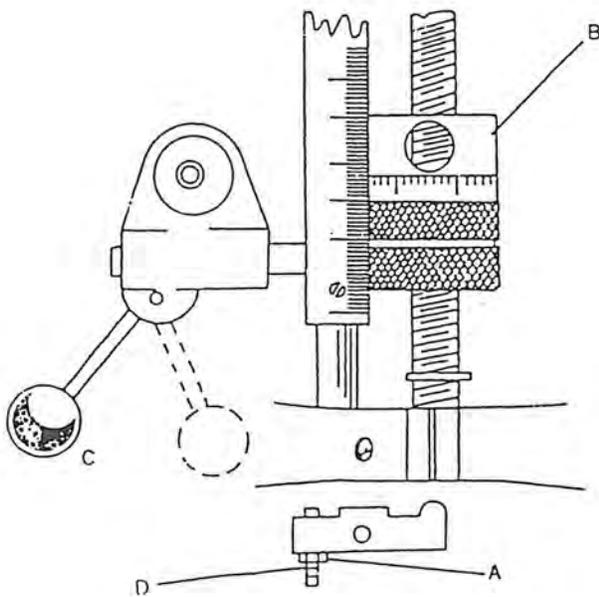
7-8 BALANCE SPRING REPLACEMENT

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.



7-9 FEED TRIP ADJUSTMENT

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.



8.Handing the main operation parts (FOR VS-300A S-300A)

8-1 Name of each part (head stock)

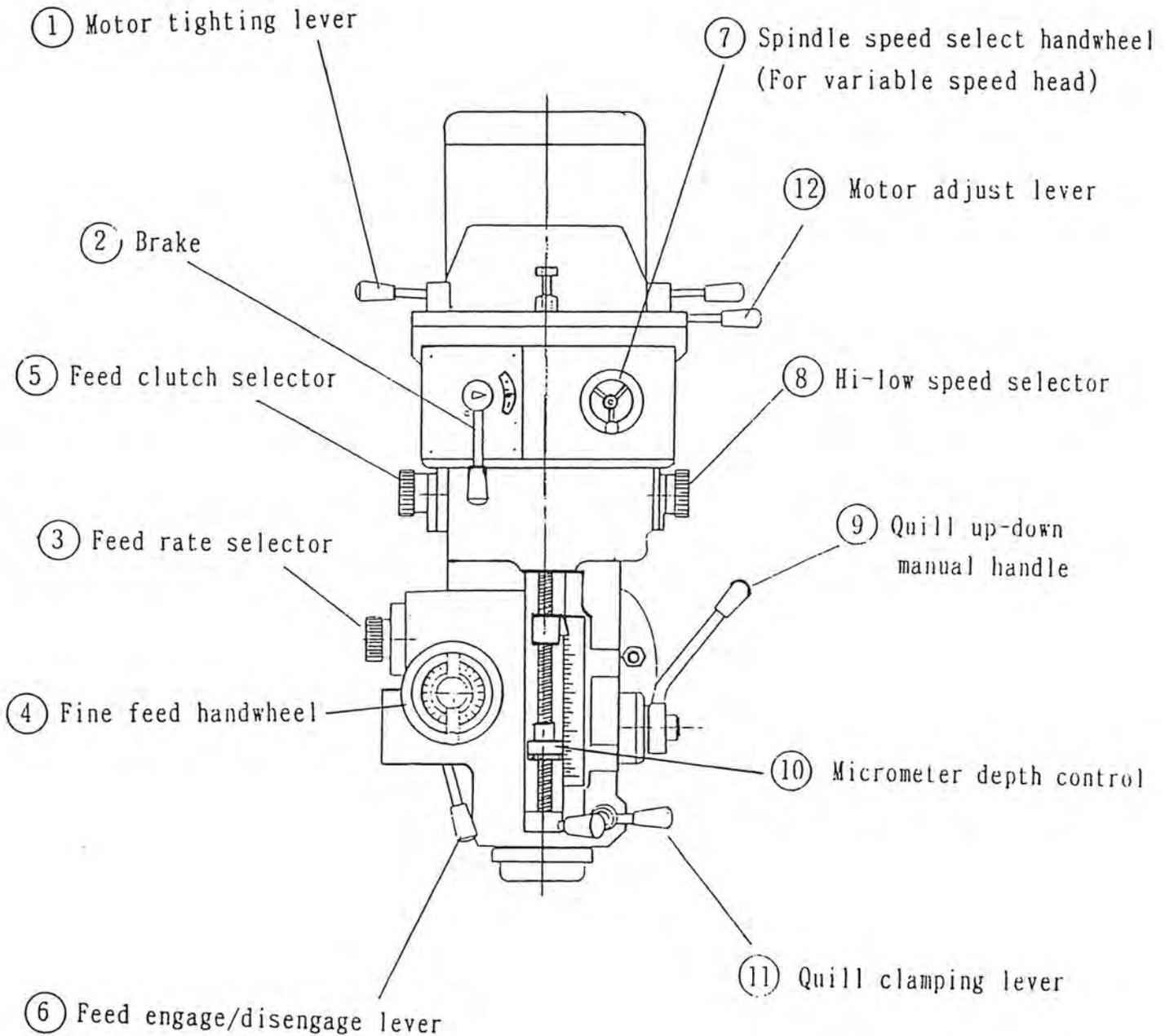


Fig-20

Variable speed

(Also good for step speed)

8-2 ELECTRIC OPERATION PANEL

- 1: POWER ON& LAMP
- 2: CROSS RAPID
- 3: SPEEDED ADJUSTER FOR CROSS FEED
- 4: VERTICAL SPINDLE FORWARD
- 5: VERTICAL SPINDEL REVERS
- 6: HORIZONTAL START BUTTON
- 7: COOLANT PUMP
- 8: VERTICAL SPINDLE STOP BUTTON
- 9: HORIZONTAL SPINDLE STOP BUTTON
- 10: Z AXIS DOWN BUTTON
- 11: Z AXIS UP BUTTON
- 12: EMERGENCY STOP BUTTON

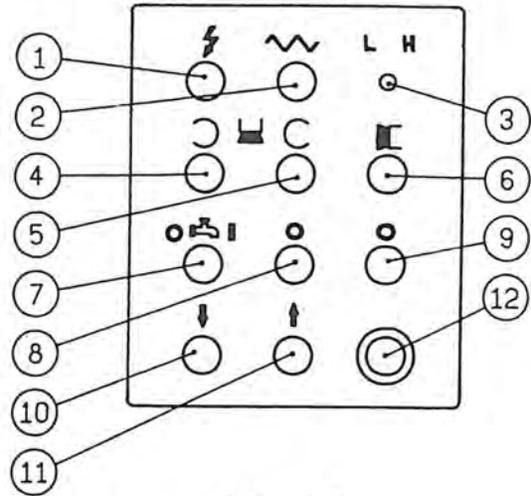


Fig-21

8-3 Change of vertical spindle speed

Check if the hi-low speed selector (Fig20-8) in the correct poition as needed. Then press the spindle high-low speed (Fig21-4) or (Fig21-5), spindle can be rotated in the correct direction.

The vertical spindle speed should be chosen according to work piece material, cutter diameter and cutter material table 5 and 6 for your reference.

To change the vertical spindle speed operate the high-low speed selector (Fig20-8) and rotating speed select handwheel (Fig20-7) spindle speed can be read out from the indicator.

Attention: the speed select hand wheel (Fig20-7) can be rotated only when the spindle is running.

Hi-low speed slecting: (Do not operate the hi-low speed selector (Fig20-8) when spindle is running) stop spindle first, then rotate selector to the high or low position as selected. (if can not be rotatd, please rotateing the spindle slightly by hand) Then press the vertical spindle high-low speed. (Fig21-4) (Fig21-5)

8-4 SPINDLE BRAKE

Position 1 : Releasing

Position 2 : Spindle motor power off through the engagement of micro switch (inside, not shown)

Position 3 : Braking,

The lever is cam operated and will never return back until you push it. The spindle will be powered again as you push it to position 1. All are controlled electric-magnetically. This will offer you a great convenience for immediate stop of spindle and shifting back gears (Inching).

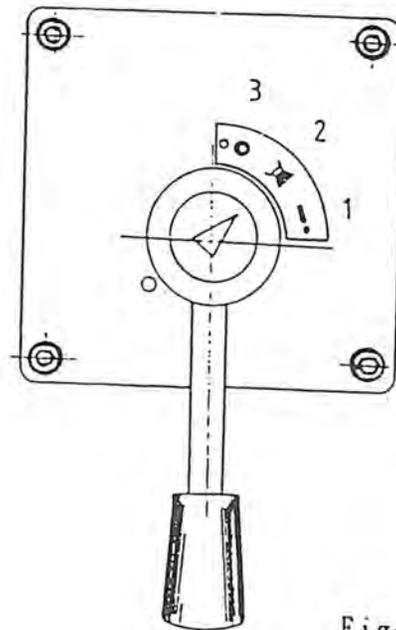


Fig-22

ADJUSTMENT

After long period usage, the brake shoe might be loosed and some adjustment is required.

Use a flat head driver to adjust the bolt inside the hole at left-front position of pulley cage. Clockwise will tight the brake. Counter-clockwise will loose it.

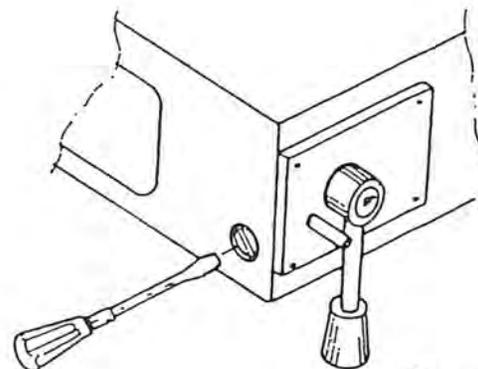


Fig-23

Operation

1. Pull the handle on the boss.
2. Select the most suitable position.
3. Push home until the locating pin engages.

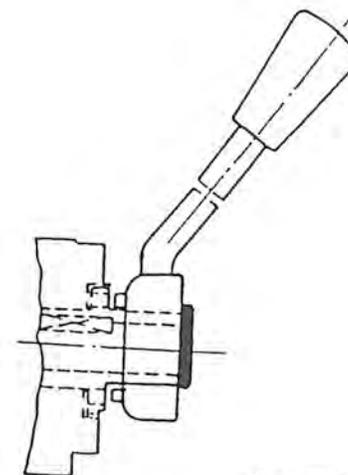


Fig-24

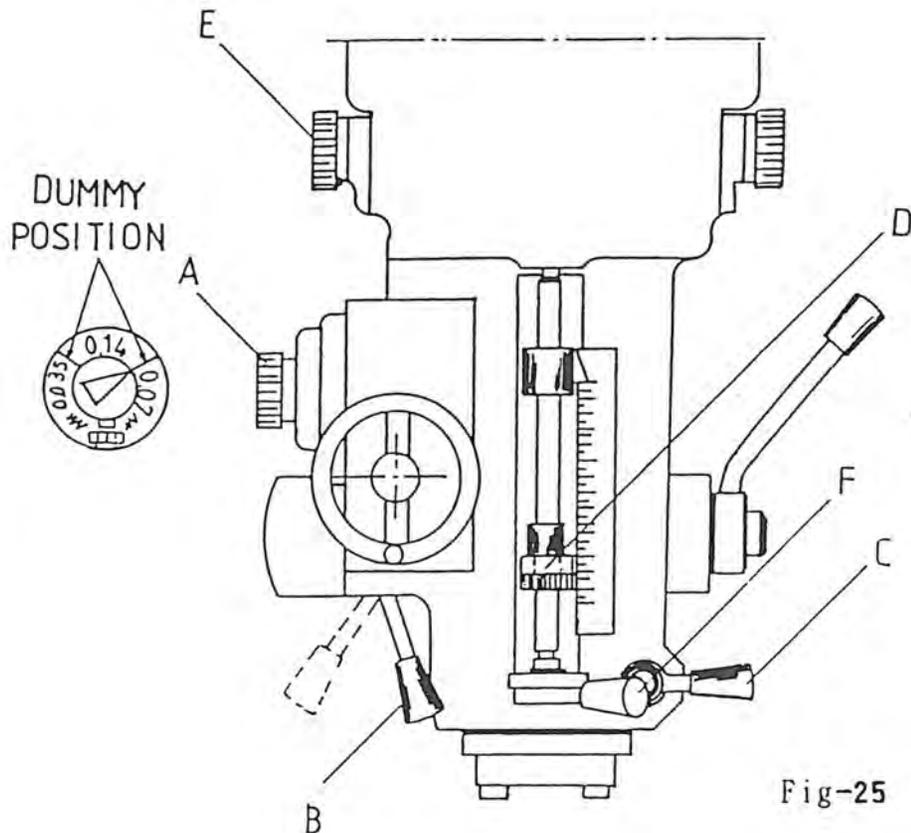


Fig-25

a). FINE HAND FEED

1. Turn the feed rate selector (A) to any of the two "Dummy" position.
2. Engage Feed Trip Lever (B).
3. The Quill is now under handwheel control.

b). POWER FEED

Maximum loading 1" (25mm) dia solid drill in steel.

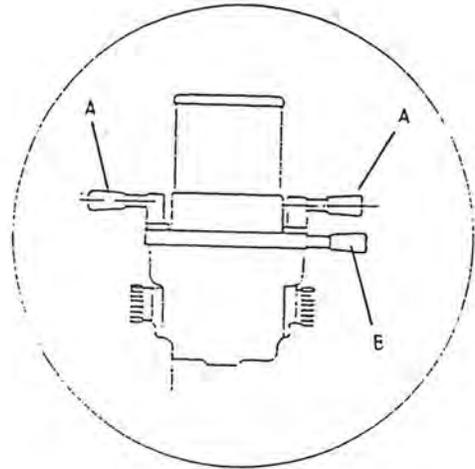
1. Ensure quill lock is off, (C).
2. Set micrometer dia to required depth, (D).
3. Engage Feed Clutch Selector, (E).
4. Select feed rate, (A).
5. Engage feed trip lever, (B).
6. The feed will automatically trip out at a depth within 0.2mm (± 0.01 ").

NOTE : To interrupt Power Feed, just press down the dis-engagement lever (F).

8-5 SPINDLE SPEED RANGE

a). Belt change

1. Stop motor
2. Slacken 2 motor lock levers. (A).
3. Slide motor forward through shift lever (B).
4. Position belt on appropriate pulleys
5. Slide motor to the rear to tension V belt.
6. Tighten 2 motor lock levers.



b). Pole change

1. Press the spindle stop button or brake the spindle.
2. Select the pole change switch "2" for high range "1" for low range
3. Press the start button

c). Back Gearing

1. Brake the spindle.
2. Turn the H-L knob in either direction to the next horizontal position. You can feel the "Snap in" correct position through the ball-spring mechanism. (The H-L knob is of rotory type, so you can turn it to both directions)
3. If difficulty happened in meshing gears, inching the spindle through brake lever.

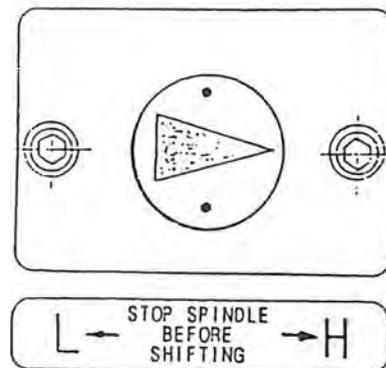


Fig-26

8-6 Vertical spindle head swivelling

Swivelling within the vertical plane of the spindle head is necessary when milling slanted work. Swivel range from 0° to 45° is possible.

The spindle head should be swivelled in the following manner:

- 1) Loosen the 4 bolts (Fig 27-1) at the rear of the spindle head rotation shaft.
- 2) Turn the spindle head swivelling worm (Fig 27-2) with a wrench to swivel the spindle head to the required angle while observing the scale.
- 3) Tighten the 4 bolts after obtaining the required swivel.

Attention: Loosen 4 bolts only. Do not take off the bolts.

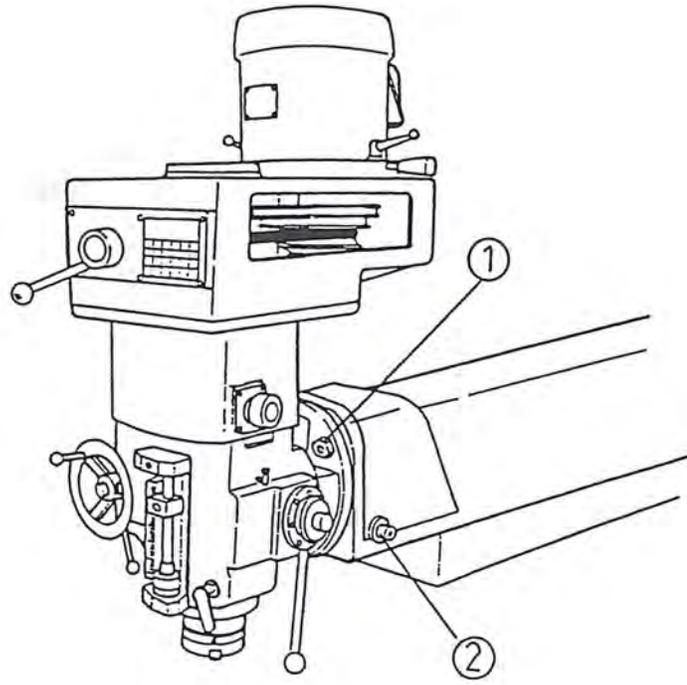


Fig-27

Maintenance

VEE BELT REPLACEMENT (FOR VS-300A, S-300A)

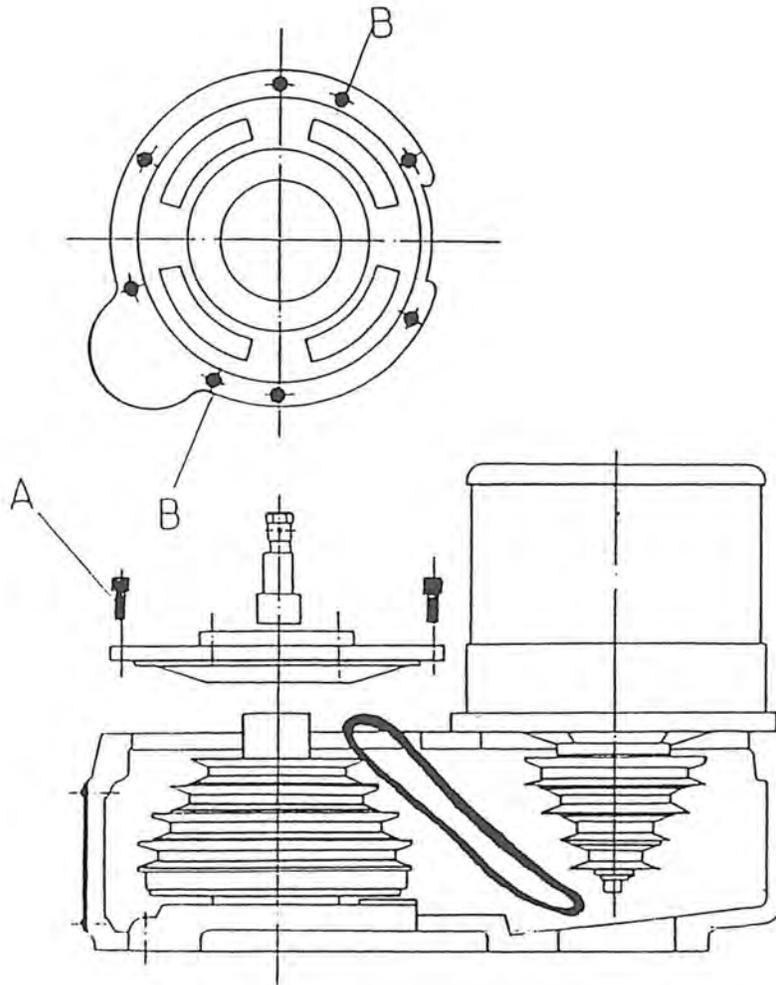


Fig-28

1. Isolate machine
2. Remove draw bar.
3. Use L key to remove six M6 screws "A".
4. Use 2 screw "A" to screw into the two tapped holes "B". Thus, the Top cover assembly can be raised out.
5. The belt can be replaced now.

Specifications of V belt : B37 for S-300A

925VC3830 FOR VS-300A

Maintenance

BRAKE SHOE REPLACEMENT

Repeat sequence 1 to 5 on page 27.

1. Remove the spindle pulley off.
2. Use flat head screw driver to kick-off the two the two half piece of brake shoe.
3. Remove the two springs.
4. Replace new brake shoe and re-assemble the two springs.
5. Press the assembled brake shoe to rear support pin first, then to the front cam.
6. For new brake shoe, some adjustments is required. (P.34)

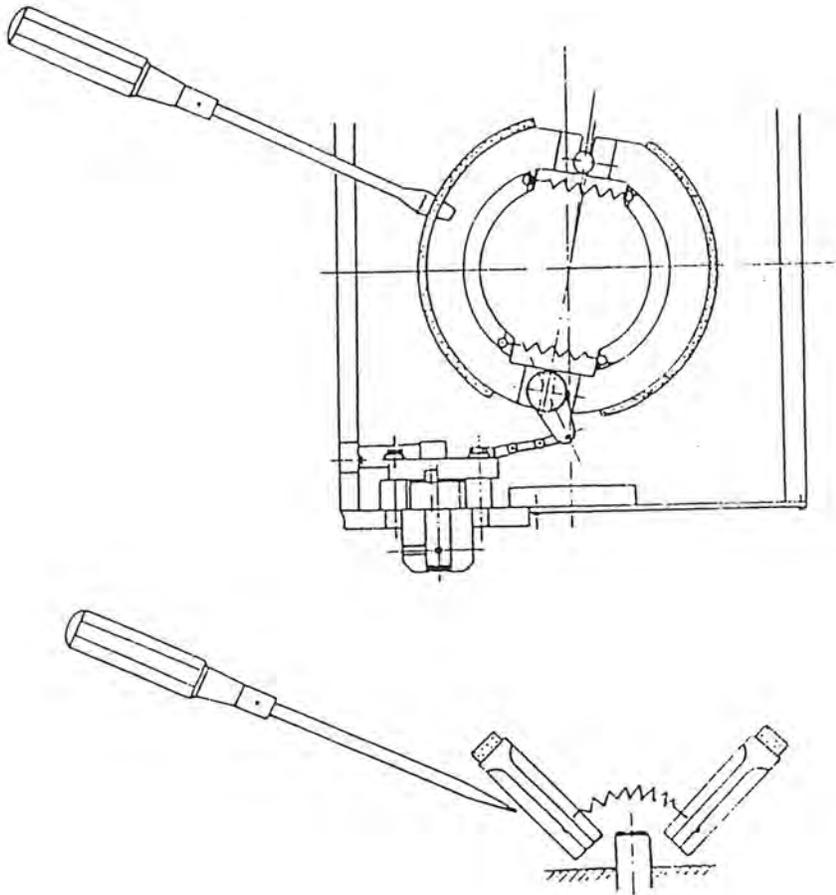


Fig-29

Maintenance

BACKGEARS PEPLACEMENT

1. Remove the spindle pulley off.
2. Release six M8 bolts "A".
3. Remove pulley cage and brake shoes.
4. Release four M8 bolts "B".
5. Remove upper cover "C".
6. Remover upper snap ring "D".
7. Replace back gear "E".

NOTE :

The back gear "E" is made of high quality alloy steel sncmz1 through hardened, and ground, freatment. It is preciselly assembled and machined in the factory, therefore it should be replaced as a whole unit only.

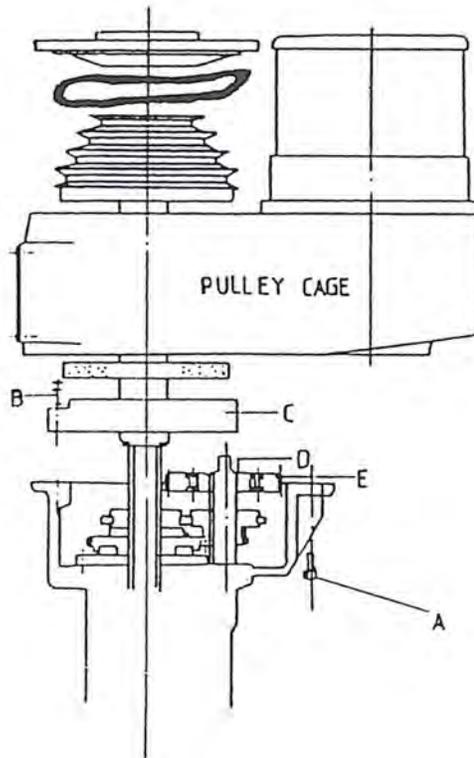


Fig- 30

Maintenance

BALANCE SPRING REPLACEMENT

1. With quill at top of movement, apply quill lock.
2. From right hand side:
Remove : screw "A", snap ring "B", hub "C",
From left hand side:
Remove : Feed latch cover "E", two pins "F", latch "G",
Spring-clutch unit "H", two keys "I", snap ring "J",
Pinion shaft seat "K".
3. Release two screws "D", allowing spring housing "L" to rotate
lowly in the hole of head casting.

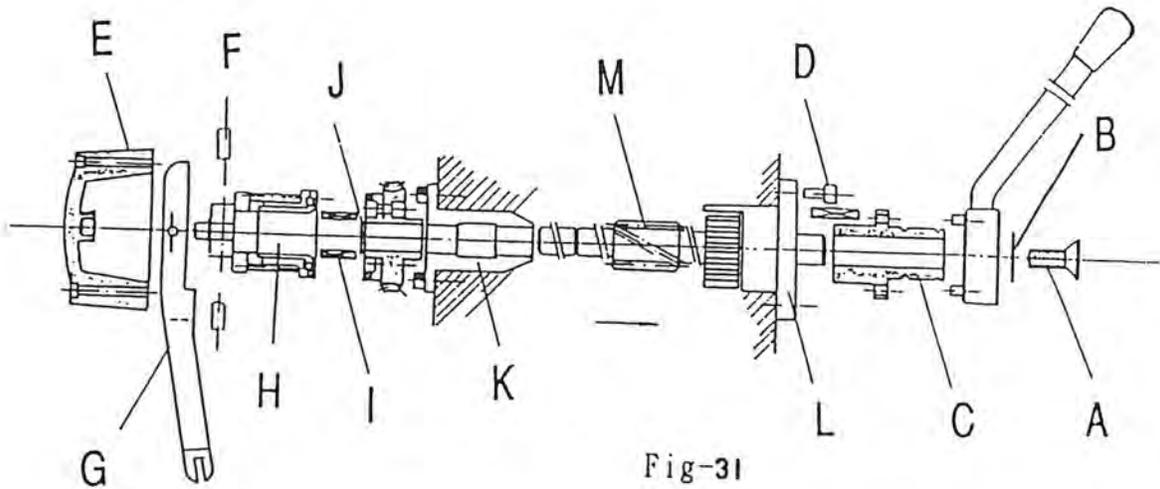


Fig-31

4. Remove pinion shaft unit "M".
5. Separate spring housing "L" from "M"
take care of the spring tension during separating.
6. Release the set screw "N" and replace the new spring.
7. Assemble spring in opposite procedure.
Before putting spring housing assembly to head casting hole,
turn housing clockwisely to reduce the spring volume until
it can be inserted to the hole.

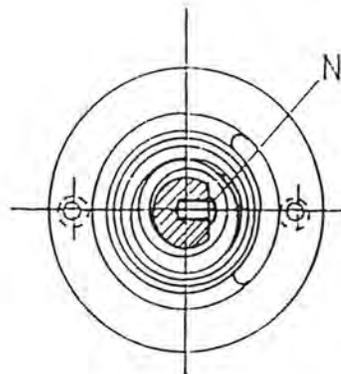


Fig-32

Maintenance

SPINDLE - QUILL ASSEMBLY

The three spindle bearings, two 7011A "A" and 6209 "B", are of machine tool grade precision bearings and was assembled very precisely in factory.

The two 7011A angular contact ball bearing "A". are selecting assembled with the inner and outer precision collar "C" and "D" and then preloaded to give the optimum combination between temperature raising and toughness of spindle.

Each spindle-quill assembly has been Optimum adjusted and test run, therefore we do not recommend you to disassemble this unit. i. e.

SPINDLE-QUILL UNIT SHOULD BE CHANGED AS A WHOLE UNIT

QUILL REMOVAL

1. Lock quill
2. Remove micrometer stop and quill stop.
3. Remove pinion shaft as described on page 41 .
4. Put hand below the quill bottom and unlock quill to remove it from head casting carefully.

NOTE : When the quill unit will be replaced, please use hole micrometer to measure the hole size of cast iron as precise as possible and tell us, so we can built the correct size of quill unit for you.

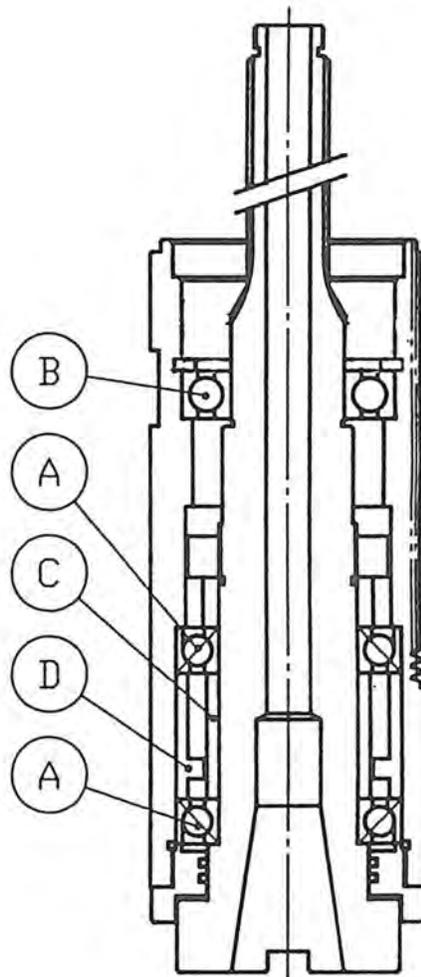


Fig-33

Trouble Shooting

TROUBLE	CAUSE	CORRECTION
SPINDLE BRAKE DO NOT WORK OR NOT WORK WELL	<ol style="list-style-type: none"> 1. Micro-switch fail. 2. Magnatic contactor fail. 3. Brake shoe wear 	<ol style="list-style-type: none"> 1. Replace micro-switch. 2. Replace magnetic contactor. 3-1 Tight the adjusting screw. 3-2 Replace brake shoe.
SPINDLE POSER FEED DO NOT WORK AFTER THE ENGAGE LEVER PULLED	<ol style="list-style-type: none"> 1. Quill locked 2. Power feed clutch not rotated to feed engage position. 3. Power feed rates select knob set on "Dummy" position (The micro-feed handwheel not rotate) 	<ol style="list-style-type: none"> 1. Always release quill clamp before feeding. 2. Rotate power feed clutch knob to feed engage position. 3. Rotate power feed feed rates select knob to one of the three feed rates.
SPINDLE POWER FEED STOPS DURING DRILLING	<ol style="list-style-type: none"> 1. Overload makes safety clutch slip. (Clitch slip noise happen) 	<ol style="list-style-type: none"> 1. Reduce cutting condition. or if necessary, adjust the spring force of clutch.
SPNDLE POWER FEED DIS-ENGAGEMENT NOT WORK WILL	<ol style="list-style-type: none"> 1. The two M4 set screws on dis-engage lever loosed. 	<ol style="list-style-type: none"> 1. Tighten set screws.
HAND MICRO-FEED NOT WORK	<ol style="list-style-type: none"> 1. Power feed rates selecting knob set on one of the three feed positions. 2. Engage lever not operated. 	<ol style="list-style-type: none"> 1. Rotate this knob to one of the two "Dummy" positions. 2. Pull engage lever.
V-BELT SLIPS AT CUTTING	<ol style="list-style-type: none"> 1. V-belt too loose. 2. V-belt worn. 3. Wrong grooves. 	

Trouble Shooting

TROUBLE	CAUSE	CORRECTION
FEED STOP SUDDENLY DURING MACHINING	1. Overload makes the shear pin shear out.	1. Check the overload cause and replace shear pin.
FEED RATE CHANGE NOT WORK	2. The jaw of the two speeds rocker broken.	1. Replace the two speeds rocker.
KNEE CANT BE POWER ELEVATED	1. Knee is locked on column. 2. Over weight of workpiece, fixtures...etc. (Max load capacity : 350 kgs) 3. Poor lubrication between Knee and column.	1. Release lock bolts. 2. Use hand elevating. 3. Check lubrication.
HARD TO CHANGE SPEED OF HORIZONTAL	1. Gears not meshed. 2. Poor lubrication on spline shaft and gears.	1. Use "Inching" button. 2. Check lubrication.
RAPID TRAVERSE OF FEEDBOX NOT WORK	1. Wrong motor rotating di- 2. Multi-disc clutch worn. 3. Rapid traverse shifter worn.	1. Reconnect the power supply. 2. Adjust clutch. 3. Replace shifter

Trouble Shooting

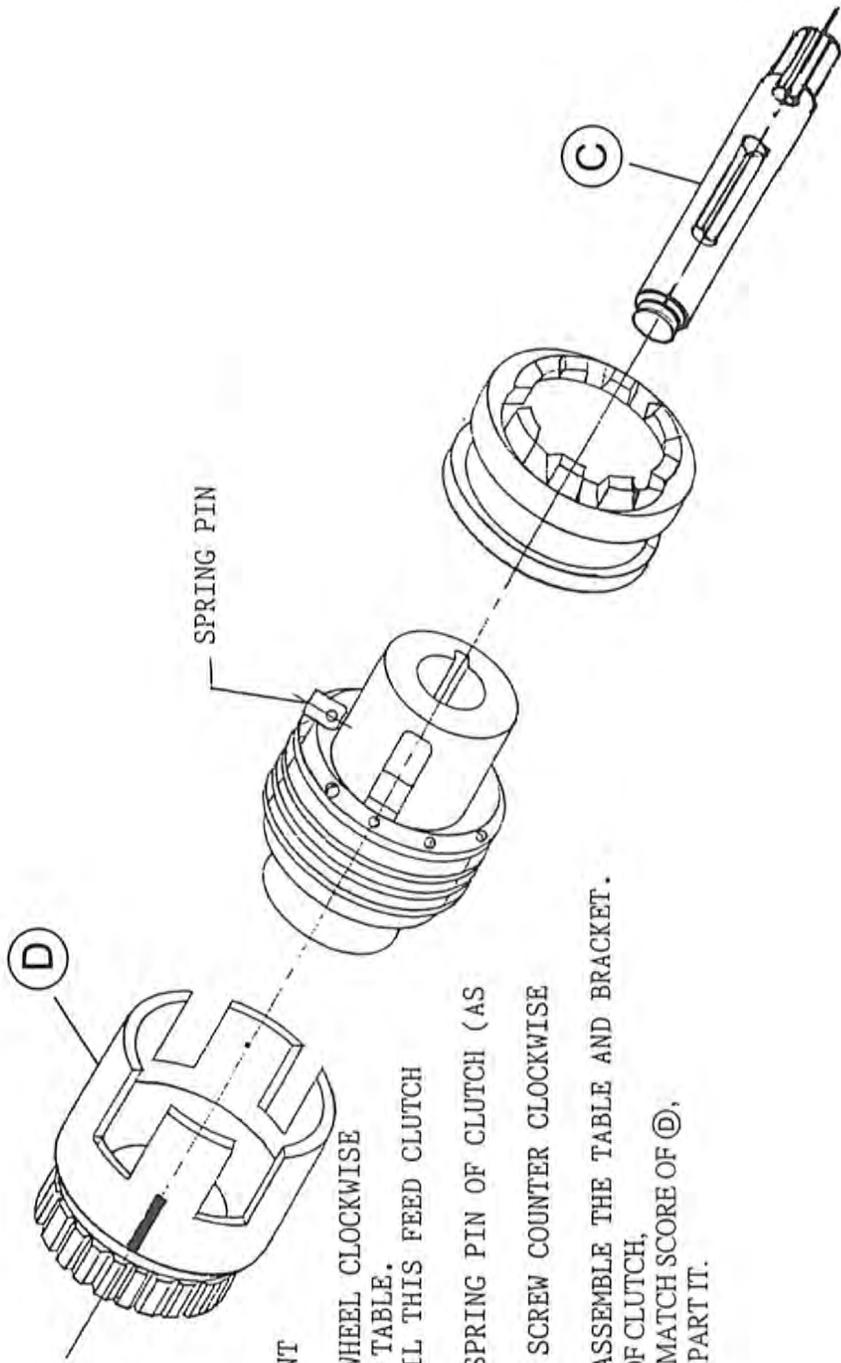
TROUBLE	CAUSE	CORRECTION
CHATTER	<ol style="list-style-type: none"> 1. Lack of rigidity in the machine, fixtures arbor or workpiece. 2. Cutting load too great. 3. Dull cutter 4. Poor lubrication 5. Straight tooth cutter. 6. Peripheral relief angle too great. 	<ol style="list-style-type: none"> 1. Improve rigidity 2. Decrease number of teeth in contact with workpiece. 3. Resharpen 4. Improve lubrication 5. Use helical tooth cutter. 6. Decrease relief angle
CANNOT HOLD SIZE	<ol style="list-style-type: none"> 1. Cutting load too great 2. May be due to chip packing 3. Chips causing misalignment. 	<ol style="list-style-type: none"> 1. Decrease number of teeth in contact with workpiece 2. Increase oil pressure in redirect flow so as to wash chips out of teeth 3. Brush or blow all chips away before mounting new piece of work
PREMATURE CUTTER DULLING	<ol style="list-style-type: none"> 1. Cutting load too great 	<ol style="list-style-type: none"> 1. Decrease number of teeth in contact with workpiece 2. Add blending oil to lubricant
POOR SURFACE FINISH	<ol style="list-style-type: none"> 1. Feed too high 2. Dull tool 3. Speed too low 4. Insufficient number of cutter teeth 	<ol style="list-style-type: none"> 1. Decrease feed and increase speed 2. Resharpen 3. Increase surface speed 4. Use cutter with more closely spaced teeth

Trouble Shooting

TROUBLE	CAUSE	CORRECTION
CUTTER "HOGS IN"	<ol style="list-style-type: none"> 1. Peripheral relief too great 2. Rake angle too large 3. Improper speed 	<ol style="list-style-type: none"> 1. Use recommended angle 2. Decrease rake angle 3. Check and adjust
VIBRATION	<ol style="list-style-type: none"> 1. Insufficient clearance causing rubbing 2. Machine at fault 	<ol style="list-style-type: none"> 1. Use recommended clearance angle 2. Check machine, be sure arbor is at least 1/3 diameter of cutter
WORK BURNISHING	<ol style="list-style-type: none"> 1. Cut is too light 2. Insufficient peripheral relief 3. Land too wide 	<ol style="list-style-type: none"> 1. Increase depth of cut 2. Increase peripheral relief angle 3. Decrease width of land
CUTTER BURNS	<ol style="list-style-type: none"> 1. Insufficient lubricant 2. Speed too fast 	<ol style="list-style-type: none"> 1. Add more sulfur base oil 2. Decrease speed
TEETH BREAKING	<ol style="list-style-type: none"> 1. Feed too high 	<ol style="list-style-type: none"> 1. Decrease feed per teeth May be possible to maintain rate by increasing the number of teeth

ADJUSTABLE FEED CLUTCH FOR LONGITUDINAL FEED BOX MOD: 300 SERIES

THIS NEW DEVICE IS DESIGNED FOR ADJUSTABLE IF THE RAPID WAS INEFFECTIVE WHEN YOU LIFT RAPID FEED BAR, THIS CONDITION MAY HAPPENED AFTER CERTAIN PERIOD, PLEASE DO THE FOLLOWING PROCESS:



- (1) REMOVE 4 SCREWS FROM BRACKET FROM TABLE RIGHT SIDE, (FACE TO MACHINE)
- (2) CLAMP 2 CLAMP LEVEL IN FRONT OF SADDLE.
- (3) TURNING LONGITUDINAL HANDWHEEL CLOCKWISE UNTIL BRACKET RELEASE FROM TABLE.
- (4) PUSH TABLE TO THE LEFT UNTIL THIS FEED CLUTCH IS OBVIOUSLY.
- (5) USING DRIVER TO DISENGAGE SPRING PIN OF CLUTCH (AS DRAWING)
- (6) TURNING LONGITUDINAL LEAW SCREW COUNTER CLOCKWISE APPROXIMATE 3 ROUND.
- (7) REPEAT ABOVE PROCESS TO REASSEMBLE THE TABLE AND BRACKET.
- (8) WHEN YOU REPLACE THE ARBOR OF CLUTCH, THE CHASE OF ARBOR SHOULD BE MATCH SCORE OF ⊕, AND FOLLOW THE WAY TO TAKE APART IT.