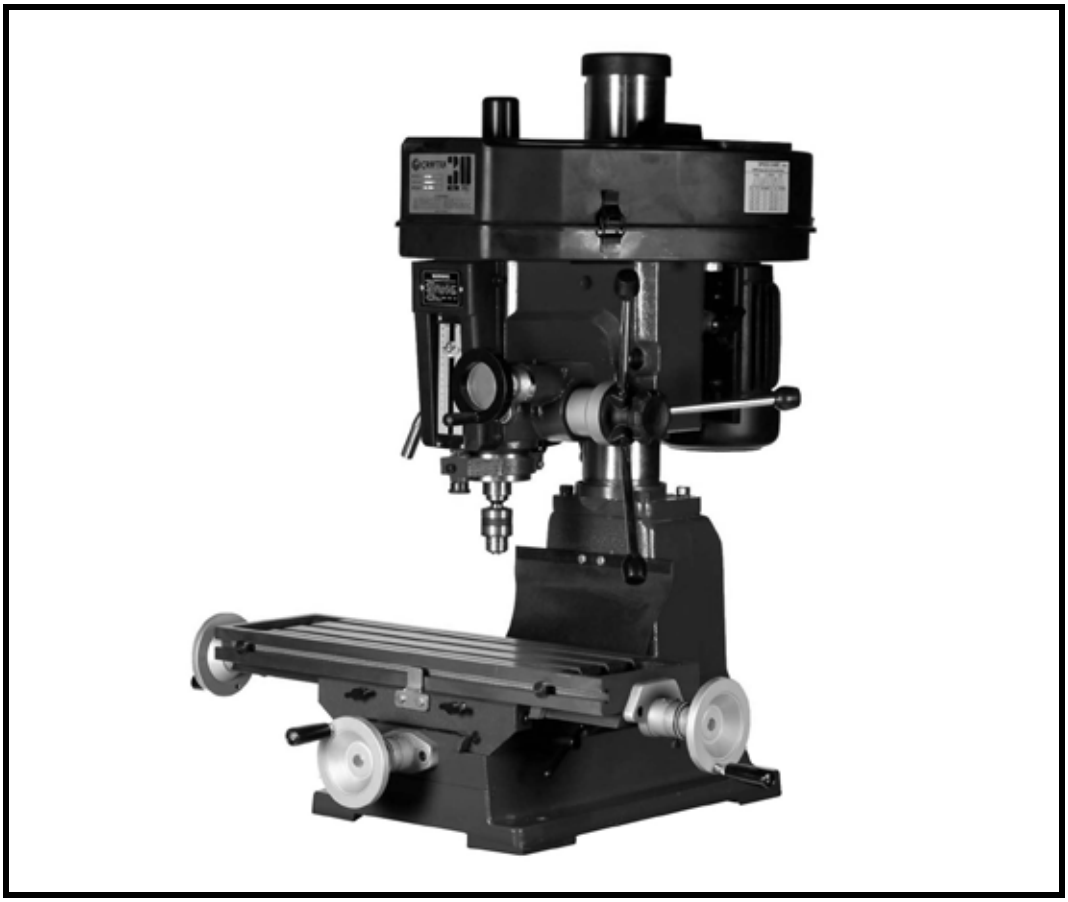
B1977
1.5-HP Milling / Drilling Machine
User Manual



Safety Guidelines

- **Keep the work area clear.** Remove foreign objects prior to operation so as to ensure safety.
- **Use the safety guard**. The safety guard prevents Chips from spraying out and causing cuts or burns.
- **Remove adjusting keys and wrenches** before turning machine on.
- **Lock the machine head.** Check if the machine head is safely locked prior to operation.
- **Wear proper apparel.** Do not use loose clothing or jewelry, which can get caught in moving parts. Rubber soled footwear is recommended for best footing.
- **Always use safety glasses.** Wear protective eyewear when operating, servicing, or adjusting machinery.
- **Keep hands in sight.** Do not put hands or fingers around, on, or below any rotating cutting tools.
- **Keep children away.** All visitors should be kept a safe distance from the work area.
- **Never leave the machine running unattended.** Turn the power off. Do not leave the machine until it comes to a complete stop.
- **Secure work.** Use clamps or a vise to hold work, when practical. It is safer than using your hands, and it frees both hands to operate the machine.
- **Do not overreach.** Failure to maintain proper working position can cause you to fall into the machine or cause your clothing to get caught, pulling you into the machine.
- **Do not use in a dangerous environment.** Don't use power tools in damp or wet locations, or expose them or rain. Keep work area well lighted.
- **Do not repair or adjust the voltage inverter.** Notify qualified personnel for repairs or adjustment to prevent damage or personal injury.
- **Always disconnect the machine from the power source before servicing.**

TABLE OF CONTENTS

LIST OF MACHINE MODELS

MD-30B 1-1/2HP(2HP)

MD-30BC	CE standard
MD-30BCP	CE standard + Forward & Reverse +4P/8P
MD-30BGC	CE standard + Tapping + 4P/8P
MD-30BRF	CE standard + Forward & Reverse
MD-30BCT	CE standard + Tapping
MD-30BT	Tapping system without CE

MD-30N 34/HP(1HP)

MD-30NC	CE standard
MD-30NRF	CE standard + Forward & Reverse

MD-30M 1HP(1-1/2HP)

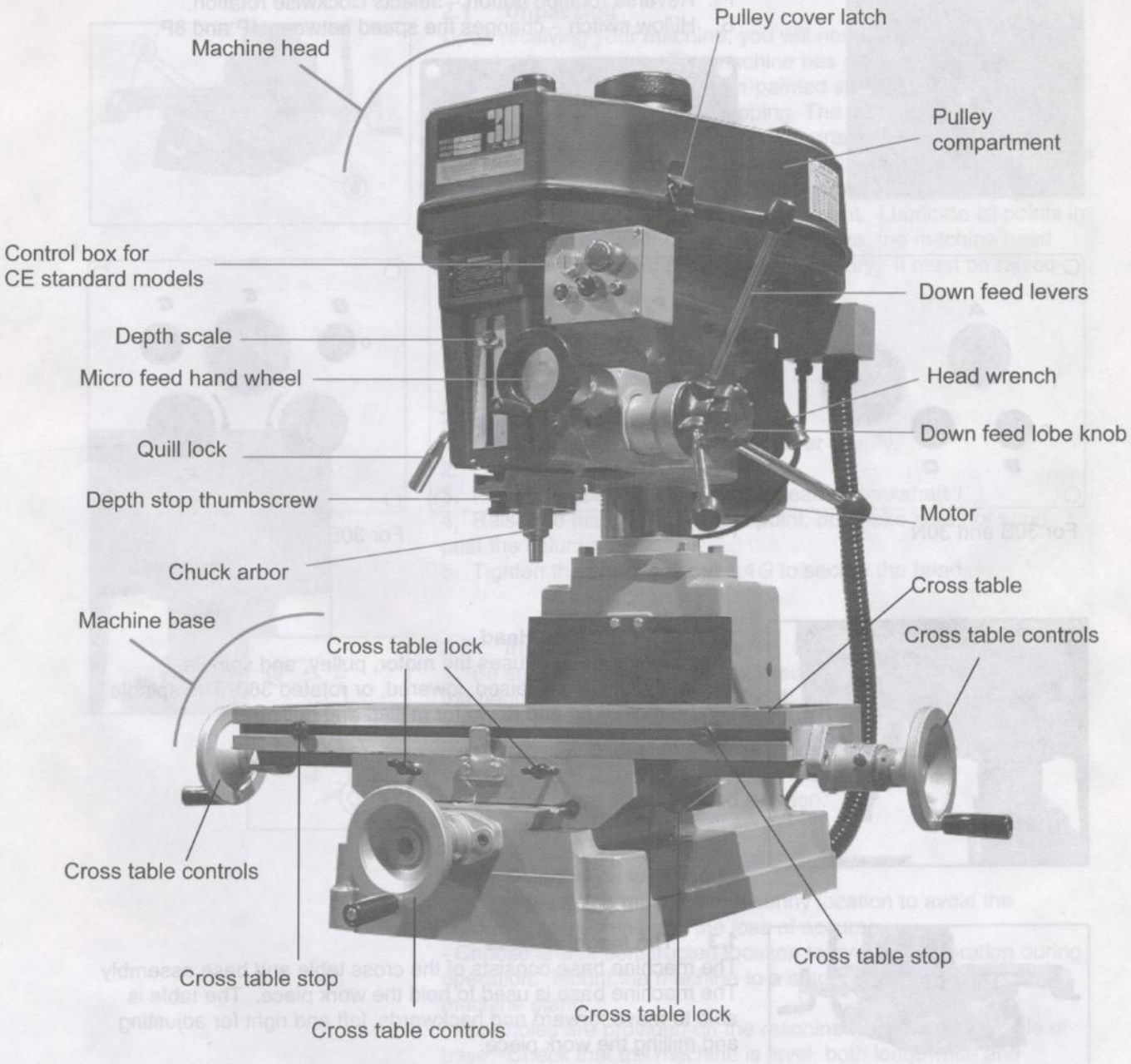
MD-30MC	CE standard
MD-30MRF	CE standard + Forward & Reverse

MACHINE SPECIFICATIONS

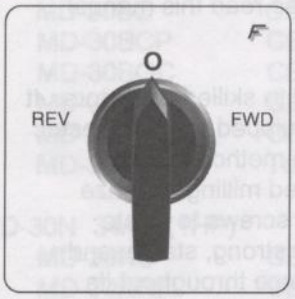
	MD-30B	MD-30N	MD-30M
DRILLING CAPACITY	32mm 1-1/4"		
TAPPING CAPACITY	19mm 3/4"		
SWING	405mm 16"	430mm 17"	
SPINDLE TAPER	MT3#, NT30#, R8	MT3# , R8	
SPINDLE TRAVEL	130mm 5"	110mm 4.3"	
QUILL DAIMETER	75mm 3"	62mm 2-7/16"	
COLUMN DAIMETER	115mm 4-1/2"	95mm 3-3/4"	
SPINDLE NOSE TO TABLE	460mm 18"	445mm 17.5"	
X AXIS TRAVEL	430mm 16.9"	350mm 13.7"	
Y AXIS TRAVEL	190mm 7.5"	180mm 7"	
TABLE SIZE (L x W)	730x210mm 28.7"x8.3"	660x190mm 26"x7.5"	
TABLE SLOT	16mm 5/8"		
BASE SIZE (L x W)	610x400mm 24'x15.7"	560x340mm 22"x13.4"	
SPINDLE R.P.M.	12 Speed 50HZ: 90~2150 4P:100~2080 8P:50~1040 60HZ: 110~2580 4P:120~2500 8P:60~1250		
MOTO R	1-1/2(2HP)	3/4(1HP)	1 (1-1/2HP)
COOLANT MOTOR	1/8HP / 3ph		
MACHINE SIZE(L / W / H)	1080X1100X1100mm 42.5"X43.3"X43.3"	950X1030X980mm 37.4"x40.5"x38.5"	
STAND SIZE (L / W / H)	750X560X790mm 29.5"x22"x31"		
NET WEIGHT (Without stand)	270kgs	180kgs	
MEASUREMENT	27.4CU.FT.	24CU.FT.	

Thank you for purchasing the Md-30N MD-30B COMPLEX Machine. If properly cared for and operated, this machine can provide you with years of accurate, service. Please read this manual carefully before using you machine.

This machine is of the fine quality, can be operated easily, and it is not limited to skilled operators. It has several uses, such as surface cutting, drilling, milling, and also can be equipped with an electric switch for tapping. The drilling and milling operation can be performed by two methods: Hand operation for quick drilling and worm gear feed operation for an even, controlled milling. Bronze adjustable nuts, adjust for thread clearance and reduce the wear. They allow screws to rotate smoothly and increase the thread accuracy. The column makes this machine strong, stable, and accurate. Head is made of tough cast iron to ensure its accuracy and endurance throughout its processing, the boring of cylinder hole, grinding, and internal stress relief. The pulley cover is easy to open, which is convenient for adjusting the belt and changing speeds.



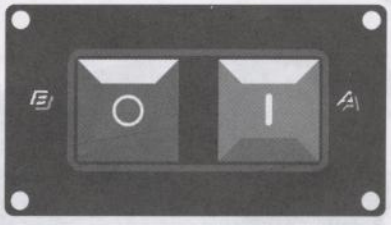
1 Description of Machine Parts

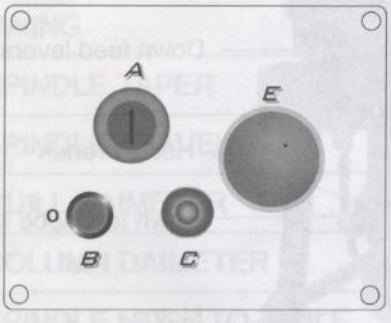


1.1 The Control Panel

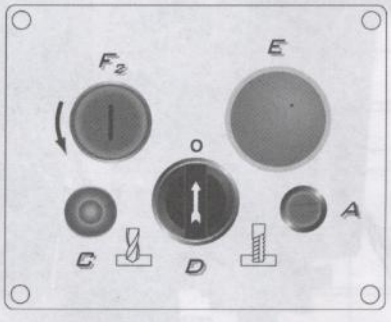
The control panel is mounted on the machine head and is used to control the machine's operations and comes in many different formats.

A. Start button – starts motor and spindle rotation.
B. Stop button – stops motor and spindle rotation.
C. Power indicator – indicates main power is active.
D. Drilling/tapping selector – selects milling or drilling mode.
E. Emergency Stop button – stops all power to the machine. Rotate to release the button.
F. Spindle rotation switch – selects spindle rotation and off switch.
F_1. Forward rotation button – selects clockwise rotation.
F_2. Reverse rotation button – selects clockwise rotation.
S. Hi/low switch – changes the speed between 4P and 8P.

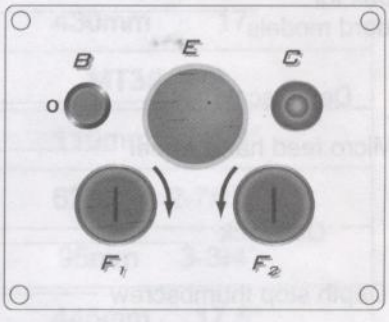




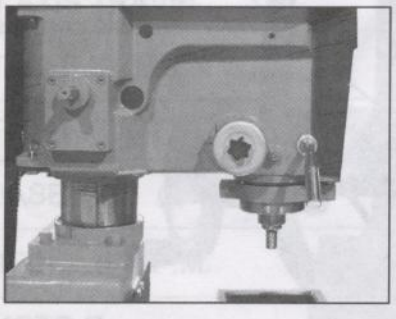
For 30B and 30N



For 30B



For 30B

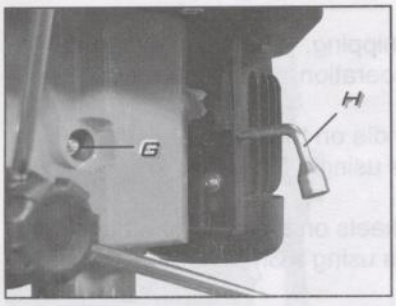


1.2 The Machine Head

The machine head houses the motor, pulley, and spindle assembly. It can be raised, lowered, or rotated 360. The spindle can be moved up and down for milling and drilling.

1.3 The Machine base

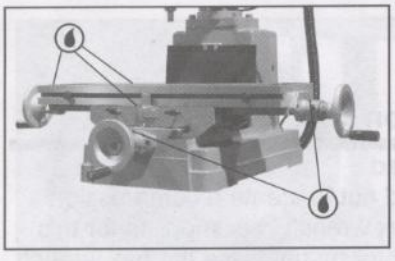
The machine base consists of the cross table and base assembly. The machine base is used to hold the work piece. The table is able to move forward and backwards, left and right for adjusting and milling the work piece.



1.4 The machine head's socket wrench

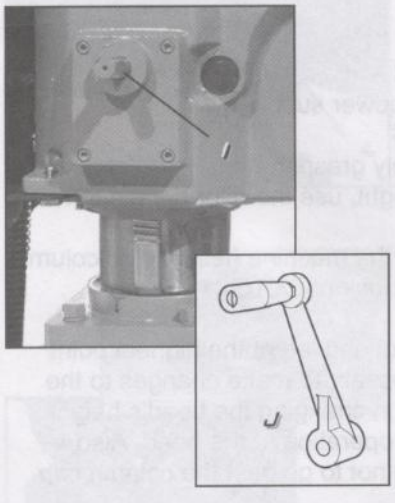
A 10mm hex socket wrench *H* is conveniently stored in the motor mount bracket. The wrench has a hex socket, designed to fit the head lock nut *G*.

2 Unpacking and Installation



2.1 Unpacking

Upon receiving your machine, you will need to unpack it from the crate and plastic wrap. The machine has a protective coating applied at the factory on all non-painted surfaces. This coating is used to prevent rust during shipping. The rust proof coating must cleaned before use. A commercial degreaser, kerosene or similar solvent may be used to remove the grease from the machine, but avoid getting solvent on belts or other rubber parts. After cleaning, coat all metal surfaces with a light lubricant. Lubricate all points in with medium consistency machine oil. Also, the machine head was set in the lowered position at the factory. It must be raised before operation.



2.2 Raising the machine head

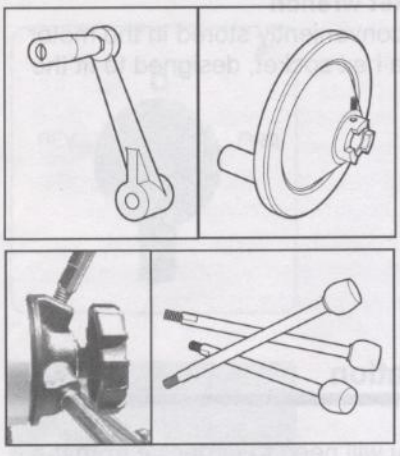
1. Disconnect the machine from power supply.
2. Loosen the head lock nut 1.4*G*.
3. Place the riser handle *J* on the head's crankshaft *I*.
4. Raise the head to its highest point, but make sure not to go past the column cap.
5. Tighten the head lock nut 1.4*G* to secure the head.

2.3 Installation of Machine

1. Be sure the head is securely fixed to the column. Check that the head lock nut is sufficiently tight.
2. Place the lifting belt around the center of the head. Before moving machine, ensure that the machine is properly balanced for safety.
3. Lift and place in a prepared location.

2.4 Selecting a location

- Do not place the machine in a sunny location to avoid the deformity of machine and the loss of accuracy.
- Choose is well-constructed location to avoid any vibration during operation. Mount the machine to a sturdy table, base or optional machine stand.
- Four holes are provided on the machine for securing to table or base. Check that the machine is level, both lengthwise and crosswise. Use shims if necessary.



2.5 Installing Loose Parts

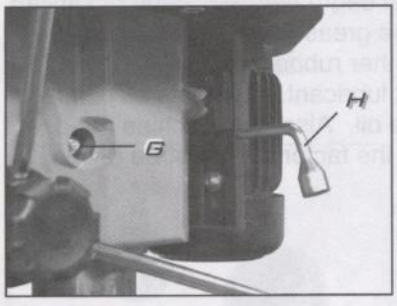
Some parts are not attached for shipping. These parts must be place on the machine for proper operation.

Riser Handle – Place the riser handle on the machine head's crankshaft. Tighten the setscrews using a 5mm hex wrench.

Hand Wheels – Place the hand wheels on the crankshaft of the cross table. Tighten the setscrews using a 3mm hex wrench.

Lever arms – Screw the lever arms into the lever hub of the machine head. Tighten down with a wrench.

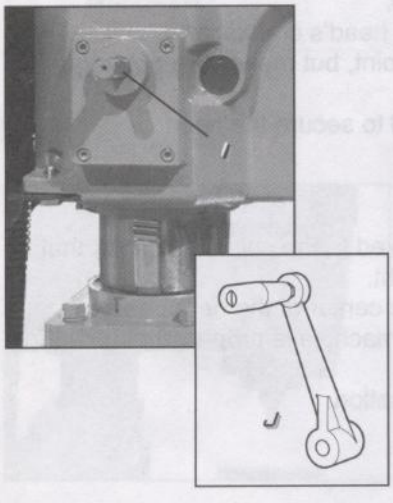
3 Setup and Pre-operation



3.1 Securing the machine head

The machine head uses a bolt and nut to create a compression lock onto the column. A 10mm hex wrench H is supplied for this operation and is located on the motor mount. Use the hex wrench to tighten the lock nut on the machine. The lock nut G may be loosened for rotating or adjusting the height of the machine head.

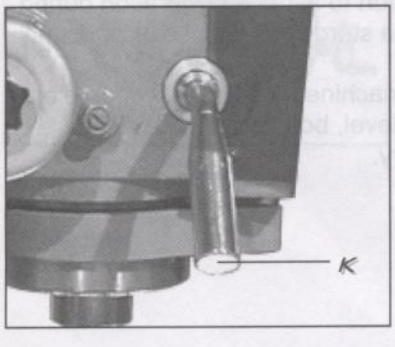
Warning! Securing the head to the column is critical to prevent accidents and to keep the machine's operations true. Failure can result in damage to the work piece, the machine, and personal injury.



3.2 Setting the machine head

1. Disconnect the machine from power supply.
2. Loosen the head lock nut 3.1*G*
3. Rotate to loosen the head, firmly grasp the head and push left or right to rotate. To adjust the height, use the riser handle to raise or lower the machine head.
4. Set the head's height. Secure the machine head to the column. Use the hex wrench to tighten the lock nut 3.1*G*.

It is recommended that head be set and left at the highest point for most operations. It is not necessary to make changes to the height of head often. A reduction in changing the head's height ensures the safety and continued operation of the head. Also when raising the head, make sure not to go past the column cap.



3.3 Locking the quill

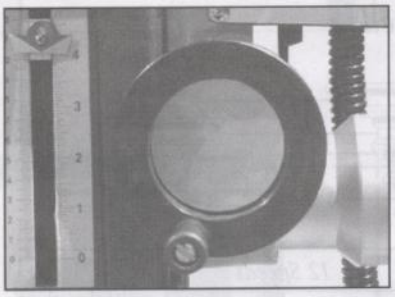
The machine head is equipped with a quill lock to lock the depth of the spindle. It is useful for setting the tool depth for milling and drilling. Simply rotate the quill lock handle *K* until tight. Rotate counter clockwise to release the quill. Leave the quill lock released when not need for an operation.

3.4 Lowering the spindle

Lowering the spindle lowers the drilling or cutting tool. There are two methods for lowering the cutting tool. One method is to use the down-feed lever arms. The lever handles are for gross and quick movements. The second method uses the micro-feed hand wheel. The micro-feed hand wheel is for fine and slow movements.

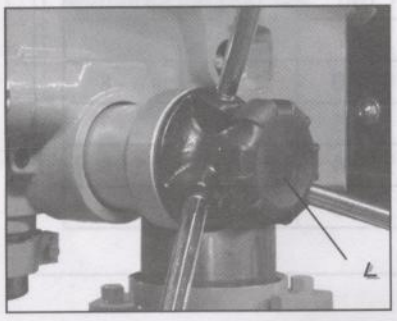
3.5 Using the lever arms

Grasp the lever handle knob and pull down. Remember not release the levers unless quill is locked or the spindle has reached the top position. Use the lever handles to control the ascent when raising the spindle.



3.6 Using the micro-feed hand wheel

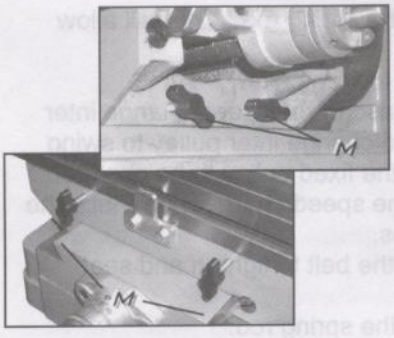
Simply grasp the handle on the hand wheel and turn. Turn the hand wheel clockwise for down and counter clockwise for up. Use the micro-feed hand wheel to make precise movement. Depth measurements can be monitored precisely by observing the micro-adjusting indicator behind of the hand wheel.
1 revolution = 2.5mm or 1inch.



3.7 Transfer of down feed control

The lever arms and micro-feed hand wheel both lower the spindle, but at different rates. To use the micro-feed hand wheel, down-feed control must be transferred. Transfer the down-feed control as follows.

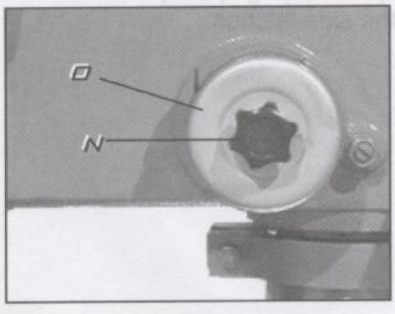
1. Check that machine is not running.
2. Lock the down-feed levers. Tighten the lobe knob *L*.
3. Use the micro-feed hand wheel as normal.
4. Return down-feed control to the lever arms by loosening the lobe knob.



3.8 The cross table locks

The cross table locks are T-handle *M*. There are four T-handles *M* on the cross-table. They can lock both horizontal axes of the cross table. Use these cross-table locks to provide better precision by preventing the work piece from moving. Turn clockwise to lock and counter-clockwise to unlock. Suggested uses are as follows.

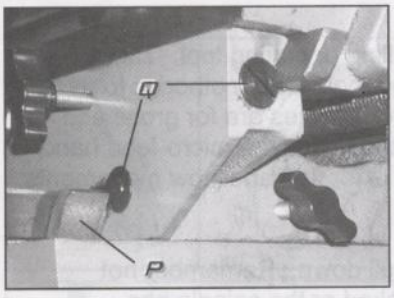
- Lock both tables when drilling.
- Lock the table of the non-milling axis when milling.



3.9 The spindle-return spring

The spindle-return spring is the retraction mechanism for the spindle. The spindle cap has slots along the side. Over time, the spindle return may be slow or lethargic. Adjust the spindle return mechanism so that he spindle retracts properly.

1. Loosen the star knob *N* by turning it counter-clockwise.
2. Rotate the spring casing *O* one slot to re-tension the spring.
3. Tighten the star knob *N* by turning it clockwise.
4. The spindle return spring adjustment is complete.

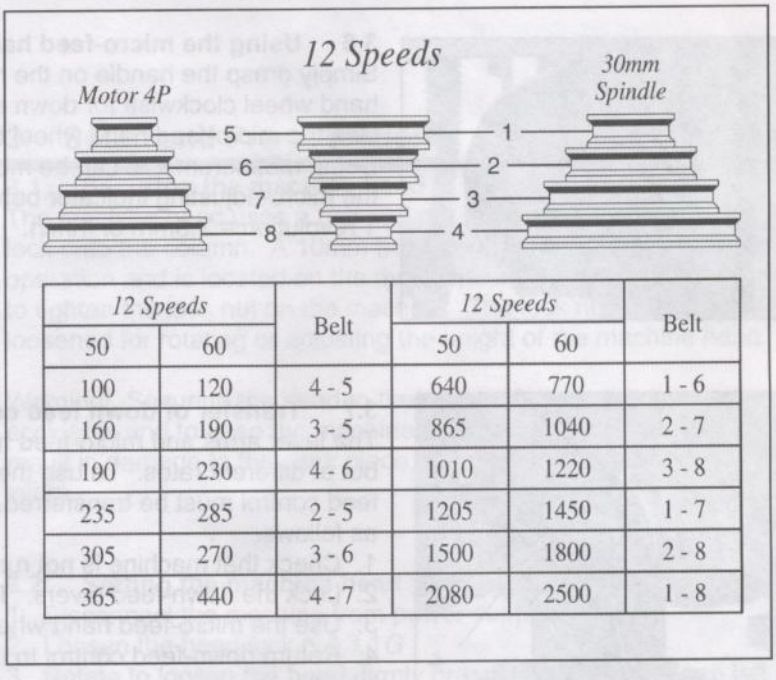


3.10 Adjusting the table slack

The machine is equipped with Gib strip *P* adjustment to compensate for wear and excess slack on cross-table. Adjust the gib strip by turning the gib strip screw *Q* with a large screwdriver for excess slack. If the gib strip *P* is to tight, loosen the gib strip screw *Q* by turning it counter-clockwise.

-The table should feel a slight drag when moving the table.

3.11 Speed changing and adjust belt

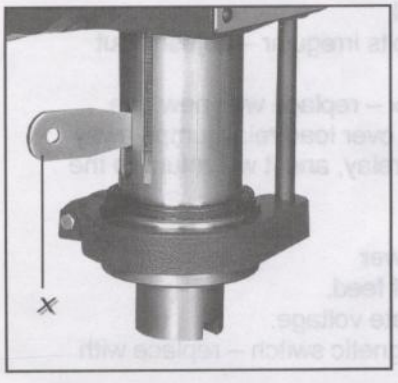


12 Speeds		Belt	*12 Speeds*		Belt
50	60		50	60	
100	120	4 - 5	640	770	1 - 6
160	190	3 - 5	865	1040	2 - 7
190	230	4 - 6	1010	1220	3 - 8
235	285	2 - 5	1205	1450	1 - 7
305	270	3 - 6	1500	1800	2 - 8
365	440	4 - 7	2080	2500	1 - 8

1. Make sure power is off.
2.. Open belt cover by releasing side latches.
3. Loosen T-handle *R* to release the spring rod. This will allow the motor to swing.
4. Push motor toward the head to loosen belts.
5. Loosen the two screws at the base of the speed change inter pulley. This will allow the speed change inter pulley to swing and will allow the belt used on the fixed pulley to be changed.
6. Select the suitable RPM from the speed chart. Then Place the belts on the desired pulley steps.
7. Swing the motor away to allow the belt to tighten and seat properly.
8. Tighten the T-handle *R* to lock the spring rod.
9. Tighten the two screws for the speed change pulley.
10. Close the belt cover and lock the side latches.

3.12 Setting the depth stop

1. Use the down feed handle to lower the bit to the surface of the work piece.
2. Lock the quill, turn the quill lock handle clockwise.
3. Set the desired depth by rotating the thumbscrew *W* below the depth scale.
4. Unlock and return the quill, turn the quill lock handle counter-clockwise and push in.



3.13 Tool changing

They are two types of chuck arbors and their removal is slightly different.

Non-Treaded Type

1. Disconnect the machine from the power supply.
2. Place a wooden board on the cross table to protect its surface.
3. Lower the spindle about 100mm and lock by using the quill lock 3.3K or the lobe knob 3.7L of the down feed levers.
4. Place the drift key *X* into the key slot of the quill.
5. Use a hammer to tap the drift key *X* into the key slot.
6. Tap until the chuck arbor falls.

Treaded Type

1. Disconnect the machine from the power supply.
2. Place a wooden board on the cross table to protect its surface.
3. Open the pulley cover.
4. Raise the arbor bolt just above the top of the spindle shaft. Use a hex wrench and rotate the arbor bolt.
5. Tap the top of the arbor bolt than taper has been loose, holding chuck arbor and turn detach the arbor bolt.

4 The operation cycle

4.1 Machine operation

1. Check that the head is secure.
2. Secure the work piece to the table by using a vise or table blocks.
3. Use the table hand wheels to position the work piece.
4. Lock the table using lock levers
5. Adjust the table stops.
6. Set the speed by adjusting the pulley belt.
7. Some models have 4P/8P power transmission. Set the Hi/Low switch to Hi or Low 1.1*S*. Return to off position when not in use.
8. Select the cutting mode, drilling/milling or tapping.

4.2 For drilling operation

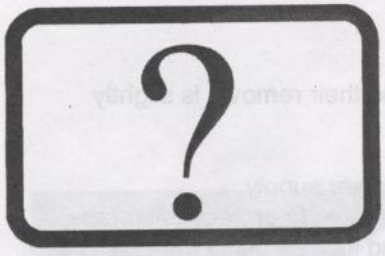
9. Zero the depth stop and set to the required depth.
10. Start the machine. Press the start button 1.1*A*.
11. Begin drilling, use the down feed levers to lower the drill bit.

4.3 For tapping operation

9. Zero the depth stop and set to the required depth.
10. Start the machine. Press the start button 1.1*A*.
11. Begin tapping, use the down feed levers to lower the tapping bit.

4.4 For milling operation

9. Zero the depth stop and set to the required depth.
10. Adjust the table stops to the work piece size.
11. Start the machine. Press the start button 1.1*A*.
12. Use the down feed levers to bring the milling bit just above the work piece.
13. Transfer the down feed control to the micro-feed hand wheel, use the lobe knob 3.7*L*.
14. Begin milling: use the micro-feed hand wheel to lower the milling bit, use the quill lock handle 3.3*K*, and use the table hand wheels to move the workpiece.



5 Trouble shooting

5.1 No running after switch ON

1. Main switch interruption while volts irregular – adjust input voltage.
2. Break down of fuse in switch box – replace with new one.
3. In case of too much current, the over load relay jumps away automatically – press the overload relay, and it will return to the correct position.

5.2 Motor overheat and No power

1. Overload – Decrease the load of feed.
2. Lower voltage – adjust to accurate voltage.
3. Spoiled contact paint on the magnetic switch – replace with new one.
4. Breakdown of overload relay – Connect it or replace with new one.
5. Motor is poor – replace with new one.
6. Break down of fuse or poor contact with wire (it is easy to damage the motor while there is a short circuit) – Switch off power source at once and replace fuse with new one.
7. The tension of pulley V-belt to tight – adjust for proper tension of V-belt.

5.3 The temperature of spindle bearing is too hot

1. Grease is insufficient – Fill the grease.
2. The spindle bearing is fixed too tight – turning with no speed and feel the tightness with hand.
3. Turning at high speeds for a long time – cut with less pressure.

5.4 Lack of power with main spindle revolving

1. The tension of V-belt too loose-Adjust for proper tension of V-belt.
2. Motor has burned out – replace with new one.

5.5 Table travel has not balanced

1. The gap of spindle taper too wide – adjust bolts properly.
2. Loosening of wing nuts *M* – turn and fasten in place.
3. Feed too deep – decrease depth of feed.

5.6 Micro-feed does not work smoothly

Loosening of clutch – Be sure to tighten it

6 Maintenance

That's easer to keep machine in good condition or best performance by means of maintaining it at any time that remedy it after it is out of order.

6.1 Daily Maintenance (by operator)

a. fill the lubricant before starting machine everyday.
b. If the temperature of spindle caused overheating or strange noise, stop machine immediately to check it for keeping accurate performance.
c. Keep working area clean: release vise, cutter, workpiece from table; switch off paper source; take chip or dust away from machine and follow instructions lubrication or coating rust-proof oil before leaving.

6.2 Weekly Maintenance

a. Clean and coat the cross leading screw with oil.
b. Check to see if sliding surface and tuning parts lack of lubricant. If the lubricate is insufficient, fill it.

6.3 Monthly Maintenance

a. Adjust the accurate gap of slide both on cross and longitudinal feed.
b. Lubricate bearing, worm, and worm shaft to avoid wear.

6.4 Yearly Maintenance

a. Level the table to maintain the accuracy.
b. Check electric cord, plugs, switches at least once a year to avoid loosening or wearing.

7 Parts Lists and Technical Drawings

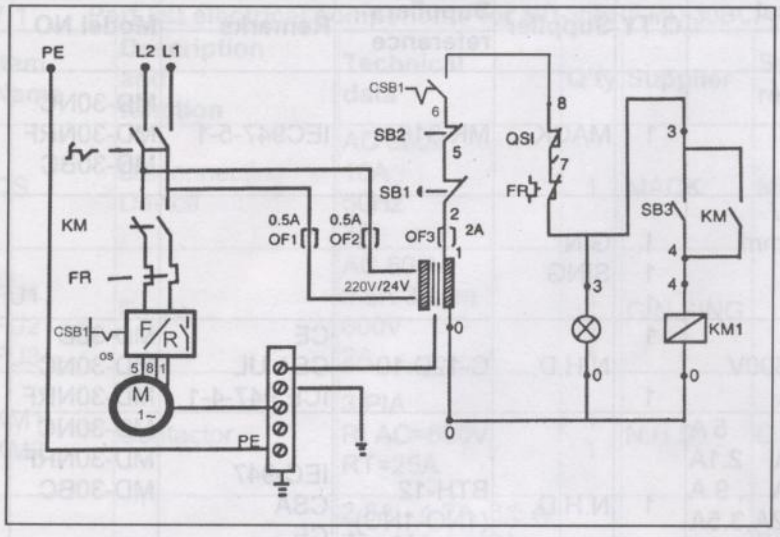
7.1 Part list electrical components for MD-30BRF,MD-30BCP, MD-30BCT, MD-30BGC,MD-30BT

Item Name	Description and function	Technical data	Q'ty	Supplier	Suppliers reference	Remarks	Model NO
QS	Disconnecting Device	AC 600V 16A 50Hz 3P	1	MACK	MK-316	IEC947-5-1	
FU1 FU2 FU3	Fuses	AC 600V 0.5A 30mm 600V 2A	1 1 1	GIN SING			
KM1 KM2	Contactor	3 PIA RI AC=600V RT=25A	1 1	N.H.D.	C-12D 10	CE CSA UL ICE 947-4-1	
FR	Over relay	2.8A - 4.2A, 3.5 A 7A~11A, 9A UI=660V Ith * 10A	1	N.H.D.	BTH-12 (1NO-1NC)	IEC-947 CSA CE	
KR	Relay	Spule AC 24V AC 240V, 5A DC 30V, 5A	1 1	BETA	MY-2	UL	MD-30BGC MD-30BCT
TC	Transformer	AC 400V 24V 50VA	1	San LI	2930N 29230	CE IEC-61558- 1/-2-4	
CSB1	High/Low electronic phase change switch	AC 600V 3PH 16A	1	A.P.	C172- 60X60-2		MD-30BGC MD-30BCP
SB3,SB5 SB1,SB2	Push buttons Emergency Stop	600V 1NO + 1NC 1NO + 1NC	1 1	MACK	MACK MK-B/22 MK-AE22	IP-2	MD-30BCP MD-30BRF MD-30BGC MD-30BCT
SB2	Push buttons	1NO + 1NC	1	MACK	MK-B/12	IP-2	MD-30BCP MD-30BRF
SB4	Push buttons	1NO	1	MACK	MK-B/22	IP-2	MD-30BCP MD-30BRF
SB3	Push buttons	1NO	1	MACK	MK-B/10	IP-2	MD-30BGC MD-30BCT
SB4	Drilling/Tapping	AC250V 10A 600V 2NO	1	GIKOKA	OSS-22-03	IP-2	MD-30BGC MD-30BCT
QS1	Safety door switch	AC-15 3A / 240V	1	HIGHLY	EK-25	CE EN60947-5-1 EN50047 IP65	
QS2 QS3	Micro-switch	AC 125V, 12A 250V, 6A	1 1	ZIPPY	VMVO6S 0600	UL VDE CSA	MD-30BGC MD-30BCT
PL	Pilot light	AC24V 1W	1	GIKOKA	PL1301		
TB	Terminal block	AC 600V Max. 10A		SHINING	TA-010	IP-2	
M	Motor	230,240,380,400, 415V / 3PH /1PH KW 1.5 4P/8P	1	JUI CHUN		ICE 34-1	

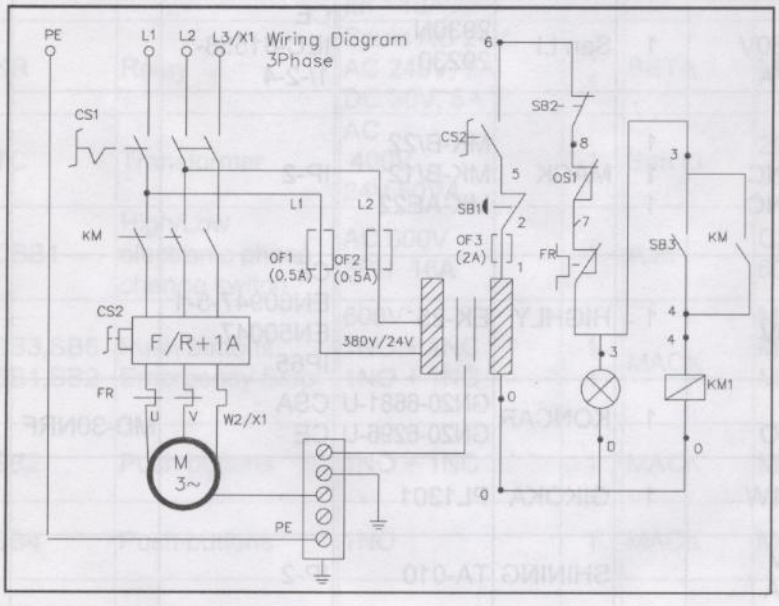
7.2 Part list electrical components for MD-30BC,MD-30NC,MD-30NRF

Item designation	Description and function	Technical data	Q'TY	Supplier	Suppliers reference	Remarks	Model NO
QS	Disconnecting Device	AC 600V 16A 50Hz 3P	1	MACK	MK-316	IEC947-5-1	MD-30NC MD-30NRF MD-30BC
FU1 FU2 FU3	Fuses	AC 600V 0.5A 30mm 600V 2A	1 1 1	GIN SING			
KM1 KM2	Contactor	3 PIA RI AC=600V RT=25A	1 1	N.H.D.	C-12D 10	CE CSA UL ICE 947-4-1	MD-30B MD-30NC MD-30NRF
FR	Over relay	4 - 6 A , 5 A 1.8-2.4A, 2.1A 7 - 1 1 A , 9 A 2.8A-4.2A,3.5A UI=660V Ith 10A	1	N.H.D.	BTH-12 (1NO-1NC)	IEC-947 CSA CE	MD-30NC MD-30NRF MD-30BC
TC	Transformer	AC 400V, 230V 24V 50VA	1	San LI	2930N 29230	CE IEC-61558- 1/-2-4	
SB3 SB2 SB1	Push buttons Push buttons Emergency Stop	600V 1NO 1NO +1NC 1NO +1NC	1 1 1	MACK	MK-B/22 MK-B/12 MK-AE22	IP-2	
QS1	Safety door switch	AC-15 3A / 240V	1	HIGHLY	EK-25	CE EN60947-5-1 EN50047 IP65	
CSB1	Forward & Reverse switch	600V 20A+1NO	1	KONCAR	GN20-6681-U GN20-6296-U	CSA CE	MD-30NRF
PL	Pilot light	AC24V 1W	1	GIKOKA	PL1301		
TB	Terminal block	AC 600V Max. 10A		SHINING	TA-010	IP-2	
M	Motor	230,240,380, 400,415,440V 1PH , 3PH KW 0.75 KW 1 230,240,380, 400,415,440V 3PH ,1PH KW 1.5	1	JUI CHUN		ICE 34-1	

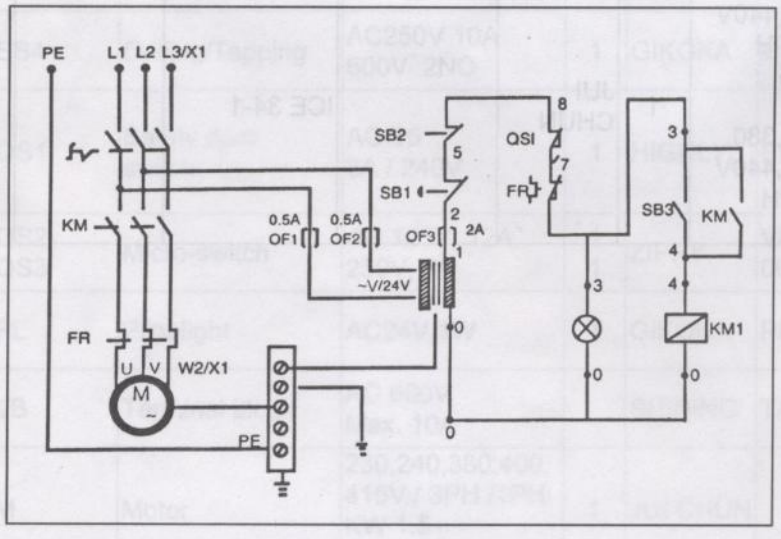
7.3 Diagram Wiring



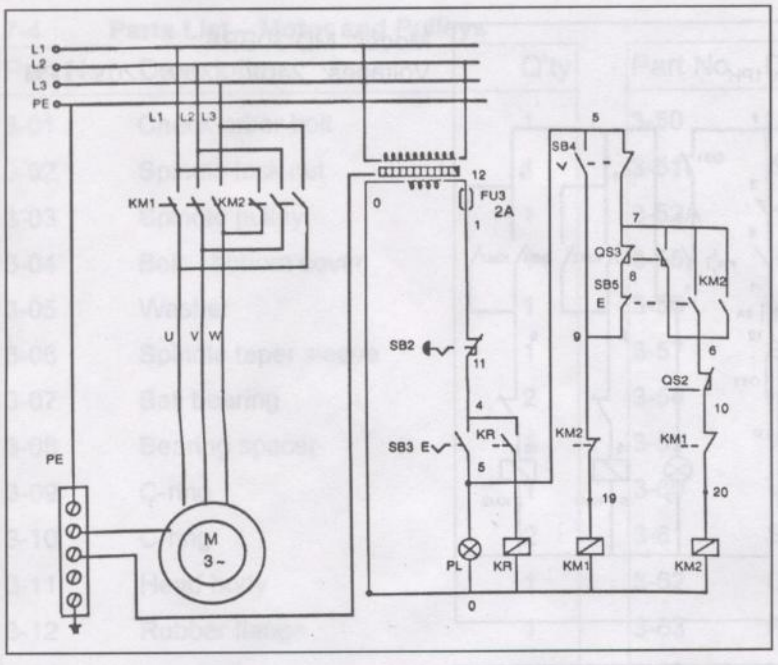
Model: MD-30NRF
Voltage: 240V, 230V, 220V 1PH



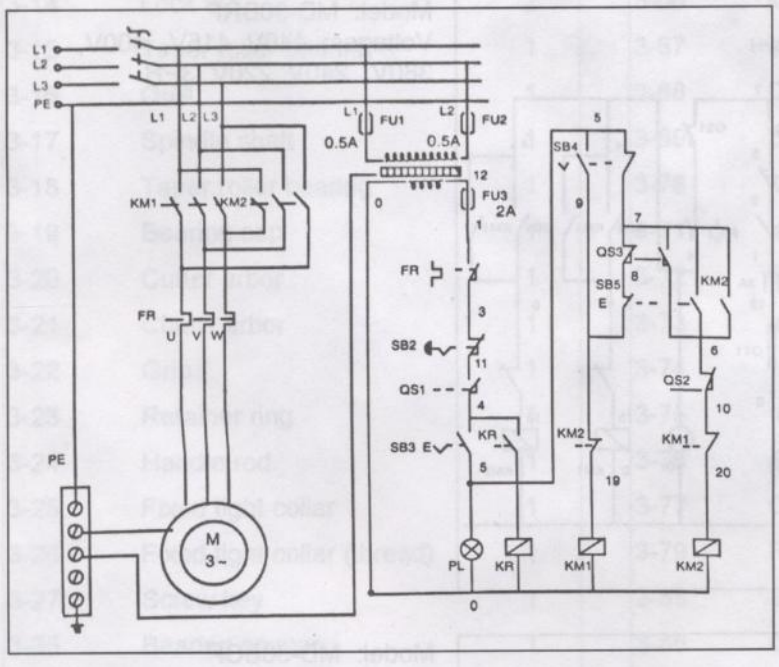
Model: MD-30NRF
Voltages: 440V, 415V, 400V, 380V, 240V, 220V 3PH



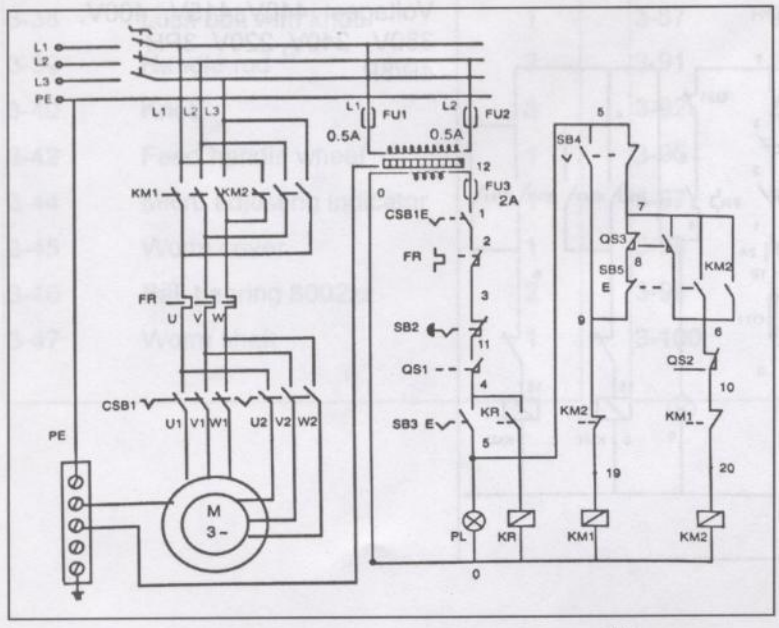
Models: MD-30BC, MD-30NC
Voltages: 440V, 415V, 400V, 380V, 240V, 230V, 220V 1PH,3PH



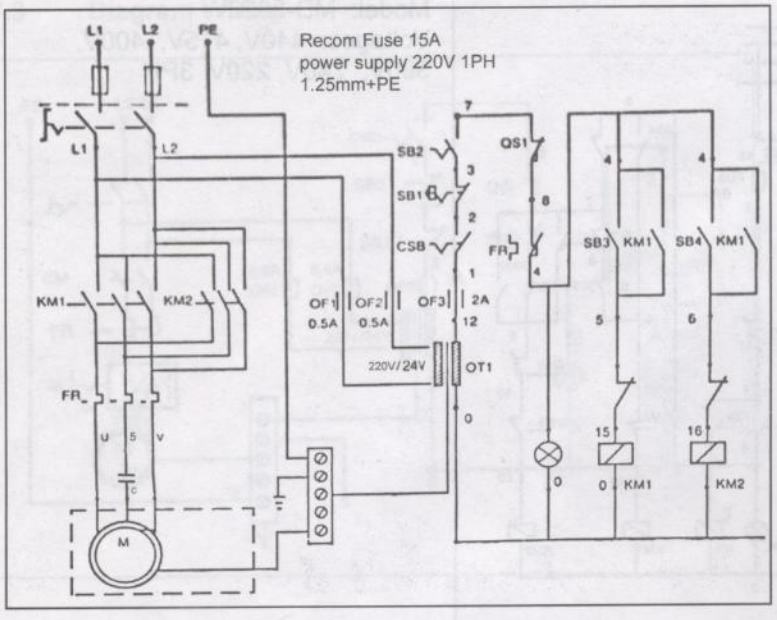
Model: MD-30BT
Voltages: 440V, 415V, 400V,
380V, 240V, 220V 3PH



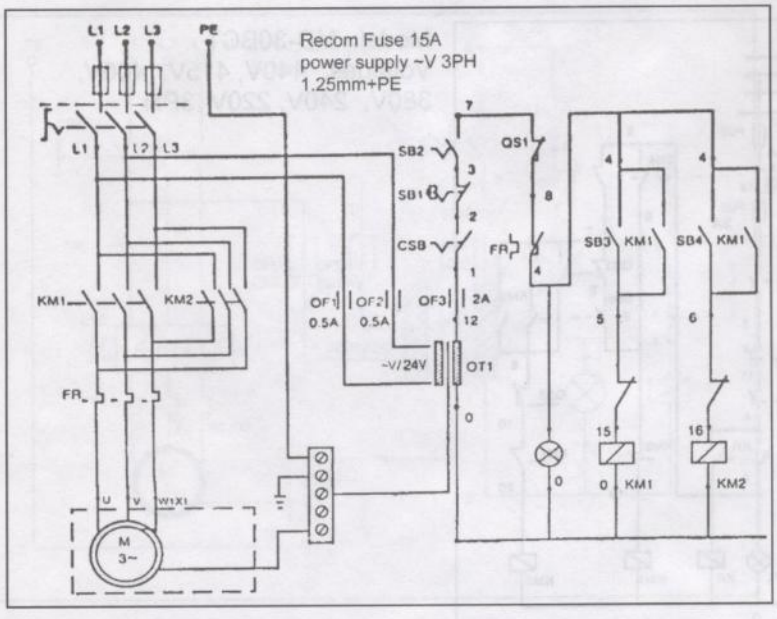
Model: MD-30BCT
Voltages: 440V, 415V, 400V,
380V, 240V, 220V 3PH



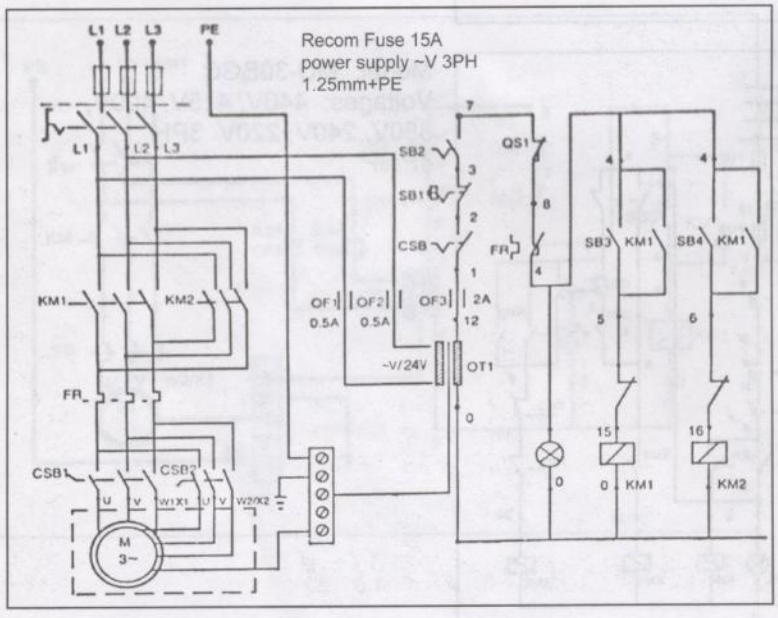
Model: MD-30BGC
Voltages: 440V, 415V, 400V,
380V, 240V, 220V 3PH
4P/8P



Model: MD-30BRF
Voltages: 240V, 230V, 220V 1PH



Model: MD-30BRF
Voltages: 440V, 415V, 400V,
380V, 240V, 220V 3PH



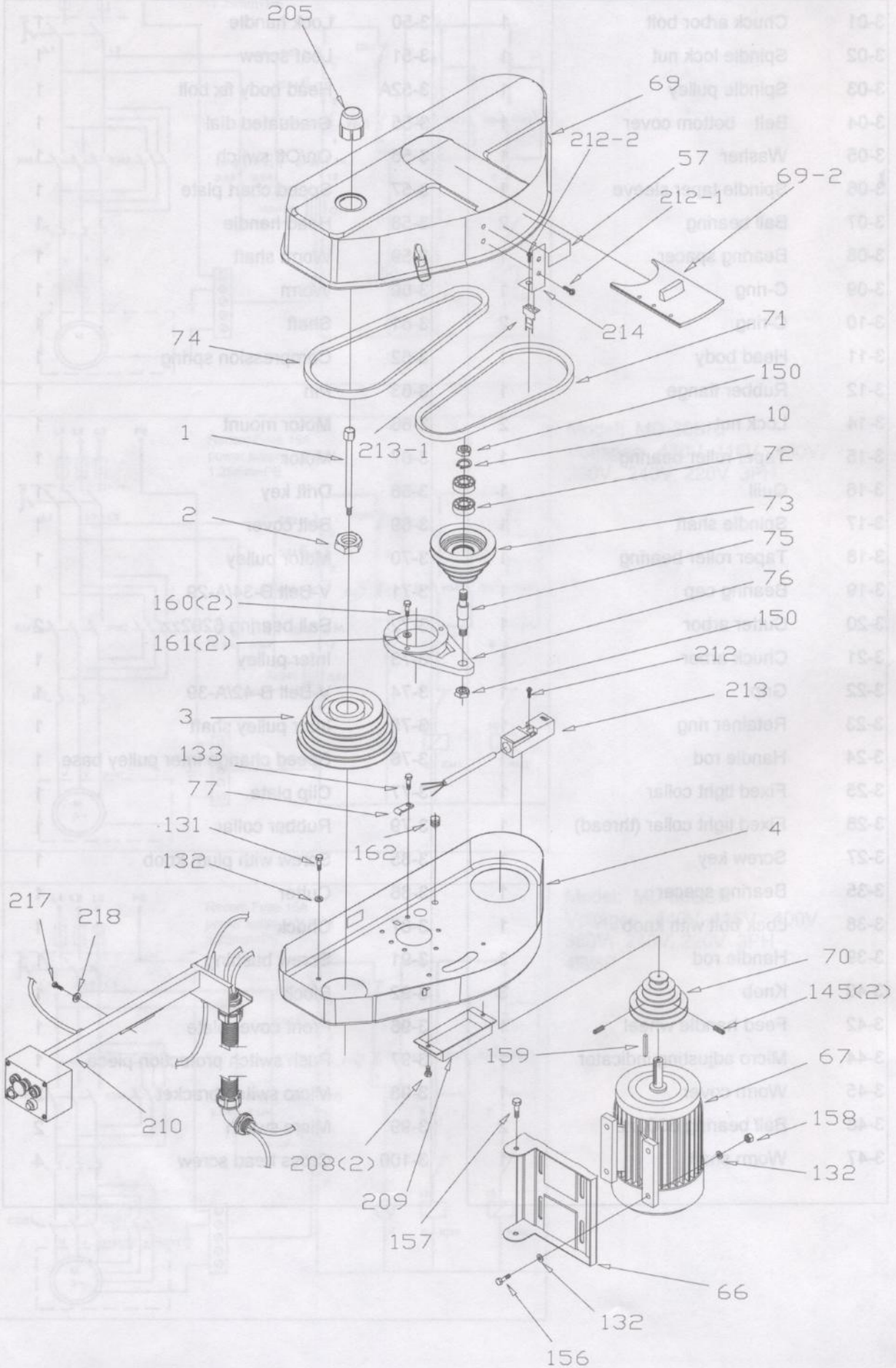
Model: MD-30BCP
Voltages: 440V, 415V, 400V,
380V, 240V, 220V 3PH
4P/8P

7-4 Parts List – Motor and Pulleys

Part No.	Description	Q'ty
3-01	Chuck arbor bolt	1
3-02	Spindle lock nut	1
3-03	Spindle pulley	1
3-04	Belt bottom cover	1
3-05	Washer	1
3-06	Spindle taper sleeve	1
3-07	Ball bearing	2
3-08	Bearing spacer	1
3-09	C-ring	1
3-10	C-ring	2
3-11	Head body	1
3-12	Rubber flange	1
3-14	Lock nut	2
3-15	Taper roller bearing	1
3-16	Quill	1
3-17	Spindle shaft	1
3-18	Taper roller bearing	1
3-19	Bearing cap	1
3-20	Cutter arbor	1
3-21	Chuck arbor	1
3-22	Grip	1
3-23	Retainer ring	1
3-24	Handle rod	1
3-25	Fixed tight collar	1
3-26	Fixed tight collar (thread)	1
3-27	Screw key	1
3-35	Bearing spacer	1
3-38	Lock bolt with knob	1
3-39	Handle rod	3
3-40	Knob	3
3-42	Feed handle wheel	1
3-44	Micro adjusting indicator	1
3-45	Worm cover	1
3-46	Ball bearing 6002zz	2
3-47	Worm shaft	1

Part No.	Description	Q'ty
3-50	Lock handle	1
3-51	Leaf screw	1
3-52A	Head body fix bolt	1
3-55	Graduated dial	1
3-56	On/Off switch	1
3-57	Speed chart plate	1
3-58	Head handle	1
3-59	Worm shaft	1
3-60	Worm	1
3-61	Shaft	1
3-62	Compression spring	1
3-63	Pin	1
3-66	Motor mount	1
3-67	Motor	1
3-68	Drift key	1
3-69	Belt cover	1
3-70	Motor pulley	1
3-71	V-Belt B-34/A-29	1
3-72	Ball bearing 6202zz	2
3-73	Inter pulley	1
3-74	V-Belt B-42/A-39	1
3-75	Inter pulley shaft	1
3-76	Speed change inter pulley base	1
3-77	Clip plate	1
3-79	Rubber collar	1
3-85	Screw with plum knob	1
3-86	Cutter	1
3-87	Chuck	1
3-91	Screw bushing	1
3-92	Block	1
3-96	Front cover plate	1
3-97	Push switch protection piece	1
3-98	Micro switch bracket	2
3-99	Micro switch	2
3-100	Cross head screw	4

7.5 Explosion Drawing – Motor and Pulleys

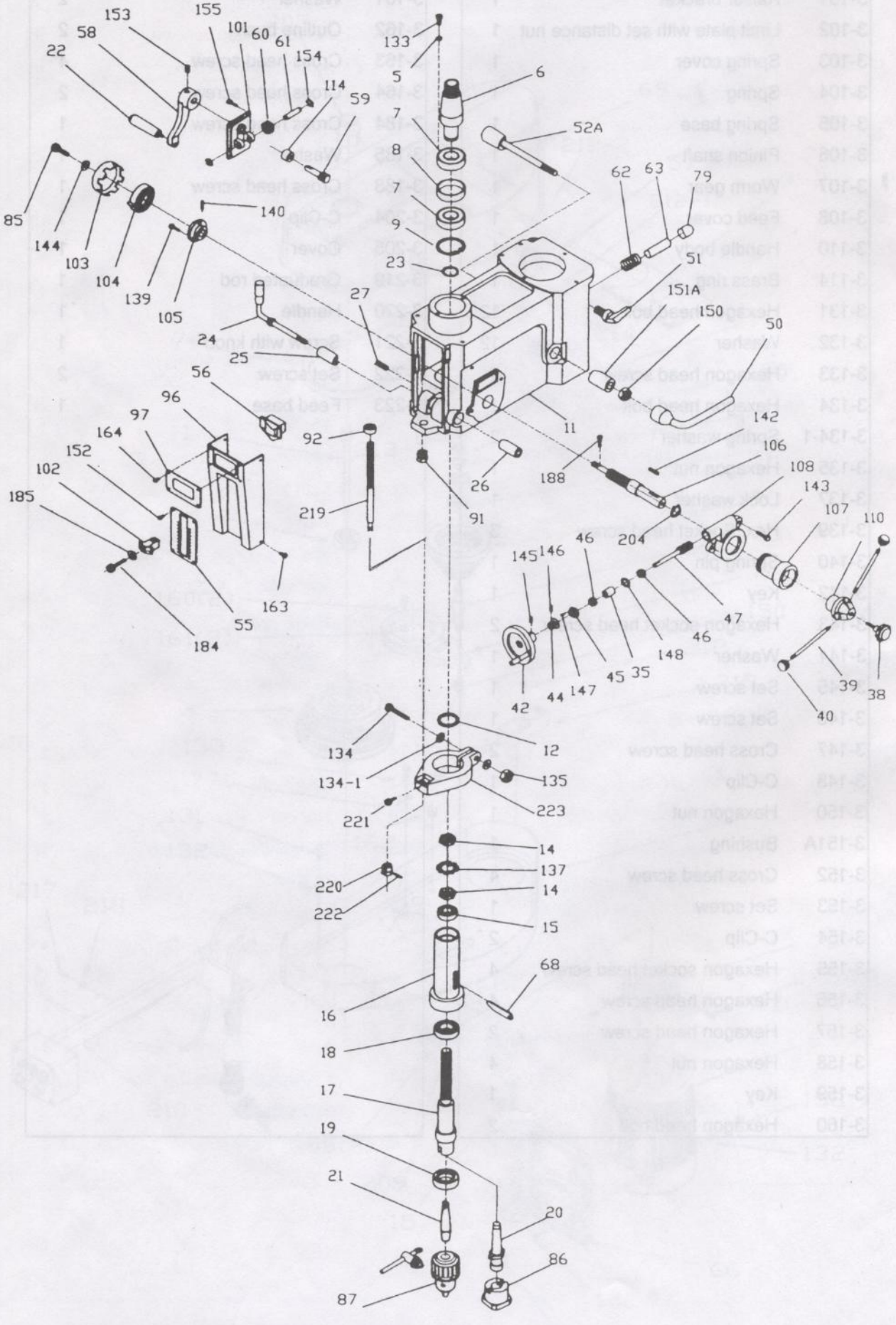


7-6 Part list - Machine head

Part No.	Description	Q'ty
3-101	Raiser bracket	1
3-102	Limit plate with set distance nut	1
3-103	Spring cover	1
3-104	Spring	1
3-105	Spring base	1
3-106	Pinion shaft	1
3-107	Worm gear	1
3-108	Feed cover	1
3-110	Handle body	1
3-114	Brass ring	1
3-131	Hexagon head bolt	12
3-132	Washer	12
3-133	Hexagon head screw	4
3-134	Hexagon head bolt	1
3-134-1	Spring washer	2
3-135	Hexagon nut	1
3-137	Lock washer	1
3-139	Hex. Socket head screw	3
3-140	Spring pin	1
3-142	Key	1
3-143	Hexagon socket head screw	2
3-144	Washer	1
3-145	Set screw	1
3-146	Set screw	1
3-147	Cross head screw	2
3-148	C-Clip	1
3-150	Hexagon nut	1
3-151A	Bushing	1
3-152	Cross head screw	4
3-153	Set screw	1
3-154	C-Clip	2
3-155	Hexagon socket head screw	4
3-156	Hexagon head screw	4
3-157	Hexagon head screw	2
3-158	Hexagon nut	4
3-159	Key	1
3-160	Hexagon head bolt	2

Part No.	Description	Q'ty
3-161	Washer	2
3-162	Outline bush	2
3-163	Cross head screw	4
3-164	Cross head screw	2
3-184	Cross head screw	1
3-185	Washer	1
3-188	Cross head screw	1
3-204	C-Clip	1
3-205	Cover	1
3-219	Graduated rod	1
3-220	Handle	1
3-221	Screw with knob	1
3-222	Set screw	2
3-223	Feed base	1

7.7 Explosion Drawing - Machine Head



7-8 Part List Table and Base

Part No.	Description	Q'ty
4-01	Table handle wheel	3
4-02	Dial clutch	2
4-03	Bearing 51103	4
4-04	Square flange	1
4-05	Leading screw (short)	1
4-06	Base	1
4-07	Gib strip (short)	1
4-08	Column	1
4-09	Column base	1
4-10	Rack	1
4-11	Column cover	1
4-12	Gib strip bolt	2
4-13-1	Lock handle	1
4-13-2	Leaf screw	2
4-14	Movable fixed block	1
4-15	Table base nut	1
4-16-1	Middle base	1
4-17	Holder plate	1
4-18	Anti-dust plate	1
4-19	Holder plate	1
4-20	Table clutch	1
4-22	Left flange	1
4-23	Table nut	1
4-24	Leading screw(long)	1
4-26	Right flange	1
4-27	Gib strip (long)	1
4-28	Table	1
4-29	Fixed block	2
4-30	Movable fixed ring	2
4-31	Block	1
4-121	Plate	2
4-131	Hexagon head bolt	4
4-145	Set screw	1
4-166	Spring pin	2
4-167	Scale ring	2
4-167-1	Set knob	2
4-168	Oil ball	3
4-169	Hexagon head bolt	4

Part No.	Description	Q'ty
4-170	Plastic washer	4
4-171	Hex. socket cap screw	8
4-172	Hexagon head screw	4
4-173	Spring washer	4
4-176	Hex. socket cap screw	2
4-181	Washer	4
4-189	Set screw	3
4-198	Connector	1
4-199	Clamping	1
4-200	Tube	1
4-201	Holder ring	1
4-202	Screw	1
4-203	Cover	1
4-210	Cover plate	1
4-211	Screw	4
4-212	Screw	2

7.9 Explosion Drawing - Table and Base