Supertec

Operation Manual
Precision Surface Grinding Machine

DW-618M

MODEL: **DW-618M**

SERIAL NO.: **EPM17021**

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SAFETY PRECAUTIONS

General Safety Precaution

a. Before being engaged in operating this machine. Please read and understand all the instruction manuals. And follow all the warning signs labeled on the machine. Don't to disfigure the placard arbitrarily

b. During operation, please do not expose any part of your body near you the moving Range of the machine. Otherwise, don't expose too long time.

c. Never touch workpiece, grinding wheel or spindle unless the stops completely.

d. Before operation, make sure all the guards, switch and other safety devices are in place and functioning.

e. Before starting the machine, make sure that workpiecese and grinding wheel have been securely held to avoid accidents.

f. Operators should wear safety glasses, safety shoes, and hearing protection and remove Rings, watches, jewelry and loose fitting clothing for their own protection while operating the machine.

g. Service or installation of the machine must be performed by qualified or well experienced technicians.

h. Never touch switches or buttons with wet hands.

i. The operator must take the training course of standard operation or activity until he can operate this machine safety.

j. If have to adjust or renew the belt, the first thing is to turn the power off.

- Machine Tool Safety Precautions

a. Check all the pressure gauges before operating.

b. Cut off thee power immediately if there is electricity power breakdown.

c. The electrical door should be kept closed during operating.

d. If the safety guards are removed and have not been not been restored properly, the operator should not try to operate the machine.

e. Before operation, make sure all the switches on the control panel are in place.

f. Make sure that workpieces are properly held on the table, and check the holding Power of chuck.

g. Never perform the machine beyond its maximum allowable rotation speed.

h. Before preceding the daily operation, the machine should be warmed up for a couple of minutes.

i. Never try to remove chips while the machine is still in its machining cycle.

j. There must be no obstacles to obstruct the operator in the working area.

k. While operating the machine. The operator should keep his hair or other curly shaped objects away form the moving parts of the machine.

l. Make sure the covers of the guards are closed properly before operating.

m. Never try to touch any of switches unintentionally while the machine running under AUTO mode.

1. GENERAL DESCRIPTION

Construction (refer to the outline dimensions)

This machine is a small-sized horizontal precision surface-grinding machine with a square-shaped table. This machine has a simple construction, each part of which has an enough rigidity to meet high requirements. By the use of this machine it is possible to perform precision grinding effectively with a stabilized accuracy through a light and simple operation.

The construction of the machine

	Column	Vertical feed hand-wheel
	Wheel head	Wheel guard
	Wheel spindle	Mother, wheel flange
Machine body	Worktable	Guard, dogs
	Saddle	Longitudinal feed hand-wheel, Cross feed hand-wheel
	Frame	Push button switch, saddle clamping device
Dust suction system		Optional accessory

SPECIFICATIONS

MODEL DESCRIPTION	614	618	818
CAPACITY			
Table size	150x355mm(6x14")	150x460mm(6x18")	205x460mm(8x18")
Max. grinding length	375mm(14-3/4")	475mm(18-3/4")	470mm(18-3/4")
Max. grinding width	160mm(6-1/3")	160mm(6-3/4")	210mm (8-3/4")
Max. distance from table surface to spindle center	400mm(15-3/4")	400mm(15-3/4")	400mm(15-3/4")
Standard mag chuck size	150x355mm(6x14")	150x460mm(6x18")	205x460mm(8x18")
LONGITUDINAL MOVEMENT			
Manual travel	380mm (15")	485mm (19")	485mm (19")
CROSS MOVEMENT			
Manual travel	180mm(7")	180mm(7")	210mm(8-1/4")
Hand feed per graduation	0.02mm (0.0005")	0.02mm (0.0005")	0.02mm (0.0005")
Hand feed per revolution	5mm (1/5")	5mm (1/5")	5mm (1/5")
VERTICAL DOWNFEED			
Hand feed per graduation	0.005mm(0.0002")	0.005mm(0.0002")	0.005mm(0.0002")
Hand feed per revolution	1mm(0.05")	1mm(0.05")	1mm(0.05")
GRINDING WHEEL			
Wheel size (DxWxBore)	180x13x31.75mm	180x13x31.75mm	180x13x31.75mm
Spindle speed (60HZ/50HZ)	3600/300rpm	3600/300rpm	3600/300rpm
MOTORS			
Spindle drive motor	1.5HP	1.5HP	1.5HP
NET WELGHT(approx.)	560kgs (1232lbs)	720kgs (1584lbs)	820kgs (1800lbs)
GROSS WELGHT(approx.)	690kgs (1518lbs)	850kgs (1870lbs)	950kgs (2090lbs)
PACKING SIZE(L×W×H)	1300x1150x1980mm	1300x11501980mm	1300x1150x1980mm

NOTE: The contents of this brochure are for reference only and are subject to change without notice

Standard Accessories

1. Grinding Wheel	1
2. Wheel Flange	1
3. Balancing Arbor	1
4. Diamond Dresser	1
5. Tool Box with Tools	1
6. Dust Guard	1
7. Leveling Screw & Nuts	5
8. Touch-up Paint	1
9. Working lamp	1
11. Hook	4
10. Operation Manual	1

Details of tools

NO	NAME	614 / 618 / 818	
1	Pin face box wrench	22mm, 46mm	1 for each
2	Hexagon-headed spanner	3, 4, 5, 6, 8,	1 for each
3	Adjustable wrench	200	1
4	Cross screw driver	NO:1	1

Optional Accessories

* Permanent Magnetic Chuck
* Spare Wheel Flange
* Dust Suction system
* Coolant with Splash Guard
* Coolant & Dust Units
* Manual Overhead Dresser
* Precision Vise
* Angle Dressing Device
* Radius Dressing Device
* Halogen Lamp

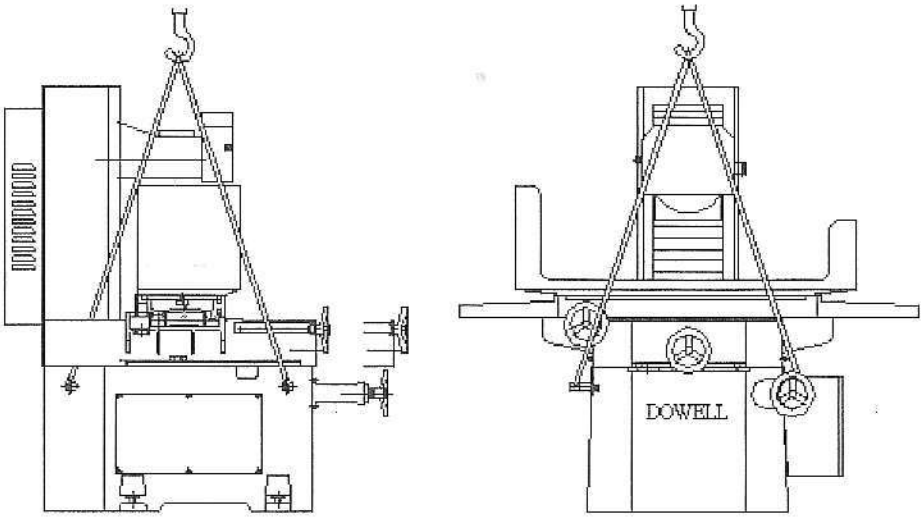
2. MOUNTING

Transporting

(1) When transporting the machine, the dust suction system is to be separated from the machine body. Care should be taken; so that any shock will not be given to the machine is the transportation.

(2) Lifting of the machine body should be made by passing wire rope (more than ø10mm) through the metal fittings (eyebolts) on the side of the frame.

In this case insert quilted cloth or wastes between the machine and the rope. Care must be taken so that any scratches or damages will not be given to the machine. Weight of the machine body is approximately 550kgs for 614, 600kgs for 618.



Cleaning

Use light-oil immersed soft cloth, in order to remove rust preventive oil applied on the machine. Avoid a use of gasoline or thinner.

Mounting

(1) Mounting can be made on a floor in a usual machine shop (with concrete more than 150mm in thickness). However, avoid places where there is much vibration or the machine might be exposed directly to the sun.

Any special foundation work is not required except for a very poor ground condition. In case mounting must inevitably is made around a place where there are shapers or presses, which become the origin of vibration, vibration-proof foundation work must be done.

The surface-grinding machine is one of the machine tools, which have an aversion to vibration. Accuracy of the ground surface is impeded to a great degree by the transmission of vibration of vibration coming from outside.

(2) First, Put the four plates on a place to be mounted. Then, place the machine on them, so that each of the four leveling bolts of the machine will be placed in conformity with each of those plates.

Adjusting

Horizontal adjustment is made by use of the four bolts. Place the precision level (sensitivity-one graduation 0.02mm/m) on the surface of the table (or chuck). Make its adjustment within 0.04mm/m for both longitudinal and cross direction.

Power Sources Wiring:

(1) Electrical equipment (refer to the wiring diag.)

The electrical of the machine consists of the following items:

Electric motor for grinding wheel	1kg	2P
Electric motor for dust suction system	0.4kw	2P

Lubricating pump	0.015kw
Working pump	12V 20W

For 2 voltages compatible motor, make sure that the motor wiring match with the source voltage. (Refer to the wiring diag). The motor was already wired for high voltage for safety.

(2) Connection of source

Connect the source (through your source switch) to the source cord on the rear part of the frame.

Connect the working lamp to a 110V source through the plug socket.

Caution: Never connect the plug socket for the lubricating pump to the source before oiling.

(3) Checking the direction of revolution

Make an inching of the grinding wheel motor by pressing the push button switch and check to see the direction of its revolution. The legal direction of its revolution is clockwise, viewing the front of the machine.

In case the direction is reverse, replace two of the three cords with each other.

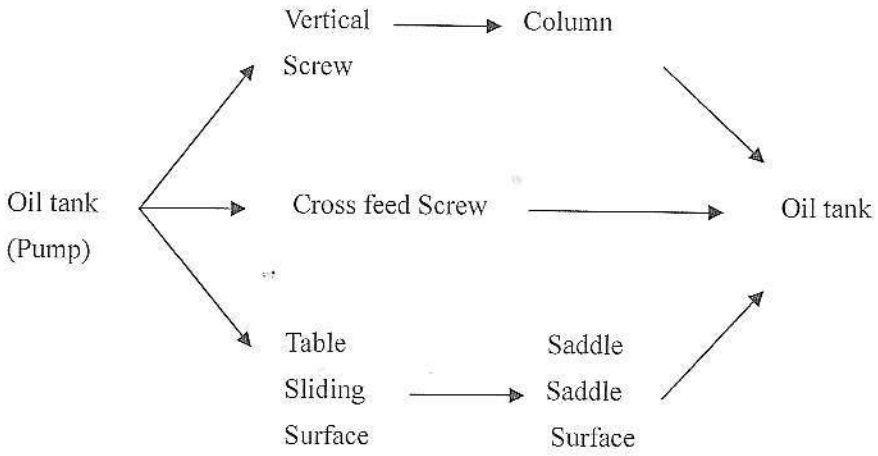
3. OILING AND LUBRICATION

Lubrication System

This machine adapts a fully automatic lubricating system.

Oiling can be made into the oil tank on the lower part of the column. When connecting the plug socket to the source, oiling to every part will be accomplished through the lubricating pump.

Oiling system



Lubricating oil

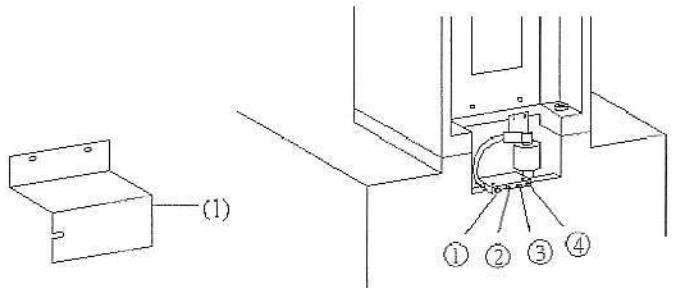
It is recommended that the equivalent oil can be used.

Service Point	Amount	Oil specification	Remarks
Way lubricate oil tank	2 Liters	Mobil Vacuoline oil 1405 or slide way Lubricant ISO 32	Replenish in three to six months

Procedure of oiling

First, remove the cover on the lower part of the column and make an oiling into the oil tank. The capacity of the tank is approx. 2 liters. Second, connect the plug socket to the socket to the source. In a little while, oil will come to the inspection window on the upper part of the front of the column.

Caution: The lubrication pump operates as soon as the source is put "ON" So never fail to cut " OFF "the source switch at the time of the completion of the operation.



(1) Oil control valve for column and vertical screw

(2) Oil control valve for cross screw

(3) Oil control valve for table and saddle

(4) Oil control valve for pressure adjustment

4. TEST RUNNING AND OPERATION

Check Items before Running

Make sure of the following points again:

(1) Legal running of the wheel spindle.

(2) Working of the oiling pump.

Hand – wheel Operation

Vertical feed hand-wheel	Revolve clockwise	Rising
	Revolve counter-clockwise	Descending
Cross feed hand-wheel	Revolve clockwise	Retreating
	Revolve counter-clockwise	Advancing
Longitudinal feed hand	Revolve clockwise	Rightward
	Revolve counter-clockwise	Leftward

Longitudinal movement of the table is made with the cable wound on the shaft of the hand-wheel. In case a hand-wheel condition is soft when operating hand-wheel (there are some slips), clamp the nut on the right lower part of the table to lock it.

Care should be taken is this case so that too strong a clamp will not be given to the nut.

Selection of Grinding wheel

(1) Make sure the following items before selecting grinding wheel:

- Workpiece (shape, dimension, grinding area, tolerance)
- Workpiece material (hardness)
- Machining tolerance (size tolerance, finish)
- Production capability (production quantity at a unit time)
- Grinding method (cylindrical or surface)
- Grinding machine (brand, precision)
- Size and shape of grinding wheel

- Revolution number and speed of grinding wheel
- Availability of coolant

(2) Recommended grinding wheel

WHEEL SIZE / MATERIAL		HORIZONTAL AXIS #1 、 #5 、 #7						VERICAL AXIS#2 、#6		
		D	T	H	D	T	H	D	T	H
		180	13,16,19	31.75 50.85	255	32	50.80 76.20	205 225	75 100	25 32
		205	13,16,19 ,25	31.75 50.85	305	32,38,50	73.20 127.00	305 355	125,150 125,150	32,38 32,38
		255	13,16,19 ,25	50.80 76.20	355	32,38,50	127.00	405 455	125,150 125,150	32,38 32,38
		305	13,16,19 ,25	76.20 127.00	405	32,38,50	127.00 203.20			
S..C, S..CK SF..,SNC..,SK.. SNCM..,SCM	STOCK	19A46K 8 V (WA46K8V)			19A46K8V (WA46K8V)			19A46K8V (WA46K8V)		
AS ABOVE HEAT TREATED	STOCK	1. WA46H8V 2. SA46 I 8V			1. WA46H8V 2. SA46 I 8V			1. WA46H8V 2. SA46 I 8V		
SKH2~9,5KS. SUJ..SKD..	STOCK	SA46H 8V			SA46H 8V			SA46H 8V		
SUS400 SUH1,3	STOCK LESS	SA46I 8 V			SA46I 8 V			SA46I 8 V		
FC..	STOCK	1. C46J 5 V 2. 19A46K 8 V			1. C46J 5 V 2. 19A46K 8 V			1. C46J 5 V 2. 19A46K 8 V		

Mounting and Dismounting of Grinding wheel

It is recommended to select a grinding wheel with abrasive grain, grain size, hardness (degree to be bound) and binding material suitable for the material, shape and accuracy of the work-piece. And make sure that there exist no cracks as a sound test (by lightly tapping the wheel with a wooded hammer).

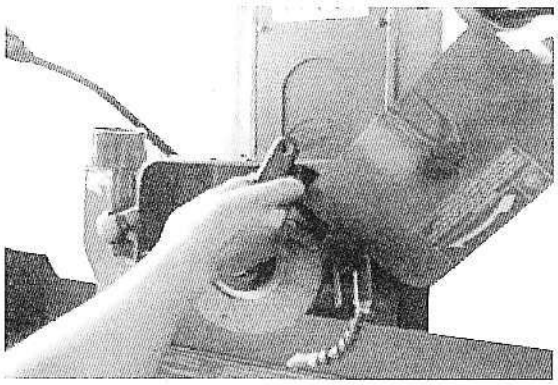
(1) When mounting a new wheel to the machine, first, mount it to the grinding wheel flange it roughly by use of the wheel balancing device.

Note: Refer to the paragraph 4.4 "Balancing of Grinding Wheel"

(2) Wipe lightly a tapered end part of the wheel spindle and the tapered hole of the flange, and check to see that there are no dusts on them.

Then, insert the wheel flange into the tapered part and clamp a hexagon-headed nut with the attached wrench.

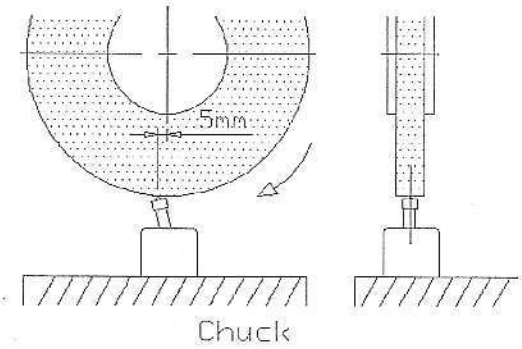
At this time, hole downs the wheel by left hand.



(3) Close the wheel cover.

(4) Start the wheel spindle by pushing the push button switch on the right side of the frame, and make a racing of the wheel in a few minutes. At this time, do not allow your face to come near the wheel, because an accident may occur.

(5) Make a rough dressing with the diamond dresser mounted on the chuck until swing of the outer periphery of the wheel disappears. Place the diamond in a position where its tip comes somewhat leftwards away from just under the center of the wheel.



(6) Stop the revolution of the wheel and turn reverse the hexagon headed nut, pressing down the wheel by left hand. Then, remove the wheel flange and make balance of the wheel precisely again.

Note: It is recommended that balancing will be make timely at the time of operating, because the wheel becomes out of balance due to its wear.

Balancing of Grinding wheel

Explanation is made on how balancing of the wheel is done by the use of the wheel balancing device (special accessory)

(1) Place the device on a sturdy base and make out a level of the knife-edge with the adjusting bolts, looking at the attached level.

(2) Insert the grinding wheel flange with a mounted wheel into the arbor for an exclusive use, and fix it, clamping the nut.

Note: Remove all the balance pieces.

(3) Put the above onto the device and allow it to run lightly.

(4) When the wheel is out of balance, it comes back a little to the opposite direction to that of revolution, and in a little while, the wheel makes a movement just like a pendulum and stops.

(5) In the item (4) the heaviest part comes underneath, so, make a mark of that point with chalk.

(6) Put on balance on a place on the opposite side to the position marked with chalk and fix it with a screw.

(7) Check to see, which is heavier, the side with the fixed balance piece or the opposite side (on the side marked with chalk). by use of the device.

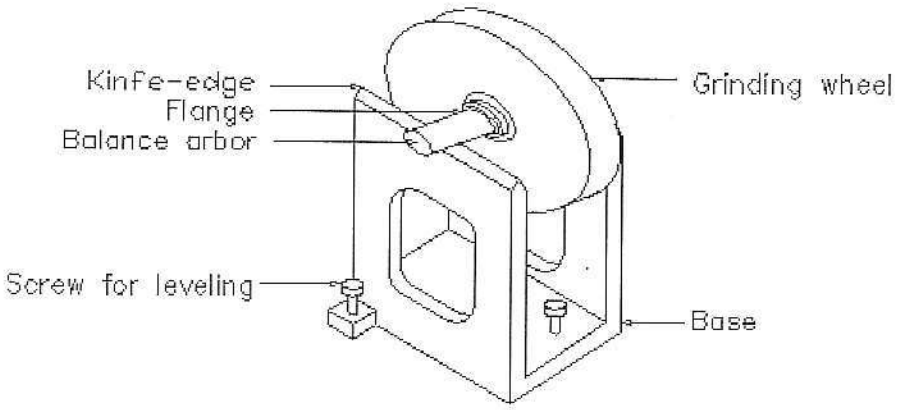
(8) On the opposite side to the heavier side, mount two balance pieces in symmetry with the line of gravity (angle is optional).

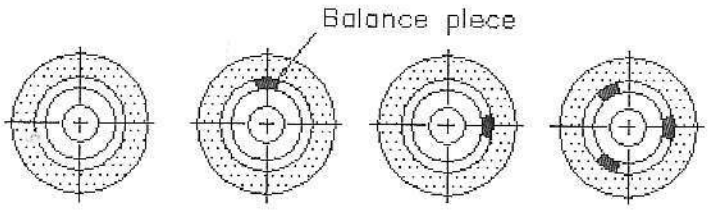
(9) Check to see a balance of the wheel again. When the wheel is out of balance, repeat its balance until a complete balance is obtained angles of two balance

pieces (make sure of moving them in symmetry with the line of gravity).

Note: Moment decreases as the balance pieces come near the center

(10) When balance is attained, the wheel does not swing any longer like pendulum.





5. GRINDING OPERATION

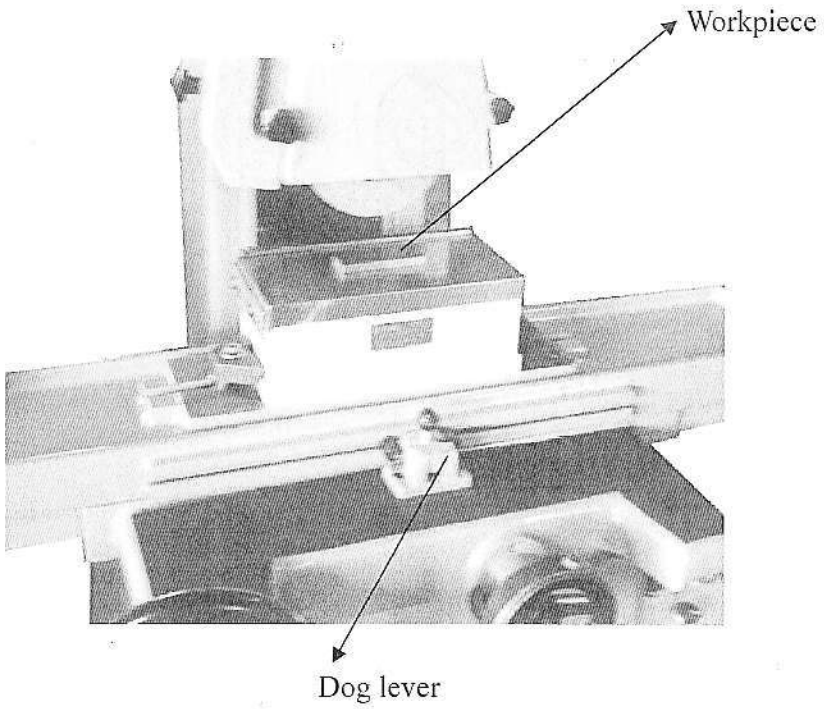
Basic Grinding Operation

(1) Mount the wheel, the balance of which has been attained. A wheel out of balance worsens accuracy of the workpiece and shortens a service life of the wheel spindle.

(2) Wipe well the surface of the chuck with a brush, wiper or wastes, and put quietly the workpiece onto the chuck for fixing the workpiece on it.

(3) Adjust the position of the table dogs on the right and left side in accordance with the length of the workpiece.

Note: when the dog levers are felled down this side, a movement of the table to the right or left end will be possible without moving the position of the dogs. Accordingly, me use of this in a case where dressing become necessary during operation.



(4) When the vertical feed hand-wheel is revolved, the wheel is allowed to cut in the work. In this case, great care should be taken so that the wheel will not encroach upon the workpiece on account of overfeeding on occasion when it approaches the workpiece. It is also recommended that infeed will be made, allowing the longitudinal hand-wheel to operate slowly.

(5) After the wheel has come in contact with the workpiece, proceed to the grinding operation, giving a suitable amount of infeed to the wheel.

Note: (1) The feed amount of wet grinding (pouring water) should be 50~100% more than that of dry grinding.

(2) Select the amount of feed properly in accordance with grain size, hardness of the wheel and material or hardness of the workpiece

(6) How to use dial indicators

For both the vertical and cross feed hand-wheel there exist dial indicators on they're outside periphery to indicate the amount of feed.

It is possible to loosen the two knobs to turn the dial in order to set it to the zero degrees, if necessary. In this case, push down the hand-wheel lightly by hand, so that it will not turn together with the dial.

(7) Perform a spark-out after a coarse of fine grinding, if necessary. Then, remove the workpiece, putting the chuck "OFF"

Selection of linear Speed

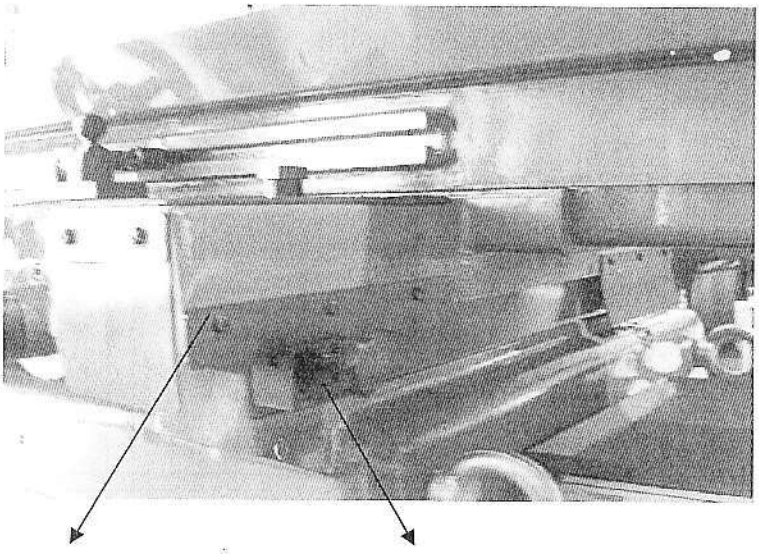
MATERIAL OF WORKPIECE / GRINDING METHODE	SOFT STEEL	HEAT TREATED STEEL	TOOL STEEL	MILD STEEL
FINE	6~15	30~50	6~30	16~20

Infeed amount of Grinding wheel

MATERIAL OF WORKPIECE / GRINDING METHODE	SOFT STEEL	HEAT TREATED STEEL HRC41 ABOVE	TOOL STEEL	STAINLESS STEEL	MILD STEEL
COARSE	0.015~0.03	0.015~0.03	0.02~0.04	0.02~0.03	0.015~0.04
FINE	0.005~0.01	0.005~0.01	0.005~0.015	~	0.005~0.01

Saddle Clamping Device

This device is applied for a plunge grinding, which is done without giving any cross feed, especially for form grinding.



Set Screw

There are two setscrews located each on vertical hand wheel and cross feed hand wheel.

Tighten the setscrew during the operation of "CUTTING T SLOT". The machine will remain steady.

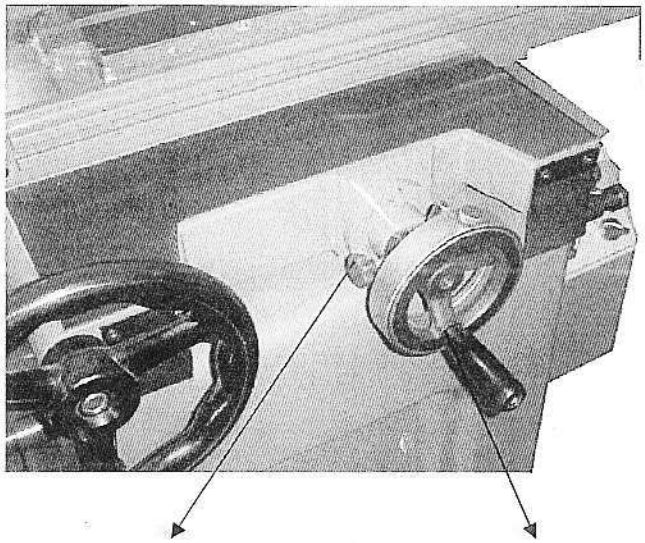
Dust Suction System

Be sure to use the dust suction system in the case of dry grinding

Grinding dusts pollute the air in the shop and harmful to the security of the machine and the health.

The height of the mouth of the dust suction is adjustable. Accordingly efficiency of dust suctioning can be enhanced, when the mouth is lowered enough within the limits of that it does not impede with the workpiece.

Note: Never use the dust suction system in the case of wet grinding (pouring water).



SET SCREW CROSS FEED HAND WHEEL

6. MAINTENANCE

General Maintenance

It is essential that the following periodical maintenance will be kept, in order to keep the original accuracy within a long period of time.

(1) Wipe every part of the machine, in particular, its polished part with oil-immersed cloth after wiping it with dry clothe at the time of completion of the operation.

(2) Remove grinding chips in the inner part of the wheel guard or on the surface of the table.

Chuck

The surface of the chuck is an important surface, which becomes a standard of accuracy. But it has a tendency to be scratched, because it is made of soft steel material. It is therefore necessary to treat it with consideration as much as possible. It becomes necessary to grind the surface of the chuck once again. If its accuracy gets out of order or there come out some scratches on it.

Note: For the grinding of the surface of the chuck it is recommended that a grinding wheel to the grade WA 46H will be used and its rough dressing performed with a small amount. Also, clean the surface of the chuck well and oil thinly.

Grinding Wheel Spindle

As grease lubrication is given for the grinding wheel, oiling is not required for it. In case its accuracy will be reduced after a few years usage of it (its life is dependent upon the condition of usage). Return it to company for repairing or replace it with a new spindle.

Procedure for the replacement of the wheel spindle

(1) Remove the wheel.

(2) Loosen the clamp bolt and remove the guard.

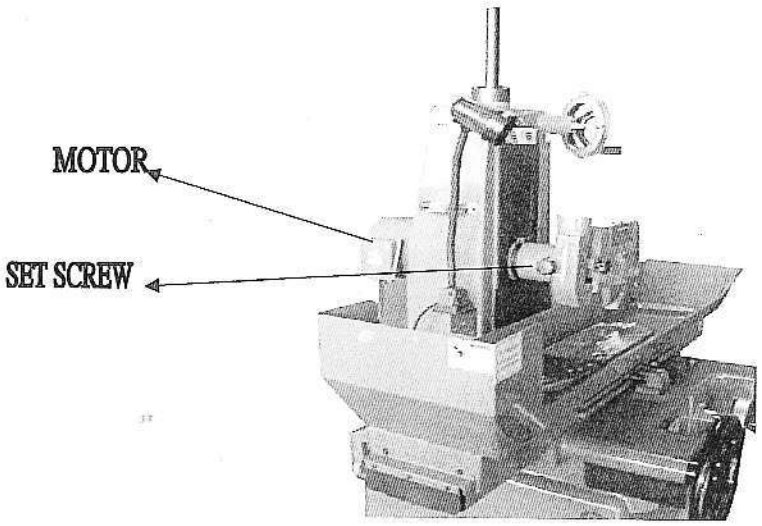
(3) Loosen the setscrews positioning at the five points on the upper and lower part of the wheel head.

(4) Remove the connections of the motor

(5) Pull out motor backwards, keeping it by both hands.

(6) Mounting of the wheel spindle should be made according to the reverse order to the above procedure.

In this case, never clamp the screw of the wheel head too strong.



Lubrication Oil

Change lubrication oil after first month operation and six to twelve months. After for the next, respectively.

There is an exhaust port (threaded plug) on the lower part of the oil tank.

At the same time, clean the inner part of the oil tank and the filter of the pump.

Procedures of table wire changing

(1) a. Remove each left side covers of table and saddle.

b. Move the table to its righted and back by 40-50mm (1.6-2") as shown on draw in 1. Of next page.

c. Remove the drums on the ends of table and worn-out old wire.

d. Insert a new wire between table saddles.

(2) Wind up end of wire by one turn on each drum as worn-out old wire. A tighten the nut firmly. (As the nut is tightened firmly. The wire is clamped securely. The wire is wound be loosened as the nut is tightened). The tightening of the nut is done with pins inserting is the side hole of drum and nut.

(3) Clamp the right drum under the table and wind up the wire by three turn as shown or drawing 3. If no help were available, temporary holding by a string would be better a shown on drawing 3. If a help is available, have him hold the wire during this operation for preventing of its winding off.

(4) (1) Stop the table at right end (Important).

(2) As shown on daring 4. Make complete there windings at the revolving drum.

(5) Insert the windings to the drum.

Remark: When the table is at the right end position, one groove on revolving drum must be free from the engagement of wire as shown on drawing 5

(6) Stretch the wire and wind up it on the left side drum. Under the table. Then give a tension to wire as shown on item 3 by means of hexagonal bar wrench and pin.

(7) Move the table by hand wheel slightly and check following items.

a. Whether the wire is engaged in the groove securely.

b. Whether the adjacent wire on the revolving drum is overlapped each other.

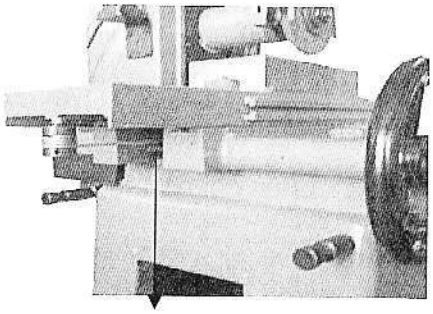
(8) (1) Remove holding string on the right-hand of table.

(2) Move the table and adjust the tension of the wire according to the same way shown on item 3.

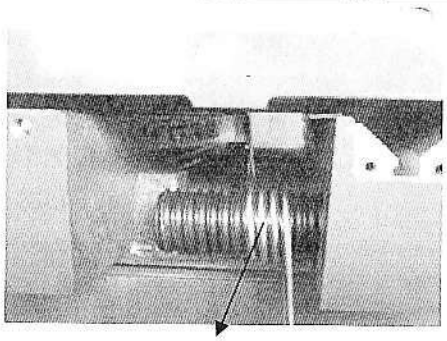
Remark: The bigger the tension of wire the shorter the life of wire. If the tension of wire is small, the slip of the wire will not give smooth running on the table. Adequate tension can be judged by giving a weight to the will as shown on drawing.8

(9) Mount the covers of left side table and saddle.

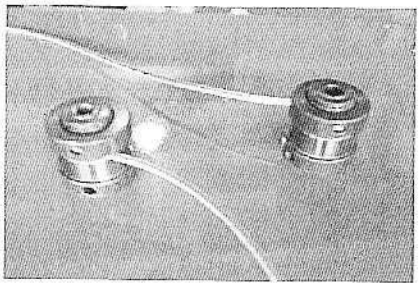
(SEE NEXT PAGE FIGURES)



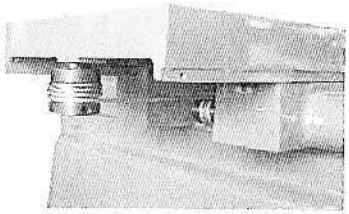
1. LEFT SIDE DRUM



5. ONE GROOVE



2. LEFT SIDE DRUM RIGHT SIDE DRUM



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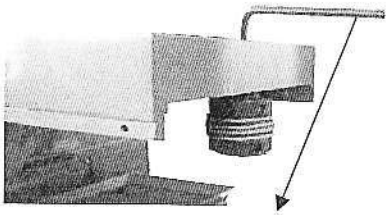
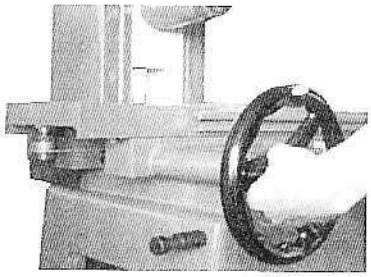


3. HEXAGONAL BADR WRENCH



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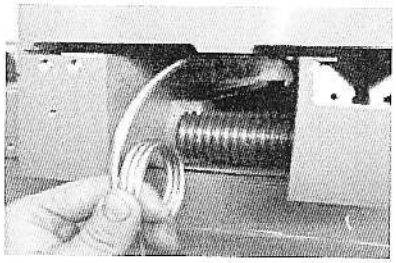
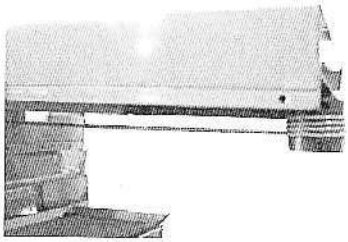


4. REVOLVING DRUM



8. APPROX 2KGS