



MANAGEMENT PRAYOSHA ENGINEERING

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(1) INSTALLATION:--

The following instruction for proper placement and preparation of the machine will ensure subsequent operation at its full capabilities for precision performance.

(2) LOCATION.

The machine should be installed on a firm level foundation or floor that provides rigid, vibration free support.

When location is on an upper floor, choose a place where there is maximum structural bracing below it. If it is necessary to locate the machine where some vibration is unavoidable, Isolation mounting should be used.

(3) MOVING THE MACHINE.

When the machine is delivered into the work-shop premises along with the wooden packing Box, move it to the required place by sliding it on rollers where material handling facilities is not available. Then open the side

Covers. The bottom platform can be removed by placing it on the two packing pieces so that the fixing bolt can be lifted out. The machine then can be rolled off the platform on the rollers to eliminate the base.

CAUTION. Do not lift the machine in any other manner what so ever.

(4) FOUNDATION HOLES:-

When the machine is placed in its required position, it should have holes of diameter 200 mm x 300 mm deep previously dug according the pitch of machine base holes. The foundation bolts can be of 5/8 x 10" or m 15 x 250 mm. The bolts are suspended in the holes with nuts in the position. A good concrete mixture is poured, rammed in to the holes to brim of surface.

(5) LEVELLING:-

When the table in central position, test the surface both the longitudinally and transversely with a precision

Spirit level. Place Shims under the machine foot as requirement demands to correct the level. Tighten the leg screw (provided near base holes) then test the level of the table again in both directions. Read just again with shims if necessary. No excessive tightening should be exercised than normally required. (This pre caution can be taken by using the right spanner for tightening. No pipes run over spanner must be used to achieve more mechanical advantage.)

(6) BEFORE CONNECTING TO POWER SUPPLY.

When the machine arrives in Packing Box the spindle motor along with the flange square plates is not in its original place. The motor is then removed from platform base and fastened to the machine head on the rear

Side of the machine. Four Hexagonal bolts screwed in its flanged plate on the vertical arm complete the motor fixing part. Pass the transmission belt over the two pulleys and tension the belt. The belt tensioning should be done by skilled hands. Tighten the four bolts accordingly. Care should be taken that the belt is enough tensioned and yet should sag when pushed fingers. Fix the cover plate in its position.

(7) CHECKING ALL ELECTRIC MOTORS FOR PROPER ROTATION.

Checking Spindle Motor Direction of Rotation: Before operating a newly connected machine check the direction of spindle as follows: Start the spindle start button then immediately push spindle stop button. Observe the rotation of wheel spindle. The spindle should rotate clockwise as seen from front.

If the direction is anti clock wise change 2 wiriest the motors terminal box only. (And not any where else,).

CHECKING POWER PACK MOTOR ROTATION.

Prior to switching hydraulic motor ensure the following: Screw the Two hoses to the stand by Power pack

To its threaded adaptors. Color coded pip and adaptors make assembly easier. Sufficient tightening force is required to tighten the hoses. Fill the hydraulic tank with the recommended (SAE-30 or equivalent) Hydraulic medium unto the gauge mark...

CAUTION: Do not start the pump motor without Hydraulic medium. The leads of wires are connected to Hydraulic Power Pack motor. Start the pump motor and **immediately** stop it. Observe the rotation of motor from above. (Fan of motor through guards.) It should rotate clockwise. If not change the two leads at pump motor terminal box only. Refer **Initial Table reciprocation starting.** Before operating Hydraulic System further.

Checking Cross Feed Motor and Vertical rapid motor for correct rotations (if applicable)

If the above spindle rotation is corrected then the cross feed and vertical motors will operate in their correct

Direction of rotation without fail.

(8) ELECTRICAL SYSTEM:-

The Electric circuit diagram gives the necessary information of motors and its control gear. Carefully going

Through the circuit will make better under standing of the system...

Interlocked circuit wherever possible: Interlocking of controls of motors is given prime importance during designing to evade dangerous accidents otherwise possible. For e.g. the rapid vertical motor is inoperative while the spindle motor is grinding. **Important:** It is good to **inspect** the contactor screws which might have loosened due to vibrations when the machine was in transit.

Routine Maintenance: Inspect the loose screws of contactors/ terminal blocks every 6 to 8 months.

(9) SELECTION AND USE OF GRINDING WHEELS.

In recent years grinding has accounted for almost a quarter of all machining work. The primary consideration in selection of grinding machines and then the grinding wheels are of most importance. Selection of grinding wheels depends upon the nature of material to be ground. Other factors of importance are the speed of wheel and work, amount of material to be removed, and the accuracy and quality of surface finish desired. Various wheel manufacturers (We recommend generally wheels of Grinder Norton) publish information which helps in selecting the right wheel for the exact job.

Material.	Grain	Grade.	Abrasive,
(1) Cast Iron.	30 to 36	I or J	Silicon Carbide
(2) HSS.	46 to 60	G or H	Aluminum Oxide
(3) Die Steel.	46	G	-do-

(5) SS	36	H	Silicon Carbide.
(4) MS	36 to 46	I J or K	-do-
(6) Tool Steel	36 to 46	H	Aluminum Oxide
(7) All. Bronze.	30 to 46	H or I	Silicon Carbide.

(10) WHEEL TESTING.

Before mounting of grinding wheel, hang it in the air on one finger, and then tap it at the edge to see if it gives clear ringing sound. A Wheel that does **not ring clear** is probably cracked and **should not be used**.

(11) CHANGING OF GRINDING WHEEL

The knurled button plug is provided on the right side of the spindle, as seen from the front. Unscrew the knurled plug and push the pin wrench into the hole. Rotate spindle / Grinding Wheel by hand until the wrench

Fits into the hole of spindle. Introduce the forked pin wrench into the two holes of spindle nut. Rotate clockwise (the nut being left hand) to unscrew it off the spindle. Gently remove the wheel along with the washers.

For mounting the new Grinding Wheel rotate the spindle nut (the washers in their respective positions) in anti clockwise direction with the same forked wrench. **Caution** : Remove the lock pin wrench and **do not forget** to screw the knurled button plug in its place before starting the spindle.

(12) TO REMOVE SPINDLE FLANGE OFF THE SPINDLE.

In removing a wheel flange from the spindle always use the wheel sleeve puller which is furnished with the machine. This will avoid an risk of cracking the wheel or damaging the spindle by pounding it out. Remove the spindle nut (in similar locking of spindle as described earlier)which was too a left hand thread. Then thread the outer member of wheel sleeve puller into the wheel flange tighten the inner screw against the spindle, thus loosening the wheel flange without harmful jarring. In putting a wheel flange on the spindle, first see the wheel flange hole and taper nose of spindle **are perfectly clean**. Then slip the flange on the spindle nose, seat it by hand and tighten by means of same fastners and wrench. (of course locking the spindle in this case too)

(13) BALANCE OF WHEEL.

It is essential that the wheel run perfectly true and without vibration. The Grinding Wheels are balanced by the manufacturer and in the case of wheels of size used on our machines, should not require attention

in this respect. other than truing. However wheel flange and balancing segments are furnished with machine. The mandril provided is used with the wheel flange and suspended on the balancing stand (optional accessory) for static balance. Segments two or three can be used as per the demand so obtain

a static balance on the stand.

(14) LUBRICATION PROGRAMME : AUTOMATIC AND MANUAL.

Automatic lubrication to the main reciprocation table is a branch of hydraulic line from the hydraulic circuit. The amount of lubrication is controlled by needle valve provided underneath the cross slide. The actual amount of flow is set as follows. Close the Needle valve entirely and open / rotate anticlockwise $1/10$ to $1/8$ of a revolution. **Essential** : During grinding it may be made a customary habit of inspecting of

oil (lubricating circuit) by simply applying the finger to the table or/and flat way to moist with oil. If not adjust needle valve accordingly. This must be included in routine maintenance programme. **Ensure**: Make sure the flexible return pipe from the machine base is connected to the adapter on the power pack. Tighten clip thereafter. For **manual lubrication** follow the chart as under.

(15) PROGRAMMED LUBRICATION CHART.

Location.	Medium / Grade.	Duration.	Executing Apparatus.
Guideway of Saddle / Base. nipples.	SAE-20 or equivalent.	8 to 12 hours.	By oil gun into the side holes normally closed by oil
Vertical arm guide ways.	SAE-20 or equivalent.	8 to 12 hours.	By oil gun on tpo cups provided. Note: thick oil never be used.
Vertical lead Screw.	SAE-30 or equivalent.	8 to 12 hours.	By oil gun. Reach by removing cover on the rear of machine.
Cross lead Screw.	SAE-30 or equivalent.	8 to 12 hours.	By oil gun. Underneath the saddle.
Hand wheel Bearing Bracket	SAE-30 or equivalent.	3 to 4 days.	By oil gun. On the top of surface
Gear Box shaft supporting Bearing Bracket.	SAE-30 or equivalent.	4 to 5 hours.	By Oil gun. On the rear side of Machine.
Bearings of Motors.	Grease.	6 to 8 months.	By grease gun.

(16) WHEEL TRUING

A wheel truing fixture is furnished with the machine. The truing diamond tool (not furnished) should point slightly beyond the centre for the wheel in the direction of movement of the wheel surface. The wheel should be trued whenever it becomes loaded dull or glazed. Pass the diamond across the wheel with a slow steady

cross feed, **taking care to avoid any longitudinal movement** . **INSPECTION:** Make sure that wheel is spotless and has even colour throughout the grinding face when observed from the side.

(17) COOLANT SYSTEM.

With the wet grinding attachment coolant is supplied to the wheel through a nozzle fitting and flexible tubing

from motor driven centrifugal pump mounted on the supply tank.. A valve adjustment to the nozzle controls

the rate of flow and can be conveniently positioned where the coolant discharge is desired. The machine table

is surrounded by guards that protect both the machine and operator from coolant spray. The coolant collects in the return channel is delivered back to the tank via flexible pipe

(18) HYDRAULIC SYSTEM..

Hydraulics! yes Hydraulics : This magic word for modern energy transmission has already caused many

positive changes in the world around us. The application of hydraulic controls and drive systems has resulted in new designs and improved efficiency for machines (as in our case) and installations. From this hydraulic system whereby changes in power and direction are also possible and interesting technology aided for machine tools such as grinding machines is employed..

Hydraulic circuit : The PRAYOSHA Hydraulic circuit is based on the most recent design which is compact, efficient and calls for servicing at long intervals if ever. Through the circuitry can be provided it has little practical value to the user.

Capacity: The Hydraulic reservoir of power pack is filled with good quality oil SAE-30 or its equivalent (preferably obtained from **sealed cans** as much as possible.)

Routine maintenance : clean the suction strainer every 6 to 8 months by removing and cleaning in solvent

The oil should be **changed annually** (or even more frequently) on machines in constant use. Remove drain plug to get out all the oil at the bottom of reservoir, into a clean container. When empty wipe it out with a lintfree rag saturated with solvent (kerosene / petrol). Oil that has been removed from the reservoir should never be used unless it is passed through 25 microns filter..

(19) RELIEF VALVE SETTINGS

This is located in the inside of power pack. And is accessible from the top by removing the cover plate. The setting is done at our works and therefore does not need any attention whatsoever.

CAUTION ; Setting should only be done under qualified service personnel. Refrain from **opening / dismantling** units of Hydraulics system without reason or out of more curiosity.

(22) MANUAL DRIVE OF TABLE

The manual drive (not found on some machines) is through rack and pinion arrangement. In the off position

of the throttle valve the hydraulic system experiences its least pressure and therefore manual reciprocation is achieved by pushing the handwheel to engage rack, When automatic movement is switched the wheel **should be pulled back** to avoid spinning unnecessarily.

(21) INITIAL TABLE RECIPROCATION STARTING.

The hydraulic pump should be allowed to operate for initial 10 to 15 minutes with the throttle valve in OFF position. This will help in expelling all the air in the system and also the lubrication will reach the main table Vee and Flat ways. Refer Lubrication Programme for correct needle valve setting. Set the two table dogs

250 to 300 mm apart. IMPORTANT .It must be made sure that the table reversing roller unit should be maintained at a slight angular position.. before turning the further valve stem from OFF to ON position. The table will gradually reciprocate and respond to the reversing gear positively after few reverse seals. Now the hydraulic system is ready for further operations. CAUTIONS ; WE SHOULD NEVER START PUMP MOTOR WITHOUT THE HYDRAULIC MEDIUM. Should the hose connections show some leakage, then tighten the nut /adapter still further.

(22) SENSITIVE SPINDLE UNIT.

The spindle is a high precision mechanism and should be regarded with same high precaution as given attention to high precision instrument. **Therefore, never hammer on the ends of spindle, drop heavy objects, or otherwise subject it to force or impact.** The quill type unit is sealed and grease packed and requires no further attention. If even actually a spindle should need repair or adjustment, we recommend that it be returned to PRAYOSHA for reconditioning.

(23) COUPLING TABLE TO PISTON ROD.

When the machine is in transit the table is uncoupled from piston rod to avoid any trouble. **This coupled again at site before start up.** Kindly refer the self explanatory diagram of assembly scheme. A deliberate play is allowed on this assembly and therefore not fear or alter unit on discovering the same..

(24) GASKET SEALS REPLACEMENTS. (HYDRAULICS)

If there appears leakage on the top of near the valve stems then it requires seal replacement. for exploded view of assembly of seals. If the cylinder seals require any attention then the gland (Road bearing) can be extracted without disturbing the pipe work cylinder. for extraction and seal

replacement. There is no harm to **apply little grease** to the cup seals before inserting it into the cylinder for easy assembly.

(25) CROSS FEED DRIVE SYSTEM. (ELECTRIC)

The cross feed in some machines is hydro-mechanical and heavier models due to torque requirements electric feeding is designed. Hydromech Feeding.: In smaller models hydro mechanical cross feeding is employed. **The amount of cross feed is varied by setting on the slotted link.** The mode of feeding : Reverse or Forward is selected by pulling out the knob and has only two position 0 or 180 degree. This mode of selection gives forward or reverse direction. ELECTRIC FEEDING.:The intermittant cross feed is controlled by an electronic unit which receives the command signals from the limit switch.(for reaching limit switch remove top left hand side cover.) Push th cross feed forward button.When the main table reverses the intermittant feeding occurs. Variation of feeding can be obtained on the graduated potentiometric knob. Rapid forward feeding is obtained by pressing cross feeding can be selected similarly but not before pushing the cross feed stop push button.

IMPORTANT : It is generally a convention to grind work pieces by cross feeding from the operator towards the machine.

INTERESTING : There is seperate cross limit switch to arrest the cross movement .With the saddle dog

passing over the limit switch stem the electrical system becomes OFF. It is our experineece and therefore

we state,through insignificant it may look,that many of our customers call for servicing when the electrical

system is OFF in such case.Please make a note of this.

(26) CROSS FEED BELT TENSIONING.

Access to the cross feed motor belt is made by opening the front cover plate.Unscrew the check nut and tension the motor plate. Check the nur thereafter. Some alackness (but not enough) should be maintained.

(27) VERTICAL RAPID BELT TENSIONING.

The push bolt underneath the gear box on the rear end of machine is the tensioning bolt. Should vertical movement show erratic speed,then only tension this belt. Clockwise rotation tightens the belt and anticlockwise loosens it.

(28) TROUBLE SHOOTING GUIDE.

(1)	Low Oil Pressure.	Check...	Oil level Oil lines for leakage. Relief Valve mal function. Pump for damage. Clogged Filter.(intake)
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(2)	Table reverses only one side.	Check.	Table dogs missing. Change worn rollers of R--R unit. The reversing roller unit has moved off the fasteners from its key position. Remove and re fasten on its keyed (on valve stem) face only.
(3)	Excessive Lubrication & flooding on the ways.	Check.	Needle valve opening. Adjust as directed.
(4)	No table speed. need replacement.	Check.	On position of throttle valve Piston Seals for oil leakage. Relief valve malfunction. Is proper oil being used.?
(5)	Electric shock..	Call.	Qualified Electrician only.
(6)	Machine not responding	Check	Loose connection at input in machine. Main switch fuses. For tripped Cross Limit switch. For tripped Vertical Switch (If applicable)
(7)	Common Grinding errors such as chattering and scratching and burning of work.	Check.	Wheel out of balance. Wheel out of round. Improper Wheels grit and grain. Improper dressing. Faulty coolant. Cummy coolant. Faulty Operation (adjust longi and Cross Feeds) Coolant spray - is positioned or less. Dressing. (too coarse) (10)
(8)	Spindle Stalls when Grinding	Check.	Depth of cut taken out (Reduce it if excessive) Tension the spindle belt. Motor terminals for two phasing.
(9)	No Cross Feed Movement.	Check	Screws of contactors, Push Buttons and Terminal Blocks. If the calibrated feed knob on 'O' reading ? Replace feed unit and /or command limit switch.
(10)	Motors make unpleasant noise.	Check.	Terminal connection at various junctions Two phasing in the line. Start only after correction.

* R--R Unit : It is the main roller reversing unit.

(29) CAUSES AND CORRECTIONS OF COMMON GRINDING ERRORS.

CHATTER.

Indication.	Cause.	Correction.
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Chatter marks may Rebalance take any of several edge of	Wheel out of Balance.	Rebalance carefully on own mounting. after truing operation. Run wheel without coolant to throw off excess water. When wheel is removed from machine, store on side to prevent water from setting at lower wheel.
	Wheel out of round.	True before and after balancing. True sides to face.
	Wheel grading to hard.	Select softer grade, more open bond, or coarser grit.
	Dressing.	Use sharp diamond--rigidly held close to wheel.

SCRATCHING OF WORK.

Indication	Cause.	Correction.
Narrow and deep regular marks.	Wheel too coarse.	Use finer grain size.
Wide, irregular marks of varying depth.	Wheel too soft.	Use harder grading
(11)		
Widely spaced spots on work.	Oil spots or glazed areas on wheel face.	Balance and true wheel. Avoid getting oil on wheel face.
Isolated deep marks..	Improper wheel dressing.	Use sharper dressing tools, Brush wheel after dressing, preferably with stiff bristle brush.
	Coarse grains or foreign matter in wheel face.	Dress out.
	Bond disintegrates grain pulls out.	Coolant too strong for some organic bonds; decrease soda contents.
Irregular marks.	Loose dirt.	Keep machine clean.

WHEEL LOADING.

Indication.	Cause.	Correction.
Metal lodged on grain or in wheel pores.	Incorrect Wheel.	Use coarser grain size, or more open bond, to to provide chip clearance. Use more coolant.
	Faulty Dressing.	Use sharper dresser, Dress faster, Clean Wheel after dressing.
	Faulty Coolant.	Use more thinner and cleaner coolant.

Faulty Operation. Manipulate Operation to soften effect of wheel. Use less down feed.

WHEEL GLAZING.

Indication.	Cause.	Correction.
Shiny appearance : Slick feel.	Improper wheel.	Use coarser grain size, softer grade, manipulate operation to soften effect.
	Improper dressing.	Keep wheel sharp with sharp dresser, use faster dressing toll traverse. Use more dressing tool penetration. (12)
	Faulty Coolant.	(13) Use less oily coolant , Use more Coolant.
	Cummy Coolant.	Increase soda content if water is hard. Donot use soluble oils in hard water.
	Faulty Operation.	Use greater infeed.

IN ACCURACIES IN WORK.

Indication.	Cause.	Correction.
Work is not flat..	Improper dressing.	Make sure machine condition are the same when dressing as when grinding.
	Expansion of Work.	Reduce temperature of work by using more coolant and lighter cuts.

CHECKING OF WORK.

Indication.	Cause.	Correction.
Work Shows check marks	Improper wheel manipulation.	Prevent wheel fromacting too hard, Do not force wheel into work. Use larger and more even flow of coolant.
Burning of work.		
Work shows dis coloration	Improper wheel.	Use softer wheel or manipulate to gat soft effect. Prevent glazing and loading. Use more coolant
down while in contact with	Faulty Operation.	Bring wheel to work more gradually. Use more feed. Prevent stoppage of work
	Wheel.	

WHEEL BREAKAGE.

Indication.	Correction.
Radial break,. three or more pieces. between	Reduce wheel to rated speed. Correct improper mounting such as lack of blotters, tight arbors un even flange pressure or dirt

to	flanges and wheel. Prevent overheating due to lack of coolant. Prevent excessive wheel pressure on work. Do not allow wheel become jammed on work.
Radial break, two pieces.	Prevent excessive side strain.
Irregular break.	Do not allow wheel to become jammed on work. Prevent blows on wheel. Do not use wheels that have been damaged in handling. Examine wheel before using. Sound wheel by tapping.
General. arbor, as action code	Do not attempt to grind with a wheel that is too tight on the wheel will break when started. Prevent excessive hammering of wheel. Familiarize yourself with the provisions of the safety governing use of grinding wheels, and observe the rules.

(30) FOR YOUR SAFETY

- (1) Before starting and connecting the machine, make sure it is **4 wire 3 phase AC supply**. (440 / 440 Watts The other wire in Neutral.
- (2) Connect the motor in order and checking each motor after the other. First start spindle motor, then hydraulic motor, coolant motor cross and vertical Motors.
- (3) Stop the machine and operations temporarily if voltage **dips below 350** on metre.
- (4) Since the average useful life of a hydraulic medium is between 8000 to 12000 hours, **change** without hesitance after this period is attend.
- (5) Cover the front pannel cove with a thin transperant polythene, to avoid the grinding dust dressing spray and the coolant splash attacking it gradually during normal use of the machine.
- (6) As much as possible employ few operators than all operating the machine intermittantly.
- (7) **No smoking** and negligent handling of open **fire** in Gas Welding torch should be prohibited near Hydraulic Grinding Machine. Srore fire hydrants if possible.

SAFETY GRINDING.

Before starting actual work set the machine in motion (Spindle and Hydraulic only) for one minte or so.

After mounting a new wheel the **no load rotation** should not be less than 5 minutes. **Never use** larger / oversize wheels other than those that are specified. Befor starting

work the operator must make sure that the work to be ground is held securely on the magnetic chuck.

Work should **never** be mounted on a dirty chuck. Before actuating the longitudinal feed, **Check** the positioning and fastening of table dogs (stoppers) which limit the longitudinal travel of the table. As a poorly secured table dog may **slide back** and fail to reverse the table and consequently the table will ram the sides **causing damages** accordingly. The length of stroke should be 75-- 100 mm more than the length of work piece to be ground.

NEVER LEAVE THE OPERATING MACHINE UNATTENDED

To regrind the magnetic / machine table longitudinal **speed should be slow** and very small cross feed increments to be administered. Also if the work pieces are of the size of table length then too the table speed should be slow and cross increments small.

(9) Since the machine has several motors the operator must become well acquainted with the panel control gear in general.

(10) We recommend to faithfully adhere to the safety regulations and never allow careless operation of the machine.

OVER THE WHEEL MANUAL TRUING ARRANGEMENT. (OPTIONAL)

With the over the wheel manual dressing arrangement dressing becomes faster and simple operation. The diamond tool (1/2 " shank turned to the required size : of manually with the lever on the right side. **CLOCKWISE ROTATION OF THE THIMBLE (KNOB) FEEDS THE DIAMOND DOWNWARDS.** The diamond is fed downwards in increments of 0.1 mm, the least count on the knurled thimble / knob.

CAUTION. The truing speed is controlled by the operator. **The slower the lever movement the finer the**

truing cut, it should be carried in a minimum of five seconds or so. In using the arrangements it is essential that the stroke of the ram is parallel with the surface of table. This is adjusted as follows.:

True the wheel from the table (not the over head dressing) and grind a test block.

Stop the table and true with the overhead dressing arrangement. Feed the grinding wheel slowly until it contacts the work piece (test block). Read the witness marks and adjust it accordingly by raising or lowering with the adjustment screws.

SADDLE LOCKING ARRANGEMENT (Optional)

This attachment is compulsory for jobs with slot grinding the wheel should be dressed on its periphery and also on its face. A case hardened (hardness 60 RC) Nickel chromed, ground spindle is held between two cadmium plated blocks and fixed on the saddle with fasteners. This spindle moves along with the saddle. A slotted capsule fixed on the machine base has a sliding pinch blocks (Case hardened to 45 RC) with the spindle passing through it. Under normal use this pinch block can be pulled out of the slotted capsule and

kept positioned near one end of the spindle. During slot grinding this can be introduced in the slotted capsule and tightened with allen key to lock the saddle in desired position.

Warning : Do not operate the cross feed by manual or Auto Cross Feed once the saddle is locked. This will damage the screw and nut beyond repair..

ADJUSTABLE WORK LIGHT (Optional)

The shade of this is ideally suited to the operator and vented at the back cover bowl to dissipate heat. This helps in keeping the shade cool to touch. The two arm supported shade can be positioned acceptably to the desire of the operator. A standard 60 Watt bulb is recommended (not furnished) and the conductor receptacle for 220 /240 Volt AC Single phase supply. A Toggle switch built in on the lamp assembly is provided (Instantly On / Off operation)

MICRO DOWNFEED. (Optional)

This arrangement provides for fully adjustable control of the Down feed. Down feed index knob (pinion) is pushed to engage (sun gear) it. Anticlockwise rotation feeds the grinding wheel downwards. Pullout the downfeed index knob to disengage it from sun gear when raising or lowering the wheel with power. (push buttons).