

**PRECISION SURFACE
GRINDING MACHINE**

OPERATION MANUAL

MODEL: SG-618 2A

CONTENTS

1. General Description	
1.1 Construction	1
1.2 Specifications	1
1.3 Standard Accessories	2
2. Installation	
2.1 Transporting	4
2.2 Cleaning	4
2.3 Installation	5
2.4 Adjusting	5
2.5 Power Source Wiring	5
3. Oiling and Lubrication	
3.1 Lubrication System	7
3.2 Lubricating Oil	7
3.3 Procedure of Oiling	7
4. Test Running and Operation	
4.1 Function of Switches on Control Panel	9
4.2 Function of table speed control lever on the front of base	11
4.3 Table Longitudinal Movement	12
4.3.1 Saddle cross Movement	12
4.4 Hand-Wheel Operation	12
4.5 Mounting and Dismounting of Grinding Wheel	12
4.6 Balancing of Grinding Wheel	14
4.7 Operator's Checking before Operation	16
4.8 Trial Running of the Machine	16
5. Grinding Operation	
5.1 Basic Grinding Operation	18
5.2 Saddle Clamping Device	21
5.3 Dust Suction System	21
6. Maintenance	
6.1 General Maintenance	22
6.2 Chuck	22
6.3 Grinding Wheel Spindle	22
6.4 Lubricating Oil	23
6.5 Hydraulic Oil	23
6.6 Hydraulic Pressure Adjustment	25

7. Power Box

7.1 Power box 6182A 26

8. Attached drawings

Hydraulic diagram 30
Outline Dimensions 31
Clearance Chart & Floor Plan 31
Electric Diagram 32

I. GENERAL DESCRIPTION

1-1 Construction (refer to the outline dimensions)

This machine is a small-sized horizontal precision surface grinding machine with a squareshaped table. This machine has a simple construction, each part of which has an enough rigidity to meet high accuracy 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

Machine body {
 Column
 Wheel head
 Wheel spindle
 Worktable
 Saddle
 Base
 Hydraulic power unit

Main functions:

Vertical feed hand-wheel
 Wheel guard
 Motor, wheel flange
 Guard, dogs
 Longitudinal feed hand-wheel, cross feed handwheel
 Electric cabinet, saddle clamping device
 Hydraulic table feed control lever pressure adjusting knob.

1-2 SPECIFICATIONS:

	ITEM	INCH	METRIC
Capacity	Maximum grinding length	18.5"	470m/m
	Maximum grinding width	6.3"	160m/m
	Maximum distance from spindle center to table surface	16"	405m/m
Table	Working surface area	18.3"x6"	465m/mx150m/m
	Maximum longitudinal movement	18.9"	480m/m
	T-slot width	0.669"	17m/m
Saddle	Maximum cross movement	7"	177m/m
Feeds	Longitudinal movement of Table: Hydraulic feed	9.8-65fpm	3-20m/min
	Hand feed per revolution	4.2"	105m/m
	Cross movement of saddle Hand feed per revolution	0.2"/rev	5m/m/rev
	Graduation of handwheel	0.005"	0.02m/m
	Rapid feed	47"/min	1200 mm/min
	Step feed	0.006" - 0.4"/pass	0.15-10mm/pass

	ITEM	INCH	METRIC
	Vertical movement of wheel head hand feed per revolution	0.05"/rev	1m/m/rev
	Graduation of handwheel	0.0002"	0.005m/m
Grinding wheel	Diameter, standard	7.1"	180m/m
	Optional accessories up to	8"	205m/m
	Width	0.25"-0.63"	6-16m/m
	Bore	1.25"	31.75m/m
	Spindle revolution (50/60HZ)	2850/3420rpm	2850/3420rpm
Motors	Grinding wheel spindle	1HP/1.5HP	1HP/1.5HP
	Lubrication pump	0.02HP	0.02HP
	Hydraulic pump motor	1 HP	1 HP
	Cross feed motor	25 W	25 W
Floor	L x W x H	83"x51.2"x70.9"	2110x1300x1800 m/m
Weight	(Approx)	1980 Lbs	900 Kgs

NOTE: The contents of this specifications are subject to change without notice.

1-3 STANDARD ACCESSORIES:

- (1) Grinding wheel (WA46: 7.1" ϕ x 0.5" x 1.25" ϕ 1 pc
- (2) Grinding wheel adaptor & puller 1 set
- (3) Arbor for wheel balancing. 1 pc
- (4) Diamond tool (1/4 carat) with a base. 1 set
- (5) Dust sweeping plate. 1 pc
- (6) Working lamp 1 set
- (7) Leveling plates. 5 pcs
- (8) Leveling bolts with nuts 5 pcs
- (9) Eyebolts 4 pcs
- (10) T-Nut 2 pcs
- (11) Necessary tools with a tool box. 1 set
- (12) Lubrication oil (4 liter) 1 can
- (13) Plug (5/8") 4 pcs
- (14) Operation manual and inspection certificate 1 copy each
- (15) Spare paint 1 can

* Details of tools

No.	Name	Model 618-H	Quantity
1	Pin face box wrench	27mm, 46mm	1 for each
2	Hexagon-headed spanner	3,4,5,6,8	1 for each
3	Adjustable wrench	200m/m	1
4	Cross screw driver	No: 1	1

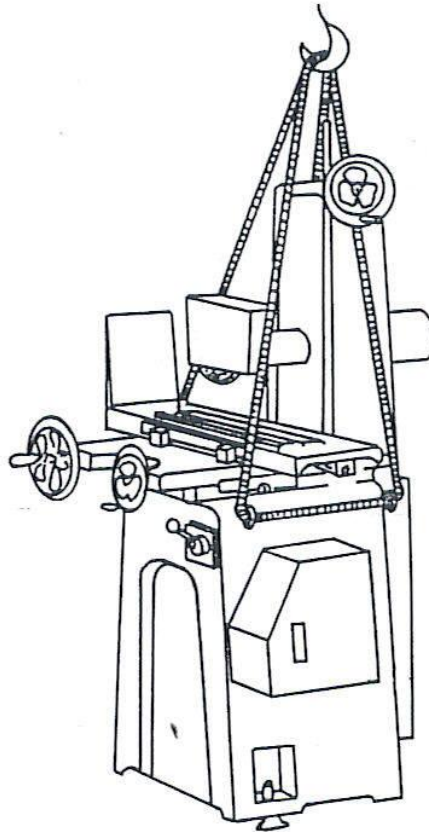
II. INSTALLATION

2-1 Transporting

2.1.1. Transporting of model 618 -H / AH

- (1) When transporting the machine, care should be taken, so that any shock will not be given to the machine in the transportation.
- (2) Lifting of the machine should be made by passing wire rope (more than $\phi 8$) through the metal fittings (eyebolts) on the side of the base.

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 is approximately 900 kg. (1980 lbs)



2-2 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.

2-3 Installation

- (1) Installation 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 installation must inevitably be 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 surface grinding machine is impeded to a great degree by the transmission of vibration coming from outside.

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

2-4 Adjusting

Horizontal adjustment is made by use of the five leveling bolts.

Place the precision level (sensitivity-one graduation 0.02m/m/M) on the surface of the table (or chuck). Make its adjustment within 0.04m/m/M for both the longitudinal and cross direction.

2-5 Power Sources Wiring:

- (1) Electrical equipment (refer to the wiring diagram).

The electrical equipment of the machine consists of the following items:

Electric motor for grinding wheel	0.75kw 2P
Electric motor for dust suction system	0.4kw 2P
Electric motor for cross movement	25 W
Lubricating pump	10W
Hydraulic pump motor	0.75kw 6P
Working lamp	60W

For 2 voltages compatible motor, make sure that the motor wiring match with the source voltage. (refer to the wiring diagram). 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 base.

Connect the working lamp to electric source or electric cabinet.

Caution: Never press push button switch power "ON" 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 direction of its revolution is clockwise, viewing the front of the machine.

(4) Connection of the dust suction motor to the magnetic switch inside the electric cabinet.

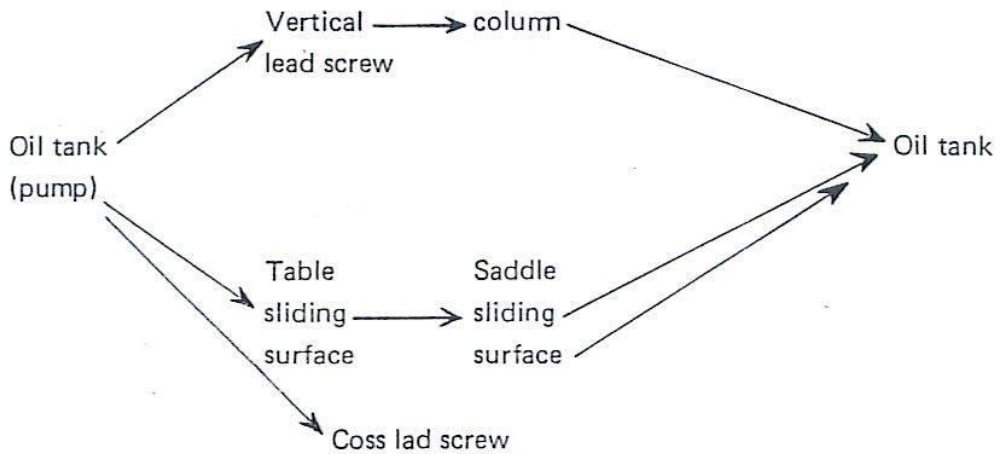
III. OILING AND LUBRICATION

3-1 Lubrication System

This machine uses a fully automatic lubricating system.

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

Oiling system



3-2 Lubricating Oil

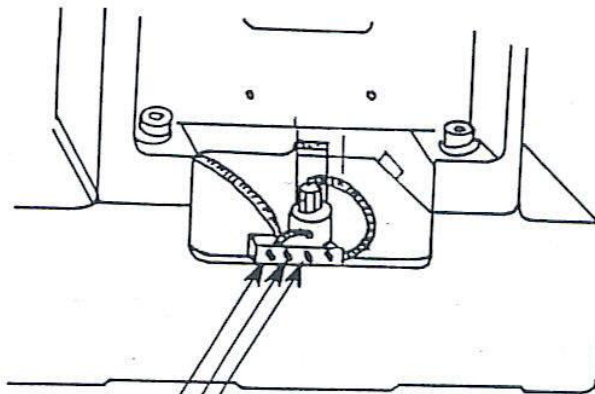
It is recommended that the equivalent oil can be used.

Service Point	Amount	Oil specification	Remarks
Lubricating oil tank	2 Liters	Mobil Vacuoline oil 1405 or slideway Lubricant ISO 32	Replenish in three to six months

3-3 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. 4 liters. In a little while, oil will come through the inspection window on the upper part of the front of the column.

Caution: The lubricating 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.



Adjust valve for column
slide way

Adjust valve for lead screw

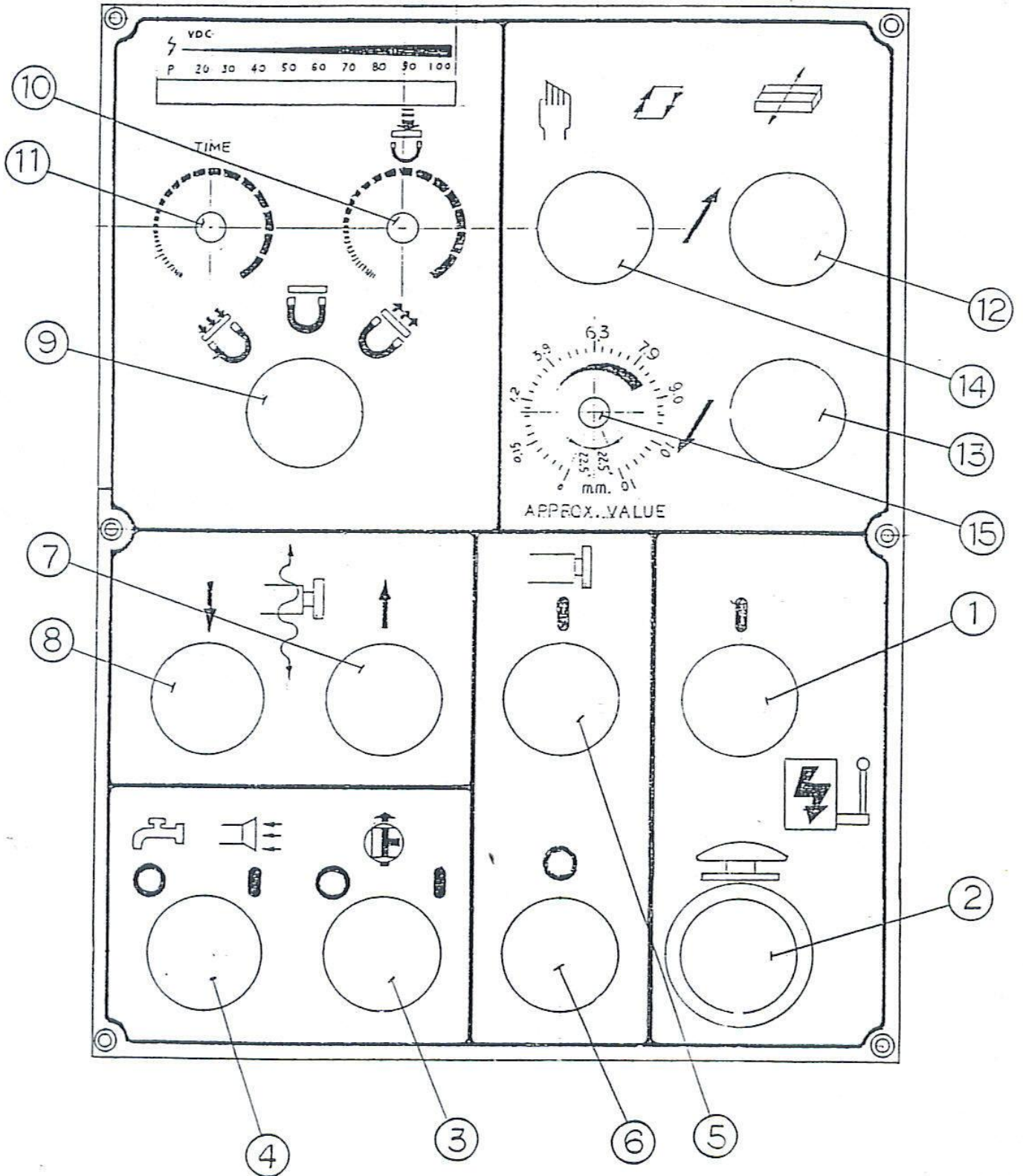
Adjust vale for longitudinal
and cross slide way.

IV. TEST RUNNING AND OPERATION

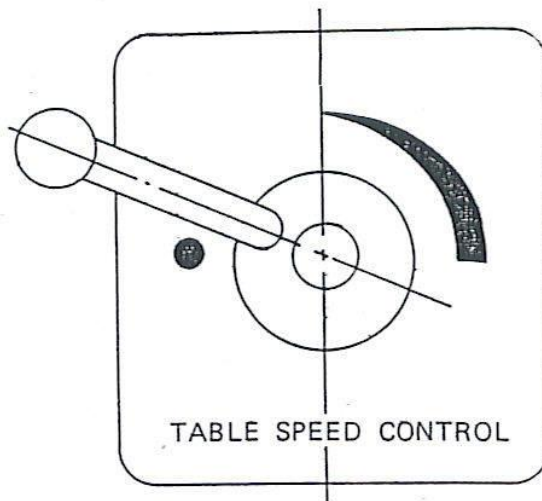
4-1 Function of Switches on Control Panel - 618AH/AHD

No.	Function
1	Main power on
2	Emergency stop (dis-connect all power except magnetic chuck)
3	Hydraulic pump motor R: on L: off
4	Coolant and dust suction R: on L: off
5	Spindle motor on
6.	Spindle motor off
7	Spindle rapid feed up (For 618AHD)
8	Spindle rapid feed down (For 618AHD)
9	Magnetic chuck on and off (opt.)
10	Magnetic chuck clamping force adjustment (opt.)
11	Demagnetizing time adjustment (opt.)
12	Cross rapid feed inward
13	Cross rapid feed outward
14	Mode selection R: Traverse grinding L: plunge grinding
15	Step feed rate adjustment for traverse grinding

YSG - 618 AH/AHD



4-2 Function of Table Speed Control Lever on the Front of Base



Turn C.W.: Increase table speed

Turn C.C.W.: Decrease table speed & stop

4-3 Table Longitudinal Movement

Hydraulic table travel

To engage the hydraulic table travel, turn the table speed control lever C.W. until desired speed is obtained.

Hydraulic pressure is unloaded when the lever is in the table stop position.

(C.C.W., dead point) Table stroke length is set by two table dogs and two proximity switches located inside of saddle which provides easy setting and safe handling of the machine.

Be sure the table hand wheel is in pull-out position before starting the hydraulic table travel.

Table hand feed

The table hand wheel is located on the left side of the front controls and moves the table by rack with a pinion at the end of hand wheel shaft. In case of hand feed; the safety hook must be un-locked then push hand wheel in where pinion and the rack are engaged.

When the desired position is obtained, pull-out the hand wheel and lock the safety hook for preventing the turning of hand wheel in case of hydraulic feed.

4-3-1 Saddle cross movement

Saddle is driven by a set of electric motor system which provides continuous rapid feed and auto. step feed.

Rapid feed

Turn mode selection switch (14) on control panel to left (manu. rapid feed), then press button switch (12) to get inward movement or (13) to have outward movement. It gives a fix speed about 1200 mm/min. Saddle stops immediately when the button is released.

Auto. step feed

There is a set of electronic driving system which provides automatical cross step movement on pre-setting feed rate.

Select the step feed mode by turning switch (14) to right, then adjust feed rate by turning switch (15) (c.w. to increase)

Adjust the dogs at left side of saddle to have suitable stroke in accordance with the width of work piece.

Actuate the table longitudinal feed, then press either push button switch (12) or (13) to get desired direction of step feed.

Then saddle will give an auto. cross movement at each reversing of table, and reverse by the pre-setting stroke of left side dogs.

4-4 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-wheel	Revolve clockwise	Rightward
	Revolve counter-clockwise	Leftward

4-5 Mounting and Dismounting of Grinding wheel

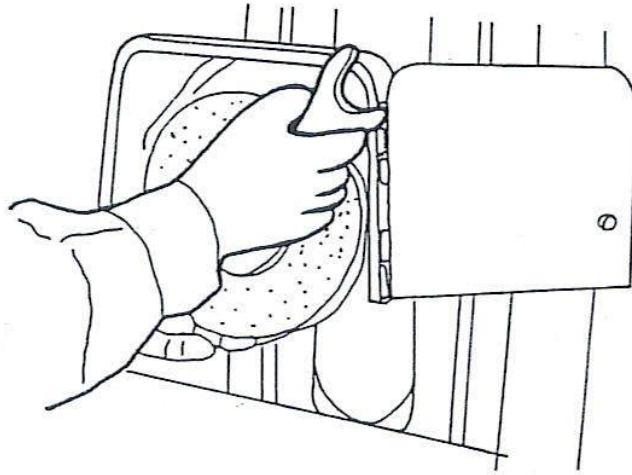
It is recommended to select a grinding wheel with abrasive grain, grain size, hardness (degree to be bound) and binding material suitable for the material, shape and accuracy of the work-piece. And make sure that there exist no cracks as a result of a sound test (by lightly tapping the wheel with a wooden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

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

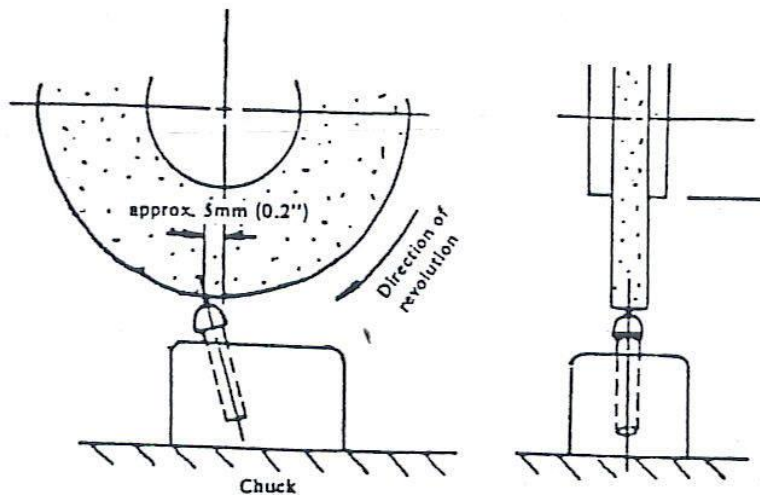
Note: Refer to the Paragraph 4.6 "Balancing of Grinding Wheel."

- (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, hold down the wheel by left hand.



- (3) Close the wheel cover.
- (4) Start the wheel spindle by pushing the push button switch on the electric cabinet 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 reversely 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 made timely at the time of operating, because the wheel becomes out of balance due to its wear.

4-6 Balancing of Grinding Wheel

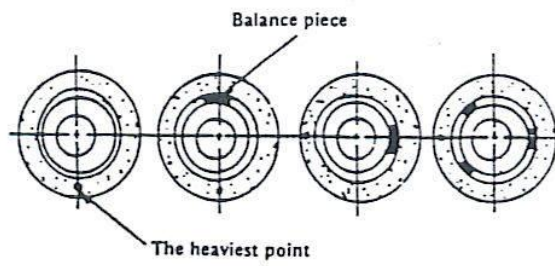
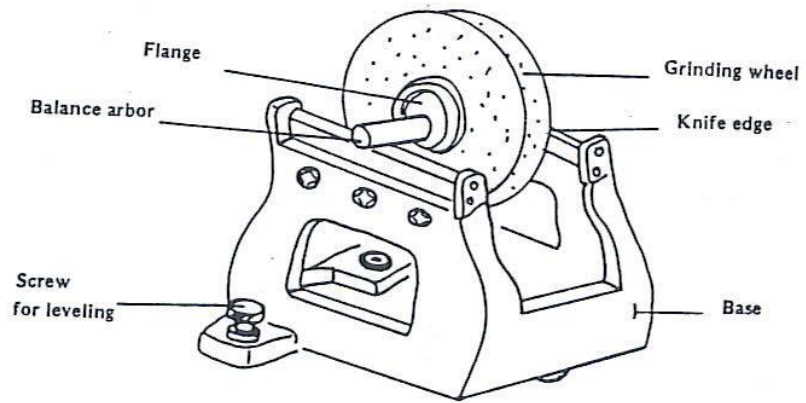
Explanation is made on how balancing of the wheel is done by the use of the wheel balancing device (special accessories).

- (1) Place the device on a sturdy base and make out a level of the knife edge with the three 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 piece 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, adjusting opened angles of the 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 the pendulum.



4-7 Operator's Checking before Operation

Prior to the grinding operation, once again check the following items to insure successful operation.

1. Cleaning of the machine. Remove rust preventatives.
2. Fill the hydraulic tank with approximately 16 gallons (60 liters) hydraulic oil. Check the quantity of oil by observing an oil gauge attached at the side of the tank.
3. Make certain the machine voltage before connecting it to your power supply. The name plate of the machine voltage is attached on the electrical power box.
4. Check the rotation of the wheel with the arrow on the wheel guard. If incorrect, one phase of the power supply line must be changed over.
5. Check the oil gauge at the top of column to see if there is oil running when press the main power button ① after 1 or 2 minutes.
6. Check the wheel specifications and safety speed. Consult your wheel supplier for recommended grades of wheels for various materials to be ground.
7. Confirm the wheel has been trued properly.
8. Care should be taken for the mounting and handling of the wheel to wheel adaptor and also their unit to spindle nose.
9. The table of this machine has been ground and does not require further regrinding. A light cut of the mounting surface of magnetic chuck, if necessary, must be taken to prevent the bending of table after clamped.
10. Table speed control lever must be at stop position (9:00 o'clock) where no table feed is provided.
11. On the control panel for the selection of dust suction & coolant pump motor must be at the OFF position.
12. Legal running of the dust suction motor and coolant pump motor.
13. Legal running of the hydraulic pump motor.

4-8 Trial Running of the Machine

(Prior to entering into this operation, make sure to confirm OPERATOR'S CHECKING BEFORE GRINDING OPERATION shown on the former pages item 4.7)

1. Press main power button ①
2. Confirm lubrication oil appear in the oil gauge on the column top.
3. Press spindle motor button ⑤ on.
4. Check the direction of wheel spindle revolution (Clockwise).

5. Press hydraulic pump motor ③ on.
6. Move the table few times by table hand wheel and then stop it at the position where saddle proximately switches are in between two table dogs.
7. Turn table speed control lever slowly until its speed reaches to 5-6 m/min (20 ft/min).
8. Confirm table moves smoothly.
 - 8-1. Turn switch ⑭ to right
 - 8-2. Adjust switch ⑮ to middle
 - 8-3. Press push button switch ⑫ or ⑬
 - 8-4. Confirm saddle moves smoothly
9. Return the lever to table stop position.
10. Press dust suction & coolant pump to confirm their function.
11. Press button ④ ⑥ ⑧ individually to confirm stops of hydraulic pump, spindle motor, dust suction motor.
12. Re-press ③ ⑤ ⑦ button, then press Emergency stop button ② for confirming stop of hydraulic pump, spindle motor, dust suction motor at the same time.

If there is no abnormal operation by above, trial running of the machine is completed.

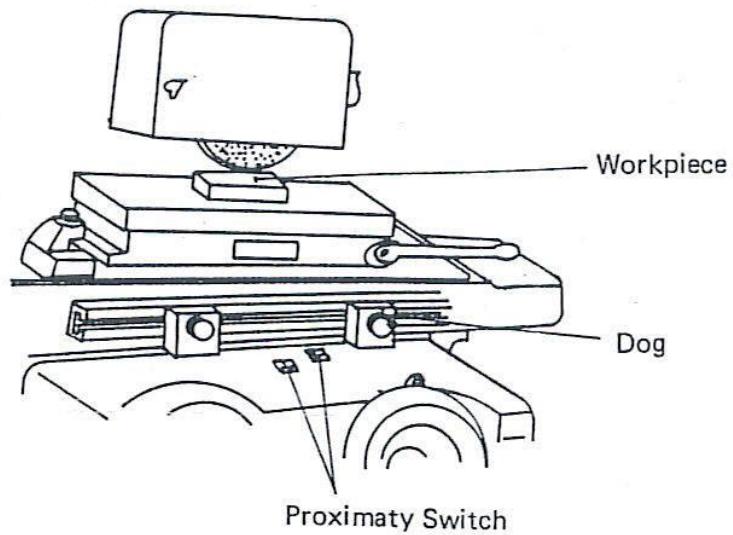
V. GRINDING OPERATION

5-1 Basic Grinding Operation

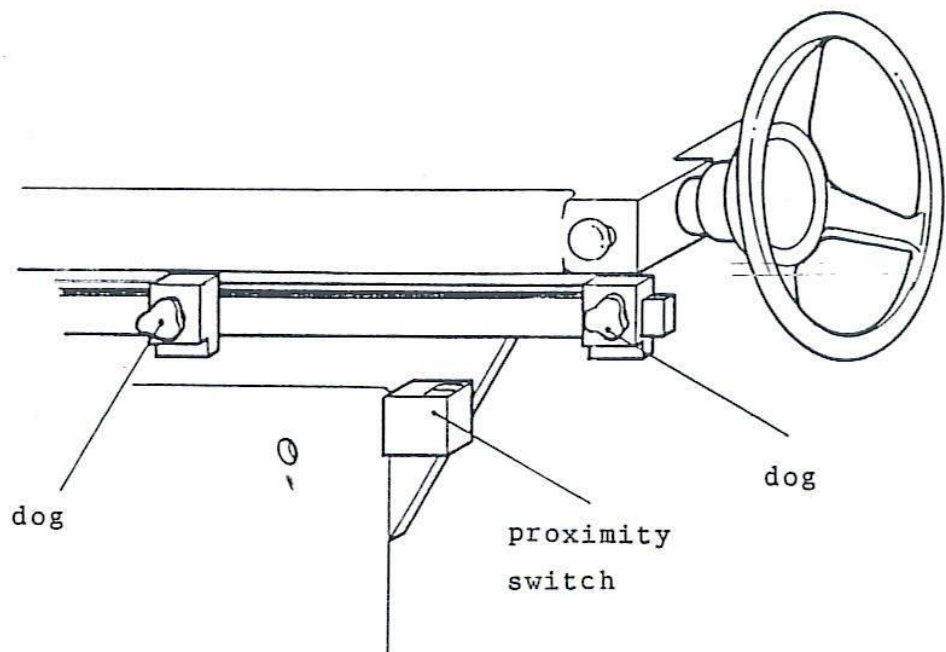
- (1) Mount the wheel, the balance of which has been attained.

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 sweeping plate, wiper or wastes, and put quietly the workpiece onto the chuck for fixing the workpiece on it.



- (3) Clamp the workpiece on the chuck.
- (4) Adjust the clamping force by actuating knob ⑩ if you have this option.
- (5) Adjust the position of the table dogs on the right and left side in accordance with the length of the workpiece.
- (6) Press the main power button ① .
- (7) Press the spindle motor button ⑤
- (8) Press the hydraulic pump motor ③
- (9) Turn table speed control lever slowly to get a smooth table speed about 6 M/min.
After a reverse or two then up to your desired speed.
- (10) Re-adjust the dogs to get suitable travel length to meet the workpiece.
- (10-1) For plunge grinding (or shoulder grinding) keep mode selection switch ⑭ on left.
- (10-2) For traverse grinding
 - (10-2-1) Press push button switch ⑫ or ⑬ to have saddle move.
 - (10-2-2) Re-adjust the feed rate by turning switch ⑮
 - (10-2-3) Re-adjust the reversing stroke of saddle in accordance with the width of workpiece by adjusting the dogs on the left side of it.



- (11) 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.
- (12) After the wheel has come in contact with the workpiece, proceed to the grinding operation, giving a suitable amount of infeed to the wheel.

A Criterion of the amount of infeed

Dry traverse grinding	Coarse	Vertical feed	0.01 – 0.03 mm (0.0004 – 0.0012'')
		Cross feed	2.5 – 5 mm (0.001 – 0.002'')
	Fine	Vertical feed	0.0025 – 0.005mm (0.001 – 0.002'')
		Cross feed	1 – 3 mm (0.04'' – 0.12'')
Dry plunge grinding	Coarse & fine	Vertical feed	0.0025 – 0.015mm (0.001 – 0.006'')

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.

(13) How to use dial indicators

For both the vertical and cross feed hand-wheel there exist dial indicators on their 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.

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

5-2 Saddle Clamping Device

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

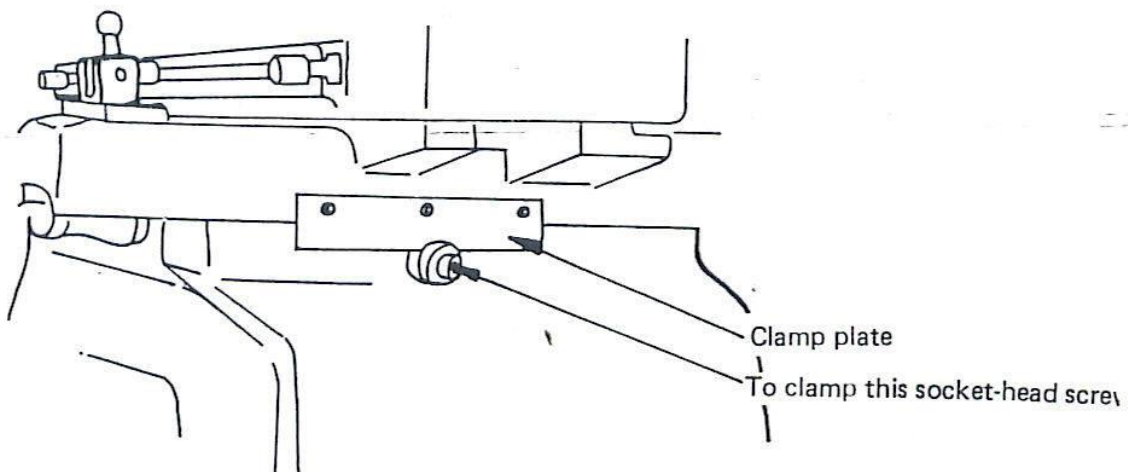
5-3 Dust Suction System

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

Grinding dusts pollute the air in the shop and are 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).



VI. MAINTENANCE

6-1 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 cloth 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.

6-2 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 over 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 grinding wheel to the grade WA46H will be used and its rough-dressing performed with a small amount of infeed. Be sure that grinding will be done after excitation. Also, clean the surface of the chuck well and oil it thinly.

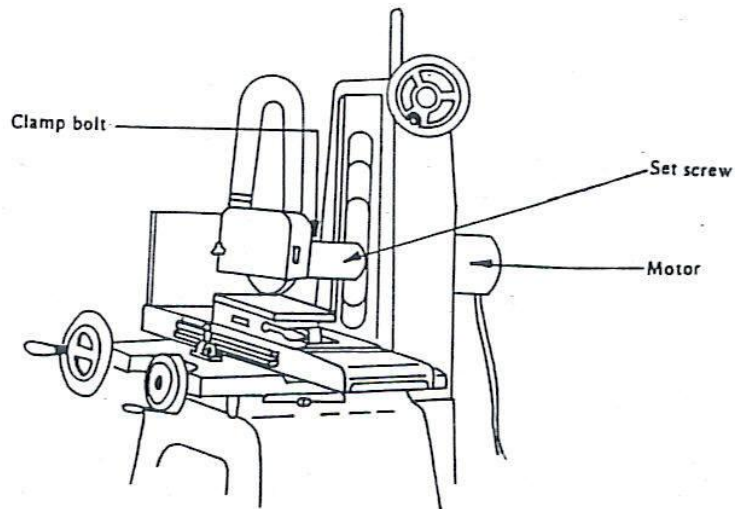
6-3 Grinding Wheel Spindle

As grease lubrication is given for the grinding wheel spindle bearings, oiling is not required for it. In case its accuracy will be reduced after a few years usage of it (its service life is dependent upon the condition of usage), return it to our company for its repair 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 set screws 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 the motor backwards, keeping it by both hands.
- (6) Mounting of the wheel spindle should be made according to the reverse methods to the above procedure.

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



6-4 Lubricating Oil

Change lubricating 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.

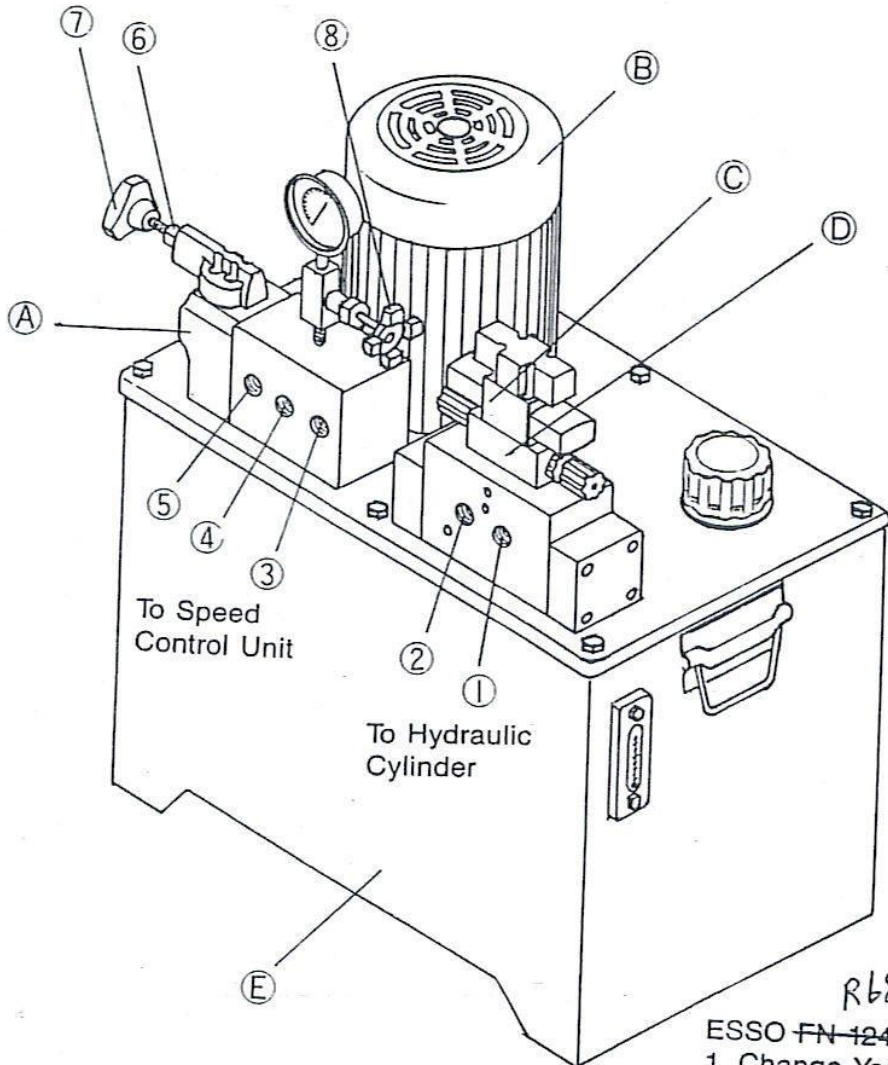
6-5 Hydraulic Oil

Change yearly, 60 liters each time (Esso R6.8 is suggested)

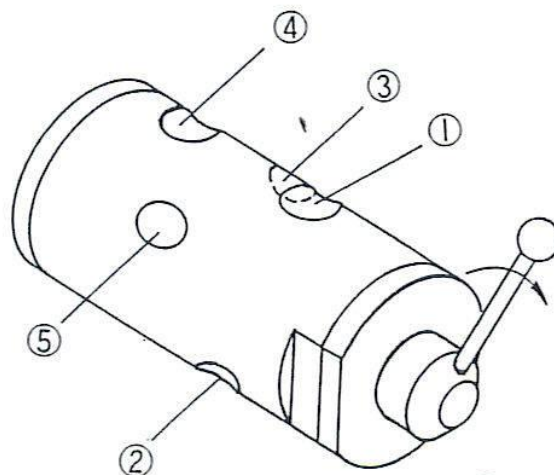
There is an exhaust port (threaded plug) on the lower part of the oil tank.

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

HYDRAULIC POWER UNIT



R68
 ESSO FN-1243
 1. Change Yearly
 2. 60 Liters Each Time



Speed Control Unit
 (Locates in Front
 of the Base)

NO.	PART NAME	SPEC.
A	RELIEF VALVE	J.C. SBT-03
B	MOTOR	JUN CHUNG 220/60, 6P 1 HP
C	SOLENOID VALVE	WILSON HD3-43SGS-BGA-02
D	THROTTLE & CHECK VALVE	SUNNY TVC-W-02M-20
E.	OIL TANK	VOL. 76 liters

HYDRAULIC PRESSURE ADJUSTMENT

The working pressure of the hydraulic pump is set to 12 kg/cm² (168 lbs/in²) and this has been adjusted at factory before shipment.

However, when the setting is disturbed by unforeseen accidents, this setting must be readjusted.

To check the pressure of hydraulic system: (See fig. 1)

1. Start the table hydraulically with a slow speed of less than 1 m/min. As hydraulic pressure is unloaded when the table is stopped correct pressure can not be observed
2. Open the gauge cock ⑨ located just under the pressure gauge and observe the hydraulic pressure.
3. Open cup ⑧ C.C.W.
4. Loose nut ⑥ C.C.W
5. Turn screw ⑦
 - 1) C.W. to increase pressure.
 - 2) C.C.W to decrease pressure.
6. Fasten nut ⑥ , cup ⑧ after the adjustment is done.
7. Close the gauge cock ⑨ to maintain the life of the pressure gauge.

POWER BOX					
INDEX NO	DESCRIPTION	QTY	INDEX NO	DESCRIPTION	QTY
1	FUSE F1 2A , F2 2A , F4 2A , FUSE , F3 5A	3			
2	CROSS FEED CONTROL BOX (L-2A0021) 110V	1			
3	RELAY (MK-2P) WITH AC110V CONTACT	1			
4	TRANSFORMER 110V4A 12V5A	1			
5	CONTROLLER UNIT SOURCE AC110V OUTPUT DC12V AMPS DC15MA (PU-NA)	1			
6	CONTROLLER UNIT SOURCE AC110V OUTPUT DC12V AMPS DC15MA (PU-NA)	1			
7	TIMER RELAY IS AC110V (A+B-2)	1			
8	RELAY (MK-2P) WITH AC110V CONTACT	1			
9	RELAY (MK-2P) WITH AC110V CONTACT	1			
10	RELAY (MK-2P) WITH AC110V CONTACT	1			
11	CHARACTERISTICS RATING 250V 15A	1			
12	MAGNETIC SWITCH (REVERSE) S-CR11 AC110V	1			
13	CAPACITORS 20 μ F 240VAC	1			
14	MAGNETIC SWITCH S-C11L AC110V	1			
15	MAGNETIC SWITCH S-C11L AC110V	1			
16	MAGNETIC SWITCH S-C11L AC110V	1			

EM618AH1

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①

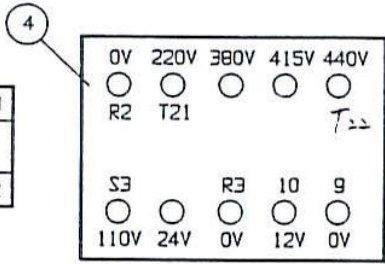
R3	S3	10	7
F1	F2	F3	F4
46	0	11	7

②

L-2A002															
1	2	3	4	5	6	7	8	W	46	U	0	47	48		

③

14			53
R4			
0	7	31	52



⑤

-	+	45	39
PU-NA			
0	15	34	42

⑥

-	+	44	35
PU-NA			
0	15	34	42

⑦

50			51
AHS-2			
0	35	39	43

⑧

46			13
R1			
0	15	14	14

⑨

33			34
R2			
0	31	31	53

⑩

			43
R3			
0		31	42

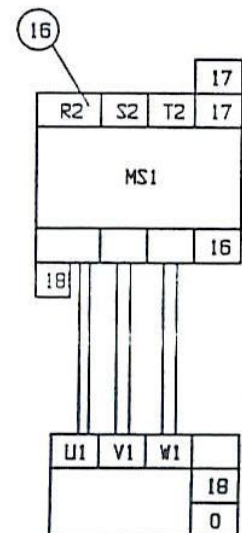
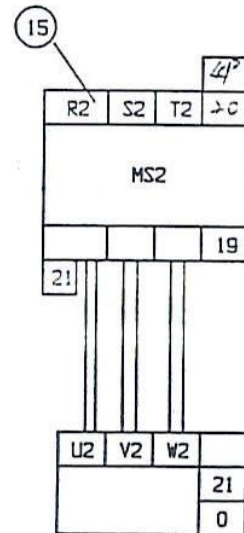
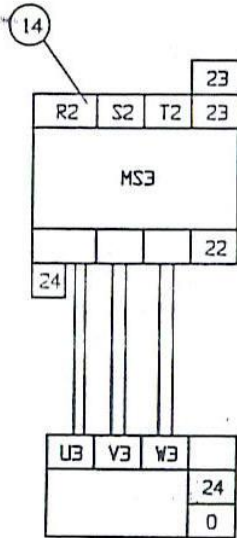
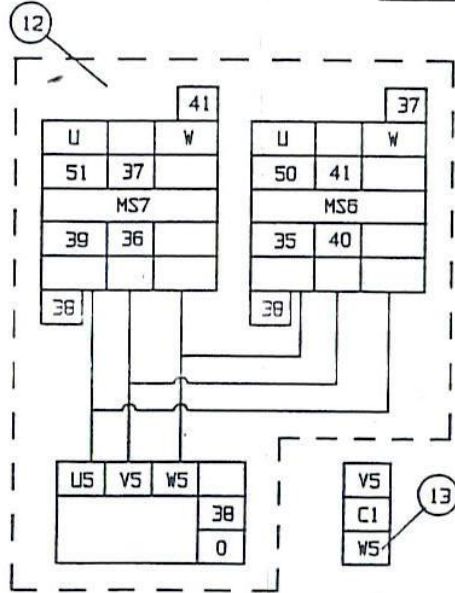
-27-

ON
OFF

F _t	F ₆	F ₇
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⑪

T21
T2
T22



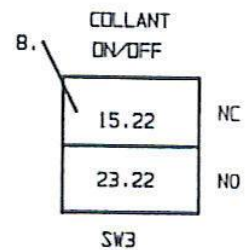
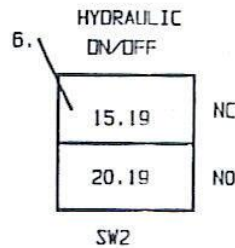
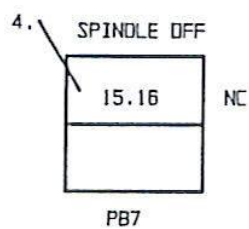
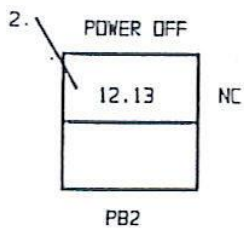
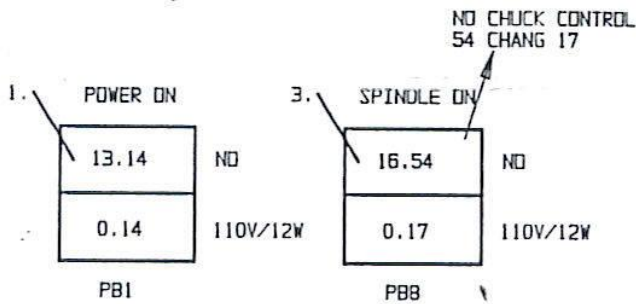
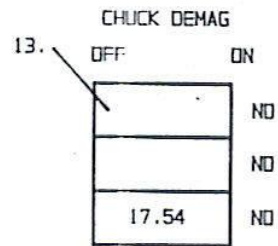
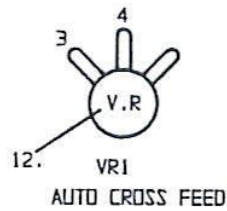
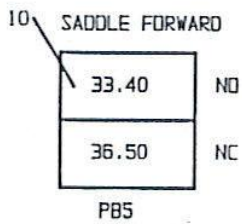
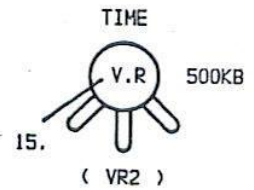
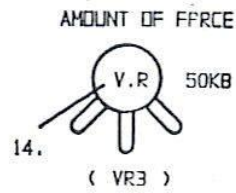
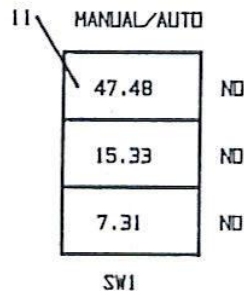
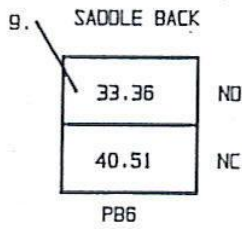
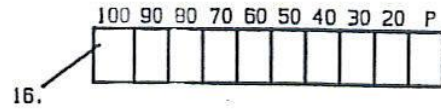
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618AH 美國協寶外銷

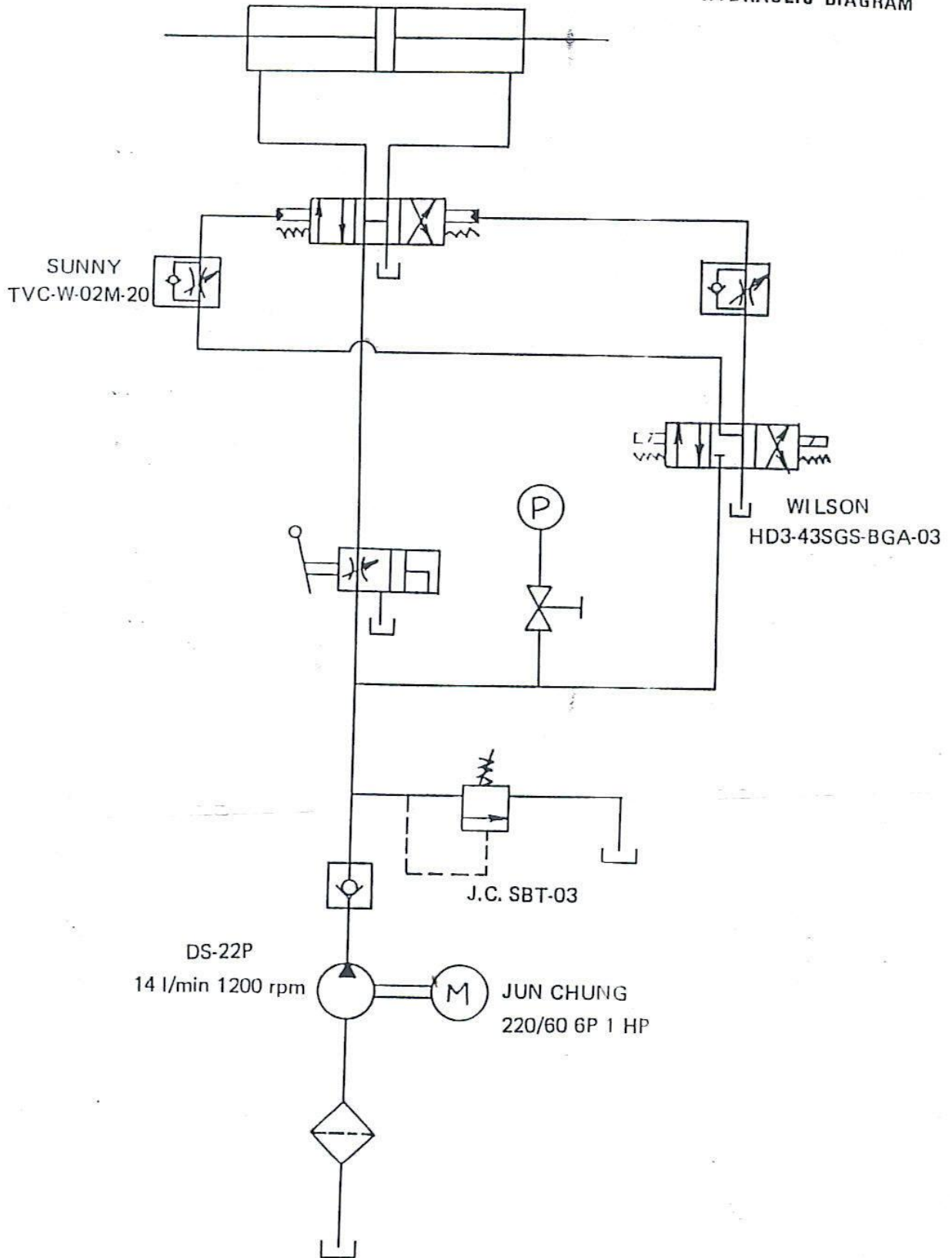
POWER BOX					
INDEX NO	DESCRIPTION	Q' TY	INDEX NO	DESCRIPTION	Q' TY
1	ILLUMINATER PUSH BUTTONS WITH 110V NEON BUJB (GREEN) YK22 Ø 1a 1b	1			
2	PUSH BUTTONS (RED , 1a 1b , EMERGENCY) YK22 Ø 1a 1b	1			
3	ILLUMINATER PUSH BUTTONS WITH 110V NEON BUJB (GREEN) YK22 Ø 1a 1b	1			
4	PUSH BUTTONS (RED , YK22 Ø 1a 1b)	1			
6	SELECTOR SWITCH (3 POSITIONS , YK22 Ø 1a 1b)	1			
8	SELECTOR SWITCH (3 POSITIONS , YK22 Ø 1a 1b)	1			
9	PUSH BUTTONS (WHITE , YK22 Ø 1a 1b)	1			
10	PUSH BUTTONS (WHITE , YK22 Ø 1a 1b)	1			
11	SELECTOR SWITCH (3 POSITIONS , YK22 Ø 4a)	1			
12	VARIABLE RESISTOR 1M Ω	1			
13	SELECTOR SWITCH (3 POSITIONS , 2a)	1			
14	VARIABLE RESISTOR (50KB)	1			
15	VARIABLE RESISTOR (500KB)	1			
16	LED	1			

EM618AH3

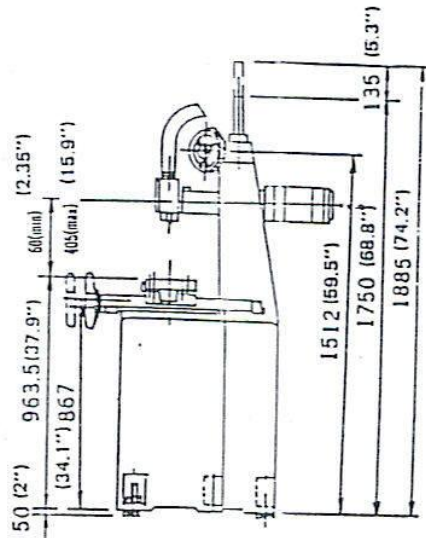
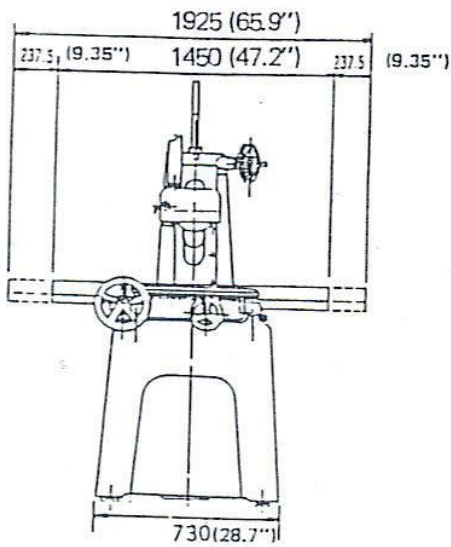
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EM618AH4



HYDRAULIC DIAGRAM



Outline dimensions for model 618-H



Clearance chart & Floor Plan

