



Since 1979



JHC-12S

Centerless Grinder Operation Manual

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CH 1

General Safety Tips

This operation manual is description how to install, operate the machine and a basic maintenance, inspection job. This manual will teach you how to safety and correct operate the machine, in order for the machine works appropriately. Please read carefully this instruction manual before installation and operation.

This manual's safety tips and the warning sign on machine are very important; please fully understand before operation machine.

1.1 Warning Tips

To avoid serious injure, the owner and all operator should provide necessary of protection equipments for the regular operation, special operation. The owner should select qualified person with proper grinding training to operate and maintain the machine. Also, please follow below safety rules and local laborer safety laws

1. This machine will be only operated by qualify operator who know the machine's specification and safety rules very well.
2. When machine running, do not close to any movable parts of machine, if need, please turn off the machine power.
3. Please wear protective hair cap or hold hat to prevent long hair from falling down during operation.
4. Do not wear loose clothing, gloves, long sleeves and neckties during operation.
5. Please wear goggles and protection mask to avoid damage by accident or mis-operation. Wear safety shoes while operating this machine.
6. Do not operation this machine without any guidance and supervision.
7. Please stop the spindles when change / adjust the workpiece, or equip / dismantle the accessories.
8. Do not use inflammable or poisonous coolant
9. Please stop the machine immediately when find out any safe problem, ask for help from local agent.
10. Do not remove any warning sign from the machine.

1.2 General Safety Tips

In order to eliminate accident and keep the machine working well, the safety considerations are very important. Pay attention on the safety rules will much increase the productivity.

1. Wear the goggles mask
2. Wear the safety shoes
3. Wear the safety helmet and overall, and tight the cuff.
4. Do not wear the gloves while operation machine.
5. Keep the area where around machine clean, dry and bright anytime
6. Do not use air gun to clean the chip and dust around the servo driver.
7. Clean and maintain the machine after finish the work.
8. All guards and doors should be secured all the time except maintenance
9. Before start machine, make sure that the stop button and emergency stop switch are both turn off
10. Never let running machine unattended, turn power off before leaving
11. Never modify the functions and capacity of machine without consult with local agent
12. This tips are used for centerless grinder only. No flammable materials such as wood or plastic shall be used as workpiece.
13. The owners should demand operators to participate safety seminars and practices.

14. Read this instruction manual before operating this machine. During operation or reparation, pay attention to the directions or warnings pasted on the machine.
15. All guards and doors should be secured at all times except when maintenance is required.
16. Removal or replacement of workpiece is not allowed when grinding and regulating wheels are both running. This is also applied while workpiece is too close to grinding wheel.
17. Do not attempt to clear sludge inside coolant cycle channel before grinding process is finished.
18. Check grinding wheel and make sure that spindle turns at clockwise direction before actuating spindle motor. Allow grinding wheel to perform idle run for at least five minutes.
19. Adjust the screws on workrest and guide blade hold workpiece through the gap between grinding wheel and regulating wheel for grinding process.
20. Choose proper size of workpiece to machine capacity. Improper size of workpiece would damage and break the grinding wheel.
21. Before grinding make sure that workpiece is held with proper way. Use support blade as cushion guide to hold workpiece. Be cautious that gap between centers should be checked so as to prevent the grinding wheel from impacting workpiece when the spindle is running.

22. During grinding, remove all objects other than the workpiece from the machine.
23. After switching the spindle motor off, allow the spindle to stop freely. Never attempt to stop the grinding wheel by hand or other objects.
24. During wet grinding, do not try to adjust nozzle after spindle starts. Stop coolant before, switching spindle motor off.
25. Nobody other than the operator is allowed to stay at the left side of machine. Operators should not stand right behind the machine, and should view the workpiece from the right side.
26. Never open electric box without approval. Consult the electrical technician or qualified personals for electrical troubleshooting.
24. This machine cannot be used in the explosive environment.

1.3 Machine Safety Tips

Before operation this machine, the operator must fully understand this manual.

1. The operator and service person, must be pay attention to the warning sign, do not remove or damage.
2. Do not remove the belt cover for avoiding the accident
3. Do not remove the limit switch to change the slide travel
4. Please use proper tools to adjust, maintain and repair the machine

5. Any problem occurred, please stops the machine immediately.
6. Before operation, please aware of bellowing tips
 - (1) When machine running, do not close to any movement or rotation parts, such as grinding wheel and regulating wheel.
 - (2) Do not use hand to clean the chips which on the wheel and worktable, please make sure to clean the chips after the machine stop.
 - (3) Stop the machine when adjusting the direction of coolant spray head.
 - (4) Do not try to touch or change the workpiece when worktable moving
 - (5) Stop the machine immediately when unusual situation happen during the machine running ; restart the machine after solved
 - (6) Make sure the work space is enough for the machine ,remove clogs and scraps out of machine, keep the irrelative staff away from the machine

1.4 Standard operation process for daily machine turn off

1. Turn off the power
2. Clean the machine
3. Apply lubrication on the machine

CH 2

Machine Specification

2. SPECIFICATON

2.1 Specification of Machine

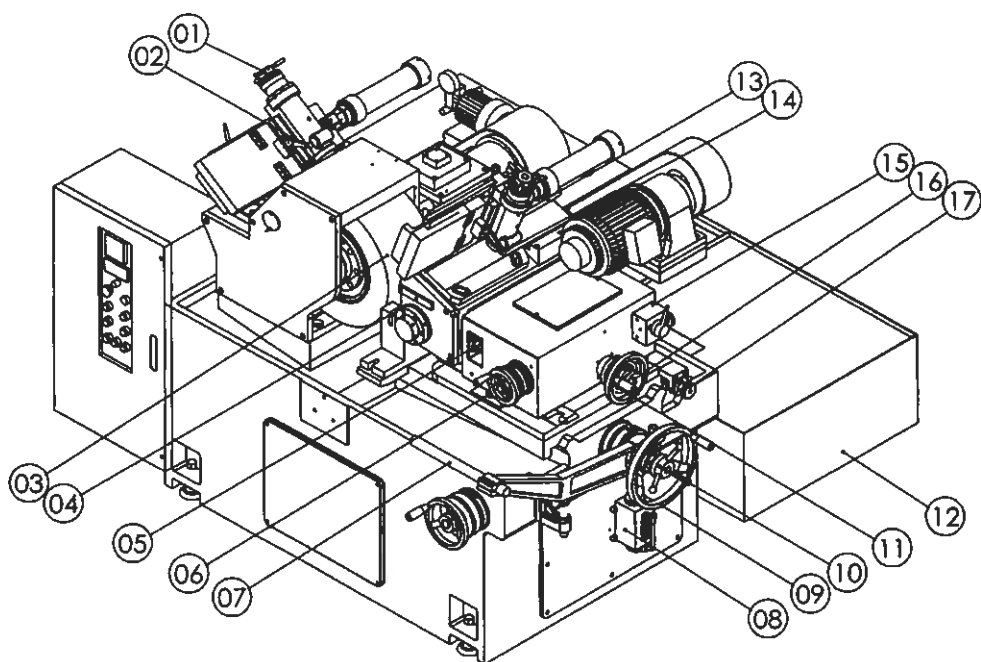
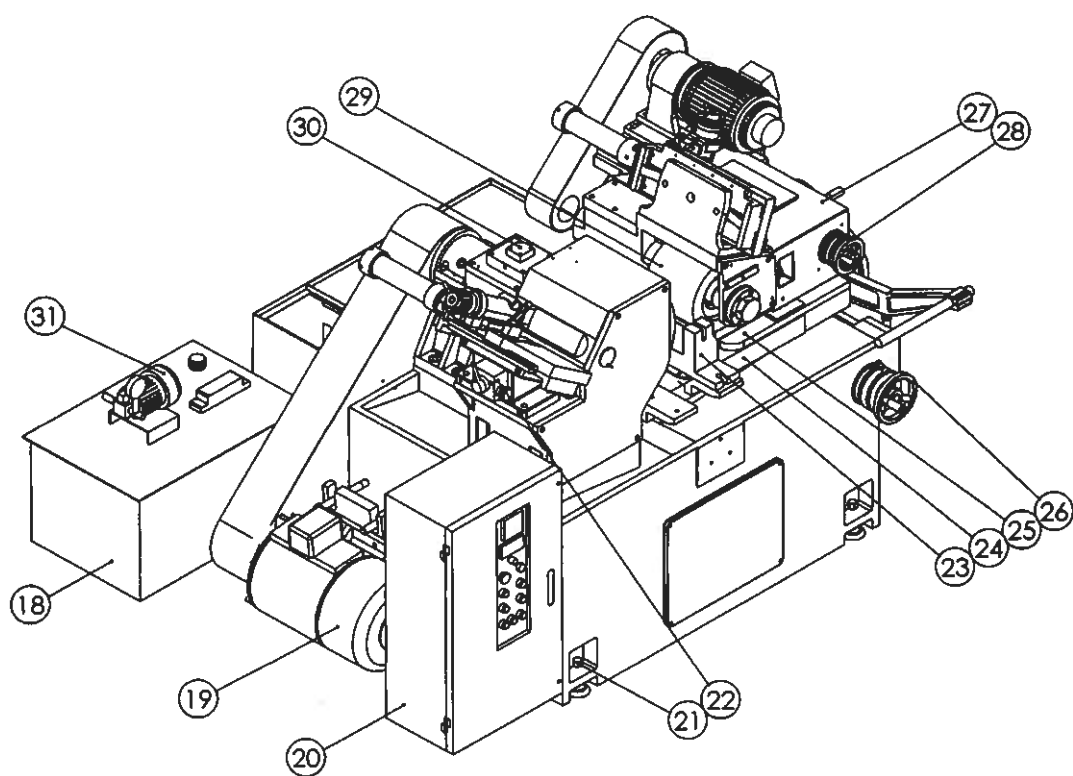
	JHC-12S	JHC-18S	JHC-18AS	JHC-18BS	JHC-20S
Std work rest (dia)	Ø1~Ø25 mm	Ø1~Ø50 mm			
Special work rest (dia)	Ø25~Ø40 mm	Ø40~Ø100 mm			
Grinding wheel size (dia / width / hole)	Ø305×150×Ø120	Ø455×205×Ø228.6	Ø455×255×Ø228.6	Ø455×305×Ø228.6	Ø510×205×Ø254
Regulating wheel size (dia / width / hole)	Ø205×150×Ø90	Ø255×205×Ø111.2	Ø255×255×Ø111.2	Ø255×305×Ø111.2	Ø305×205×Ø127
Grinding wheel speed	1900 R.P.M	1500 R.P.M			1350 R.P.M
Regulating wheel speed	10-300 R.P.M	10-250 R.P.M			
Grinding wheel motor	7.5 HP	15 HP		20 HP	
Regulating wheel motor	2 HP	4 HP		4 HP	5 HP
Hydraulic pump motor	1HP				
Coolant pump motor	1/8 HP	1/4 HP	1/2 HP		
handwheel feed on Regulating wheel	4 mm / per Rev. 0.02 mm / per Gra.	3.5 mm / per Rev. 0.05 mm / per Gra.			
handwheel micro feed on Regulating wheel		0.1mm / per Rev. 0.001mm / per Gra.			
handwheel feed on Table	7 mm / per Rev. 0.05 mm / Gra.	9 mm / per Rev. 0.05 mm / per Gra.			
handwheel micro feed on Table		0.2 mm / per Rev. 0.001mm / per Gra.			
Dressing handwheel	1.25mm / per Rev. 0.01mm / per Gra.	2mm / per Rev. 0.01mm / per Gra.			
Regulating wheel tilt angle	+5° ~ -3°				
Regulating wheel swivel angle	±5°				
Floor space (L×W×H)	1800x1400x1400 mm	2300x2000x1530 mm			
Net weight (approx)	1600 kgs	2800 kgs	2900 kgs	3000 kgs	3200 kgs
Packing weight (approx)	1750 kgs	3100 kgs	3200 kgs	3300 kgs	3500 kgs
Size of case (L×W×H)	2300x1100x1800 mm	3300 x1400 x1900 mm			

2.2 MECHANISMS AND PART LIST

NO	NAME		NAME
01.	Grinding Wheel Dressing Unit	17.	Regulating Wheel Swivel Angle Adjusting Screw
02.	Grinding Wheel Dressing Emergency Handle	18.	Oil Tank
03.	Grinding Wheel	19.	Grinding Wheel Motor
04.	Blade	20.	Electrical Box
05.	Regulating Wheel Lock Nut	21.	Basic Screw (Leveling Screw)
06.	Regulating Wheel Swivel Angle Lock Nut	22.	Grinding Wheel Dressing Switch
07.	Set Grinding Feed Handle	23.	Workrest
08.	Auto Oil Filler	24.	Lower Slide (Worktable)
09.	Worktable Feed Handle	25.	Upper Slide
10.	Worktable Micro Lock Hand screw	26.	Worktable Micro Feed Hand wheel
11.	Regulating Feed Hand wheel	27.	Regulating Wheel Housing
12.	Coolant Tank	28.	Regulating Wheel Micro Feed Handwheel
13.	Regulating Wheel Dressing Unit	29.	Regulating Wheel
14.	Regulating Wheel Dressing Emergency Handle	30.	Oil Window of Grinding Wheel Spindle
15.	Regulating Wheel Dressing Switch	31.	Hydraulic Motor
16.	Regulating Wheel Micro Locked Handscrew		

2.3 Mechanism Parts Function

- (1) Dressing grinding wheel
- (2) To avoid carelessness cause grinding wheel damage
- (3) Grinding workpiece
- (4) Support workpiece
- (5) Fixed regulating feed axis on regulating housing.
- (6) Fixed regulating wheel leveling swivel angle. each one both left & right side
- (7) For infeed only
- (8) Force the lubrication oil into the slide , bearing and screw
- (9). Adjust the distance between blade and grinding wheel
- (10). The worktable micro feed handwheel will working after locking
- (11). Adjust the distance between blade and regulating wheel
- (12). Reservoir the coolant
- (13). Dressing regulating wheel
- (14). To avoid carelessness cause regulating wheel damage
- (15). Control direction and speed of dressing's cylinder
- (16). The Regulating wheel micro feed handwheel will working after locking
- (17). Adjust level swivel angle
- (18). Reservoir the Lubrication oil
- (19). Grinding wheel power source
- (20). Electrical control and switchboard
- (21). Adjusting machine leveling
- (22). Control direction and speed of dressing's cylinder
- (23). Fix the blade
- (24). Support work rest
- (25). Regulating wheel leveling angle rotation surface and upper slide surface.
- (26). Micro adjust the distance between workrest and grinding wheel
- (27). Fixed regulating wheel seat and upper slide
- (28). Micro adjust the distance between regulating wheel and upper feed device
- (29). Control feed and speed
- (30). Check grinding wheel spindle's lubrication oil whether works well or not
- (31). For spindle lubrication oil and hydraulic oil for dressing



CH 3

Transportation & Installation

3.1 Safety Request for Lifting and Transportation

3.1.1 Safety rules for lifting

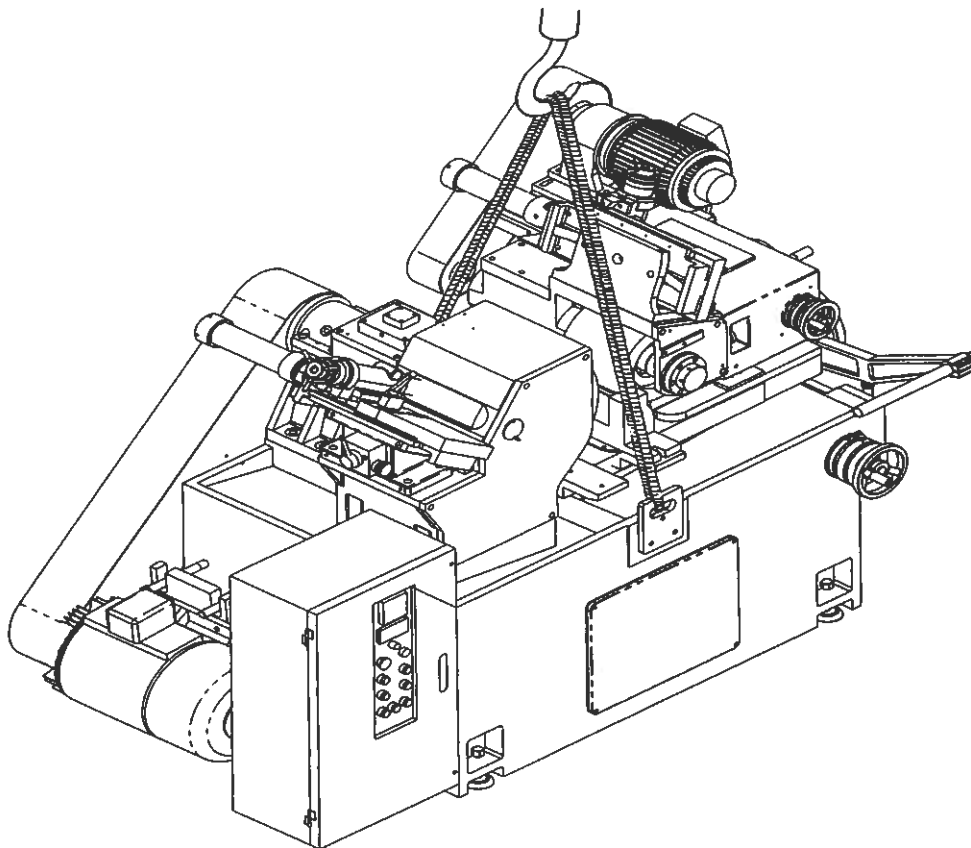
1. Hoist capacity has to be equipped by user at his factory, and its loading capacity be able to haul at least 6 tons.
2. Coil of steel wire rope (sling). The external diameter of wire rope has to be 20 mm by 2 coils.
3. Tools for hang-up: once piece of adjusted wrench or 32 mm of top open spanner. At least, please find out 6 pieces of screws and hang-plate from tool bow, which was putting together with machine into the wooden case. Then, fix the hooks on two sides of those plates firmly, haul the hook of hoist step, be sure to load it in balance not turbulent in move for safety concern.

Notes:

1. The capacity of steel wire should be serious considered; please choose the diameter of steel wire must be over 20 mm for its diameter, the capacity must be at least 6 tons. It's safety rules on demand in order to protect the worker's safety, and to prevent the steel wire form breaking during hang-up.
2. The capacity of steel hook must be 6 tons for both hooks during it on hang-up of loading.
3. The hang plate with 6 pieces of screws. For safety consideration, do not use the wire and hooks, which are below the proper capacity on required during the machine on hang-up loading.

3.1.2 Safety Conditions while lifting

1. The speed of hoist must be limited as low as possible for loading.
2. Check the length of wire rope as request; make sure those 6 pieces of screws to be fixed on two sides both firmly.
3. Check the steel hooks on both sides of machine again
4. Keep it to be balancing during the hang-up loading.
5. Before the machine be hang-up, please recheck the steel wire rope holding on the proper spots on the machine firmly. Do not let steel wire rope be slunk away during hanging the machine.
6. Be ware let anyone enter the area below the machine hanging by wire rope. Keep all staff at your factory away from dangerous area at least 2 m.



3.2 Safety Rule For Forklift

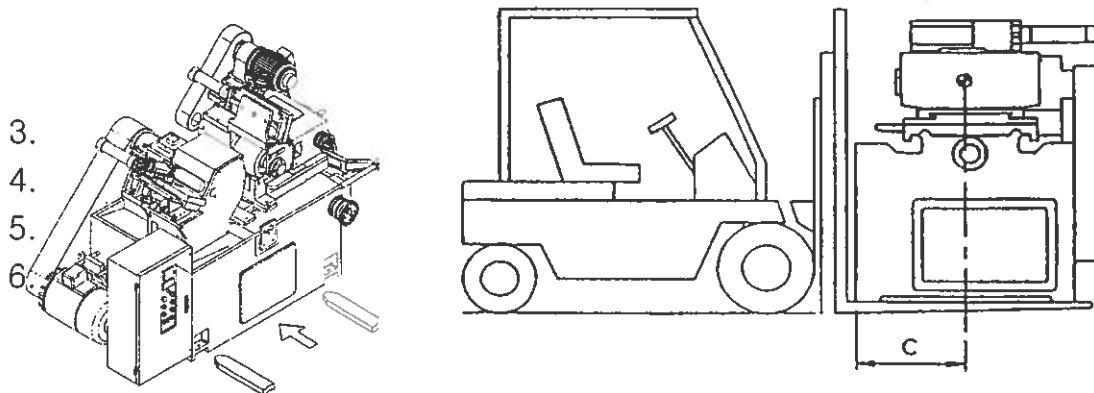
In case of a factory without hoist, a forklift can be used in installation of machine

1. The capacity of forklift and lorry need by the machine show as below

Model	JHC-12S	JHC-18S	JHC-18AS	JHC-18BS	JHC-20S
Capacity	3 tons	4 tons	5 tons	5 tons	5 tons

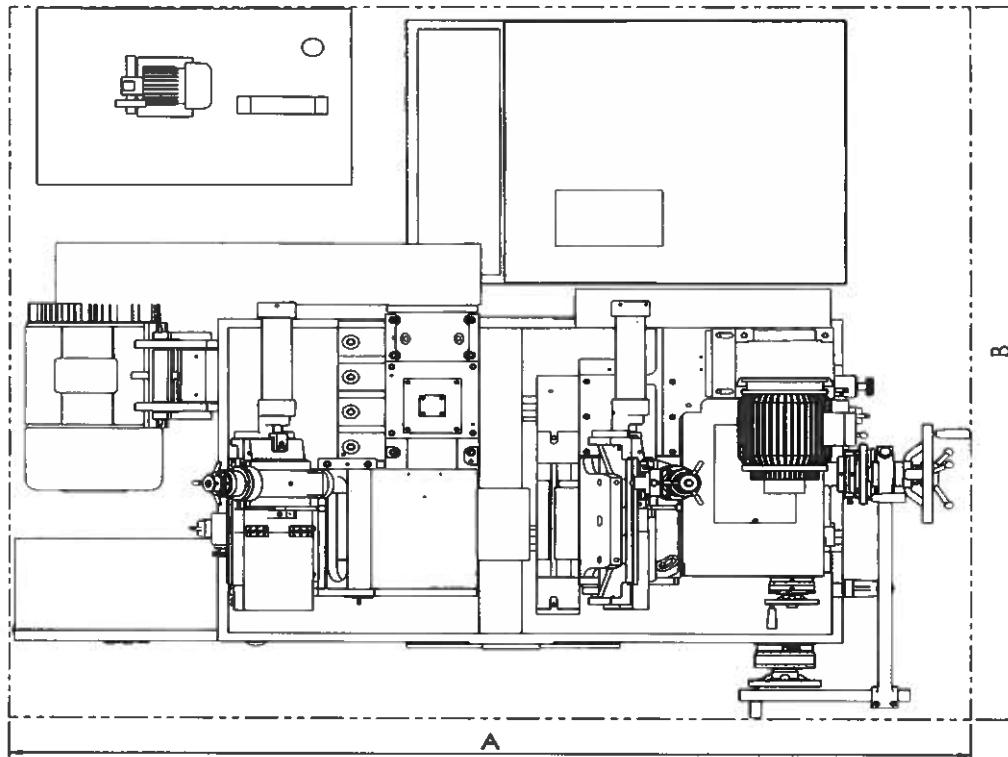
2. Proper ways of forklifting should consider the location of center of gravity of machine in the direction of lifting.

Model	JHC-12S	JHC-18S	JHC-18AS	JHC-18BS	JHC-20S
C(mm)	325	460			



3. A qualified person for operating forklift has to be complied by user.
4. On the way to move a machine form lorry into the user's factory. It's no need to take off the pallet below wooden crate. Do not crash the machine easily and load the machine down. If not, it will affect the accuracy and function of this machine.

3.3 Floor Plan



	JHC-12S	JHC-18S	JHC-18AS	JHC-18BS	JHC-20S
A	2800	3300	3300	3300	3300
B	2400	3000	3000	3000	3000

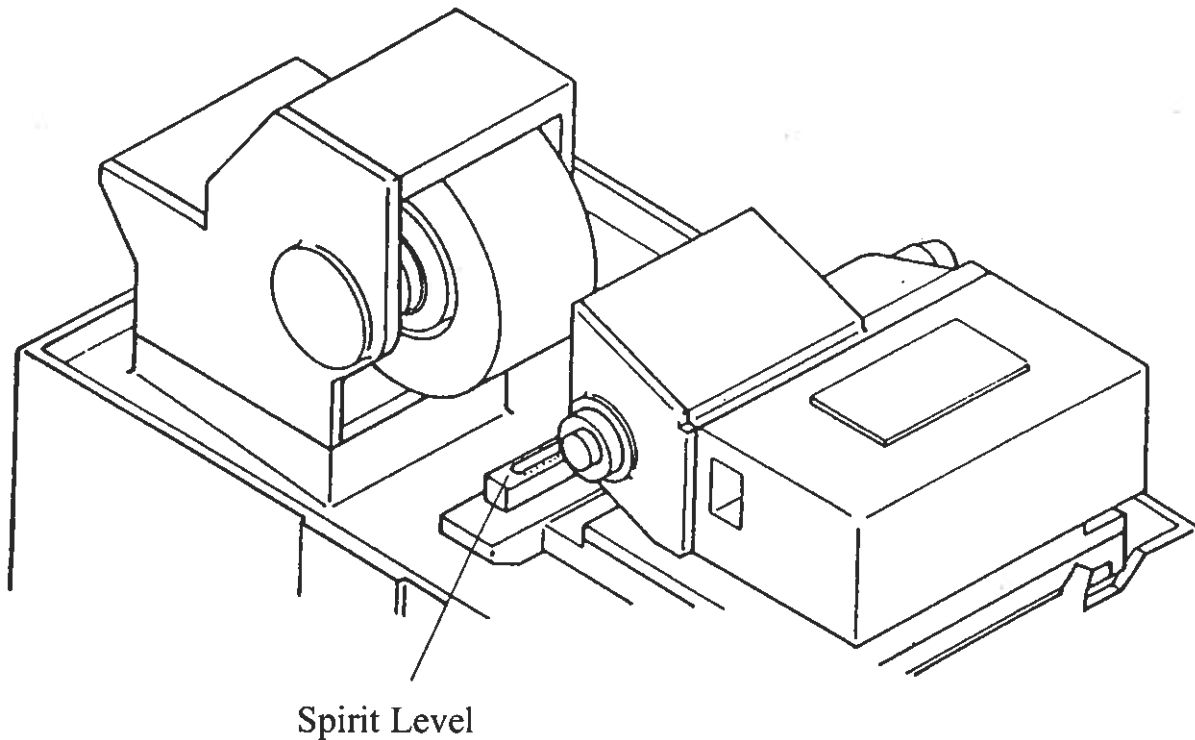
3.4 Foundation

The machine should be installed with ever-rigid floor. It's recommended to use concrete of at least 150 mm thickness at the place installing the machine and to keep from source of vibration, such as punching or planer. It would be better to use vibration-isolated equipment at the foundation. This is especially important for high precision grinding machine.

3.5 Leveling

The level of machine will be regulated after machine installed for 24 hours. The level precision of machine is subject to change by temperature and other factors. Hence, it should be re-leveling once a year to ensure its precision.

Each graduation of level should be 0.02 mm/m. please do not apply wooden level owing to its low precision. In regulating, spirit level (see below) should be laid on worktable of lower slide so as to adjust machine's level and the surface of worktable.



3.6 Clearing The Machine

For shipment by ocean freight to user's factory, it has to use anti-rust oil spreading over all the rust parts of a machine for protection. When take the plastic cover off machine, please use soft cloth with kerosene to clean machine body and then put either oil or grease on the parts, which need to be lubricated before to running the machine.

3.7 Preparation for power supply

	JHC-12S	JHC-18S	JHC-18AS	JHC-18BS	JHC-20S
Fuse recommended	40	63	63	63	63
Wire cable (mm ²)	5.5	14	14	14	14
Switch height form ground (m)	1.5	1.5	1.5	1.5	1.5

3.8 Lubricant Reference

	ESSO	SHELL
Type	# 10	# C 10

3.9 Coolant liquid needed to prepare

	Aluminum	General Materials
Quantity (Gal)	50	5

3.10 Line Connection and Trial Run

3.10.1 Power Check

1. Check motor voltages against power supply before installation
2. Ensure that the power supply connoted complies with the local safety regulation and protected by safety earth
3. Check the correct direction of rotation of the motors after connecting the machine to the power supply

3.10.2 Test Run

Turn on the buttons of auto-lubricating motor, grinding wheel coolant system on control panel as shown in follow picture, to avoid the operator being hurt by electric shock, all the connecting wire cables with machine main motor, coolant tank and lubricating oil tank must be put into the grounded

A button on the control which has sequential effect, at first the switch of auto-lubricating should be pressed, and then the other button will be pushed in effect. The switch could be started by user after grinding wheel switch on. all the motors in the machine will be stopped instantly if the emergency stop button , red color in its cap is pressed

In order to start up again, user have to turn the red mushroom cap on, after joining power supply, you have to test running both lubrication motor and wheel motor to check whether these can run properly or not. If no pressure comes out through the oil pipe, check hydraulic cycle diagram in which of No.5 stop valve plus No.6 pressure gauge (meter) then open the stop valve. When the grinding wheel makes a reverse turn, it is only need change two wire cable of power lines with lubricating motor

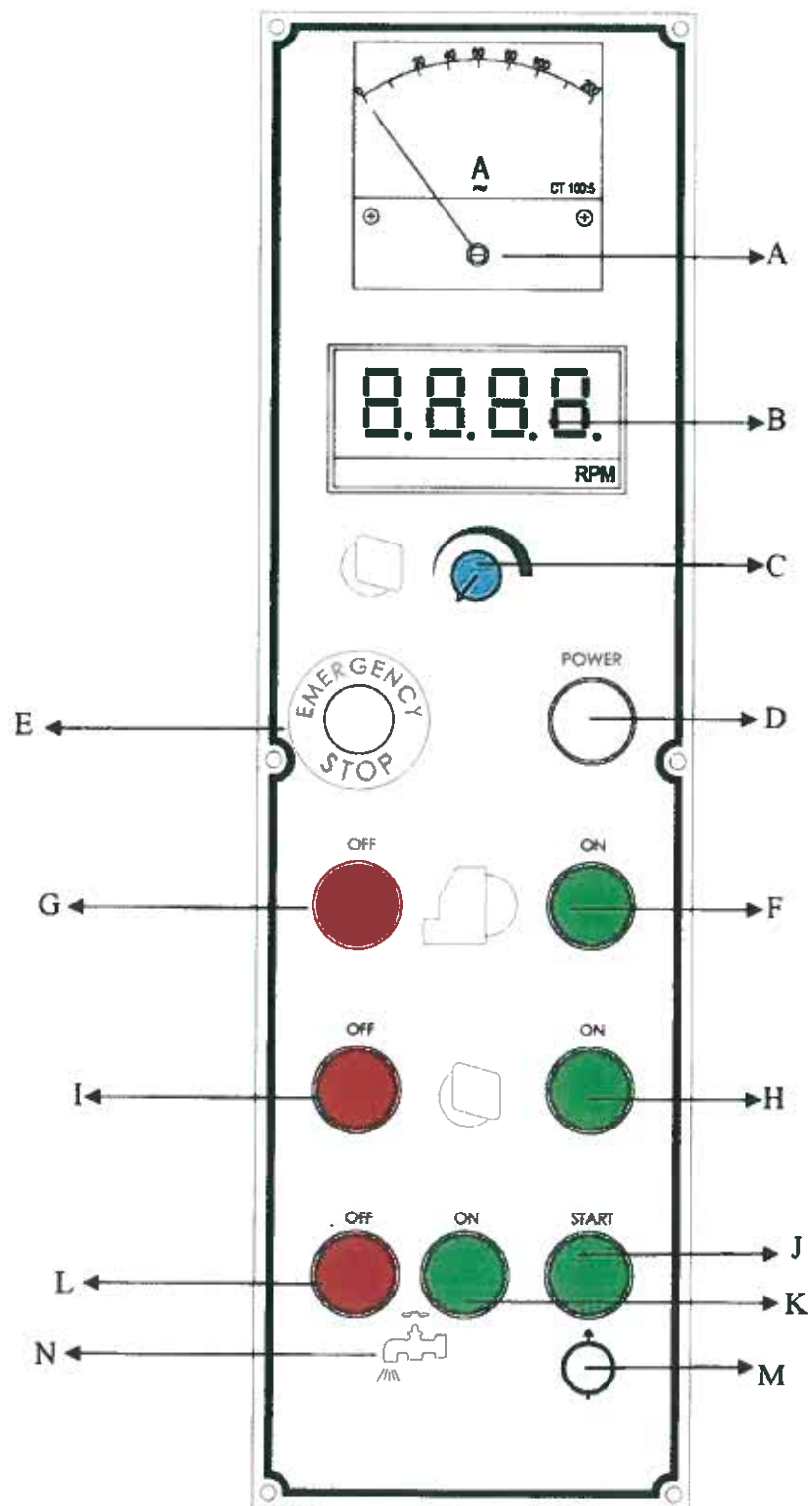
If the pressure flow out (which will be indicated by pressure gauge as show) the problem should be that grinding wheel is turning on reversely. It has to change any two lines of main power and also lubricating power lines. Please do not change connection with grinding wheel and motor because of regulating wheel and motor both were joined together with one power cable in the same turn during assembly

Try test run of coolant pump immediately, turn the switch of coolant system off and on, then you will find out the turning direction whether it is same with mark of not

A timer inside the electrical control box my control delayed turn off time on lubrication pump so that there is still staying power after grinding wheel motor turned off. Oil my go on lubricating until stop button is pressed. The above-mentioned switch will act after machine is turned off and full stop switch is pressed

In turning off machine, first turn off switch of coolant liquid, then 2~3 minutes later, press full stop switch to make adhered coolant all slide away, which will prevent grinding wheel from absorbing coolant and keep its balance

3.11 Control panel illustration:



Part No	Illustration
A	Ampere meter, Indicator for load for electric current: Show as grinding wheel spindle motor's electric current load
B	RPM indicator: Show as regulating wheel's rpm
C	Variable resistance: Adjusting regulating wheel speed (0~300 rpm)
D	Power indicator light
E	Emergency button
F	Grinding wheel start button
G	Grinding wheel stop button
H	Regulating wheel start button
I	Regulating wheel stop button
J	Hydraulic start button
K	Coolant start button
L	Coolant stop button
M	Lubricant
N	Coolant

CH 4

Machine Mechanism and Adjust

Balancing, Dressing and assembling of Grinding Wheel

Balancing of grinding is to obtain good smoothness and accuracy of workpiece after grinding and to keep machine in equilibrium condition. The jerk mark appearing on the ground workpiece is owing to vibration. This kind of deformation can be seen by eyes. Vibration often occurs on account of the eccentricity of grinding wheel, which is caused by deviation flange mounting on grinding wheel or obliquity between flange and mandrel. Balancing adjusting shown as Figure 4 – 1.

4.1. Balancing of grinding wheel

1. Mount the balance arbor (mandrel) into grinding wheel, lock it tightly with nuts and hoist it on the balance base (Figure 4 – 1)
2. Rotate the grinding wheel by hand, when it stops, the bottom point is where with the most heavy weight, and then move and fix the balance weight (Figure 4 – 1)
3. By several times of adjustment, it will be found out that the grinding wheel no more stops at the certain point actually. To mount a new grinding wheel, first measure its balance in general, and then balance is made after the surface of grinding wheel is completely corrected and dressed. It's no need to correct balance of regulating wheel because it rotates very slowly.

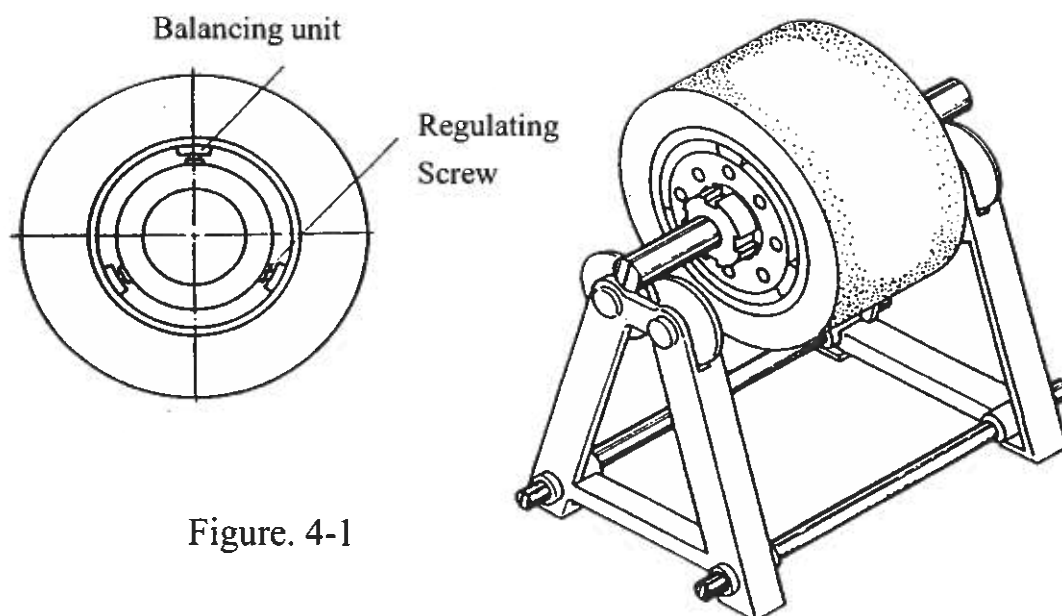


Figure. 4-1

4.2 Assembling Grinding Wheel

4.2.1 Procedures:

1. All parts should be wiped clean upon dismantling and for lubrication
2. All contact surfaces should be coated with grease.
3. The parts between grinding wheel and flange should be coated with anti-rusting grease or paved with a coat of tinfoil for the sake of dismantling next time
4. To mount the dismantled alloy bearing, tighten all bolts by diagonal way
5. Do not loose bearing nut.

4.2.2 Assembling of grinding wheel

1. Grinding wheel housing & spindle
2. Grinding wheel
3. Lock nut (left thread)
4. Oil seal bush
5. Housing cover
6. Alloy bearing seat and nut

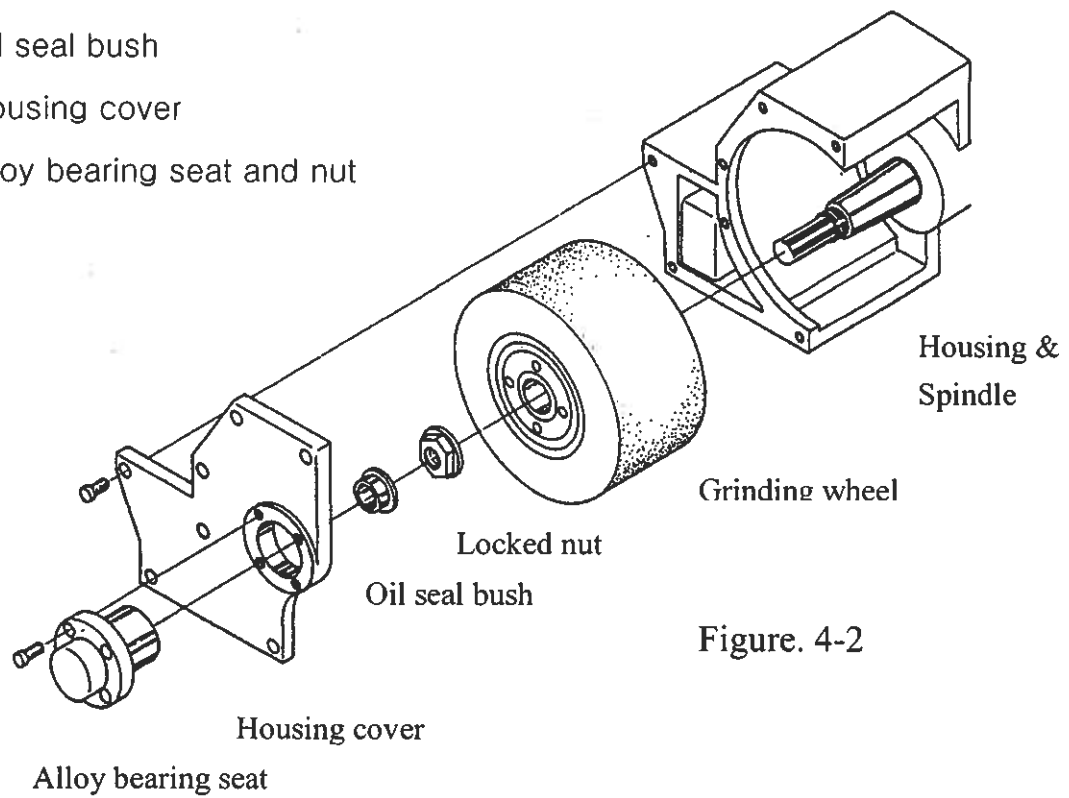


Figure. 4-2

4.3 Mounting and Dismantling Procedure of JHC-12S

Step 1: (Figure 4 – 3)

1. Separator two oil pipes connect to alloy bearing seat.
2. Dismantling end cover plate screw and taper pin

Step 2: (Figure 4 – 4)

1. Take out oil seal bush.
2. Loose grinding wheel locked nut along with clockwise direction for 2 – 3 cycles by spanner. (Do not draw out completely)
3. Take out spanner and mount flange extractor, then keep grinding wheel away from main shaft once.
4. Take out flange extractor and draw out grinding wheel locked nut
5. Slightly dismantle grinding wheel

Step 3: (Figure 4 – 5)

1. Draw out screw on flange cover from grinding wheel
2. To mount back according to the above mentioned action in reverse order

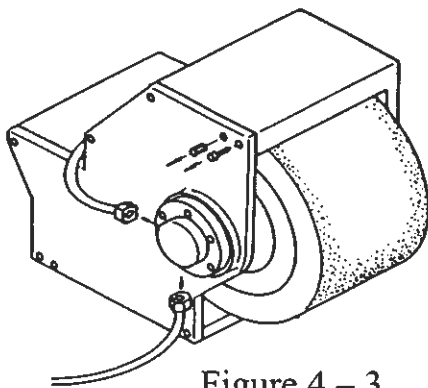


Figure 4 – 3

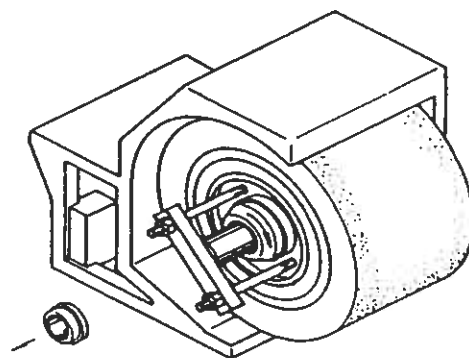


Figure 4 – 4

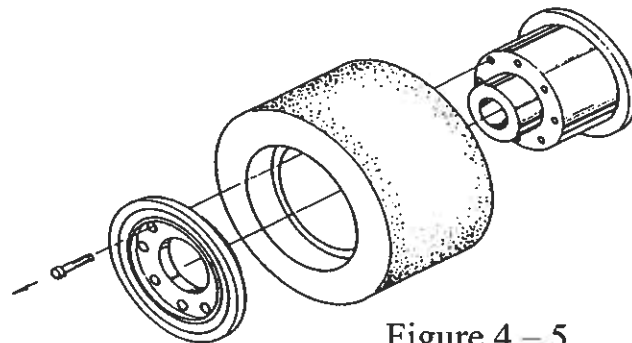


Figure 4 – 5

Note:

1. All parts should be cleaned and lubricated up disassemble
2. All assembled contact surfaces should be coated with grease.
3. The parts between grinding wheel and flange should be coated with anti-rusting grease or paved with a coat of tinfoil for the convenience of disassembling next time
4. Do not loose bearing nut
5. To mount back alloy bearing stand, all bolts should be screws by diagonal way.

4.4 Spindle Correction

Upon replacing grinding wheel or regulating wheel, main shaft's deflection must be corrected to ensure grinding precision. As Figure 4 – 6 shown erect gauge on worktable with gauge needle being leant against circumference of main shaft with proper pressure, where all contact surface must be cleaned. Start grinding wheel or regulating wheel, and read out variation from gauge, the maximum should not over 0.003 mm. If it is over this value, slightly knock flange locked nut along this variation's in counter clockwise direction. The action must be repeated for several times until variation is eliminated.

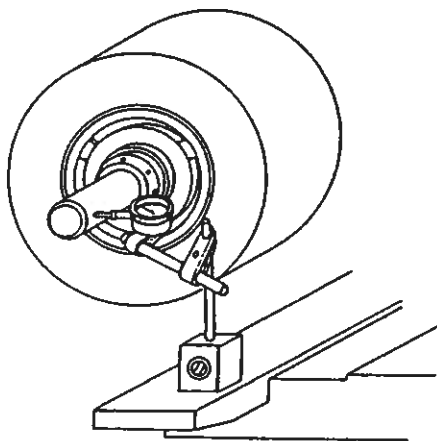


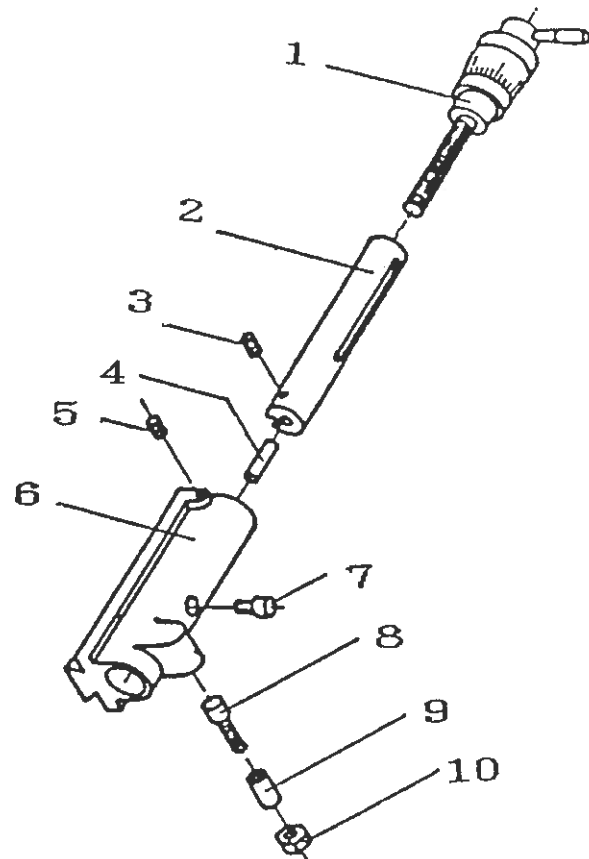
Figure 4 - 6

4.5 Grinding wheel dressing

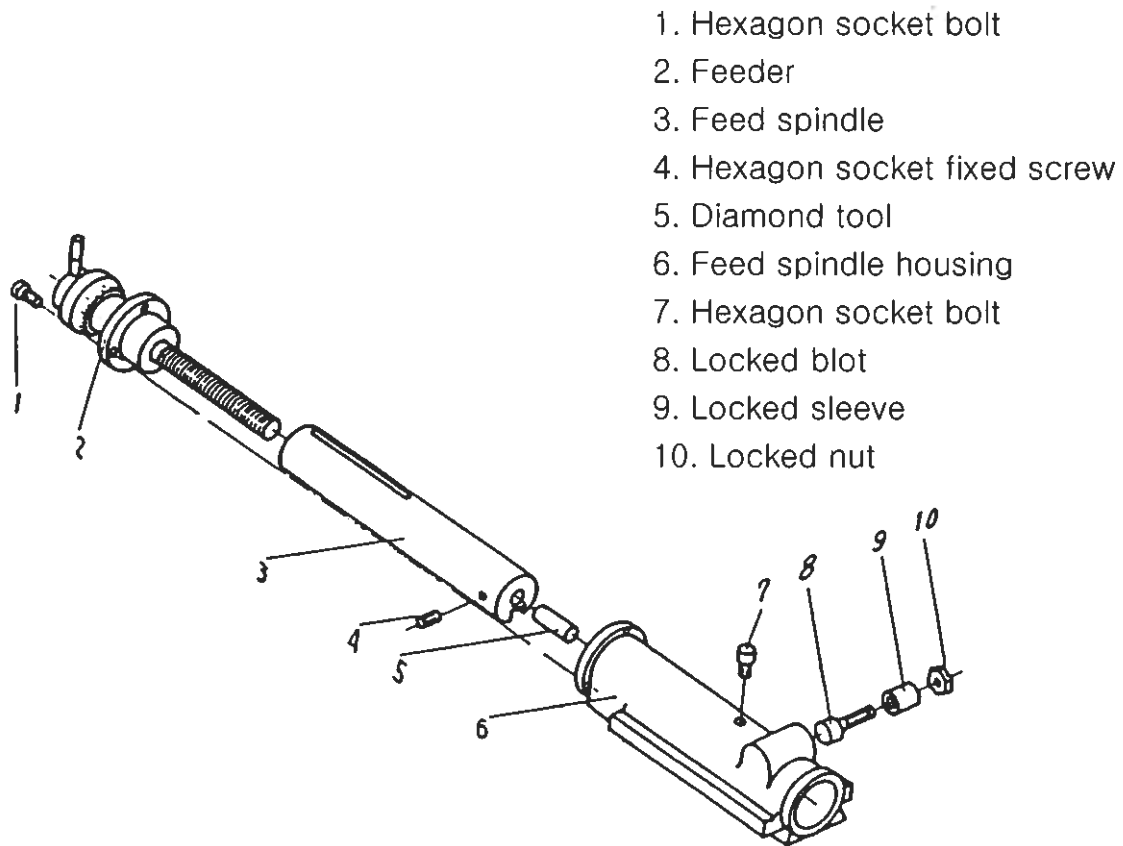
The dressing of grinding wheel almost utilizes single diamond tool method. The size of diamond is subject to dress grinding wheel's diameter and binding degree, but commonly 500 – 600 mm grinding wheel employs 1 – 2 carat of diamond tool. To avoid vibration when erecting, diamond tool should be completely fixed on feed shaft, and the distance from its fixed part to the nose of it must be reduce as much as possible. Hydraulic driving way is applied in dressing feed, with 0 to 300 mm/min of range of continuing regulating structure. Rough grinding is in 200 – 250 mm/min, and finishing in 30 – 50 mm/min feed speed, where dressing is made. If there is large amount of heat generated owing to diamond tool when dressing, coolant must be added, which will not only control temperature rising but also washes out impurities in sands. To dress feed amount, rough grinding is in 0.02 mm and finishing is in 0.005 – 0.01 mm, where the last dressing is made, but not feeding. To meet grinding condition and consider production efficiency, sometimes crash-roll dress or bounded tool is adopted.

4.5.1 Dresser of JHC-12S

1. Feeder
2. Feed spindle
3. Hexagon socket fixed screw
4. Diamond tool
5. Hexagon socket fixed screw
6. Feed spindle housing
7. Hexagon socket bolt
8. Locked bolt
9. Locked sleeve
10. Locked nut



4.5.2 Dresser of JHC-18S, 18AS, 18BS, 20S



4.5.3 Mounting and dismantling procedure

1. Loose part 10 locked nut, and slightly knock several times inward to make part 8 locked bolt to loose part 2 feed spindle.
2. Draw out part 7 hexagon socket bolt
3. Loose part 5 hexagon socket fixed screw, draw out part 2 feed spindle through part 1 feeder
4. Draw out part 3 hexagon socket fixed screw, dismantle worn diamond socket fixed screw
5. Mount back according to the above mentioned action in reverse order, replacement is finished.

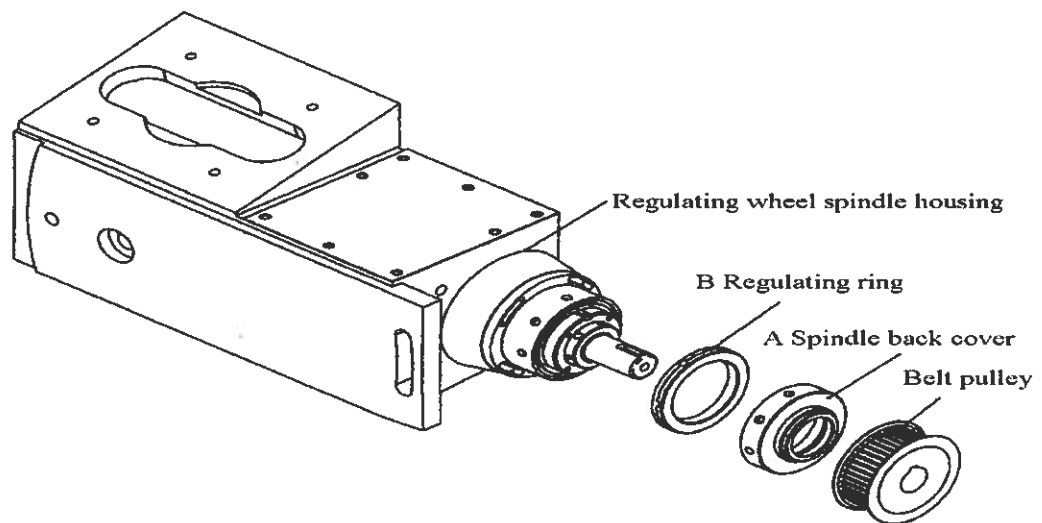
4.6 Introduction of Regulating Wheel

4.6.1 Regulating wheel feed mechanism

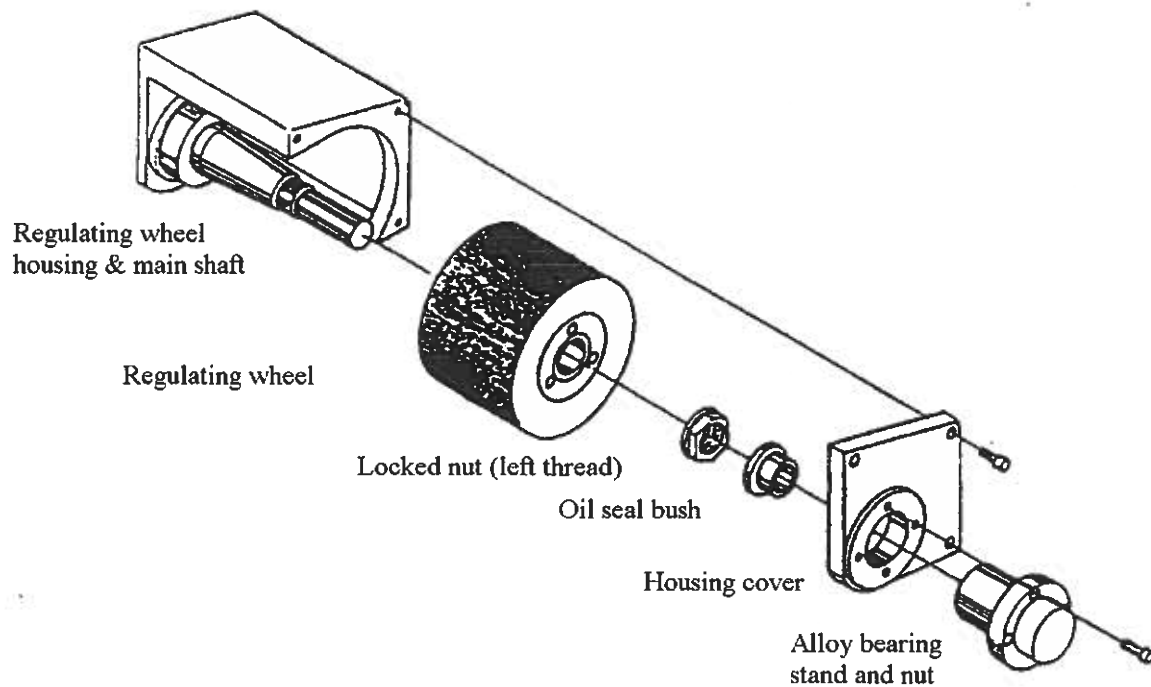
When grinding wheel is fixed, grinding of workpiece depends on the movement of regulating wheel slide, i.e., the travel of regulating wheel slide and lower slide would regulate distances between regulating wheel, grinding wheel and blade. Lower slide and regulating wheel slide are respectively equipped with rough feed handwheel and micro feed handwheel (no micro feed device for regulating wheel slide of JHC-12S). Micro feed is to lock worm shaft inside feed handwheel by outside nut. In general condition. Moving regulating wheel slide is to compensate worn size of regulating wheel. Besides, feed screw's clearance caused by long time war can be eliminated by regulating brass nut. Regulating wheel spindle make $\pm 5^\circ$ level swivel to grinding wheel spindle. The advantage is that cone occurred on workpiece can be regulated from level degree, not by dressing grinding wheel.

4.6.2 Spindle position of regulating wheel in infeed grinding method

The vertical angle of regulating wheel can be inclined $+5^\circ$ to -3° in thrufeed. This is adjusted in accordance to grinding feed speed. While failing to line up grinding wheel owing to adjustment of vertical angle, you must line them up, as the way shown in Figure 4 – 7. First open end cover "A", then revolve locked screw "B" forward by clockwise direction, backward by counterclockwise direction (from standing at positioning screw). It might be chuck if not turning by hand, you may start regulating wheel driving motor and then hold down locked screw to turn locked screw, which may prevent you from cutting



4.6.3 Assemble and disassemble of regulating wheel



Note:

1. All parts should be cleaned and lubricated up disassemble
2. All assembled contact surfaces should be coated with grease.
3. The parts between regulating wheel and flange should be coated with anti-rusting grease or paved with a coat of tinfoil for the convenience of disassembling next time
4. Do not loose bearing nut
5. To mount back alloy bearing stand, all bolts should be screws by diagonal way.

4.6.4 Assemble procedure of JHC-12S

Step 1: (Figure 4 - 7)

1. Separator two oil pipes connect to alloy bearing seat.
2. Dismantling end cover plate screw and taper pin

Step 2: (Figure 4 - 8)

1. Take out oil seal bush.
2. Loose 2 - 3 cycles of regulating wheel locked nut with clockwise direction by spanner. (Do not draw out completely)
3. Take out spanner and mount flange extractor, then keep grinding wheel away from main shaft once.
4. Take out flange extractor and draw out grinding wheel locked nut
5. Slightly dismantle grinding wheel

Step 3: (Figure 4 - 9)

1. Draw out screw on flange cover from grinding wheel
2. To mount back according to the above mentioned action in reverse order

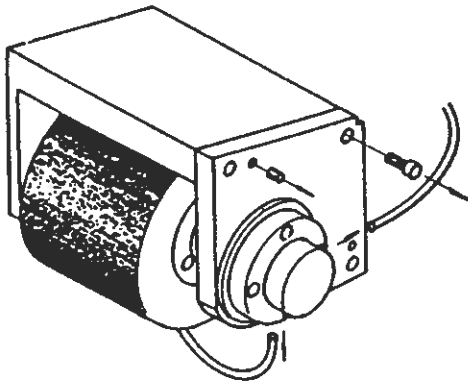


Figure 4 - 7

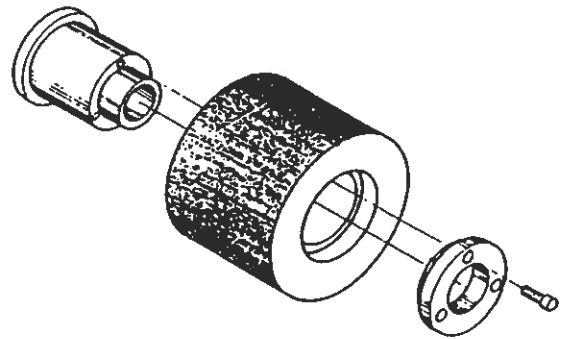


Figure 4 - 9

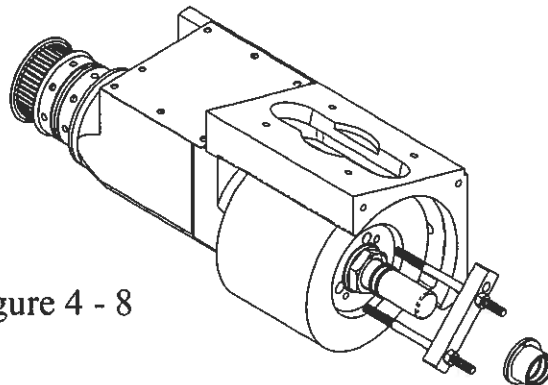


Figure 4 - 8

4.6.5 Assemble procedure of JHC-18S, 18AS, 18BS, 20S

Step 1: (Figure 4 - 10)

1. Separator two oil pipes connect to alloy bearing seat.
2. Dismantling end cover plate screw and taper pin

Step 2: (Figure 4 - 11)

1. Take out oil seal bush.
2. Loose 2 - 3 cycles of regulating wheel locked nut with clockwise direction by spanner. (Do not draw out completely)
3. Take out spanner and mount flange extractor, then keep grinding wheel away from main shaft once.
4. Take out flange extractor and draw out grinding wheel locked nut
5. Slightly dismantle grinding wheel

Step 3: (Figure 4 - 12)

1. Draw out screw on flange cover from grinding wheel
2. To mount back according to the above mentioned action in reverse order

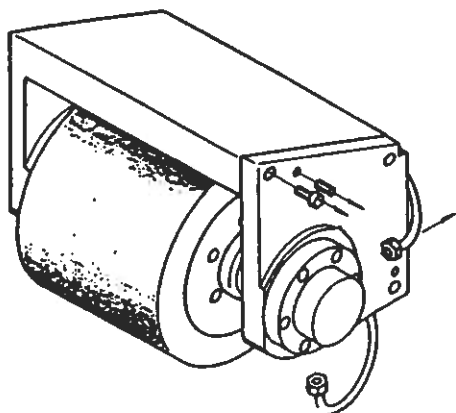


Figure 4 - 10

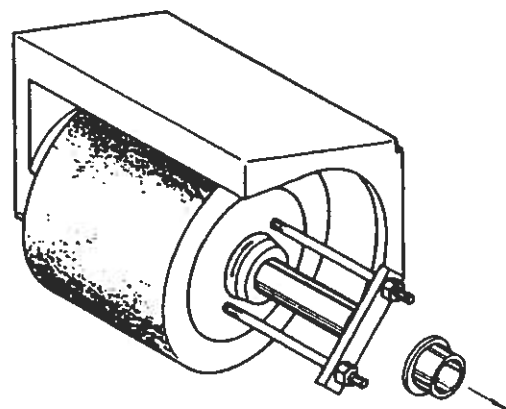


Figure 4 - 11

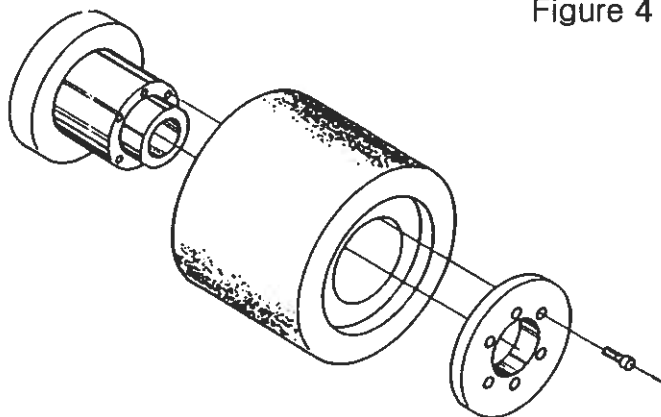


Figure 4 - 12

4.6.6 Speed of regulating wheel

The rotating speed of regulating wheel ranges from 10 to 300 rpm, and dressing from 316 to 337 rpm. Grinding speed is subject to change by (1) work piece's axial feed speed and (2) workpiece's circumferential speed. Generally speaking, grinding rotating speed of grinding ranges from 20 to 40 rpm. The workpiece's axial feed speed can be shown by the following formula

$$V = \pi D \sin \theta N$$

Where V = Workpiece's axial feed speed, m/min
 D = Regulating wheel's diameter, mm
 N = Regulating wheel's rotating speed, rpm
 θ = Regulating wheel's slant angle

Make the above formula to projected curve can render the following formula, which represents relationship between workpiece's circumferential speed V and regulating wheel's rotating speed

$$N = V / \pi D$$

Where V = Workpiece's circumferential speed m/min
 D = Regulating wheel's diameter, m

In general, the slant angle for grinding is 2 to 3°, where workpiece circumferential speed ranges from 25 to 35 m/min. Before machining, slant angle of workpiece in a slight bending state should be expanded, and feed speed must be accelerated. When it turns out with good real circle, increase rotating speed to obtain high precision. Workpiece axial feed speed is in direct proportion to regulating wheel. Hence, regulating wheel will lead to reduce feed speed, i.e. diameter of regulating wheel is reduce from 300 mm to 250 mm. The initial feed speed of 1.2 m/min will be down to 1 m/min. Generally speaking, reduction on circumferential speed can be corrected by higher rotating speed. Although to alter regulating wheel's slant angle may adjust workpiece' axial feed speed, it is not recommended because correction must be made up changing slant angle. Besides, be noticed that correction both on workpiece's circumferential speed and correcting grinding condition.

4.6.7 Dress on regulating wheel

In dressing regulating wheel, the condition of diamond tool coolant is in general the same with that of grinding wheel. But the dressing rotating speed of regulating wheel is approximately 325 rpm. Hence, in rough grinding, the dressing speed is 40 to 50 mm/min, as for the speed of finishing is in general same with that of grinding wheel. Be careful that the dress surface on regulating wheel will affect grinding surface of workpiece. The difference between regulating wheel and grinding wheel in dressing is that the latter's shape is cylindrical while the former shape is like single piece and double curvature planes is formed by regulating wheel's slant angle and dressing device's swivel angle. Generally speaking, in rough grinding, slant angle of regulating wheel is larger than that of dressing device by 1.5° to 2.5° . In finishing, it is around 1.5° .

4.6.8 Assemblage and Replacement of diamond tool

The assemble and change procedures of diamond tool on regulating wheel is the same as that of grinding wheel

4.6.9 Regulating wheel's slant angle (Figure 4 – 13 / 4 – 14)

1. Loose lock nuts of parts 2, 3
2. Turn regulating bolt of part 1 to make regulating wheel slant transversely, in which slant scale can be shown from angle indication on Part 4
3. Lock parts 2 and 3, upon regulating to required angle.
4. Horizontal swivel angle can be shown by indication on part 3
5. Lock part 2 after positioning.

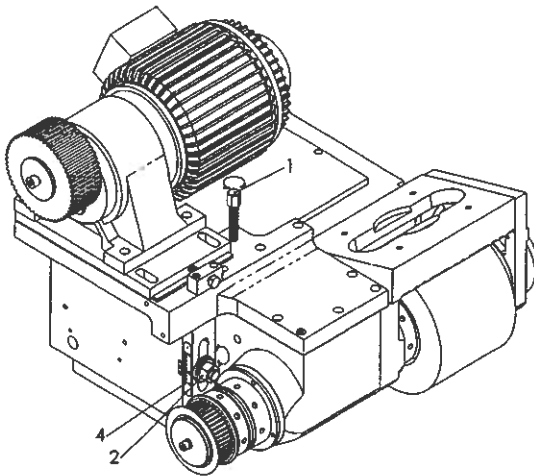


Figure 4 - 13

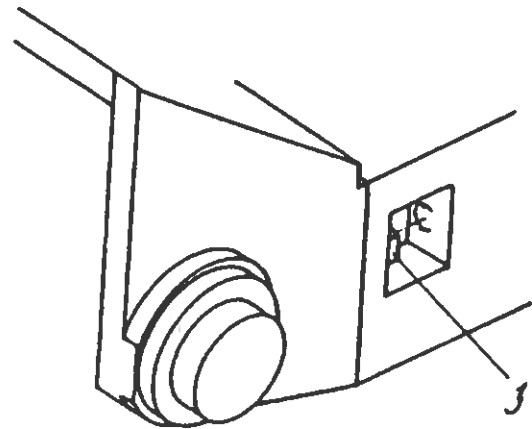


Figure 4 - 14

4.6.10 Regulating wheel's swivel angle (Figure 4 – 15/ 4 – 16)

1. Loose lock nuts on part 2 (respectively with one on lefts side and right side)
2. Properly turn regulating hand screw on part 1 to made regulating wheel for horizontal swivel.
3. Respectively on left side and right side, in regulating, turn right on one side, and left turn is made on the other side. Upon positioning, you must turn right for draw tight the left turn 4. horizontal swivel angle can be show by indication on part 3.
4. Lock part 2 after position

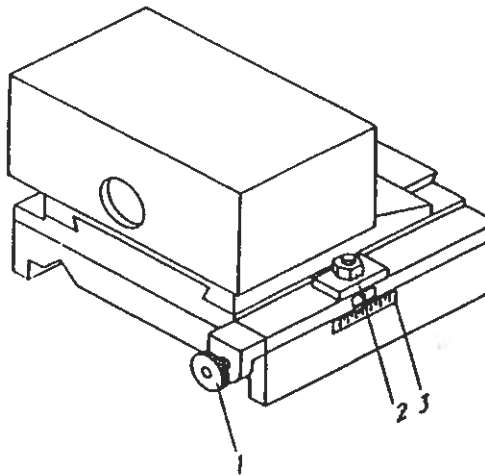


Figure 4 – 15

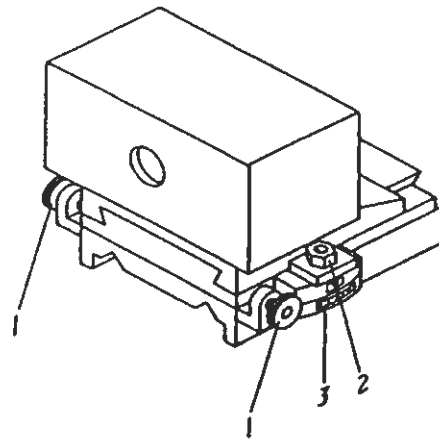


Figure 4 – 16

4.7 Blade Support and Workrest

1. Infeed workrest and blade
2. Thrufeed workrest and blade
3. Work support blade

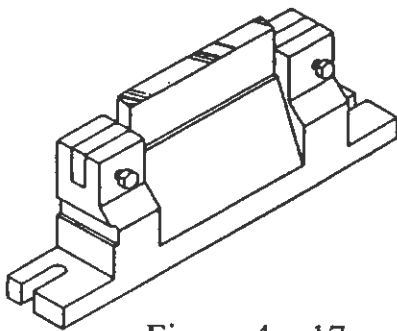


Figure 4 – 17

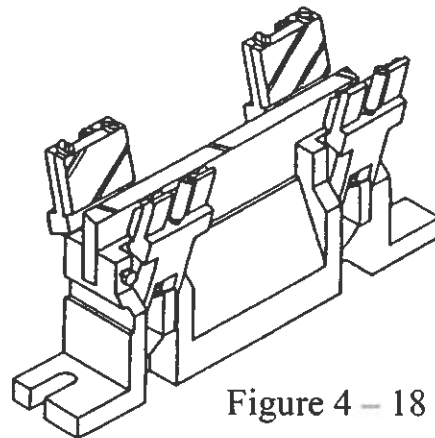


Figure 4 – 18

The work support blade in common is 60°. There is more wear in the part of frequent contact on workpiece due to the load of grinding resistance. Generally speaking, blade is welded with super-hard wolfram shell, sometimes high speed steel is used. The thickness of work blade should be smaller than that of external diameter of workpiece. 1/2 to 1/6 of diameter of workpiece plus center height of grinding wheel or regulating wheel is the center height of grinding piece. If the height of support blade is insufficient, packing plate should be used to achieve the required height. The thickness of support blade is shown on chart below.

Thickness of support blade (mm)	Diameter of workpiece (mm)
0.8	1 ~ 2
1	1.5 ~ 3
2	3 ~ 5
3	4 ~ 6
4	5 ~ 8
5	7 ~ 9
6	8 ~ 10
8	10 ~ 12
10	12 ~ 20
13	15 ~ 30
15	17 ~ 40

4. Erection and adjustment workrest and blade

Put blade into blade way to a proper position, then lock fixed bolts on two sides (Figure 4 – 19). Place workrest on worktable, measure the required position and turn feed handwheel in worktable to move blade near grinding wheel. Upon blade's cutting edge being in parallel with grinding wheel's surface, adjust workrest lock bolts to fix workrest on worktable. (Figure 4 – 20)

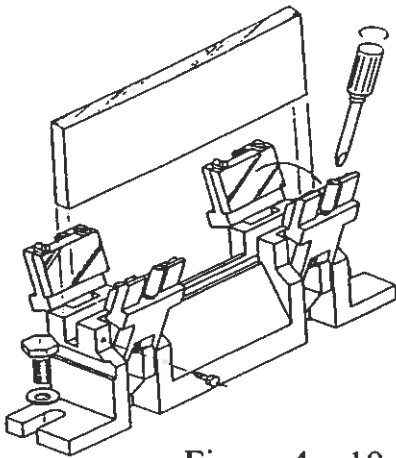


Figure 4 – 19

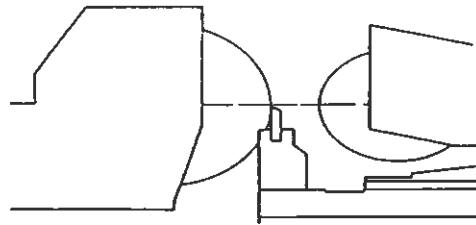


Figure 4 – 20

5. Adjustment of thrufeed guide plate

The regulation of thrufeed guide plate is show on (Figure 4 – 21). Turn regulating screw by screwdriver to make guide plate close or open to adapting itself to the size of workpiece, where regulating scale is shown on (Figure 4 –22). The guide plate should be parallel to both grinding wheel and regulating wheel, and the entry of regulating wheel's edge is $1/2$ of the tolerance of workpiece. The exit edge has the gap of 0.01 to 0.03 mm, while entry and exit of grinding wheel's edge takes gap of 0.2 to 0.4 mm. The test method is to put the ground workpiece passing from entry through exit, then from exit to entry to ensure that it is passed smoothly and moves in on direction. If the one line or not. If guide plate and regulating wheel are not on the same line. Then workpiece will become concave or convex as shown (Figure 4 – 23).

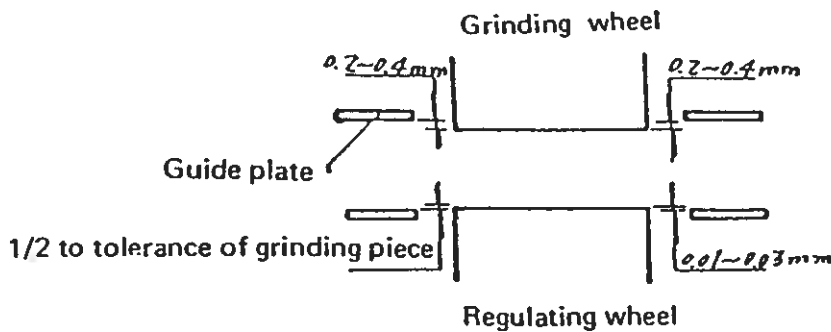


Figure 4 - 21

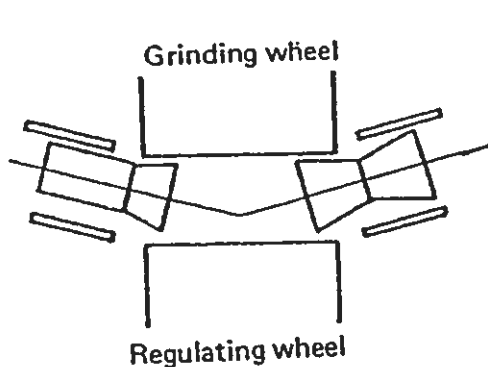


Figure 4 - 22

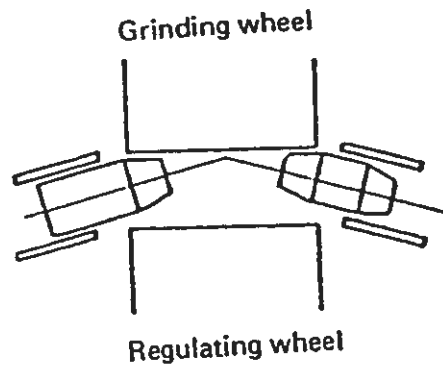


Figure 4 - 23

4.8 Introduction of Grinding Wheel

4.8.1 Selection of grinding wheel

For desirable grinding process, grinding wheel is selected based on workpiece's requirement and machine's grinding feature. The consideration must also include selecting proper roughness degree, binding degree, texture and binding agent.

Grits of centerless grinding machine include "A" grit, "WA" grit, single-crystallized grit of aluminum oxide series, as well as "C" grit, and "GC" grit of silicon carbide. Herein, workpieces of various grits are explained as following:

1. Aluminum oxide series

- (1) "A" grit – Used for workpieces of high tensile strength, tough and higher viscosity by larger feed depth
- (2) "WA" grit – Used for workpieces of extreme high tensile strength, tough and fragile by smaller feed depth
- (3) Single-crystallized grit – Used for alloy steel, which is hard and difficult to be ground

2. Silicon carbide grit

- (1) "C" grit – Suitable for workpiece of low tensile strength, hard but fragile, and high ductility
- (2) "GC" grit – Used for workpiece of marble, leather, rubber, super hard alloy of low tensile strength, extreme hard, delicate and fragile with smaller feed depth.

As far as steel is concerned, the most tough "A" grit is better for soft steel workpiece. Hard material, such as hardened steel and special steel, hard and tough "WA" grit is adapted instead of "A" grit. For general cast iron, brass, copper, tin and tungsten materials, "C" grit is applied. "A" grit, however with high hardness and high self-generating function, which may prevent lip of grit from being buried.

"GC" grit which is harder than "C" grit is applied in high compression state of special cast iron, and super hard alloy with heating treatment. As for stainless steel, which is poor of grinding, the hardest single-crystallized grit in aluminum series and its toughness lying between "A" grit and "WA" grit is used to attain good work efficiency.

4.8.2 Roughness Degree

No of roughness	10,12,14,16,20,24	30,36,46,54,60	70,80,90,100,120,150,180,220	240,280,320,400,500,600,700,800
Type	Coarse	Medium	Fine	Very fine

Roughness degree is classified as shown as above. The sizes of various grits are given below

Type	Coarse	Medium	Fine	Very fine
Diameter (mm)	1 – 3	0.4 – 1	0.1 – 0.4	0.024 – 0.08

The roughness degrees which are by centerless grinding process can be summarized as

Process	Rough	Rough and polishing	Polishing	Lap grinding
Roughness no	46	60	80	120, 180

Generally speaking, for better efficiency, high ductility workpiece is applied by tough grinding wheel to improve its grinding surface. Fine grinding wheel is usually adopted for hard machining and delicate materials.

4.8.3 Binding Agent

Binding agent includes vitrified (V), silicate (S), rubber (R), resinoid (B), shellac (E) and metal (M). Vitrified is the hardest and strong binding agent, only very few amount would obtain would obtain high hole rate to required binding degree with very few clogs on grinding wheel. The bound wheel is very sharp and has high strength. Hence, it takes the most part in grinding work. Vitrified grinding wheel is used in most centerless grinding machine. When finishing or accuracy are required, shellac or rubber binding grinding wheel are applied. Regulating wheels almost are rubbers binding grinding.

4.8.4 Binding Degree

Binding degree represents strength of binding agent, the following is its classification:

Binding degree	E, F, G	H, I, J, K	L, M, N, O	P, Q, R, S	T, U, V, W, X, Y, Z
Strength	Very soft	Soft	Medium	Hard	Very hard

Grinding wheel has the degrees of K, L, M while regulating wheel has degrees of Q. In all times, hard binding degree is applied to soft workpiece, however and soft binding is applied to hard workpieces. Besides, brass and copper based soft workpiece adopt hard binding degree to prevent hole from being clogged.

4.8.5 Texture

Grinding wheel's density in unit volume is called texture. There are three stages in JIS: rough, medium and dense. The function of texture is to discharge chips, its effect has close relation with binding degree. The following items are the rules for selecting texture:

1. Workpiece's hardness and toughness

Tough texture applies to soft workpiece and dense texture applies to hard and brittle workpiece

2. Finishing degree and grinding volume

Large grinding volume with rough grinding degree is applied by rough texture. Precision grinding is employed by dense texture.

The above mentioned items are the general rules for selecting grinding wheel. Before grinding, workpiece's condition and grinding machine's status must be fully considered in order to attain desirable results.

4.8.6 Grinding wheel's Circumferential Speed

The higher the grinding wheel's circumferential speed is reached, the better the grinding efficiency and finishing surface is obtained. But grinding wheel's circumferential speed is limited by the strength of binding agent. Generally speaking, centerless grinding machine's circumferential speed is around 1800 m/min. When the speed of vitrified binding grinding wheel is 1800 m/min, 16 kg/cm^2 of centrifugal tension is then generated. Grinding wheel of roughness degree of no 46 and binding degree of K, whose circumferential speed would decelerate because diameter reduced due to abrasion. Once an new grinding wheel's circumferential speed is determined, it is not necessary to make any correction until its speed declined by abrasion. When selecting grinding wheels, please refer to the table shown in next page for correct type.

4.8.7 Selection of Grinding Wheel

Grinding materials			Hardness of grinding material	Recommended types of grinding wheel
Steel	carbon	General structure rolled steel (SS) Mechanical structure carbon steel (SC) (S-CK)	HRC 25	A 60M 38A 60L
		Structure carbon steel iron pipe (STK) Carbon steel wrought work (SF) Carbon steel cast work (SC)	HRC 25	WA60L
	Alloy steel	Nickel chromium alloy steel (SNC) Nickel chromium molybdenum alloy steel (SNM) Chromium alloy steel (SM) Aluminum chromium molybdenum alloy steel (SACM)	HRC 55	WA60L
		High carbon chromium bearing steel (SUT) Structure alloy steel cast work (SCA) Carbon tool steel (SK)	HRC 55	WA60L/K
	tool	High speed tool steel (SKH)	HRC 60	WA60L/K, GC60L, 32A60L
		Alloy tool steel (SKS, SKD, SKT)	HRC 60	WA60L/K, GC60L, 32A60L
	Stainless	Stainless steel 1 – 4 (SUS 1 – 4) Heat-resisting steel 1 – 3 (SHE 103)		WA60L/K, GC60L, 32A60L
		Stainless steel 5 – 16 (SUS 5 – 16) Heat-resisting steel 4 – 5 (SHE 4 – 5)		WA54L, GC60L, 32A60L
	Cast	Common cast iron (black heart cast iron FC)		C60L
		Special cast iron		GC60K
		Black heart weldable iron (FCMB)		A60M
		White heart weldable iron (FCMW)		
Non iron		Brass (BS) Bronze (BC) Material for permanent magnet Cast magnet		C46K A60M WA60K C60L, GC60L

CH 5

Maintenance & Repair

5.1 Lock-out procedures before maintenance and repair

Before performing maintenance or repair work, be aware that the zero energy state should be achieved ahead of any intervention, which includes

- a. Disconnect the machine from energy supply
- b. Lock the main switch to prevent any accidental connection
- c. Release any residual energy like hydraulic pressure
- d. Verify that the grinding wheel and any movable items are in standstill i.e in zero energy state

5.2 Trouble shooting

1. Spindle not moving
 - a. The voltage or the frequency are correct
 - b. The insulator switch (PSW) turned to position
 - c. The fuse (FU9) burnt
 - d. The emergency stop switch (SB1) on or damaged
 - e. The magnetic contactor (SB4) burnt or damaged
 - f. The heat accumulating device is loosened
 - g. The magnetic contactor (KM1) is burnt or damaged
 - h. The motor is burnt

Note: Only professional personnel is allowed to execute the checking and repairing. If the emergency stop switch (SBI) is turn off, the original situation will be restored

2. Spindle unable to stop
 - a. The red button (SB3) switch is damaged
 - b. The magnetic contactor's (KMI) point of contact has joined together

3. Spindle unable to operated after been started
 - a. The magnetic contactor's (KMI) auxiliary point of contact (13,14) see whether it is damaged of not well contact
 - b. The motor burnt

4. Spindle stops automatically after rotating a while
 - a. The heat accumulating device (FRI) loosened
 - b. The power supplied set before hand has been change for amount of power supplied refer to power overloaded column in electrical part list
 - c. The power flow to see whether there is problem arising from different of phase

5. Work lamp is not on
 - a. The electric flow and voltage are abnormal
 - b. The fuse (FU10) is burnt
 - c. The switch (WL) is damaged
 - d. The bulb (WL) is burnt

6. Fuse (FU9) is burnt

- a. Check the line circuit of the magnetic contactor (KM2) to see whether it is short
- b. Check the wire cable to see whether the outer surface of its insulator is broken

7. Fuse (FU7) is burnt

- a. Check the circuit to see whether it is short or burnt
- b. Check the transformer whether it is short or burnt
- c. Check the wire cable whether the outer surface of its insulator is broken

8. Leakage of electricity

- a. Check the wire cable whether the outer surface of its insulator is broken
- b. Check the electric control box whether it is wet
- c. Check the transformer and see whether it is wet or other reasons that cause the damage
- d. Check and see whether other parts touched its outer shell

CH 6

Lubrication and Cooling System

6.1 Lubrication

The use of lubricant, lubrication (or change oil) cycle whether are done in comply with chart shown below or not have much to do with machine's life and precision. Hence, please purchase lubricant from reliable oil supplier in accordance with the chart shown below. Based on convenience and safety transportation, lubricant in both grinding wheel spindle and regulating wheel spindle have been emptied before shipping. However, inside oil tank must be filled with oil before start to working. Otherwise both bearing and spindle will be damaged. The other sliding parts must be lubricated as indicated. But oil in transmission box hasn't been removed, please do not add oil ever H line otherwise there will be too much oil as show below. Oil of the same grade form other brand is also available, lubrication (change oil) cycle is based on the period of 8 hours for each work day.

Cycle	Lubrication parts	Oil capacity	Specification	Remark
New machine: 1: 3 months 2: 6 months 3: 12 months	Oil tank	Add to 25 mm from surface of barrel, JHC-12S approx. 15 gallon	Gulf brand special spindle oil R-12.or ESSO SPINESSO 10.。	Check once every half month, if lower than 80 mm from surface of barrel, oil must be added to required position
Each month	Dressing device fed screw	Appropriate amount	Gulf brand special cycle engine oil R-68	
Each day	Auto oil filler	Appropriate amount	Gulf brand special cycle engine oil R-68	Add oil when lower L line
Each day	Dress	Appropriate amount	Gulf brand special cycle engine oil R-68	

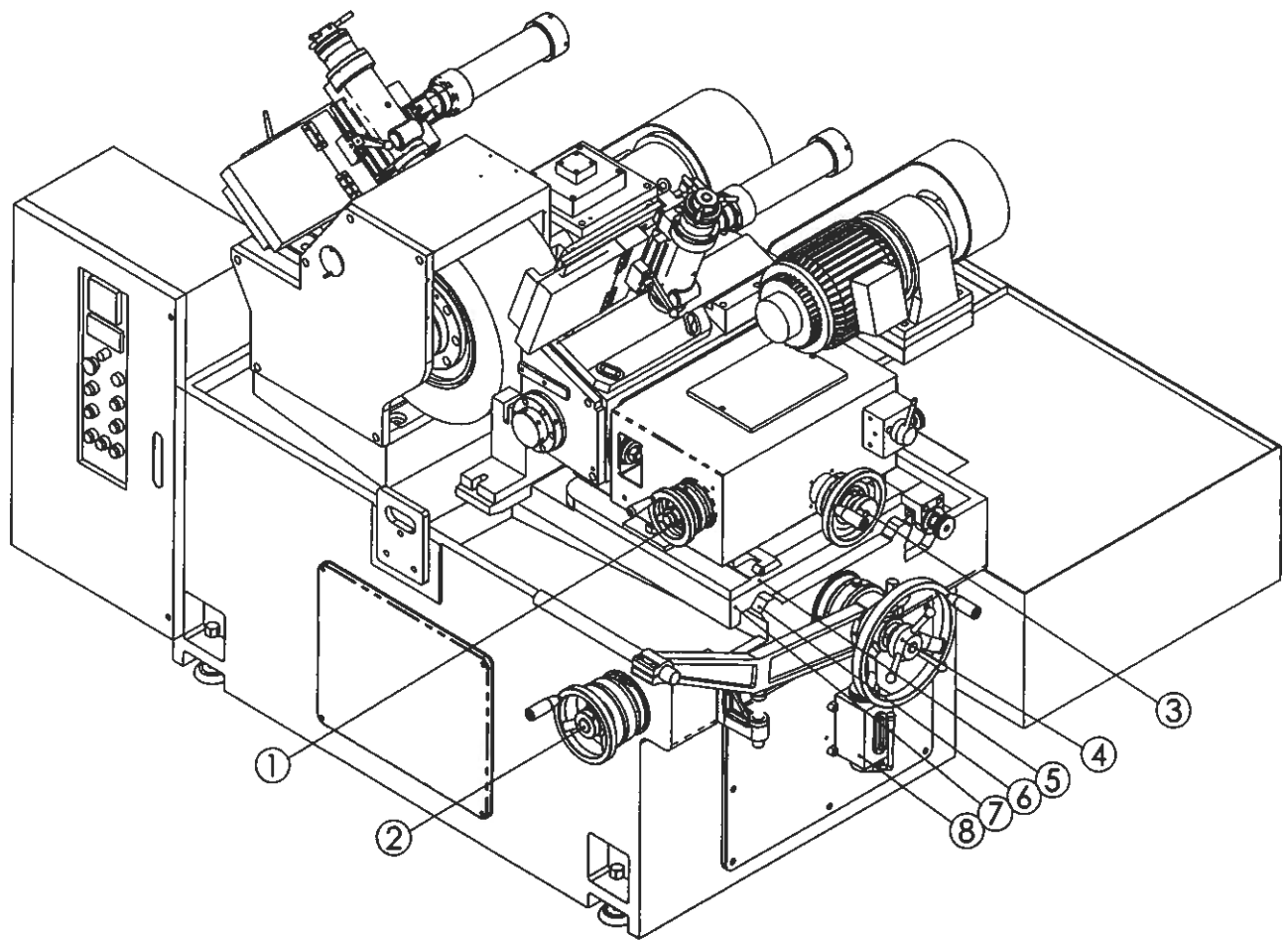
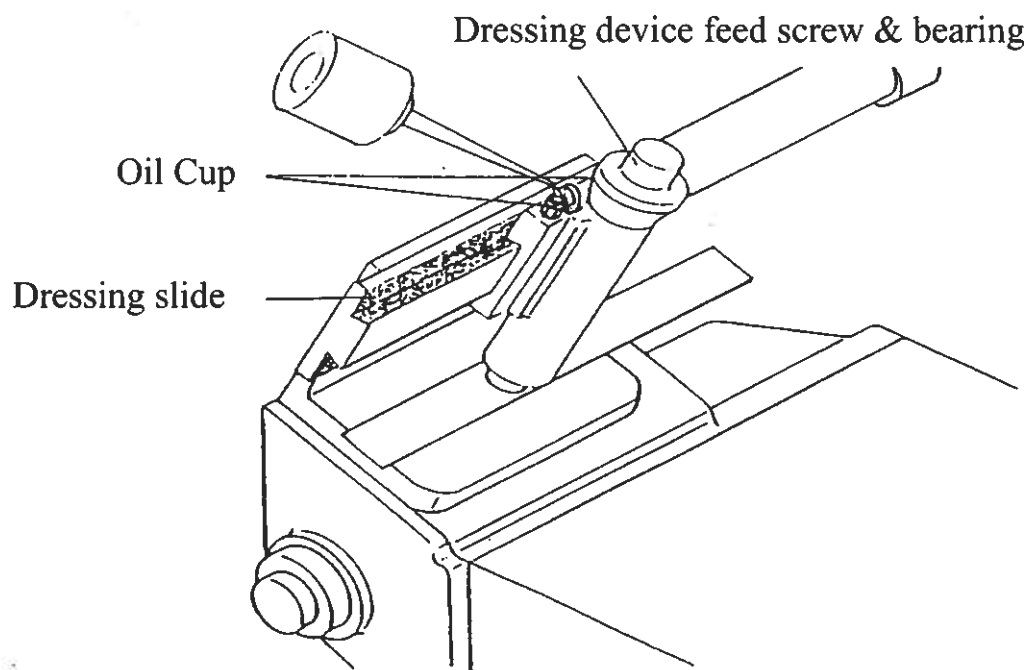
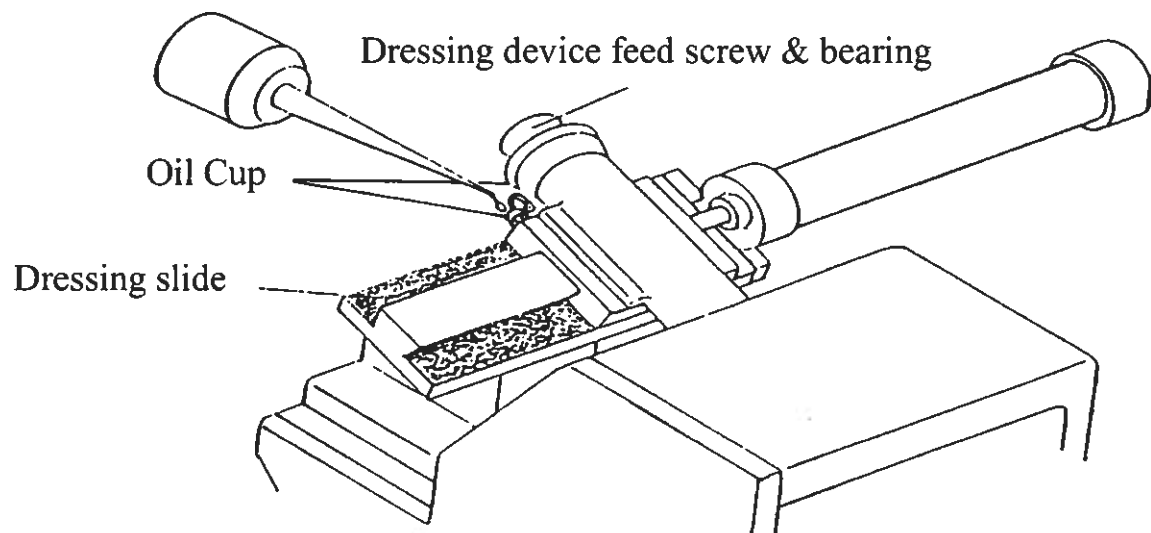


Figure 6 - 1

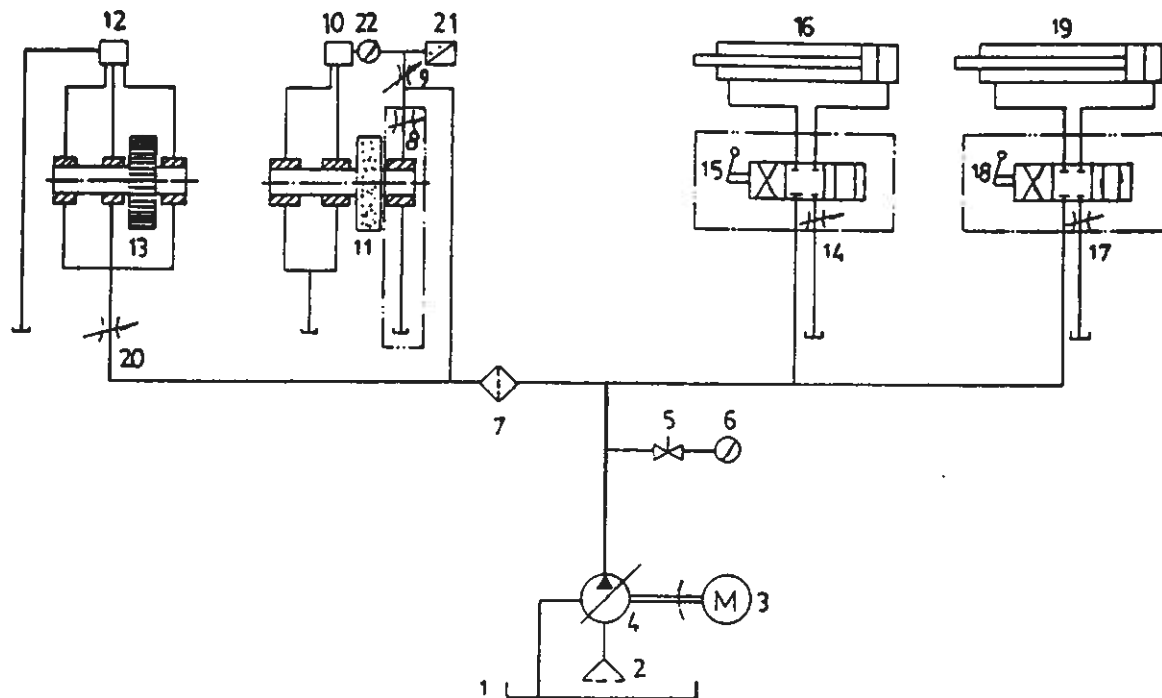
6.1.1 Parts for Lubrication (Figure 6 – 1)

1. Regulating wheel micro feed bearing
2. Worktable micro feed bearing
3. Regulating wheel feed bearing and screw
4. Worktable feed bearing and screw
5. Rail of slide
6. Plane of revolution on lower slide
7. Rail of lower slide
8. Inlet of oiler



6.1.2 Hydraulic System

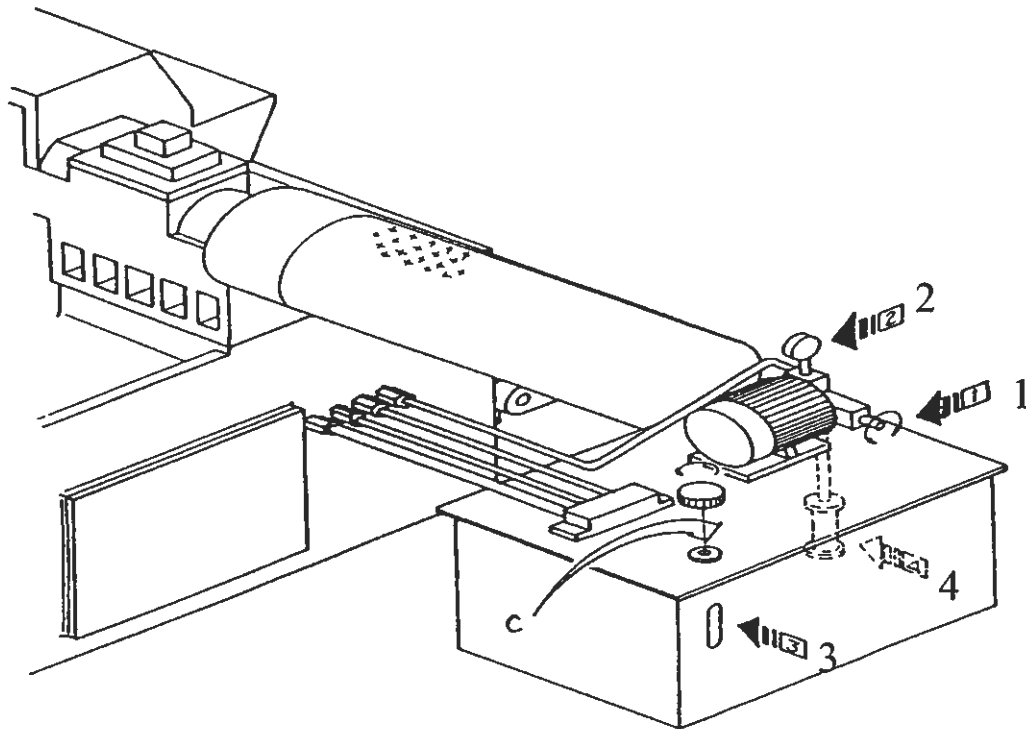
Hydraulic loop



- | | |
|------------------------------|---------------------------------|
| 1. Oil tank | 2. Filter (3/4") |
| 3. Motor | 4. Hydraulic pump |
| 5. Stop valve | 6. Pressure gage |
| 7. Filter (1/2") | 8. Flow control valve |
| 9. Flow control valve | 10. Grinding wheel oil window |
| 11. Grinding wheel | 12. Regulating wheel oil window |
| 13. Regulating wheel | 14. Flow control valve |
| 15. Directional change lever | 16. Dressing oil cylinder |
| 17. Flow control valve | 18. Directional change lever |
| 19. Dressing oil cylinder | 20. Flow control valve |
| 21. Pressure switch | 22. Pressure gage |

6.2 Hydraulic Pressure Adjustment

Auto lubrication and hydraulic dressing devices for grinding wheel spindle and regulating wheel spindle are used with same pump; generally, oil pressure should be kept at $7 - 8 \text{ kg/cm}^2$, if pressure is higher than store's seal, oil will leak. If pressure is too low, oil cylinder shaft of dresser will tremble while moving. When filter is clogged by impurities, oil pressure will decrease. In this condition, take out filter and clean it. If oil pressure is still low, open cap of oil pressure regulator, and regulate its screw. The pressure increase by clockwise direction and decrease by counterclockwise direction.



6.2.1 Detail of Oil Tank Parts

Figure 6 - 2

1. Pressure regulating screw
2. Pressure gauge
3. Oil gauge
4. Filter

C : Oil port (Gulf brand special spindle oil R-12 ESSO brand SPINEESO 10)

6.3 Flow Control Valve

Flow control valve is to regulate oil capacity into grinding wheel spindle and regulating wheel spindle and to keep normal oil pressure and capacity so that lubrication and cooling system may obtain high efficiency. Its regulating way is shown as Figure 6 – 3. Following mark direction on hand screw, turn right is to reduce flow and turn left is to increase flow. The amount of flow control valve can be seen from oil windows. Please refer to (Figure 6 – 4, 6 – 5)

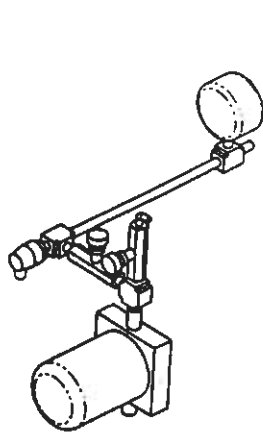


Figure 6 – 3

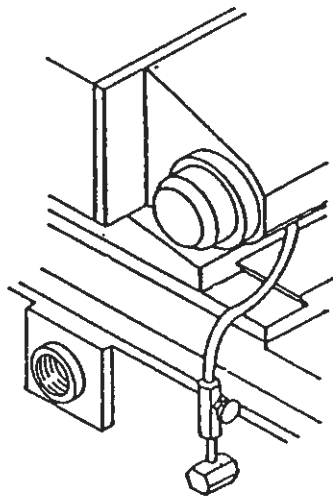


Figure 6 - 4

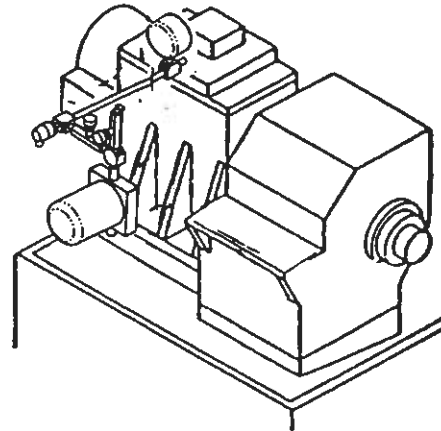


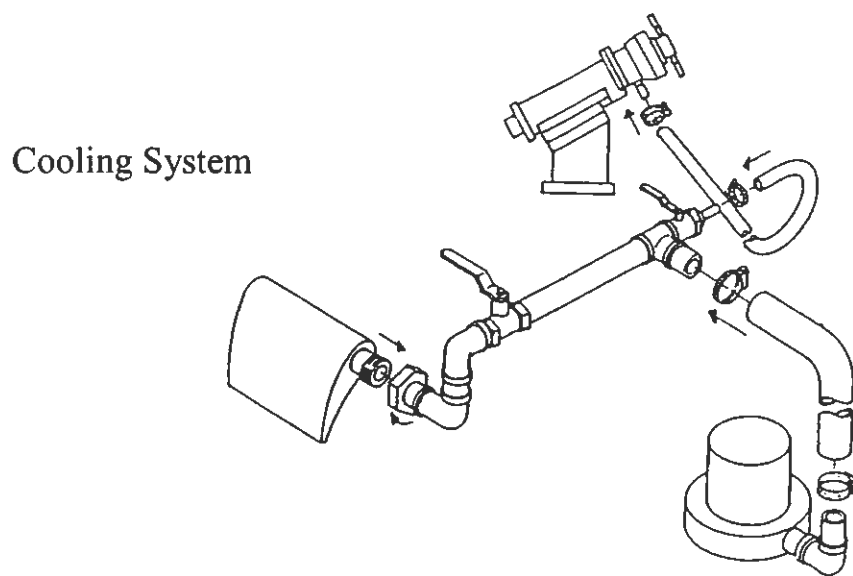
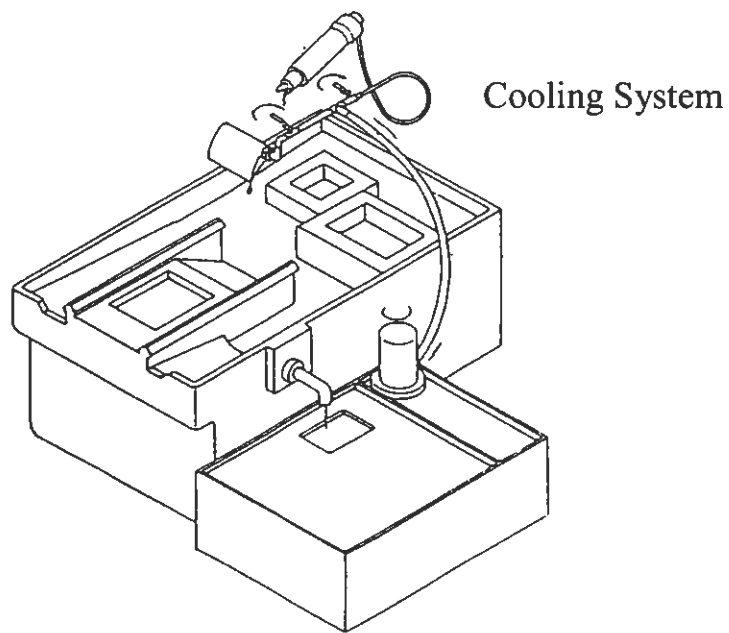
Figure 6 - 5

6.4 Setting on The Pressure Switch

This machine has a pressure switch attaching to the top of oil filter. The function of this pressure switch is to cut off power connection automatically and stop the grinding wheel to protect the alloy bearing among grinding wheel in case of the pressure lower than indication set on the gauge. Generally, the pressure switch will be set on red mark as 1 kg / c m² as normal before the machine's shipment the flow control valve of grinding wheel should be set on 2 kg / c m². Under the stalling condition of grinding wheel, please check out this set valve checks out if whether it is correct or not. Also, the pressure of flow control is lower than set valve on pressure switch.

Setting

1. Start the machine and turn on the grinding wheel spindle
2. Adjusting the screw on the pressure switch, let the pressure over 1 kg / c m²
3. Clockwise direction adjusting the flow valve, when the value on indicator from 3 kg / c m² go down to 1 kg / c m², the grinding wheel motor will stop, if it is not at 1 kg / c m², then have to adjust again, to make sure the motor will stop when pressure at 1 kg / c m²,
4. Open the flow valve let the pressure between 3.0 – 3.5 kg / c m²,



6.5 Coolant Selection

Coolant is to get flush grits of binding agent and chips from both grinding wheel and regulating wheel quickly. It can cool workpiece, reduce friction between workpiece and grinding wheel, and enhance surface glazing on workpiece. Coolant flows from tank through pump to machine, then back to coolant tank and flow through some deposit tanks to get rid of sands, bonding agent and chips. Hence, a great amount of mud-like things is deposited in reservoir. In this case, coolant had

better been changed frequently otherwise grinding glazing and accuracy will be affected. Pump is easily damaged. Magnetic coolant separator or filter device can get rid of great amount of grinding chips such that coolant can be changed for a longer time.

There are various types of coolant. Please choose the suitable type.

A. Water-solubility coolant

(1) Emulsifying series coolant

With mineral oil as the element liquid, fatty acid soap, petroleum resin soap, tea acid soap, petroleum, sulfur soap (5 – 20%) of negative iron active agent as the emulsifier, mix further with alcohol, fatty acid grease as binding agent. Generally, it is diluted by water 20 to 50 times before use. It appears like milk. The advantage of this series is good lubrication, but its cooling and permeability are less good.

(2) Transparent and emulsifying coolant

With little oil but more emulsifier, when coolant is diluted to 70 – 100 times, oil is dispersed to the corpuscles nearly as transparent body, whose cooling and permeability are less good.

(3) Transparent water-solubility coolant

Mainly with chemical treatment chrome acid sodium such as inorganic ammonium, dissolves into water and appears transparent, which develops anti-solubility and rust prevention with good grinding effect. It is suitable for cast iron and cast steel.

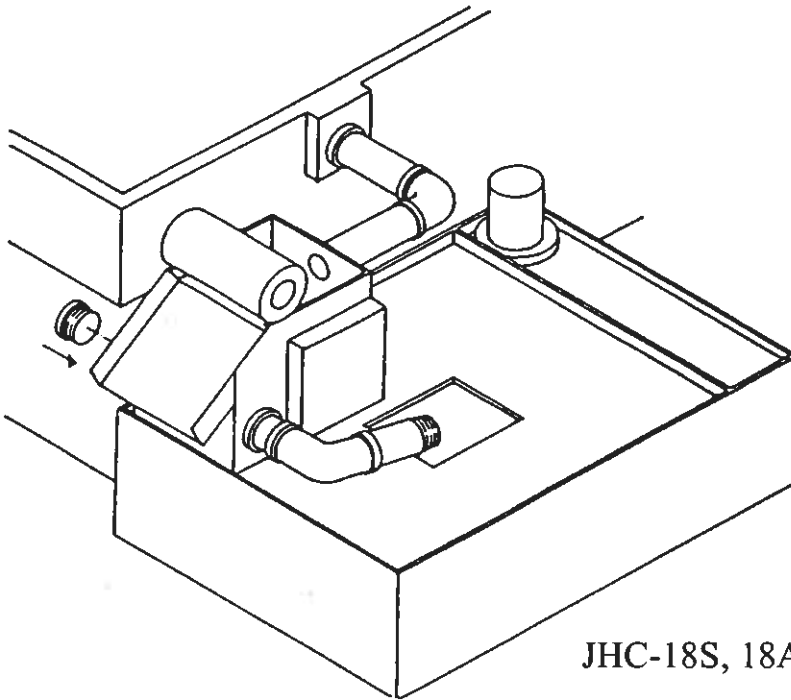
B. None water-solubility grinding liquid

Mainly with light mineral oil, mixes with sulfur fatty oil or chlorine sulfur fatty oil, which has good lubrication, including active and inactive. If added with sulfur, chlorine such as extreme pressure additives, it can effectively reduce grits worn and torn, and prevent grinding wheel's holes from being clogged, which may reduce heating. Hence, this is suitable for precision grinding and better for aluminum workpieces. Be ware of its inflammability and hygiene.

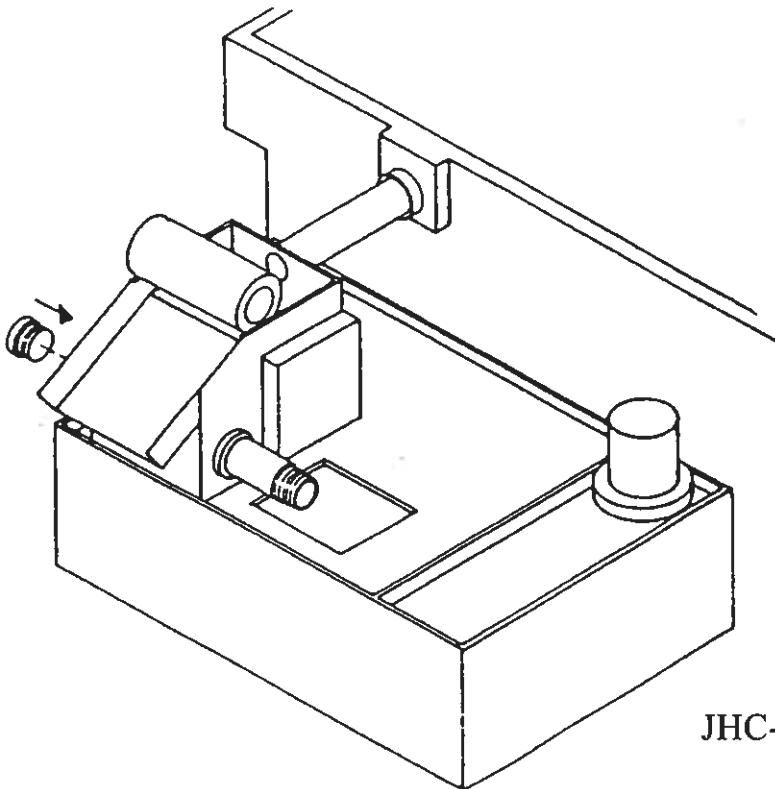
C. Water

Water is good for cooling but less good for lubrication. It may cause rust for metal workpieces. Under special conditions, it is used for grinding in porcelain and glass fiber. But do not apply the used-water. The used grinding liquid should be treated according to general standard industrial wastewater treatment, such as chemical treatment (by acid-base treating method) or burned ash in order to avoid water pollution.

Magnetic Coolant Separator Mounting



JHC-18S, 18AS, 18BS,

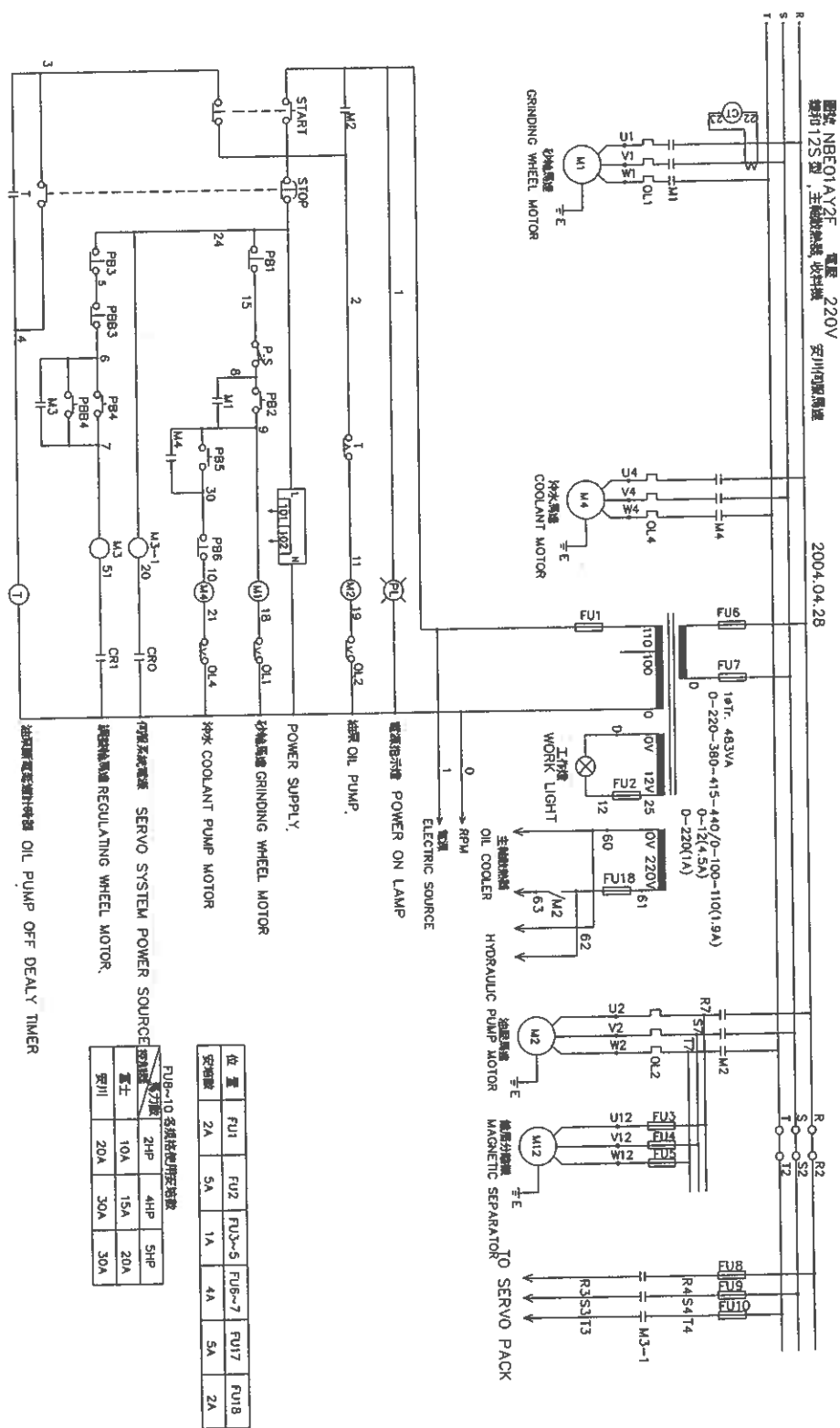


JHC-12S

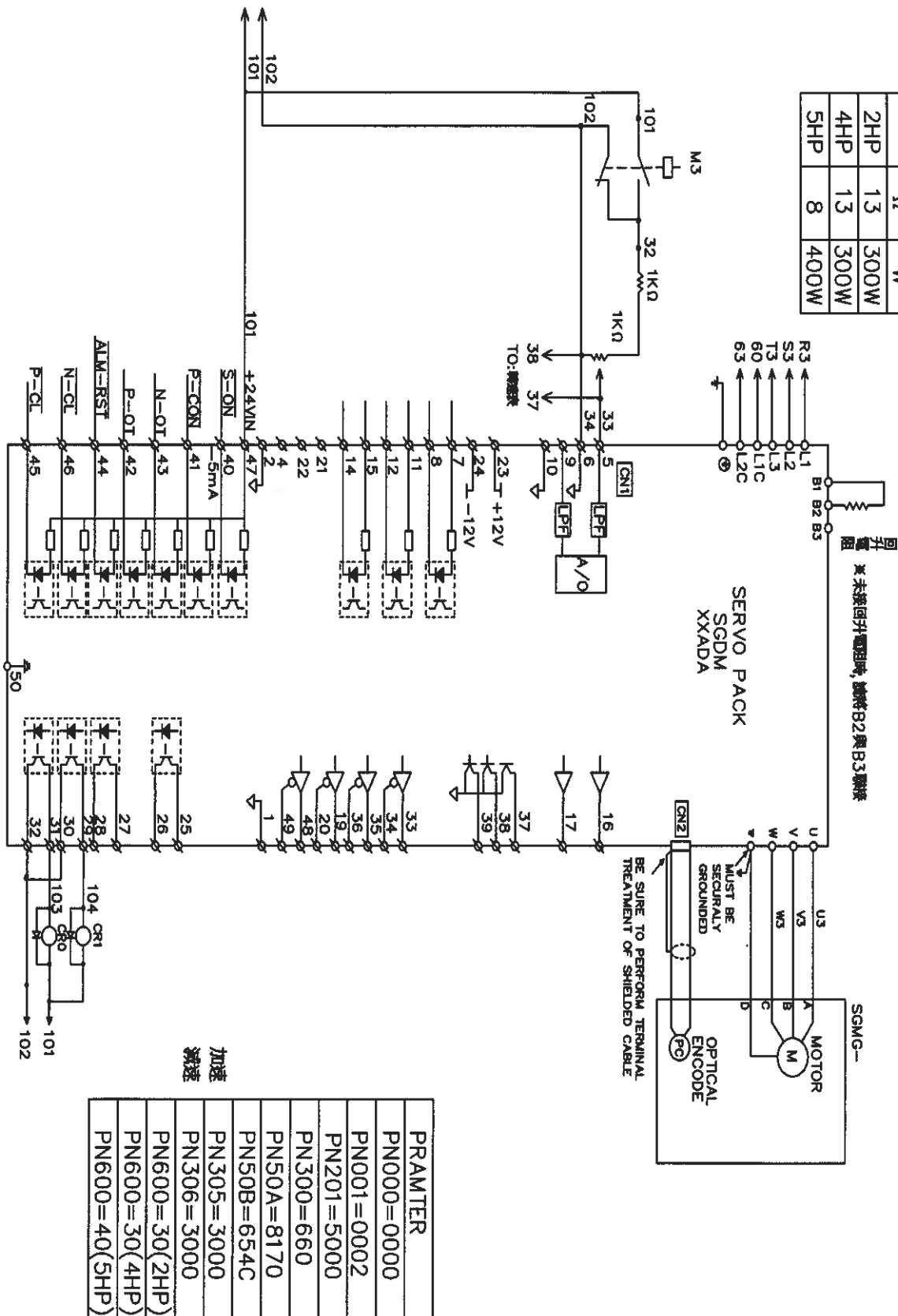
CH 7

Electrical Circuit Diagram
&
Parts List

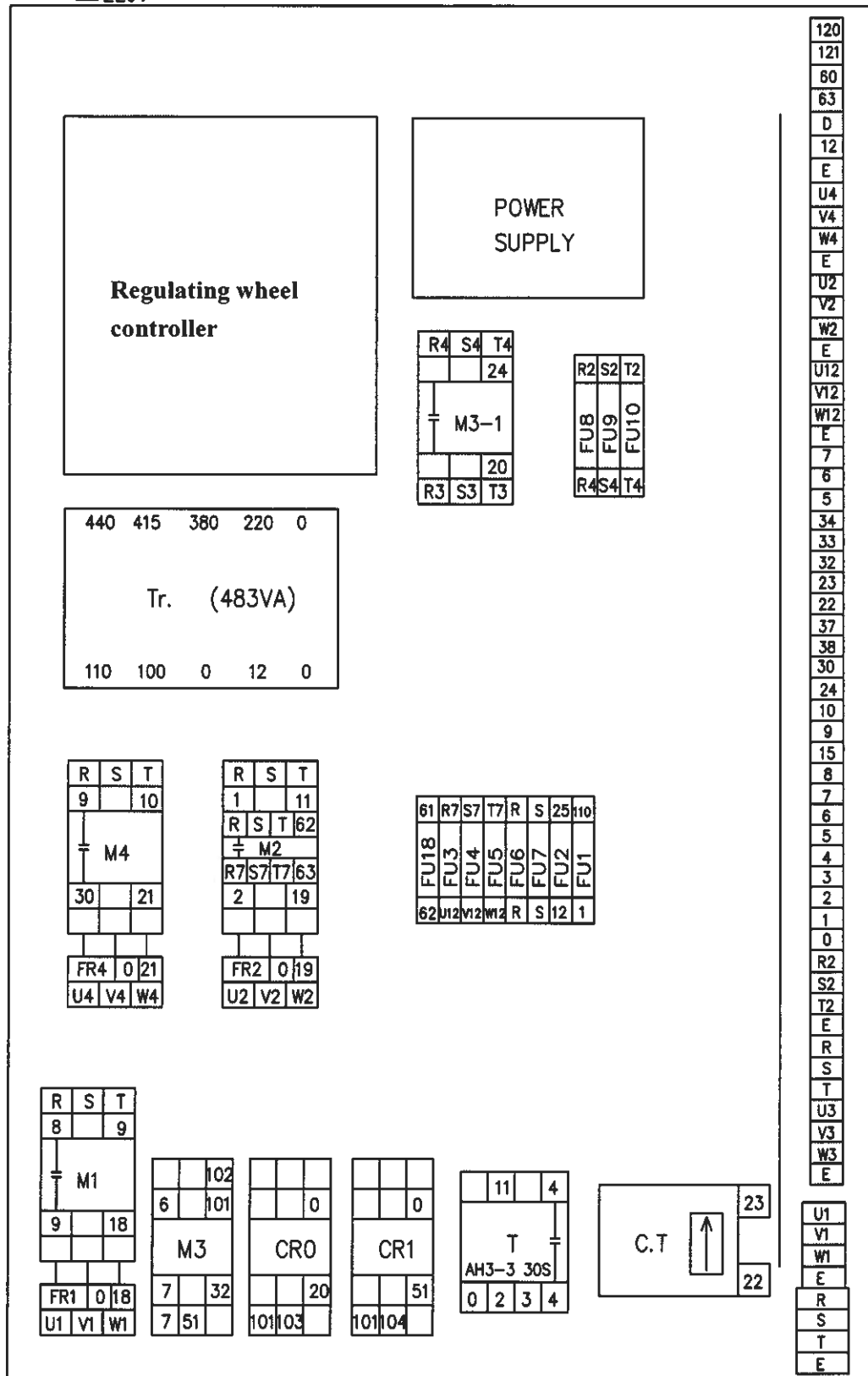
7-1



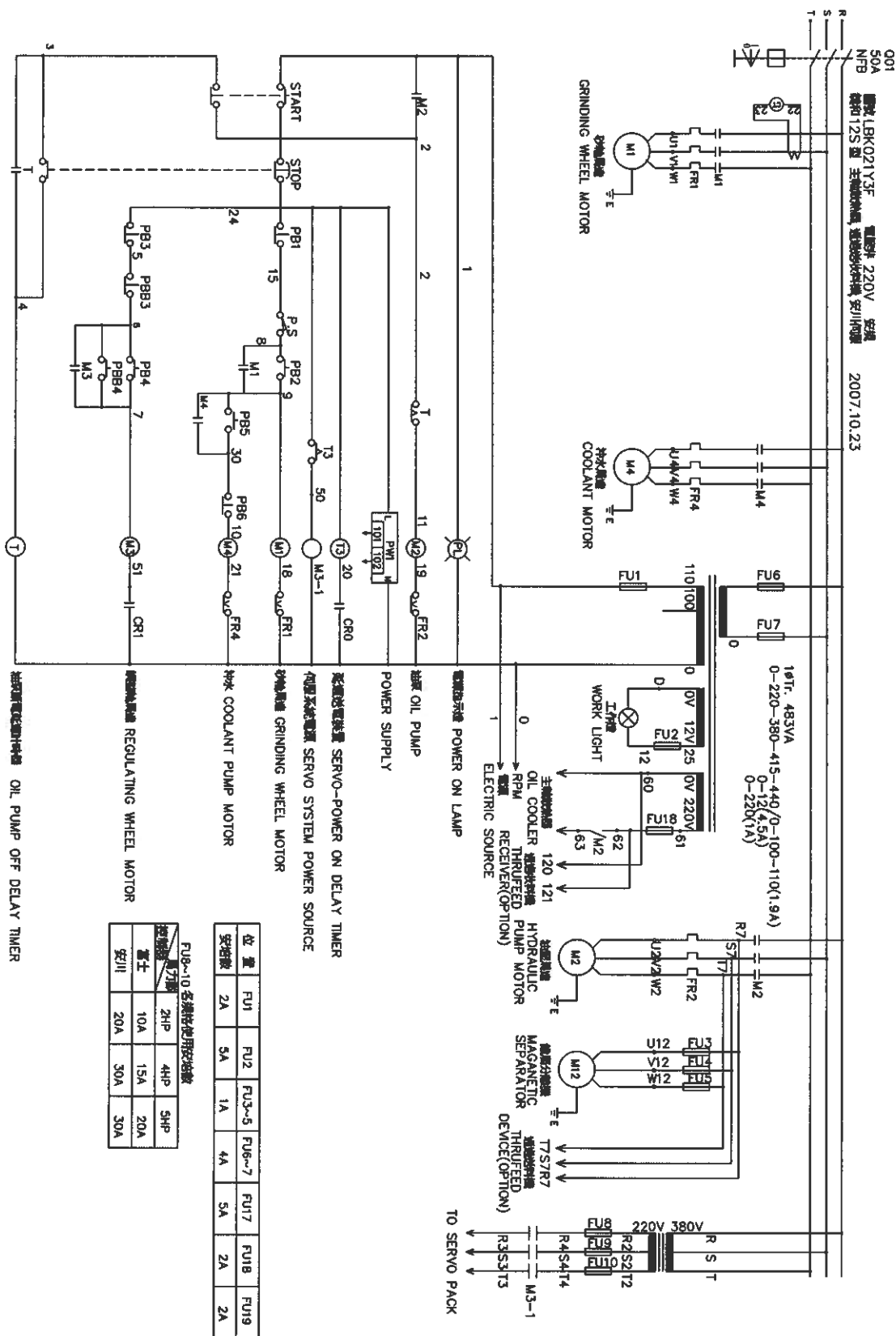
	Ω	W
2HP	13	300W
4HP	13	300W
5HP	8	400W



PRAMTER
PN000=0000
PN001=0002
PN201=5000
PN300=660
PN50A=8170
PN50B=654C
PN305=3000
PN306=3000
PN600=30(2HP)
PN600=30(4HP)
PN600=40(5HP)

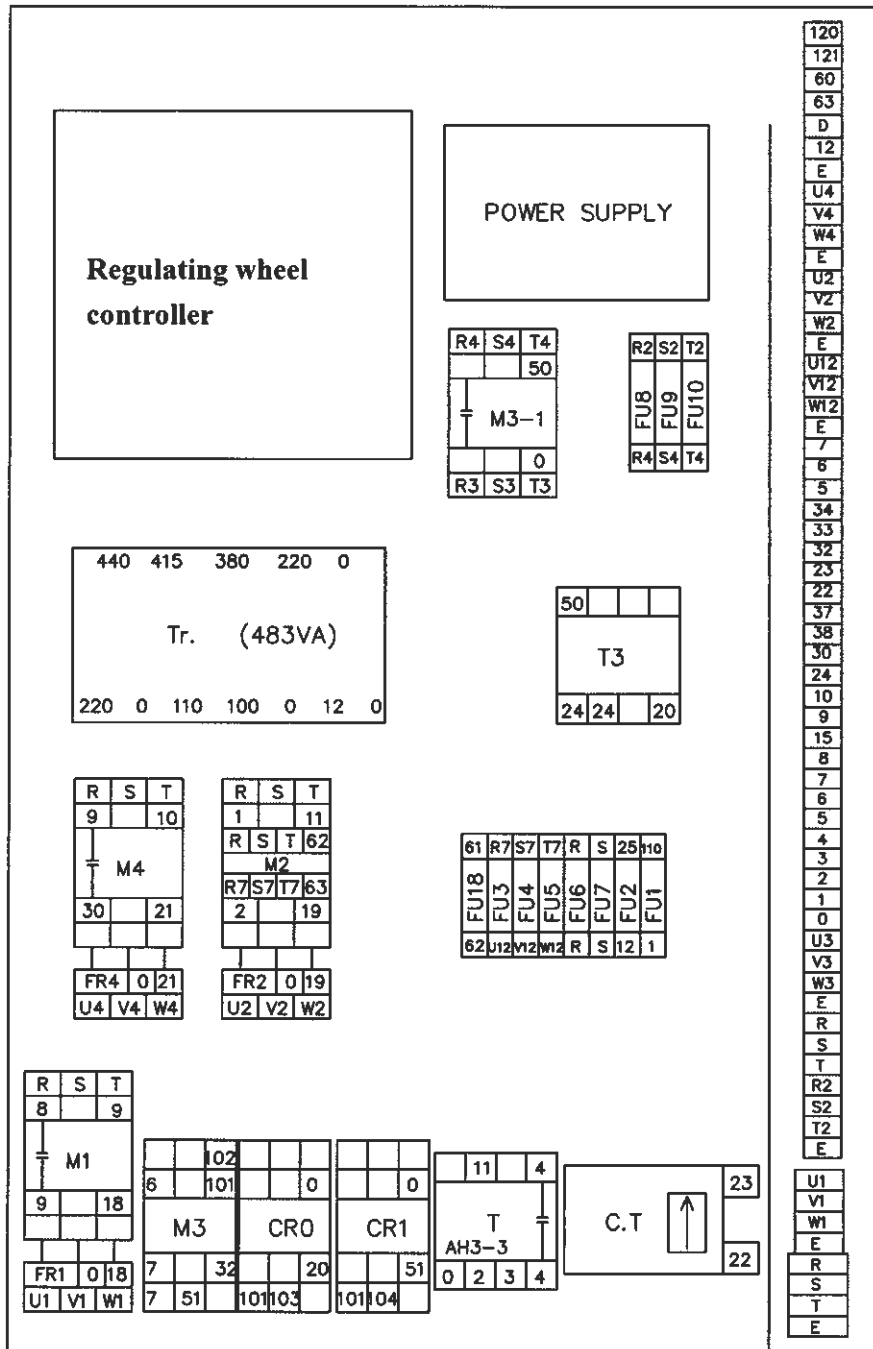


7.2 JHC-12S Voltage \neq 220V



回升原因與貢獻

R

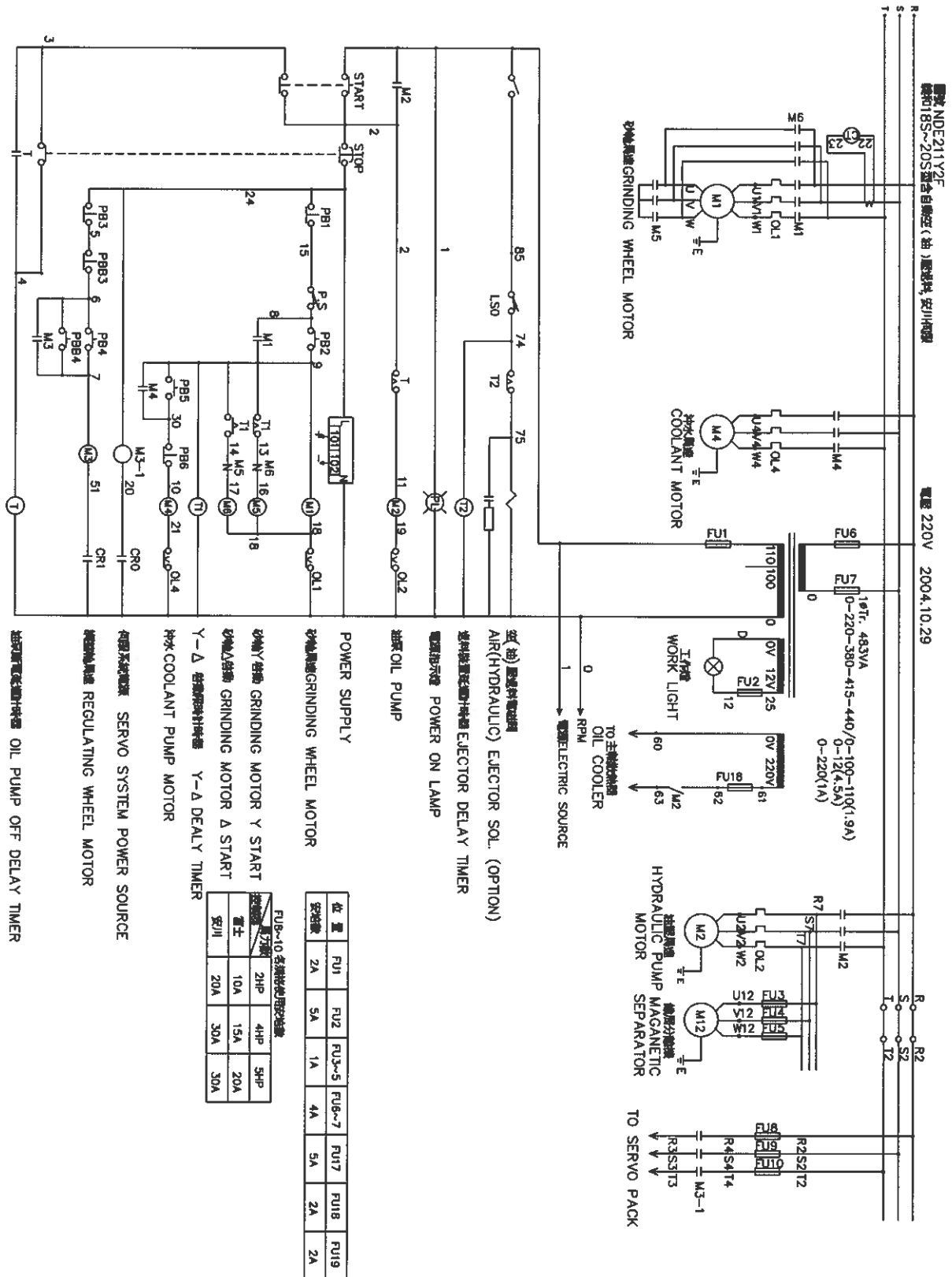


ELECTRICAL EQUIPMENT LIST
JHC-12S

Item Designation	Description	Technical data	Q'ty	Supplier & reference	remark
SB 1	Emergency Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER PRV-K11	IEC 947 EN 60947 UL : CSA
SB 2	Hydraulic Start	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 3	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 4	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 5	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 6	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 7	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 8	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 9	G .W/ R .W Motor Hydraulic Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 10	Coolant Pump Start / Stop	DC 250 V 11A AC600V 10A	1	MOELLER RD-10/ K10	IEC 269-2 NFC 63 210 UL : CSA
FU 1 ,FU 2 FU3	Main Circuit Fuse	500 v 32A	3	13332 IEGRAND	IEC 269-2 NFC 63 210
FU 4 ,FU 5 FU 6	Motor Fuse	500 v 10A	3	13316 IEGRAND	IEC 269-2 NFC 63 210
FU 7 ,FU 8	T.R Fuse (PR. Side)	500 v 2A	2	13302 IEGRAND	IEC 269-2 NFC 63 210
FU 9	Control Circuit Fuse	500 v 2A	1	13302 IEGRAND	IEC 269-2 NFC 63 210
FU 10	Work Pump Fuse	500 v 1A	1	13306 IEGRAND	IEC 269-2 NFC 63 210
M 1	G .W Motor	380/415/50 Hz 15 kw 4 P	1	SEING	
M 2	Hydraulic Pump Motor	380/415/50 Hz 0.75 kw 4 P	1	JIA CHENG	
M 3	R.W Motor	380/415/50 Hz 2.2 kw 6 P	1	SEING	
M 4	Coolant Pump Motor	380/415/50 Hz 0.2 kw 2 P	1	Yeong Chyuan	

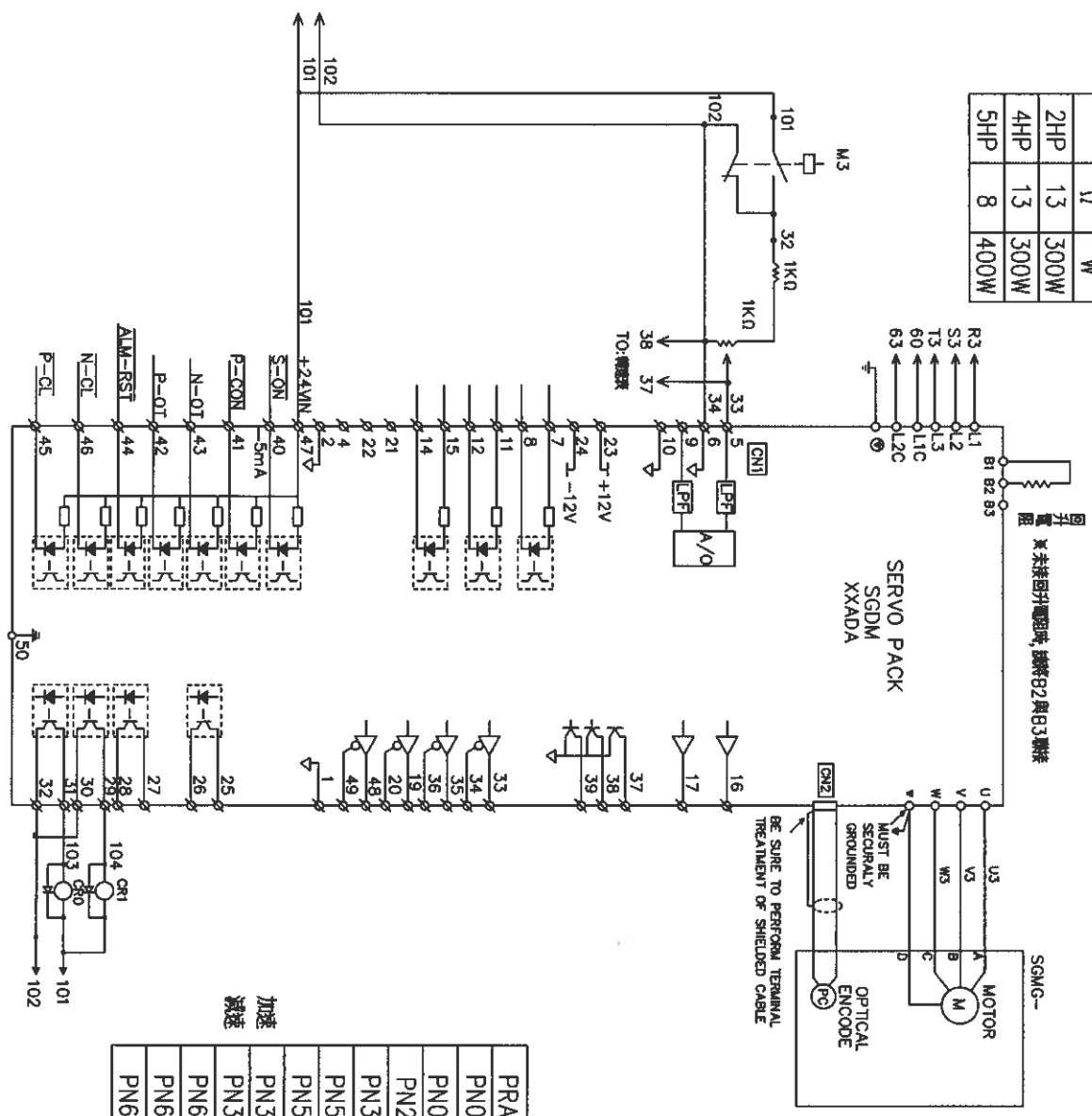
KM 1	R.W Motor Contactor	Ui = 660 v Ith = 35 A	1	ALLEN – Bradley A24	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 2	Hydraulic Pump Motor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 3	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 4	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
FR 1	Overload Relay	Set Range 22 A – 32A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 2	Overload Relay	Set Range 1.5 A – 2.3A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 3	Overload Relay	Set Range 4.0 A – 5.0A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 4 (2 HP only)	Overload Relay	Set Range 2.8 A – 4.2A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
PSW	Main Power Switch	Uimp = 6 kv I = 32 A	1	MOELLER P-32	IEC 947-4 EN 60947 UL CSA N F
A.L	G .W Motor Current Meter	0A – 200 A	1	Chung Hsin YS – 8N	
C.T	G .W Current Transformer	100A : 5 A	1	Chung Hsin YAL – I	
W.L	Work Lamp	AC 12V / 55W	1	ENMEN WOTAN	
T.R	Control Transformer	0.38 / 0.11v 260 AV 50Hz	1	PER SHING	
T.M 1	Hydraulic Pump Delay Off	0 – 30 sec. 110 v / 5 A	1	PUNA AH3-3	

7.3. JHC-18S, JHC-20S Voltage=220V



图升电阻Ω與W數

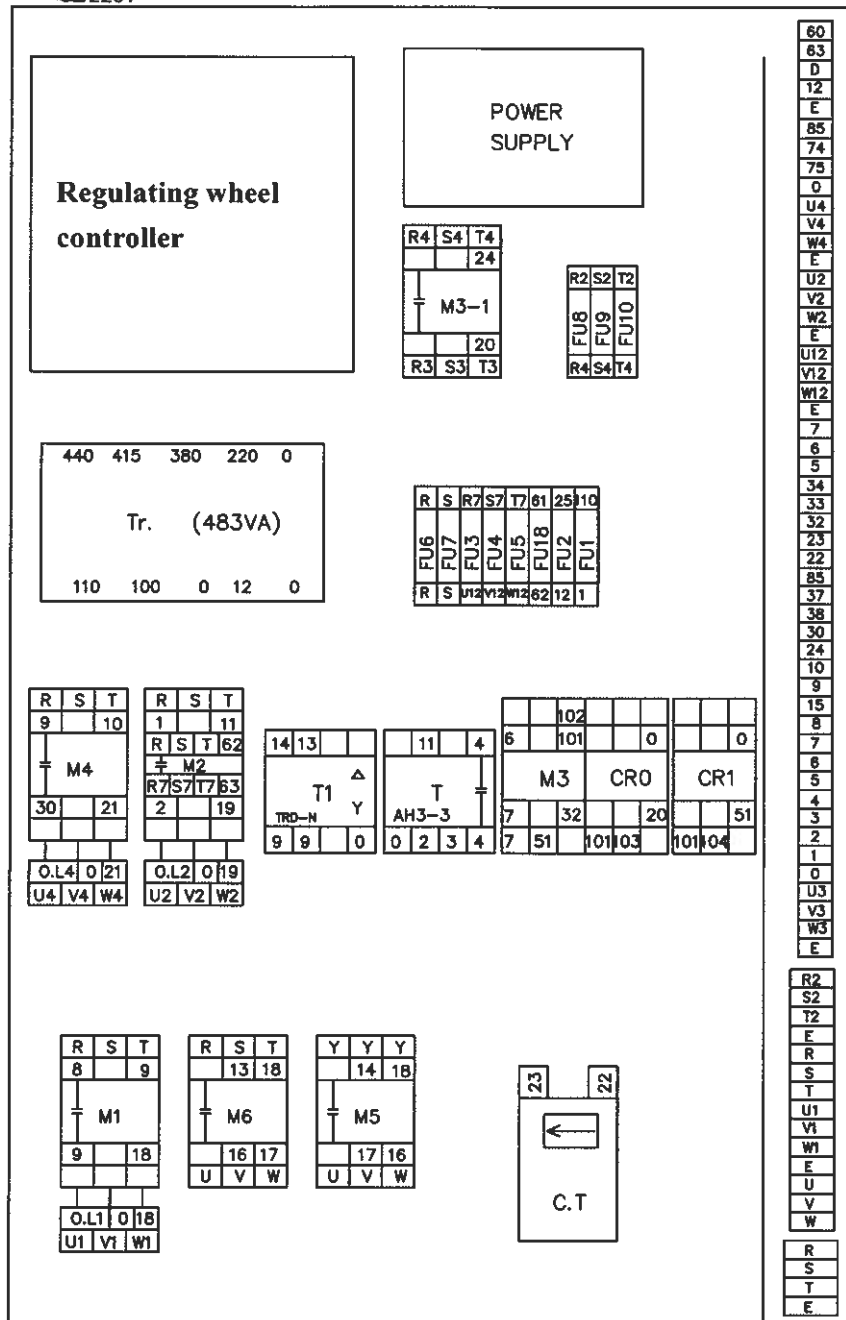
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4HP	13	300W
5HP	8	400W



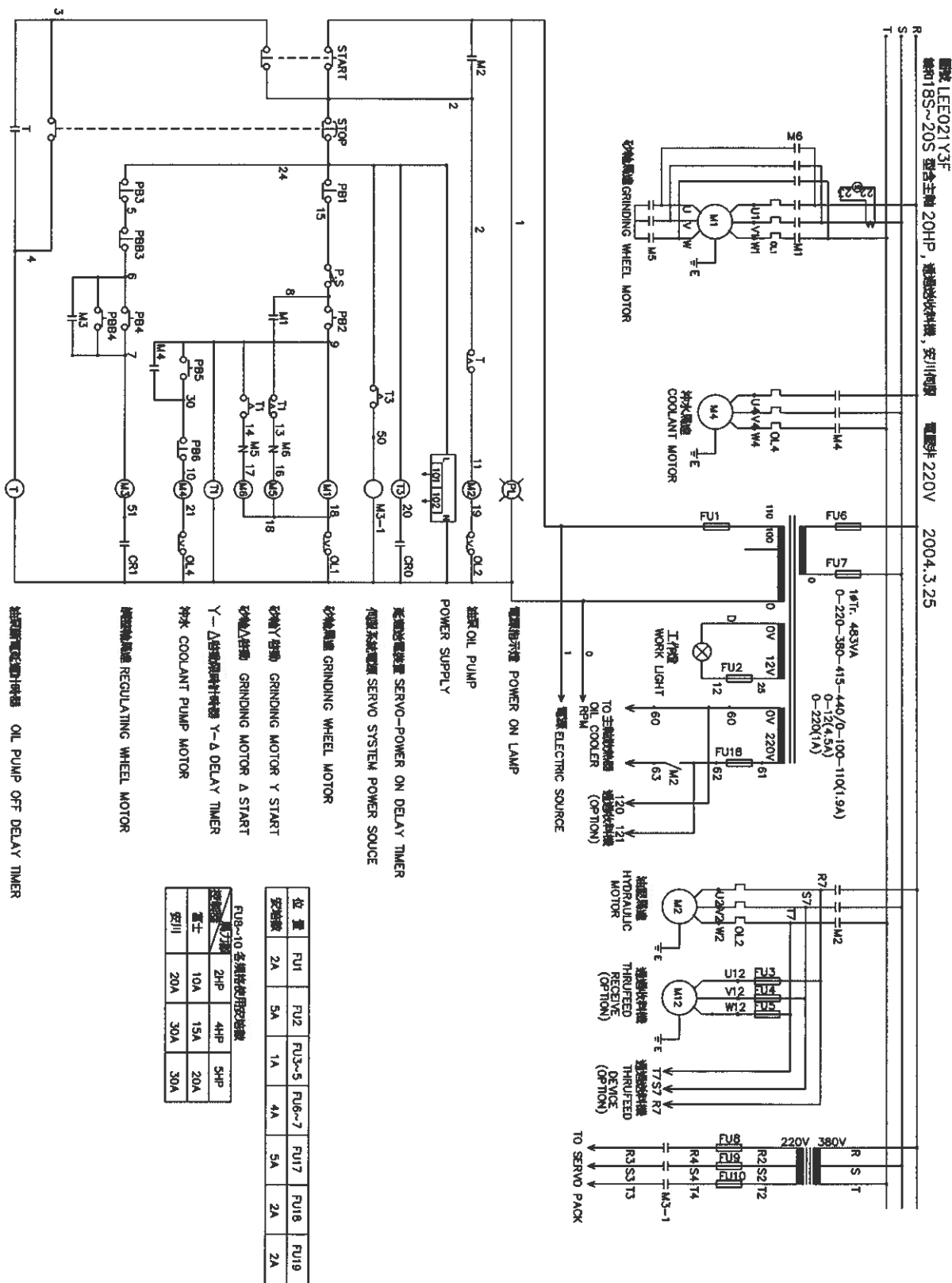
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PN001=0002
PN201=5000
PN300=660
PN50A=8170
PN50B=654C
PN305=3000
PN306=3000
PN600=30(2HP)
PN600=30(4HP)
PN600=40(5HP)

加速 減速

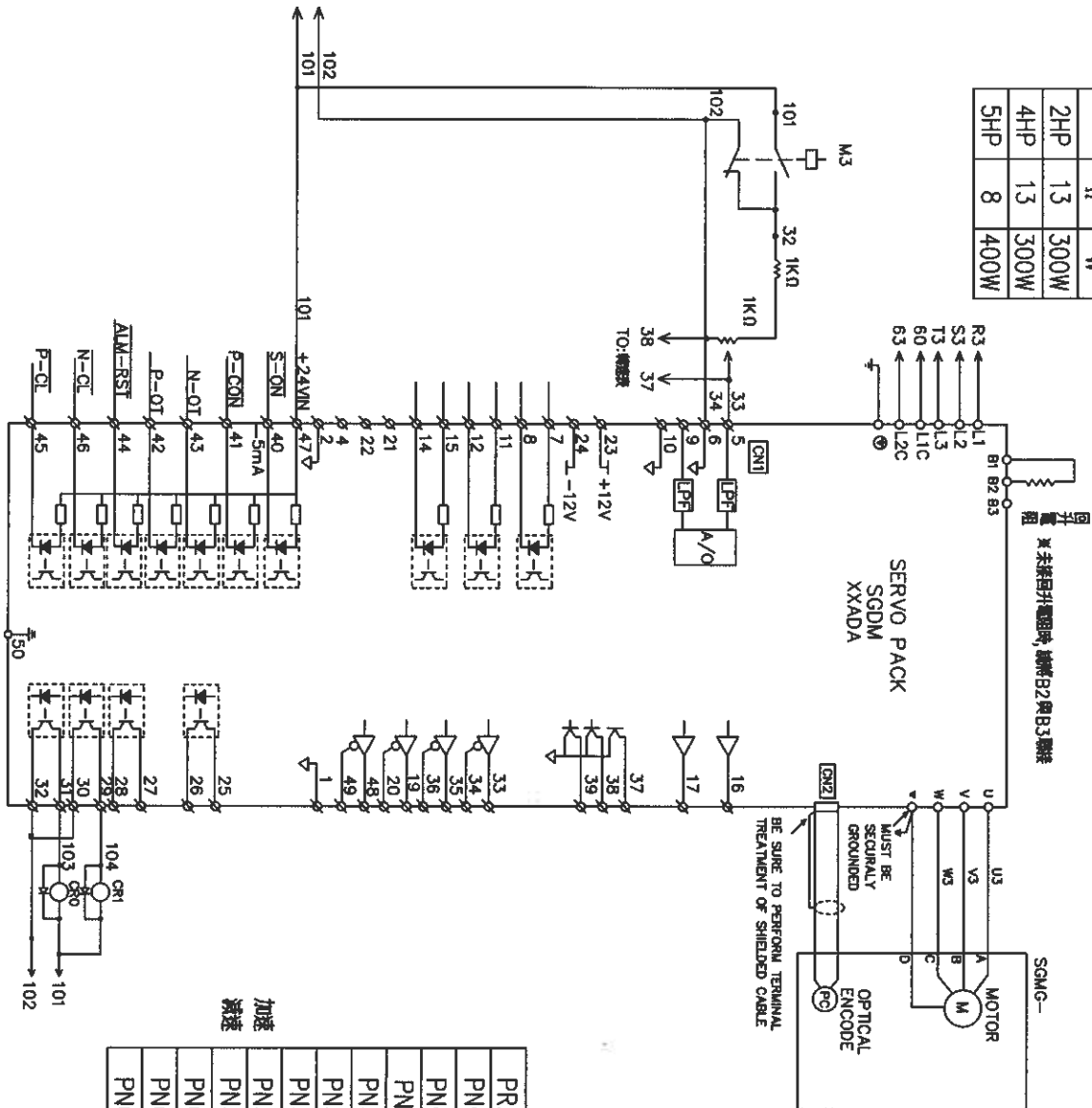
電圧 220V



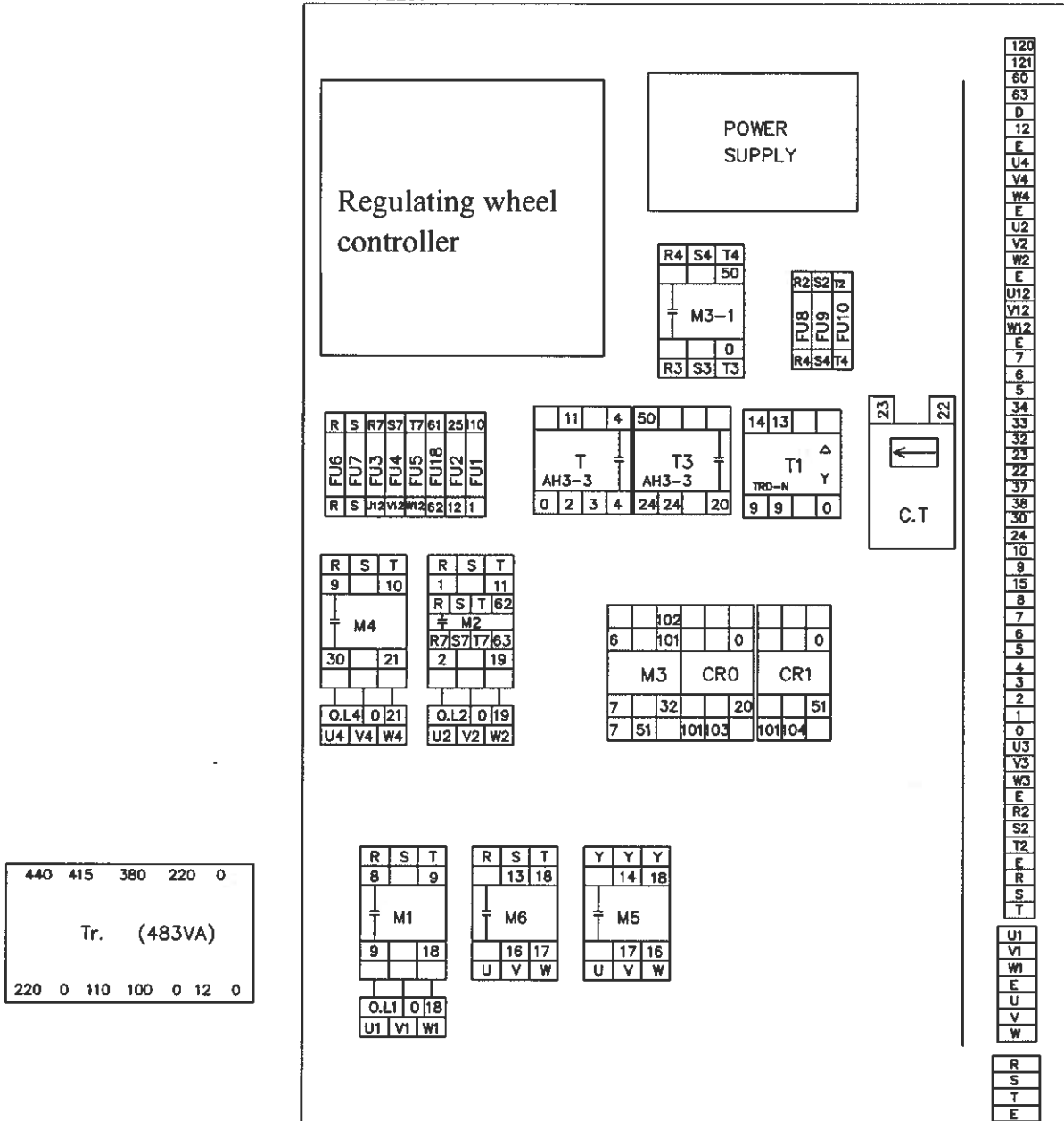
7.4 JHC-18S, JHC-20S Voltage \neq 220V



	Ω	W
2HP	13	300W
4HP	13	300W
5HP	8	400W



PRAMTER
PN000=0000
PN001=0002
PN201=5000
PN300=660
PN50A=8170
PN50B=654C
PN305=3000
PN306=3000
PN600=30(2HP)
PN600=30(4HP)
PN600=40(5HP)



ELECTRICAL EQUIPMENT LIST
JHC-18S, 18AS

Item designation	Description	Technical data	Q'ty	Supplier & reference	remark
SB 1	Emergency Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER PRV-K11	IEC 947 EN 60947 UL CSA N F1
SB 2	Hydraulic Start	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 3	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 4	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 5	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 6	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 7	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 8	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 9	G .W/ R .W Motor Hydraulic Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 10	Coolant Pump Start / Stop	DC 250 V 11A AC600V 10A	1	MOELLER RD-10/ K10	IEC 269-2 NFC 62 210 UL : CSA
FU 1 ,FU 2 FU3	Main Circuit Fuse	500 v 32A	3	13332 IEGRAND	IEC 269-2 NFC 62 210
FU 4 ,FU 5 FU 6	Motor Fuse	500 v 10A	3	13316 IEGRAND	IEC 269-2 NFC 62 210
FU 7 ,FU 8	T.R Fuse (PR. Side)	500 v 2A	2	13302 IEGRAND	IEC 269-2 NFC 62 210
FU 9	Control Circuit Fuse	500 v 2A	1	13302 IEGRAND	IEC 269-2 NFC 62 210
FU 10	Work Pump Fuse	500 v 6A	1	13306 IEGRAND	IEC 269-2 NFC 62 210
FU 11,FU12 FU 13	Hydraulic Pump Fuse	500 v 6A	3	13306 IEGRAND	IEC 269-2 NFC 62 210
M 1	G .W Motor	380/415/50 Hz 15 kw 4 P	1	SEING	

M 2	Hydraulic Pump Motor	380/415/50 Hz 0.75 kw 4 P	1	JIA CHENG	
M 3	R.W Motor	380/415/50 Hz 2.2 kw 6 P	1	SEING	
M 4	Coolant Pump Motor	380/415/50 Hz 0.2 kw 2 P	1	Yeong Chyuan	
KM 1	R.W Motor Contactor	Ui = 660 v Ith = 35 A	1	ALLEN – Bradley A24	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 2	Hydraulic Pump Motor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 3	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 4	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
FR 1	Overload Relay	Set Range 22 A – 32A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 2	Overload Relay	Set Range 1.5 A – 2.3A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 3	Overload Relay	Set Range 4.0 A – 5.0A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 4 (2 HP only)	Overload Relay	Set Range 2.8 A – 4.2A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
PSW	Main Power Switch	Uimp = 6 kv I = 100 A	1	MOELLER F-100	IEC 947-4 EN 60947 UL CSA N F
A.L	G .W Motor Current Meter	0A – 200 A	1	Chung Hsin YS – 8N	
C.T	G .W Current Transformer	100A : 5 A	1	Chung Hsin YAL – I	
W.L	Work Lamp	AC 12V / 55W	1	ENMEN WOTAN	
T.R	Control Transformer	0.38 / 0.11v 260 AV 50Hz	1	PER SHING	
T.M 1	Hydraulic Pump Delay Off	0 – 30 sec. 110 v / 5 A	1	PUNA AH3-3	
T.M 2	Y- Δ Timer -G.W Start-	0 – 30 sec. 110 v / 5 A	1	PUNA AH3-3	

ELECTRICAL EQUIPMENT LIST
JHC-18BS, 20S

Item designation	Description	Technical data	Q'ty	Supplier & reference	remark
SB 1	Emergency Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER PRV-K11	IEC 947 EN 60947 UL CSA N F1
SB 2	Hydraulic Start	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 3	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 4	G .W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 5	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 6	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 7	R.W Motor Stop	600 v 3A	1	SHERN DIAN DPB-2	
SB 8	R.W Motor Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 9	G .W/ R .W Motor Hydraulic Stop	Uimp = 6 kv Ui = 500 v AC 15 : 400v/4A	1	MOELLER RD-10/ K10	IEC 947 EN 60947 UL : CSA
SB 10	Coolant Pump Start / Stop	DC 250 V 11A AC600V 10A	1	MOELLER RD-10/ K10	IEC 269-2 NFC 63 210 UL : CSA
FU 1 ,FU 2 FU3	Main Circuit Fuse	500 v 32A	3	13332 IEGRAND	IEC 269-2 NFC 62 210
FU 4 ,FU 5 FU 6	Motor Fuse	500 v 10A	3	13316 IEGRAND	IEC 269-2 NFC 62 210
FU 7 ,FU 8	T.R Fuse (PR. Side)	500 v 2A	2	13302 IEGRAND	IEC 269-2 NFC 62 210
FU 9	Control Circuit Fuse	500 v 2A	1	13302 IEGRAND	IEC 269-2 NFC 62 210
FU 10	Work Pump Fuse	500 v 6A	1	13306 IEGRAND	IEC 269-2 NFC 62 210
FU 11,FU12 FU 13	Hydraulic Pump Fuse	500 v 6A	3	13306 IEGRAND	IEC 269-2 NFC 62 210
M 1	G .W Motor	380/415/50 Hz 5.5 kw 4 P	1	SEING	
M 2	Hydraulic Pump Motor	380/415/50 Hz 0.75 kw 4 P	1	JIA CHENG	
M 3	R.W Motor	380/415/50 Hz 1.5 kw 6 P	1	SEING	

M 4	Coolant Pump Motor	380/415/50 Hz 0.1 kw 2 P	1	Yeong Chyuan	
KM 1	R.W Motor Contactor	Ui = 660 v Ith = 35 A	1	ALLEN – Bradley A24	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 2	Hydraulic Pump Motor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 3	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
KM 4	R.W Motor Contactor	Ui = 660 v Ith = 22 A	1	ALLEN – Bradley A09	EC947 VDE 0660 BS 5424 UL CSA N F1
FR 1	Overload Relay	Set Range 10 A – 16A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 2	Overload Relay	Set Range 1.5 A – 2.3A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
FR 3	Overload Relay	Set Range 1.5 A – 2.3A AC-15 , 500v	1	ALLEN – Bradley 193B	IEC 947-4 BS 4941 UL CSA N F1
PSW	Main Power Switch	Uimp = 6 kv I = 100 A	1	MOELLER P-100	IEC 947-4 EN 60947 UL CSA N F
A.L	G .W Motor Current Meter	0A – 200 A	1	Chung Hsin YS – 8N	
C.T	G .W Current Transformer	100A : 5 A	1	Chung Hsin YAL – I	
W.L	Work Lamp	AC 12V / 55W	1	ENMEN WOTAN	
T.R	Control Transformer	0.38 / 0.11v 260 AV 50Hz	1	PER SHING	
T.M 1	Hydraulic Pump Delay Off	0 – 30 sec. 110 v / 5 A	1	PUNA AH3-3	
T.M 2	Y- Δ Timer -G.W Start-	0 – 30 sec. 110 v / 5 A	1	PUNA AH3-3	

CH 8

Troubleshooting

Fault Finding (Trouble Shooting)

There are various phenomenon and difficulties occurred in centerless grinding work, the following table shows their reasons and solution. In fact, a problem results from may reasons and comes with several solutions in which each other has relativity. Hence, the following measure is not the only way to settle problem.

Definition	Cause	Action
No oil come out from oil pump	1. Level of oil in oil tank is too low.	1. Add Oil.
	2. Oil pump oil entry tube congested	2. Check whether there is congestion in filter and oil tube.
	3. Viscosity of the oil is too high	3. Check wheher the oil used is correct.
	4. Oil pump parts damaged.	4. Replace the damaged part.
Noise of oil pump	1. Air has entered the Oil tube.	1. Make sure the oil tube is inserted into the oil.
	2. There is air in the system.	2. Removed air from the system.
	3. Oil pump's rotation is to high	3. Adjust speed according to original motor.
	4. Clog of filter.	4. Please maintain regularly.
	5. Clog of oil tube.	5. Clean all smudge in the oil tube.
	6. Oil pump parts damaged.	6. Parts to be changed by maintenance technician.
	7. Viscosity of the oil is too thick	7. Use correct type of oil.
	8. Oil pump spindle and motor spindle have different concentricity.	8. Reinstall.
Noise of belt	1. Belt is loose	1. Adjust motor clamp and tightness of the belt.
	2. Belt changed shape	2. Replace

Phenomenon / Fault	Cause	Solution
Scar on finishing surface	1. Excessive hardness of blade 2. Chips or grinding wheel's small blocks adhered or melted on blade	1. Replaced with a soft blade 2. Add soluble cutting coolant in cooling water
Come with equal space of screw like trace	1. Edge hit of grinding wheel 2. Undesirable regulating of guide plate 3. High dressing speed 4. Diamond tool worn and torn 5. Diamond tool holder loose	1. Edge of grinding wheel form a cone shape 2. Make guide plate parallel 3. Reduce dressing speed and feeding volume 4. Change contact surface of diamond tool 5. Change diamond tool holder
Equal or unequal space of thin line	1. Poor dressing 2. External vibration	1. Dressing from edge of grinding wheel, keep fixed dressing speed 2. Isolation of vibration
Deep and irregular trace	1. Grinding wheel loose	1. Insert packing piece between flange and grinding wheel and lock tem well
Grinding burned scar grind cracks		1. Re-erect diamond tool 2. Exchange diamond tool 3. Employ low binding degree of grinding and reduce volume which pouring large amount of cooling water

Phenomenon / Fault	Cause	Solution
Vibration	<ol style="list-style-type: none"> 1. Erect-screw loose 2. Out of balance of grinding wheel 	<ol style="list-style-type: none"> 1. Re-erect it and make its load even distribution 2. Re-balancing
Self-excited vibration	<ol style="list-style-type: none"> 1. Center too high 2. Blade's angle too large 3. Blade too thin 4. Undesirable erection of blade 5. Bend of blade 6. Large volume of grinding 7. Undesirable selection of grinding wheel 8. Undesirable real circle of grinding wheel 9. Grinding wheel's trestle loose 10. Mandrel loose 11. Diamond tool holder loose 	<ol style="list-style-type: none"> 1. Reduce center height 2. Reduce angle 3. Increase thickness 4. Relock clamp screw 5. Correct blade 6. Reduce grinding volume and increase grinding make numbers 7. Consult with grinding wheel manufacturer 8. Dressing is made before and after balance taken, screw locked equally 9. Relock screw 10. Regulate regulating wheel's mandrel 11. Relock holder and change diamond tool
Fail to get real circle	<ol style="list-style-type: none"> 1. External vibration 2. Center too low 3. Blade angle too small 4. Excessive hardness of grinding wheel 5. High grinding pressure 6. Large volume of rough grinding 7. Regulating wheel loose 8. Insufficient cooling water (in grinding hollow piece) 9. Undesirable dressing 	<ol style="list-style-type: none"> 1. Isolation of external vibration 2. Increase center height 3. Increase angle 4. Accelerate thrust speed 5. Use sharp diamond tool to increase correcting speed 6. Reduce feeding volume and do the first grinding by high thrust speed 7. Relock screw and regulate 8. Add coolant on desirable place of contact point 9. Dress again

Phenomenon / Fault	Cause	Solution
High central part	Undesirable regulation of guide plate	<ol style="list-style-type: none"> 1. Make guide plate parallel and reduce tilt angle of regulating wheel 2. Increase swivel angle of regulating wheel on dressing device
Low central part	Undesirable regulation of guide plate	<ol style="list-style-type: none"> 1. Make guide plate parallel 2. Increase tilt angle of grinding wheel 3. Reduce swivel angle of regulating wheel on dressing device
Fail to get real straightness	<ol style="list-style-type: none"> 1. More deformation before grinding 2. Excessive grinding volume in the first grinding with insufficient grinding volume 	

CH 9

Spare Parts

Operate Location		Name	Specification	Q'ty	Remark
Grinding wheel	End cover	Oil seal	TC45 ,62 ,9	1	
	Alloy bearing seat	O ring	G35	1	
		O ring	G55	1	
	Spindle front cover	Oil seal	TC75 ,95 ,12	1	
		O ring	G65	2	
	Spindle rear cover	Oil seal	TC60 ,75 ,9	1	
		O ring	G50	2	
	Center rest Oil window	Thrust bearing	51111	1	
Regulating wheel	End cover Alloy bearing Seat	Oil seal	TC45 ,62 ,9	1	
		O ring	G35	1	
		O ring	G55	1	
	Front bearing External nut	Oil seal	TC70 ,88 ,12	1	
		O ring	G60	2	
	Inner nut	Oil seal	TC60 ,80 ,12	1	
		O ring	G85	1	
	Rear bearing External nut	O ring	G80	1	
	Inner nut	Oil seal	TC40 ,56 ,11	1	
	Rear cover	O ring	G70	1	
		Thrust bearing	51106	2	
		O ring	G80	1	
	Oil window	O ring	G45	1	
Regulating wheel Feed mechanism	Force entry	Ball bearing	6204 Z	2	
	Bearing seat	Ball bearing	6202 ZZ	1	
		Oil seal	TC32 ,48 ,8	1	
	Two sides of Each axle	Ball bearing	6204 Z	7	
		Oil ring	G50	7	
Speed change Driving mechanism	Chain strainer	Ball bearing	6202 Z	4	
	Feed bearing seat	Thrust bearing	51106	2	

Operate Location		Name	Specification	Q'ty	Remark
Grinding wheel	End cover	Oil seal	TC65 ,95 ,14	1	
	Alloy bearing seat	O ring	G55	2	
		O ring	G80	1	
	Spindle front cover	Oil seal	TC105 ,135 ,14	1	
		O ring	G95	2	
	Spindle rear cover	Oil seal	TC80 ,105 ,13	1	
		O ring	G70	2	
	Center rest	Thrust bearing	51117	2	
Regulating wheel spindle mechanism	Oil window	O ring	G45	1	
	End cover	Oil seal	TC50 ,72 ,12	1	
	Alloy bearing Seat	O ring	G40	2	
		O ring	G65	1	
		O ring	G65	1	
	Front bearing External nut	Oil seal	TC85 ,110 ,13	1	
		O ring	G120	1	
		O ring	G75	2	
	Inner nut	Oil seal	TC75 ,105 ,13	1	
		O ring	G105	1	
		O ring	G90	1	
	Rear bearing External nut	O seal	TC58 ,85 ,12	1	
	Inner nut	Oil ring	G90	1	
	Rear cover	Thrust bearing	51106	2	
		O ring	G80	1	
Speed change Driving mechanism	Oil window	O ring	G45	1	
	Force entry	Ball bearing	6206 Z	2	
	Bearing seat	Ball bearing	6204 ZZ	1	
		Oil seal	TC35 ,64 ,13	1	
		Oil ring	G80	1	
	Both sides of each	Ball bearing	6305 Z	6	
	Axle central part of	Oil ring	G65	6	
	Each axle chain	Ball bearing	6007 ZZ	4	
Strainer		Ball bearing	6003 Z	4	

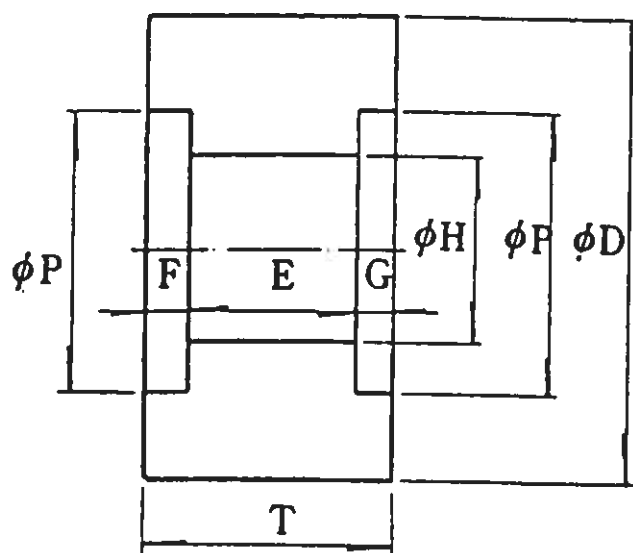
Regulating wheel feed mechanism	Feed bearing micro Feed bearing	Thrust bearing	51106	2	
		Thrust bearing	51106	2	
Lower slide feed mechanism	Feed bearing micro Feed bearing seat	Thrust bearing	51109	2	
		Thrust bearing	51107	2	
Dressing oil Cylinder	Oil cylinder cover piston	O ring	P 65	2	
		O ring	P 20	2	
		O ring	P 48 A	2	
Oil supply system	Oil filter	O ring	G 75	2	
		O ring	P 20	1	
		Filter	1/2"	1	
	Oil tank	Filter	3/4"	1	
	Dressing control Valve	O ring	P 20	1	
		O ring	P 10 A	1	

CH 10

Appendix A

-Size of Grinding & Regulating Wheel-

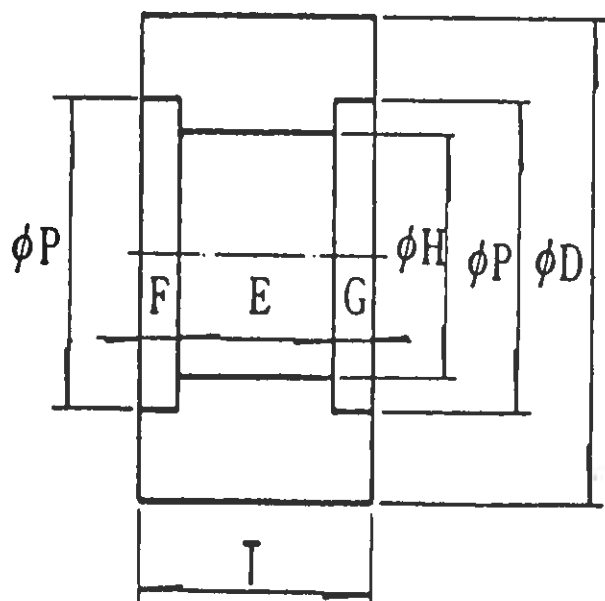
Grinding Wheel



UNIT : MM

	ΦD	T	ΦH	F	G	P	E
JHC-12S	305	150	120	25	25	175	100
JHC-18S	455	205	228.6	25	25	295	155
JHC-18AS	455	255	228.6	50	50	295	155
JHC-18BS	455	305	228.6	50	50	295	205
JHC-20S	510	205	254	25	25	320	155

Regulating Wheel



UNIT : MM

	ΦD	T	ΦH	F	G	P	E
JHC-12S	205	150	90	25	25	130	100
JHC-18S	255	205	111.2	75	20	170	110
JHC-18AS	255	255	111.2	100	45	170	110
JHC-18BS	255	305	111.2	100	65	170	140
JHC-20S	305	205	127	75	20	190	110

CH 11

Technical Skill for Centerless grinding

Production per work pieces

It will depend on work pieces, material of grinding wheel. Also there is a formula for the speed of every minute grinding:

$$n = \sin \theta \times \pi DN$$

$\sin \theta$: the tilt angle of regulating wheel

D: the diameter of regulating wheel

N: the RPM of regulating wheel

Thrufeed grinding technical proposal

Below is the formula of stock removal, angle and center high for thrufeed grinding

Formula: $H + (\emptyset \div 4) = GH$

H: The altitude from top of blade to center of grinding wheel

\emptyset : The diameter of workpieces

GH: The altitude of workpieces (the distance between top of workrest and center of workpieces)

WH: The distance between center workpieces and center of grinding wheel
(approximate $\emptyset \div 4$)

For example:

$$H = 37$$

Workpieces $\emptyset 20$

$$37 + (20 \div 4) = 42 \text{ (GH)}$$

For slant (tilt) angle 1° adds entry for 0.1 mm of stock removal

For WH, 1 mm of additional height increases the entry for stock removal of 0.01 mm.

For R angle, every degree reduces entry for stock removal by 0.1 mm

Rough grinding does not require having entry or exit for stock removal.

Precise grinding requires 0.02 mm for front and 0.01 mm for rear stock removal total 0.03 mm.

Finishing grinding requires 0.02 mm for front and 0.02 mm for rear stock removal total 0.04 mm

For example:

$$H = 37$$

Workpieces $\varnothing 20$

$$37 + (20 \div 4) = 42 \text{ (GH)}$$

Rough material: $\varnothing 20.2$ Finished products: $\varnothing 19.96$

Rough grinding: $\varnothing 20.05$ Precise grinding: $\varnothing 19.98$ Finishing grinding: $\varnothing 19.96$

Rough grinding

$$\text{Tilt angle } 2.5^\circ = 0.25 \quad \text{WH } 5 \text{ mm} = 0.05 \quad \text{Total} = 0.3 \text{ mm}$$

0.3 mm deduct actual stock removal

Material minus size of rough grinding

$$0.3 - (20.2 - 20.05) = 0.15$$

$$\text{Swivel angle (R)} = 1.5^\circ$$

Precise grinding

$$\text{Tilt angle } 2.6^\circ = 0.26 \quad \text{WH } 5 \text{ mm} = 0.05 \quad \text{Total} = 0.31 \text{ mm}$$

0.31 mm actual stock removal

Rough grinding minus finishing size of stock and deduct 0.03 mm (precise grinding require)

$$0.31 - (20.05 - 19.98) - 0.03 = 0.21$$

$$\text{Swivel angle} = 2^\circ \sim 2.1^\circ$$

Precision grinding

Tilt angle $2.7^\circ = 0.27$ WH 5 mm = 0.05 Total = 0.32 mm

0.32 mm deduct actual stock removal

Precise grinding minus finishing size and deduct 0.04 mm (finishing grinding require)

$$0.32 - (19.98 - 19.96) - 0.04 = 0.26$$

Swivel angle = $2.5^\circ \sim 2.6^\circ$

H: The distance between center of workpieces and center of grinding wheel

Gr: The radius of grinding wheel

Rr: The radius of regulation wheel

Wr: The radius of workpieces

a: Pointing angle of blade

B: Center height of B relation to G

r: Center height of r in relation to R

B + r: Center height of B+r

Grinding of precision shaft

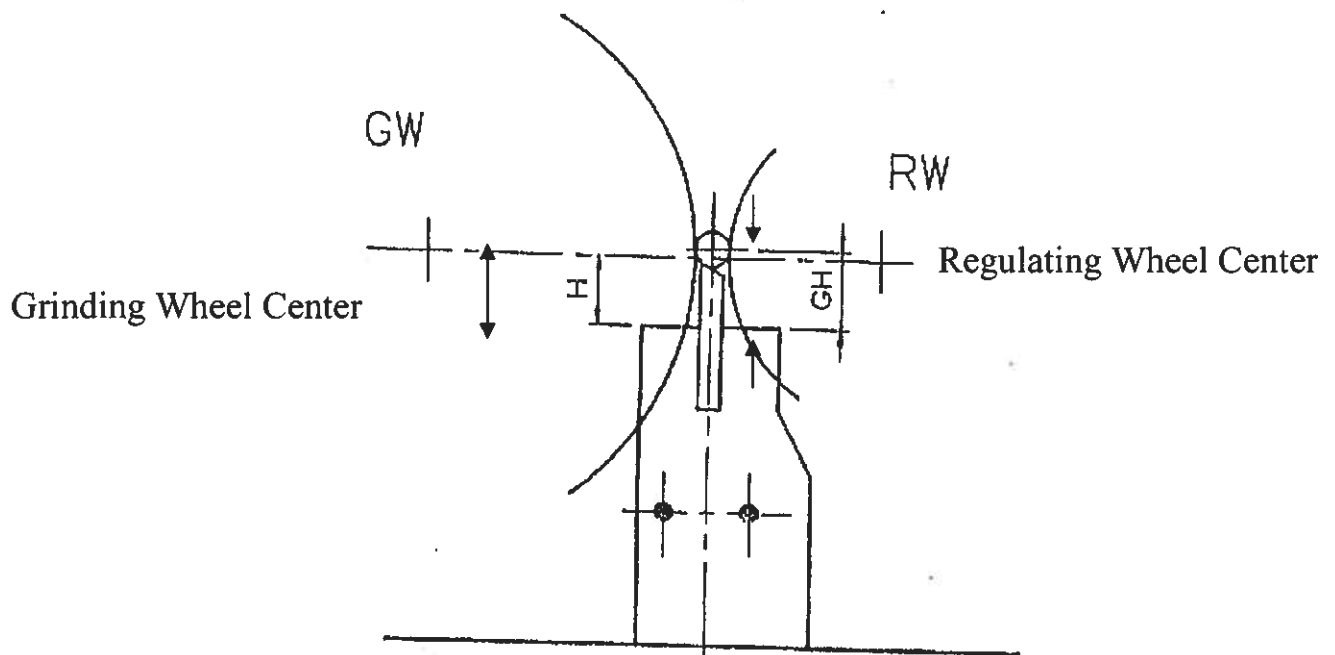
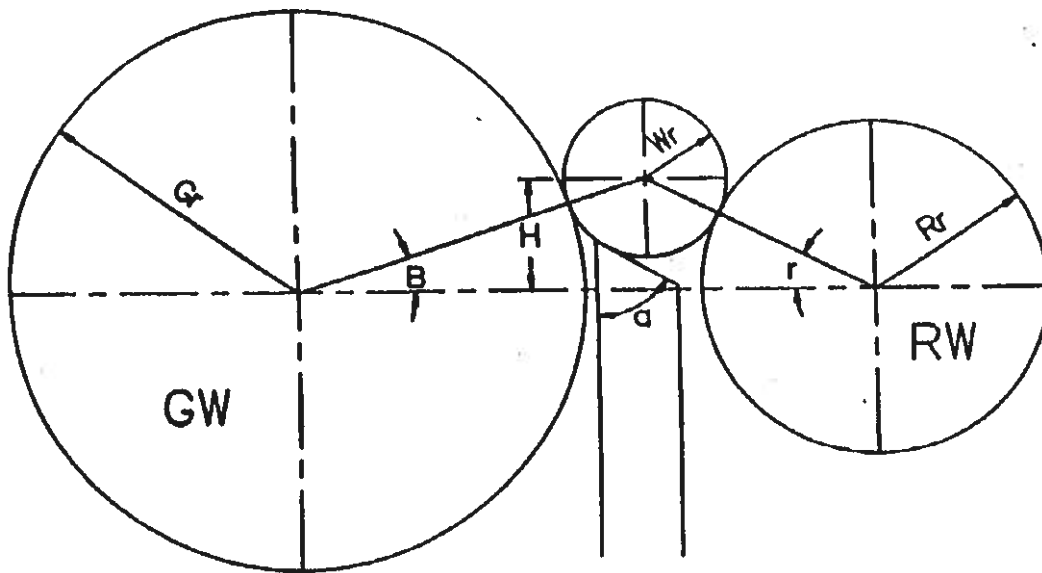
Center high = B + r = $7^\circ \sim 12^\circ$

Formula

$$B+r = A (1 / \sin)(H / Gr + Wr) + 1 / \sin (H / Rr + Wr)$$

Similar formula

$$H \cong \sin (B+r) \times (Gr + Wr) \times (Rr + Wr) / (Gr + Wr) + (Rr + Wr)$$



Method of Adjusting Guide Plate

-Thrufeed Grinding-

