OPERATION MANUAL

HYDRAULIC & SERVO CONTROL DOWN FEED

PRECISION SURFACE GRINDER

MODEL : SGS-1020SD
SGS-N1224SD
SGS-1224SD
SGS-1230SD
SGS-1632SD
SGS-1640SD

0009V001

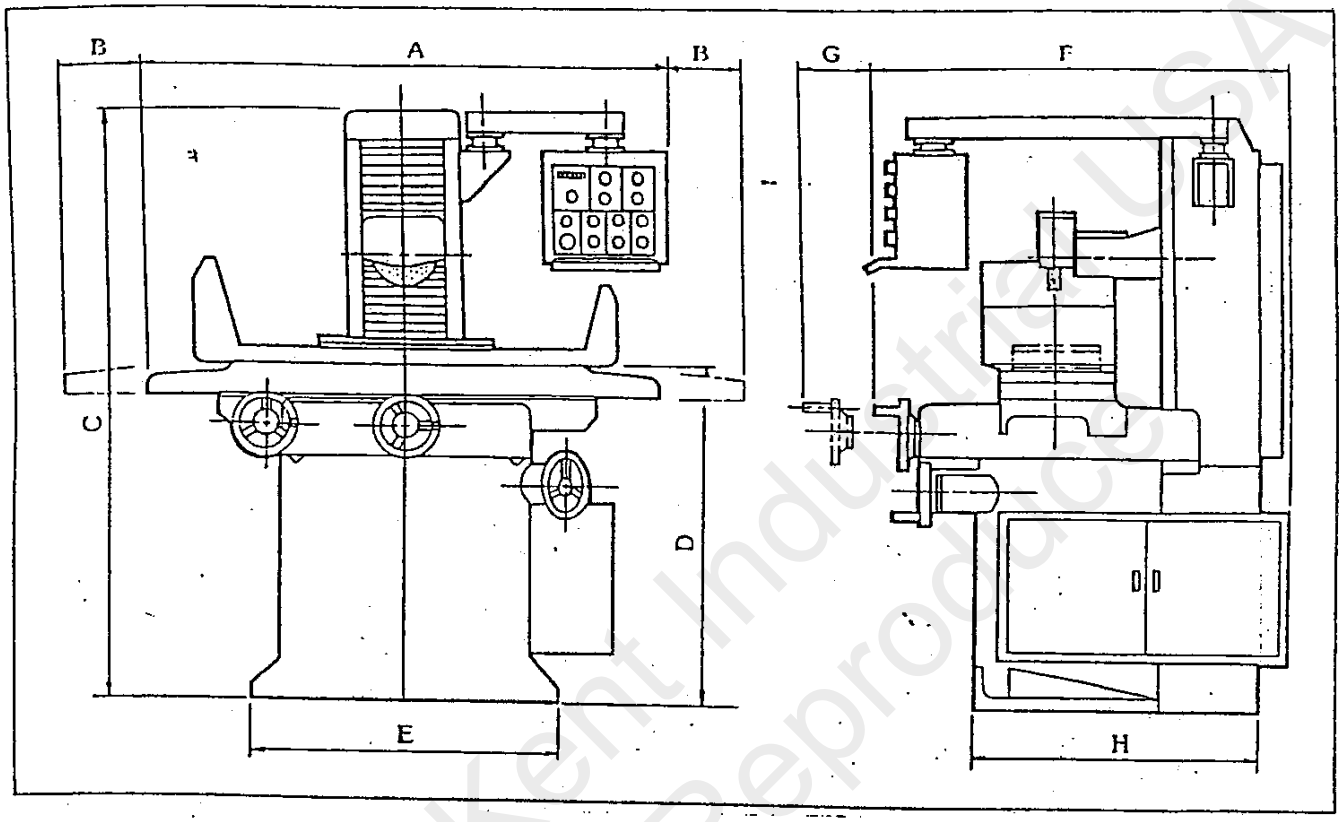
CONTENTS

* We following a policy of continous improvement of all our products, reserve the right to change specification, mechanics, or designs at any time without notice or obligation.

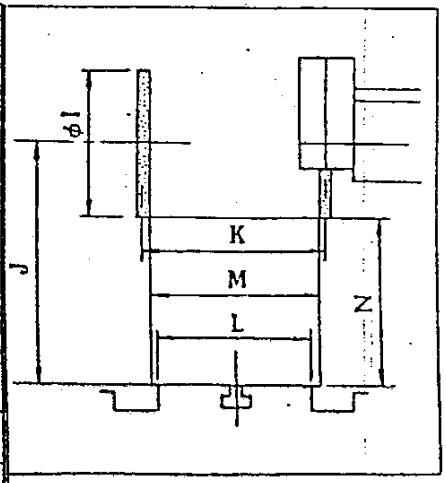
2. PROFILE DIMENSION

PROFILE DIMENSION

Unit: mm



	SGS-618 M	SGS-816 M/H	SGS-1020 M/H/AH/AHD	SGS-N1224 H/AH/AHD	SGS-1224 AH/AHR/AHD	SGS-1230 AH/AHR/AHD	SGS-1632 AHR/AHD
A	1260 (49 1/2")	1160 (45 1/2")	1520 (60")	1850 (72 7/8")	1850 (72 7/8")	2150 (84 7/8")	2500 (98 1/2")
B	240 (9 1/2")	215 (8 1/2")	260 (10 1/4")	330 (13")	330 (13")	400 (15 3/4")	425 (16 3/4")
C	1660 (65 1/2")	1660 (65 1/2")	1720 (67 3/4")	1720 (67 3/4")	1880 (74")	1880 (74")	2000 (78 3/4")
D	940 (37")	940 (37")	940 (37")	940 (37")	980 (38 1/2")	980 (38 1/2")	1050 (41 3/8")
E	615 (24 1/2")	615 (24 1/4")	890 (35")	910 (35 7/8")	1010 (39 3/4")	1010 (39 3/4")	1050 (41 3/8")
F	850 (33 1/2")	900 (35 1/2")	1020 (40 1/4")	1065 (42")	1185 (46 1/2")	1185 (46 1/2")	1600 (63")
G	180 (7")	200 (8")	265 (10 1/2")	325 (13")	345 (13 1/2")	345 (13 1/2")	450 (17 3/4")
H	700 (27 1/2")	750 (29 1/2")	870 (34 1/4")	973 (38 1/4")	1035 (40 3/4")	1035 (40 3/4")	1425 (56")
I	200 (8")	200 (8")	203 (8")	203 (8")	355 (14")	355 (14")	355 (14")
J	460 (18")	460 (18")	500 (20")	500 (20")	595 (23 1/2")	595 (23 1/2")	620 (24 1/2")
K	165 (6 1/2")	215 (8 1/2")	265 (10 1/2")	320 (12 1/2")	335 (13 1/4")	335 (13 1/4")	450 (18")
L	150 (6")	160 (6 1/4")	230 (9")	260 (10 1/4")	260 (10 1/4")	260 (10 1/4")	400 (15 3/4")
M	150 (6")	200 (8")	250 (10")	300 (12")	300 (12")	300 (12")	400 (15 3/4")
N	360 (140")	360 (14")	400 (15 3/4")	400 (15 3/4")	415 (16 1/2")	415 (16 1/2")	445 (17 1/2")



3.SPECFICATION:

Unit:mm

ITEM \ MODEL		SGS-1020 SD	SGS-1224 SD	SGS-1230 SD	SGS-1632 SD	SGS-1640 SD
Working surface of table(W.xL.)		230*500 (9"x20")	260*600 (10.25"x24")	260*750 (10.25"x30")	400*800 (16"x32")	400*1000 (16"x40")
Max. grinding surface (W.xL.)		250*500 (10"x20")	300*600 (12"x24")	300*750 (12"x30")	400*800 (16"x32")	400*1000 (16"x40")
Max. longitudinal travel of table		520(20.5")	620(24.5")	720(30.25")	835(33.5")	520(20.5")
Max. cross travel of table		263(10.4")	332(13.1")		450(17.7")	
Distance between table surface and spindle certer line		500 (20")	600 (23.6")		620 (24.4")	
Variable table speed		0.5-25M/min(1.6--80fpm)				
Auto. crossfeed		0-25MM(0--1")				
Crossfeed handwheel	Per graduation	0.01(0.0005")				
	Per revolution	4(0.2")				
Auto.downfeed min. unit		0.001(0.00005")				
Longitudinal travel adjustable from.....to		50--500 (2"--20")	50--600 (2"--24")	50--750 (2"--30")	50--800 (2"--32")	50--1000 (2"--40")
Crossfeed travel adjustable from.....to		0--255 (2"--20")	0--304 (0"--12")		0--406 (0"--16")	
Spindle motor		2HP*2P	5HP*4P		7.5HP*4P	
Hydraulic pump motor		2HP*6P				
Auto. crossfeed motor		1/5HP*6P				
Auto. downfeed motor		400W AC Servo				
Grinding wheel(O.D*T*I.D)		203*12.7*31.75 (8"*0.5"*1.25")	355*31.75*127 (14"*1.25"*5")		355*50.8*127 (14"*2"*5")	
Rotation speed of spindle		3500rpm/60hz 2900rpm/50hz	1750rpm/60hz 1450rpm/50hz		1750rpm/60hz 1450rpm/50hz	
Coolant Pump		1/8HP				
Dust collector motor		1/2HP*2P				
Machine weight	Net	1350Kgs (2970lbs)	1850Kgs (4070lbs)	1950Kgs (4290lbs)	2800Kgs (6160lbs)	3000Kgs (6600lbs)
	Gross	1600Kgs (3520lbs)	2150Kgs (4730lbs)	2250Kgs (4950lbs)	3150Kgs (6930lbs)	3400Kgs (7480lbs)
Packing dimension		2060*1680*2050 (81"*66"*80.7")	2260*1740*2210 (88.9"*68.5"*87")	2260*1740*2210 (88.9"*68.5"*87")	2780*2210*2250 (109.4"*67"*88.5")	2780*2210*2250 (124"*67"*88.5")

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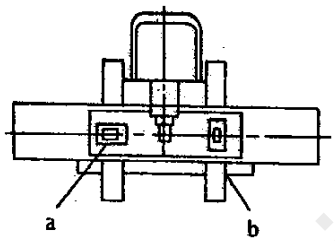
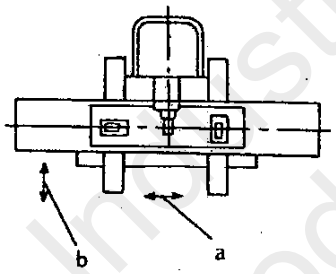
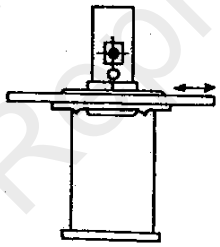
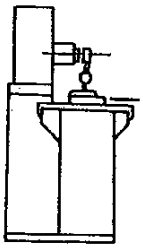
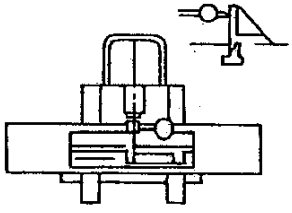
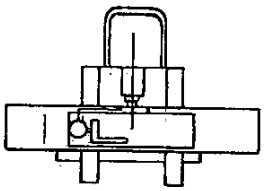
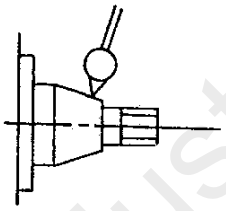
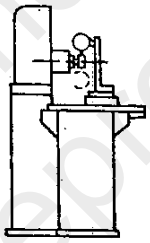
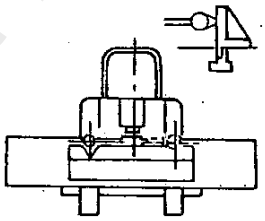
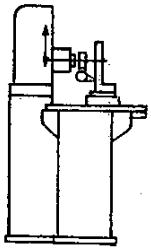
STANDARD ACCESSORIES:

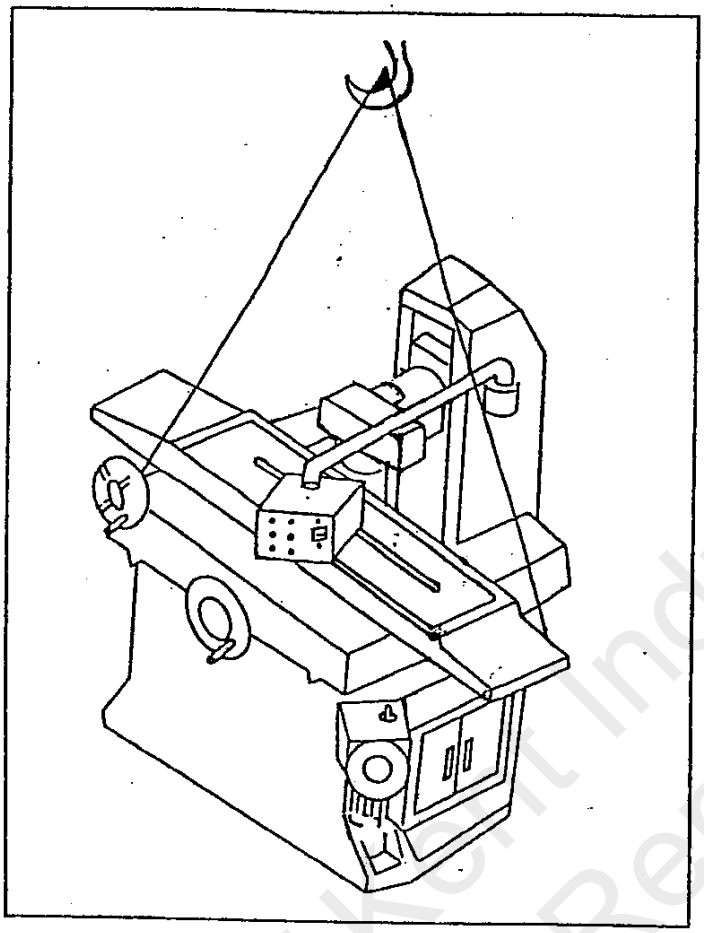
Operation manual..... 1pc.
Tool box and tools.....1pc.
Wheel flange.....1pc.
Wheel balancing base.....1pc.
Wheel balancing arbor.....1pc.
Grinding wheel.....1pc.
Flange extractor..... 1pc.
Diamond Dresser.....1pc.
Diamond Dresser base.....1pc.
Work light..... 1pc.

4. PRECISION TABLE

No.	Check taken	Illustration	Permissible Erros'
1	a) Level longitudinally (spirit level) b) Level across (spirit level)		a)0.02 per 1000 mm. b)0.02 per 1000 mm.
2	Straightness of table movement. a) Longitudinally. b) Cross traverse.		a)0.02 per 1000 mm. b)0.02 per 1000 mm.
3	Rise and fall of table in longitudinal traverse		0.01 per 1000 mm.
4	Table surface parallelity to its cross traverse		0.01 per table width
5	Parallelity of clamping slots to table traverse		0.015 per 1000 mm.

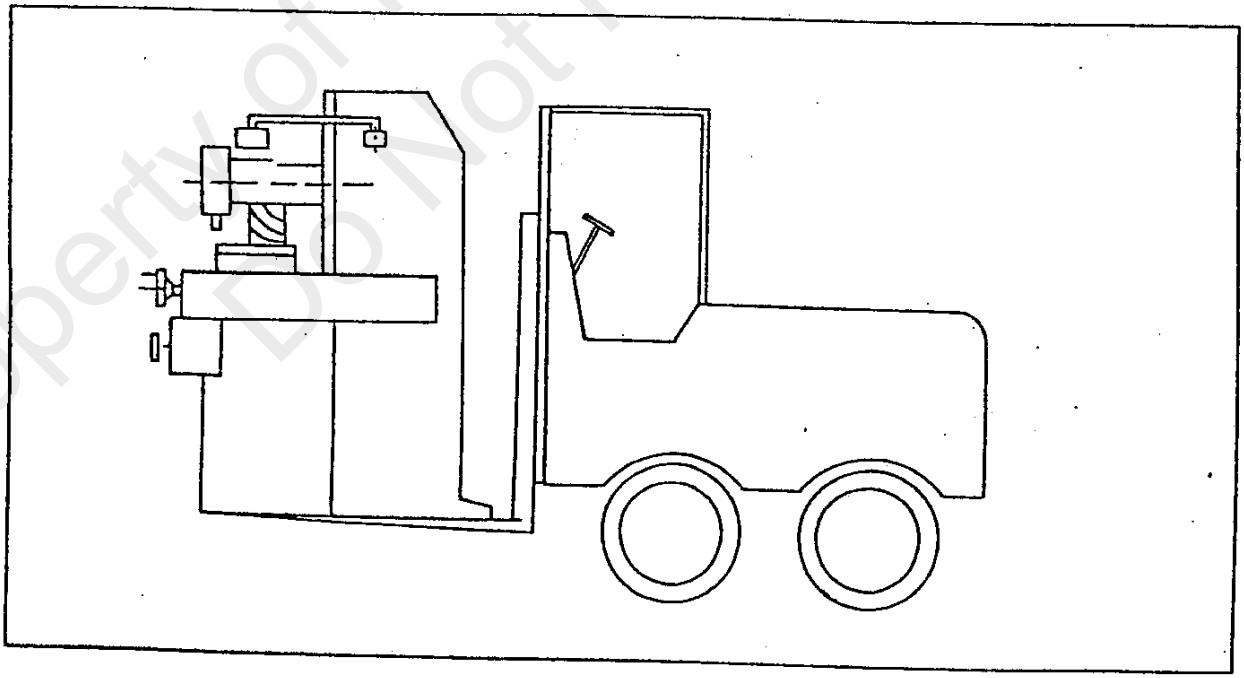
6	Clamping slots at right angles to table cross traverse		0.02 per 300 mm.
7	True running of taper of grinding spindle.		0.01 mm.
8	Parallelity of grinding spindle to table (transition test with 100 mm. arm)		0.02 per 300 mm.
9	Grinding spindle at right angles to clamping slots (transition test with 200 mm. arm)		0.02 per 300 mm.
10	Vertical traverse of grinding spindle carrier at right angles to table in cross plane of machine		0.01 per 100 mm.

5. INSTALLATION AND LIFTING NOTICE OF THE MACHINE



The machine has been investigated and adjusted before it is moved out of the factory. The most important is to surely prevent machine from hit while the machine is in transportation and installation.

Use wrecker and hook to transport the machine; steel wire hooks four hanging pegs which are on the two sides of the machine. But you have to pay attention to the balance of the machine,and please put some separator between steel wire and machine to protect paint.



Use fork truck to put the machine as upper chart description

• Clean machine

After opening the wooden case, you have to prevent process surface from rust. You will find the machine is coated with thin rustproof oil. Please wipe off the rustproof oil by soft cloth and light oil. Iron plat or knife will damage the paint.

• Fastening equipment for movement or packing

when move (or pack) the machine, working table is fixed from front-left and rear right sides, and crossfeed of saddle is fixed from the right and left sides of saddle and base body. This is only used while move of the machine. As soon as the machine is well installed, you have to loosen the fixed equipment.

• Location of the machine:

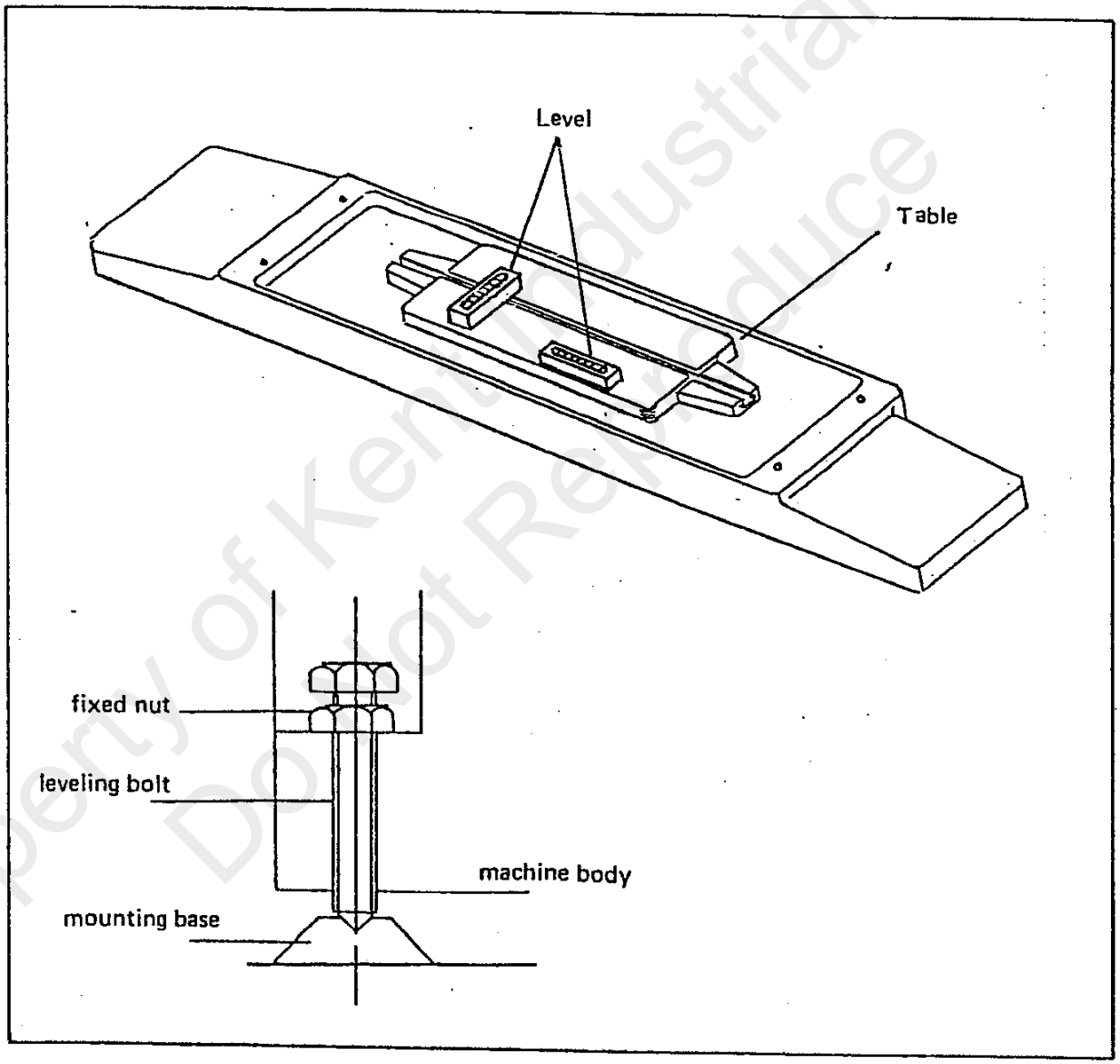
Location of the machine will influence the grinding precision and effeciency. You have to carefully dispose it as well as boring machine. Very precise process is asked by any kind of grinding machine. But in the fact, many grinding machines always be located among with milling machine, drilling machine, shaping machine and slotting machine. Obviously, we won't be satisfied with the process from these grinding machines, because the vibration from other machines will transmit to grinding machine and produce lines on grind surface.

* Unsteady land cannot be located grinding machine, otherwise, the machine will lose its correct shape.

6. LEVELLING OF THE MACHINE

Generally speaking, the machine doesn't need of any special foundation except very precision grind, but the machine has to be located on even and smooth place where is without any vibration.

The settlement of the machine by smoothly put three (or four) adjusting screws on the foundation. Put precision level (0.02mm/M) as per chart description and adjust level within one graduation.



After first level adjusting of the machine, you have to readjust once two weeks in first month, and then, adjust once every three months after the foundation is stable.

7. NOTICE BEFORE MACHINING

1. Wire the machine according to the electric circuit diagram.
2. Install the machine with adequate "body" clearance beyond the maxium travels.
3. Operator always wears protecting eye-glasses.
4. Check wheel rotation, it must be clockwise.
5. Do not operate the grinding wheel faster than the speed shown on the wheel blotter.
6. Before starting machine, vertify that the wheel is secure.
7. Do not operate the machine if the wheel guard has not locked.
8. Vertify thet the work is secure and /or the magnetic chuck energized
9. Vertify that the grinding wheel clears the work.

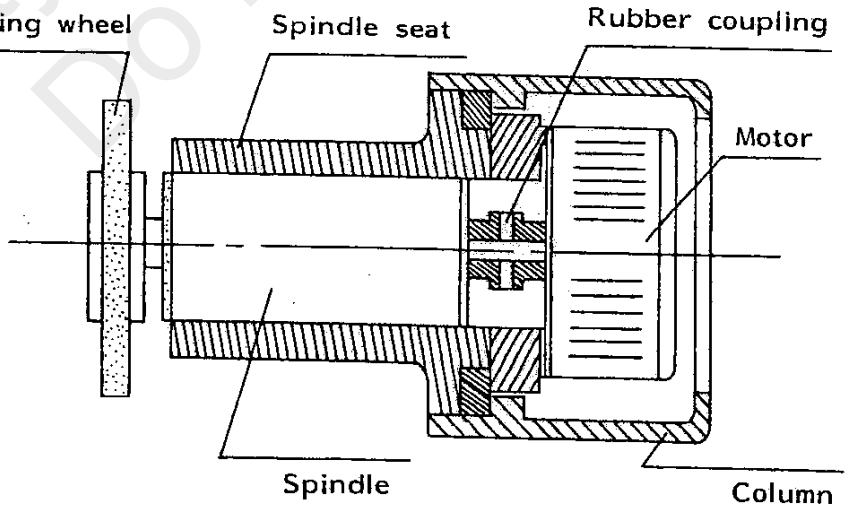
CAUTION

* General motor is constructed with two voltages, but we always preconnect it with customers' ordered voltage. In case you need the other voltage, please remember to alter them to your asked style before you connect every points as per below electric diagram. Otherwise, these equipments will be burned or cannot work caused by shortage of power.
  Spindle motor.
  Hydraulic motor
  Coolant and duster motor
  Three phase transformer
  Single phase transformer

(A) WHEEL VIBRATION CHECK-UP

If the spindle vibrates, please take off the wheel, and then turn on spindle motor again, and check the following points:

1. If no vibration occurs on spindle, it means the vibration comes from the wheel, please re-balance the wheel and wheel flange.
2. If the spindle still vibrates, please take off the motor and check the coupling cushion.
3. As the spindle is under precision assemble, so please do not disassemble it yourself.
4. As the spindle is running at a very high speed, so the wheel must have very well balance otherwise it will cause the spindle vibrates and the wheel breaks.



8. SELECT AND BALANCE OF THE GRINDING WHEEL

COMMENTS FOR GRINDING

1. When mass cutting, the grinding wheel roughness is at about 30—40, high speed is required for wheel dressing.
2. For fine finish, the grinding wheel roughness is at about 40—80, slow speed is required for wheel dressing.
3. Distortion Factors Of Workpiece:
   a) Overload capacity.
   b) The crossfeed and longitudinal movement of the table is too slow.
   c) Grinding wheel becomes blunt or clog with chips.
4. If the workpiece appears to burn, may be the grinding wheel is hard, or the wheel is blunt or clogged by chips.

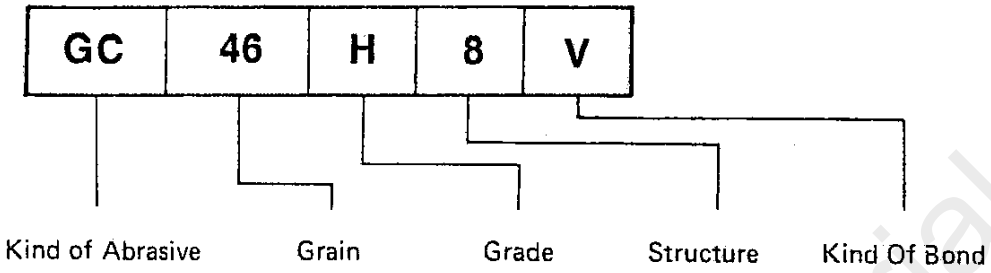
GRINDING WHEEL RECOMMENDATION

1. Maintenance:
   Do not bump, and keep away from wet or hot place.
2. Selection:
   If it has no damage or crack, you must ensure it sounds clearly.
3. Speed:
   It must not faster than the speed shown on the wheel blotter.

WHEEL SELECTION TABLE

Wheel Specification / Material	Wheel Diameter	150mm—205mm	205mm—355mm	355—510mm
STEEL	< HRC 25	WA A 46K	WA A 46J	WA A 36J
	< HRC 25	WA 46J	WA 46I	WA 36I
ALLOY STEEL	< HRC 55	WA 46J	WA 46I	WA 36I
	< HRC 55	WA 46I	WA 46H	WA 36H
TOOL STEEL	< HRC 60	WA 46I	WA 46H	WA 36H
	< HRC 60	WA 46H	WA 46G	WA 36G
STAINLESS STEEL	Series 400	WA 64I	WA 46H	WA 36H
	Series 300	WA 36J	WA 30J	WA 36I
CAST IRON	Ordinary	C 46J	C 46I	C 36I
	Special	GC 46I	GC 46H	GC 36H

GRINDING WHEEL MARKINGS



COMPONENT OF ABRASIVE AND MATERIAL

Abrasive	A	WA	H	C	GC
Material	general steel	heat-treated carbon/alloy steel	high speed steel	cast iron non ferrous	supper hard material tungsten carbide steel

SIZE OF GRAIN

Coarse	10 – 24
Medium	30 – 60
Fine	70 – 220

Grain / Grinding Condition	Coarse	Fine
Grinding Capacity	great	small
Surface Roughness	coarse	fine
Workpiece Hardness	soft	hard
Contacted Dimension	wide	narrow
Wheel Diameter	big	small
Bond Type	stickly	brittle

GRADE

STRENGTH OF THE BOND WHICH HOLD ABRASIVE

Soft	A – H
Medium	I – P
Hard	Q – Z

Grinding Condition \ Grade	Soft	Hard
Workpiece Hardness	hard	soft
Contacted Dimension	wide	narrow
Wheel Speed	quick	slow
Movement Of Works	slow	quick
Precision	good	bad
Operator	skill	non-skill

STRUCTURE

THE NUMBER REFERS TO THE RELATIVE SPACING OF THE GRAINS OF ABRASIVE:

Close	0 – 5
Medium	6 – 9
Wide	10 – 12

Grinding Structure \ Structure	Wide	Close
Surface Roughness	coarse	fine
Contacted Dimension	wide	narrow
Workpiece Hardness	soft	hard

BOND

TYPE	Vitrified	Silicate	Resinoid	Rubber	Shellac
Mark	V	S	B	R	E

REFERENCE FOR GRINDING CONDITION

Material / Finish	Cast Iron, Soft/harden steel	Stainless and heat resistant steel	Tool steel	Cross Feed
Rough	0.0006–0.0012" 0.0015–0.03mm	0.0008–0.0012" 0.02–0.03mm	0.0008–0.0016" 0.02–0.04mm	under 1/2 of wheel thickness
Fine	0.0002–0.0004" 0.005–0.01mm		0.0002–0.0006" 0.005–0.015mm	under 1/4 of wheel thickness

CROSS FEED AND DOWN FEED

Feed Capacity	great	small
Grinding Resistance	great	small
Heat Produced	much	less
Surface Finish	coarse	fine
Wheel Worn-out	much	little

BALANCE OF WHEEL

Accurate grinding, brightness of work-piece, spindle and bearing life are greatly concerned with the balance of wheel, and also eliminate the wheel's internal stress.

First balance of the grinding wheel: fixed grinding wheel on the spindle tightly, then dress it by diamond dresser till it is precise. But in order to obtain real precision of grinding wheel, you have to take off the grinding wheel and rebalance once more after first balance.

Because different material workpiece has to be grinded by different quality grinding wheel, we suggest you prepair a seldom used grinding wheels with their special flanges. So that you can prevent trouble from taking off and rebalancing the grinding wheel.

After assemble the wheel and wheel flange (Fig 1), put on the balance rod and place on the balancing stand (Fig 2), then follow the points below:

1. Adjust the balancing stand level (Fig 3).
2. Let the wheel swings to find out the center of gravity and then mark with a [✓], (Fig 4)
3. Lock the balancing block [B] on the opposite side of center of gravity and do not move any more. (Fig 5).
4. Put two balancing blocks [P] at equal distance from [B] (Fig 6)
5. To check balance, rotate the wheel at about 90° each time. If not balance, just move the balancing blocks [P] to a well balanced place.
6. After balancing, you must let the wheel running under normal speed for at least five minutes.
7. Since long-time grinding will make the wheel loses it's balance. You must check and re-balance it occasionally.
8. If use coolant supply during grinding, do not start coolant unless the wheel is running, otherwise the wheel will be out of balance because of absorbing the water. If the wheel stand for a long time, will make the water concentrate at the lowest point. Therefore, after grinding for a period of time, idle running is necessary for eliminating un-balance.

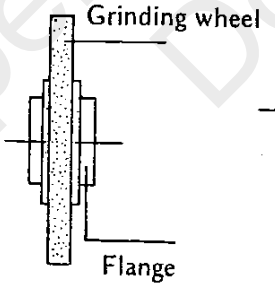


Fig 1

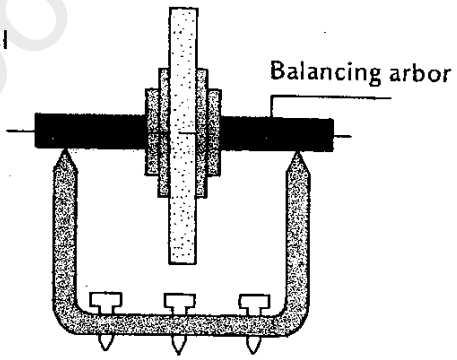


Fig 2

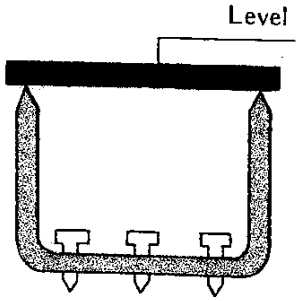


Fig 3

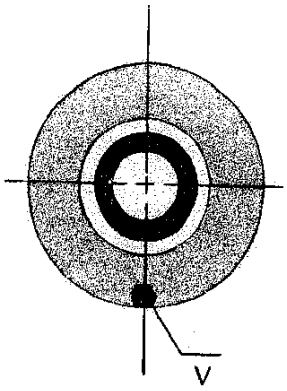


Fig 4

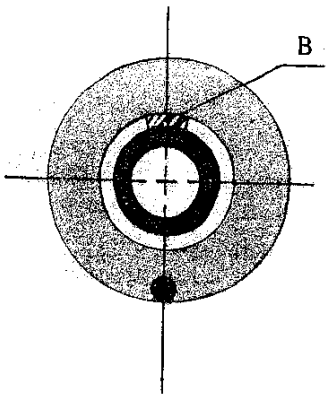


Fig 5

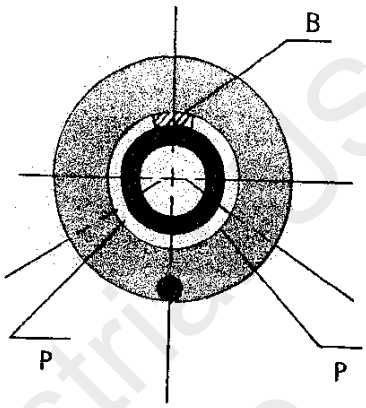


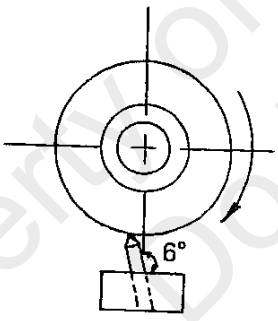
Fig 6

HOW TO DRESS GRINDING WHEEL AND USE DIAMOND DRESSER:

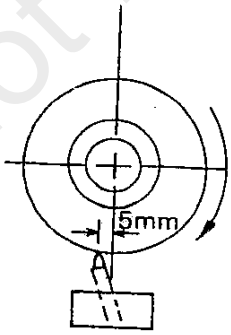
* When you dress grinding wheel, diamond inevitably wear along the machining direction, so that the diamond dresser has to be put at the position of angle 6°slant to keep its sharp. (fig 1)

* When you are going to dress the grinding wheel, put the sharp top of diamond dresser at approximately 5mm to the left bottom of grinding wheel, and stop longitudinal movement of working table, then, move cross feed front and rear slowly to dress. (fig 2)

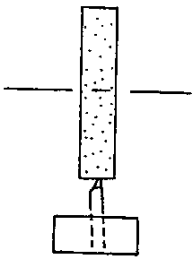
* When you dress the grinding wheel, you have to start from the middle because grinding wheel usually wear more on two sides than in the middle. If you dress from two sides to middle, then, it will produce pressure. (fig 3)



(Fig. 1)



(Fig. 2)



(Fig. 3)

Dressing speed and capacity can influence the grinding surface, If you don't ask for best surface or you want bigger grinding capacity, the rough dressing is enough. (dressing capacity 0.01-0.03mm each time and coordinate with fast speed across the grinding wheel three or four times). If you ask for best surface or last finished grinding, then the grinding wheel has to be treated with precision dressing. (dressing capacity from 0.02mm, 0.01mm, 0.005mm reduced gradually and coordinate with slow and steady speed across grinding wheel).

Generally speaking, the usage life of grinding wheel and diamond dresser, precise dressing is longer than rough dressing.

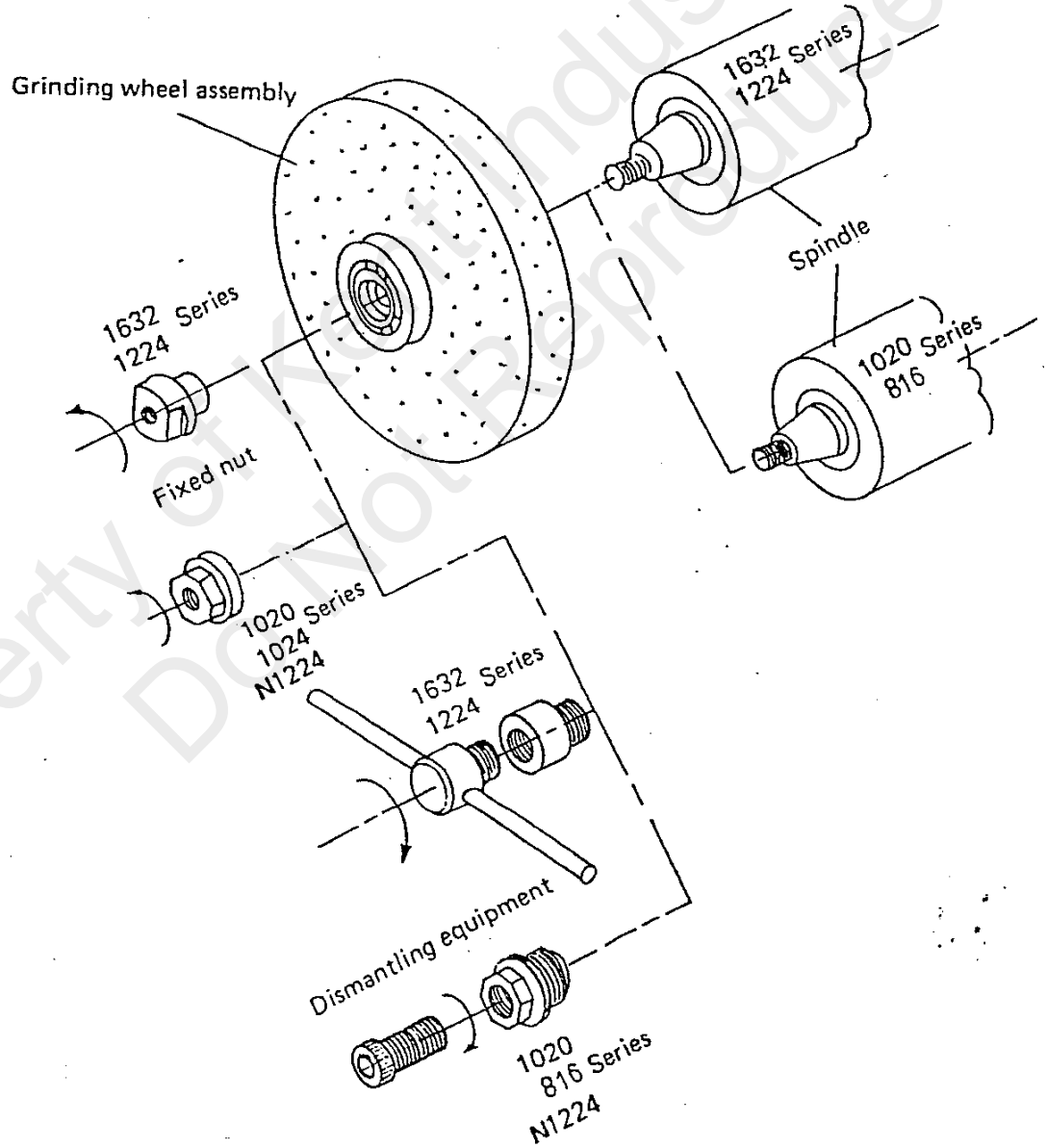
9. INSTALLATION AND DISMANTLING OF THE GRINDING WHEEL

Installation:

1. Choose installe the bigger conical surface of grinding wheel toward inside, and carefully put it on the spindle.
2. Firmly tighten the fixed nut counterclockwise(by moveable wrench or open wrench)

Dismantling:

1. Loosen the fixed nut clockwise.
2. Firmly hold the grinding wheel by one hand, and dismantle it clockwise until the grinding wheel breaks away spindle. Then, you can take down the grinding wheel.



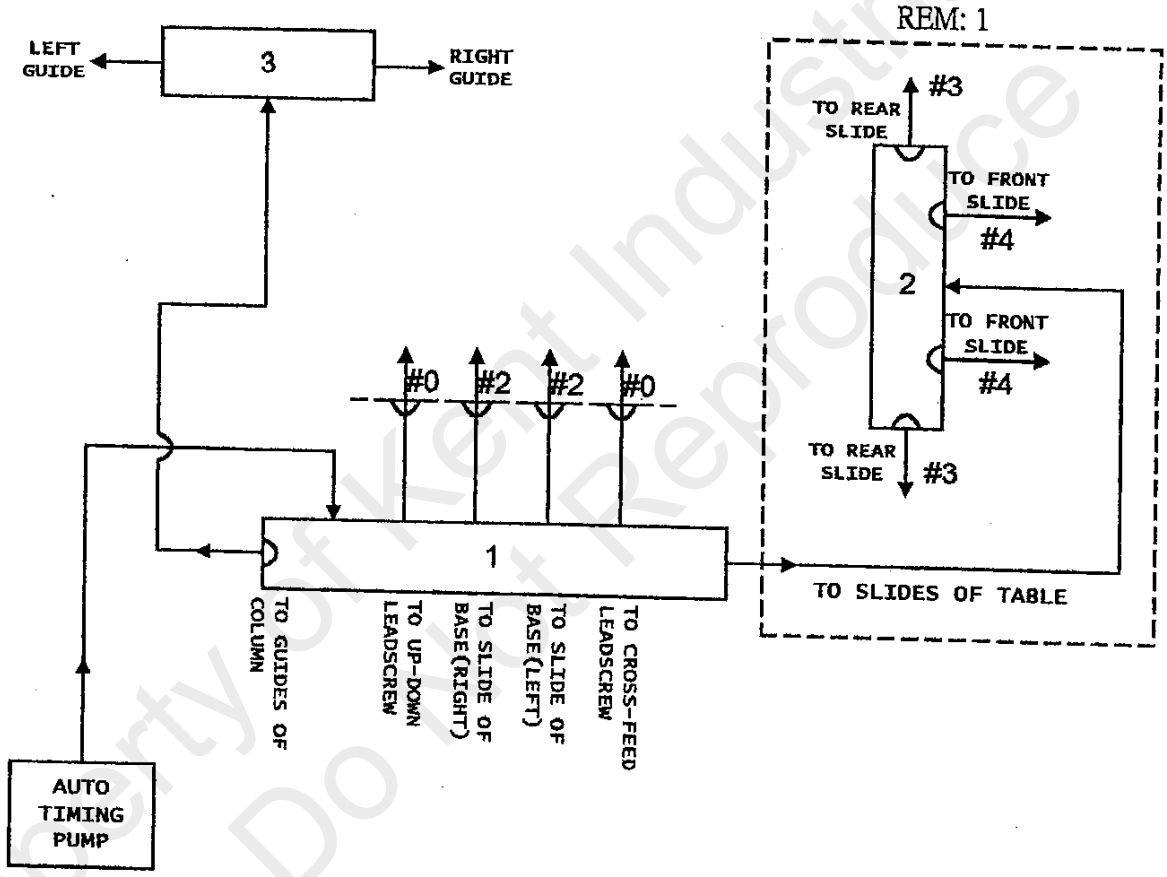
10.LUBRICANT SYSTEM AND DIAGRAM

Lubricated system effects the best tolerance condition and long life of machine.
Our machine is equipped with one shot lubrication system for easy operator's maintains.
In order to keep the machine in best condition,the user has to pay attention for the following:

1.Keep the lubricant more than 1/3 in lubricant pump any time.

2.Check all slides&leadscrews lubricated condition.when any or some of slides&leadscrews are dry,stop and clear the trouble imm.Untill the lubrication is correct.

3.Please use indicated brand and No.of the lubricant in order to obtain the best lubrication. BP,ESSO,MOBIL o r SHELL # SAE30 slide lubricant.



1.7WAYS DISTRIBUTOR.
2.5WAYS DISTRIBUTOR.
3.3WAYS DISTRIBUTOR.
D.JOINT OF RATIO DISTRIBUTION CONTROLLER(UNIDIRECTION).

* After hydraulic pump switching on, the auto timing lubricant pump will implement automatic lubrication once every ten minutes(Quantity is 3cc-6cc the factory default is 6cc.)
* The quantity of auto timing lubricant pump is about 1.5L(1500c.c).
* Under the auto timing lubricant pump, there is a slush reservoir,when the reservoir full of waste oil ,Please take the reservoir out and throw waste oil away, Don't use these oil any more.

REM:1 if the machine model is "M" type this section will be omitted.

COMMENT FOR HYDRAULIC OIL CHOICE AND USAGE

Hydraulic oil **has to be maintainted in adequate viscosity**. More or less viscosity will decrease working effeciency and increase wear of the hydraulic system of machine.

So please use our suggested brand and number of hydraulic oil in order to get best results.

Hydraulic oil will become inferior after use a period of time.

So that it has to be changed regularly to prevent from greasy dirt.

The sediments will cause hydraulic system inconvenient in working ,and even will decrease using life of hydraulic equipment. The normal hydraulic oil is transparent and flavor generally .

Beside periodcally change hydraulic oil, in case you find below status, please change oil immeadiately to protect hydraulic system.

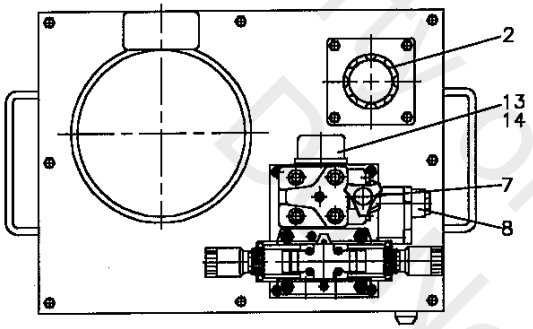
(a). Oil Became darkbrown color and produced odor caused by rapid inferior.

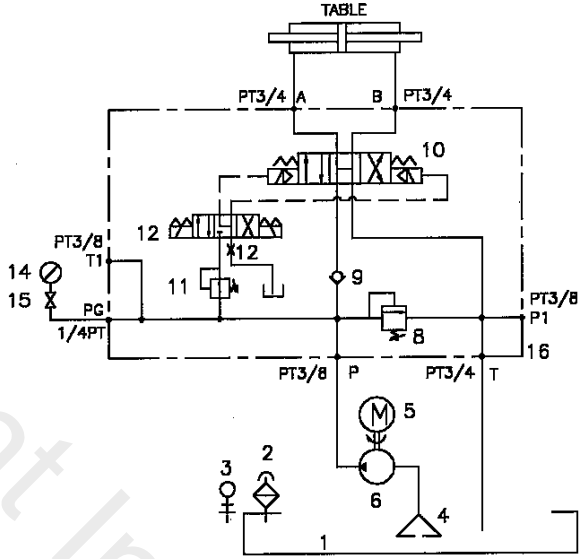
(b). Oil became creamwhite color because of water parmeation.

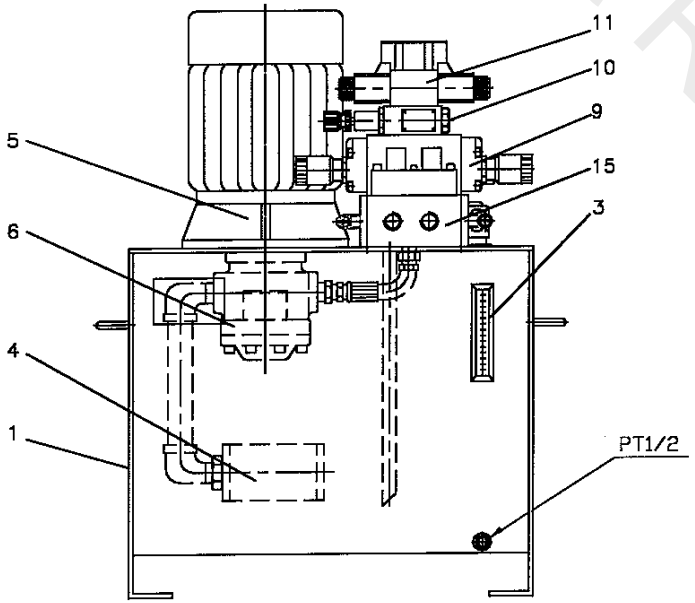
BRAND	KAO-KUANG	BP	ESSO	MOBIL	SHELL
OIL NO.	R-46	ENERGUL HL100 4.5° E/50℃ 33cst/50℃	ESSTIC 50℃ 4.7° E/50℃	D.T.E. Oil Medium	Teilus oil 29

* First time to change of new hydraulic oli is after three months usage; then alter again once every year. (Please compensate the wear away oli anytime in order to maintain a standard capacity of working oil.)
* Hydraulic Pressure of main pump has to be kept within 18--22kg/cm^2.
* The capacity of hydraulic tank is approximately 60 L.(1632 series is 80 L).

HYDRAULIC SYSTEM & DIAGRAM



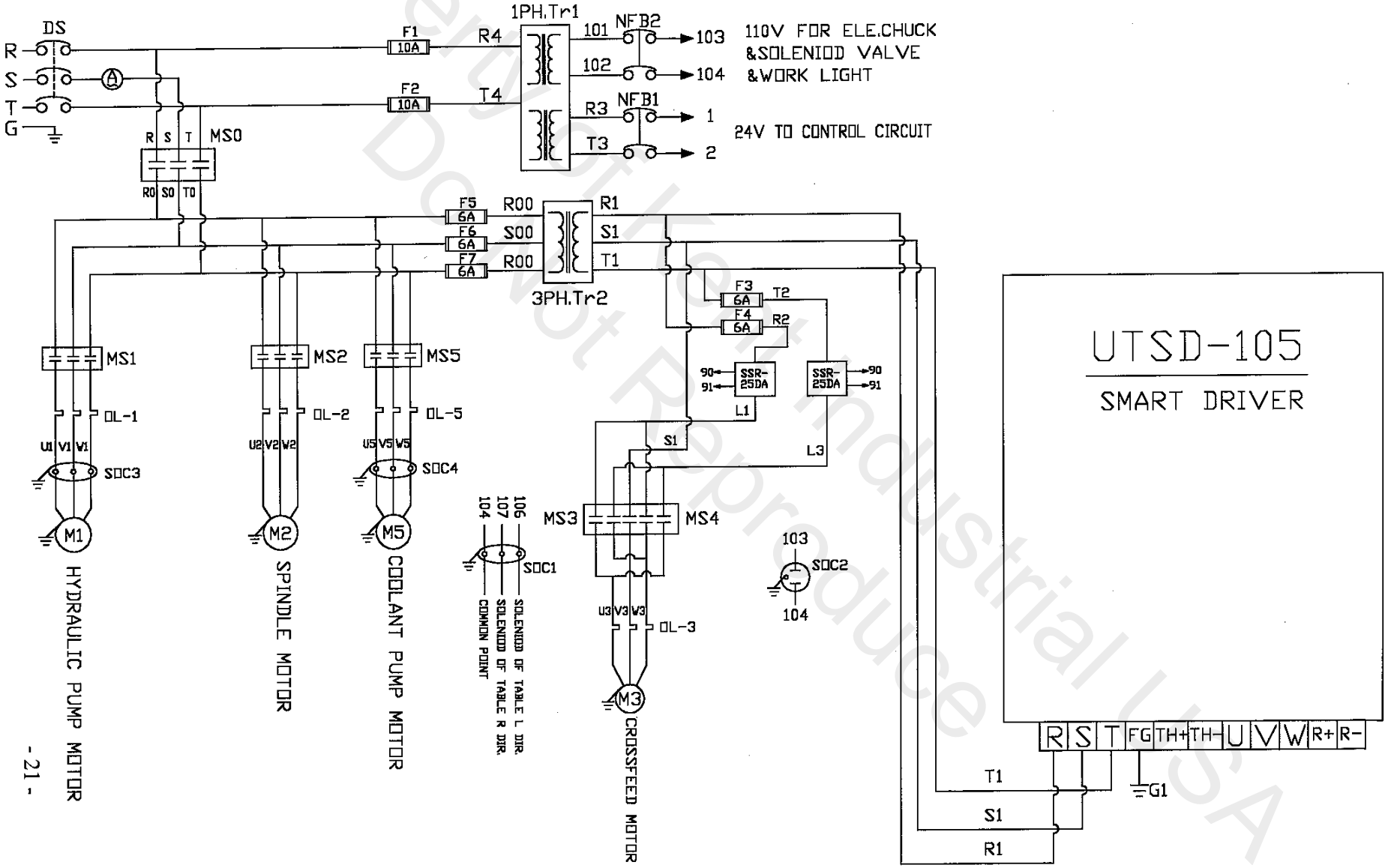


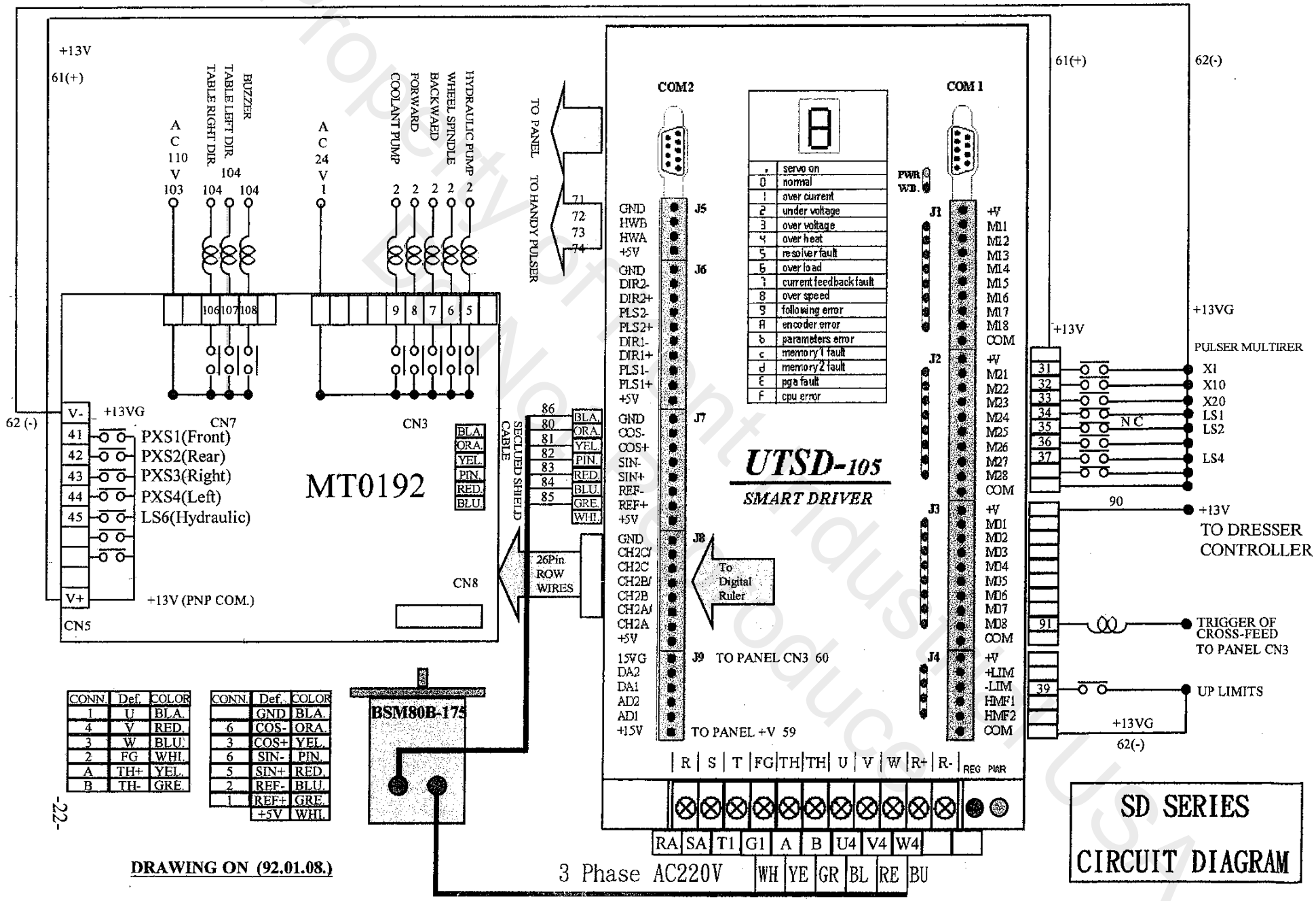


NO	DESCRIPTION	SPECIFICATION	Q'TY	NOTE
15	MANIFOLD	EM-967	1	
14	GAUGE COCK	NU-02	1	
13	PRESSURE GUAGE	2-1/2"ø70K	1	
12	RESTRICTOR	ø1.0	1	
11	SOLENOID VALVE	SWH-G02-C4-A110-10	1	
10	REDUCING VALVE	MPR-02P-K-0-20	1	
9	GRINDER VALVE	HPD-G04-C31	1	
8	CHECK VALVE	CV-G03-05-10	1	
7	RELIEF VALVE	RF-G04-1-31	1	
6	VANE PUMP	VPNC-F12-2-30 (1020SD) VPNC-F12-2-30 (1224SD)	1	
5	ELEC. MOTOR	2HP6P	1	
4	SUCTION STRAINER	PS-08	1	
3	LEVEL GAUGE	KS-5"	1	
2	AIR BREATHER	AB-1163	1	
1	OIL TANK	80L	1	

CONTROL PANEL

1020/1224/1632 SD MAIN CIRCUIT DIAGRAM(E)





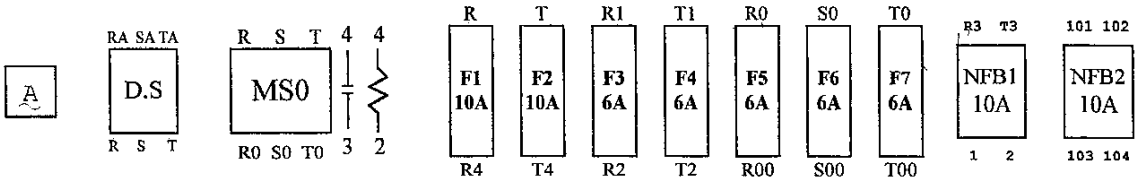
CONN.	Def.	COLOR
1	U	BLA.
4	V	RED.
3	W	BLU.
2	FG	WHI.
A	TH+	YEL.
B	TH-	GRE.

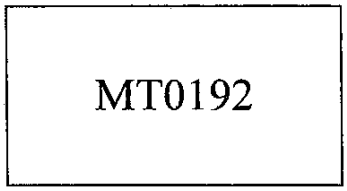
CONN.	Def.	COLOR
	GND	BLA.
6	COS-	ORA.
3	COS+	YEL.
6	SIN-	PIN.
5	SIN+	RED.
2	REF-	BLU.
1	REF+	GRE.
	+5V	WHI.

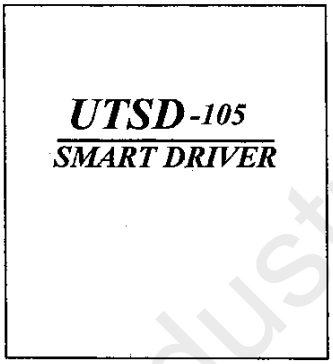
DRAWING ON (92.01.08.)

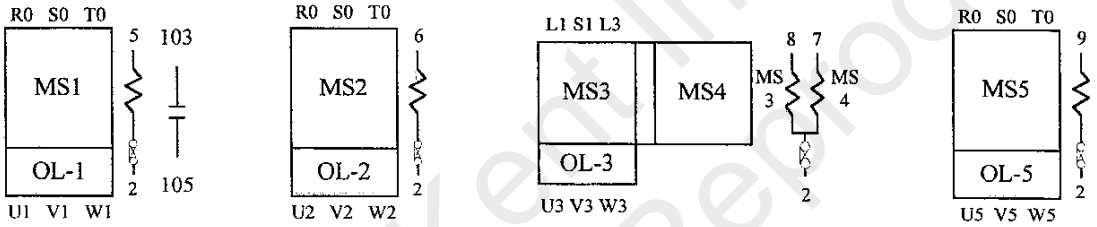
SD SERIES CIRCUIT DIAGRAM

1020/1224/1230/1632SD LAYOUT OF MAIN ELECTRICAL BOX(IT)







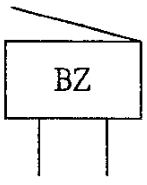


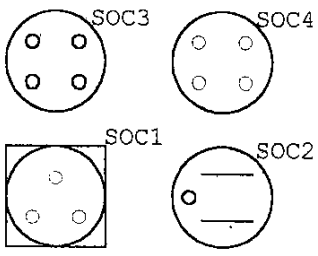
TB1

59	60	36	37	62	31	32	33	71	72	73	74								1	2	3	4			103	104	23	24	G	R	S	T	G

TB2

U2	V2	W2	G	A	B	U4	V4	W4	G	34	35	39	41	42	43	44	45	61	62	104	105	23	24	G	U3	V3	W3	G	U5	V5	W5	G	U1	V1	W1	G	104	106	107	108	G	1	2



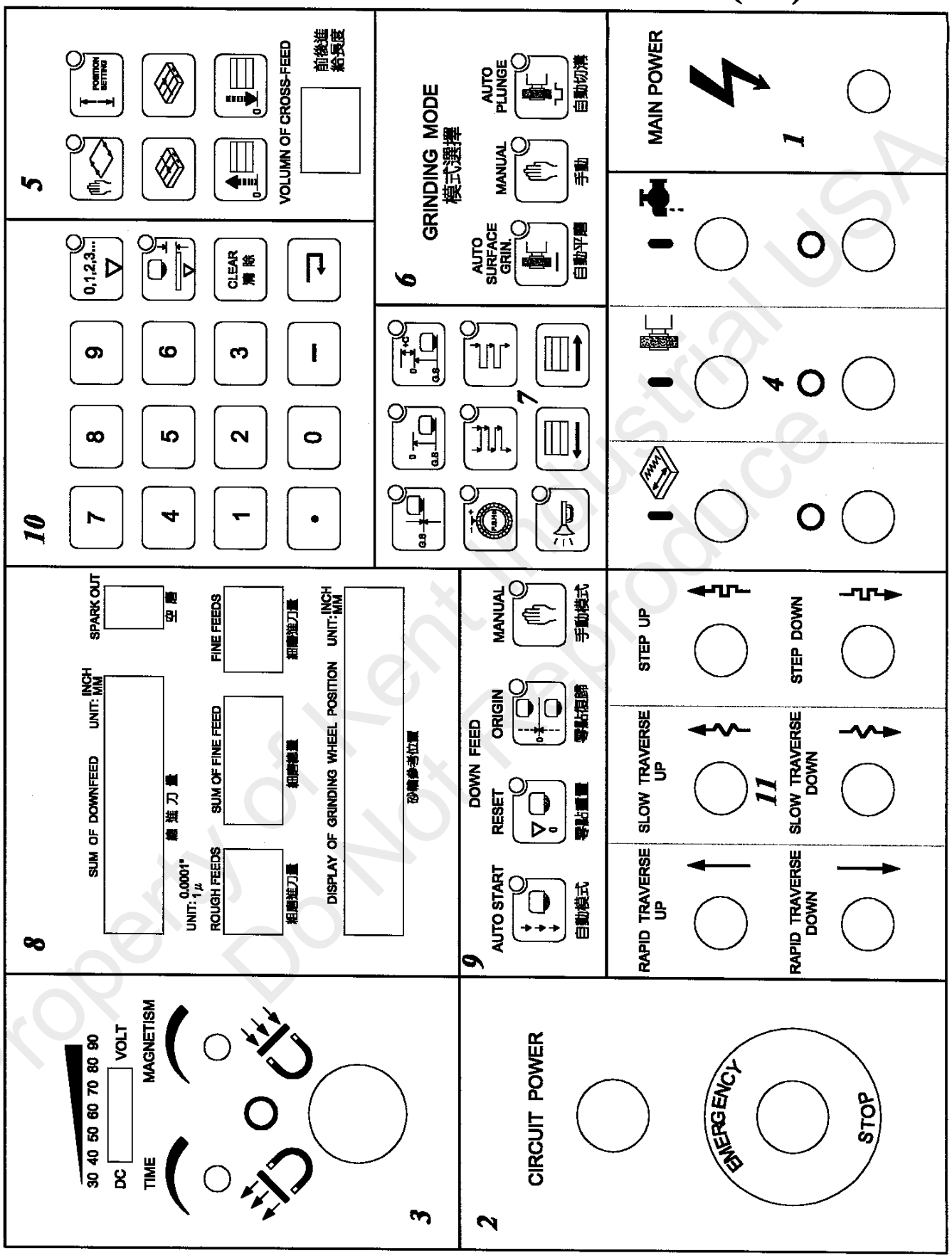


ELECTRIC PARTS LIST

(1020--1640SD SERIES)

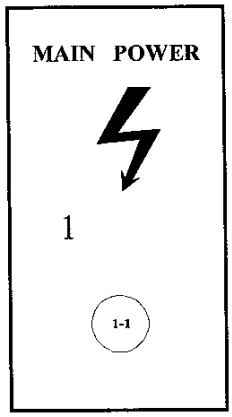
Index No.	Parts Name.	Description
CP.	Control Panel	Main Control keys and display
UTSD-105.	Smart Driver.	NC. Controller & Sever Motor Driver.
MT0173	Translation Board	Input&Output Board.
BSM80B	Sever Motor	Sever Motor For Downfeed.
MS0.	Magnetic Switch	Magnetic Switch Of Power Source.
MS1	Magnetic Switch	Magnetic Switch Of Hydraulic Pump.
MS2	Magnetic Switch	Magnetic Switch Of Spindle Motor.
MS3&MS4	Magnetic Switch	Magnetic Switch Of Crossfeed Motor (Back&Forth).
MS5	Magnetic Switch	Magnetic Switch Of Coolant Pump & Duster-Suction Motor.
M1	Motor	Hydraulic Pump Motor.
M2	Motor	Spindle Motor.
M3	Motor	Crossfeed Motor (Back&Forth).
M5	Motor	Coolant Pump & Duster-Suction Motor.
D.S.	Safety Breaker	Saferty Breaker Of Main Power
NFB1.	No-Fuse Breaker	No Fuse Breaker Of Circuit Control System(24V)
NFB2.	No-Fuse Breaker	No Fuse Breaker Of Soleniod Valve & Electric Chuck(110V)
F1,F2.	Fuse	Fuse For Protecting Control Circuit.
F3,F4.	Fuse	Fuse For Protecting SSR-25DA Unit.
F5,F6,F7.	Fuse	Fuse For Protecting 3Ph Transformer.
A.	Current Meter	Amperemeter Of Circuit.
SOC1.	Socket	Socket Of Solenoid Valve For Table Dir.Control.
SOC2.	Socket	Socket Of Work-Light.
SOC3.	Socket	Socket Of Hydraulic Pump.
SOC4.	Socket	Socket Of Coolant Pump & Duster-Suction Motor
1PH TR.	1Ph Transformer	Transformer For Cicurit Control System
3PH TR.	3Ph Transformer	Transformer For Crossfeed & Rapid Up And Down Motor
TB1,TB2.	Terminal Board	Terminal Board Of Wires Connect
OL1...OL5.	Over Load Relay	Motor Over Load Protect Relay
SSR-25DA.	Crossfeed Controller	Crossfeed (manual & auto) Control Unit
LS1...LS6.	Limit Switch	For Circuit Controling Limit Switches
PXS1..... PXS4.	Approximately Switch	For Auto Cross-feed stroke setting & Table Dir. Change (also a Trigger Signal of Auto Cross-Feed or Plunge).
BZ	Buzzer	For Reminding Of The Auto Circle has been finished.

DESCRIPTION OF CONTROL PANEL(CP.)



Section 1:

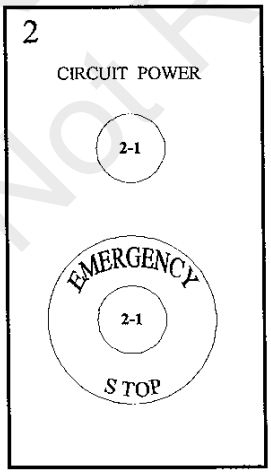
There is 1 indicate lamp in this section, and the function of the lamp is described as below:



1-1 is the indicating lamp of the supply power.

Section 2:

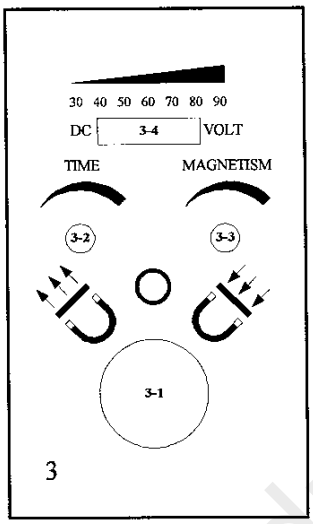
There are 2 push buttons in this section, and the function of the item is described as below:



2-1 is a push button with indicate lamp of starting circuit power.
2-2 is a push button of turning circuit power off (also is a emergency stop button).

Section 3:

This is a magnetic chuck control section, and the function of the items is described as below:



3-1 is a select switch of magnetic or demagnetic.(right is magnetic,left is demagnetic and middle is stop.)

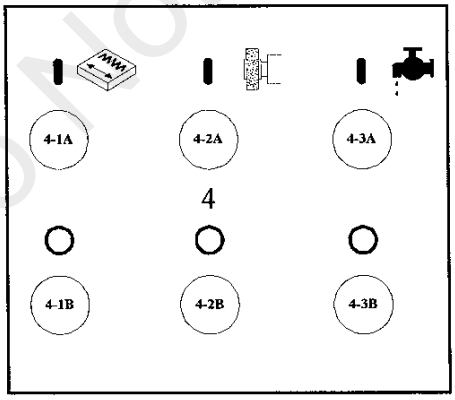
3-2 is a variable resistence of demagnetism time adjusting.

3-3 is a variable resistence of magnetism strength adjusting.

3-4 is a led indicating of magnetism strength .

Section 4:

This is a power unit control section, and the function of the items is described as below:



4-1A is a push button with indicate lamp of starting hydraulic pump unit.

4-1B is a push button of turning hydraulic pump unit off.

4-2A is a push button with indicate lamp of starting spindle motor.

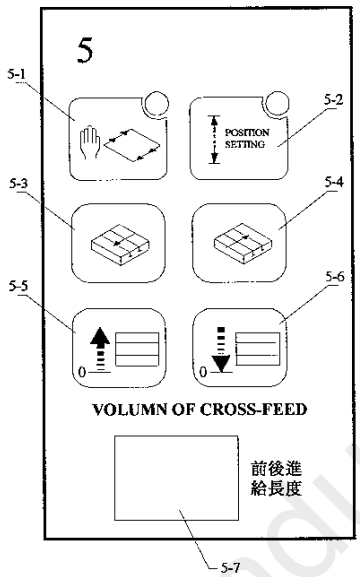
4-2B is a push button of turning spindle motor off.

4-3A is a push button with indicate lamp of starting coolant pump unit.

4-3B is a push button of turning coolant pump unit off.

Section 5:

This is a saddle cross-feed control section, and the function of the items is described as below:



5-1 is a key of manual or auto cross-feed control select.

5-2 is a key of setting stroke of auto cross-feed.

5-3 is a key of moving saddle toward the operator.(on auto mode is a ↙ dir.activate)

5-4 is a key of moving saddle away from the operator.(on auto mode is a ↗ dir. activate)

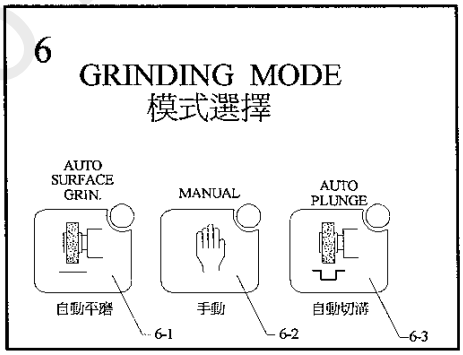
5-5 is a key of increasing length adjusting of auto cross-feed every strike.

5-6 is a key of decreasing length adjusting of auto cross-feed every strike.

5-7 is a led indicating of length of auto cross-feed every strike.

Section 6:

This is a grinding mode select section, and the function of the items is described as below:



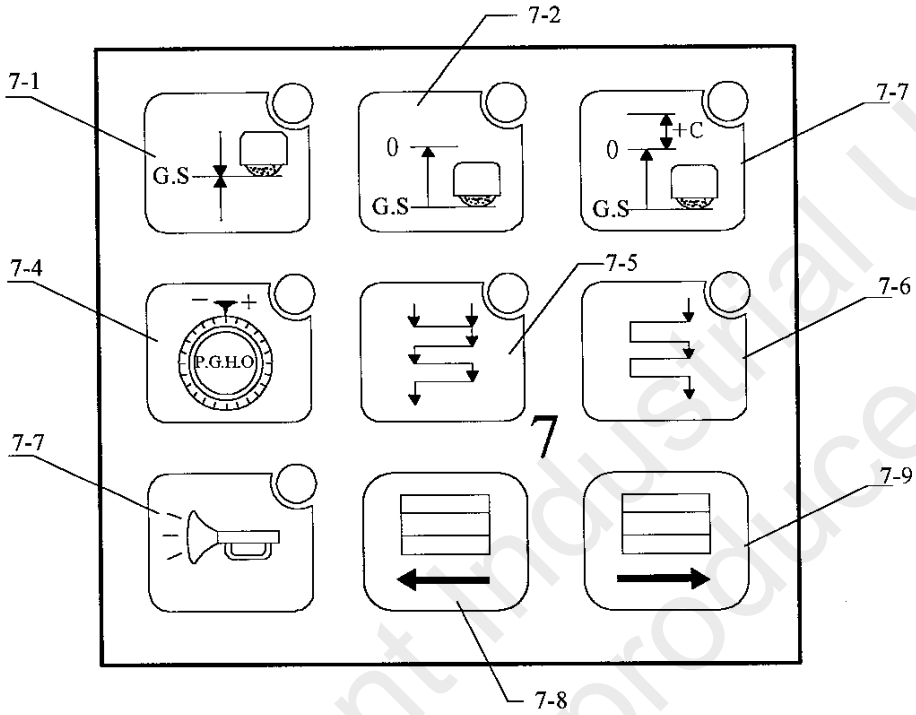
6-1 is a key of auto surface grinding mode selection.

6-1 is a key of manual operation mode selection.

6-1 is a key of auto plunge grinding mode selection.

Section 7:

There are 9 keys in this section, and the function of each key is described as below:



7-1—7-3 these three keys are wheel head retracting mode select keys, when auto start mode circle finished. And the choosing of mode is unique.

The key 7-1  is setting for no retracting mode.

The key 7-2  is setting for retracting to the origin point mode.

The key 7-3  is setting for retracting to the origin point + "C" value mode.

The key 7-4  is enable or disable the function of handy pulser unit.

7-5—7-6 these two keys are one-edge or two-edges auto feed mode for auto surface grinding or auto plunge select keys.

The key 7-5  is setting for two-edges auto feed mode.

The key 7-6  is setting for one-edge auto feed mode.

The key 7-7  is turning the function of horn on or off.

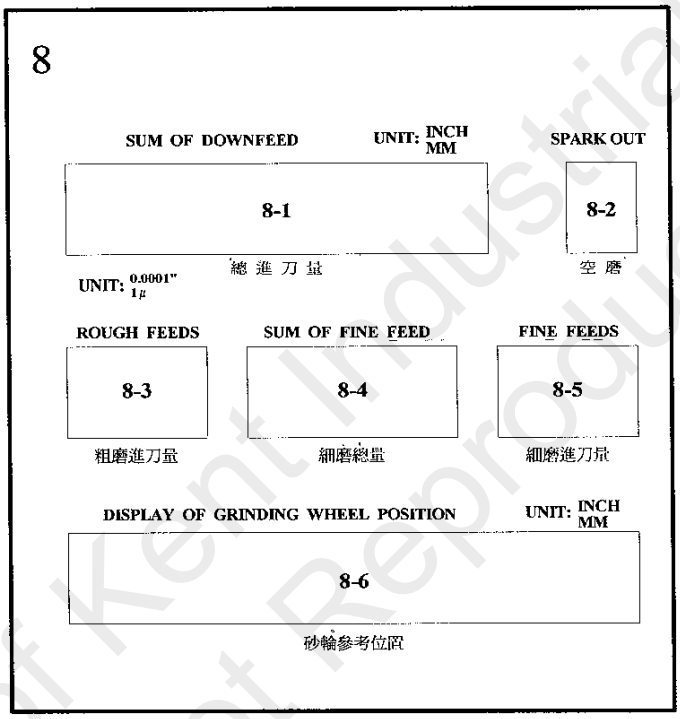
7-8—7-9 these two keys are activating the table longitudinal movement direction and the choosing of mode is unique.

The key 7-8  is activating the table moving direction (forward to← Dir.)

The key 7-9  is activating the table moving direction (forward to→ Dir.)

Section 8:

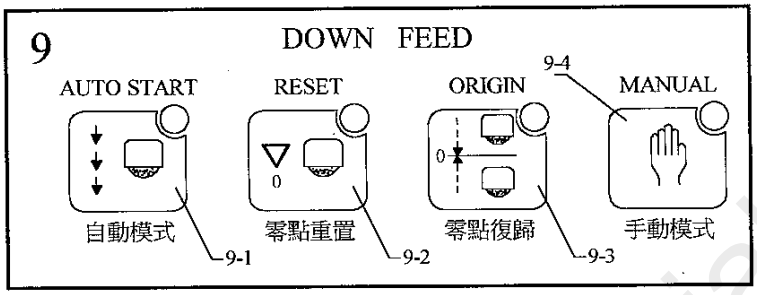
There are 6 led displays in this section, and the function of each is described as below:



8-1 is a led display of sum of downfeed showing the setting of total downfeed value.
8-2 is a led display of spark out showing the setting of spark-out times.
8-3 is a led display of rough feeds showing the setting of each rough-feed value.
8-4 is a led display of fine feeds showing the setting of sum of fine-feeds value.
8-5 is a led display of fine feeds showing the setting of each fine-feed value.
8-6 is a led display of grinding wheel position showing the wheel reference position.

Section 9:

This is a grinding wheel down-feed control section, and the function of the items is described as below:



9-1 is a key of auto down-feed control mode.

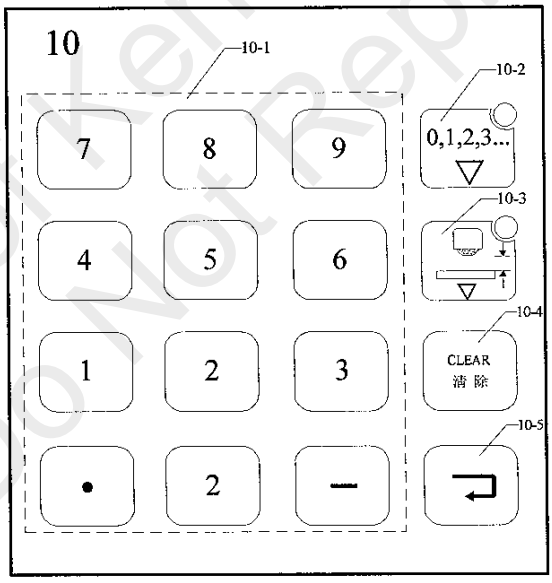
9-2 is a key of setting grinding wheel position to a reference zero position.

9-3 is a key of grinding wheel moving to reference zero position.

9-4 is a key of manual down-feed control mode.

Section 10:

This is a figures input and setting section, and the function of the items is described as below:



10-1 are keys of figures and point that can input numeral dates.

10-2 is a key of dates input activating.

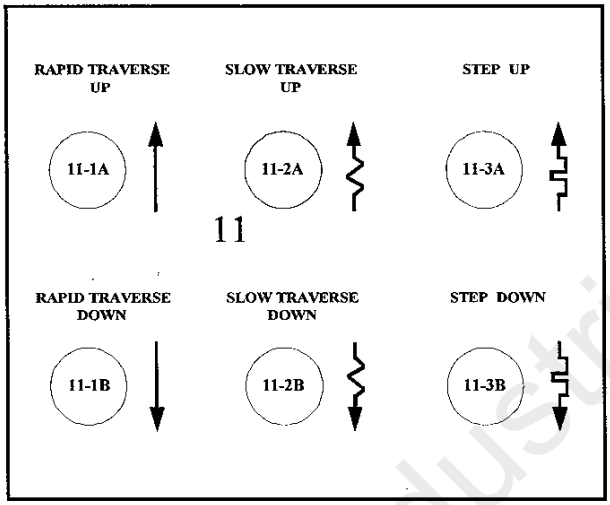
10-3 is a key of quick setting of fine feed.

10-4 is a key of clearing the input dates.

10-5 is a key of making certain the input dates.

Section 11:

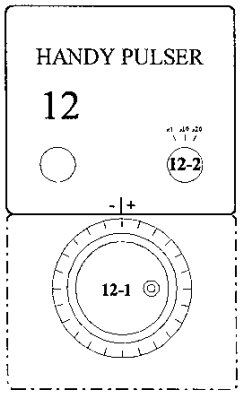
This is a manual down feed control section, and the function of the items is described as below:



11-1A is a push button of driving the wheel head rapid traverse up.
11-1B is a push button of driving the wheel head rapid traverse down.
11-2A is a push button of driving the wheel head slow traverse up.
11-2B is a push button of driving the wheel head slow traverse down.
11-3A is a push button of driving the wheel head step up.
11-3B is a push button of driving the wheel head rapid step down.
(The capacity of each step up or step down is set by 8-5(fine feeds).

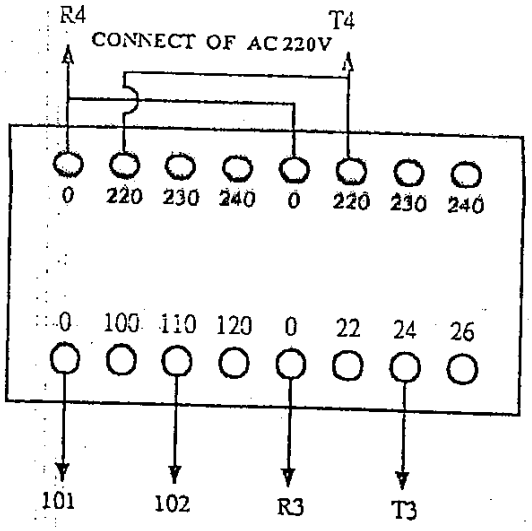
Section 12:

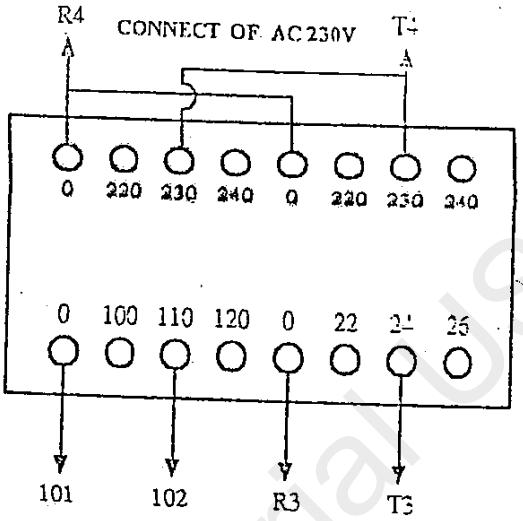
This is a handy pulser unit control section, and the function of the items is described as below:

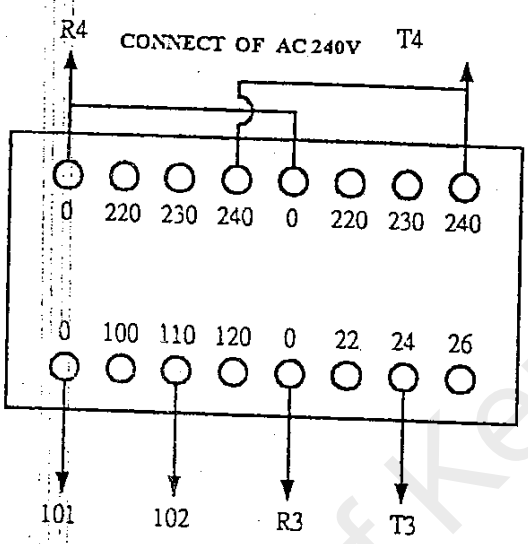


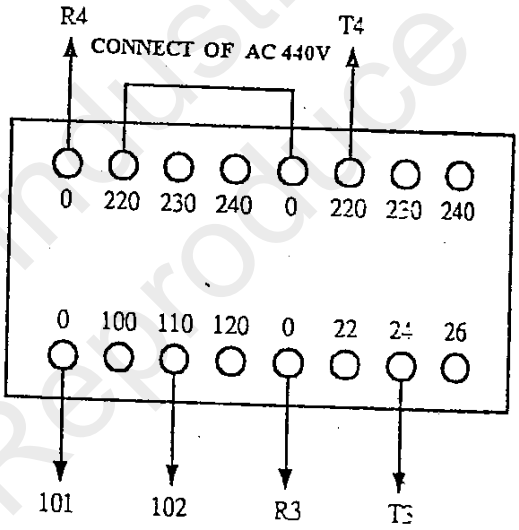
12-1 is a wheel of pulse generator.
12-2 is a select switch for the multiple range of pulse generator.
(The ranges is unit*1, unit*10, unit*20)

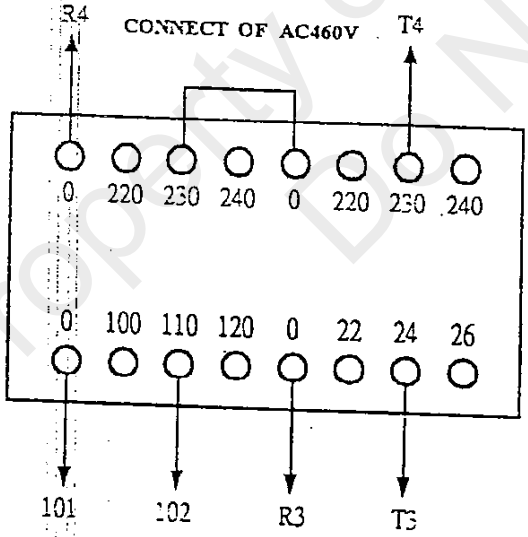
CONNECT OF 1PH. TRANSFORMER

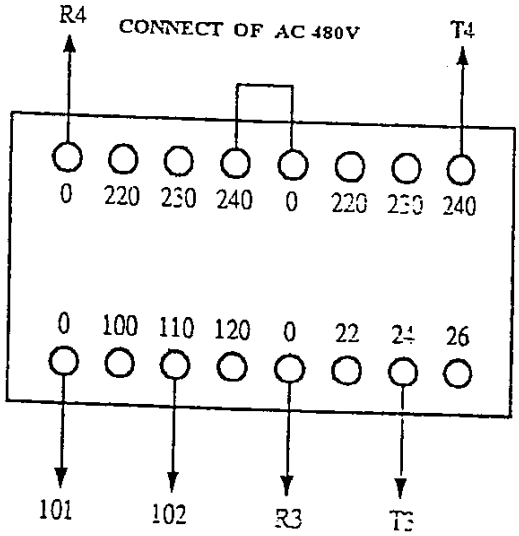






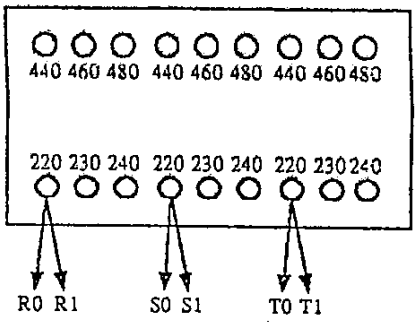






CONNECT OF 3PH. TRANSFORMER

CONNECT OF AC220V



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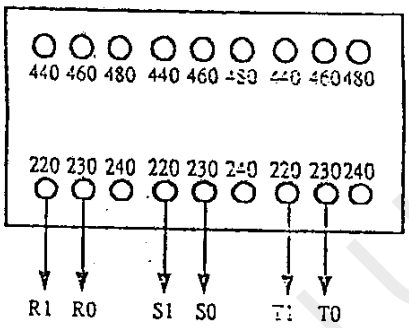

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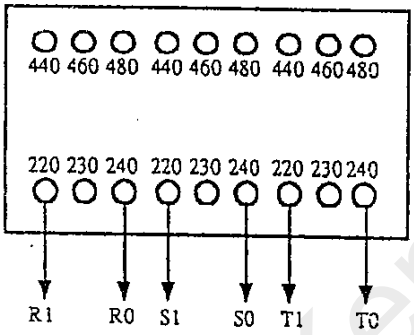
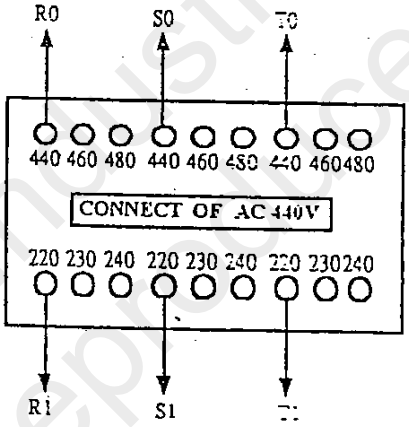
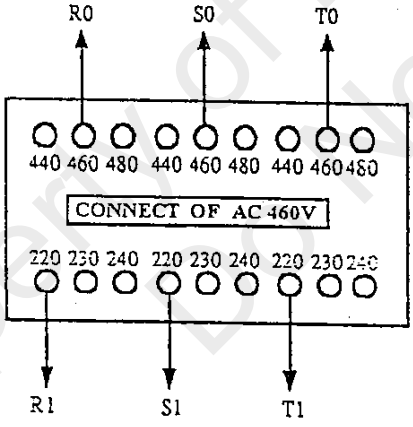
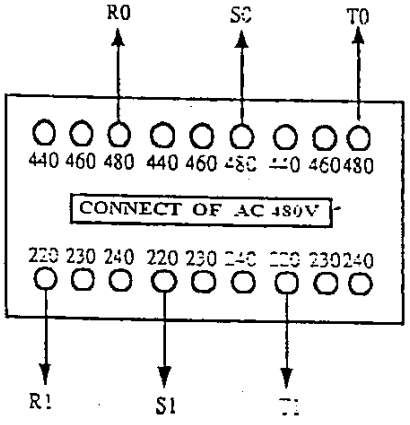
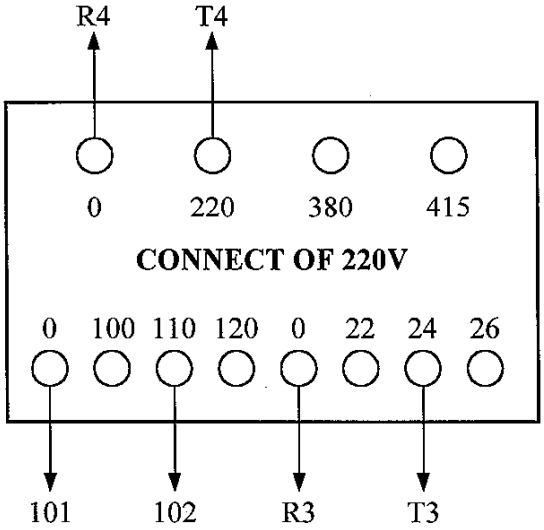


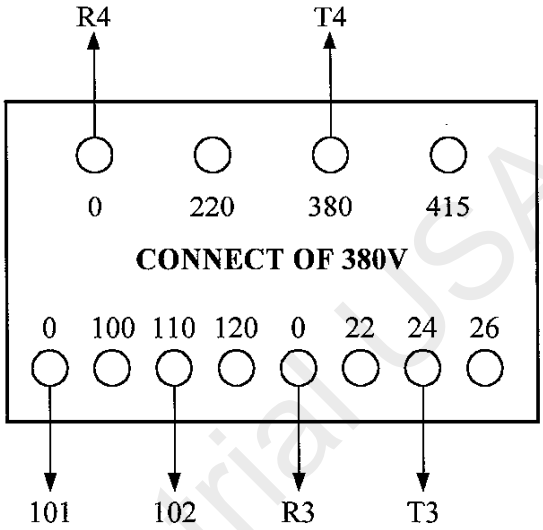


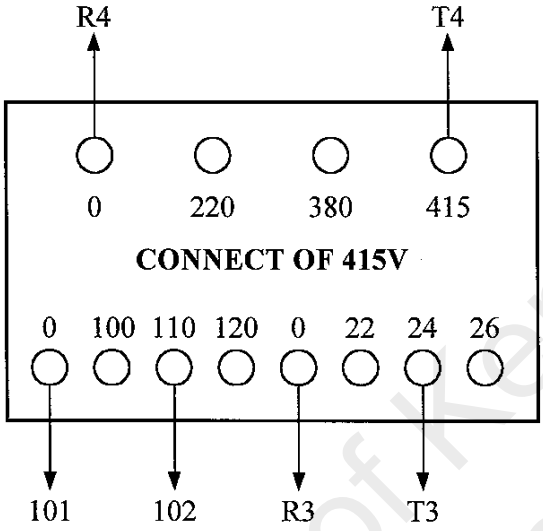




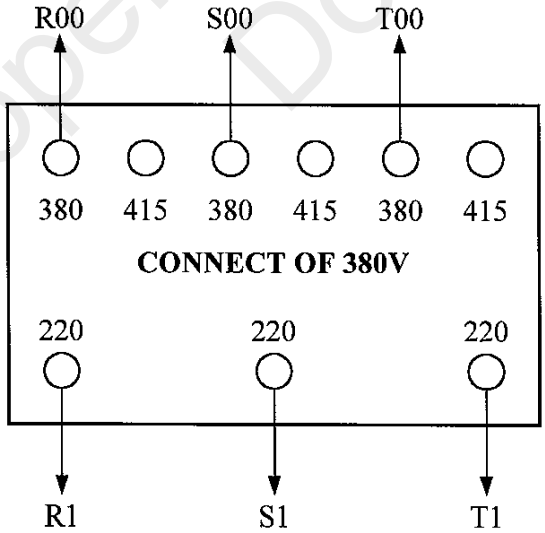
CONNECT OF 1PH. TRASFORMER

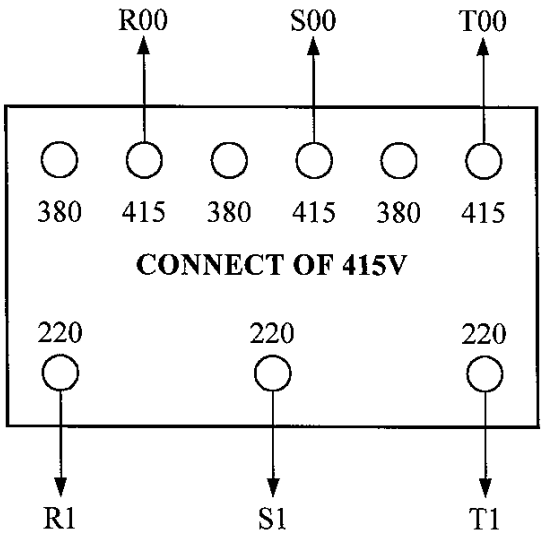




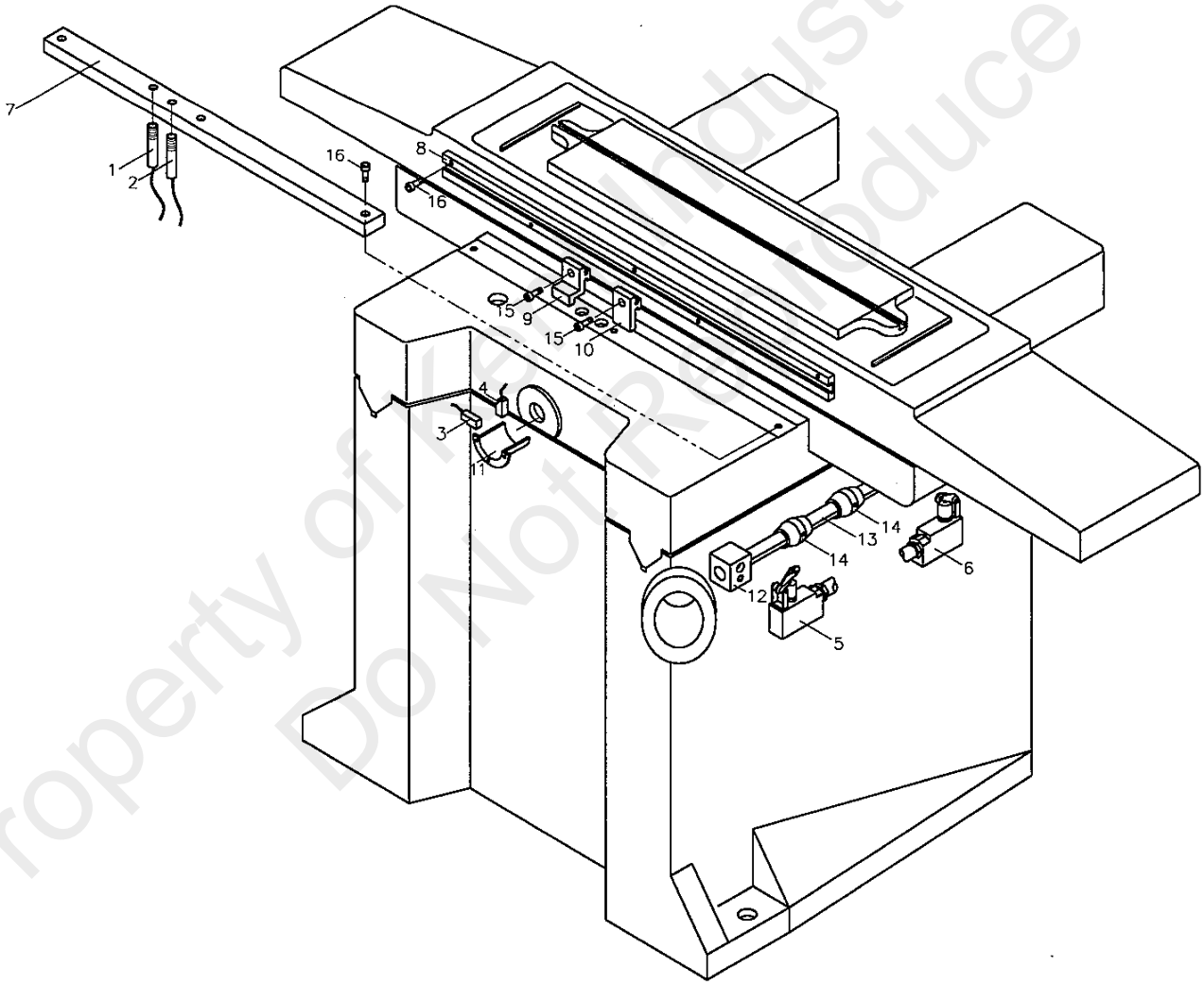


CONNECT OF 3PH. TRASFORMER





APPROXIMATE&LIMIT SWITCHS LOCATION



APPROXIMATE&LIMIT SWITCHS LOCATION

(1020---16340SD SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	PXS4 (PM12-02P)	Approximate Switch	1
2.	PXS3 (PM12-02P)	Approximate Switch	1
3.	PXS1 (PM12-02P)	Approximate Switch	1
4.	PXS2 (PM12-02P)	Approximate Switch	1
5.	LS1 (MJ1-6114)	Limit Switch	1
6.	LS2 (MJ1-6114)	Limit Switch	1
7.	1020-323	Guide Plate	1
8.	1632-615	Induction Block Guider	1
9.	1020SD-322A	Induction Block(L)	1
10.	1020SD-322A-1	Induction Block(R)	1
11.	1020-643	Induction Shell(R)	1
12.	1020-609	Mouting Base	2
13.	1020-607	Lead Rod	1
14.	1020-607	Stroke Control Dog	2
15.	W 5/16" x 1/2 "L	Socket Head Cap Screw	2
16.	W 1/4" x 1/2 "L	Socket Head Cap Screw	8

NOTICES BEFORE OPERATION MACHINE:

1.Accordind to the operation manual electric diagram .to connect the power supply. and be sure the power cable capacity must over than machine totall power consumption 1.5 times.

2.The ground of installing machine must have enough space to lay out the machine and its components and mobile parts moving area .

3.To wear the safty glasses when operation machine.

4.To confirm the rotation of spindle is clockwise,before installing the wheel.

5.To confirm the wheel is fixed well.

6.To confirm the wheel guard is locked well.

7.To confirm the wheel is balanced well.

8.To confirm the wheel material is matched with workpiece quality.

9.To confirm mobile parts(slide way, leadscrew etc.) with lubricant oil .

10.To confirm there are moderate hydraulic oil(quality&quantity) in the tank.

11.To confirm there are moderate lubricant oil(quality&quantity) in the lubricantor.

12.To confirm there are moderate grinding liquid(quality&quantity) in the coolant.

13.Whether the filter paper setting up correct.(opational accessory)

14.To confirm the hydraulic flow control leveler set on "OFF" position.

15.Warning:(It may cause the risks immediately if not comply with the notices strictly as description below).

a.Confirming the rotation of spindle is clockwise.(before confirming, please do not install the wheel set).

b.Confirming the workpiece is(are) hold perfectly .

c.Never let the wheel linear velocity over its specification.

e.Never let the wheel overfeed.

f.Rebalancing the wheel is necessary,whenever the the wheel is running vibrated.

g.Never wear spacious cloth & wear hair dishevelled,when operation machine.

h.Keep person(s) out the machine operation area except the operator.

i.The electric equipment must be earthed.

OPERATION OF MACHINE

When made preparations for the operation machine.then you can get ready to operate machine and to be familiar with operation skills and get the best working condition by following procedures as description as below :

A.reconfirming the following notices

a-1.The machine must be located on the vibration-proof ground.
a-2. Leveling of the machine.
a-3. Lubrication the slide ways & screws with slide way lubricate oil at first times use.
a-4. The Power supply must be adapted to the machine's specification.
a-5. Before starting the spindle motor, please do not install the wheel until you ensure it rotates at clockwise direction.
a-6. Do not install the wheel until you have already balanced it.
a-7. Be sure the flow control leveler at stop position.
a-8. Be sure the machine moving parts area is clearance.

B.Table longitudinal movement

b-1. Pressing the push button 2-1 to start control circuit.
b-2. Adjusting the travel stroke adjuster(L&R) at fit position.
b-3. Starting the hydraulic pump motor (press the push button 4-1A).
b-4. Pressing the Key of 7-8 or 7-9 once to activate the table moveing dirction.(7-8 is forward to ←DIR. 7-9 is forward to →DIR.)
b-5. Turn the flow control leveler at clockwise dir. slowly. till the table moving speed is suited for your wanted. then table will move reciprocating between the L&R travel stroke adjuster.
b-6. When table is moving , user can change the speed variable by turning the flow control leveler.clockwise dir. speed is getting up, on the contrary, is getting down.
b-7. You can pause the table movement , by pressing the 4-1A once (then the indicate lamp within 4-1A will be flashed with 1 sec. frequency).and restart the table movement by Pressing the push button 4-1A again.
b-8. When table on pause condition , by pressing the key 7-8 or 7-9 intermittent, to make the table forward to ←DIR. or → DIR. moving intermittent.(the speed of table movement is setting by flow control leveler)

C. Saddle cross-feed movement

c-1.Manual rapid cross travel operation:
1. Make sure the key of 5-1 on manual mode(when the indicate led is not lightened)
2.Pressing the key of 5-3 make the saddle to↙ DIR. rapid movement till it reaches the position that you want , than release the key.
3.Pressing the key of 5-4 make the sdalle to ↗DIR. rapid movement till it reaches the position that you want , than release the key.

c-2.Auto cross-feed operation:
1. Pressing the key of 5-1 once, change to auto-crossfeed mode (then the indicate led is going to light up).
2.Setting the cross travel stroke of up-column(See the description on next page)
3.Pressing the key of 5-3 or 5-4 once to activate the saddle to ↙ DIR. or ↗DIR. auto cross-feed.

4.Adjusting the volumn of auto cross-feed to fit your need.(key of 5-5 is increase, 5-6 is decrease the every intermittent feed volume.)

5.Chioce the auto crossfeed mode of key of 7-5 or 7-6 , 7-5 for two-edges auto feed mode, 7-6 for one-edges auto feed mode.

6. Operate proceeding of auto cross-feed stroking system

(a).At first , make sure the key of 5-1 is on manual feed mode.
After that,pressing the key of 5-3 or 5-4(for rapid forward or backward). to sent the saddle to the first grinding edge of workpiece "A".
(please refer FIG.1 below)

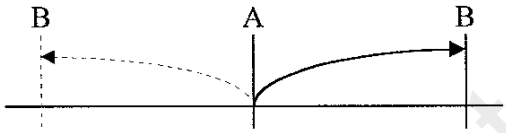


FIG.1

After the above procedures,pressing the key of 5-2 (position setting key with condition LED indicator) once, Then LED indicator will be flashed with 1 second frequence.and operation the keyof of 5-3 or 5-4 to sent the spindle seat to the second edge of workpiece "B".
Then one more pressing the key of 5-2 , and the LED indicator is going to stop flashing and keep lighting, till the key of 5-1 changeover to auto mode. when the LED indicator of 5-2 turn off, the procedure is completed.

(b). If the setting is not correct; for instance: setting "A"&"B" two points almost close together, or only just setting one point "A".then pressing the key of 5-1 to the auto mode(LED light up).
this moment the LED indicator of 5-1 will be quickly flashed with 0.1 second frequency. It means the setting is mistake please resetting again.

(c).This system has auto memory fuction ; when the machine is operation and power is failure suddenly or the energency stop switch is pushed to interrupt operation.
unless the user turn the cross-feed leadscrew manually before resarting the power supply. otherwise the previous setting won't be changed.

D.Servo controller system (for down-feed) operation:

When the control circuit power on ,the LED display of 8-1,8-2,8-3,8-4,8-5and 8-6 & indicator of manual operation will be lighted up.at same time.
then the figures of 8-6 will display "0".and the others will display the figures that have been set in last time,then the manual down-feed system is ready to operate.

d-1. Manual down-feed operation

1.Pressing the key of 6-2 once,to activate manual down-feed operation mode.

2. The LED display of 8-6 is showing a reference position of wheel-head (relative to reference zero point).whenever the system power on, the first time showing is a reference zero point.

3.When manual down-feed system is on operation,anytime, you can press the push-button 9-2 once to reset the reference position of wheel-head to a new reference zero point.(so before you press the key, you must confirm that is really your ask of new reference zero point).

4.Whenever the reference position of wheel-head is not on reference zero point. then, anytime, you can press the key of 9-3 once(must lasting over 1 sec.), to set the wheel-head return to it's original position (reference zero point). (It may cause a little hazard,so please take more cares of operation this key).

5. When the function of "original position return" is activating; then,You can interrupt the function at once, by pressing the key of 9-4 one stroke.

6.Pressing the 11-1A persisted to travel the wheel head rapid traverse up till it reaches the position that you want.

7.Pressing the 11-2B persisted to travel the wheel head rapid traverse down till it reaches to the position that you want.

8.Pressing the 11-2A persisted to travel the wheel head slow traverse up till it reaches the position that you want.

9.Pressing the 11-2B persisted to travel the wheel head slow traverse down till it reaches to the position that you want.

10.Pressing the 11-3A one stroke to travel the wheel head one step up.

11.Pressing the 11-3B one stroke to travel the wheel head one step down.

REM.1:the capacity of step up or step down is set by key of 8-5.

d-3.Auto down-feed circle operation

d-3a..Surface grinding mode:

1.Pressing the key of 6-1 once to turn the operation mode in auto surface grinding mode (the indicating LED will light up).

2. Pressing the key of 10-2 once (the indicating LED will light up). to start the numeric dates input of sum of downfeed,spark out, rough feeds, sum of fine feed , fine feeds , and the value C+ of key of 7-7 ; when you activate this fuction , at first the LED display of 8-1 will become flashing to wait for the dates input,then you can keyin the figures in the keys of 10-1,after the dates have been keyed already,then press the enter key(10-5) to make certain, or press the key of 10-4 to clear the dates and rekeyin again, or press the 10-5 to skip to next step.the numeric dates input sequence is sum of downfeed, rough feeds, sum of fine feed, fine feed, and spark out times, and the value of C+.

2-1. Unless user have complete finished the input sequence circle, otherwise the indicating LED won't go off (it means user can't do other procedure.)

2-2. The key 10-3 is a key that function just like the key of 10-2, but it is a quick setting only for fine feed.

3. Do the procedures of c-2 (auto cross-feed operation).
4. Choice the wheel head retract mode after auto feed circle finishing ; key of 7-1 is no retracting, key of 7-2 is retracting to origin point, key of 7-2 is retracting to origin point + C valve, the indicator of chosen mode will light up.
5. Choice the function of horn on or off (if choice is "on" mode, then it will sound up when the auto-down feed circle have finished, but user can close the sound by pressing the key of 7-7 one more times.)
6. Pressing the 9-1 (AUTO START) one stroke to start the auto down-feed circle. (Then indicator of 9-1 will light up And indicator of 9-4 will go out).
7. When the auto down-feed circle finished, then the wheel head will rise (it depend. on the mode as described on item 4). and the control system will be changed to the condition of manual down-feed operation.

d-3b. Plunge grinding mode :

1. Pressing the key of 6-3 once to turn the operation mode in auto plunge grinding mode. (the indicating LED will light up)
2. Do the procedures of d-3b item 2-7 (but the item 3 auto-cross function will be disable.)

d-4. Handy pulse unit operation :

1. The grinding mode must be set on 6-2 manual mode (then the function of manual down-feed operation & auto down-feed circle operation will be disabled.)
2. Press the key of 7-4 to enable the function of Handy pulse unit.
3. Switching the select switch 12-2 at right range (x1 or x10 or x20) (per graduation capacity = selected numerical * unit)
4. Turn the 12-1 (pulse wheel) clockwise to drive wheel-head down feed.
5. Turn the 12-1 (pulse wheel) anti-clockwise to drive wheel-head up feed.
6. Do not operate the pulse wheel too fast.

REM2 : The spindle motor is interlocked with mag. chuck controller & wheel guard cover. so that unless user switching the mag. chuck on magnetism and locking the wheel guard cover well, otherwise user can not start the spindle motor.

REM3 : The auto down-feed trigger signal is also on the ends of auto cross-feed stroke. (only for surface grinding mode.)

REM4 : The auto down-feed trigger signal is on the right end of table longitudinal

Attention : Before starting the Auto mode, Please reset the reference position of wheel to reference zero point, otherwise the control panel will be displayed a "origin" message and the procedure can not continue.

19. GRINDING BUGS AND ELIMINATIONS

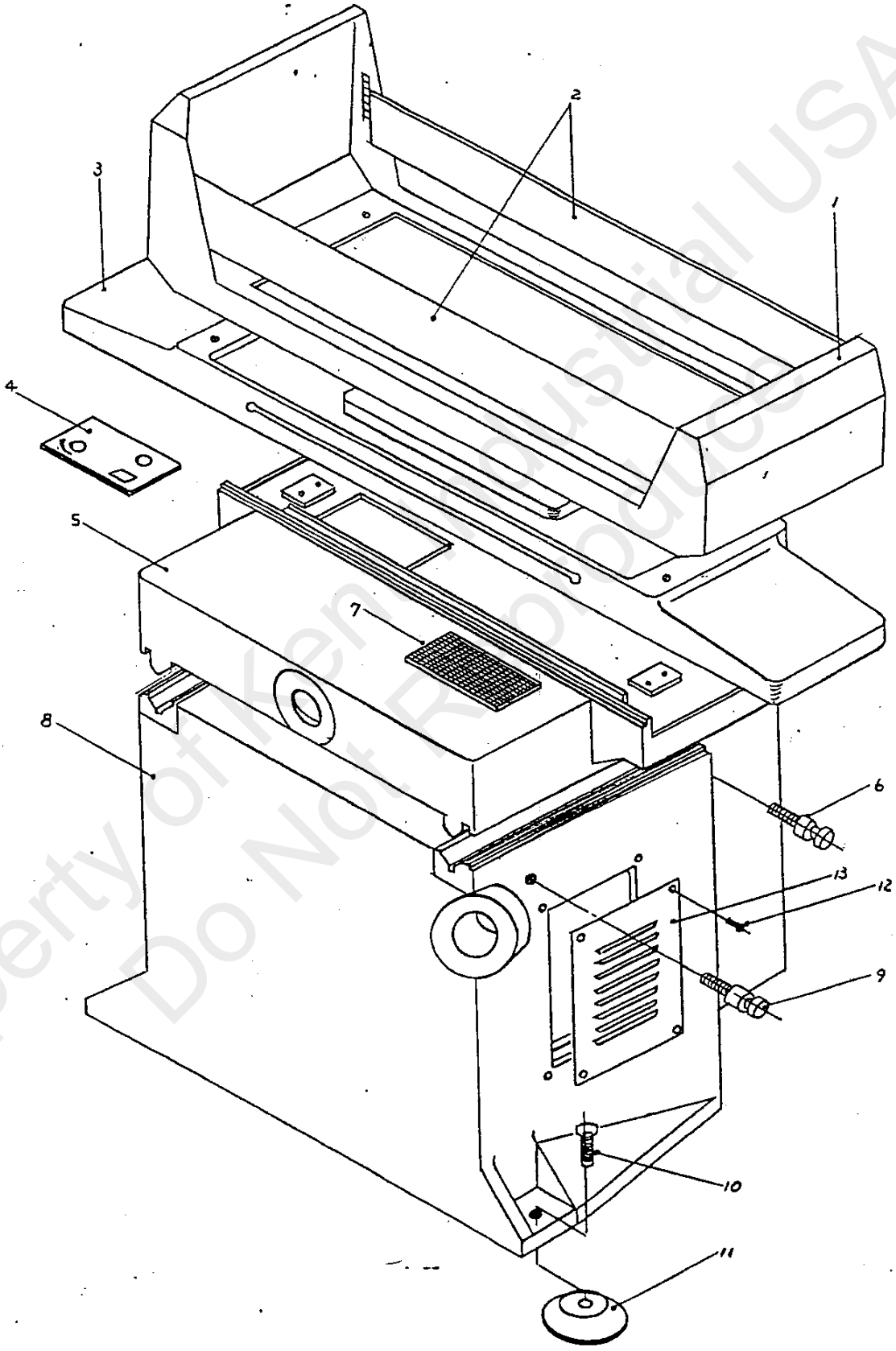
Grinding Bugs and Eliminations.

Bugs style.	Reason	Corrective methods
Vibrative waves	a. Vibration.	a. Keep machine in best condition and balance the grinding wheel certainly.
	b. Grinding wheel surface loses its round.	b. Use sharp grinding wheel to dress grinding wheel surface again.
	c. Girnding wheel is too hard	c. Increase working table speed and fix with right grinding wheel.
Burn on grinding surface of processed material.	a. Caused by too hard or tiny grained grinding wheel.	a. Fix with softer or rougher grained grinding wheel, or decreased line speed of grinding wheel.,
	b. Grinding wheel is too blunt or coated with dusts.	b. Dress grinding wheel until it has rougher grained degree.
	c. Caused by large downfeed capacity.	c. Decrease downfeed capacity Decrease crossfeed capacity.
	d. Caused by shortage of coolant water.	d. Increase the discharge of coolant water. Refill clean coolant water. Use stronger coolant effect mixture.
Workpiece lost parallel	a. Bad on magnetic chuck surface.	a. Use tiny grained grinding stone or oiled stone to polish the contact surface between magnetic chuck and work piece.
	b. Precision of magnetic chuck surface is not good enough.	b. Regrind magnetic chuck surface.
Rough on glossy surface	a. Feed is too much when you dress the grinding wheel.	a. Lightly dress by one or two times sparklingly dressing.
	b. Caused by too big feed capacity in the final process.	b. Tiny feed and polish surface.
Loading of grinding wheel	a. Incorrect specification of grinding wheel.	a. Use open style grinding wheel which has rougher grain and softer material.
	b. Inadequate coolant liquor.	b. Guide coolant liquor to contact part and clean coolant liquor.
	c. Working table speed is too low.	c. Increase working table speed.
	d. Uncertainly dress of grinding wheel.	d. Use sharp diamond dresser to adjust grinding wheel, rough grain is requested.

20.Complete Knockdown Drawing & Parts List

TABLE,SADDLE&BASE ASS'Y

(816H ,1020,N1224)



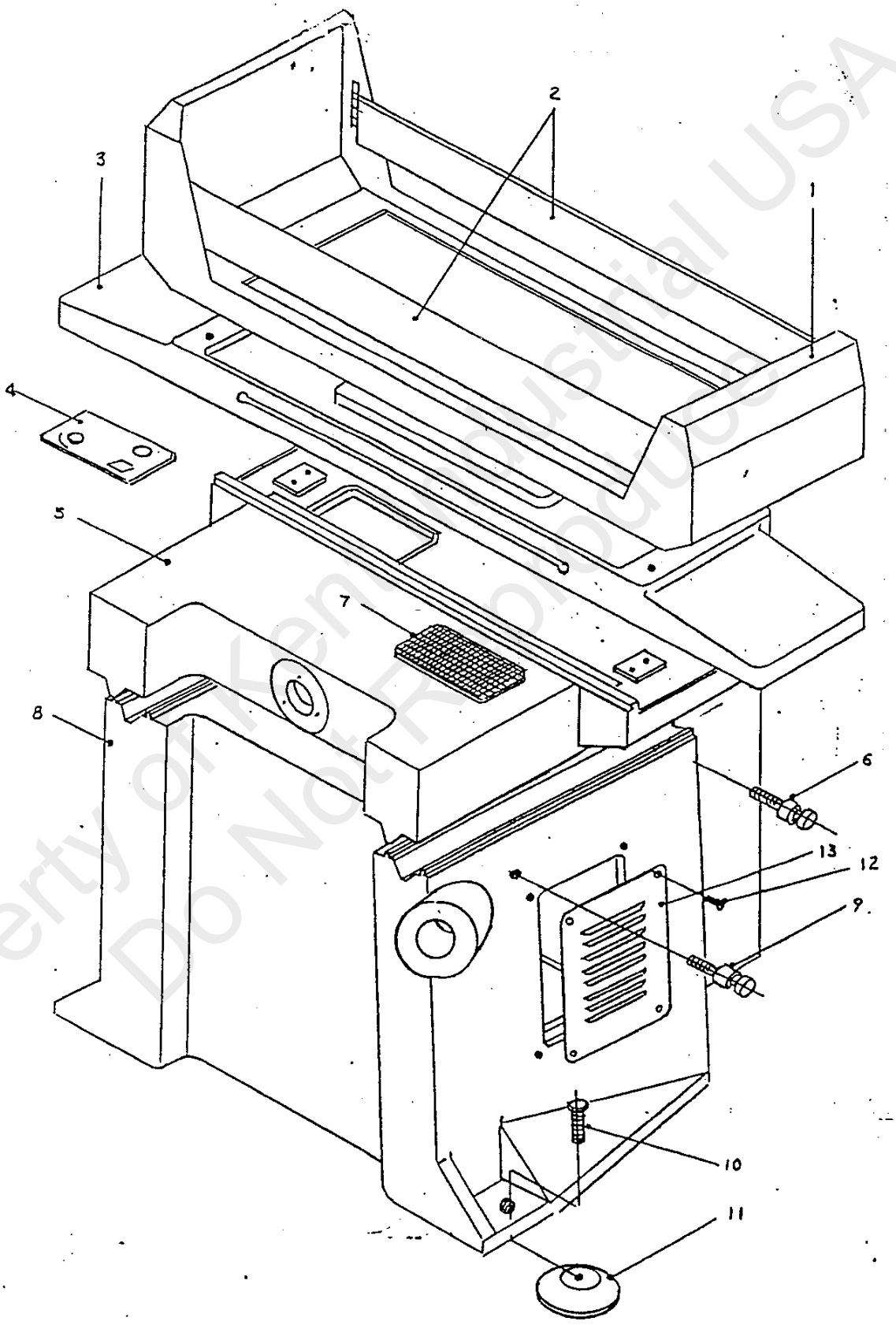
TABLE,SADDLE&BASE ASS'Y

(1020 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-308	Splash Guard (Frame)	1
2.	1020-308	Splash Guard (Plate)	4
3.	1020-301	Table	1
4.	1020-725	Indication Plate	1
5.	1020-401	Saddle	1
6.	1020-703	Lifting Bolt	1
7.	1020-711	Rubber Plate	1
8.	1020-501	Base	1
9.	1020-704	Lifting Bolt	1
10.	1020-717	Levelling Screw	3
11.	1020-716	Levelling Pad	3
12.	W1/4"*1/4"	Socket Head Cap Screw	8
13.	1020-710	Side Cover	2

TABLE,SADDLE&BASE ASS'Y

(1224,1230,1632 SERIES)



TABLE,SADDLE&BASE ASS'Y

(1224,1230 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1224-308	Splash Guard (Frame)	1
	1230-308	Splash Guard ((Frame)	4
2.	1224-308	Splash Guard (Plate)	4
	1230-308	Splash Guard (Plate)	4
3.	1224-301	Table	1
	1230-301	Table	1
4.	1020-725	Indication Plate	1
5.	1224-401	Saddle	1
6.	1020-703	Lifting Bolt	1
7.	1020-711	Rubber Plate	1
8.	1224-501	Base	1
9.	1020-704	Lifting Bolt	1
10.	1020-717	Levelling Screw	5
11.	1020-716	Levelling Pad	5
12.	W1/4"*1/4"	Socket Head Cap Screw	8
13.	1020-710	Side Cover	2

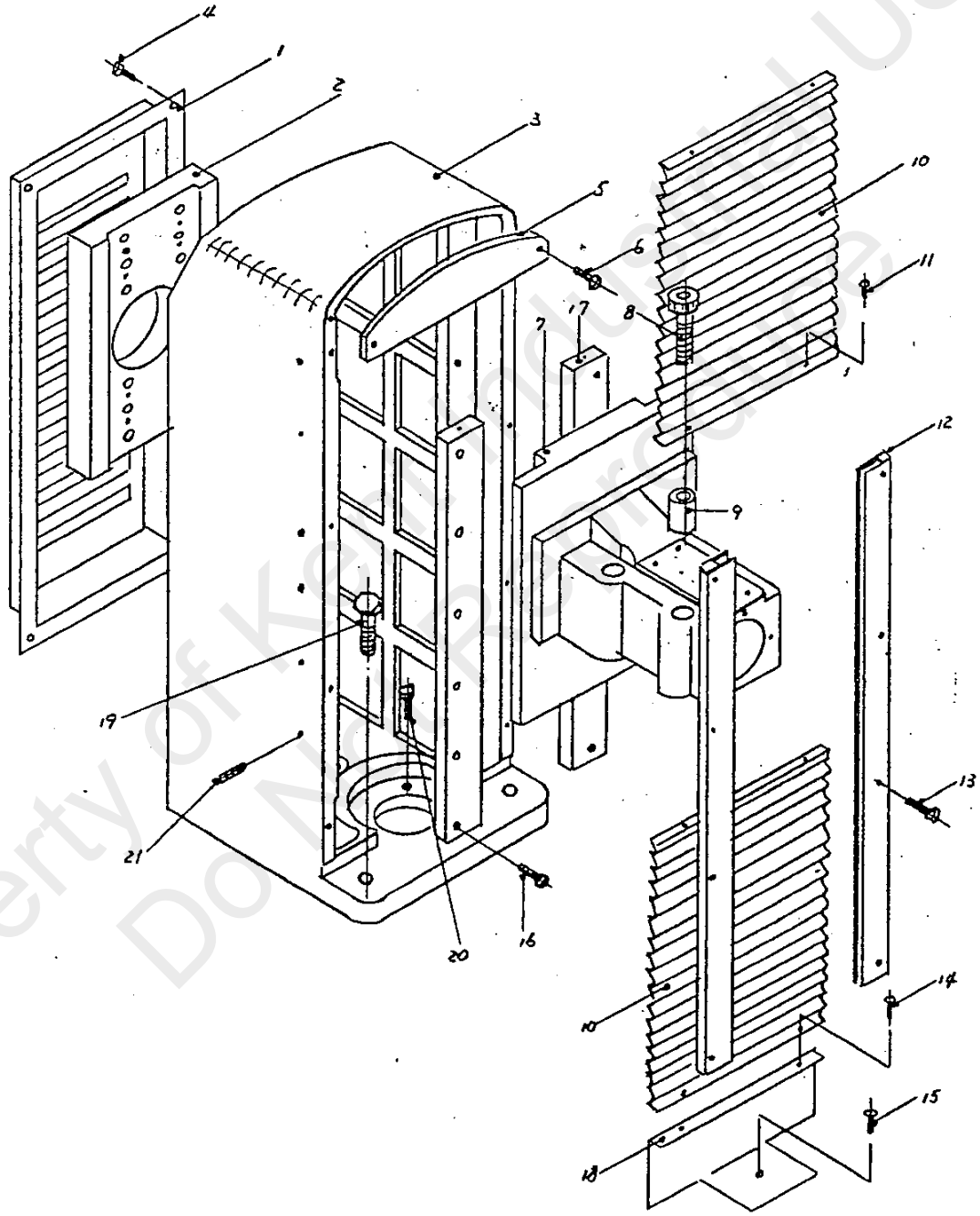
TABLE,SADDLE&BASE ASS'Y

(1632 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1632-308	Splash Guard (Frame)	1
2.	1632-308	Splash Guard (Plate)	4
3.	1632-301	Table	1
4.	1020-725	Indication Plate	1
5.	1632-401	Saddle	1
6.	1632-703	Lifting Bolt	2
7.	1020-711	Rubber Plate	1
8.	1632-501	Base	1
9.	1632-704	Lifting Bolt	2
10.	1020-717	Levelling Screw	5
11.	1020-716	Levelling Pad	5
12.	W1/4"*1/4"	Socket Head Cap Screw	8
13.	1632-710	Side Cover	2

COLUMN ASS'Y

(618,816,1020,N1224,1224,1230 SERIES)



COLUMN ASS'Y

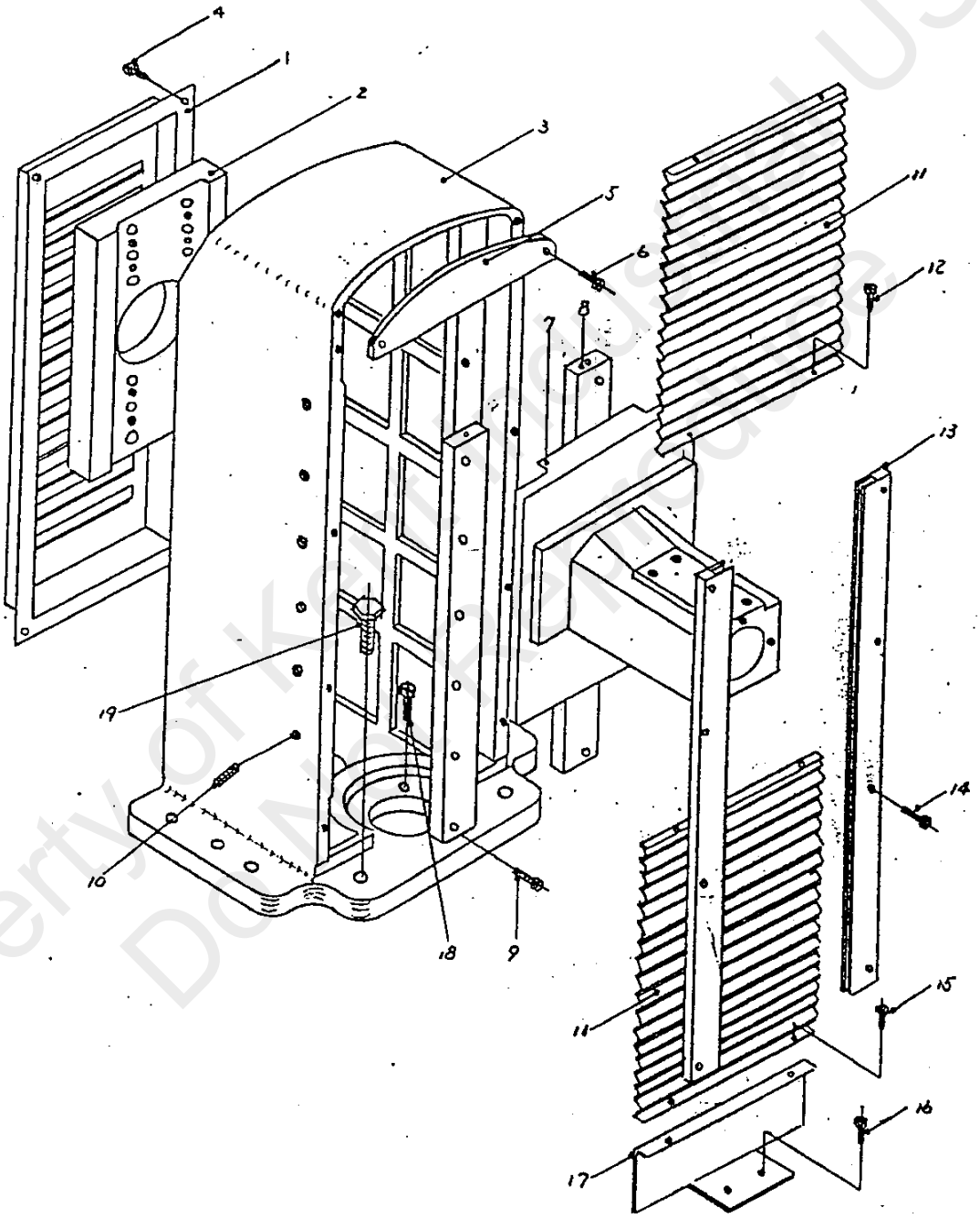
(1020,N1224 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-205	Column Rear Cover	1
2.	1020-102	Head B	1
3.	1020-201	Column	1
4.	W1/4"*1/4"L	Round Head Screw	6
5.	1020-204A	Upper Cover Of Column	1
6.	W1/4"*3/4"L	Socket Head Cap Screw	2
7.	1020-101	Head A (1020 serial)	1
	N1224-101	Head A (N1224 serial)	1
8.	W5/8"*3"L	Socket Head Cap Screw	2
9.	1020-112	Copper collar	2
10.	1020-224	Dust Protection Fold Fabric	2
11.	W1/4"*1/4"L	Round Head Screw	4
12.	1020-203A	Shield Dust Guide Rail	2
13.	W3/16"*3/8"L	Round Head Screwl	8
14.	W1/4"*1/4"L	Round Head Screw	4
15.	W1/4"*1/4"L	Socket Head Cap Screw	1
16.	W3/8"*1"L	Socket Head Cap Screw	12
17.	1020-202A	Vertical Guide Rail	2
18.	1020-207A	Shield Dust	1
19.	W3/4"*2"L	Hexagonal Head Screw	4
20.	W1/2"*2 1/2"L	Socket Head Cap Screw	3
21.	W3/8"*1"L	Set screw	12

COLUMN ASS'Y
(1224,1230 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1224-205-1	Column Rear Cover	1
2.	1224-102	Head B	1
3.	1224-201	Column	1
4.	W1/4"*1/4"L	Round Head Screw	6
5.	1224-204	Upper Cover Of Column	1
6.	W1/4"*3/4"L	Socket Head Cap Screw	2
7.	1224-101	Head A	1
8.	W5/8"*3"L	Socket Head Cap Screw	2
9.	1224-112	Copper collar	2
10.	1224-224	Dust Protection Fold Fabric	2
11.	W1/4"*1/4"L	Round Head Screw	4
12.	1224-203A	Shield Dust Guide Rail	2
13.	W3/16"*3/8"L	Round Head Screw	10
14.	W1/4"*1/4"L	Round Head Screw	4
15.	W1/4"*1/4"L	Socket Head Cap Screw	1
16.	W3/8"*1"L	Socket Head Cap Screw	12
17.	1224-202	Vertical Guide Rail	2
18.	1224-207	Shield Dust	1
19.	W3/4"*2"L	Hexagonal Head Screw	4
20.	W1/2"*2 1/2"L	Socket Head Cap Screw	3
21.	W3/8"*1"L	Set screw	12

COLUMN ASS'Y
(1632 SERIES)

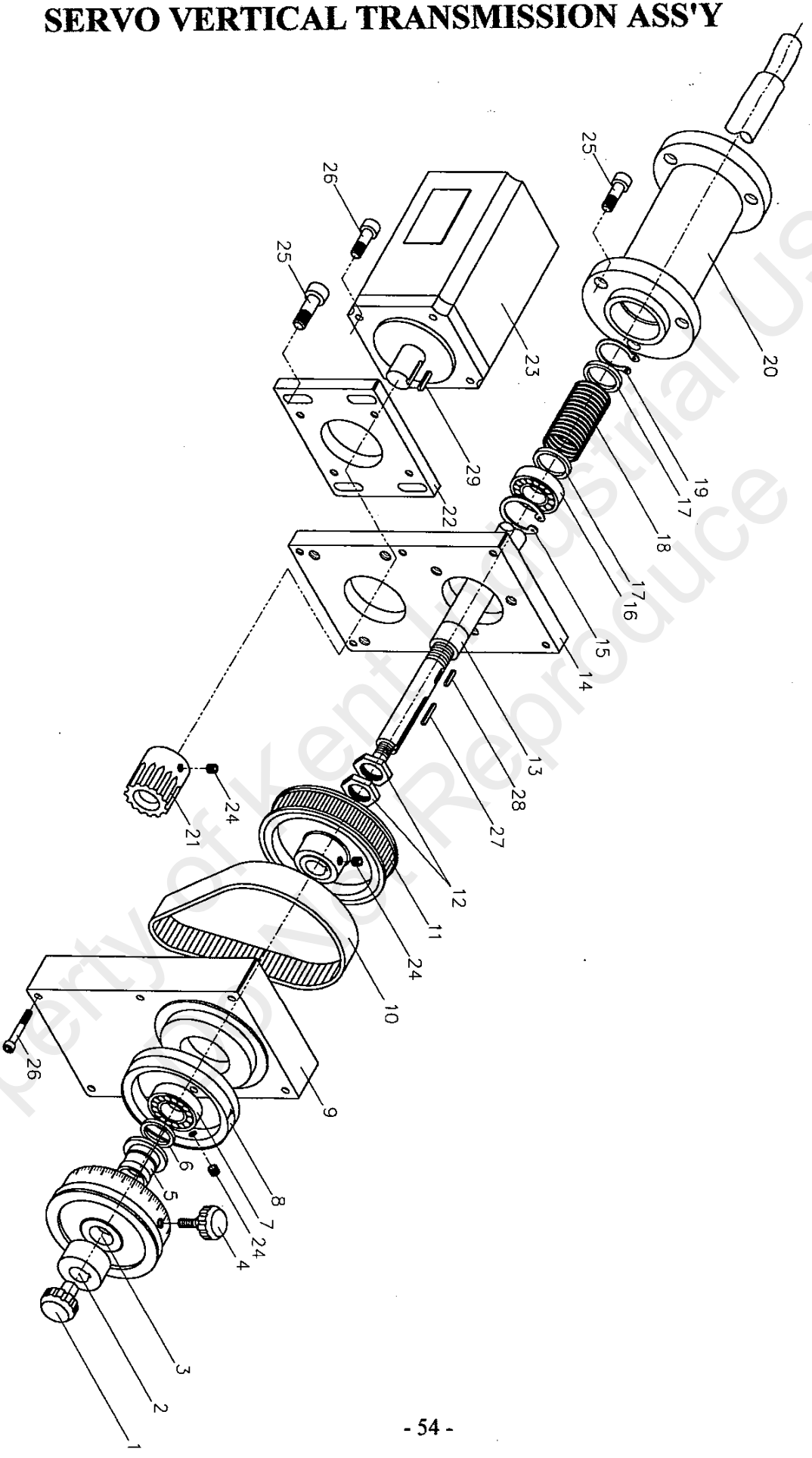


COLUMN ASS'Y

(1632,1640 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1632-205	Column Rear Cover	1
2.	1632-102A	Head B	1
3.	1632-201	Column	1
4.	W1/4"*1/4"L	Round Head Screw	6
5.	1632-204	Upper Cover Of Column	1
6.	W1/4"*1"L	Socket Head Cap Screw	2
7.	1632-101	Head A	1
8.	1632-202	Vertical Guide Rail	2
9.	W1/2"*1 1/2"L	Socket Head Cap Screw	16
10.	W1/2"*1"L	Set Screw	16
11.	1632-206	Dust Protection Fold Fabric	2
12.	W3/16"*1/4"L	Round Head Screw	4
13.	1632-203	Shield Dust Guide Rail	2
14.	W3/16"*1/4"L	Round Head Screw	10
15.	W3/16"*1/4"L	Round Head Screw	4
16.	W3/16"*1/4"L	Round Head Screw	2
17.	1632-207	Shield Dust	1
18.	W1/2"*2 1/2"L	Socket Head Cap Screw	3
19.	W3/4"*2"L	Hexagonal Head Screw	8

SERVO VERTICAL TRANSMISSION ASS'Y



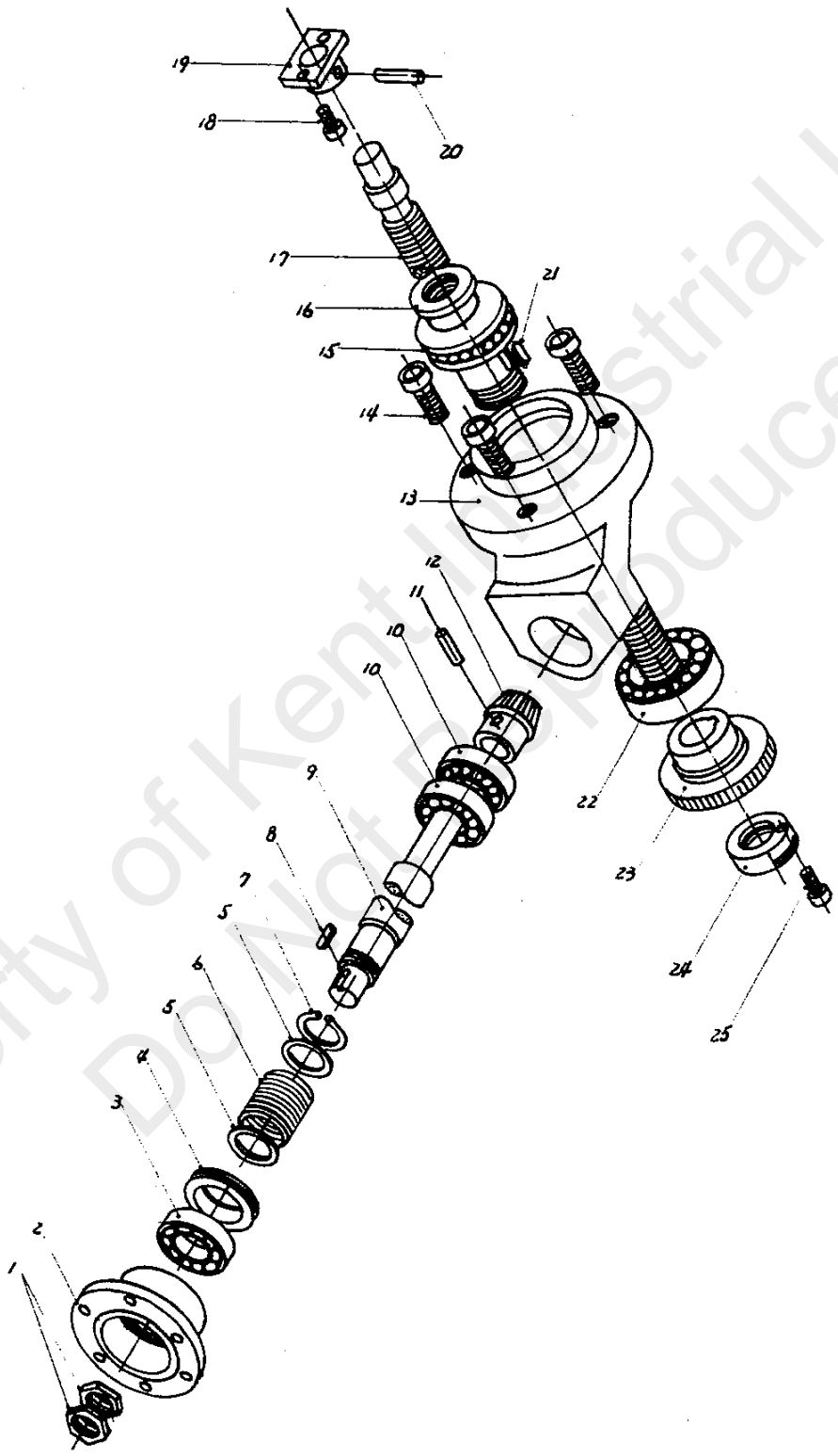
SERVO VERTICAL TRANSMISSION ASS'Y

(1020---1640SD SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-729	Cap Nut	1
2.	1020-548	Spacer	1
3.	1020-N801	Dial Ring	1
4.	W 5/16" x 30mm	Cap Bolt	1
5.	1020-N804	Bush	1
6.	1020-N805	Spacer	1
7.	1303	Bearing	1
8.	1020-N803A	Index Ring	1
9.	1020-543	Fixed Cover	1
10.	5M x 500L	Timing Belt	1
11.	1020-544	Timing Belt Pulley(Big)	1
12.	1020-410	Nut	2
13.	1020-545	Transmission Shaft	1
14.	1020-542	Fixed Plate	1
15.	R55	Snap Ring	1
16.	1205Z	Bearing	1
17.	1020-506	Washer	2
18.	1020-507	Spring	1
19.	S25	Snap Ring	1
20.	1020-541	Bracket	1
21.	1020-546	Timing Belt Pulley(Small)	1
22.	1020-547	Servo Motor Base	1
23.	BSM80B-2	Servo Motor	1
24.	W 1/4"	Set Screw	6
25.	W 5/16" x 1" L	Socket Head Cap Screw	7
26.	W 1/4" x 3/4" L	Socket Head Cap Screw	4
26.	W 1/4" x 1 1/2" L	Socket Head Cap Screw	6
27.	5 x 5 x 25	Key	1
28.	5 x 5 x 20	Key	1
29.	6 x 6 x 25	Key	1

UPPER&LOWER TRANSMISSION ASS'Y

(1020AHD/N1224AHD/1224AHD/1230AHD/1632AHD)



UPPER&LOWER TRANSMISSIONASS'Y

(1020,N1224,1224,1230SD)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-410	Hexagonal Nut	2
2.	1224-804	Connect Flange	1
3.	# 6005	Ball Bearing	1
4.	1224-871	Nut Of Flange	1
5.	1020-506	Washer	2
6.	1020-507	Spring	1
7.	S 25	Snap Ring	1
8.	5*5*20L	Key	1
9.	1020-805	Transmission shaft	1
	N1224-805	Transmission shaft	1
	1224-805 (1224,1230)	Transmission shaft	1
10.	# 6204	Ball Bearing	2
11.	φ 6*30L	Spring Pin	1
12.	1020-217	Bevel Pinion	1
13.	1020-214	Gear Seat	1
14.	W1/2"*2"L	Socket Head Cap Screw	3
15.	# 51108	Thrust Bearing	1
16.	1020-213 (1020,N1224)	Upper&lower Lead Screw Socket	1
	1224-213 (1224,1230)	Upper&lower Lead Screw Socket	1
17.	1020-212 (1020,N1224)	Upper&lower Lead Screw	1
	1224-212 (1224,1230)	Upper&lower Lead Screw	1
18.	W5/16"*3/4"L	Socket Head Cap Screw	2
19.	1020-218	Connect Bracket	1
20.	φ 6*30L	Spring Pin	1
21.	7*5**25L	Key	1
22.	# 6011Z	Ball Bearing	1
23.	1020-216	Bevel Gear	1
24.	1020-215	Lock Nut	1
25.	W1/4"*1/4"L	Socket Head Cap Screw	1

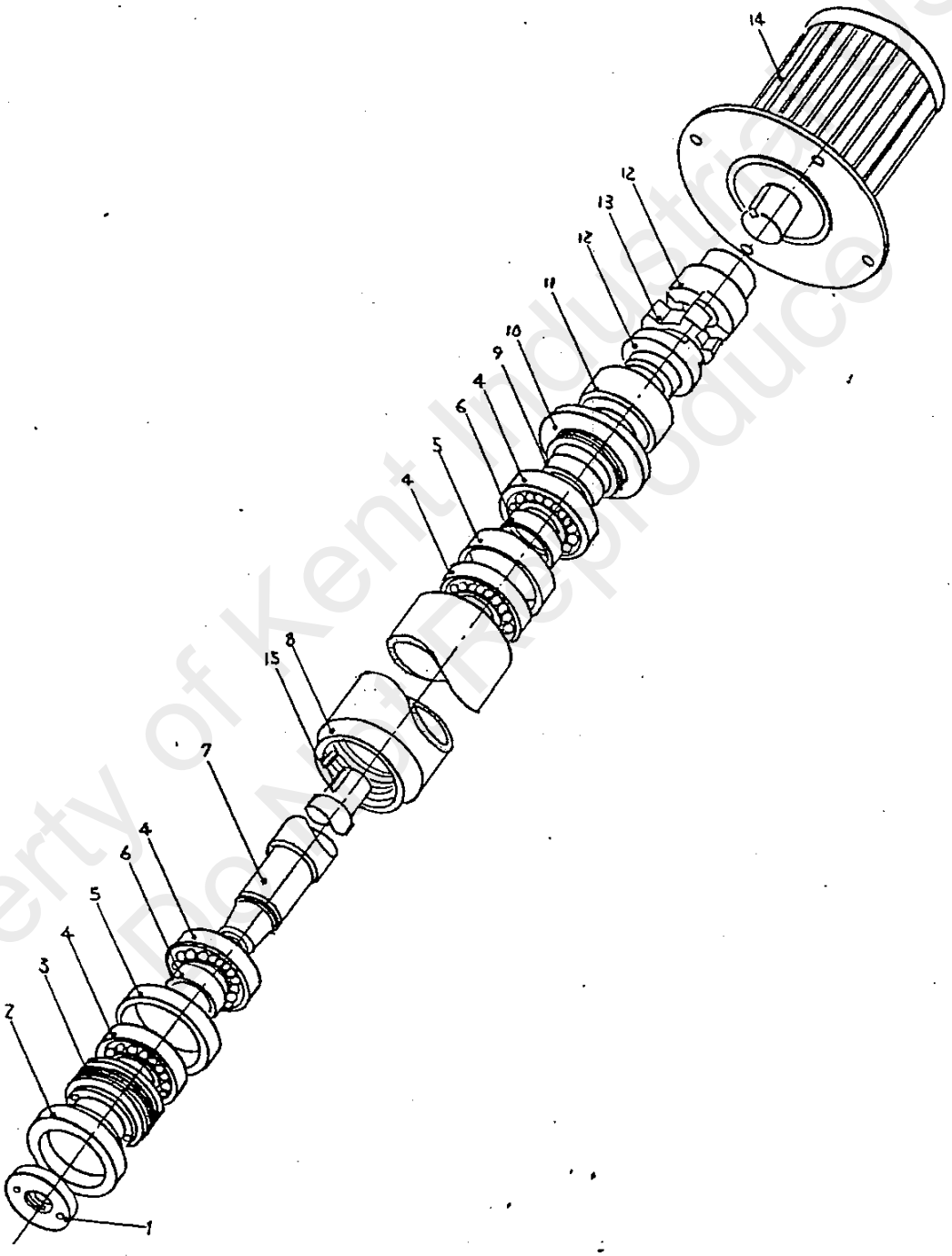
UPPER&LOWER TRANSMISSION ASS'Y

(1632,1640 SD)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-410	Hexagonal Nut	2
2.	1224-804	Connect Flange	1
3.	# 6005	Ball Bearing	1
4.	1224-871	Nut Of Flange	1
5.	1020-506	Washer	2
6.	1020-507	Spring	1
7.	S 25	Snap Ring	1
8.	5*5*20L	Key	1
9.	1632-805	Transmission shaft	1
10.	# 6204	Ball Bearing	2
11.	φ 6*30L	Spring Pin	1
12.	1632-221	Bevel Pinion	1
13.	1632-223	Gear Seat	1
14.	W1/2"*2"L	Socket Head Cap Screw	3
15.	# 51110	Thrust Bearing	1
16.	1632-213	Upper&lower Lead Screw Socket	1
17.	1020-212	Upper&lower Lead Screw	1
18.	W5/16"*3/4"L	Socket Head Cap Screw	2
19.	1632-218	Connect Bracket	1
20.	φ 6*30L	Spring Pin	1
21.	7*5**25L	Key	1
22.	# 6213Z	Ball Bearing	1
23.	1632-222	Bevel Gear	1
24.	1632-215	Lock Nut	1
25.	W1/4"*1/4"L	Socket Head Cap Screw	1

SPINDLE -ASS'Y

(618,816,1020,N1224,1224,1230,1632 SERIES)



SPINDLE ASS'Y

(618,816,1020,N1224 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-106	Spindle Nut	1
2.	1020-105	Spindle Cover	1
3.	1020-107	Spindle Cover Bush	1
4.	# 7206 CP4	Angular Contact Bearing	4
5.	1020-109	Spacer	2
6.	1020-108	Spacer	2
7.	618-134	Spindle Shaft	1
	816-134	Spindle Shaft	1
	1020-144	Spindle Shaft	1
	N1224-144	Spindle Shaft	1
8.	618-103	Spindle Housing	1
	816-103	Spindle Housing	1
	1020-103	Spindle Housing	1
	N1224-103	Spindle Housing	1
9.	1020-110	Spindle Cover Bush	1
10.	1020-128	Spindle Cover	1
11.	1020-127	Spindle Nut	1
12.	1020-111	Coupling	2
13.	1020-113	Rubber Coupling	1
14.	2HP*2P	Spindle Motor	1

SPINDLE ASS'Y
(1224,1230 SERIES)

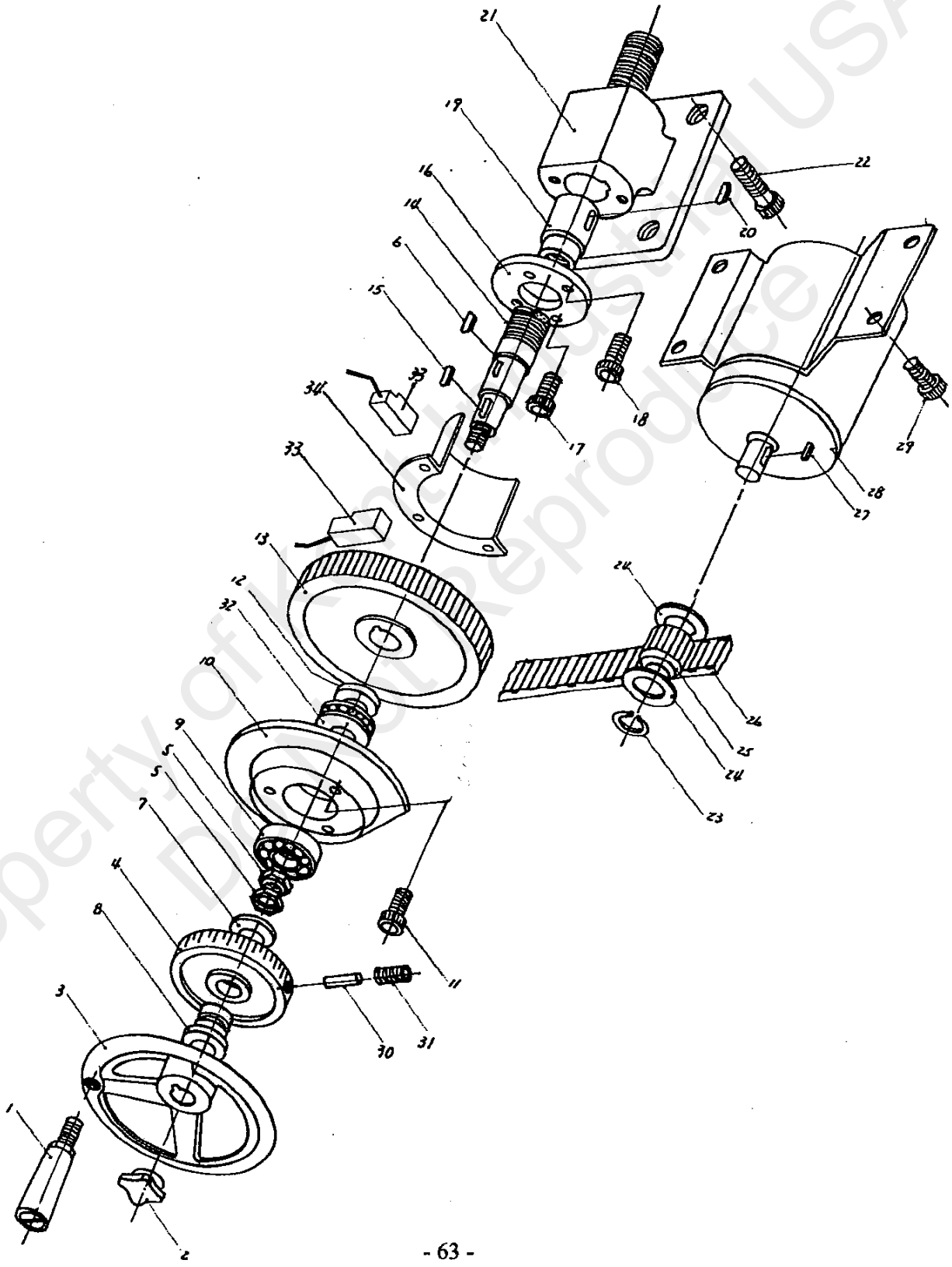
Index No.	Parts No.	Parts Name	Q'ty
1.	1224-106	Spindle Nut	1
2.	1224-105	Spindle Cover	1
3.	1224-107	Spindle Cover Bush	1
4.	# 7208 CP4	Angular Contact Bearing	4
5.	1224-109	Spacer (inner)	2
6.	1224-108	Spacer (outside)	2
7.	1224-104	Spindle Shaft	1
8.	1224-103	Spindle Housing	1
9.	1224-110	Spindle Cover Bush	1
10.	1224-128	Spindle Cover	1
11.	1224-127	Spindle Nut	1
12.	1224-111	Coupling	2
13.	1224-113	Rubber Coupling	1
14.	2HP*2P	Spindle Motor	1

SPINDLE ASS'Y

(1632 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1632-112	Spindle Nut	1
2.	1632-105	Spindle Cover	1
3.	1632-106	Spindle Cover Bush	1
4.	# 7209 CP4	Angular Contact Bearing	4
5.	1632-109	Spacer	2
6.	1632-110	Spacer	2
7.	1632-104	Spindle Shaft	1
8.	1632-103	Spindle Housing	1
9.	1632-107	Spindle Cover Bush	1
10.	1632-108	Spindle Cover	1
11.	1632-115	Spindle Nut	1
12.	1632-111	Coupling	2
13.	1632-113	Rubber Coupling	1
14.	7 1/2HP*4P	Spindle Motor	1

CROSS FEED ASS'Y

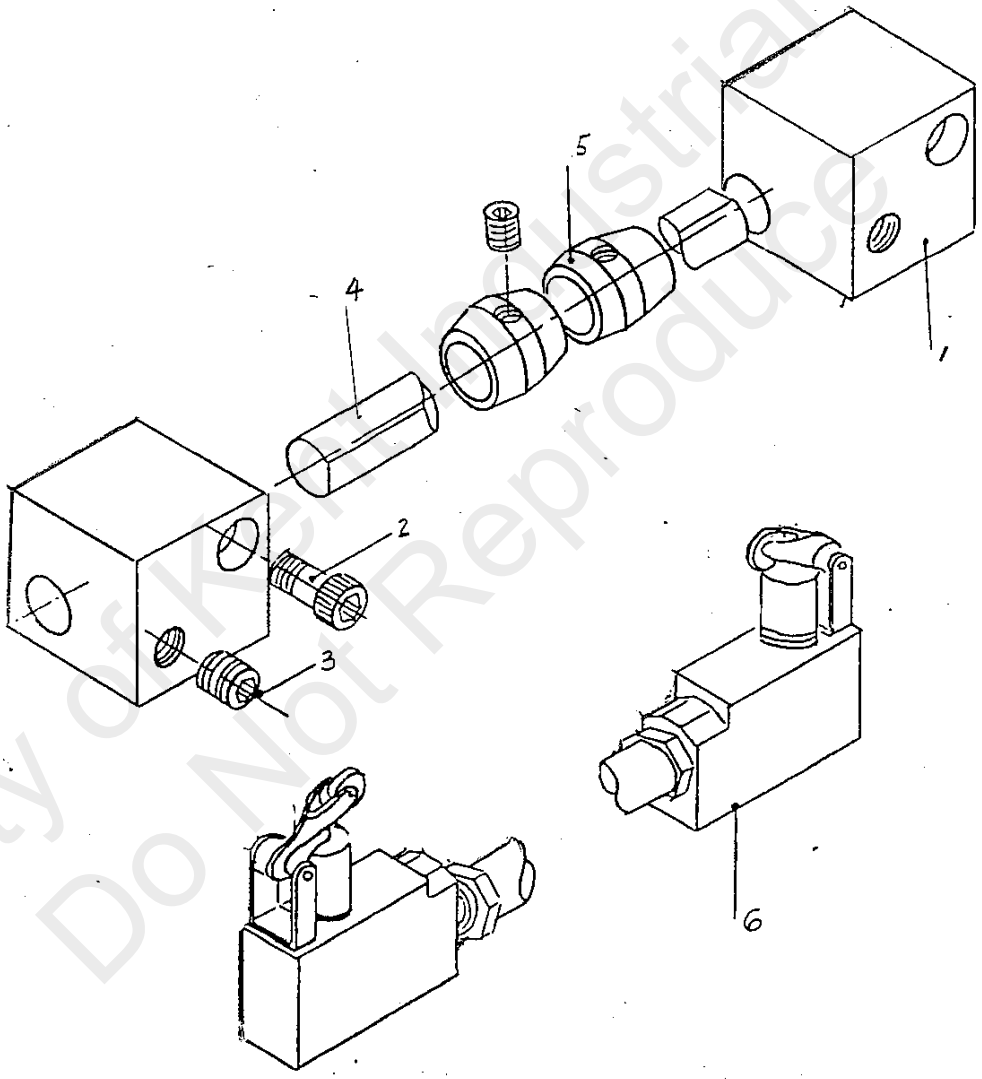


CROSS FEED ASS'Y

(1020--1640SD SERIES)

Index No.	Parts No.	Parts Name	Q'ty
			1
1.	1020-728	Grip	1
2.	1020-729	Cap Nut	1
3.	1020-714	Handwheel	1
4.	1224-406	Graduation Dial	2
5.	1020-410	Hexagonal Nut	3
6.	5*5*20L	Key	1
7.	1020-408	Bearing Retainer	1
8.	1224-406-1	Bush Of Graduation Dial	1
9.	# 5204ZZ(1020--1230)	Bearing	2
	# 7204ZZ(1632)	Bearing	1
10.	1020-407(1020--1230)	Graduation Dial Holder	1
	1632-407(1632/1640)	Graduation Dial Holde	3
11.	W1/4"*1"L	Socket Head Cap Screw	1
12.	1224-409(1020--1230)	Spacer	1
	1632-603(1632/1640)	Spacer	1
13.	1020-601	Timing Belt Pulley(Large)	1
14.	1224-402(1020--1230)	Crossfeed Leadscre	1
	1632-402(1632/1640)	Crossfeed Leadscre	4
15.	5*5*15L	Key	1
16.	1020-405(1020--1230)	Leadscrew Backlash Adjuster	1
	1632-405(1632/1640)	Leadscrew Backlash Adjuster	2
17.	W5/16"*1/2"L	Socket Head Cap Screw	2
18.	W5/16"*1/2"L	Socket Head Cap Screw	1
19.	1020-404(1020--1230)	Leadscrew Nut	1
20.	5*5*20L	Key	1
21.	1020-403(1020--1230)	Leadscrew Nut Base	1
	1632-403(1632/1640)	Leadscrew Nut Base	4
22.	W3/8"*2"L	Socket Head Cap Screw	1
23.	S-11	Snap Ring	2
24.	1020-604	Washer	1
25.	1020-602	Timing Belt Pulley(Small)	1
26.	187L075(1020--1230)	Timing Belt	1
	225L075(1632/1640)	Timing Belt	1
27.	4*4*20L	Key	1
28.	1/5HP*6P	Crossfeed Motor	4
29.	W1/4"*3/4"L	Socket Head Cap Screw	1
30.	φ 5*10L	Round Pin	1
31.	W1/4"*3/4"L	Ajusting Screw	1
32.	51104	Thrust Bearing	1
33.	PS-05P	Approximate switch	1
34.	1020-643	Induction Ring	1
35.	1224-424	Key	

CROSSFEED CONTROL LIMIT SWITCH ASS'Y



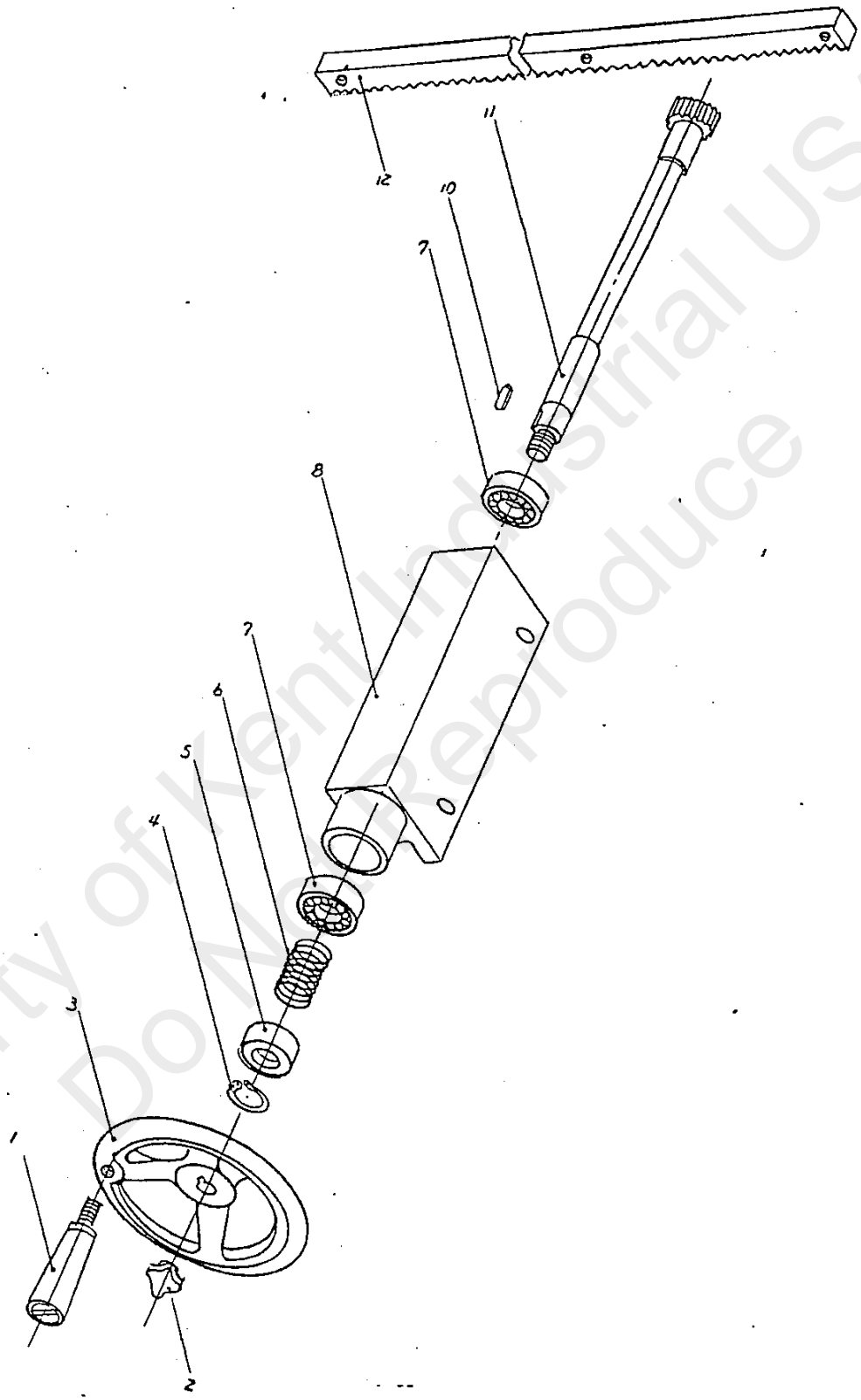
CROSSFEED CONTROL LIMIT SWITCH ASS'Y

(1020--1640SD SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-609-1	Mouting Block	2
2.	W1/4"*2 1/2"L	Socket Head Cap Screw	2
3.	W1/4"*5/8"L	Headless Socket Screw	4
4.	1020-607	Pad Rod	1
	1224-607	Pad Rod	1
	1632-607	Pad Rod	1
5.	1020-608	Dog	2
6.	ZE-NA2-2	Limit Switch	2

LONGITUDINAL HAND FEED ASS'Y

(816H,1020H,AH,AHD&N1224,1224,1230,1632 SERIES)



LONGITUDINAL HAND FEED ASS'Y

(N1224,1224,,1230SD)

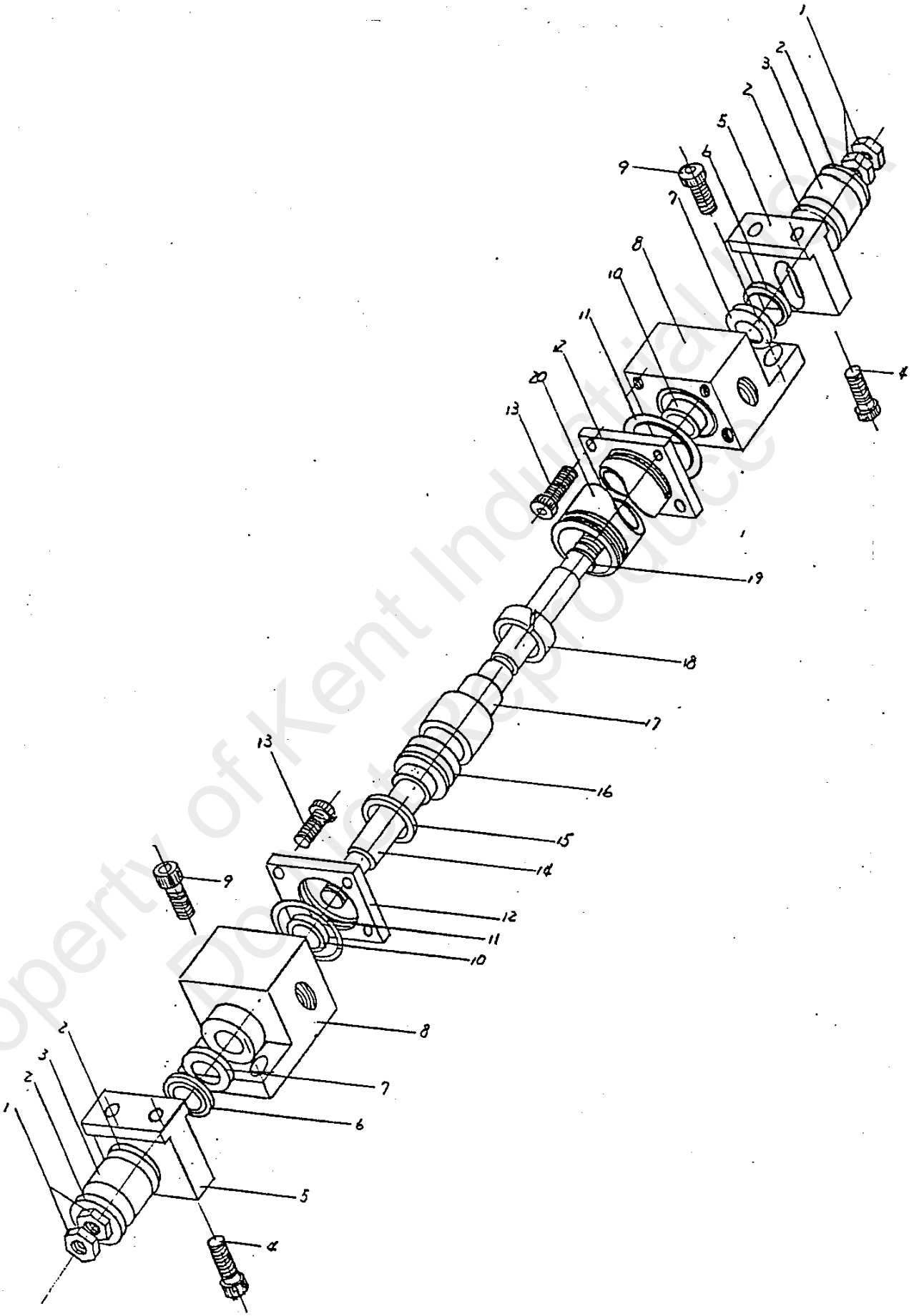
Index No.	Parts No.	Parts Name	Q'ty
1.	1020-728	Grip	1
2.	1020-729	Cap Nut	1
3.	1020-714	Handwheel	1
4.	S-17	Snap Ring	1
5.	1020-623	Bush	1
6.	1020-626	Spring	1
7.	# 6003ZZ	Ball Bearing	2
8.	1224-621	Frame	1
9.	R-35	Snap Ring	1
10.	5*5*15L	Key	1
11.	1224-622	Pinion Shaft	1
12.	1224-310	Gear Rack	1
	1230-310	Gear Rack	1

LONGITUDINAL HAND FEED ASS'Y

(1632,1640SD)

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-728	Grip	1
2.	1020-729	Cap Nut	1
3.	1020-714	Handwheel	1
4.	S-17	Snap Ring	1
5.	1020-623	Bush	1
6.	1020-626	Spring	1
7.	# 6003ZZ	Ball Bearing	2
8.	1224-621	Frame	1
9.	R-35	Snap Ring	1
10.	5*5*15L	Key	1
11.	1632-622	Pinion Shaft	1
12.	1632-310	Gear Rack	1

HYDRAULIC CYLINDER ASS'Y



HYDRAULIC CYLINDER ASS'Y

(1020&N1224,1224,1230SD)

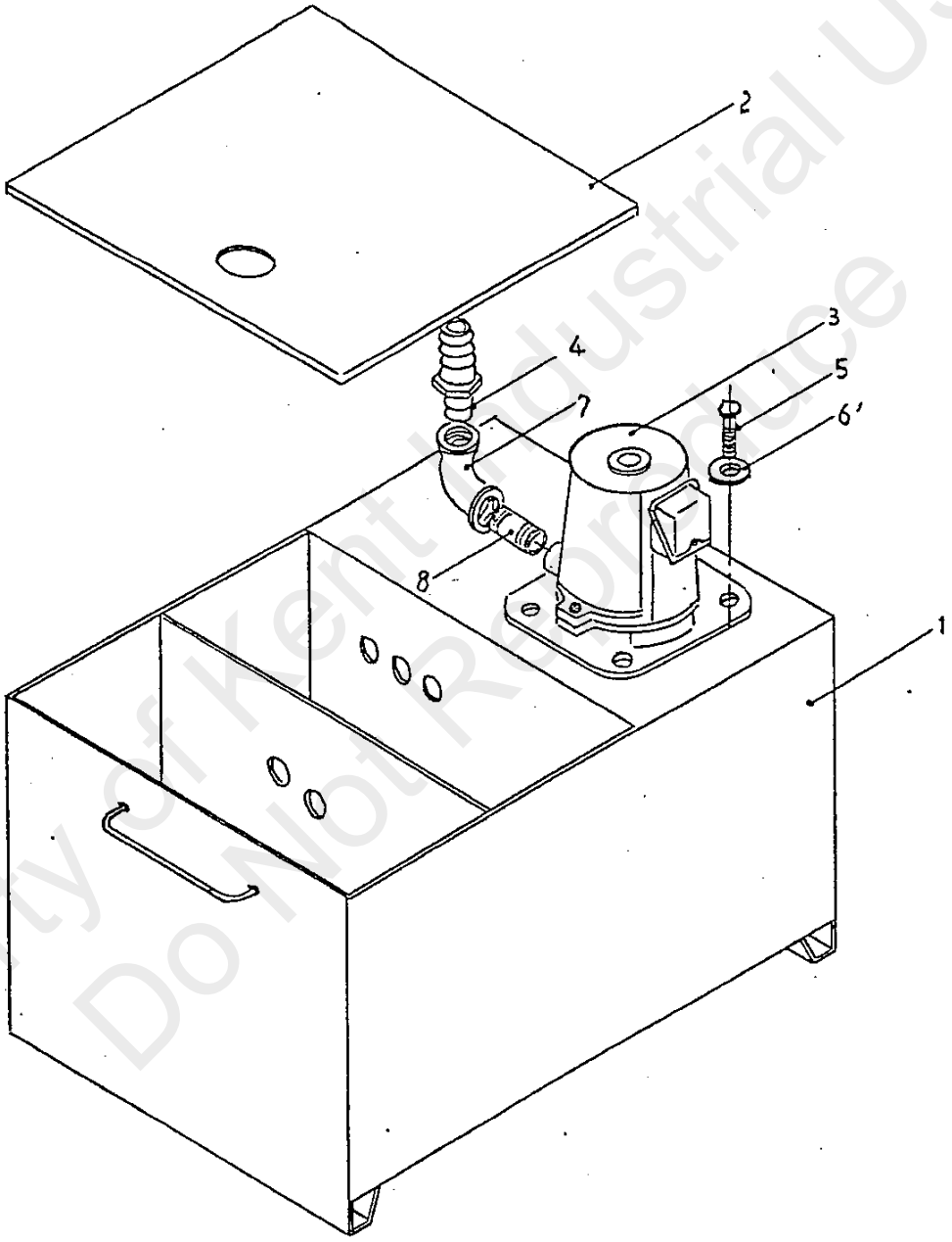
Index No.	Parts No.	Parts Name	Q'ty
1.	M10*P1.25	Hexagonal Nut	4
2.	1020-629	Washer	4
3.	1020-628	Rubber pad	2
4.	W3/8"*1 3/4"L	Socket Head Cap Screw	4
5.	1020-619	Drawing Seat	2
6.	LBH 20*28*4.5*6	Dust Seal	2
7.	USH 20*28*5	U-Packing	2
8.	1020-A4-06	End Cover	2
9.	W5/16"*3/4"L	Socket Head Cap Screw	4
10.	MB 2012	Du Bush	2
11.	G 30	O-Ring	2
12.	1020-A4-08	Fixed Plate	2
13.	W1/4"*1"L	Socket Head Cap Screw	4
14.	1020-A3-01	Piston Rod	1
15.	P24	O-Ring	1
16.	1020-A4-09	Piston A	1
17.	1020-A4-09-1	Piston B	1
18.	φ25* φ30*9.7W	Slide Ring	1
19.	P16	O-Ring	1
20.	1020-A3-02	Cylinder	1

HYDRAULIC CYLINDER ASS'Y

(1632,1640 SD)

Index No.	Parts No.	Parts Name	Q'ty
1.	M12*P1.25	Hexagonal Nut	4
2.	1632-629	Washer	4
3.	1632-628	Rubber pad	2
4.	W3/8"*1 3/4"L	Socket Head Cap Screw	4
5.	1632-619	Drawing Seat	2
6.	LBH 25*33*4.5*6	Dust Seal	2
7.	USH 25*33*5	U-Packing	2
8.	1632-A4-06	End Cover	2
9.	W5/16"*3/4"L	Socket Head Cap Screw	4
10.	1632-A3-03	Du Bush	2
11.	G 35	O-Ring	2
12.	1632-A4-08	Fixed Plate	2
13.	W1/4"*1"L	Socket Head Cap Screw	4
14.	1632-A3-01	Piston Rod	1
15.	P234	O-Ring	1
16.	1632-A4-09	Piston A	1
17.	1632-A4-09-1	Piston B	1
18.	φ 35* φ 40*9.7W	Slide Ring	1
19.	P21	O-Ring	1
20.	1632-A3-02	Cylinder	1

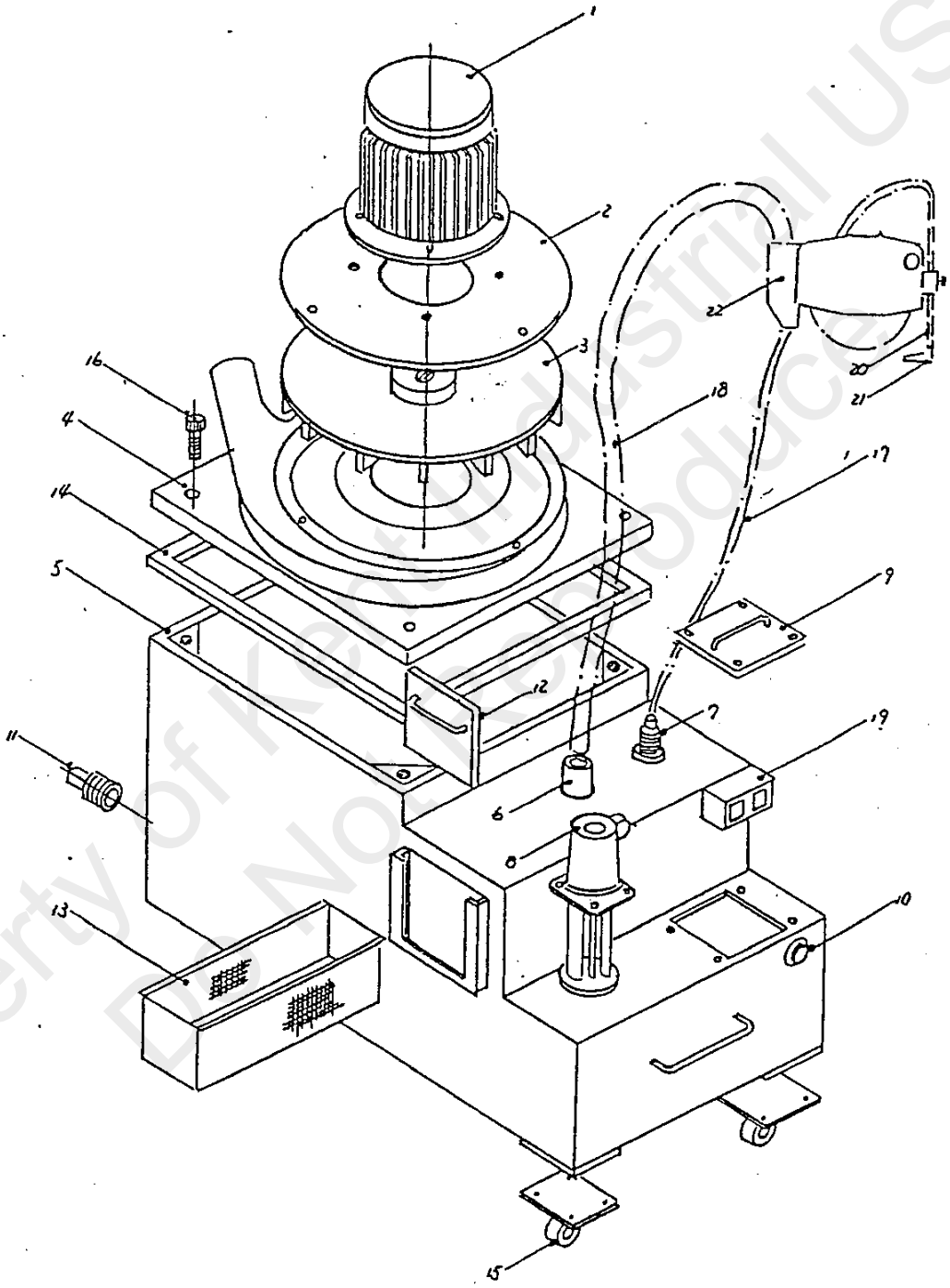
COOLANT SYSTEM ASS'Y



COOLANT SYSTEM ASS'Y

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-780	Coolan Tank	1
2.	1020-781	Motor Fixed Plate	1
3.	1/8HP*2P	Coolant Pump	1
4.	1020-782	Coolant Hose Connector	1
5.	W1/4"*3/4"L	Hexagonal Head Screw	4
6.	1/4"	Washer	4
7.	1/2"	90° Elbow	1
8.	1/2"	Nipple	1

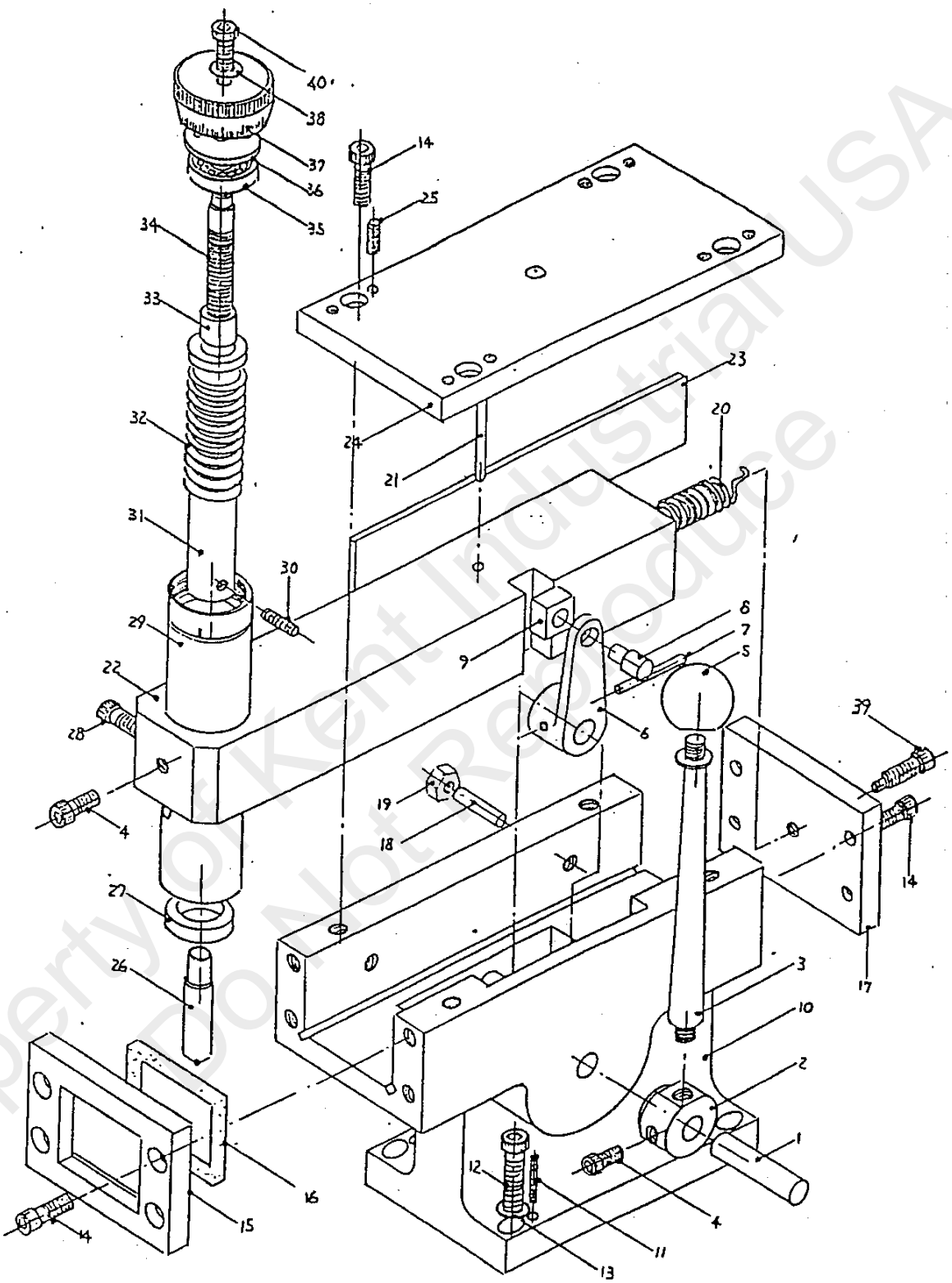
DUST-SUCTION COOLING SYSTEM ASS'Y



DUST-SUCTION COOLING SYSTEM ASS'Y

Index No.	Parts No.	Parts Name	Q'ty
1.	1/2HP*2P	Motor	1
2.	1020-763	Motor Fixed Plate	1
3.	1020-762	Suction Fan	1
4.	1020-761	Upper Cover	1
5.	1020-760	Tank	1
6.	1020-768	Suction Hose Connector	1
7.	1020-769	Coolant Hose Connector	1
8.	1/8HP*2P	Coolant Pump	1
9.	1020-764	Cover	1
10.	SCI	Coolant Indicator	1
11.	W1"	Plug	1
12.	1020-765	Filter Cover	1
13.	1020-766	Filter	1
14.	1020-767	Cover Packing	1
15.	SRB	Roller Bracked	4
16.	W3/8"*1"L	Hexagonal Head Screw	4
17.	SCH	Coolant Hose	1
18.	SSH	Suction Hose	1
19.	SS	On-Off Switch	1
20.	1020-770	Coolant Pipe	1
21.	1020-708	Coolant Nozzle	1
22.	1020-771	Dust-Collector	1

PARALLEL DRESSER ASS'Y



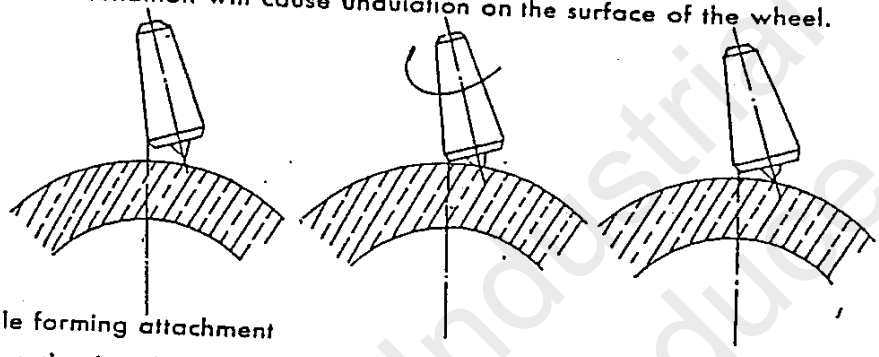
PARALLEL DRESSER ASS'Y

Index No.	Parts No.	Parts Name	Q'ty
1.	1020-737	Lever Shaft	1
2.	1020-738	Shaft Bushing	1
3.	1020-739	Lever	1
4.	W1/4"*1/2"L	Socket Head Cap Screw	2
5.	1020-740	Knob	1
6.	1020-741	Arm	1
7.	φ4*20L	Pin	1
8.	1020-742	Pin Shaft	1
9.	1020-743	Slid Block	1
10.	1020-730	Parallel Dresser Base	1
11.	W1/4"*3/8"L	Set Screw	2
12.	W1/4"*1 1/2"L	Socket Head Cap Screw	4
13.	W1/4"	Washer	4
14.	W3/8"*1/2"L	Socket Head Cap Screw	12
15.	1020-733	Front Cover	1
16.	1020-735	Oil-Immersed Pad	1
17.	1020-734	Rear Cover	1
18.	W1/4"*1/2"L	Set Screw	3
19.	W1/4"	Nut	3
20.	1020-744	Spring	1
21.	φ5*24L	Pin	1
22.	1020-731	Slider	1
23.	1020-736	Gib	1
24.	1020-732	Upper Cover	1
25.	W1/4"*3/8"L	Socket Head Cap Screw	8
26.	1020-745	Diamond Tip	1
27.	RZ20	U-packing	1
28.	W3/8"*1"L	Socket Head Cap Screw	1
29.	1020-746	Adapter	1
30.	1020-747	Set Screw	1
31.	1020-748	Diamond Tip Holder	1
32.	1020-749	Spring	1
33.	1020-750	Copper Bush	1
34.	1020-751	Lead screw	1
35.	# 6200ZZ	Bearing	1
36.	1020-752	Cover	1
37.	1020-753	Graduation dial	1
38.	1020-754	Washer	1
39.	1020-755	Spring Fix Screw	1
40.	W3/8"*1/2"L	Socket Head Cap Screw	1

20. USE OF THE OPTIONAL ATTACHMENT

(a).Parallel Dressing attachment

The wheel can be dressed either by diamond tool on the chuck or on the parallel dressing attachment which mounted on a spindle carrier. The diamond tool is arranged at an angle to the center line of the wheel as shown on figure, so that when the diamond loses its keenness it can be turned at an angle, ensuring that there is always a sharp diamond edge available. The dressing method and points are the same as "Dress the wheel". Experiences have shown that, with highly accurate grinding, dressing with the diamond which mounted on the magnetic chuck is better than that on the spindle carrier (the former is more stable than the latter) as the latter condition will cause undulation on the surface of the wheel.



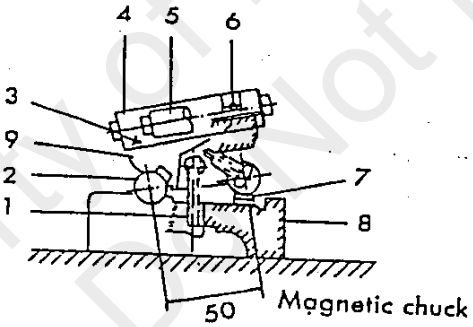
(b).Angle forming attachment

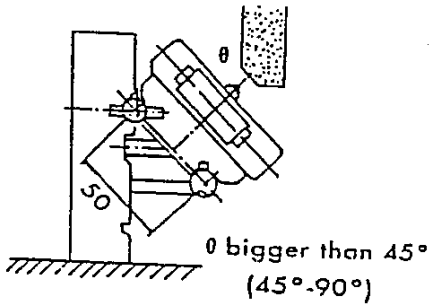
(1) Let the Attachment be attracted to the magnetic chuck, keeping a 90° right angle between the attachment and the wheel. The magnetic chuck should be kept low.

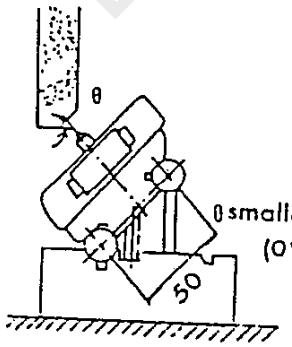
(2) The value in question will be the Sine of the angle times 50. That is $B = Sin\theta \times 50$

(3) Get a gauge Block the thickness of which equals that of B (or make one)

(4) Put this gauge Block under the base of the Sine Bar stand. Tighten with the fastening bolts and the produre is complete.







1. Fastening bolt
2. Mandrel
3. Slide adjustment bolt
4. Slide base
5. Handle
6. Diamond fixed hole
7. Block gauge
8. Build-in base
9. Sine Bar stand

(5). Degree and block gauge thickness conversion table

Deg.	Sin.	Block gauge thickness	Deg.	Sin.	Block gauge thickness	Deg.	Sin.	Block gauge thickness
1°	0.0175	0.875	22°	0.3746	18.730	43°	0.6820	34.100
2°	0.0349	1.745	23°	0.3907	19.535	44°	0.6947	34.735
3°	0.0523	2.615	24°	0.4067	20.335	45°	0.7071	35.355
4°	0.0698	3.490	25°	0.4226	21.130			
5°	0.0872	4.360	26°	0.4384	21.920			
6°	0.1045	5.225	27°	0.4540	22.700			
7°	0.1219	6.095	28°	0.4695	23.475			
8°	0.1392	6.960	29°	0.4848	24.240			
9°	0.1564	7.820	30°	0.5000	25.000			
10°	0.1736	8.680	31°	0.5150	25.750			
11°	0.1908	9.540	32°	0.5299	26.495			
12°	0.2079	10.395	33°	0.5446	27.230			
13°	0.2250	11.250	34°	0.5592	27.960			
14°	0.2419	12.095	35°	0.5736	28.680			
15°	0.2588	12.940	36°	0.5878	29.390			
16°	0.2756	13.780	37°	0.6018	30.090			
17°	0.2924	14.620	38°	0.6157	30.785			
18°	0.3090	15.450	39°	0.6293	31.465			
19°	0.3256	16.280	40°	0.6428	32.140			
20°	0.3420	17.100	41°	0.6561	32.805			
21°	0.3584	17.920	42°	0.6691	33.455			

* The value of Block gauge thickness must times 2 when apply this table to Sine Bar attachment.

(c). Sine Bar

The Sine Bar is used to chuck the inclined angle of the magnetic chuck, when the angle forming surface is large.

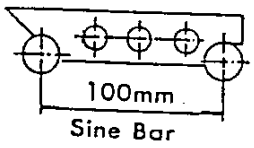
(1) The value in question equals the Sine of the angle times 100, $B = \sin\theta \times 100$

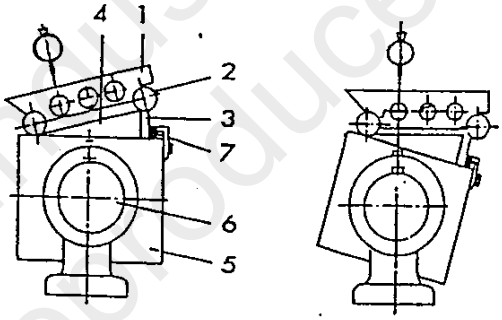
(2) Get a gauge block the thickness of which equals that of B.

(3) Put this gauge at one end of the Sine Bar and let it be attracted to the inclinable magnetic chuck. This Sine Bar must be kept parallel to the longitudinal direction of the machine.

(4) Press the dial gauge against the surface of the Sine Bar and turn the cross feed hand wheel, so that the saddle moves back and forth for the checking of the accuracy of the angle of the magnetic chuck

1. Mandrel
2. Sine Bar
3. gauge Block
4. Application of the trigonometry
5. Inclinable Magnetic Chuck
6. Mandrel of the Magnetic Chuck
7. Stop block

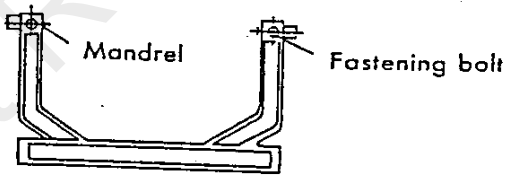




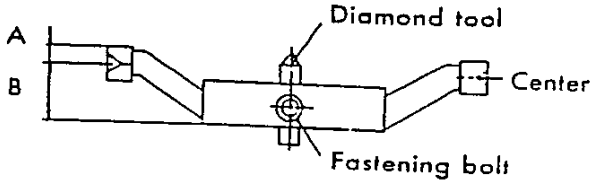
(d). Radius Forming Attachment

The Radius Forming Attachment is composed of a main stand, several swing rods and a diamond tool.

(1) Main Stand



(2) Swing rod and diamond tool



A name plate is attached to the swing rod with the A and B

A: the distance between the upper rim and the center

B: the distance between the bottom rim and the center

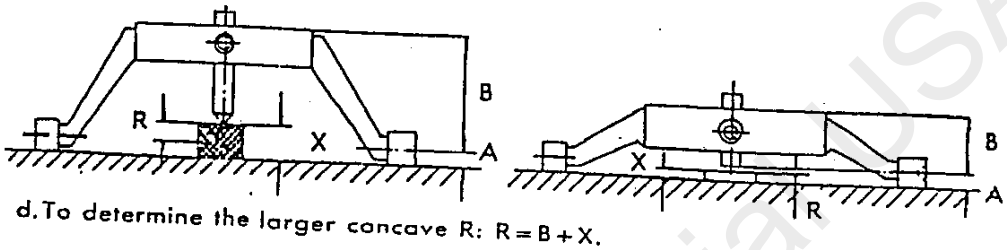
The R forming is the adjustment of the distance between the diamond tool and the rod center so that they form a R shape.

(3) To determine the concave and convex R:

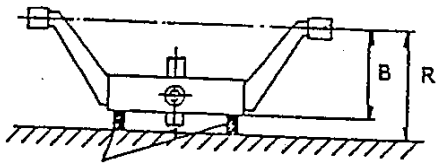
a. If the tool is parallel to the center line, it equals to OR.

b. To determine the convex R: Put the swing rod on a place disk. Put a block gauge of proper thickness under the diamond tool. Then R = X-A

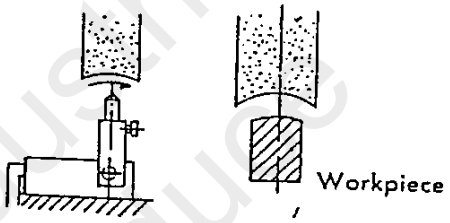
c. To determine the smaller concave R; R = A-X



d. To determine the larger concave R: R = B + X.



Same thickness gauge block (X)

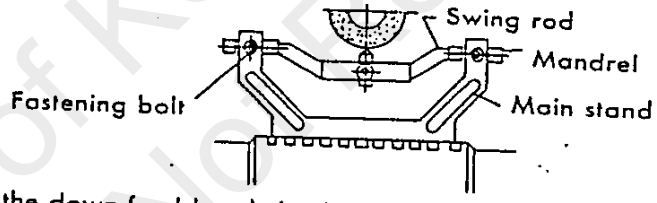


e. Note:

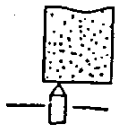
1. The base and side of the grinding wheel should be well-dressed.
2. The Radius Forming Attachment shall be parallel to the grinding wheel.
3. The diamond tool shall be parallel to the Radius Forming Attachment.

(4) Operation of the Radius forming attachment:

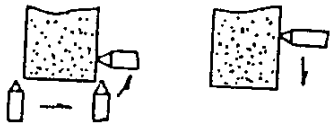
a. Find the center of the grinding wheel, then secure the work table.



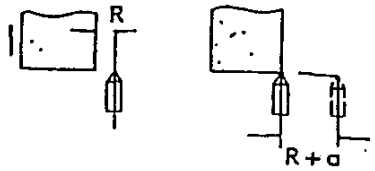
b. Turn the down-feed handwheel at 1/3 on the width of the wheel so that the wheel cuts into 0.02mm of the diamond tool. Now turn the cross feed handwheel to dress the grinding wheel, and turn the calibration reading on the down feed back to zero.



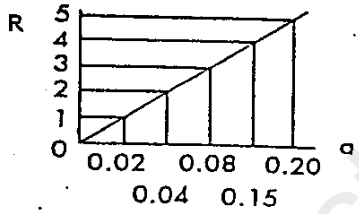
c. Turn the diamond tool 90°. and elevate it into a proper position (greater than the R size in question)



d. Elevate the grinding wheel so that it stays away from the diamond tool and the wheel is in such a position such that the distance between the side of the wheel and the center of the Diamond tool is just R.



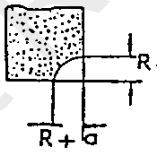
e. Move the diamond tool (R + a) leftward, with "a" found in the following table.



f. Turn the downfeed handwheel so that the grinding wheel approaches the diamond tool.

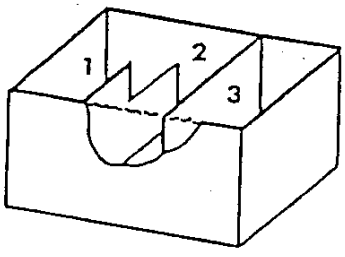
g. Turn the swing rods 90° each time, inching 0.05mm per step till the R is determined.

h. The final position the wheel assumes is as follows.



(e).Coolant System

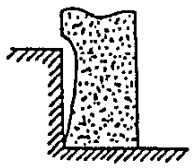
Insert the power source plug in socket (at the rear side of the electric control box). Press the pushbutton switch to start the coolant pump, the pump should rotate in a clockwise direction. If not, interchange any of the two cords of the three-cord cable. Adjust coolant flow by turning the ball valve to a suitable rate. Cooling water collected from the table will return to coolant tank thrugh return hose. It will then be filtered in the coolant tank by turns of cabinet #1,2,3.

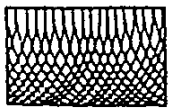


- Coolant tank capacity: 40 liters
- Coolant pump: 1/8 HP x2P

(f). Common cases in Side Grinding

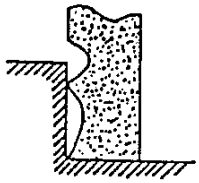
(1)

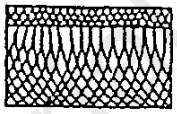




In the case shown in the figure above, the side-grinding wheel and the work have a smaller contact surface, so that the efficiency is higher, and the surface roughness is better.

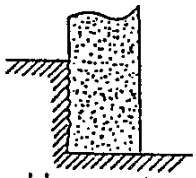
(2)





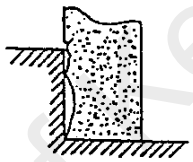
In the figure above, the wheel and the work have two sections of contact, and the surface of grinding is bad. The surface has to be corrected into the shape shown in (1).

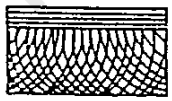
(3)



The wheel has not been cut to 'Relief Angle', thus it contacts the whole face of the work, causing the surface of processing rough and rugged. Also, the greater face of contact will cause burns and cracks.

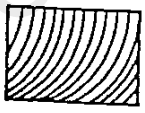
(4)

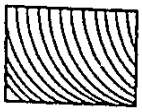




The "Relief Angle" of the wheel is lower than the surface of the work, so that the work face becomes two sections, the upper section resembling that in (3) and the lower section in (1). Now it is necessary to enlarge the "Relief Angle" part so that it will be higher than the face of the work.

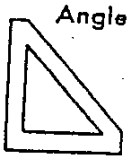
(5) If the spindle does not constitute a right angle with the work table surface, the side faces will turn out to be as shown:

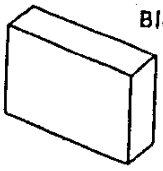


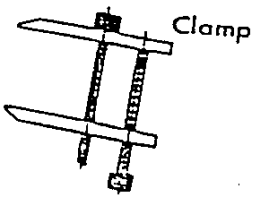


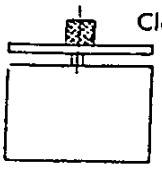
(g).Right Angle Grinding

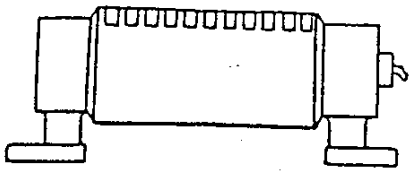
(1) Tools





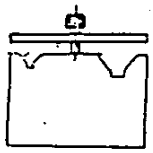






Inclinable Magnetic Chuck

gauge Block,

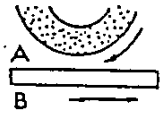


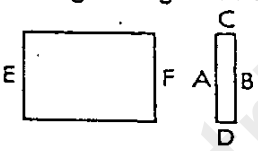
Clamp

(2) Use of the jigs and tools: take the grinding of the block of six faces A, B, C, D, E, F. For example:

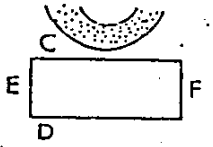
a. Under 200mm:

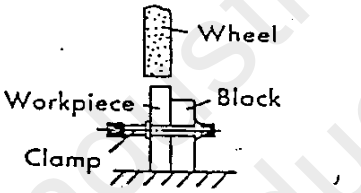
* Grinding of the first basic face, or the surface grinding of A and B,



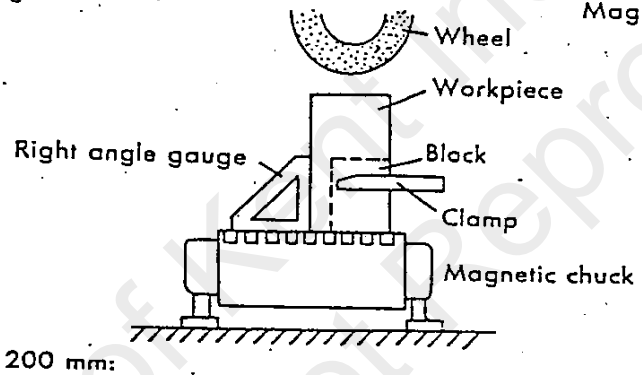


* Grinding of C and D





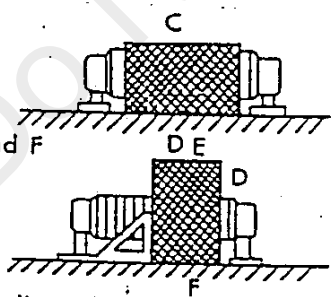
* Grnding of E and F



b. Over 200 mm:

* Grinding of the first basic face or A,
*. Grinding of C and D: turn the inclinable magnetic chuck into 90°

* Grinding of E and F



(3) Precaution: The grinding of right angle depends on the patience and clever mindedness of the operator for its precision. For inatance, whether the burrs after grinding is done well, whether the tools ae kept clean, whether the work table are kept clean, the accuracy of the angle gauge, etc. all will have a direct influence over the precision of the product.