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* 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.

PRECISION SURFACE GRINDING MACHINE

**MODEL : SGS-3468AHD
SGS-3488AHD**

This series machine is hydraulic and electric combined precision machine tool. The operator is asked to know general operational methods of precision machines and special features of this machine.

So that the machine can be machined correctly.

When the machine is wrong in machining, please advise us immediately with model number, serial number, and manufacturing date of the machine.

SPECIFICATION& STANDARD ACCESSORIES:

UNIT:MM

ITEM \ MODEL	3468AHD	3488AHD
GRIND RANGE (L*W)	1700*850	2200*850
MAX.TABLE TRAVEL	1900	2400
MAX.DISTANCE BETWEEN TABLE SURFACE AND SPINDLE CENTER	950	950
TABLE SURFACE SIZE (L*W)	1700*850	2200*850
ELECTRO-MAG. CHUCK (L*W)	850*850 *2	850*1100 *2
GRINDING WHEEL (O.D*LD*T.)	508*127*50	508*127*50
TABLE SPEED	5-28m/min	5-28m/min
AUTO. CROSS-FEED CARRIAGE	0-38	0-38
CROSS HAND WHEEL DIAL	0.02	0.02
VERTICAL TRAVEL INFEEED DIAL	0.002	0.002
MOTOR OF SPINDLE	15HP*6P	15HP*6P
MOTOR OF HYDRAULIC TANK	10HP*6P	10HP*6P
MOTOR OF UP-DOWN FEED	850W DC SERVO	850W DC SERVO
NET. WEIGHT	12000 KGS	13000 KGS

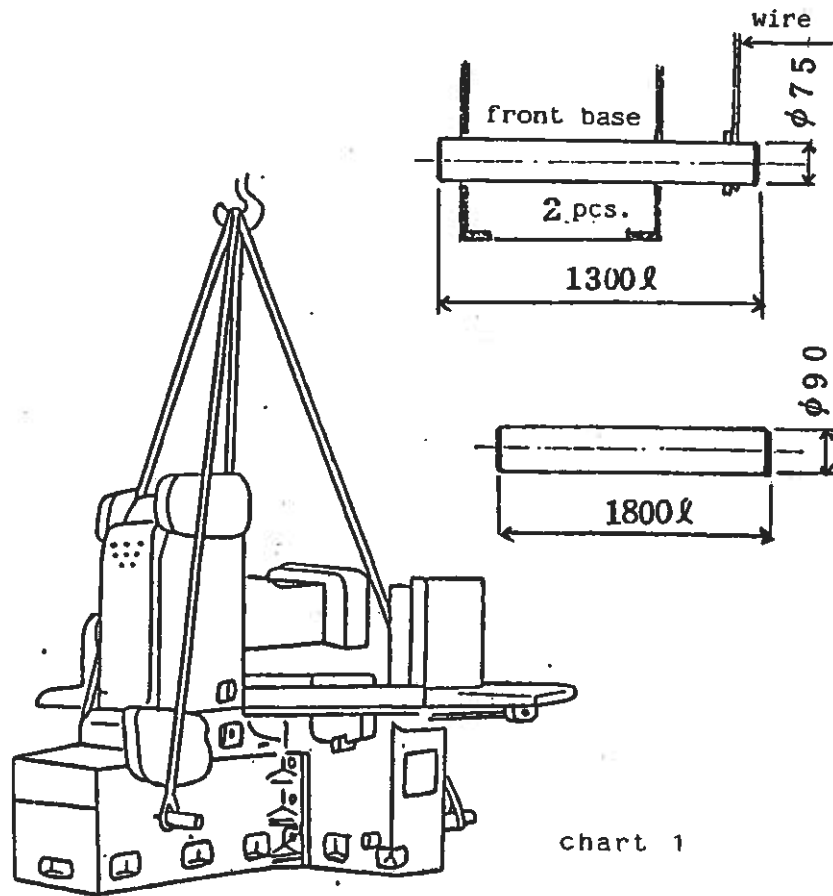
ACCESSORIES:

Standard accessories

- | | |
|---|---|
| 1.Grinding wheel.....1 pc. | 2. Wheel flange and weight.....1 pc. |
| 3.Tool box with tools.....1 set. | 4.Splash guard.....1 set. |
| 5.Base screw & Plate.....1 set. | 6. Wheel balancing base..... 1 pc. |
| 7. Wheel balancing arbor.....1 pc. | 8.Flange extractor.....1 set. |
| 9.Diamond dresser.....1 pc. | 10. Automatic lubricant equipment..... 1 set. |
| 11.Coolant equipment wih paper filter..... 1 set. | |

2. MOVEMENT & INSTALLATION

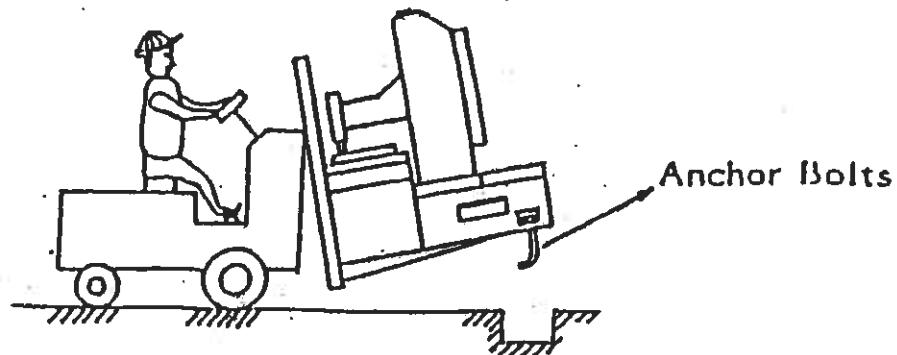
- 2-a. When move the machine, it is very important to surely prevent machine from vibration and crash in order to keep precision of the machine.
- 2-b. After take off the wooden case, use hoist to transport the machine. you have to prepare three steel pegs and hanging wire. Put two pegs into front base holes, and one peg into rear base hole under the saddle, then put some soft separator between steel wire and machine to protect two sides of up column. after that procedure, then hang up slowly .(see chart 1). and must pay attention to the balance of the machine.
- 2-c. There are four hooks on the outside of hydraulic tank, please also use steel wire to hang up the tanks.



2-d. Foundation

When foundation the machine, except using hoist, You can also use the fork lifter to install the machine.

d-1. Use the anchor bolts;



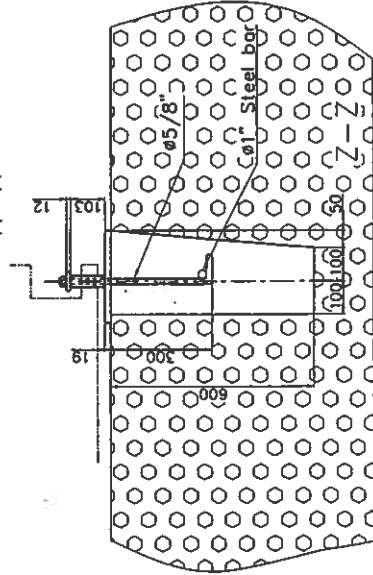
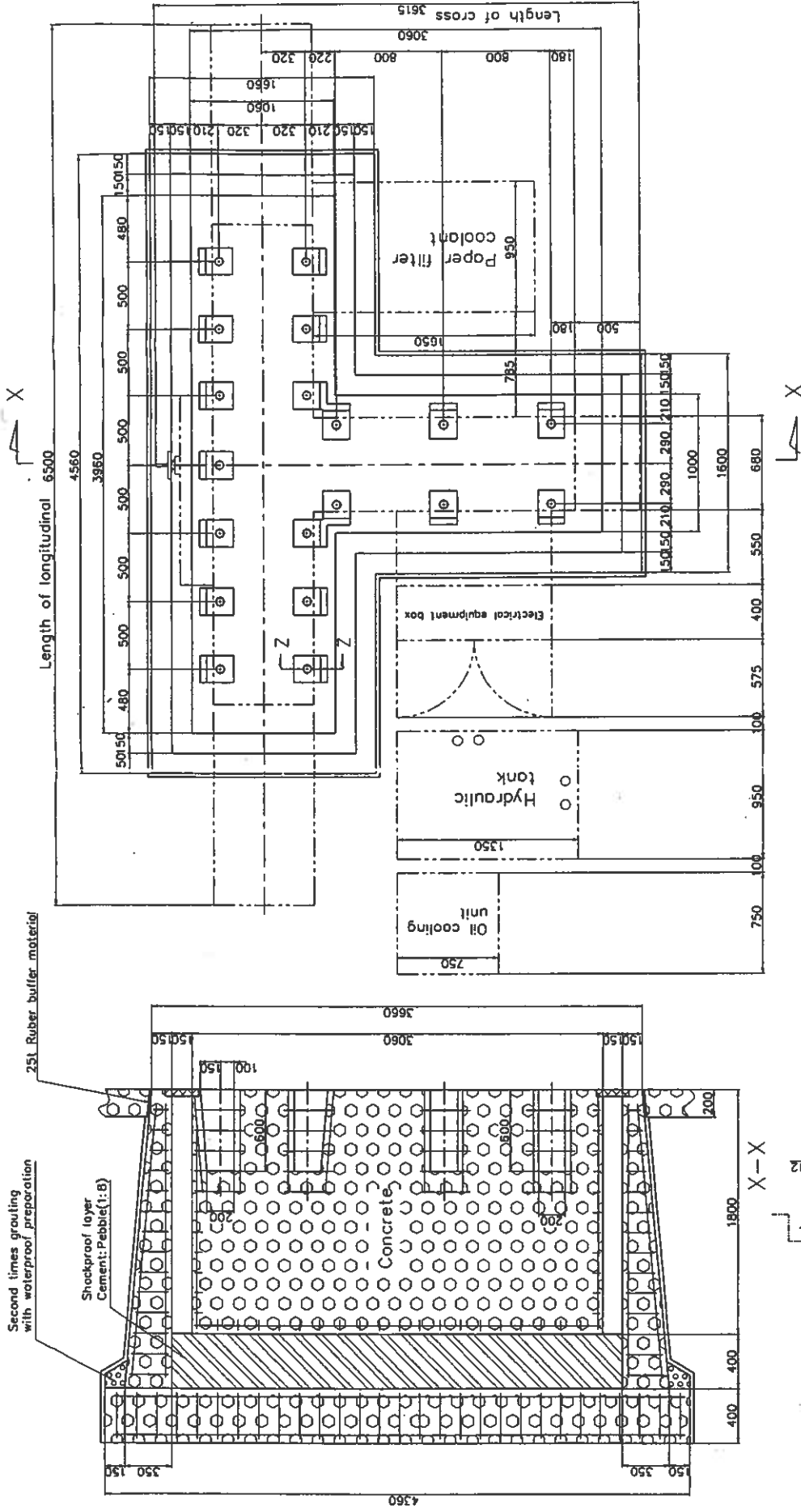
- * Lock the anchor bolts on the machine by nut, and let the thread portion at least 35 mm for adjust.
- * Lay down the machine slowly to aim anchor bolts at foundation holes.
- * Levelling the machine by taper block.
- * Fill up the holes with concreat.

d-2. Use the levelling pads and screws;



- * Screw the levelling screws on the machine base. For easy levelling and more steady of the machine, make screws as deep as possible.
- * Lay down the machine slowly, to let the round head of levelling screws fall into the center holes of levelling pad.
- * Levelling the machine .

3468AHD Foundation & floor space



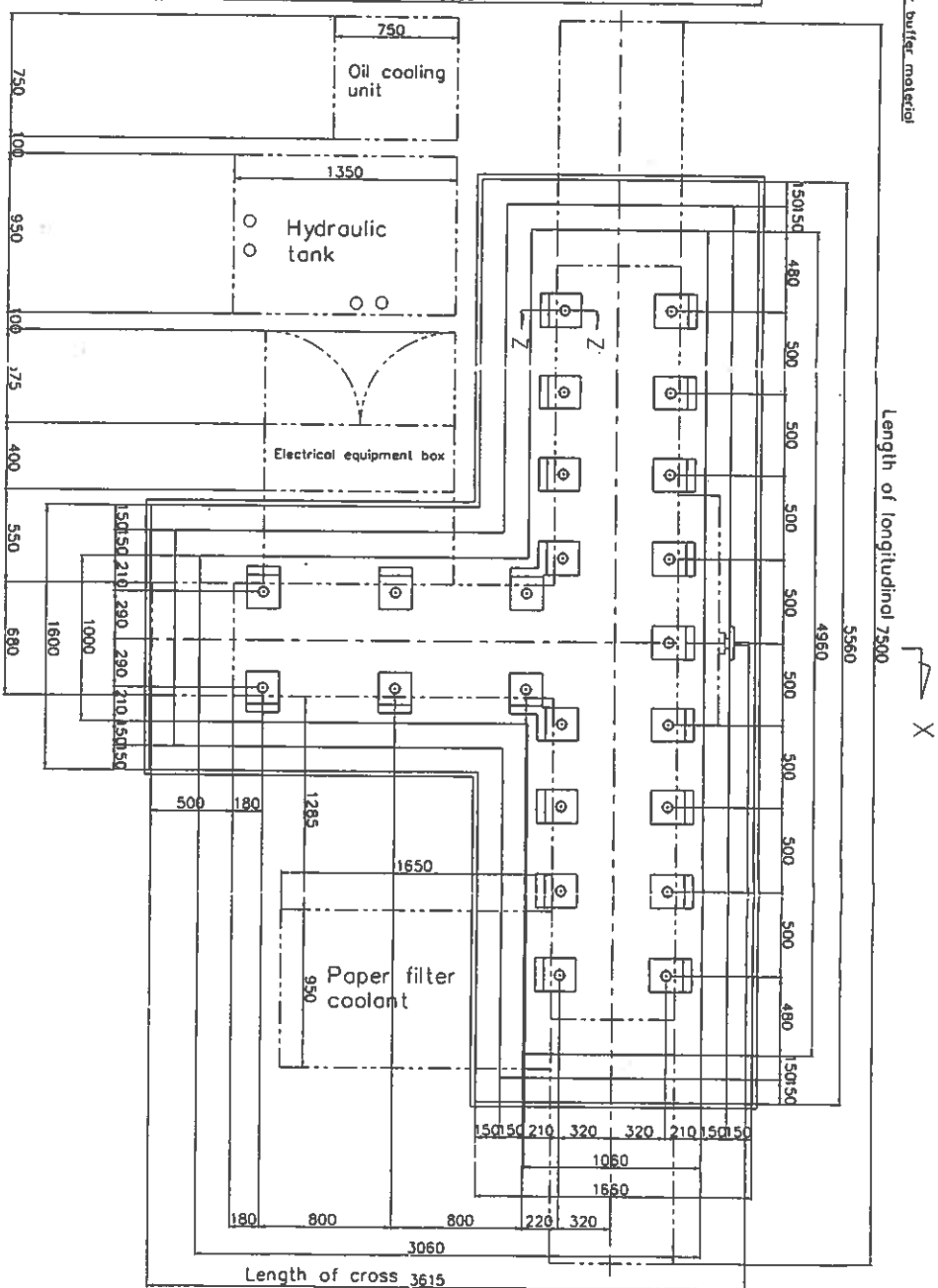
Technical drawing of a rectangular structure, likely a foundation or wall, showing cross-sections and dimensions.

Dimensions (mm):

- Overall width: 4360
- Overall height: 1800
- Top section width: 350, 150
- Bottom section width: 350, 150
- Central concrete core width: 3060
- Central concrete core height: 1500
- Shockproof layer thickness: 200
- Concrete core thickness: 200
- Bottom section thickness: 100, 150

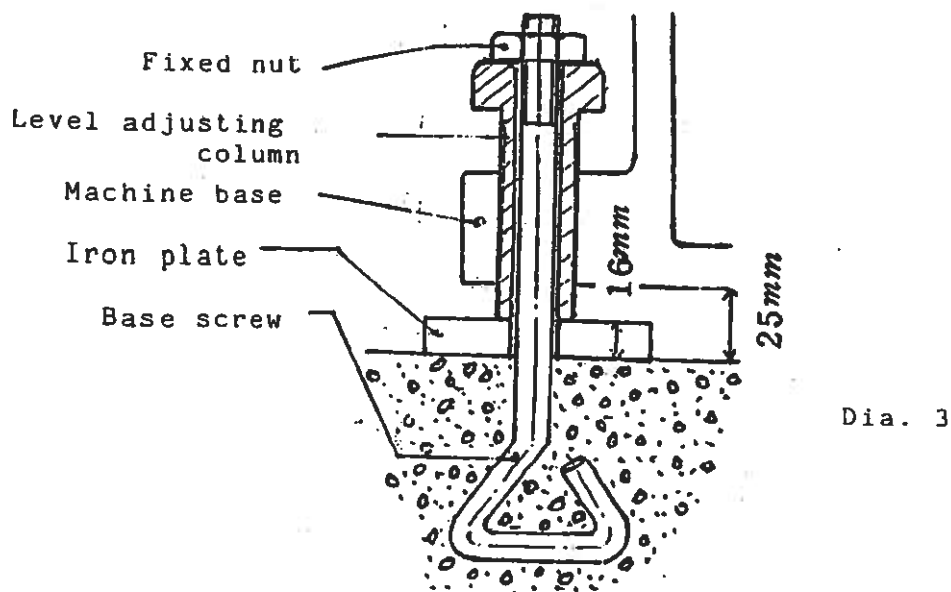
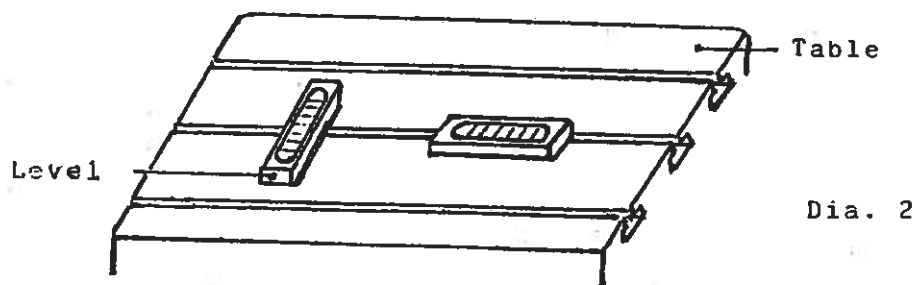
Labels and Notes:

- Shockproof layer Cement: Pebble(1:8)
- Concrete
- 25# Rubber
- Second times grouting with waterproof preparation



3. ADJUSTMENT

- 3-a. Level adjustment : put precision leveler(0.02 mm/m) on left side of the table to adjust till front, rear, left, right sides of the table are all within 0.04 mm/m. (diagram 2)
- 3-b. There is described in next page, use adjusting screw to adjust the level of the machine.
- 3-c. Adjust left and right two places on the front and rear base, then readjust other adjusting screws till the asked precision, and tighten the nuts of base screws.
- 3-d. You have to readjust the level once every two weeks within one month after the first adjustment. Then steady readjust again every four or five months to maintain the grinding precision.



4.1 CLEANING

Before pack, some places of the machine are coated with rustproof grease to prevent the surface from rust.

You have to wipe off it by soft cloth and light oil.

NOTICE: Any volatile oil and cutting liquid are prohibited.

4.2 SETUP

4.2-a. Location of the machine has to be escaped from unsteady land, direct sunshine, and changeable temperature.

4.2-b. Build the ground work as per setup diagram.

4.2-c. Dig foundation screw holes at indicated places on the concrete ground. (strongly suggestion).

4.2-d. Setup order; hang up the machine(same procedure if you use the fork truck), put foundation screws into machine base screw holes and tighten the nuts.

4.2-e. Aim at the foundation screw holes on the ground and slowly put down the machine.

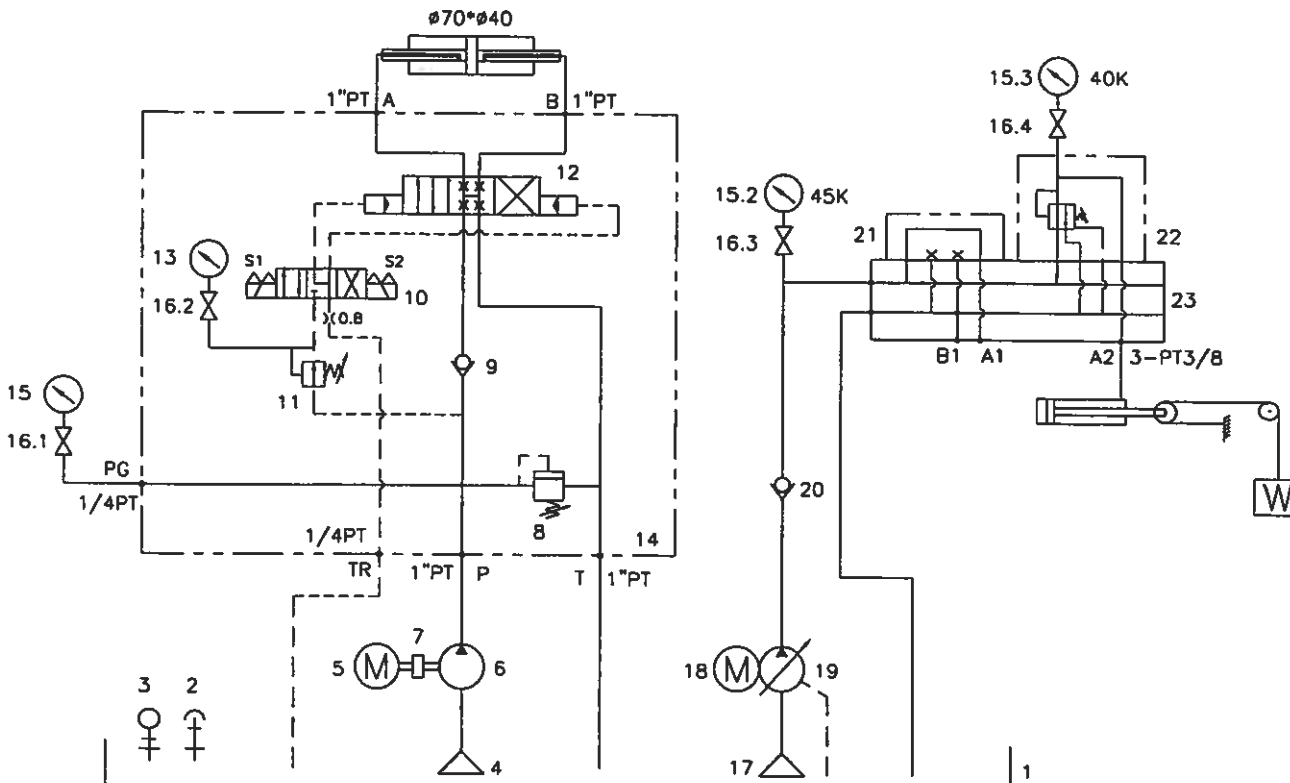
4.2-f. Then put iron plate at rear base of the saddle, and one each at right & left sides of front base, too. (iron plate are prepared by user.) Meanwhile, it has to be kept 25mm parallel space between machine base and concrete, be sure there is no rest shape on the ground.

4.2-g. Fill the foundation screw holes with concrete, be sure there is no nest shape on the ground.

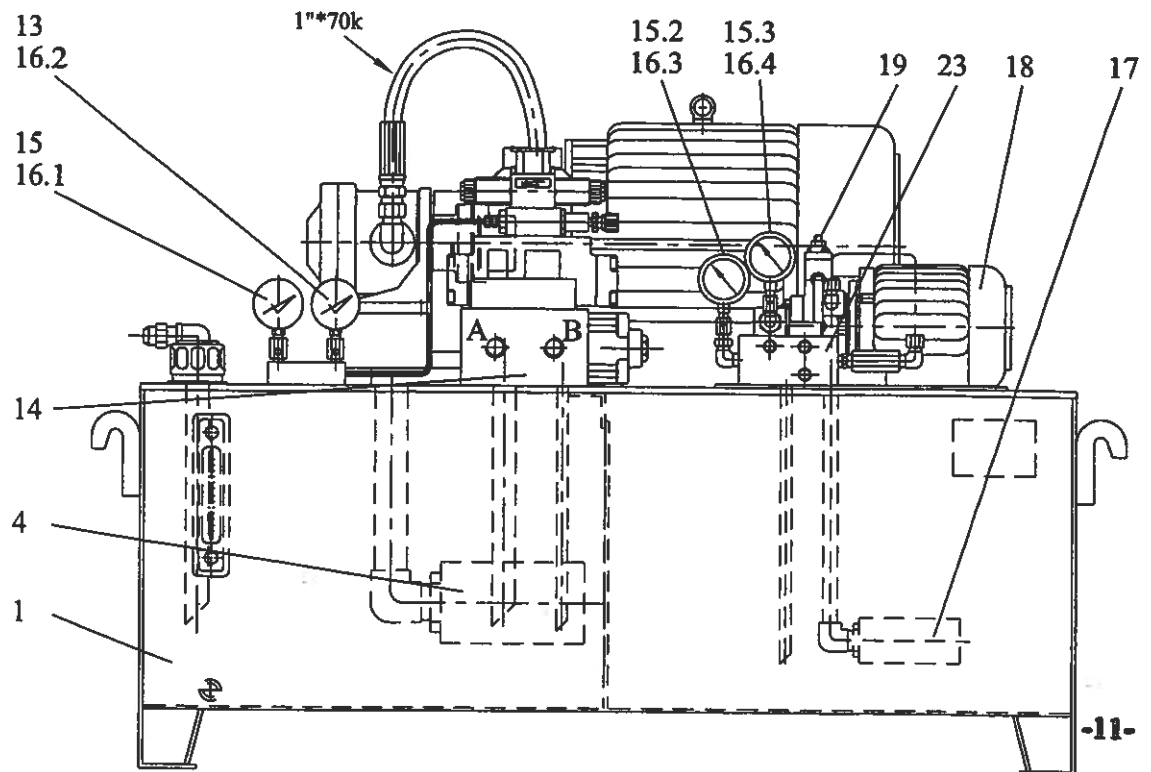
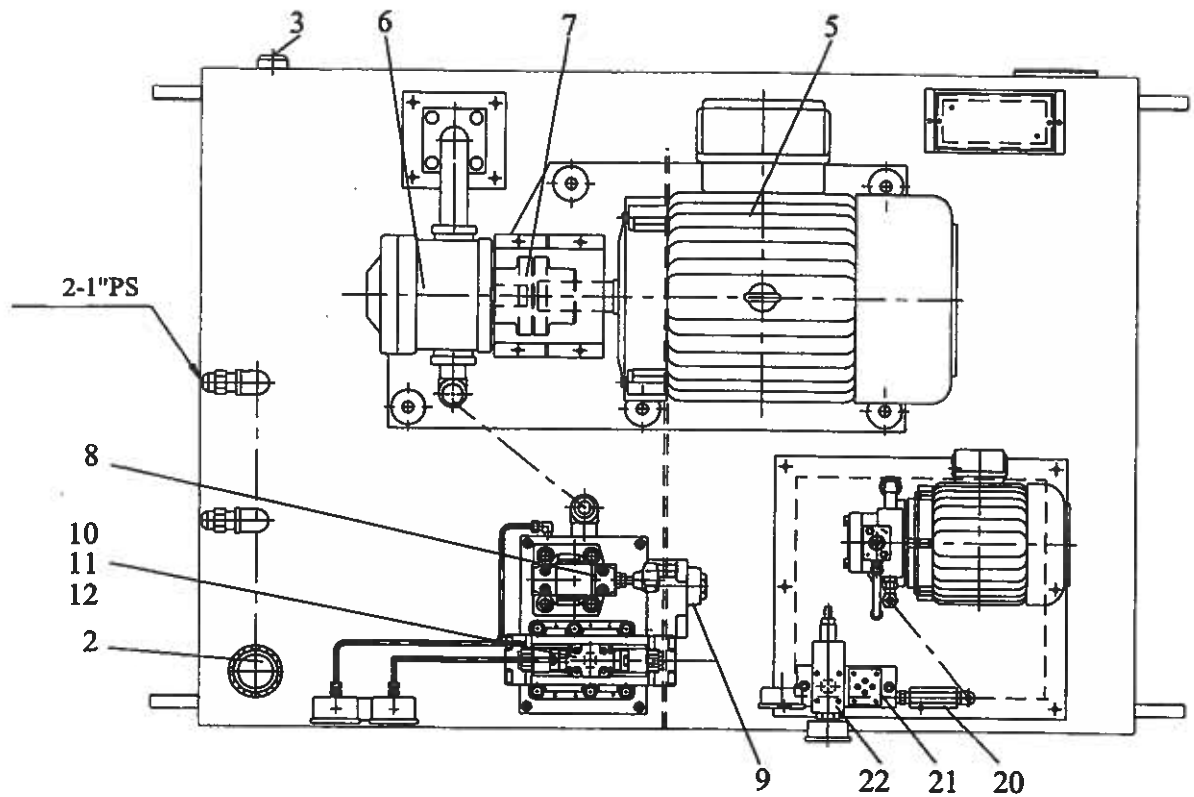
4.2-h. After concrete solidified, adjust the screw till machine is in good parallel as per above section adjustment described. (took out the iron plates.)

NOTICES BEFORE OPERATION MACHINE:

1. According to the operation manual electric diagram .to connect the power supply. and be sure the power cable capacity must over than machine total 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 safety 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.
8. To confirm the wheel material is matched with workpiece quality.
9. To confirm mobile part(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 lubricator.
12. To confirm there are moderate grinding liquid(quality&quantity) in the coolant.
13. Whether the filter paper setting up correct.
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.
 - 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 somebody out the machine operation area except the operator.
 - i. The electric equipment must be earthed.



HYDRAULIC TANK UNIT LAY OUT



HYDRAULIC PUMP UNIT PARTS LIST

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	500L	Oil Tank	1
2.	AB-1163	Air Breather & Filter	1
3.	LS-7"	Oil Level Gauge	1
4.	NS-2"	Suction Strainer	1
5.	10HP*6P 623	Motor	1
6.	VPNE-94-2-30	Vane Pump	1
7.	E-112	Coupling	1
8.	HRF-G06-1-R-10	Relief Valve	1
9.	CV-G06-50-10	Check Valve	1
10.	SWH-G02-C4-A110-10	Solenoid Valve	1
11.	MPR-02P-K-20	Reducing Valve	1
12.	HPD-G06-C31-ET	Grinder valve	1
13.	2 1/2"*35K	Pressure Gauge	1
14.	MB-3468	Manifold Block	1
15.	2 1/2"*70K	Gauge Cock	3
16.	NU-02	Suction Strainer	2
17.	PS-08	Relief	1
18.	1HP*4P 5/623(20L)	Motor	1
19.	VPVC-F12-A2-01	Pump	1
20.	CI-T03-05-10	Check Valve	1
21.	M02-P/A	End Cover	1
22.	MRB-02G-A-1-20	Balance Valve	1
23.	M02-2E(EM-977)	Manifold	1

COMMENT FOR HYDRAULIC OIL CHOICE AND USAGE

Hydraulic oil has to be maintained in adequate viscosity. More or less viscosity will decrease working efficiency 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 periodically change hydraulic oil, in case you find below status, please change oil immediately to protect hydraulic system.

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

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

BRAND	KAO-KUANG	BP	ESSO	MOBIL	SHELL
OIL NO.	R-53	ENERGUL HL100 4.5° E/50°C 33cst/50°C	ESSTIC 50°C 4.7° E/50°C	D.T.E. Oil Medium 3.93° E/50°C 28.9cst/50°C	Teilus oil 29 4.0° E/50°C 29cst/50°C

* First time to change of new hydraulic oli is after three months usage; then alter again once every year. (Please compensate the wear away oil anytime in order to maintain a standard capacity of working oil.)

* Hydraulic Pressure of 15(Pressure gauge) has to be kept about 20kg/cm² . (remark1)

* Hydraulic Pressure of 13(Pressure gauge) has to be kept about 12kg/cm² . (remark2)

* Hydraulic Pressure of 15.2(Pressure gauge) has to be kept about 38kg/cm² . (remark3)

* Hydraulic Pressure of 15.3(Pressure gauge) has to be kept about 30kg/cm² . (remark3)

* The oil capacity of hydraulic tank is approximately 500 L.

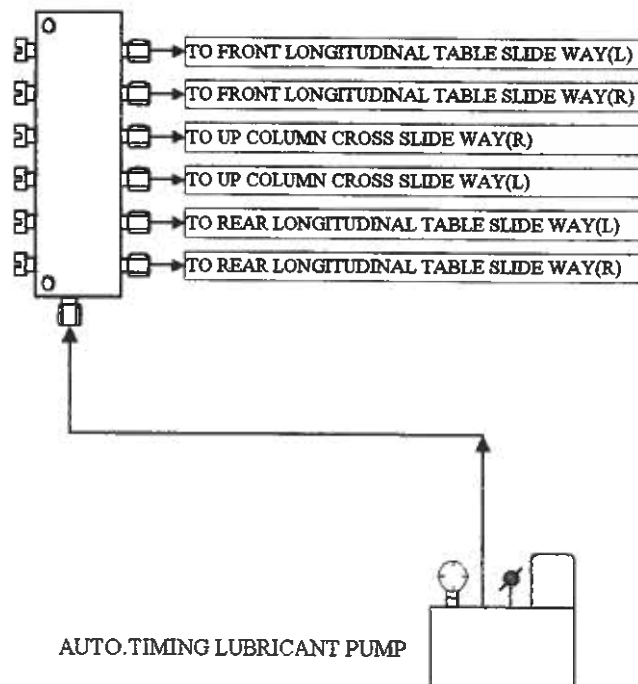
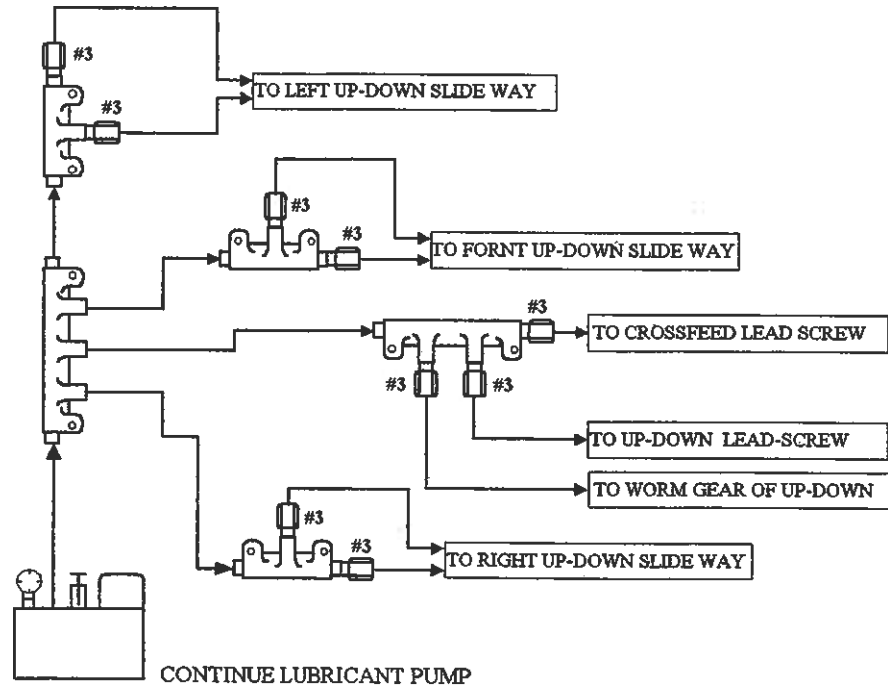
Remark1:This is for table longituding movement.

Remark2:This is for shock of table reciprocating longituding movement.

Remark3:These are for balancing of wheel head down feed (but the value of 15.2 is always bigger than the value of 15.3).

LUBRICANT INSTRUCTION SYSTEM & DIAGRAM 1/2

3468/3488 SERIES



LUBRICANT INSTRUCTION SYSTEM & DIAGRAM 2/2

3468/3488 SERIES

Reliability of the machine and economic running are ensured only by the correct choice of lubricant for the individual lubricating points.

(1).Lubricant pump:

- 1-1. Continue lubricant pump will be cyclically operated, When the hydraulic pump is turned on, and the fluid of the pump is about 500c.c every minute, but please keep the pressure between 6--9kg/cm².
- 1-2. Auto Timing Lubricant Pump will also be activated when the control power is turned on; It is a internal one-shot type lubricant. It pumps 3-6c.c once every 30 minutes. (user can chose the lubricant quantity range one of 3,4,5,6c.c and the factory default is the range of 6c.c).

(2).Lubricant:SAE30,BP,ESSO,MOBIL or SHELL slide way oil.

(3).Lubricant tank:

- 3-1. Continue Lubricant pump; about 40L(40000 c.c).
- 3-2. Auto timing lubricant pump; about 1.5L(1500 c.c).

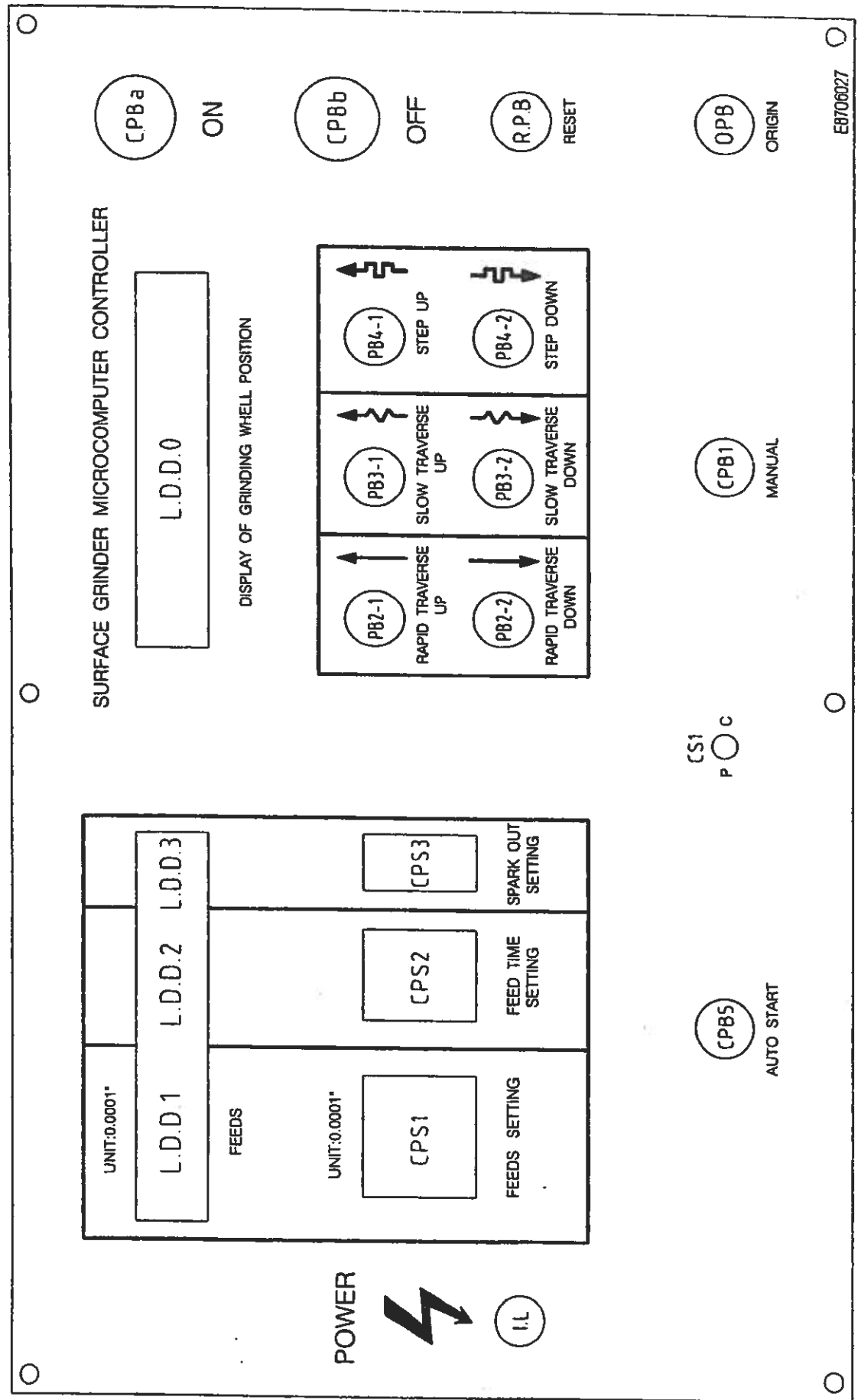
(4).Lubricant point: Please see the diagram previous page.

(5).Please check the oil quantity of lubricant tank very often, and always keep the oil tanks full of 70%.

(6).Please check every lubricant point sometimes , make sure every point working properly, it is a important maintain of machine.

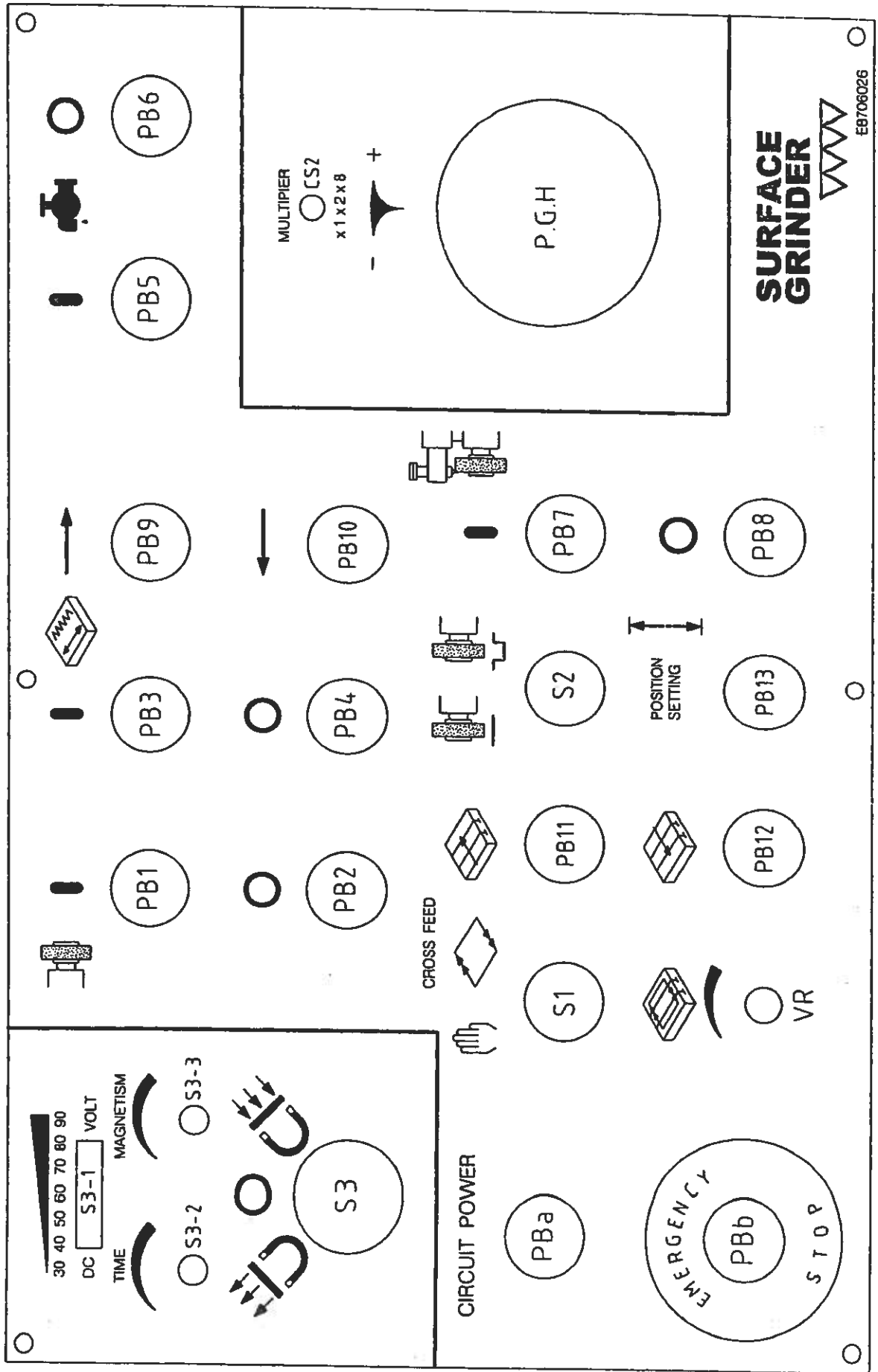
3468 AHD CONTROL PANEL 1/2

-16-



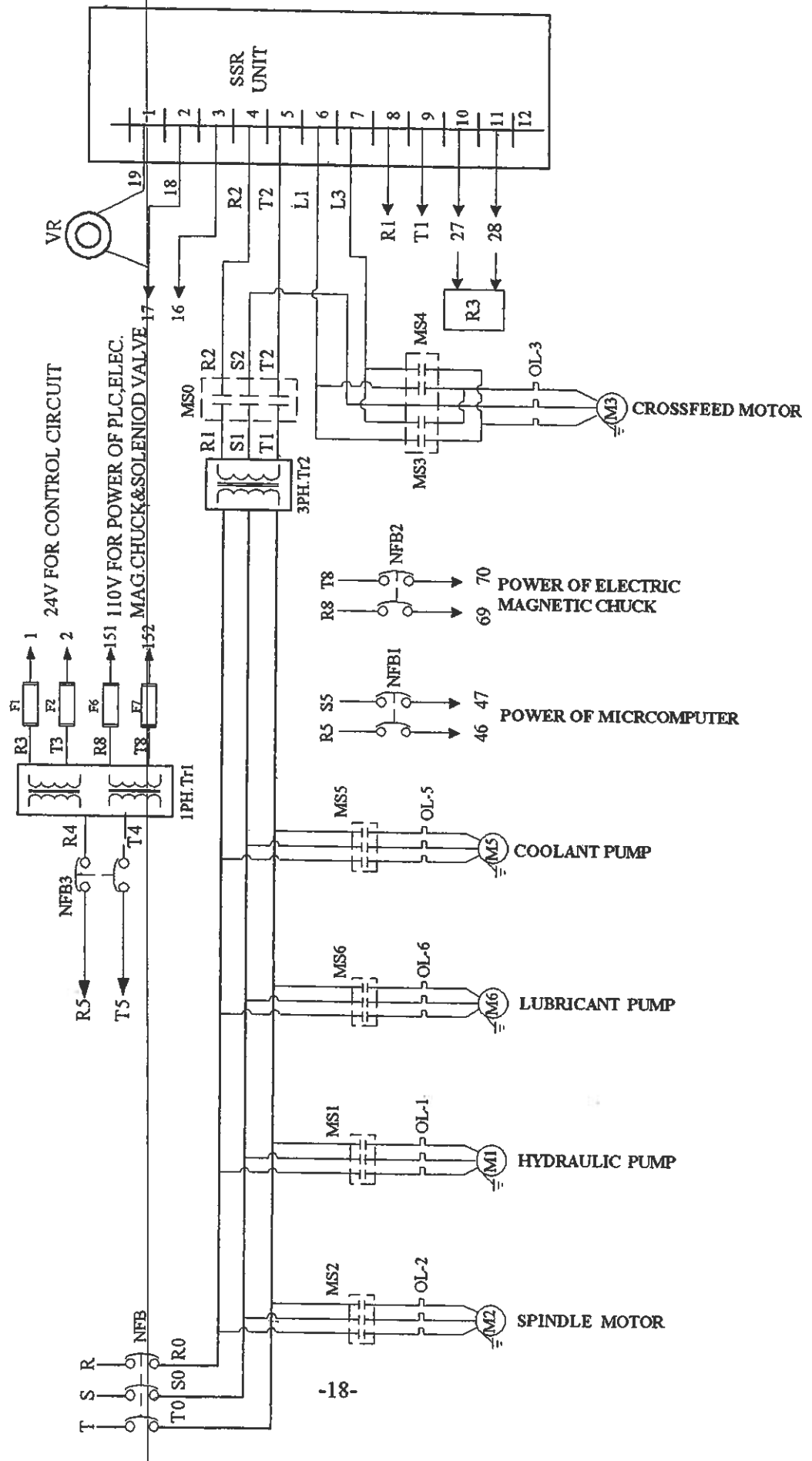
3468 AHD CONTROL PANEL 2/2

-17-

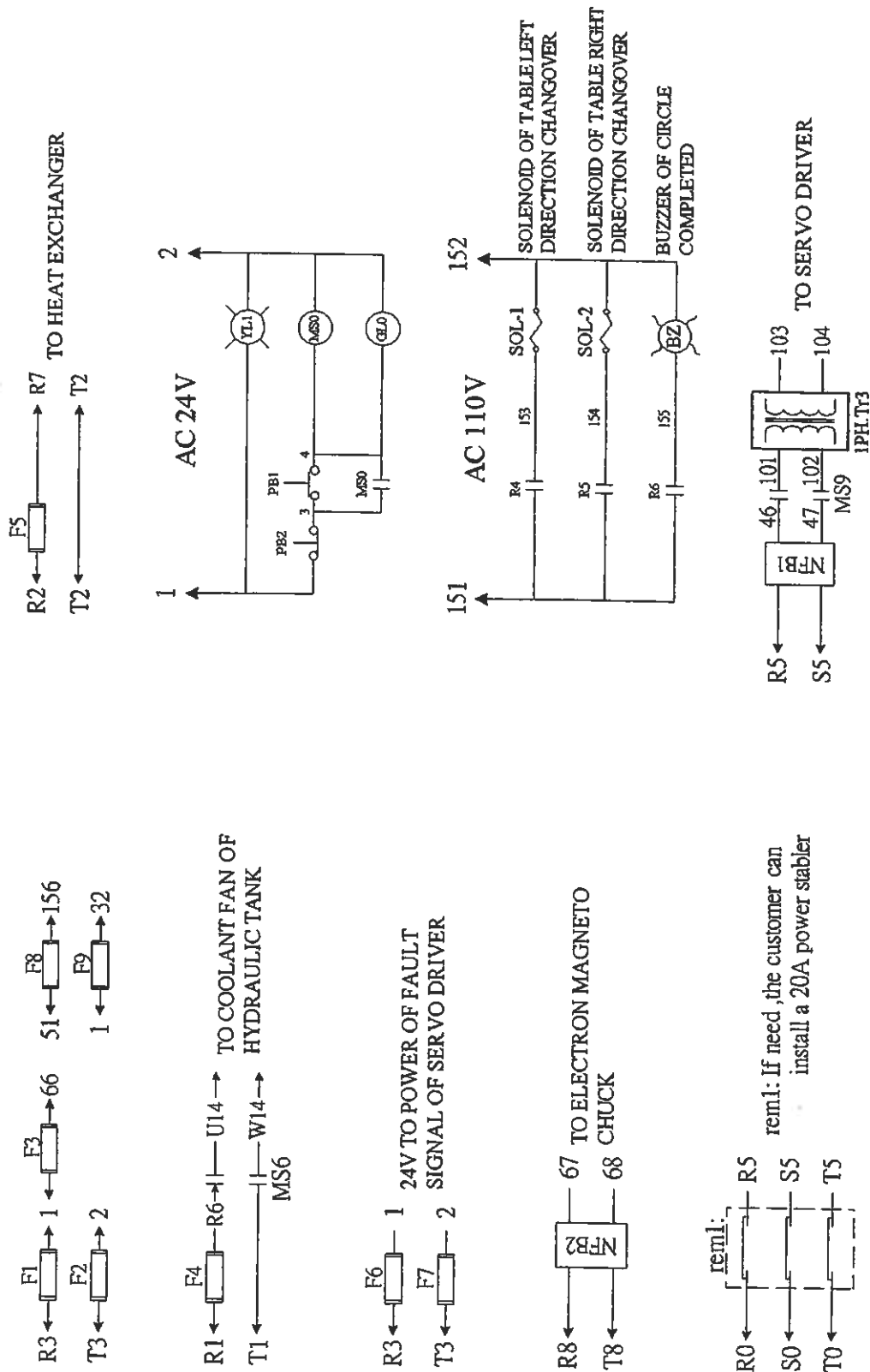


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3468AHD SERIES MAIN ELECTRIC CIRCUIT DIAGRAM 1/2(FR)



3468AHD SERIES MAIN ELECTRIC CIRCUIT DIAGRAM 2/2(FR)



**3468AHD SERIES GRINDER
SHARP PLC CONTROL CIRCUIT**

Legend:

- 5:24V
- 6:40-0V
- 7:PHASE A
- 8:PHASE B
- 9:DIR. CHANGE (L)
- 10:DIR. CHANGE (R)

Control Functions and PLC Connections:

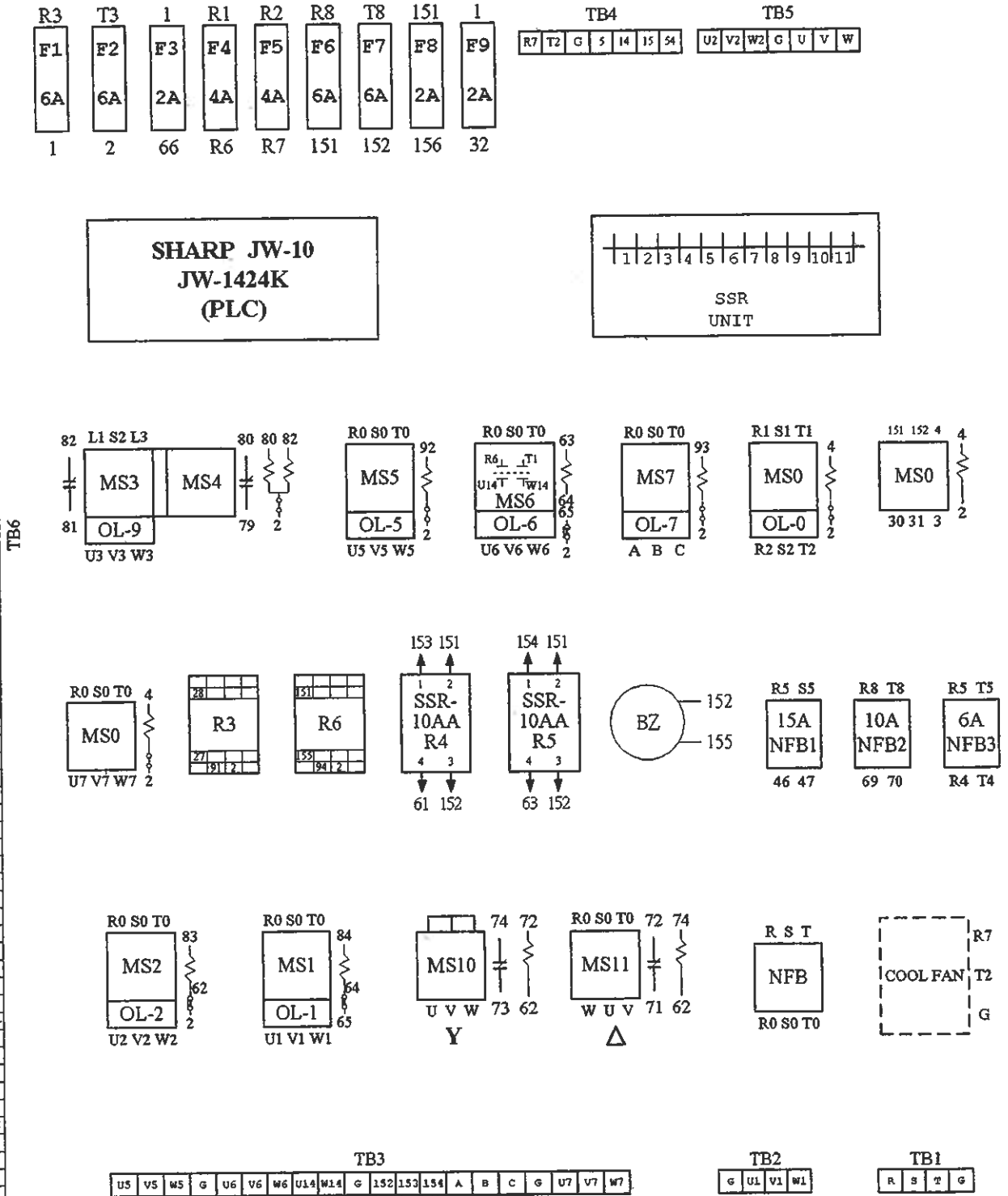
Function	PLC Input/Output	PLC Address
PHASE A	PX S1	6
PHASE B	PX S2	7
LEFT DIR.	PX S3	8
RIGHT DIR.	PX S4	9
PROGRAM SETTING	PB S1	11
AUTO OR MANU	PB S1	11
RAPID FORWARD	PB S1	11
RAPID BACKWARD	PB S1	11
FRONT LIMIT	LS 1	14
REAR LIMIT	LS 2	15
SPINDLE	PB 1	20
SHUTDOWN THE COMPUTER	CPB a	22
STARTING THE COMPUTER	CPB b	25
FAULT SIGNAL OF DRIVER	R1	26
PLUNGE OR SURFACE GRIND	S2	29
WHEEL DRESSING	PB 7	33
INTERLOCK OF MAG. CHUCK	S3	35
HYDRAULIC PUMP	PB 3	36
RIGHT DIR.	PB 10	39
LEFT DIR.	PB 9	38
COOLANT	PB 5	48
COOLANT	PB 6	52
SIGNAL OF STOPPING	CN 4	53
INTERLOCK OF SPINDLE	LS 3	54
TABLE RAPID MOVE	PB 10	59

Internal PLC Logic and Outputs:

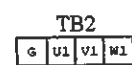
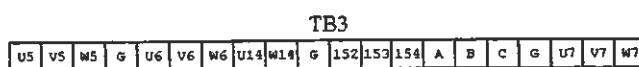
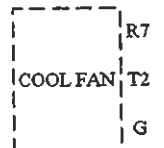
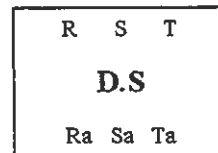
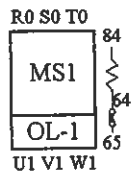
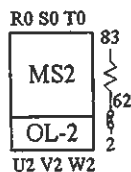
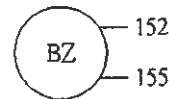
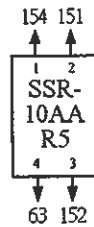
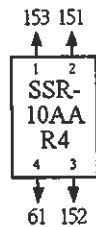
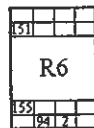
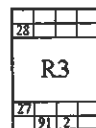
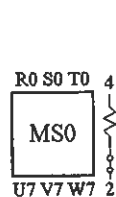
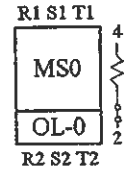
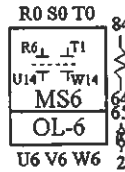
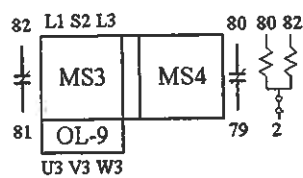
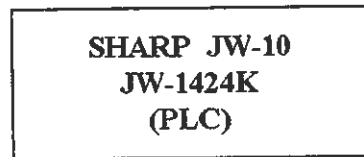
- Relays:** MS0, MS1, MS2, MS3, MS4, MS5, MS6, MS7, MS8, MS9, MS10, MS11, MS12, MS13, MS14, MS15, MS16, MS17, MS18, MS19, MS20, MS21, MS22, MS23, MS24, MS25, MS26, MS27, MS28, MS29, MS30, MS31, MS32, MS33, MS34, MS35, MS36, MS37, MS38, MS39, MS40, MS41, MS42, MS43, MS44, MS45, MS46, MS47, MS48, MS49, MS50, MS51, MS52, MS53, MS54, MS55, MS56, MS57, MS58, MS59, MS60, MS61, MS62, MS63, MS64, MS65, MS66, MS67, MS68, MS69, MS70, MS71, MS72, MS73, MS74, MS75, MS76, MS77, MS78, MS79, MS80, MS81, MS82, MS83, MS84, MS85, MS86, MS87, MS88, MS89, MS90, MS91, MS92, MS93, MS94, MS95, MS96, MS97, MS98, MS99, MS100, MS101, MS102, MS103, MS104, MS105, MS106, MS107, MS108, MS109, MS110, MS111, MS112, MS113, MS114, MS115, MS116, MS117, MS118, MS119, MS120, MS121, MS122, MS123, MS124, MS125, MS126, MS127, MS128, MS129, MS130, MS131, MS132, MS133, MS134, MS135, MS136, MS137, MS138, MS139, MS140, MS141, MS142, MS143, MS144, MS145, MS146, MS147, MS148, MS149, MS150, MS151, MS152, MS153, MS154, MS155, MS156, MS157, MS158, MS159, MS160, MS161, MS162, MS163, MS164, MS165, MS166, MS167, MS168, MS169, MS170, MS171, MS172, MS173, MS174, MS175, MS176, MS177, MS178, MS179, MS180, MS181, MS182, MS183, MS184, MS185, MS186, MS187, MS188, MS189, MS190, MS191, MS192, MS193, MS194, MS195, MS196, MS197, MS198, MS199, MS200, MS201, MS202, MS203, MS204, MS205, MS206, MS207, MS208, MS209, MS210, MS211, MS212, MS213, MS214, MS215, MS216, MS217, MS218, MS219, MS220, MS221, MS222, MS223, MS224, MS225, MS226, MS227, MS228, MS229, MS230, MS231, MS232, MS233, MS234, MS235, MS236, MS237, MS238, MS239, MS240, MS241, MS242, MS243, MS244, MS245, MS246, MS247, MS248, MS249, MS250, MS251, MS252, MS253, MS254, MS255, MS256, MS257, MS258, MS259, MS260, MS261, MS262, MS263, MS264, MS265, MS266, MS267, MS268, MS269, MS270, MS271, MS272, MS273, MS274, MS275, MS276, MS277, MS278, MS279, MS280, MS281, MS282, MS283, MS284, MS285, MS286, MS287, MS288, MS289, MS290, MS291, MS292, MS293, MS294, MS295, MS296, MS297, MS298, MS299, MS300, MS301, MS302, MS303, MS304, MS305, MS306, MS307, MS308, MS309, MS310, MS311, MS312, MS313, MS314, MS315, MS316, MS317, MS318, MS319, MS320, MS321, MS322, MS323, MS324, MS325, MS326, MS327, MS328, MS329, MS330, MS331, MS332, MS333, MS334, MS335, MS336, MS337, MS338, MS339, MS340, MS341, MS342, MS343, MS344, MS345, MS346, MS347, MS348, MS349, MS350, MS351, MS352, MS353, MS354, MS355, MS356, MS357, MS358, MS359, MS360, MS361, MS362, MS363, MS364, MS365, MS366, MS367, MS368, MS369, MS370, MS371, MS372, MS373, MS374, MS375, MS376, MS377, MS378, MS379, MS380, MS381, MS382, MS383, MS384, MS385, MS386, MS387, MS388, MS389, MS390, MS391, MS392, MS393, MS394, MS395, MS396, MS397, MS398, MS399, MS400, MS401, MS402, MS403, MS404, MS405, MS406, MS407, MS408, MS409, MS410, MS411, MS412, MS413, MS414, MS415, MS416, MS417, MS418, MS419, MS420, MS421, MS422, MS423, MS424, MS425, MS426, MS427, MS428, MS429, MS430, MS431, MS432, MS433, MS434, MS435, MS436, MS437, MS438, MS439, MS440, MS441, MS442, MS443, MS444, MS445, MS446, MS447, MS448, MS449, MS450, MS451, MS452, MS453, MS454, MS455, MS456, MS457, MS458, MS459, MS460, MS461, MS462, MS463, MS464, MS465, MS466, MS467, MS468, MS469, MS470, MS471, MS472, MS473, MS474, MS475, MS476, MS477, MS478, MS479, MS480, MS481, MS482, MS483, MS484, MS485, MS486, MS487, MS488, MS489, MS490, MS491, MS492, MS493, MS494, MS495, MS496, MS497, MS498, MS499, MS500, MS501, MS502, MS503, MS504, MS505, MS506, MS507, MS508, MS509, MS510, MS511, MS512, MS513, MS514, MS515, MS516, MS517, MS518, MS519, MS520, MS521, MS522, MS523, MS524, MS525, MS526, MS527, MS528, MS529, MS530, MS531, MS532, MS533, MS534, MS535, MS536, MS537, MS538, MS539, MS540, MS541, MS542, MS543, MS544, MS545, MS546, MS547, MS548, MS549, MS550, MS551, MS552, MS553, MS554, MS555, MS556, MS557, MS558, MS559, MS560, MS561, MS562, MS563, MS564, MS565, MS566, MS567, MS568, MS569, MS570, MS571, MS572, MS573, MS574, MS575, MS576, MS577, MS578, MS579, MS580, MS581, MS582, MS583, MS584, MS585, MS586, MS587, MS588, MS589, MS590, MS591, MS592, MS593, MS594, MS595, MS596, MS

9.3468AHD LAYOUT OF MAIN ELECTRICAL BOX 1/2

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89
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151
152
R2
T2
R1
S1
T1
G
R0
S0
T0
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R3
S5
T5
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U3
V3
W3
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R4
T4
R3
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R2
T2
R1
S1
T1
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R0
S0
T0
G
R5
S5
T5
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69
70
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24
G
U3
V3
W3
G
R4
T4
R3
T3
R8
T8
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6
7
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The diagram illustrates the electrical connections for a control system. Key components and their connections are as follows:

- UT-920**: Microcontroller unit.
- MT-10 POWER SUPPLY**: Provides power to the system.
- L.F.**: Low Frequency block.
- TB9**: Connector with the following pinout:

+5V	1	→ 122
A	2	→ 120
A\	3	→ 170
B	4	→ 121
B\	5	→ 171
C	6	
C\	7	
DGND	8	→ 123 $\frac{1}{=}$
FAULT	9	
ENABLE	11	
AGND	12	→ 117 $\frac{1}{=}$
ANALOG	13	→ 116
+12V	15	
- TB10**: Connector with the following pinout:

R1	→ 183
R2	
COM	→ 182
COM	→ 44
LS+	→ 45
COM	→ 180
LS-	→ 181
COM	→ 42
EX-START	→ 43
COM	
CHO	
OUT	→ 5
OUT	→ 53
+13V	
PEND	
- TB7**: Connector with the following pinout:

46	47	101	102	103	104	1	2	4	5	26	53	89	90	151	152
----	----	-----	-----	-----	-----	---	---	---	---	----	----	----	----	-----	-----
- CH1**: Connector with the following pinout:

113	114	111	112	116	117	118	119
4	6	3	7	5	10	15	16
- SERVO DRIVER**: Receives signals from the CH1 connector and controls the servo motor.
- UD-BL ADJ-DS**: Adjustable delay block.
- S4**: Switch with connections 182 and 183.
- CHOCK**: Inductor component with connections 125 and 125A.
- Resistors**: R1 (MY2NJ), R2 (MY2NJ), MS0 (MY2NJ), MS9 (CN-18), MS9 (CN-11).

ENCODER FEEDBACK

A	C	H	K	N	R	L
Green	White	Black	Red	Brown	Yellow	$\frac{1}{=}$
120	121	122	123	170	171	124
CHA	CHB	+5V	GND	CH \bar{A}	CH \bar{B}	CASE

SWITCH SETTINGS

- UPPER SWITCH : 44,45
- LOWER SWITCH : 180,181
- INFEED SWITCH : 42,43

3468/3488 AHD CONTROL PANEL & ELECTRIC PARTS DESCRIPTION 1/2

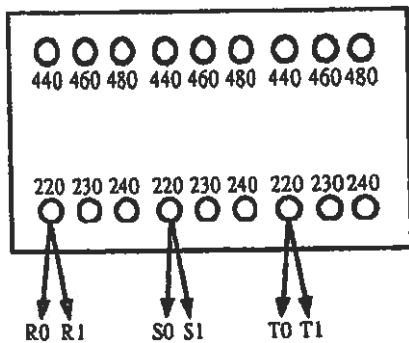
I.L	INDICATE LAMP OF POWER SOURCE.
CPBa	PUSH BUTTON "ON" OF MICROCOMPUTER CONTROL.
CPBb	PUSH BUTTON "OFF" OF MICROCOMPUTER CONTROL.
OPB	PUSH BUTTON OF ORIGIN RETURN (TO SET THE WHEEL HEAD RETURN TO REFERENTIAL ZERO POINT).
RPB.	PUSH BUTTON OF ZERO RESET (TO SET THE L.D.D0 TO REFERENTIAL ZERO POINT).
CPB1	PUSH BUTTON OF MANUAL CONTROL MODE WITH INDICATE LAMP(IT IS A NORMAL TURN ON CONDICTION TILL PUSHING THE "PB5". (REM.1)
L.D.D0	LED DISPLAY OF GRINDING WHEEL REFERENTIAL POSITION.
L.D.D1	LED DISPLAY OF FEEDS SETTING (SETTING NUMERAL UNIT).
L.D.D2	LED DISPLAY OF FEEDING TIMES (AUTO MODE).
L.D.D3	LED DISPLAY OF SPARK OUT TIMES (AUTO MODE).
CPS1	DIP SWITCH OF FEEDS SETTING.
CPS2	DIP SWITCH OF FEEDING TIMES.
CPS3	DIP SWITCH OF SPARK OUT TIMES.
CPB5	PUSH BUTTON OF AUTO CONTROL MODE WITH INDICATE LAMP.(AS SOON AS PUSH THE "PB1" THE CONTROL CONDICTION WILL CHANGE TO THE MANUAL MODE) .
PB2-1	PUSH BUTTON OF DRIVING THE WHEEL HEAD RAPID TRAVERSE UP.
PB2-2	PUSH BUTTON OF DRIVING THE WHEEL HEAD RAPID TRAVERSE DOWN.
PB3-1	PUSH-BUTTON OF DRIVING THE WHEEL HEAD SLOW TRAVERSE UP.
PB3-2	PUSH BUTTON OF DRIVING THE WHEEL HEAD SLOW TRAVERSE DOWN.
PB4-1	PUSH BUTTON OF DRIVING THE WHEEL HEAD STEP UP (THE QUANTITY IS SETTING BY "PS1".
PB4-2	PUSH BUTTON OF DRIVING THE WHEEL HEAD STEP DOWN (THE QUANTITY IS SETTING BY "PS1".
CS1	SELECT SWITCH OF MICROCOMPUTER OR ROTARY HANDLE CONTROL. (C:MICROCOMPUTER CONTROL. P:ROTARY HANDLE CONTROL).
S3	SELECT SWITCH FOR CHUCK MAGNETIC OR DEMAGNETIC CONTROL
S3-1	INDICATE LED FOR STRENGTH OF MAGNETISM
S3-2	VARIABLE RESISTANCE FOR DEMAGNETISM TIME ADJUSTING
S3-3	VARIABLE RESISTANCE FOR STRENGTH OF MAGNETISM TIME ADJUSTING
PBa	PUSH BUTTON "ON" OF CONTROL CIRCUIT SOURCE WITH INDICATE LAMP (IL0).
PBb	PUSH BUTTON "OFF" OF CONTROL CIRCUIT SOURCE.(ALSO AS A EMERGENCY STOP).
S1	CROSS-FEED SELECT SWITCH (AUTO OR MANUAL)
VR	VARIABLE STEP SPEED OF AUTO CROSS-FEED MODE.
PB11	PUSH BUTTON FOR ACTIVEING FORWARD CROSS-FEED
PB12	PUSH BUTTON FOR ACTIVEING BACKWARD CROSS-FEED
PB1	PUSH BUTTON "ON" OF SPINDLE MOTOR.
PB2	PUSH BUTTON "OFF" OF SPINDLE MOTOR.

REM1:IT IS ALSO A INTERRUPTER, WHEN SOMETIME THE "PB" IS PRESSED,THE USER CAN INTERRUPT THE FUCTION ANYTIME BY PRESSING THE "PB1".

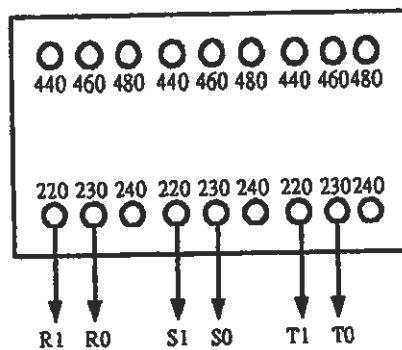
PB3	PUSH BUTTON "ON" OF HYDRAULIC PUMP MOTOR.
PB4	PUSH BUTTON "OFF" OF HYDRAULIC PUMP MOTOR.
PB9	PUSH BUTTON FOR TABLE RIGHT MOTION ACTIVATING
PB10	PUSH BUTTON FOR TABLE LEFT MOTION ACTIVATING
S2	SELECT SWITCH OF SURFACE OR PLUNGE MODE.
PB13	PUSH BUTTON OF AUTO CROSS-FEED STORKE SETTING WITH INDICATOR .
PB5	PUSH BUTTON "ON" OF COOLANT SYSTEM
PB6	PUSH BUTTON "OFF" OF COOLANT SYSTEM
CS2	SELECT SWITCH OF MULTIPLE OF 1, 2, 8 UNIT OF ROTARY HANDLE CONTROL.
P.G.H	ROTARY HANDLE OF PULSE GENERATOR.
MS0	MAGNETIC CONTACTOR FOR CIRCUIT CONTROL SOURCE.
MS1	MAGNETIC CONTACTOR FOR HYDRAULIC PUMP MOTOR.
MS2	MAGNETIC CONTACTOR FOR SPINDLE MOTOR.
MS3 MS4	MAGNETIC CONTACTOR FOR SPINDLE SEAT CROSS-FEED MOTOR.
MS5	MAGNETIC CONTACTOR FOR COOLANT.
MS6	MAGNETIC CONTACTOR FOR LUBRICANT PUMP.
MS7	MAGNETIC CONTACTOR FOR HYDRAULIC PARALLEL DRESSER PUMP.
MS9	MAGNETIC CONTACTOR FOR POWER OF SERVO DRIVER & NC CONTROLLER.
R1,R2,R3,R6	AUXILIARY RELAY FOR NC. CONTROL SYSTEM.
NFB	NO FUSE BREAKER FOR MAIN POWER SUPPLY.
NFB1	NO FUSE BREAKER FOR POWER OF MICROCOMPUTER.
NFB2	NO FUSE BREAKER FOR POWER OF ELECTRIC MAGNETIC CHUCK.
NFB3	NO FUSE BREAKER FOR POWER OF SERVO DRIVER.
M1	HYDRAULIC PUMP MOTOR.
M2	SPINDLE MOTOR.
M3	SPINDLE SEAT FORWARD&BACKWARD CONTROL MOTOR.
M5	COOLANT PUMP MOTOR.
M6	LUBRICANT PUMP
S4	SELECT SWITCH OF WHEEL HEAD RISINGUP OR NOT, AFTER FINISHING AUTO DOWN FEED GRINDING CYCLE
UD-BL ADJ-DS	DIP SWITCH FOR COMPENSATION THE BACKLASH OF UP-DOWN LEAD SCREW
LS1	APPROXIMATE SWITCH FOR AUTO CROSS-FEED TRIGGER SIGNAL.
PXS1 PXS2	APPROXIMATE SWITCH FOR SETTING STROKE OF AUTO CROSS-FEED
PXS3 PXS4	APPROXIMATE SWITCH FOR TABLE RECIPROCATE TRAVEL DIR.CHANGEOVER.
LS+	LIMIT SWITCH FOR MAX. TRAVEL OF SPINDLE SEAT.
LS3	LIMIT SWITCH FOR ENGAGING WITH THE SPINDLE MOTOR & WHEEL GUARD COVER
OL1,OL2 OL3,OL4 OL5,OL6	CURRENT OVERLOAD PROTECTOR .
F1---F9	FUSES
1PH tr1.	1 PHASE TR.(FOR CONTROL CIRCUIT & EM.CHUCK POWER SUPPLY. AND POWER OF FAULT SIGNAL OF SERVO DRIVER).
3PH tr2.	3 PHASE TR.(FOR SPINDLE SEAT RAPID UP&DOWN AND CROSS-FEED,LUBRICANT PUMP,PAPER FILTER MOTOR).
1PH tr3.	1 PHASE TR.(FOR SERVO MOTOR DRIVER)..
S.S.R -10AA (R4,R5)	TABLE RECIPROCATE TRAVEL DIR.CHANGEOVER SOLENIOD CONTROLLER.

CONNECT OF 3PH. TRANSFORMER

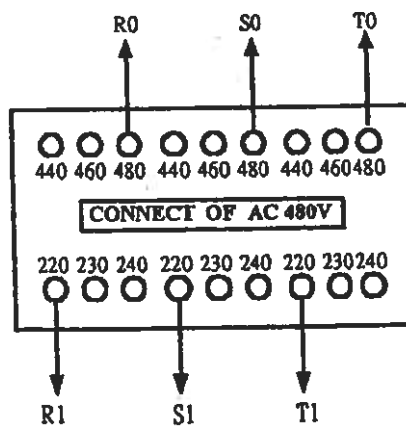
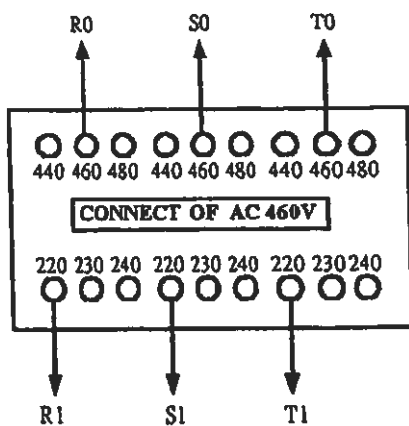
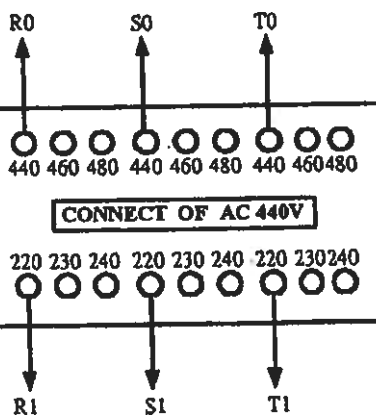
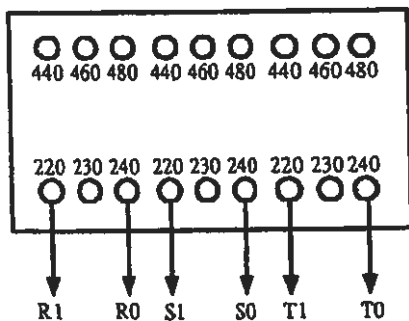
CONNECT OF AC 220V



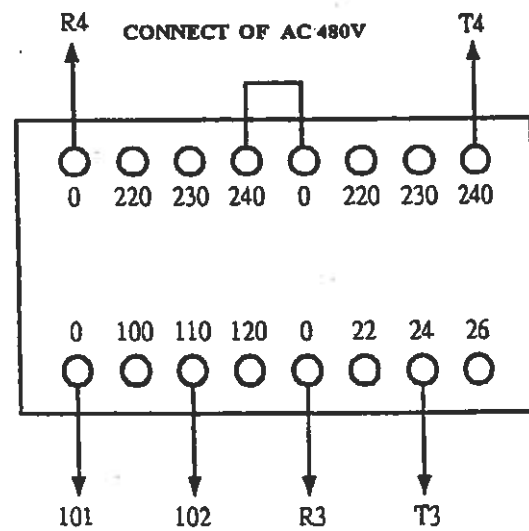
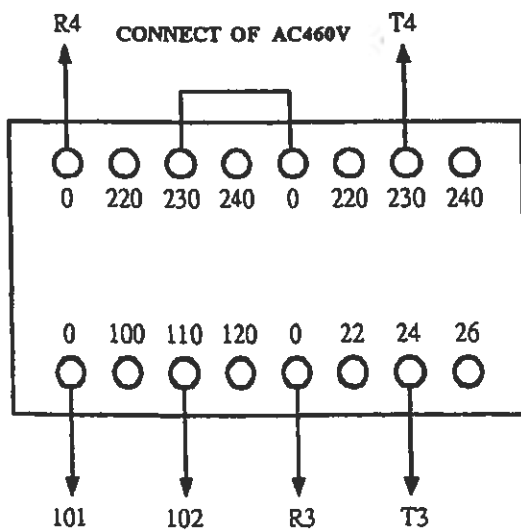
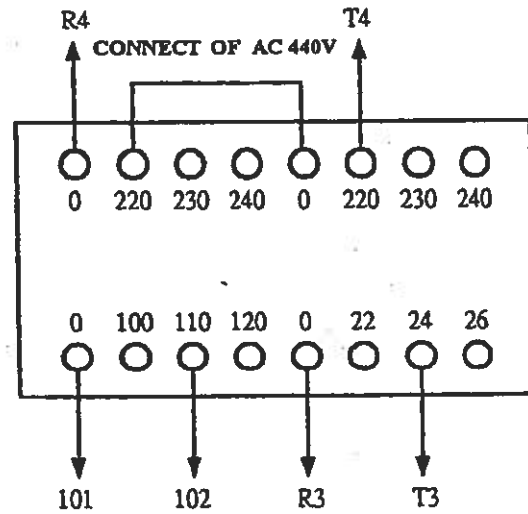
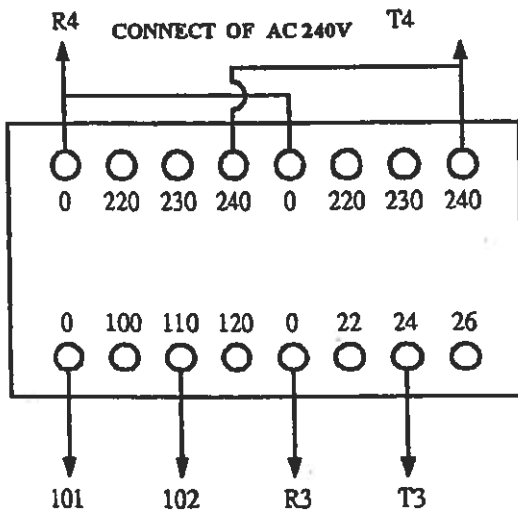
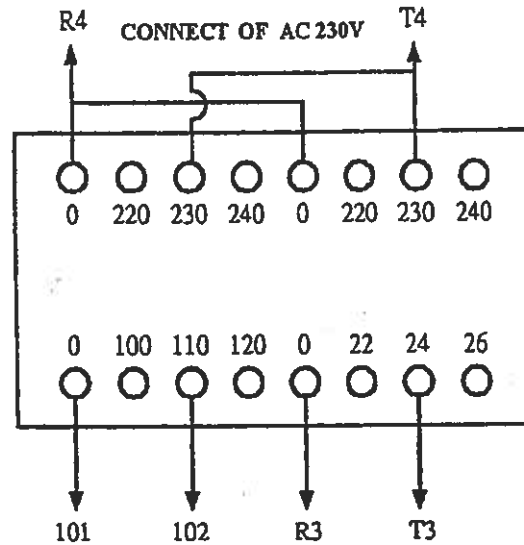
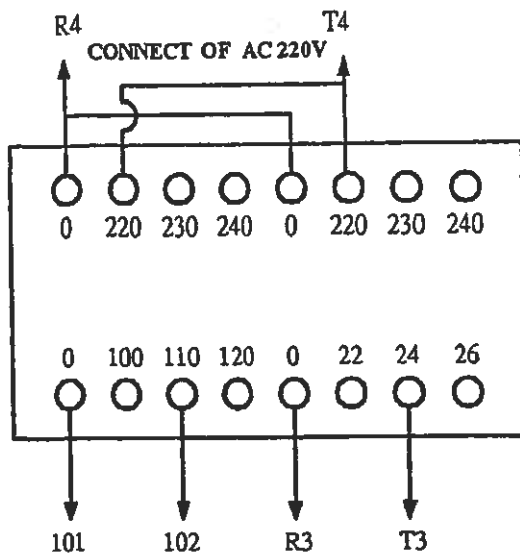
CONNECT OF AC 230V



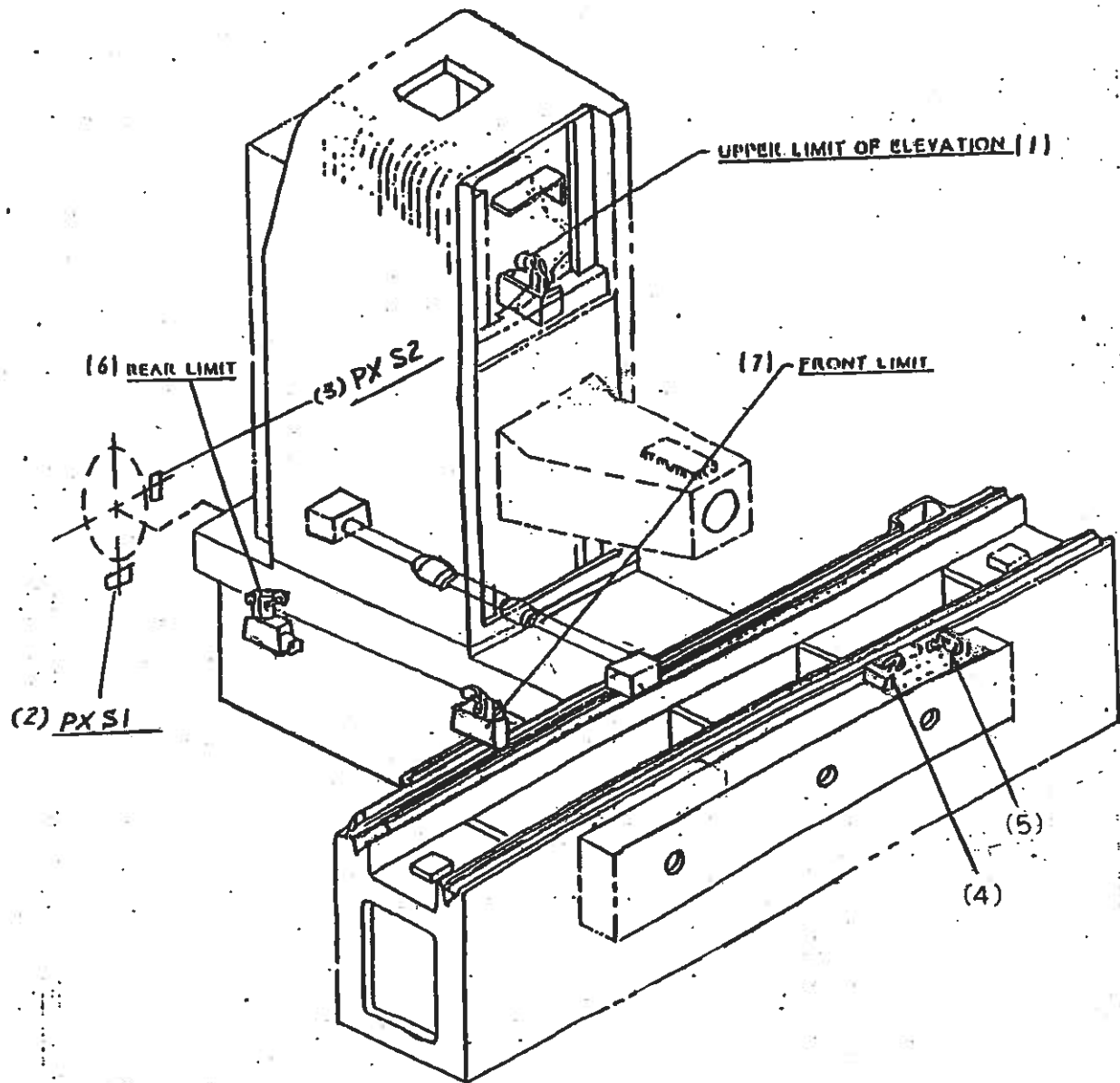
CONNECT OF AC 240V



CONNECT OF 1PH. TRANSFORMER



3468/3488AHD (Approximate) Limit switch Position



Description:

1. LS+
2. PXS1
3. PSX2
4. PSX3
5. PSX4
6. LS-1
7. LS-2

* For Above Code NO. ,Please Refer To Circuit Diagram

12. 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. Adjusting the travel stroke adjuster(L&R) at fit position.
- b-2. Starting the electric control circuit (press the push button PBa).
- b-3. Starting the hydraulic pump motor (press the push button PB3).
- b-4. Pressing the push button PB9 or PB10 once to activate the table moving direction.(PB9 is forward to →DIR. , PB10 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 PB3 once (of course you also can turn the flow control leveler at stop position). and restart the table movement by Pressing the push button PB9 or PB10(the fuction just like the process b-4).
- b-8. When table on pause condition , by pressing the PB3 sustaining, then pressing PB9 or PB10 intermittent, to make the table forward to →DIR. or ← DIR. moving intermittent.

C. Up-Column cross-feed movement

c-1. Manual rapid cross travel operation:



- 1. Turn the S2 on surface grind mode (left side).
- 2. Turn the S1 on manual feed mode (left side).
- 3. Pressing the PB11 make the Up-column to ↑DIR. rapid movement till it reaches the position that you want , than release the PB11.
- 4. Pressing the PB12 make the Up-column to ↓DIR. rapid movement till it reaches the position that you want , than release the PB12.

c-2. Auto cross-feed operation:

- 1. Turn the S2 on surface grind mode (left side).
- 2. Turn the S1 on auto feed mode (right side).
- 3. Setting the cross travel stroke of up-column(See the description on next page)
- 4. Pressing the PB11 or PB12 once to activate the up-column to ↑DIR. or ↓DIR. auto cross-feed.
- 5. Adjusting the VR to fit your need. (colckwise is increase, anticolckwise is decrease the every intermittent feed volume.)

6. Activating the table longitudinal movement function

c-3. Setting of auto cross-feed stroke system

1. At first, make the S2 select at surface mode().
Then choice S1 select switch on the menu operate mode().
After that, operation the PB11 or PB12 push button switch (for rapid forward or backward). to sent the spindle seat to the first grinding edge of workpiece "A" (please refer FIG.1)

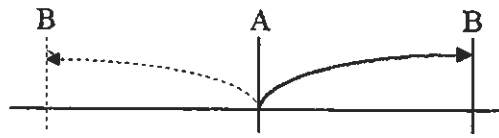




FIG.1

- After the above procedures, press PB13 push button switch (position setting switch with condition indicator PL1) once, Then indicator of PL1 will be flashed continue with 1 second frequency. And operation PB11 or PB12 switch to sent the spindle seat to the second edge of workpiece "B". Then one more pressing the PB13 push button, and indicator of PL1 is going to stop flashing and keep lighting, till the S1 select switch changeover to auto mode(). with the indicator of PL1 turn off, the procedure is completed.
2. If the setting is not correct; for instance: setting "A"&"B" two points almost close together, or only just setting one point "A". then switching S1 select switch to the auto mode(). this moment the indicator of PL1 will be quickly flashed with 0.1 second frequency. It means the setting is mistake please resetting again.
 3. This system has auto memory function ; when the machine is operation and power is failure suddenly or the emergency stop switch is pushed to interrupt operation. unless the user turn the cross-feed leadscrew manually, before restarting the power supply. otherwise the previous setting won't be changed.

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

- d-1. Pressing the CPBa once to turn the Microcomputer controller power on.
(Then you can Pressing the CPBb once to shut down the Microcomputer controll system)

d-2. Manual down-feed operation

1. Turn the select switch CS1 at "c" position (right side)
 2. When the Microcomputer controller power on. the LED display of L.D.D0, L.D.D1, L.D.D2, L.D.D3, & indicator of manual operation (the bulb inside CPB1) will be lighted up. at same time. (then the figures of L.D.D0, L.D.D2, L.D.D3 will display "0" and the L.D.D1 will display some numeric, the numeric is set by the dip switch CPS1). then the manual down-feed system is ready to operate.
 3. L.D.D.0 is showing a reference position of wheel-head (relative to reference zero point). whenever the system power on, the first time show in L.D.D.0 is a reference zero point.
 4. When manual down-feed system is on operation, anytime, you can press the push-button switch R.P.B one stroke 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).
 5. Whenever the reference position of wheel-head is not on reference zero point. then, anytime, you can press the push button O.P.B once, 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).
 6. When the function of "original position return" is activating; then, You can interrupt the function at once, by pressing the push-button switch CPB1 one stroke.
 7. Pressing the PB2-1 persisted to travel the wheel head rapid traverse up till it reaches to the position that you want.
 8. Pressing the PB2-2 persisted to travel the wheel head rapid traverse down till it reaches to the position that you want.
 9. Pressing the PB3-1 persisted to travel the wheel head slow traverse up till it reaches to the position that you want.
 10. Pressing the PB3-2 persisted to travel the wheel head slow traverse down till it reaches to the position that you want.
 11. Pressing the PB4-1 one stroke to travel the wheel head one step up.
 12. Pressing the PB4-2 one stroke to travel the wheel head one step down.
- REM. 1: the capacity of step up or step down is set by dip switch CPS1 (capacity = the figures of CPS1 * unit)

d-3. Auto down-feed circle operation

d-3a.. Surface grinding mode:

1. Set the select switch CS1 at "c" position (right side)
2. Adjusting the dip switch of CPS1 to set the capacity of every auto-down feed.
3. Adjusting the dip switch of CPS2 to set the auto-down feed times. (it is a up-counter)
4. Adjusting the dip switch of CPS3 to set the spark out times. (it is a up-counter)
5. Do the procedures of c-2 (auto cross-feed operation).
6. Pressing the CPB5 (AUTO START) one stroke to start the auto down-feed circle.
(Then indicator of CPB5 will light up And indicator of CPB1 will go out).

7. When the auto down-feed circle finished, then the wheel head will rise a little up.
(user can set the select switch S4, that locate in electric box , at left side to disable the function of auto rise up) and the control system will be changed to the condition of manual down-feed operation.

d-3b. Plunge grinding mode:

1. Turn the select switch CS1 at "c" position (right side)
2. Turn the select switch S2 at plunge grinding mode (left side) (then the function of electric control cross-feed will be disabled)
3. Adjusting the dip switch of CPS1 to set the capacity of every auto-down feed.
4. Adjusting the dip switch of CPS2 to set the auto-down feed times. (it is a up-counter)
5. Adjusting the dip switch of CPS3 to set the spark out times. (it is a up-counter)
6. Do the procedures of B (table longitudinal movement).
7. Pressing the CPB5 (AUTO START) one stroke to start the auto down-feed circle.
(Then indicator of CPB5 will light up And indicator of CPB1 will go out).
8. When the auto down-feed circle finished, then the wheel head will rise a little up.
(user can set the select switch S4, that locate in electric box , at left side to disable the function of auto rise up) and the control system will be changed to the condition of manual down-feed operation.

d-4. Pulse generator handle-wheel operation:

1. Turn the select switch CS1 at "p" position (left side) (then the function of manual down-feed operation & auto down-feed circle operation will be disabled.).
2. Turn the select switch CS2 at right range (x1 or x2 or x8) (per graduation capacity = selected numerical * unit)
3. Turn the P.G.H clockwise to drive wheel-head down feed.
4. Turn the P.G.H anti-clockwise to drive wheel-head up feed.
5. Do not operate the P.H.G 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).

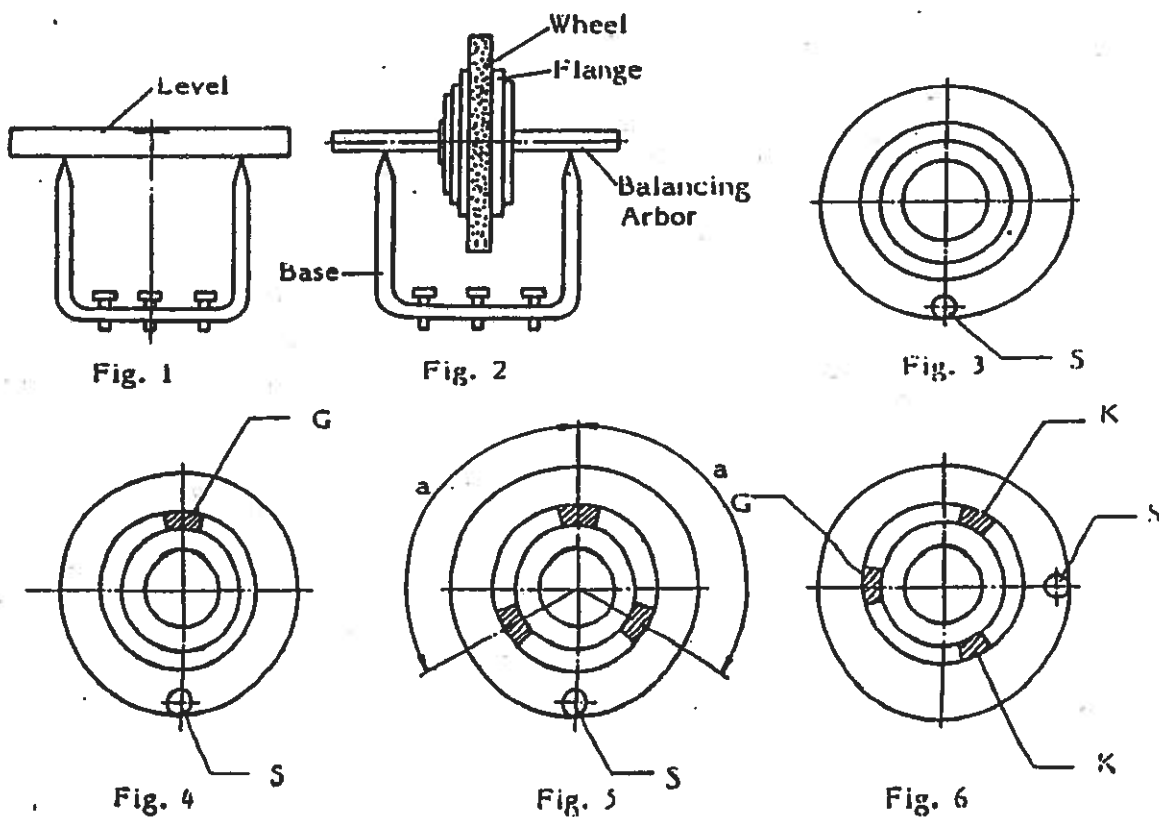
REM4: The auto down-feed trigger signal is on the right end of table longitudinal movement stroke. (only for plunge grinding mode).

13. Balancing the grinding wheel

Efficient balancing is essential to eliminate unnecessary and additional stress in the wheel. It is also unavoidable to obtain high quality results. Grinding accuracy and surface finish as well as life of grinding wheel, wheel spindle and bearings depend to some considerable extent on careful balancing. Static balancing will frequently sufficed for this purpose.

The grinding wheel together with the wheel flange is fitted to balancing arbor and this assembly is then placed on two accurate parallel knife edges of the wheel balancing base, and balancing can be effected as follows: (see Fig. 2)

- * The wheel balancing base must be levelled (Fig. 1)
- * Allow the wheel to oscillate to find the center of gravity which is then marked "S" with chalk (Fig. 3)
- * Apply the first balancing weight "G" opposite to this point "S" and screw it up. It can not be moved again (Fig. 4)
- * Place two correction weight "K" anywhere around the periphery, but at equal distance "a" from weight "G" (Fig. 5)
- * Turn the wheel through 90° at a time and see if it is balance. If not, the correction weight "K" must be moved until the wheel is in balance in any position (Fig. 6)
- * After balancing, the wheel must be given a test run of at least five minutes at full working speed before being used or starting re-balance.



14. GENERAL COMMENTS OF GRINDING

The grinding results obtained depend to a very degree on the choice of the correct grinding wheel and suitable operation.

(1) Stock removal efficiency

For intensive stock removal a coarse grain (about 30-36) should be used. The wheel is dressed by passing the diamond over quickly so that the surface of the wheel is roughened and bites well.

(2) Surface finish required

If fine finish is to be produced, a finer grain wheel is required (40-80). The diamond in this case is passed slowly over the wheel so as to break up the grain.

(3) Distortion of the workpiece

If the workpiece shows too much distortion when being ground, this means that the stock removal was too great and the longitudinal and cross movements of the table was too slow, or the grinding wheel is " clogged ".

(4) Undersirable burns and grinding cracks

If burn marks and grinding cracks appear, this means that the wheel is too hard, or the wheel " clogged "

15. WHEEL INSPECTION

It is absolutely essential to comply fully with following safety rules. These are intended to protect the operator against danger.

Wheel inspection and fitting:

Prior to fitting any grinding wheel, it should always be tested. Sounding the wheel is a generally accepted test method.

The wheel should be suspended from a mandrel secured to its bore and should then be lightly sounded with a wooden hammer. Even wheels with hair cracks not visible with the bare eye will produce a distorted note in comparison with perfect wheel where the sound is clear. Defective grinding wheel must not be used.

There are two pieces of paper washer on both faces of wheel and serve as plastic packings between wheel and mounting flange. The packing washer must not be removed, when mounting the wheel should slide onto the flange easily by hand without the need for force. Wheel flange must be absolutely clean especially on the clamping and location surface, in the spindle bore and thread. The flange fixing screws should be tightened gradually and diagonally. The wrench should be applied at least 4 to 6 times to each screw in turn. When the wheel has run under coolant for sometime the paper packing washers will be damped, so it must re-tighten the fixing screws again diagonally.

After being balanced for the first time, the wheel must be mounted on the grinding spindle of the machine and dressed. This can be done with the parallel dresser on the spindle carrier or with one fitted on the table. When dressing the wheel from the table, the table must be locked longitudinally and then cross-traversed with handwheel. The wheel must be dressed until it runs dead true. The grinding finish is improved, if any out-of-truth in the side walls of the wheel is also removed.

After this first balancing, the wheel must be removed from the spindle again and then carefully re-balanced. After being fitted to the spindle again and re-dressed, it is ready for use.

- * The wheel attached with the machine are accurately balanced together with their mountings. As wear can lead to unbalance, the wheel should be re-checked and, if necessary, re-balanced.

Grinding wheel absorbs humidity and coolant, it is therefore advisable not to start coolant supply when the wheel is stationary, otherwise the wheel will absorb liquid on one side only and will then be out of balance. If the wheel is allowed to stand for any length of time coolant will collect at the lowest point. Unbalance will also be generated if the wheel is not allowed to idle after operation. Idling is essential to throw-off coolant by centrifugal force.

Prior to place the flange-mounted grinding wheel to the spindle, flange bore and spindle taper must be absolutely clean, and the wheel is pushed by hand onto the spindle taper.

Subsequently, tighten wheel flange securely with fixed bolt. (Fig. 7). To release wheel flange from spindle taper with extractor. (Fig. 8).

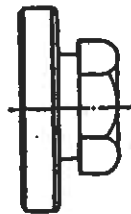


Fig. 7

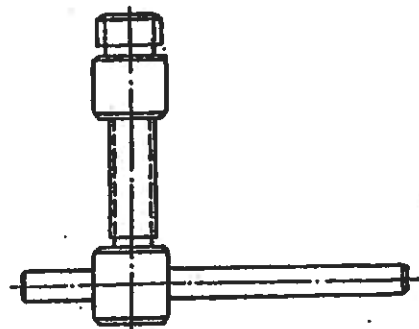


Fig. 8

- * If various materials have to be ground, so that the wheel has to be changed frequently it is more advantageous to change the wheel complete with flange. It would involve unnecessary loss of time and wheel waste to remove the wheel from its mounting every time and re-balance and re-dress it.

16.DRESSING THE WHEEL AND CORRECT TREATMENT OF DRESSING DIAMOND

The diamond is inserts in the dressing device. The sleeve of the dressing device is arranged at an angle fo about 5° , so that , when the diamond loses its keenness, it can be turned in the sleeve, along with its holder, thus ensuring that there is always a sharp diamond edge available.

Various degrees of roughness can be produced in the ground component by varying the speed at which the diamond is passed over the grinding wheel.

If there is only about 0.2mm to 0.3mm stock removal, it is advisable to roughen the grinding wheel. This is done by feeding the diamond in about 0.03mm and turning the handwheel rapidly, so that the dressing diamond moves quickly over the wheel. This makes the wheel bite well and the stock removal is good.

If the component is to be finish ground to size with the same grinding wheel, the wheel must be dressed again, this time slowly, in two or three passes, with the diamond fed in only about 0.01mm.

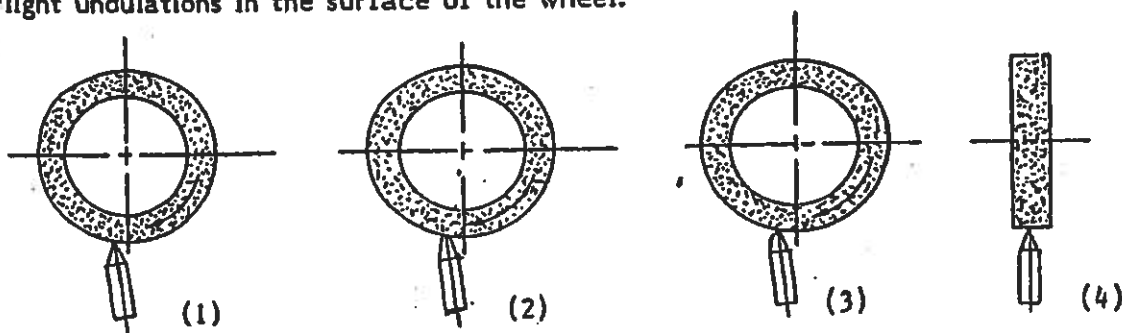
Frequent light dressing is better for the life of the grinding wheel and the diamond than a heavy cut.

When dressing, the diamond should always be cooled, if possible, but sudden cooling is dangerous, as it can lead to the diamond being split.

As the diamond is very brittle because of its extraordinary hardness and being sensitive to even the slightest knock, naturally cracks easily.

When dressing, begin in the center, as the edges are uaually worn down further. If dressing is begun at the worn edges, there is danger of the higher pressure in the center overstressing the daimond and shattering it.

Experience has shown that, with highly accurate grinding, dressing with the hand-operated dressing device on the spindle carrier is inadequate. The hand operation necessarily causes -light undulations in the surface of the wheel.



- (1) The new diamond is inclined at the correct angle to the wheel.
- (2) As a face has formed on the diamond, it must be turned about its axis.
- (3) The new point acts like a new diamond again.
- (4) Begin in the middle of the width.

After a certain time, the diamond must be changed in its holder, i.e. it must be reset to ensure economical operation. This re-setting should be undertaken in time, before any of the holder itself has been ground off. Otherwise, there is first of all the danger of breaking the diamond out and losing it, or secondly, of its being too small to be reset. This is really false economy.



(1)



(2)



(3)

(1) The new diamond.

(2) The diamond now be reset.

(3) Too late. The diamond can no longer be reset, as it has no more holder. Resetting should be done by specialists only.

17. STORAGE OF GRINDING WHEELS

The wheels should be kept in special racks in a dry place and must be protected from knocks and jolts, especially when they are being transported.

As a rule, they should be stood on edge, but thin wheels and wheels with a sharp edge must be laid flat on an even surface.

Grinding wheels must not be allowed to come into contact with oil or grease. An oilsoaked wheel loses its bite and its application is very limited.

18. SELECTION OF SUITABLE GRINDING WHEELS

Grinding wheel markings: For instance WA 46K8V

WA: Kind of abrasive

.6: Grain size

K: Grade

8: Structure

V: Bond type

A. Kinds of abrasive

A: For common steel grinding

WA: For higher hardness material grinding, such as heat-treated steel, alloy steel, etc.

H: Suitable for higher hardness material, particularly high speed steel

C: For cast iron and non-ferrous grinding

GC: For super hard grinding such as tungsten carbide steel

B. Grain size

Coarse: 10,12,14,16,20,24

Medium: 30,36,46,54,60

Fine: 70,80,90,100,120,150,180

Grinding condition \ Grain	Coarse	Fine
Stock removal	much	little
Surface roughness	coarse	fine
works hardness	soft	hard
Surface contacted	wide	narrow
Dia. of the wheel	big	small

C. Grade: It indicate the strength of the bond which hold abrasive

Soft: A to H

Medium: I to P

Hard: Q to Z

Grinding condition \ Grade	Soft	Hard
Works hardness	hard	soft
Surface be contacted	wide	narrow
Movement of work	slow	quick
Wheel speed	quick	slow

D. Structure: The structure number of a wheel refers to the relative spacing of the grains of abrasive; the larger number, the wider the grain spacing.

Close: 0,1,2,3,4,5,

Medium: 6,7,8,9,

Wide: 10,11,12,

Grinding condition \ Structure	Wide	Close
Surface roughness	coarse	fine
Surface be contacted	wide	narrow
Works hardness	soft	hard

E. Bond:

V: Vitrified,

S: Silicate,

B: Resinoid,

R: Rubber,

E: Shellac

19. WHEEL SELECTION TABLE

Wheel Specification		Wheel Diameter		150mm-205mm	205mm-355mm	355-510mm
Material						
STEEL	< HRC 25	WA	46K	WA	46J	WA 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	46I	WA	46H	WA 36H
	Series 300	WA	36J	WA	30J	WA 35I
CAST IRON	Ordinary	C	46J	C	46I	C 35I
	Special	GC	46I	GC	46H	GC 36H

20. REFERENCE FOR GRINDING CONDITION

(1). Downfeed

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

(2). Cross feed

Cross feed	Great	Small
Grinding resistance	great	small
Heat produced	much	less
Surface finish	rough	fine
Wheel worn out	much	little

(3). Table longitudinal traverse

Table traverse	Quick	Slow
Grinding resistance	great.	small
Heat produced	less	much
Surface finish	rough	fine
Wheel worn out	much	little

Suitable speeds of the table traverse

Work material	Soft steel	Heat treated steel	Tool steel	Cast iron
Speed: M/Min.	6-15	20-25	6-25	16-20

(4). Suitable peripheral speeds of wheel : 1200-1800M/Min.

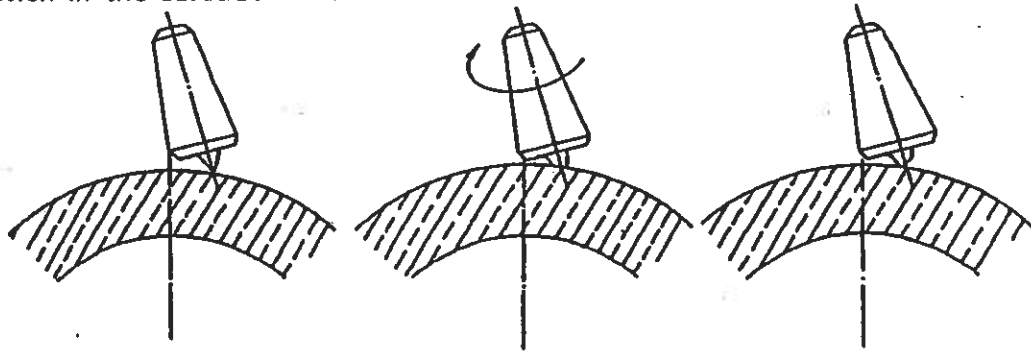
Wheel speed Condition	Quick	Slow
Grinding resistance	small	great
Heat produced	much	less
Surface finish	fine	rough
Wheel worn out	small	great
Safety	bad	better

Material	Peripheral speed
Steel	20-30M/Min.
Cast iron	18-20M/Min.
Tungsten Carbide	8-18M/Min.
Zinc alloy and light metal	25-30M/Min.

USE OF THE OPTIONAL ATTACHMENT

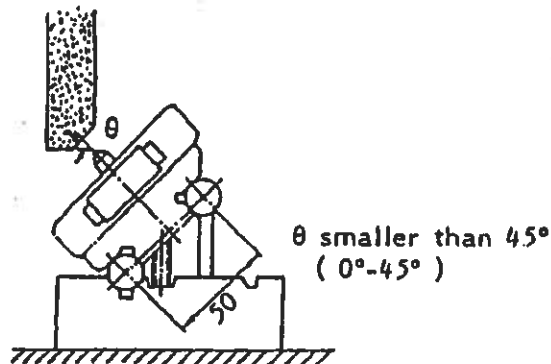
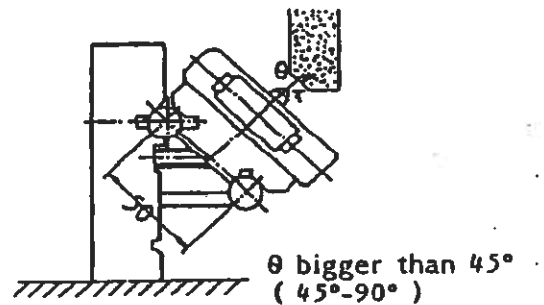
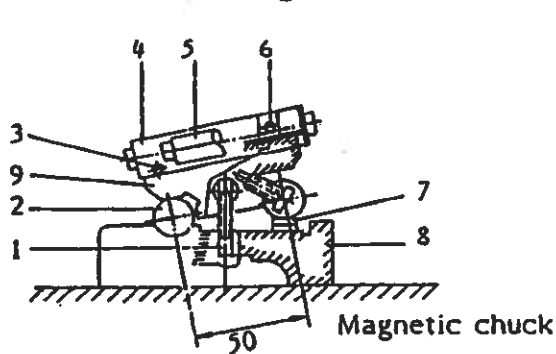
(a). Parallel Dressing attachment (Standard Accessory)

The wheel can be dressed either by diamond tool on the chuck or on the parallel dressing attachment which mounted on spindle carrier. The diamond tool is arranged at an angle to the center line of the wheel as shown on Fig. , so that when the diamond loses its keenness it can be turned an angle, ensuring that there is always a sharp diamond edge available. The dressing method and points are same as "Dressing the wheel". Experience has shown that, with highly accurate grinding, dressing with the diamond which mounted on the magnetic chuck is better than which on the spindle carrier (the former is more stable than latter) as the latter condition will cause slight undulation in 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 level.
- (2) The value in question will be the Sine of the angle times 50. That is $B = \sin \theta \times 50$
- (3) Get a Block gauge the thickness of which equals that of B (or make one)
- (4) Put this Block gauge under the base of the Sine Bar stand. Fix with the fastening bolts and the forming is done.



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

(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 block gauge the thickness of which equals that of B.

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

(4) Press the dial gauge against the surface of the Sine Bar and meanwhile 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

5. Inclinal Magnetic Chuck

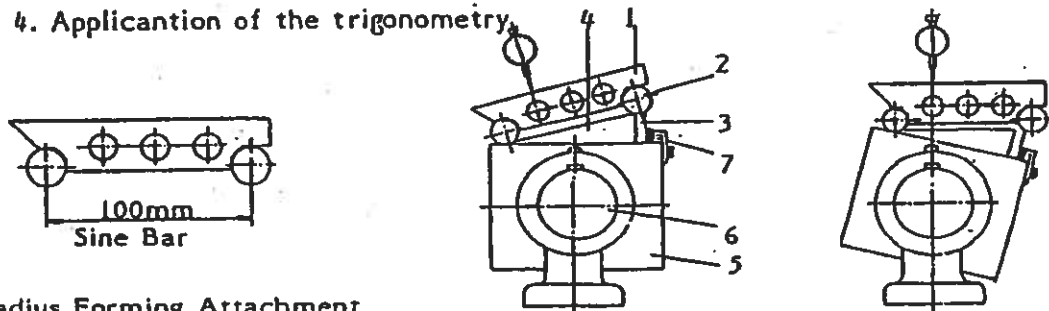
2. Sine Bar

6. Mandrel of the Magnetic Chuck

3. Block gauge

7. Stop block

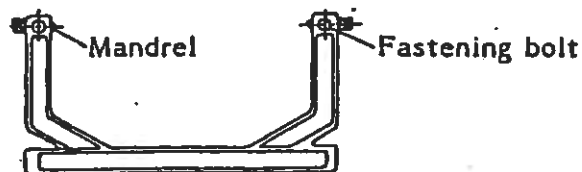
4. Application of the trigonometry.



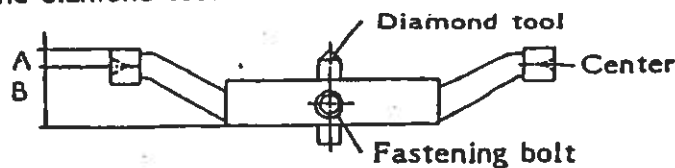
(d). Radius Forming Attachment

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 to mean:

A: the distance between the upper rim and the center

B: the distance between the bottom rim and the center

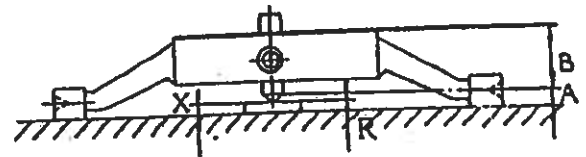
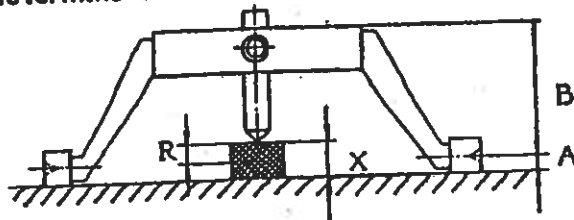
The R forming is the adjustment of the distance between the diamond tool and the swing rod center so that the R shaping results.

(3) To determine the concave and convex R:

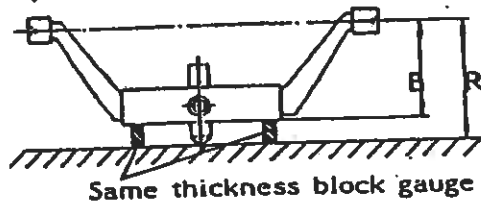
a. If the tool is parallel to the center line, it equals OR.

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 $R = X - A$

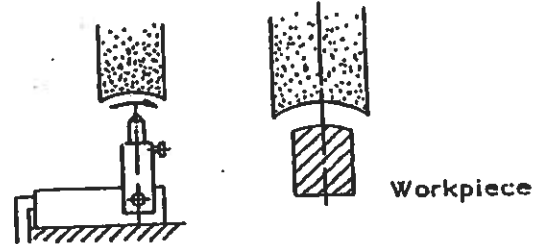
c. To determine the small concave R



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



Same thickness block gauge

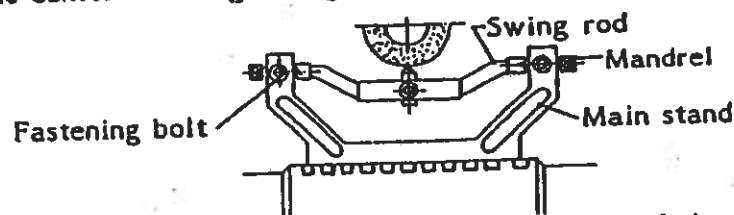


e. Note:

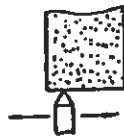
1. The base and side of the grinding wheel shall be well-dressed.
2. The Radius Forming Attachment shall be parallel to the grinding wheel.
3. The diamond tool shall be parallel to the Radius Forming Attachment.

(4) Operation of the Radius forming attachment:

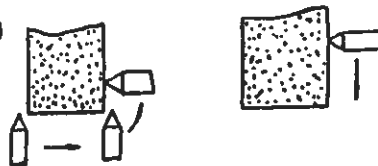
a. Find the center of the grinding wheel. then fix the work table.



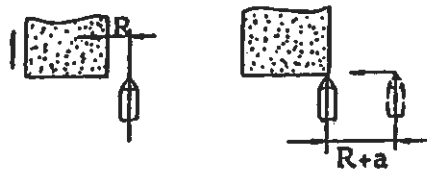
b. Turn the down-feed handwheel at $1/3$ on the width of the wheel so that the wheel cuts into 0.02mm of the diamond tool. Now turn the cross feed handwheel to dress the grinding wheel, and turn the calibration reading on the down feed back to zero.



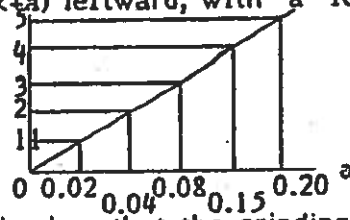
c. Turn the diamond tool over an angle 90° and elevate it into a proper position (greater than the R size in question)



d. Elevate the grinding wheel so that it goes away from the diamond tool and the wheel in such a position 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.



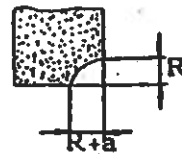
- f. Turn the downfeed handwheel so that the grinding wheel approaches the diamond tool.



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



- h. The wheel finally becomes the following shape.



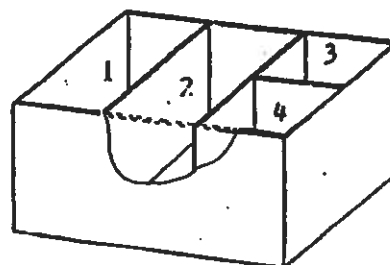
(e). Coolant System (Standard accessory)

Insert the power source plug in socket (at the rear side of electric control box).

Press the pushbutton switch to start the coolant pump, the pump should rotates in clockwise direction, if not, interchange the any two cords of three-cord cable.

Adjust coolant flow by turning the ball valve to suitable rate.

Cooling water collected from table and returns to coolant tank through return hose then filtered in the coolant tank by turns of cabinet #1,2,3,4.

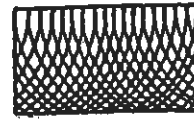
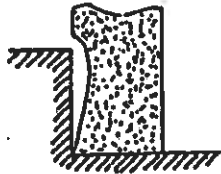


* Coolant tank capacity: 110 liters

* Coolant pump: 1/8 HP

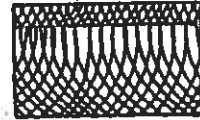
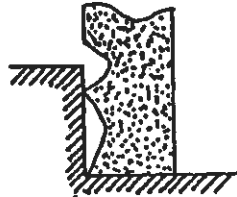
(f) . Common cases in Side Grinding

(1)



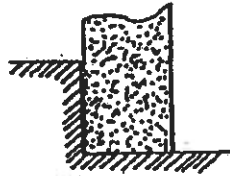
In the case shown in the figure above, the side-grinding wheel and the work have a smaller contact surface, in which case the efficiency is higher, and the surface roughness is better.

(2)



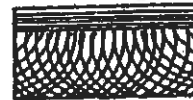
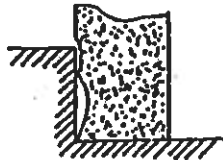
In the figure above, the wheel and the work have two sections of contact, and the surface of grinding is bad. The surface has to be corrected into the shape shown in (1).

(3)



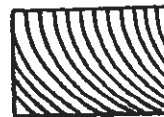
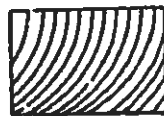
The wheel did not cut to "Relief Angle", thus it contacts the whole face of the work, causing the surface of processing rough and rugged. Also, the greater face of contact will cause burns and cracks.

(4)



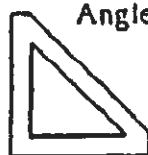
The "Relief Angle" of the wheel is lower than the surface of the work, so that the work face becomes two sections, the upper section resembling that in (3) and the lower section in (1). Now it is necessary to enlarge the "Relief Angle" part so that it will be higher than the face of the work.

(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 :

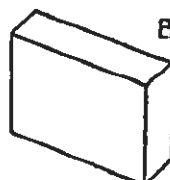


(g) . Right Angle Grinding

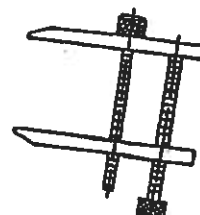
(i) Tools



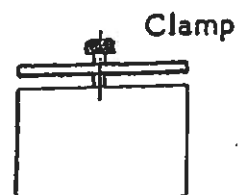
Angle gauge



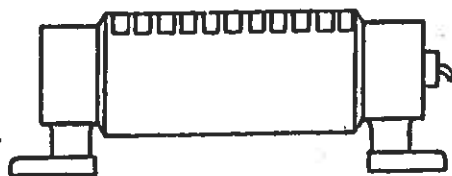
Block



Clamp



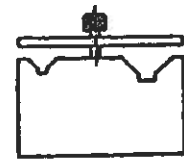
Clamp



Inclined Magnetic Chuck



Block gauge

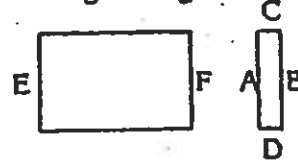


Clamp

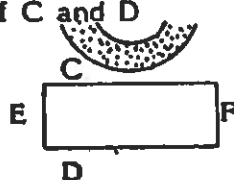
(2) Use of the jigs and tools: take the grinding of the block of six faces A, B, C, D, E, F. For example:

a. Under 200mm:

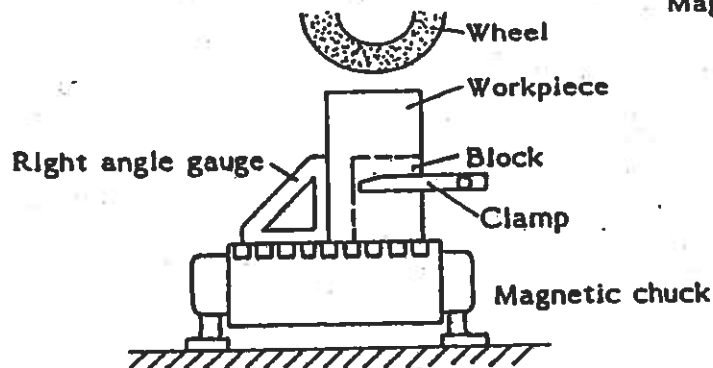
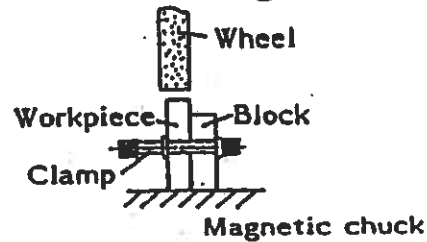
* Grinding of the first basic face, or the surface grinding of A and B,



* Grinding of C and D



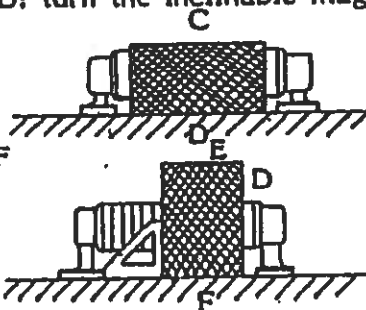
* Grinding of E and F



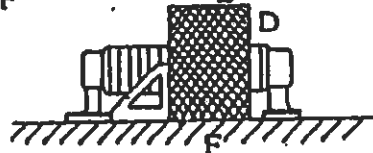
b. Over 200mm:

* Grinding of the first basic face or A,

* Grinding of C and D: turn the Inclined 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 instance, whether the burrs after grinding is done well, whether the tools are 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.

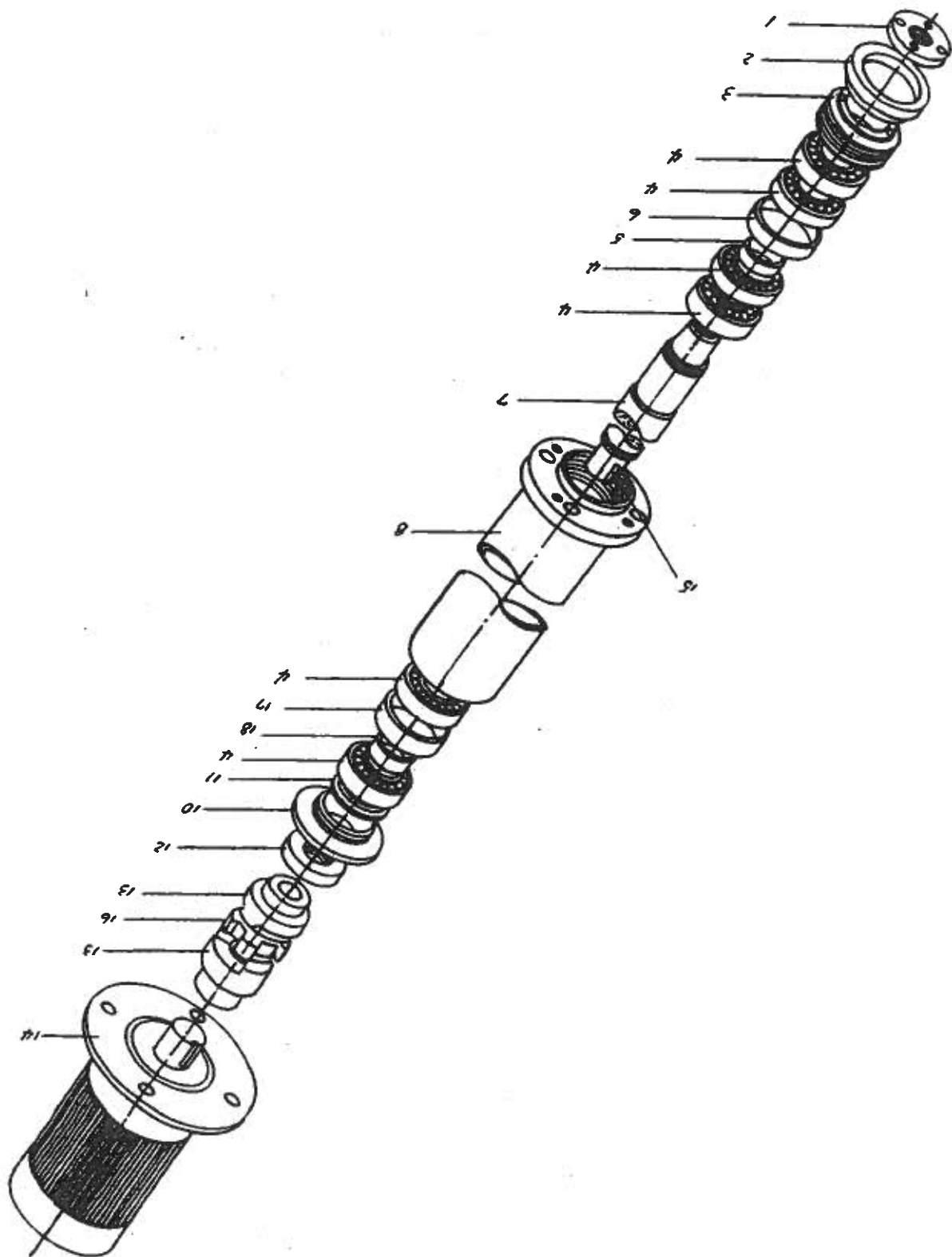
22.Complete Knockdown Drawing & Parts List

Up Column Ass'y.....	47
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UP-COLUMN ASS'Y

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	3468-202	Head A	1
2.	3468-368	Dust Bellows Batten	1
3.	3468-315	Slide Way Of Dust Bellows	1
4.	3468-366	Fixed Plate Of Dust Bellows(Up)	1
5.	3468-331	Dust Bellows	2
6.	2448-325A	Tapper Stick	3
7.	5/16"	Adjusting Screw	3
8.	5/16"	Nut	3
9.	3468-369	Fixed Plate Of Dust Bellows(Bot.)	1
10.	3468-314	Fixed Plate	1
11.	3468-201	Up-Column	1
12.	1/4"	Socket Head Cap Screw	5
13.	3/8"	Socket Head Cap Screw	7
14.	1"	Hexagonal Head Screw	5



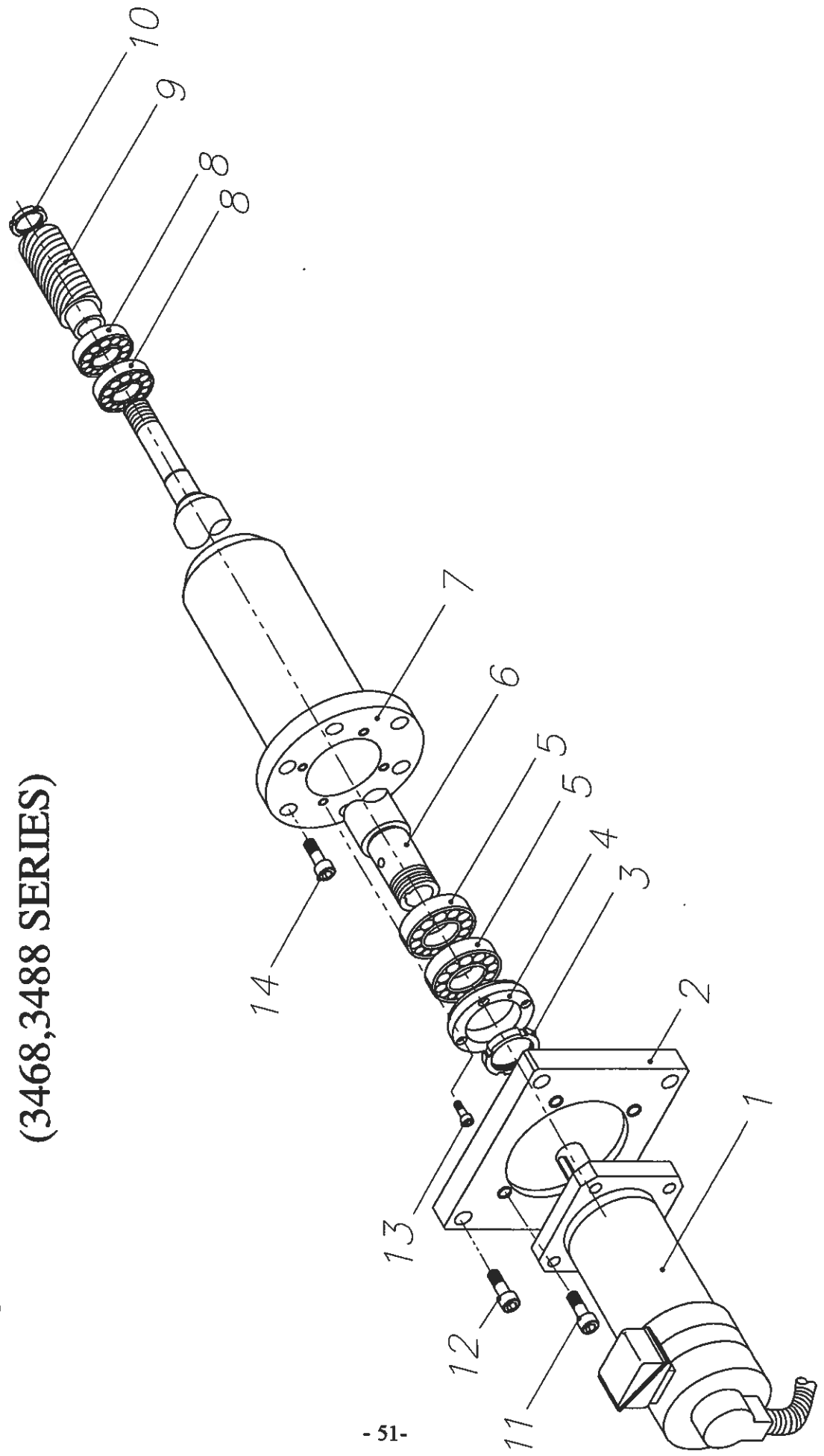
Spindle Set Ass'y

SPINDLE SET ASS'Y

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	T1512-154	Spindle Nut (Front)	1
2.	T1512-153	Spindle Cover (Front)	1
3.	T1512-155	Cover Bush	1
4.	B7215 P4	Bearing	6
5.	T1512-156	Spacer (Inside)	1
6.	T1512-157	Spacer (Outside)	1
7.	3468-352	Spindle Shaft	1
8.	2448-351	Spindle Houshing	1
9.	-----	-----	--
10.	T1512-160	Spindle Cover (Rear)	1
11.	T1512-158	Cover Bush (Rear)	1
12.	T1512-159	Spindle Nut (Rear)	1
13.	MT-125	Coupling	2
14.	15HP*6P	Spindle Motor	1
15.	15*8*552	Key	1
16.	MT-125	Rubber Coupling	1
17.	T1512-162	Spacer (Outside)	1
18.	T1512-161	Spacer (Inside)	1

UPPER&LOWER DRIVE ASS'Y (3468,3488 SERIES)

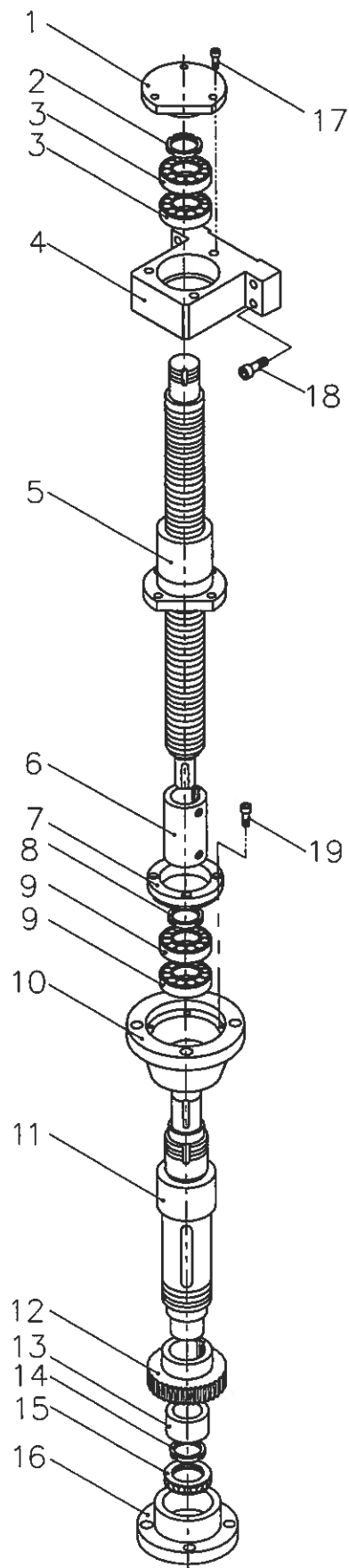


UPPER&LOWER DRIVE ASS'Y

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	CN800T	Servo Motor	1
2.	3468-544	Bracket	1
3.	YSR M40×P1.5	Nut	1
4.	3468-545	Cover of bearing	1
5.	B7208	Bearing	2
6.	3468-541A	Transmission Shaft	1
7.	3468-543	Shaft Housing	1
8.	B7206	Bearing	2
9.	2448-218	Worm Shaft	1
10.	YSR M40×P1.5	Nut	1
11.	3/8"	Socket Head Cap Screw	4
12.	3/8"	Socket Head Cap Screw	4
13.	1/4"	Socket Head Cap Screw	4
14.	5/16"	Socket Head Cap Screw	6

UPPER&LOWER TRANSMISSION ASS'Y (3468,3488 SERIES)



UPPER&LOWER TRANSMISSION ASS'Y

(3468,3488 SERIES)

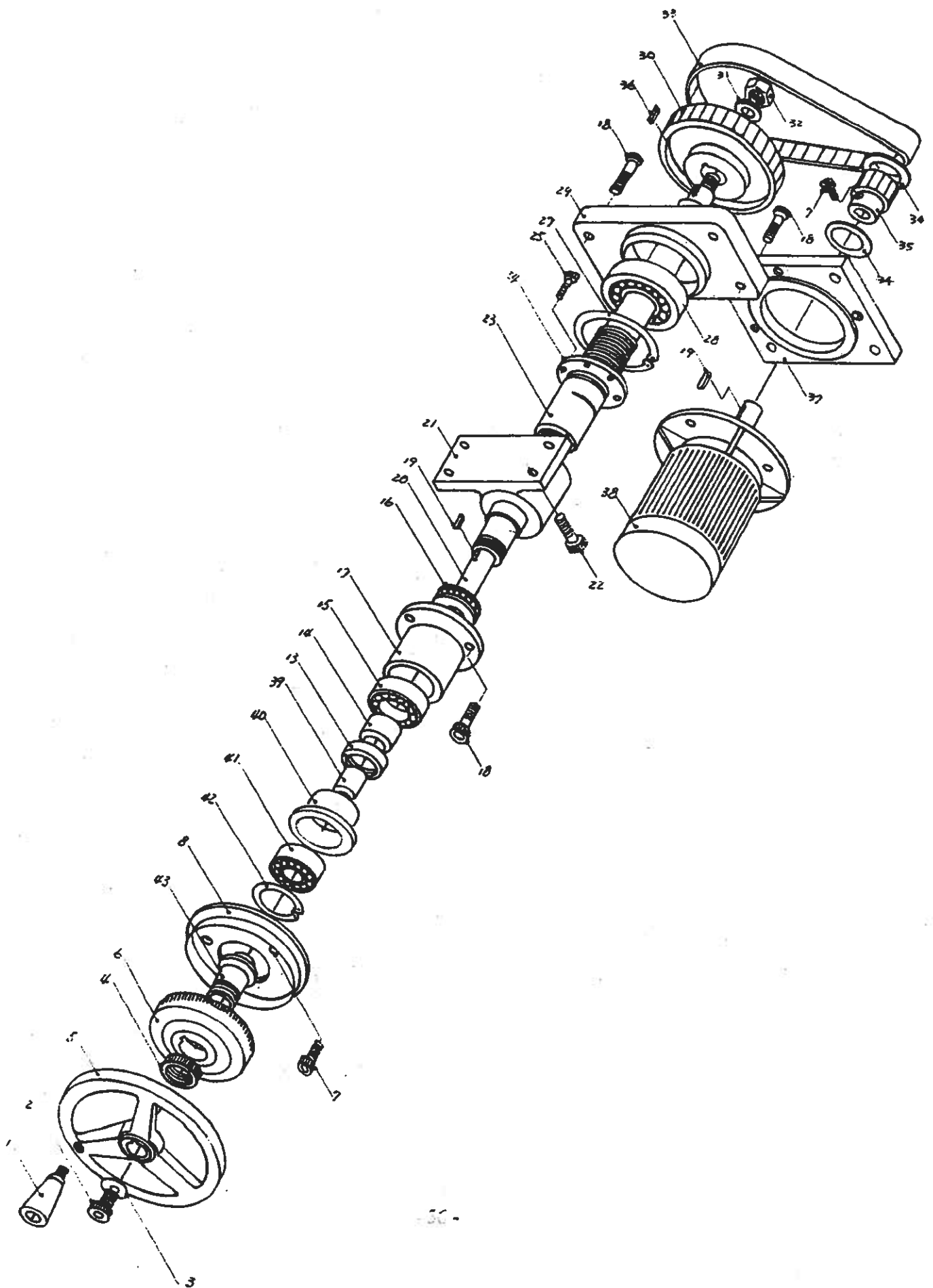
Index No.	Parts No.	Parts Name	Q'ty
1.	1512-507	Bearing Cover	1
2.	YSR M40×P1.5	Nut	1
3.	B7208	Bearing	1
4.	3468-506	Bearing Base	1
5.	3468-238-1	Lead Ball Screw	1
6.	2448-240	Coupling	1
7.	2448-224	Bearing Cover	1
8.	YSR M30×P1.5	Nut	1
9.	B7206	Bearing	1
10.	2448-223	Bearing Base	1
11.	3468-221	Worm Shaft	1
12.	2448-222	Worm Gear	1
13.	3468-221-1	Spacer	1
14.	YSR M40×P1.5	Nut	1
15.	51306	Bearing	1
16.	2448-220	Bearing Cover	1
17.	5/16"	Screw	3
18.	3/8"	Screw	4
19.	1/4"	Screw	4

CROSS-FEED ASS'Y

(3468,3488 SERIES)

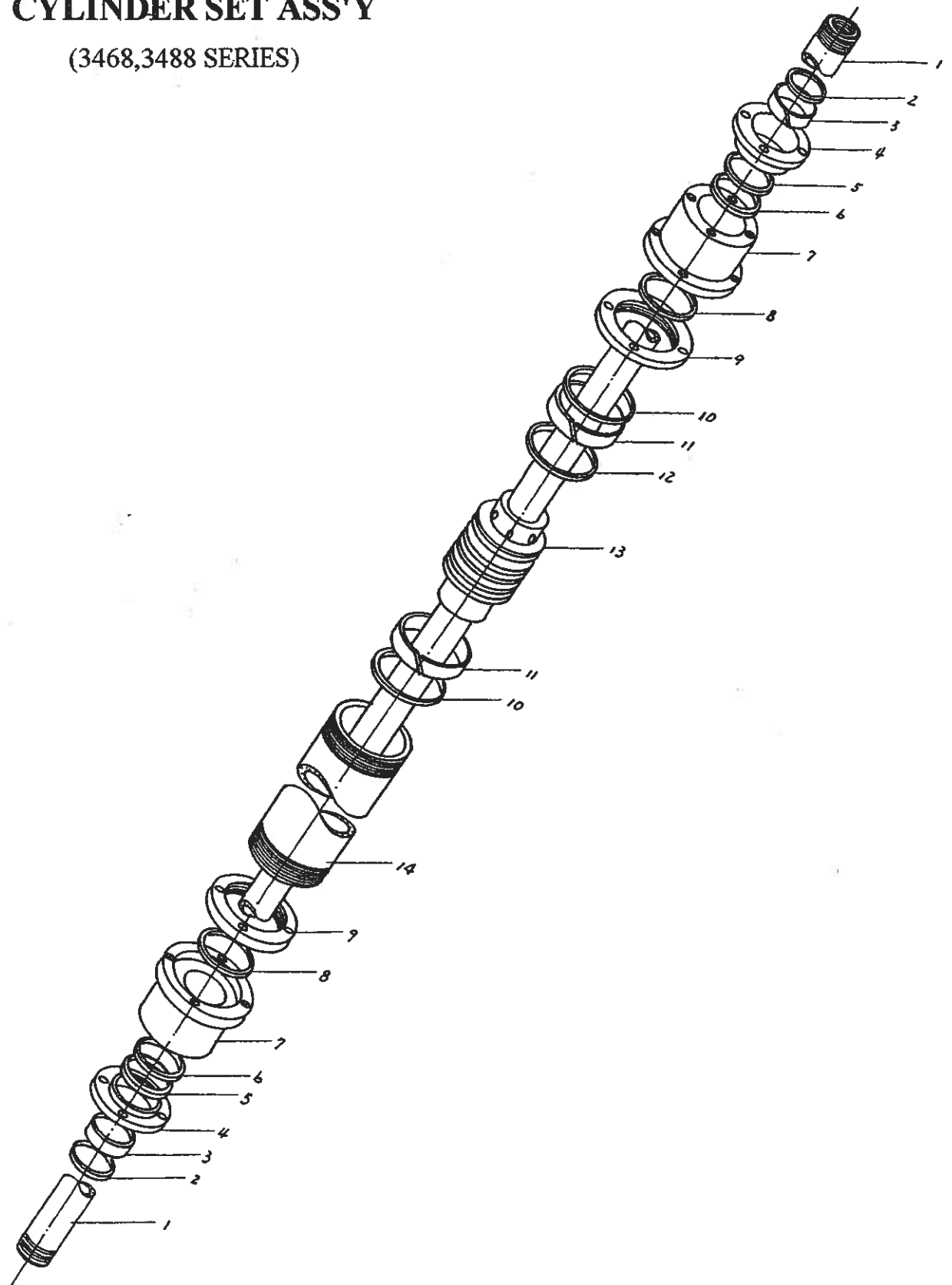
Index No.	Parts No.	Parts Name	Q'ty
1.	1020-728	Hand Grip	1
2.	W 1/4"*5/8"L	Socket Head Cap Screw	1
3.	2040-414	Washer	1
4.	2040-402	Nut	1
5.	1020-714	Hand Wheel	1
6.	2040-404	Graduation Dial	1
7.	W 1/4"*1/2"L	Socket Head Cap Screw	7
8.	2040-405	Dial Holder	1
13.	2448-432B	Lock Nut	1
14.	2040-409	Washer	1
15.	B5205	Bearing	1
17.	2448-435A	Bearing Housing	1
18.	W 3/8"*1"L	Socket Head Cap Screw	15
19.	5*5*20L	Key	1
20.	3468-439	Cross Feed Ball Screw	1
21.	2448-478	Ball Screw Nut Base	1
22.	W 1/2"*1 3/4"L	Socket Head Cap Screw	4
23.	2448-439-1	Cross Feed Nut Of Ball Screw	1
25.	W 5/16"*1 1/4"L	Socket Head Cap Screw	6
27.	R-52	Snap Ring	1
28.	B 1205Z	Bearing	1
29.	2448-443	Bearing Housing	1
30.	2040-411	Timing Belt Pulley	1
31.	W 1/2"	Washer	1
32.	W 1/2"	Hexagonal Nut	1
33.	P 3/8"*330H	Timing Belt	1
34.	2040-413	Timing Belt Pulley Flange	2
35.	2040-412	Timing Belt Pulley	1
36.	5*5*25L	Key	1
37.	2448-447A	Cross Feed Motor Fixed Plate	1
38.	1/4 HP*6P	Cross Feed Motor	1
39.	2040-442	Washer	1
40.	2040-440	Bearing Seat	1
41.	B 2203	Bearing	1
42.	R 40	Snap Ring	1
43.	2040-441	Set Spacer	1

Cross Feed Ass'y



CYLINDER SET ASS'Y

(3468,3488 SERIES)

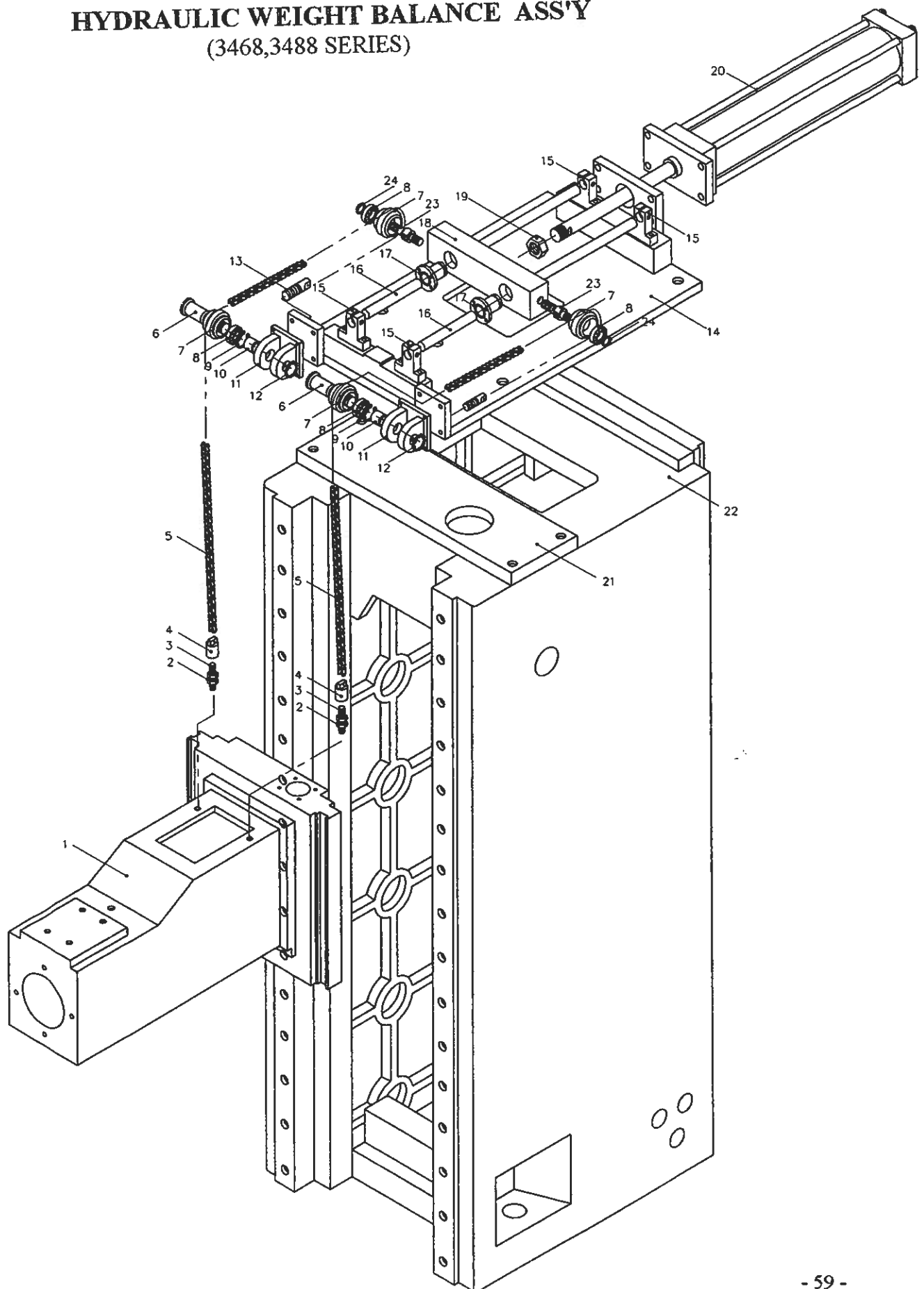


CYLINDER SET ASS'Y

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	3468-331	Cylinder Rod	2
2.	LBH 40*48*5*6.5	Dust Seal	2
3.	40*45*1.5	Wear Ring	2
4.	3468-329	Cover	2
5.	USH 40*50*6	U -Packing	2
6.	OSR 40	Packing	2
7.	3468-332	End Cover	2
8.	G 65	O Ring	2
9.	3468-333	Lock Nut	2
10.	USH 60*70*6	U -Packing	2
11.	60*55*15	Wear Ring	2
12.	OSP70	Packing	1
13.	3468-335	Piston	1
14.	3468-334	Cylinder Pipe	1

HYDRAULIC WEIGHT BALANCE ASS'Y (3468,3488 SERIES)



HYDRAULIC WEIGHT BALANCE ASS'Y

(3468,3488 SERIES)

Index No.	Parts No.	Parts Name	Q'ty
1.	3468-202	Head A	1
2.	5/8"	Nut	1
3.	2448-346	Adjust Screw	1
4.	2448-345	Connector Of Chain	1
5.	CP 5/8	Chain	1
6.	2448-348	Shaft Of Chain Wheel	1
7.	2448-349	Chain Wheel	1
8.	6003ZZ	Bearing	1
9.	R35	Inner Snap Ring	1
10.	2448-350	Spacer	1
11.	2448-341	Base Of Chain Wheel	2
12.	S17	Outer Snap Ring	1
13.	2448-347	Connector Of Chain	1
14.	3468-370	Base Of Balance Structure	1
15.	SS30	Holder Of Shaft	1
16.	SF30	Shaft	1
17.	LF30-N-TYPE	Linear Bearing Of Flange Type	1
18.	3468-371	Connect Plate	1
19.	M20*P1.5	Nut	1
20.	FA50B*425	Cylinder	4
21.	3468-314	Fasten Plate	4
22.	3468-201	Up Column	1
23.	2448-372	Shaft Of Chain Wheel	4
24.	YSRM17*P1	Nut	1