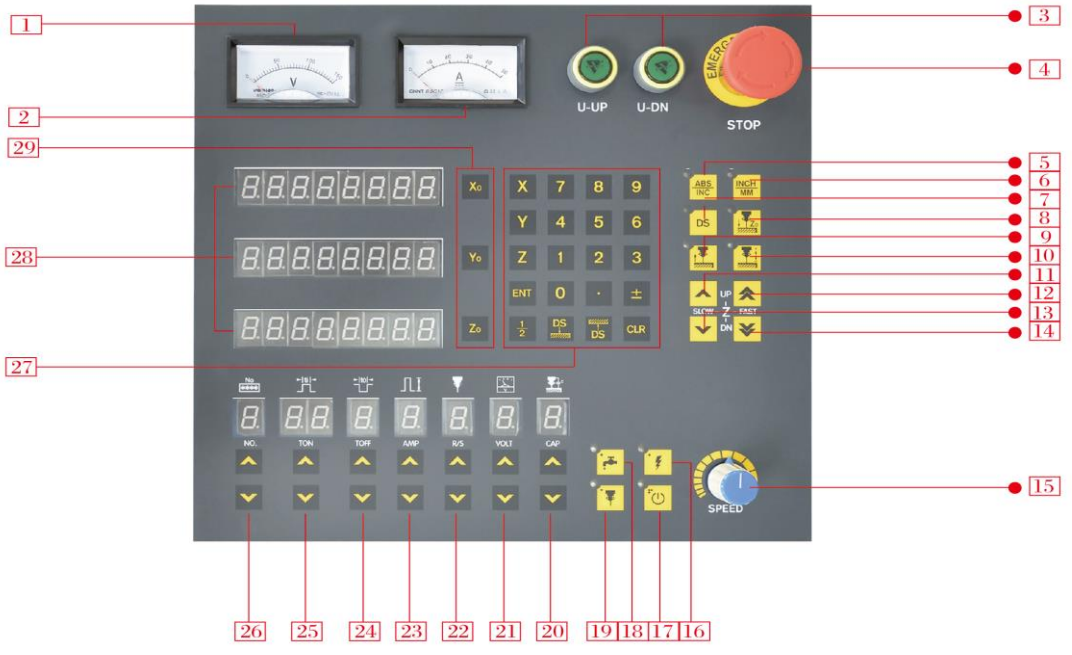
CONTENT

1. Operation panel



Layout of control panel

1 voltage meter

Indication of gap voltage of machining.

2 Ampere meter

Indication of machining current

3 W axis lift switch of up and down

Press UP, W axis moves upward. Press DW, W axis moves downward

4 Emergency stop switch

When power up machine, loosen this switch. When emergency situation happens, press this button to cut off the power.

5 ABS/INC Coordinate 

Function of digital readout, ABS indicates absolute coordinate, the indication light is off at default status. INC indicates relative coordinate, the indication light is on at default status. Operator can set 0 of workpiece at ABS

coordinate, and then change to INS for machining process in INC coordinate. Set 0 in any position of INC coordinate will not affect 0 position found in ABS coordinate.

6 Inch/ metric 

Show position as INCH or METRIC unit, light on is INCH and light off is METRIC.

7 Pre-set depth drilling function 

Light on, this function is ON.

How to use pre-set depth machining for blind hole popping: it's a mode get contain depth from surface of workpiece, when discharging is done, head will go back to top surface of workpiece.。

Pre-set depth parameters could be set during machining or input coordinate value directly.

Machining setting:

① Set Zero for coordinate

Press tool setting button, light is on. Spindle feed speed is adjustable by rotary switch.

When buzzer is giving sound, set Z axis zero, then move spindle upward to keep 2-5mm distance from workpiece.

② Sample trial

Do hole drilling on workpiece until needed depth, turn of machining, and press 

once for record, when press down 

, value of DRO of Z axis sparkles twice. For example, actual needed depth is 20mm, regularly considering wear ratio of electrode 100%, Z axis needs to go down to 40mm.

③ Back upward

Move electrode out of workpiece, and keep distance between electrode and workpiece 2-5mm, at this moment, press 

(Z axis coordinate sparkles twice). At this moment, actual depth of machined blind hole could be checked by DRO of Z axis, if actual depth of hole is not satisfied as need,

operator can adjust value do trail again.

④ Machining

Move X and Y axis to target position according to DRO of X and Y axes.

Press down DS button to start pre-set depth machining.

During machining, Z axis start to count at the moment electrode touches the workpiece.

⑤ End of machining

When job is done, press DS, light's off, quit pre-set depth machining model.

Sample trail setting of pre-depth machining without machining:

For instance: consider wear ratio of copper tube 100%, if actual needed depth is 20mm, first set Z axis Zero, manually move Z axis down to 40mm and press DS button, and record down face. Then move up electrode 22mm, press DS, retrace to up face. Open DS to do trial machining.

Sample of pre-set depth machining:

15mm blind hole machining

① Z axis set Zero, manually move Z axis downward 30mm, press DS to record down face. Move Z axis upward 15mm, and then press DS to record up face, open DS to start pre-set depth machining.

② When machining is done, pull electrode out of workpiece, and record actual machined depth is 14mm,(first set Z axis Zero, when electrode get out of workpiece, move X and Y axis and make electrode touch the surface of workpiece)

③ Actual wear ratio of electrode=(worn length)÷(actual machined depth)×100

(30-14)÷14×100=114%

④ Actual worn length of machining = actual machined depth×(1+wear ratio÷100)

15×(1+114÷100)= 32.1

⑤ Reset down face as 32.1mm and up face as 17mm, start real pre-set depth machining.

8 Automatic backward function 

When this function is at ON status, when machining stop, electrode will go upward to a certain position automatically. The certain position means after machining is done, electrode moves upward from machining stop position to random position, and this position was set before machining.

For example, Z axis DRO coordinate input or manually adjusted with 50mm, press CLR button to record, then open automatic backward function, light's on. When machining is done, electrode move upward 50mm.

9 Tool setting switch 

Press tool setting switch, light of  is on. Rotation motor's opened automatically (also could be stopped manually), adjust rotation switch to change different model, edge touching, slow speed and fast speed.

[edge touching] status, spindle doesn't rotate, edge touching and centering could be done under this mode.

[slow speed] status, spindle goes downward slowly until electrode touches the workpiece and gives alarming.

[fast speed] status, spindle goes downward quickly until electrode touches the workpiece and gives alarming.

When electrode touches workpiece, buzzer is giving small sound. There is tiny spark between electrode and workpiece, and

For edging and centering, use this function with DRO 

★ During regular machining, don't open this function.

10 Electrode repair switch 

When do deep hole popping, carbon deposition might happen to affect machining status, use this function to repair head of electrode until recover normal machining status. Light's off means function off.

11 Up lift switch 

At manual mode, move Z axis upward slowly. 

12 Up lift switch

At manual mode, move Z axis upward swiftly, press this button for 3 second, Z axis move quickly backward to top limit position.

13 Descend switch 

At manual mode, move Z axis downward slowly.

14 Descend switch 

At manual mode, move Z axis downward swiftly. 。

15 Potentiometer 

(1) During machining, adjust it to change gap voltage and current of machining. Clockwise rotate it to reduce gap voltage to increase machining current. Counterclockwise rotate it to increase gap voltage to decrease machining current. Normally potentiometer shall be adjusted to match machining parameters to make sure machining current stable. Regular machining voltage should stabilize in the range of 20~25V.

(2) The adjusted range of potentiometer is 60° from center to left and right side.

16 High frequency switch 

Open high frequency switch, high HF power is on. Voltage meter shows impulse machining voltage, electrode and workpiece got electricity on, hand touching is forbidden.

DRO function area

17 One key machining 

After setting up machining parameters, press one key machining, and machine starts to do machining itself.

18 pump switch 

Open pump, water comes out of electrode. Before machining, check if water comes out correctly.

19 Switch of spindle rotating 

Spindle rotates according to pre-set speed smoothly.

Press down the switch, rotating motor start to rotate.

★ Rotating direction should be clockwise(observation from top, pre-set in the factory)

★ If it's difficult to take seal ring out, operator can use water pump switch to flushing seal ring out.

20 gap capacitance (0~4) CAP

Parallel electrode capacitances, it can increase machining speed. High set value, faster machining speed, but wear of electrode increased accordingly. If electrode capacitances are not used, when process hard alloy, speed would be very slow, to it's necessary to use gap capacitance, of course, according to practical situation

21 Machining voltage (1-3)VOLT

When process tiny hole, low voltage shall be chosen, high voltage with big current will burn electrode, to cause machining not sustainable. Electrode with diameter less than 0.5mm, choose medium voltage; below 0.3, choose low voltage.

Diameter of electrode	Set value	Output voltage
Above Φ0.7mm	1or 2	76V
Around Φ0.3mm	2or 3	63V
Around 0.15mm	3	47V

0 and 4 not voltage output

22 speed adjustment of rotating head(1-F)R/S

When machining is unstable or there's special requirement of diameter accuracy, operator can adjust rotating speed to increase stability and effectiveness of machining. But regularly, no need to adjust it, use it's default setting.

23 Power amplifier (1-8) AMP

More AMP, larger machining current, faster machining speed, but wear increased, so adjust it properly.

24 High frequency interval (0-F) TOFF

TOFF is mainly relative to machining stability and chip removal capacity. Bigger TOFF value, much easier to remove chips, but machining speed goes down.

25 High frequency width (0-99) TON

TON is mainly relative to surface finish and wear of electrode. Bigger Ton valve, less wear of electrode, faster machining speed, but surface finish is getting worse.

26 segment number

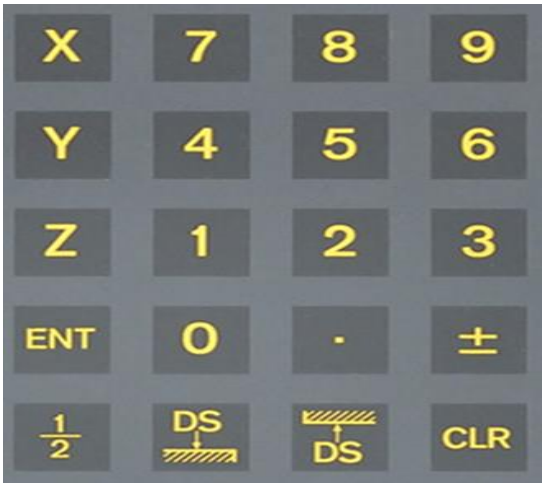
System default setting has 16 groups machining parameters as below table:

Machining parameters

No.	Electrode dia.	Material	TON	TOFF	AMP	R/S	VOLT	CAP
0								
1	Φ0.15	-	2	3	1	F	3	1
2	Φ0.2	-	2	5	2	F	3	1
3	Φ0.3	-	4	3	2	F	3	1
4	Φ0.4	-	6	9	3	F	3	1
5	Φ0.5	-	9	9	4	F	3	1
6	Φ0.6	-	7	8	3	F	2	1
7	Φ0.7	-	7	9	4	F	2	1
8	Φ0.8	-	9	8	4	F	2	1
9	Φ0.9	-	9	9	5	F	2	1
A	Φ1.0	-	14	8	5	F	2	1
B	Φ1.5	-	16	9	6	F	2	2
C	Φ2.0	-	20	9	7	F	2	2
D	Φ2.5	-	25	A	8	F	2	3
E	Φ3.0	-	28	9	8	F	2	3
F	>Φ3.0	-	38	A	8	F	2	3

★ Group 0 is user setting, it could be changed by operator

27 Digital readout control area



Sample: X axis, input “88”

First press “X” and then input number “88”and press “ENT”

Y axis, input “-88”

First input number “88”, then press “Y” and “±” and press “ENT”.

28 Zero clearing of coordinate

29 display coordinate

30 machining speed

Side of operate box:

Status	Left	Center	Right
Aligning	Edge touch	Slow	Fast
Machining	Slow	Medium	Fast

Pressed	Penetration
Not pressed	Normal

Aligning status refers to explanation of aligning button

At fast speed status, machining speed of spindle could be adjusted by this switch, to guaranty stability.

Fast: diameter of electrode $\Phi 0.7 \leqslant D \leqslant \Phi 1.5$

Medium: regular status that widely used.

Slow: diameter of electrode $\leqslant \Phi 0.5$. For machining of hard alloy, aluminum, titanium. When electrode is shaking, the machining is pretty unstable, use this function.

Penetration: when it needs to drill through down side of electrode, use this.

2. Machining sequence

2.1 Procedure before machining

（1）Setup of workpiece

Put workpiece on the table and fasten.

（2）Install electrode

Install electrode into check of spindle head.

（3）Check working fluid

Open pump and check if working fluid comes out of electrode correctly.

（4）Adjustment of location where to make hole

Use hand wheel of X and Y axis to move to target position according to DRO.

Adjust W axis (2nd of Z axis), keep distance between electrode and workpiece about 3~5mm

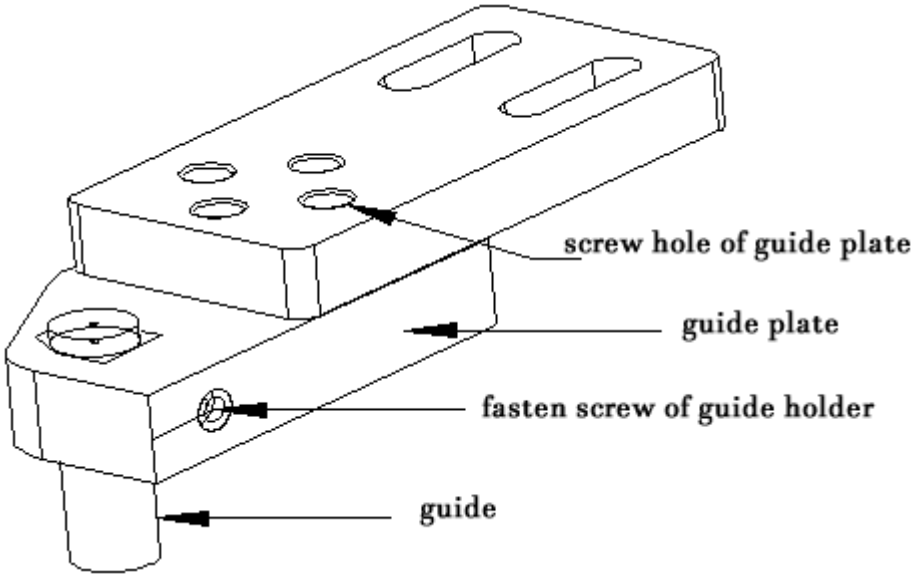
（5）Setting of machining parameters

Set parameters, choose suitable speed

（6）Start

Press “One key machining” key to start drilling.

2.2 Set guide of electrode



Suitable guide shall be used accordingly to different diameter electrode, and guide must be

fastened firmly. 要使用适合铜管电极直径的电极导向器，把电极导向器牢牢地安装在导向板孔内。

2.3 Installation of electrode

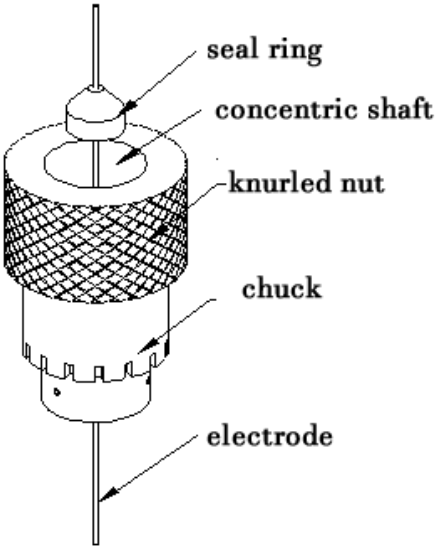
（1）check electrode

a. Choose good quality electrode with good straightness

b. Make sure electrode is not blocked. (especially below Φ0.5mm)

How to check? Simply blow with mouth and the other side submerged in the water,, check if there is bubbles.

（2）Installation of electrode

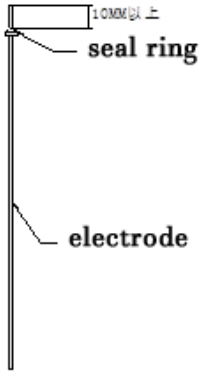


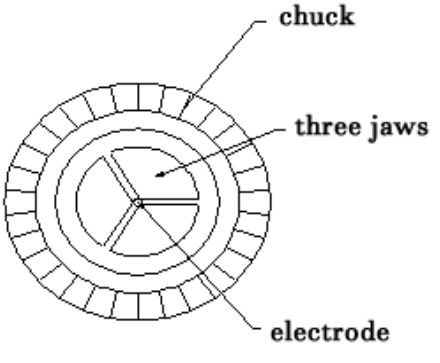
Install electrode according to above graph.

★ Suitable seal shall be used according to diameter of electrode.

★ Don’t bend electrode during operation.

★ Taper part of seal heads up and match the taper of motor inside





Top side of electrode should exceed seal more than 10mm.

As there are three jaws of chuck, so the electrode should be installed in the center of these jaws.

★ when use electrode with diameter less than Φ0.5mm, to avoid damage of electrode, don't use spanner with too much strength. Or it will bend electrode and affect flushing.

（3）Installation of electrode chuck.

a. Open machining switch and adjust potentiometer and move spindle upgrade to top limit position.

b. Left hand hold knurled nut of electrode holder and aim to down side of rotation motor(inner taper tread), right hand open rotation motor switch, knurled automatically goes up to lock. (When knurled nut rotates with motor and not more holding). For electrode more than Φ1.0mm, it needs to press lock screw cap of electrode chuck(upside) to lock again.。

c. Use special wrench to lock three jaws.

d. Keep electrode rotating, press manual up and down switch, and move spindle downward to make sure electrode go through center of guide, stop when electrode get out of down side of guide. Don't bend electrode.

2.4 Installation of workpiece

（1）Put workpiece on stainless steel fixture on working table, and fasten temporarily.

（2） Set magnetic base of micrometer at cover of down side of spindle, adjust straightness and positioning of workpiece, then fastened workpiece tightly.

2.5 Method of locating position to drill

（1）Open aligning(tool setting) switch, head rotation switch and machining switch, move spindle goes down(rotating), let electrode exceed down side of guide about 20~30mm.

（2）move X and Y axis towards workpiece until side of electrode touches the side of workpiece. At this moment, it's necessary to clean workpiece, as oil, water or dirt will affect positioning accuracy, so clean it.

（3）When electrode touches the side of workpiece, then buzzing, and stop moving X and Y axis.

★ If electrode touches workpiece too much, it will bend and affect drilling performance. So it's necessary to be cautious.

（4） After side decided, move electrode upward, not to touch workpiece, then X and Y axis to target location according to reading of DRO.

★ Diameter of electrode should be taken in to consideration when move X and Y axis, supplement the difference.

2.6 Setting of machining parameters

Set suitable parameters according to diameter of electrode, machining efficiency and material of workpiece.

Below parameters table are just for reference (these parameters might be different according to different circumstance)

diameter:Φ0.15mm			Material of electrode: brass				Water pressure: 10 (Mpa)		
material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SS	6	2	3	1	F	4	1	medium	1′30″
SS	4	3	5	2	F	4	1	Low	1′05″
SKD11	8	3	5	2	F	4	1	Low	3′30″
CR12	10	4	3	1	F	4	1	Low	4′30″
brass	15	2	3	1	F	3	1	medium	6′10″
diameter:Φ0.15mm			Material of electrode: copper				Water pressure: 10 (Mpa)		
tungsten	5	3	5	2	F	4	1	Low	4′30″
tungsen	5	2	3	1	F	3	1	Low	5′30″
VIKING	7	2	3	1	F	3	1	Medium	8′30″
VIKING	11	3	5	2	F	4	1	Low	12′50″
SKD61	5	2	5	2	F	4	1	Medium	3′05″

(above parameters are suitable for tiny electrode with diameter less or smaller than Φ0.15mm)

Diameter:Φ0.2mm			Material of electrode: brass				Water pressure: 8.5 (Mpa)		
Material	height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SS	6	3	7	3	F	3	1	Medium	20″
Bearing	5.5	2	3	3	F	3	1	Medium	58″

steel									
AK80	22	4	3	1	F	3	1	Medium	4′55″
45#	7	3	3	1	F	3	1	Medium	1′30″
Aluminum	17	4	3	1	F	3	2	Medium	3′35″
Diameter :Φ0.2mm			Electrode material: copper				Water pressure: 8.5 (Mpa)		
tungsten	5	2	3	1	F	3	1	Low	2′15″
tungsten	8	4	3	2	F	3	1	Medium	7′05″
tungsten	10	2	5	2	F	3	1	Medium	7′50″
tungsten	18	4	3	2	F	3	1	Medium	18′
tungsten	35	3	5	2	F	3	1	Medium	35′
SKD61	5	2	5	2	F	4	1	Medium	3′25″
brass	15	2	4	2	F	3	1	Medium	2′50″
Diameter :Φ0.3mm			Electrode material: copper				Water pressure: 7.5 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	22	4	3	2	F	3	2	Medium	1′
SKD11	30	3	5	3	F	3	1	Medium low	1′30″
SKD11	42	4	3	2	F	3	1	Medium	2′35″
SKD11	42	4	5	3	F	3	1	Medium low	3′15″
CR12	34	4	5	3	F	3	2	Medium	2′25″
CR12	40	4	3	2	F	3	1	Low	3′20″
SS	40	4	3	2	F	3	1	Medium	1′38″
SS	26	3	3	2	F	3	1	Medium	1′13″
45#	30	4	5	3	F	3	1	Low	2′30″
AL	32	3	6	2	F	1	3	Medium	25″
diameter:Φ0.3mm			Electrode material: copper				Water pressure: 7.5 (Mpa)		
tungsten	9	4	3	2	F	3	1	Low	7′15″
tungsten	15	4	4	3	F	3	1	Low	4′20″
tungsten	19	2	3	2	F	3	1	Low	7′30″
tungsten	30	4	7	4	F	3	1	Low	9′
tungsten	50	4	7	4	F	3	1	Low	16′

Copper	10	5	6	3	F	3	1	Medium	3′
Copper	20	5	6	4	F	3	1	Medium	6′

Electrode:Φ0.4mm			Electrode material: brass				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	40	7	A	3	F	3	1	Low	3′05″
SKD11	40	6	9	3	F	3	1	Medium	2′16″
45#	42	8	B	3	F	3	1	Low	3′17″
SS	40	5	8	3	F	3	1	Low	3′18″
SS	40	6	9	3	F	3	1	Medium	2′02″
Aluminum	60	7	A	3	F	1	3	low	3′10″
Electrode:Φ0.4mm			Electrode material: copper				Water pressure: 7 (Mpa)		
Tungsten	30	4	6	3	F	3	1	Low	5′55″
Copper	30	6	9	4	F	3	1	Medium	4′21″
copper	39	7	7	3	F	3	1	Medium	5′35″
Electrode:Φ0.5mm			Electrode material: brass				Water pressrue 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	42	7	A	3	F	2	1	High	1′10″
SKD11	42	10	B	2	F	1	1	High	1′12″
45#	30	10	8	3	F	2	1	Medium	1′22″
45#	30	6	7	3	F	1	1	High	1′06″
SS	40	7	A	3	F	2	1	Medium	1′33″
SS	40	6	B	3	F	1	1	High	1′10″
Aluminum	60	9	A	4	F	1	1	Medium	1′20″
Electrode:Φ0.5mm			Electrode material: copper				Water pressure: 7 (Mpa)		
Tungsten	9	5	8	3	F	3	1	Low	1′20″
Tungsten	15	6	9	3	F	3	1	Low	4′35″
Tungsten	25	5	7	3	F	3	2	Low	8′18″
Tungsten	30	4	8	4	F	3	1	Low	9′15″
copper	43	10	A	5	F	3	1	Medium	5′50″

Electrode:Φ0.6mm			Electrode material: brass				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
CR12	30	7	A	3	F	1	1	High	50″
CR12	40	12	A	5	F	3	1	High	1′12″
SS	40	12	B	5	F	3	1	High	1′06″

45#	42	7	A	4	F	2	1	High	1′08″
45#	42	9	A	4	F	2	1	High	1′08″
AL	60	10	A	4	F	1	1	Medium	1′12″
Electrode:Φ0.6mm			Electrode material: copper				Water pressure: 7 (Mpa)		
Tungsten	16	6	A	3	F	2	1	Low	7′20″
Tungsten	25	7	A	3	F	3	1	Low	11′50″
Tungsten	25	6	9	4	F	3	1	Low	12′55″
Copper	39	12	A	5	F	3	1	Medim	2′30″

electrode:Φ0.7mm			Electrode material: brass				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	42	8	7	3	F	2	1	High	1′50″
AK80	50	12	9	3	F	2	2	High	1′16″
45#	40	10	6	3	F	1	1	High	1′05″
45#	40	14	7	3	F	2	1	High	1′20″
Carbide	200	14	7	4	F	1	1	High	10′30″
CR12	40	8	A	4	F	2	1	High	1′22″
AL	60	12	A	4	F	1	1	Medium	1′10″
Diameter:Φ0.7mm			Electrode material: copper				Water pressure : 7 (Mpa)		
Tungsten	25	8	9	5	F	3	1	Low	4′15″
Tungsten	30	7	A	5	F	3	1	Low	6′30″
Tungsten	50	7	A	3	F	2	1	Low	12′
Copper	39	10	B	4	F	2	1	Medium	4′15″
diameter:Φ0.8mm			Electrode: brass				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	42	14	8	4	F	2	1	High	1′04″
SKD11	42	9	5	4	F	1	1	High	1′
CR12	40	10	6	4	F	1	1	High	57″
SS	40	9	5	4	F	1	1	High	55″
45#	40	10	7	4	F	1	1	High	1′23″
brass	52	10	C	4	F	2	1	High	2′
AL	60	41	9	4	F	1	1	High	1′
Diameter:Φ0.8mm			Electrode material: copper				Water pressure 7 (Mpa)		
Tungsten	22	5	9	4	F	3	1	Low	1′23″
Tungsten	30	8	A	5	F	3	1	Low	1′24″
copper	39	12	9	4	F	1	1	Medium	2′15″

Diameter:Φ0.9mm			Electrode material:				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SS	40	15	9	4	F	1	1	high	1′09″
45#	42	15	6	4	F	1	1	High	1′08″

SS	100	13	9	4	F	1	1	High	4′15″
CR12	40	15	7	4	F	1	1	High	1′
SKD11	70	14	8	4	F	1	1	High	2′07″
AL	60	13	8	4	F	1	1	High	1′05″
Diameter:Φ0.9mm			Electrode material: copper				Water pressure: 7 (Mpa)		
Tungsten	10	8	9	6	F	3	1	Low	1′ 40″
Tungsten	30	7	A	3	F	1	1	Low	9′10″
Tungsten	45	7	9	3	F	2	1	Low	10′ 10″
Copper	39	14	8	4	F	1	1	Medium	2′35″
diameter:Φ1.0mm			Electrode material: brass				Water pressure: 7 (Mpa)		
Material	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Machining speed	Machining time
SKD11	40	15	7	5	F	1	1	High	1′03″
SKD11	100	15	F	6	F	1	1	High	7′
CR12	40	18	7	5	F	1	1	High	1′
SS	150	13	B	5	F	1	1	High	8′45″
45#	40	15	A	5	F	1	1	High	1′08″
AL	70	14	A	4	F	1	1	High	1′30″
Diameter:Φ1.0mm			Electrode material: copper				Water pressure: 7 (Mpa)		
Tungsten	20	7	A	3	F	2	2	Low	5′15″
Tungsten	50	8	B	4	F	2	1	Low	10′30″
Tungsten	86	7	A	4	F	2	1	Low	18′20″
Tungsten	39	13	A	5	F	1	1	High	2′35″
Material:SKD11			Electrode material: copper				Water pressure: 7 (Mpa)		
Diameter	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Speed	Time
Φ1.2	42	15	A	5	F	1	1	Medium	1′28″
Φ1.5	42	16	C	6	F	1	1	Medium	1′45″
Φ1.8	42	22	C	6	F	1	1	Medium	1′50″
Φ2.0	42	23	D	7	F	1	2	Medium	1′55″
Φ2.2	42	23	D	7	F	1	2	Medium	2′05″
Φ2.5	42	25	B	7	F	1	2	Medium	2′45″
Φ3.0	42	30	9	8	F	1	2	Medium	3′20″

Material: aluminum			Electrode material: brass				Water pressure: 7 (Mpa)		
Electrode	Height	TON	TOFF	AMP	R/S	VOLT	CAP	Speed	Time
Φ1.2	60	15	C	5	F	1	1	Medium	54″
Φ1.5	60	17	C	6	F	1	1	Medium	1′05″
Φ1.8	60	22	C	6	F	1	1	Medium	52″
Φ2.0	60	22	C	7	F	1	1	Medium	55″

Φ2.2	60	23	D	7	F	1	2	Medium	1′01″
Φ2.5	60	25	E	8	F	1	2	Medium	1′15″
Φ3.0	60	26	E	8	F	1	2	Medium	1′06″

2.7 Machining

（1）Make sure system is not at automatic depth preset function or automatic backward mode.

（2）Obverse if water comes out correctly with proper pressure. Open automatic machining button and start hole burning.

（3）Watching status of discharging and adjust potentiometer to get stable machining

（4） When get through, if there is spark out of down side of piece, and flushing, job is done.

If put rubber belt or base plate, it will get good hole.

Metal plate also can be used underneath the workpiece to get good hole

（5）To proceed next hole, move X and Y manually to next location for burning.

（6）After all machining done, move spindle upward and open rotate motor to take electrode out of guide and then clean up the machine.

3. Notes of abnormal machining

3.1 Guide of electrode

（1）Check guide

a. Check if there is break or crack of ruby. Especially there is burned mark, abrasive paper can be used for clean burned mark to check status of machine

b. Get electrode through guide, the hole of guide is not enlarged or blocked.

（2）Fasten guide

Guide is fastened by stainless steel screw, don’t tighten the screw with too much strength, if always with too much strength, vertically of drilled will be affected.

（3）How to adjust verticality of electrode guide.

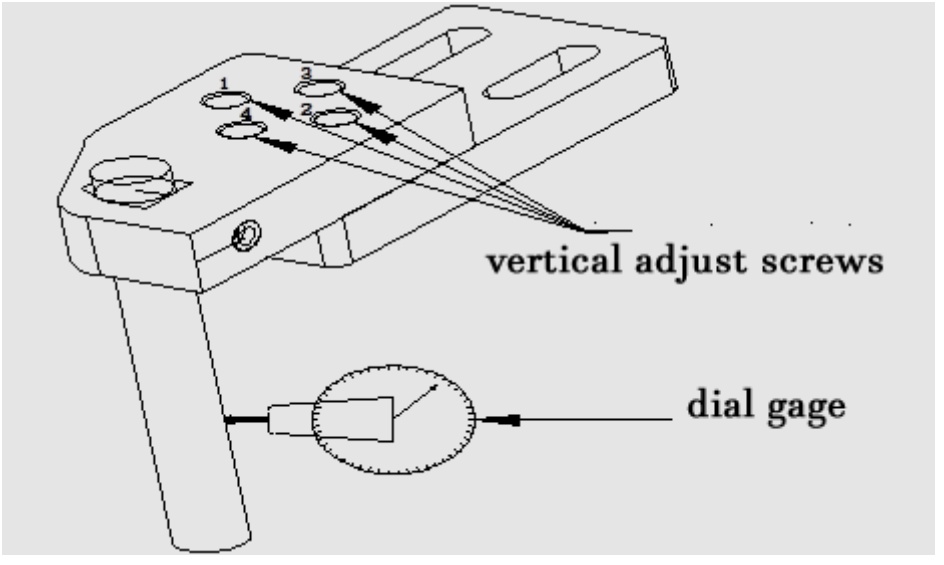
a. Rough method

- get electrode exceed down side of guide about 40~50mm(better use brass electrode with diameter≥Φ1.5mm), or push rod Φ12mm in to installed position of guide.
- Use precision square or square block, get its side to approach the exceed part of

electrode or push rod, adjust vertical screw in X and Y axis direction to get even gap from up to down side.。

- Fasten the vertical adjust screw at last.

b. precise method



- Use push rod with outer diameterΦ12mm to fix in the position of guide, length of push rod should be more than 80mm
- Set dial gage on the marble table, and move working table, get the header of dial gage to the push rod at its top position.
- Move U axis up and down to make sure error within 0.02mm, in vertical direction, adjust screw No.1 and No.2 for left and right error, and adjust No.3 and No.4 screw for front and back error.
- After adjustment, fasten all four screws.

3.2 Unstable machining

（1）Check machining condition, such as parameters.

（2）Check flushing status of water.

（3）Make sure electrode is not bent or eccentric.

（4）Make sure workpiece is well fastened.

（5）Make sure electrode is installed and chuck installed properly, especially the installation of electrode chuck.

（6）Make sure the electrode doesn’t wear unusually.

（7）Make sure good verticality of installed electrode

3.3 Electrode is bent

（1）Check machining condition.

（2）Make sure there is no insulated material between electrode and workpiece.

（3）Make sure power cable to workpiece and electrode connect well.

（4）Make sure the gap between electrode and workpiece is not so big.

（5）Check if electrode is blocked.

3.4 Abnormal discharging

（1）Check machining condition.

（2）If there is water flushing out or if pressure is too small

3.5 Electrode lifting rapidly

（1）Check machining condition

（2）Electrode bent problem

（3）Abnormal wear of electrode

★ When use old electrode to drill hole again, if the black burned mark is too long or deformed, length more than 10mm, it’s better to shear burned part off. Or turn on polarities exchange switch to burned the black part, and then switch back to continue machining.。

（4）For the electrode with diameter less than Φ1.0mm, due to residue of machining, it’s better to use hollow electrode to keep machining stable.

3.6 Low machining speed

（1）Check machining parameters.

（2）Checking flushing

（3）Electrode head exceed too long out of guide

（4）electrode tube and chuck are not in the same concentric point.

（5）electrode is not vertical to guide

3.7 W axis can’t move upward or downward

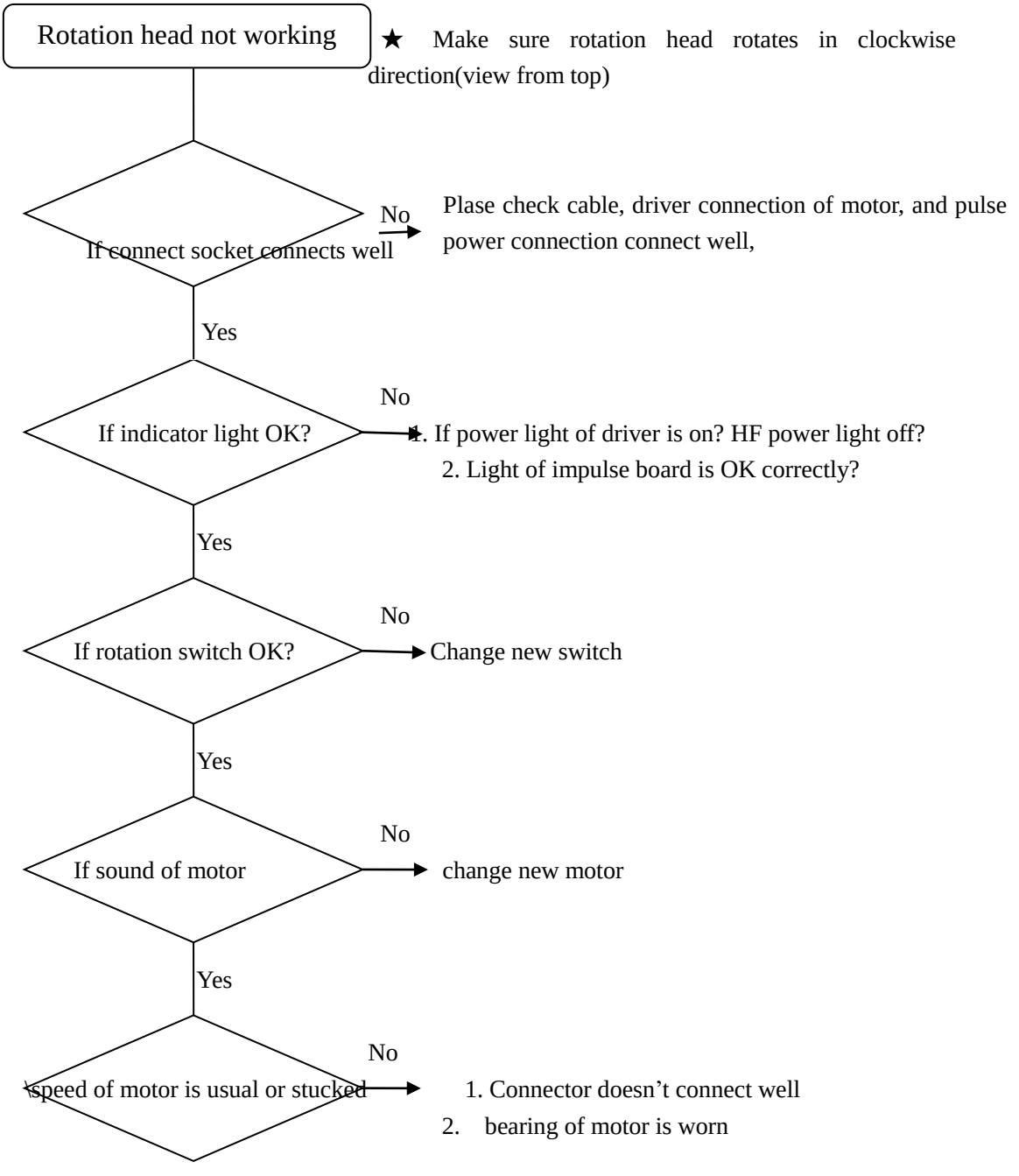
（1）Check if missing phase of three phase power.

（2）Check up and down switches, cable connection situation.

（3）Check if switches damaged or mechanically stuck in up and down system

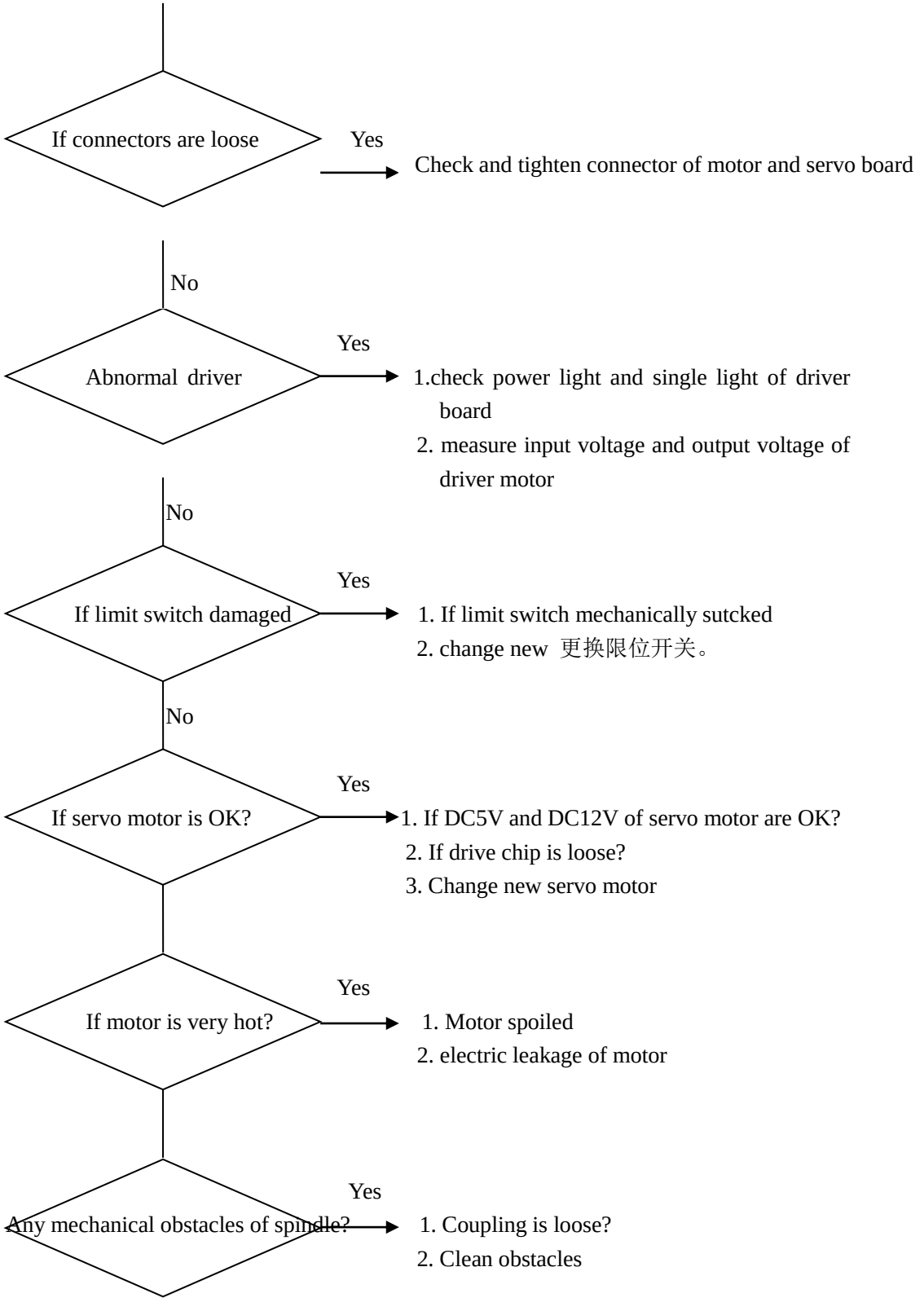
（4）Check if middle relay works well or not connect well.

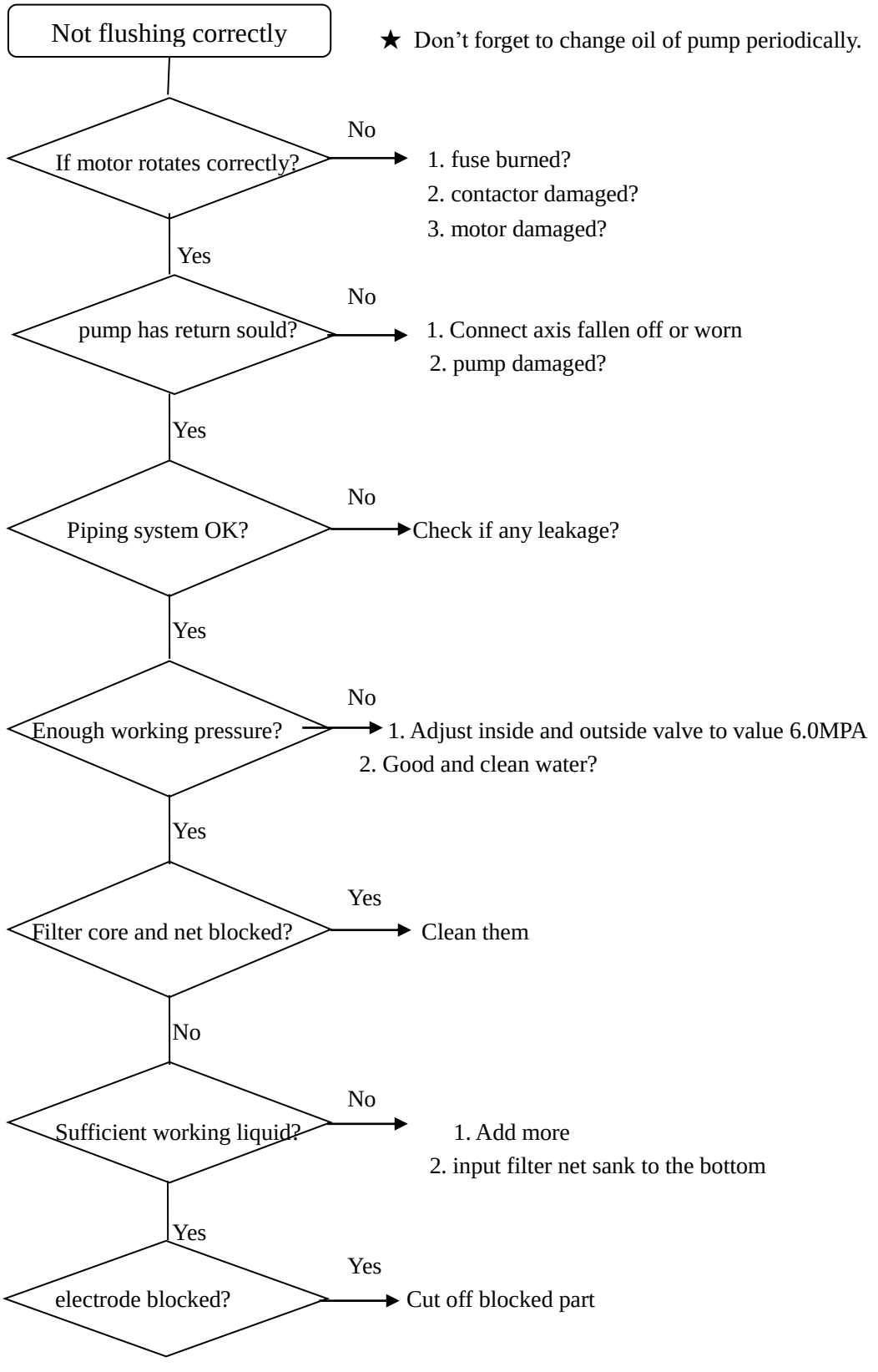
4. Procedure of fault diagnosis

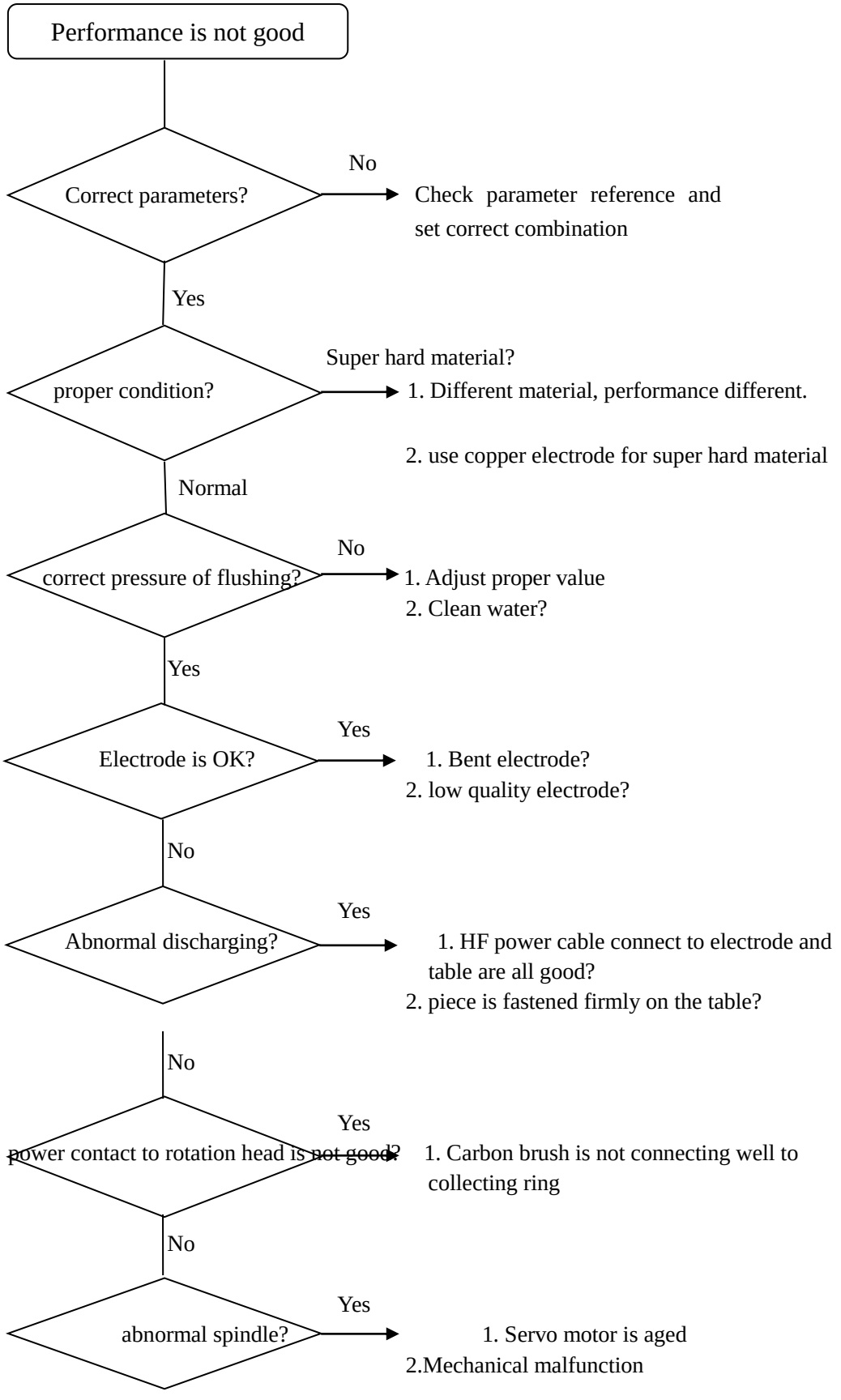


Spindle can't move up and down

★ during machining, speed adjust switch is not turned to left side.

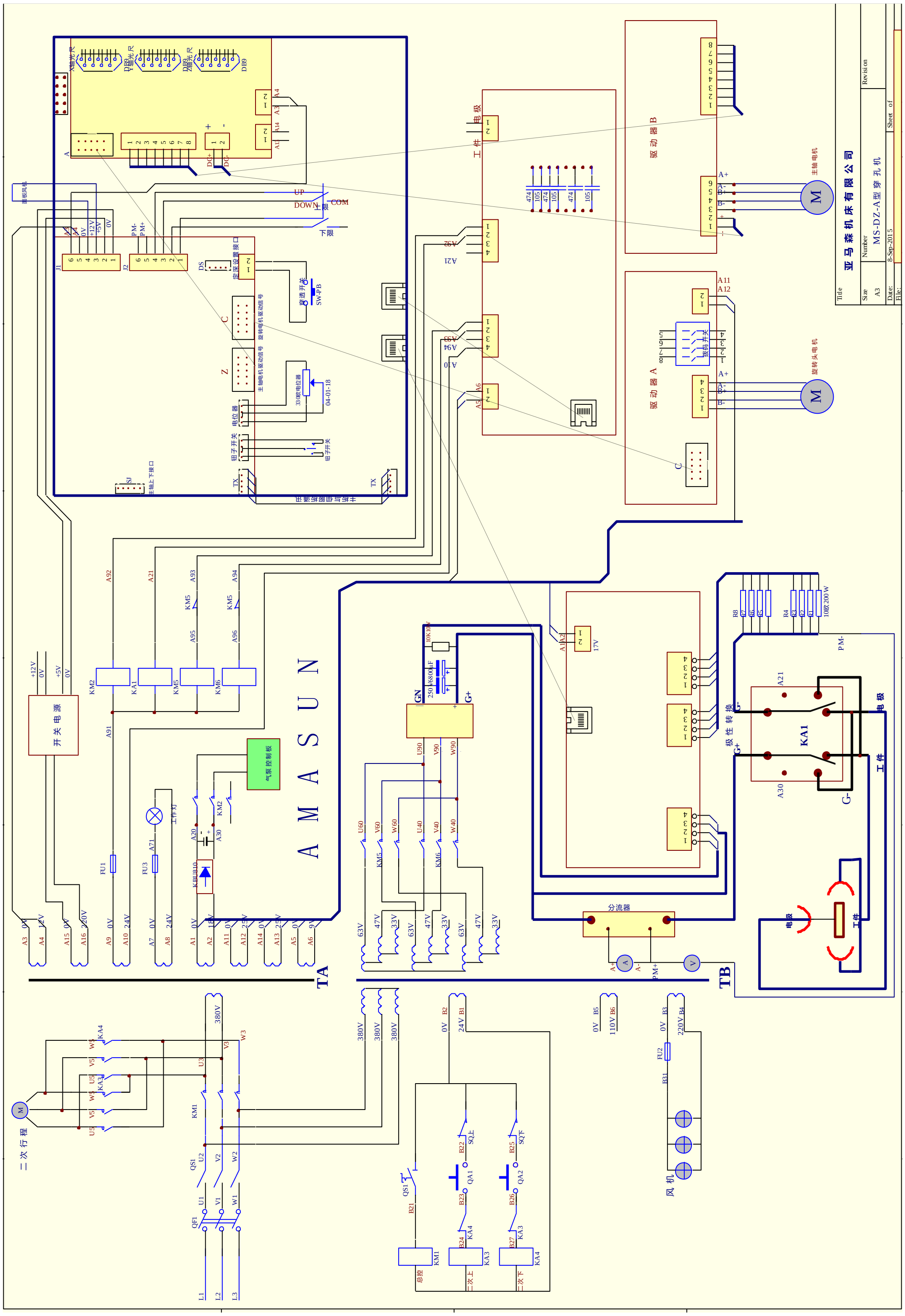

If connectors are loose
Yes
Check and tighten connector of motor and servo board
No
Abnormal driver
Yes
1.check power light and single light of driver board
2. measure input voltage and output voltage of driver motor
No
If limit switch damaged
Yes
1. If limit switch mechanically sutcked
2. change new 更换限位开关。
No
If servo motor is OK?
Yes
1. If DC5V and DC12V of servo motor are OK?
2. If drive chip is loose?
3. Change new servo motor
If motor is very hot?
Yes
1. Motor spoiled
2. electric leakage of motor
Any mechanical obstacles of spindle?
Yes
1. Coupling is loose?
2. Clean obstacles

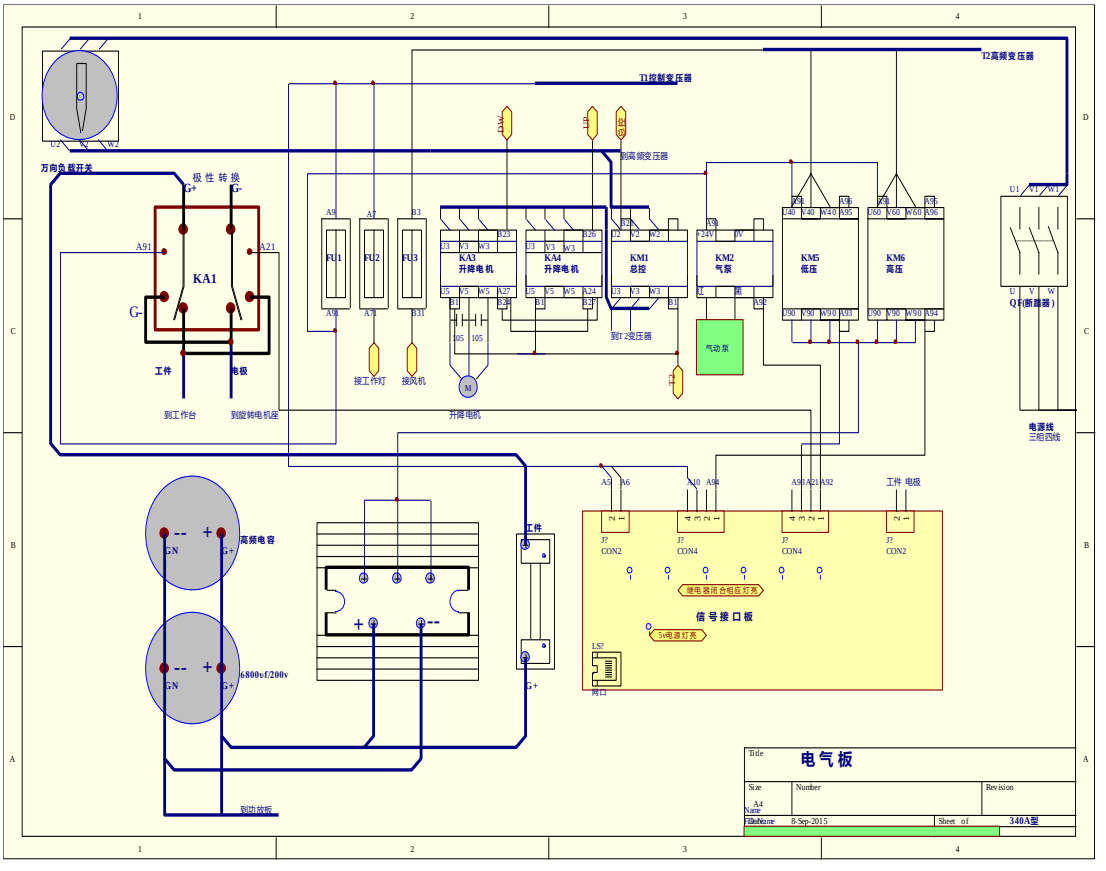

Not flushing correctly
★ Don't forget to change oil of pump periodically.
If motor rotates correctly?
No
1. fuse burned?
2. contactor damaged?
3. motor damaged?
Yes
pump has return sould?
No
1. Connect axis fallen off or worn
2. pump damaged?
Yes
Piping system OK?
No
Check if any leakage?
Yes
Enough working pressure?
No
1. Adjust inside and outside valve to value 6.0MPA
2. Good and clean water?
Yes
Filter core and net blocked?
Yes
Clean them
No
Sufficient working liquid?
No
1. Add more
2. input filter net sank to the bottom
Yes
electrode blocked?
Yes
Cut off blocked part

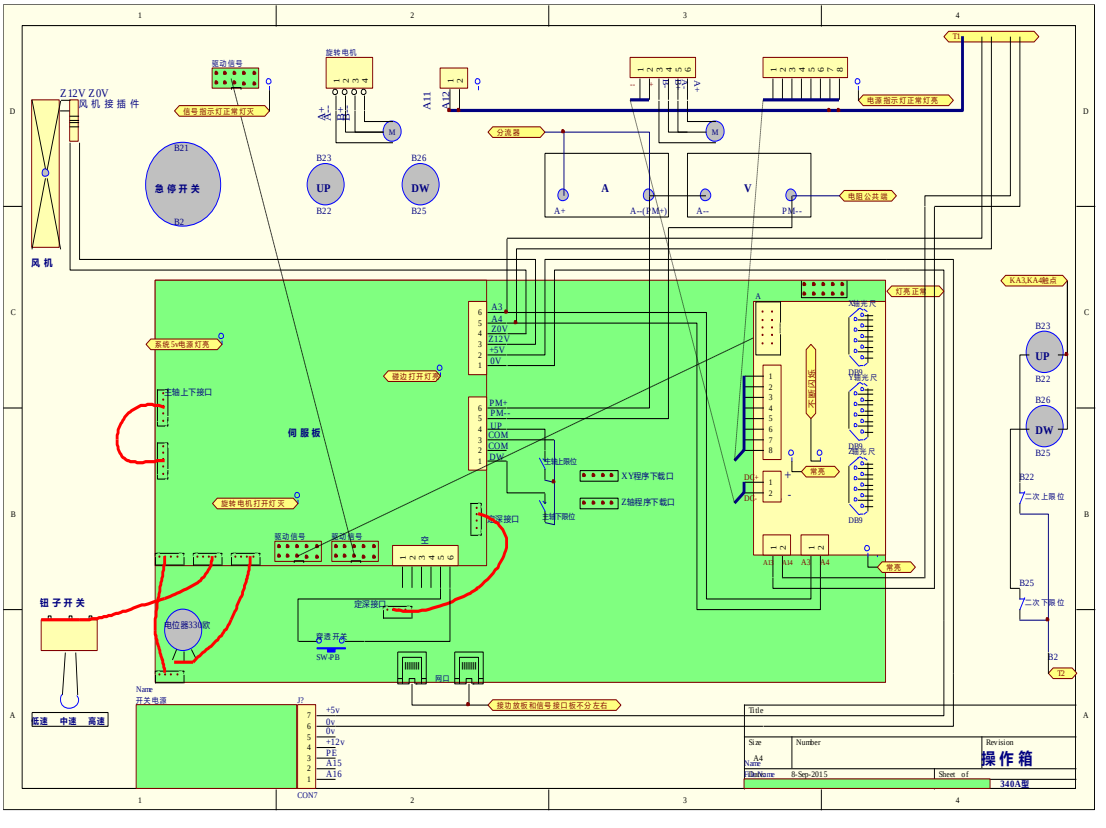

Performance is not good
Correct parameters?
No
Check parameter reference and set correct combination
Yes
proper condition?
Super hard material?
1. Different material, performance different.
2. use copper electrode for super hard material
Normal
correct pressure of flushing?
No
1. Adjust proper value
2. Clean water?
Yes
Electrode is OK?
Yes
1. Bent electrode?
2. low quality electrode?
No
Abnormal discharging?
Yes
1. HF power cable connect to electrode and table are all good?
2. piece is fastened firmly on the table?
No
power contact to rotation head is not good?
Yes
1. Carbon brush is not connecting well to collecting ring
No
abnormal spindle?
Yes
1. Servo motor is aged
2.Mechanical malfunction

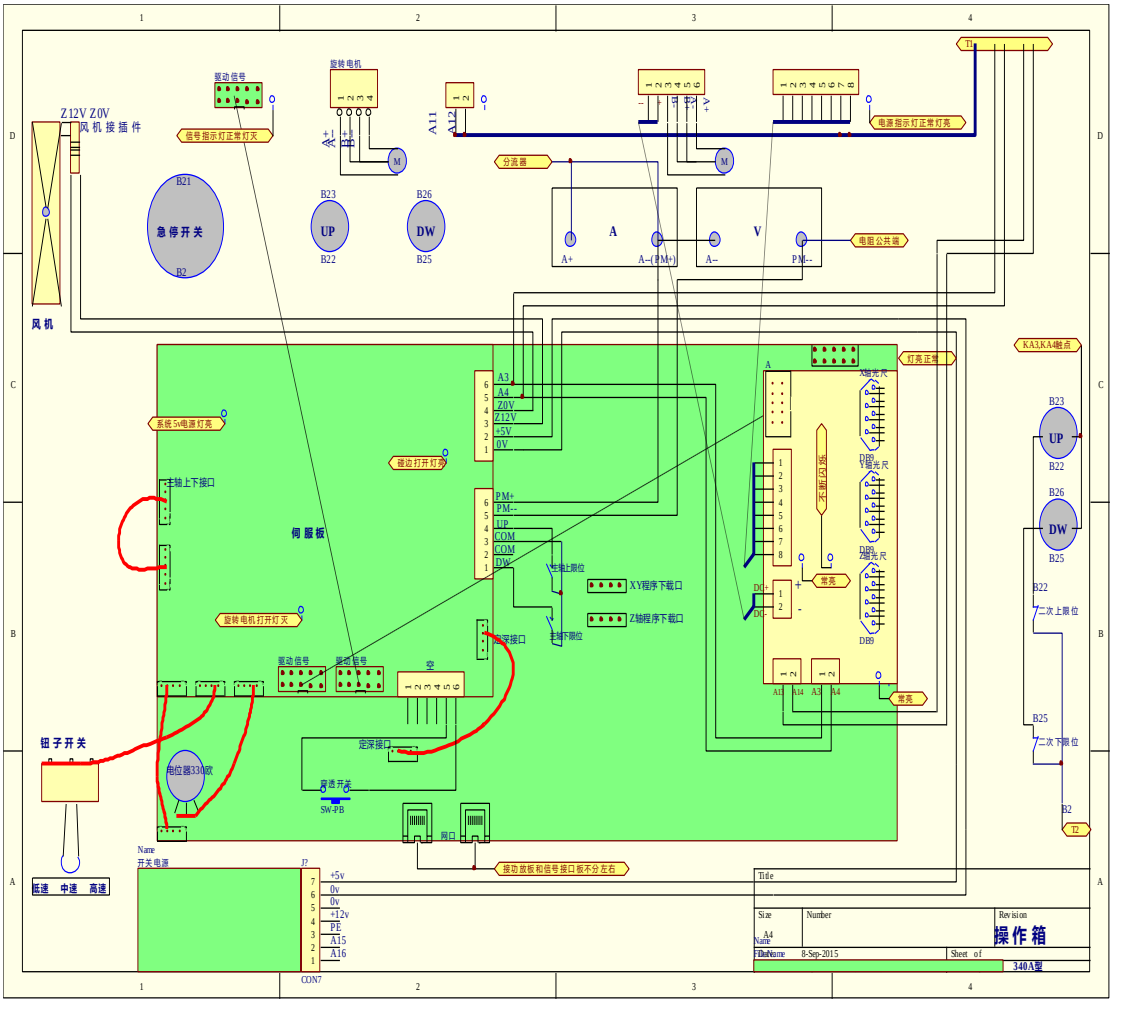
5.Electircal circuit

Electrical schematic diagram




T1控制变压器
T2高频变压器
到高频变压器
万向急停开关
极 性 转 换
KA1
FU1
FU2
FU3
KA3 升降电机
KA4 升降电机
KM1 总控
KM2 气泵
KM5 低压
KM6 高压
气动泵
到T2变压器
接工作灯
接风机
升降电机
工件
电极
到工作台
到旋转电机座
QF(断路器)
电源线 三相四线
高频电容
6800uf/200v
到功放板
信号接口板
继电器闭合相应灯亮
5v电源灯亮
CON2
CON4
Title
电气板
Size
A4
Number
Revision
Date
8-Sep-2015
Sheet of
340A型


Z12V Z0V
风 机 接 插 件
急 停 开 关
UP
DW
分流器
电源指示灯正常灯亮
电阻公共端
风 机
伺 服 板
系统5v电源灯亮
旋转电机打开灯关
钮 子 开 关
低速 中速 高速
开关电源
接功放板和信号接口板不分左右
Title
操作箱
Size
A4
Number
Revision
Date
8-Sep-2015
Sheet of
340A型


Z12V Z0V
风机接插件
风机
急停开关
B21
B2
驱动信号
信号指示灯正常灯灭
旋转电机
A+ A- B+ B-
M
A11
A12
分流器
A
V
A+
A-(PM+)
A--
PM--
电阻公共端
电源指示灯正常灯亮
B23
UP
B22
B26
DW
B25
伺服板
系统5v电源灯亮
主轴上下接口
磁边打开灯灭
旋转电机打开灯灭
A3
A4
Z0V
Z12V
+5V
0V
PM+
PM--
UP
COM
COM
DW
主轴上限位
主轴下限位
XY程序下载口
Z轴程序下载口
定深接口
空
驱动信号
限位信号
灯亮正常
X轴光尺
Y轴光尺
Z轴光尺
DB9
常亮
KA3,KA4触点
二次上限位
二次下限位
钮子开关
电位器330欧
滑动开关
SW-PB
网口
接功放板和信号接口板不分左右
开关电源
J7
+5v
0v
0v
+12v
PE
A15
A16
CON7
低速 中速 高速
Title
Size
A4
Number
Revision
操作箱
Date:
8-Sep-2015
Sheet of
340A型