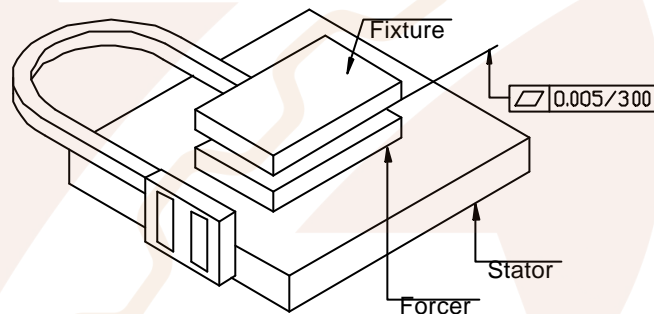


8. LMSP operation note and troubleshooting

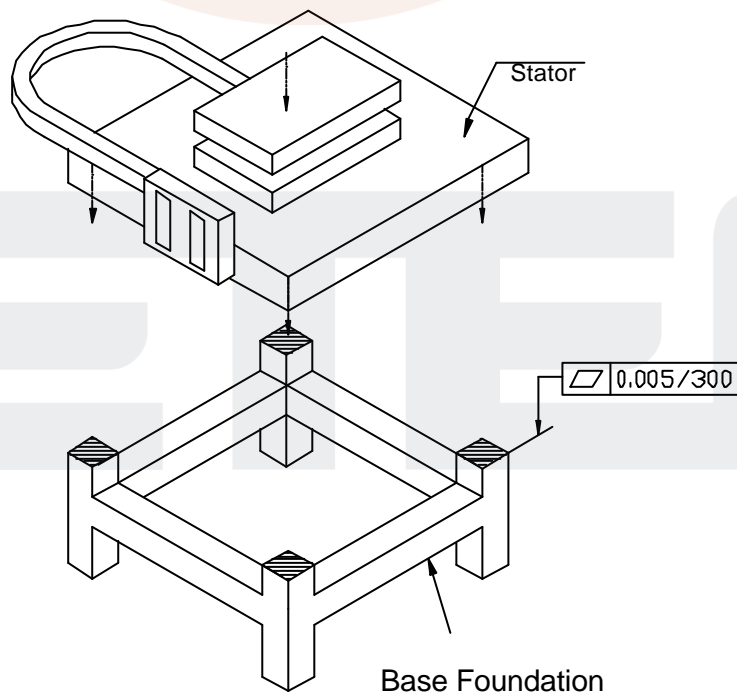
8.1. Operation note

8.1.1. Fixture mechanism design

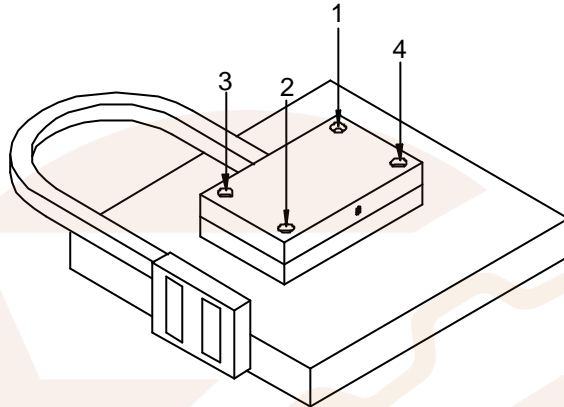
Fixture surface flatness must be less than $5\mu\text{m}/300\text{mm}$, otherwise the forcer may be bent which degrades the air bearing's performance or causes resonance in the servo system.



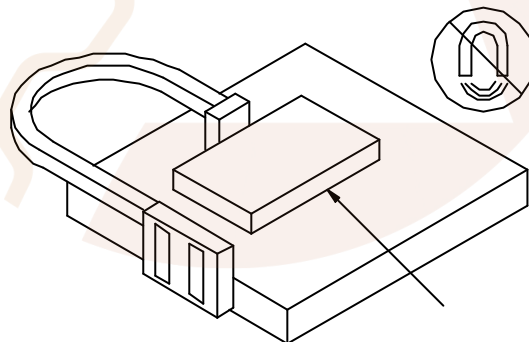
The joint surface of the base, the foundation for the stator in the figure below, must be less than $5\mu\text{m}/300\text{mm}$, otherwise the stator may be bent as well.



Follow the number order in the figure below to tighten the screws that is, 1-2-3-4-1-2-3-4-.1-2-3-4-. Have your payload' s mass center stay in the center of forcer. The lower its mass center is, the less the motor control error will be.

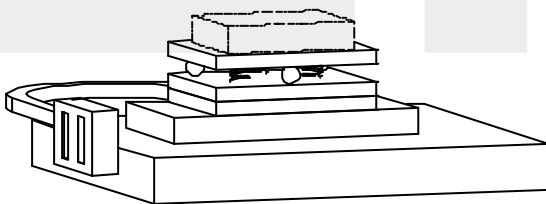


In the vicinity of the forcer, avoid placing any strong magnetic material to affect the normal operation of the forcer.

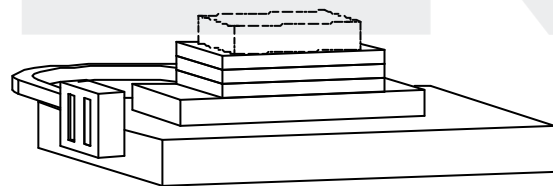


In the vicinity of forcer avoid magnetic material

Do not use point contact for adjusting your fixture' s level. Use plane contact whenever possible.



✗



✓

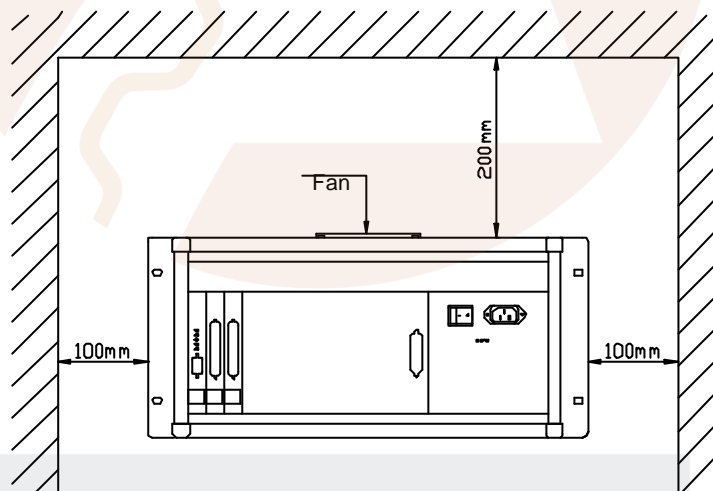
8.1.2. Air supply

Clean air is a must. Water and particles should be filtered out, less that air duct is clogged. The supplied air pressure is between 3 and 4 bars.

The air gap between the forcer and the stator is 10-15µm. If the pressure is too low (<3 bar), the surface of the stator will be scratched; if the pressure is too high (>4 bar), the forcer' s stiffness will be smaller. Even worse, a vibration phenomenon "pneumatic hammer" may happen.

8.1.3. Driver

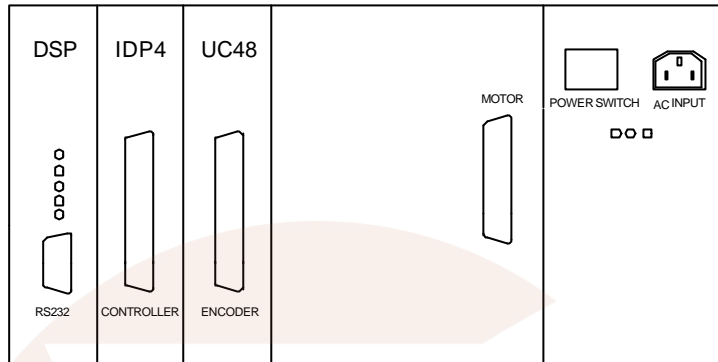
Heat dissipation plays an important role in driver' s performance. Beware of the ventilation of the cabinet where the driver is to be installed. Check the cabinet' s fan location also. See the figure below for the minimum space recommended.



Make sure the motor cable LMACK20H, encoder cable LMACE20C, the RS232 cable LMACR20A, have been fastened up tightly to avoid bad contact connections.

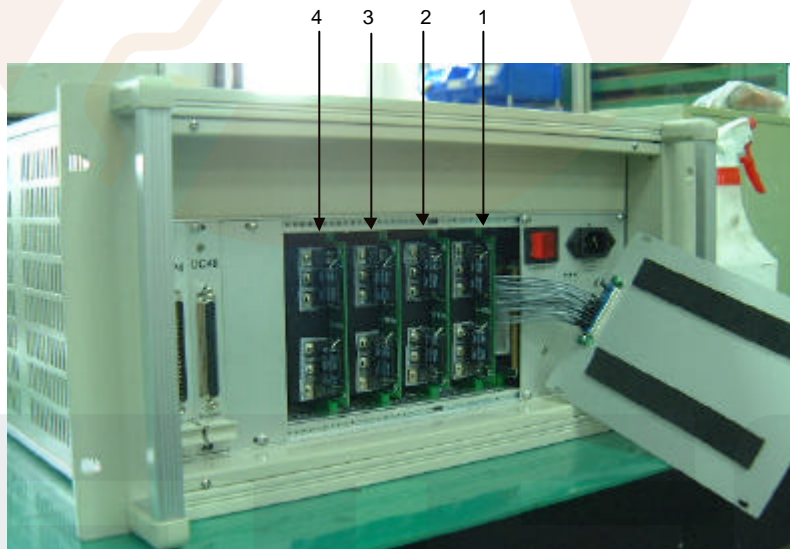
When the power is on, NEVER plug in or out any control cable , especially the RS232 cable, which may cause short circuit, electrical shock or system failure.

The panel of the driver is shown below:

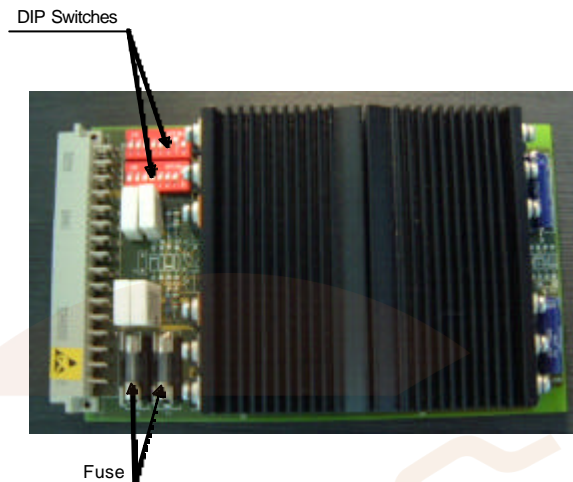


The DIP switches on the PU2 amplifiers should be set correctly and be careful of the specification of the fuses. The PCB's are numbered, the DIP switches and fuses locations on the boards are shown in the following two pictures.

- 4 PU2 amplifier PCB boards:

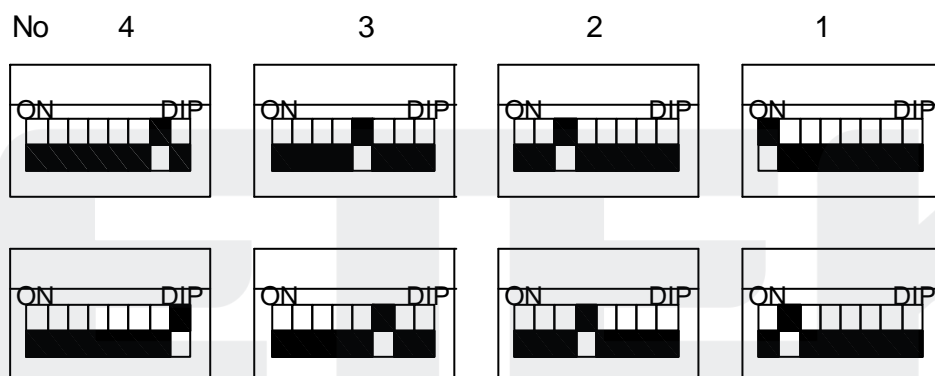


- DIP switches and fuses on the PU2 PCBs:
The specification of the fuse is T6.3A/AC250V time lag type.



- The numbered PU2, PCBs , the DIP switches are set as follows:
 Each PU2 board has two rows of DIP switches. They should be set correctly to the configuration shown below. The number designates the corresponding PU2 board, and two DIP switches are toggled to ON position in pair in each PU2 board. For example, the PU2 board numbered 1 has the leftmost switch in the upper row and the second leftmost switch in the lower row toggled to ON position. Other switches in these two DIP switches on this board are in OFF position. It is ON when it is toggled up.

Note the number specifies the corresponding PU2 board.



8.2. Trouble shooting

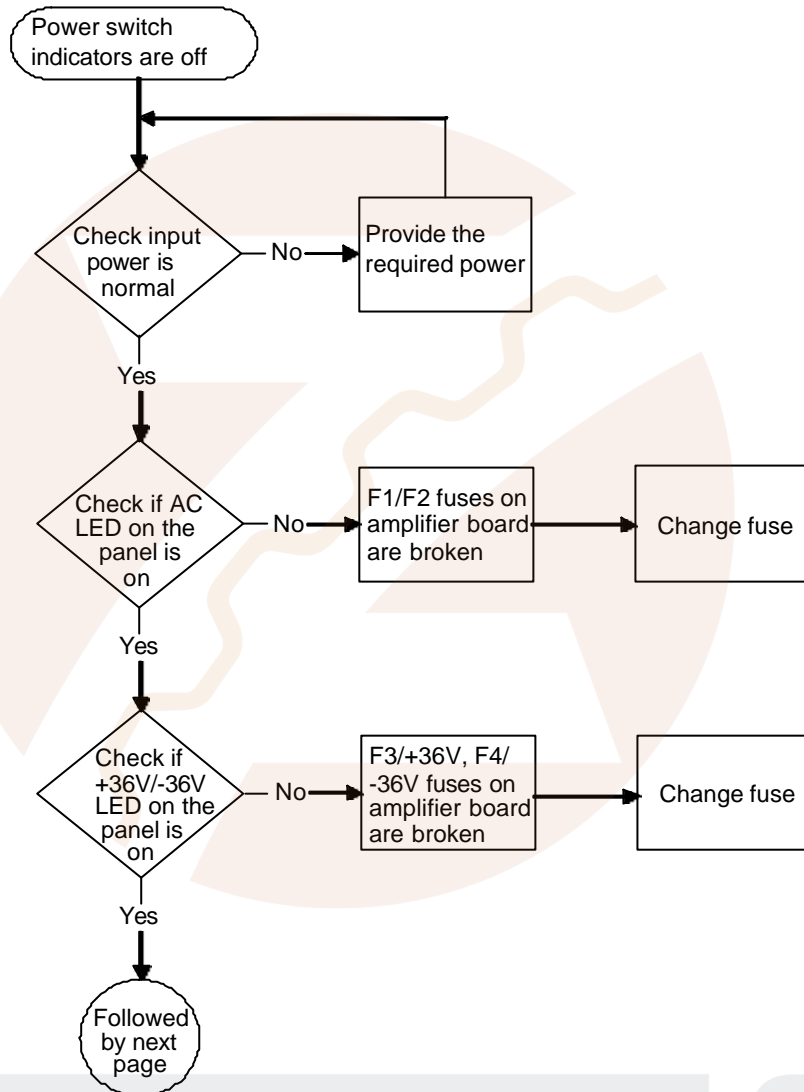
	Symptom	Possible reason	Action to take
1	Forcer cannot do homing.	The speed parameter for homing been set too fast (lost motion).	Decrease " gss.5" ; If the parameter is 20,change it to a value below 15.
2	Forcer lost motion	Speed, acceleration been set too large. Unable to reach these setting.	Check fa' s setting
3	Cannot make alignment.	<ul style="list-style-type: none"> ◆ Loose encoder connection. ◆ Strong magnetic disturbance in the vicinity of the forcer. ◆ Check " rp" parameter if it was intended to do closed loop auto alignment after power on. 	<ul style="list-style-type: none"> ◆ Fasten the connector firmly. ◆ Take away magnetic disturbance source. ◆ Key in " rp" , it must be 17 or 25.
4	Forcer does not move.	<ul style="list-style-type: none"> ◆ No air supply. ◆ DSP card LED does not flash. ◆ Loosen connectors. 	<ul style="list-style-type: none"> ◆ Check clean, right pressured air. Air gap is 10-15µm. ◆ Change DSP card. ◆ Fasten all connectors.
5	Cannot key in compensation values. Use " we" to write tkx in,tky,tka,tkb,tkc,tkr values after measurement. Check nkx,nky,nka,nkb,nkc,nkr , if they show 0 values.	<ul style="list-style-type: none"> ◆ Didn' t write in EEPROM. ◆ Problem with DSP card. 	<ul style="list-style-type: none"> ◆ In the order of " we1" , " we2" , " we0" write in compensation table. ◆ Change DSP card.

	Symptom	Possible reason	Action to take
6	Cannot make alignment with position encoder.	◆ Adjust parameter setting.	<ul style="list-style-type: none">◆ The second values of 'nn0'~'nn5' all falls in 2.0 ± 0.3.◆ 'ff' and 'nsp' must be about the same value, otherwise key in 'cd' command. Make them to the same value.◆ Key in 'gc' command If 2048 appears change encoder. Values are between -2048 and 2047.



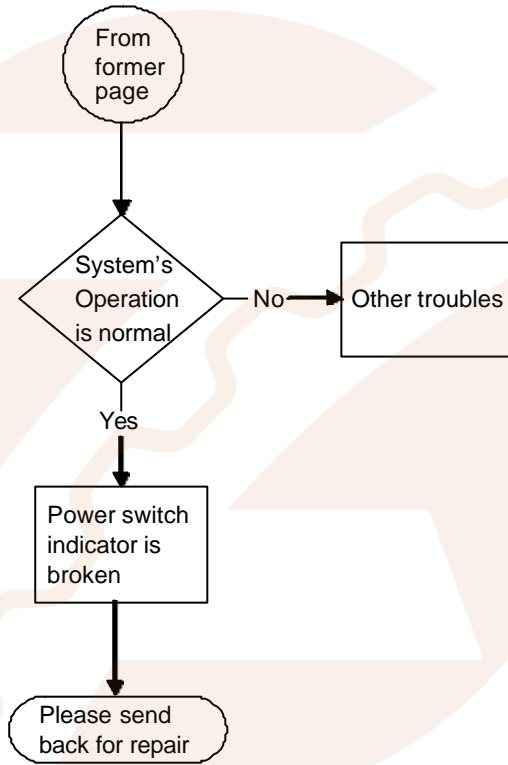
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7. Power switch indicators are off



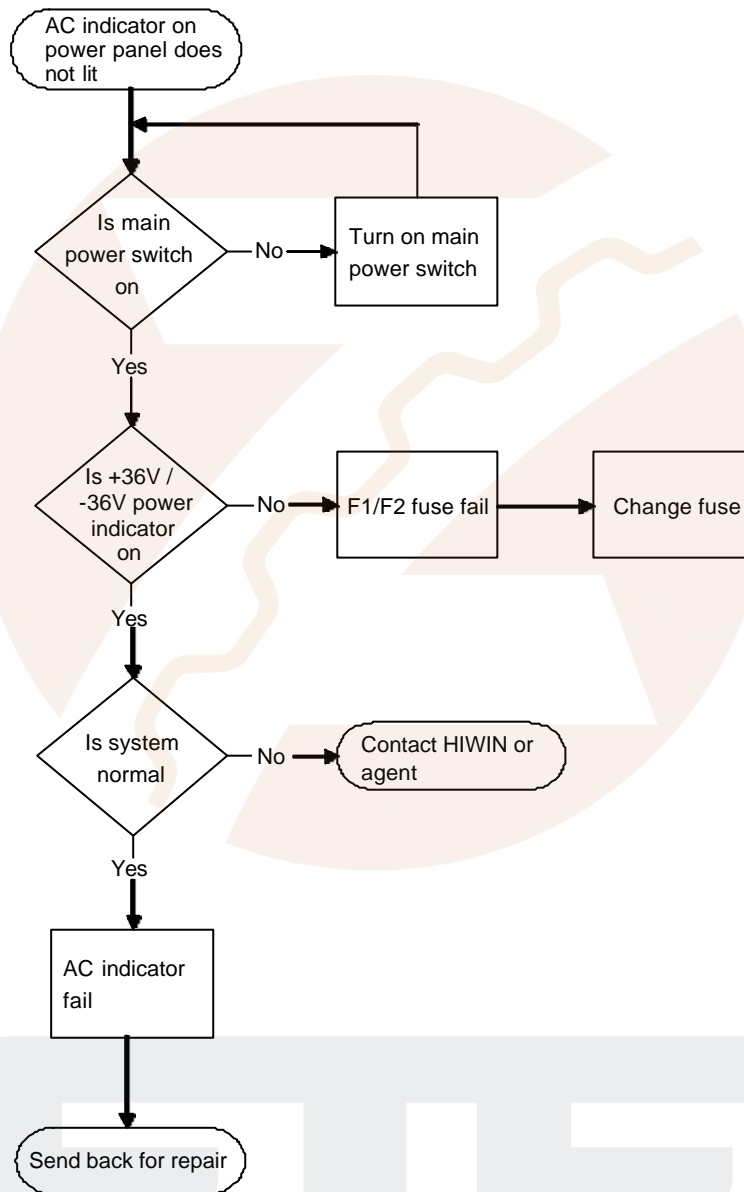
- F1/F2 ARE EITHER 3A TIME LAG FUSES IN AC220V OR 4A TIME LAG FUSES IN AC110V
- F3/F4 ARE 10A, FAST ACTING FUSES

7. Power switch indicators are off

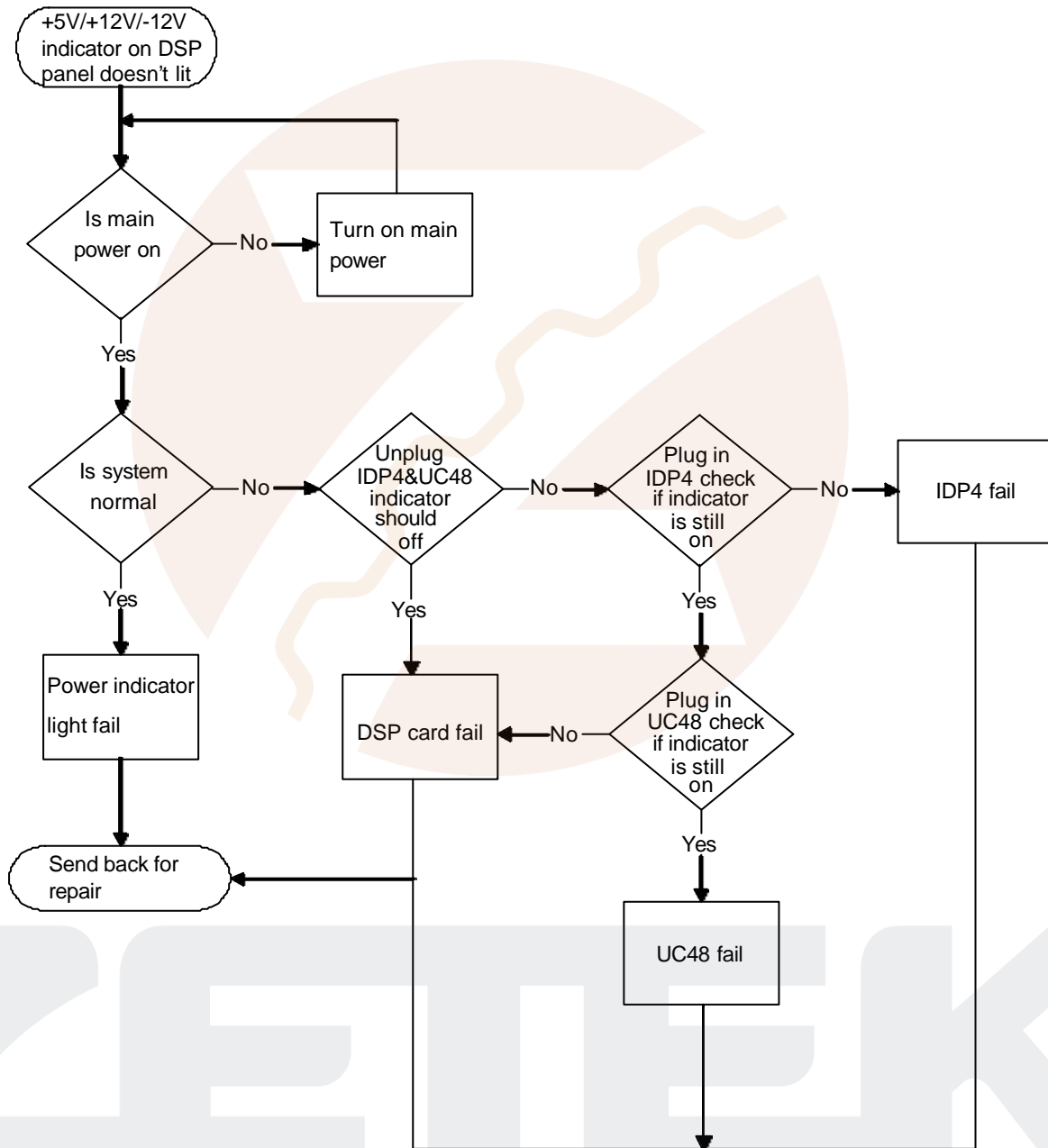


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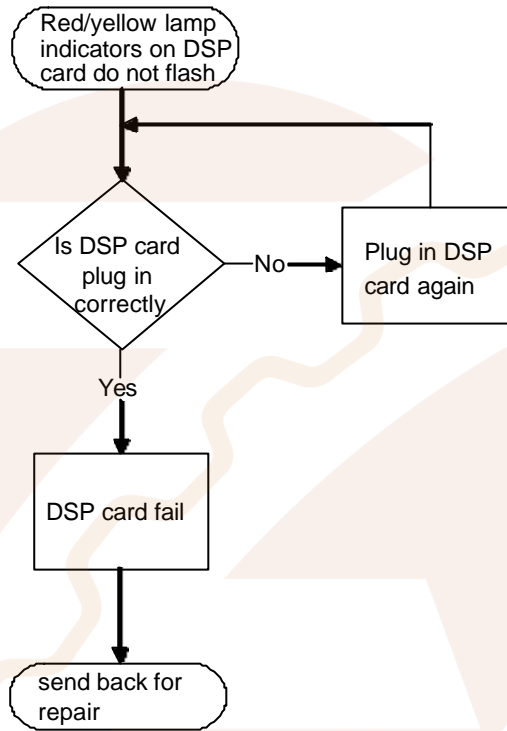
8. AC indicator on power panel does not lit



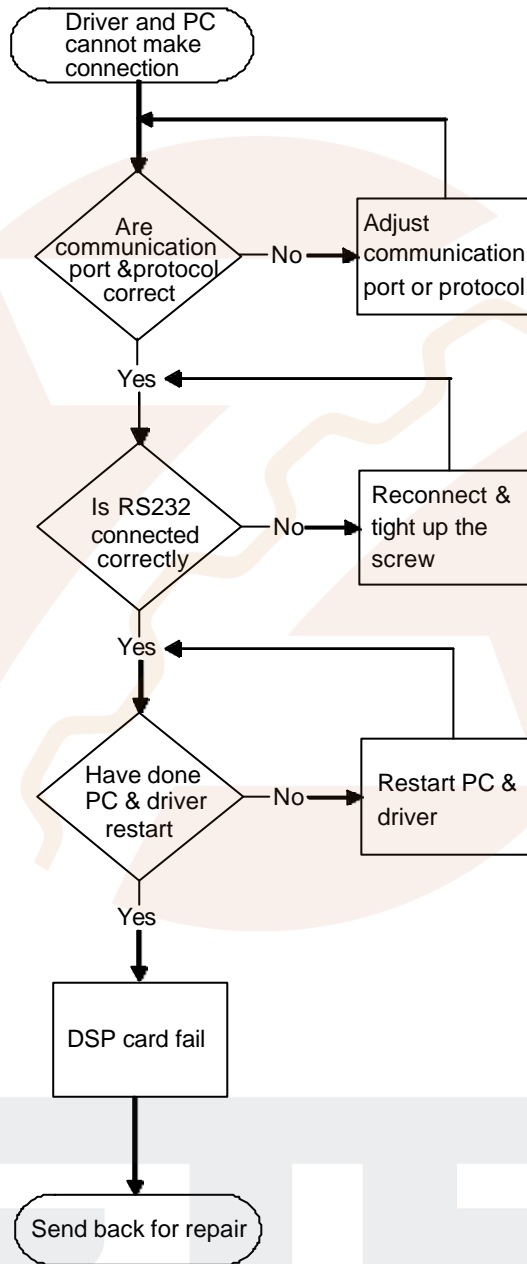
9.+5V/+12V/-12V indicators on DSP panel doesn't lit



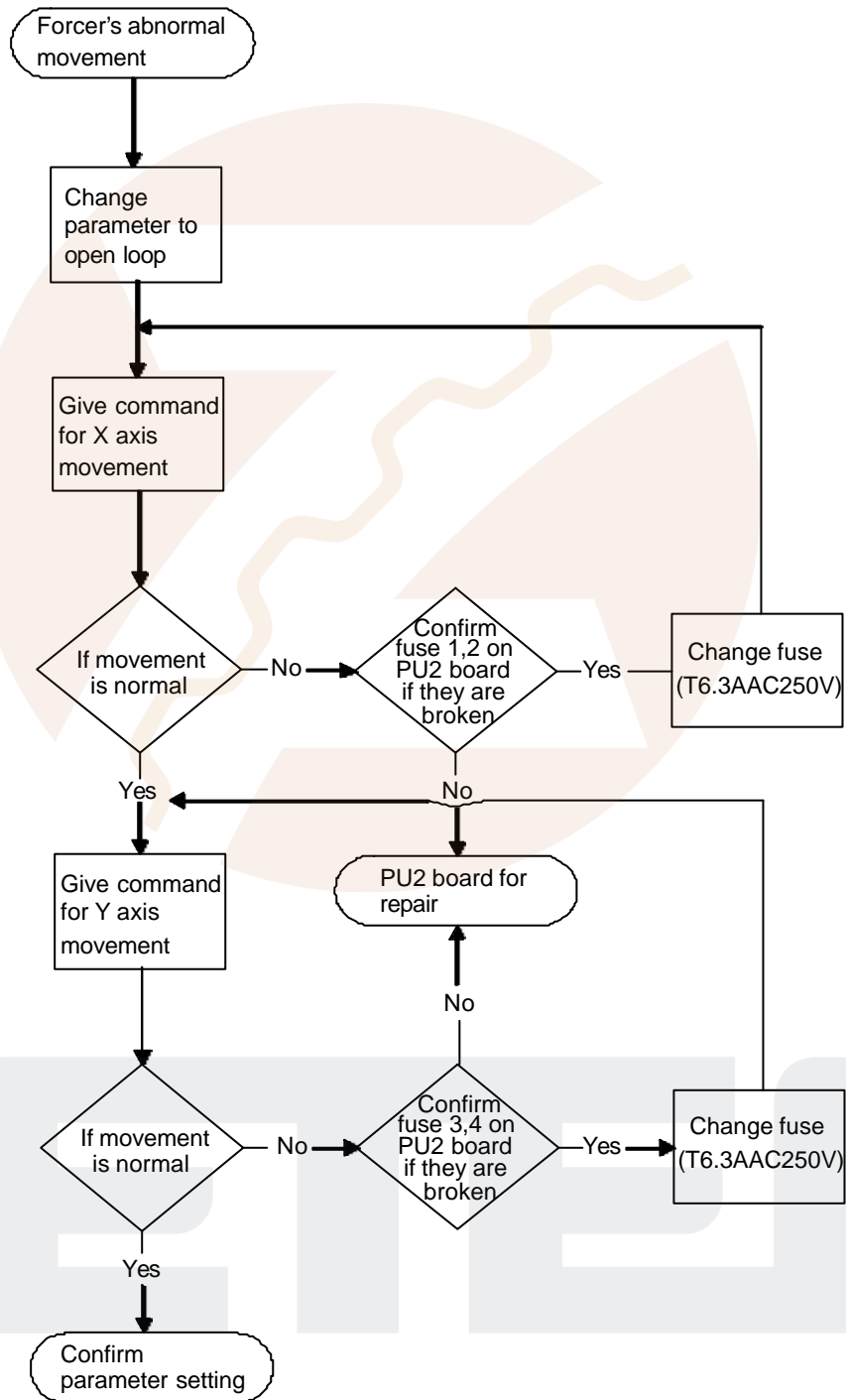
10.Red/yellow lamp indicators on DSP card do not flash



11.Driver and PC cannot make connection



12. Forcer's abnormal movement



13. Cannot make pitch alignment

Please do the standard procedure of pitch alignment as follows:

Standard procedure of pitch alignment

>fx 0 key in

please use eyesight to do the pitch alignment manually.

>fx 2 key in

Motor SVON, make motor and sensor of the same direction, for example:

>pr 1000 1000 1000 (command to move motors)

>dr 1000 999 1000 (motor's relative position after movement)

If the sign is not correct,

>px key in, 3 numbers appeared i.e. 1 1 1 show direction of three sensors

>px key in the opposite value of the wrong positions (1 -1, -1 1)

Keep the same when the position is correct

Try

>px 1000 1000 1000

>dr if the showed values are about the same as command values then the direction is consistent.

For example:

>px 1000 1000 1000

>dr if it shows - 1000 - 999 1000

The key in >px -1 -1 1

do 'pr' command again, "dr" confirm its direction.

>sl key in (echo back 220)

>fx1 key in

Motor start to make alignment.

>

Pitch alignment succeed ,and enter into closed loop.

>gs find home position then response

>gs ok

Finish pitch alignment.