Maintenance Manual

Spirit SI /GE/GX/LS

Spirit SI/GE/GX/LS Maintenance Manual

Revised 02, January, 2006

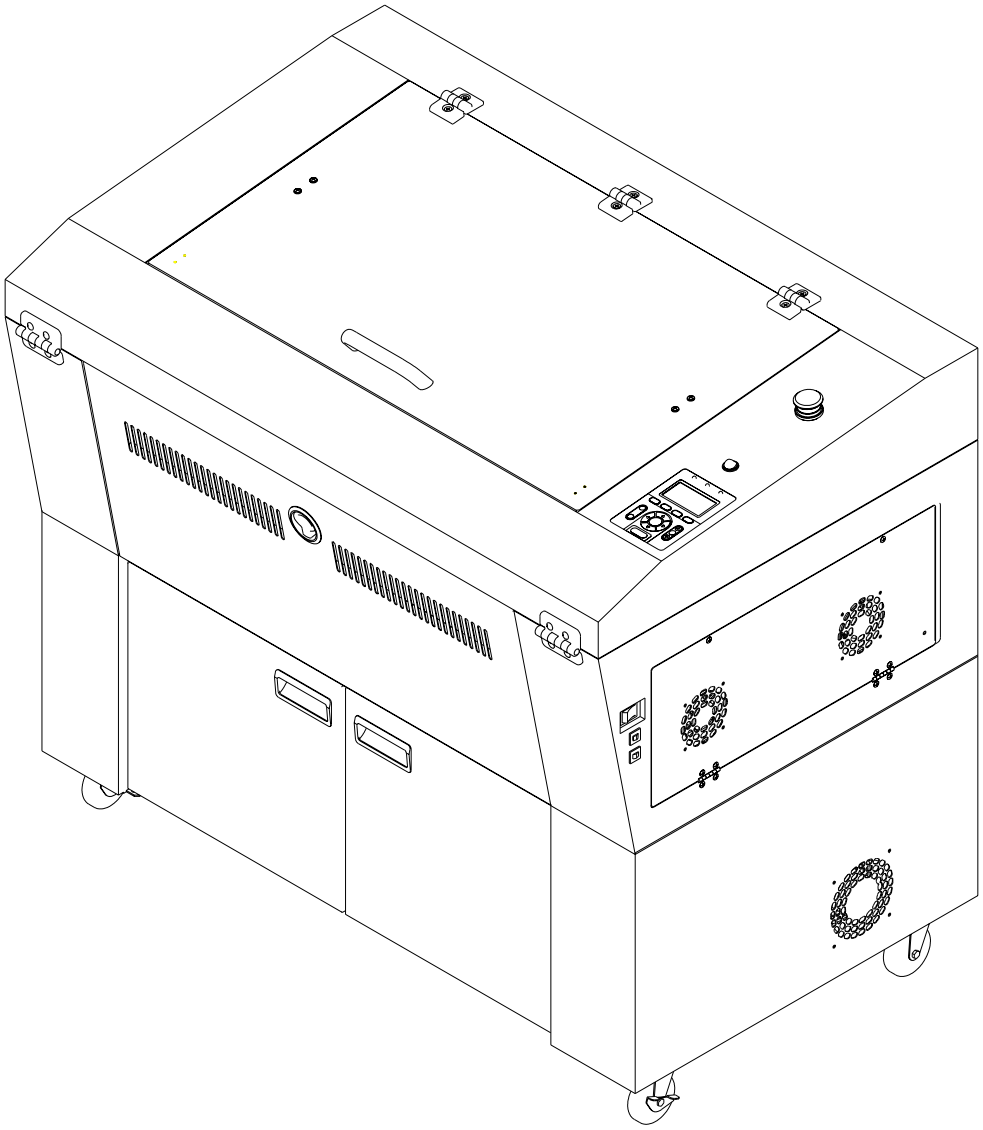
Introduction

1. Serial Number.

The Serial number of your machine is very important and unique. Please copy down the serial number and keep it for your records. Please include this serial number when you correspond with us for any kind of questions. Thank you.

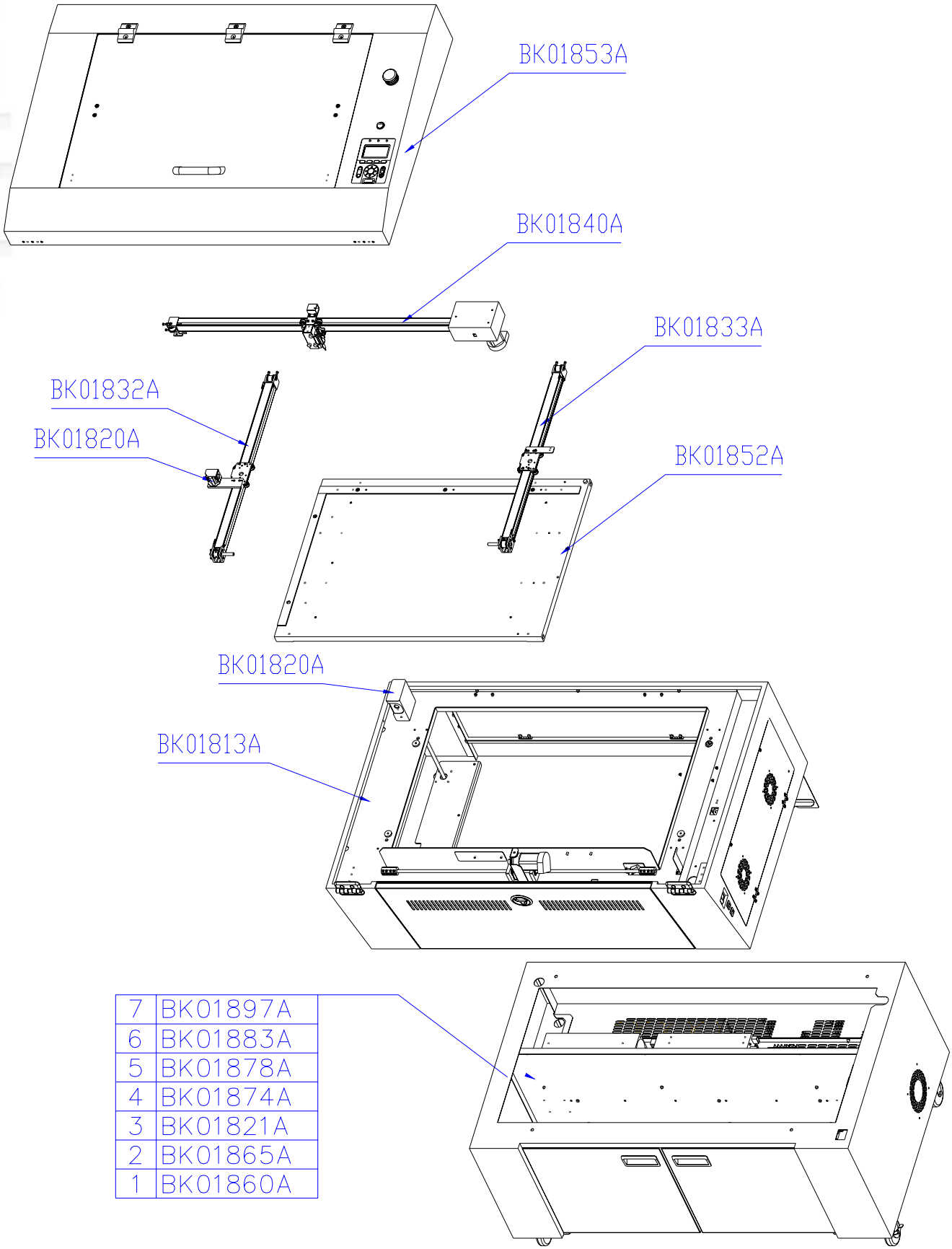
2. Safety Precautions.

The machine should not be operated without supervision. Due to the dangerous nature of laser, we should always pay attention to what is going on with the machine. DO NOT leave a running machine unattended.



Chapter 1. Machine Overview

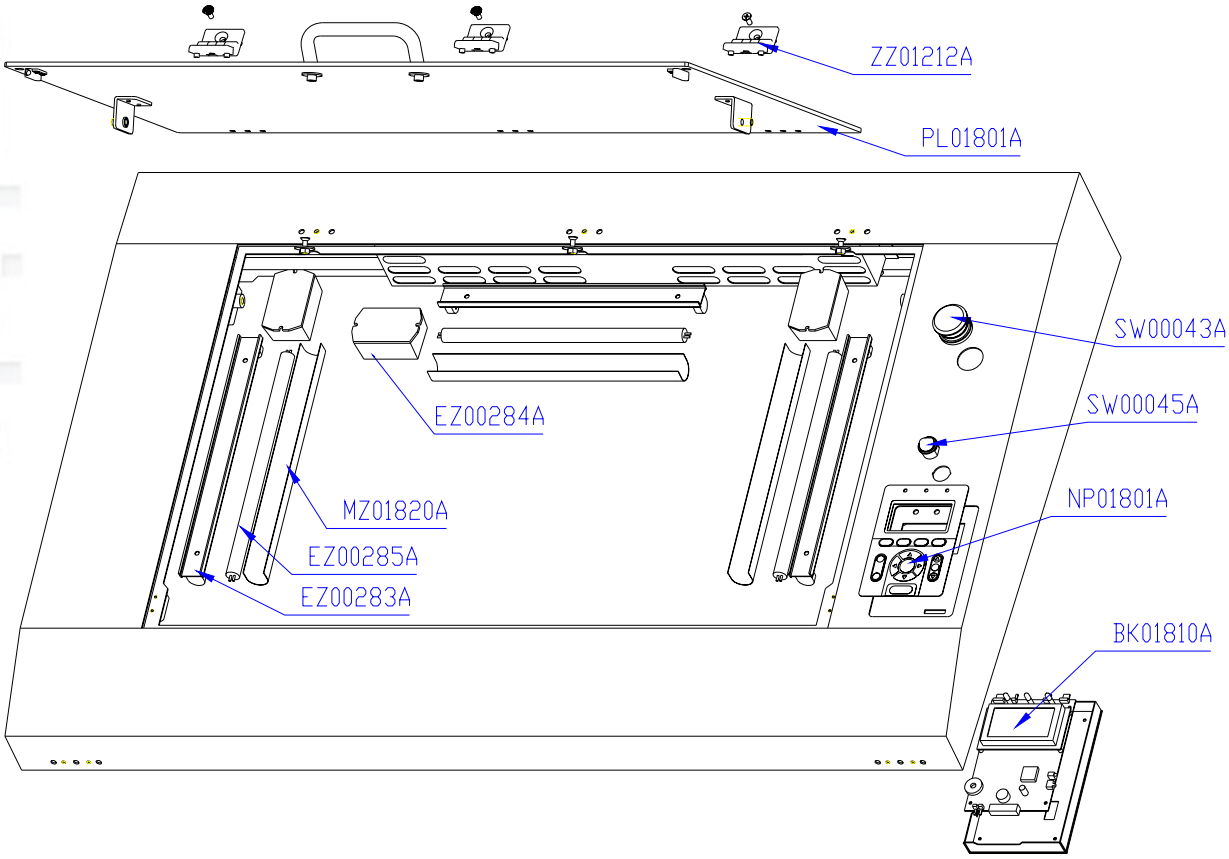
1. Overall



7	BK01897A
6	BK01883A
5	BK01878A
4	BK01874A
3	BK01821A
2	BK01865A
1	BK01860A

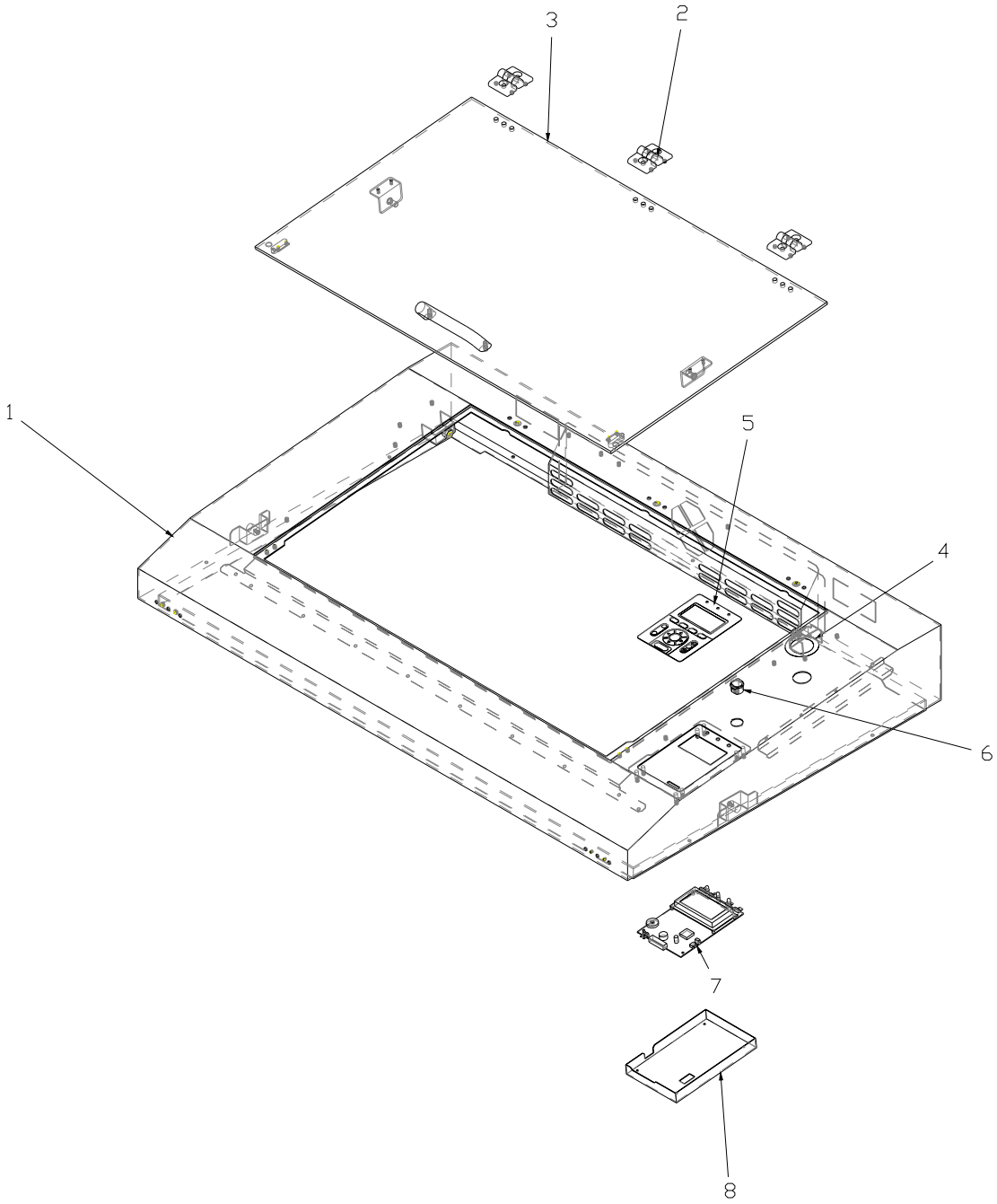
Parts Number for SI	Parts Number for GE	Parts Number for GX	Parts Number for LS	Parts Name
BK01853A	29003643G	29004573G	29006263G	Top cover assembly
BK01840A	29003676(02)	29004575G	29006040G	X-axis assembly
BK01832A	29002531	29004576G	29005927G	Y-axis assembly (Left)
BK01833A	29002532	29004577G	29005928G	Y-axis assembly (Right)
BK01852A	29003644(01)	29004574G	29002548G	Working Table
BK01813A	29003645(03)	29004578G	29002516G	Spirit unit chassis
BK01897A	29003969(02)	29004732G	N/A	100W base chassis assembly
BK01883A	29003893(02)	29004572G		60W base chassis assembly
BK01878A	N/A	N/A	N/A	50W base chassis assembly
BK01874A	N/A	29004733G		40W base chassis assembly
BK01821A	29003894(02)	29004734G		30W base chassis assembly
BK01865A	N/A	N/A	29004231G	25W base chassis assembly
BK01860A	N/A	N/A		12W base chassis assembly

2-1. Top Cover for Spirit SI, GE, GX



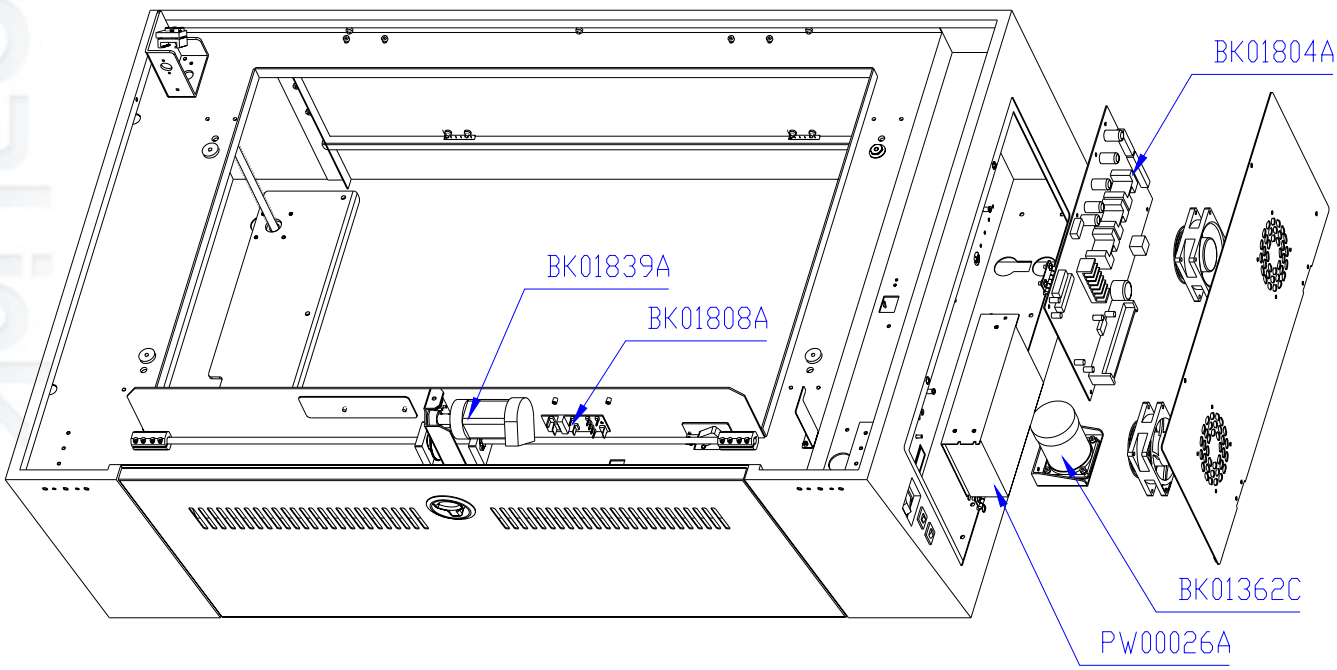
Parts Number for SI	Parts Number for GE	Parts Number for GX	Parts Name
ZZ01212A	26500166	26500166G	Window hinge
PL01801A	22801557	22802102G	Window
SW00043A	25700035	25700035G	Emergency switch
SW00045A	25700032	25700032G	Lamp switch
NP01801A	23400020	23400020G	Control panel sticker
BK01810A	23800145	23800145G	Spirit keyboard module
EZ00284A	N/A	N/A	DC 12V 8W ballast
MZ01820A	23300296	23300296G	Light shade
EZ00285A	N/A	N/A	8W fluorescent light
EZ00283A	22000124	22000124G	Lamp holder
29004037	29004037	29004037G	LED light

2-1. Top Cover for Spirit LS



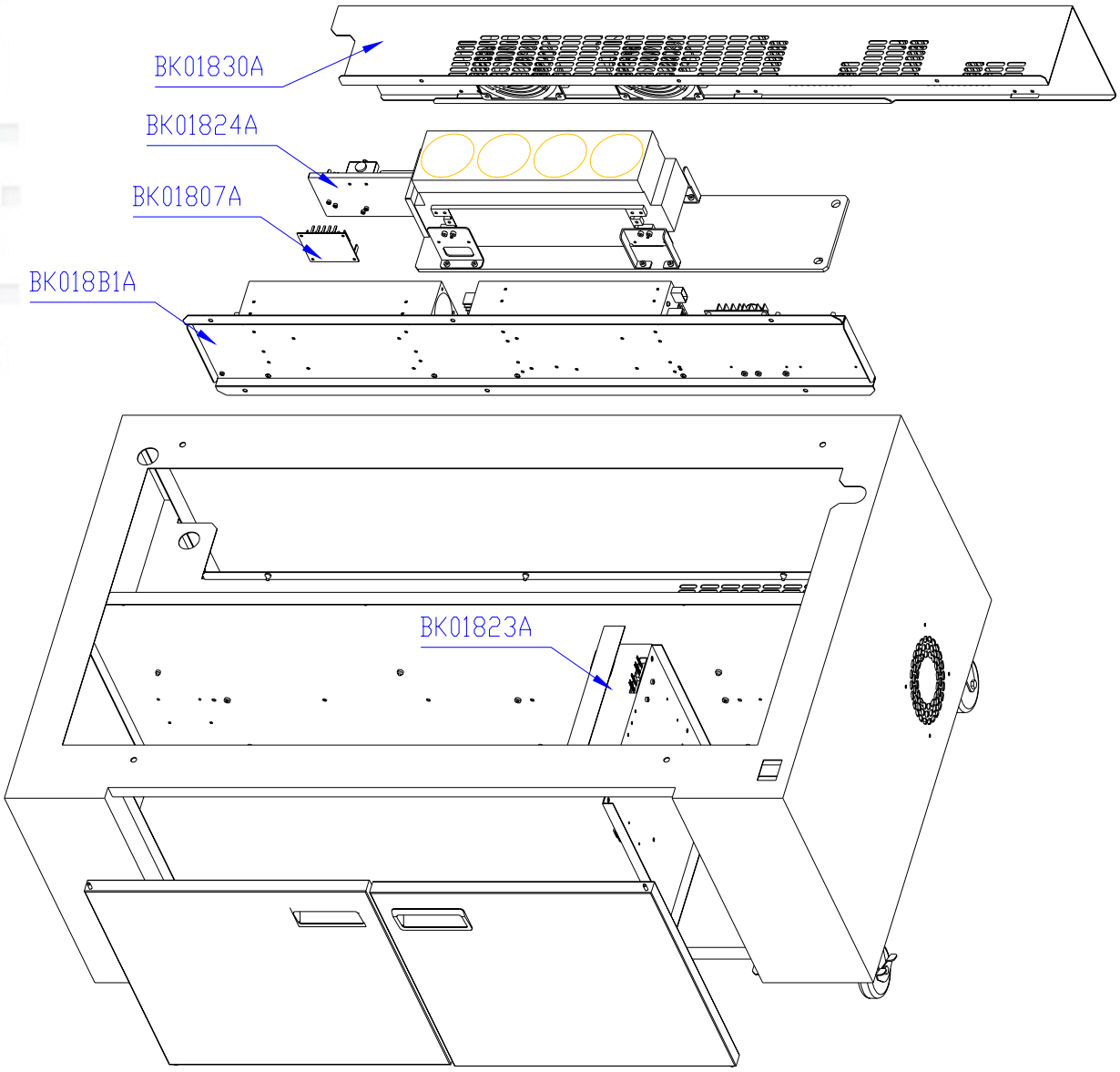
ITEM	PARTS NUMBER	PARTS NAME	QTY.
1	29006263G	Top Cover assembly	1
2	26500166G	Window Hinge	3
3	29003833G	Window Assembly	1
4	25700094G	Key Switch	1
5	23400020G	Control panel sticker	1
6	24400995G	Key board	1
7	20901927G	Key Switch to Emergency Stop Switch Cable	1
8	29005274G	Keyboard Assembly	1

3. Mid Section



Parts number for SI	Parts Number for GE & LS	Parts Number for GX	Parts name
BK01804A	29002506	29005033G	Spirit main board
BK01362C	29001141	29001141G	Z motor assembly
PW00026A	24500022	24500022G	Meanwell power supply 40/5V
BK01839A	29002537	29002537G	Motor group
BK01808A	29002510	29002510G	Y motor PCB

4. Base Section



Parts number for SI	Parts Number for SI LS	Parts name
BK01830A←1	29003272G←1	Base back door assembly
BK01824A←2	29003651G←2	12W system Assembly
BK01807A←3	29005059G←3	DC12V POWER MODULE
BK018B1A←4	29002557G←4	12W power supply fixture
BK01823A←5	29003783G←5	12V Power block

Parts number for SI	Parts Number for SI LS	Parts name
BK01830A←1	29003271G←1	Base back door assembly
BK01824A←2	29003652G←2	25W system Assembly

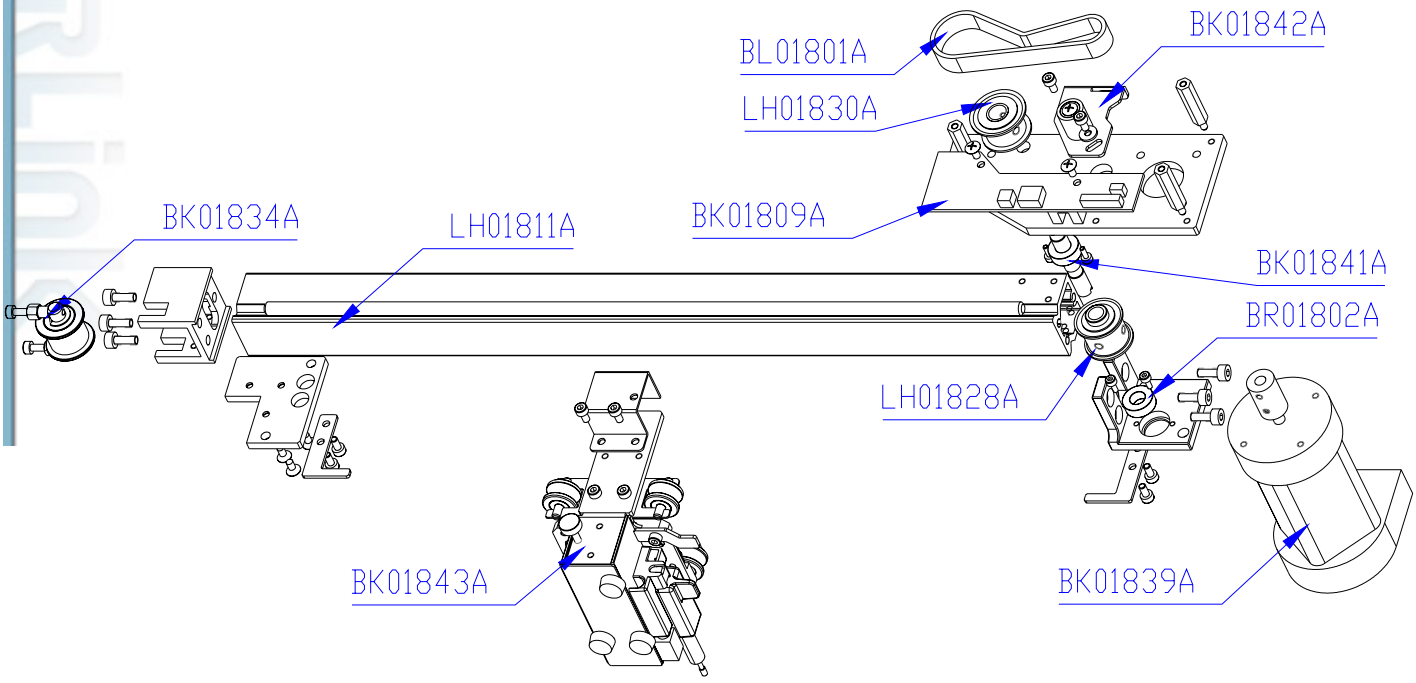
BK01807A←3	29005059G←3	DC12V POWER MODULE
BK018B1A←4	29002562G←4	25W power supply fixture
BK01823A←5	29003783G←5	12V Power block

Parts number for SI	Parts Number for SI LS	Parts name
BK01830A←1	29003629G←1	Base back door assembly
BK01824A←2	29004123G←2	V30 system Assembly
BK01807A←3	29005059G←3	DC12V POWER MODULE
BK018B1A←4	29003971G←4	V30 power supply fixture
BK01823A←5	29003783G←5	12V Power block

Parts number for SI	Parts Number for SI LS	Parts name
BK01830A←1	29003267G←1	Base back door assembly
BK01824A←2	29003659G←2	V40 system Assembly
BK01807A←3	29005059G←3	DC12V POWER MODULE
BK018B1A←4	29002587G←4	40C power supply fixture
BK01823A←5	29003783G←5	12V Power block

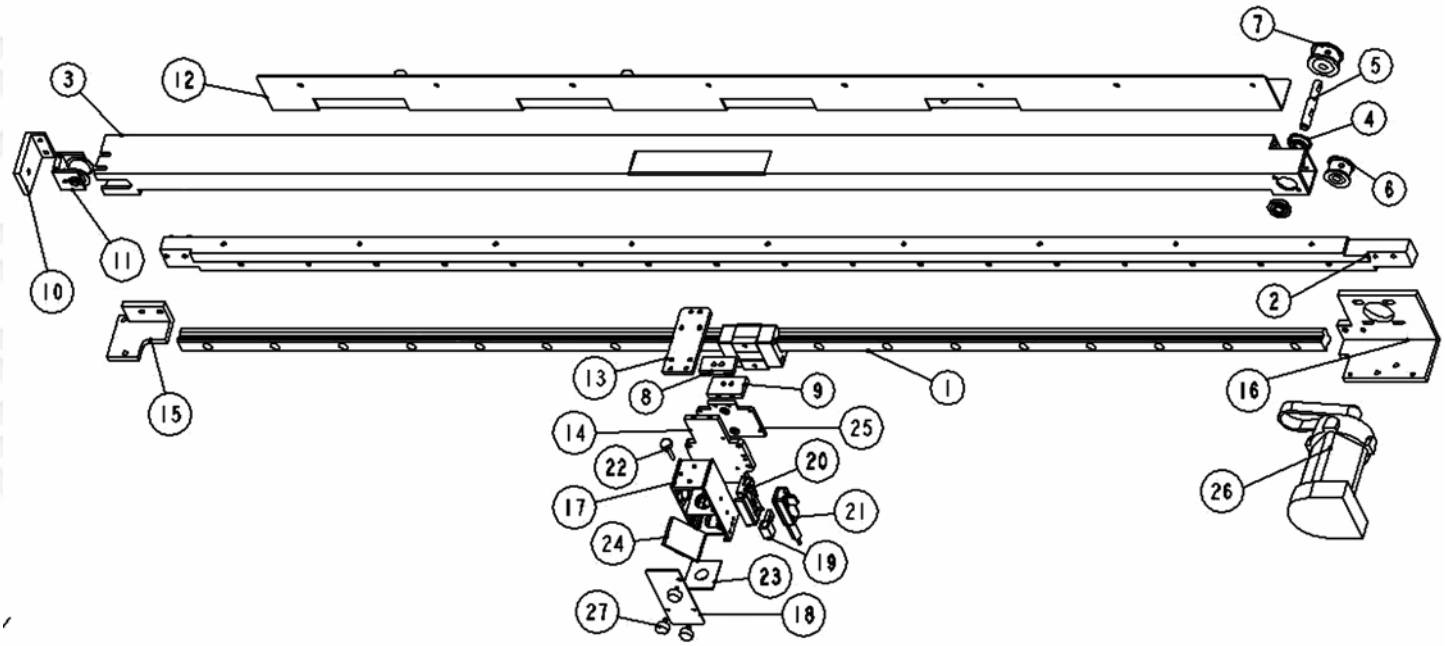
Parts number for SI	Parts Number for SI LS	Parts name
BK01830A←1	29003629G←1	Base back door assembly
BK01824A←2	29003632G←2	60W system Assembly
BK01807A←3	29005059G←3	DC12V POWER MODULE
BK018B1A←4	29004228G←4	T60 power supply Assembly
BK01823A←5	29003783G←5	12V Power block

5. X-axis assembly for Spirit SI/GE



Parts number for SI	Parts Number for GE	Parts name
BK01842A	29002540	X axis transmission pulley assembly
BL01801A	20600074	X axis belt
LH01830A	22800940	X axis mid belt wheel
BK01809A	29002511	X motor module
BK01841A	29002539	X axis transmit shaft assembly
LH01828A	22800938	X axis transmit belt wheel
BR01802A	20700053	Bearing
BK01839A	29002537	Motor group
LH01811A	22800923	X axis slideway
BK01834A	29002533	Tension idle pulley assembly
BK01843A	29002541	Lens carriage assembly

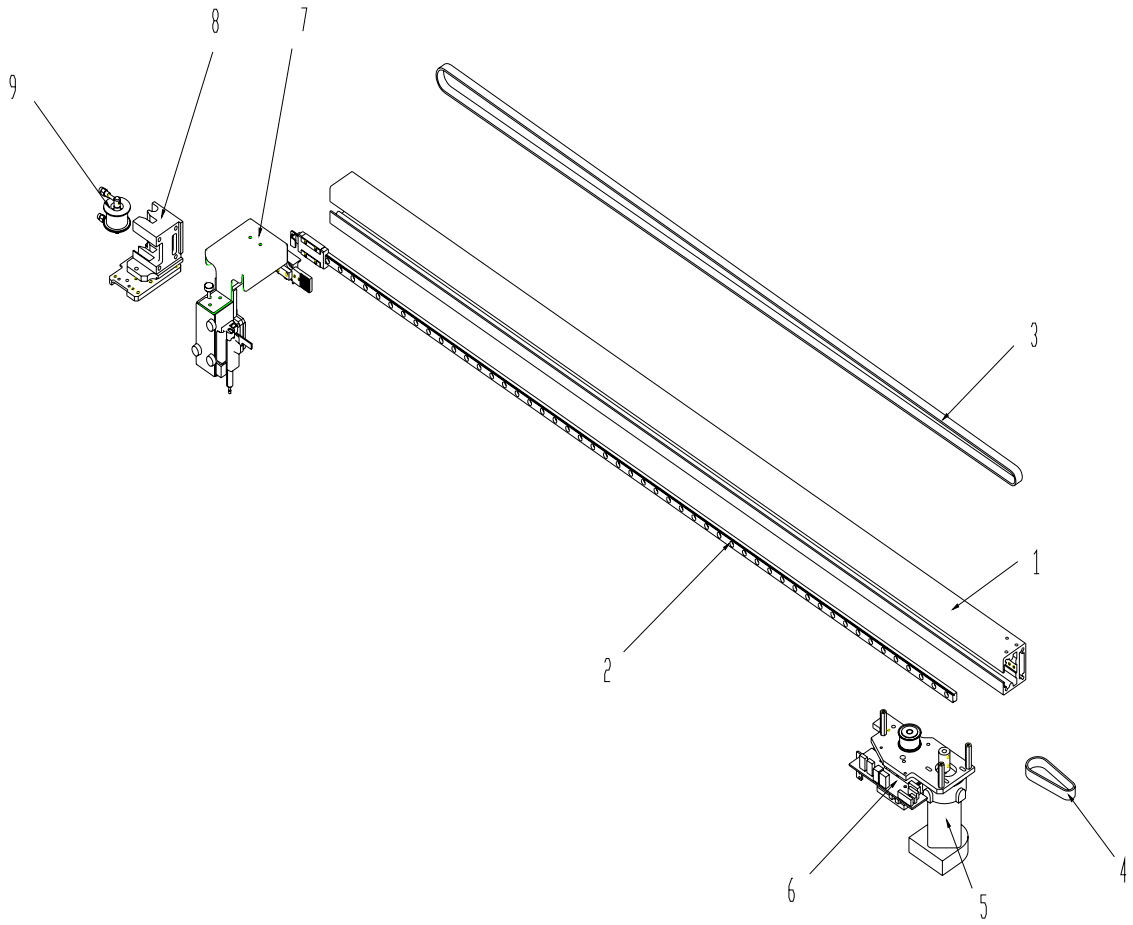
5-1. X-axis assembly for Spirit GX (including lens carriage assembly)



No	Part number for GX	Part name for GX
1	23300265G	X axis linear guide
2	22800673G	x axis main beam
3	22800672G	X-axis beam - 1
4	20700037G	bearing
5	22800823G	X-axis pulley core (right)
6	22800686G	X Pulley_30 teeth gear
7	22800664G	X pulley_36 teeth gear
8	22800683G	Carrage belt plate (up)
9	22800684G	Carrage belt plate (down)
10	22800205G	x axis belt adjuster
11	29000302G	X-Axis idel Pulley fixture
12	24400644G	X-cable-carrier bracket
13	22800213G	X-cable-carrier
14	22802108G	Lens carriage connect board
15	22802109G	Linear guide Left bracket
16	22802110G	Linear guide Right bracket
17	22801996G	Lens carriage Assembly-C180
18	22802084G	Lens carriage front cover - C180
19	22800955G	carriage airflow valve
20	29002546G	Auto focus seat Assembly
21	29002547G	Auto focus pin Assembly
22	29000706G	Hand Knobs(M3-16)
23	22802117G	air nozzle - C180

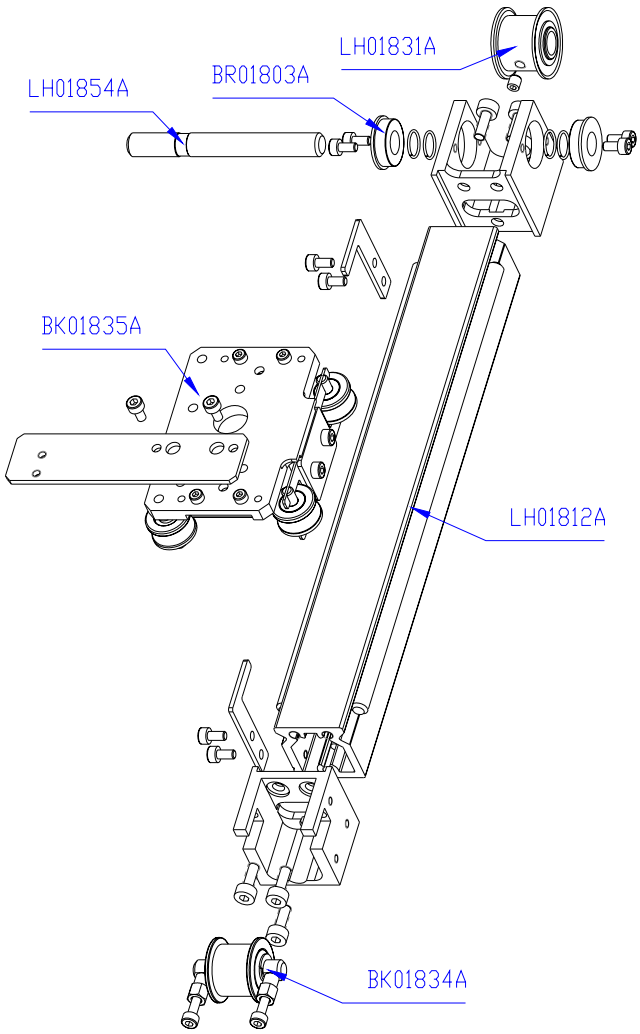
24	29004736G	Carriage mirror Holder
25	22802107G	Lens carriage base
26	29004980G	SPIRIT GX X-AXIS MOTOR SET
27	23300298G	Hand Knobs(CRKB.M3-6L)

5-2. X-axis assembly for Spirit LS



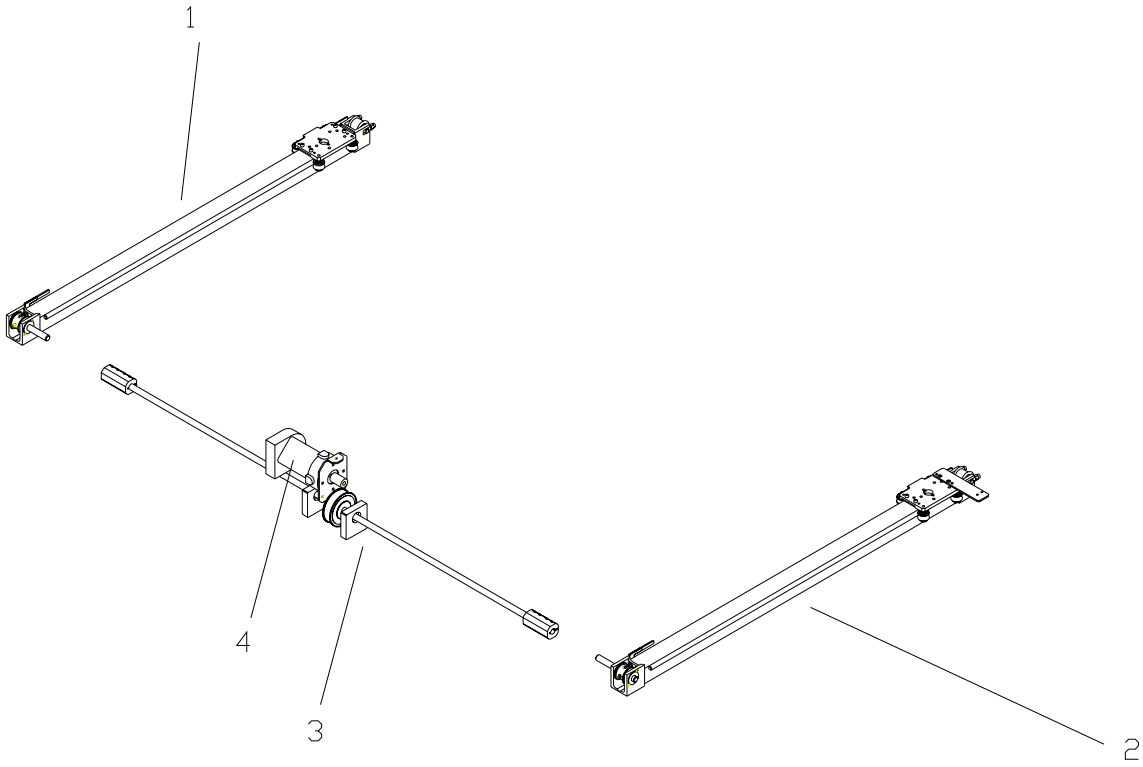
ITEM	PARTS NUMBER	PARTS NAME	QTY
1	23301231G	linear guide(MGN9C1R800Z0CM<E10>)	1
2	22803045G	x axis slideway	1
4	20600176G	Open Steel Filum Belt (U2GT-1794-15)	1
5	29002537G	X motor assembly	1
6	29005107G	X motor PCB(AAS I) - Spirit	1
7	29005506G	Lens carriage Assembly	1
8	22803049G	Tension pulley shaft bracket	1
9	29006039G	Tension idle pulley Assembly	1

6. Y-axis assembly



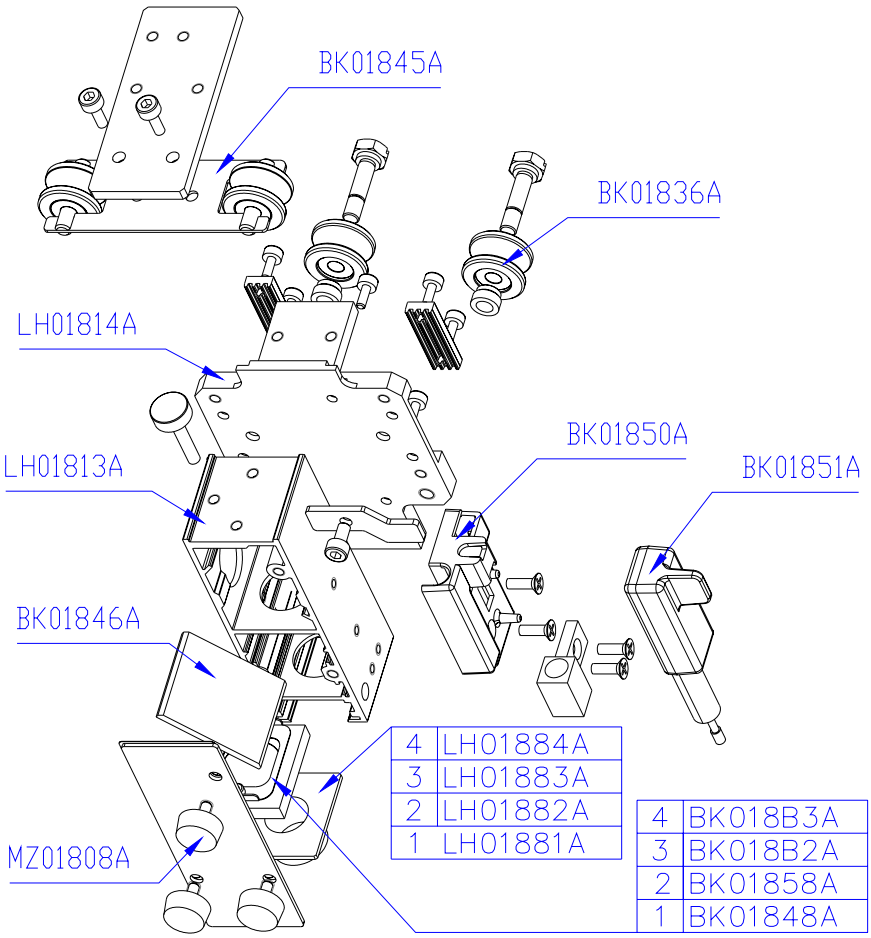
Parts number for SI	Parts Number for GE	Parts Number for GX	Parts name
29005867G	29002531G	29004576G	Y-Axis Rail Assembly(Left)
29005866G	29002532G	29004577G	Y-Axis Rail Assembly(Right)
LH01831A	22800941	22800941	Y axis transmit belt wheel
BR01803A	20700054	20700054	Bearing
LH01854A	22800950	22800950	Y axis passive axle center
BK01835A	29002534	29002534	Double side mount assembly
LH01812A	22800924	22802104G	Y axis slide way
BK01834A	29002533	29002533	Tension idle pulley assembly

6-1. Y-axis assembly for Spirit LS



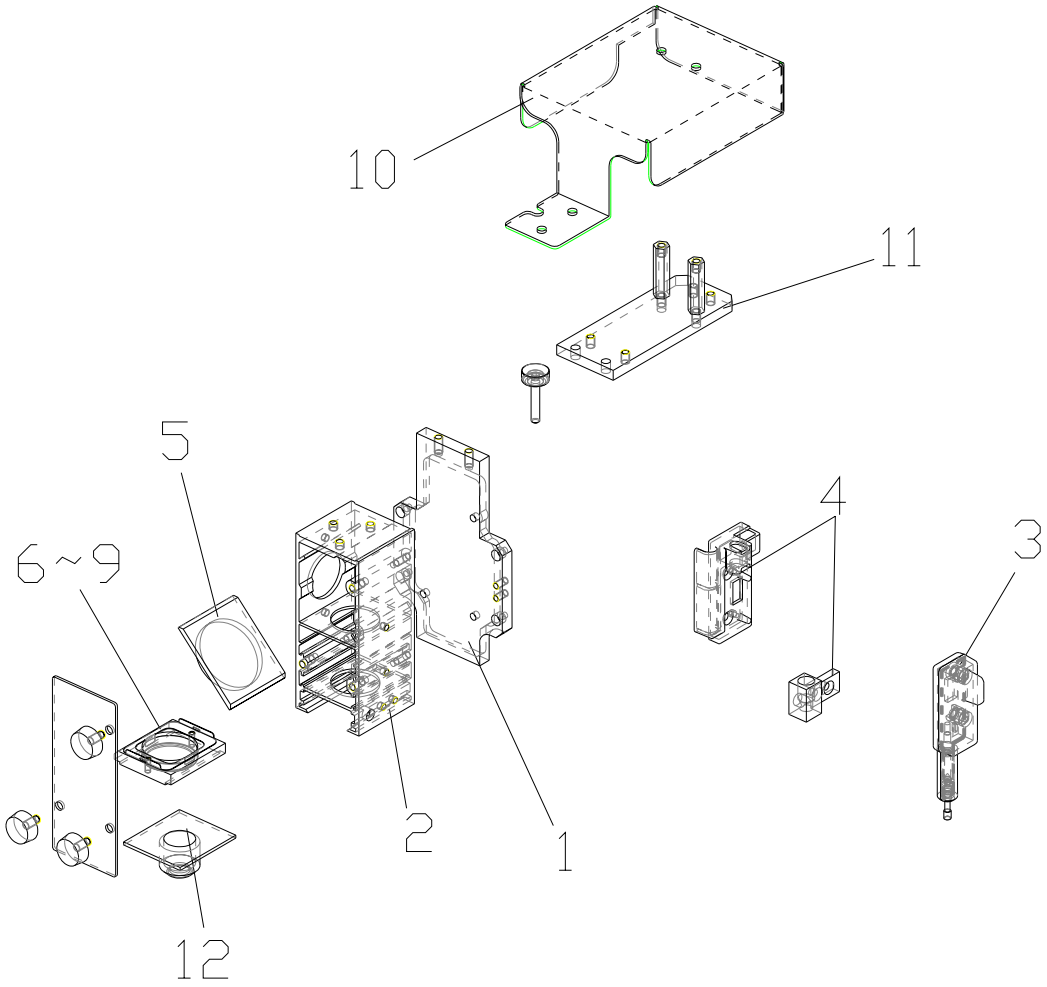
ITEM	PARTS NUMBER	PARTS NAME	QTY.
1	29005927G	Y-Axis Rail Assembly(left)	1
2	29005928G	Y-Axis Rail Assembly(right)	1
3	29006390G	Y Transmit Shaft Assembly	1
4	29002537G	Y Motor assembly	1

7. Pen carriage for Spirit SI/GE



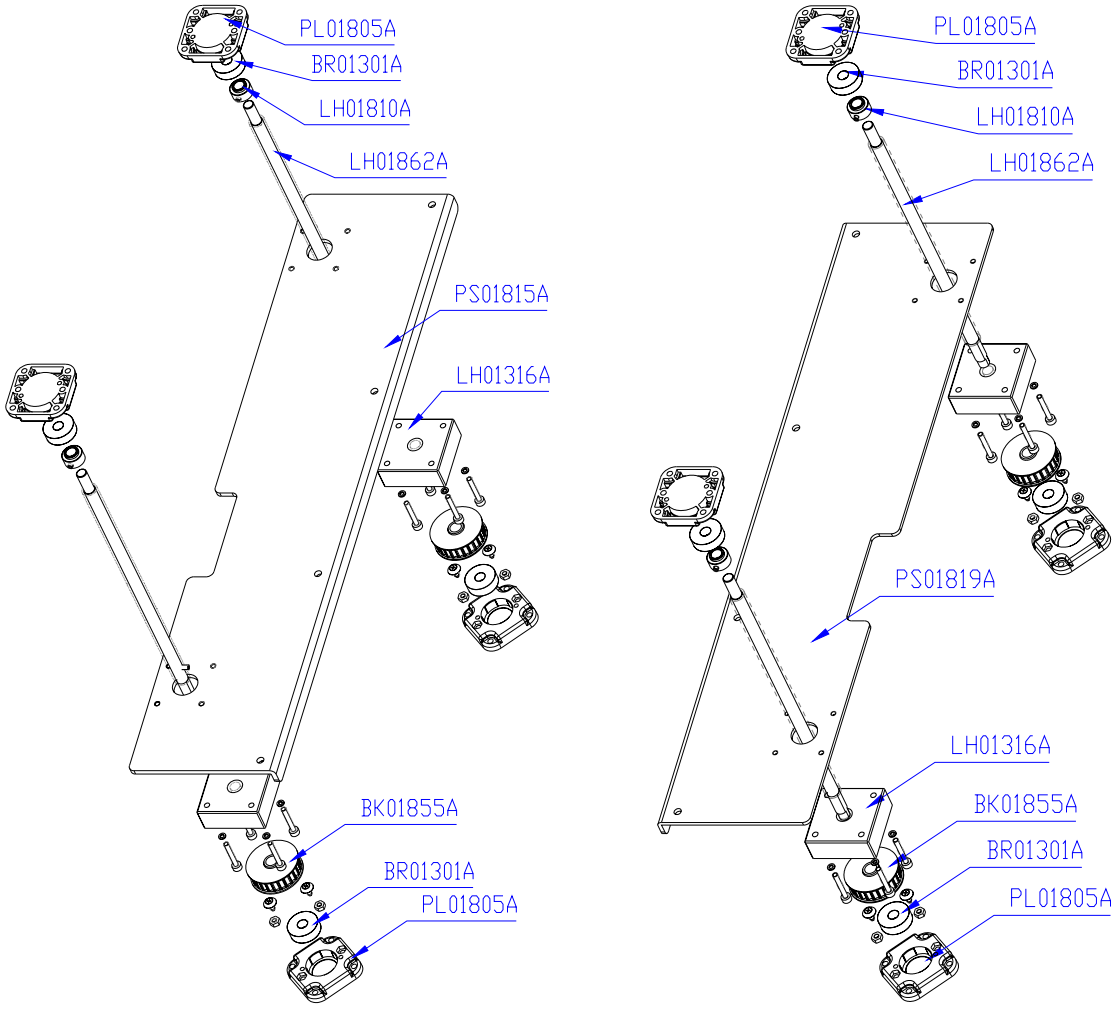
Parts number for SI	Parts Number for GE	Parts Number
BK01845A	29002543	Wheel spring assembly
BK01836A	29002535	Unilateral wheel
LH01814A	22800925	Lens carriage base
LH01813A	22801018	Lens carriage organize
BK01850A	29002546	Auto focus seat assembly
BK01851A	29002547	Auto focus pin assembly
BK01846A	29002544	Carriage reflector hold assembly
MZ01808A	23300298	Hand knobs
BK018B3A	29002589	4.0” focal lens assembly
BK018B2A	29002588	2.5” focal lens assembly
BK01858A	29002554	1.5” focal lens assembly
BK01848A	29002545	2.0” focal lens assembly
LH01884A	N/A	Air nozzle (4“ inch)
LH01883A	22801216	Air nozzle (for cloth)
LH01882A	22801217	Air nozzle (enhance)
LH01881A	22800962	Air nozzle

7-1. Pen carriage for Spirit LS



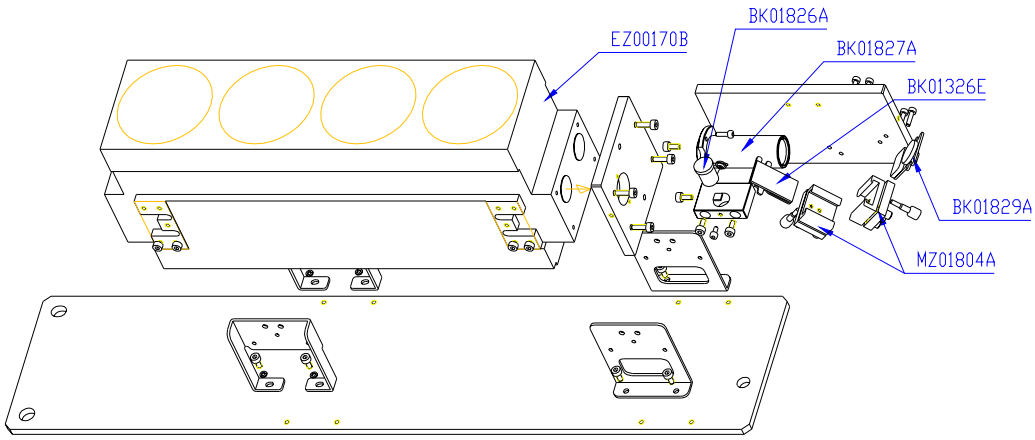
ITEM	PARTS NUMBER	PARTS NAME	QTY.
1	22802108G	Lens carriage roconnect board -	1
2	22801996G	Lens carriage Assembly-V2	1
3	29006010G	Auto focus pin Assembly	1
4	29002546G	Auto focus seat Assembly	1
5	29004736G	Carriage Reflector Hold	1
6	29002545G	2.0" Focal lens Assembly	1
7	29002554G	1.5" Focal lens Assembly	1
8	29002588G	2.5" Focal lens Assembly	1
9	29002589G	4.0" Focal lens Assembly	1
10	24403536G	Lens carriage top shingle	1
11	22802917G	Lens carriage assist base	1
12	22802117G	air nozzle	1

8. Z-platform



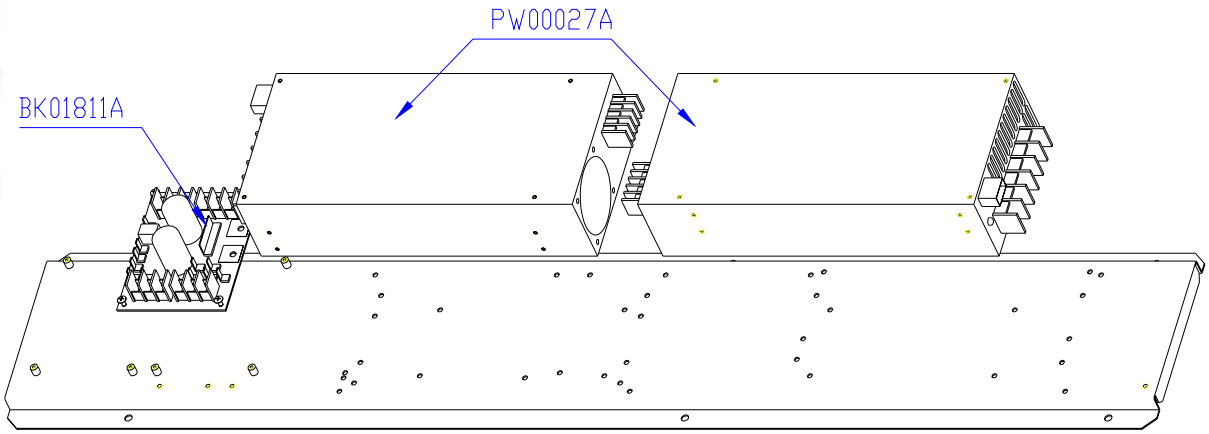
Parts number for SI	Parts Number for GE & LS	Parts Number for GX	Parts name
PL01805A	24100366	22802102G	Bearing seat
BR01301A	20700034	20700034G	Bearing
LH01810A	22800922	22800922G	Z axis top stopper
LH01862A	22801022	22801022G	Z axis table screw
PS01815A	29003638	24402291G	Working table bracket (left)
PS01819A	29003637	24402291G	Working table bracket (right)
LH01316A	22800130	22800130G	Z axis screw thread
BK01855A	29002551	29002551G	Z axis pulley assembly
BR01301A	20700034	20700034G	Bearing
PL01805A	24100366	24100366G	Bearing seat

9. Mirror 1/Laser unit



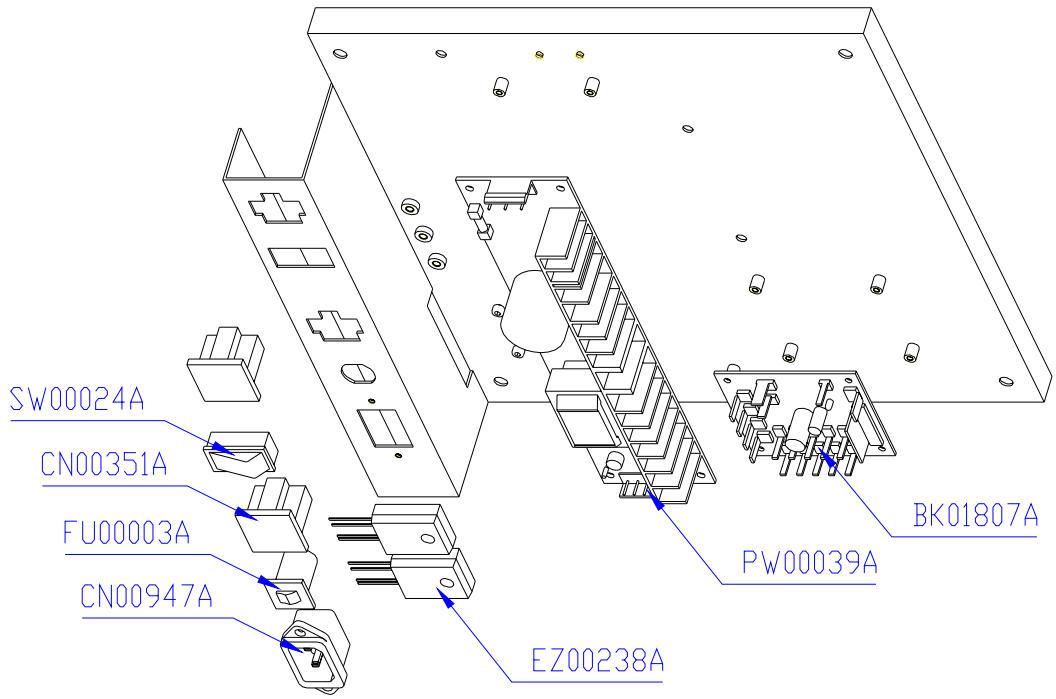
Parts number for SI	Parts Number for GE/GX	Parts name
EZ00170B	N/A	30W laser tube (depends on model)
BK01826A	N/A	Red pointer assembly
BK01827A	N/A	3X beam expander
BK01326E	N/A	Red pointer mirror
BK01829A	N/A	Mirror 1 assembly
MZ01804A	N/A	Prism mounts assembly

10. Power supply



Parts number for SI	Parts Number for GE	Parts Number for GX	Parts name
BK01811A	29002513	29002513G	Laser power adapter
PW00027A	N/A	N/A	Power supply PSP-600 49V
N/A	24500032	24500032G	Power supply ASNER 800W 30V

11. Base section side panel (SI)



Parts number for SI	Parts Number for GE/GX	Parts name
SW00024A	N/A	Rocker switch SW-115
CN00351A	N/A	AC plug
FU00003A	N/A	Fuse
CN00947A	N/A	AC connector
EZ00238A	N/A	SSR KSD215AC3
PW00039A	N/A	Power LPS-75-12 DC 12V
BK01807A	N/A	DC 12V module

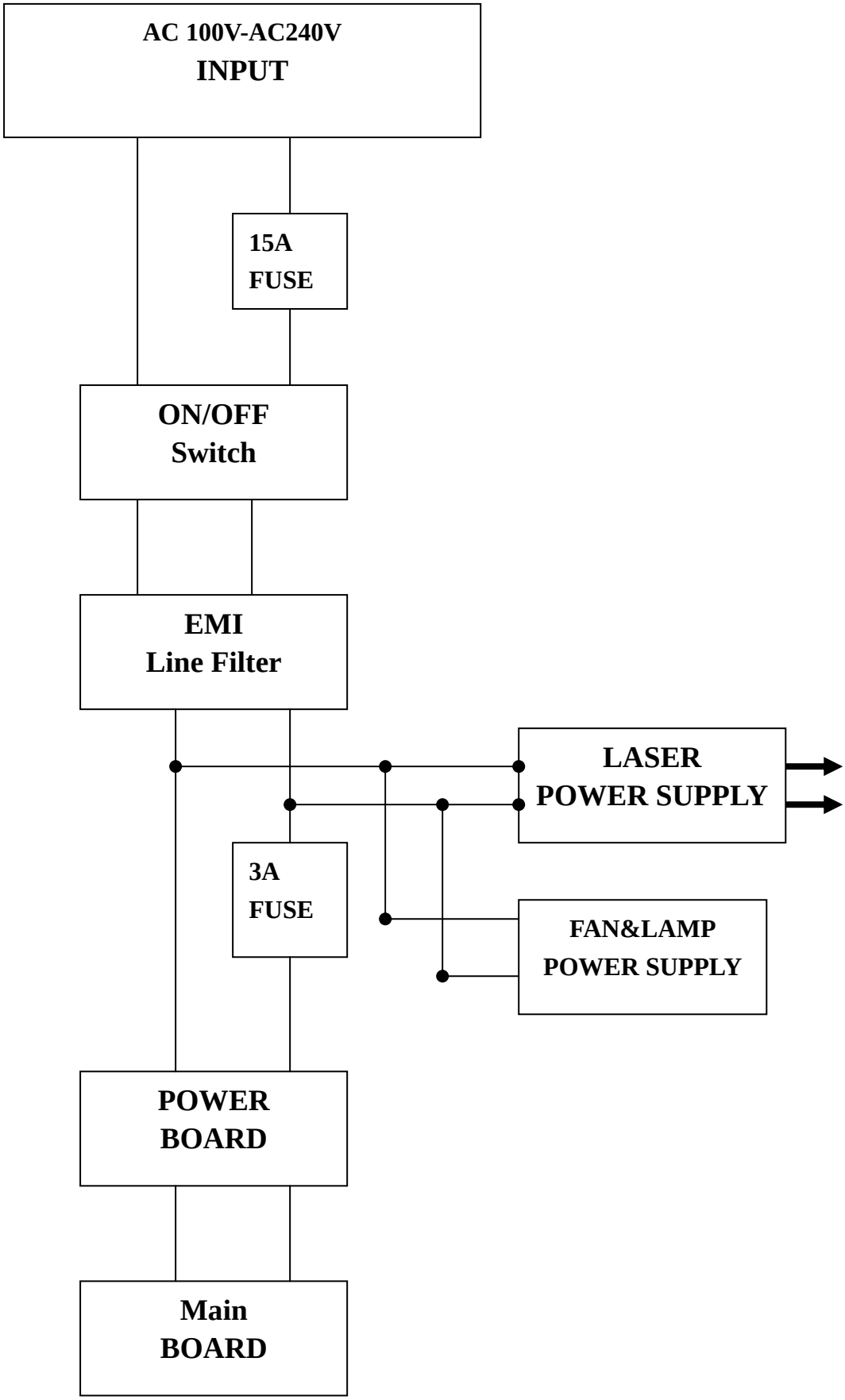
Section 2. Power System

Refer to the following chart for the number of power supplies and parts number that is equipped with your Spirit.

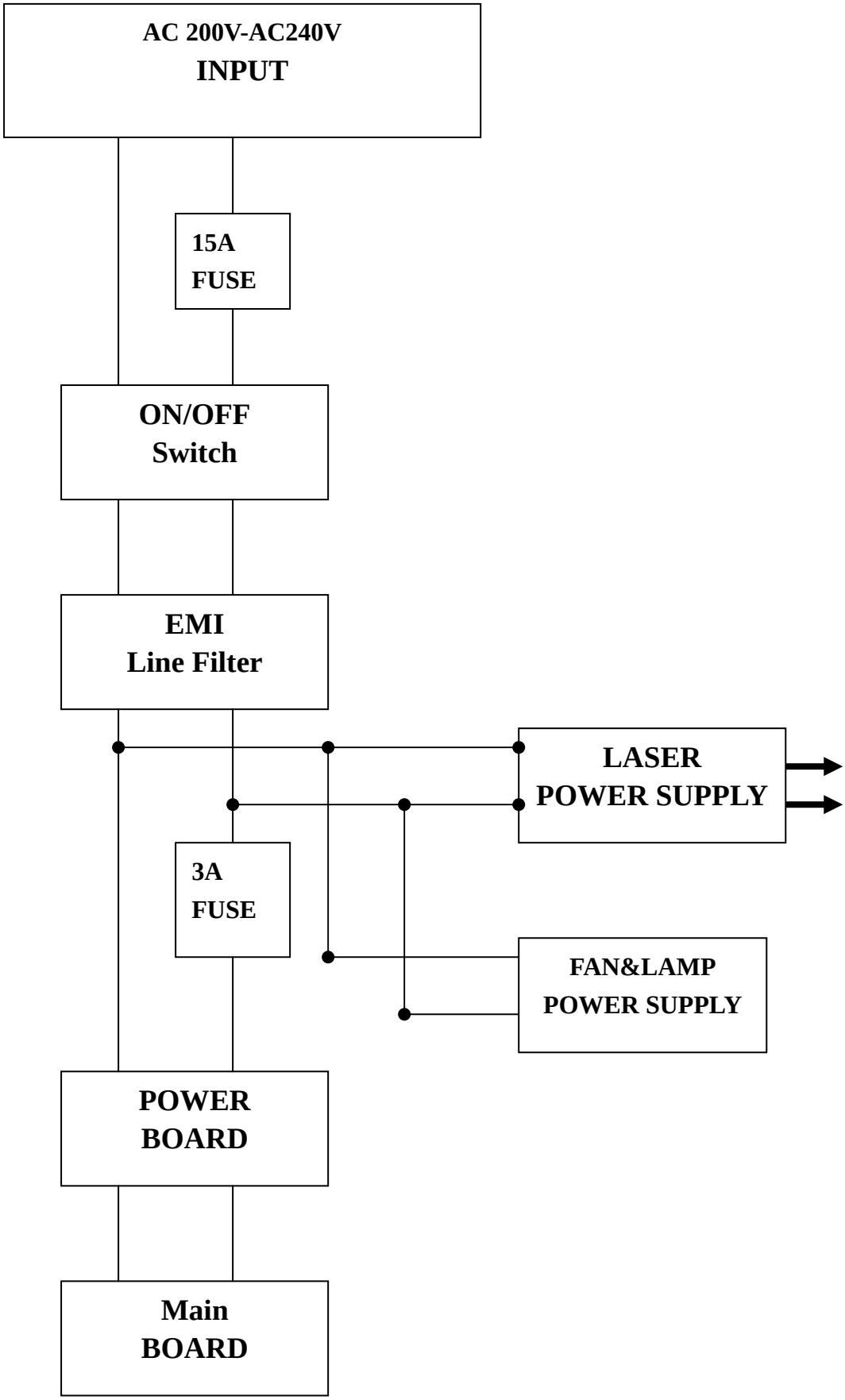
Machine Model	Laser Tube	Number of Power Supplies	Power supply parts Number
SI-12W	Synrad 48-1 series	1	PW00011A
SI-25W	Synrad 48-2 series	1	PW00012A
SI-30W	Deos	2	PW00027A
SI-40W	Deos	2	PW00027A
SI-60W	Deos	3	PW00027A
SI-100W	G-100	5	PW00027A
GE-30W, GX-30W	V-30	1	24500032
GE-40W, GX-40W	V-40	1	24500032
GE-60W, GX-60W	T-60	2	24500032
GE-100W, GX-100W	T-100	4	24500032

The normal voltage output of the power supply for Spirit SI should be at 48V and for Spirit GE should be at 30V. To measure the output voltage of the power supply unit, use a multi-meter to get the voltage reading at the immediate output location.

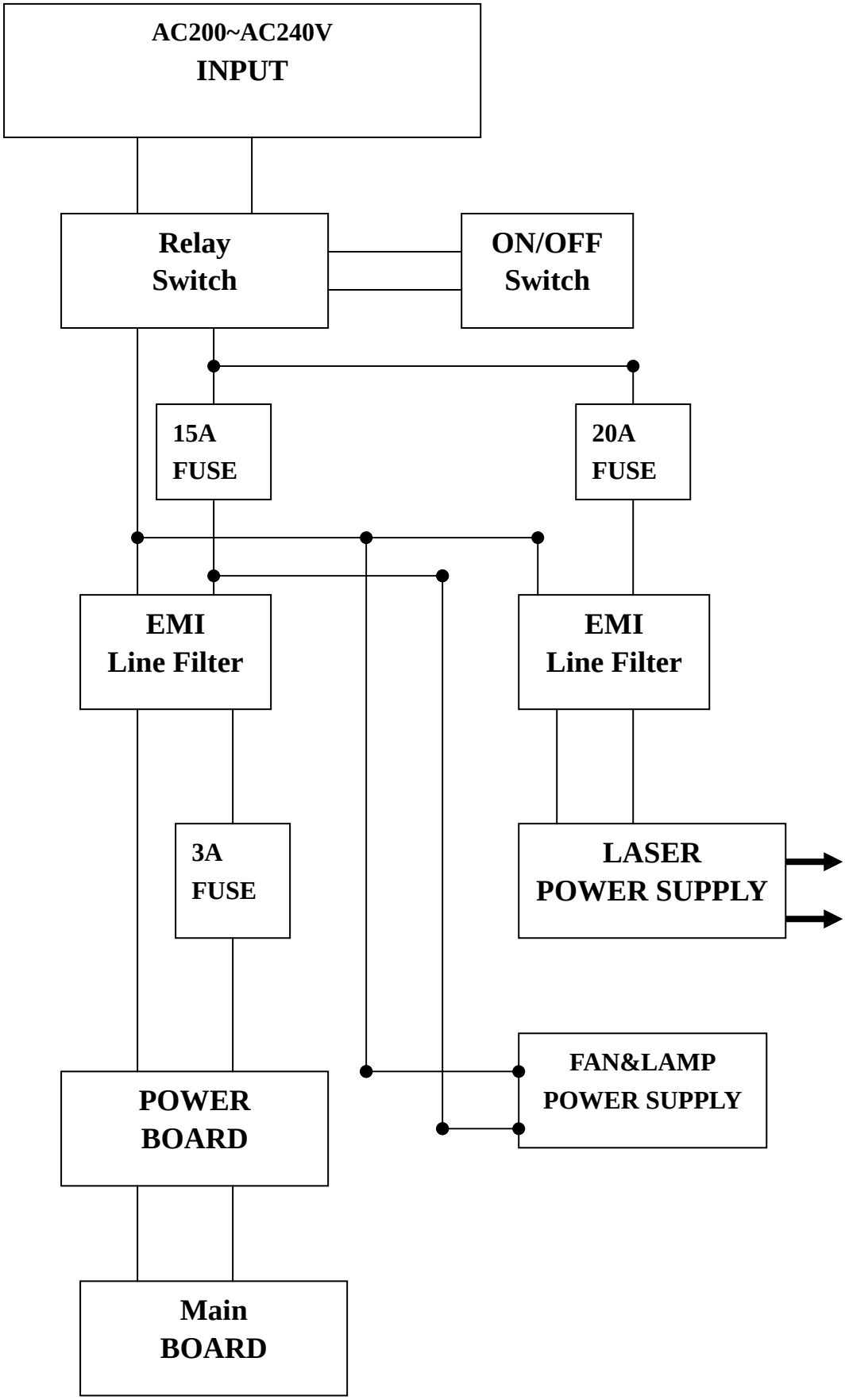
10W~25W Power Cable Layout Diagram (SI)



50W~75W Power Cable Layout Diagram (SI)

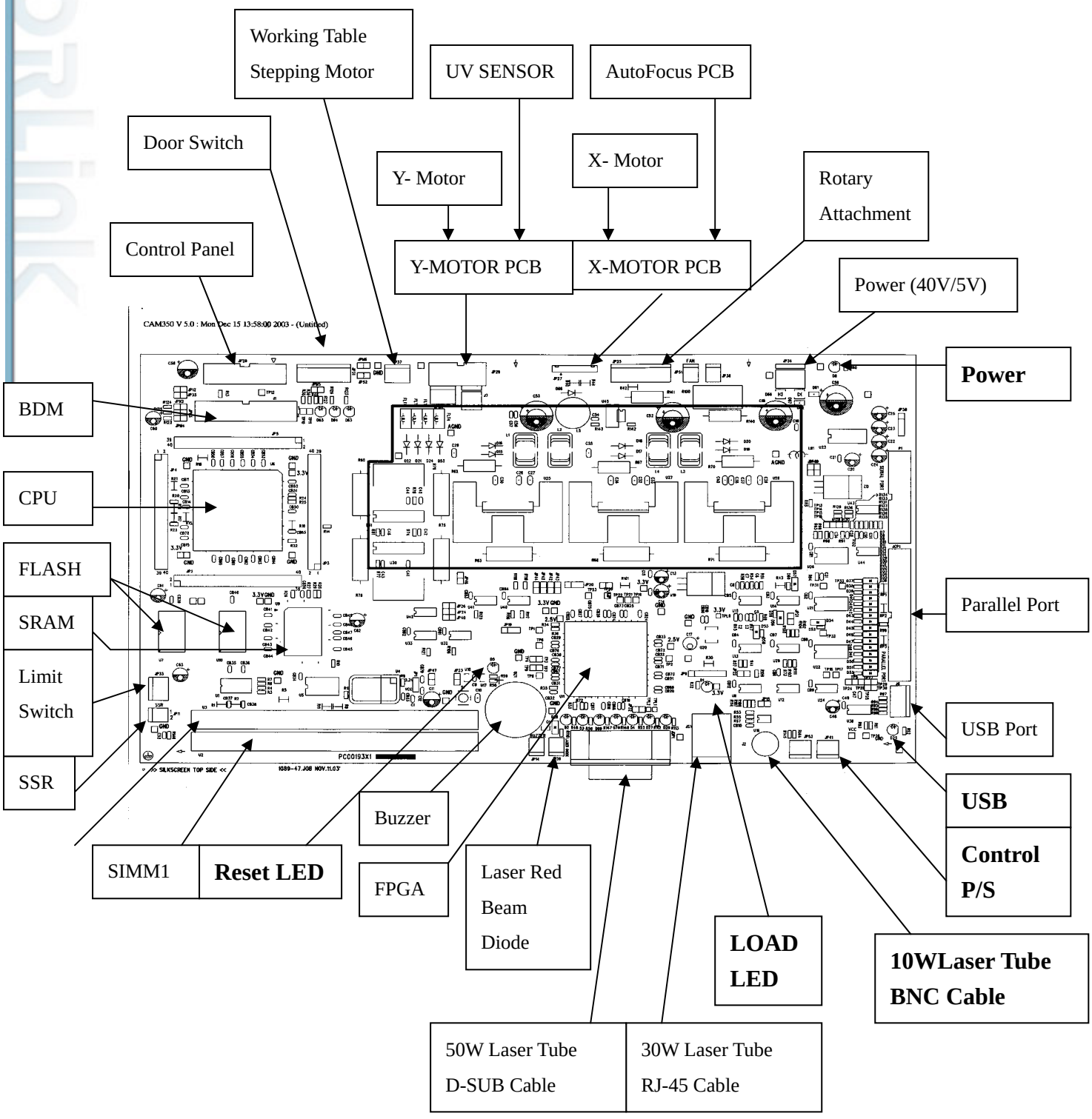


100W Power Cable Layout Diagram (SI)

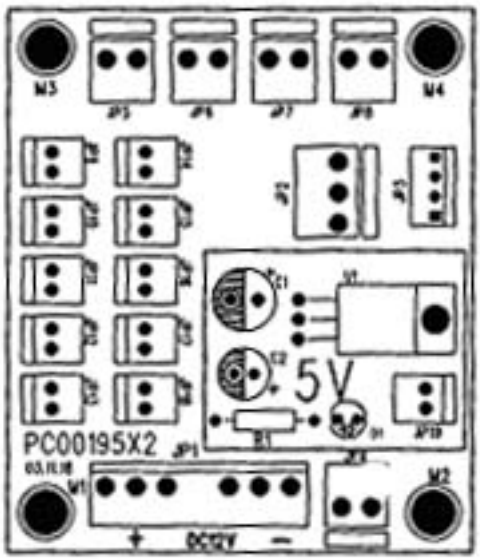


Section 3: Electrical System

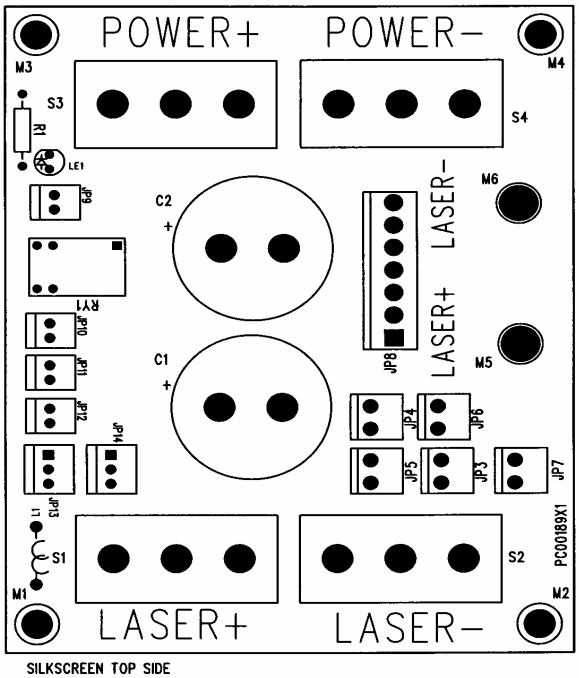
SPIRIT MAINBOARD DIAGRAM



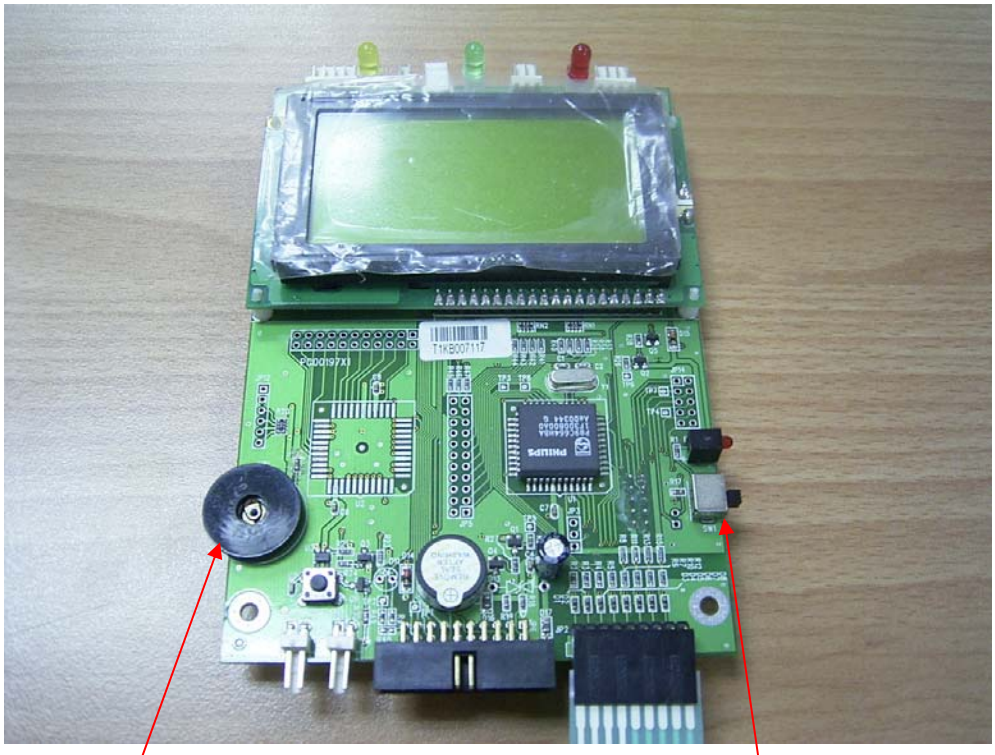
BK1807A DC12V Module



BK01811A Laser Power Adaptor



Control Panel



Dial for adjusting contrast.

Load firmware button. (Button is at lower position at default.)

Section 4: Laser System

What is laser?

Laser is an acronym from Light Amplification by Stimulated Emission of Radiation.

Types of laser tubes

There are two types of laser sources used with the Spirit, namely Coherent-Deos and Synrad. There are 12W, 25W, 30W, 60W and 100W models with Synrad laser tubes and also there are 30W, 40W, 60W, and 100W models with Coherent Deos laser tubes.

How to measure the power output of a laser tube?

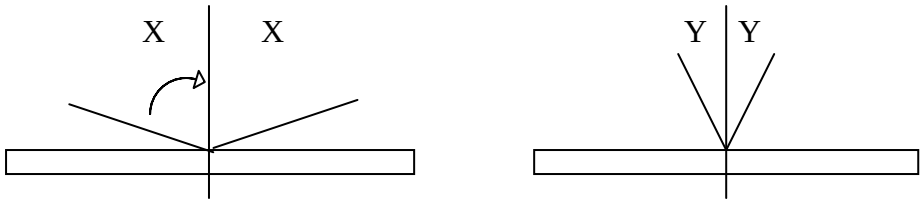
In order to measure the power output of a laser tube, we need to use a power meter (GCLPM2500AA) that will measure the heat generated and convert it to a power reading. The best place to measure the laser output power is at the immediate output of the laser tube (before to mirror 1).

How does the laser beam travel to the working area?

The laser beam generated by the laser source is reflected and guided by 4 optical lenses on to the working area. Therefore the proper adjustment and maintenance of them are crucial.

Optical Alignment

Understanding Reflection.

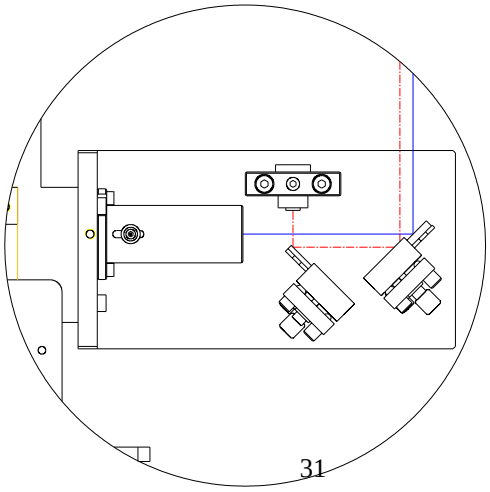


Light enters at an angle and leaves at an angle.
If light enters at an angle X, it will leave at an angle X.
If light enters at an angle Y, it will leave at an angle Y.

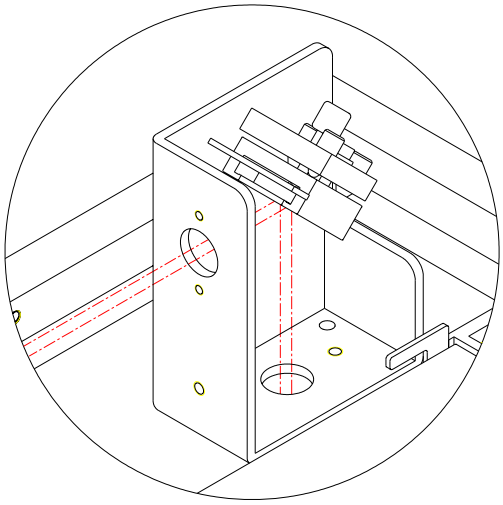
Beam Alignment

The laser beam is guided to the top of the working area by using 4 reflective mirrors. Therefore, these mirror adjustments are crucial to the proper functioning of the machine. If the laser beam is not aligned correctly, the beam path will be shifted or tilted and both rastering and vectoring quality will be affected.

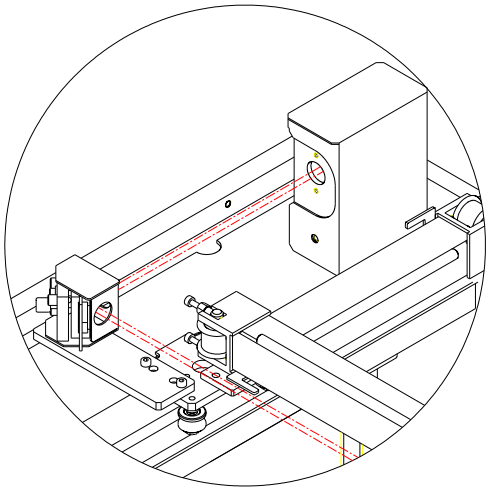
Step 1: Unscrew the back panel of the machine revealing the laser tube and Mirror 1. Turn on the machine and enter the hidden diagnostic menu by holding down the Autofocus keys while turning on the machine. Select test laser source. Set laser power to about 5%. Remove the protective cover of Mirror 1 and remove Mirror 1. Place a cardboard or paper about 1.5 meters away from the laser source. Fire the laser until you get a small burnt mark on the cardboard. (Determine the laser beam and the red beam are aligned by seeing if the burnt hole is at the exact location of the red beam. If they are not, adjust the red beam diode so that the red beam and the burnt mark are at the same location.) Place Mirror 1 back to the mirror holder.



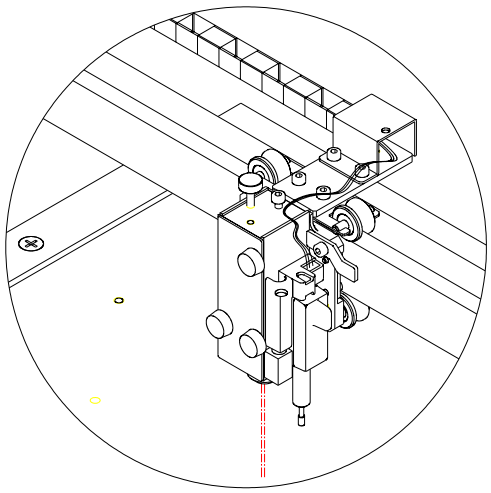
Step 2: Place a piece of masking tape over the tube opening that leads to Mirror 2. Fire the laser and see if it leaves a burnt mark in the center of the hole. Also check that the burnt mark left by the laser beam is circular in shape. If it is not circular, i.e. oval or other shape, then the laser beam might have hit the inner tubing and get reflected on the way from Mirror 1 to Mirror 2. If this is the case, place a piece of masking tape before the tube entrance, fire laser and adjust Mirror 1 so that laser passes through the center of the opening.



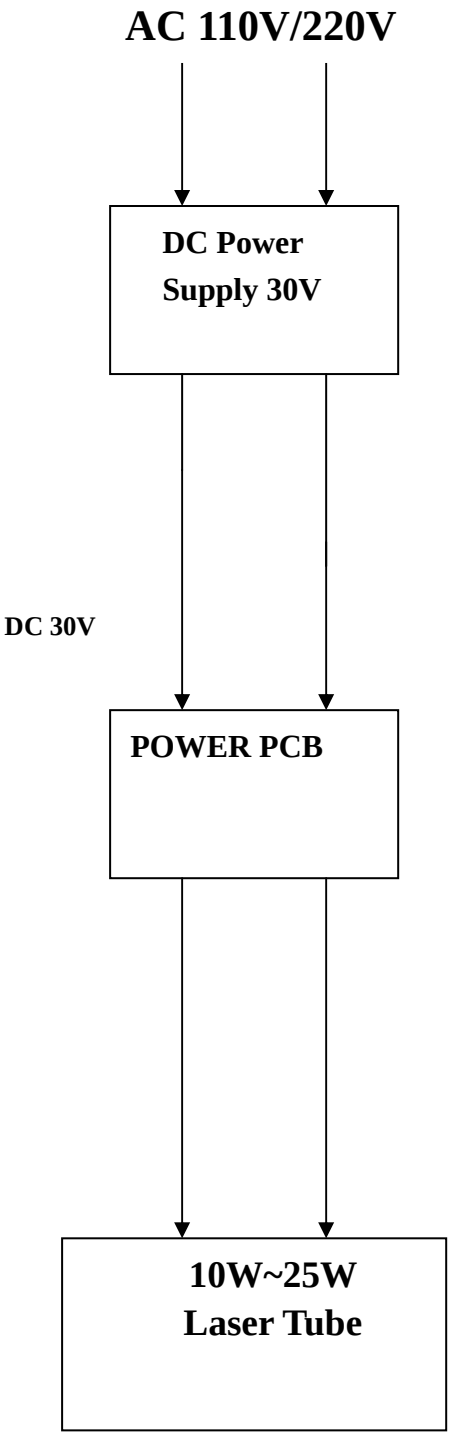
Step 3: Place a masking tape on the opening before Mirror 3. Move the rail along the Y-axis so that Mirror 3 is close to Mirror 2. Fire the laser and see if the laser beam goes through the center of the circle. Then move the rail so that Mirror 3 is to the far end of Mirror 2. Fire the laser and see if it leaves a mark at the same location when it was close to Mirror 2. Adjust Mirror 2 repeatedly so that the burnt mark is at the center and on top of one another when Mirror 3 is both close and far from Mirror 2.



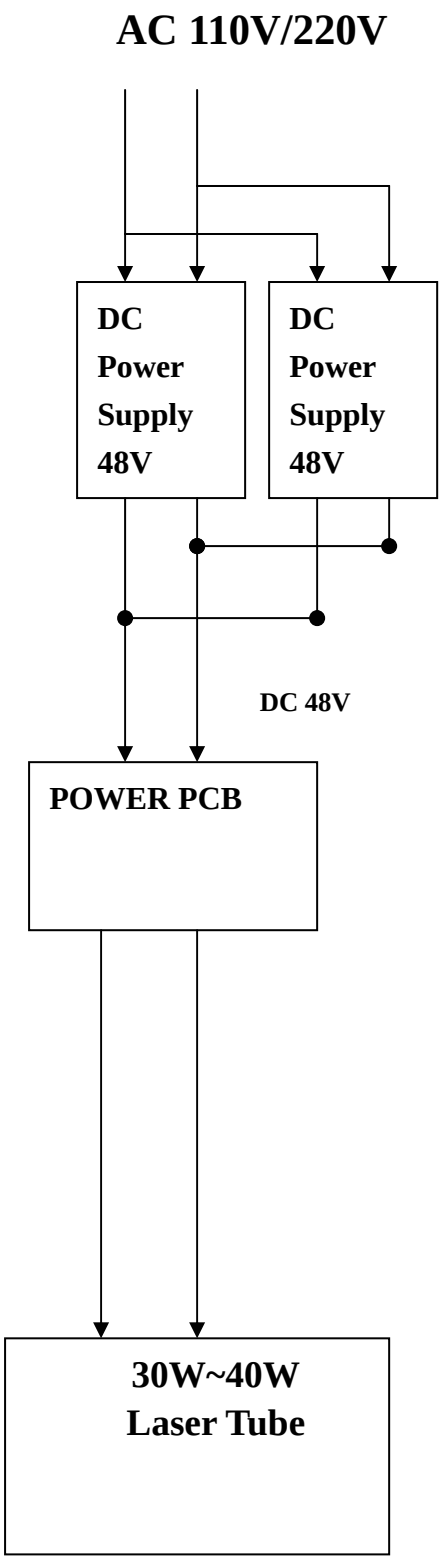
Step 4: Place a masking tape on the opening before Mirror 4. Move the pen carriage to the upper left corner of the working area. Fire the laser and adjust Mirror 3 so the laser beam passes through the center of the opening. Move the pen carriage to the upper right end of the working table. Fire the laser and adjust Mirror 3 so the laser beam passes through the center of the opening. The laser should pass through the same spot when the pen carriage is positioned at upper left and upper right. Do the same for the bottom left corner and bottom right corner.
Place a masking tape over the nozzle opening. Position the pen carriage at one of the 4 corners of the working area. Fire the laser and adjust Mirror 1 so the laser passes through the center of the nozzle opening. Repeat for all 4 corners of the working area. After adjusting Mirror 1, you may have to re-adjust Mirror 2 and Mirror 3 as well. (Repeating Steps 2 & 3.)
If the laser beam passes through the center of the nozzle opening at all 4 corners, then the laser beam should have been aligned properly. Cut four 20x20 mm squares at the four corners of the working area to double check that the edges of the square are not slanted



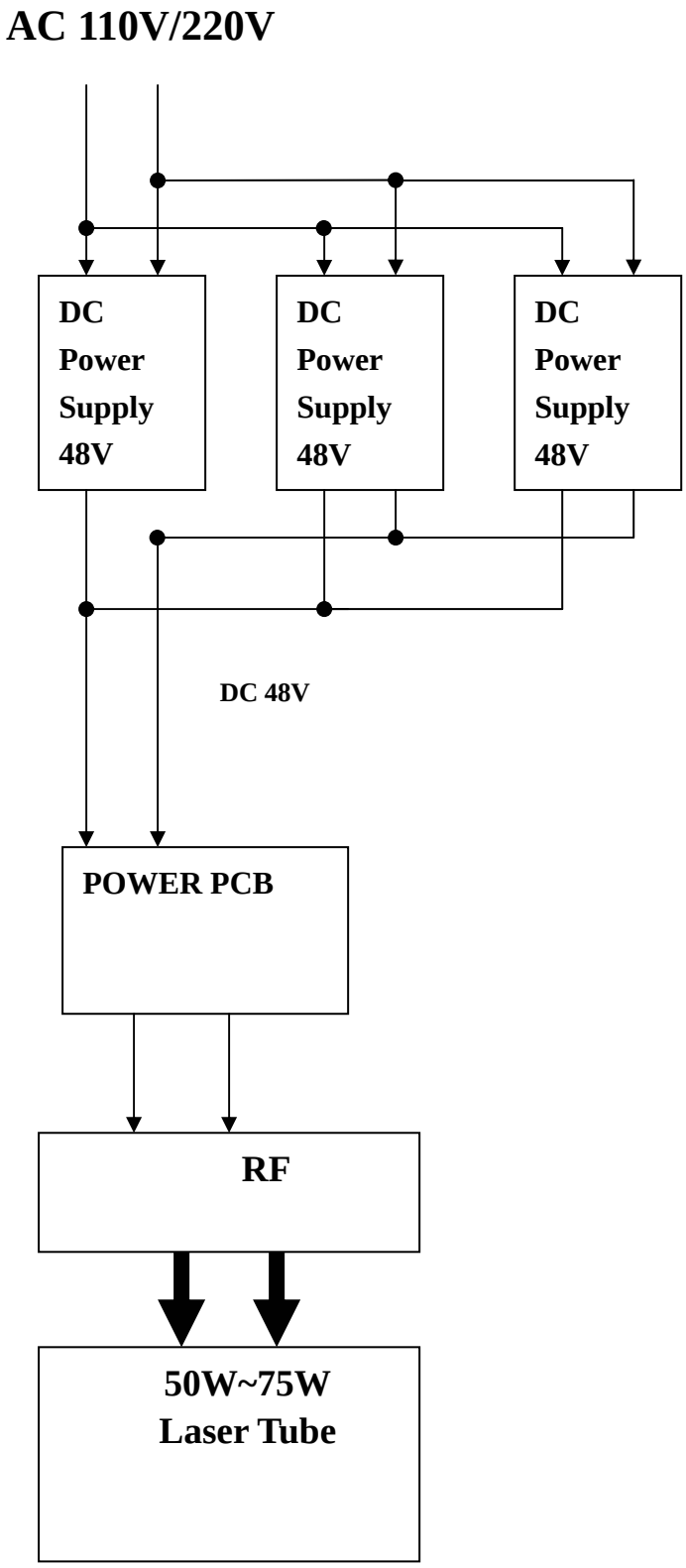
10W~25W Laser Tube Wiring Diagram (SI)



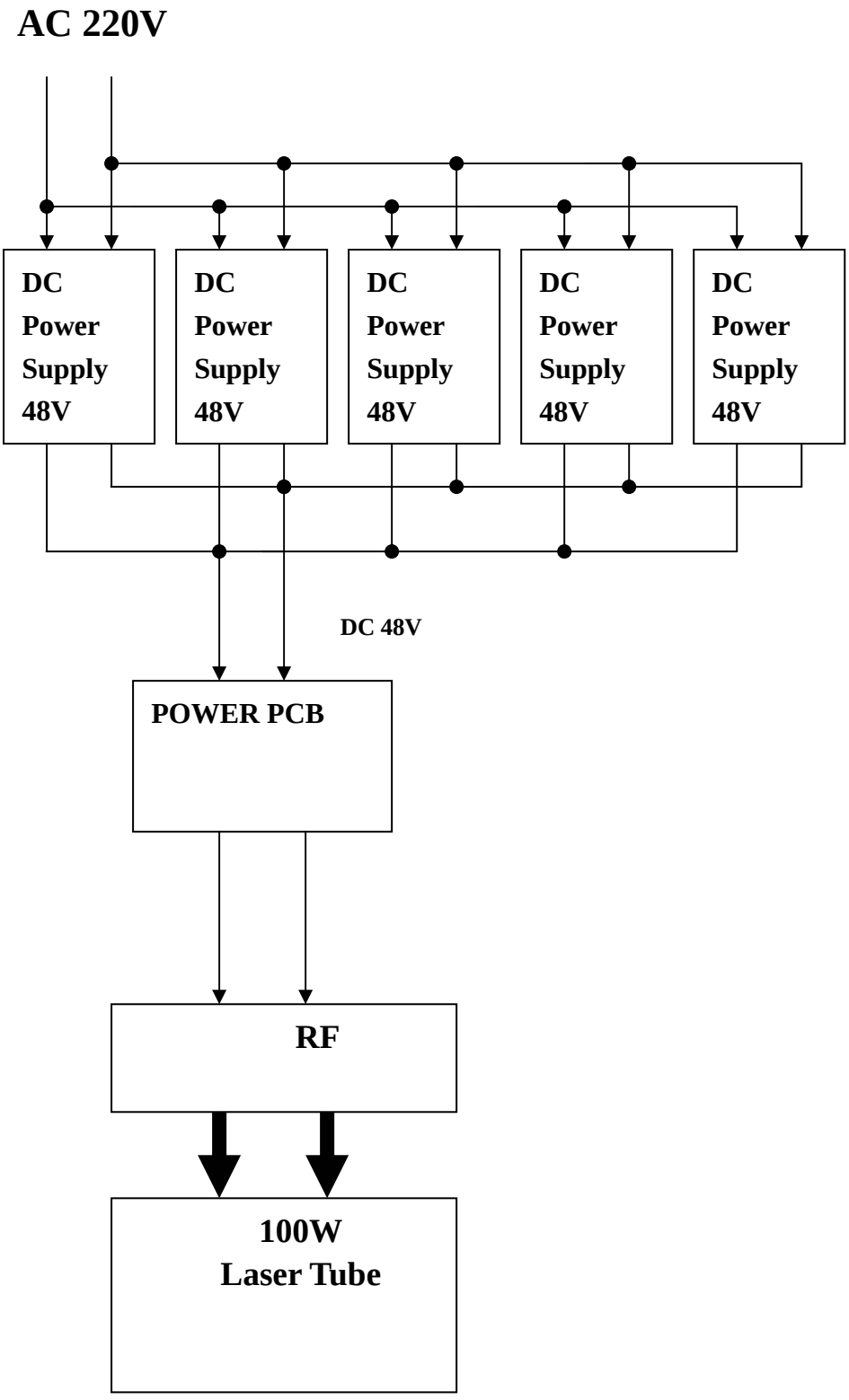
30~40W Laser Tube Wiring Diagram (SI)



50W~75W Laser Tube Wiring Diagram (SI)



100W Laser Tube Wiring Diagram (SI)

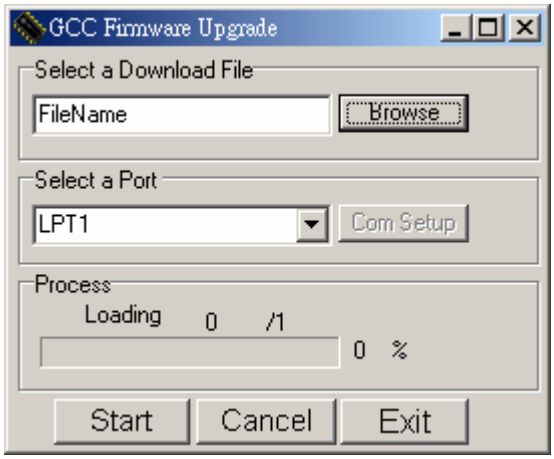


Section 5: Firmware

How to upgrade the firmware?

From www.gccworld.com website, you can logon with a distributor account and download an utility tool called “uploader.exe” With this utility tool you can upgrade the machine to the newest firmware or the firmware of your choice.

1. Turn on the machine while holding down the F2 button will allow you to send the firmware via the parallel port.
2. Run the uploader.exe file.
3. Change the Com Setup to LPT1.
4. Locate the firmware file on your computer.
5. Click on the “Start” button and wait until the machine re-initialize.



Chapter 2. System Diagnostics

Section 1. Hidden Diagnostics

To enter the hidden Diagnostics menu, hold down the Autofocus button and turn on the machine.

There are 11 tests under the hidden diagnostics menu.

1. LCM Key Test

   LCM Key test will test the functionality of the keys on the keypad.

2. LCM Interface Test

   LCM Interface test will display a series of different shapes on the LCM to allow user to detect any malfunction on the display unit.

3. Parallel port test

   Parallel port test checks that the parallel port is functional by asking the user to send a file through the parallel port.

4. Serial port test

   Serial port test checks that the serial port is functional by asking the user to send a file through the serial port. (The serial port is for diagnostic purposes only. Please do not use.)

5. USB test

   USB port test checks that the USB port is functional by asking the user to send a file through the USB port.

6. DRAM test

   DRAM test checks the functionality of the DRAM.

7. Laser test

   Laser test allow you to fire the laser tube at a selected laser power. (This is also the

utility that you use to perform beam alignment.)

8. X motor test

   X motor test checks that the X motor is functional by asking user to use the keys on the control panel to move the pen carriage along the X axle.

9. Y motor test

   Y motor test checks that the Y motor is functional by asking user to use the keys on the control panel to move the pen carriage along the Y axle.

10. Z motor test

    Z motor test checks that the Z motor is functional by asking user to use the keys on the control panel to move the platform up and down the Z axle.

11. Hard Stop test

    Hard Stop test checks that the X and Y sensors are functional by asking the user to manually move the pen carriage towards the X and Y sensor flags

Chapter 3 Preventive Maintenance

1. Cleaning of optical lenses

In order to prolong the usability of the optical lenses, it is recommended that we clean the optical lenses once every week or as required. Since these lenses are coated with a chemical substance that protects the lens itself from the intensive laser power, we have to take great care when cleaning the lenses so that we do not scratch or peel off the chemical substance.
The following are three consumable items that you can purchase to clean the mirrors and lenses.

1. Cotton buds ZZ01250A

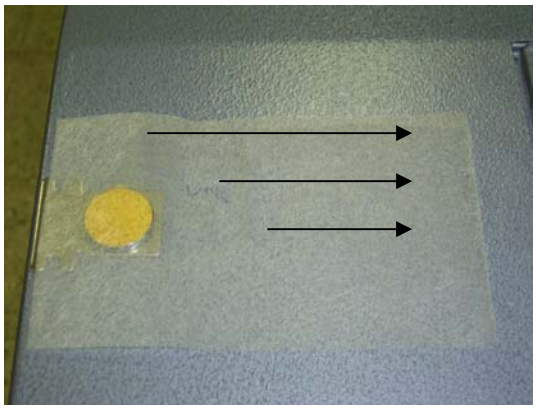
2. Lens cleaning paper ZZ01249A

3. Lens cleaning solution ZZ01248A

Cleaning the optical mirrors:

Release the screws holding the mirrors in place. Place a piece of lens cleaning paper and add a drop of lens cleaning solution.

Slowly pull the wetted paper from one side to another.

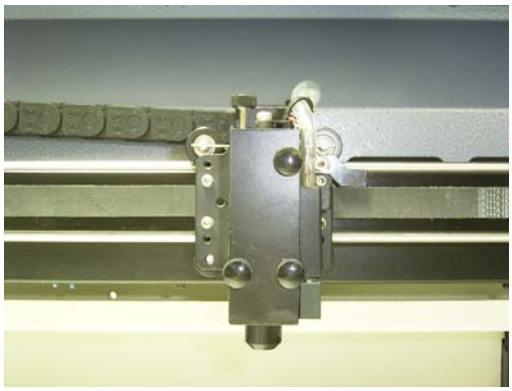


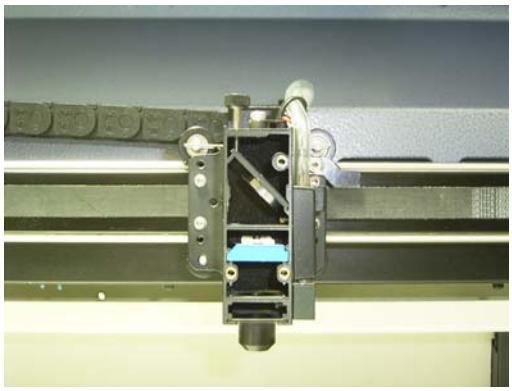
Make sure the lens is cleaned, dried and does not have any debris on the surface.

Cleaning the focusing lens:

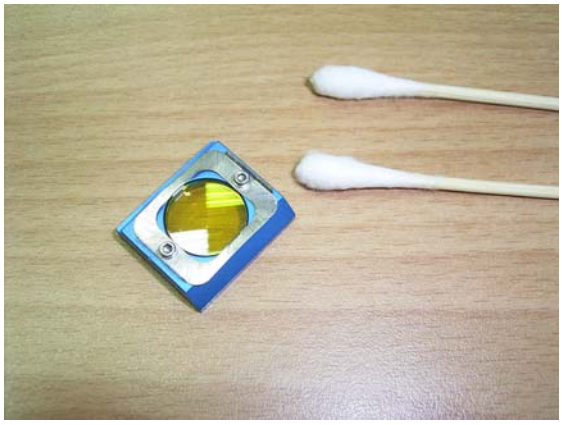
First remove the lens from the pen carriage. To remove the focusing lens, release the

three screws on the pen carriage as shown below and locate the focusing lens in the pen carriage.





Apply a drop or two of the cleaning solution on a cotton bud and lightly clean the focusing lens. Use a second cotton bud to dry or air dry the lens.



Make sure the lens is clean and dried before putting it back in the pen carriage unit.

2. Cleaning and protecting the X, Y rails:

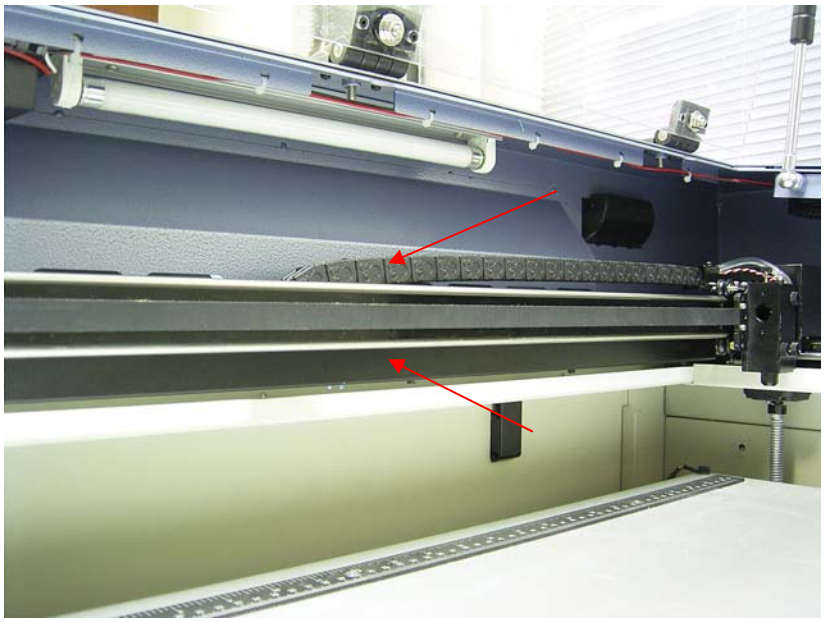
In order to prevent the X and Y rails from chemical by-products produced when laser passes through acrylic sheets, applying NSK, PS2 grease can prevent the rails from being

corroded.

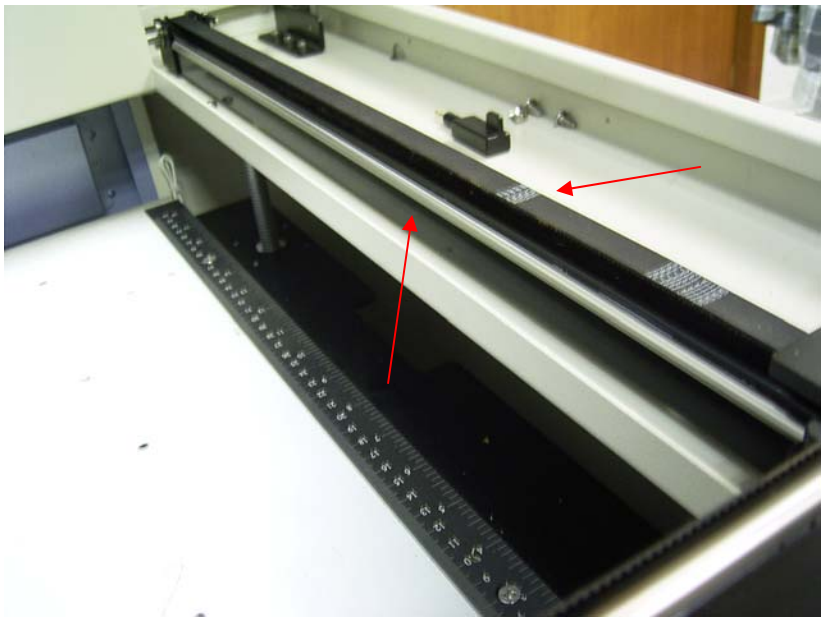
It is recommended that the X-rail should be cleaned daily or after each day's operation. The Y-rail requires the same type of cleaning and greasing about once a week. Use a piece of non-abrasive cloth to swipe and clean the rails. Then apply a small amount of the PS2 grease on to the rail and swipe it clean again.

PS2 grease MZ01417A

Please note that there are two rails on the X rail.

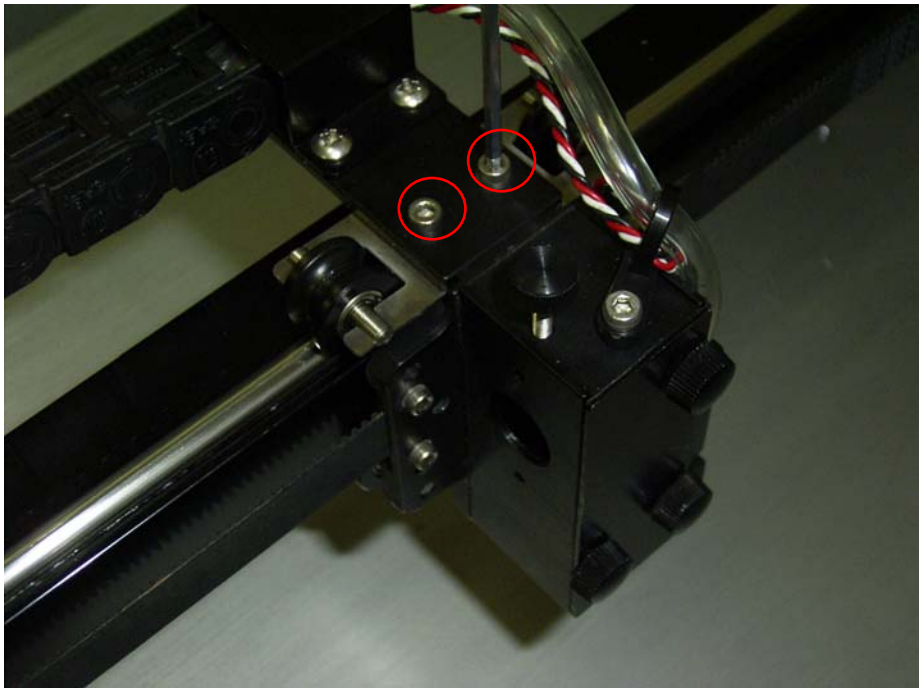


There are 2 rails on the Y-axis as well.



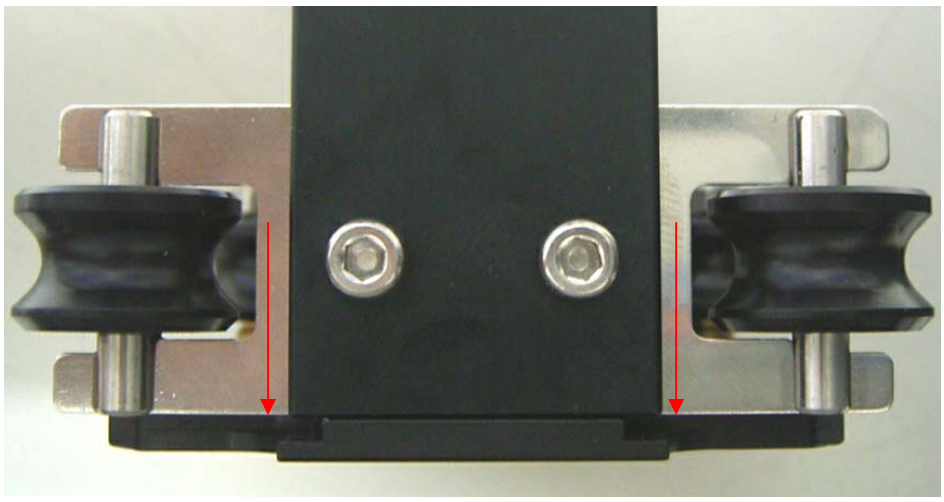
3. Changing the X rollers

The estimated life of a set of rollers is about 500 working hours. To change rollers, simply remove the hex bolts using a size 3 Allen key as shown below.



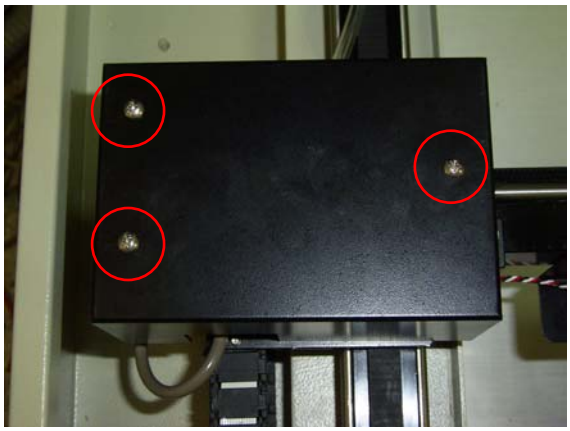
Notice that the roller has a wider side and a narrower side. The narrower side should be closer to the pen carriage.

When installing the new rollers, make sure that we push the roller set towards the pen carriage so that it is positioned against the lens carriage and then tighten the bolts.

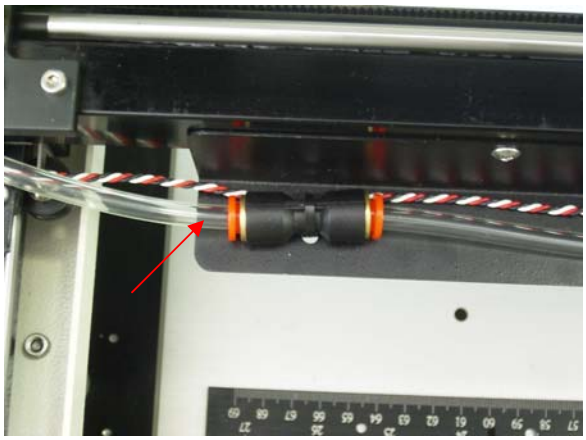


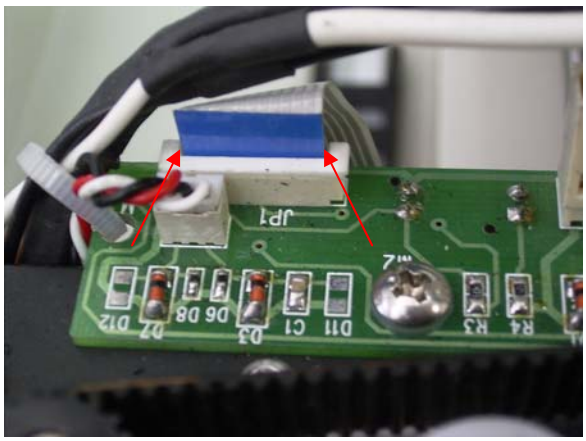
4. Exchanging the X-axis assembly

Remove the screws shown below to remove the cover.

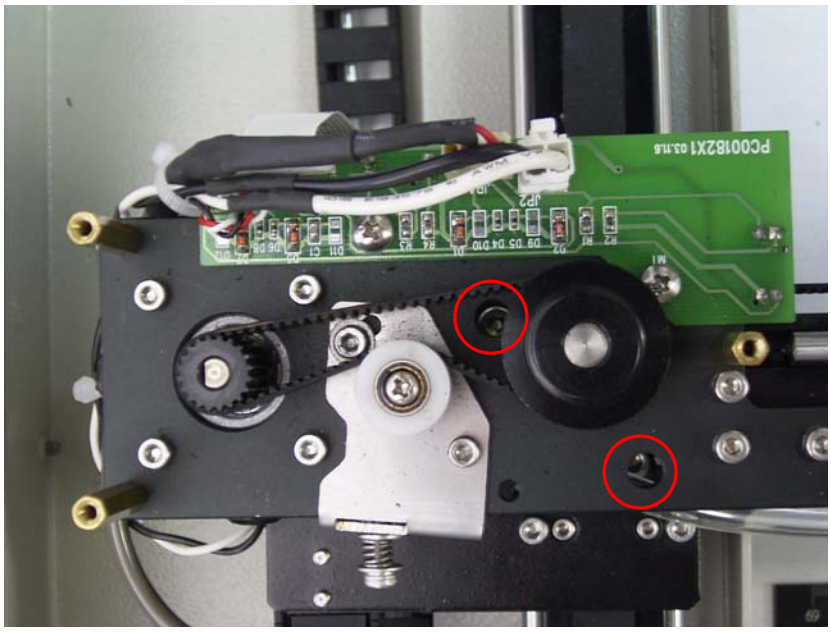


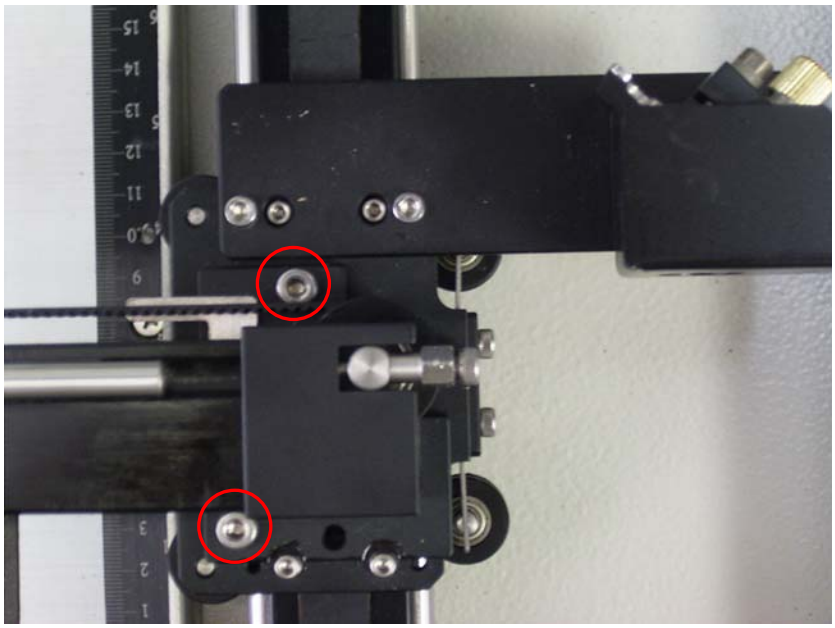
After removing the cover, disconnect the transparent air pipe and the X-motor flat cables as shown.





Remove two hex bolts on each side of the X-axis.

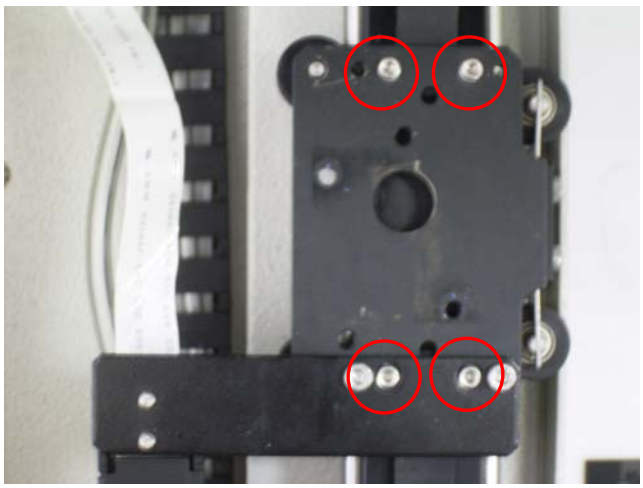


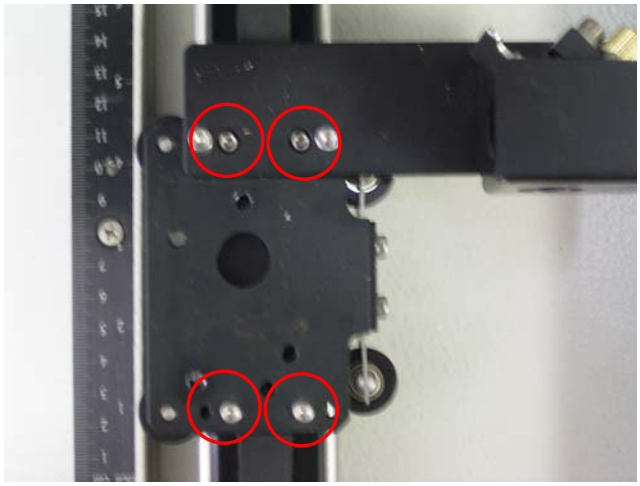


Then lift up the X-rail assembly to detach from the mounts.

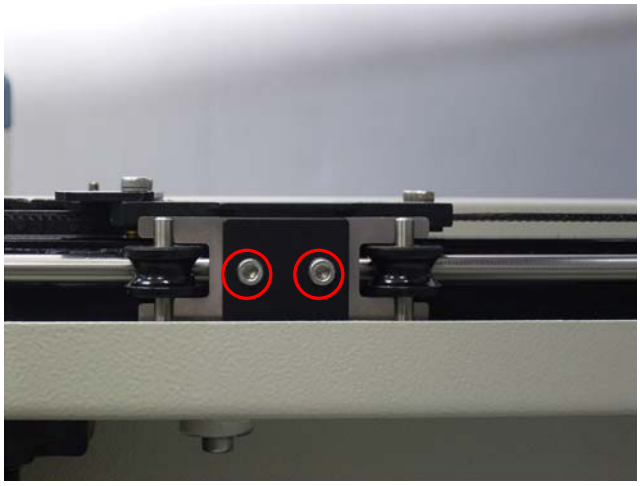
5. Changing the Y rollers.

Detach the X-rail and remove the following screws to completely remove the Y roller holders.





Unscrew the following screws to remove the side rollers.



Chapter 4. Troubleshooting

Section 1. Error messages

Error Message	What does it mean?	What to do?
"Laser Tube Error Laser tube is over heat please press any key to stop."	This means that the laser tube's temperature is too high or the laser tube is dead.	1. Turn off the machine to allow the laser tube to cool off. 2. Restart the machine to see if the same message shows.
"HPGL Command Error Get an odd number of parameters please press any key to stop"	This means error has occurred during the transfer of data from driver to firmware.	1. Resend the data file.
"WARNING! SmartGUARD fire alarm system is activated, please reboot machine"	The SmartGuard fire alarm system has been activated.	1. Turn off the machine. 2. Check for fire or smoke. 3. Clear any hazards. 4. Turn on the machine.
"WARNING! Emergency stop is activated, please free the emergency stop to continue next job"	The Emergency button has been pushed down.	1. Release the emergency button by turning it clockwise.
"Please install the Auto Focus pin first before performing the auto focusing or focus tuning"	User is attempting to use the Autofocus function while the Autofocus pin is not installed.	1. Press "F1" to return previous menu. 2. Install the autofocus pin and to perform Autofocus. 3.
" HPGL Command Error Command: Address: Please press any key to stop"	The firmware on the machine and the driver is not compatible.	1. Find out the firmware and driver versions that are being used. 2. Upgrade to the most up-to-date firmware and driver versions or use compatible versions.
"Machine Moving Limit reach upper limit switch	The Z-platform has reached the top most limit.	1. Press any key to return the previous page.

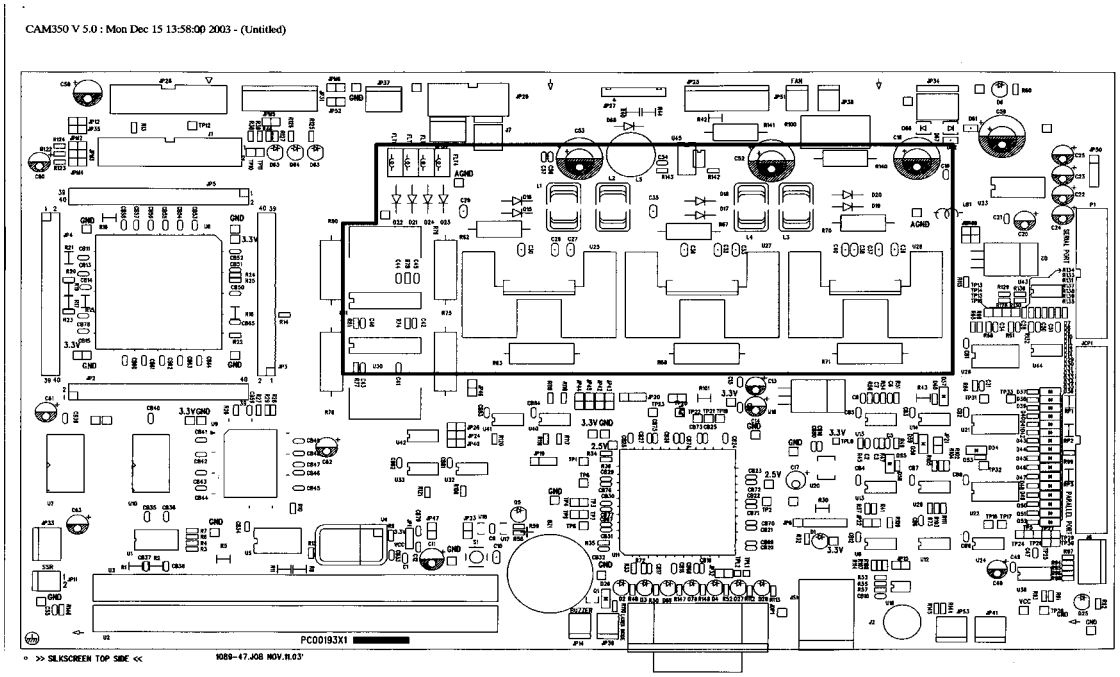
please move opposite direction"		2. Check that the Z-limit switch sensor is working properly. 3. Continue work or lower the Z-platform if necessary.
"PCL Command Error Command: Address: Please press any key to stop"	The firmware on the machine and the application driver is not compatible.	1. Find out the firmware and driver versions that are being used. 2. Upgrade to the most up-to-date firmware and driver versions or use compatible versions.
"Error! Please check the lens carriage position under relative mode"	The output object is out of the working area and cannot be outputted.	1. Check that the output object can be outputted on the working area under the correct position mode. 2. Adjust the pen carriage to an open area. For e.g Origin point for relative mode or center of the table for Center mode. 3. Restart the job.
"No Language Data Display in English Please download language data first"	The file that contains the Language data is missing.	1. Set the language back to English. 2. Upload the missing language file to the machine. 3. Set the language mode to the desired language again.
"Storage total file size out of 4M bytes. Please remove some file"	The file being stored exceeds the 4M size limit.	1. Reduce the size of file to be stored to below 4M. 2. Save the file again.

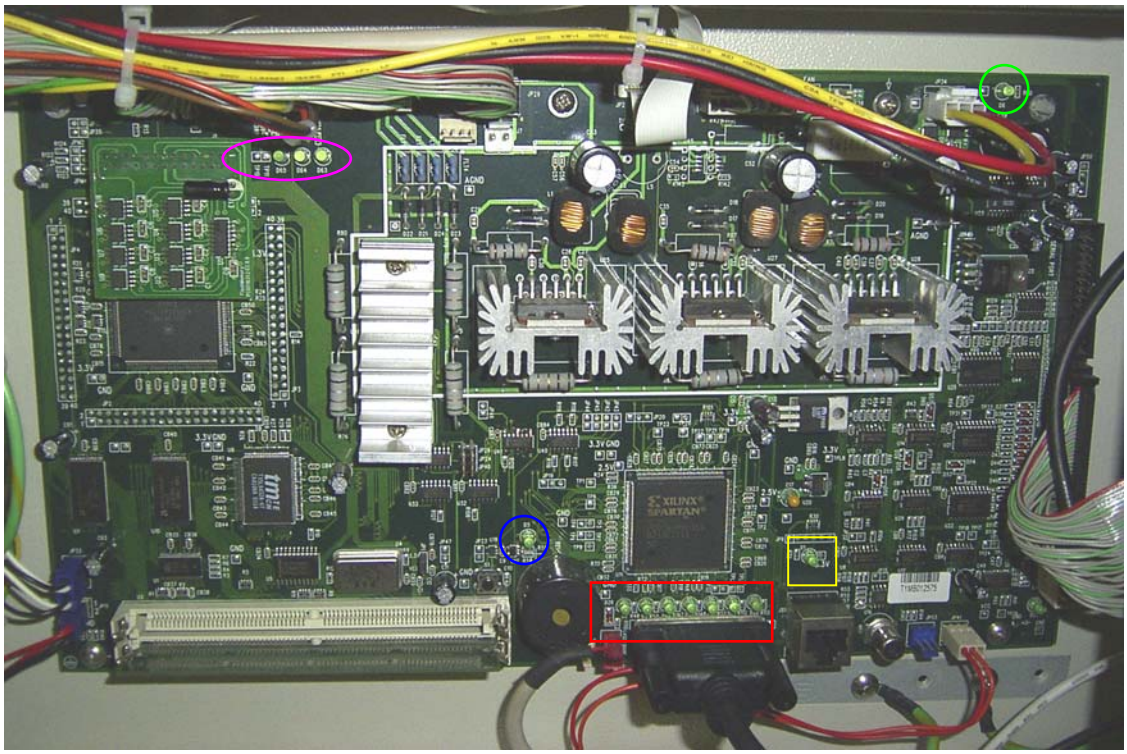
"No Flash Memory. Please check the device on machine."	The flash memory is not detected.	1. Make sure that the flash memory is installed properly. 2. Save file again.
"X motor malfunction. For service please inform your local distributor"	X-motor failed or its related components failed.	1. Turn off the machine. 2. Move the lens carriage from left to right by hand freely to make sure the rail is not blocked. 3. Check for loosed connections and bad wirings. 4. Change the X-motor PCB to see if the error is with the PCB. 5. Replace the X-motor and check to see if fixed. 6. If error remains after the X-motor change, replace the main board as well.
"Y motor malfunction. For service please inform your local distributor"	X-motor failed or its related components failed.	1. Turn off the machine. 2. Move the lens carriage from back and forth by hand freely to make sure the rail is not blocked. 3. Check for loosed connections and bad wirings. 4. Change the Y-motor PCB to see if the error is with the PCB. 5. Replace the Y-motor and check to see if

		fixed. 6. If error remains after the Y-motor change, replace the main board as well.
"Z motor malfunction. For service please inform your local distributor"	Z-motor failed or its related components failed.	1. Check that the connections of the wiring are not loosed or damaged. 2. Replace the Z-motor.

Section 2. Error lights

Identifying problems by looking at the lights on the mainboard.



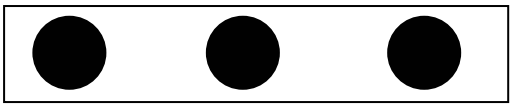


The LED circled in green is the 5V light. This light should always be “ON“ showing that there is a 5V supplied to the mainboard. Check that the power supply next to the mainboard that provides the 5V power is working properly if it is not “on”.

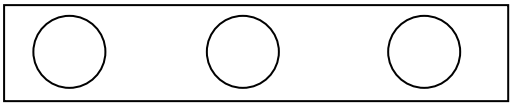
The LED circled in blue is the reset light. This light should only turn on when the reset button is hit. If it stays “on” all the time then the mainboard needs to be changed.

The LED circled in yellow is the initialization light. This light turns on when the machine is turned on. It will turn off after the initialization process. If it stays on, then mainboard is damaged.

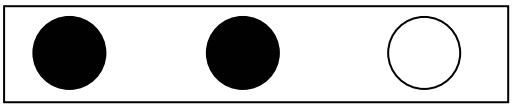
The LEDs circled in purple are the door sensor lights.
When all doors are closed, all three LEDs will stay “on”.



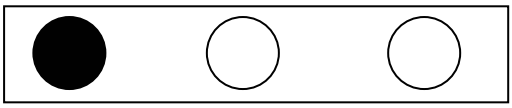
When the front door is open or front door sensors malfunctioning, all the LED will turn off.



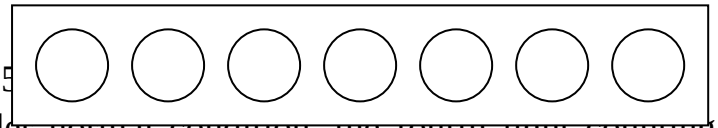
When the backdoor is open or the backdoor sensors are malfunctioning, the two leftmost LEDs will turn “on”.



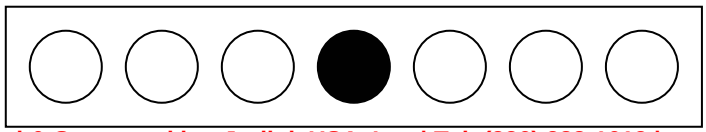
When the top cover is open or the top cover sensors are malfunctioning, the left most LED turns to “on”.



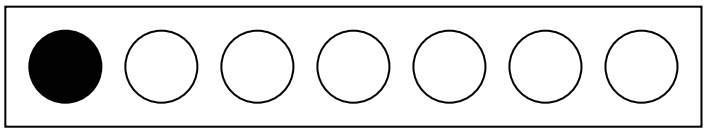
The LEDs circled in red are the laser tube status lights.



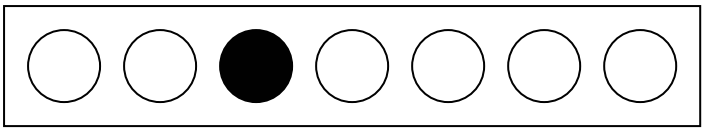
For 5
Under normal condition, the fourth light counting from the left will be “ON.” However, the brightness of the LED depends on the power level used.



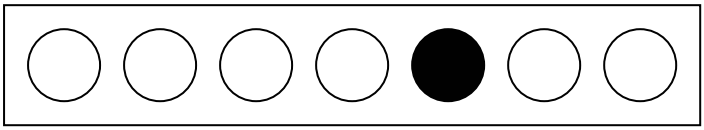
When the first LED from the left turns “ON”, check that the RF cable is connected.



When the third LED from the left turns “ON”, either the laser head or the RF cable is bad.

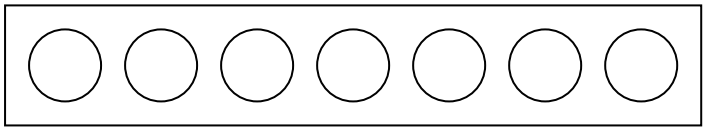


When the fifth LED from the left turns “ON”, the RF power supply has gone over temperature.

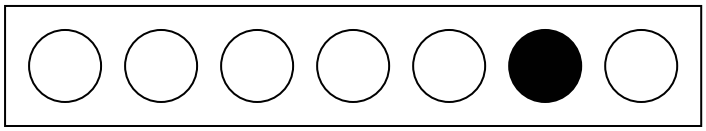


For 30W models:

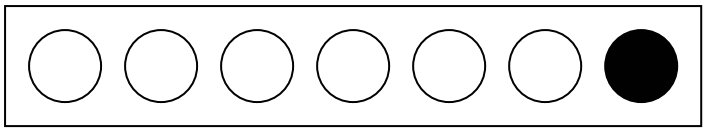
Only the two right most LEDs are used for 30W models. Under normal condition, all LEDs will **not** turn “ON”.



During initialization, the sixth LED from the left will turn “on” by default. The LED will turn “off” after the initialization meaning that the laser is ready to fire. However, if the LED stays on afterwards, that means the laser source is malfunctioning.



When the last LED from the left turns “ON”, the incoming voltage to the laser source is incorrect. Check that the output voltage to the laser source is correct.



Note: If the electrical circuit in the laser source has been damaged then the signals shown may not reflect the exact problem.

Setting tickle pulse on Spirit machines equipped with Synrad laser sources.

By nature, Synrad laser sources require a tickle pulse to keep the laser ready for firing. The tickle pulse signal required depends on the individual laser tube. The usual setting is at 5k, however, it may be required to adjust the tickle pulse rate. If the laser is too weak, we can set it to 7k and if the laser is bleeding, then we can set it to 3k.

Hold the “down arrow key” when turning on the machine until “Laser Tube Model Number” shows on the display. Wait till the lens carriage comes to a stop. Press the Enter key to get to the Model Number selection page. Select the corresponding laser tube model from this page. Press F4 and then the

Start/Stop key to save and restart the machine.