

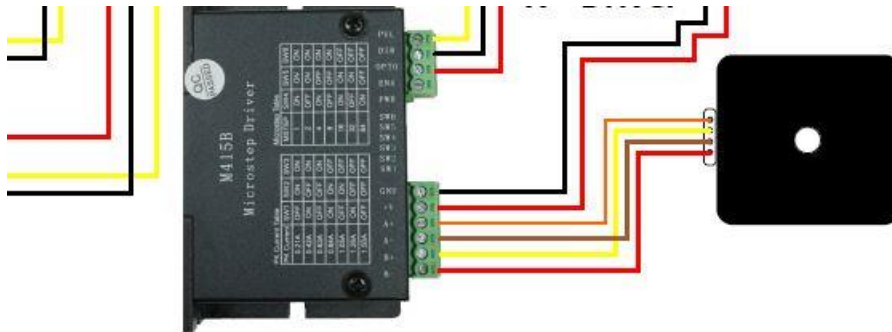
LIGHT OBJECT

Mini-rotary Wiring Instructions

What we need to get started.

1. A 2-axis mini-rotary
2. A Mini 2 phase 2A 1-axis Stepper Motor Driver
3. 4-wire motor power wire
4. 6-pin phoenix connector
5. Some shrink tubing
6. A wire stripper/cutter
7. A soldering iron kit(with some soldering wire)

Driver wiring Diagram



**Note: For drivers with PUL+ and DIR+, connect those to +5V on controller board. Those with DIR-, connect it to DIR on the controller board and for PUL, connect to PUL- on controller board*

4 LEAD WIRES

	1	2	3	4
Color Code 1	Red	Blue	Green	Black
Color Code 2	Brown	Orange	Red	Yellow
Color Code 3	Red	Red White Stripe	Green	Green White Stripe
Bipolar Driver	A	\bar{A}	B	\bar{B}

Step1:

Make sure you got all the items starting with your stepper motor and stepper driver.



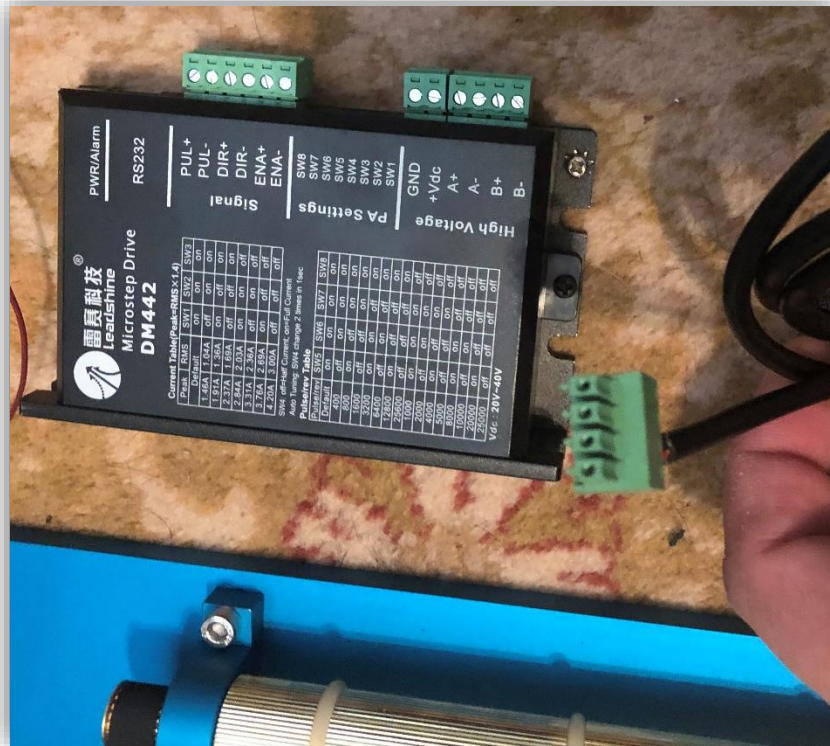
Step2:

So, our goal is to have our mini rotary working with our PR530 Co2 machine. The stepper motor that comes with the mini-rotary is a two-phase stepper motor given by the fact that it has 4-wires coming out. These wires need to be paired in a certain way to make our (A+, A-) and (B+, B-) pair. Take a look at the stepper driver (1) and take a look at the various inputs. There is an input that has A+A- and B+B-, Here is where your phoenix connector (green connector will go).

Now here is how we know how to paired them:

Motor connection: RED and YELLOW wires go to A+ and A- to the motor driver, BROWN and ORANGE wire go to B+ and B- to the motor driver.

Note: Color of the wires may vary. Please double check if the pair of wires are right using a multimeter. User the diagrams above for reference.



Step 3:

Now that we have a clearer understanding of our four wires, and how they are related in (A+A-) and (B+B-) we have to make the connection in the other end. By the other end I mean between the pigtail coming from the stepper motor (1) and the 4-wire cable (2). To successfully finish this step, make sure you already have the pairs as described in step 2 for the pig tail. If you have the pairs, one can easily check if you got the correct pairs by connecting the pairs together and trying to move the rotary around. There should be some resistance which means the pair is correct!

We got the pairs from the pigtail, now let us wire it to the 4-wire cable (black cable). Take a look at how the other end is connected to the phoenix connector. That is, see which color cable goes to the (A+, A-) input. That color wire should match the A+A- coming from the stepper motor. So, what we are doing here is carrying the wire signal from the stepper motor to the stepper driver.

Note: It is not important which A+, A- is connected to the stepper driver input. What is important is that the pair go to the A+, A- input. It doesn't matter if they are switch, but the pair need to go in the A+, A- input.



Step4:

Let use some Electrical Tape to hold the connection just long enough to test if the connection is done correctly. We will need to solder the connection together to make the bond more permanent later, but I think first we need to test if we did it correctly.

Step5:

Turn on the machine before unplugging any wires, then once the machine is done homing please move the laser head close to the middle of the bed. Turn off machine. Make sure machine is turn off, before unplugging any wires. Note: we did this because once we connect the rotary, and turn the machine on it

will try homing but because we are using the y-axis it will never do it.

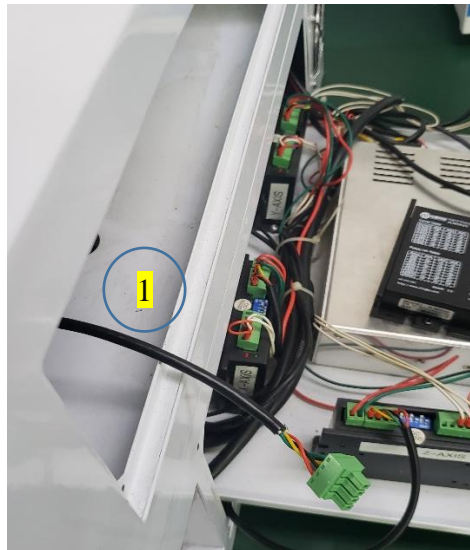
Now let's connect the mini-rotary to the machine.

Things to know:

1. We are going to steal the connection from the y-stepper motor.
2. We need to find which stepper driver is for the y-axis.
3. Make the connection.
4. Test

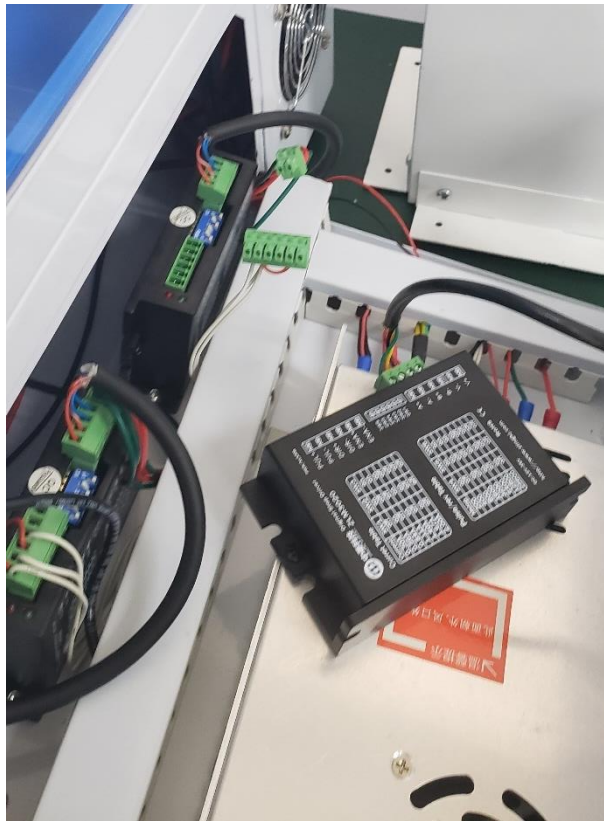
Step5a)

Open the side panels the houses the stepper drivers (Get the right Allen wrench to do it). It should be on the right-hand side of the machine. Once open it should look similar to the image below. If no stepper drivers then maybe it is of the other side. Unscrew the side blue acrylic panel as shown in (1).



Step5b)

Find which stepper driver is the one for the y-axis. Put your u-stepper driver close enough to the y axis stepper driver and steal the connection needed to make the u-rotary work. Power connection (PUL+,PUL-,DIR+,DIR-,ENA+,ENA-) and (V+,V-) connection.



Step5c)

Now we can turn on the machine. It will try homing (which is the part where machine tries to find its (0,0) position. Well turn on machine and then press on the STOP button to stop it from homing. Now try moving in the y-axis. Every time you do this it should rotate the rotary around. If it does with no clicking noise than you did your connection correctly and now, we are ready to solder them. If it makes some noise and it looks like the mini-rotary stepper motor is locking then we have to double check on our wire connection as there might exist a wrong connection.

Note: when we are ready to solder the connection, make sure to add some heat shrink tubing first to cover the exposed wires and make the connection professionally done. Use a heat gun or a lighter to shrink the tube. Take a look at the image below to see what I mean.

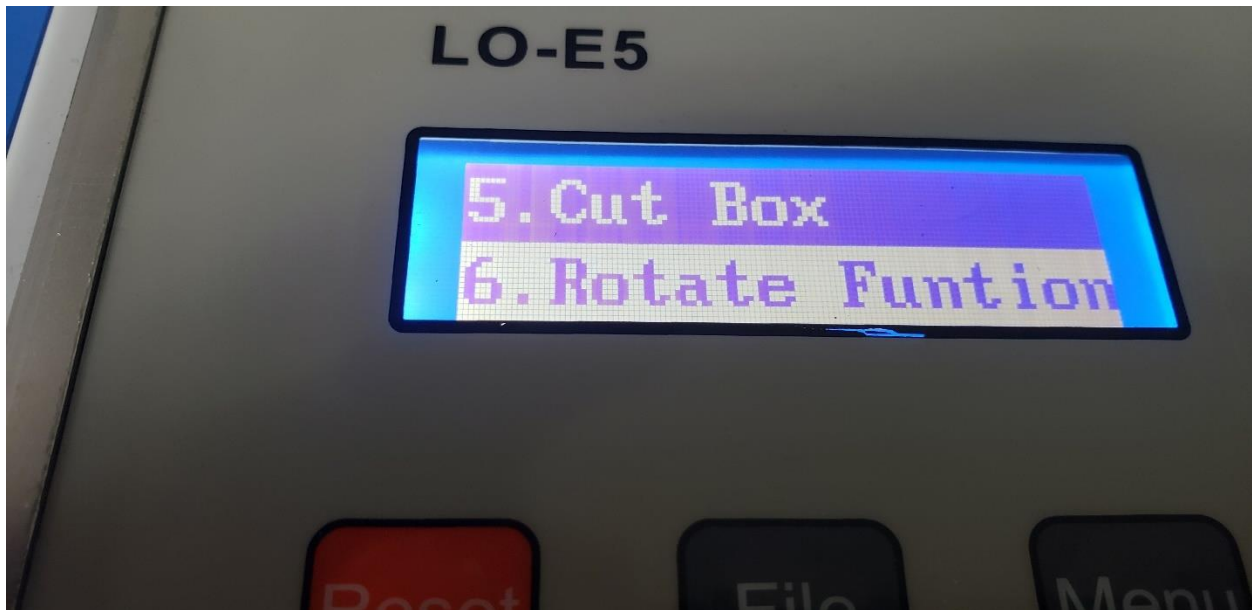


Step6.

Things to know:


1. Unfortunately for the PR530 there is no easy way to connect your rotary. Every time you want to use your rotary you will be disabling the y-axis and enabling the U.
2. When you are ready to start using the rotary, there is two places that will need to be consider for it to work properly. One is the E5 controller and another is the software.

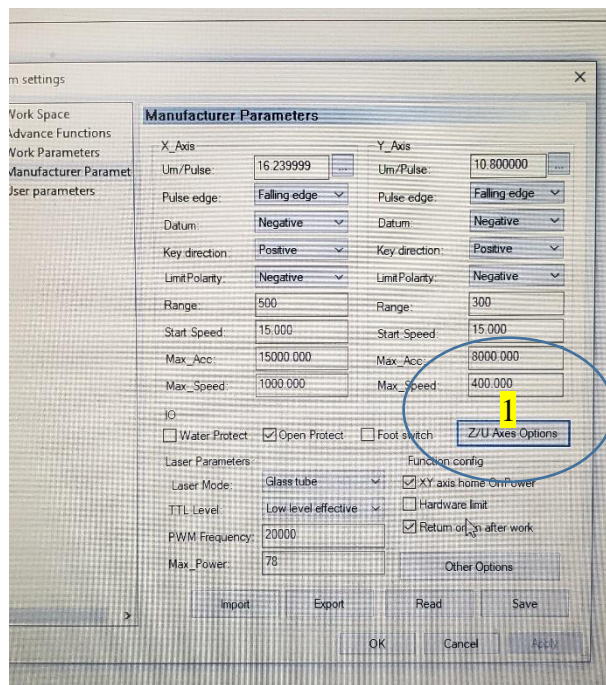
To enable rotary on the E5, go to Rotate Function.



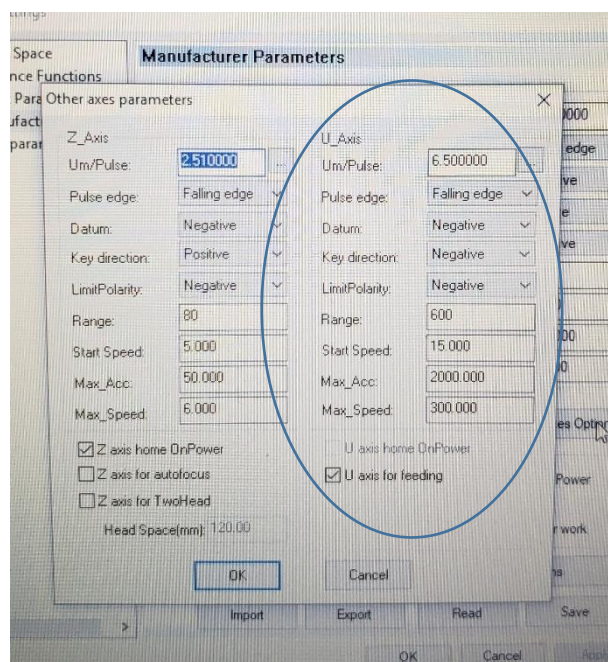
On Rotate: Move left and right to go from close to open. Open is enabling the rotary. The Rotate Axis means the Axis on which you are going to be engraving.



To play with the u-axis rotary parameters we open up LaserCAD and go to System Options . Double click it, once open to Manufacturer Parameters-> then you will see Z/U Axes Option (1). Double click on it open that option.



You will arrive to *Other Axes Parameters*, notice the U-axis. Here you have the options to play with how fast the rotary is moving, how far can the rotation go to and other rotational options.



This is how basically we can get the mini-rotary to work with a PR530 machine. This is going to be a growing how-to instruction for the mini-rotary with the PR530. Any comments and confusion please us know so we can make the necessary changes.

Common troubleshooting

<u>Problem</u>	<u>Causes</u>	<u>Measures</u>
LED off turn	Wrong connection for power or low-voltages for power	Check wiring of power or enlarge voltage of power
Motor doesn't run, without holding torque	Wrong connection of stepper motor/Reset signal is effective when offline	Correct its wiring/Make RESET ineffective
Motor doesn't run, but maintains holding torque	Without input pulse signal	Adjust PMW & signal level
Motor runs wrong direction	Wrong wires connection/ wrong input direction signal	change connection of any of 2 wires/change direction settings
Motor's holding torque is too small	Too small relative to current setting, acceleration is too fast, motor stalls, driver does not match with the motor	Correct rated current setting, reduce the acceleration, rule out mechanical failure, change a suitable driver.