Manuals+ — User Manuals Simplified.

ARCDROID CNC Plasma Robot Instruction Manual

ARCDROID CNC Plasma Robot Instruction Manual

Contents

SAFETY, WARNINGS, AND PRECAUTIONS

Arc Droid™'s mission is to produce the best possible machinery, and we hope that it becomes an indispensable tool in your workshop. With proper use and care, your product should deliver years of trouble free service. Please read this instruction manual carefully to get the most out of your ArcDroid™

⚠ Safe operation is your responsibility! The Arc Droid™ is designed to operate in conjunction with high voltage plasma cutting equipment, so proper safety precautions are required.
Failure to follow these precautions may result in severe injury.

Keep hands, cables, clothing, or other loose items away from the ArcDroid™ arm while operating.

Protect the Arc Droid™ screen from sparks, debris, and impacts.

Plasma cutting generates high amounts of UV radiation.

Always wear proper eye protection with wrap around safety glasses.

Plasma cutters operate using high voltages, never connect your ArcDroid™ directly to plasma arc voltage.

Arc Droid™ is not compatible with High Frequency (HF) plasma cutters. If you are unsure if your cutter is HF, consult the manufacturer of your cutter.

Never look directly into the plasma arc without protective shielding, and ensure others nearby do the same.

Wear protective work gloves at all times. Plasma cutting generates a lot of heat and sharp edges.

Always read and understand the manufacturers instructions for both the ArcDroid™, and the plasma cutter you use with it.

Arc Droid™ is precision machinery, and should be protected from moisture to ensure proper operation.

ArcdroidTM is manufactured and sold by 2 AM Innovation Limited. It is a CNC robotic arm compatible with many plasma cutters. This user manual is an essential part of proper use of the machine. 2 AM Innovation Ltd is not liable for accidents, injuries, or damage resulting from intentional or unintentional misuse of this machine.
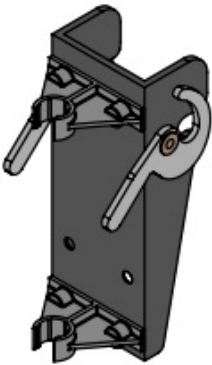
WHAT'S IN THE BOX?

- ArcDroid™ CNC
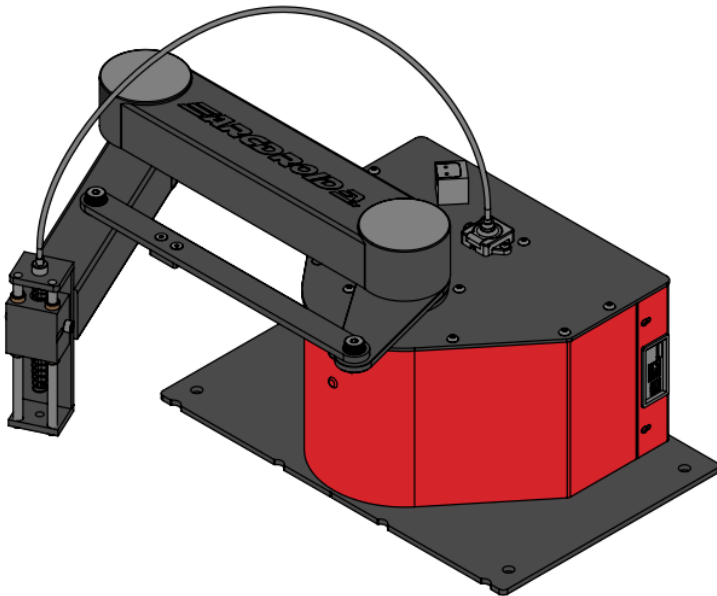
- Simple Trace™ Controller
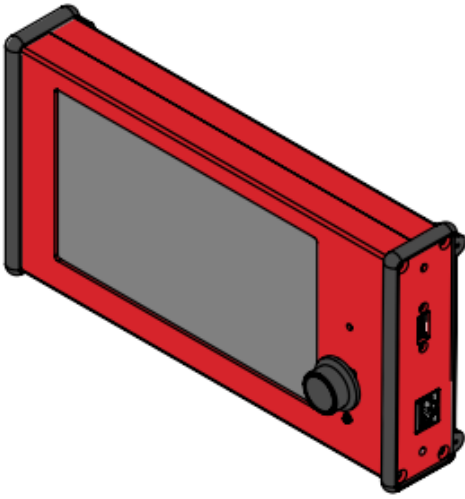
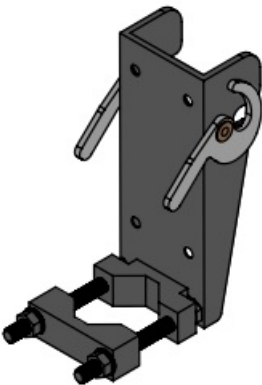- Communication cable

- Stylus holder

- Universal torch mount

- Calibration triangle

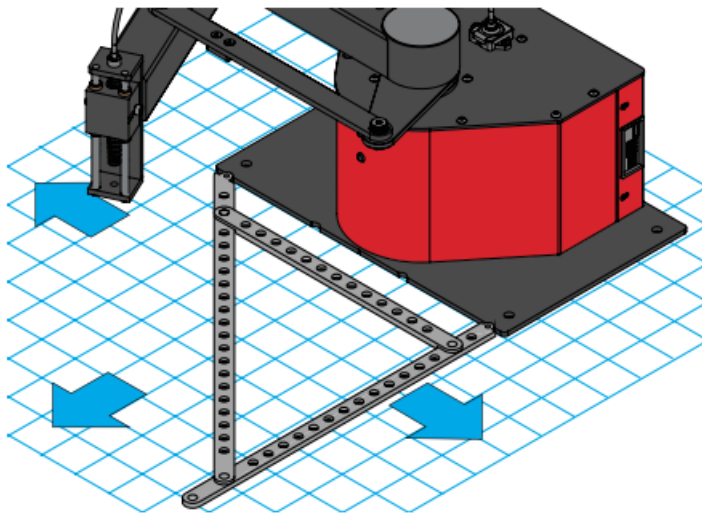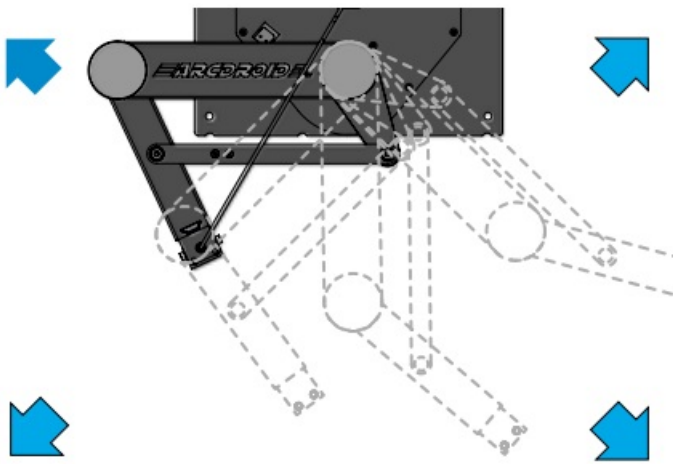- 3 x Calibration points

- Power cable
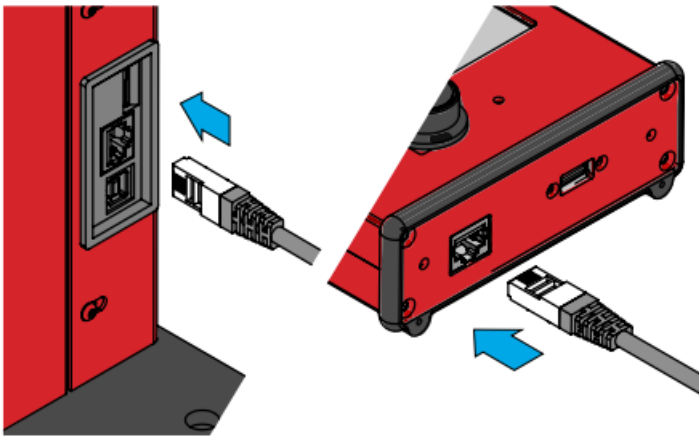

- Stylus

MACHINE SETUP AND LOCATION

1. For the initial setup and calibration of the Arc Droid™, choose a flat, level work surface.

2. Place the Arc Droid™ on the work surface with a clear area in front and to the sides of the machine to allow for arm movement.

3. Connect the communication cable to the Simple Trace™ controller and the Arc Droid™.

4. Connect the the power cable to the Arc Droid™, and plug into power source

5. Power on the ArcDroid™, and when it is completed booting, press the HOME button Home The ArcDroid™ is now ready for initial setup.

CALIBRATION

Calibration is an essential part of setup. Do not attempt to cut with ArcDroid™ until the calibration has been done successfully. Failure to calibrate properly will result in low accuracy cuts.

For a video tutorial on calibration, please visit our youtube channel: www.youtube.com/arcdroidcnc

CALIBRATION TRIANGLE

Assemble the Calibration triangle according to the diagram shown.

Take note of the numbering and arrows on the triangle rails. They should be facing upwards.

Use the calibration points to secure the rails, with the points facing upwards.

If assembled correctly, the triangle will lay flat on a level surface with the numbers and calibration points facing upwards.
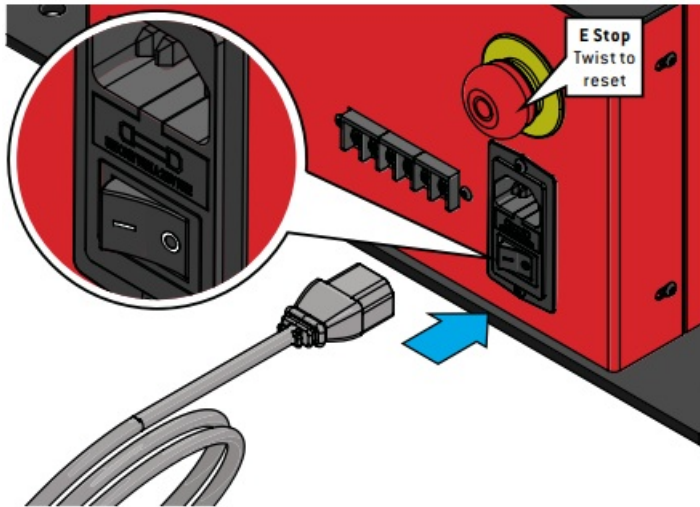
CALI BRA TIONSLED

The calibration sled is a tool used to guide the ArcDroid™ through the calibration process. Before using, it must

be adjusted.

Place the sled on one of the rails, and check for fit.

Using a philips screwdriver, adjust the screws on the side of the sled until the sled can slide smoothly along the rail without rattling or wiggling from side to side.

PLASMA TORCH ATTACHMENT

A firm, straight connection between the plasma torch and the Arc Droid™ is required for best results. Loosen the nuts on the torch mount enough to slide in the end of the torch.
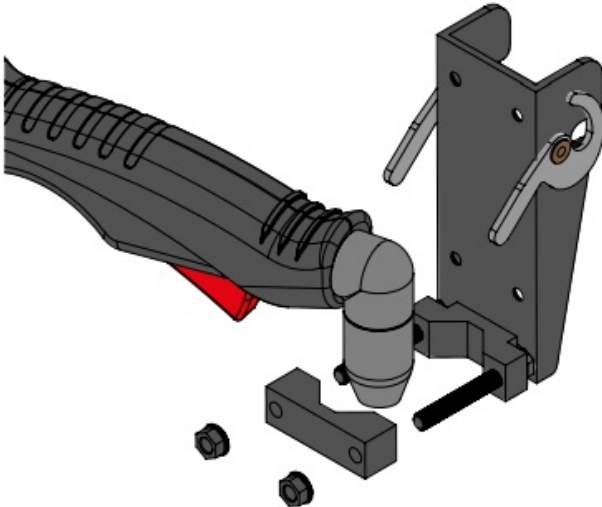
Insert the torch into the torch mout, and align the body of the torch handle to be approximately parallel with the torch mount.

Ensure the torch head is aligned vertically while tightening the nuts on the torch mount.

Tighten the nuts on the torch mount until a firm connection is achieved. There should be no wobble or flexing between the torch and the torch mount.

NOTE: Is is best to clamp the torch on the fixed part of the handle, not on the removable cap

ARCDROID ™

Place the machine on clean, flat and level surface. A workbench or piece of steel is ideal.

Ensure the Arc Droid™ and table surface are level.
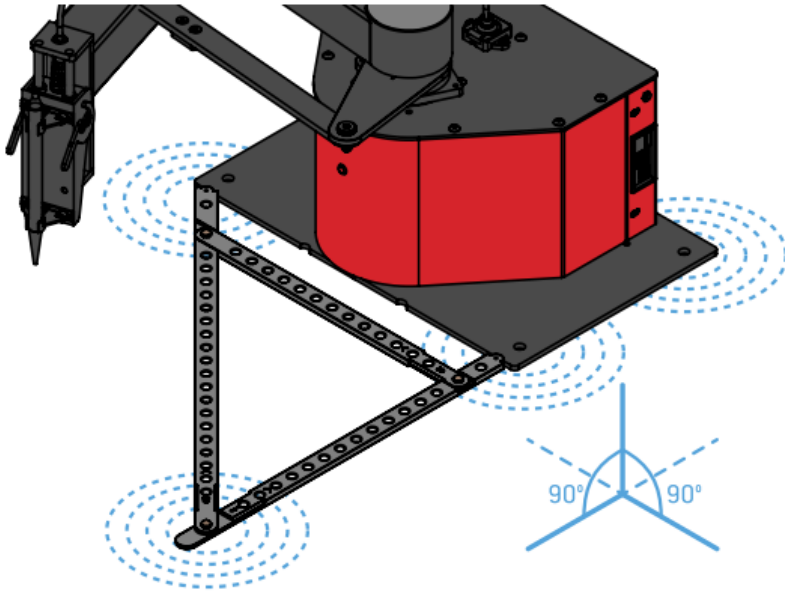Use flat surface on the top of the Arc Droid™ arm to check the level.

If possible, clamp the ArcDroid™ and triangle to the work surface so that it doesn't move during calibration.

Place the assembled calibration triangle in front of the machine in the correct orientation, and clamp or secure in place.

Attach the stylus to the Z-axis plate and secure with the locks. Do not plug into the Arc Droid™.

Place the calibration sled on the calibration rail at position 1. The pointed end of the sled should point in the direction of the rail towards the Arc Droid™.

Plug the calibration sled into the connection on the side of the ArcDroid™.

To begin the calibration process, power the machine on, and access the routine via SETTINGS then CALIBRATE The software on screen will guide you through the process.

Tips for Calibration

- Gently maneuver the ArcDroid™'s arm so that the end of the stylus is directly above the cone on top of the calibration sled at position 1.
- Twist the knob on the screen to lower the stylus point until the point is centered inside the tip of the stylus. You may need to adjust the arm position while lowering the stylus.
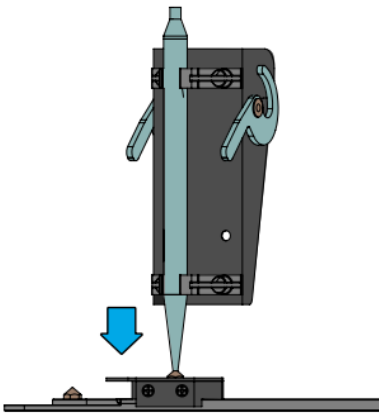
- The stylus tip, calibration sled, and rail should all be firmly in contact.
- Using steady, firm pressure, slide the stylus and sled together down the rail to the next position.
- Note the numbered location and and arrow indicate the starting position of the sled, and the direction of travel.
- Once the stylus calibration is complete, remove the stylus.
- Install the torch on the Z-axis. **TORCH MUST BE OFF OR DISCONNECTED FROM POWER.**
- Gently maneuver the ArcDroid™'s arm so that the cone on the top of the calibration sled is in contact and centered in the hole of the torch.
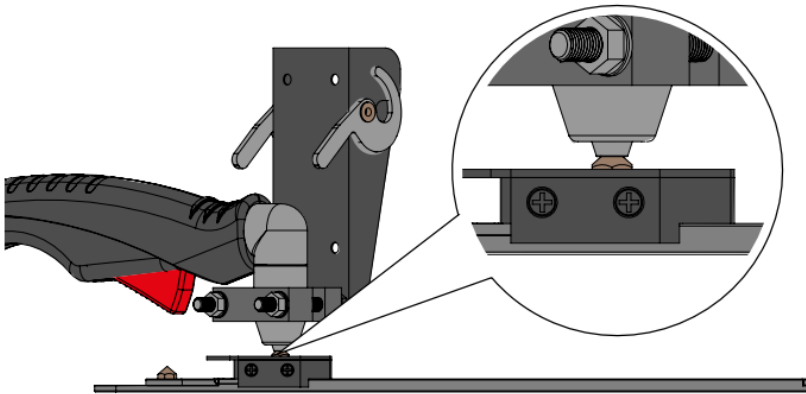- Follow the on-screen instructions as before.

- The universal torch mount can be removed and reinstalled from the ArcDroid™ without the need to recalibrate, as long as the cutting head remains firmly attached to the universal torch mount.

NOTE: Calibration should be repeated each time the torch is removed from the torch mount.

Z-axis c

Z-axis calibration is done to ensure accurate height of the torch tip above the work piece. To complete this process, you will need a small piece of material of a measured thickness (3mm-7mm is good) to be a height gauge.

- Install the stylus on the Z-axis and plug the cable into the connector on the side of the machine .
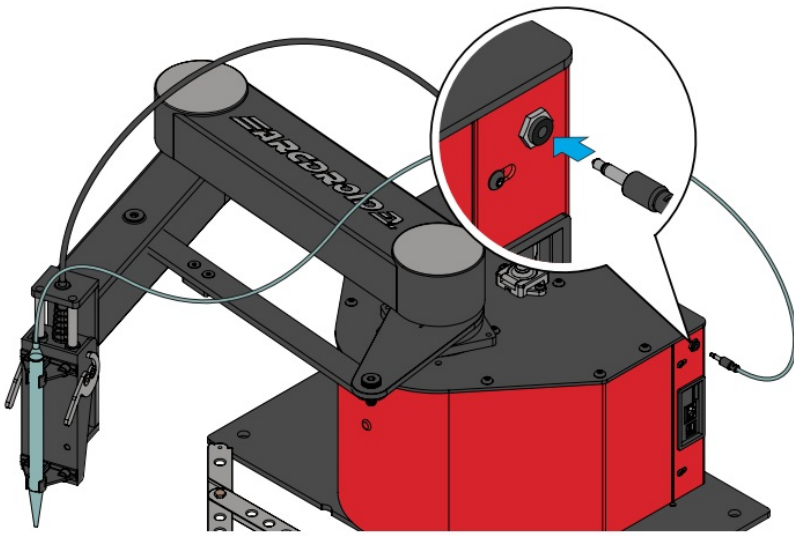
- Power ON the ArcDroid™ and when it is completed booting, press the HOME button
- Move the stylus to a flat area in the middle of the work surface, and press ZERO
- Press TRACE Trace then Shape Then press the circle icon Finally press the button on the stylus and choose a small diameter circle roughly 10mm.
- Press SETTINGS
- Clear Z should be set to the thickness of your height gauge. Press OK
- Press EXIT EXIT to return to the main screen.
- Press RUN and the ArcDroid™ will run the program.
- Place the height gauge under the tip of the stylus and check the difference between the top of the gauge, and the tip of the stylus.
- Press Settings then Machine Settings
- Scroll down by pressing the down arrow, to find 'Probe Offset' and press it.
- Change Z axis value to reflect the difference in height between the tip of the stylus and the height gauge.
- Exit to the main screen and run the program again. Use the thickness gauge to check the updated height and repeat the process if needed.

CONNECTING A PLASMA CUTTER

WARNING
ArcDroid™ is not compatible with High Frequency (HF) plasma cutters. If you are unsure if your cutter is HF, consult the manufacturer of your cutter.

The ArcDroid™ uses a simple two-wire interface to turn your plasma cutter on and off. Depending on the manufacturer and model of your cutter, adding this wire connection may void the warranty of your cutter, and may result in permanent damage. If you are unsure about any step of this process, consult a professional.

Before attempting this connection, we recommend you watch the tutorial on our youtube page at
www.youtube.com/arcdroidcnc

Some plasma cutters already have an interface for this connection which makes the process simpler. Follow the steps below depending on which connection type you will be making:

Yes, my plasma cutter has this connection

- Depending on the type of connector your plasma cutter has, you may need to modify it to connect to the

ArcDroid™.

- The trigger port connectors are located on the back of the ArcDroid™.

- For a firm, reliable connection, attach spade terminals to the end of the plasma cutter's torch switch cable and attach at the indicated connectors. Polarity does not matter for the torch switch connection. Polarity is important for AUX 1 and AUX 2 connections. DO NOT connect the torch switch to the other connectors. It may result in damage to the cutter, the ArcDroid™, or both.

No, my plasma cutter does not have this connection

- In order to connect your plasma cutter to the ArcDroid™, you will have to access the trigger switch inside the handle of the plasma cutter. Be aware that opening and modifying the plasma handle may void the warranty and should only be done by an experienced professional.
  Please watch the tutorial on connections before attempting to modify your plasma cutter: **www.youtube.com/arcdroidcnc**

- You will need 16-18ga shielded wire approximately 8ft (2.4m) and two spade terminals.

- Open the plasma cutter handle and locate the trigger switch.

- The switch will have two contacts. These contacts must be connected in parallel to the torch switch connectors on the back of the ArcDroid™. It is not necessary to disconnect the existing trigger wires in the handle.

- Once the trigger wires have been correctly identified, they can be traced back to the plasma cutter unit and wires attached to their terminals.

- It is highly recommended to watch and understand the video tutorial listed above before making this connection.

- Once the wires have been attached to the terminals of the trigger wires, they are ready to be connected to the ArcDroid™.

- Attach the spade terminals to the free ends of the wires.

- At tach the spade terminals to the back of the ArcDroid™ at the location shown in the above diagram.

ArcDroid™ User Interface

Before using the ArcDroid™, learn about the User Interface (UI) to understand how to properly operate the machine. The UI is accessed and controlled using the touchscreen attached to the ArcDroid

1. Touch screen area. Press firmly when making a selection.
2. Control knob. Rotate to raise and lower the Z-axis. Press to conf irm when using some Simple Trace™ features.
3. Reset button. Press to restart UI. Note any unsaved traces will be lost.

WARNING
Sparks are other debris can damage the touch screen. Make sure the screen is safely protected before starting a cut.

Main Screen
This is the screen that appears on startup. It is where all the major functions of the ArcDroid™ can be accessed.

Simple Trace Screen

The Trace Screen is where you can create and edit cut files. G-Code and DXF files may be edited here as well.

Tune / Cut Settings Screen
Here you can change cut settings. Careful adjustment of these parameters will improve cut quality and part accuracy. Once you find the best settings, you can record them in the Notes section of this user manual.

Settings Screen
Use this screen to Calibrate, adjust machine settings, or access other advanced features.

THE FIRST CUTS

Once ArcDroid™ is properly setup and calibrated, it is ready to be used. The below diagram shows the essential steps and workflow of operating the ArcDroid™

- Power ON the machine. Once booted, press home
- Choose your cut file. Select or load a DXF file you have created, or generate your own cut file using the Simple Trace™ menu
- Choose the zero point for the cut by maneuvering the arm to the desired location, and then pressing ZERO ZERO Rotating the knob on the screen will raise or lower the torch.
- Check the cut file. Ensure the torch is disabled Then press RUN The machine will run the ut file movements.
- Enable the torch by pressing the icon
- Press RUN to begin the cut.
- Pressing will reset the cut to the start of the file.
- Pressing PAUSE will finish cutting the current line segment, then pause. The cut can then be resumed from the current location.

IMPORTANT
If the machine is not cutting correctly, or otherwise not operating properly, immediately stop the cut either by pressing the STOP button on the screen, or the emergency stop button on the back of the ArcDroid™

SIMPLE TRACE

Arcrdoid comes with Simple Trace™ pre-installed. This software enables you to copy a template, existing part, or sketch using the ArcDroid™ without using a computer. Here's how to use it.

Setting up

Simple Trace is easiest to use with with ArcDroid™ set up in a workspace and the material to be cut clamped in place.

- Install the stylus on the Z-axis, and plug the connector into the side of the ArcDroid™.
- Ensure the working area in front of the ArcDroid™ is clear, then turn it on.
- Press HOME Home to home the machine.
- Then press TRACE Tra

Tracing a part template

Cardboard or other thick materials make great templates since they are easy to trace. Using doublesided tape to

stick the template to the material will also make tracing easier.

- Stick the template to the material in the desired area.
- Maneuver the Stylus and arm into the position you want to be the zero point, then press ZERO ZERO This will now act as the reference point for the rest of your drawing.
- To raise or lower the stylus, slowly rotate the knob on the screen. It's best to have the stylus just above the materia

ArcDroid™ will make cuts in the same order that you enter them in simple trace, so it's best to start with holes and small features before tracing the outline of a template.

To add a hole, adjust the height of the stylus to just above the template, then maneuver the point of the stylus to the center of the hole marked on the template.

- Press the shapes menu button then the circle icon and then press either the button on the stylus, or press the knob on the screen to confirm the location.
- This will bring up the dialog with the circle dimensions.
- The circle dialog box will appear, allowing you to enter the Diameter, X and Y coordinates, Lead-in length, lead in location, and cut side.
- To change the dimensions, press the dimension, enter the new value, then press the green check mark to confirm.
- To change the cut side, press the cut icon until the desired type is shown.
- To change the lead in location, press the leadin location button at the top right of the menu. Pressing the button will cycle through the different location options and display them on the screen.
- Pressing the green check mark again will return to the trace screen. You can then choose other elements to add to the drawing.
- To Trace the outline of the template, press the line drawing icon then press the knob, or the stylus button.
- Move the stylus to the starting point of the cut, and press the stylus button. Then move the stylus to the next point of the cut, and press the button again. Simple Trace™ will add a straight line segment between these two line segments.
- Continue to follow the outline of the template around it's perimeter.
- To add a curve, you can add many small line segments spaced closely together, or press and hold the button while smoothly dragging the stylus along the edge of the template. The results may vary depending on the quality of the template.
- Once you have completed tracing the perimeter of the template and arrived back at the starting point, double click the stylus button to close the shape.
- The line drawing dialog box will now display several options. Choose the lead-in length by pressing the dimension and then using the number pad to enter a new value.
- Press the cut side icon to choose which side of the line to cut.
- You can also choose for the entered shape to be a closed or open polygon.
- Press the green check mark to return to the trace screen.
- Press SETTINGS to enter the cut settings for your particular torch and material. Press the green check mark to return to the trace screen.
- When complete, press save A dialog box with the file name of the drawing will be shown. Press OK to confirm.

Files may be saved to the USB or internal memory. If a USB is inserted, it will be saved there. If there is no USB inserted, the file will be saved to the internal memory.

- Press EXIT EXIT The file will be shown on the main screen, ready to cut.

ONLINE RESOURCES

For more information and resources about ArcDroid™, please visit our support page:
https://arcdroidcnc.com/pages/downloads

For video tutorials check out our youtube channel, and don't forget to subscribe to get all the latest updates!
www.youtube.com/arcdroidcnc]

To see what other ArcDroid™ users are doing, and share your projects, take a look at our community forum:
https://forum.arcdroidcnc.com/

BASIC MAINTENANCE

The ArcDroid™ is a piece of precision machinery. Proper use and maintenance of the machine will result in great performance and a long service life. Plasma cutting generates smoke, vapors and metal debris that should be periodically cleaned from the machine. Always make sure the ArcDroid™ is OFF while doing cleaning and maintenance

- Remove dust and debris from the Z-axis rails to ensure it can move freely.
- Apply a silicone-based lubricant to the Z-axis rails for smooth motion.
- Depending on use, it's good practice to tighten the internal belts periodically.

Belt Tightening:

- Rotate the ArcDroid™ arms to the correct position for belt tightening
- Remove the two rubber plugs from the case to allow access to the tightening screws.
- Insert a 3mm allen key into the upper hole to engage the tightening screw.
- Less than half of a turn is enough to tighten the belts. DO NOT OVERTIGHTEN.
- Repeat the process on the lower hole to tighten the second belt. They should be tightened the same amount.
- Re-insert the rubber plugs in the correct locations

UPDATING SOFTWARE

Simple Trace™

ArcDroid™'s Simple Trace™ software and UI is periodically updated to add features, improve performance, and fix bugs.

You can download these updates at: https://arcdroidcnc.com/pages/downloads

1. Download the software to your computer and unzip the files.
2. Clear and reformat a USB stick to FAT32 format. There should be no other files on the USB stick
3. Copy the unzipped files to the USB stick.

4. Power on the ArcDroid™, and once on, insert the USB stick into the right side of the Screen.
5. Press the reset button or power cycle the ArcDroid™. The button is located just below the control wheel on the screen.
6. ArcDroid™'s screen will flash red, and then begin a series of updates. This will take up to 5 minutes, depending on the size of the update.

Main Firmware Update

To update ArcDroid™'s firmware, you will need a micro SD card with maximum capacity of 32GB formatted to FAT32 file type.

Download the firmware files from our website at: <u>https://arcdroidcnc.com/pages/downloads</u>

1. Unzip the files. Then load onto the micro SD, an ensure there are no other files on the card.
2. Turn on the ArcDroid™, and when finished starting up, Insert the micro SD card into the slot on the side of the machine
3. Press the reset button on the screen.
4. As the firmware is updated, the top of the screen will briefly display 'BUSY PROCESSING'.

To confirm the update was successful, press the settings button Firmly tap the ArcDroid™ logo five times. Then press 'Version info' and ArcDroid™ will display the current version information.

TROUBLESHOOTING

Problem	Potential Cause	Fix
Torch does not operate	- Torch disabled in software interface - Trigger switch not wired correctly	- Check the torch is enabled Press to enable or disable. - Refer to the torch connection section of this manual for a guide on trigger wiring.
Poor accuracy	- Calibration issue. - Misaligned torch or consumable issue. - Loose belts.	- Redo the calibration routine. - Check torch is securely attached to torch mount, and the cutting axis is vertical. Check if torch consumables are worn out. - Refer to the belt tightening guide.

Screen does not light up	- Poor connection - Blown fuse	- Check the connections on both ends of the communication cable. If cable damage is suspected, try replacing with another Cat6 ethernet cable. - Check fuse located under the power cable connector. The fuse is 5A.
Screen does not respond correctly	- Screen needs calibration - Screen is dirty or damaged	- Recalibrate the touch screen. Go to Settings -> Touch Screen -> Calibrate touch. - Carefully clean the screen of dust and debris. Also make sure to carefully check around the edge of the screen for debris suck between the screen and housing
Incorrect torch height or z-axis movement	- Torch lead snagging - Z-axis rails sticking - Z-axis cable damaged	- Support torch lead away from workpiece and other potential snag locations. - Clean and lightly lubricate z-axis rails. - Inspect Z-axis cable for kinks, or damage at the cable interfaces.
Machine resets or moves randomly when torch starts	Incompatible (High frequency) plasma cutter.	Replace plasma cutter with a low frequency type of cutter.
Imported G-code not displaying correctly	- Incorrect Kerf setting - File size too large or improperly formatted.	- Before importing G-code, set kerf to 0. - File size must be below 5300 lines. Change CAM export settings to reduce number of lines.

STORAGE AND TRANSPORT

- Keep the ArcDroid™ protected from dust and moisture.
- When transporting, make sure the arm is secured and the machine is placed in a protective container.
- Hard impacts may disrupt the machine calibration. If the machine has been dropped or impacted, it may require re-calibration.

Canadian Office:
2977 Coopers Falls Rd.
Washago Ontario
Canada, L0K 2B0
Phn: +705-828-0470

Hong Kong Office:
63 Wo Yi Hop Rd.
Kwai Chung New Territories
Hong Kong
Phn: +852-662-0682

Documents / Resources

ARCDROID CNC Plasma Robot [pdf] Instruction Manual
CNC Plasma Robot, CNC, Plasma Robot, Robot

References

- 🌐 **ARCDROID CNC – ArcDroid CNC**
- 🌐 **Downloads – ArcDroid CNC**
- ᗓ **ArcDroid™ Forums**
- **User Manual**