ShopBot®

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Overview of Power Supply & Placement of ShopBot

USA and Canada

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General Safety and Precautions

This safety summary contains general safety warnings that should be understood during operation of this machine. Failure to observe these precautions could result in injury.

Learn and understand safe use of the machine. Do not allow untrained individuals to operate the machine without supervision. Be aware of the location of the Emergency Stop switches at all times.

Eye and ear protection MUST be worn by the machine operator as well as any bystanders or observers. Flying sawdust, material chips, and other debris can cause serious eye injury.

Wear closed-toe shoes at all times.

Make sure that your material is properly secured before cutting, and be aware of any small parts that may come loose after being cut. If a small part catches the edge of a spinning bit, it can be thrown forcefully in any direction, causing injury or damage.

Never place your hands on the rails of the ShopBot. Be aware that the machine may move unexpectedly in any direction, which can cause serious injury if your hands are in the path of movement.

Never wear gloves while operating the machine. As with any power tool, a glove can get caught in moving or spinning parts and pull your hand into the machinery.

Never leave a machine running and unattended. Understand that a spinning tool generates friction and heat, creating a risk of fire. This risk is minimized by using correct chip load, using sharp bits, and by always double-checking your files before cutting. Be prepared to pause or stop the cut if something seems incorrect or unsafe.

Keep a working fire extinguisher within reach of the machine, for the reasons listed above.

Overview: Power Supply to the ShopBot (US and Canada)

When a ShopBot is ordered, the customer specifies what power the building has available and what equipment is desired so that an appropriate system can be configured. ShopBot can help you with what questions to ask so that you can determine what power supply you have available in your building, but it is your responsibility to supply ShopBot with the correct information. The control box and router/spindle are set up at the ShopBot factory.

Overall, there are two sources of power (two feeds) that run into the ShopBot Control Box:

1. The 110V (15A) power source that powers the control box (“Source 2” on the Power Diagram)
2. The 220V (208 - 240A) power source (usually single phase) that powers the relay for the VFD (Variable Frequency Display), that controls the speed of the spindle (“Source 1” on the Power Diagram)

   NOTE: The power cord for the spindle VFD is run to a relay inside the ShopBot control box so that the ShopBot control software can turn the spindle ON/OFF when running a part file and the E-Stop(s) can shut down the spindle in case of an emergency. The power cord to the VFD (or router) should never be wired directly to the wall instead of through the control box.

Prior to the install, a **licensed electrician** should run power to the ShopBot installation location (i.e. the wall). The Power Diagram and Electrical Specs for each order that the electrician will need to reference are sent in advance, and can also be found in the door of the control box when the ShopBot is delivered. The Power Diagram/Electrical Specs can also be downloaded from the ShopBot website at http://www.shopbottools.com/ShopBotDocs/wiring.htm.

To determine which specs reflect your individual order, refer to the next section.

Once the ShopBot is assembled to the point that the control box is mounted to the ShopBot table, the licensed electrician returns to run the power from the wall into the ShopBot control box. Remember that there are two feeds that run from the wall to the control box: the line for the box itself, and the relay to the VFD for the spindle. It is the responsibility of the installer [the individual(s) assembling the ShopBot] to run the cables from the motors, sensors, and spindle fan/VFD into the control box during assembly.

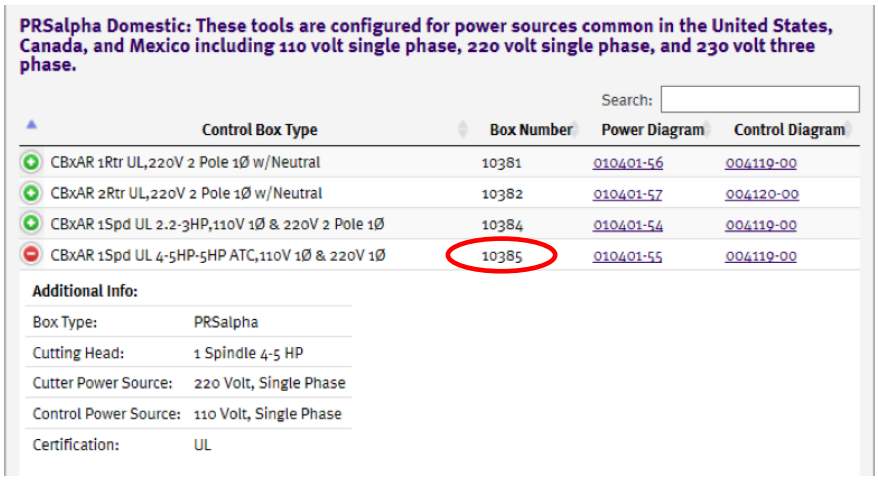
Reading a Quote/Order to Determine the Correct Electrical Specs

Look at the quote/order received from ShopBot, and download the specs (power diagram) that refer to that control box. The electrician can determine the wiring that is required from the power diagram. The relevant information on a standard ShopBot quote is in large type and bold below:

EXAMPLE QUOTE: 4HP SPINDLE WITH SINGLE PHASE POWER
PRSGANTRYA - PRS Gantry Tools-Alpha
TOOL SUMMARY
LENGTH 96
WIDTH 48
HEIGHT 6
0 0
VOLTAGE = 220V 1Ø Domestic [The first part (220V 1Ø) refers to the power to the spindle. The second part (Domestic) refers to the power to the control box (110V)]
DUAL_Z = NO
HP_CUTTER_1 = 4HP
HP_CUTTER_2 = None
DRILL = NONE
PNEUMATIC_ASSIST = NONE
Alpha Gantry Details:
10633 - Table 96-60-6
002735 - Gantry 60
002742 - YZ Car 8” Z
12571 - HSD 4HP 220V 1PH PRS (The spindle ordered)
40385 - CSxARx 4 Mtr 1 Spd CE 4-5HP, 220V 3Ø (ShopBot’s internal number of the control box. Note the last 3 digits in red; these are the digits needed to find the correct power diagram/ specs)

Downloading Your Electrical Specs: Example 1

Now that you have the information for your specific tool, you can find your power diagram/electrical specs at **http://www.shopbottools.com/ShopBotDocs/wiring.htm**. Scroll down to the section "Domestic Tools" and find your control box by typing in the last 3 digits in the search box, or scroll down the list (ignoring the first 2 digits). For the electrician: see end of document on how to read the power diagram.



PRSalpha Domestic: These tools are configured for power sources common in the United States, Canada, and Mexico including 110 volt single phase, 220 volt single phase, and 230 volt three phase.

Search:

Control Box Type	Box Number	Power Diagram	Control Diagram
CBxAR 1Rtr UL,220V 2 Pole 1Ø w/Neutral	10381	010401-56	004119-00
CBxAR 2Rtr UL,220V 2 Pole 1Ø w/Neutral	10382	010401-57	004120-00
CBxAR 1Spd UL 2.2-3HP,110V 1Ø & 220V 2 Pole 1Ø	10384	010401-54	004119-00
CBxAR 1Spd UL 4-5HP-5HP ATC,110V 1Ø & 220V 1Ø	10385	010401-55	004119-00

Additional Info:

Box Type:	PRSalpha
Cutting Head:	1 Spindle 4-5 HP
Cutter Power Source:	220 Volt, Single Phase
Control Power Source:	110 Volt, Single Phase
Certification:	UL

EXAMPLE QUOTE #2: 2.2 HP SPINDLE WITH THREE PHASE POWER

PRSGANTRYA - PRS Gantry Tools-Alpha
TOOL SUMMARY
LENGTH 48
WIDTH 48
HEIGHT 6
0 0

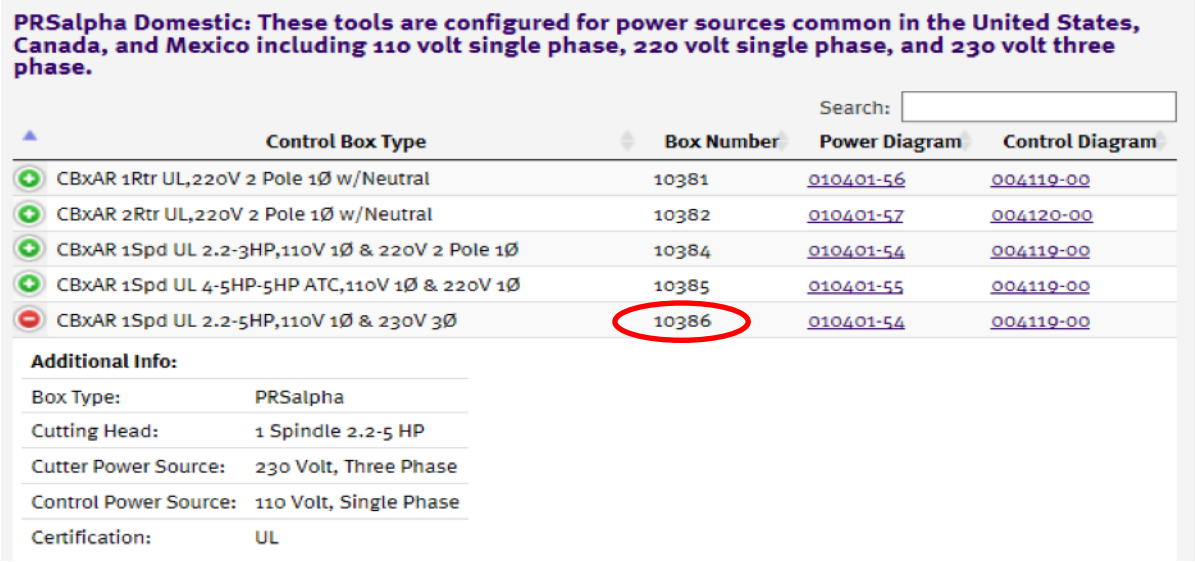
VOLTAGE = 230V 3Ø Domestic [The first part (230V 3Ø) refers to the power to the spindle. The second part (Domestic) refers to the power to the control box (110V)]
DUAL_Z = NO
HP_CUTTER_1 = 2.2HP
HP_CUTTER_2 = None
DRILL = NONE
PNEUMATIC_ASSIST = NONE
Alpha Gantry Details:
10633 - Table 48-48-6
002735 - Gantry 48
002742 - YZ Car 8" Z

12577 - HSD 2.2HP 230V 3PH PRS (The spindle ordered)

40386 - CSxARx 4 Mtr 1 Spd 2.2-5HP, 230V 3Ø (ShopBot's internal number of the control box. Note the last 3 digits in red; these are the digits needed to find the correct power diagram/ specs)

Downloading Your Electrical Specs: Example 2

Now that you have the information for your specific tool, you can find your power diagram/electrical specs at **http://www.shopbottools.com/ShopBotDocs/wiring.htm**. Scroll down to the section "Domestic Tools" and find your control box by typing in the last 3 digits in the search box, or scroll down the list (ignoring the first 2 digits). For the electrician: see end of document on how to read the power diagram.



PRSalpha Domestic: These tools are configured for power sources common in the United States, Canada, and Mexico including 110 volt single phase, 220 volt single phase, and 230 volt three phase.

Search:

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CBxAR 1Rtr UL,220V 2 Pole 1Ø w/Neutral	10381	010401-56	004119-00
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CBxAR 1Spd UL 2.2-3HP,110V 1Ø & 220V 2 Pole 1Ø	10384	010401-54	004119-00
CBxAR 1Spd UL 4-5HP-5HP ATC,110V 1Ø & 220V 1Ø	10385	010401-55	004119-00
CBxAR 1Spd UL 2.2-5HP,110V 1Ø & 230V 3Ø	10386	010401-54	004119-00

Additional Info:

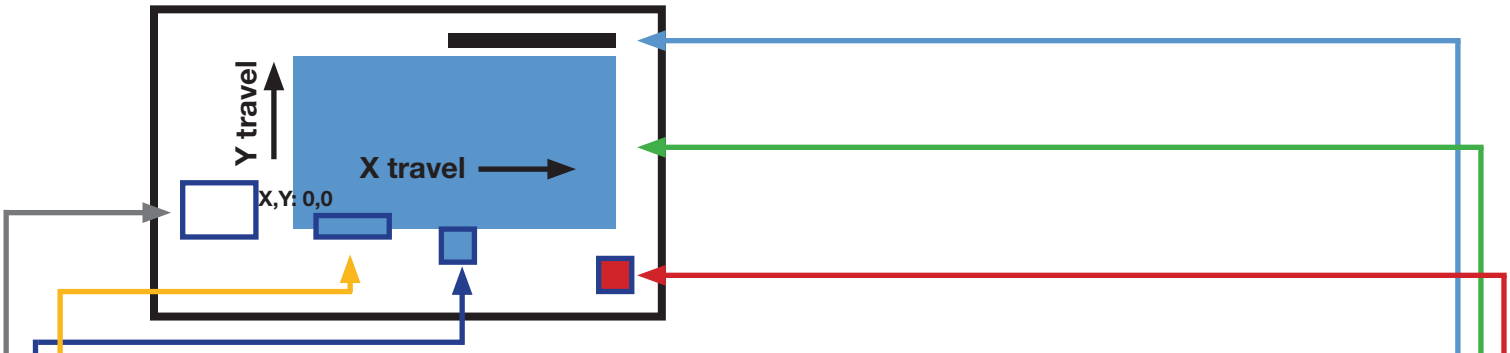
Box Type:	PRSalpha
Cutting Head:	1 Spindle 2.2-5 HP
Cutter Power Source:	230 Volt, Three Phase
Control Power Source:	110 Volt, Single Phase
Certification:	UL

Other Power Needs in the ShopBot Room/Location

- **Dust Collection or Vacuum:** Please check the system ordered and wire accordingly. Some larger systems may require a 20A circuit and plug, or even 220V. The ShopFox dust collector (no relation to ShopBot) in the 220V version comes with a power cord but no plug. It is up to the licensed electrician to provide the plug and matching receptacle.
- **Outlets for Computers, Chargers, and Other Devices:** Accessories and additional tools such as cordless drill chargers, scroll or band saws, and shop vacs may require different power needs. If ordering equipment from the U.S., it may be necessary to also purchase the appropriate converter for 110v or 220v devices, as well as appropriate plug adapters.
- **Vacuum Hold Down:** If a vacuum hold down has been ordered with the ShopBot, please check with ShopBot to determine what the power requirements are, and be sure to talk over where the vacuum pump should be located. For a quick reference and links to different blower options available from ShopBot, visit **http://www.shopbottools.com/mProducts/vacuumholddown.htm**.
- **Laser:** If you are ordering a laser for the space, check the power needs for the exhaust system's blower. It may also need the services of a licensed electrician.

Deciding Where to Place the ShopBot

The footprint for a ShopBot that will hold a 4' x 8' piece of plywood (PRSalpha 96-48) is roughly 6' x 10' (183cm x 305cm). The exact dimensions and specs for each size ShopBot can be found on the first page of the ShopBot price list, which can be downloaded from the ShopBot Tools website at **http://www.shopbottools.com/PriceList.pdf**.



- **What is the traffic flow around the ShopBot?** The "far" side (with the e-chain that carries the cabling) should be about 12" - 18" (30 - 50 cm) from a wall to allow access to that side of the table but discourage traffic along that side. The wider space should be at the front of the tool (along the X-axis where the control box and VFD sit). If the length of the room doesn't allow a generous area on both ends of the table (the shorter ends across the gantry), then more space should be allowed at the 0,0 location, with 30 - 50 cm at the "far" side.
- **The control box** sits under the table near the X,Y 0,0 location. Power has to run from the power box on the wall to the control box. How is the power cord installed by the licensed electrician from the wall going to get to the control box? Conduit? Under the floor and up? If it comes down from the ceiling, will it be out of the way of the travel of the ShopBot and people moving around the area?
- **The VFD that controls the spindle** sits next to the middle leg of the ShopBot. Allow enough room between the VFD and the wall to allow a wheelchair to get through. Remember: the VFD is wired into a relay in the control box by the installer, and is turned ON/OFF by the ShopBot controls. Never wire the VFD into the wall rather than through the ShopBot control box.
- **Where is the computer that runs the ShopBot going to sit?** The preferred location is near X,Y 0,0 and set up so that the orientation of the keyboard matches the orientation of the tool. It's also important to think about where the computer will plug into a power source. A good early project can be to create a podium for the ShopBot computer to sit on.
- **Where is the material for the ShopBot going to be stored, and how is it loaded onto the table?** The easiest way to load is from either of the "short" ends rather than over the higher sides of the table. If the tool has an Automatic Tool Changer (ATC), then material can only be loaded from the "near" end of the table.
- **Where is the dust collector going to sit in relation to the ShopBot and computer?** Most installations have it at the other end of the room (if not our of the room) because it is often louder than a running ShopBot. It is important to consider the support for the dust collection hose, such as overhead or attached to the ceiling itself.

An Elegant Dust Collection Hose Management System

The dust collection hose must be hung so that it does not get in the was of the travel of the ShopBot. One option is to hang the hose from the ceiling. Each space has a different ceiling configuration, and so it is up to the customer to determine how it is going to handle the dust collection hose.

The example in the photos below allows the dust collection hose to extend over the full surface of the ShopBot table, while not dropping down into the travel of the tool while in the center of the table. Note that the hose is attached to the hanger at two points, forming a loop. The strut and hardware shown below was purchased at a tractor supply store and may be available at big box DIY stores. It is traditionally used for sliding barn doors. Any length of material and attachment that allows the hose to slide along the length is appropriate.

Spindle at 0,0 position (near corner)

Spindle at 2440,1220mm (far corner)

Supplies Needed in Advance for Successful ShopBot Install

Cabinet-grade plywood, 0.75” (19mm) thick, for support and sacrificial board: 2 sheets

(The assembly manual suggests MDF for the sacrificial board, but in a location with changing humidity levels, plywood is recommended)

NOTE: If installing a vacuum hold down system with plenum and bleeder board, see ShopBot website for instructions. In this case, cabinet-grade plywood should be used for the support board, but the plenum and bleeder board should be MDF as per instructions.

Outside deck screws, star drive T20 or T25, 1¼” long. 1 box. Available at Home Depot or Lowe’s. These screws will be used to attach the sacrificial board to the support board (instead of gluing) and will be used for hold down in regular ShopBot projects. A box of T20 or T25 star drive heads is also a good idea in the event that the one that comes with the screws becomes misplaced or stripped.

Plywood for projects. The podium project requires 2 pieces of cabinet-grade plywood. Either half-inch (12mm) or three-quarter-inch (18mm) is fine.

Tools: The list of tools required for building a ShopBot can be found in the assembly manual. A simple tool kit is included with the ShopBot. Having a 6’ (2m) level on hand makes leveling and squaring the table much easier.

ShopBot Software

Computer Setup for International Customers

The PC that runs the ShopBot must be set to US English in order to correctly run the ShopBot Control System software. A document with instructions on how to set up the computer correctly can be found at **http://www.shopbottools.com/files/InternationalComputerConfiguration.pdf**

Prior to installing ShopBot software: If the PC is managed by an IT group, it is strongly recommended that the computer gets a clean install of Windows using English (US) as default language without any entity managing the software or settings. The user will ultimately need to be an administrator. Check with ShopBot support for additional instructions.

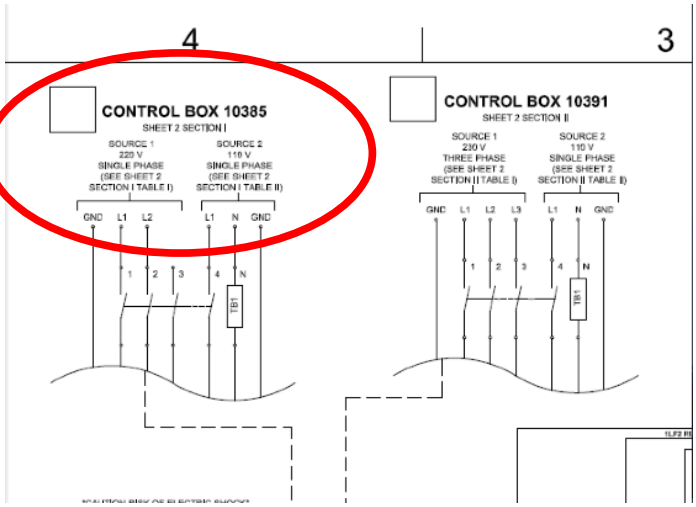
ShopBot Control Software is pre-loaded onto a thumb drive found in the white ShopBot binder that comes with your machine. It is important to load the software and drivers before plugging the ShopBot into the computer. It is always a good idea to check the ShopBot website and download the most recent version of the software prior to running the tool. The latest version of the ShopBot Control Software is available at no cost, and can be found at **http://www.shopbottools.com/mSupport/controlsoftware.htm**.

VCarve Pro design and toolpathing (CAD/CAM) software included with the purchase of a ShopBot is available for download from an email sent from ShopBot to the manin contact person on the purchase order. The name of the customer and the license code is also printed in the front of the white ShopBot binder that comes with your tool. If you are unable to locate the email with the correct download and customer information, you can contact **support@shopbottools.com** for a copy of the information.

For the Electrician/Contractor

WARNING: Be sure to read the Power Diagrams for advanced wiring and during the actual installation.

EXAMPLE 1: Control Box XX385



Note that the Power Diagram has information for Control Box xx385 and Control Box xx391.

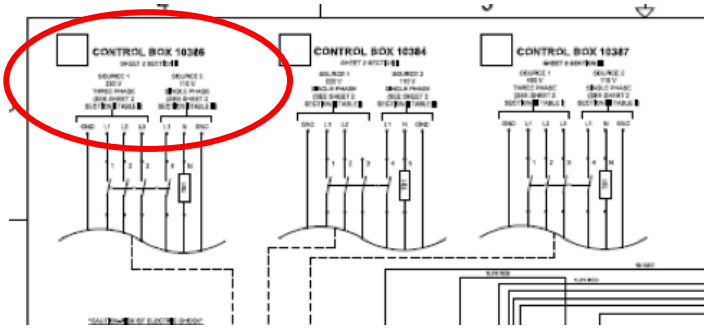
- xx385 is single phase
- xx391 is three phase

Use the diagram that corresponds with the order.

The only part that the electrician needs to wire into the control box is in the upper left corner of the power diagram. The remaining diagram may help with technical support, but is not needed for installation.

Tables with additional information for the electrician (example: wire gauge and circuit size) are also found in the power diagram.

EXAMPLE 2: Control Box XX386



Note that this Power Diagram contains information for Control Boxes xx384, xx386, and xx387. Use the diagram that corresponds with the order.

The only part that the electrician needs to wire into the control box is in the upper left corner of the power diagram. The remaining diagram may help with technical support, but is not needed for installation.

Tables with additional information for the electrician (example: wire gauge and circuit size) are also found in the power diagram.