



***AUTOMATIC DUST COLLECTION  
FOR SMALL SHOPS***

***GG900A  
MOTOR CONTROLLER  
ADAPTER  
INSTRUCTIONS***

Thank you for choosing our Automatic Dust Collection System. We at Grngate have developed what we hope will be a valuable addition to your shop. Numerous articles have been written about the health risks associated with sawdust. Our goal is to provide you, the woodworker, with both a cleaner and safer shop. Making the entire dust collection operation totally automatic and synchronized with the actual machine operation allows the user to maximize his/her enjoyment of their shop time.

Our staff includes professional design engineers and manufacturing personnel who are also dedicated woodworking enthusiasts. We have tried to address many of the issues with both installation and operation we have encountered over many years of experience. We wish you many years of chip making enjoyment!

***BEFORE WE START ON THE INSTALLATION AND SETUP, LET'S TAKE A MOMENT TO TALK ABOUT SAFETY.***

Purchasing this product assumes you have already purchased our system. If you already have this installed, you will have had to address various mechanical and electrical issues. You will need to wire the Motor Controller Adapter to the System Controller and to motor controller on your collector.

Although we have tried to make the installation as easy and simple as possible with low voltage “plug-and-play” system wiring, there is always risk associated with any AC power wiring tasks. We will guide you through the wiring procedures with accurate descriptions and pictures, but.....

***IF YOU FEEL AT ALL UNCOMFORTABLE ABOUT THESE TASKS SEEK THE HELP AND GUIDANCE OF A PROFESSIONAL ELECTRICIAN!***

So let's get started!

## **MODEL GG900A MOTOR CONTROLLER ADAPTER**

### **WHY DO YOU NEED THIS PRODUCT?**

The Grngate System Controller is rated up to a 1HP, 115VAC or 2HP, 230V motor. However, some collectors have larger motors.

Larger motors often have a 3 phase motor connected to a motor controller unit. This provides for:

- Soft start of the motor, eliminating a large power surge when turned on
- Variable motor speed
- Conversion of single phase incoming power to 3 phase power for the motor
- Remote turn on and off via low voltage switches

Our Motor Controller Adapter bridges the gap from the Grngate System Controller to a dust collector having larger motors using a motor controller. (However, some collectors use a simple magnetic starter. In this case our GG500B, C Motor Contactor would be used.)

### **PRODUCT DESCRIPTION**

The Motor Controller Adapter emulates the remote ON/OFF switch module that usually accompanies the dust collector. When properly installed, your automatic dust collection system operates without any intervention from you. Just turn on your tool and go to work!

Please note- Although we also offer a Motor Contactor accessory (GG500B, C), this product is used for higher horsepower motors that *do not* incorporate a motor controller.

### **SPECIFICATIONS**

INPUT VOLTAGE	115 or 230 VAC
INPUT POWER	Less than 2 W
RELAY CONTACT RATING	1A @ 24VDC; .5A @ 125VAC
SIZE	5-3/4 X 3-1/8 X 1-7/8 exclusive of mounting flanges and cable glands

## WHAT'S IN THE BOX

The kit has all the components required to control a dust collector incorporating a motor controller.

In the box you will find:

- 1- MOTOR CONTROLLER ADAPTER MODULE
- 1- SYSTEM CONTROLLER TO MOTOR CONTROLLER POWER CABLE
- 1- INSTRUCTION MANUAL



What's not in the box is the wiring required to connect the Motor Controller Adapter to the motor controller on the collector. This is usually included with the collector.

## INSTALLATION

We will first get the module mechanically installed and then tackle the wiring.

### ADAPTER MOUNTING

There are no special requirements as to placement. The unit has flanges with mounting holes at both ends.

However, the supplied cable is 3' long so the Adapter module needs to be mounted within this distance from the System Controller. If your installation requires a longer separation you will need to supply your own cable. See Appendix A at the end.

### MOTOR CONTROLLER ADAPTER TO SYSTEM CONTROLLER AC WIRING

Let's do the wiring with the AC connections from the System Controller to the Motor Controller Adapter.

**\*\*\*\*\*BUT FIRST\*\*\*\*\***

***MAKE SURE THAT THE POWER CABLE SUPPLYING AC POWER TO THE SYSTEM CONTROLLER IS COMPLETELY DISCONNECTED / UNPLUGGED FROM THE POWER SOURCE!***

***FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.***

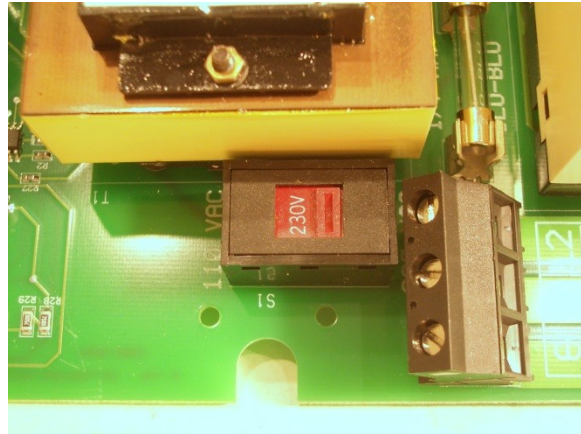
Remove both covers from the System Controller and Motor Controller Adapter boxes.

The System Controller top cover is has six screws around the perimeter. The cover can now be removed. **CAUTION-** there is a cable connecting electronic assemblies in the top and bottom halves of the case. Please don't put undue strain on this cable.

The Motor Controller Adapter top cover is removed by removing the four screws around the perimeter. The cover can now be removed.

Your System Controller may be powered with either 115VAC or 230VAC. You made this choice when you installed it. As part of the installation you set the switch in the controller.

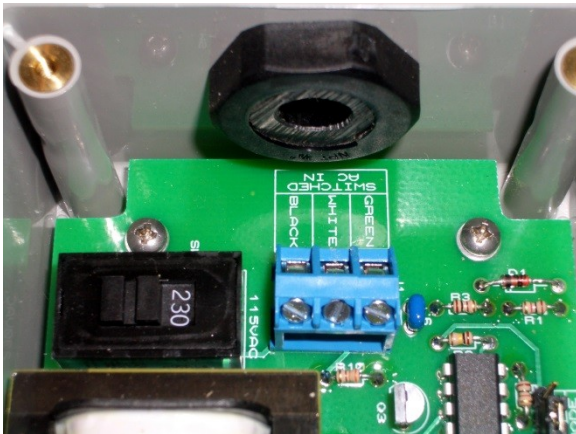
Here's a picture of the voltage selector switch in the System Controller. (You should have already set this to your incoming voltage.)



There is also a voltage selector switch in the Motor Controller Adapter. **You must set this switch to match the voltage you selected when you installed the System Controller.**

**We suggest you select which voltage option you need right now so it won't be forgotten later.**

Use a small flat blade screwdriver and slide the switch actuator to the correct voltage position.

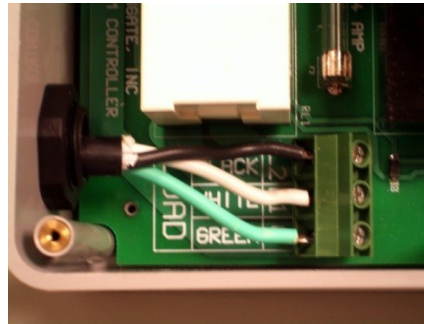


**-CAUTION-**

**FAILURE TO SELECT THE CORRECT  
AC VOLTAGE RANGE MAY RESULT  
IN DAMAGE TO THE UNIT.**

Using the supplied 3' cable (or your own) insert the cable through the right hand cable gland on the System Controller. The gland accepts cable diameters from .23" to .55". If the cable won't slide through, try opening up the clamp on the gland by turning it counter clockwise. It may be somewhat hard to rotate and will have a clicking sound as it turns.

Pull the cable through so that there is sufficient length to be able to insert the wire ends into the **LOAD** terminal block.



Now insert the wire ends into the terminal block with the wire color matching the label on the board. If the wire doesn't insert, make sure the terminal block opening is fully open. Turn the screw on the top of the terminal block counter-clockwise to open up the connection recess. After the wire end is fully inserted into the block there should be little or no exposed bare wire. Hold the wire firmly and turn the screw clockwise until it is snug. Give it just a little more without over tightening to ensure a good contact. If you did not tin the wire ends make sure that there are no strands of exposed wire. If there are, remove the wire, re-twist the bare wire end and re-insert and tighten.

After all three wires are securely tightened, allow a little slack in the cable and twist the gland nut clockwise until it firmly grips the cable.

The other end of this cable is then connected to the Adapter.

Pull the cable through the gland on the smaller enclosure end so that there is sufficient length to be able to insert the wire ends into the **SWITCHED AC** terminal block.



Insert the wire ends into the terminal block with the wire color matching the label on the board. If the wire doesn't insert, make sure the terminal block opening is fully open. Turn the screw on the top of the terminal block counter-clockwise to open up the connection recess. After the wire end is fully inserted into the block there should be no exposed bare wire. Hold the wire firm and turn the screw clockwise until it is snug. Give it just a little



more without over tightening to ensure a good contact. If you did not tin the wire ends make sure that there are no strands of exposed wire. If there are, remove the wire, re-twist the bare wire end and re-insert and tighten. After all three wires are securely tightened, allow a little slack in the cable and twist the gland nut clockwise until it firmly grips the cable.

## **ADAPTER TO COLLECTOR MOTOR CONTROLLER WIRING**

This part of the installation will be the most challenging. There are various motor controller modules that are used by various suppliers for the collector's motor. However, there is a typical wiring scheme used in most of them.

Your collector should have come with a remote ON/OFF pushbutton box. This is usually wired to the motor's controller. We are going to abandon this remote box and substitute the Motor Controller Adapter. (Note: if you wish to keep both the remote switch box *and* the automatic function using the Adapter this can be done. See Appendix B at the end of the instructions.)

### **WHAT THE ADAPTER DOES**

The remote box has two push buttons. The ON button uses a NORMALLY OPEN type of action. That is, the switches contacts are normally an open circuit until you press the switch. The OFF button is just the opposite. The switches' contacts are normally closed and then open when the button is pressed.

There are two relays in the Motor Controller Adapter that will be used to emulate this action. Power is sent to the Adapter from the System Controller when a tool is turned on. The microcontroller in the Adapter then pulses the START relay for about a second. This mimics pushing the START switch on the remote box. The relay's normally open (NO) contacts are connected to the wires that had been wired to the start switch of the remote switch box.

When the power is removed from the adapter due to the tool being powered down, the STOP relay is then pulsed for about a second, again mimicking pushing the STOP switch on the remote box. This relay's normally closed (NC) contacts are then connected to the wires that were connected to the STOP switch on the remote box.

Your job is to identify the wire connections that were used in the remote box and then connect them to the NO, NC and COM relay terminals in the Adapter unit.

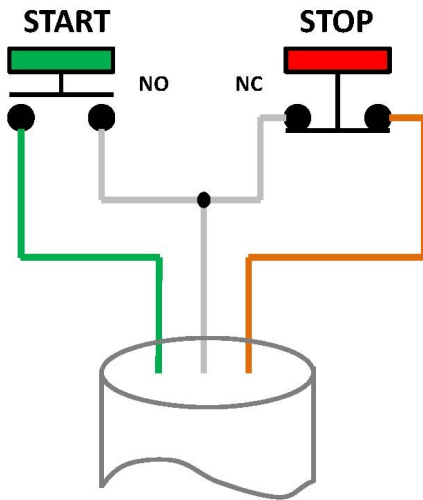
**HINT:** Look at the wire colors connected to the switches and make a note of them. This will help keep track when wiring the cable to the Adapter.

## EXAMPLE

As an example, here's a typical remote box and wiring.



Typical REMOTE CONTROL BOX.



The three wire interface shown in the wiring diagram above is very typical. Notice that there is a common connection between the two switches. This wire (shown here as grey but typically white) needs to be connected to both of the COM terminals in the Adapter. A jumper wire connecting the two COM relay terminals is shipped installed with the Adapter.

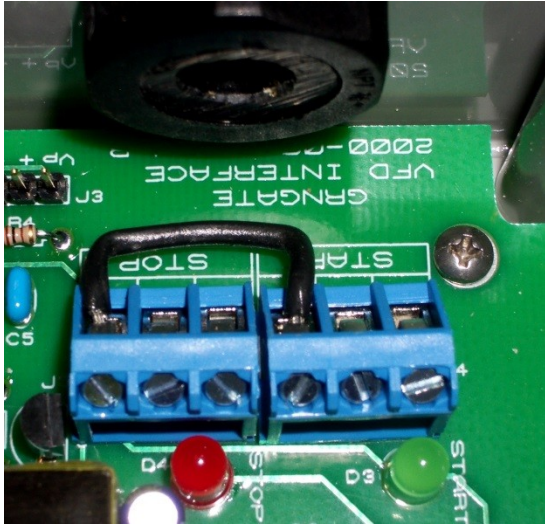
**NOTE:** The wire colors in your interface wiring may be different.

the NO terminal on the START terminal block in the Adapter.

The START wire (shown in the above wiring diagram as green) is connected to

The STOP wire (shown in the above wiring diagram as orange) is connected

to the NC terminal on the STOP terminal block in the Adapter.



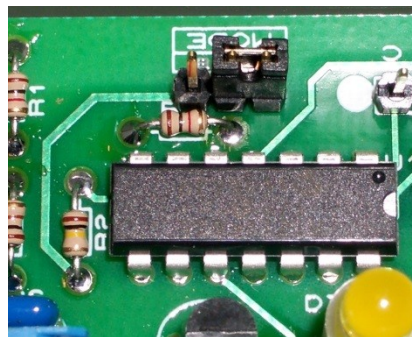
Good job! You have completed all the wiring.

## ADAPTER SETUP

There is only one task that requires you to choose an option. The Adapter has two modes: A and B. You will almost always want the A mode. This is the pulsed operation described earlier. Mode B does a simple on/off of the START relay with the STOP relay not being used.

The jumper should already be in the MODE A position.

**But double check it !**



**CONGRATULATIONS!**

**YOU HAVE FINISHED THE INSTALLATION!**

**WE WISH YOU MANY PLEASANT HOURS OF WOODWORKING.**

## OPERATION

When any machine tool is started, such as your table saw, the tool's blast gate will open and the System Controller's front panel AMBER LED will go on. The ADAPTER's ON relay will turn on for about a second. This will signal the dust collector to power up.

After the tool is turned off, the OFF DELAY in the gate will be enabled. At the end of the delay the AMBER LED on the System Controller's panel will go out and the Adapter's OFF relay will turn on for about a second. This signals the collector to turn off.

## TROUBLE SHOOTING

There are 3 LED's on the Adapter's circuit board. These are visible when the cover is removed.

- The **GREEN** LED pulses when the on relay is pulsed to start the collector.
- The **AMBER** LED indicates the Adapter is on. This comes on steady simultaneously with the **GREEN** LED pulse. It will go out when the **RED** LED is pulsed to turn off the collector.
- The **RED** LED pulses when the off relay is pulsed to stop the collector.

By noting the action of the LED's, you will help us troubleshoot your Adapter/system.

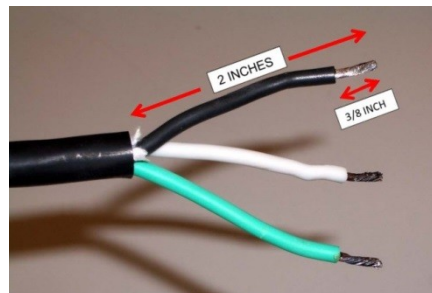
## APPENDIX A- MAKING YOUR OWN CUSTOM LENGTH CABLE

The Adapter comes with a 3 foot length of 3 wire pre-stripped cable for connection to the System Controller. This cable may be cut if you need a shorter length. But if your installation requires a longer cable, you can make up one yourself. The cable is 3 conductor power cord type available at most hardware stores and home centers. The wire size need not be large as the current is very low. #16 or 18 gauge is fine.

Carefully strip the outer jacket back about 2 inches for the end that will be wired to the System Controller.

Strip the outer sheath about 1 inch for the end that will be connected to the Adapter.

***Be very careful not to nick the wires as you remove the outer cable jacket.***



NOTE: The 2 inch length shown is at the                    text above.  
System Controller end. Please refer to the

There is usually some sort of filler weaved along with the wires when the cable was made.  
Carefully clip these off.

Now strip the insulation at both the wire ends. After you have removed the insulation  
tightly twist the exposed strands on each wire. This will make the insertion of the wires into  
the terminal blocks in the controller easier and ensure there isn't any little wire strands  
sticking out that might be a possible source for shorting.

Now continue to connect the cable per the previous instructions.

## **APPENDIX B- WIRING THE ORIGINAL REMOTE ON/OFF SWITCH IN PARALLEL WITH THE ADAPTER**

You can keep the original remote on/off switch control that came with your collector. This is a bit more complicated than simply replacing the remote switch.

Here's how to do it.

You will need a length of 4 conductor cable. As the signals are low power, low voltage (typically 24 V), the wire size can be smaller than the typical AC wiring type. Wire gauges from 18 to 24 will work fine.

Prepare the new cable by stripping back the outer sheath and the wires as per the previous instructions.

The goal is to:

- Connect the ON switch in the remote switch module in **PARALLEL** with the normally open (NO) connections of the START relay in the adapter.
- Connect the OFF switch in the remote switch module in **SERIES** with the normally closed (NC) connections of the STOP relay in the adapter.

Remove the jumper in the Adapter connecting to two **COM** terminals on the START and STOP terminal blocks.

Connect two wires in the new 4 conductor cable to the **NO** and **COM** terminals on the START terminal block in the Adapter. **Make a note of the colors you chose!**

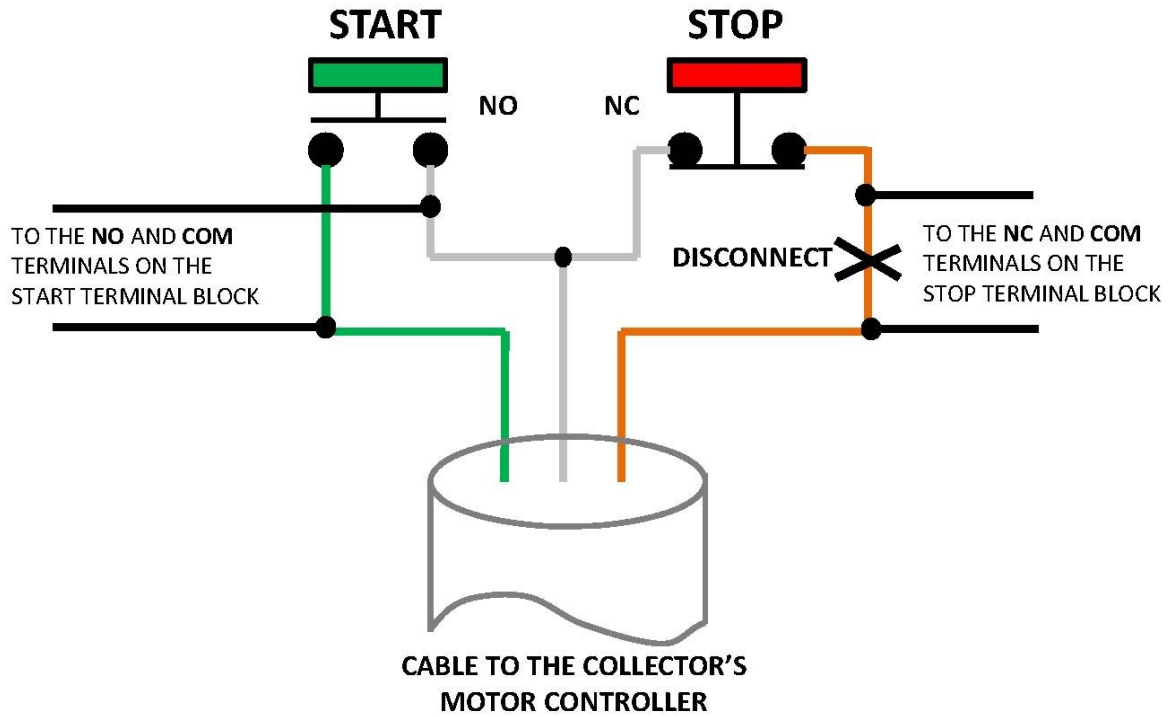
Connect the remaining two wires to the **NC** and **COM** terminals of the STOP terminal block in the Adapter.

The next task is connecting the wires you connected to the START terminal block to the START switch in the remote module. Depending on the style of connection used on the switch, you may need to be creative here.

Then connect the last two wires. Disconnect the wire going to the STOP switch from the motor controller that was **NOT** wired to the common connection. Connect this disconnected wire to one of the two remaining wires coming from the Adapter. A small wire nut will do the job.

Finally connect the last cable wire to the now vacant terminal on the STOP switch.

There were lots of words describing the connections. Sometimes a picture is easier and more helpful. Here's a wiring diagram of what you need do:



**Remember-** you needed to remove the common wire jumper in the remote module between the ON and OFF switches.

Please contact Grngate at any time if you have questions or concerns regarding your system. You may use our contact page at:

[www.grngate.com](http://www.grngate.com)

email us at:

[info@grngate.com](mailto:info@grngate.com)

or phone us between 9AM and 5PM during Pacific Time at:

408-872-0504

Again, thanks for selecting our system and we wish you many rewarding and enjoyable woodworking experiences!

Chuck & Petr

**NOTES:**