



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

GG1002A STARTER KIT

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.

You probably already have some sort of dust collector, from a simple shop-vac to a large, central cyclone separator. If you already have this installed, you will have had to address various mechanical and electrical issues. Our system is no different. You will need to install the blast gates in the duct lines and wire the System Controller to AC power and 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!

WHY AN AUTOMATIC SYSTEM?

All dust collection systems share a common goal: to collect the sawdust and wood chips generated by various woodworking machines. Many small shops use a simple shop-vac connected to a particular machine. When it's time to use another machine, the shop-vac is disconnected and re-attached to the new tool. Although this technique certainly works, there are several issues that take time and cause annoyance. The ducting must be moved from tool to tool, the shop-vac must be controlled independently of the tool and many shop-vacs will quickly experience a clogged filter. Although there are after-market remote controls to help, the other issues remain.

The next step up is to connect several tools to a central collector via duct work. To allow for efficient operation, only the tool in use is 'connected' to the ducting. This is done with the use of blast gates which are nothing more than some sort of valve in the duct line at each tool. Many woodworking supply sources sell various types with the sliding gate variety being very common. Although this removes the need to mechanically move the duct connection from tool to tool, the other issues still remain. To use any particular machine tool the user must:

- Open the associated blast gate
- Confirm all the blast gates on unused tools are closed (this is for system efficiency).
- Turn on the collector.
- Turn on the particular tool.
- Perform the task.
- Turn off the tool.
- Turn off the collector.
- Close the blast gate.

Now let's see what the Grngate system can do for you.

SYSTEM DESCRIPTION

Our system eliminates all of the steps above other than operating the tool and going to work- which is the fun part! All the other required operations are handled automatically by the system without any action from the woodworker.

When a tool is turned on, a sensor on the tool's power cord senses the electrical current. This in turn will command a motorized blast gate to open while simultaneously turning on the central collector. When the tool is turned off, the procedure is reversed with various delays built into the system to allow any debris in the duct work to be completely vacuumed out.

Although most small shops will have only one tool in use at a time, the system allows several tools to be used simultaneously assuming the duct work design and collector have been sized accordingly.

Numerous safety features have been incorporated addressing such issues as a gate jam, overloading or shorting of the system wiring along with mechanical shielding to keep little fingers away from the moving parts of the gates.

To keep the sensor installation safe and simple, the electrical sensors just clip onto the various power cords of any tool. There is no need to have access to the tool's electrical boxes.

The blast gates are placed in the duct line at each tool. The duct collars on the gates have a stepped diameter to allow easy connection to a wide variety of ducts such as metal, flexible and plastic pipe.

All the system components- sensors, gates and system controller- are connected with computer-type cabling that is supplied. All the cables use well-proven RJ-type connectors used on telephones and computer networks.

The actual connectivity of all the parts is very flexible allowing for essentially any ductwork layout. But more on this later.

EXPANSION

We also offer various accessories to customize and enhance your system.

Although the Starter Kit contains three gates, your system requirements may require additional gates. We have several Expansion Kits with either sensors or manual switches. You can expand your system to however many gates you need.

Blast gates will typically be operated by a tool sensor but there are times when manual control is desired- such as for a floor sweep or chop saw. For these chores we offer an Expansion Kit as mentioned above or just a manual switch that replaces the tool sensor.

If you want to have both a sensor and manual switch be able to operate a gate, we have a Sensor Splitter that lets you do this.

If you have a tool that needs a larger blast gate than 4 inch, we have a Parallel Gate Kit that allows operation of a pair of gates simultaneously from a single sensor or manual switch. This is the equivalent of a single 6 inch gate.

If your collector is larger than the rated load of the System Controller's 3HP, we offer a Motor Contactor rated at up to 5HP and 3 phase.

And if you have a unique situation that's not covered by all this, please contact us and we will try to help you sort out a solution.

MODEL GG1002A STARTER KIT

WHAT'S IN THE BOX

The starter kit has all the components for a three gate system.

In the box you will find:

- 1- SYSTEM CONTROLLER
- 3- TOOL SENSORS with CLIPS
- 3- FOUR INCH MOTORIZED BLAST GATES
- 3- SENSOR CABLES
- 3- SYSTEM CABLES
- 1- INSTRUCTION MANUAL



What's not in the box is the AC wiring required to connect the System Controller to the AC power and collector. Since each installation will be unique with either 115VAC or 230VAC operation along with various power plug choices and wiring length, we felt it is easier for the user to choose what the installation requires. We will help guide you through this later on.

INSTALLATION

OK, it's finally time to start having some fun and put your new system together.

There are three primary system components-

- SENSORS
- GATES
- SYSTEM CONTROLLER

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

SENSOR MOUNTING

Let's start with the sensors. Each machine tool will have a sensor and associated gate. The sensor simply attaches to the power cord of the tool with a supplied clip. If the tool has no electronic control associated with it, the sensor can be attached on either side of the power switch or magnetic starter. It just needs to be on the power cable that supplies power to the tool.

There are no special requirements as to placement (however, please read the NOTE below), but the supplied sensor cable is 6' long so the sensor needs to be attached within this distance from where the gate will be. The only precaution is to not place the sensor where it would be too close to another tool's motor. If the other motor were turned on, it could trigger an unwanted collector action. We suggest that a separation of 6 inches is sufficient.

NOTE: Some power tools including the SawStop table saw and certain European tools have an electronics control system. In these cases the sensor must be attached AFTER the control box, ideally directly on the cable going to the motor. Otherwise it is possible to incur erratic sensing and collector operation due to a constant current being drawn by the control system.

Place the power cord into the groove on the sensor. Next place the clip over the cord such that the hook ends on the clip are toward the notches at both sides of the sensor. Now press the clip and sensor together until both hooks on the clip engage the notches on each side of the sensor.

The spring action of the clip along with the rubber cushions in the clip allow for a wide range of cord diameters. Here's a picture of a sensor attached to a power cord.



If you have a power cord that is too large to allow the clip to work try removing the two pieces of tubing in the clip. If the cord is still too large, use tywraps or tape rather than the clip to attach the sensor to the power cord.

GATE MOUNTING

Each tool you want to have as part of your collection system must have a blast gate associated with it. Gates are typically attached to ductwork dropping from a “Y” in the main duct line. The machine side of the gate is usually connected to the tool with flexible plastic ducting for convenience.

The gate can be mounted in either direction as there are no airflow directional issues. However, we suggest they be installed such that the cable jacks on the gate are on the collector side of the gate. This will let the system cables be easily routed along the ductwork.

The gate-to-duct mechanical connection is usually wrapped with tape to ensure an airtight seal. We suggest the use of aluminum tape such as is used in HVAC ducting and available at most hardware centers. Duct tape is not recommended as it can become brittle over time and the adhesive can dry up.

Many gates are installed simply suspended in the duct lines without further support. However, if your situation calls for firmly mounting the gate we have provided for that. There are two captured ¼-20 nuts on the bottom edge of the gate. The mounting center is 5 3/16”. You can add whatever sort of bracket, plate or strap your situation requires.



SYSTEM CONTROLLER- MOUNTING

There is one system controller for the system. This is usually mounted near the collector although it can be placed anywhere. It may be more convenient to mount it near your power source.

There are several mounting holes on the flanges of the unit. Two are on the upper flange and one in the middle of the lower flange. You can drill out the holes to a larger size if you need to accommodate a larger screw diameter.

Try to mount the unit such that at least one screw will be into a stud. If you must mount it onto drywall, use some sort of toggle bolt, plastic wall anchor or other drywall attachment means. Most hardware centers will have various product offerings.

WIRING

Now we'll connect all the pieces and get the AC wiring completed. The system kit includes 3 sensor cables and 3 system cables.

SENSOR-to-GATE WIRING

Each sensor is connected to its matching gate on a particular tool. Use one of the 6' sensor cables and plug one end into the jack on the sensor. Plug the other end into the jack marked "SENSOR" on the gate. There is only one jack on the gate that the cable plug will fit into.

Any excess cable can be bundled up and fastened with a tie wrap or tape.

GATE / CONTROLLER WIRING

There is a lot of versatility in how you can connect all the gates with the system controller. Let's start at the system controller. There are 4 jacks on the upper right-hand side. Insert a 25' system cable into any one of them- they are all the same. Now route the cable to the first gate in the ducting run. This assumes that the controller is near the collector. If not, try to connect to a gate at one end of a duct run. You will see why in just a moment. The cable can be plugged into either jack on the gate that is labeled "NETWORK". They are both the same.

Now using another system cable, plug this into the other NETWORK jack on the gate you have started with. All the jacks on this gate should now be filled. Route the second cable to the next gate along the duct run and plug into one of the NETWORK jacks on this gate. Continue to "daisy chain" all the gates along the duct run in the same way.

This would be the simplest system wiring scheme. But your system may have several main duct runs starting at the collector with each run servicing one or more tools. Not a problem. After you have completed the "daisy chain" wiring on one run start a new cable run on the other duct branch. As there are four jacks on the system controller, you can

have up to four separate cable runs. This is usually more than sufficient for most small shop installations.

Again, any extra cable lengths can be bundled up with a tie wrap for a neat install. As the system cables will usually be run alongside the ducting, they can be attached at intervals to the ducting for support and a clean look.

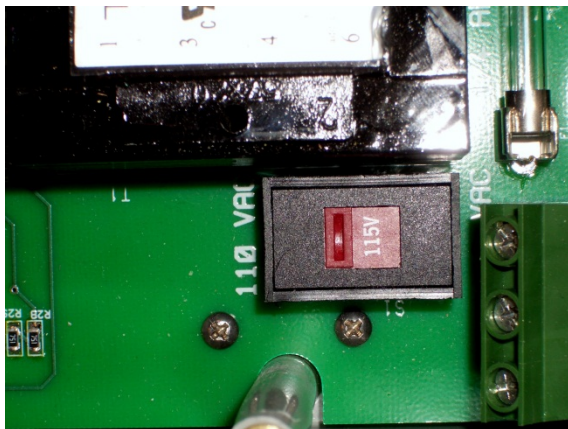
If you need longer cables than the 25' we supply or if you would like to customize your wiring with shorter cables for a 'clean look' you can order additional cables from a source we recommend. We have found them to be of high quality, reasonably priced and good service. There is a list in an appendix at the end that will get you there.

AC WIRING

Now let's finish the wiring with the AC connections to the controller and collector.

The top cover is removed by removing the 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 system may be powered with either 115VAC or 230VAC. There is a switch in the controller to select either. You will be removing the top cover on the controller to do the wiring. 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 so the correct voltage shows.



-CAUTION-

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

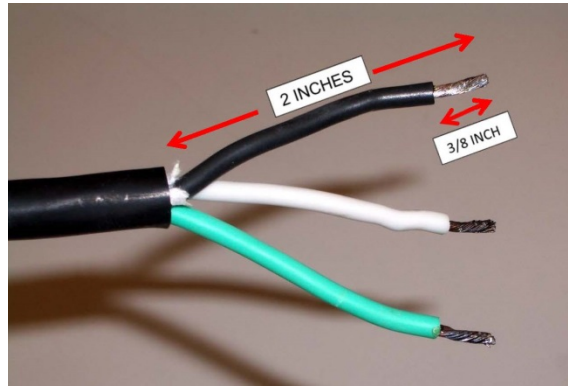
Let's first wire the controller to the collector. We suggest #14 three conductor power cable. Most hardware centers sell this by the foot. The wire colors are usually white, black and green.

TIP: An alternative is to get an extension cord and cut it into two pieces to get the lengths you require for the AC power and collector wiring. We have found this a very easy and cost-effective solution as both the power plug and receptacle are already

wired and many times are molded onto the cable providing a robust and safe electrical and mechanical connection.

Now strip the ends of both cables per the picture below.

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



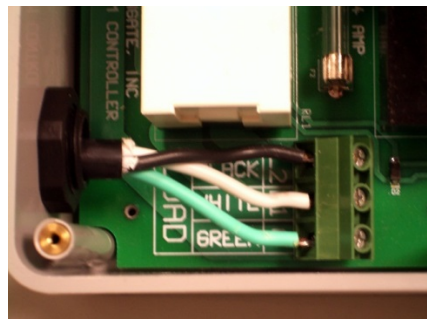
There is usually some sort of filler weaved along with the wires when the cable was made. Carefully clip these off.

After you have removed the insulation from the wire ends, 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.

NOTE: You may even want to "tin" the wires. Using a soldering iron, apply solder to the bare, twisted wire ends. Any excess solder can be removed by quickly rapping the cable on a surface while the solder is still molten. Although not necessary, this small detail adds a degree of professionalism to your installation and will make the connection to the terminal blocks that much easier.

Insert the prepared cable through the right hand cable gland. The glands accept 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.



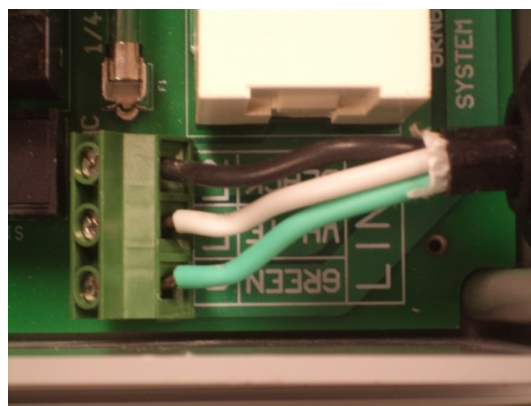
Now insert the wire ends into the terminal block with the wire color matching the label on the board. If the wire doesn't insert, make sure the terminal block opening is fully open. Turn the screw on the top of the terminal block counter-clockwise to open up the connection recess. After the wire end is fully inserted into the block there should be 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.

The other end of this cable is then connected to your collector. If you used an extension cord, all you need to do is plug in your 115VAC collector. Otherwise, there are other various options. You may want to use an appropriate plug and socket or directly wire into the collector motor's electrical junction box. Follow the manufacturer's instructions regarding this connection.

***NOW MAKE SURE THAT THE POWER CABLE IS COMPLETELY DISCONNECTED / UNPLUGGED FROM THE POWER SOURCE!
FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.***

Repeat the process with the power cable supplying AC voltage. The incoming power cable wires are inserted into the **LINE** terminal block.



There are several ways to connect to the voltage supply. You may wire directly into a junction box, a breaker box or use a plug. Whatever your choice, make sure you wire safely according to accepted standards.

AS WE STATED EARLIER, IF YOU FEEL AT ALL UNCOMFORTABLE ABOUT THESE TASKS, SEEK THE HELP AND GUIDANCE OF A PROFESSIONAL ELECTRICIAN!

Congratulations! You have completed all the system wiring.

SYSTEM SETUP

There is only one task that requires you to choose an option. Each gate has a jumper inside that allows you to select the delay time after the tool associated with the gate has been turned off. The default delay time is about 6 seconds (SHORT delay). This delay allows any debris in the ductwork to be drawn into the collector before the collector is turned off and the gate closes. This is fine for most tools such as table saws, jointers, planers and bandsaws. Tasks performed at these tools is usually an isolated action meaning that once the tool is turned on, the task is completed without the need to cycle the tool on and off frequently. However, tools such as a motorized miter saw (chop saw) are constantly turned on and off during use. To keep the collector from cycling on and off too frequently, you can select a LONG delay of 5 minutes. (Another option is to use a Manual Switch.)

To change the delay, you must remove the cover on the gate electronics.

- Unplug all the cables connected to the gate
- Remove the screws in the cover.



- Remove the jumper located at the end of the PC board farthest from the jacks. It is labeled “OFF DELAY”. The jumper should have been in the “SHORT” position.
- Re-insert the jumper into the “LONG” position
- Re-attach the cover
- Re-insert the cables

That's it. Repeat this for any gate for which you want to have a LONG turnoff delay.

CONGRATULATIONS!

YOU HAVE TOTALLY COMPLETED THE INSTALLATION OF YOUR NEW SYSTEM!

WE WISH YOU MANY PLEASANT HOURS OF WOODWORKING.

OPERATION

When power is turned on for the first time, the SYSTEM CONTROLLER has an initial delay of 30 seconds to allow any open or partially open gates to close. Gate closure is automatic and the gates will cycle to a closed position with a slow motor start. The collector will not be turned on.

After the 30 second initial delay has finished the FAN LED on the SYSTEM CONTROLLER will blink 3 times indicating the system is ready.

Now when any machine tool is started, such as your table saw, the tool's gate will open followed by the dust collector powering up.

The FAN LED on the SYSTEM CONTROLLER will turn on indicating the collector relay has been energized.

After the tool is turned off, the OFF DELAY will be enabled after which the collector will turn off followed about 2 seconds later by the gate closure.

There is a user selectable 7 second lockout delay after the collector has been turned off allowing it to wind down before it can be re-started. Some larger HP collectors can trip their circuit breaker if they are turned back on before they have sufficiently slowed down. Although we do not include the jumper with this kit, if you find that you need this feature just contact us and we will supply you the necessary jumper and instructions. We include the jumper for this feature with the MOTOR CONTACTOR KIT for larger collector motors.

The collector may be manually turned on at any time by pressing the MANUAL push button switch on the SYSTEM CONTROLLER.

If a tool is now turned on, its gate will open. However, the collector is already on. When the tool is turned off the gate will close and the collector will turn off with the timing as described earlier.

Should you want to turn the collector off with a tool already turned on and the collector operating, press the MANUAL switch on the SYSTEM CONTROLLER. This will override the gate signal and power down the collector. The collector will stay off even though the tool is still on and its gate open. When the tool is turned off, its gate will close and the collector will continue to stay off. The system is now back to normal operation and the next tool turned on will open the gate and start the collector as usual.

TROUBLE SHOOTING

There are various safety features designed into the system. These include:

- An AC power fuse inside the SYSTEM CONTROLLER. This protects against a problem with the controller power supply. The fuse is a 3AG ¼ Amp SloBlo. Please contact Grngate If you experience continued fuse problems.
- If an overload or short should occur in the gate network cabling, the FAN LED on the SYSTEM CONTROLLER will blink. You can find where the issue is by unplugging the gate cables starting at the CONTROLLER and working your way down the 'daisy chain(s)'. When the LED stops blinking, the problem lays further down the chain. This may be caused by a faulty gate or damaged cable. The system will automatically return to normal operation once the fault has been fixed.
- Gate jamming. This can be caused by a piece of material that lodged in the gate and subsequently stalled the gate motor when it tried to open or close. The gate will try to automatically clear the jam by cycling three times. If the jam persists, the gate will stop and freeze. After the jam has been cleared, the gate must be reset by removing the power. This is done by unplugging the gate cable that leads back to the SYSTEM CONTROLLER. After the cable is re-inserted, the gate will automatically close. This may be accompanied by briefly turning on the collector. The system should now be back to normal.
- All power and signal lines are protected against electrostatic discharge. Plastic ductwork can sometimes produce rather startling 'sparks'.

ACCESSORIES

We offer various accessories and add-ons to expand and enhance your system. You can find the details on our web site: grngate.com

Here's a short description of what we have.

- Gate Expansion Kits (GG1004A and GG1006A)- You can add single gates with either a SENSOR or MANUAL SWITCH. The kit contains the GATE, either a SENSOR or MANUAL SWITCH and all the necessary cables. There is no limit on the number of gates you may have.
- Parallel Gate Kit (GG1005B)- If you have a machine that has a large dust port and requires a larger gate than 4", this kit lets you have two 4" gates that operate together from a single SENSOR (or MANUAL SWITCH). The kit contains two 4" GATES, a PARALLEL GATE ADAPTER module, SENSOR and all cabling.
- Splitter Kit (GG1008A)- If you want to have both SENSOR and MANUAL SWITCH control of a gate, this kit is for you. The SPLITTER module lets you connect the gate, sensor and switch. But you are not limited to just a sensor/switch combination. You can have two sensors or two switches for complete versatility. The kit contains the SPLITTER module and a short sensor cable. You add either another sensor or switch with either a SENSOR KIT or MANUAL SWITCH KIT.
- Sensor Kit (GG1007A)- Contains a SENSOR and sensor cable.
- Manual Switch Kit (GG1006A)- Contains a MANUAL SWITCH and sensor cable
- 3 Pole Motor Contactor (GG500A)- If your collector motor is larger than 3HP or if you have a 3 phase unit, the contactor is rated for these larger motor and 3 phase situations. It operates as a secondary contactor (relay) controlled by the SYSTEM CONTROLLER.
- 3 Pole Motor Contactor with Thermal Protection (GG500B)- The contactor is a larger industrial unit and includes a thermal protection module for motor protection.

We also have individual parts such as SENSORS, MANUAL SWITCHES, SYSTEM CONTROLLERS, cables, etc. for repair and replacement services.

CABLE SOURCE APPENDIX

If you would like to order either gate network cables or sensor cables we recommend using Monoprice. We have found them to have excellent quality and good prices.

Here's some direct links to various cables:

Gate network cables:

- 1 ft [1 Ft Gate Network Cable](#)
- 2 ft [2 Ft Gate Network Cable](#)
- 3 ft [3 Ft Gate Network Cable](#)
- 5 ft [5 Ft Gate Network Cable](#)
- 7 ft [7 Ft Gate Network Cable](#)
- 10 ft [10 Ft Gate Network Cable](#)
- 14 ft [14 Ft Gate Network Cable](#)
- 20 ft [20 Ft Gate Network Cable](#)
- 25 ft [25 Ft Gate Network Cable](#)
- 30 ft [30 Ft Gate Network Cable](#)
- 50 ft [50 Ft Gate Network Cable](#)
- 75 ft [75 Ft Gate Network Cable](#)
- 100 ft [100 Ft Gate Network Cable](#)

Sensor Cables:

- 7 ft [7 Ft Sensor cable](#)
- 14 ft [14 Ft Sensor Cable](#)
- 25 ft [25 Ft Sensor Cable](#)

If you have an unusual cable requirement just contact us. We will try to help you get the system configuration you need.

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

email us at:

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: