



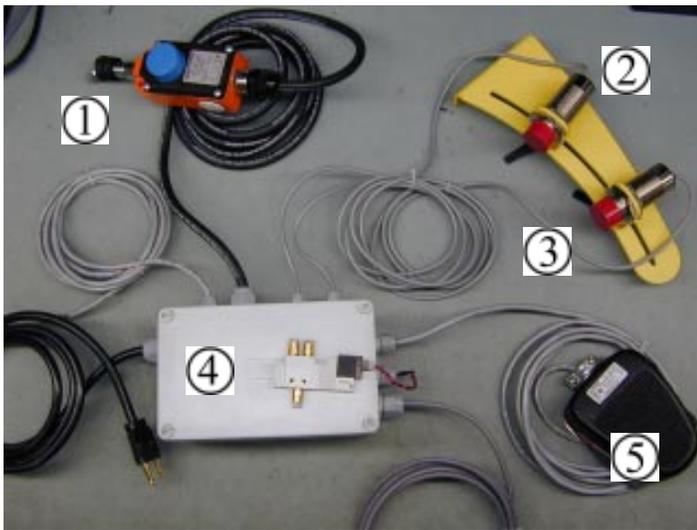
Advanced Interlock

IK3

Advanced Interlock (IK3) installation involves working with the following assemblies:

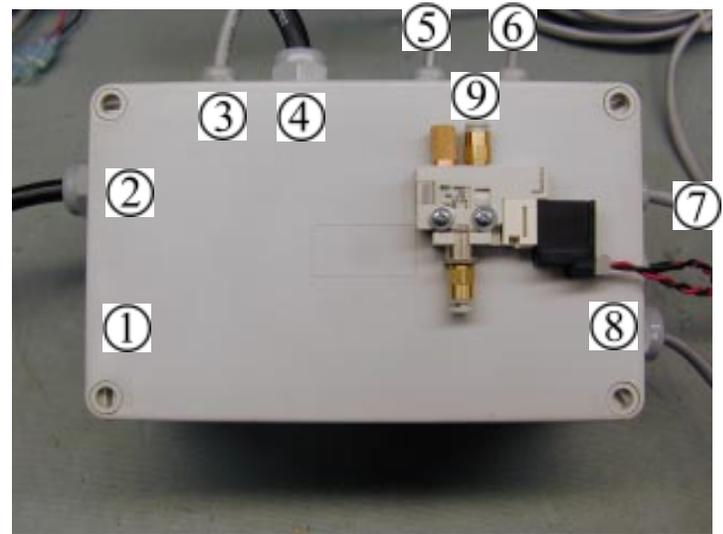
- Line kill switch and safety cable
- Proximity sensors and their mounting brackets
- Control box mounting
- Pneumatic connections
- Saw interlock wiring

The two pictures below identify these components and should help orient you during the installation process.



Advanced Interlock Components

- 1 — Line kill safety switch
- 2 — Upper saw arbor proximity sensor
- 3 — Lower saw arbor proximity sensor
- 4 — Control box
- 5 — Foot switch



Advanced Interlock Control Box

- 1 — AC outlet for TigerStop™
- 2 — 115VAC line 10A max
- 3 — To saw interlock
- 4 — To line kill safety switch
- 5 — To upper saw arbor prox
- 6 — To lower saw arbor prox
- 7 — To foot switch
- 8 — To TigerStop™ amplifier
- 9 — Air supply

Safety Warnings

Disconnect BOTH the TigerStop™ and the Saw from the AC power line BEFORE starting installation of the Advanced Interlock!

TigerStop™ must be installed in accordance with all local, state, and federal regulations, as well as common sense safety requirements. Use only trained professionals when installing TigerStop™ with existing equipment to ensure a safe and proper work station that will in no way endanger the operator or any other personnel. Do not operate TigerStop™ without proper training, both in TigerStop™ operation, and in the operation of adjoining equipment.





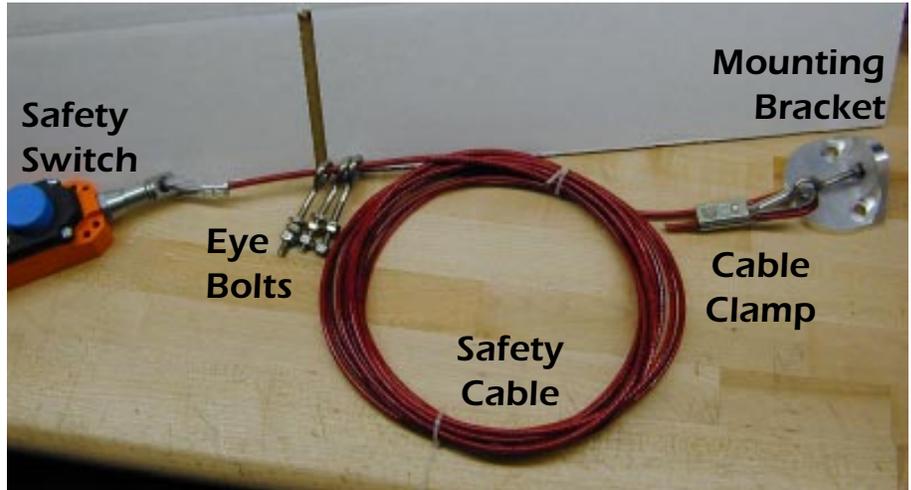
IMPORTANT NOTICE

The following Advanced Interlock installation pictures, drawings, and procedures are specifically tailored towards Whirlwind saws. If your machine is from a different manufacturer, use this information as a general guide. Also, refer to the section entitled **Theory of Operation** at the end of this Product Closeup.

Line Kill Switch and Safety Cable Installation

The picture to the right shows the components associated with the Safety Switch:

- Safety Switch
- Eye Bolts
- Safety Cable
- Cable Clamp
- Mounting Bracket



As shown in the closeup of the line kill switch on a Whirlwind saw, the line kill safety switch is bolted to the saw end of the feed table using two (2) 10-32x1½” socket head cap screws and 10-32 nuts.

The mounting holes for the switch are 1.60” apart. Center the mounting holes vertically on the table lip.

As shown in the closeup of the line kill bracket, the line kill bracket is bolted to the far end of the feed table with three (3) 3/8”x1” hex head bolts and three (3) 3/8”x16 nuts.



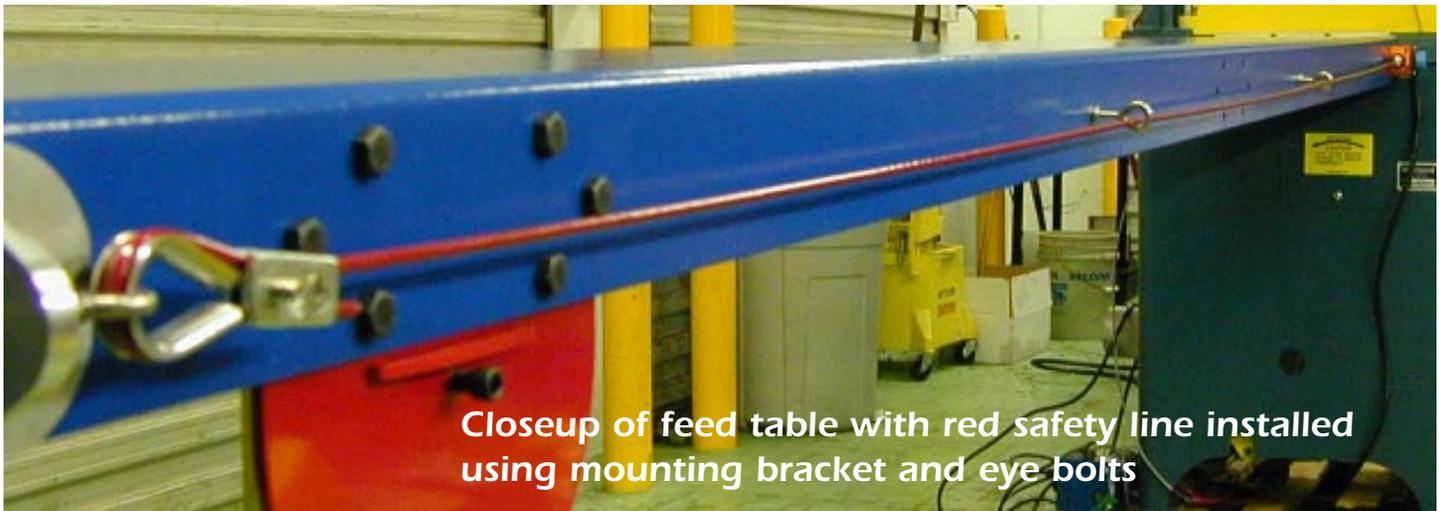
Mount the 1/4-20 eye bolt with cable thimble and cable clamp to the line kill bracket as shown in the picture to the left.

NEXT PAGE





As shown in the next picture, the red safety line is held in place and spaced out away from the table lip by two (2) 1/4-20 eye bolts. Drill two eye bolt mounting holes in the table lip that are equally spaced along the length of the table.



Closeup of feed table with red safety line installed using mounting bracket and eye bolts

After the safety switch, mounting bracket, and eye bolts are attached, the safety line must be tensioned.

Loosen the cable clamp, pull the safety line taut, and retighten the clamp. If the cable is properly tensioned, the blue button on the safety switch can be pushed, and a click will be heard as the switch latches into its operating position.

By pulling on the safety line, the motion of the TigerStop™ is immediately halted and the power supply to the motor is cut. The same actions occur if the cable becomes slack (as, for example, from a broken cable or loose cable clamp.)

Proximity Sensor Installation

In the picture to the right the upper and lower arbor proximity sensors are shown attached to their adjustable mounting bracket.

This view is from the front of the saw, with the access panel removed, looking upward with the saw blade on the LEFT side of the picture.

The purpose of the proximity sensors is to monitor the arbor position. These sensors have red LEDs (Light Emitting Diodes) which light up when the saw arbor is within the active sensing range of the sensor.

Both sensors are mounted in a curved slot on the adjustable mounting bracket to allow each sensor to move up or down following the same arc as the saw arbor.



Closeup of upper and lower proximity sensors and their bracket mounted inside a Whirlwind saw



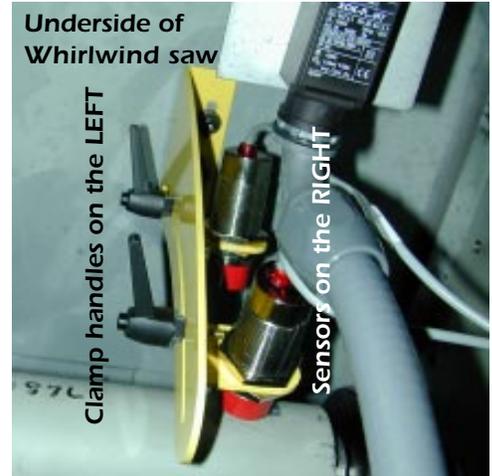


Proximity Sensor Installation (Continued)

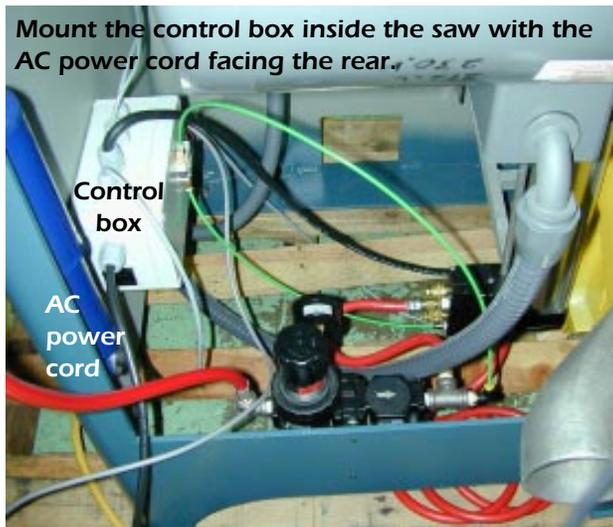
To avoid interference with the saw arbor, make sure that both proximity sensors are initially backed off in their movable brackets. To accomplish this, loosen the 30mm sensor nuts and adjust each sensor's position so that only the red sensor face (and not the threaded sensor body) extends out toward the saw arbor. Tighten the sensor nuts "finger tight"

Orient the adjustable bracket with the sensors on the right side of the bracket and the clamp handles on the left. Bolt the bracket to the underside of the saw table with two (2) 1/4-20x3/8" bolts and two (2) 1/4" flat washers. See picture. (On Whirlwind saws the underside of the saw table is pre-drilled and tapped for 1/4-20 bolts.)

With the saw arbor in its lower, resting position, loosen the 30mm nuts and adjust the lower saw arbor proximity sensor for a 1/4" air gap between the face of the sensor and the saw arbor. Loosen and retighten the clamp handle as necessary to position the sensor vertically. Firmly tighten the 30mm nuts. (The upper saw arbor proximity sensor will be adjusted later in this procedure.)



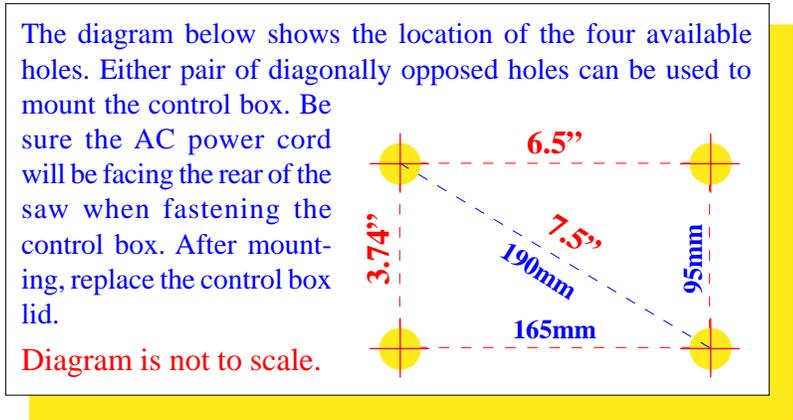
Control Box Mounting and Pneumatic Connections



The next picture, looking into the interior of a Whirlwind saw from the rear, shows where to mount the control box. It is necessary to drill and tap two holes for #8-32 screws in the side wall of the saw to mount the control box.

The second picture below shows the approximate position of the holes as viewed from the outside.

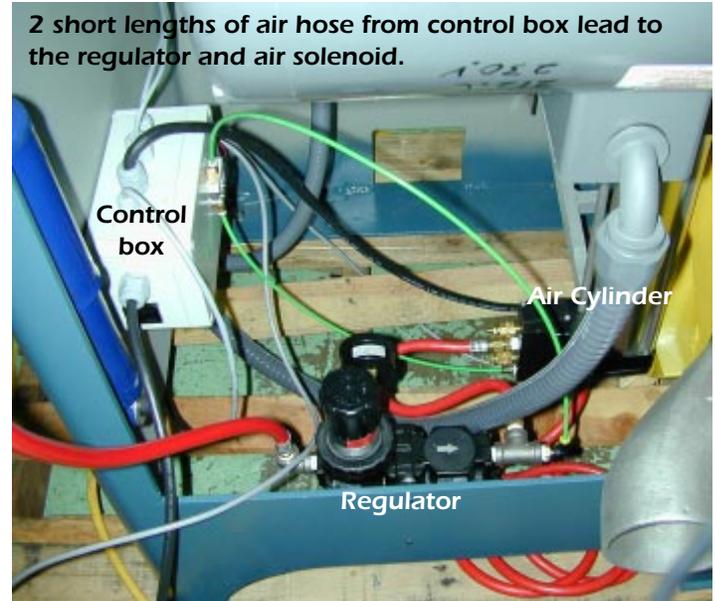
To access the control box mounting holes, undo the four corner screws and remove the control box lid.





Control Box Mounting and Pneumatic Connections (Continued)

As shown in the next picture, use two short lengths of air hose (green in the photo) to connect the control box air solenoid to the saw regulator and air cylinder. The connection to the saw regulator may require the use of the (supplied) male elbow. The male end of the elbow is screwed into the galvanized tee on the output of the saw regulator, and the tube end is used for the 'control box to regulator' hose. The control box air solenoid is shipped with 4mm air fittings that are appropriate for your saw.



Saw Interlock Wiring

It is strongly recommended that a qualified electrician perform the following installation steps.

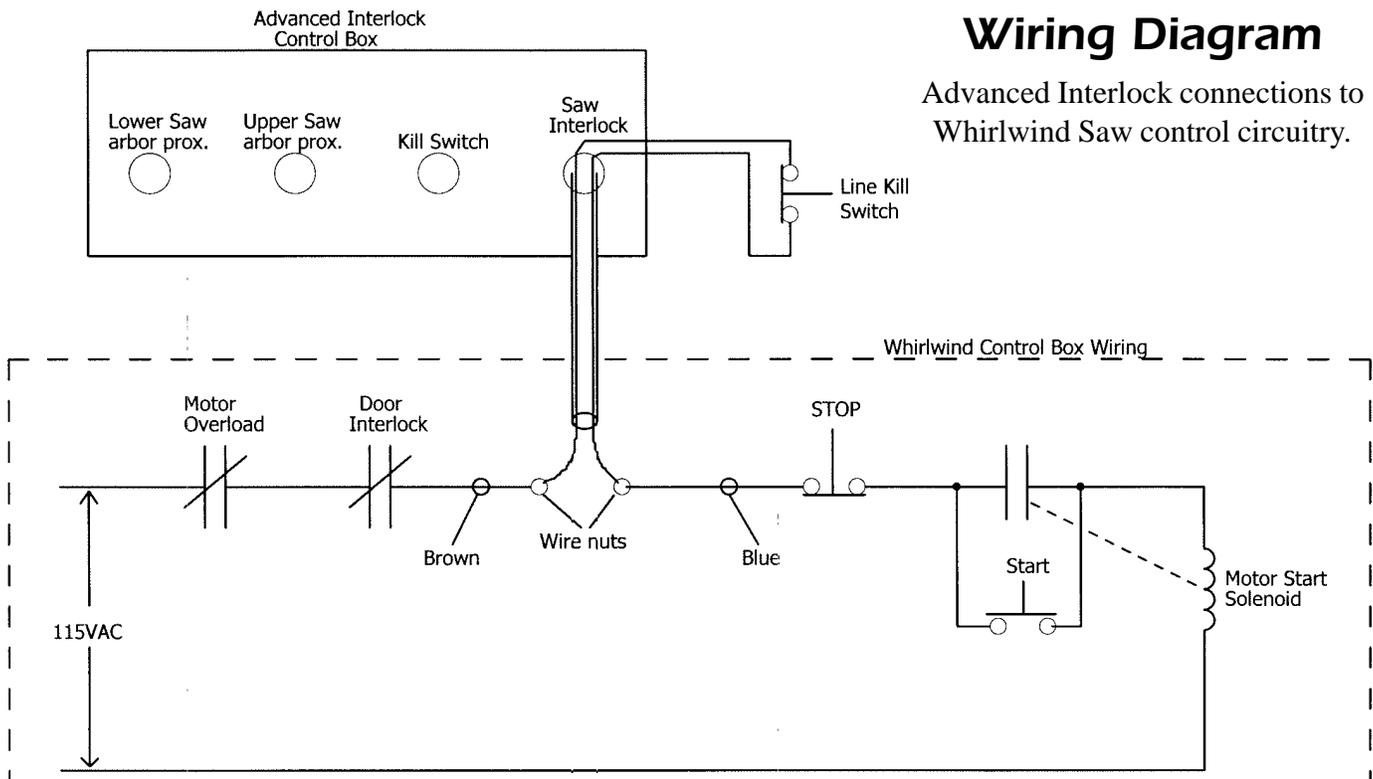
The wiring diagram below shows the typical motor control wiring found on Whirlwind saws.

The two wires in the "saw interlock" cable from the control box are wired in series with the saw motor starter solenoid. The brown and blue wires identified on the diagram are typically wire-nutted together in Whirlwind control boxes.

Basically, one pole from the line kill switch is wired in series with the motor start/stop circuit. During normal operation, the line kill switch contacts are CLOSED, allowing the motor to run. When the safety line is pulled, the line kill contacts OPEN and power is removed from the saw motor.

Wiring Diagram

Advanced Interlock connections to Whirlwind Saw control circuitry.





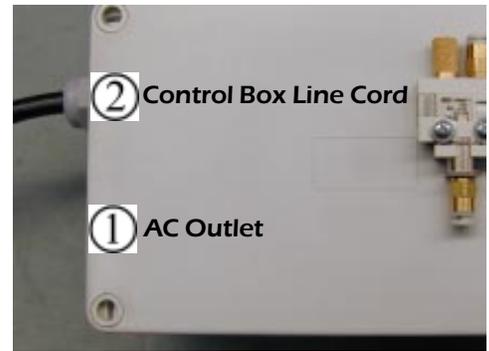
Final Setup and Test

Plug the TigerStop™ power cord into the AC outlet 1 on the control box. Plug the control box line cord 2, into a source of 115VAC.

Follow the instructions in the TigerStop™ Manual for setting the Interlock and Systems modes. When using the Advanced Interlock, these settings are normally set to “2.”

With AC power and air pressure applied to the machine, home the TigerStop™. Activate a cut list and depress the foot switch. The saw arbor will travel upward into cutting position until the upper saw arbor proximity sensor is active, and then the arbor will descend. The position of the upper proximity sensor must now be adjusted to be appropriate for the thickness of the material being cut. If the saw arbor passes by the upper proximity sensor without the LED lighting up, the sensor face must be repositioned closer to the saw arbor. Be sure to firmly tighten the 30mm sensor nuts when the correct position has been located.

Test the line kill switch by pulling the safety line, and observe the TigerStop™ controller screen. It should go blank, and the saw motor should stop, if the installation has been completed successfully.



Theory of Operation

There are two main purposes for this section: First, to provide information that will be useful when troubleshooting installations involving Whirlwind saws. Secondly, to provide enough information to allow the user to install the Advanced Interlock on non-Whirlwind saws and other machines such as punches, presses, or other custom-built equipment.

Proximity Sensors

When installed on a TigerStop™, the Advanced Interlock provides the capability of high speed production through the use of two proximity sensors.

For example, in an up-cutting saw application the sensors are used to detect saw arbor position. The position of the upper proximity sensor is adjusted so it detects the saw arbor only after the saw blade has completed its upward motion through the material to be cut. The arbor is then immediately allowed to fall back down to the resting position.

This results in faster production compared to the typical saw where cut duration is based upon a fixed time delay that is usually much longer than necessary.

When installing the Advanced Interlock on machines other than Whirlwind saws the point to remember is that the sensor labeled “Upper Prox Sensor” is mounted so that it is active when the tool (saw, drill, etc.) is in the machining position. The sensor labeled “Lower Prox Sensor” is mounted so that it is active when the tool is in the resting (parked) position.

For example, if a drilling operation is being performed, then the Upper Proximity Sensor should sense the drill chuck when it is in the extended (drilling) position and the Lower Proximity Sensor should sense the chuck when it is in the retracted (non-drilling) position.

The proximity sensors are metal-sensing and are more sensitive to steel than aluminum. They have a red LED at the rear of the sensor that lights when the sensor has detected a metal target.



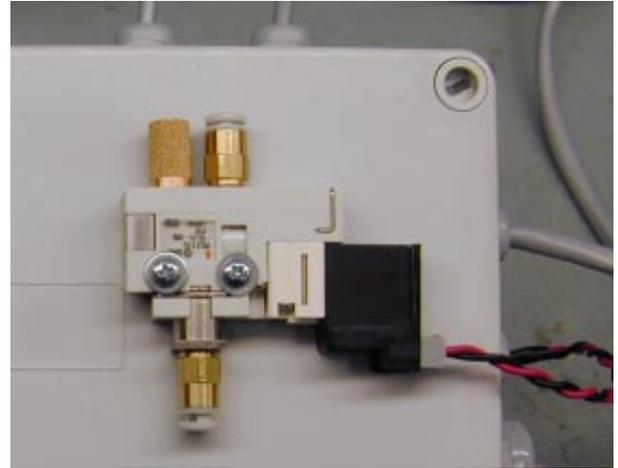


Theory of Operation (Continued)

Pneumatic Solenoid

A 24 VDC pneumatic solenoid is supplied with the Advanced Interlock and is mounted on top of the supplied Control Box.

This solenoid is energized (which allows air to pass through the solenoid) after a TigerStop™ move is completed and stays energized until the Upper Proximity Sensor is active. In the case of an up-cut saw, the TigerStop™ pushes the raw material into position, the solenoid is energized, air passes through the solenoid to the main saw air cylinder which pushes the saw arbor upward. The solenoid remains energized until the saw blade cuts through the material and the saw arbor position is detected by the Upper Proximity Sensor. The solenoid is then de-energized, and the arbor falls back to the resting position and is detected by the Lower Proximity Sensor. After the Lower Proximity Sensor is active the TigerStop™ is allowed to move again.



Safety line & Kill Switch

For safety reasons, regardless of the specific type of machine that the Advanced Interlock is installed on, there is a **requirement** for a way to quickly shut the machine down. To accomplish this you **must** install the provided safety line and kill switch in the vicinity of the machine tool(s).

Typically, the safety line is run along the entire length of the material in-feed table and down to the machine tool. The safety switch has two sets of electrical contacts that are both closed after the safety line is tensioned and the blue reset button pushed. One set of contacts controls power to the AC outlet mounted on the Control Box. The second set of contacts are used in the machine tool start/stop wiring as shown on the Wiring Diagram page of this manual. If the operator pulls on the safety line, both contacts open up, which immediately removes power from the TigerStop plugged into the Control Box AC outlet and also shuts down the machine tool.



System Mode/Interlock mode setting

The System and Interlock modes in the Controller must be set to appropriate values for proper operation of the Advanced Interlock. There are two basic modes, semi and fully automatic.

In semi-automatic operation, the operator needs to push the  button or depress the foot switch after each machine operation (e.g., saw cut).

In fully automatic operation, and an initial foot press after the raw material is loaded, the TigerStop will push, cut, push, etc. until the length of raw material is used up. Semi-automatic material pusher operation is accomplished by setting the Interlock Mode to 2 and the System Mode to 2. Fully automatic operation is accomplished by setting the Interlock Mode to 2 and System Mode to 3. *Please refer to your TigerStop manual for instructions on how to change these settings.*