OPERATORS MANUAL
FOR
AGL4400 Series

AGL Inc.
Advanced Greig Laminators

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Preface

Your Advanced Greig Laminators, Inc. (AGL) laminator is a finely engineered and designed piece of equipment.

Standard equipment includes a 1/4 HP DC drive (variable and reversible), manually adjusted pneumatic brake and clutch, plus an air-operated laminating section with easily adjustable spacer system for controlled laminating nip opening.

The nip rolls are the heart and soul of the laminator. To insure a quality end product, the rolls are rigid enough to carry their weight, plus the working pressures against them without deflecting. The covering is ground straight and concentric to the bearing journals to insure a constant uniform opening at the laminating nip between the top and bottom roll. The power transmission from the drive motor to the bottom laminating roll and the release liner windup clutch is with chain. The laminating nip section is protected with an electric through beam sensorl.

The AGL design has a rigidly constructed steel frame. All parts are machined to prints, ensuring complete interchangeability of all parts, manufactured or purchased. Adjustable air pressure to the laminating nip section is supplied via your regulated, clean and dry air.

Selecting Area

Select an area that has a smooth, level surface for the laminator to set on, this will allow for easier maneuverability of the machine if it requires moving later on. The area should be large enough to allow an operator ample room to properly handle your largest product on the infeed and outfeed sides of the laminator. The sides of the laminator should also be easily accessible in case service or maintenance is required. AGL approximates this area should be about 7-8 feet in front and back of the machine and 3-4 feet on either end. This is only a suggestion, your plant and the products to be laminated will be the determining factor.

Uncrating

Your new laminator may come in a full crate. The crate is designed to be usable for future shipping if required, so careful disassembly of the crate is important if the crate is to be reused. The crate is held together by screws (phillips head) a power screwdriver with a phillips bit is recommended but not required for uncrating. First, remove the top of the crate, keep the screws for future use on the crate. Next, remove the front of the crate (it is recommended that two people disassemble the crate, so one person can hold the panels while the other removes the screws). Move around the crate and remove the remaining panels. Remove the bolts holding the laminator down to the skid. A fork truck can now lift the laminator off the skid (it is possible to get the laminator out of the crate after removing only the top and front and the hold down bolts). With the laminator on the fork truck, install the casters then lower the machine down onto the casters. Your machine is ready to be moved into position.

CAUTION ***The laminator is a large heavy piece of equipment. Do not attempt to move the machine with one person. Injury is possible as well as permanent damage to the laminator. The laminator should only be rolled on a relatively smooth and level surface. Tipping or forcing the machine over large bumbs can destroy the alignment of the rolls, idlers, and unwind/windup shafts. This alignment is required for proper lamination. Advanced Grieg Laminators, Inc.'s warranty does not cover malfunction of the machine due to improper handling of the machine during installation*.**

With the machine in the proper place, lock the casters. Remove the shrink wrap, bands, and protective coverings from the rolls.

CAUTION ***Do Not use a knife or other sharp object to remove the shrink wrap from the laminator and the protective coverings from the rolls. This can cause irreparable damage to the laminator enclosures and rolls.***

Electrical Connection

Refer to the **Electrical Requirements** under Specifications for the proper requirements for your laminator. All connections to components and terminal blocks should be checked for tightness before initial startup. This will help avoid and electrical problems caused by connections that may have loosened due to vibration during shipping. A readily accessible disconnect device shall be incorporated into the fixed wiring circuit. The switch on the laminator is not considered a disconnect device. Consult a qualified, licensed electrician to ensure that the power supply for the machine is properly installed in your facility. Qualified personnel can remove the RH enclosure cover to allow access to the terminal strip and grounding lug. Advanced Grieg Laminators, Inc. will not be responsible for damage caused by incorrect electrical installation.

Pneumatic Connection

Refer to the Pneumatic Requirements under Specifications for the proper requirements for your laminator. The air supply should be clean, dry, and regulated. Failure to properly clean and dry the air supplied to the laminator will cause damage to the cylinders. The laminator is supplied with a 1/4npt port for your final connection.

CAUTION ***The air supply to the laminator must be clean and dry. Particles and moisture can damage the cylinders***.

Recycling Packaging

If your machine came in a fully enclosed crate, the crate can be stored flat for future use or dismantled and the wood can be recycled. The screws can be kept for future use of the crates or stored for some other use. The shrink wrap is not recyclable and should be thrown away. The foam protective coverings over the rolls can be recycled to be used for other shipping purposes.

Machine Dimensions

Width: 65”
Height: 54”
Depth: 27”
Weight: 800 lbs.

Electrical Requirements

4400-220/230 VAC single phase, 50/60 Hz, 50 Amp service.
4400T-220/230 VAC single phase, 50/60 Hz, 30 Amp service.
4400C-220/230 VAC single phase, 50/60 Hz, 20 Amp service.

Pneumatic Requirements

Approximately 2-3 cfm at 60-90 psi line pressure supplied via your cleaned/dried/regulated plant air.

Material Capacity

Upper Front Station:	8” Diameter x 42 long x 3” Diameter core.
Upper Rear Station:	10” Diameter x 39 long x 3” Diameter core. (Thermal) 10” Diameter x 42 long x 3” Diameter core. (Pressure Sensitive)
Lower Rear Station:	10” Diameter x 39 long x 3” Diameter core. (Thermal) 10” Diameter x 42 long x 3” Diameter core. (Pressure Sensitive)
Lower Front Station:	8” Diameter x 42 long x 3” Diameter core.

IMPORTANT
READ THIS SECTION BEFORE OPERATING YOUR LAMINATOR

General Machine Safety

The following messages are written here for your safety, all operators and others around the laminator should read, understand and follow these messages.

1. Read and understand all the safety instructions.
2. Keep this manual in a place where it can be easily referenced by all operators.
3. **All connections to components and terminal blocks should be checked for tightness before initial startup. This will help avoid and electrical problems caused by connections that may have loosened due to vibration during shipping.**
4. Use only the recommended power source to run the laminator. Consult a qualified and licensed electrician if you are unsure of the power supply and the safety features of the supply.
5. If power supply cord is run across the floor, provide adequate protection to the cord to avoid damage from foot traffic, dropped items or rolling items.
6. Do not attempt to service the laminator without qualified personnel available. Damage to the machine or injury to you could be caused by moving parts or high voltage.
7. Do not operate the laminator with out all guards in place. If a guard is damaged or not working properly, replace or repair before returning the machine to operation. If the machine is run without all guards in place the safety obligation of the manufacturer is null and void.
8. Do not insert fingers, hands, or items into openings in the sideframes. Items may become entangled in moving parts or in contact with high voltage.
9. Disconnect or lockout power from machine when any service is required and when cleaning the nip rolls.
10. Disconnect or lockout power from the machine and refer to service personnel if the performance of the machine changes indicating a problem or if machine does not operate normally to correct operational procedures.

Operator Safety

Your laminator is designed to protect the operator from injury when used properly. Do not operate the machine without all guards and protection devices in place, serious injury could occur.

⚠ WARNING

The nip section can pull you into laminator! Do not place fingers into the nip section when the rolls are rotating. It is recommended that operators tie long hair back and not wear neckties, loose clothing and jewelry since they can be caught in the nip section and pull the operator into the machine. Proper equipment such as gloves should be used if the material being laminated requires it. The nip rolls will lower if there is a loss of air pressure.

The nip section is protected by a thru beam sensor that shoots a light beam across the machine in front of the nip rolls. When the machine is in continuous run mode, the rolls will stop when the beam is broken by an item too close to the nip section. However, if the machine is in jog mode, an alarm will sound warning the operator that he/she is very close to the nip section, but the rolls will not stop rotating. The jog mode is useful for starting prints into the laminator and smoothing the print corners out as they enter the nip section, but this mode should be used as sparingly as possible since it puts the operator at a greater risk than the run mode.

⚠ CAUTION

When the machine is in jog mode, an alarm will sound to warn the operator but the rolls will not stop rotating when the light beam is broken. Use this mode sparingly and with respect.

There are E-stop switches on the top of the enclosures. The machine will stop and the nip section will open if any of these switches are tripped. Striking the red mushroom heads on the switches with your palm can activate the four switches. The machine must be reset after and E-stop condition has occurred. Refer to the **Operation** section for further details.

General

1. Power: A circuit breaker switch, located on the rear of the machine, switches the main power on and off. The switch is labeled clearly so the operator can tell if the power is on or off.
2. Reset: A reset button is used to start the machine initially and restart the machine after an E-stop condition has occurred. After the power is turned on, the reset button is held for 15 seconds to allow the machines electrical controls to reset to initial settings.
3. Speed: A potentiometer is used to control the speed that the laminator will run product through. Your laminator has the electrical and mechanical capability to run up to 20 feet per minute, but the quality of the product output is the governing factor in maximum process speed.
4. E-stops: E-stop switches are located at all four corners to allow the operator to stop the machine and open the nip rolls and pull rolls in case of emergency. The button must be pulled back out before pressing the reset button to restart the machine.
5. Nip Rolls: The nip rolls are the heart and soul of the laminator and must be cared for properly in order to give years of quality product output. Always dial the shim wheel to a shim setting greater than "0" when the machine is not in use. This will prevent the rolls from forming a flat spot from resting against each other. The pull rolls should remain in the open position when not in use.

CAUTION

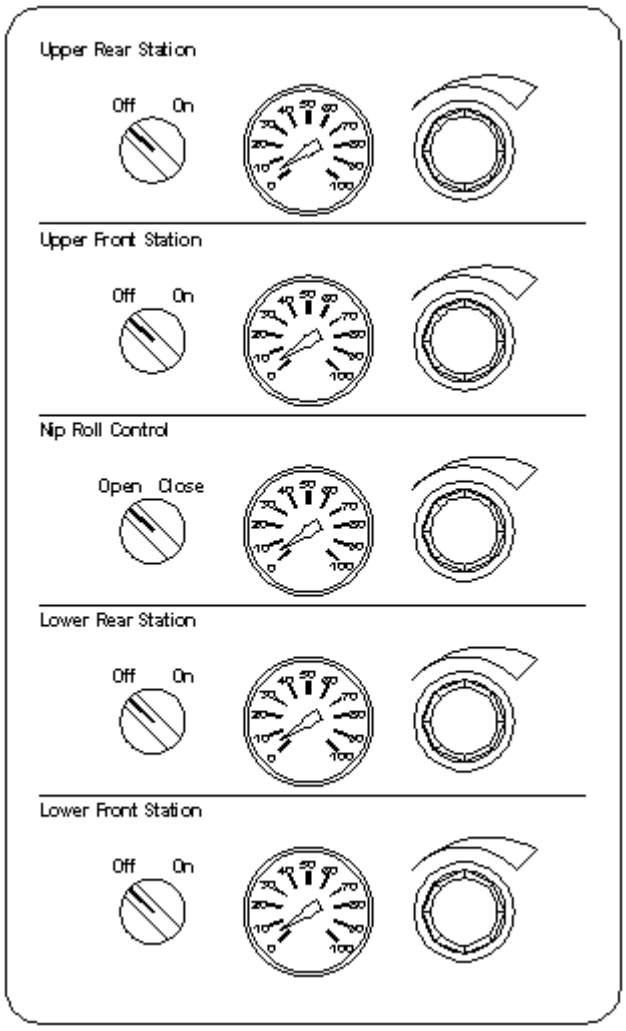
Always set the shim wheel to a setting greater than "0" when the machine is not in use. This will prevent the roll from coming together and forming a flat spot. Permanent damage can be caused to the rolls if this warning is not heeded.

6. Rev- Fwd: This is a two position switch that will select the direction the machine will run. The Fwd selection will make the machine run front to back, and will run with the foot switch and continuous run mode. The Rev selection allows the machine to run back to front, but only when pressing the footswitch with the switch in the Rev position. This machine was not designed to run continuously in reverse.
7. Run: This switch starts the machine in run mode. Pressing the button while the footswitch is on will transfer the mode of operation from jog to continuous run.
8. Foot Switch: The foot switch will run the laminator in the forward direction at the speed set by the potentiometer. The foot switch is always active, this allows an operator to press the foot switch to get a print started and then press the Run button to transfer to the continuous run mode without stopping.
9. Temperature Control with switch: The two position switch allows the operator to turn the heater in the roll on or off. The temperature controller allows the operator to set a desired temperature for a process.
10. Brakes: Turn the regulator knob clockwise to increase web tension from the unwind station. Turn the regulator knob counter clockwise to decrease web tension from the unwind station.
11. Clutches: Turn the regulator knob clockwise to increase web tension from the unwind station. Turn the regulator knob counter clockwise to decrease web tension from the unwind station.

Right Hand Control Panel

Note: Your laminator may or may not have all controls shown based on model and configuration.

The right hand control panel looks like the figure below.



Upper Rear Station:
The two position switch changes the station between off and on. The regulator adjusts the air pressure to the brake changing the web tension. The gauge indicates air pressure which allows for repeatable results.

Upper Front Station:
The two position switch changes the station between off and on. The regulator adjusts the air pressure to the brake changing the web tension. The gauge indicates air pressure which allows for repeatable results.

Nip Roll Control:
Two position switch opens and closes the nip rolls. The regulator adjusts the air pressure to the cylinders that create the pressure on the nip rolls. The gauge indicates air pressure which allows for repeatable results

Lower Rear Station:
The two position switch changes the station between off and on. The regulator adjusts the air pressure to the brake changing the web tension. The gauge indicates air pressure which allows for repeatable results.

Lower Front Station: (optional)
The two position switch changes the station between off and on. The regulator adjusts the air pressure to the brake changing the web tension. The gauge indicates air pressure which allows for repeatable results.

Figure 1 Right Hand Control Panel

Left Hand Control Panel
The left hand control panel looks like the figure below.

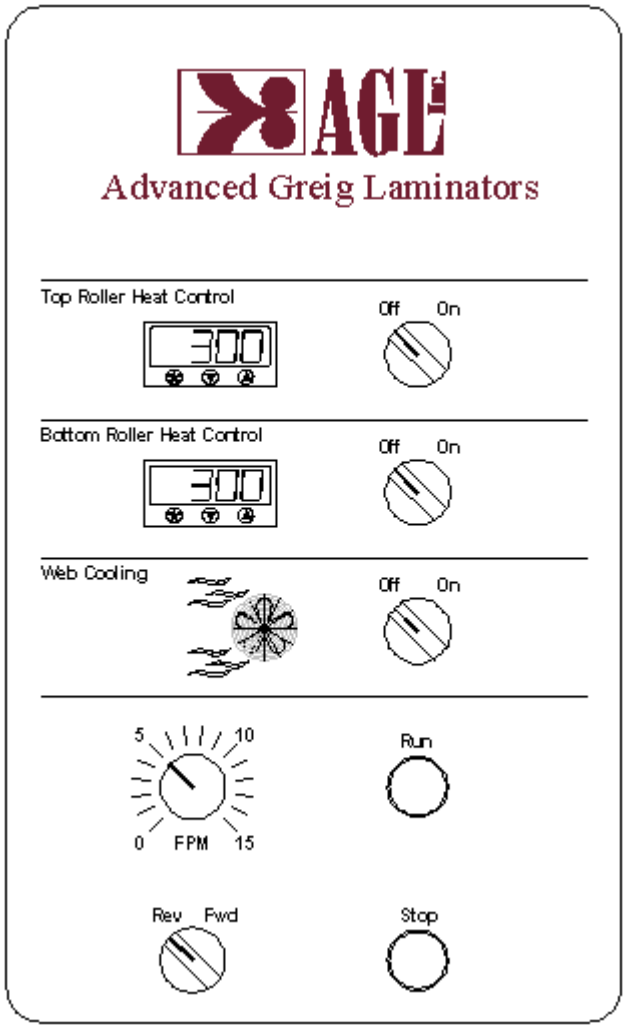


Figure 2. Left Hand Control Panel

Top/Bottom Roll Heat Control:
Two position switch turns heater for upper roll on and off. The temperature controller allows the operator to set a desired temperature for the process. The controller will maintain that temperature during the process. These stations may not be here if heated rolls are not present.

Web Cooling: (optional)
Two position switch turns the fans that create a cool air flow to the web on and off.

Speed Pot sets the laminators speed. 0-15 FPM

Rev Fwd switch selects the direction the machine will run.

Run switch starts machine running in direction selected.

Stop switch stops the drive system

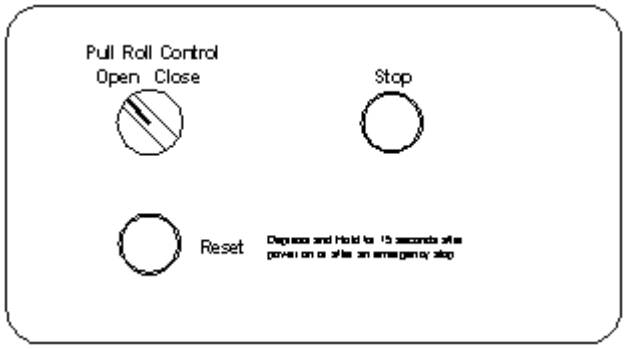


Figure 3. Rear Control Panel

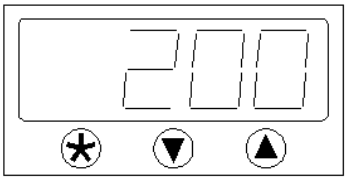
Pull Roll Control:
Two position switch opens and closes the nip rolls. The regulator adjusts the air pressure to the cylinders that create the pressure on the nip rolls. The gauge indicates air pressure which allows for repeatable results. Switch may not be here if pull rolls not installed.

Stop switch stops the drive system

Reset switch resets machine after power on or estop. Press and hold for 15 seconds.

Temperature Controls

Your laminator may have heated rolls that allow you to laminate with thermal films and pressure sensitive films that require heat to activate the adhesive. The temperature controls have a maximum temperature set at the factory. The operator cannot set the temperature above this point. The controllers are also set up with an over temp alarm. If there is a failure and the heater coils heat out of control, the temperature controller will create an e-stop condition.



The temperature controller looks like the graphic shown at the left. The operator only needs to press and hold the ***asterisk*** key then press the ***up arrow*** key to raise the "Set Point Temperature" or the ***down arrow*** to lower the "Set Point Temperature". The square green LED in the upper left will stay on initially as heater comes up to temperature and flash as the controller pulses electricity to maintain the heat in the rolls. The top alarm LED will flash on if the rolls exceed the upper temperature limit set at the factory and then the machine will go into an E-stop condition. The rolls must be allowed to cool down before restarting machine. The machine can be restarted by pressing and holding the Reset button for 15 seconds. If the machine fails again in the same manner, the laminator should be serviced by qualified personnel.

Laminator Setup

Your laminator has been designed to make the setup and lamination process as easy and repeatable as possible, however, there will be techniques that make this phase easier that you will only learn by using the machine. Do not get frustrated if the setup process takes longer than you expected, the process will get quicker and easier the more you use your laminator.

The set up process is comprised of the following steps:
1. Loading and positioning the film.
2. Webbing the laminator.
3. Setting the process controls to initial settings.
4. Warm up time (if required by process)

Loading and Positioning the Film

1. Determine the way the film is wound, adhesive inside or outside. This will determine the way it is placed on the unwind shaft. If the adhesive is wound to the inside, the web will be pulled from the bottom of the supply roll. The web path configuration figures show the film in this configuration.
2. Swing the upper rear shaft out for loading.
3. Remove the locking core chuck and the core idler. Slide the locking core chuck, film roll, and core idler onto the shaft.
4. Rotate the shafts back into place.
5. Measuring from the sideplates, make sure the film is centered on the shaft. Once the measurements from each end of film to the sideplates are equal, tighten the locking core chuck and core idler down.
6. Repeat this process on any other unwind station.
7. If the film is a pressure sensitive with a release liner, you will need to set up a wind up station. This is done by webbing the film under an idler and separating the film and liner. Once the liner has been separated from the film, it must be routed up over the second idler and taped to a windup core.
8. The wind up core is a cardboard core that is loaded the same as a film roll, but the shaft is lifted up on the right hand side, then moved to the right to free it from the driving shaft. Load core, chuck and collar, place assembly back in position and center the core. Keep in mind that the windup cores will rotate the exact same direction as the lower nip roll.
9. Tape the release liner to the core and windup any slack by hand. Feed the film with adhesive around and through the nip opening. **Note: You may require feeder stock to keep the film from sticking to the lower nip roll.**

Webbing the Laminator

The term webbing means routing the film through the laminators' idlers and nip rolls and thus creating a web. The easiest way to web the machine up after loading the film is by using a piece of feeder stock. The stock can be anything that is relatively stiff, but still flexible enough to route around the nip roll. A common example would be tag board.

The first step in webbing the machine is to have a planned web path configuration. There are two web path configurations shown for two different processes in this manual. The encapsulation process uses thermal film from top and bottom to "encapsulate" the substrate being fed into the laminator. This process seals the edges and protects the substrate. Refer to figure 3 as the webbing process is described below.

Encapsulation Process

1. Load thermal film on the upper rear and lower rear unwind stations. Loosen the brake tension by rotating the regulator knob counter clockwise.
2. Set the shim wheels to “0”, place a piece of feeder stock into the nip rolls with plenty of stock hanging out the front. Close the nip rolls onto the piece of feeder stock.

CAUTION ***The nip section can pull you into laminator! Do not place fingers into the nip section when the rolls are rotating. It is recommended that operators tie long hair back and not wear neckties, loose clothing and jewelry since they can be caught in the nip section and pull the operator into the machine***

3. Pull the film from the upper rear station down under the idler roller directly behind the nip roll and over the top of the top nip roll. Tape the film to the feeder stock.
4. Remove the infeed table for easier access. Pull the film from the lower rear station up over the idler roller directly behind the bottom nip roll and under the bottom nip roll. Tape the film to the feeder stock.
5. Replace the infeed table.
6. Set the speed potentiometer to a low setting, select Fwd and press Run. Move to the rear of the machine.
7. Open the pull rolls using the switch. Guide the stock coming from the nip rolls through the pull rolls. Close the pull rolls after the film has passed through the rolls.
8. Turn the heater controls to “On” and set the desired temperature. While the rolls are heating up use your process control chart to make all initial settings on the brakes, speed and nip pressure.
9. With rolls at the desired temperature you may feed the substrate into the nip section.
10. This diagram shows the chiller roll being used. This is the standard configuration, a fan bank assembly is also available for use with the chiller roll or a curl cam assembly.

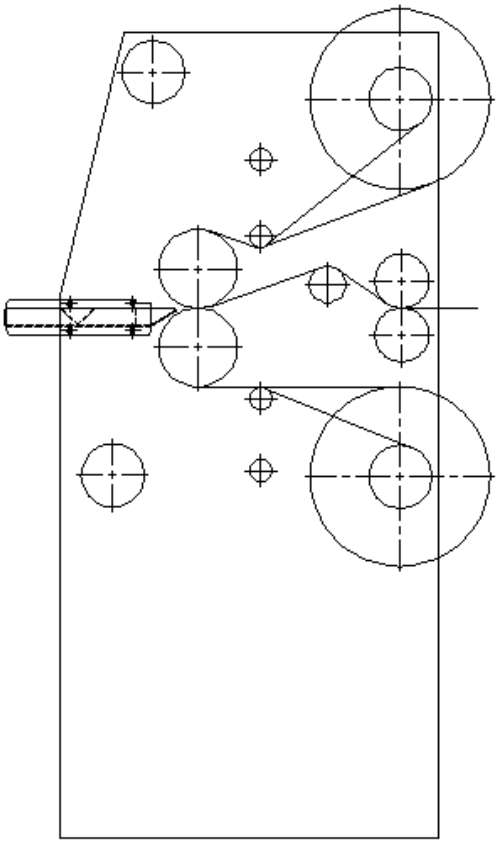


Figure 4. Encapsulation Process

Pressure Sensitive Process

1. Load film on the rear upper unwind station. Loosen the brake tension by turning regulator knob counter clockwise.
2. Set the shim wheels to “0”, or to the correct shim height if a board is being used. Place a piece of feeder stock into the nip rolls with plenty of stock hanging out the front and close the nip rolls onto the piece of feeder stock.

WARNING ***The nip section can pull you into laminator! Do not place fingers into the nip section when the rolls are rotating. It is recommended that operators tie long hair back and not wear neckties, loose clothing and jewelry since they can be caught in the nip section and pull the operator into the machine***

3. Pull the film from the upper rear station down under the idler roller directly behind the nip roll and over the top of the top nip roll. Separate the release liner from the film and tape the film to the feeder stock. Load lower rear station the same way.
4. Route the release liner in an “S” wrap on the idler rolls and back to the upper front windup station. Tape the release liner to the wind up core.
5. Set the speed potentiometer to a low setting, select Fwd with the selector switch. Jog the machine forward to run out film. Be sure to place scrap substrate between the film and the lower nip roll to avoid adhesion to the lower roll.
6. Move to rear of machine and guide film through open pull rolls.
7. Turn the heater control to “On” and set the desired temperature.(if required) While the roll is heating up, use your process control chart to make all initial settings on the brakes, speed and nip pressure.
8. With roll at the desired temperature you may feed the substrate into the nip section.

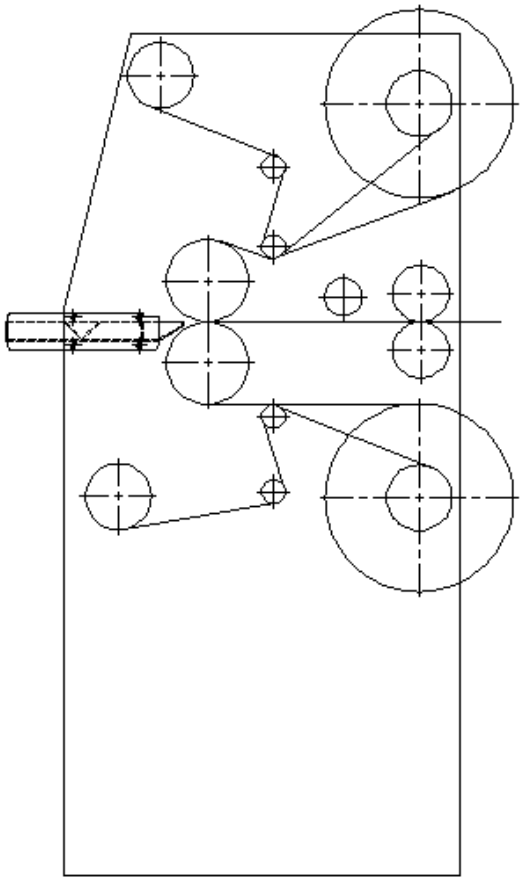


Figure 5. Pressure Sensitive Process

Optional Curl Cam Operation

The curl cam is used to form thermal films as they exit the nip roll. This is important when using films of different thickness and grade in an encapsulation process. Depending on your film configuration, running straight through the laminator may cause upward or downward curl in your product. This is due to the speed at which each film cools, since the films will cool at different rates, the result will be higher tension in one film versus the other which will cause curl. The way to reduce the curl is to form the film/substrate/film assembly while it is still warm and malleable, that is where the curl cam comes in. If your film has an upward curl, route your web over top of the first idler and under the second idler, this will form a downward curl. The amount of forming is done by pulling the spring pins on either side of the curl cam and locating it at the angle that gives you the best result.

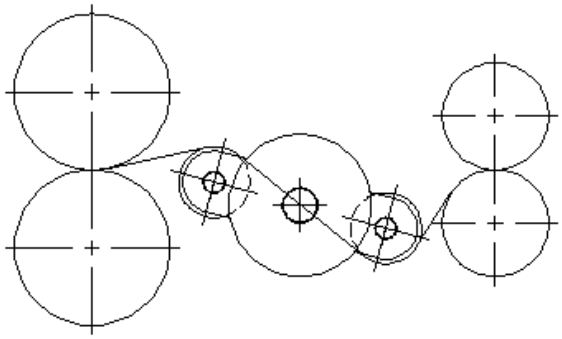


Figure 6. Forming downward curl

If your film has downward curl, the web should be routed under the first idler roller and over the second roller. Rotate the assembly and lock in place to gain the best results.

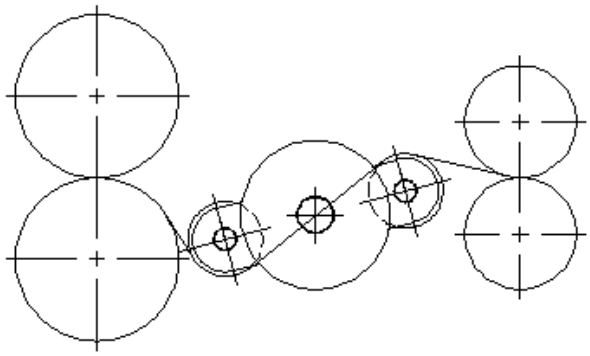
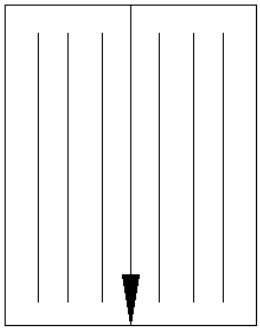


Figure 7. Forming upward curl

The curl cam can be rotated all the way around to switch the s-wrap configuration without rewebbing, simply unlock the assembly and rotate around and lock back in posiopen
tion.

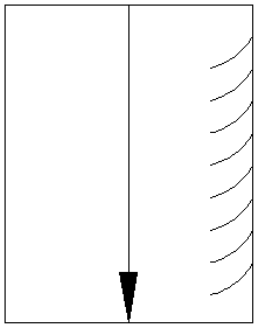
Process Output Trouble Shooting



Straight waves in output

Pull roll creating too much tension → Decrease clutch air pressure

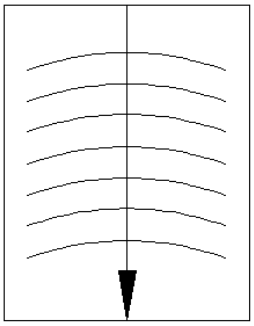
Film not cooling fast enough → Slow feed rate down and turn on cooling system.



Waves on one side of output

Nip "zero" setting may be incorrect → Check nip setting and adjust if necessary. Refer to **Zeroing the Nip** in the maintenance section.

Pull roll "zero" setting may be incorrect → Check nip setting and adjust if necessary. Refer to **Zeroing the Nip** in the maintenance section. Pay particular attention to sides opposite the waves.



D-Waves in Product

If waves are in the substrate and not film
Substrate problem → Check the substrate moisture content and the substrate tension.

If waves are in the film
Low tension between nip & pull roll → Increase air pressure to pull roll clutch.
Roll pressure settings → Adjust nip and pull roll settings as required.

Web Breaks

Web breaks caused by excess tension: If the web breaks between the unwind station and the nip, reduce the unwind brake tension. If the web breaks between the laminating opening and the rewind station, reduce the rewind clutch tension.

Web breaks will occur from faulty material. The AGL laminator will not correct this; the material must be replaced.

Curl in Product

1. Running a hot mount material in cold-mount machine sometimes creates a curl in the finished product.
2. Too much web tension: Reduce unwind brake tension.
3. Excessive roll pressure: Reduce upper roll pressure.
4. Wrong spacers being used.

Wrinkles in Product

1. Check the adhesive stock for wrinkles while operating. If wrinkles exist, this is a manufacturing material defect, and must be cut out of the roll. A laminator will not correct material defects.
2. String the web straight and square between the unwind and the windup shafts. If it is not straight and square, the tension will not be even across the web and will cause wrinkling.
3. If the web is loose between the unwind and the drive roll, there is not enough tension on the unwind brake. Increase the tension on the unwind brake to correct.
4. If the web is loose between the windup and the drive roll, there is not enough tension on the windup clutch. Increase the tension on the windup clutch to correct.
5. If the web gets narrow between the unwind and the drive roll, there is too much tension on the unwind brake. Decrease the tension on the unwind brake to correct.
6. Top and bottom laminating rolls may not be parallel. Make sure spacer shims are the same size, then zero the nip. Refer to **Zeroing the Nip** in the maintenance section.

Poor Lamination

1. All substrate materials must be cleaned and free of dust, dirt, grease, and any other type film.
2. Poor lamination is usually caused by thickness variation in the substrate materials such as plywood, hard board or other such non-precisely made materials. To overcome this, cylinder spacers may have to be removed and materials laminated without the use of cylinder spacers, or the next smaller spacer may be used or special spacer utilized.
3. Materials such as Plexiglas or glass sometimes carry a greasy or oily film. These materials may need to be cleaned with a solvent prior to lamination.
4. Poor lamination can be caused by defective material. To correct this, replace defective material with higher quality material.

Bubbles in Product

1. Visually inspect materials, mounting or overlays for any voids in the adhesive film. If any exist, it cannot be corrected by any laminating machine - that part of the material should be discarded.
2. Low pressure on nip rolls → Increase air pressure to nip rolls.
3. Incorrect shim setting → Adjust shim wheel to correct setting.
4. Nip "zero" setting may be incorrect → Check nip setting and adjust if necessary. Refer to **Zeroing the Nip** in the maintenance section.

Process Control Charts

In order to consistently output high quality product, the operator must have a definite starting point on the many process variables. This can be achieved by having the operators document system settings when you have achieved acceptable quality output. The process control chart will allow any operator to set the machine up for a given process. Keep in mind that the system variables may require adjusting as the process is being run, but the chart gives an excellent starting point. Factors such as temperature, humidity, changing film roll diameters all affect the process, therefore, operator technique in running the machine is inevitable. There is a blank process control chart located on page 4-10, copy this page as often as needed for new processes.

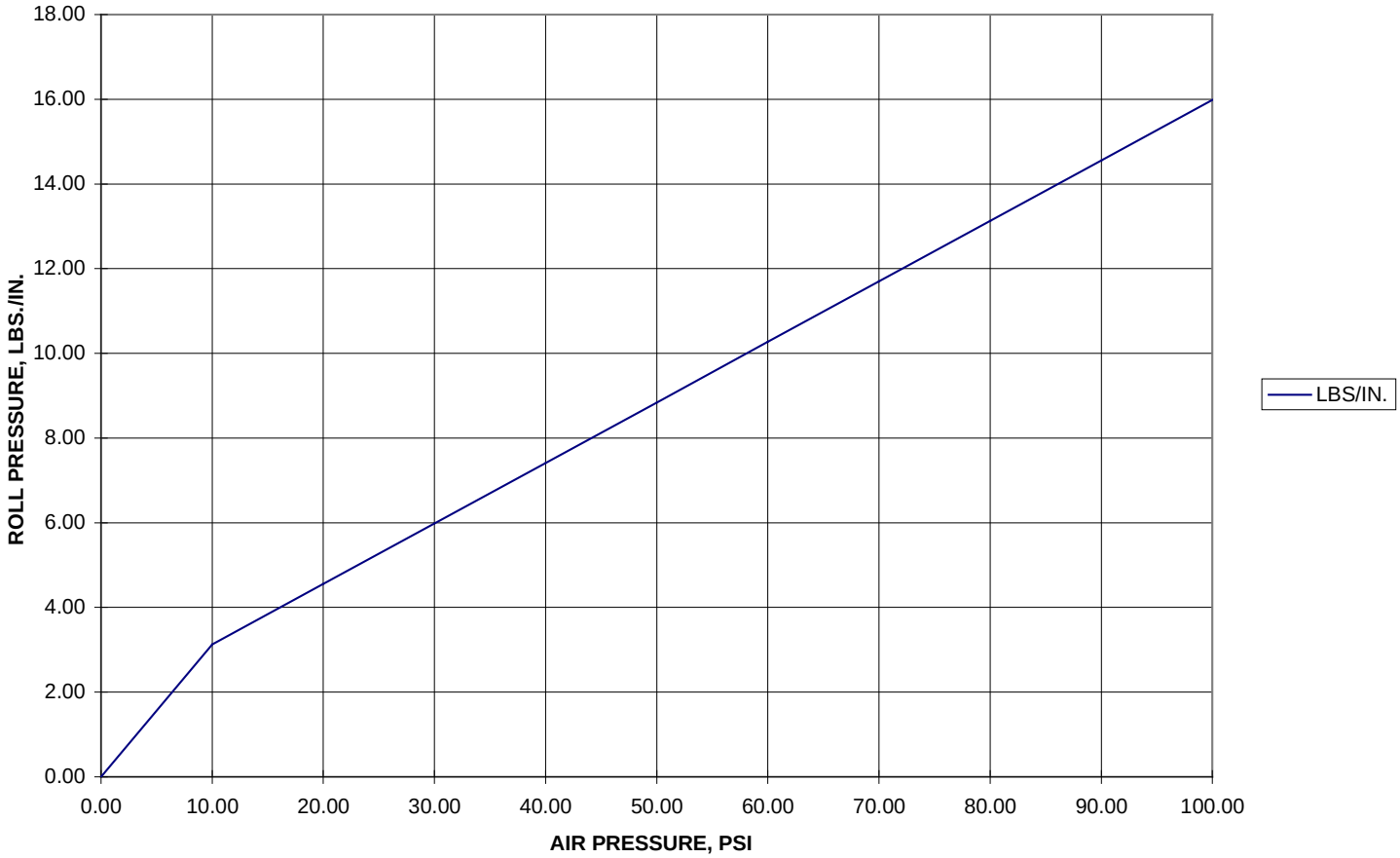
PROCESS CONTROL CHART

Process:_____
Product:_____
Material Top:_____
Material Bottom:_____
Other Material:_____
Date Settings Documented:_____

Front Control Settings	
Speed (Ft/min):	Shim Dial Setting:
Nip Roll Pressure: (PSI)	Pull Roll: Up Down
Top Roll Heater: On Off	Top Temp. Setting: Deg. F
Bottom Roll Heater On Off	Bottom Temp. Setting: Deg. F
Film Station Settings	
Upper Let-off: On Off	Pressure Setting:(PSI)
Upper Windup: On Off	Pressure Setting:(PSI)
Lower Let-off: On Off	Pressure Setting:(PSI)

Other Instructions:_____

AGL4400 LAMINATOR ROLL PRESSURE



Maintenance

As a result of years of experience, refined engineering and construction techniques, very little time need be lost to maintenance. However, regular maintenance will keep your laminator operating at its optimum level.

WARNING ***Removing the enclosure covers to work on machine exposes person to electrocution and moving parts hazard. Only trained service personnel should perform maintenance with any guards or covers removed.***

Nip Roll Section

The most critical adjustment of the nip and pull rolls is the “zero” position. This adjustment makes the top roll parallel to the bottom roll which creates even pressure and pull distribution across the face of the roll. If the rolls are out of adjustment, the machine will not laminate properly. Zeroing the nip is done at the factory before shipment, but should be checked at startup and if laminator is not creating quality output.

Checking the Nip

1. Place two pieces of thin paper (approximately 1.0” wide by 12.0” long) between the upper pressure roll and the lower roll (about 3.0” from each end).
2. Set the shim dial to the “0” setting and put the upper pressure roll in the down position by activating pressure roll valve.
3. Pull gently on both pieces of paper, if both pieces of paper have the same drag, the nip is fine, if the drag is different, follow the procedure below to correct the setting. The pull rolls are adjusted the same as the nip rolls.

Zeroing the Nip

1. Loosen the jam nut on the top of the cylinder rod.
2. Adjust the cylinder stop clockwise to raise the roll and counter clockwise to lower the roll.
3. Check the nip using the 3 steps shown in the **Checking the Nip** section.
4. Once the drag on the pieces of paper has been equalized, turn each cylinder stop ¼ turn and lock the jam nut down on top of it.

Cleaning the Nip Rolls

WARNING ***Cleaning the nip rolls may require the nip rolls to be rotating. Rotate the rolls at a very slow rate to avoid being pulled into the nip section. Do not wear neck ties, loose clothing or hanging jewelry that could be pulled into the nip section.***

The nip rolls should be cleaned as often as necessary, the frequency will vary on the products used and the processes being run. AGL recommends a mild detergent solution or denatured alcohol with a 100% lint free cloth to clean the rolls. Your film manufacturer can recommend solvents that will remove the adhesive from silicone and neoprene rolls without causing damage to the coverings. To facilitate the cleanup process, adhesives should be cleaned from the rolls as soon as possible and while the roll is still warm. A rubber "eraser" has been included in your accessory kit that can be used to clean the adhesive from the warm rolls. Rub the eraser over the adhesive with the rolls turning very slowly. The cloth and alcohol can be used to remove the residue.

CAUTION ***Use of incorrect solvents on your nip and pull rolls can cause irreparable damage to the coverings. Advanced Grieg Laminators,Inc. is not responsible for damage to roll coverings caused by these solvents.***

Roller open and close rate

The rollers must open and close evenly to prevent excessive wear on the cylinders and bearings. This rate is set at the factory, but can be adjusted in the field. Follow the procedure below to adjust the nip rolls.

WARNING ***Maintenance that requires working on the machine while power and air are connected poses and imminent danger of electrocution or extremities being caught in rotating parts. Only qualified personnel should work on a machine in this state***

1. There are flow control fittings on both cylinders, but the fittings on the left hand cylinders will require most of the adjusting.
2. To increase the rate, turn the adjustment screw counter clockwise, to decrease the rate turn the adjustment screw clockwise. The upper fitting controls the “Open” rate, and the lower fitting controls the “Close” rate. Do not rotate the screw more than ½ turn at a time.
3. Adjust the open rate until the rolls open correctly, then proceed with the close rate.
4. Lock the adjustment screw in place with the jam nut. Be careful not to turn the adjustment screw as you tighten the nut.
5. Replace enclosure covers.

Lubrication

The high temp grease that is packed into the nip roll bearings will begin to pass by the seal as the machine is used in high temperature applications. The frequency of high heat processes will determine the frequency of adding grease to the bearings. Inspect the nip roll bearings at least weekly for grease outside the seals, replace the grease as necessary with a high temperature No. 2 consistency bentone-based grease with petroleum oil. Your lubrication vendor can recommend a quality product with this specification. The grease should be added slowly with the shaft turning until a slight bead forms at the seal.

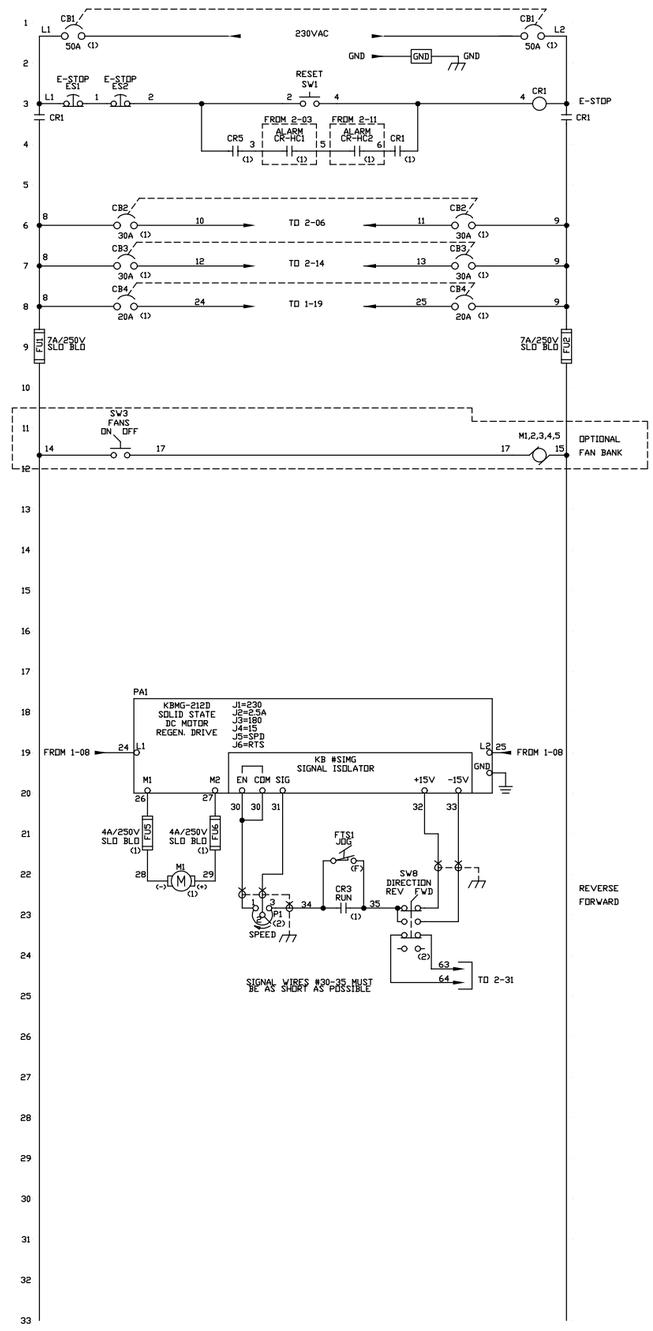
When the bearings are being greased, the bearing gibs should also receive a coating of lithium grease.

The chain should be lubricated as needed with a Lubriplate spray chain lubricant. The tension in the chain should be checked at 6 months and tightened to take up any stretching that may have occurred, and then inspected yearly from that point on. Be careful not to overtighten the chain.

230 VAC 60 HZ
1 PHASE 50A BRANCH
SUPPLY FROM DISCONNECT.
CONSULT LOCAL CODES FOR
APPROPRIATE WIRE SIZE.

NOTE:
GROUND SUBPANELS TO
ENCLOSURES OR TO GROUND
TERMINAL BLOCK

1



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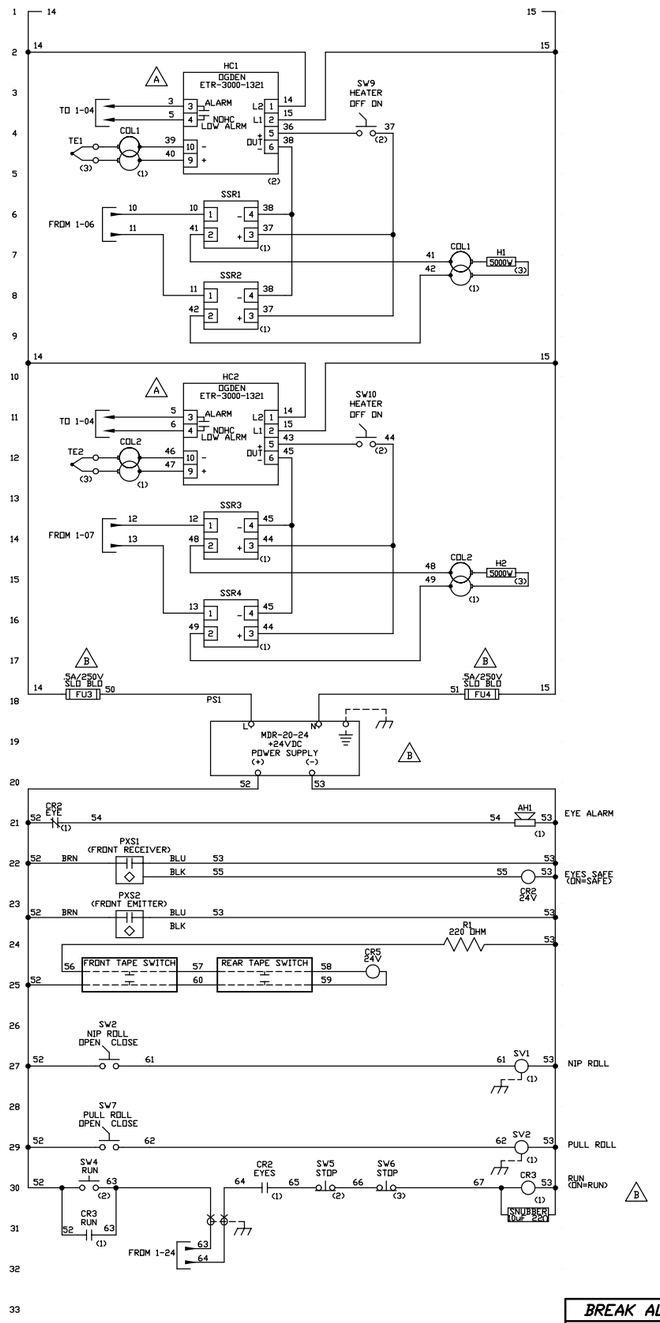


REV NO.	DESCRIPTION	DATE	INT.	ECN
B	CHANGED POWER SUPPLY, FUSES WERE .25A MOVED DRIVE CONTROL TO 24VDC RUNG	1-7-09	GFT	2151
A	CONTROLLER WAS ETR-33200-1321	11-25-08	GFT	

BREAK ALL SHARP EDGES
DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
0.00 +/-0.015
0.000 +/-0.005
ANGLES +/-.5°

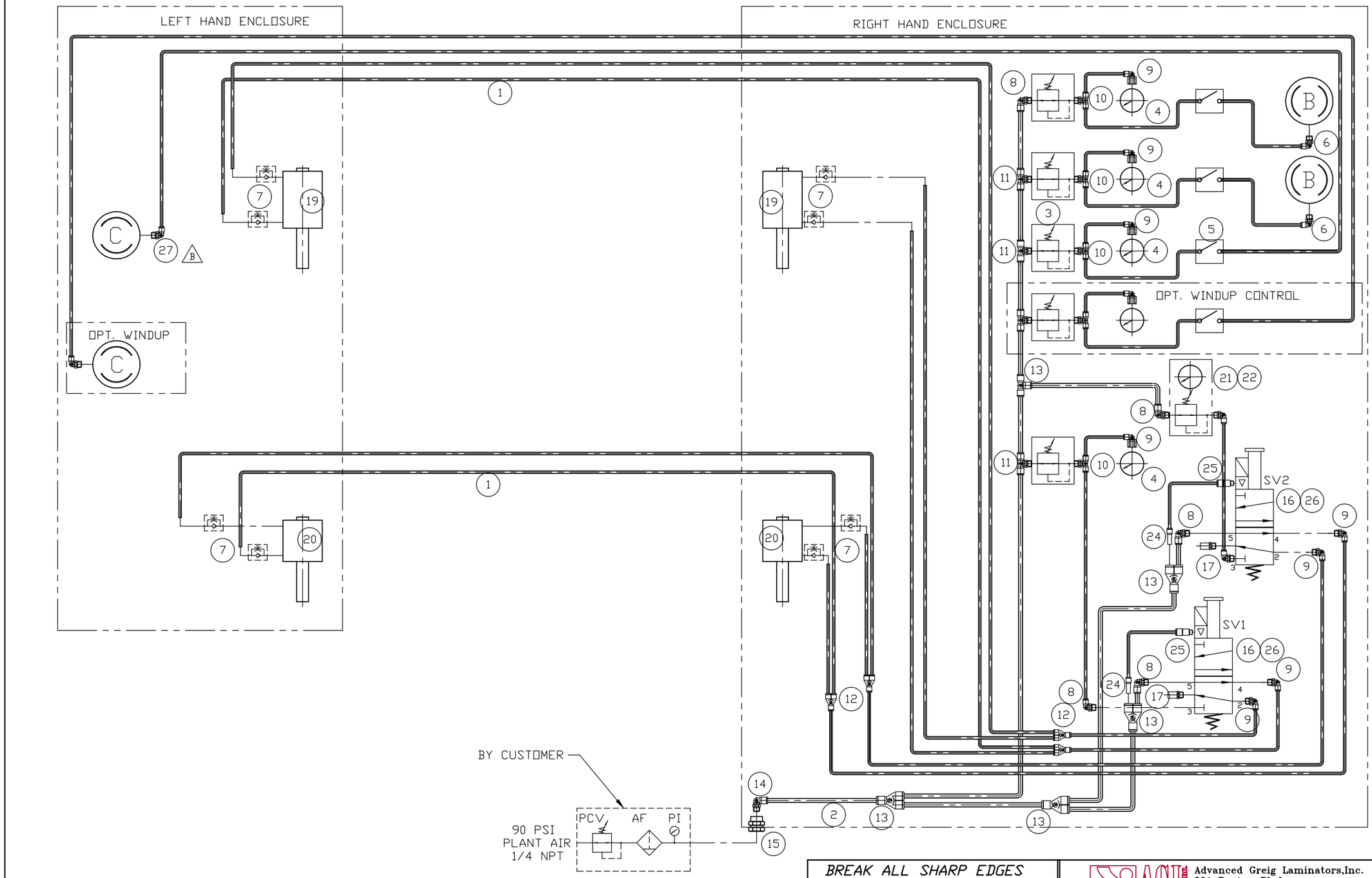
MAT'L:
FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

CONTROL SCHEMATIC AGL4400 (NUMATICS VALVE)

SCALE: N.T.S.
DATE: 5-21-07
DWG. NO. AGL-44-D5178-2
REV. B



REV NO.	DESCRIPTION	DATE	INT.	ECN
B	#27 WAS #6	7-2-07	GFT	
A	REVISED TO NUMATICS VALVE	4-25-07	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L:
AGLK3116-1
AGLK3116-2

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

AGL Inc. Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

PNEUMATIC ASSEMBLY
AGL 4400

SCALE: 1/4 = 1

DATE: 9-10-03

DWG. NO. AGL-44-C3115-1

REV. B

Warranty and Conditions

AGL warrants all models of the laminator's product line manufactured to be free from defects in workmanship and materials for a period of one year with the exception of operator caused damage, or surface abrasions to the laminating rolls, or other obvious caused damage. The warranty period will commence on the date it ships from AGL.

This warranty does not apply to any equipment which after delivery has been subject to abuse, accident or alterations by anyone other than persons authorized by AGL.

Component parts such as controls, motors, heating elements, air cylinders, etc. which are incorporated into the design and manufacture of our laminators are purchased from reputable manufacturers and suppliers and, as such carry their respective warranties. Failure of any components purchased by AGL and incorporated in the laminators carry supplier warranty and to insure proper credit all parts that should fail must be returned freight prepaid for evaluation **LABOR AND ALL RELATED COSTS TO REPLACE THE DEFECTIVE PART WILL BE BORNE ENTIRELY BY THE END USER**. AGL assumes the responsibility of incorporating these various component parts into the fabrication of the laminator and warrants that this will be done in a suitable and workable manner.

AGL offers no warranty for the laminated product and/or process that the machine produces and as such will not be liable for any special, indirect or consequential damages.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE. AGL is not liable for incidental or consequential damage such as, but not limited to, list profits, loss of use of other equipment or increases in operating costs or expenses.

Bill Of Material

Part #: AGL-44-K5181 **Appl #:** **Assy #:** **BOM Rev:** A

Model #: **Rev:** **Rev:** **Date:** 2/20/2003

Description: MASTER BILL OF MATERIALS, AGL4400 (2003)

Item:	Part #:	Description:	Qty:
1	AGL-44-K3124-1	MAIN MACHINE FRAME ASSY, AGL4400	1
2	AGL-44-K3091-1	NIP ROLL ASSEMBLY, AGL4400 (BAUMER EYE)	1
3	AGL-44-K5162	DRIVE ASSEMBLY, AGL4400	1
4	AGL-44-K5172	PULL ROLL ASSEMBLY, AGL4400	1
5	AGL-44-K3093-1	UNWIND ASSEMBLY, AGL4400	1
6	AGL-44-K3100-1	WINDUP ASSEMBLY, AGL4400	1
7	AGL-44-K0397	INFEED TABLE ASSEMBLY, AGL44/AGL4400	1
8	AGL-44-K0390	IDLER ASSY	1
9	AGL-44-K5179-2	ELECTRICAL ASSEMBLY, AGL4400 (NUMATICS VALVE)	1
10	AGL-44-K3116-1	PNEUMATIC ASSEMBLY, AGL4400	1
11	AGL-44-K3660	CHILLER ROLL ASSEMBLY, 4400/44	1
12	AGL-XX-K2660	ACCESSORIES KIT, 44/4400/64 SERIES/6400/6450	1

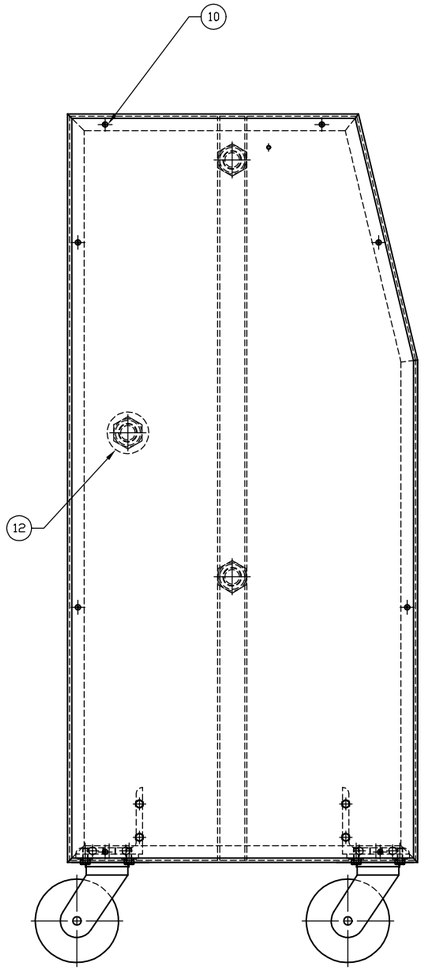
Bill Of Material

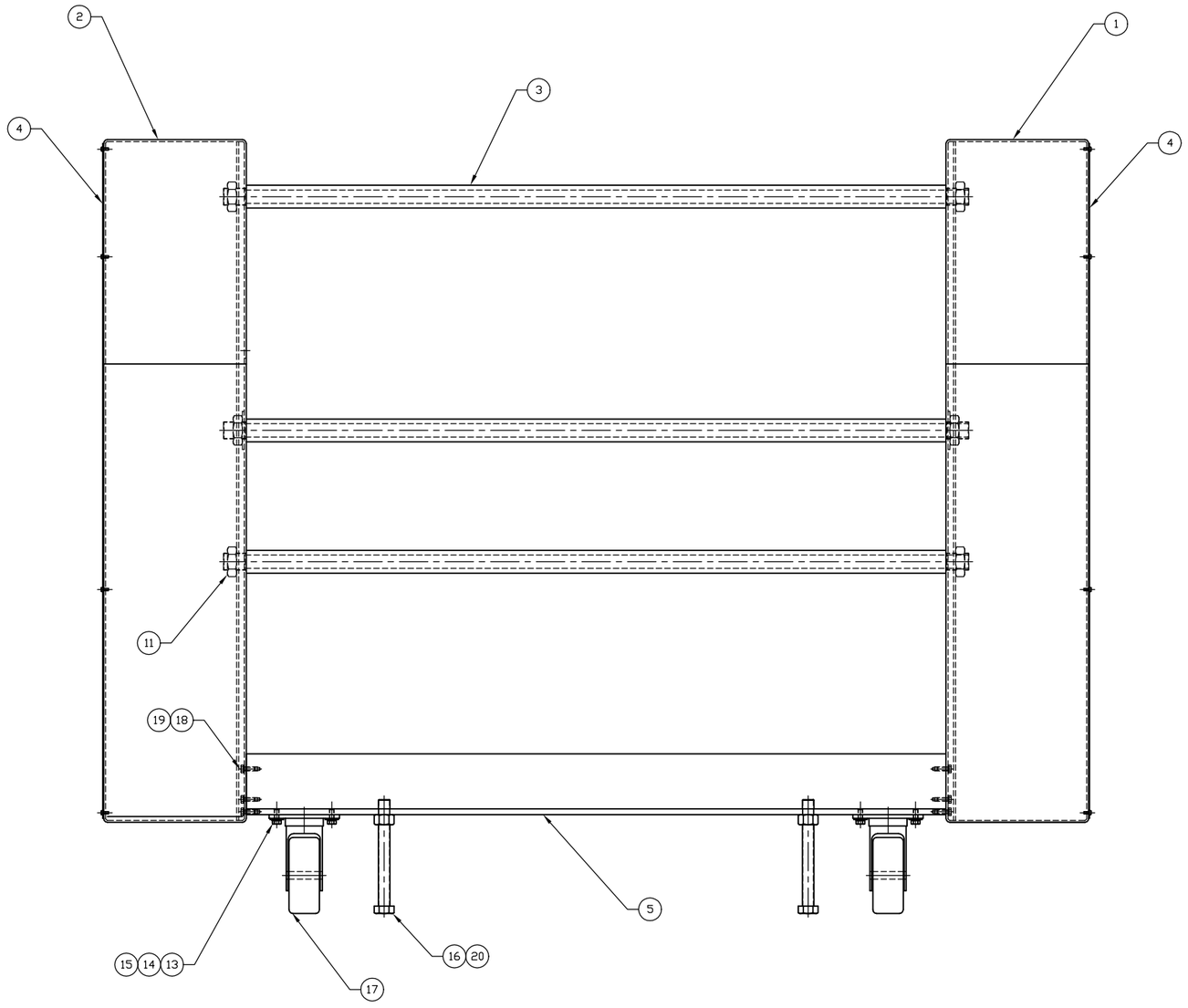
Part #: AGL-44-K3124-1 **Appl #:** **Assy #:** AGLD3123-1 **BOM Rev:** -

Model #: **Rev:** **Rev:** - **Date:** 9/11/2003

Description: MAIN MACHINE FRAME ASSY, AGL4400

Item:	Part #:	Description:	Qty:
1	AGL-44-D3088-1	RH. ENCLOSURE, AGL4400	1
2	AGL-44-D3089-1	LH. ENCLOSURE, AGL4400	1
3	AGL-44-B0449	CROSS TUBE	3
4	AGL-44-B0858-1	GUARD, AGL4400	2
5	AGL-44-B5177	LOWER TIE BAR	2
10	000055-03	BHSCS, #8-32UNC, 3/8 LG, BLACK	16
11	000198-15	NUT, HEX, JAM, 1-1/8-12UNF, ZINC	6
12	000207-16	WASHER, FLAT, SAE, 1-1/8 DIA, 2-1/4 OD, 1-3/16 ID, ZINC	2
13	000340-06	HHCS, 5/16-18UNC, 3/4 LG, ZINC	16
14	000207-07	WASHER, FLAT, SAE, 5/16 DIA, 11/16 OD, 11/32 ID, ZINC	16
15	000493-07	WASHER, LOCK, 5/16 DIA, SPLIT, ZINC	16
16	000358-36	HHCS, 3/4-10UNC,7 LG, ZINC	4
17	001451	CASTER, SWIVEL, 5 DIA 900 LBS.	4
18	001416-08	HHCS, 1/4-20UNC, 1 LG, GD 8, ZINC	16
19	000493-06	WASHER, LOCK, 1/4 DIA, SPLIT, ZINC	16
20	000201-12	NUT, HEX, 3/4-10UNC, ZINC	4





REV NO.	DESCRIPTION	DATE	INT.	ECN

BREAK ALL SHARP EDGES
DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
0.00 +/-0.015
0.000 +/-0.005
ANGLES +/-.5°

MAT'L: AGLK3124-1
FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY.
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

MAIN MACHINE FRAME ASSY AGL4400

SCALE: 1/4 = 1
DATE: 9-11-03
DWG. NO. AGL-44-D3123-1
REV.

Bill Of Material

Part #: AGL-44-K3091-1 **Appl #:** **Assy #:** AGLC3090-1 **BOM Rev:** B

Model #: **Rev:** **Rev:** A **Date:** 1/2/2002

Description: NIP ROLL ASSEMBLY, AGL4400 (BAUMER EYE)

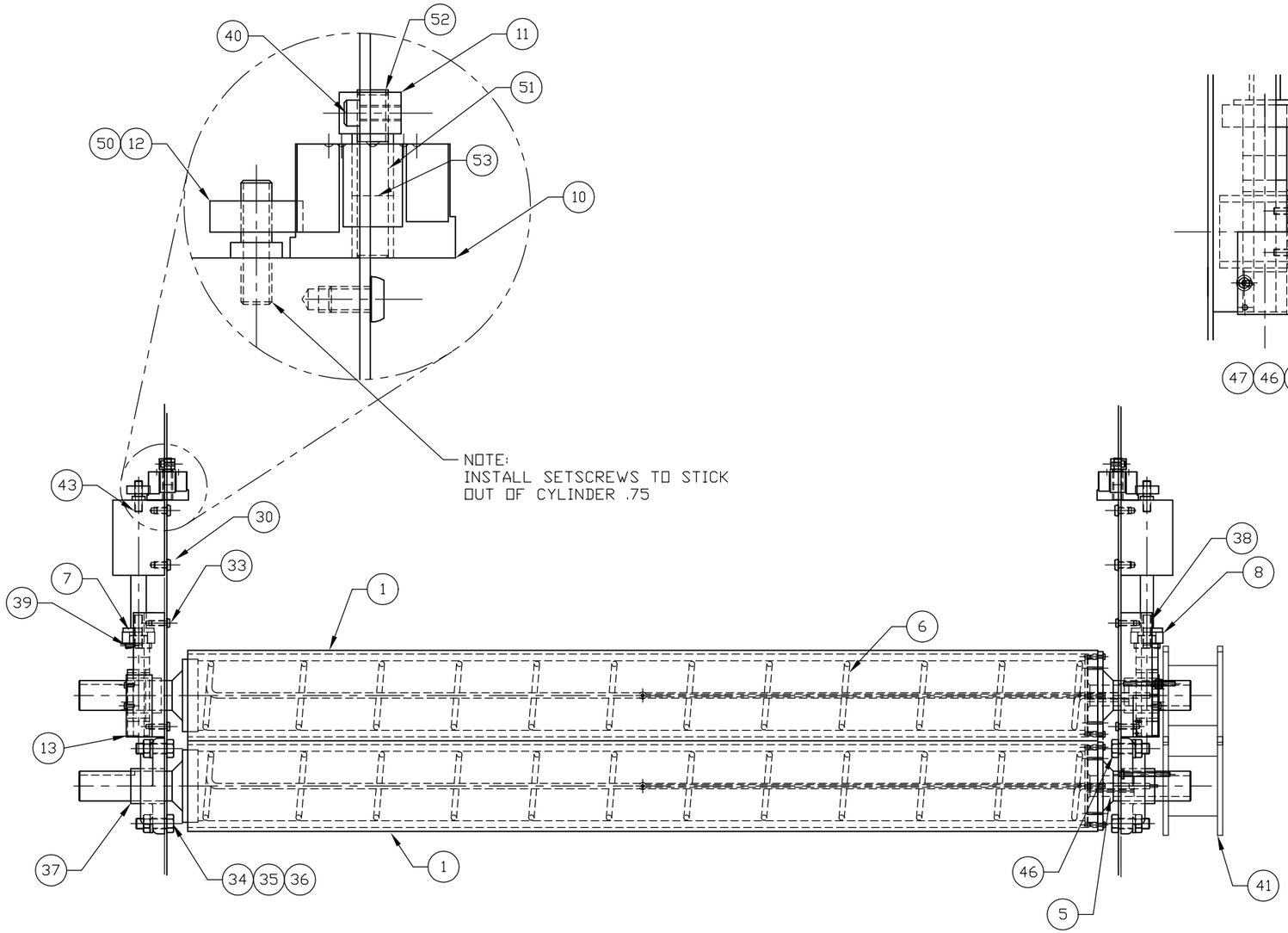
Item:	Part #:	Description:	Qty:
1	AGL-44-C0455	NIP ROLL SUB ASSY	2
2	AGL-44-B0885	BEARING GIB	4
3	AGL-44-B0886	CENTERING COLLAR	2
4	AGL-44-B0954	SLIP RING STOP, AGL 4400	2
5	AGL-44-B0458	JOURNAL PLUG	2
6	AGL-44-B0457	HEATING ELEMENT, AGL44/4400	2
7	AGL-44-B0889	REDUCER	2
8	AGL-44-B0891-1	BEARING MODIFICATION, ALTER AMI #UCST207-23C4HR5	2
9	AGL-44-B0892-1	RH. EYE MTG. BRKT, 4400, SERIES 10	1
10	AGL-64-B0015	SHIM WHEEL	2
11	AGL-44-B3087	SHIM SHAFT SUPPORT, AGL4400	2
12	AGL-64-B0913-1	STOP, CYLINDER, TAPPED	2
13	AGL-44-B0892-2	LH. EYE MTG. BRKT, 4400, SERIES 10	1
30	000061-04	BHSCS, 5/16-18UNC, 1/2 LG, BLACK	8
33	000009-06	SHCS, 1/4-20UNC, 3/4 LG, BLACK	8
34	000349-12	HHCS, 1/2-13UNC, 1-1/2 LG, ZINC	4
35	000493-10	WASHER, LOCK, 1/2 DIA, SPLIT, ZINC	4
36	000195-09	NUT, HEX, JAM, 1/2-13UNC, ZINC	4
37	012108-23	BEARING, FLANGE, 2-BOLT, 1-7/16 DIA BORE, HIGH TEMP	2
38	000161-32	SSS, CUP PT, 3/8-24UNF, 2 LG, BLACK	2
39	000127-08	SSS, CUP PT, #8-32UNC, 1/2 LG, BLACK	2
40	000007-04	SHCS, #10-24UNC, 1/2 LG, BLACK	4
41	012052-02	SLIP RING, 5 POLE, 3@45A, 2@7.5A, 1.44 BORE	2
42	000201-04	NUT, HEX, #10-24UNC, ZINC	3
43	000161-24	SSS, CUP PT, 3/8-24UNF, 1-1/2 LG, BLACK	2
44	000573-06	PHMS, PHILLIPS, #4-40UNC, 3/4 LG, ZINC	2
45	000207-01	WASHER, FLAT, SAE, #4 DIA, 5/16 OD, 1/8 ID, ZINC	2
46	000493-01	WASHER, LOCK, #4 DIA, SPLIT, ZINC	2

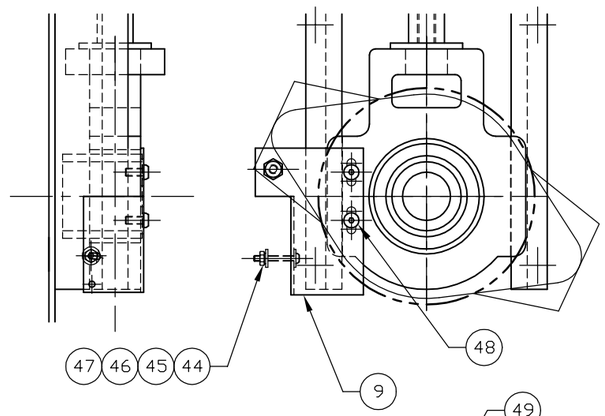
Part #: AGL-44-K3091-1 **Appl #:** **Assy #:** AGLC3090-1 **BOM Rev:** B

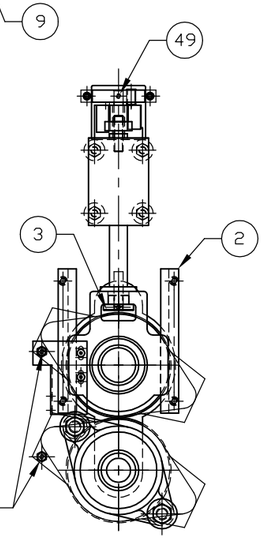
Model #: **Rev:** **Rev:** A **Date:** 1/2/2002

Description: NIP ROLL ASSEMBLY, AGL4400 (BAUMER EYE)

Item:	Part #:	Description:	Qty:
47	000201-01	NUT, HEX, #4-40UNC, ZINC	2
48	000055-03	BHSCS, #8-32UNC, 3/8 LG, BLACK	4
49	000129-04	SSS, CUP PT, #10-24UNC, 1/4 LG, BLACK	2
50	012378-04	SSS, BRASS TIP, 1/4-20UNC, 1/4" LG.	2
51	000289-16	PIN, DOWEL, 3/8 DIA, 2 LG	2
52	001392-15	PLUNGER, SPRING, LEP, 3/8-16UNC, 5/8 LG	2
53	000732-06	BUSHING, BRONZE, 3/8 ID, 1/2 OD, 3/4 LG	4







REV NO.	DESCRIPTION	DATE	INT.	ECN
A	#30 WAS HHCS, #33 WAS SHCS	9-5-03	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK3091-1

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

NIP ROLL ASSY
AGL4400, BAUMER EYE

SCALE: 1/4 = 1

DATE: 1-2-02

DWG. NO. AGL-44-C3090-1

REV. A

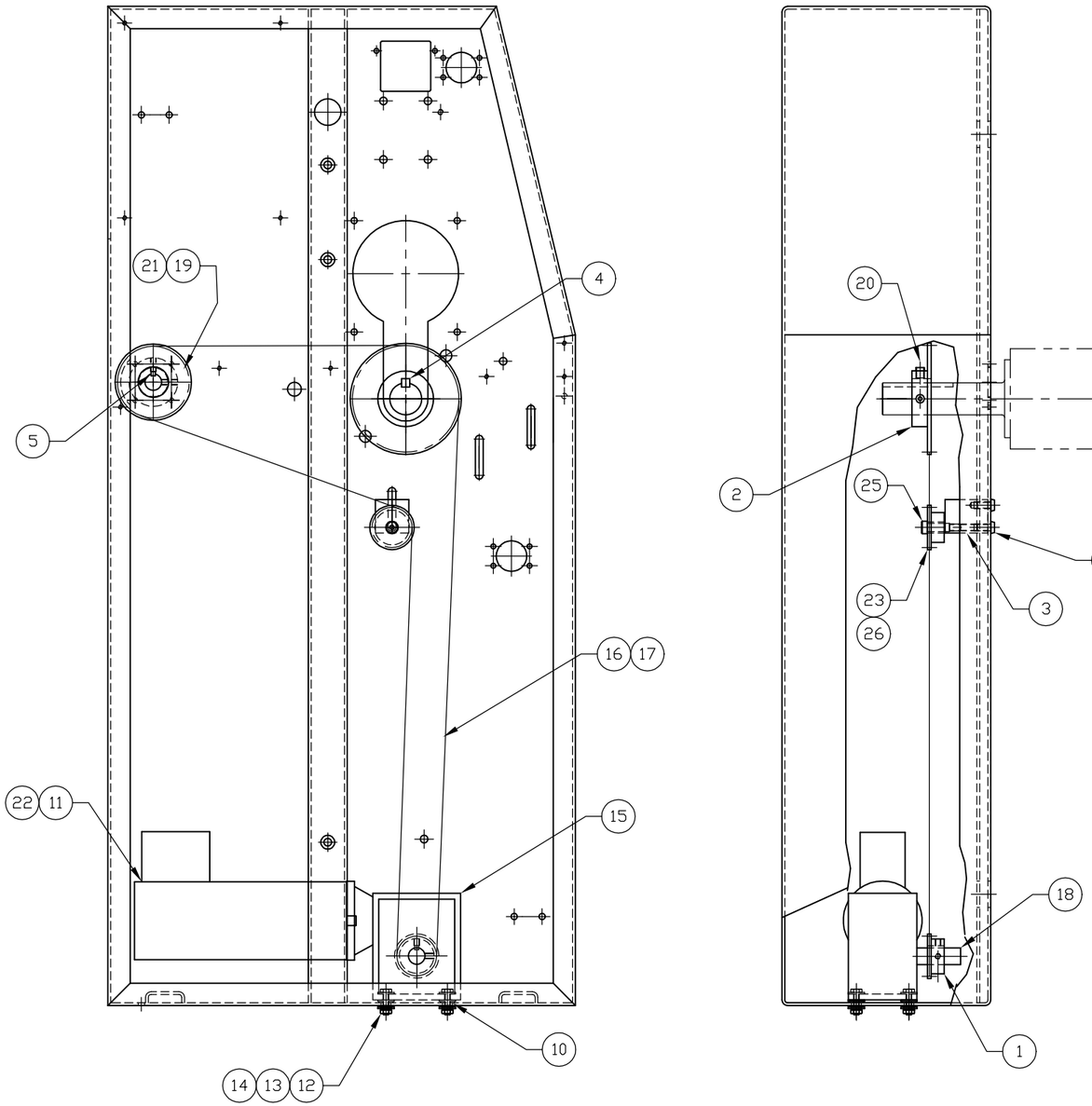
Bill Of Material

Part #: AGL-44-K5162 **Appl #:** **Assy #:** AGLC5163 **BOM Rev:** C

Model #: **Rev:** **Rev:** - **Date:** 9/5/2003

Description: DRIVE ASSEMBLY, AGL4400

Item:	Part #:	Description:	Qty:
1	AGL-XX-B3026	SPROCKET MODIFICATION (ALTER MARTIN #35B15)	1
2	AGL-XX-B3027-1	SPROCKET MODIFICATION (ALTER MARTIN #35B40)	1
3	AGL-XX-B5134	IDLER TENSIONER, 1.93 LG.	1
4	001428-48	KEY, 0.375 SQ, 3.00 LG, CRS	1
5	001317-08	KEY, 0.188 SQ, 1.00 LG, CRS	1
10	001295-03	GROMMET, RUBBER, 1/4 ID, 5/8 OD, 1/8 THICK PANEL, 7/16 HOLE	4
11	002930-01	MOTOR, PMDC, TENV, 1/4 HP, 180VDC, 063B14 FACE	1
12	000337-08	HHCS, 1/4-20UNC, 1 LG, ZINC	4
13	000657-05	NUT, HEX, NYLOCK, JAM, 1/4-20UNC, ZINC	4
14	000207-06	WASHER, FLAT, SAE, 1/4 DIA, 5/8 OD, 9/32 ID, ZINC	12
15	012022-08	GEAR BOX, 50:1, 63B14 FACE, SINGLE LEFT OUTPUT	1
16	012141-210	CHAIN, #35, 210 PITCHES	1
17	001275	CHAIN, #35, CONNECTING LINK	1
18	012022-09	NOW PURCHASED AS PART OF #012022-08	1
19	012154-27	SPROCKET, 3/8 PITCH, .75 DIA BORE, 27 TOOTH	1
20	000135-08	SSS, CUP PT, 3/8-16UNC, 1/2 LG, BLACK	2
21	000131-06	SSS, CUP PT, 1/4-20UNC, 3/8 LG, BLACK	2
22	012442-18	HHCS, M5 x 18mm LG., BLACK	4
23	000912-15	SPROCKET, 3/8 PITCH, 0.50 DIA BORE, 15 TOOTH	1
24	000061-05	BHSCS, 5/16-18UNC, 5/8 LG, BLACK	2
25	000635-08	SHOULDER SCREW, 3/8 DIA, 1 LG (5/16-18UNC)	1
26	000732-06	BUSHING, BRONZE, 3/8 ID, 1/2 OD, 3/4 LG	1



REV NO.	DESCRIPTION	DATE	INT.	ECN

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK5162

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

DRIVE ASSEMBLY

SCALE: 1/4 = 1

DATE: 9-4-03

DWG. NO. AGL-44-C5163

REV.

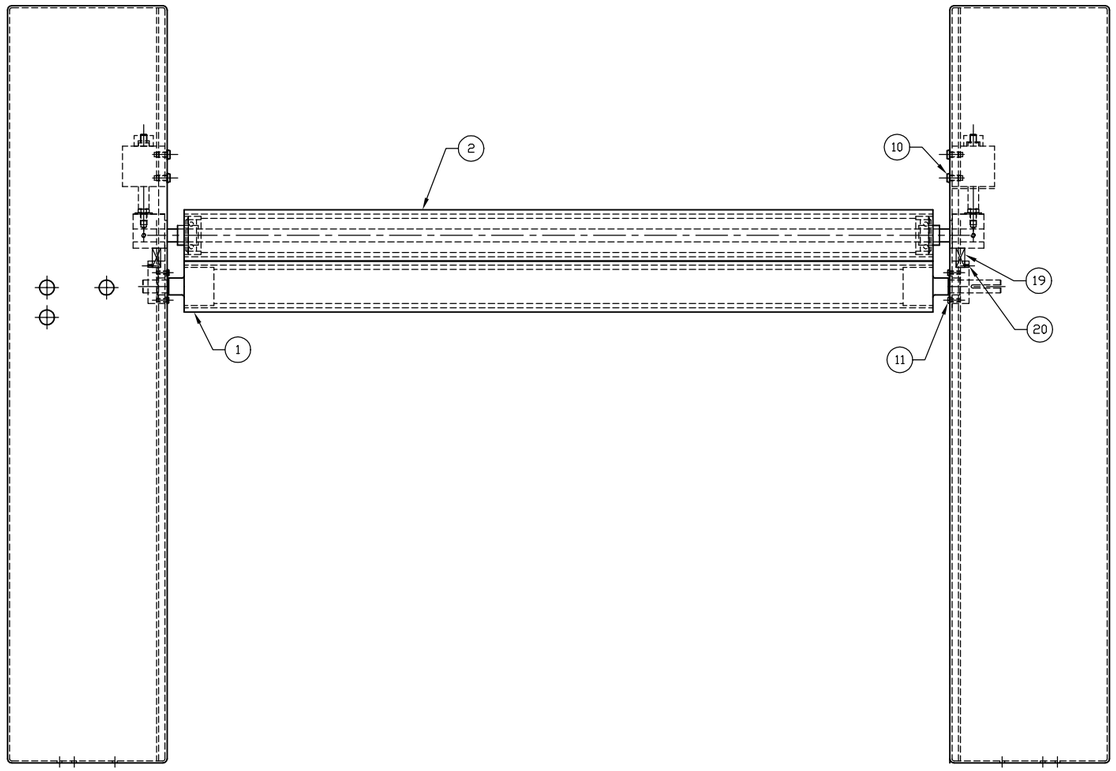
Bill Of Material

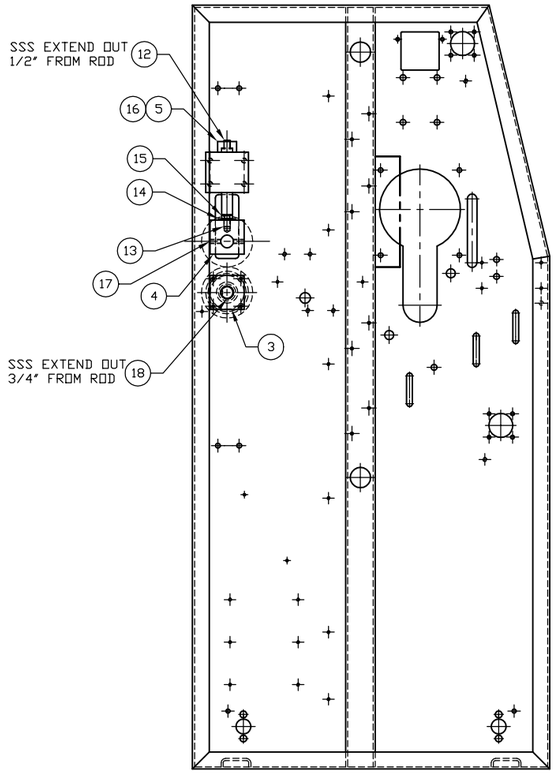
Part #: AGL-44-K5172 **Appl #:** **Assy #:** AGLD5171 **BOM Rev:** -

Model #: **Rev:** **Rev:** - **Date:** 9/10/2003

Description: PULL ROLL ASSEMBLY, AGL4400

Item:	Part #:	Description:	Qty:
1	AGL-44-B0405	LOWER PULL ROLL	1
2	AGL-44-B5173	UPPER PULL ROLL SUB ASSEMBLY, AGL4400	1
3	AGL-44-B0407-1	BUSHING BLOCK	2
4	AGL-XX-B5175	PULL ROLL GUIDE BLOCK	2
5	AGL-44-B2861	CYLINDER STOP, AGL4400 SPECIAL	2
10	000061-04	BHSCS, 5/16-18UNC, 1/2 LG, BLACK	8
11	000057-05	BHSCS, #10-24UNC, 5/8 LG, BLACK	8
12	000161-20	SSS, CUP PT, 3/8-24UNF, 1-1/4 LG, BLACK	2
13	000161-24	SSS, CUP PT, 3/8-24UNF, 1-1/2 LG, BLACK	2
14	000207-08	WASHER, FLAT, SAE, 3/8 DIA, 13/16 OD, 13/32 ID, ZINC	2
15	000198-07	NUT, HEX, JAM, 3/8-24UNF, ZINC	2
16	012378-04	SSS, BRASS TIP, 1/4-20UNC, 1/4" LG.	4
17	000131-12	SSS, CUP PT, 1/4-20UNC, 3/4 LG, BLACK	2
18	000743-05	BUSHING, FLANGE, BRONZE, 3/4 ID, 1 OD, 5/8 LG	2
19	012438-01	SPRING, DIE, LIGHT DUTY, .50 DIA. x 1.50 LG.	2
20	000127-04	SSS, CUP PT, #8-32UNC, 1/4 LG, BLACK	2





REV NO.	DESCRIPTION	DATE	INT.	ECN

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK5172

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

PULL ROLL ASSEMBLY
AGL4400

SCALE: 1/4 = 1

DATE: 9-10-03

DWG. NO. AGL-44-D5171

REV.

Bill Of Material

Part #: AGL-44-K3093-1 **Appl #:** **Assy #:** AGLD3094-1 **BOM Rev:** A
Model #: **Rev:** **Rev:** - **Date:** 9/5/2003
Description: UNWIND ASSEMBLY, AGL4400

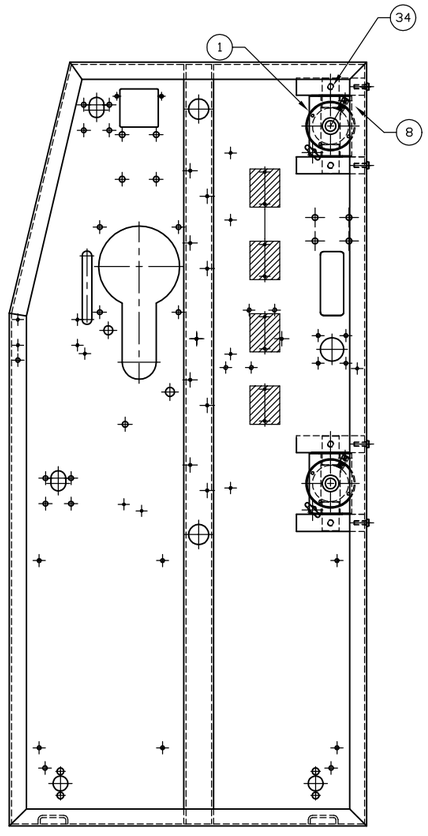
Item:	Part #:	Description:	Qty:
1	AGL-44-B0412-1	BEARING BLOCK	2
2	AGL-44-B3096-1	MAIN BLOCK UNWIND	4
5	AGL-44-B3092-1	UNWIND SHAFT, AGL4400	2
6	AGL-44-B0418	SHAFT SUPPORT, CANTILEVERED LET-OFF	1
7	AGL-44-B0419-1	PIVOT SHAFT	4
8	AGL-44-B0865-1	BRAKE STOP	2
9	001317-04	KEY, 0.188 SQ, 0.50 LG, CRS	2
10	AGL-44-B0420	CORE COLLAR	2
11	AGL-XX-B3095-1	CORE HOLDER ASSEMBLY, 1-1/4 BORE, CLAMP COLLAR, TAPERED CAP	2
12	AGL-44-B0849	SHAFT SUPPORT, UNWIND	1
20	000059-06	BHSCS, 1/4-20UNC, 3/4 LG, BLACK	16
21	012409-20	BEARING, FLANGED, 1.25 ID x 1.41 OD. x 1.25 LG. PAPZ2020P10	4
22	000059-10	BHSCS, 1/4-20UNC, 1-1/4 LG, BLACK	4
23	000207-06	WASHER, FLAT, SAE, 1/4 DIA, 5/8 OD, 9/32 ID, ZINC	4
24	000493-06	WASHER, LOCK, 1/4 DIA, SPLIT, ZINC	4
25	000195-05	NUT, HEX, JAM, 1/4-20UNC, ZINC	4
26	012439-16	BEARING, FLANGED, 1.00 ID x 1.13 OD. x 1.00 LG.	4
27	001378-05	BRAKE, PNEUMATIC, 5/8 BORE	2
28	000035-03	SHCS, #10-32UNF, 3/8 LG, BLACK	2
29	000007-14	SHCS, #10-24UNC, 1-3/4 LG, BLACK	2
30	000201-04	NUT, HEX, #10-24UNC, ZINC	2
31	001400-40	EYEBOLT, WIRE, 1/4-20UNC,5 LG	2
32	000195-05	NUT, HEX, JAM, 1/4-20UNC, ZINC	2
33	012265-06	SSS, NYLON TIPPED, 1/2-13UNC, 3/4 LG. BLACK	1
34	000135-24	SSS, CUP PT, 3/8-16UNC, 1-1/2 LG, BLACK	4
35	000411-20	COLLAR, SHAFT, 1.25 DIA BORE, 1/2 WIDE	2
36	000928-80	RING, RETAINING, EXT, 1-1/4 DIA	2
37	012440-40	BEARING, THRUST, WASHER, 1-1/4 DIA BORE, .03 THICK	2

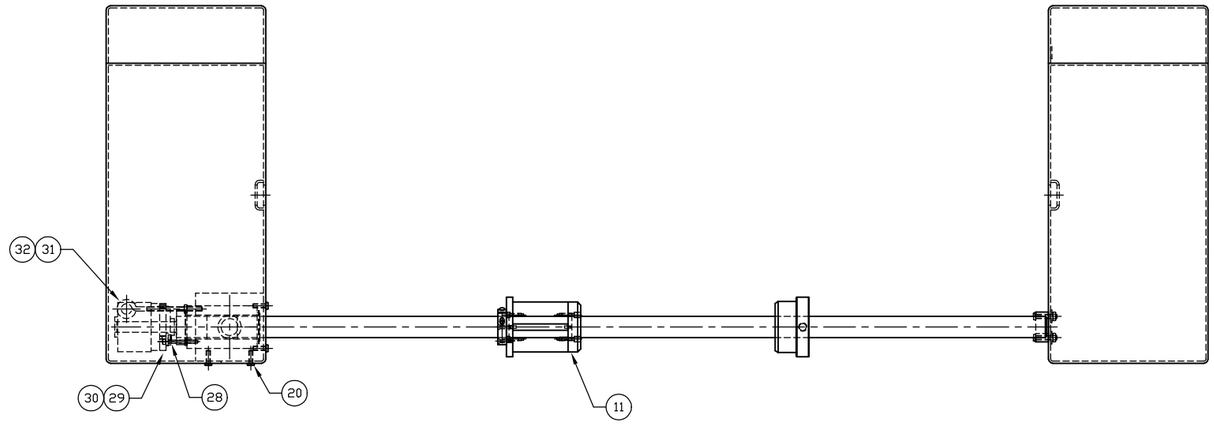
Part #: AGL-44-K3093-1 **Appl #:** **Assy #:** AGLD3094-1 **BOM Rev:** A

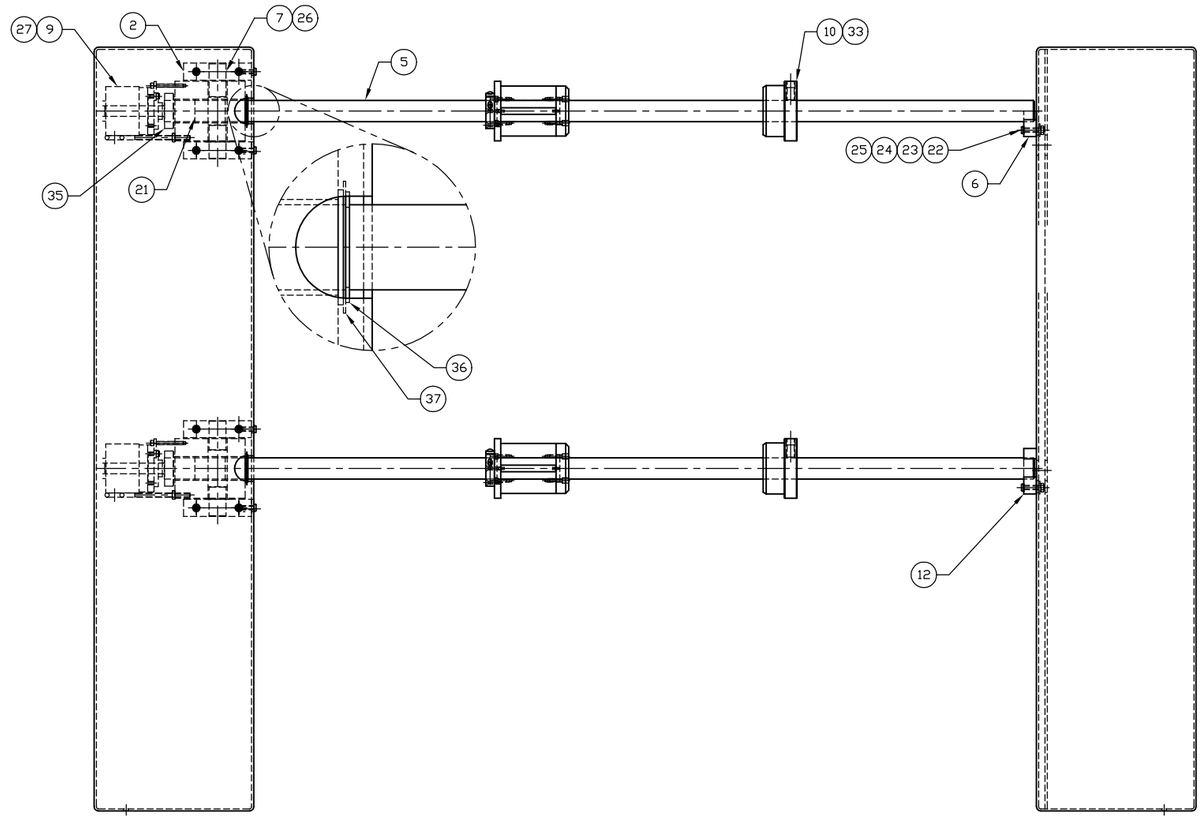
Model #: **Rev:** **Rev:** - **Date:** 9/5/2003

Description: UNWIND ASSEMBLY, AGL4400

Item:	Part #:	Description:	Qty:







REV NO.	DESCRIPTION	DATE	INT.	ECN

BREAK ALL SHARP EDGES
DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
0.00 +/-0.015
0.000 +/-0.005
ANGLES +/-.5°

MAT'L: AGLK3093-1
FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

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DeForest, WI 53532

UNWIND ASSEMBLY
AGL4400

SCALE: 1/4 = 1
DATE: 9-5-03

DWG. NO. AGL-44-D3094-1

REV.

Bill Of Material

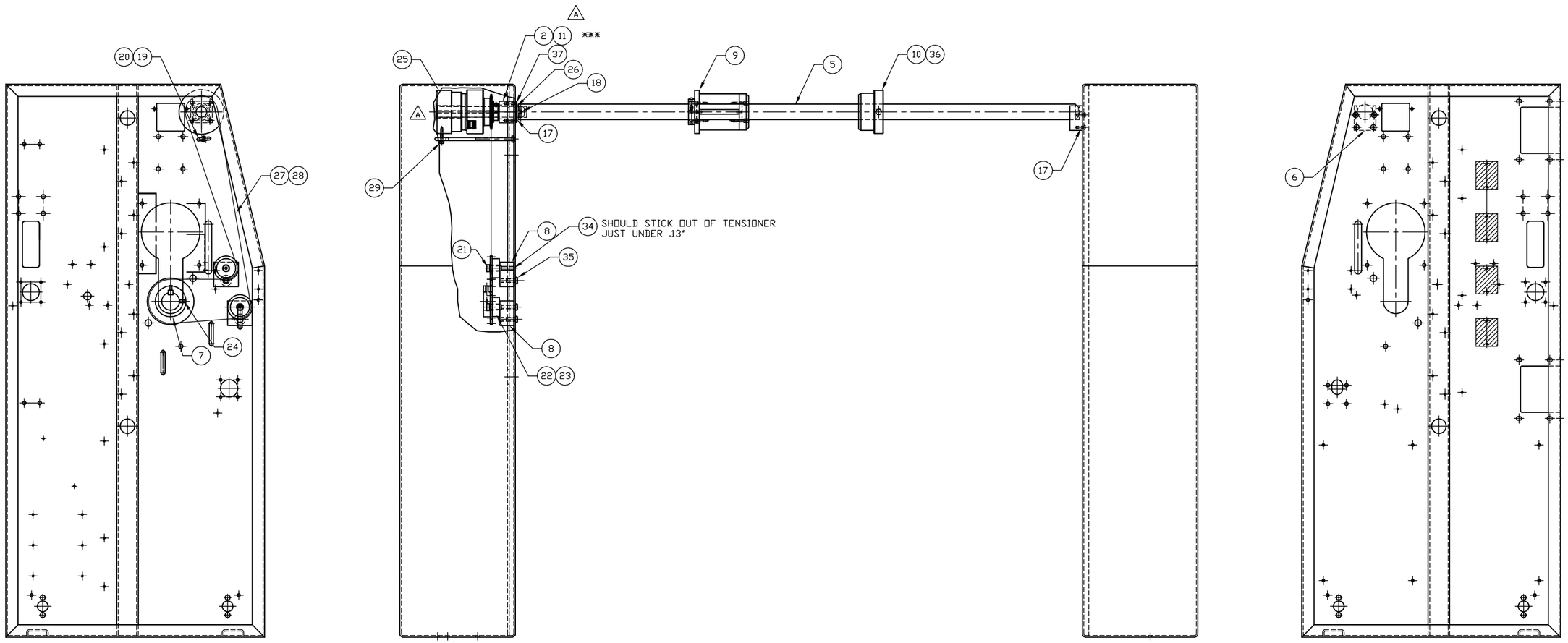
Part #: AGL-44-K3100-1 **Appl #:** **Assy #:** AGLD3099-1 **BOM Rev:** -

Model #: **Rev:** **Rev:** A **Date:** 9/9/2003

Description: WINDUP ASSEMBLY, AGL4400

Item:	Part #:	Description:	Qty:
1	AGL-44-B0872-1	CLUTCH SHAFT	1
2	AGL-44-B0873-1	BEARING BLOCK	1
5	AGL-44-B3101-1	WINDUP SHAFT, AGL4400	1
6	AGL-44-B0436-1	SUPPORT, WINDUP SHAFT	1
7	AGL-44-B0876-1	NIP ROLL SPROCKET MOD. (ALTER MARTIN #35B30, 1/2" BORE)	1
8	AGL-XX-B5166	IDLER TENSIONER, 1.13	2
9	AGL-XX-B3095-1	CORE HOLDER ASSEMBLY, 1-1/4 BORE, CLAMP COLLAR, TAPERED CAP	1
10	AGL-44-B0420	CORE COLLAR	1
11	AGL-XX-B5168	BUSHING MOD. (ALTER BOSTON #FB1418-12)	1
17	000057-05	BHSCS, #10-24UNC, 5/8 LG, BLACK	8
18	000283-10	PIN, DOWEL, 3/16 DIA, 1-1/4 LG	1
19	001400-48	EYEBOLT, WIRE, 1/4-20UNC, 6 LG	1
20	000195-05	NUT, HEX, JAM, 1/4-20UNC, ZINC	1
21	000635-08	SHOULDER SCREW, 3/8 DIA, 1 LG (5/16-18UNC)	2
22	000912-15	SPROCKET, 3/8 PITCH, 0.50 DIA BORE, 15 TOOTH	2
23	000732-06	BUSHING, BRONZE, 3/8 ID, 1/2 OD, 3/4 LG	2
24	000131-06	SSS, CUP PT, 1/4-20UNC, 3/8 LG, BLACK	2
25	001377-07	CLUTCH, PNEUMATIC, 35A22 INPUT, 7/8 BORE	1
26	000928-56	RING, RETAINING, EXT. 7/8	1
27	012141-139	CHAIN, #35, 139 PITCHES	1
28	001275	CHAIN, #35, CONNECTING LINK	1
29	000035-08	SHCS, #10-32UNF, 1 LG, BLACK	1
34	000133-06	SSS, CUP PT, 5/16-18UNC, 3/8 LG, BLACK	1
35	000061-08	BHSCS, 5/16-18UNC, 1 LG, BLACK	3
36	012265-06	SSS, NYLON TIPPED, 1/2-13UNC, 3/4 LG. BLACK	1
37	000777-14	BEARING, THRUST, WASHER, 7/8 DIA BORE, .03 THICK	1

*** INSTALLATION NOTE:
BUSHING IS PRESSED IN FROM TAPPED SIDE
FLANGE SHOULD STICK THROUGH ENCLOSURE



REV NO.	DESCRIPTION	DATE	INT.	ECN
B	REVISED CLUTCH TO MACHIII STANDARD	4-9-07	GFT	
A	#11 WAS MISNUMBERED AS #29	7-18-06	GFT	

BREAK ALL SHARP EDGES
DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
0.00 +/-0.015
0.000 +/-0.005
ANGLES +/-.5°

MAT'L: AGLK3100-1
FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

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WINUP ASSEMBLY
AGL4400

SCALE: 1/4 = 1
DATE: 9-9-03
DWG. NO. AGL-44-D3099-1
REV. B

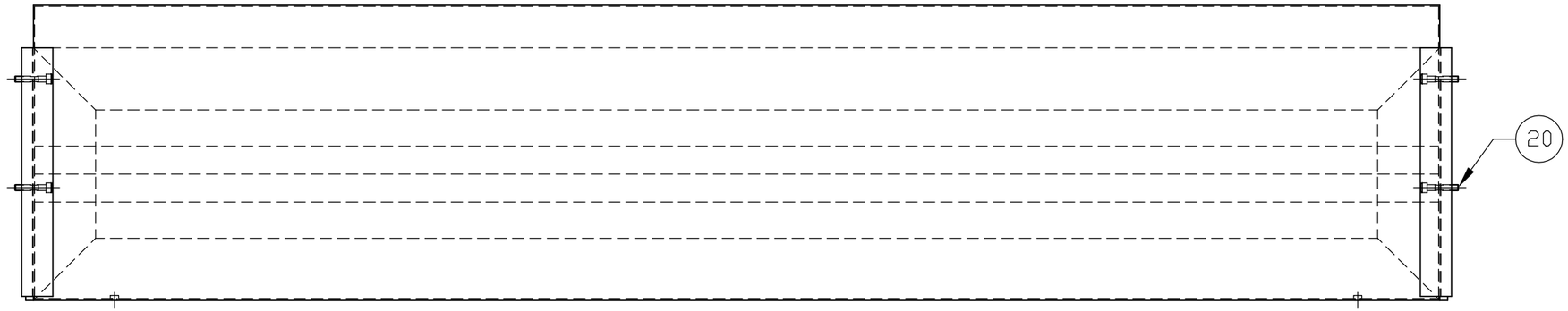
Bill Of Material

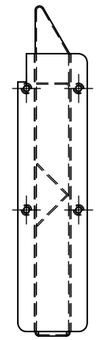
Part #: AGL-44-K0397 **Appl #:** **Assy #:** AGLB0396 **BOM Rev:** -

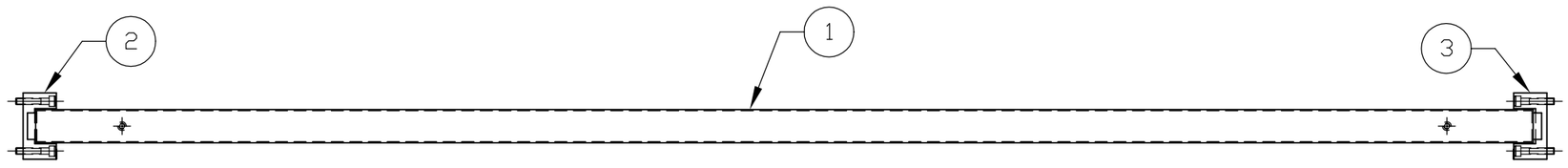
Model #: **Rev:** **Rev:** A **Date:** 10/31/1997

Description: INFEED TABLE ASSEMBLY, AGL44/AGL4400

Item:	Part #:	Description:	Qty:
1	AGL-44-B0398	INFEED TABLE	1
2	AGL-44-B0880	TABLE SUPPORT, LH.	1
3	AGL-44-B0881	TABLE SUPPORT, RH.	1
20	000035-08	SHCS, #10-32UNF, 1 LG, BLACK	8







REV NO.	DESCRIPTION	DATE	INT.	ECN
A	REVISED TO USE AGL 4400 TABLE SUPPORTS	2-11-98	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK0397

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

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INFEED TABLE ASSEMBLY AGL44/4400

SCALE: 1/4 = 1

DATE: 11-1-97

DWG. NO. AGL-44-B0396

REV. A

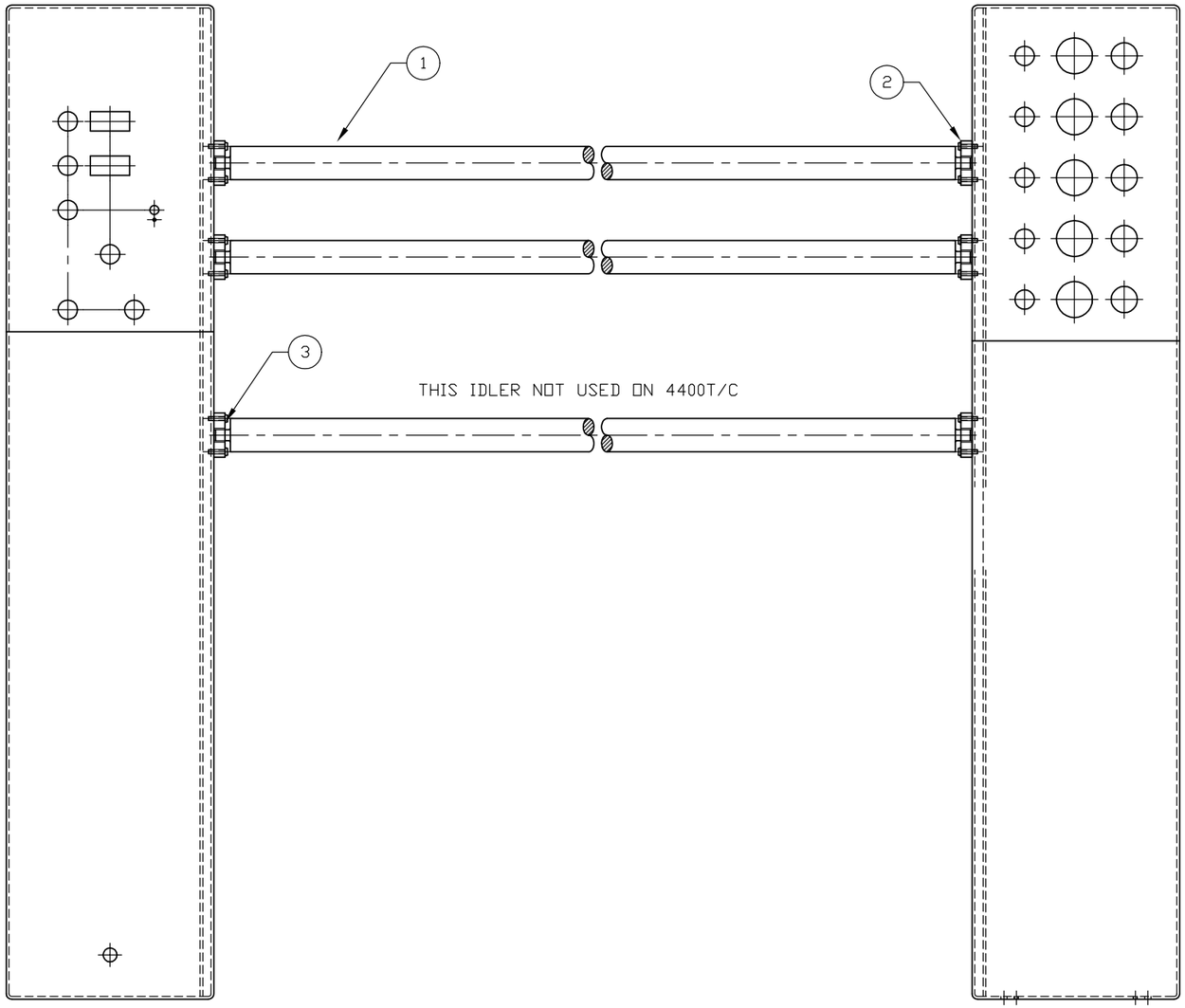
Bill Of Material

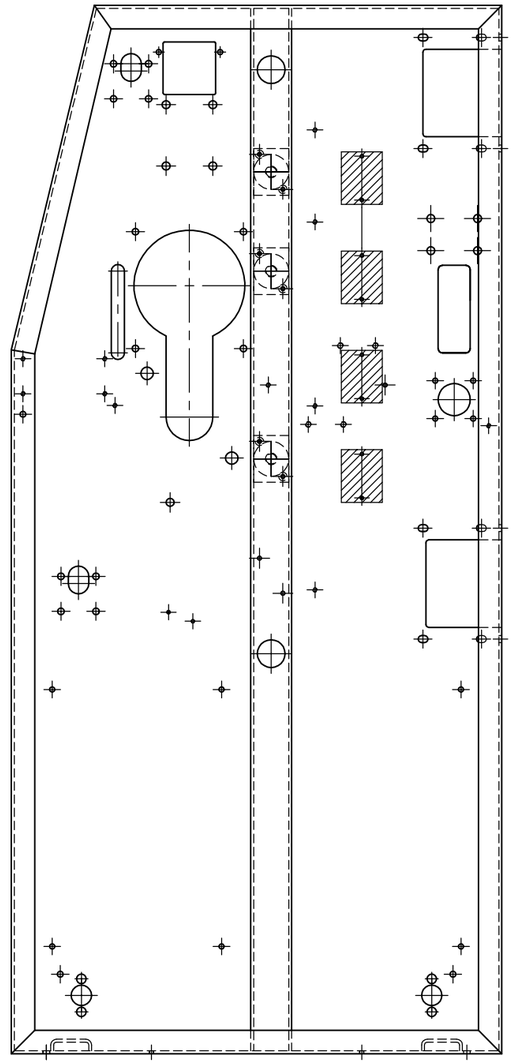
Part #: AGL-44-K0390 **Appl #:** **Assy #:** AGLC0384 **BOM Rev:** -

Model #: **Rev:** **Rev:** C **Date:** 4/3/1998

Description: IDLER ASSY

Item:	Part #:	Description:	Qty:
1	AGL-44-B0391	IDLER SHAFT	3
2	AGL-44-B0395	IDLER BLOCK	6
5	000071-06	BHSCS, #10-32UNF, 3/4 LG, BLACK	12





REV NO.	DESCRIPTION	DATE	INT.	ECN
C	REVISED TO SHOW NEW ENCLOSURES	9-5-03	GFT	
B	REVISED AND REDRAWN	1-3-02	GFT	
A	MADE ALL IDLER NON REMOVABLE	2-9-98	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK0390

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

IDLER ASSEMBLY
AGL4400

SCALE: 1/4 = 1

DATE: 11-25-96

DWG. NO. AGL-44-C0384

REV. C

Bill Of Material

Part #: AGL-44-K5179-2 **Appl #:** **Assy #:** **BOM Rev:** B

Model #: **Rev:** **Rev:** **Date:** 4/25/2007

Description: ELECTRICAL ASSEMBLY, AGL4400 (NUMATICS VALVE)

Item:	Part #:	Description:	Qty:
0	AGL-44-D5178-2	CONTROL SCHEMATIC, AGL4400 (NUMATICS VALVES)	1
1	AGL-44-A2432	TERMINAL MARKERS, AGL4400 & 44 SERIES	1
2	AGL-44-C5647	SUBPANEL ASSEMBLY	1
4	AGL-44-B5180	SUBPANEL, AGL4400	1
6	002326-02	SWITCH, KNOB, 2 POS, 2NO, 2NC	1
8	012142-01	KNOB, FLUTED, 1.06 DIA., 1/4 DIA. SHAFT	1
9	002318-02	SWITCH, PUSHBUTTON, FLUSH, 1NO, BLACK	2
10	002506	SWITCH ASSY, PUSHBUTTON, E-STOP	2
11	001998-03	CONTROLLER, MOTOR, 240V INPUT, 90 or 180VDC OUTPUT	1
12	001625-07	CONTROLLER, TEMP W/ ALARM	2
13	001623-50	RELAY, 50A, 240V, 1-PHASE	4
14	002728-01	EMITTER, SERIES 10	1
15	002427-04	SWITCH, FOOT, SPDT, MTD. IN GUARD, 16' CABLE	1
16	002337-06	SOCKET, RELAY, 5-PIN, DIN RAIL MTG	1
17	002337-01	SOCKET, RELAY, 11-PIN, DIN RAIL MTG, FINGER SAFE	2
18	002974-01	RELAY, MIDGET, 3PDT, 24VDC	2
19	002339-02	CLIP, HOLD-DOWN, RELAY SOCKET	2
20	001569-050	CIRCUIT BREAKER, CLASS 720, 2 POLE, 240V, 50A	1
21	000055-03	BHSCS, #8-32UNC, 3/8 LG, BLACK	8
22	002099-10	LABEL, .50 x 1.50, VINYL, SELF LAMINATING	150
23	001883-05	TERMINAL BLOCK, 35MM, 10-26 AWG, GRAY, UK5N 12K5521	25
24	001879-01	DIN RAIL, 35MM WIDE, 7.5MM HIGH, 2 MT LG, NS35/7.5	12
25	000716-00	WIRE, STRANDED, 16 AWG, BLACK	20
26	000719-00	WIRE, STRANDED, 10 AWG, BLACK	30
27	002324-01	SWITCH, KNOB, 2 POS, 1NO	4
28	001153-05	CORD GRIP, BELL-MOUTH, BLACK, 5/8" MTG HOLE	1
29	002318-06	SWITCH, PUSHBUTTON, FLUSH, 1NC, RED	2
30	001089-01	CABLE TIE, NYLON, WHITE, 4" LG	50

Part #: AGL-44-K5179-2 **Appl #:** **Assy #:** **BOM Rev:** B

Model #: **Rev:** **Rev:** **Date:** 4/25/2007

Description: ELECTRICAL ASSEMBLY, AGL4400 (NUMATICS VALVE)

Item:	Part #:	Description:	Qty:
31	001090-01	CABLE TIE, MOUNT, ADHESIVE-BACKED, 3/4" SQ	50
32	001876-10	TERMINAL BLOCK, GND, 35MM, 8-20 AWG, USLKG10 29C3451	5
33	002544-02	WIRE, THERMOCOUPLE, TYPE J, #20AWG,SHIELDED, 1000 FT ROLL	30
34	002728-02	RECEIVER, SERIES 10	1
35	000720-00	WIRE, STRANDED, MTW, 6 AWG, BLACK	16
36	001352-06	STANDOFF, HEX, M/F, #10-32UNC, 3/4 LG, AL	6
37	001089-02	CABLE TIE, NYLON, WHITE, 5.5" LG	15
38	001090-02	CABLE TIE, MOUNT, ADHESIVE-BACKED, 1" SQ	15
39	001875-01	FUSE HOLDER, TERMINAL BLOCK, 35MM MTG, (NOW INCLUDES 001881-01)	6
40	001211-03	NUT, K-LOCK, #8-32UNC, ZINC	4
42	001530-070	FUSE, SLO-BLO, 7.0A, 250V, 1/4X1-1/4"	2
43	001530-005	FUSE, SLO-BLO, 1/2A, 250V, 1/4X1-1/4"	2
44	001530-040	FUSE, SLO-BLO, 4.0A, 250V, 1/4X1-1/4"	2
45	001569-030	CIRCUIT BREAKER, CLASS 720, 2 POLE, 240V, 30A	2
46	002507-04	END COVER, TERMINAL BLOCK, D-UK4/10	2
47	000071-03	BHSCS, #10-32UNF, 3/8 LG, BLACK	8
48	002448-02	CORD GRIP, LIQUID-TIGHT, 1" NPT, 0.71-0.98 DIA, BLK	1
49	002728-03	CABLE, SERIES 10, 2M LG.	2
50	001503-03	TERMINAL, FEMALE, INSULATED, w/INSUL GRIP, 12-10 AWG	8
51	001503-02	TERMINAL, FEMALE, INSULATED, w/INSUL GRIP, 16-14 AWG	9
52	001509-08	TERMINAL, RING, INSULATED, BRAZED SEAM, 12-10 AWG, #10 STUD	12
53	001509-07	TERMINAL, RING, INSULATED, BRAZED SEAM, 16-14 AWG, #6 STUD	12
55	000581-03	PHMS, PHILLIPS, #10-32UNF, 3/8 LG, ZINC	20
57	002852-55	CONTACTOR, 3 POLE, 55 AMP, 240V	1
58	000059-04	BHSCS, 1/4-20UNC, 1/2 LG, BLACK	4
59	000057-03	BHSCS, #10-24UNC, 3/8 LG, BLACK	12
60	001022-08	SPIRAL WRAP, 1/2", CLEAR	8
61	002433	SPIRAL WRAP, 1/4 DIA, NATURAL	8
62	001826-11	POWER SUPPLY, SINGLE, 24VDC, 1.0A	1

Part #: AGL-44-K5179-2 **Appl #:** **Assy #:** **BOM Rev:** B

Model #: **Rev:** **Rev:** **Date:** 4/25/2007

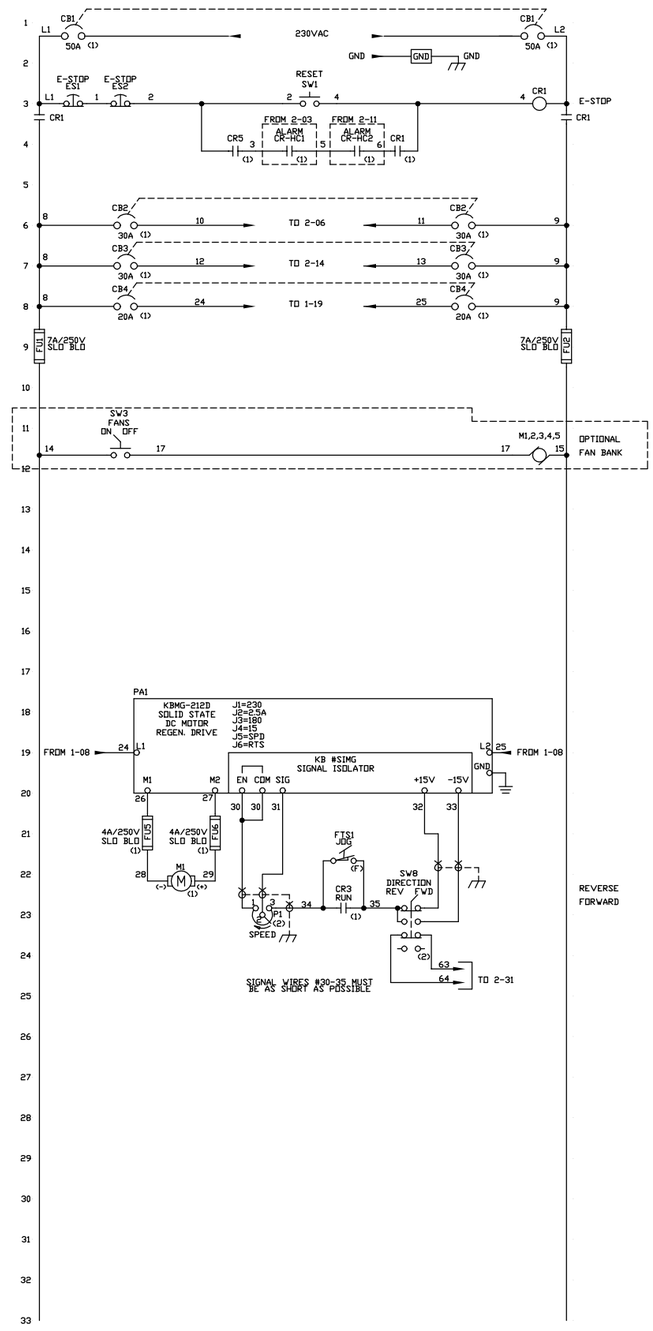
Description: ELECTRICAL ASSEMBLY, AGL4400 (NUMATICS VALVE)

Item:	Part #:	Description:	Qty:
63	002511-01	ALARM, PANEL MTG, 3-28VDC	1
64	001966	LUG, GROUNDING, 1/0-14AWG	1
65	002974-02	RELAY, MIDGET, 1PDT, 24VDC	1
66	001569-020	CIRCUIT BREAKER, CLASS 720, 2 POLE, 240V, 20A	1
68	001731-03	CABLE, 3 x 20 AWG, SHIELDED	4
69	000719-24	WIRE, STRANDED, 10 AWG, GREEN/YELLOW	6
70	002523-06	FERRULE, INSULATED, 6AWG, STD LENGTH, GREEN	10
71	002523-05	FERRULE, INSULATED, 10AWG, STD LENGTH, BLACK	12
72	002523-10	FERRULE, INSULATED, 12AWG, STD LENGTH, GRAY	2
73	002523-02	FERRULE, INSULATED, 14AWG, STD LENGTH, BLUE	2
75	002951	SIGNAL ISOLATOR	1
76	002512-01	LEGEND, HIGH VOLTAGE	2
77	002512-03	LEGEND, DO NOT OPERATE WITHOUT GUARDS IN PLACE	2
78	002512-04	LEGEND, CAUTION HOT	2
79	002512-05	LEGEND, DANGER PINCH POINT	4
80	002727-01	CONNECTOR, 90 DEG. FLAG DISCONNECT 16-14AWG	2
81	002727-02	CONNECTOR, 90 DEG. FLAG DISCONNECT 12-10AWG	2
82	006004-45	RIBBON SWITCH, 4' LEADS, 4 WIRE, YELLOW, 45" LG.	2
83	002345-221	RESISTOR, METAL-FILM, 1%, 1/4W, 221 OHM	1
84	002492-022	SUPPRESSOR, ARC, TYPE QC, 22 OHM	1
85	012393	DOUBLE SIDED TAPE	90
86	002893-02	END BARRIER, FUSE BLOCK	1
87	002955-01	WIRE DUCT, 1 x 1-1/2, WHITE	56
88	002955-02	WIRE DUCT, 1 x 2-1/4, WHITE	84

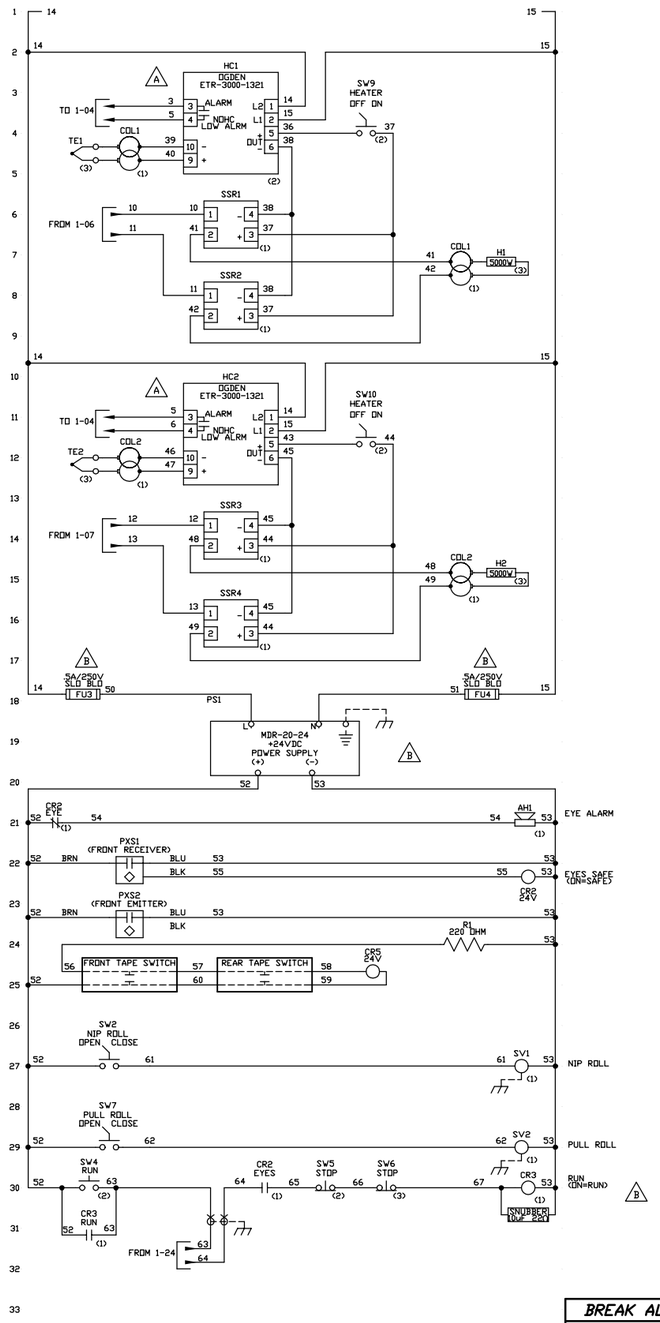
230 VAC 60 HZ
1 PHASE 50A BRANCH
SUPPLY FROM DISCONNECT.
CONSULT LOCAL CODES FOR
APPROPRIATE WIRE SIZE.

NOTE:
GROUND SUBPANELS TO
ENCLOSURES OR TO GROUND
TERMINAL BLOCK

1



2



REV NO.	DESCRIPTION	DATE	INT.	ECN
B	CHANGED POWER SUPPLY, FUSES WERE .25A MOVED DRIVE CONTROL TO 24VDC RUNG	1-7-09	GFT	2151
A	CONTROLLER WAS ETR-33200-1321	11-25-08	GFT	

BREAK ALL SHARP EDGES
DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED
0.00 +/-0.015
0.000 +/-0.005
ANGLES +/-.5°

MAT'L:
FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

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DeForest, WI 53532

CONTROL SCHEMATIC AGL4400 (NUMATICS VALVE)

SCALE: N.T.S.
DATE: 5-21-07
DWG. NO. AGL-44-D5178-2
REV. B

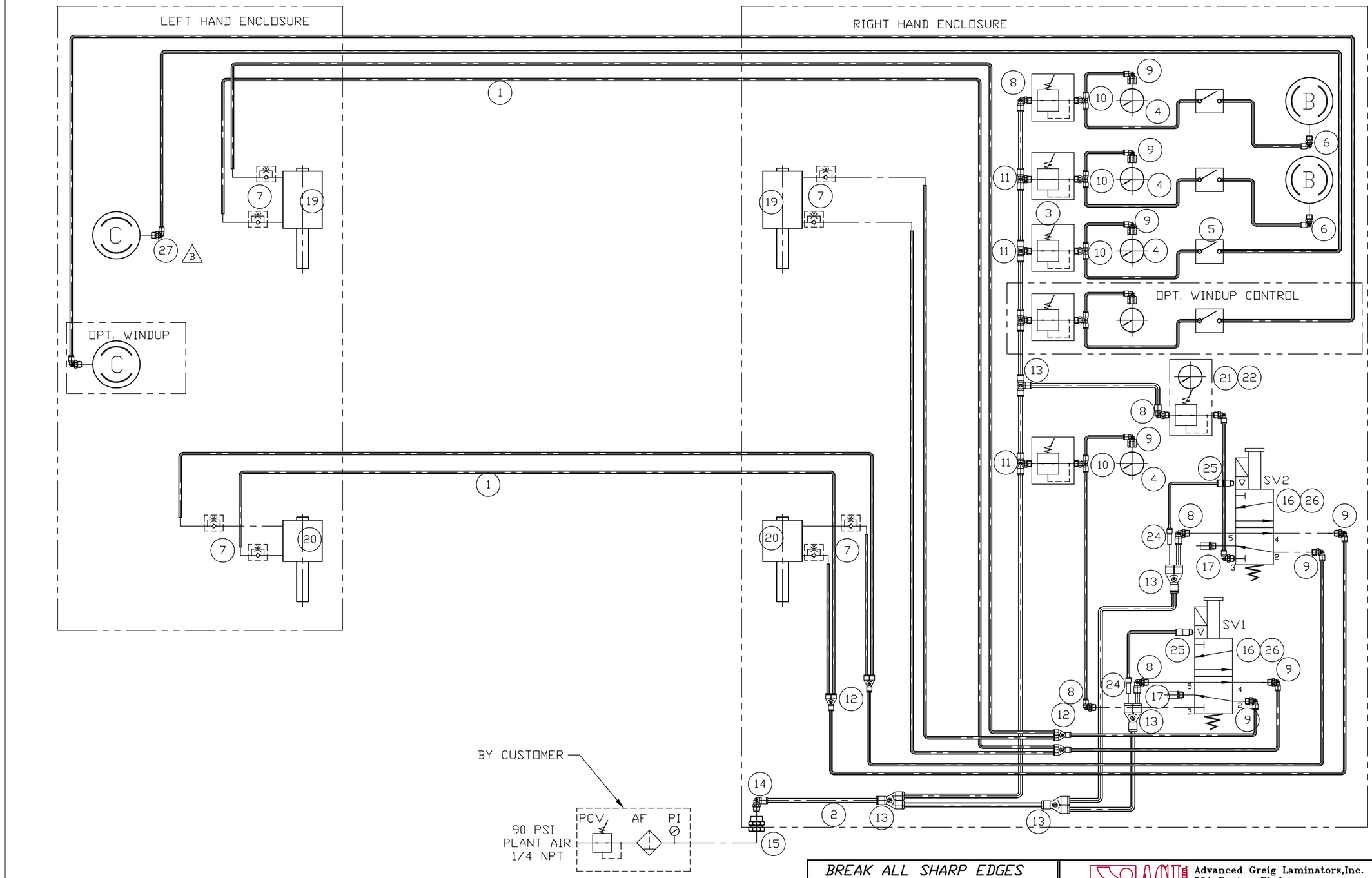
Bill Of Material

Part #: AGL-44-K3116-1 **Appl #:** **Assy #:** AGLC3115-1 **BOM Rev:** B

Model #: **Rev:** **Rev:** B **Date:** 9/10/2003

Description: PNEUMATIC ASSEMBLY, AGL4400

Item:	Part #:	Description:	Qty:
1	012262-05	TUBING, 5/32" OD, BLACK	35.0
2	012263-05	TUBING, 1/4" OD, BLACK	8.0
3	001294	REGULATOR, PRESSURE, 1/8NPT	4
4	012234-03	GUAGE, PRESSURE, 0-100PSI, 1/8NPT, PANEL MNT.	4
5	001418	AIR SWITCH, NO, 1 POLE	3
6	000847-06	FITTING, PIPE, ELBOW, MALE, 5/32 OD, 1/8 NPT	5
7	000861-02	FITTING, PIPE, FLOW CONTROL, ELBOW, 5/32 OD, 1/8 NPT	8
8	000847-10	FITTING, PIPE, ELBOW, MALE, 1/4 OD, 1/8 NPT	4
9	000851-02	FITTING, PIPE, ELBOW, FEMALE, 5/32 OD, 1/8 NPT	8
10	000849-05	FITTING, PIPE, TEE, BRANCH, 5/32 OD, 1/8 NPT	4
11	000849-08	FITTING, PIPE, TEE, BRANCH, 1/4 OD, 1/8 NPT	3
12	000855-01	FITTING, TUBE, "Y", 5/32 OD TUBE	4
13	000855-04	FITTING, TUBE, "Y", 1/4 OD TUBE	4
14	000847-12	FITTING, PIPE, ELBOW, MALE, 1/4 OD, 1/4 NPT	1
15	000822-02	FITTING, PIPE, BULKHEAD, 1/4 NPT, 3/4-16UNC	1
16	012303-04	VALVE, SOLENOID, 2 POSITION, 24VDC, EXT. PILOT	2
17	012011-01	MUFFLER, EXHAUST, 1/8NPT	2
19	001457-20	AIR CYLINDER, 2 DIA BORE, 2 1/2" STROKE, FINE THD	2
20	001457-09	AIR CYLINDER, 2 DIA BORE, 1 1/4" STROKE, FINE THD	2
21	012010-01	REGULATOR/GUAGE COMBINATION, 0-125PSI ITEM NUMBER 00277043	1
22	012010-02	BRACKET KIT, REGULATOR	1
23	000854-04	FITTING, TUBE, TEE, 1/4 OD TUBE	1
24	012280-05	FITTING, REDUCER, PLUG-IN, 1/4 TUBE-5/32 TUBE	2
25	000845-02	FITTING, PIPE, MALE, 5/32 OD,10-32UNF	2
26	012572-04	CONNECTOR, SOLENOID VALVE	2
27	000847-01	FITTING, PIPE, ELBOW, MALE, 5/32 OD, 1/16 NPT	1



REV NO.	DESCRIPTION	DATE	INT.	ECN
B	#27 WAS #6	7-2-07	GFT	
A	REVISED TO NUMATICS VALVE	4-25-07	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L:
AGLK3116-1
AGLK3116-2

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

AGL Inc. Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

PNEUMATIC ASSEMBLY
AGL 4400

SCALE: 1/4 = 1

DATE: 9-10-03

DWG. NO. AGL-44-C3115-1

REV. B

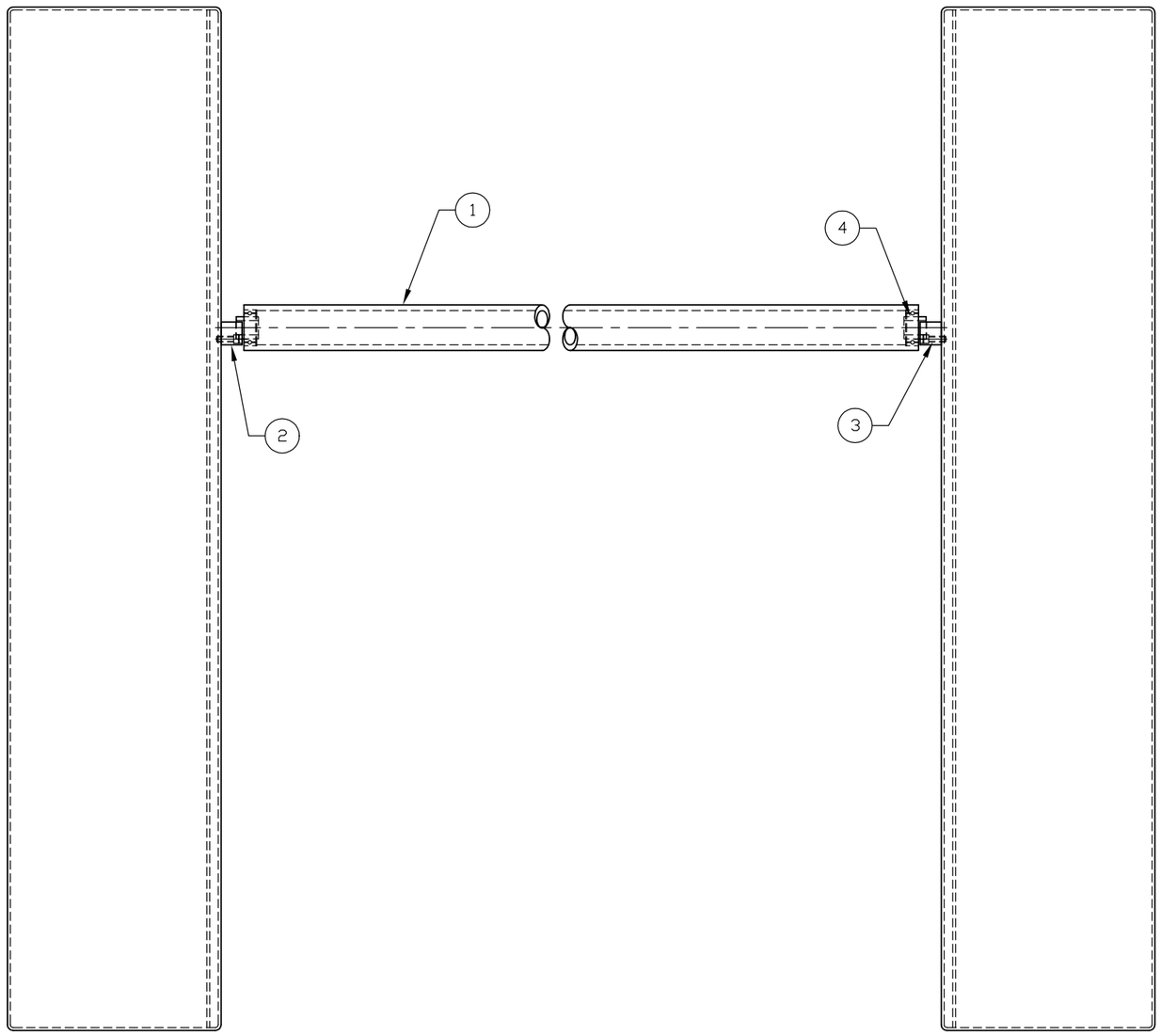
Bill Of Material

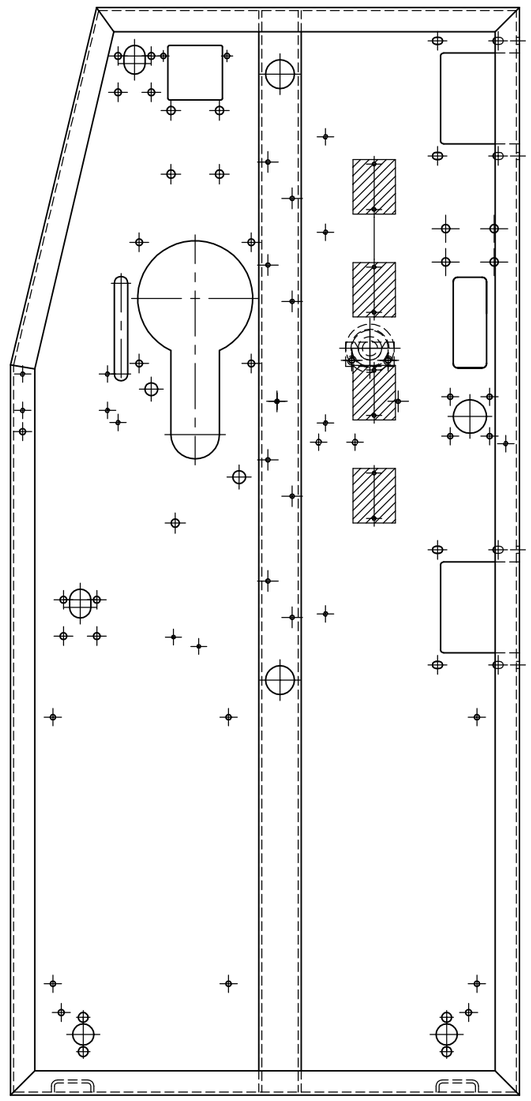
Part #: AGL-44-K3660 **Appl #:** **Assy #:** AGLC3659 **BOM Rev:** -

Model #: **Rev:** **Rev:** A **Date:** 5/2/2001

Description: CHILLER ROLL ASSEMBLY, 4400/44

Item:	Part #:	Description:	Qty:
1	AGL-44-B3661	CHILLER ROLL, 4400/44	1
2	AGL-64-B0996	IDLER ROLLER SUPPORT	2
3	000037-06	SHCS, 1/4-28UNF, 3/4 LG, BLACK	4
4	000882-10	BEARING, CYLINDRICAL, .63 BORE	2





REV NO.	DESCRIPTION	DATE	INT.	ECN
A	REVISED TO SHOW NEW ENCLOSURES	9-9-03	GFT	

BREAK ALL SHARP EDGES

DO NOT SCALE DWG.

UNLESS OTHERWISE SPECIFIED

0.00 +/-0.015
0.000 +/-0.005

ANGLES +/-.5°

MAT'L: AGLK3660

FINISH:

JOB NO.	QTY.	DWG. BY.	CHK BY
		GFT	

Advanced Greig Laminators,Inc.
801 Burton Blvd.
DeForest, WI 53532

CHILLER ROLL
AGL4400/44

SCALE: 1/4 = 1

DATE: 5-2-01

DWG. NO. AGL-44-C3659

REV. A

Bill Of Material

Part #: AGL-XX-K2660 **Appl #:** **Assy #:** **BOM Rev:** D

Model #: **Rev:** **Rev:** **Date:**

Description: ACCESSORIES KIT, 44/4400/64 SERIES/6400/6450

Item:	Part #:	Description:	Qty:
1	012235-01	CUTTER, ZIPPY	1
2	012236-01	ROLL ADHESIVE ERASER, PLAIN, SHRINKWRAPPED	1
3	001446-04	ALLEN WRENCH, LONG ARM, 3/32, T-HANDLE	1
4	AGL-XX-B0823	LIFTING BRACKET	2
5	001446-11	ALLEN WRENCH, LONG ARM, 1/4 T-HANDLE	1
6	000349-08	HHCS, 1/2-13UNC, 1 LG, ZINC	4
7	012248	CLOTH, LOW LINT, 12x13	1
8	012249	ALCOHOL, ISOPROPYL, 1 PINT 70%	1
9	000493-10	WASHER, LOCK, 1/2 DIA, SPLIT, ZINC	4
10	001530-070	FUSE, SLO-BLO, 7.0A, 250V, 1/4X1-1/4"	2
11	X6	OPERATORS MANUAL	1