

Matrix™ 2360

PROGRAMMABLE SHEAR with Touch Screen Control



- INSTALLATION
- OPERATION
- MAINTENANCE
- TROUBLESHOOTING

USER MANUAL

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Original Instructions in English



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Matrix[™] 2360 Programmable Shear User Manual

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1 INTRODUCTION

Matrix™ 2360 Programmable Shear

A universal, state-of-the-art cutting tool for the conversion of web or card stock to strips.



1.1 Function

- Programmable for strip length in inches or metric units
- Automatic mode selection based on strip length:
 - Strip Mode: for strips¹ between 0.8 mm to 19.00 mm (0.03" to .75")
 - Card Mode: for card lengths between 19.01 to 609 mm (0.76" to 24.0")
- Strip length is cut to close tolerances
- Cuts 360 strips per minute in strip mode²
- Programmable for quantity of strips from 1 to 9,999

1.2 Features

- Standard 101.6 mm (4") guillotine blade or optional 152.4 mm (6") blade
- User-settable 120/220 volt operation
- Touch Screen Operator Interface and computer control
- Batch-start (CYCLE) and drive roller movement (JOG) pushbuttons
- Hardened tool-steel guillotine blade
- Precision pinch-drive web feed system

¹ Minimum strip width is dependent on material being cut.

² If feature registration is used, the maximum speed will be reduced.

- Optional back-up move to mitigate delamination
- DC guillotine blade drive motor for quiet action and minimum vibration
- Static electricity prevention
- Material width setting changed easily without tools
- Built-in operator safety features:
 - Interlocked cover over guillotine blade and chute
 - EPO (Emergency Power Off) switch
 - Chute Interlock
 - UL & CE approved wiring methods and components
- Built-in testing features:
 - Feed web while not operating the shear (JOG Button)
 - Run the shear while not feeding web (CYCLE BLADE on OPTIONS screen)

1.3 Options

Refer to Section 5.1.6 for details on these optional features.

- Powered Roll Feed Module with Free Loop Sensor
- Roll Support Spindle
- Feature Registration for cuts based on a material feature
- Reject Mark Detection with customized programming
- Output Card Guide for guiding long strips or cards out over the chute.
- Stretch model (The wide blade fits only on the *Matrix™* 2360S model. The entire machine is larger to accommodate the blade.)
- Magnetic Exit Guide
- Blade support fixture for accurately sharpening a 2360 blade. See Section 7.5.1.

1.4 Specifications

- *Throughput*³ up to 360 strips per minute in strip mode
- *Strip/Card Length:*
 - *Strip Mode*⁴ 0.8 mm to 19.00 mm (0.03" to .75")
 - *Card Mode* 19.01 mm to 609.00 mm (0.76" to 24")
- *Cut Tolerance:*
 - *Strip Mode* 0.10 mm (0.004")
 - *Card Mode* 1.52 mm (0.060")
- *Width of Material* min 19.05 mm (0.75"), max 101.6 mm (4")
 - *Stretch model* min 57.15 mm (2.25"), max 152.4 mm (6")
- *Weight (approx.)* 37 kg (80 lb.)
 - *Stretch model (approx.)* 39 kg (85 lb.)
- *Dimensions (approx.)* 45.7 cm x 43.2 cm x 29.2 cm (18" x 17" x 11.5")
 - *Stretch model* 45.7 cm x 48.3 cm x 29.25 cm (18" x 19" x 11.5")

(Dimensions do not include optional roll feed equipment)
- *Mounting* Tabletop with vibration-damping feet
- *Facilities Requirements:*
 - *Power: Voltage* 100-120VAC, 50/60Hz (or 207-244VAC, 50/60Hz)
 - *Current (FLA Full Load Current)* 1.23 Amp (0.62 Amp)
 - *Current (SCR Short Circuit Rating)* **5 kA**
- *Environment:*
 - *Temperature Range (Operating)* 1° to 30° C (33° to 85° F)
 - *(Storage)* -25° - 55 °C (-13° - 131 °F)
 - *Humidity* 10% to 30% at 30° C
 - *Altitude* up to 2000m (6562')
- *Noise Level* less than 70 dB

³ If feature registration is used, the maximum speed will be reduced.

⁴ Minimum strip width is dependent on material being cut.

- *Warranty* 36 Months (See Section 9 for Details)

1.5 CE Mark

This machine is CE marked. The Declaration of Conformity is available upon request.



1.6 Orientation

Throughout this manual, the infeed of the machine will be referred to as the 'Front'.

The output chute part of the machine will be referred to as the 'Rear' of the machine.



1.7 Glossary

MSDS: Material Safety Data Sheet

PSDS: Product Safety Data Sheet

Pushbutton: A physical, manually operated, electrical component used to start, stop, or otherwise activate a function.

Button: A representation of the surface of a “real” pushbutton displayed on the touch screen and used to start, stop, or otherwise activate a function.

HMI: Human-Machine Interface. Screen displays, alerts, indicator lights, and audible signals provide information to the Operator, and various controls the Operator uses to direct machine activities.

Strip: A precisely cut assembly of various papers and chemicals, which may be assembled with other parts, or inserted into a vial.

Web: An assembly in varying lengths of various papers and chemicals.

2 GENERAL

This manual provides all information necessary to safely and predictably operate the system for its intended purpose. **All Operators should read and be familiar with the sections of this manual indicated below next to the green bar before attempting operation of the system. All sections should be read before attempting any service or troubleshooting of the system.** This is what is included in this document package:

Maintenance & Troubleshooting	Operation	SAFETY	This manual covers the safe operation of this machine and describes the various safety systems incorporated into the machine.
		INSTALLATION	This manual provides information regarding the installation of the unit to ensure that the system is installed, adjusted, and connected correctly.
		OPERATION	A brief description of each module on the system and descriptions of the controls on the HMI screens. Loading raw materials and machine preparation. is covered at the end of this section.
		INSTALLATION OF OPTIONAL FEATURES	Installation of the support spindle, automatic roll feed, card guide, and output chute guide is covered here. Adjustment of the optional registration sensor is also described in this section.
		MAINTENANCE	Maintenance schedules and procedures and details on moving assemblies for access. Procedures to adjust machine hardware. Do not attempt any troubleshooting activities beyond those described in this section without advice from a Kinematic Automation Service Representative.

More information is included as separate files in the documentation package.

- Spare Parts List
- Support Documentation: BOMs and Assembly Drawings
- Schematics: Electrical and Pneumatic
- Third Party Equipment Manuals and Instructions

2.1 Special Symbols



NOTE: All Operators must read the safety tips highlighted as in this example, and used throughout this manual. The symbols provide information to assist in operation, care, and safe use of the equipment.

The following examples show the symbols used, and the relative importance of the information that accompanies the symbol. These information packages can save you time, help you produce a quality product, and assist in the safe operation of the equipment.



NOTE: The information symbol announces a useful bit of information for system or operator convenience.



IMPORTANT: The exclamation point is sometimes used to draw attention to important information, usually relating to policies or unusual procedures. Some of this information may describe situations and processes that could cause damage to the equipment or produce defective product.



CAUTION: This identifies safety hazards and processes that could cause physical injury to Operators or other personnel.

Please be careful.



ELECTRICAL HAZARD: This symbol warns of the dangers from electrical shock that can cause physical injury or death.

Use extreme care in this area.

3 SAFETY

The first and most important step toward the safe and efficient operation of this or any other piece of precision production equipment is to read and understand all sections of this manual before operating the equipment. This manual provides the requisite training to safely operate the equipment. The equipment should be operated solely by trained personnel.



CAUTION: This section outlines several basic safety precautions that must be followed by anyone moving or working on or near this equipment. Refer also to safety precautions required by state, federal, local authorities, and your company.



CAUTION: Before working with chemicals or product materials containing chemicals, refer to your company's Product Safety Data Sheets (PSDS) and Material Safety Data Sheets (MSDS) for information about the chemicals.
Use all safety precautions described in those documents.



ELECTRICAL HAZARD: Disconnect the unit from its power source before beginning any maintenance or repair procedure. If a panel is opened, exposure to live electrical circuits is possible. Failure to follow all electrical safety procedures could result in **SERIOUS INJURY or DEATH BY ELECTROCUTION.**



CAUTION: If the equipment is not operated as instructed in this document the safety features and protective devices might not operate as described. This creates a hazard for the Operator and bystanders. It could also damage the equipment.



NOTE: Use electrical LOCKOUT / TAGOUT procedures whenever and wherever possible. If service or adjustments require an energized electrical supply, be extremely careful.
NEVER WORK ALONE.

Here are a few more rules to help ensure your safety:

1. Keep extremities, hair, clothing, jewelry, or other personal items that may be caught up in the moving parts of the machine, away from those parts whenever the machine is running.
2. Long hair should be tied back while operating or standing close to an operating machine.
3. Do not wear loose clothing or dangling jewelry while operating or standing close to an operating machine.
4. Do not insert any foreign object into the machine at any point.
5. Never operate the machine with any side panel removed. Removing side panels will not turn machine or control power OFF.
6. When machine power is OFF, dangerous voltages are present within the machine. Disconnect the machine from the AC power line before removing any side panel.



CAUTION: Do not put anything into the machine except the material to be processed. Foreign objects will damage the machine and may cause dangerous flying metal fragments.

The following paragraphs describe additional safety features, processes, and procedures to help ensure Operator safety and product quality.

3.1 Safety Systems

3.1.1 EPO (Emergency Power Off) Switch

A RED Emergency Power Off (EPO), mushroom style, manual pushbutton switch is mounted on the top panel, behind the guide rails. This pushbutton must be pulled out to enable machine operation and may be pushed or “slapped” to the “in” position to turn off control power and stop the machine. In an emergency, push or slap this button to the “in” position to cut power and stop the machine. This type of button is also referred to as an E-Stop.



There is no alert or special display on the screen if the EPO button is activated, but the machine will not operate if it is pushed in.



ELECTRICAL HAZARD: The EPO switch does not turn off electrical circuits inside the unit.

3.1.2 Blade Cover Safety Interlock

The clear LEXAN® cover over the guillotine cutter is electronically interlocked, as is the metal output chute. Removal or opening of either of these components will cause the machine to stop operating.

There is alert screen for the opening of the blade cover. The control screen turns red, and an alert message displays.

The side panels are not interlocked. Disconnect all power supplied to the machine before opening any side panel. See the information about safely powering down the machine for maintenance procedures in Section 3.2.

3.1.3 Chute Interlock

If the output chute is removed while power is on, an interlock causes the control power to go off. However if the chute is removed there is no warning screen, but the machine will not operate until it is replaced.



ELECTRICAL HAZARD: Turning off control power does not remove hazardous voltages inside the equipment. Do not remove any panels until the main power has been disconnected at a source external to the electrical cabinet.

3.2 Lock Out/Tag Out Procedures

The procedure below covers the minimum requirements for shutting down the equipment for maintenance procedures. It should be followed to ensure that the machine is stopped, isolated from all potentially hazardous energy sources, and locked out. The purpose of the lockout is to prevent anyone from reconnecting electrical power before it is safe to do so. Reconnecting energy sources before the

machine is completely reassembled can result in extremely dangerous consequences.



ELECTRICAL HAZARD: Disconnect the unit from its power source before beginning any maintenance or repair procedure. If a panel is opened, exposure to live electrical circuits is possible. Failure to follow all electrical safety procedures could result in **SERIOUS INJURY or DEATH BY ELECTROCUTION.**

Your company may have additional measures that should be followed for lock out/tag out. Make sure that you are familiar with your company's written policies before continuing.



CAUTION: Refer also to safety precautions required by your company and federal, state, and local authorities. **ALWAYS FOLLOW YOUR EMPLOYER'S WRITTEN PROCEDURES.**

3.2.1 Lockout/Tag Out Steps

- 1) Notify all affected employees that servicing or maintenance is required on a machine and that the machine must be shut down and locked out / tagged out to perform the servicing or maintenance.
- 2) LOCATE and IDENTIFY energy sources, potential hazards, and all control devices. This includes:
 - Electrical Energy Sources (The power cord, the plug receptacle, and the on/off switch)
- 3) Turn the electrical power off ('O') with the switch above the plug receptacle.
- 4) Remove the power cord from the plug receptacle **on the machine.**
- 5) Lock out / tag out the receptacle with your assigned individual lock per your company's safety policy.

3.2.2 Restoring to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken by authorized personnel (the individual who originally took the equipment out of service or the responsible supervisor.)

- 1) Check the machine to ensure that nonessential items have been removed from the clearance space around the machine and that the machine and its components are operationally intact.
- 2) Verify that the electrical power switch is off ('O') above the plug receptacle.
- 3) Remove the lock out / tag out devices.
- 4) Reattach the power cord to the plug receptacle on the machine.
- 5) Turn the electrical power on ('I') with the switch above the plug receptacle.
- 6) Test the operation of the equipment.
- 7) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

3.3 Vision & Hearing Safety



Wear protective glasses while operating or working around the equipment. There is a risk of flying projectiles due to the blade moving at high speed.

Operating sound level⁵ is less than 70 dB(A). Hearing protection is not required.

3.4 Other Personal Protection Equipment Requirements

This equipment may be used to process materials treated with a variety of substances, some may be hazardous to the skin or lungs. The safety precautions required vary greatly depending on the chemical(s) used. The following equipment **may be required**. Consult the safety information in the MSDS for the chemicals used on the material that will be processed with this equipment.



Wear protective gloves designed to protect hands from sharp edges while cleaning the shear blade.
Also, wear protective gloves while handling material treated with any hazardous substance. Refer to the MSDS for information about the chemicals used in your process.

⁵ The sound levels indicated here were measured at the Kinematic facility. Sound levels may vary at the final location.



Wear a protective mask to avoid breathing any dangerous fumes, dust, or fibers from materials treated with any hazardous substance. Refer to the MSDS for information about the chemicals used in your process.



Wear a protective smock to avoid contamination of clothing from chemicals, dust, or fibers from materials treated with any hazardous substance. Refer to the MSDS for information about the chemicals used in your process.

3.5 Residual Risks

Every effort has been made to reduce risks and hazards and make this equipment as safe as possible to operate. A few residual risks cannot be completely avoided for the equipment to function. These risks are marked on the machine and should be known to all personnel near the equipment. **check image for new blade cover**



SHEAR CUT HAZARD: The interlocked Lexan blade guard and is designed to prevent access to the blade during operation.

Do not attempt to circumvent this safety feature.

There is a risk for Operators with small fingers if they attempt to reach under the output chute safety bar.

Never put fingers or other objects near the blade during operation.

This blade is very sharp.



Do not insert tools or other objects into the slot of the static control bar. A painful but not hazardous shock (roughly equivalent to the shock received from shuffling across a carpet, and then touching a grounded metal object) can result.

3.6 Misuse



CAUTION: If the equipment is not operated as instructed in this document, the safety features and protective devices might not operate as described. This creates a hazard for the Operator and bystanders. It could also damage the equipment.

Using the machine incorrectly that can result in hazards. Any injury or hazards resulting from using the system in ways other than its intended purpose are considered negligent. Misuse may also void the warranty. Possible ways of misusing the machine include (but are not limited to) the following:

- ⊘ Do not allow anyone to run the machine unless they are fully trained and completely familiar with all of the information in this User Manual.
- ⊘ Do not perform maintenance procedures unless the machine is locked out as described in Section 3.2.
- ⊘ Do not leave tools, cleaning materials, or any other foreign objects anywhere in or on the machine when it is not locked out.
- ⊘ Do not attempt to circumvent safety interlocks since dangerous risks to the Operator and to the machine are prevented with these safety features.
- ⊘ Never run the machine with a door or fixed panel open or removed.
- ⊘ Never operate the machine with a power cord other than that supplied with the machine.
- ⊘ Do not put anything through the system except the material as specified to Kinematic at the time of purchase without contacting Kinematic first.
- ⊘ Never put wet material through the machine or pour liquids over the machine.
- ⊘ Do not operate the machine in an environment with temperature, humidity or altitude outside of the range indicated in Section 1.4. Do not operate the machine outside of a suitable enclosed building.
- ⊘ Do not use metal objects to clean the blade: e.g. knives, screwdrivers, etc. Damaged blades will not cut well, and may shatter at high speed. See Section 7.4 for blade cleaning procedures.
- ⊘ This machine is not intended to process material for human consumption.

3.7 General Safety Notes

DO NOT DEPEND on the automatic safety systems. Activating the EPO switch or other safety interlock does not disconnect dangerous voltages within the machine.



ELECTRICAL HAZARD: Before working on the machine, or working inside the electrical cabinet, main power should be disconnected at a source external to the electrical cabinet.

If a condition occurs that requires operator intervention within the processing area of the machine, first observe that the machine is fully stopped. Turn the electrical power off at the power entry module on the rear of the system. When reaching into the process area, be careful of any hazards. The system, although protected by adequate safety covers, may have various pinch points, cutting points, and electrical shock hazards exposed while performing service or repairs.

4 INSTALLATION

The *Matrix*[™] 2360 Programmable Shear is a stand-alone system requiring only connection to the proper power source for operation.

The *Matrix*[™] 2360 Programmable Shear is designed for use in a controlled environment. Although designed and constructed to withstand even the most adverse of manufacturing atmospheres and demanding applications, the machine is a very precisely adjusted, sensitive piece of machinery. 'Unnecessary roughness' during transportation and installation should be avoided. The *Matrix*[™] 2360 Programmable Shear should be treated like any fine instrument, with care and attention, and only by those who understand its value.

The unit should have been shipped completely assembled. Save the packing crate for storage and/or shipping.

4.1 Moving the Machine

The *Matrix*[™] 2360 Programmable Shear is small and light enough to be carried without the use of a forklift or other lifting device. It is recommended that two persons lift the machine by its base.



IMPORTANT: Do not lift the equipment by the top components, control panel, or optional roll feed.

A rigid stand, bench, or table should be cleared and ready for machine placement before the machine is moved. Gently place the unit on the tabletop.

Suggested Clearance: Approximately 1 m (3') on all sides.

4.2 Storage

Keep the original shipping crate for long-term storage and or shipping. This will protect the machine from damage. Shipping it in a different container will result in additional charges if you return the unit for service. Keep storage temperature in the range of -25 to 55 °C (-13 to 131 °F).

4.3 Electrical Supply

Either:

Nominal 115 (100-120) VAC, single phase, 50-60 Hz, 5 A

-or-

Nominal 230 (207-244) VAC, single phase, 50-60 Hz, 5 A



IMPORTANT: If the voltage selected on the power entry module does not match the supply voltage, the machine may be damaged when live power is connected. Read Section 4.3.1 carefully.



ELECTRICAL HAZARD: Connect the power cord to the machine first. Do not connect the other end of the power cord to any live source until the machine is in its final location, all other facilities are connected, all panels are fastened, the output chute is in place and the clear blade cover is closed.

Failure to follow all electrical safety procedures could result in **SERIOUS INJURY or DEATH BY ELECTROCUTION.**

Use only the power cord supplied by Kinematic for your machine. Make sure that the cord is installed so that it is not a slip, trip, or fall hazard. Do not leave the cord stretched out on the floor.

4.3.1 Power Entry Module

The unit should be attached to the proper power source only after installation is complete. The power cord plug fits into the power entry module on the control panel.

If the power available differs from the setup of the power entry module (see picture), remove the fuse cover (using a small screwdriver) and turn it upside-down, until the correct arrows meet and the correct power source voltage is right side up.



Power Entry Module

This module contains the main fuse for the machine. Refer to the Spare Parts List for the replacement part number.

The rocker switch is the main switch for the machine. Leave it in the OFF ('O') position as shown here until installation is complete.

4.4 Foot Switch Connector

The foot switch connects to the equipment through the nine pin connector on the left side of the system.

The foot switch is optional. It performs the same function as the CYCLE pushbutton on the control panel.



4.5 Decommissioning/Disposal

Prior to permanent disposal of the system, perform the following activities:

- Cut all wiring.
- Remove shear blade (See Section 7.3) and wrap it securely to prevent the sharp edge from being a hazard.
- Remove the PLC battery and dispose of appropriately.
- Dispose of unit according to all requirements of your company and federal, state, and local authorities.

Other than the blade and battery, this machine contains no hazardous components that require special disposal.

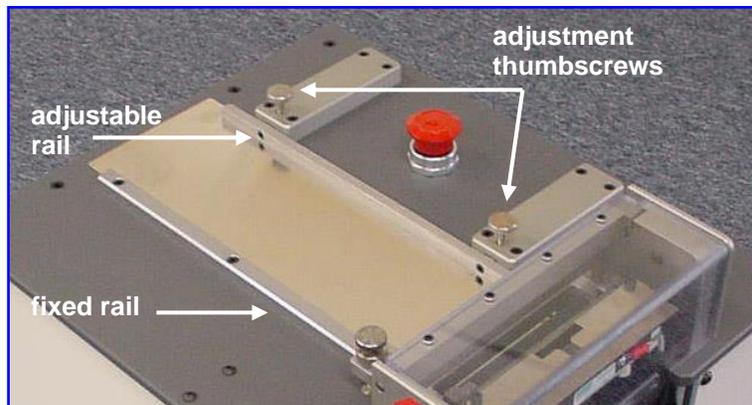
5 OPERATION

5.1 General Module Description

5.1.1 Guide Rails

The material is guided into the rollers between two guide rails. These rails should be adjusted to hold the material straight as it slides into the rollers, but not to hold the material so tight that they impede it from moving freely.

One guide rail is fixed in place, and the other guide rail is adjustable. Adjustment of the guide rail is covered in Section 5.4.1.

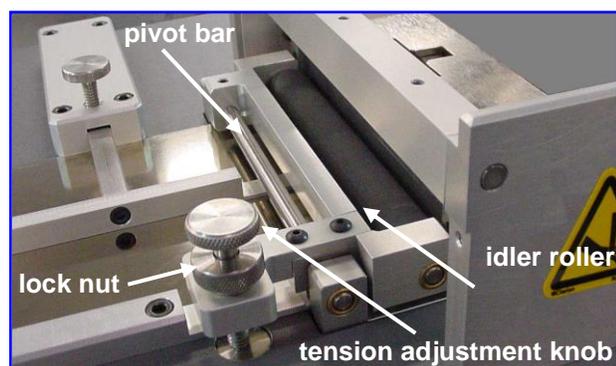
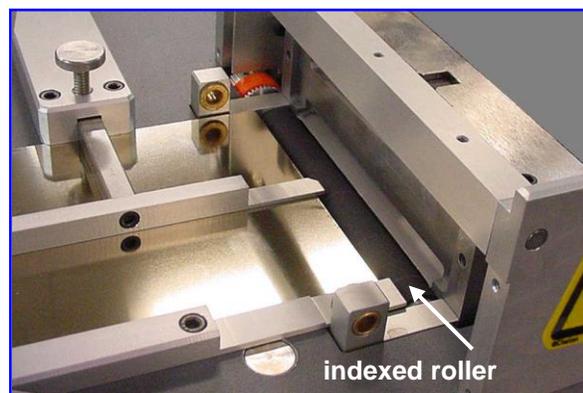


5.1.2 Rollers

The material is held in place and driven into the blade by two rollers. The indexed roller is fixed in place and rotated in precise increments by the PLC. It is normally hidden by the idler roller on top of it.

The idler roller has no motor control; it is spring loaded to press against and roll over the indexed roller. The framework that holds it pivots to control the tension on the material between the two rollers.

To load the material between the rollers, press and hold down the tension adjustment knob. This lifts the idler roller so material can be inserted between the rollers.



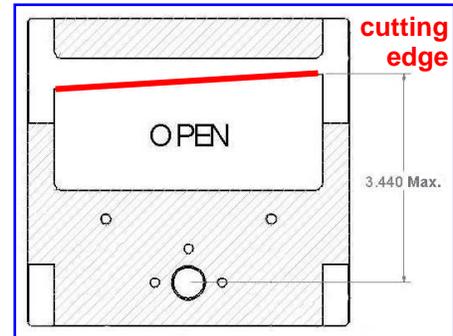
The downward pressure of the spring-controlled idler roller may be adjusted to control the tension on the material. Adjustment of the pinch roller tension is covered in Section 5.4.2.

5.1.3 Die Block and Blade Module

The guillotine blade is made from hardened D2 tool steel. The blade drive motor is a direct current motor for quiet action and minimum vibration. The blade moves vertically against a die block to cut the strips.

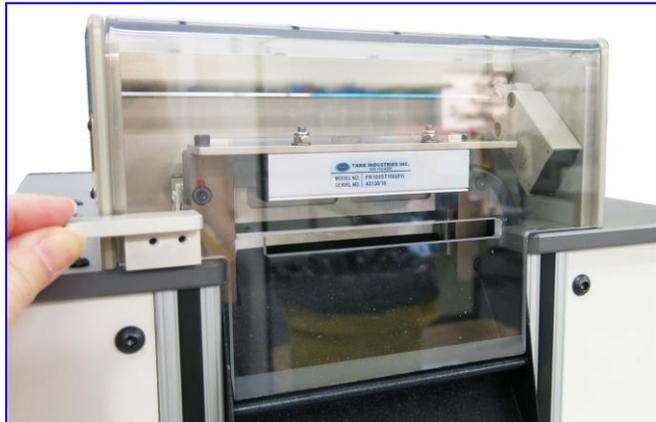
There are two blade widths available:

- Standard 101.6 mm (4")
- Optional 152.4 mm (6")



Guillotine Blade

The LEXAN® safety cover over the guillotine blade is electronically interlocked. If it is opened during operation, the machine stops, the control screen turns red, and an alert message displays.



Blade Cover

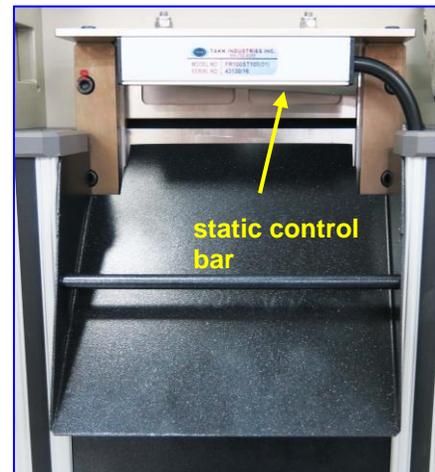
More details on the blade are covered in the following sections: 7.3 Blade Removal and 7.5 Sharpening the Guillotine Blade.

5.1.4 Output Chute

The output chute collects the cut strips at the rear of the unit and allows them to fall into a receptacle (not provided with the machine) placed next to the unit.

Removal of the chute during operation will cause the machine to stop. No warning is displayed, but the machine will not operate until it is replaced.

See Section 6.5 for details on the optional magnetic exit guide that can guide material down the chute.



Output Chute (cover open)

5.1.5 Static Control Bar

Static electricity can prevent strips from falling into the output chute. These strips may be cut repeatedly. Some materials are more likely than others to generate static electricity.



A static control bar is provided to de-ionize strips after they have passed through the blade set. The static control power supply is located inside the machine and is active when the machine is on. The static control bar is attached to a steel rail mounted at the rear of the unit. The groove in the static control bar should be cleaned with clean dry pressurized air on a regular basis. See Section 7.2.



IMPORTANT: Do not insert tools or other objects into the slot of the static control bar. A painful but not hazardous shock (roughly equivalent to the shock received from shuffling across a carpet, and then touching a grounded metal object) can result.

The pins inside the groove could also be damaged.

5.1.6 Optional Components

- **Wide Blade Option** – The blade in the *Matrix*™ 2360 Programmable Shear is 101.6 mm (4"). The *Matrix*™ 2360S model has a 152.4 mm (6") blade. The entire machine is larger to accommodate the blade. This allows for the cutting of wider materials.
- **Infeed Options -**
 - **Roll Support Spindle** – Supports a roll of material to be fed into the system. Unlike the Optional Automatic Roll Feed, this device has no motor. The material is pulled from the roll by tension from the drive rollers. See Section 6.1 for more details and the installation procedure.
 - **Automatic Roll Feed Module with Free Loop Sensor** - The automatic roll feed module has a motor that rotates a hub to allow material to flow from the roll without tension. A free-loop sensor controls the motion of the hub to insure a constant supply of material. The motor has its own control panel with power on, forward, and

reverse buttons. See Section 6.2 for more details and the installation procedure.

- **Registration Option** - An adjustable registration sensor is mounted in the product path, either just before or just after the guillotine blade. Its purpose is to ensure the product is fed and cut at the correct position, based on a Customer-defined feature (notch, mark, hole, & etc.) on the material to be cut. Feature sensors may be through-beam, reflective heads, or lasers, depending on the Customer requirements and the material being processed. See Section 6.3 for more details.
- **Output Card Guide** – This guide directs long strips or cards out from the machine horizontally, past the output chute. See Section 6.4 for more details.
- **Magnetic Exit Guide** – Adding one or more of these magnetic bars will guide the cut strips into a narrower exit path. See Section 6.5 for more details.

5.2 Turning the Machine On

Turn the switch ON (‘I’) at the power entry module. Be sure the red “mushroom” EPO pushbutton on top of the machine is up, the metal output chute is in place, and the blade cover is closed. The touch screen should



illuminate and display the Kinematic Logo, the machine name, and the HMI software part number. No other buttons should be illuminated at this time.

There is no signal or warning if the EPO pushbutton is activated or the metal output chute is not in place. The machine cannot be turned on if either condition exists. If the blade cover is lifted, the screen turns red and displays an alert message.



NOTE: If the blade cover is opened while control power is ON, the machine will not function, and this screen is displayed:

**THE BLADE COVER IS OPEN.
CLOSE THE COVER. THEN PRESS
THE START PUSH BUTTON
TO CONTINUE**

When the equipment is ready, pressing the ON pushbutton turns control power ON to the machine. When control power is ON, the ON pushbutton is illuminated, the touch screen displays the Main Screen (see section 5.3.2 for further information),

and the cooling fan operates. The machine completes initialization by indexing the indexed roller and cycling the blade twice.

During the first three seconds after the ON button is pressed, the machine performs self-diagnostics. If a problem is detected, refer to the troubleshooting guide in Section 7.17.



CAUTION: Do not put anything into the machine except the material to be processed. Foreign objects will damage the machine and may cause dangerous flying metal fragments.

5.3 System Control Description

There are four pushbuttons on the control panel below the Operator's touch screen. The pushbuttons work like this:



CYCLE – Starts the process of cutting the programmed number of strips. (If pressed during a batch run it halts that run and resets the strip counter.)

JOG – Moves product through the machine without cutting

ON – Applies control power to the system and begins the self-diagnostics

OFF – Stops machine operation and shuts off control power in the system



ELECTRICAL HAZARD: Pressing the OFF pushbutton or the EMERGENCY POWER OFF pushbutton does not remove dangerous voltages inside the equipment. Turn off the main circuit breaker and disconnect the equipment from the facility power supply before removing panels.



NOTE: When the foot switch is connected as described in Section 4.4, pressing it performs the same function as pressing the CYCLE pushbutton.

5.3.1 Touch Screen Control

The graphic display is designed to detect the Operator's touch on the screen surface. Button representations, arrow buttons, and numbers (fields) are pressed (touched) to make some change on the machine, to start a process, or to go to another screen.

Some of the displays pictured in this section show strip dimensions in inches, and some show metric values. This is only to illustrate that the equipment is capable of operating in either mode. During normal operation, if the Operator configures the machine for metric strip cutting, all associated screen displays will show metric values.

The **general process for changing a number (field)** is as follows:

1. Navigate to the screen where the field can be changed. On some screens, fields are displayed but cannot be changed. (For example, to change strip size or quantity, the UNITS button must be pressed on the Main screen to open the screen where these fields are changed.)
2. **Touch the number** on the screen. A flashing black rectangle called the cursor should appear behind the far right digit. If no black rectangle appears, this field cannot be changed from the current screen; it is present for information only.
3. To change the value of the digit highlighted by the cursor, touch the **up or down arrow** buttons (at the bottom of the screen).
4. To move the cursor to another digit, touch the **right or left arrow** buttons (at the bottom of the screen).
5. After you have set the field to the desired setting, touch the **RETURN** button to accept the value. The cursor will stop flashing.

If a value is outside of acceptable parameters, when the previous screen is displayed again, the value of the field is reset to the original value.

6. To ignore your change, touch the **ESCAPE** button to reset the value to its original value.
7. Touch the **RETURN** button again to return to the previous screen.



NOTE: In data input screens, pressing the RETURN button once causes any entered data to be accepted and saved. The button must be pressed a second time to return to the previous screen.



NOTE: Inch and Millimeter modes are independent of each other. Setting the millimeter mode value will not make the machine cut the inch equivalent in inch mode. Each mode must be programmed separately.

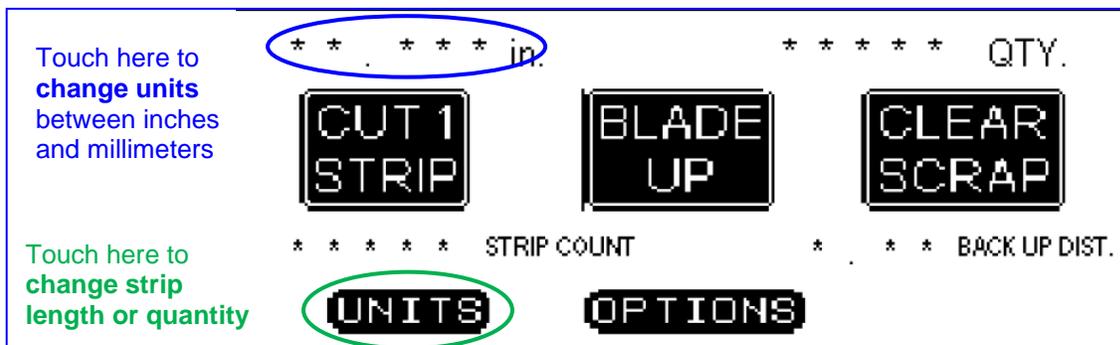


NOTE: The following illustrations use asterisks (*) to indicate the position of value fields. The equipment will display the values programmed or derived during operation.



NOTE: The screens are shown as they appear when the machine is in operation, or ready for operation or maintenance, as required. The screens appear 'GRAY-on-GREEN, -AMBER, or -RED' on the equipment, but are represented as black and white in this manual.

5.3.2 Main Control Screen



The Main Control Screen appears when the machine has been turned on (the ON pushbutton is pressed) and all sub-systems have initialized successfully. The asterisks (*) shown in the value locations are displayed as correct values during machine operation.

The field in the upper left corner shows the size (in inches or millimeters) of the strip to be cut. To change the units from inches to millimeters and back, touch this field.

The field in the upper right corner shows the quantity of strips to be cut. Both of these values are set at the Set Units screen (section 5.3.3). Touch the **UNITS** button at the bottom of this screen to open the Set Units screen.

The **STRIP COUNT** field displays the total of all strips cut in automatic mode (i.e. strips cut when the CYCLE pushbutton is pressed.) This counter is reset to zero only when the RESET button on the Options Screen is pressed. See Section 5.3.4.

When the **BACK UP DIST** field is pressed, the back up move distance can be changed. When it is non-zero, the pinch drive will reverse by this distance just after each strip is cut free. This mitigates adhesive problems causing delamination of the material. Too short a back move may allow the leading edge of the material to be stuck to the blade as it completes its motion after the cut. Too large a move will slow the cycle rate. Setting this field to 0 disables the back up move entirely.

The **CUT 1 STRIP** button causes the machine to make one cut at the programmed width. It rotates the indexed roller one pitch and activates the guillotine to make one complete down then up cycle. The button will be highlighted when pressed, but since it is a momentary button, it will revert to its ready state when released.

The middle button causes the blade to go up and down without moving the material. The button will display **BLADE UP** when the blade is down and **BLADE DOWN** when the blade is in the up position.

If the blade is left in the down position, pressing the **CYCLE** pushbutton (below the touch screen) will cause the blade to move to the up position. Pressing the **CYCLE** pushbutton a second time causes the machine to run an entire programmed cycle. Pressing the **CYCLE** pushbutton again during a cycle stops the cycle.

At the far right on the screen is a **CLEAR SCRAP** button, which activates the indexed roller to turn and drive the trailing end of card material through to the output chute without cutting. This is useful for clearing the machine of the scrap left over from each run. Due to the necessary distance between the rollers and the blade, there will always be a small amount of scrap remaining. (See NOTE on next page.)

The **OPTIONS** button opens the Options screen. This screen is used for setting some basic operational parameters (or 'preferences') on the machine. The OPTIONS screen is described in section 5.3.4.

5.3.3 Set Units Screen

The Set Units Screen appears when the **UNITS** button on the Main Screen is pressed. There is one screen for inches and one for millimeters. It is used to set the size and quantity of the strips to be cut in a batch.



The range of strip sizes for Strip Mode operation is from 0.8 mm to 19.00 mm (0.03" to 0.75"). The range of values for Card Mode operation is from 19.01 mm to 609

mm (0.76" to 24.0"). See page 23 for details on entering numbers with the touch screen.

The range of values for the quantity (QTY.) of strips or cards to be cut (the batch size) is from 1 to 9,999. Set to a low number (e.g. 10) until machine set up is complete and you have measured actual strip length. (See Section 5.4.3.)



NOTE: When setting the strip quantity (QTY.), set to a number that will leave at least 19 mm (.75") of material at the trailing end of each card. The blade will cut accurately only when at least 19 mm (.75") of material is left behind the blade as scrap. If less material is left, the rollers are not holding the material securely and precise strips cannot be cut.

The equipment automatically enters Card Mode when the entered strip length exceeds 19.01 mm (0.75"). In Card Mode, process speed is reduced to allow time for more product movement.

In the optional Registration Mode, the machine process speed is slightly reduced a little more to allow time for the detection of the registration feature. In Strip Mode, the motor advances the material and the registration logic is on. When the registration point is detected, the motor briefly stops and the cut is made. In Card Mode, the material is driven for most of the card length at high speed, then the motor slows and the registration logic is turned on. The motor briefly stops when the registration point is detected, and the cut is made.



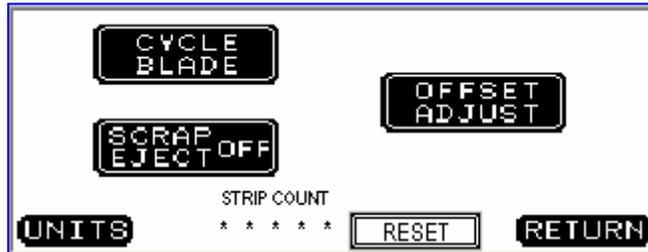
NOTE: Inch and Millimeter modes are independent of each other. Setting the millimeter mode value will not make the machine cut the inch equivalent in inch mode. The size and offset for each mode must be programmed separately. Change from inch to millimeter mode, or from millimeter to inch mode by returning to the Main screen and touching the length field.



NOTE: The strip size set here is modified by the offset adjustment defined on the OFFSET ADJUST screen. See Section 5.4.3. The offsets for Inch and Millimeter modes and must be programmed separately.

5.3.4 Options Screen

The Options Screen is accessed via the **OPTIONS** button at the bottom of the Main Screen. It is used for setting certain machine parameters and doing certain tasks.



The **CYCLE BLADE** button at the top left corner of the screen causes the blade to cycle indefinitely without the material moving through it. The indexed roller does not index in this mode. This does not increment the STRIP COUNT or the STRIPS CUT field displayed on the Run Screen.

Stop the blade from cycling by pressing the **CYCLE BLADE** button a second time. There is no text change, so the operator will have to determine if the blade is cycling or not. Do not put any foreign objects into the cutting area. This is particularly dangerous while the blade is cycling.



CAUTION: Do not put anything into the machine except the material to be processed. Foreign objects will damage the machine and may cause dangerous flying metal fragments.

The **SCRAP EJECT ON/OFF** button activates (or deactivates) the automatic scrap clearing mechanism. When the button displays **SCRAP EJECT ON**, the scrap piece at the end of a card will automatically be cleared at the end of the cycle.



NOTE: When the Roll Feed option is installed, SCRAP EJECT should always be set to OFF.

The **OFFSET ADJUST** button is for adjusting the actual strip size when it is out of tolerance compared to the desired strip size. This process is described in Section 5.4.3.

The **STRIP COUNT** field displays the total of all strips cut in automatic mode (i.e. strips cut when the CYCLE pushbutton is pressed.) This counter is reset to zero only when the RESET button next to it is pressed. Shutting off power does not reset it.



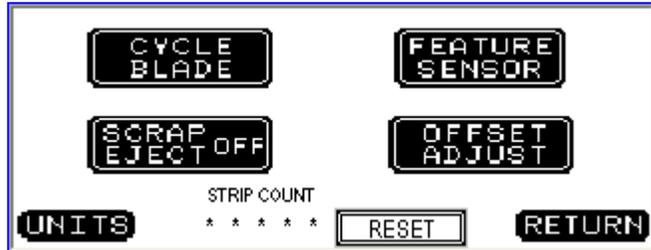
NOTE: The STRIP COUNT field can be used to schedule maintenance procedures such as blade sharpening.

The **UNITS** button opens the same screen as the UNITS button on the main screen. See Section 5.3.3.

The **RETURN** bar button opens the Main Screen.

5.3.5 Options Screen (with Registration Option)

If the Feature Registration option is installed, the **Options** screen is slightly different. An additional button, **FEATURE SENSOR**, is displayed at the top right corner of the screen. All other functions described for the **Options** screen work the same as described for that screen.



The **FEATURE SENSOR** button is for activating and deactivating the optional **Feature Registration**. It opens the **Set Registration Sensor** screen. That screen is described in section 6.3.2.

5.3.6 Run Screen

The Run Screen appears when the **CYCLE** push-button (below the touch screen) is pressed and the machine begins running a batch.

It displays an animated graphic design, simulating strips being cut.



It also shows the number of strips to be cut, the strip size (in inches or millimeters) the actual number of strips already cut in this batch, and a bar graph, which shows the progress (as a percentage) of the run.



NOTE: The STRIP COUNT field on the OPTIONS screen counts strips cut without resetting after each batch.

Observe that this illustration shows question marks (?) in place of an actual percentage of the run. The equipment screen displays a percentage value in this

location during an actual run. The asterisks (*) in the value locations are displayed as numeric values on the equipment while in operation.



NOTE: To stop a cycle before the run has ended, press the **CYCLE** pushbutton again.

When a cycle is interrupted using the CYCLE pushbutton, the internal strip counter will reset to zero. Pressing CYCLE the next time starts a new run. The new run starts the strip count at zero and cuts the originally programmed number of strips.

5.3.7 Alert Screens

Three alert screens can appear during operation or setup of the machine. The first two alert screens appear with a red background. The reset alert screen is displayed with an orange background.

5.3.7.1 ALERT SCREEN: BLADE COVER OPEN

The machine will not initialize or run with the blade cover open.

**THE BLADE COVER IS OPEN.
CLOSE THE COVER. THEN PRESS
THE START PUSH BUTTON
TO CONTINUE**

5.3.7.2 ALERT SCREEN: REGISTRATION FAILED

This message alerts the operator that the (optional) Feature Registration Sensor has failed to detect a feature. This may be due to a sensor failure, blockage, incorrect setup, a card feature that is difficult to detect, incorrect amplifier setting (see Section 6.3.2), or a damaged fiber optic.

**REGISTRATION FAILED
CHECK SENSOR**

SET

RETURN

Touch the SET button to open the SET REGISTRATION SENSOR screen. (See Section 6.3.2.) This would be done to check and adjust the registration settings for the material used.

Touch the RETURN button to close this screen and open the MAIN screen. If the material was defective, the machine could be cleared of the defective material, loaded with good material, and then restarted.

5.3.7.3 ALERT SCREEN: RESET WARNING

This message alerts the operator that the RESET key on the Offset Adjust screen (see Section 5.4.3) will change the OFFSET value to zero. Press the RESET key to zero that value. Press the RETURN key to go back to the Offset Adjust screen.

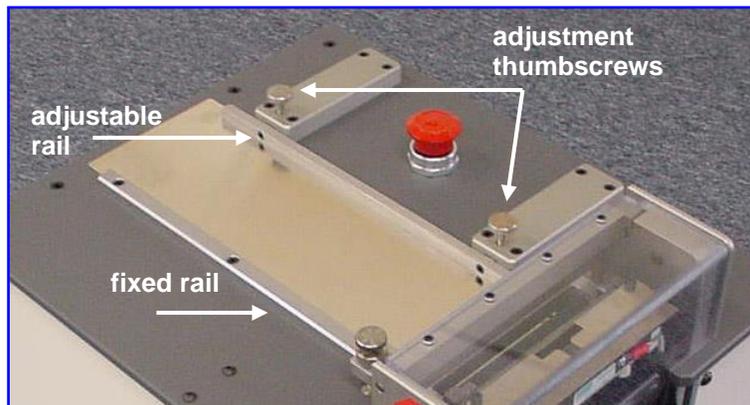


5.4 Set-up for New Material

Before the machine is used for the first time and each time the type material to be cut is changed, adjustments may need to be made to the machine. When the width of the material is changed, the guide rail should be adjusted. When the thickness of the material is changed, the tension on the rollers may need adjustment. The offset setting may also need to be changed.

5.4.1 Guide Rails

- a) Before operating the machine, the guide rails on the top of the machine must be adjusted to accept the product to be processed.
- b) One guide rail is fixed in place, and the other guide rail is adjustable to the width of the web.
- c) Place a section of product on the infeed platen, loosen the two knurled thumbscrews, adjust for product width, and then tighten the thumbscrews again. Allow a 0.05 mm to 0.076 mm (.002 to .003") clearance at both the edges of the material. Be sure the rails are parallel before tightening the thumbscrews.





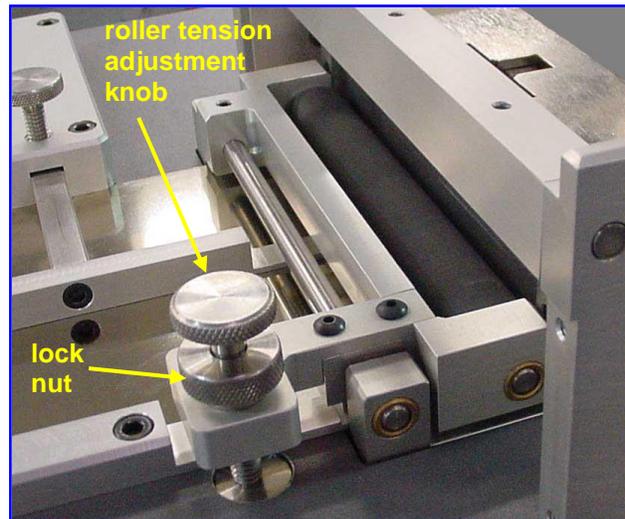
NOTE: The product should not be tightly squeezed between the left and right guide rails.

On standard width systems, the minimum material width is 19.05 mm (0.75") to allow enough support for the adjustable guide rail positioning bars. On wide blade systems, the minimum material width is 57.15 mm (2.25"). If the adjustable rail is too close to the fixed rail, the positioning bars cannot be locked into position.

5.4.2 Roller Tension

Product is driven through the guillotine blade by an indexing bottom drive roller with an idler roller on top. The indexing roller is fixed in place, while the idler roller is spring loaded against the indexing roller. (See Section 5.1.2.)

A Roller Tension Adjustment Knob is provided to the left of the blade cover. Hold down on this knob to temporarily raise the idler roller and insert material.



Roller Tension Adjustment Knob



NOTE: Maximum roller force is approximately 3.9 kg (8.5 lb). However, the roller tension should be adjusted to no more than what is required to hold the material securely; higher pressures will deform the compliant roller and lead to strip width issues.

The pressure of the spring-controlled idler roller in the down position is adjustable, and may be adjusted to accommodate the material used. Adjust the roller pressure for your material by following these steps:

1. Shut off electrical power by unplugging the machine.
2. Open the clear blade cover over the rollers.
3. Press and hold the top of the Roller Tension Adjustment Knob down and insert the material through the rollers.
4. Release the knob.

5. Loosen the **lock nut** counterclockwise (**CCW**), and turn the **top knob CCW** until the material moves freely through the rollers without making either roller turn. Use one hand on either side of the rollers to move material.
 - Turning top knob CCW loosens the tension
 - Turning top knob CW increases the tension
6. Turn the top knob CW just until pulling the material from either side of the rollers makes **both** rollers turn. (The bottom roller is best observed by looking at the drive pulley.)
7. Tighten the lock nut (CW) after any adjustment.
8. Remove the material, close the blade cover, plug the machine back in, and cut at least 10 test strips to test tension setting. (See the next section for details on cutting test strips. If there is variation in test strip size, loosen lock, tighten top knob ¼ to ½ turn, relock, and test again.)



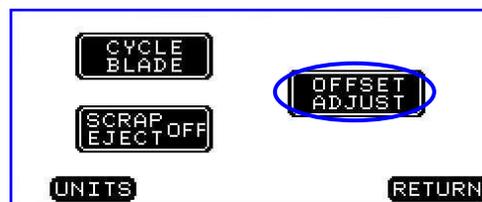
IMPORTANT: Too little pressure may allow product slippage, resulting in inaccurate strip lengths. Excessive pressure may result in inaccurate strip lengths due to flattening of the indexing roller.

5.4.3 Offset Adjustment

Depending on your material, some offset may need to be set to account for any slight differences that may occur between the desired strip size and actual measured cut size. Follow the instructions below to test strip size and make an offset adjustment if necessary.

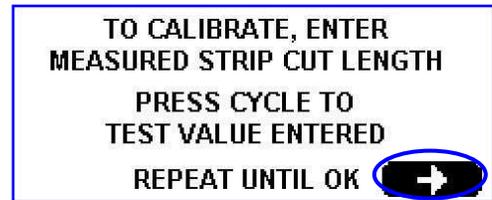
Program the machine to cut 10 strips. (See Section 5.3.3.)

Press the **BLADE DOWN** button on the Main screen. Now feed the material to be cut under the pinch roller (lifting the top roller by pressing and holding down the tension adjustment knob) and push the material up to the lowered blade. Release the tension adjustment knob. Press the **BLADE UP** button. Press the **CUT 1 STRIP** button to cut off the leading edge and discard this piece.

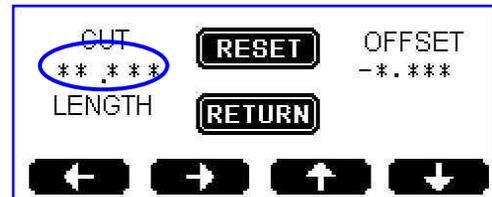


Then press CYCLE pushbutton below the touch screen to cut 10 more sample strips. Measure the length of these strips using calipers. Calculate and record the average measured strip length rounded up to the nearest thousandth. (If variations in strip length is seen, return to the instructions in Section 5.4.2.)

From the main screen, press the OPTIONS button. Then press the OFFSET ADJUST button on the Options screen.



The next screen is an instruction screen. Press the arrow button to continue.



On the OFFSET ADJUST screen, touch the screen on the cut length field. Enter the average measured strip length that was recorded above.

Use the up and down arrows to enter numbers and the left and right arrows to select digits. Press RETURN once to save the value.

The OFFSET field will display the deviation value (the difference between the desired strip length and the measured strip length). If the measured length is larger than the desired length, the OFFSET will be a negative number and future strips will be slightly smaller. If your measured length is smaller than the desired length, the OFFSET will be a positive number.

While still in the OFFSET ADJUST screen, press the CYCLE pushbutton below the touch screen to cut more strips. Measure them and compare the measurement to the desired strip length. If the new measurement is still outside of your company's tolerance range, enter the new average measured value on the screen, cut more strips and re-measure. (If variations in strip length is seen, return to the instructions in Section 5.4.2.) Continue this process until the cut strips are within tolerance.

When the desired strip length has been reached, press the RETURN button to return to the MAIN SCREEN.

The RESET button will return the OFFSET to zero. A warning screen will display before the value is reset. (See the warning screen in section 5.3.7.3.)



NOTE: There are two OFFSET values, one for inch mode, and one for millimeter mode. Setting an offset in inch mode will have no effect in millimeter mode.
When switching between modes the strip length should be verified.



NOTE: The largest change in OFFSET value that can be calculated is ± 3.00 mm (± 0.118 "). If the OFFSET should be outside this range, after pressing RETURN, enter a new length and press RETURN again to increase the calculated OFFSET. If the OFFSET calculates to ZERO, restart the process.

There are no audible or screen alerts when the OFFSET resets to ZERO.



NOTE: If the RESET button on the OFFSET screen is touched, the offset values are set to zero. If the OFFSET screen is accessed, and the Operator chooses not to make an adjustment, touching RETURN will save the current values.

5.5 Summary of Procedure for Cutting Strips

After the machine is set up, the operator sets the size and quantity of the strips needed, loads the material, and presses the **CYCLE** pushbutton.

If the material changes, or the machine is being used for the first time, some setup is required. The following instructions are a guide to setting up a new production run. After the machine is connected to the proper power source, follow the steps listed on the next page. (Don't turn the machine on until steps 1 and 2 are complete.)

1. Be sure the guide rail has been set appropriately for the material width. See Section 5.4.1.
2. Be sure the pinch roller pressure is set appropriately for the material thickness. See Section 5.4.2 for details.
3. Switch the Power Switch at the power entry module to the ON position (I) and verify that the EPO button is pulled up (deactivated). The Kinematic Opening Screen should appear.
4. Press the green ON pushbutton (just under the touch screen). The Main Screen appears (see section 5.3.2) and the machine initializes. The ON pushbutton will remain illuminated.
5. Choose Millimeters (MM) or Inches (IN) by touching the value at the top left of the screen.



NOTE: If the Feature Registration Option was purchased, the correct factory setting of the strip width tested with the material provided to Kinematic prior to delivery is recorded on the STRIP WIDTH field of the **C2360 Feature Registration / Micrometer Setting Sheet** provided with the unit.

This strip width should be less than the actual pitch between features on the input material, so that the motor slows just before the feature is detected.

6. Enter the size and quantity of strips by touching the UNITS button. This opens the Set Units Screen (see Section 5.3.3). Set the values by pressing the value field desired and, using the arrow buttons, change to the value desired. If an incorrect value is entered, press ESCAPE to return to the previously saved value. Press RETURN to return to the Main Control Screen.



NOTE: When setting the strip quantity (QTY.), set to a number that will leave at least 19 mm (.75") of material at the trailing end of each card. The blade will cut accurately only when at least 19 mm (.75") of material is left behind the blade as scrap. If less material is left, the rollers are not holding the material securely and precise strips cannot be cut.

7. Now press the OPTIONS button. On the Options Screen, choose either CLEAR SCRAP ON or OFF. If the Feature Registration Option was purchased, press the FEATURE SENSOR button and follow step 8. If the option was not purchased, go to step 9.
8. At the Set Sensor Screen, follow the instructions for setting the sensor in section 6.3.2. When the sensor is set, return to the Main Screen.
9. Press the BLADE DOWN button on the Main screen.
10. Now feed the material to be cut under the pinch roller (lifting the top roller by pressing and holding down the tension adjustment knob) and push the material up to the lowered blade. Release the tension adjustment knob.
11. Press the BLADE UP button.
12. Press the CUT 1 STRIP button on the touch screen to cut off the leading edge. Discard this piece.
13. Press CYCLE to cut at least ten sample strips. (The number of strips cut was set in 6.)

14. Using a calibrated set of outside calipers, measure the cut strips and write down the measured average. If the cuts are within tolerance, continue with 15. If the average is out of tolerance, troubleshoot the problem with these suggestions:
 - a. Make sure that the material is moving freely between the guide rails. See Section 5.4.1.
 - b. Test the pinch roller pressure. See Section 5.4.2.
 - c. If the Feature Registration Option was purchased, strip width should be less than the actual pitch between features on the input material.
 - d. If the strips are still out of tolerance see section 5.4.3 to adjust the offset.
15. If desired, press the CYCLE pushbutton to cut the remainder of the card into strips.
16. If some scrap card material remains behind the blade after a cycle, it can be pushed through to the output chute with the CLEAR SCRAP button on the main screen.
17. Set the strip quantity to the production cycle number of strips. (See 6.)

Production Steps:

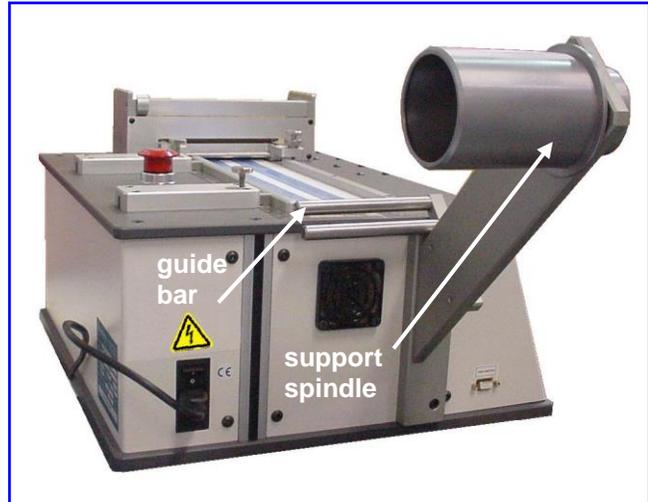
Insert material and keep repeating loading material (execute 9, 10, 11, and 12), then press CYCLE to cut the programmed number of strips, and (if CLEAR SCRAP is not ON) finally press CLEAR SCRAP to eject the trailing edge.

6 INSTALLATION OF OPTIONAL FEATURES

6.1 Optional Support Spindle

The Optional Support Spindle is shipped separately from the main body of the machine. The support spindle assembly is designed to make installation quick and easy.

The Optional Support Spindle is a mechanism to allow roll material to be fed into the system. Unlike the Optional Automatic Roll Feed, this device is not powered. The movement of material from the roll is controlled by the drive rollers pulling it into the blade.



Optional Support Spindle

Adjust the tension by turning the thumbscrew on the back of the spindle. Turn this screw clockwise to increase tension. Keep only enough tension on the support spindle to prevent spool freewheeling. Too much tension affects strip length accuracy.



NOTE: The automatic scrap eject mode should be off for roll feed. On the OPTIONS screen, make sure that **SCRAP EJECT OFF** is selected.

6.1.1 Installing the Optional Support Spindle

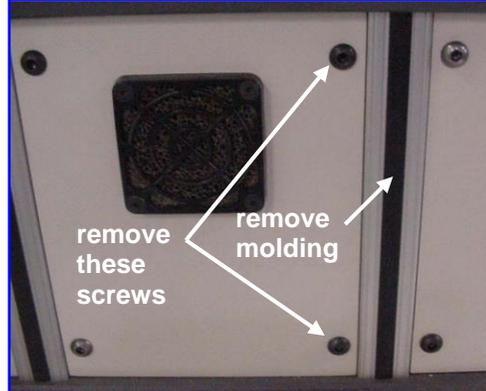
Tools required are:

- 3/16" Hex Key Wrench
- 5/32" Hex Key Wrench

The Optional Support Spindle is delivered with the following separate parts:
Three ¼-20 x 5/8" hex head screws.

Follow these instructions to install the Optional Support Spindle:

1. Remove the two button head screws located on the right side of the fan panel, using a 5/32" hex key wrench.
2. Remove the black vinyl molding of the extruded frame member, located next to the empty screw holes.



Fan Panel on Infeed (Front)

3. Insert the 'drop-in T-nuts' and align them to the empty screw holes on the fan panel.
4. Remove the Optional Support Spindle mechanism from its box and unwrap it, separating the screws.
5. Align the bracket holes with the T-nuts inside of the extruded frame member and screw them in.
6. Tighten the bolts firmly.

6.2 Optional Automatic Roll Feed

The Matrix™ 2360 Programmable Shear may be equipped with an automatic roll feed module. This allows product material to come from a roll. The roll feed module has its own control panel with POWER ON and FORWARD/REVERSE buttons.

A free-loop sensor detects the feed loop when there is enough material fed, and stops the feed motor.

When using this option, relocate the equipment if necessary to allow the web loop to hang freely.

When the sensor is not blocked, meaning material should be fed again, the motor activates to release more material, and then stops as the sensor is again blocked by product from the roll.

The nominal material core is 7.62 cm (3") in diameter. An oversize core is not recommended. Use caution if mounting an oversize core to ensure that the oversize core is centered on the spindle. There is no adapter. In some cases, an oversize roll might 'freewheel', unwinding too much material.

The loop sensor can be adjusted for distance, time, on/off delay, and angle to material. These adjustments offer optimum loop detection for varying materials.



Automatic Roll Feed Module installed



NOTE: The automatic scrap eject mode should be off for roll feed. On the OPTIONS screen, make sure that **SCRAP EJECT OFF** is selected.



NOTE: The White POWER ON switch should be left ON at all times. Power is supplied through the main system.

6.2.1 Installing the Automatic Roll Feed

The Automatic Roll Feed Mechanism is shipped separately from the main body of the machine. The optional equipment is designed to make installation quick and easy.

The Automatic Roll Feed Mechanism is delivered with the following parts:

Two ¼-20 x 1.5" hex head screws with matching washers,
and a new fan panel with a power plug and wiring installed.



ELECTRICAL HAZARD: Disconnect the unit from its power source before beginning any maintenance or repair procedure. If a panel is opened, exposure to live electrical circuits is possible. Failure to follow all electrical safety procedures could result in **SERIOUS INJURY or DEATH BY ELECTROCUTION**

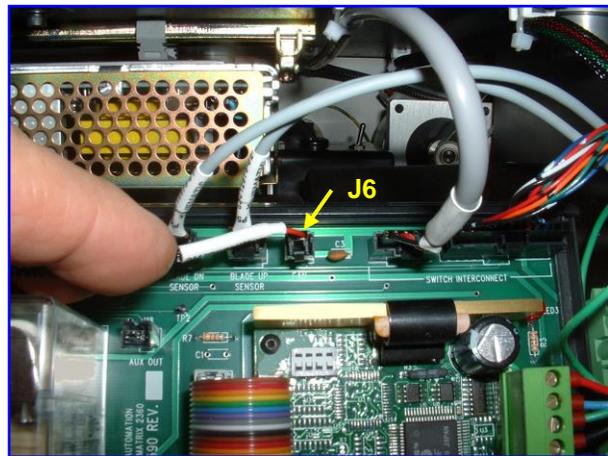
Tools required are:

- 3/16" Hex Key Wrench
- 3/32" Hex Key Wrench
- 5/32" Hex Key Wrench
- 9/64" Hex Key Wrench
- Small, Flat Blade Screwdriver

Follow these instructions to install the Automatic Roll Feed Mechanism.

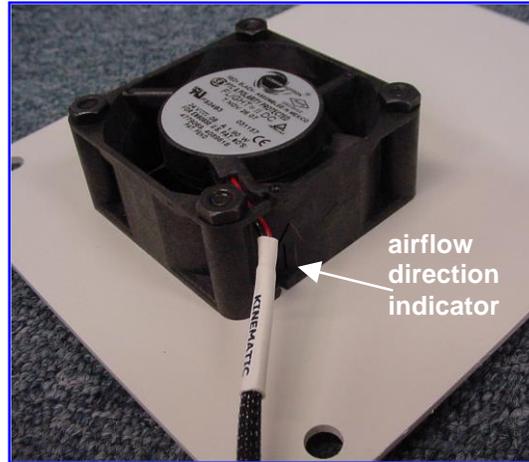
1. Disconnect the equipment by unplugging the cord.
2. Remove the front panel (the panel that wraps around the unit and includes the touch screen) by removing four ¼"-20 black oxide button head screws. Place these screws in a secure location. Do not disconnect the electrical connections. Tilt the front panel face down onto a soft surface. Avoid scratching the touch screen.

3. Trace the J6 fan power lead to the top of the circuit board and unplug the fan. The fan connection point is labeled J6 above the connector and FAN below it. Remove the fan panel by removing four ¼"-20 button head screws. Place these screws in a secure location. When removing the fan panel, thread the fan power cable out of the enclosure.



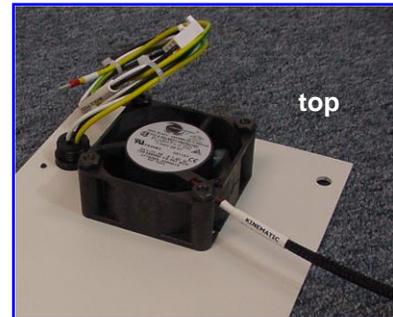
Fan Power Connection

4. Remove the fan from the panel by removing the four 6-32 flat head screws. Observe the fan and filter as you are disassembling it. The fan will be installed in the new fan panel the same way. An arrow on the fan shows the direction of the airflow. It should flow in, toward the main printed circuit board. Retain all fan-mounting hardware in a secure location. Discard the old fan panel. Check the filter. Clean it with a vacuum if needed.



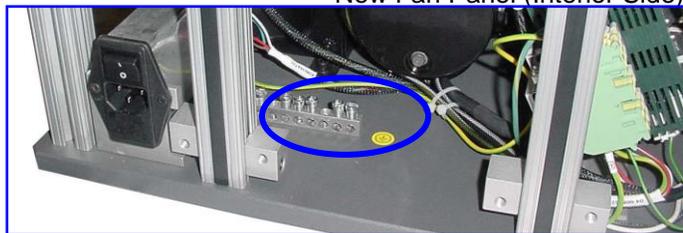
Old Fan Panel (Interior Side)

5. Install the old fan into the new fan panel using the hardware and filter saved from the previous step. There are now two wire sets attached to the fan panel and an additional ground wire attached to the panel itself (not shown). Route the fan wiring back to the fan power source. Plug it in to the same J6 connection on the circuit board where it was connected previously.



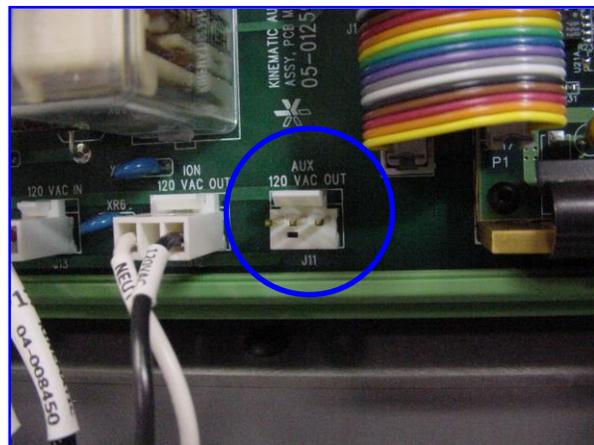
New Fan Panel (Interior Side)

6. Take the yellow and green ground wire **attached to the panel itself** (not shown) and attach it to the terminal block shown in the picture at the right. This block is attached to the base of the main unit behind the fan panel. This grounds the panel.



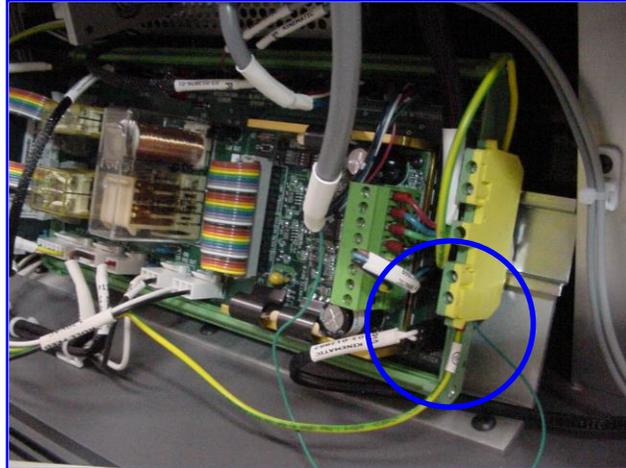
Grounding Terminal Block

7. Find the connection port at the bottom of the circuit board labeled AUX - 120V OUT / J11. Remove the safety cover on this connector. Route the cable from the new socket in the fan panel to this location. Plug in the connector with the light blue and black wires to this port.



Roll Feed Power Connection with Safety Cover Off

8. Locate the yellow and green terminal block to the right of the circuit board. Route the YELLOW and GREEN (ground) wire from the new cable to this location. Move one of the existing ground wires to the top of the block if necessary. Loosen the securing screw with a small screwdriver, insert the connector end of the green wire into the socket, and re-tighten the screw.



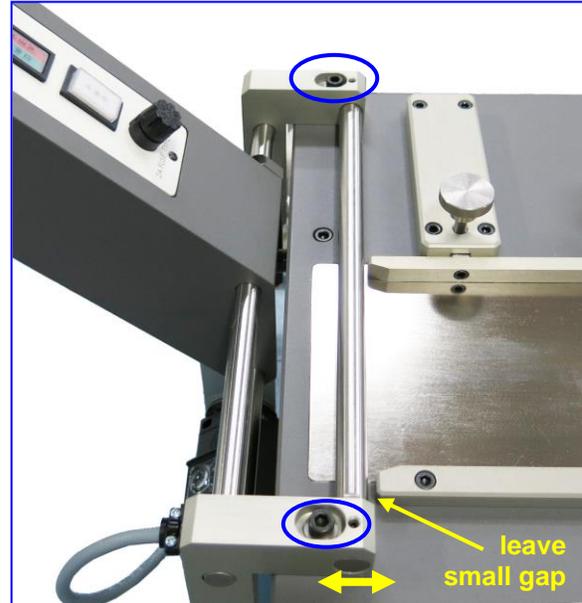
Roll Feed Ground Connection

9. Screw the new fan panel into place using the saved fan panel hardware. The new power connection should be in the upper right hand corner of the fan panel.
10. Remove the two ¼-20 x 0.75" socket head cap screws in the locations indicated with red circles in the picture on the next page from the infeed end of the M2360, using a 3/16" hex head wrench.

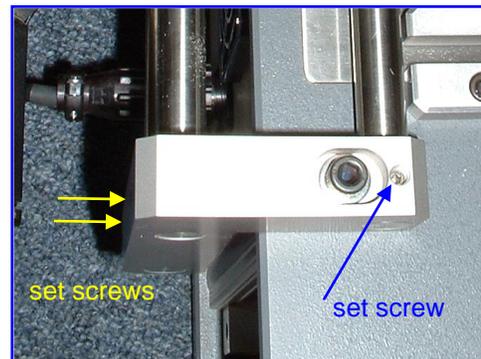


New Fan Panel Installed

11. Remove the Automatic Roll Feed mechanism from its box and unwrap it, separating the screws and washers.
12. Place the new washers and bolts in the slots provided on the roll feed mounting bracket, then place the entire assembly on the infeed end. Loosely screw in the new bolts shown in the red circles.
13. The assembly should not press on the guide rails. Tighten new bolts after adjusting.



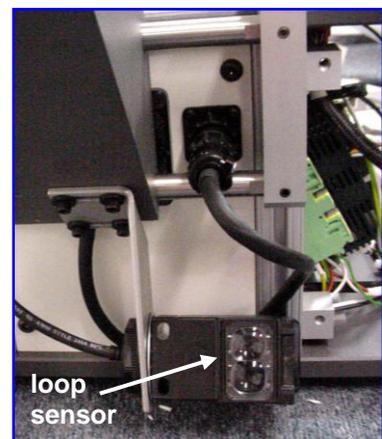
14. If the bolts do not line up with the holes in the M2360 base, the distance between the bracket ends can be adjusted slightly. There are six setscrews (one on each end of each bar) on the support frame. Loosen the three setscrews on one bracket slightly using a 3/32" hex head driver, and adjust the length of the frame so the bolts will slide into the holes on the M2360. Tighten these setscrews after making any adjustment.



15. Plug the quick disconnect screw-in plug on the roll feed power cord into the new socket on the fan panel. Stow the cord so that it does not interfere with the lenses of the sensor.

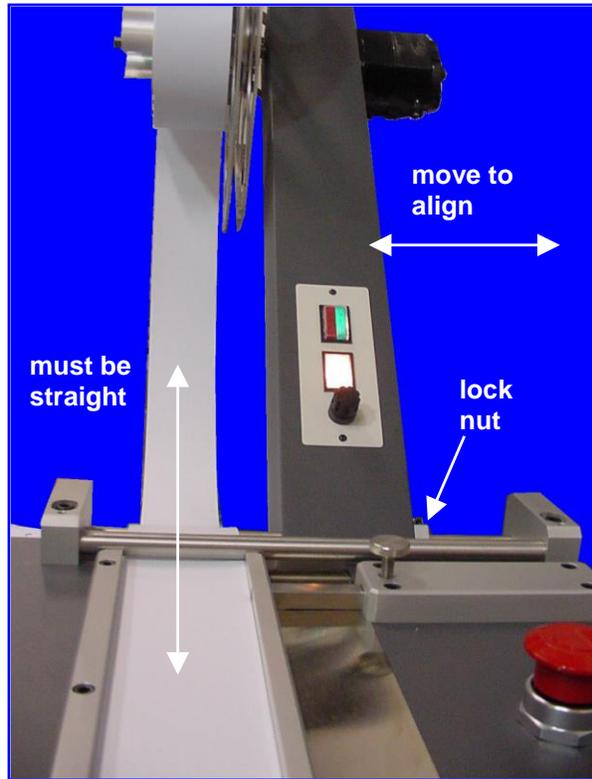
16. Tilt the front panel into place, and secure it with the screws saved for this purpose.

17. Plug the power cord into the equipment, and turn on the power. The roll feed motor should begin operation when there is no material hanging in front of the loop sensor. Hold a piece of web material about 50 cm (2") in front of the sensor, and the motor should stop. Check the fan. The air should be blowing into the enclosure. Turn off the power.



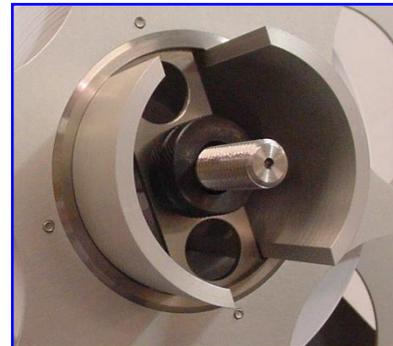
18. Now, adjust the roll feed arm for the size of material by placing the material on the roll and aligning the membrane to the infeed track. The feed arm can be moved to accommodate your material by lifting the arm and sliding it to the right or left. Adjust the web width guide rails.

Aligning Roll Feed Arm



19. Place outside flange on the roll hub to hold material securely. Lock in place.

Roll Hub Lock

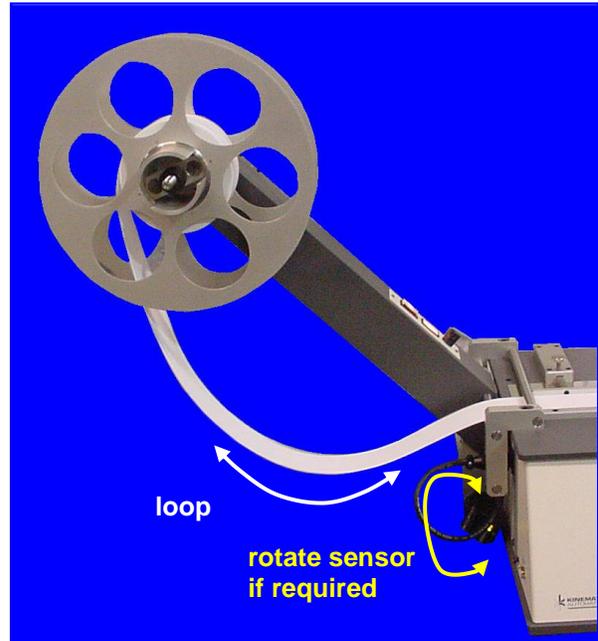


Outside Flange (Interior Side)



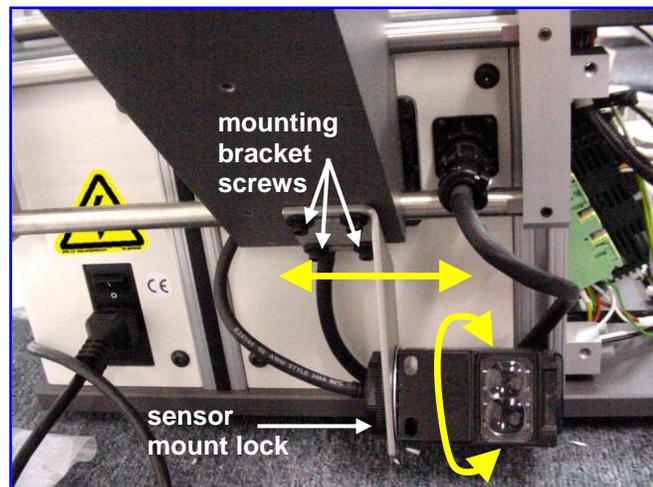
20. Feed material onto the input platen, and allow a little loop to form, hanging in front of the loop sensor. Insert the end of the material into the drive rollers, and set the machine for production as described in the OPERATION section.

21. Adjust the sensor so a generous loop of material is maintained at the infeed end of the machine. Adjust the horizontal position of the material so that the lens array on the front of the sensor cannot look past the material on the roll.



Roll Feed with Appropriate Loop

22. The sensor array should be approximately centered on the roll material. The sensor mounting may be adjusted by loosening the sensor mount lock and changing the sensor angle. The sensor may also be mounted further in or out on the mounting bracket by loosening the mounting bracket screws and shifting the bracket horizontally.

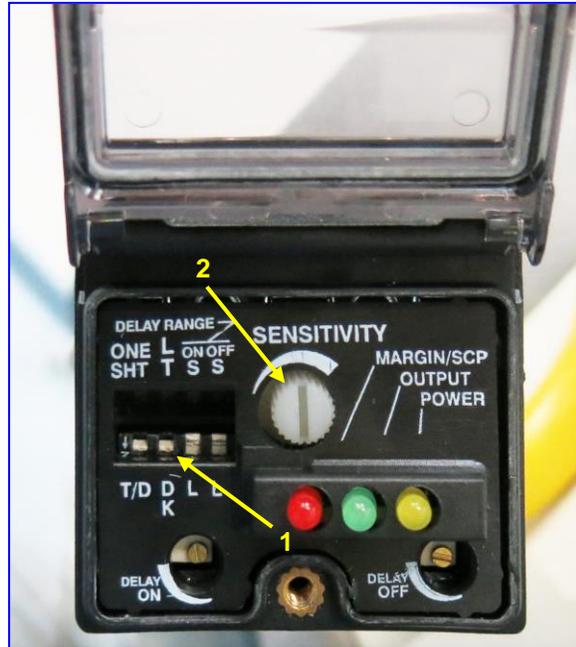


Loop Sensor

6.2.2 Setting the Loop Sensor Controls

The loop sensor adjustment is set before shipment. The settings should be adequate for most applications. If adjustment is necessary for your application, use a small Phillips screwdriver to release the screw holding the sensor controls cover. Open the cover to expose the sensor control panel.

1. Set the Light / Dark (LT /DK) switch to the Dark position (Down).
2. Set the sensitivity control to the mid-point position. Test with material in place after installation. Some materials work best with the sensitivity control fully clockwise.



Loop Sensor Control Panel

3. Slightly loosen the sensor mount (the plastic nut behind the mounting plate). Slowly change the sensor angle downward and observe that the loop gets larger. If a smaller loop is desired, move the sensor angle upward, then put some of the material back onto the roll by manually turning the roll. Continue to adjust the sensor angle until the loop is the desired size. Tighten the sensor mount when done.

The loop size may also be changed by adjusting the sensitivity control. A lower setting makes a bigger loop, and a higher setting makes a smaller loop.

The Light Emitting Diodes (LEDs) indicate the conditions shown here:

Yellow	Power On
Green	Motor Driving (this LED flashes briefly)
Red	In Range (sensor sees loop)

When done, close the sensor cover and secure it with the screw.



NOTE: The White POWER ON switch should be left ON at all times. Power is supplied through the main system.

6.3 Optional Feature Registration

The *Matrix™* 2360 Programmable Shear may be equipped with an optional Feature Registration device. An adjustable registration sensor is mounted in the product path, either just before or just after the guillotine blade. Its purpose is to ensure the product is fed and cut at the correct position, based on a Customer-defined feature on the material to be cut.



NOTE: This option is installed at the factory during manufacture. This is not a field upgrade. For retrofits, the machine must be returned to the factory. Contact Kinematic Sales for more information about this option.

The feature sensor mounting fixture is adjustable closer to, or farther from the blade, side to side, and up and down, to accommodate variations in product registration (notch, mark, hole, & etc.) locations.

Feature sensors may be through-beam, reflective heads, or lasers, depending on the Customer requirements and the material being processed.

For a through-beam configuration, the designated registration mark must present a difference in light transmission when the registration point is presented. For the reflective configuration, the product should present a sharp difference in reflectivity at the desired location. The sensor may be set to trigger on a light-to-dark, or a dark-to-light transition.

The feature registration option uses a micrometer-mounted optical sensor located at a selected point near the guillotine blade. The sensor may be located on the infeed side, or on the outfeed side, depending on the Customer specifications for the machine and the materials used. Adjustment is controlled by a micrometer-positioning unit, which is an integral part of the sensor mount.

When Feature Sensing is ON, the card will be fed as follows.

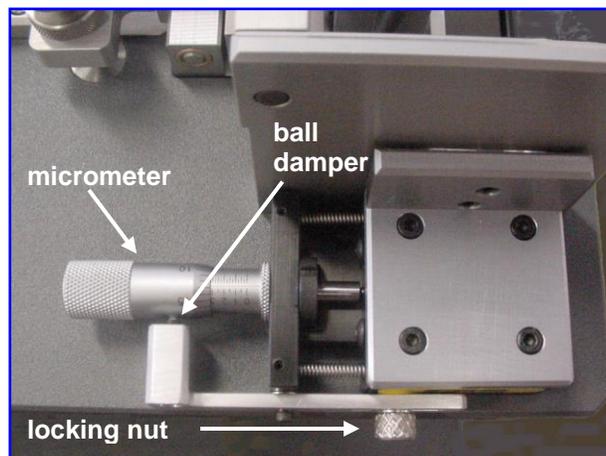
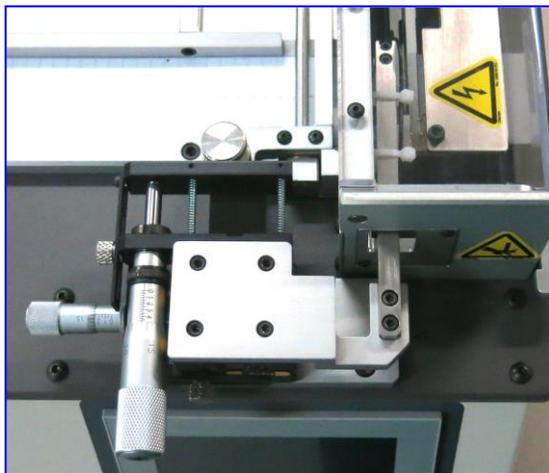
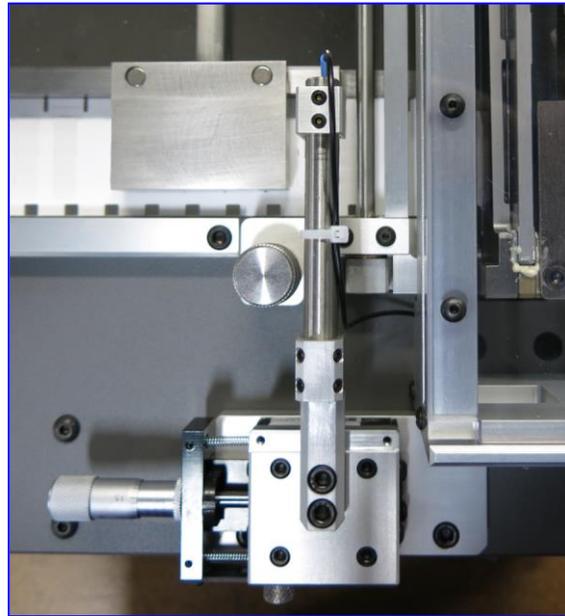
- 1) The drive will quickly feed the card to the programmed strip distance (set on the SET UNITS screen of the HMI touch screen),
- 2) The drive will then feed slowly until the sensor/amplifier signals that the feature is detected.
- 3) The drive will stop and trigger the shear to cut the strip.

So to find the first registration feature and cut the leading edge scrap, the feature must be no more than 1 strip width from the sensor. See Section 6.3.4.

In the illustration at the right, the sensor support arm is outside of the blade safety shield.

The lower illustration on the right shows the micrometer placed in a different location. In this case, the sensor support arm goes through the side of the blade enclosure.

Some units have the sensor arm on a dual micrometer stage so that the position of the sensor can be finely adjusted in both the x and y axes.



Some micrometer-positioning units are fitted with a barrel pressure ball damper and a knurled nut on a restraining bar. When adjusting these units, do not release the pressure applied by the ball. The ball damper only keeps the micrometer barrel from movement caused by the vibration of the machine. It will not interfere with the adjustment of the micrometer. The restraining system helps to hold the accurate setting of the micrometer.

6.3.1 Micrometer Adjustments

The micrometer determines where the sensor is located, so it determines where the cut will be made.

The X-axis micrometer controls the position in the x-axis, the direction of material travel. It allows positioning the sensor closer to, or farther from, the shear blade. The x-axis micrometer adjusts how close to the registration feature the cut will be.

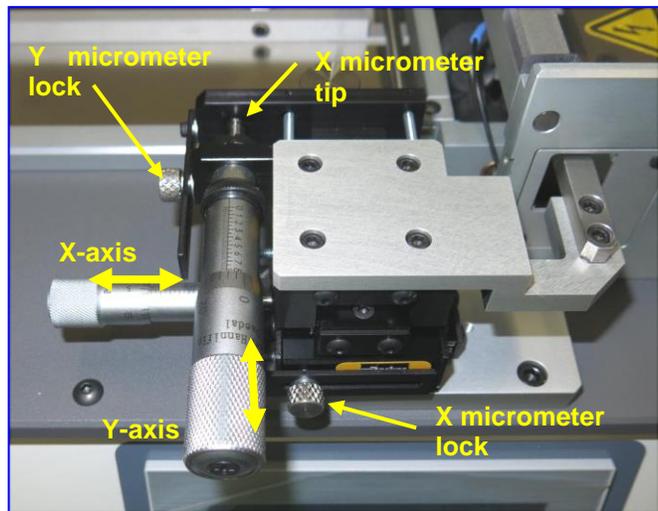
If there are 2 micrometers, the Y-axis movement positions the sensor at a selected point across the width of the card. It is controlled by adjusting the Y-axis micrometer. This micrometer has been carefully factory-adjusted for the materials provided. If the y-axis distance from the registration feature to the edge of the card varies somewhat, adjust it to be in the middle of the range.



IMPORTANT: Be careful when adjusting the micrometers. Make sure that the sensor bracket does not interfere with the die block, the blade, or the pinch roller. It may be preferable to make either the X or the Y adjustment first depending on clearance.

See the C2360 Feature Registration / Micrometer Settings sheet shipped with the unit for the factory settings.

- 1) Make sure that the micrometer tip is in contact with its mating surface, before releasing the knurled knob lock.
- 2) Unlock the micrometer using the knurled knob.
- 3) Rotate the micrometer to change the distance.
- 4) Relock using the knob.
- 5) Test the registration setting by cutting strips.
- 6) Record the setting for future reference.



IMPORTANT: Always unlock the micrometer with the knurled knob before adjustment. Secure the lock and record the new setting after the adjustment is tested.



NOTE: Refer to Section 7.14 for sensor replacement details.

6.3.2 Set Registration Sensor Amplifier Settings

This screen appears on the touch screen when the registration sensor is installed, and the FEATURE SENSOR button is pressed on the OPTIONS Screen. The FEATURE SENSOR button on the OPTIONS screen appears only if the feature registration option is installed. See Section 5.3.5.



The **FEATURE SENSING ON/OFF** button is used to enable or disable the optional feature registration. When Feature Sensing is ON, the signal from the sensor amplifier will be used each cycle to control the pinch drive and locate the material correctly before the shear is activated.

The **REGISTRATION SENSOR** indicator on the HMI screen will be darkened when the sensor/amplifier detects the feature.

The sensor amplifier settings have been optimized at the factory and recorded on the sheet supplied with the unit. If the material and/or the ambient light near the sensor changes, the sensor amplifier may need to have its trigger point re-set. The model of amplifier depends on the materials and the registration features supplied to Kinematic at the time of purchase.



NOTE: See Section 7.14.2 for additional details on adjusting the sensor amplifier settings.

6.3.3 Testing and Adjusting the Registration Feature for Speed

After turning the machine on, press the BLADE DOWN display. The blade moves to the down position and the display changes to read BLADE UP. Press the roller tension adjustment knob to allow the material to slide between the rollers and slide it through to just touch the blade. Release the roller tension adjustment knob, and check that the material is securely positioned. Press the BLADE UP display.

Choose INCHES or MM. Press the OPTIONS display, choose SENSOR, and turn FEATURE SENSING ON. Return, then turn on SCRAP EJECT.

Press the UNITS display, and enter a strip or card length that is approximately **0.5 mm (.02") less than the actual strip or card length desired**. The machine will move the material the programmed length at a high speed and then begin to look for the signal from the sensor/amplifier. The machine continues to move the material at

a slow speed until the feature sensor detects the selected feature, then stops and shears the card or strip.



NOTE: A Quality Assurance data sheet packed with the *Matrix™ 2360* records the settings used during qualification. These settings should work well unless the material or light conditions are changed. See Section 7.14.1 for adjusting the focus of the registration sensor or Section 7.14.2 to adjust the amplifier settings.

With new material, initially set the programmed length about 0.5 mm (.02”) short of the desired length. Observe that the machine is working correctly at that setting. Adjust the micrometer if necessary to achieve the desired results.

Test the settings by pressing CUT ONE STRIP. This first strip may or may not be the correct length. Treat it as scrap. Press CUT ONE STRIP several more times, and measure the resulting cards or strips, comparing each length to the specifications. Inspect and measure at least 10 strips with calipers after any change.

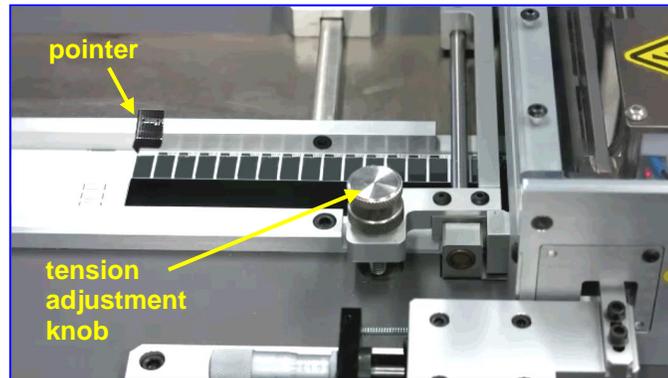
If cuts are not precise	Reduce the programmed length. Test that the SENSOR indicator is reliably changing state as the feature moves under the sensor. (See Section 6.3.2)
If the cuts are precise, but there is a noticeable delay before each cut	Optimize for speed by increasing the length by a very small amount.
If the cuts are consistent, but too soon or too late	Adjust the micrometer (see Section 6.3)
If cuts are not made at all	Check that FEATURE SENSING is turned ON. Check that the SENSOR indicator is changing state as the feature moves under the sensor. (See Section 6.3.2) Reduce the programmed length.

6.3.4 Leading Edge Alignment Pointer

The pointer supplied on the guide rail is used to simplify aligning the card for the first cut that cuts off the leading edge scrap. Use of this aid places the card in the correct location for the automatic detection of the remaining registration features even when the leading edge of the material with the same features varies from card to card. It has been factory-adjusted to align with a feature on the product supplied to Kinematic.

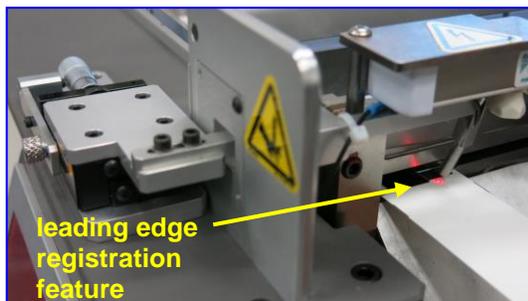
To use the pointer, follow these steps:

- 1) Press down the tension adjustment knob to pass the card between the rollers and slide the card forward to visually align the pointer with the feature on the card used at factory testing.
- 2) Press the CUT 1 STRIP button on the HMI screen to cut off the leading edge of the card. Discard this piece.
- 3) Then press the CYCLE button or footswitch to cut the remaining strips.
- 4) Finally press the CLEAR SCRAP button to eject the trailing edge of the card.

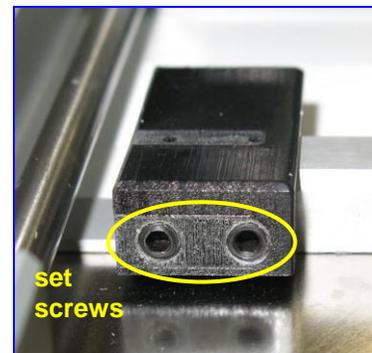


6.3.4.1 Adjusting the Pointer

The pointer is adjustable for various products by loosening the set screws at the rear of the guide rail. The tip of the pointer must be above the card, otherwise it can damage the card as it moves along the track.



Align it so that it points at a feature with the card far enough forward so that the leading edge registration feature is within a strip width of the sensor beam.



6.4 Optional Output Card Guide

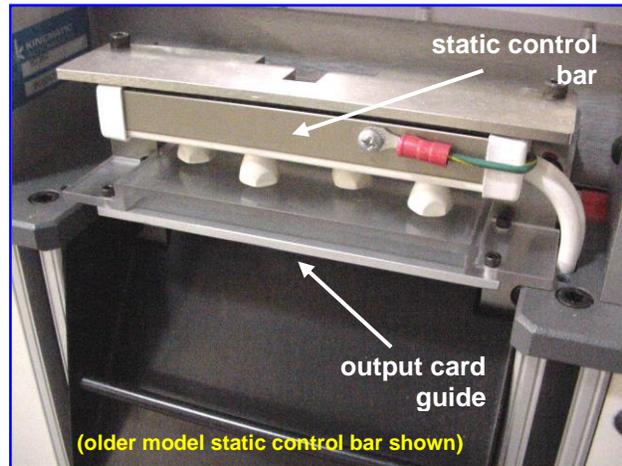
An optional card cutting guide fixture may be installed on the rear of the machine, above the output chute. The purpose of the output card guide is to guide long cards or strips out from the machine horizontally, past the output chute.

It is easily installed and removed. If purchased, it is delivered uninstalled, in the Matrix™ 2360 shipping crate. **Turn off the electrical power to the unit with the main switch on the power entry module.** Open the clear blade cover and rest it on the shelf just below the output slot.

Close the blade cover after installation.



Output Card Guide



Installed Output Card Guide

6.5 Optional Magnetic Exit Guide

One or more magnetic exit guide bars can be placed on the output chute to guide the strips into a narrow path. The bars adhere magnetically and are easily moved.



Magnetic Exit Guide

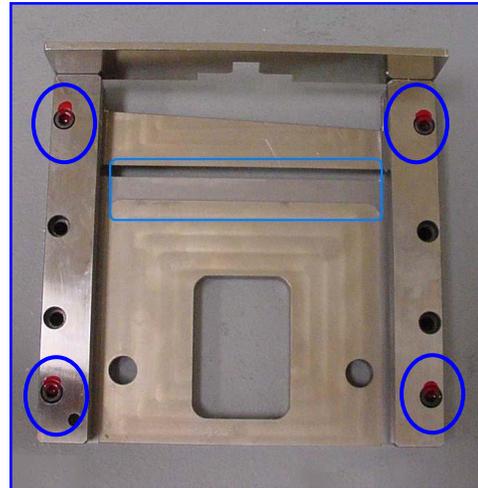
7 MAINTENANCE

7.1 Factory Sealed Settings

There are some critical adjustments made to the machine at the factory which should not be adjusted in the field except by trained technicians. These adjustments are indicated with red sealant that will flake off if the adjustment is changed.



IMPORTANT: Do not loosen, remove, or adjust areas marked with red sealant.



Areas Marked With Red Sealant

7.2 Preventive Maintenance

Turn the power off before beginning any preventive maintenance procedure. See Section 3.2 for important information of how to safely shut the machine down for maintenance procedures.

The frequency for various maintenance procedures listed below is a suggestion only. The frequency varies with throughput and materials used. Perform procedures as needed and keep a log of all maintenance performed on the machine.



IMPORTANT: Certain chemicals and cleaning agents may be hazardous to the equipment. MEK, Acetone, cleaners containing abrasives, and other substances could cause degradation or failure of various components. Harsh chemicals should not be used on this equipment.



NOTE: The STRIP COUNT field on the OPTIONS screen can be used to schedule maintenance procedures such as blade sharpening.

MAINTENANCE OBJECT	FREQUENCY / PROCEDURE
<p>BLADE ASSEMBLY</p>	<p>DAILY, or as needed: Inspect and clean the blade assembly (without die block disassembly) using denatured alcohol and cotton swabs. Lubricate the blade before reinsertion. See Sections 7.3, 7.4 and 7.10.</p> <p>Clean the exposed surfaces in and around the blade area using a soft cloth and/or cotton swabs and denatured alcohol. Do not use water.</p> <p>CAUTION – the blade is sharp.</p>
<p>DIE BLOCK CLEANING and LUBRICATION and DRIVE ROLLER CLEANING and LUBRICATION OF BLADE DRIVE ARM BEARINGS</p>	<p>WEEKLY: Remove the blade from the die block. Refer to the instructions in section 7.3. Remove the die block with the instructions in Section 7.6.</p> <p>CAUTION – the blade is sharp.</p> <p>Clean the front, back, and edges of the blade frame as described in Section 7.4. Clean and lubricate the die block as described in Sections 7.7 and 7.8. Be careful to remove all product debris and lint.</p> <p>Using the grease specified in Section 7.8, lightly lubricate the die block channels and the edges of the blade frame.</p> <p>While the die block is removed, clean both pinch drive rollers with a soft lint-free cloth dampened with isopropyl alcohol. Remove all adhesive and other contaminant buildup. Do not gouge roller.</p> <p>Before reassembling the drive arm to the blade, apply a small amount of the grease specified in Section 7.8 to the needle bearings using a lint-free applicator.</p>
<p>STATIC CONTROL BAR</p>	<p>WEEKLY: Check for dust and/or debris around groove. Blow off with low pressure clean, dry, filtered air. Be careful not to bend or break the metal pins inside the groove.</p> <p> Wear a protective mask to avoid breathing any dangerous dust or fibers collected in the static control bar if the materials cut have been treated with any hazardous substance. Refer to the MSDS for information about the chemicals used in your process.</p>

MAINTENANCE OBJECT	FREQUENCY / PROCEDURE
<p>BLADE SHARPENING</p>	<p>MONTHLY: While the equipment is disassembled for lubricating, remove the blade from the die block. Refer to the instructions in section 7.3. Sharpen the blade as indicated in Section 7.5</p> <p>Return blade to Kinematic for sharpening/repair/replacement if any signs of damage are seen.</p> <p>CAUTION – the blade is sharp.</p>
<p>FAN FILTER</p>	<p>AS NEEDED: Periodically inspect the foam filter material at the intake of the cooling fan. If this material is dirty, remove the four screws holding the fan grill in place. Remove and wash the filter material in warm soapy water. Rinse, dry, and reinstall.</p>

7.3 Blade Removal

Use this procedure when removing the Guillotine Blade for cleaning, lubricating, or sharpening.



ELECTRICAL HAZARD: Disconnect the unit from its power source before beginning any maintenance or repair procedure. If a panel is opened, exposure to live electrical circuits is possible. Failure to follow all electrical safety procedures could result in **SERIOUS INJURY** or **DEATH BY ELECTROCUTION**



CAUTION: Guillotine blades are very sharp, and could cause **SERIOUS INJURY**. Handle the guillotine blade as you would a very sharp knife. Please be careful.



IMPORTANT: If the top and bottom pairs of screws on the die block (the screws marked with a red substance) are loosened or removed, the die block alignment will be destroyed. The blade will not fit properly and will not cut properly. This problem cannot be fixed without specialized factory tools.



Do not loosen these screws.

Removal Tools:

- $5/32$ " or $3/16$ " Hex Key Wrench, for the Chute screws
- $7/64$ " Hex Key Wrench, for the Drive Bar
- $9/64$ " Hex Key Wrench, for the Static Control Bar Bracket

Cleaning Supplies:

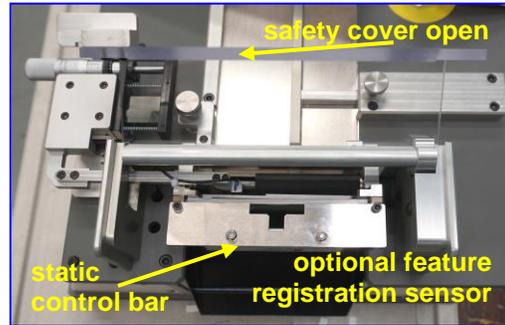
- Clean, dry cloth
- Cotton swabs
- Soft wood scrapers
- Cleaning solvent (denatured alcohol is recommended)
- Lubricant (White Lithium grease, see Section 7.8)
- Lubricant syringe (see Section 7.8)

Sharpening Tools (Blade Sharpening Kit, Kinematic P/N 19-036455, see image in Section 7.5):

- Diamond hone, fine (medium or course may be required for damage repair)
- Grit stones: Fine and UltraFine
- Blade sharpening fixture, Kinematic P/N 21-036455: Assy., Blade Sharpening (See Section 7.5.)

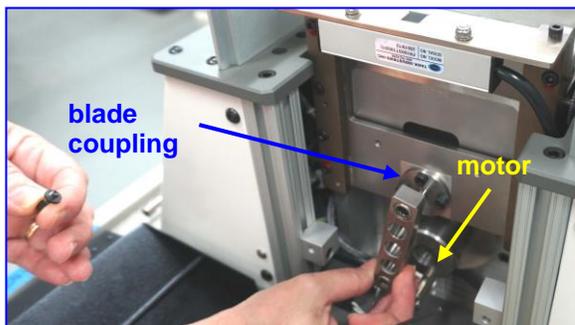
To remove the blade:

1. Lift the safety cover up.
2. If this machine is equipped with the optional feature registration sensor, be sure that the sensor support does not interfere with the blade removal. In certain circumstances, it may be necessary to adjust or remove the sensor support to avoid damage during the blade removal process. Only move this if the sensor is in the way. Save all removed parts in a secure location for later reassembly.



NOTE: If it is necessary to adjust the sensor to remove the blade, be sure to record the micrometer setting prior to adjusting it. Restore this setting after replacing the blade.

3. Use a $\frac{3}{16}$ " Hex Key Wrench to loosen the two $\frac{1}{4}$ -20 screws from the output chute. These are captive screws so they cannot be misplaced. Remove the chute.
4. With the chute removed, the connecting bar (Drive Arm) between the motor and the blade coupling can be removed by removing the $\frac{7}{64}$ " screw from the blade coupler and sliding the bar off the motor and the blade.

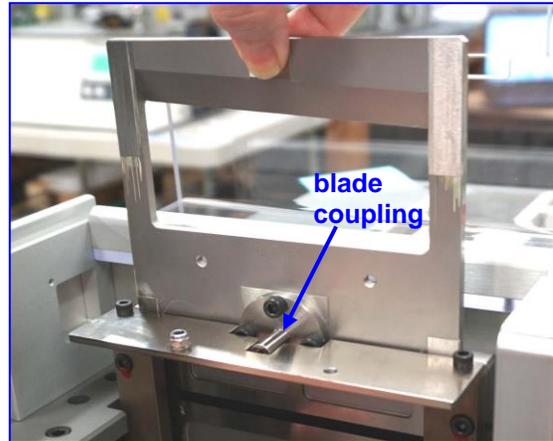


5. The static control bar bracket must be removed to remove the blade. Use a $\frac{9}{64}$ " hex key wrench to remove both screws that connect the bracket to the die block. Leave the bar power cord attached; do not pull on it.



6. Using the blade coupling as a handle, lift the blade until the top is high enough to safely grasp it at the top to lift it the rest of the way out.

The blade coupling does not need to be removed.



7. Now, carefully grasp the top of the blade, **keeping your fingers out from under the blade**. If you drop the blade, it could cause serious damage to your fingers. Pull it out the top of the assembly. While pulling the blade out, grease at both sides will become apparent. The sides must be greased again after cleaning and before re-installing the blade.
8. While the blade is removed, clean the grease from the die block guides. Inspect the die block for excessive wear.

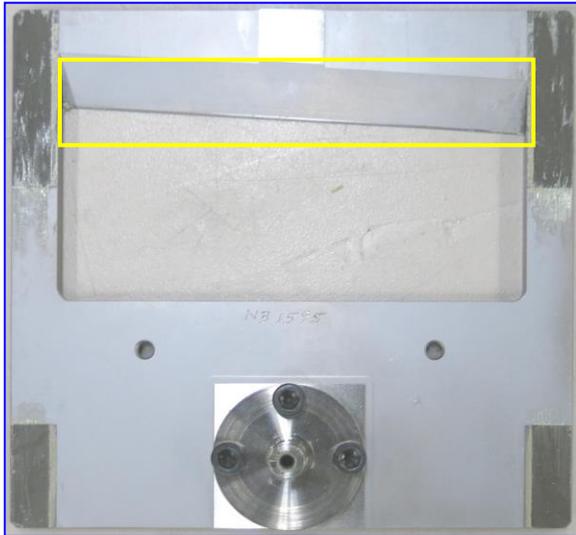


IMPORTANT: If the top and bottom pairs of screws on the die block (the screws marked with a red substance) are loosened or removed, the die block alignment will be destroyed. The blade will not fit properly and will not cut properly. This problem cannot be fixed without specialized factory tools.

9. Clean the blade. See the next section. Remove all traces of the used grease.
10. Refer to Section 7.10 for lubrication and reassembly information.

7.4 Cleaning the Blade

Use a solvent suitable for dissolving and removing any adhesive or other residue from the blade. Do not use any metallic scraper to remove the debris. Use only cotton swabs, soft shop towels, and soft wood scrapers. Clean the areas indicated.



Blade Front



Blade Rear



IMPORTANT: Before replacing the blade, it should be lubricated as described in Section 7.10.

7.5 Sharpening the Guillotine Blade

Kinematic has designed a blade support fixture that will help to accurately sharpen a 2360 blade.

The fixture is designed to securely support the blade at the correct angle for sharpening. Observe the cutout for the blade, and note that the bolt secures the blade to the fixture through the blade coupling hole.



Blade Sharpening Fixture

The old model was designed for standard size 2360 blades. The new model supports both wide blades and standard blades. The new model has 2 holes for the bolt to secure the blade to the fixture through the blade coupling hole. Some of the photos in this document show the older model which can still be used for this procedure.

The kit can be ordered by contacting Kinematic Sales. Place an order for **Assy., Blade Sharpening, P/N 19-036455**. The kit includes a blade support fixture, three diamond hones (coarse, medium, and fine), and two burr removal stones, a medium grit stone and a fine grit stone. The blade support fixture consists of a machined support stand, a washer, and a socket head bolt.

The kit looks like this. The bolt and washer in this image are in the hole for the standard size blades. The hole on the right is used for wide blades.



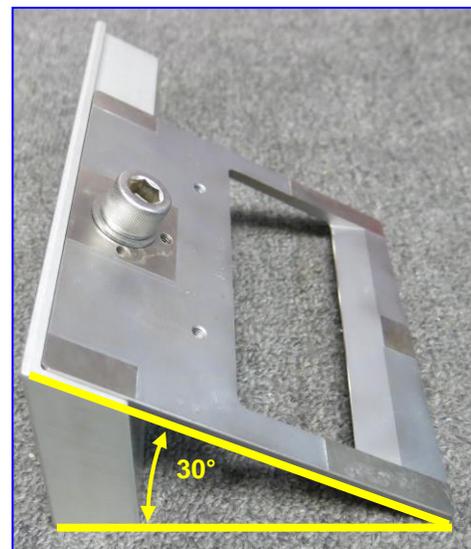
NOTE: A short instructional video on blade sharpening is available from Kinematic. Contact Kinematic Sales Department for information about viewing this video over the internet.

7.5.1 Assembling the Fixture & Blade

Remove the blade drive coupling.

Mount the blade onto the blade sharpening fixture using the supplied socket head bolt and washer.

This fixture supports the blade at a 30° angle. This is the correct angle for accurate blade sharpening.



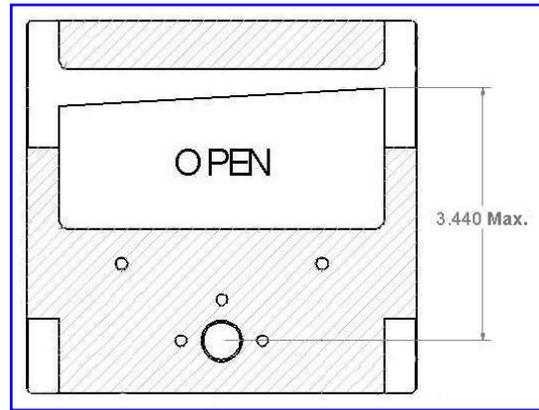
Assembled Fixture & Blade

7.5.2 Blade Specifications

There is a limit to the number of times a blade can be sharpened. Because the sharpening process removes a little of the edge each time, eventually the edge is far enough from the blade drive arm that it will not cut correctly.

If the measurement from the center of the drive hole to the high end of the blade edge is 3.440" or more, the blade has probably reached the end of its useful life.

Kinematic drawing 21-00819 shows the blade as manufactured. This illustration is similar to part of that drawing. Use this drawing as a guide to measure your blade.



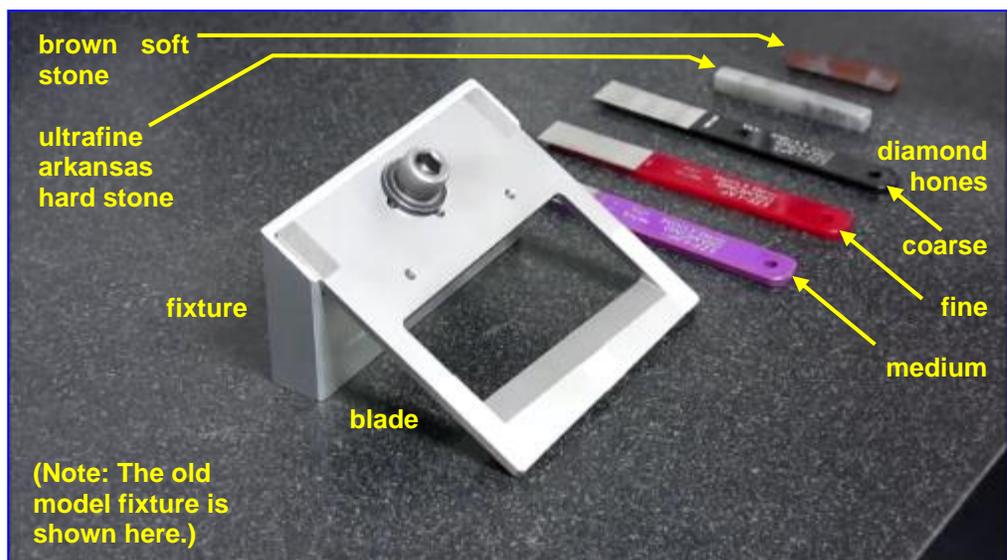
Measure Blade

Depending on the width and type of material, it may be possible to continue to use a blade that has been sharpened to or even beyond this measurement. If it does not work correctly when sharpened beyond 3.440", then the blade must be replaced.

7.5.3 Sharpening Process

Carefully inspect the cutting edge of the blade. Small sections of damage such as nicks can be corrected. Any damage that goes deeper than approximately 0.50 mm (0.020") may not be repairable. See the previous section.

1. Place the assembled fixture and blade on a firm, non-skid surface.



Blade Sharpening Kit

- Carefully examine the blade edge to determine the correct diamond hone to use. If the edge has some damage, the honing process could start with a coarse or medium hone, then finish with the fine hone. For the purpose of this discussion, we will consider that the blade is very dull and will choose the coarse diamond hone.
- If removing damage, be sure to remove the same amount of metal the full length of the edge. Inspect to see that the edge is straight when the sharpening is finished.

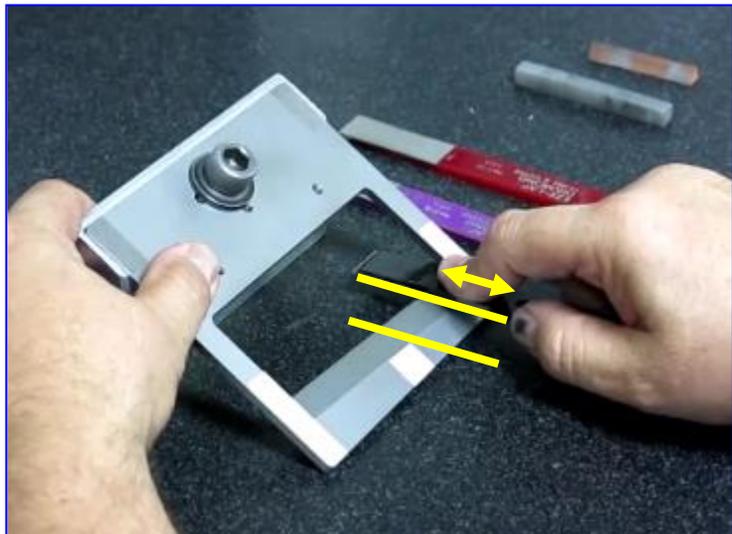


IMPORTANT: Be patient and careful. Always keep the hone parallel to the work surface and keep fingers behind the blade edge.



CAUTION: These blades are very sharp, and could cause **SERIOUS INJURY**.
Handle the blade as you would a very sharp knife.
Please be careful.

- Hold the hone so it is parallel to the surface of the workbench. Keep your finger on the hone so that it is never over the sharp edge.
- Starting in one corner, use short forward and back strokes pushing down firmly until a burr forms on the back (flat side) of the blade.
- Repeat on the other corner.



Burrs formed on back of blade

7. Only after the corners have a noticeable burr, begin forward and back motions along the length of the edge.
8. Once a small burr is detectable, begin side to side motions with the hone until a burr is present along the entire rear edge of the blade. Keep the hone parallel with the work surface. This can take several minutes.



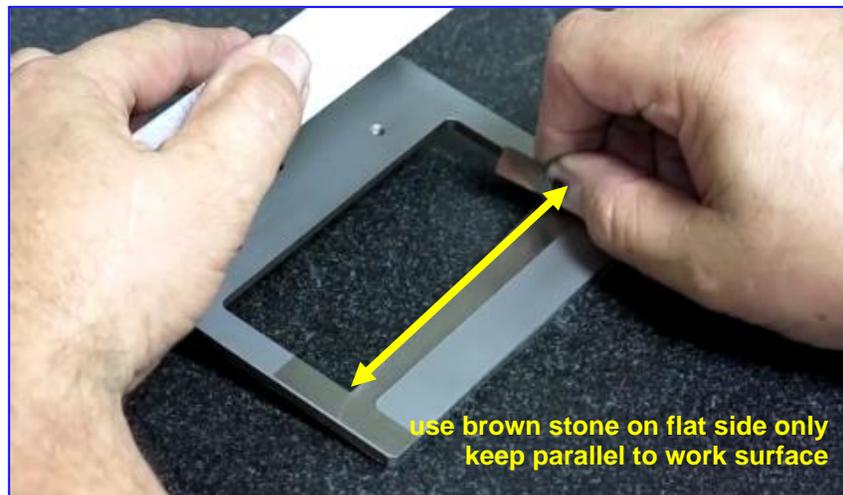
Honing the Edge

9. Remove the same amount of metal along the entire edge. The edge should be straight when the sharpening is finished.
10. Keep checking the back of the blade during the honing process. There should be a small burr along the entire length of the edge. If the burr cannot be detected along the entire length of the edge, turn the blade over and continue with the hone.



IMPORTANT: Do not try to sharpen from the back side (the flat side) of the blade. This side must be absolutely flat to work with the die block. Honing an angle from this side will cause the blade to fail.

11. After a burr has developed along the entire edge, turn the blade over and lay it flat on the workbench.
12. Hold the brown triangular fine soft stone parallel with the work surface and the blade.



Make complete side to side passes with the stone until there is no resistance. This pushes the burr to the far side of the blade.

13. Turn the blade back over and hold the white ultrafine Arkansas hard stone parallel with the work surface. Make complete side to side passes with the stone until there is no resistance. This pushes the burr back to the flat side of the blade.



the white stone can be used on both sides

14. Repeat steps 12 and 13 until the burr peels off. When the burr is almost gone, the white Arkansas hard stone can be used at a slight angle to remove the last traces of the burr.



CAUTION: Do not attempt to remove the burr with a fingertip. This can result in injury.

15. Test the sharpness by drawing the edge of a strip of paper along the sharpened edge. The edge should cut the paper smoothly without tearing it.
16. When the blade sharpening process is done, dust off the blade and then wipe it with a soft cloth and denatured alcohol. Dry the blade before beginning the reassembly.



NOTE: Before reassembling the blade is a good time to inspect the die block and clean the rollers. See Section 7.11.



NOTE: If the die block will not be removed for additional cleaning and lubrication, proceed to Section 7.10.

7.6 Removal of the Die Block

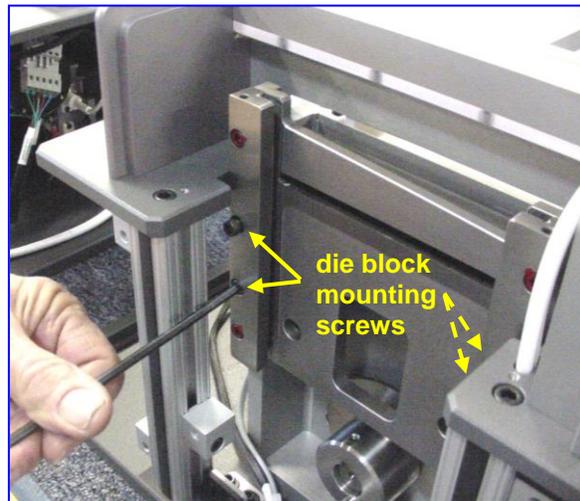
Removal of the die block makes it easier to clean and re-grease the blade path, but it is not absolutely necessary unless the die block has visible adhesives or debris that require cleaning with solvents. The same tools, solvents and lubricant that are used on the blade are used on the die block. Remove the blade (see Section 7.3) prior to removing the die block.

Follow the directions in Section 7.3 for removing the chute, the static control bar bracket, and the blade. Leave the static bar power cord attached; do not pull on it.

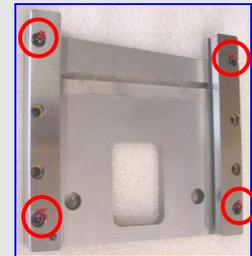
There are eight screws on the face of the die block. Four of them are coated with a red locking substance, which is easily visible when the disassembly process has reached this point.

Do not try to loosen these four screws marked with red sealant.

The other four screws (center pair on either side) are the die block mounting screws. Remove the die block mounting screws.



IMPORTANT: If the top and bottom pairs of screws (the screws marked with a red substance) are loosened or removed, the die block alignment will be destroyed. The blade will not fit properly and will not cut properly. This problem cannot be fixed without specialized factory tools.

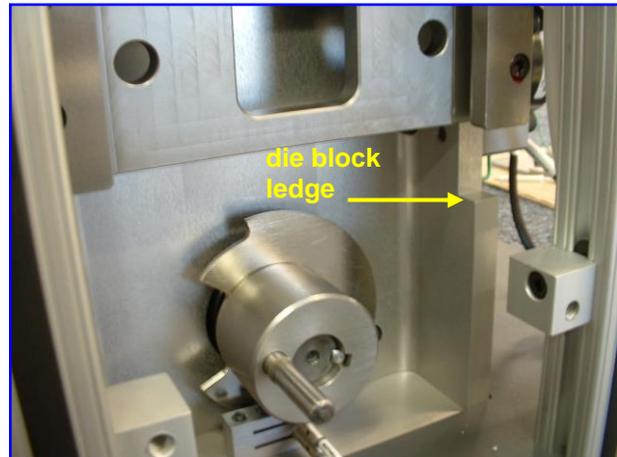


As the die block is being removed, observe the aligning ledges that support it.

When the die block is reinstalled, the block must be resting on these ledges.



CAUTION: The sharpened edge of the die block is sharp enough to cause injury.

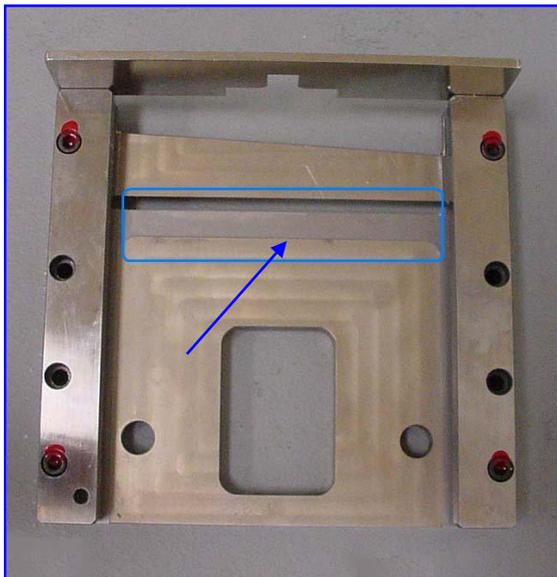


Die Block Ledge

7.7 Cleaning the Die Block

Use a solvent suitable for dissolving and removing any adhesive or other residue from the die block. Do not use any metallic scraper to remove the debris. Use only cotton swabs and soft wood scrapers. Clean the areas indicated in the illustrations, and be sure to clean the inside of the blade guides, including the remaining grease in the grooves of the blade guides. This area can be cleaned using a long cotton tipped swab. Flatten the cotton tip to make it easier to reach into the grooves. See the illustration on the following page that shows the grease in the groove.

The blue arrow points to the area on the inside of the die block where adhesives and debris can collect. This surface works with the sharp edge of the guillotine blade to cut the material.



Die Block Sharpened Edge



Die Block Rear Ledge

Clean the rear ledge of any material that may have collected there.



NOTE: While the die block is removed, there is much better access to clean the pinch rollers. See the User Manual.

7.8 Lubricating the Die Block

General Purpose Grease

Renolit ST 80 - White Lithium Grease with PTFE (polytetrafluoroethylene)
NLGI⁶ 2.5
Kinematic P/N 51-044923
Temperature range -10° to 300 °F (-23° to 150 °C)

The inside of the blade guides should be lightly lubricated on all three sides where the guides might contact the blade. The grease may be applied by using a long cotton tipped swab coated with the grease.

There is also a groove on the right and left side of the blade guide area that must be filled with grease. See the illustration to identify the location of the grooves. Only one side is illustrated. The other side has a similar groove. The illustration shows a groove already filled with grease to help make it easy to see.



Grease in the Die Block Groove

Putting grease into these grooves is important. The following illustrations show how a small syringe loaded with grease is used to fill the grooves.



Grease Syringe Applicator

⁶ National Lubricating Grease Institute



Using a Grease Applicator

7.9 Reinstalling the Die Block

When reinstalling the die block, do not over tighten the four mounting screws. If the screws are too tight, they could deform the die block. Tighten all four screws equally.

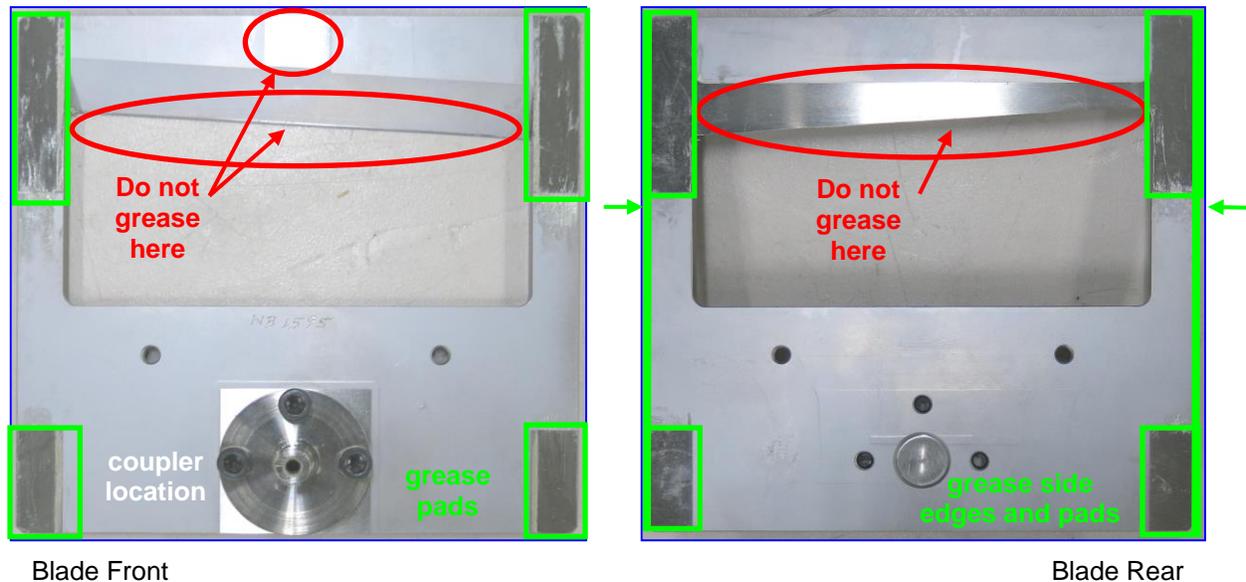
Usual tightness torque on these screws is between 5.761 and 9.217 kgf·m (50 and 80 inch-pounds). Do not exceed 9.217 kgf·m (80 inch-pounds) on these mounting screws. Too much torque could cause the die block to flex, and bind the blade.

7.10 Lubricating and Reinstalling the Blade

If the blade coupler was removed, replace it and tighten screws securely before lubricating the blade.

There are four pads on each side of the blade. These pads should be wiped clean and then re-lubricated. Lubricate the pads shown in the following illustrations by applying a thin coating of the grease specified in Section 7.8 to the entire surface of each pad. Add a thin coating of grease to the right and left edges of the blade. Be

careful and do not apply any grease to the cutting edge of the blade. Do not grease the center pad at the top on Side 1.



After the blade and die block have been cleaned and lubricated, slide the blade into the die block and check for fit and smooth operation. If there is any looseness in the assembly, the blade and die block should be considered for replacement.

Insert the blade into the die block. Manually move the blade up and down in the die block. The blade should move smoothly and have no indication of binding.

Replace the static control bar bracket and tighten screws.

Replace the drive arm.

Replace the registration sensor if it was present.

Replace the output chute.

Replace the cover.

Test for proper operation and clean cuts on strips.

7.11 Blade Drive Belt, Roller & Bushing Replacement

7.11.1 Replacing the Blade Drive Belt

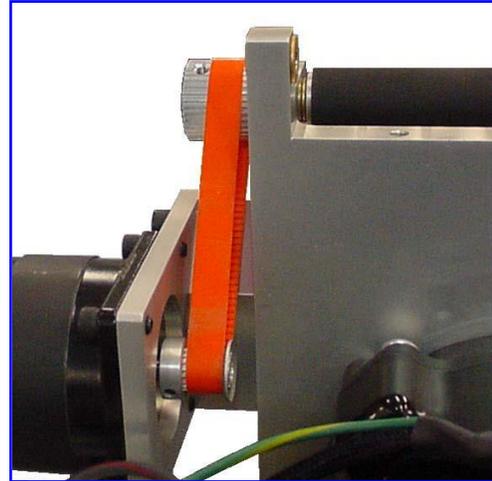
The belt is easy to replace:

1. Remove the rear panel by removing four ¼"-20 button head cap screws.
2. Loosen the three ¼"-20 socket head cap screws on the stepper drive motor mount.
3. Move the motor up and slide the belt off.
4. Replace the belt.
5. Move the motor mount down and tension the new belt. Check for approximately 3 mm (0.125") deflection.

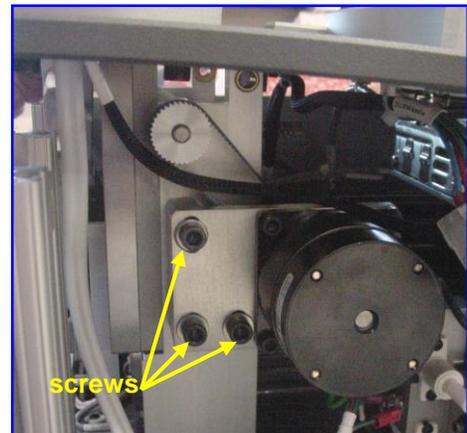
If the belt is too tight, it will bind the motor and wear the belt & motor excessively.

Tighten the three ¼"-20 screws.

6. Replace the rear panel and the four ¼"-20 button head cap screws.



Drive Belt



Motor Mount Screws

If replacing the drive roller (the lower roller) at this time, only do the first three steps of the drive belt replacement procedure. does the drive roller also have bushings?

The last three steps will be done after replacing the drive roller.

Continue the roller replacement process on the next page.

7.11.2 Replacing the Rollers



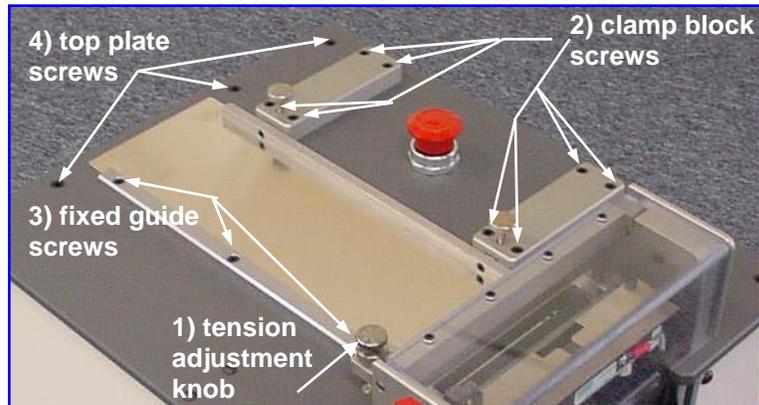
ELECTRICAL HAZARD: Disconnect the unit from its power source before beginning any maintenance or repair procedure. If a panel is opened, exposure to live electrical circuits is possible. Failure to follow all electrical safety procedures could result in **SERIOUS INJURY** or **DEATH BY ELECTROCUTION**



CAUTION: Guillotine blades are very sharp, and could cause **SERIOUS INJURY**. Handle the guillotine blades as you would a very sharp knife. Please be careful.

1. Remove the Blade and Die Block as shown in Sections 7.3 and 7.6.
2. If the drive belt was not already removed, remove the drive belt using steps 1, 2, and 3 under Replacing the Blade Drive Belt (Section 7.11.1) and then continue here.

3. Release all pressure applied by the roller by loosening the tension adjustment knob. See Section 5.1.2.

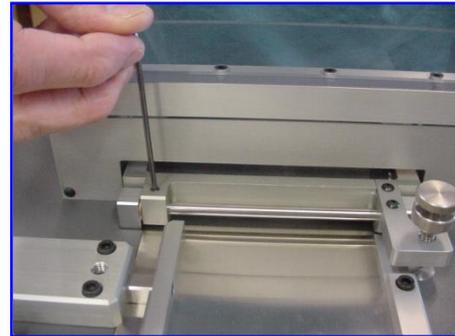


4. Using a 5/32" Allen wrench, loosen the eight 10-32 screws that hold the adjustable guide clamp blocks to the top plate until the blocks can be lifted about 1.5 mm (0.060") away from the top plate.
5. Using a 5/32" Allen wrench, loosen the three 10-32 screws that hold the fixed guide to the top plate. Loosen them enough so that the guide may be lifted approximately 1.5 mm (0.060") away from the top plate.
6. Loosen the three socket head screws at the infeed end of the top plate.

7. Use a 5/64" Allen wrench to remove the four 6-32 button head screws that hold the blade shield on the blade cover. Set the screws and shield in a secure location for use when reassembling this unit.

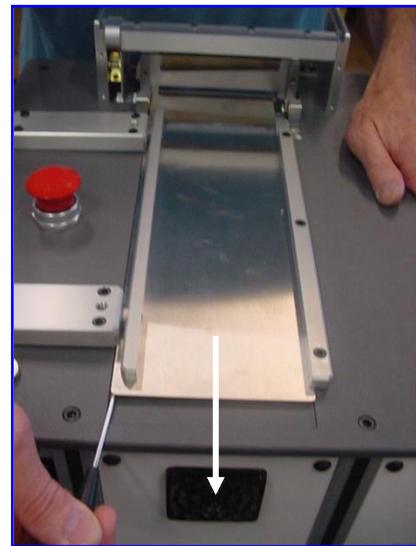


8. Use a 3/32" Allen wrench to loosen the 10-32 set screw in the pivot bar/idler roller assembly. Push the idler shaft all the way out of the bushings so the idler roller assembly is free. (Note the position of the flat area on the shaft for the set screw for later reassembly.) Set all these parts in a secure location for later reassembly.

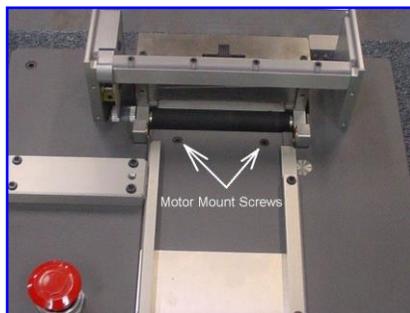


NOTE: The upper (idler) roller is easily replaced while reassembling the pivot bar assembly. If this is all that is required, no further disassembly steps are required.

9. Lift the stainless steel wear plate out of the recessed area and slide it out toward the infeed end of the machine. Place this plate in a secure location for later reassembly.
10. Using a 5/32" Allen wrench, remove the two 10-32 screws holding the top plate to the blade motor mount.

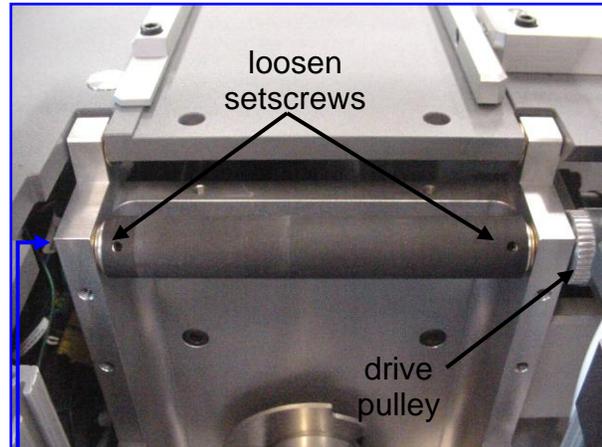


Wear Plate



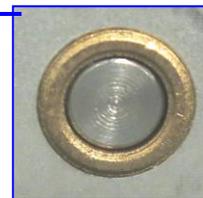
11. Next, remove the three ¼"-20 socket head cap screws at the output end of the top plate. Tilt the output end of the top plate up about 4 cm (1½") and support it in that position with a small block of wood.

12. Rotate the indexed roller (mounted in the top of the blade motor mount) by hand so the setscrews that secure it onto the shaft can be loosened. Do not remove the setscrews completely.



13. Pull the drive shaft out of the lower roller by pulling on the drive pulley. The shaft should come all the way out, and the indexed roller should be easy to remove from the system.

14. Clean the bushings to remove adhesives and debris. Lubricate with light machine oil. If the bushings require replacement request the replacement procedure instructions from Kinematic Sales.



Drive Shaft Flush with Bushing

15. Loosen, but do not remove, the setscrews on the replacement roller. Hold the roller in place, and insert the drive shaft through the bushings and through the replacement indexed roller. The drive shaft end should be flush with the outside edge of the bushing.



IMPORTANT: If the drive shaft protrudes past the bushing, it may touch the top plate of the chassis. If this is the case, it will not rotate freely. Insure that it does not protrude by pressing across the bushing with a flat edge before tightening set screws.

Note that the shaft has flats on it for securing the roller. Make sure that the setscrews on the roller are lined up with the flats on the shaft.

16. Tighten the setscrews on the roller to secure it in position on the shaft.
17. Go back to *Step 4* of Replacing the Blade Drive Belt on page 71, and continue that process. When that process is complete, return here, and continue with the next step.

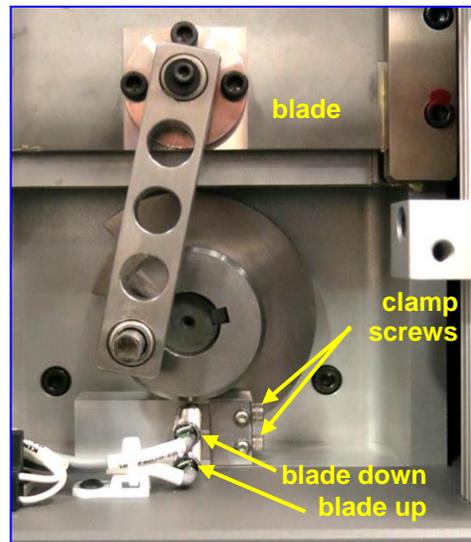
18. Remove the support block and lower the top plate onto the supports. Insert the three ¼"-20 screws removed earlier, and tighten all six ¼"-20 top plate screws.
19. Install the two 10-32 screws in the wear plate channel and tighten them.
20. Slip the wear plate into the recess on the top plate and under the card guides. Slide the wear plate as far as possible toward the infeed end of the recessed area.
21. While tightening the three screws on the fixed guide, hold the guide firmly against the screws to the outside of the wear plate.
22. Pull the adjustable guide against the face of the clamp blocks. Make sure the clamp blocks do not bind the adjustable guide after all eight 10-32 screws are tight. Check that the adjustable guide is parallel with the fixed guide.
23. Reassemble the idler roller by inserting the shaft and tightening the setscrew that holds the shaft in place.
24. Reinstall the blade shield using the four 6-32 button head screws. Make sure all screws are firmly tightened as the assembly proceeds.
25. Reinstall the die block and blade assembly. Reinstall the static control bar bracket. Reinstall the chute.
26. Adjust the idler roller tension.

Belt and roller replacement is complete. Test the equipment and then place it into service.

7.12 Blade Position Sensors

The blade position sensors are easy to replace and adjust. Disconnect the power plug from the main power source. Remove the chute and blade drive arm.

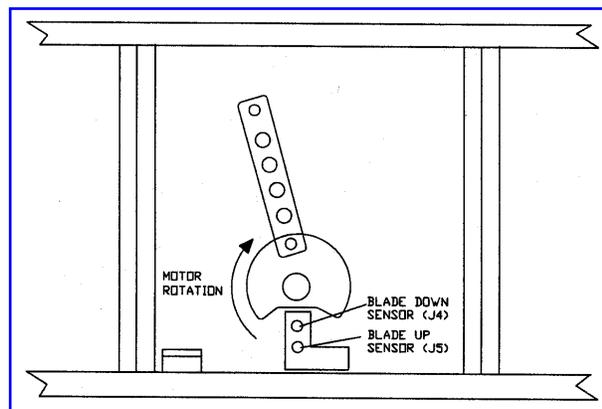
The sensors are just below the blade drive pin. They are held in place by clamp screws. Loosen the clamp screw to adjust the position.



Blade Position Sensors

7.12.1 Replacing a Blade Sensor

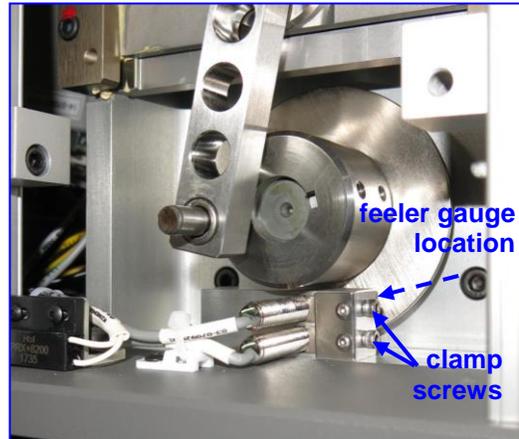
1. Disconnect electrical power.
2. Open the front of the machine and set it to the side. It is not necessary to disconnect the front panel.
3. Remove the chute.
4. Loosen the sensor clamp screw. It is not necessary to remove it completely.
5. Cut the nylon tie holding the sensor wiring in place.
6. Slide the sensor out of the block.
7. Unplug the sensor cables from J4 and J5 on the circuit board.
8. Plug the new sensor cables into J4 and J5 on the circuit board. Note that the J4 sensor cable is 1.9 cm ($\frac{3}{4}$ ") longer than the J5 cable.
9. Route the sensor wiring back to the block.
10. Insert sensor J4 (assembly P/N 03-070920-01) into the top support hole, and sensor J5 (assembly P/N 03-070920-02) into the bottom support hole.



Blade Sensor Positions

7.12.2 Adjust Sensor Clearance

11. Adjust the sensor clearance using a flat blade, 1.52 mm (0.060") feeler gauge placed between the face of the sensors and the blade cam. Lock the sensor in place with the sensor clamp screw.



Blade Sensor Adjustment

12. Recheck the clearance with the feeler gauge.

13. Replace the wire tie that was removed in step 4.

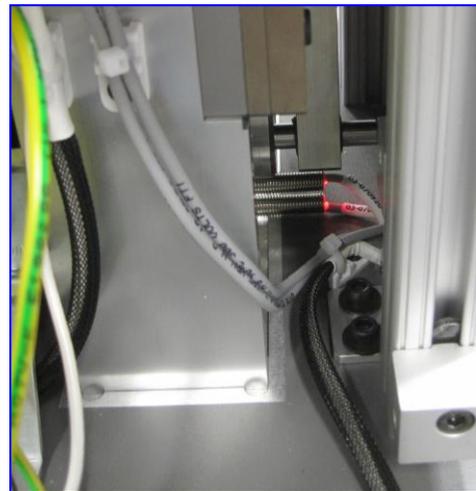
14. Check that no tools or other items are left near the blade or the rollers.

15. Replace the blade drive arm and the chute if it was removed and close the blade cover.

16. Remove the front panel (by removing the 4 black oxide screws) if it is not already removed. Carefully place it to the side without removing any connections. Place it so that the sensor LEDs are visible.

17. Restore electrical power.

18. With safety goggles on, plug the system in stand as far away as possible while still able to reach the touch screen. Move the blade using the CUT 1 STRIP option on the Main screen. Observe that both sensor LEDs are OFF when the blade is down, and both sensor LEDs are ON when the blade is up.



Sensor LEDs On

19. Disconnect the unit from electrical power. Replace and fasten the front panel.

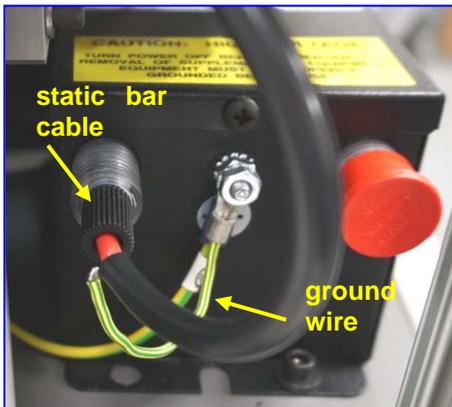
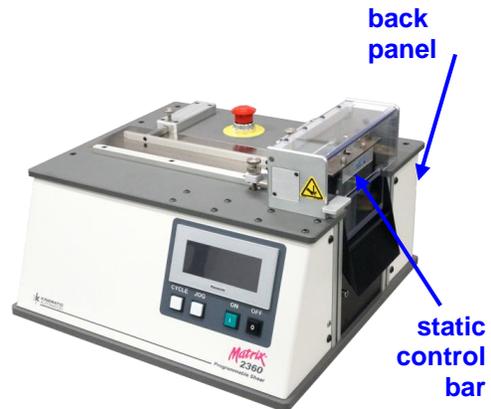
20. Reconnect the unit from electrical power and cut at least 10 test strips.



Wear protective glasses while operating or working around the equipment. There is a risk of flying projectiles due to the blade moving at high speed.

7.13 Static Control Bar Replacement

1. Disconnect electrical power.
2. Remove four screws on the back panel, and then remove the back panel.
3. The static control power supply is located just below the drive roller motor.



4. Disconnect the green and yellow ground wire that emerges from the black cable by unscrewing the nut on the power supply ground terminal. Use a 1¹/₃₂" nut driver.

5. Unscrew the black cable that connects to the static control bar.
6. Disconnect the static control bar from the bracket. Use a 7 mm nut driver to remove both screws that connect the bar to the bracket. **The screws that attach the bar will slide out once both nuts are removed.** So use caution to keep them from getting lost.



7. Pull the static control bar up until the entire cable has been pulled through the gap in the top plate. **check image for new switch**
8. When installing the new static control bar assembly, follow the steps in reverse. Be sure to attach the ground wire from the cable to the power supply and secure the nut.

Replacement of the static control bar power supply is not recommended except by experienced personnel. Return the machine to Kinematic for service.

7.14 Optional Feature Registration Sensor Replacement

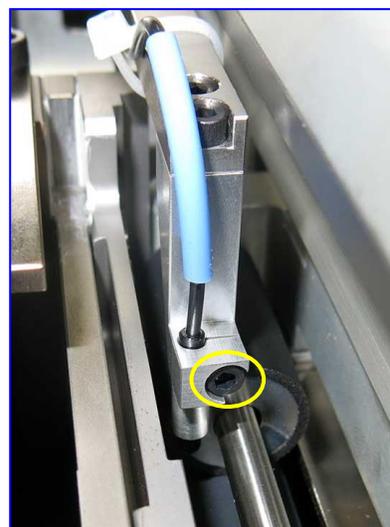


NOTE: The following information is relevant only if an optional feature registration sensor is installed.

Please refer to the information in the Third Party Documentation for detailed information on your sensor, since several types are supported for the *Matrix 2360*.

The most common sensor used on the *Matrix 2360* is a reflective sensor inserted into a C-collar tightened with a screw or locked in place with a nylon tip setscrew. Before removing the sensor, use a pen to mark on the old sensor where it sits on the holder.

Release the setscrew or collar lock screw and slide the sensor out of the holder. If an amplifier is used, unplug the sensor from the amplifier. The plug pulls out easily once the release latch on the amplifier is lifted (see lower photo). The release latch unlocks the amplifier socket to allow the sensor plug to be removed. Note the orientation of the plug as you remove it from the amplifier socket. Some cable ties may have to be cut to remove the sensor and wire.



Use the mark made on the old sensor to mark the new sensor in the same place. This will provide a good starting place for the vertical adjustment of the new sensor.

Place the sensor into the sensor holder. Many sensors have a specific zone in which the setscrew may come in contact. Verify that the screw is not outside of this zone before tightening. **Gently** tighten the screw to hold it in place. Reflective sensors have a focal point that requires that the sensor is a specific distance from the object to detect it reliably. This means that the sensor may have to be moved closer to, or farther from, the material. (See the next section.)



Do not over-tighten the lock screw or setscrew. Fiberoptic cable is easily damaged.

For through-beam sensors, make sure that the emitter and receiver are aligned. Route the sensor wire along the same path that was used for the sensor that was removed. Install the replacement sensor plug in the amplifier socket in the same orientation as the old plug and secure the release latch.

The sensor plug may be inserted in either of two orientations. Some sensors work best with the plug in one direction, and some with the plug in the other. Most dual-lead fiberoptic sensors will have one lead marked with small yellow dots. This is the transmitter lead. The other lead is the receiver lead. All Keyence amplifiers have arrows on the amplifier socket indicating which side is which.

Some testing is necessary to determine the best position for the sensor. Test operation. If the new sensor is not working as reliably as the old sensor see the next 2 sections. When done, replace any cable ties that were removed.

7.14.1 Adjusting Feature Registration Sensor Height

The sensor beam in some photoelectric sensors has a particular focal length. Place a sample of the target material under the sensor holder. Move it so that a light section of material is under the sensor. When inserting the sensor into the holder, observe the beam as it reflects from the material, and move the sensor up or down to achieve the highest reading on the amplifier. When the beam is focused, **gently** tighten the setscrew or lock screw to hold it in that position.

Do not over-tighten the lock screw or setscrew.

7.14.2 Adjusting Feature Sensor Amplifier



CAUTION: Since the sensor amplifier is usually located inside of the electrical enclosure, adjusting the sensor amplifier requires working where live circuits are present. This procedure is intended only for experienced personnel familiar with proper electrical safety practices.

The general procedure for adjusting sensor amplifiers is as follows

- Remove front panel of the *Matrix* 2360 by removing four ¼"-20 black oxide cap head screws. Carefully rotate it down without removing any connections.
- Release the cover over the amplifier.
- Move the material to be detected in place below sensor. Record the highest reading on the amplifier.
- Move the material and record the lowest reading on the amplifier.

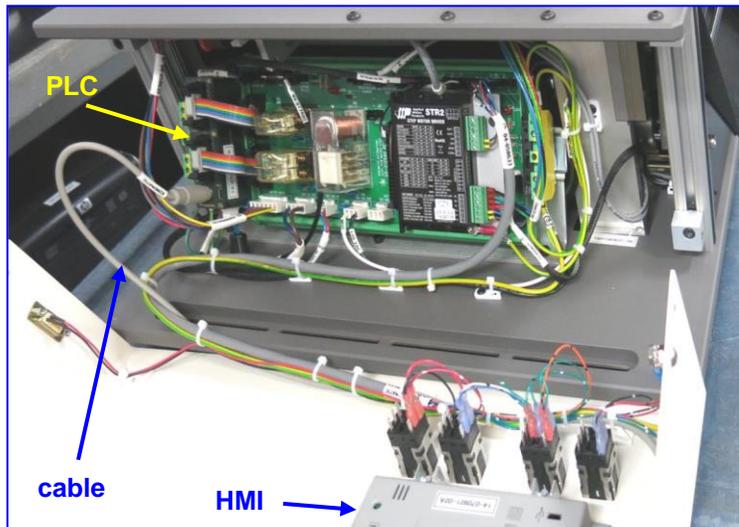


- Add the two numbers and divide by two to get the number that should be set in the amplifier. Set the amplifier to this number. (Refer to the third party sensor documentation in the documentation package.) This number may be adjusted either slightly higher or slightly lower depending on the performance.
- The amplifier may also be set using its built-in automatic adjustment procedure. Refer to the third party sensor amplifier documentation for the auto adjustment procedure.

The sensor amplifier settings optimized at the factory are recorded on the sheet supplied with the unit.

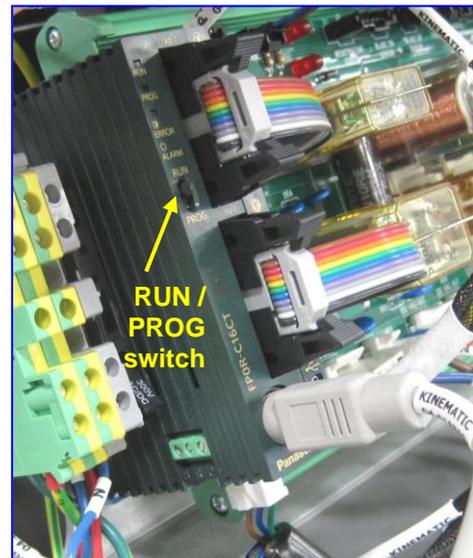
7.15 HMI or PLC Replacement

If the PLC or HMI need replacement, these components will need to be ordered through Kinematic Automation. The software must be loaded into these components at the factory.



For a new Panasonic GT12 HMI unit, all dip switches in the battery compartment should be in the OFF position as shown above. No battery is required for the HMI. The power is supplied by the system and the battery is not required to backup any system settings.

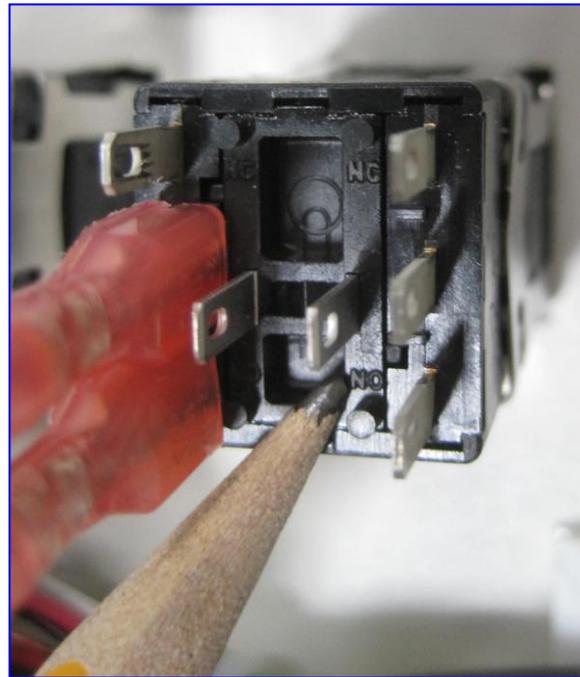
When replacing the PLC, make sure that the RUN/PROG switch is set to the RUN position as shown here.



7.16 Control Panel Switch Replacement

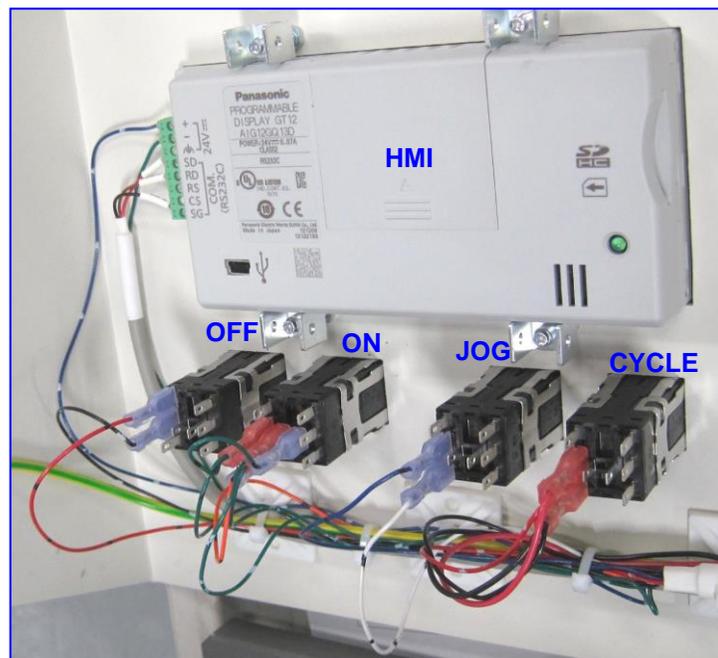
When replacing one of the pushbutton switches on the control panel, it is very important to mount the switch in the correct orientation so that it will be connected correctly. These types of switches can be connected for either the “Normally Open” or “Normally Closed” operation. The system may appear to work if a switch is connected to the wrong terminals, but it will not function correctly.

The Normally Closed side of the switch is identified by the letters “NC”. Normally Open is identified with “NO”. In this image the pencil tip is pointing at the Normally Open side of the switch.



It is strongly recommended to install any replacement switches in the orientation shown below with the Normally Closed side closest to the HMI component.

Connect the terminals as shown below. Refer to the electrical schematic for details.



7.17 Troubleshooting

If these troubleshooting tips are not enough to solve a problem, please contact Kinematic for assistance.

PROBLEM	WHERE TO LOOK
Main fuse blows when the machine is turned on.	The power entry module (fuse at main switch) must be set to the same voltage (120V or 240V) as the power source. Refer to Section 4.3.1.
The machine will not turn on when the "ON" button is pressed (the front panel switches are not lit).	<ol style="list-style-type: none"> 1) Connect power cord to live power source. 2) The switch at the power entry module must be turned on ('I'). 3) The power entry module (fuse at main switch) must be set to the same voltage (120V or 240V) as the power source. Refer to Section 4.3.1. 4) Check both fuses in power entry module. If either is bad, replace both. 5) Check Fuse FU3 located to the left side of the PLC behind the control panel. (See the fuse list at the bottom of this chart.) 6) Check Fuse FU4 located at the upper left hand corner of the main PCB. 7) Check for 120VAC with a meter at the bottom side of fuse holder FU3 and the gray terminal block. If no voltage is present, recheck the fuses in the power entry module. 8) Check OFF pushbutton switch on main panel for short or misconnection. (See Section 7.16.) 9) Check ON pushbutton switch on main panel. Using a shorting jumper short the contact and retest. 10) Remove the fan panel, verify the green LED located in the upper right hand corner of the power supply is ON. If not, the power supply is bad and must be replaced.
Control power will not come on or will not stay on when the "ON" front panel pushbutton is pressed. (ON pushbutton does not light up when pressed.)	<ol style="list-style-type: none"> 1) Make sure that blade cover is completely down. Blade cover sensor may need replacement. 2) Check that output chute is in place. Sensor that verifies chute presence may need to be replaced. 3) Make sure that the EPO switch is pulled out. Depress and pull up the pushbutton to verify pulled out position. EPO may need replacement. 4) Check On pushbutton switch on main panel for short or misconnection. (See Section 7.16.)
Control power is "ON", (the green ON switch is lit), and the HMI displays the run screen, but the machine will not initialize.	Check the 1CR and 2CR relays, the blade motor drive board, the blade sensors, and the blade motor brushes.

<p>During machine initialization, the blade motor revolves once and stops. Normal initialization is 2 revolutions.</p>	<p>Check PLC input light inside cabinet. Light #4 should be flashing. If not, blade down sensor may need replacement.</p>
<p>During machine initialization, the blade motor continues to run. Normal initialization is 2 revolutions.</p>	<ol style="list-style-type: none"> 1) Check PLC input light inside cabinet. Light #1 should be flashing when the blade is cycling. When the blade is up, the LED should be on. 2) The blade up sensor that signals to the PLC may need adjustment. Verify 15 mm (0.060") clearance between sensor and the cam. (Section 7.12) 3) Blade up sensor may need replacement. 4) If Blade motor shaft has excessive play, replace motor.
<p>Power is "ON", (the green ON switch is lit), and the HMI displays the run screen, but the machine will not run when the CYCLE pushbutton is pressed.</p>	<ol style="list-style-type: none"> 1) Press OFF button, turn power entry module switch off and then back on, and then press the green ON button again. 2) Raise the safely cover over the blade, the HMI should turn red. If the HMI remains red when the cover is lowered again, replace the interlock switch on the cover assembly. 3) The blade may have seized in the die block. Check for free up and down motion of the blade. Clean and lubricate blade and die block. 4) The CYCLE pushbutton switch may need replacement. (See Section 7.16.)
<p>Machine will not feed material through rollers when JOG button is pressed.</p>	<ol style="list-style-type: none"> 1) Check the setscrews on the roller shaft and drive pulleys. (Section 7.11.2) 2) Check belt condition. (Section 7.11) 3) Check pinch roller tension. (Section 5.4.2) 4) Check the spring pressure on the idler roller. (Section 5.1.2) 5) Verify that guide rail is not binding material. 6) Check the PLC and verify that the following lights are lit when the Jog Button is pressed. X #1 #2 and #4 as well as Y #0 should be on. If the correct PLC lights are on and there is no sound from the motor, the JOG button, or the main circuit board may be defective. 7) If the Clear Scrap function works but the Jog button does not the Jog Button needs to be replaced. 8) If there is no green light flashing on the stepper motor drive, it may be defective. 9) If there is sound from the motor, check the drive pulley. The rollers may be jammed or seized and preventing motion. If they move freely, but are not moved by the action of the pulley on the belt, replace the motor.
<p>Machine stops mid-run.</p>	<ol style="list-style-type: none"> 1) The CYCLE pushbutton switch may need replacement. (See Section 7.16.) 2) Check 2CR relay.

<p>Machine cycling erratically.</p>	<ol style="list-style-type: none"> 1) Verify supply line voltage. 2) Check 2CR relay. 3) Verify blade sensor operation. When blade is up, both LEDs are on, when blade is down both sensors are off. Verify 15 mm (0.060") clearance between sensors and the cam. (Section 7.12) 4) The CYCLE pushbutton switch may need replacement. (See Section 7.16.) 5) Replace blade motor brushes. 6) If Blade motor shaft has excessive play, replace motor.
<p>The machine is excessively noisy when the blade motor runs.</p>	<ol style="list-style-type: none"> 1) The blade may have excessive side-to-side play in the die block. Sharpen and lubricate blade and die block. (Section 7.3 through 7.10). 2) Blade motor bearings may be worn; this requires replacing the motor.
<p>Strip length is not consistent.</p>	<ol style="list-style-type: none"> 1) Check pinch roller tension. (Section 5.4.2) 2) Check the spring pressure on the idler roller. (Section 5.1.2) 3) Verify that guide rail is not binding material. 4) Clean the rollers. (Section 7.11.2) 5) Clean roller shaft bushings and inspect for damage. 6) Check and tighten roller shaft and pulley set screws. 7) Verify belt tension. Belt should deflect slightly when pushed. 8) Replace blade motor brushes.
<p>Strips bunching up in output, sticking to blade, or cut twice.</p>	<ol style="list-style-type: none"> 1) The blade will cut accurately only when at least 19 mm (.75") of material is left behind the blade. 2) Clean adhesive build-up on blade and die block. (Section 7.4) 3) Static control bar may need cleaning or replacement. (Section 7.13) 4) Sharpen blade. 5) Sharpen die block. (Note: A dull die block will dull blades prematurely.)
<p>Strips have rough edges</p>	<ol style="list-style-type: none"> 1) Clean adhesive build-up on blade and die block. (Section 7.4) 2) Sharpen blade. 3) Sharpen die block. (Note: A dull die block will dull blades prematurely.) 4) Replace blade motor brushes.
<p>Strips are delaminating</p>	<ol style="list-style-type: none"> 1) Increase the BACK UP DIST. field on the Main Control Screen. (Section 5.3.2.)
<p>No strips are being cut, but the HMI displays that strips are being cut.</p>	<ol style="list-style-type: none"> 1) Replace blade motor brushes. 2) The blade motor or blade motor drive board may be defective.

Fuse Designation & Location	Fuse Type
1FU and 2FU are in power entry module.	Bussmann GDB-5, 5 amp, 5 X 20 mm, fast acting
3FU is in a Dinrail-mounted fuse block on the left side of the PCB. It supplies 120 VAC to the DC power supply.	Littelfuse 2118-5A 5 amp, 5 X 20 mm, SLO-BLO
4FU is on the upper left of the PCB. It supplies +24 VDC to the PCB.	Bussmann GDB-5, 5 amp, 5 X 20 mm, fast acting
5FU is in the Dinrail on the right hand side. It supplies the static control bar.	Bussmann GDA-1A, 1 amp, 5 X 20 mm, fast acting
Replacement fuses may be purchased locally.	

8 SPARE PARTS, DRAWINGS AND SCHEMATICS

8.1 Spare Parts List

The spare parts list is a separate file in the documentation package. It is comprised of parts that have one or more of these characteristics: a long lead-time, critical to the operation of the machine, or may fail due to wear or damage.

Although there may be a large quantity of a certain component used in the assembly of the equipment, there may be only one or two instances where this component might be subject to wear or damage. Use all available information to assist in determining how many of a particular part to stock at your facility. Stocking parts at your facility is a management decision based on your experience and production requirements.

Most of the commercially available listed parts may be procured locally from a distributor or directly from the manufacturer. Kinematic does not maintain a stock of components, either electrical or mechanical. Parts listed without related manufacturer information either are manufactured at Kinematic or are modified at Kinematic specifically for the equipment application. These must be ordered from Kinematic. See the terms of the warranty for further details on how replacement parts can affect your warranty.

In an emergency, contact Kinematic to see if we might have a critical part available. Sometimes while we are building equipment, and depending on our production schedule, we may be able to make a part from that equipment available for your equipment. We will make every effort to help limited only by possible schedule conflicts or other factors.

8.2 Bill of Materials

A Bill of Materials is included as a separate file in the documentation package.

8.3 Assembly Drawings & Schematics

The Assembly Drawings and Schematics are to assist in any maintenance that may be needed.

9 WARRANTY

Seller warrants that each item of its own manufacture delivered hereunder shall, at the time of delivery and for a period of 36 months thereafter, be free from defects in materials and workmanship. If any such item shall prove to be defective in material or workmanship under normal intended usage and maintenance during the warranty period, upon examination by Seller, then Seller shall repair or replace, at its sole option, such defective item at its own expense; provided, however that the Customer shall be required to ship each such defective item to Seller's plant.

The warranty on commercial components is limited to the warranty provided by the original manufacturer of said components.

Any hardware or software modification made to the machine without Kinematic's prior written approval will void this warranty.

9.1 Consumable Wear Parts and Blade Maintenance

Consumable wear parts including (but not limited to) urethane drive rollers and vacuum pick cups are not covered in the warranty. The Customer must expect these types of components to have a limited lifespan and should replace them according to the maintenance schedule provided with the machine documentation.

Blades (including Cut Modules, Shear Blades, and Die Blocks) are wear items, and will become dull during use. Seller shall therefore not be responsible for repair or replacement of blades unless, upon inspection, a module is found to be mechanically defective. Adhesive and fibrous residue from materials being processed may build up on blades and other surfaces over time. Seller makes no warranty as to the prevention of such residue.

9.2 Limitation of Liability

All warranties are expressly limited to the repair or replacement of defective items as set forth herein. Except as provided for in the terms listed above, Seller shall in no event be liable for any direct, indirect, or consequential damages or losses arising from delay, defects in, or use of the machine. These damages include but are not limited to lost profits, lost business or business opportunity, overhead expense, and third party liability.

10 SERVICE

If the cause of a problem can not be found and corrected using the information contained in this manual, contact Kinematic Automation for advice.

10.1 Technical Support

Kinematic Automation provides complete after sale service and support for all our products. Contact us using the information provided below.

10.2 Hours of Operation

Monday - Friday 7:00am - 5:00pm PST (GMT - 8)

Kinematic closes for the following U.S. holidays:

New Year's Day	1 day	January 1
Presidents Day	1 day	Third Monday in February
Memorial Day	1 day	May 30 (Closest Monday)
Independence Day	1 day	July 4
Labor Day	1 day	First Monday in September
Thanksgiving	2 days	Fourth Thursday & Friday in November
Christmas Week	From December 24 (Christmas Eve) until January 2	

10.3 Contact Information

For Sales, Service, Support, and Documentation, please direct your questions and comments to Kinematic Automation by telephone, fax, email, or post.

Telephone: +1 (209) 532-3200

Fax: +1 (209) 532-0248

email: sales@kinematic.com or service@kinematic.com

Web Site: <http://www.kinematic.com/>

Mail: P.O. Box 69, Twain Harte, CA 95383

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12 YOUR NOTES

Use this page to note any changes or helpful tips. Add any other information that an Operator might find useful in the setup and operation of this machine for your particular product(s).

13 DOCUMENTATION SURVEY

Revision A

September 2020

Matrix™ 2360 Programmable Shear User Manual

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