Engrave-A-Crete® Inc.

Cobra
Operating Manual

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Order Hotline: 800-884-2114

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Other patents pending.
Foreign registrations pending.

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General Safety & Warnings

Operate Without Water

The diamond blades used with all Engrave-A-Crete Engravers are made to run dry.

All blades supplied by Engrave-A-Crete have segments that are laser welded to the core.

Some off brand blades may have soldered on segments and are very dangerous to use when cutting dry.

Cutting dry has many advantages and has little effect on blade life.

Operate with a 5 to 6 1/2 hp shop vacuum as a dust collector.

Never use water

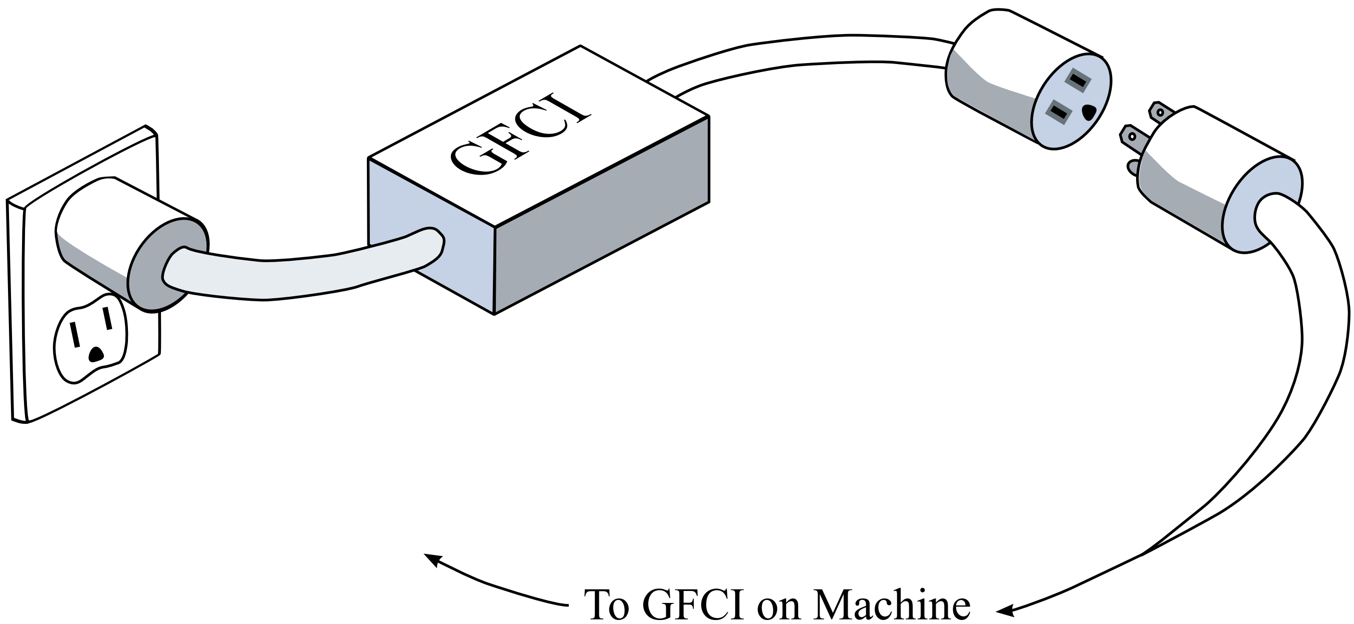
with or near this or any other electrically powered equipment.

Tip: Make operations easier by adding on extra sections of vacuum hose. 12 to 20 feet or more is really nice. Also, install a Gortex® Clean Stream filter on the vacuum for better operation.

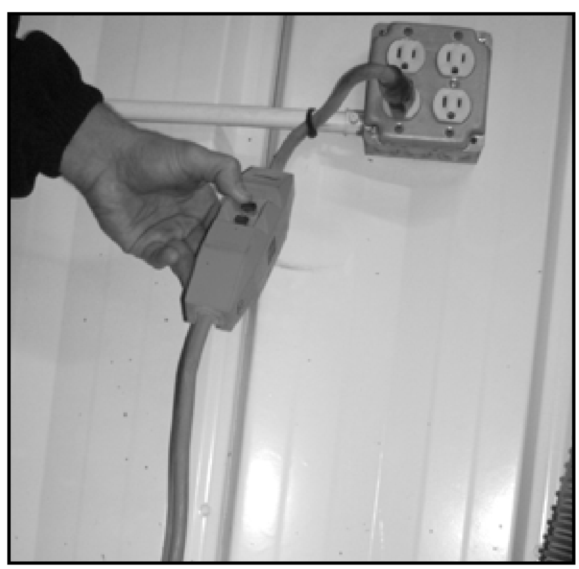
WARNING

Due to risk of death or injury by electric shock, always use a GFCI (ground fault circuit interrupter) at the power source when operating electrically powered equipment. Do not use electrically powered equipment in rain, snow or other damp conditions.

DO NOT BYPASS A GFCI
(ground fault circuit interrupter)



DO NOT WORK WITHOUT GFCI



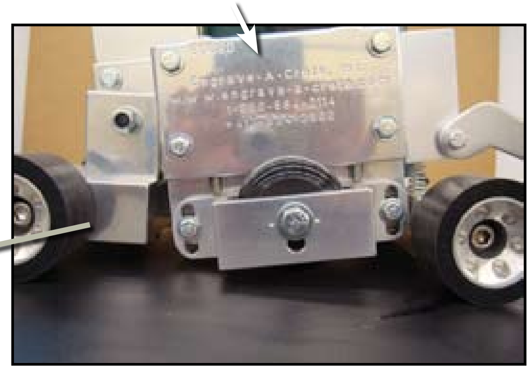
The inline GFCI must be plugged into a power receptacle first then plug the extension cord into the GFCI.

DO NOT BYPASS A GFCI (ground fault circuit interrupter)
DO NOT WORK WITHOUT A GFCI.

Cobra Machine Parts

Plunger Block

Blade Guard



Contour Following Wheel Bracket

Center Pivot

Linear Carriage

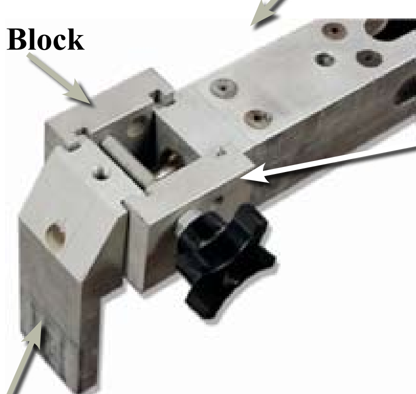
4’ Linear Track

Connecting Bar

Connecting Bar Stabilizer

Primary Connecting Bar

Clamp Block



Riser Block

Clamp Block

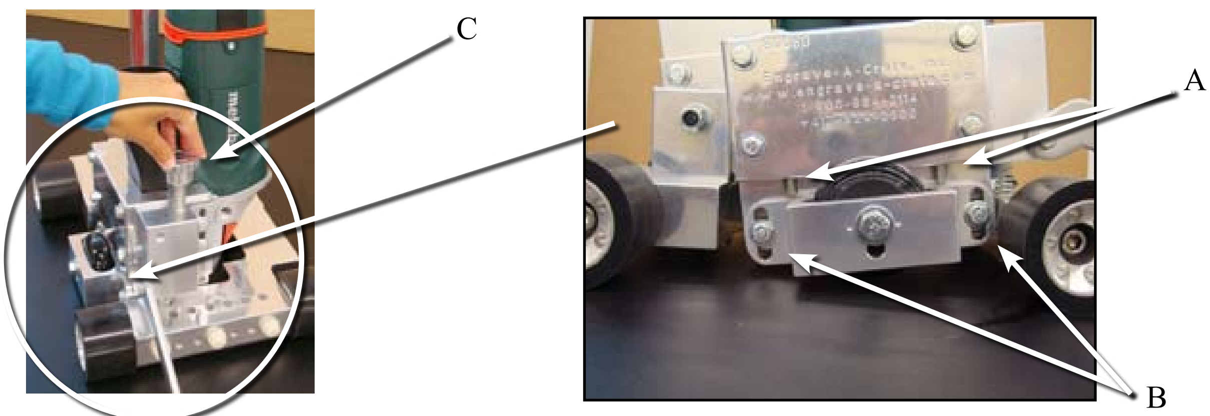
T-Pin

Setting Depth Of Cut

> Note: Check/adjust the depth of cut when the engraver first arrives, as the blade wears, and when a new blade is installed.

Primary Depth Control-

Maximum cutting depth is controlled by the contour following wheel. The ideal cutting depth is between 1/16 to 1/8 inch deep.



To Deepen The Cut:

1. Using the depth control knob, turn the contour following wheel adjusting screws (A) clockwise until they touch the contour following wheel bracket.
2. Counting the number of turns, retract those screws equal to the increased depth of cut desired.

[Note: one revolution of the contour following wheel adjusting screws (A) equals 1/16 inch.]

3. Loosen the 2 bolts (B) which secure the contour following wheel bracket.
4. Slide the bracket up until it touches the adjusting screws (A), then retighten the two bolts (B) to secure the bracket. Do not over tighten - just snug.

To Make The Cut More Shallow:

1. Using the depth control knob, turn the contour following wheel adjusting screws (A) clockwise until they touch the contour following wheel bracket.
2. Loosen the 2 bolts (B) which secure the contour following wheel bracket.
3. Using the 3/16" T-handle (C) turn the contour following wheel adjusting screws (A) clockwise to move the contour following wheel bracket to a shallower cutting depth. **[Note: one turn of the contour following wheel adjusting screws (A) equals 1/16 inch.]**
4. Slide the bracket up until it touches the adjusting screws (A), then retighten the two bolts (B) to secure the bracket. Do not tighten - just snug.

> Note: When adjusting the contour following wheel bracket, both screws (A) should be rotated equally to keep the contour following wheel bracket square.

A **Secondary Depth Control** is located within the plunger block.

The Depth Control Knob Has Two Main Functions They Are:

1. Balancing the Cobra- When cutting, the rear wheels of the engraver may lift off the slab. The reason for this is the engraver likes to use the contour following wheel as a pivot point.

What to do:

a. When the motor is running and the blade is settled into the concrete turn the depth control knob clockwise until it barely touches the frame.

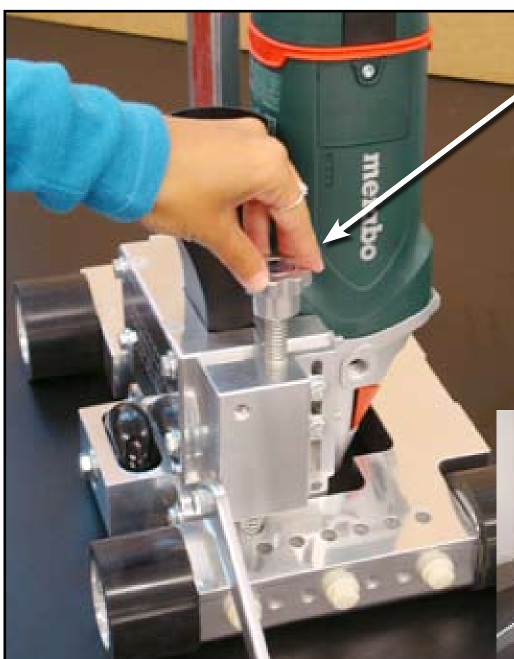
OR

b. When the motor is off, pushdown on the handle to make the blade contact the concrete. Then turn the depth control knob clockwise until it touches the frame. Next turn the knob back (counterclockwise) two turns. (Note: one turn of this depth control knob equals 1/16 inch)

2. Over riding the contour following wheel- For circular designs that require two colors, cut a very shallow groove in the concrete to mark for color separation.

What to do:

a. When the engraver is off, push down on the handle to make the blade contact the concrete. Then turn the depth control knob clockwise until it touches the frame. Next turn the depth control knob back out (counterclockwise) one half (1/2) turn (one half equals 1/32 inch). Adjust the depth control knob as needed to control this shallow cut depth.



Adjust the depth limit with the depth control knob.

During the course of operations, if the cutting depth becomes too shallow, first check that this knob is not limiting the cutting head movement before adjusting the contour following wheel.

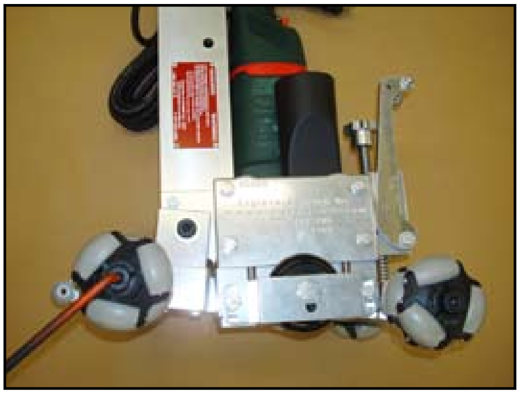
To adjust the contour following wheel, the depth control knob may need to be retracted so that it will not contact the frame while adjusting the the contour following wheel.

Tip:	Cut a groove in a piece of dry wall board, old chunk of concrete, or plywood to check the depth of cut.

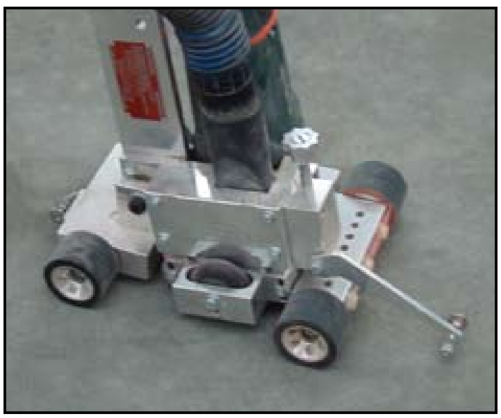
Track Free Cutting

A. Changing Wheels
B. Handle Installation & Adjustment
C. Rear Sight/Pointer Installation
D. Snapping Chalk Lines Single Handed
E. Cutting Track Free Lines
F. Mitering Corners
G. Free Form Curves

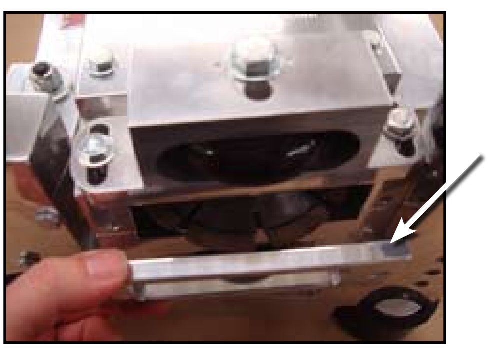
Changing Wheels



Omni Directional Wheels
Used when operating the Cobra with tracking systems for designs such as brick, perfect circles etc. Install the two piece wheel set onto the 1/2” x 2 1/2” axle bolt and tighten using 1/4” hex key.



Straight Line Wheel Kit
Used when operating the Cobra tracking free for designs such as tile, straight lines etc. Install the wheel using the 1/2” x 1” bolt and washer, tighten using 1/4” hex key.

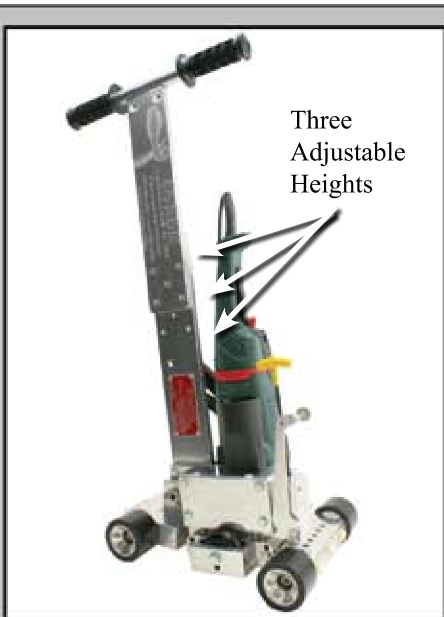


Note: The Dust Plate must be removed when using straight line wheels to accommodate the shorter diameter of these wheels.

Track free cutting done prior to other engraving will insure smoother Free-Of-The-Track operations.

(The wheels won’t be bouncing over or side tracked by other grooves.)

Handle Installation & Adjustment



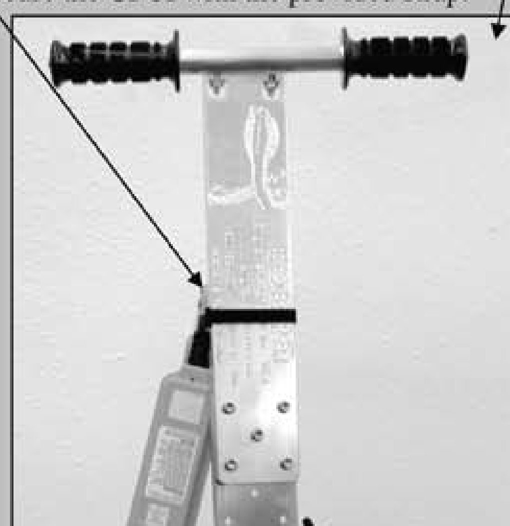
The Cobra handle offers multiple height adjustments. The upper part of the handle is removable for convenient storage and transport in the custom Cobra case.

To Attach the Handle:

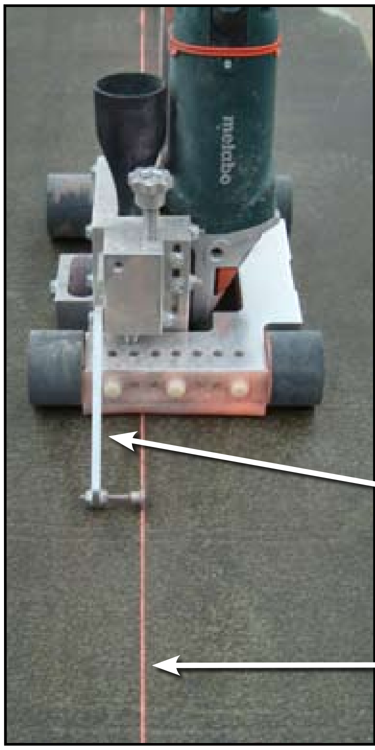
Determine the desired handle height and attach the upper handle to the lower with the provided bolts and wing nuts.

Be sure to orient the upper handle so the long end of the handle bar is facing forward.

Secure the GFCI with the provided strap.



Pointer Installation

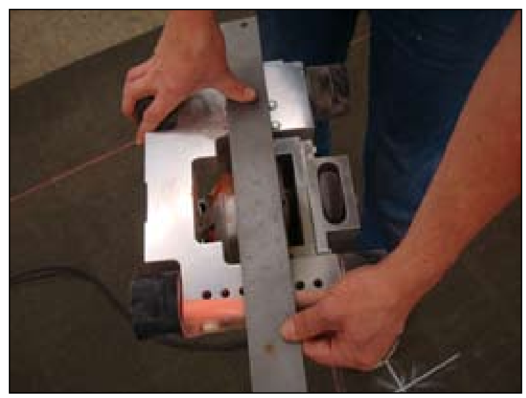


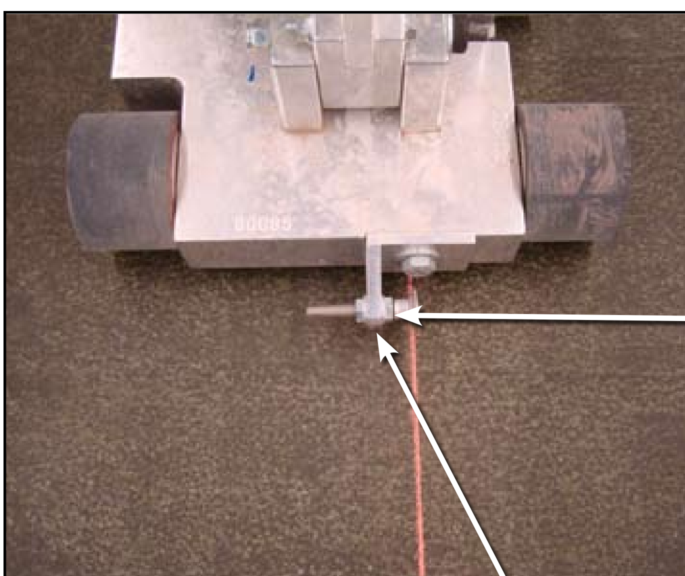
Center the engraver blade over a chalk line. Make sure the front pointer is in alignment with the chalk line. Align the rear site by turning it left or right. Tighten the jam nut against the sight. (See illustration below for details)

Trial Run- Disconnected from power (without using electricity), make some practice runs. Look underneath engraver to make sure the blade is still centered on the chalk line. Adjust the rear sight and front pointer as needed.

Front Pointer

Chalk line





Turn left or right to align with the chalk line.

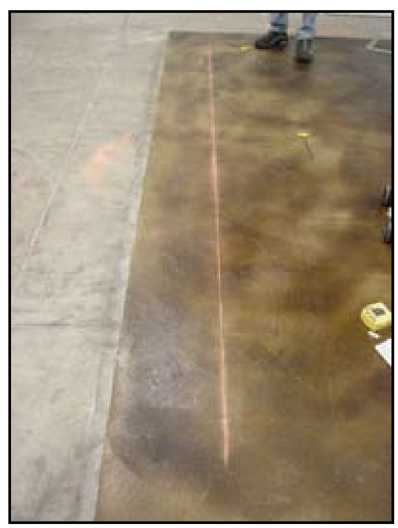
Tighten jam nut against sight

Snapping Chalk Lines Single Handed

For border layout, measure and mark the corners of the borders then drill a hole at the point of the intersecting sides.

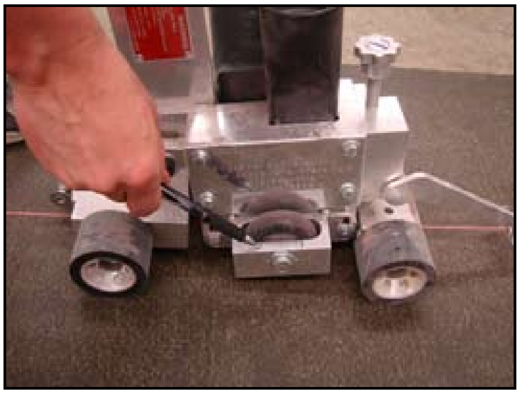
Hook the end of the chalk line with a nail or the 3/16” hex T-handle in the hole and snap a line.

Chalk lines often disappear when applying differing colors side by side. Drilled corner holes are helpful in relocating the lines.



Note: Drilled holes can be filled with a fast set patch or just left.

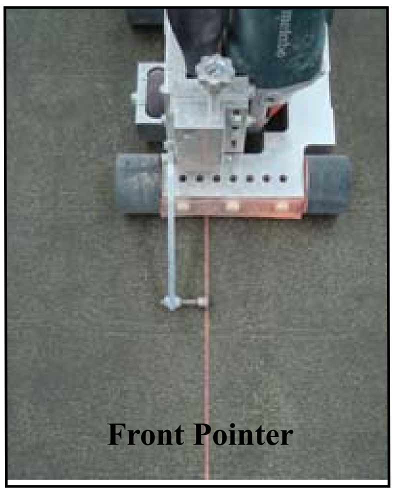
Cutting Track Free Lines



Start and stop guides should be marked on the side of the contour following wheel bracket.

1. Place a pencil mark that is 1/8” either side of the bolt head on the contour following wheel bracket.

2. The back pencil mark indicates the beginning of a cut. The forward pencil mark indicates the end of a cut.



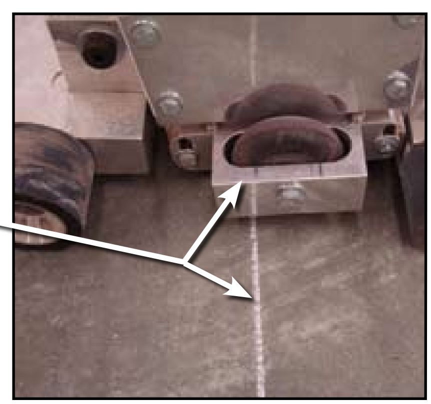
Front Pointer

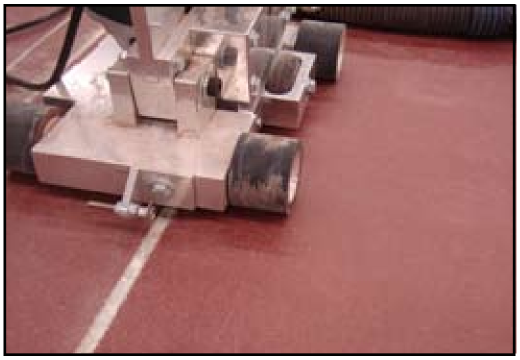
To begin cutting straight lines, first align the front and rear pointers over a snaped chalk line.

Rear Pointer

Note: Be certain to check the secondary depth limiting screw before cutting. It is responsible for balancing the engraver for a smooth even cut. Refer to page 10 for further instructions.

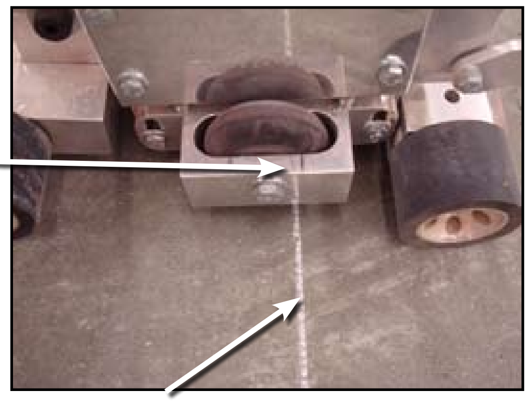
Then sight the rear pencil mark located on the contour following bracket with the beginning of the cut.



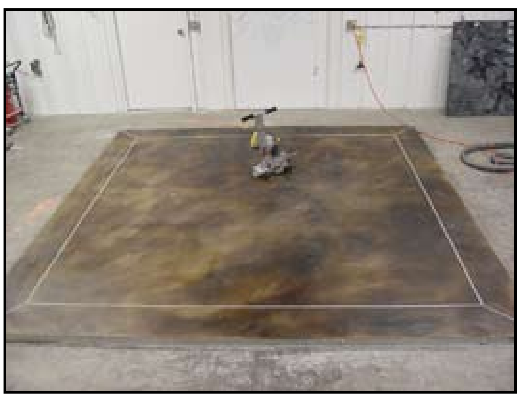


When cutting, use even, firm downward pressure to keep the engraver straight. Watch the front pointer to maintain alignment with the chalk line.

Locate the end of the cut line with the forward mark located on the side of wheel bracket.



Hold up short. It is better to undercut than to overcut.



It is helpful to have someone hold the vacuum hose and cord. If operating alone, place the hose and the cord over your shoulder. This will allow you to pull the weight of these items with your body and not with the engraver.

Track free cutting is used for borders, straight lines, tile patterns, or any random linear pattern.

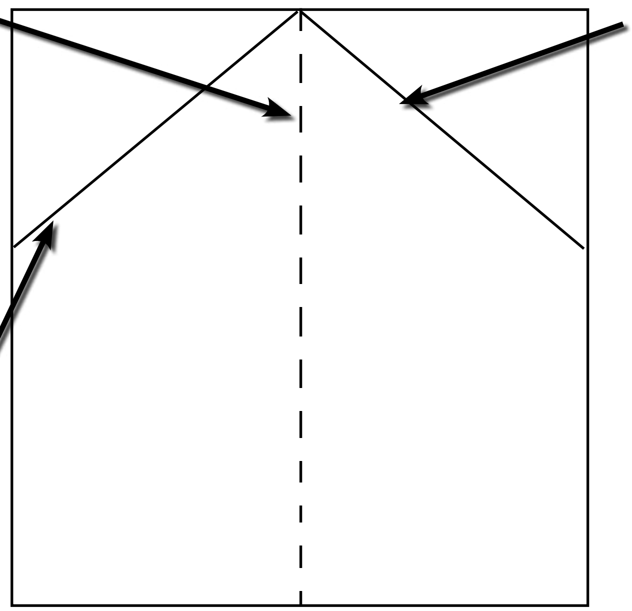
Hint: It is a good idea to snap all lines prior to cutting to check that the layout is visually pleasing.

Layout for Diagonal Tile

It is recommended to layout a tile pattern on a diagonal. It will help hide many imperfections on slabs that are not built square. Also, diagonal layouts are more aesthetically pleasing.

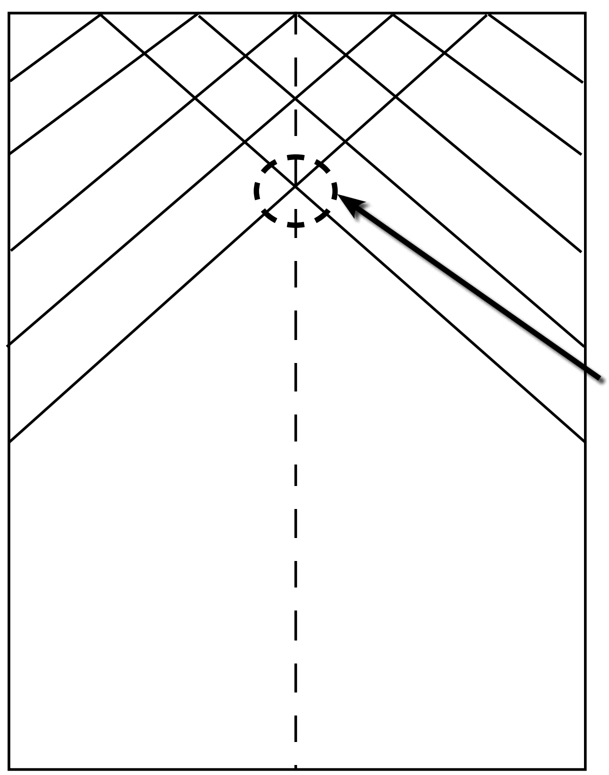
A. Snap a chalk line down the center of the slab. This may be the actual center line or the visual center due to an odd shaped or poorly framed driveways.

B. Using a framing square, measure for a 45 degree angle and snap a chalk line.



C. Flip the framing square around and measure another 45 degree angle and snap this chalk line. This line is perpendicular to the first 45 degree line created.

D. Using a framing square to measure lines, continue snapping chalk lines in both directions.



E. If the lines are properly spaced and angled, the lines will intersect on the center chalk line. If they do not cross at this point, something is wrong. Check the widths between the lines.

Free Form Curves

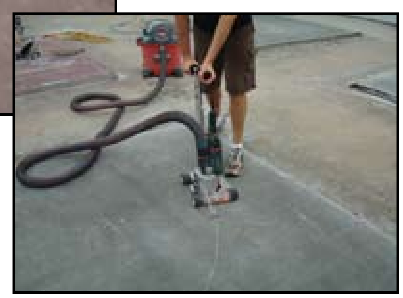
1. Draw the line to be cut.
2. Set up the engraver for track free cutting.

Refer to page 16 for set up instructions.

3. Put a lot of downward pressure on the engraver to keep the wheels from skidding as it turns.

4. Forward progress must be maintained. If forward progress stops, any attempt to turn will create a bobble in the cut line.

5. Use body weight to put sideways pressure on the engraver to make the curves.



Due to the blade being 6” behind the pointer, the sharper the curve the further the pointer will be off the drawn line.

Practice this procedure before applying it.

Tips: Whenever possible start on a straight cut that leads into a curve. It makes alignment much easier.

Hint: To draw a line parallel to the edge of a slab, a handy tool is the edge parallel marker.

Circular Brick Patterns

A. Terminology
B. Tools Needed
C. Setting The Center Pivot
D. Attaching Parts To The Engraver
E. Cutting Long Lines
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Terminology

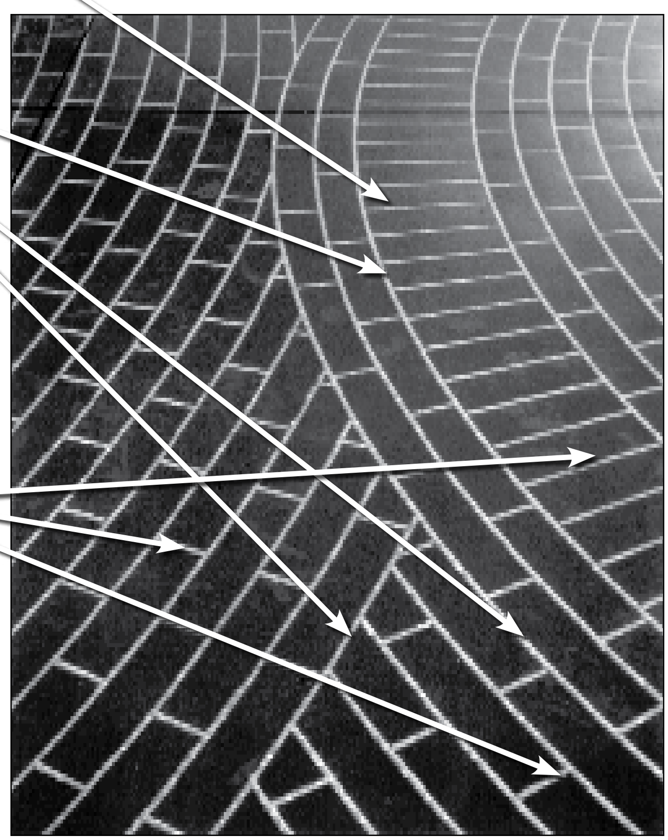
Long cuts and Short cuts

These are long cuts. Also may be called arcuate cuts as in bent or curved like a bow or an arch. If these long cuts are straight then they could also be called linear cuts. A mason would call these a bed joint.

Soldier courses are bricks that are placed at right angles to the main course of bricks. Soldier courses are placed in the circular brick pattern to keep the other bricks from growing too long or too short. They break up the pattern and they look good.

Generally a circular or arcuate pattern should have a soldier course about every 8 to 12 long cuts or courses. The pattern, the design or the size of the slab may also dictate the locations of soldier courses.

Usually the engraving process will begin with the long cuts.



These are short cuts. Short cuts begin and end between long cuts. A standard tile pattern has intersecting long cuts therefore it does not have short cuts.

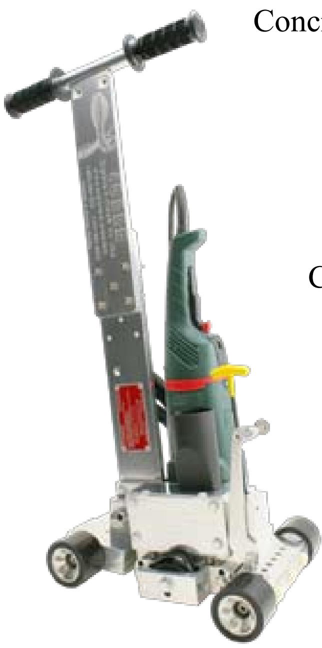
Short cuts could also be called radial cuts as in radiating from the center. A mason would call them a head joint.

Tools Needed

Tools needed to begin circular pattern

Concrete Anchoring Kit

Hammer Drill



Cobra

Center Pivot

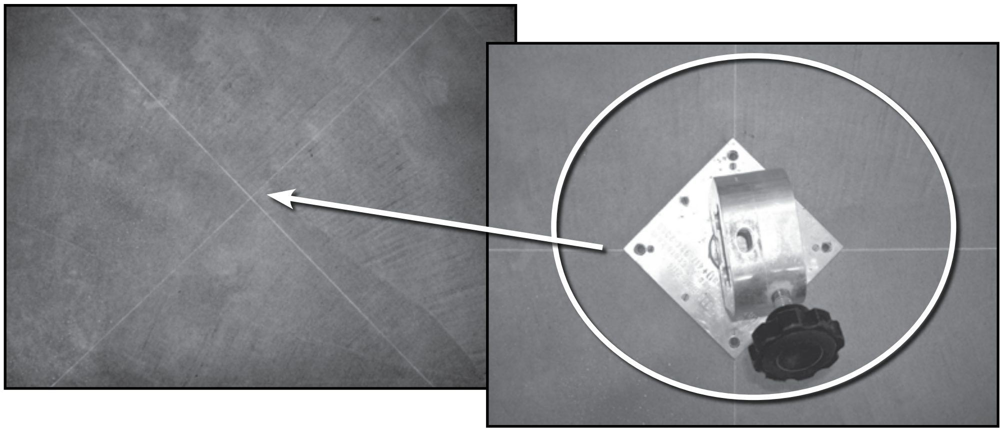
Primary Connecting Bar

Connecting Bar Stabilizer

Connecting Bar

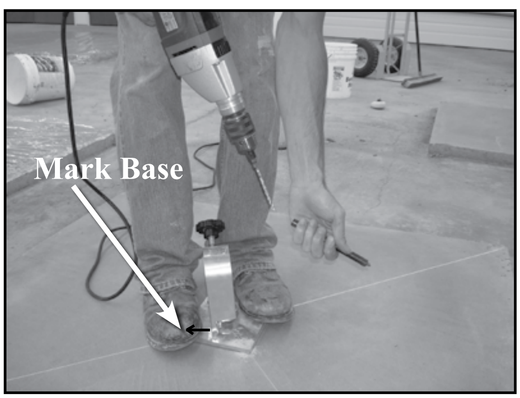
Setting The Center Pivot

Determine where the center pivot is to be located for a circular pattern.



Locate the North arrow and drill in this hole first.

Using the hammer drill and the screws from the concrete anchoring kit, attach the center pivot to the slab. Drill the hole more than deep enough for the screw. Then remove the dust from the hole by running the drill bit in and out of the hole several times.



Slide the sleeve over the drill bit.

Note: If the screw will not seat to the base plate then the hole is not deep enough, debris is remaining in the hole, or the drill bit is worn from drilling many holes.

Set the screws down tight to the base plate. Two screws set opposite of each other are usually sufficient to hold the center pivot.

Keep a mental or written note of the direction the arrow on the center pivot base is pointing. This will help to reposition the center pivot, if it is necessary to remove it before the engraving operations are completed.

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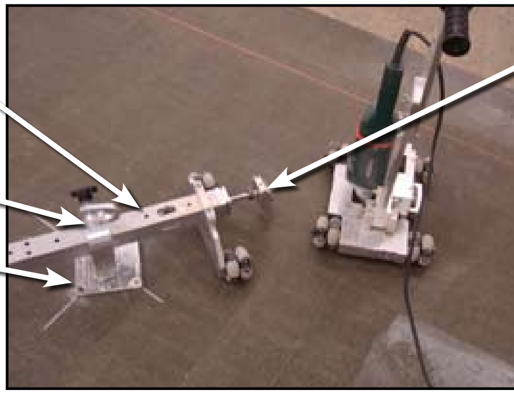
Attaching Circular Tracking To The Engraver

Primary Connecting Bar

T-Pin Hole

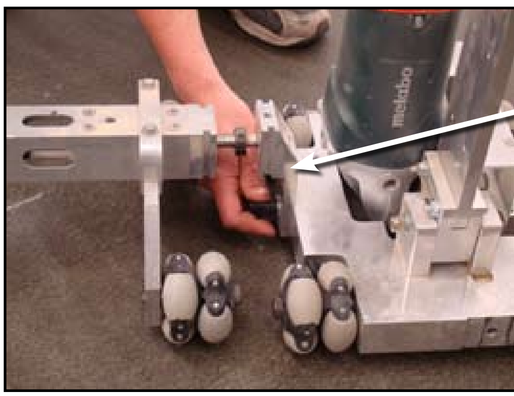
Center Pivot

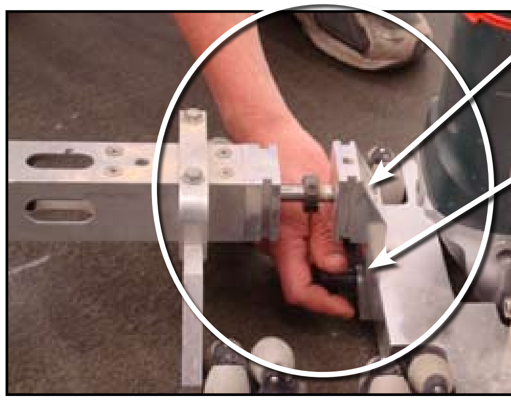


Connecting Bar Stabilizer

The Connecting Bar Stabilizer is used to stabilize the Primary Connecting Bar. Slide the stabilizer over the primary connecting bar with the wheels facing toward the machine. Stop within an 1" or so of the clamp block assembly.

Slide the primary connecting bar into the center pivot with the T-pin hole oriented closest to the machine.

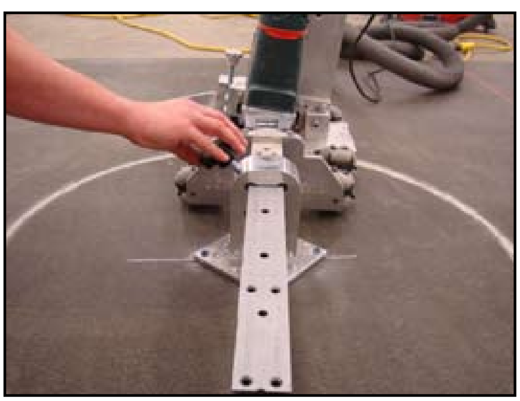




Riser Block

Star Knob

Attach the riser block to the engraver with the star knob.



Insert the T-pin into the center pivot and through the indexing hole in the primary connecting bar for the smallest circle desired. Then snug the center pivot star knob.

The smallest circle that can be acheived with the Super Compact is 25 1/2".
The largest circle that can be acheived without having to use a connecting bar support wheel is 12 to 15 feet.

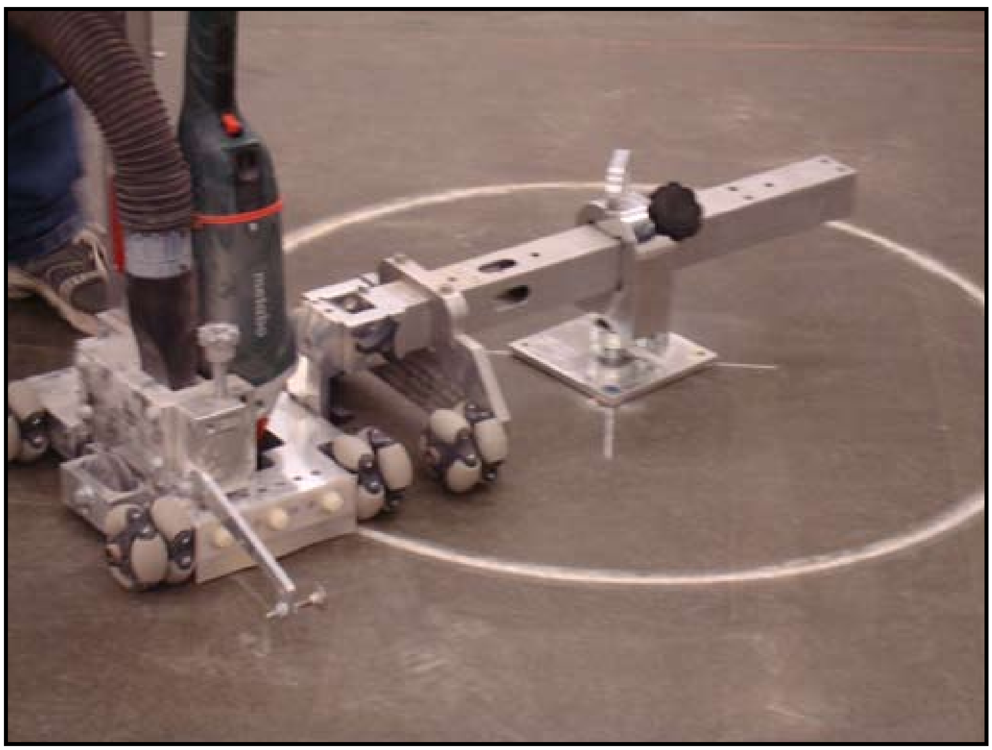
Note: The center pivot star knob secures and tightens the connecting bar to the center pivot. If the star knob is not tight, it will cause a sloppy, ugly line. When cutting short cuts (radial cuts) a loose center pivot star knob will produce overcuts.

Cutting Long Lines

Turn the engraver on, press down on the handle to firmly engage the blade with the concrete and push forward.

To index out for the next circle, remove the indexing pin, release the star knob and move the engraver out. Locate the next indexing hole and insert the pin. Lightly tighten the center pivot star knob.

Note: The indexing holes are drilled 4” apart.

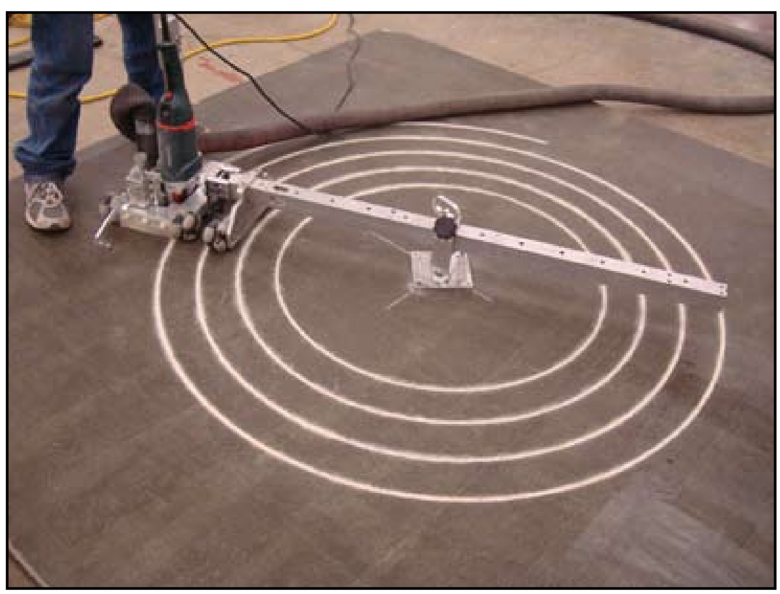


Adding Standard Connecting Bar Sections

Insert the connecting bar and attach with four connecting bar screws.

> Note: Connecting bar screws are **NOT** standard screws. Use of another type of screw will result in a loose fit between the bars. Resulting in miscuts.

Replace the T-pin in the next indexing hole, and secure your star knob.



Continue cutting circles.

Soldier Course Cutting

Soldier Courses are used in circular brick patterns to control the over all maximum brick length.

Typically when you are close to the center pivot you will put in a soldier course after six (6) to eight (8) rows. As you get further away from the center pivot a soldier course can be added after every eight (8) to twelve (12) brick rows.

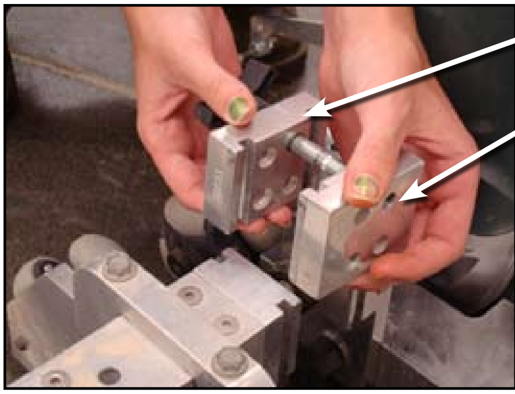
For a 12" long brick, index out 3 holes.

Insert the T-pin and tighten the star knob.

Visually check that the engraver is correctly located for the next cut. Then cut the circle.

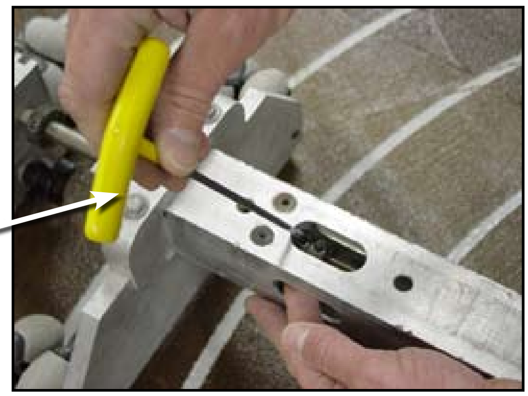
Cutting Short / Radial Cuts

Setting The Stroke Length For A 12" Soldier Course

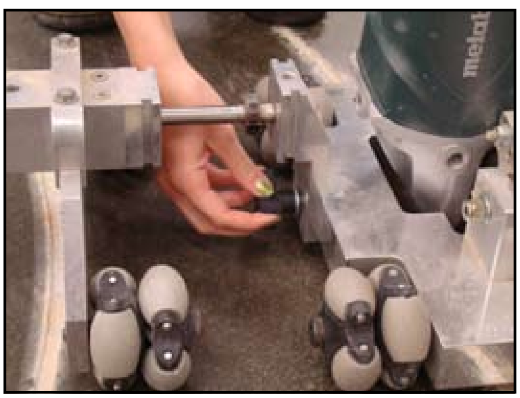


Remove the clamp block.

Unscrew the star knob connecting the riser block. Rotate the engraver 90 degrees and reattach the riser block to the engraver.



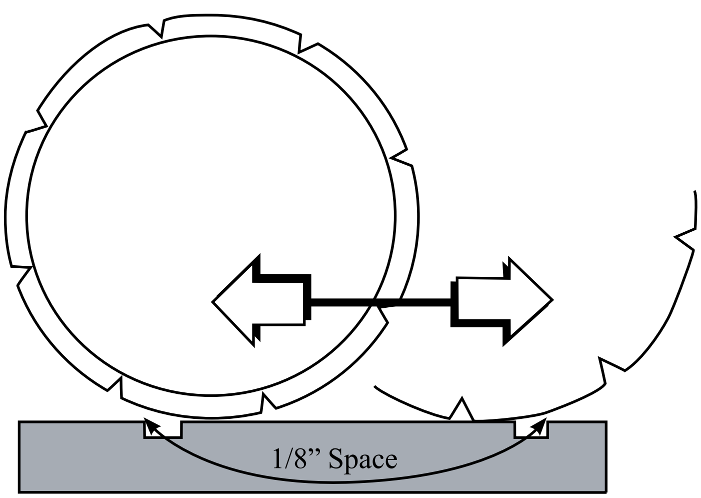
Using the 9/64" hex T-handle, loosen the two visible collars located within the primary connecting bar.



Push the engraver out until the two collars contact the single rear collar. Tighten all of these collars.

Check to see that the blade will cut exactly between the long lines.

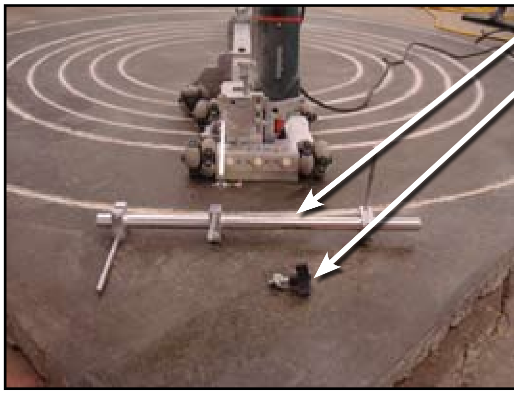
Stroke Length
Adjustment for Outward Cut.



The length of short/radial cuts are changed by adjusting the stop collars that are on the 1/2 inch shaft located inside the primary connecting bar. Adjust the stop collars to approximately 1/8 inch gap between the blade and the far sides of the long cuts. Look under the engraver to get a view of the blade and the long grooves. The illustration below shows a cross sectional view of the concrete, grooves and blade.

Rigid Pointer System

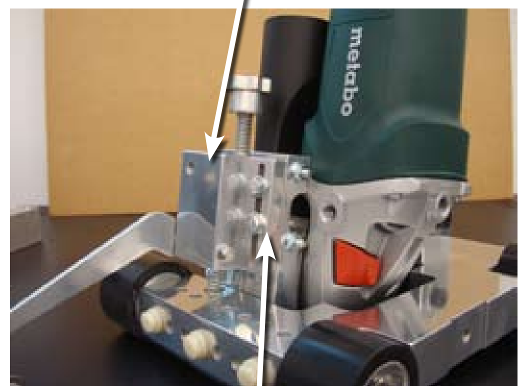
Rigid Pointer System (RPS) components.



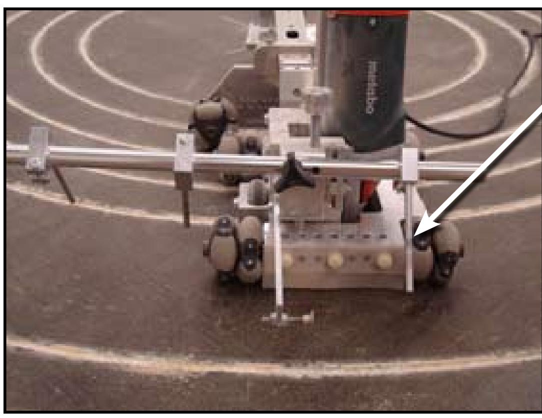
Rigid Pointer

Star Knob

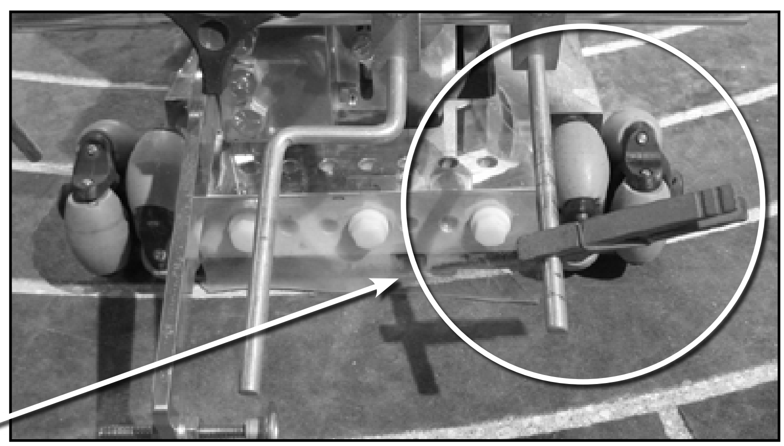
Plunger Block



Using the second hole from the top on the plunger block attach the Rigid Pointer System (RPS).



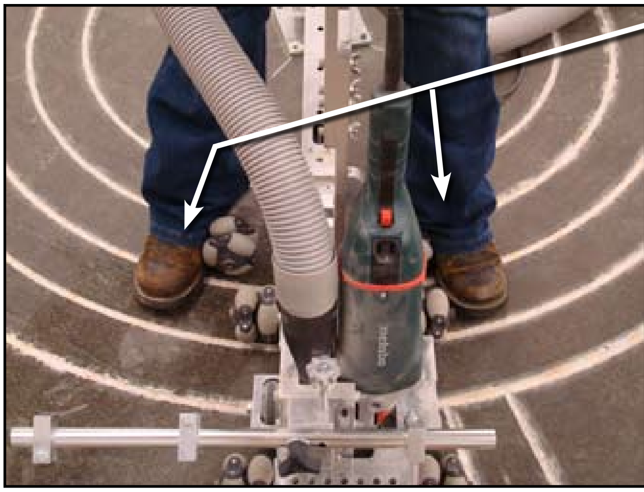
4” Pointer
Soldier Course Pointer



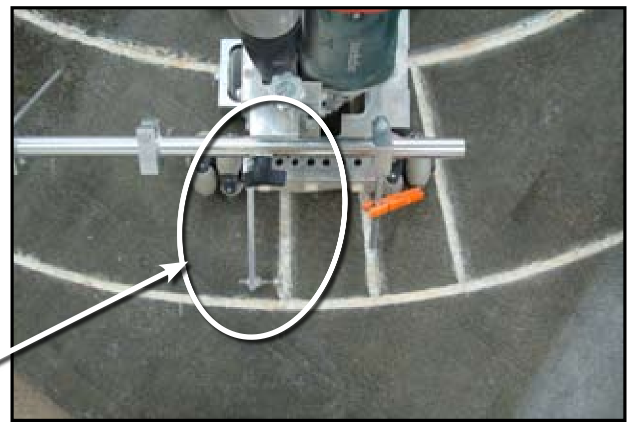
It may be helpful to attach something to the pointer being used. It is a reminder of the proper pointer.

Cutting Soldier Course Bricks

Index the connecting bar to the proper hole.



Hold the engraver steady by using your feet to chock the connecting bar stabilizer wheels. Start the cut by pressing down on the engaver handle and pushing the machine out to the end of the stroke.



At the end of the stroke, let up on the handle to get the blade out of the cut and then pull the engraver back to the beginning of the cut.

Move the engraver to the right to make the next cut. Use the 4” pointer to point at the cut just made and cut again.

> Note: When aiming at a cut line with a pointer, you should be centered over the engraver. If you alter the viewing angle the width of the brick will change.

Tip: Soldier course cuts are not necessarily aligned with the cuts of any other courses.

Tip: In a circular or arcuate pattern, soldier courses break up the pattern and keep the other bricks from growing too long or too short.

Tip: In a circular or arcuate pattern, insert soldier courses as often as deemed necessary but generally put one in at least every 8 to 12 brick courses.

To be sure there is not a small sliver of a brick remaining with the last cut, determine a delaying point to make it appear that the bricks perfectly fit into place.

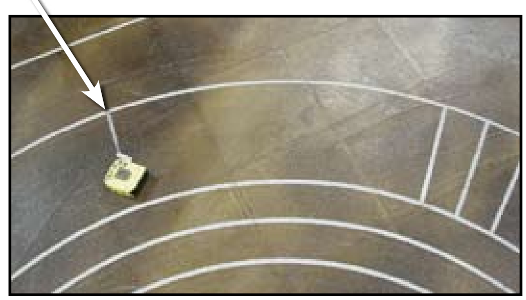
1. Make a minimum of nine cuts (total of eight bricks when counted).

> Note:
> We use the distance of 8 bricks as a delaying point to simplify the calculation of the remaining bricks. The number eight (8) is divisible to 1 by dividing it in half three times.

2. Measure the length across the **TOP** of the eight (8) bricks.

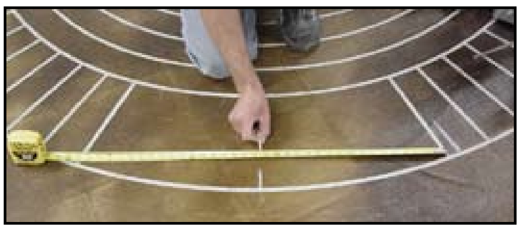
3. Transfer that delaying point measurement to the left side of those bricks and mark that point with soapstone.

4. It is a good idea to leave something in the cutting path (like a tape measure) as a reminder of the delay cutting point.



5. Continue cutting around the soldier course. Stop the engraving process at the delaying point marker.

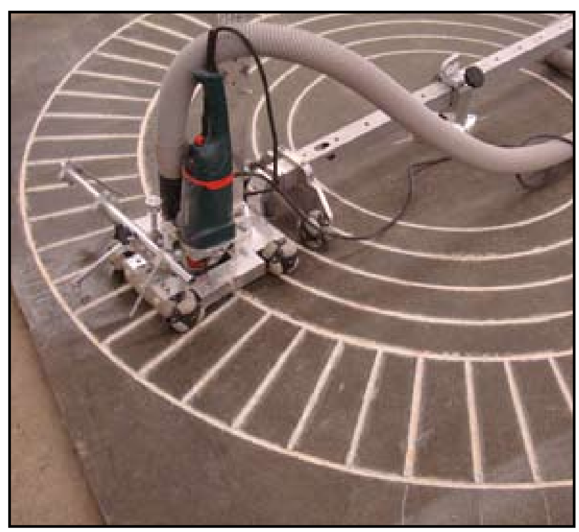
It does not matter if the last cut falls before or after the delaying point mark. It does however determine whether the remaining bricks are going to be slightly wider or narrower than the other bricks in that soldier course.



Measure and divide the remaining space in half.

Divide those two halves in half.

Then divide those four sections in half again.

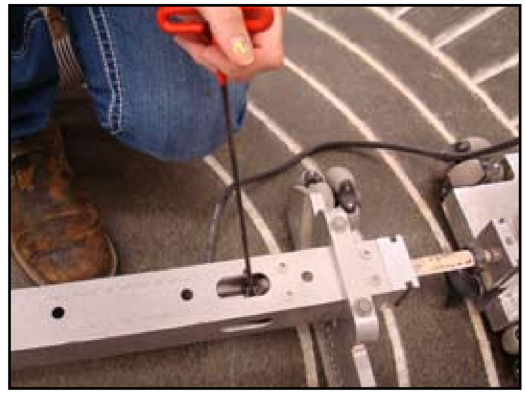


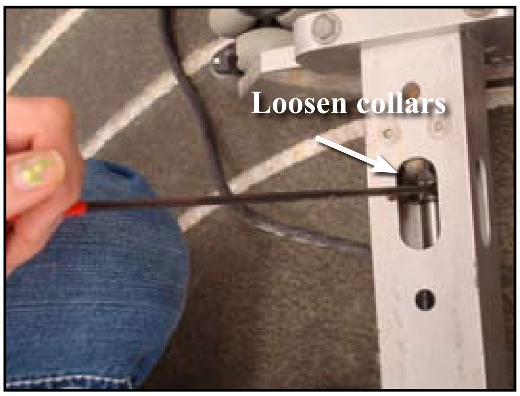
Finish the remainder of the cutting by pointing to the marks using the center pointer.

Setting the Stroke Length For Standard Brick Cuts

Index the connecting bar back one hole.

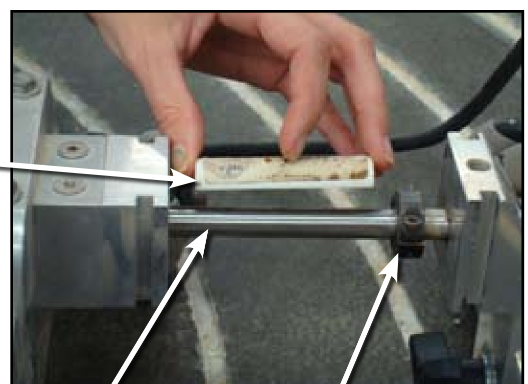
Adjust the outward stroke length, by moving the stop collars that are located inside the primary connecting bar.





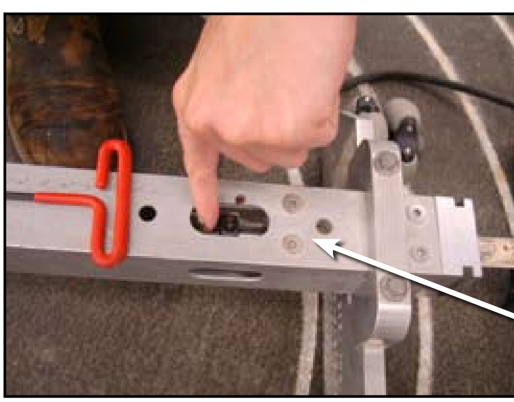
Note:
It may be necessary to tilt the engraver to gain access to the collar screws.

When adjusting length of stroke for 4" brick cuts, use the PVC spacer provided.



Bearing Housing

Place the spacer on the shaft, between the collar and the bearing housing.

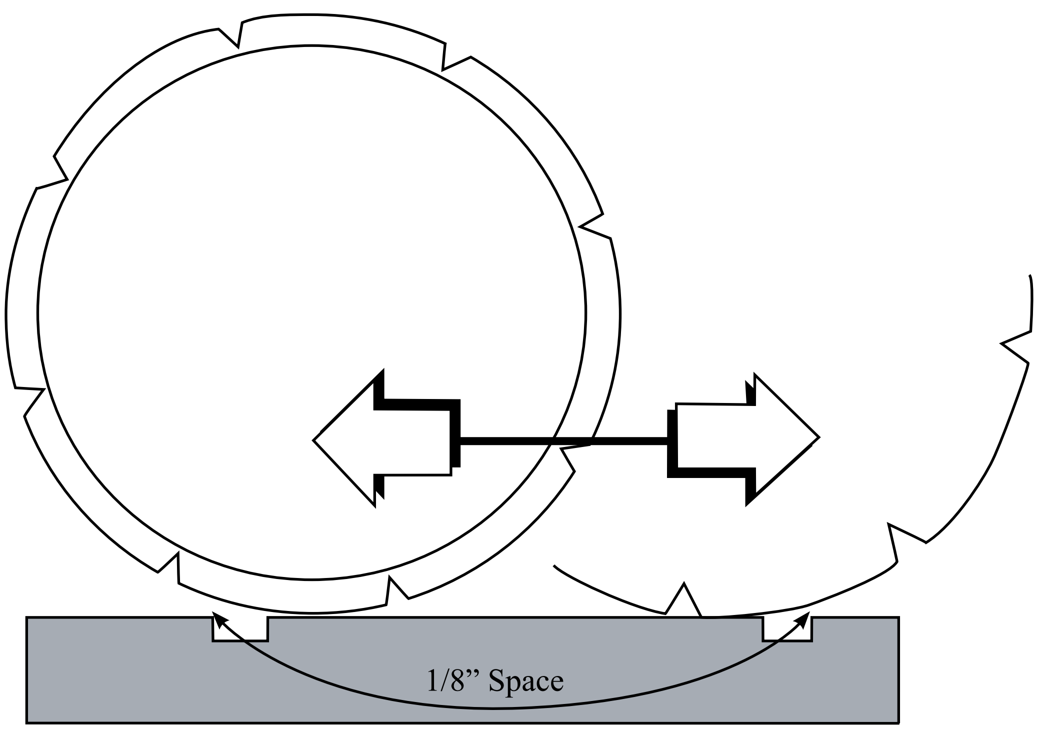


Slide the inside collars up to the bearing housing and tighten them securely. Slippage will result in overcuts.

The length of radial / short cuts are changed by adjusting the stop collars that are on the 1/2 inch shaft located inside the primary connecting bar.

Adjust the stop collars to approximately 1/8 inch gap between the blade and the far sides of the long cuts.

You'll have to look under the engraver to get a view of the blade and the long grooves. The illustration below shows a cross sectional view of the concrete, grooves and blade.

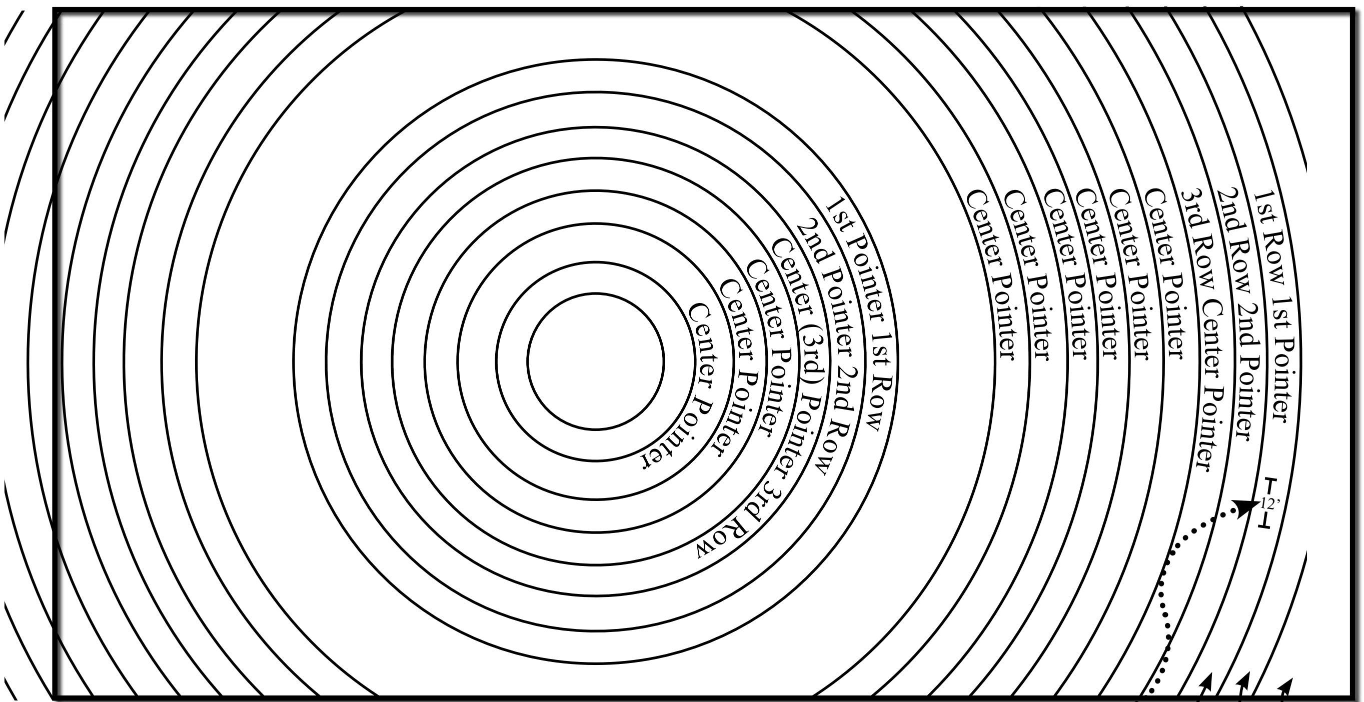


Stroke Length
Adjustment for Outward Cut.

Overview of Standard Short / Radial Cuts

To cut the short/radial cuts, start on the “first row” (see figure below) and work toward the center. Working from the outside rows inward helps to aim the Rigid Pointer System and view the work as it progresses.

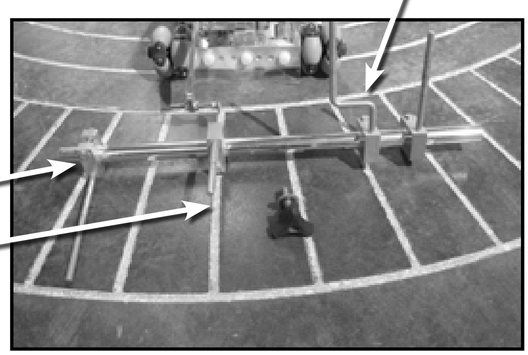
Note that there is more than one “first row”.
Every time a soldier course is crossed a new pattern begins with its’ “first row”.



The exception to starting on the furthest outside row:
When a pattern of bricks, has some courses being fragmented, start the 1st row on the course that goes completely through; even if it is reduced to a sliver in some areas.

Start cutting on the 1st row and work towards the center.

Rigid Pointer System

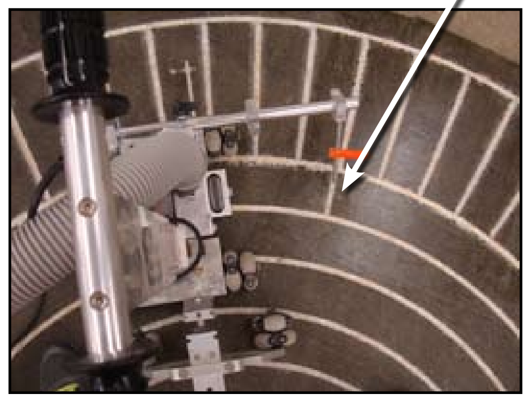


Circular Brick Cutting

First Row Brick

The words row and courses are used here interchangeably

First Row Pointer



A. The 1st pointer is set to cut 12” long bricks.

B. Because the pointer is located on the right side, cutting progresses from right to left.

C. Stand in the operating position. Switch on the motor.

D. Hold the engraver steady by using your feet to chock the connecting bar stabilizer wheels.

E. Start cutting by pressing down on the engraver handle.

F. Push the engraver out to the end of the stroke.

G. At the end of the stroke let up on the handle to get the blade out of the cut and then pull the engraver back to the stop.

H. Visually check that the cut is not overcut or undercut and of the proper depth.

I. Move the machine sideways to the left.

J. Aim the pointer at the cut just made.

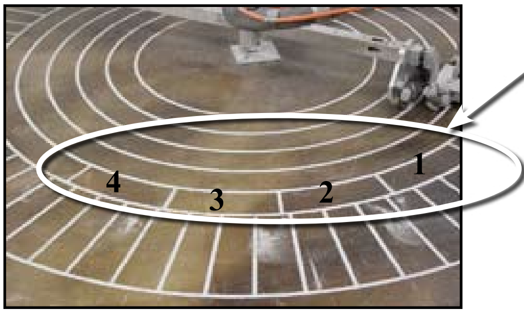
K. Make another short cut.

L. Continue to make more brick end cuts.

A brick pattern is now beginning to appear.

With practice, some operators can make a single short cut cycle (A-J) in as little as 2.5 to 5 seconds.

To be sure there is not an obviously short brick with the last cut, determine a delaying point to make it appear that the bricks perfectly fit into place.

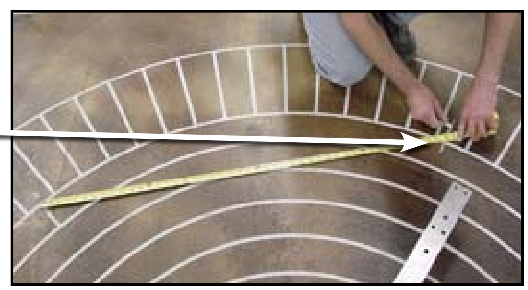


1. Make a minimum of five cuts (total of four (4) bricks when counted).

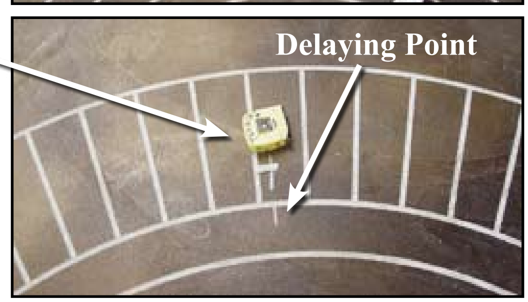
Note:
We use the distance of 4 bricks as a delaying point to simplify the calculation of the remaining bricks. The number four (4) is divisible to 1 by dividing it in half two times.

2. Measure the length across the TOP of the four (4) bricks.

3. Transfer that delaying point measurement to the right side (as viewed from the operating position) of those bricks.



4. It is a good idea to leave something in the cutting path (like the tape measure) for a reminder to stop at that point.



5. Continue cutting around the first row. Stop the engraving process at the delaying point marker.

It does not matter if the last cut falls before or after the delaying point mark. It does however determine whether the remaining bricks are going to be slightly longer or shorter than the other bricks in that course.

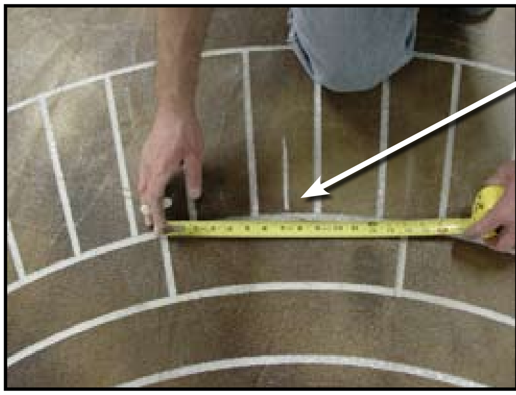
Measure and divide the remaining space in half

Divide those two halves in half.

Finish the remainder of the cuts by pointing to the marks using the center pointer.

Second Row Bricks

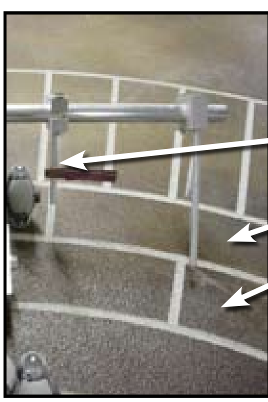
First at the center pivot index back one hole on the connecting bar.



On the first brick row there are four bricks that are probably odd in length compared to the others in that row. The second pointer will probably not align the blade in position for these four odd bricks.

So first measure and divide in half the four odd bricks. (The first four bricks that were cut on the row)

On the second row of bricks (Second row in from a soldier course) aim the **center pointer** at the dividing marks of the 1st row and cut **ONLY** these four (4) bricks in the second row.



Now, use the second (2nd) pointer to aim at the first (1st) row of brick head joint cuts.

Second pointer

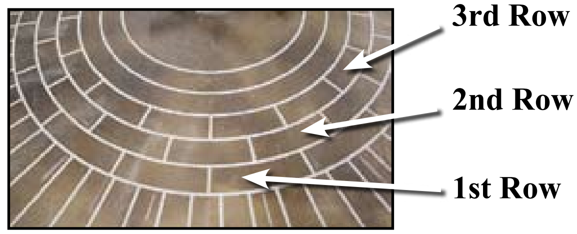
1st Row of bricks

2nd Row now being cut.

Use the 2nd pointer. Aim it at a cut in the first row to make a cut in the second row. The second pointer is set for a 6" cut. So when it is pointed to a cut line of a 12" brick, it aligns the blade to the center of that 12" brick.

Third Row Bricks

Index the machine in toward the center pivot to the next course.

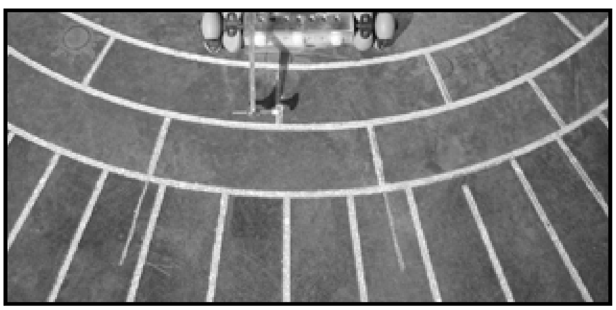


Use the #3 pointer, also called the Center Pointer.

A. The short/radial cuts of the third row of bricks are centered on the second row and are in line with the short/radial cuts on the first row.

B. Aim the pointer at the brick head joints cut on the first row, to make the cuts on the third row.

Notice that all pointers so far have aimed at the cuts in row #1



Note: The engraver has two (2) center pointers that can be used. Either use the single flip center pointer, OR leave the RPS system on and use the its center pointer.

All Other Rows

On row #4 through to the next soldier course use the center pointer.

The radial cuts of these rows are centered on the brick head joint cuts in the preceding row.

The pointer is aimed at the cut that is two rows away from the row being cut.

Point to the cut in this row

Cut in this row

Whenever a soldier course is crossed, start a new pattern progression.

Linear Brick

Tools Needed

Primary Connecting Bar

Concrete Anchoring Kit

Hammer Drill

Cobra

Connecting Bar

Connecting Bar Stabilizer

Linear Carriage

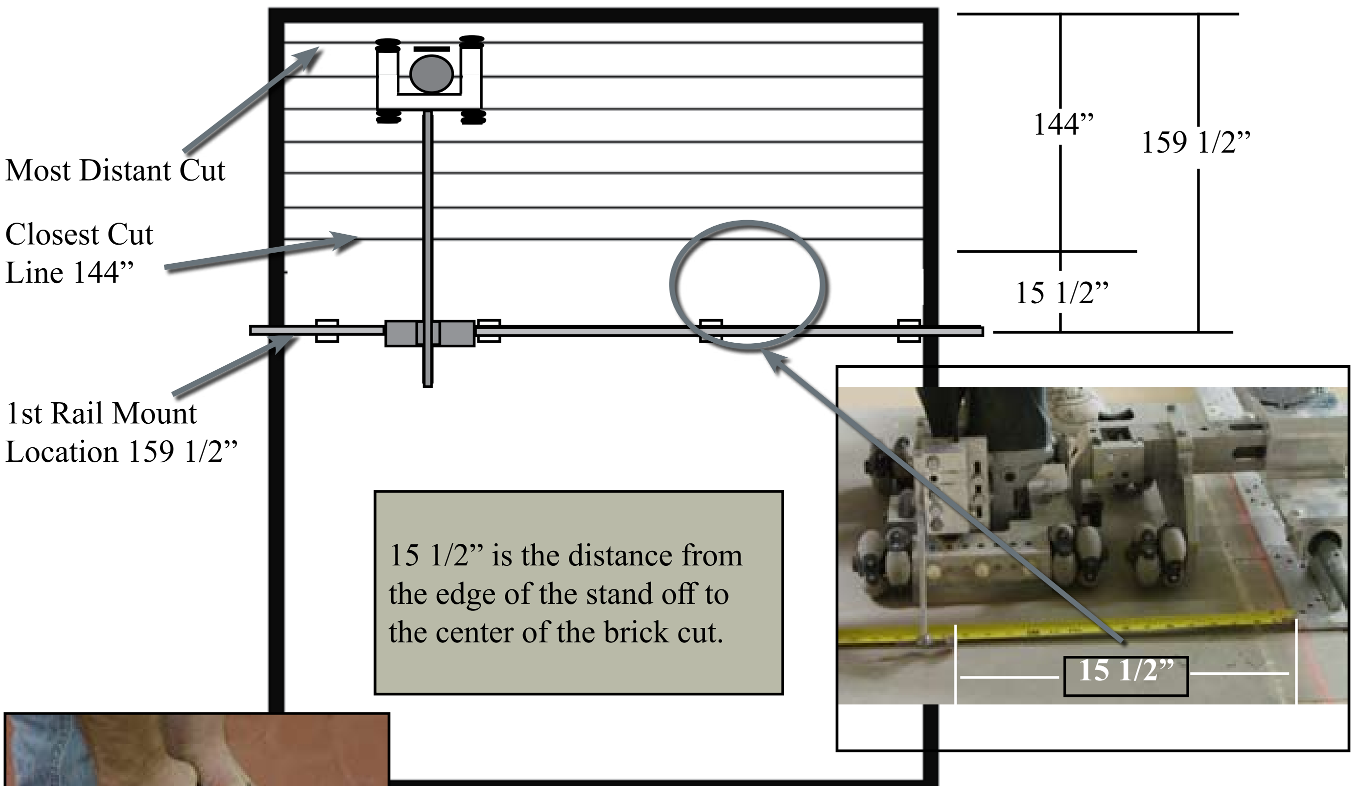
4’ or 8’ Linear Tracking

Layout of Linear Brick Patterns

The closest cut line the engraver can make to the linear rail is 15 1/2”.

The connecting bar is drilled at 4“ intervals therefore when determining where to mount the rail, use measurements that are divisible by 4 then add 15 1/2” to that measurement to mount the linear rail.

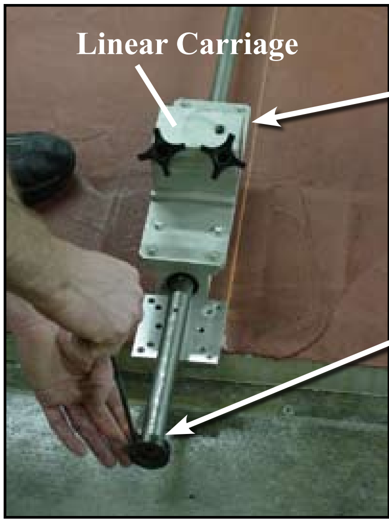
For example, the first mounting point could be 159 1/2” (12 feet + 15 1/2” = 159 1/2”) from the most distant cut.



When engraving linear bricks, do not extend the connecting bar past 10 to 15 feet. Extending further than the recommended length can cause bowed lines due to the lag time between the engraver and the linear carriage. When engraving long lines 10 to 15 feet from the linear rail, it is helpful to twist or torque the engraver in order to move the linear carriage simultaneously with the engraver.

Attach the linear rails to the concrete using a hammer drill and Tapcon® concrete screws.

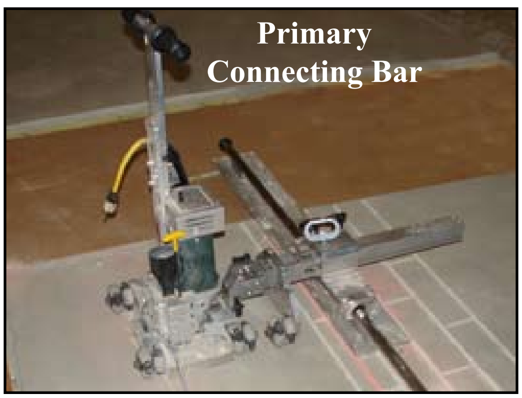
Cutting Long Lines



Carefully slide the linear carraige onto the rail.

Orient the T-Pin hole so it is closest to the engraver.

Attach the provided 1” collars to the end of the linear rails to prevent the carriage from sliding off the end of the rail and damaging the bearings.



Insert the primary connecting bar into the linear carriage.

Attach the engraver to the primary connecting bar.

Install the clamp block on the primary connecting bar.

Index, the primary connecting bar to cut the 1st long cut, insert the T-pin and tighten the star knobs.

Engrave the first long line.

After, the first long line is engraved, remove the T-pin, loosen the star knobs, and index to the next hole. Re-insert the T-pin and tighten the star knobs.

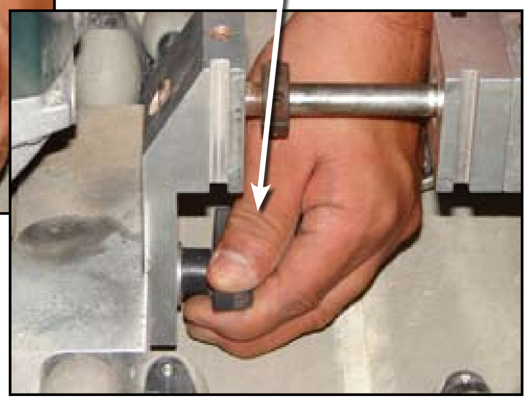
Engrave the next line.

Repeat the above process until the section of long lines are engraved.

Cutting Radial/Short Cuts

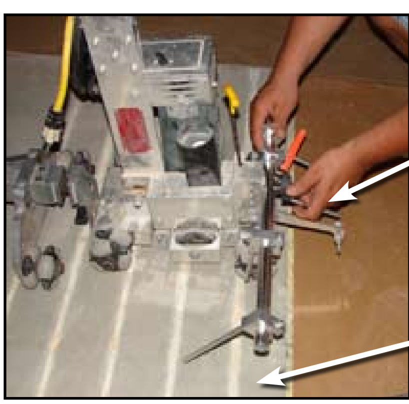
After engraving all the desired long lines, reorient the engraver to begin short cut operations.

Detach the engraver from the primary connecting bar.



Turn the engraver 90 degrees and reattach the primary connecting bar to the engraver.

Check the stroke length for short cuts. Adjust for a 4” stroke length as necessary. Refer to page 78 for specific adjustment instructions.

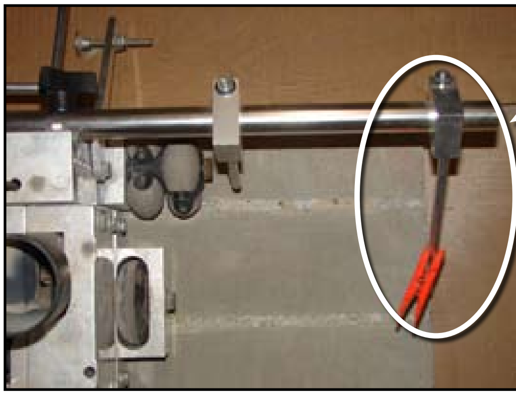


Attach the Rigid Pointer System (RPS) to the engraver.

Index the primary connecting bar to the row of bricks that is furthest away from the linear rail.

First Brick Course

Move the engraver to the far right side of the cutting area.



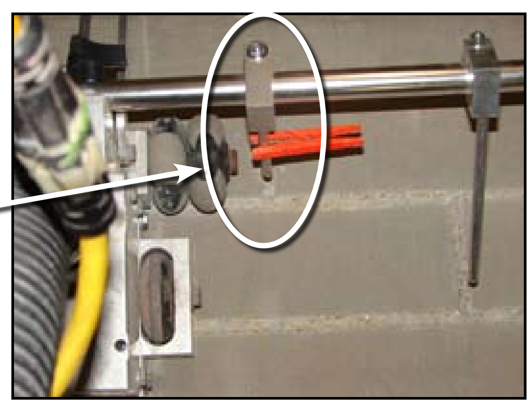
Align the first row pointer (12” pointer) with the edge of the area and make the first cut.

Move the engraver sideways and align the pointer over that cut line and make the next cut. Repeat until this row is complete.

Second Brick Course

Index the engraver towards the linear rail to set the engraver up for the second row.

To cut the second row of bricks. Aim the 2nd pointer at the first row.



Third Brick Course

Index the engraver in toward the linear carriage to the next course.

Use the #3 pointer, also called the Center Pointer.

The radial/short cuts of the third row of bricks are centered on the second row and are in line with the radial/short cuts on the first row.

Aim the center pointer at the "grout lines" on the first row. Proceed with the brick end cuts on the third row.

Notice that all pointers so far have aimed at the cuts in row #1.

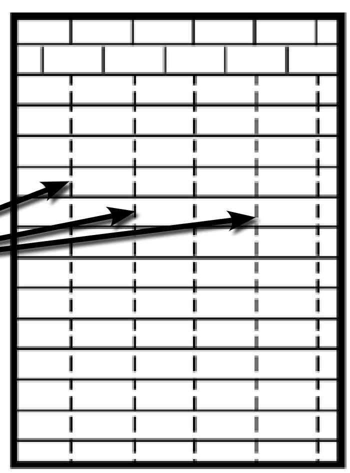
All Other Courses

On all courses remaining use center pointer to align the cuts

The radial cuts of these rows are centered on the "brick" in the preceding row.

The pointer is aimed at the cut that is two rows away from the row being cut.

Tip: To keep the short cuts aligned over a large area, snap chalk lines down the rows to use as a reference.

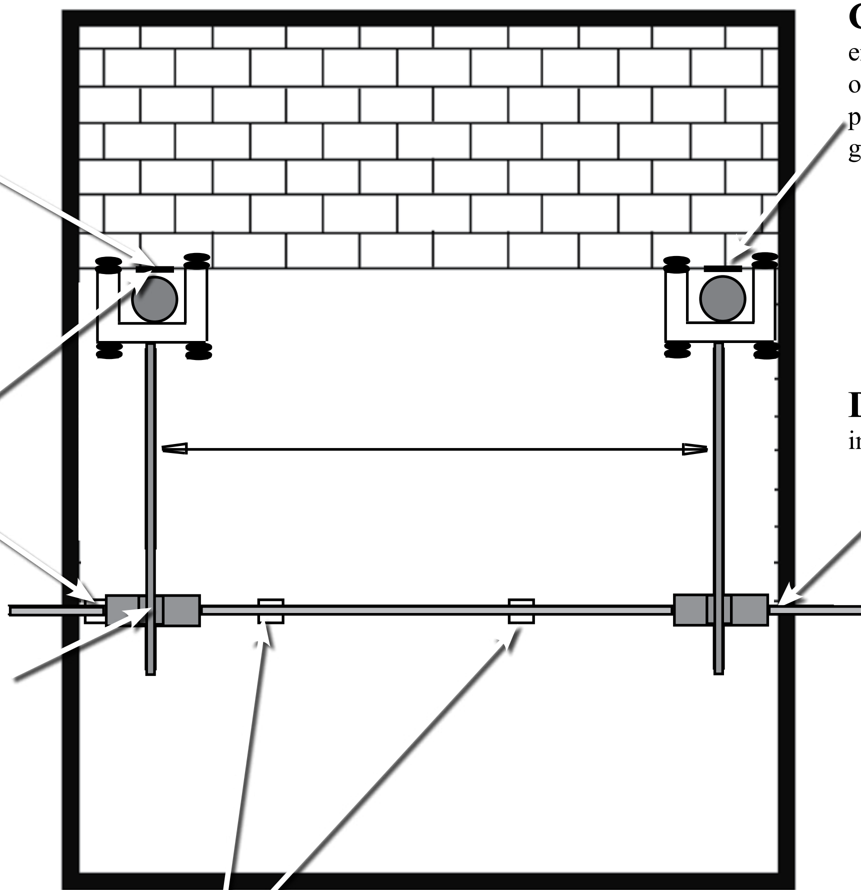


2nd Rail Mount Location

After cutting is completed in the first area, move the linear rail to a second location.

C. Move the engraver to this end of the last cut and put the blade in the groove.

B. As one unit, carefully slide the combined engraver and rail until the blade fits into the last cut.

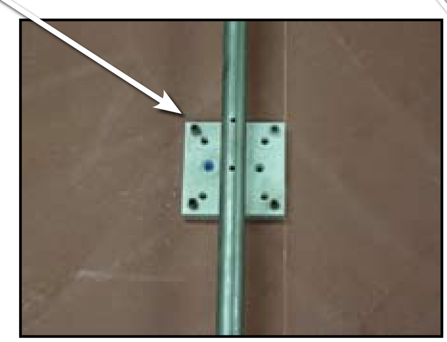


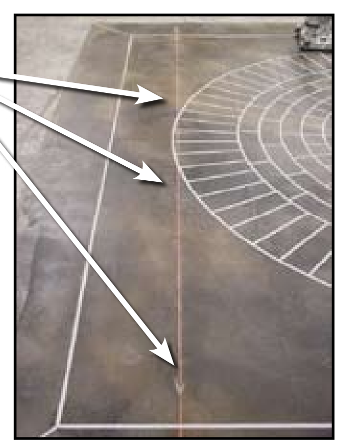
E. Move the engraver back to this end, put the blade in the groove and screw the rail in place.

D. Screw the rail in place.

A. Index out the desired distance. Install the T-Pin and tighten the star knobs.

F. Move the engraver along the rail. Check that the blade is aligned with the groove and anchor each rail standoff.

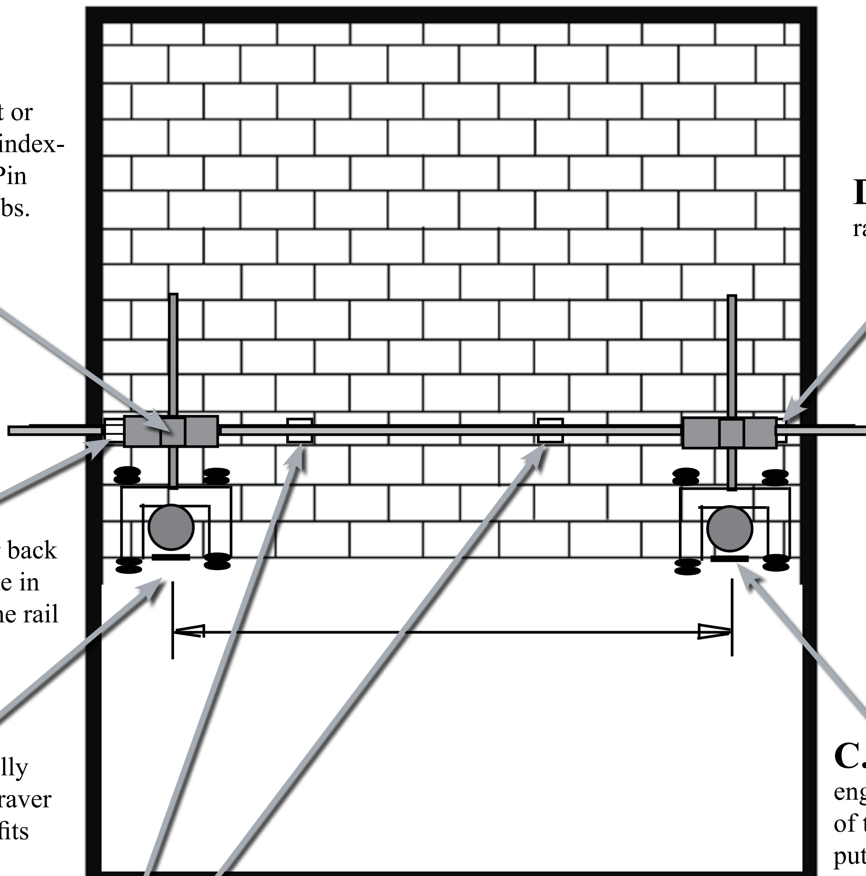




Last Rail Mount Location

A. Index in to the first or second connecting-bar indexing hole. Install the T-Pin and tighten the star knobs.

D. Screw the rail in place



E. Move the engraver back to this end, put the blade in the groove and screw the rail in place.

B. As one unit, carefully slide the combined engraver and rail until the blade fits into the last cut.

C. Move the engraver to this end of the last cut and put the blade in the groove.

F. Move the engraver along the rail. Check that the blade is aligned with the groove and anchor each rail standoff.

Cobblestone Cutting

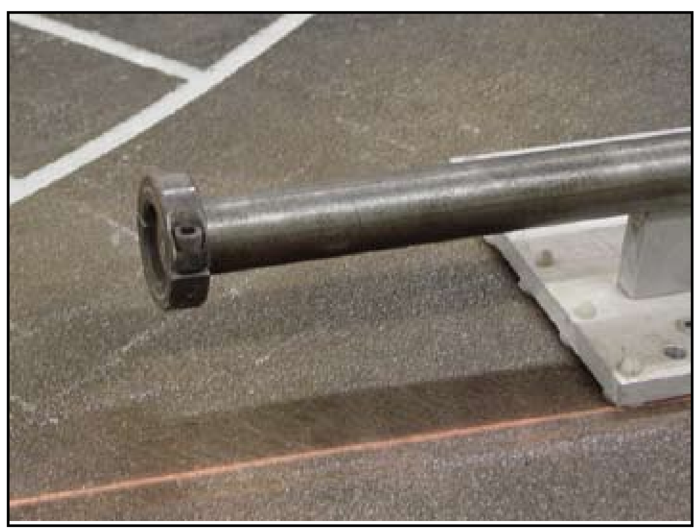
Cutting a linear cobblestone pattern is very similar to engraving a brick pattern.

The difference:

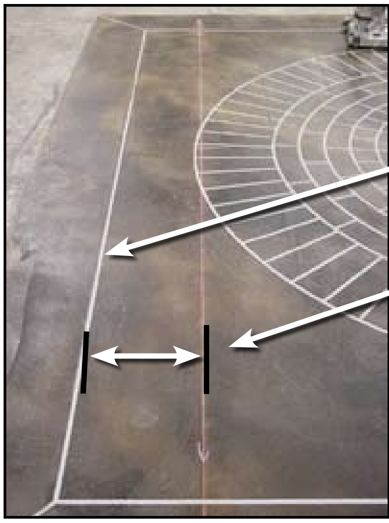
1. The long lines are spaced 8" or 12" from each other instead of 4".

2. Setting the stroke length for short cuts to 8" or 12"

3. The center pointer will be utilized to align for all short cuts. The length of the stones vary in width. **Think random.** Try not to directly align short cuts with each other on adjoining rows.



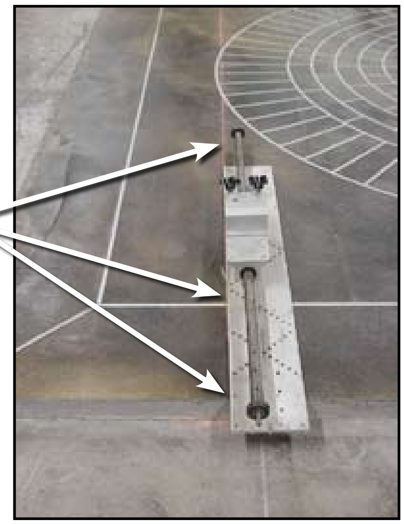
Border Cutting



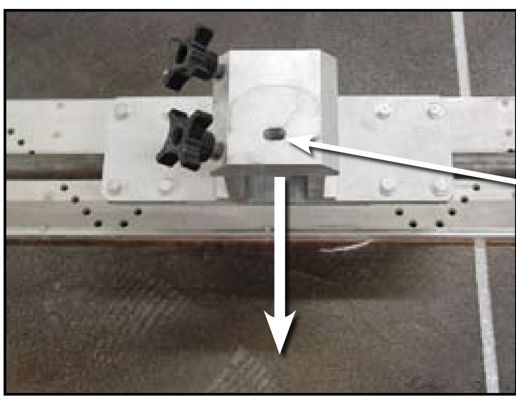
To cut soldier course brick border pattern, snap a chalk line 11 1/2 from the border cut line.

Previously cut using track free method. May also be cut using the linear track.

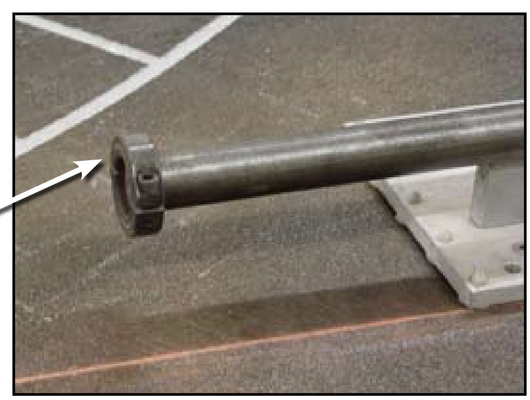
11 1/2 inches



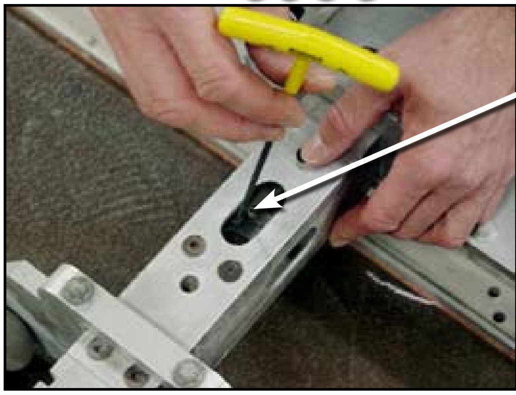
Place the linear track base along the snapped chalk line. Notice that the round linear guide rail is set closest to the line.



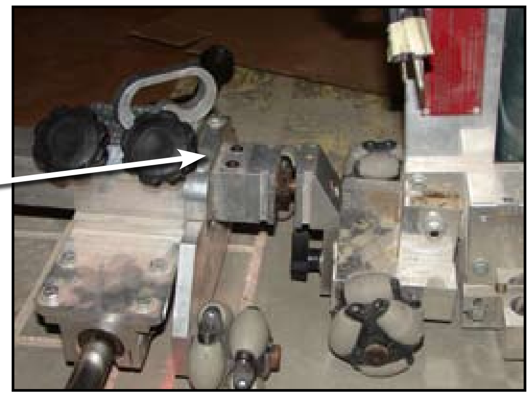
Slide the linear carriage onto the rail with the indexing hole oriented closest to the engraver.



Allowing the linear carriage to run off the rail end will damage the bearings. Use the included collars to safety the carriage.

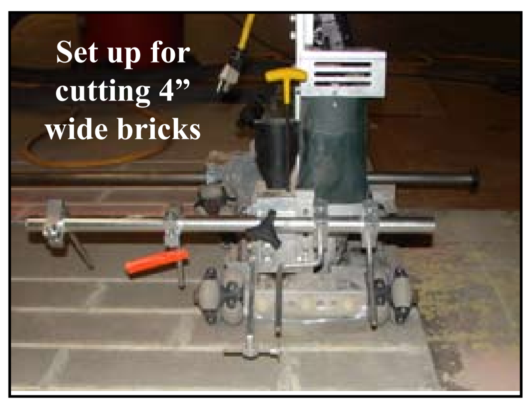


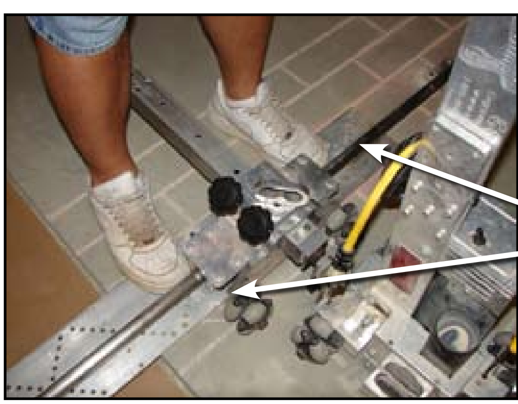
Adjust the primary connecting bar stroke length for the bricks being cut. Refer to page 29 for details on how to adjust stroke length.



Set up the engraver as shown.

Attach the Rigid Pointer System (RPS) to the plunger block. Use the 4” pointer for soldier course brick cuts, and the 6” or 12” pointers for tile or stone cuts.

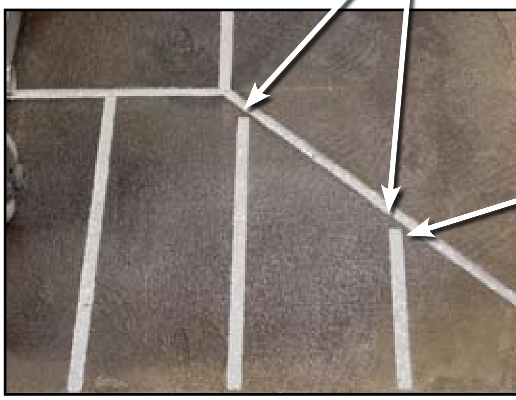




To hold the engraver in place through each cut cycle; chock, block or wedge the linear carriage with your toes.

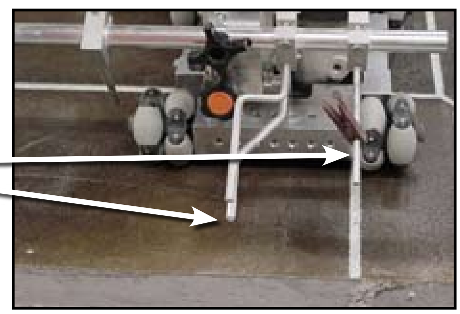
Begin the brick cutting within the mitered corner area.

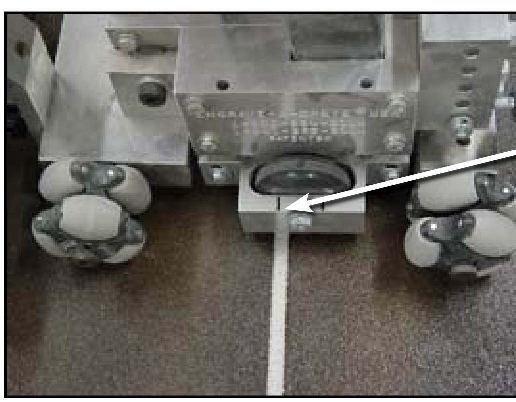
Be sure to undercut these lines. (Remember it is easier to touch-up an undercut than repair an over-cut.)



It is easy to come back and touch this up with a hand tool.

Make the first cut then use the 4” pointer to measure the next brick cut.



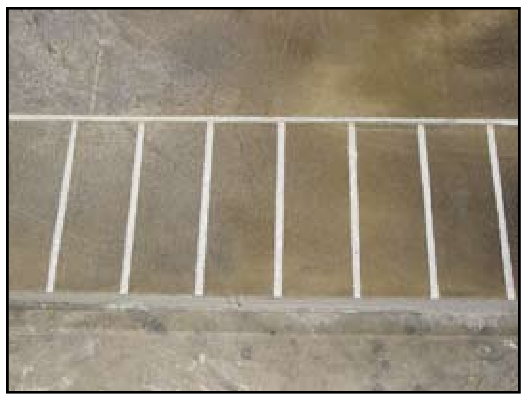


Align the rear pencil mark with the perpendicular cut.

Using the 4" pointer continue cutting bricks along the border.

Slide the linear base along the chalk line to the next section and continue cutting bricks.

.... a brick border.



OR..... leave the border blank and simple.

Other border pattern examples

Touching Up Under Cuts

It is always better to have an under-cut than an over-cut. Under-cuts can be easily fixed.

To finish an under-cut you have several tool choices.

1. Wasp
2. Hammer and Chisel
3. Barracuda and Touch-Up Template

Wasp

Miscuts

If a cut was made in an incorrect position, there are several ways to address it.

1. Do nothing. Sometimes in large areas it blends in and goes unnoticed.

Cut made in error

2. Make more cuts. Create a tie bond for the entire brick course.

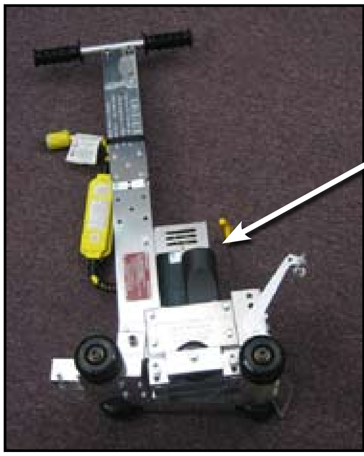
> Tip: Do not advertize to the customer that an error was made.

3. Worst case scenerio, last resort. Fill it in. When filling in a miscut, it is a good idea to make the cut deeper or drill several small holes in the bottom of the groove before filling it. The taller sidewalls or holes will aid in the bonding and long term success of the repair.

A fast set vinyl patch material can be used for filling in the miscut. Mask off all sides of the patch area to prevent the repair material from marring the surrounding surface. Patches and repairs like this are very difficult to hide when using RAC stains.

> Tip: When doing the tie bond effect let the customer know that usually there is an extra charge for this type of effect but for them it was free.

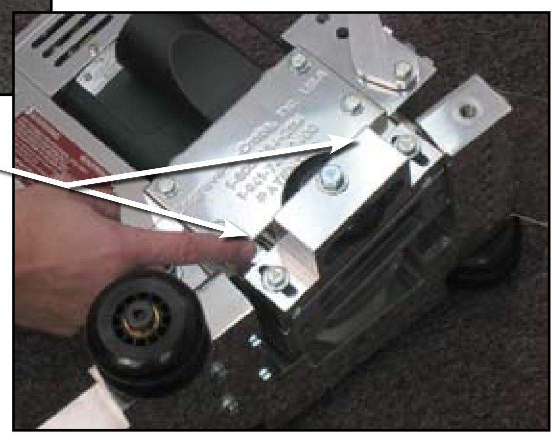
Blade Change



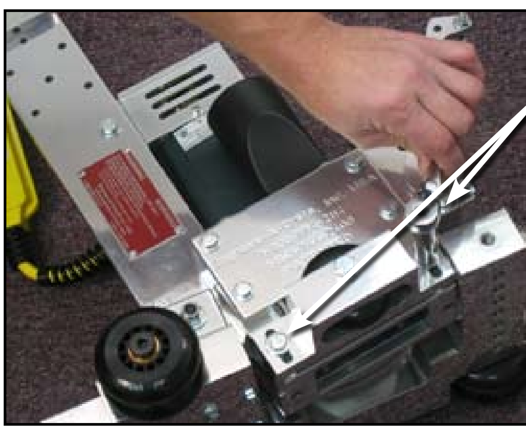
Disconnect from the power, and unplug the extension cord from the engraver.

Place the engraver on its’ side (motor side down).

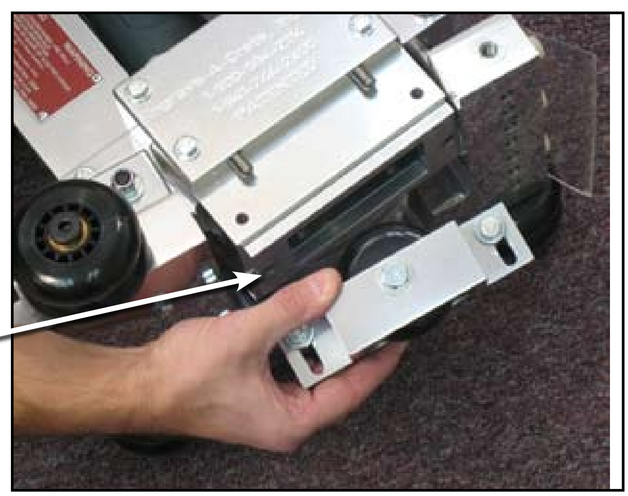
With the supplied 1/4” allen hex wrench, remove the right, front wheel.



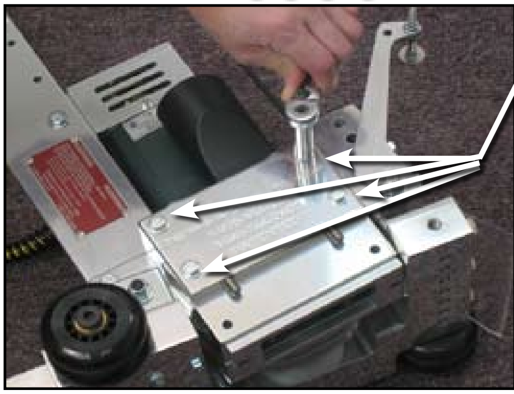
Make sure that both depth adjusting screws are touching the contour following wheel bracket.



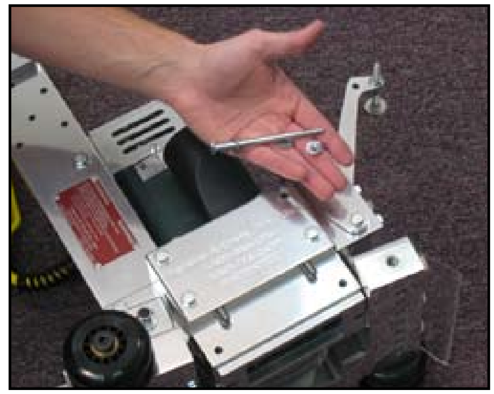
Using a 7/16 socket or wrench, remove the 2 bolts securing the contour following wheel bracket.



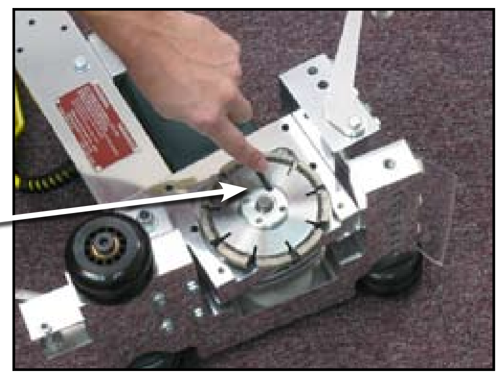
Remove the contour wheel bracket.



Remove the four (4) through bolts holding the blade guard in place.

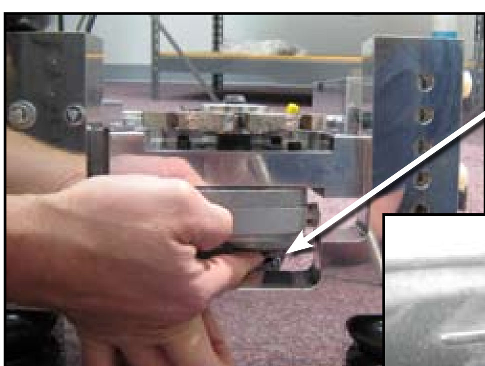


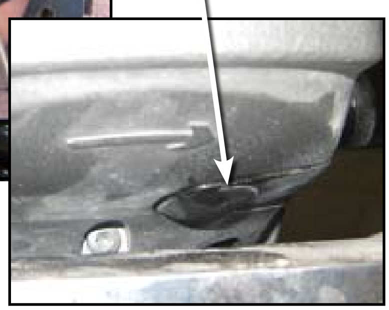
Remove the blade guard.

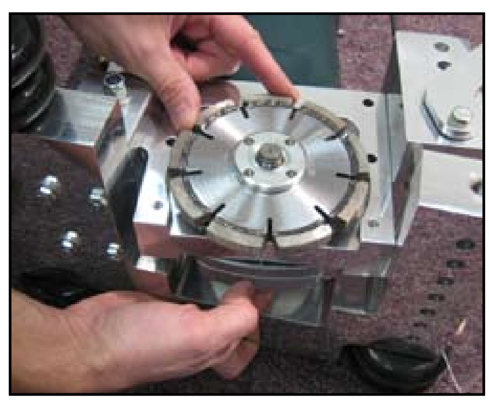


Remove any concrete dust from inside of the spanner holes.

Depress the spindle lock button on the left side of the motor and rotate the blade counterclockwise until the button locks and the blade no longer rotates.







While depressing the spindle lock button use the spanner wrench to remove the hub nut.

Remove the blade.

Wear gloves while removing blade to save wear and tear on your hands.

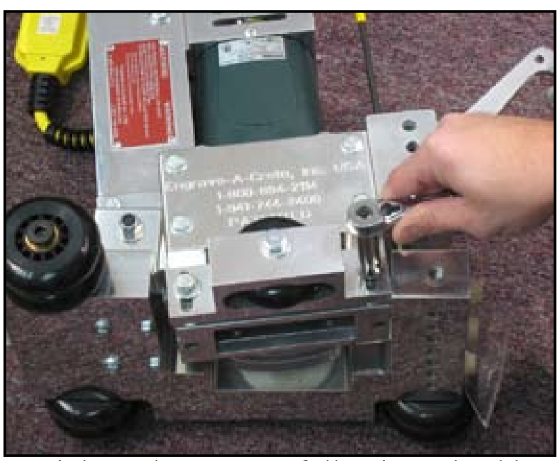
Reinstall the new blade with the direction of rotation arrow pointing counter clockwise.

Replace the hub nut and tighten using the spanner wrench while depressing the spindle lock button.

Check to see that the blade is gripped firmly between the hub nuts.

Raised Boss

Reverse the steps of the disassembly.



Note: If the new blade's core thickness is less than .200", install the hub nut with the raised boss outward.

Do not over tighten the contour following wheel bracket bolts.

The depth of cut will need to be adjusted.
See page 9 for instructions.

Tips, Tricks, & Troubleshooting

Tip: Use a 10/3 extension cord to get the most power to your equipment. Motors will run cooler, last longer, be more powerful, circuit breakers will not be overloaded as easily and you'll get the job done faster.

Tip: It's best to use little or no lubrication. If needed, use WD-40 or light weight motor oil on the shafts, bearing, jack screws, and other places that need lubrication.

Tip: Make operations easier by adding on exta sections of vacuum hose. 12 to 20 feet or more is really nice. Also, install a Gortex® Clean Stream filter on the vacuum for better operation.

Tip: Track free cutting done prior to other engraving will insure smoother Free-Of-The-Track operations. (The wheels won't be bouncing over or side tracked by other grooves.)

Tip: The front pointer should be checked if...
1. It's the first cut of the day.
2. A retaining collar comes loose.
3. It was accidentally kicked or bumped.

Tip: Be certain to check the secondary depth control knob before cutting. It is responsible for balancing the engraver for a smooth even cut.

Tip: Drilled anchor holes in the concrete can be filled with a fast set patch or just left.

Tip: It is a good idea to snap all lines prior to cutting. This allows you to check that the layout is visually pleasing.

Tip: When doing free form curves start on a straight cut that leads into a curve. It makes alignment much easier.

Tip: To draw a line parallel to the edge of a slab, a handy tool is the edge parallel marker.

Tip: Usually the engraving process will begin with the long cuts.

Tip: When mounting a center pivot or linear track, if a screw will not seat to the base plate then the hole is not deep enough, debris is remaining in the hole, or the drill bit is worn from drilling many holes.

Tip: Keep a mental or written note of the direction the center pivot base arrow is pointing. This will allow you to exactly reposition the center pivot if it is necessary to remove it before the engraving operations are completed.

Tip: The center pivot star knob secures and tightens the connecting bar to the center pivot. If the star knob is not tight, it will cause a sloppy, ugly line. When cutting short cuts (radial cuts) a loose center pivot star knob will produce overcuts.

Tip: Connecting bar screws are NOT standard screws. Use of another type of screw will result in a loose fit between the bars. Resulting in miscuts.

Tip: The indexing holes are drilled 4” apart.

Tip: When aiming at a cut line with a pointer, you should be centered over the engraver. If you alter the viewing angle the width/length of the brick will change.

Tip: Soldier course cuts are not necessarily aligned with the cuts of any other courses.

Tip: In a circular or arcuate pattern, soldier courses break up the pattern and keep the other bricks from growing too long or too short.

Tip: In a circular or arcuate pattern, insert soldier courses as often as you like but generally there should put one at least every 8 to 12 brick courses.

Tip: On circular brick soldier courses, use the distance of 8 bricks as the delaying point to simplify the calculation of the remaining bricks. The number eight (8) is divisible to 1 by dividing it in half three times.

Tip: On the first row of a circular brick standard course, use the distance of 4 bricks as the delaying point to simplify the calculation of the remaining bricks. The number four (4) is divisible to 1 by dividing it in half three times.

Tip: It may be necessary to tilt the engraver to gain access to the collar screws.

Tip: The engraver has two (2) center pointers that can be used. Either use the single flip center pointer, OR leave the RPS system on and use it’s center pointer.