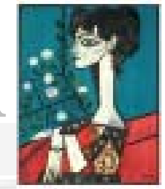
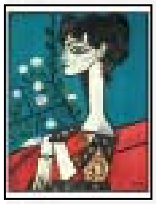
Rev 1.2
1 Dec 2003
supl. to ISBN 0-9743229-0-3



Magnetic Rotations Software Manual



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New Magnetism: Magnetic Rotations software (Homopolar device)

The Magnetic Rotations software enables an experimenter to calculate the kinetic voltage (emf) developed in rotating reference frames which include a disk shaped flat magnet (with or without a hole).

This software is bundled with the printed version of New Magnetism Book (SKU= BK001) available through our online support pages. Purchasers of the book have access to the latest and future releases through the book online support pages.

The software was designed to run on a PC compatible with a Windows type operating system (95, 98, me, XP) we have not tested it on a NT machine; however, we do not anticipate any problems.

There is no installation required, the software is a standalone executable. Copy it to whatever directory (or desktop) you prefer and execute it by double-clicking on its Icon (or filename).

The complete details for modeling the no-load HPG will be released in the New Magnetism online support area at a later time. For owners of the printed version of New Magnetism (BK001) only.

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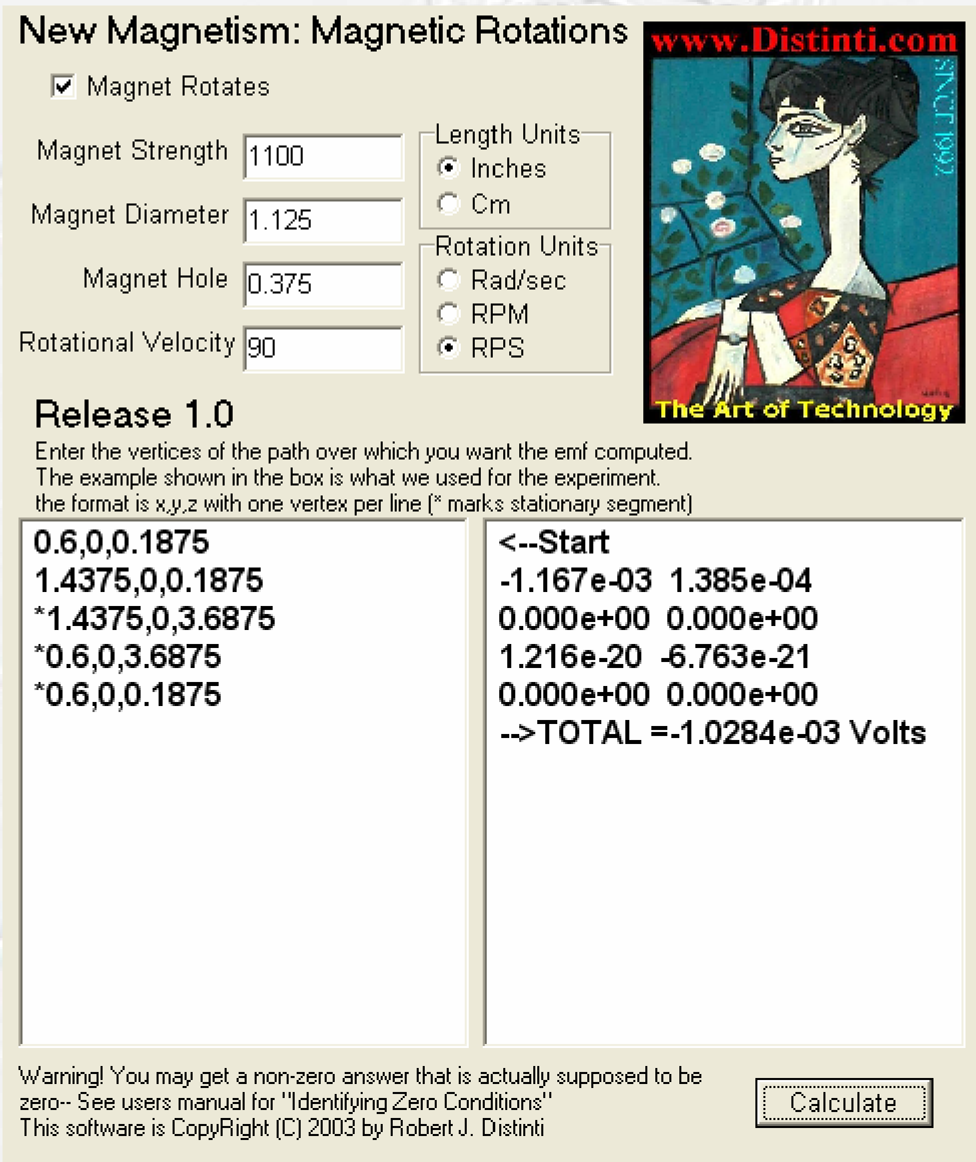
1 How to use the software

Note: if you do not understand the following instructions, see the examples that follow.

1) Execute the software by clicking on the icon (or filename). You will see the software appear in its own window as shown below.



2) Check whether the magnet rotates with the rotating reference frame or if it is stationary.

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3) Enter magnet parameters: magnet parameters are specified according to the following diagram

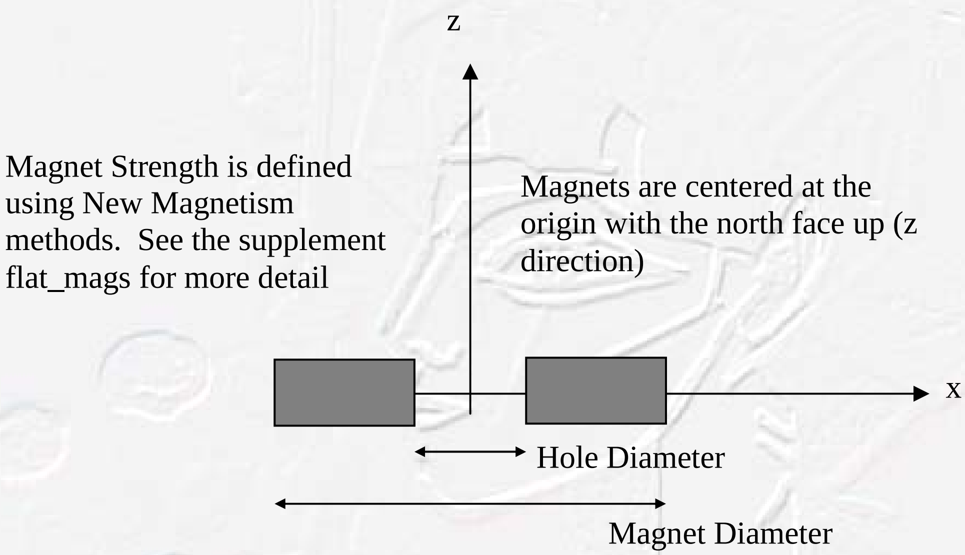

Figure 1-1

4) Enter rotational velocity of the system (select units RPS= rotations per second)
5) Enter vertices of the path over which you would like the emf calculated (place asterisk (*)) next to segments that are stationary. Note: the software does not assume that you want a closed path. If you desire a closed path then ensure that the first vertex and the last vertex are the same.
6) Click the calculate button and the software will calculate the emf generated between each set of vertices (line segments). The total kinetic voltage (emf) between start and end point is then displayed at the bottom.

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2 Sample Applications

The simple Homopolar generator (see following pictures) that we will use to test this software is constructed from very simple materials.

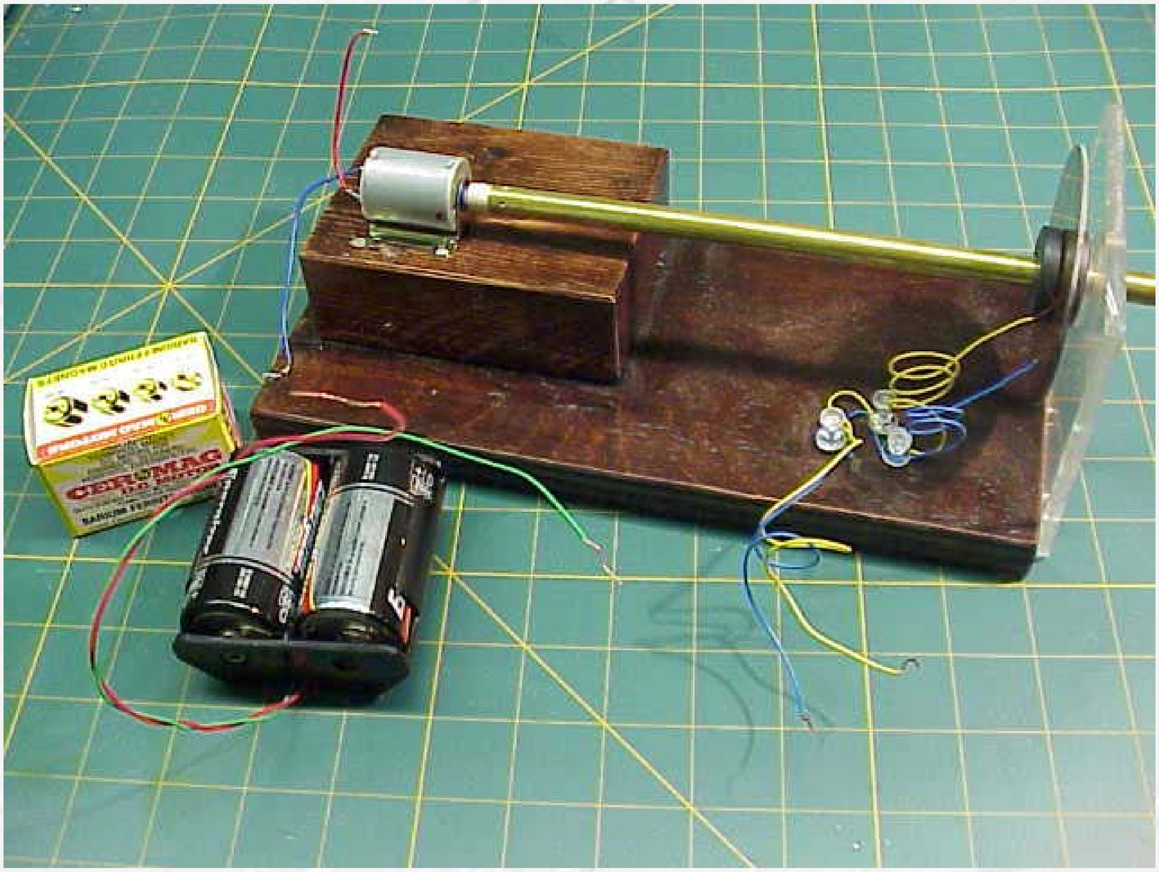

Figure 2-1: The simple HPG

1) The Mubachi 280 motor and 3/8 in brass rod are from a hobby store.
2) The batteries and battery holder can be obtained at Radio Shack. (for the finals tests a 6v lantern battery was used.
3) The two disk magnets are from Radio Shack (sku=64-1888)
4) Wood and Plexiglas from hardware/ home improvement store
5) The disk is cut from 2 sided copper clad pc board (1 oz)
6) 22 Awg wire and thumb tacks are easily obtained

Note: if you are going to build this yourself, be advised that the radio shack magnets are not consistent from package to package. Some packages have magnets with center holes exactly 3/8 inch in diameter (with magnetic

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strength that varies from 1080 1150) which will fit perfectly over the 3/8 inch shaft. In other packages, the magnets holes are not quite large enough to fit over a 3/8 inch shaft (these magnets vary in strength from 900 to 1100).

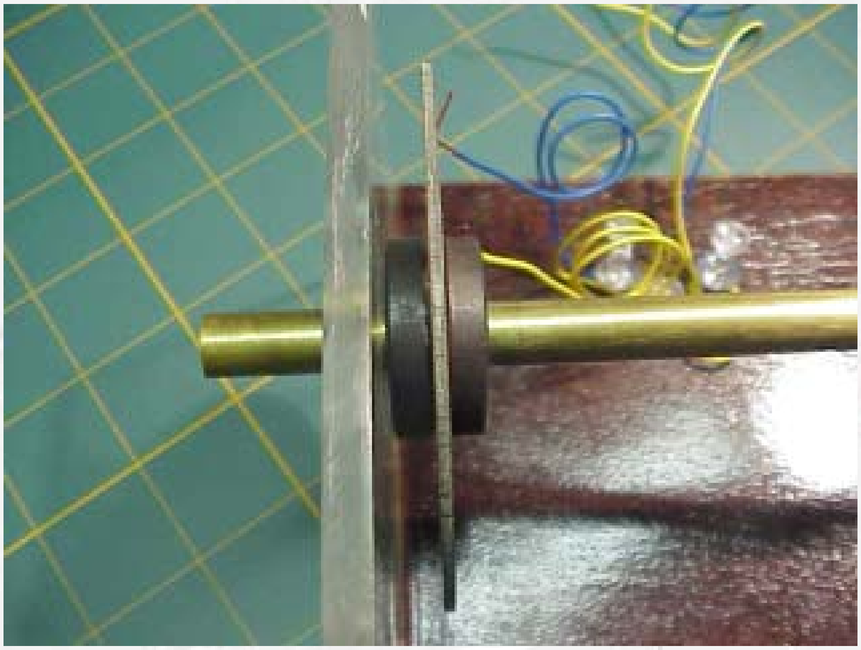

Figure 2-2: Close-up shows that disk is sandwiched by two disk magnets (note old brush configuration)

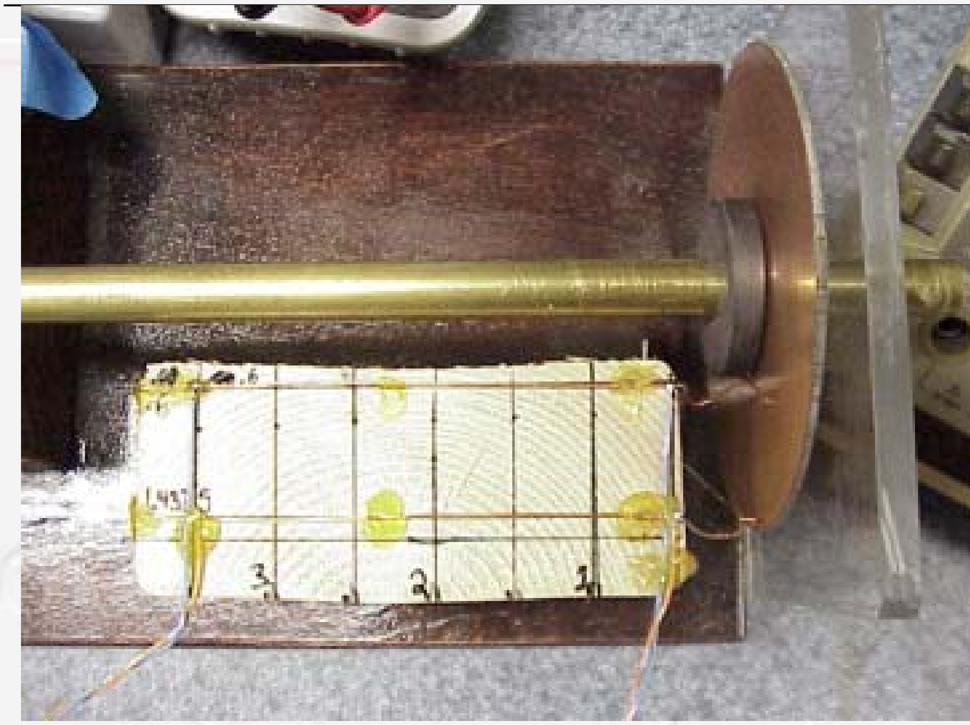

Figure 2-3: Close-up of new brush circuit

The New brush circuit features a closing path at 0.5 inches from the surface of the disk (the inner closing path) and another closing path at 3.5 inches from the surface.

2.1 Test Setup

The following photo shows the test setup for the mini HPG.

The left meter is setup to measure rotational speed in RPS. The meter is set to frequency and it is connected to a 100GV Hall Effect probe (SKU =EM002). The Hall probe is then taped to the generator in such a way that it can measure the field produced by a small disk magnet (about 3/16 in diameter) that is taped to the motor end of the shaft.

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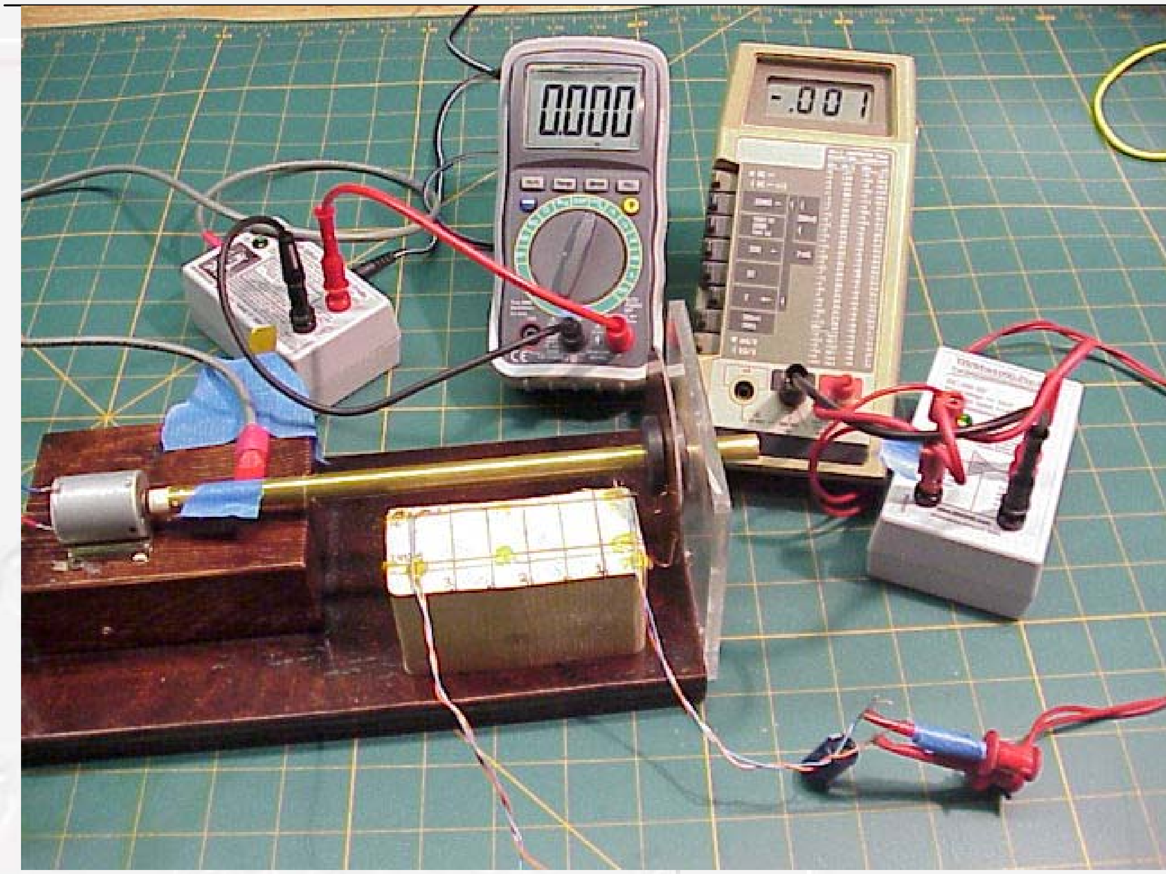

Figure 2-4

The right meter is set up to measure the no-load kinetic voltage (emf). The output of the generator (yellow and blue wires) are terminated by a 470uF (capacitor to smooth out the brush noise) and then connected to a DVMx1000 micro-volt pre amplifier (SKU=EE001). The amplifier converts micro-volts into millivolts (X1000 gain) which enable us to accurately measure output voltage to three decimal places with our standard meter.

With everything on and connected (motor off), the meters read nothing (the -1uV reading in the lower meter is a combination of DVMx1000 input offset and stray thermal emfs.

2.2 Standard Tests

2.2.1 One magnet (rear) / inside closing path

With the left magnet slid away and the inner closing circuit connected to the capacitors we obtain the following

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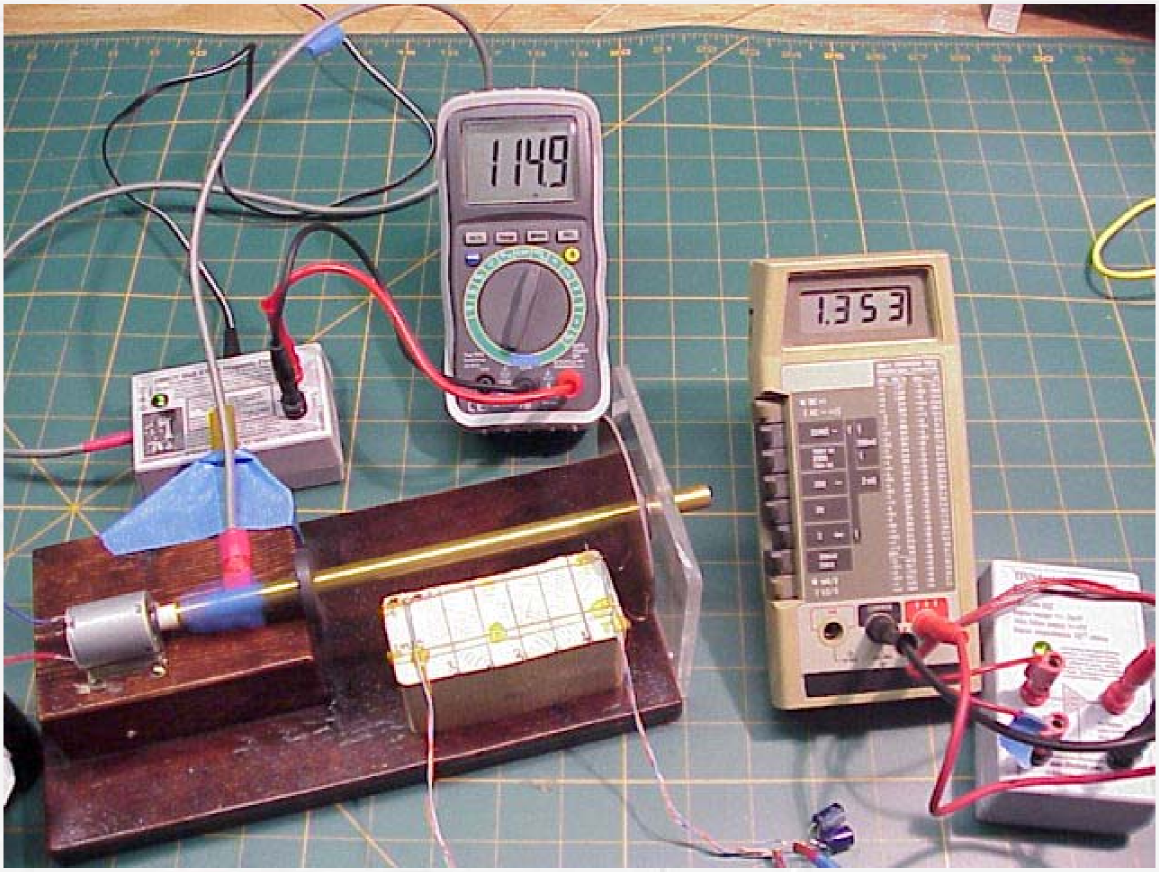

Figure 2-5

Now let us see what the software predicts for the same speed of rotation

2.2.2 Software Prediction

The software allows you to select a path around which you would like the kinetic voltage (emf) calculated. The following diagram is the path we entered into the software. Although the geometry of the brush circuit shown below is not quite the same geometry as the brush circuit of the generator, you will soon see that the geometry of the brush circuit does not matter.

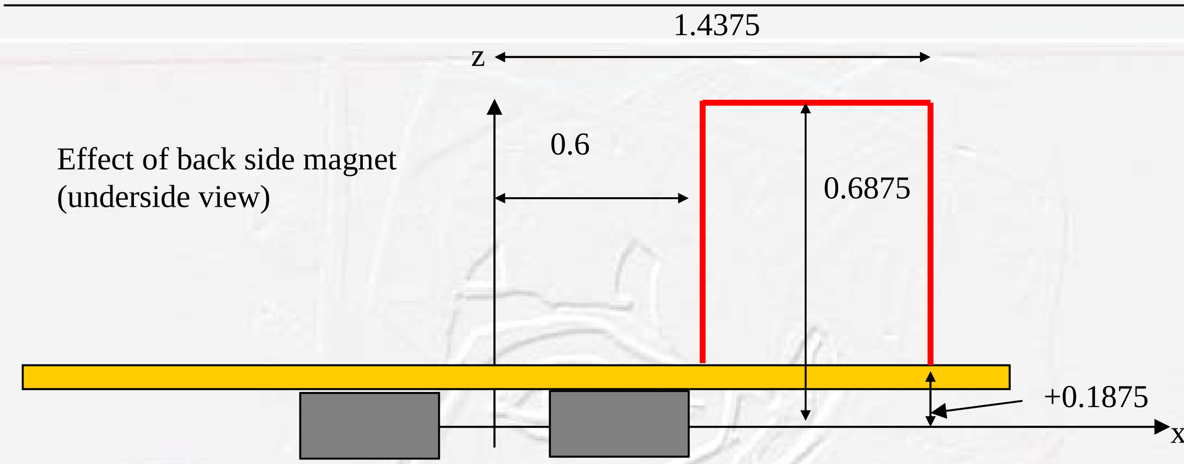

Figure 2-6

Here are the vertices that we will enter into the software for the effects of the rear magnet

Figure 2-7

The magnets used have a New Magnetism magnetic strength of about 1100.

We enter the coordinates starting with the lower left and proceeding in a counter clockwise direction. Since the brush circuit is stationary, we placed an asterisk (*) next to each segment of the brush circuit to tell the software that this section does not move with the rotating frame.

The following screen capture of the software shows the results. The right column shows the kinetic voltage developed in each line segment of the brush circuit (marked by asterisk).

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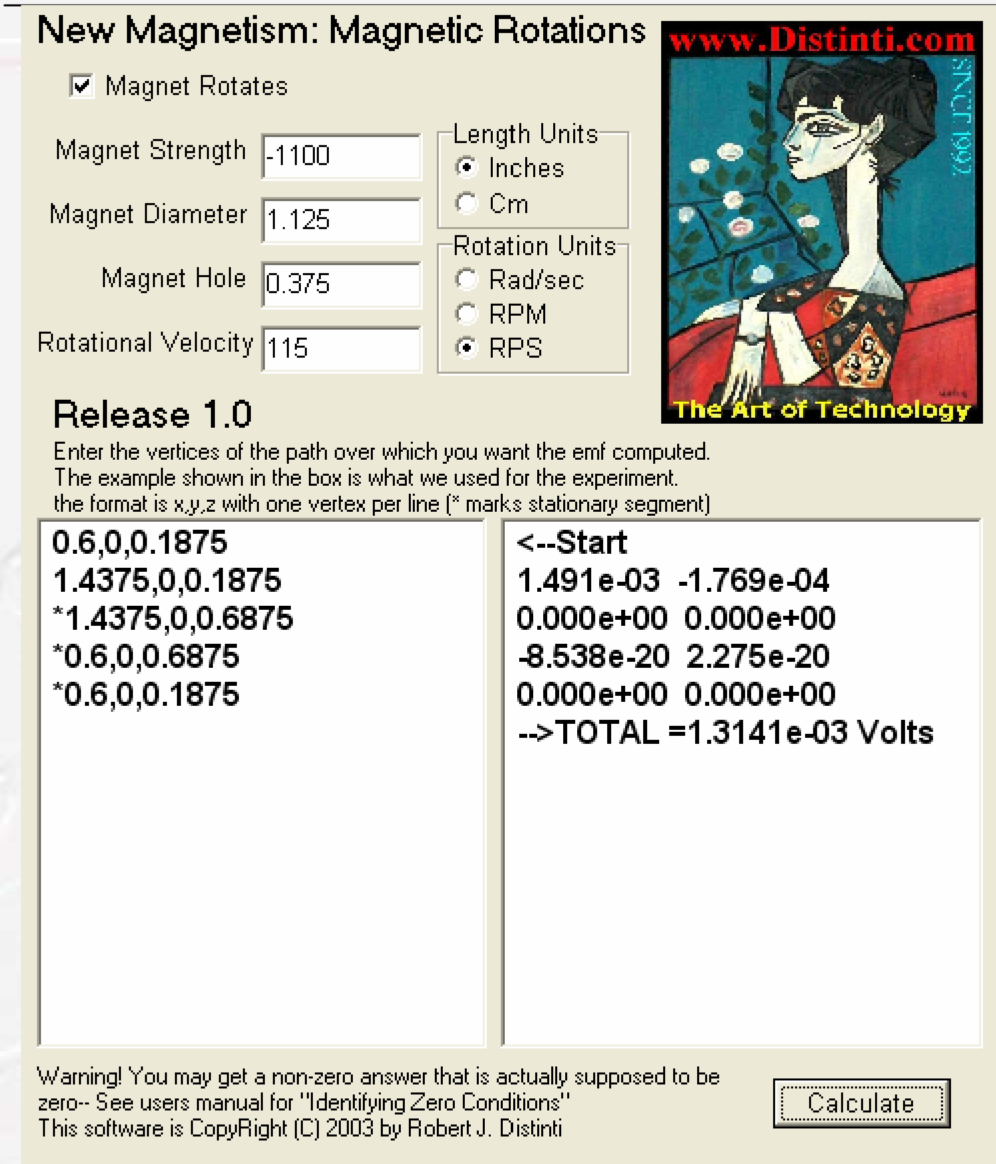

Figure 2-8

Note: the little generator was built with the north faces of the magnets in the negative Z direction, this is why we enter (-1100) into the strength field.

In the right column, there are two readings, the first reading is the emf generated from the outside of the magnet and the second reading is the emf generated from the hole. If your magnet does not have a hole, then set the hole diameter (magnet hole) to zero.

You will notice that there is excellent agreement between the software prediction and the measured value.

You will also notice the extremely small reading (e-20) in the fourth line. These readings are the results of actual (non-zero) electromagnetic effects that essentially cancel each other. The reason why it is not actually zero is due to the fact that numerical integration schemes sometimes have residuals. See identify zero conditions section.

If we uncheck “The magnet rotates” and run the software again, we get exactly the same results except that now there is no activity on the fourth line. The residuals are missing from the fourth line since the summation of zero effects is always zero.

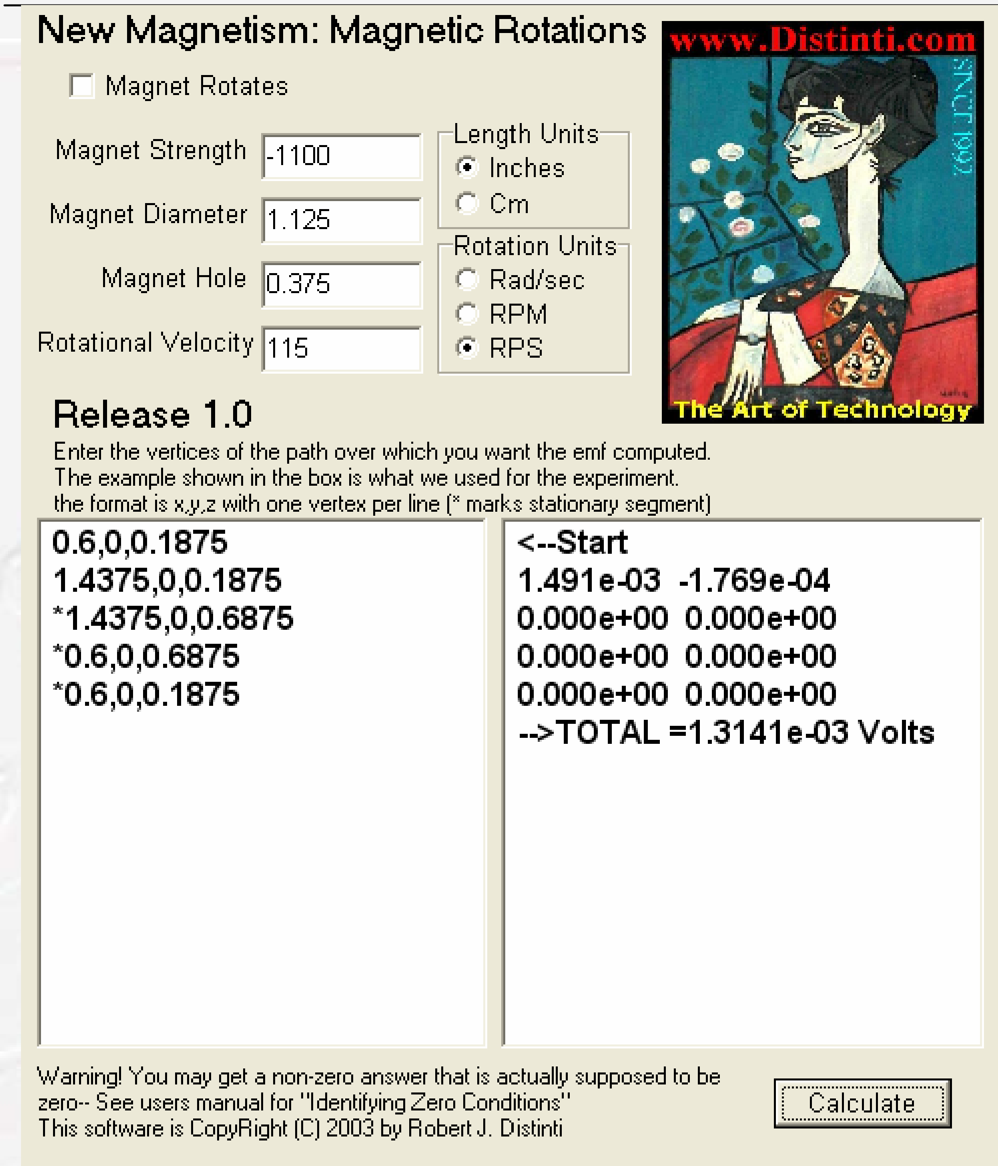

Figure 2-9

Next, we see if choice of closing path makes a difference

2.2.3 One Magnet (rear) /outside closing path

The next photo shows the results of the experiment run with the meter connected to the outside closing path.

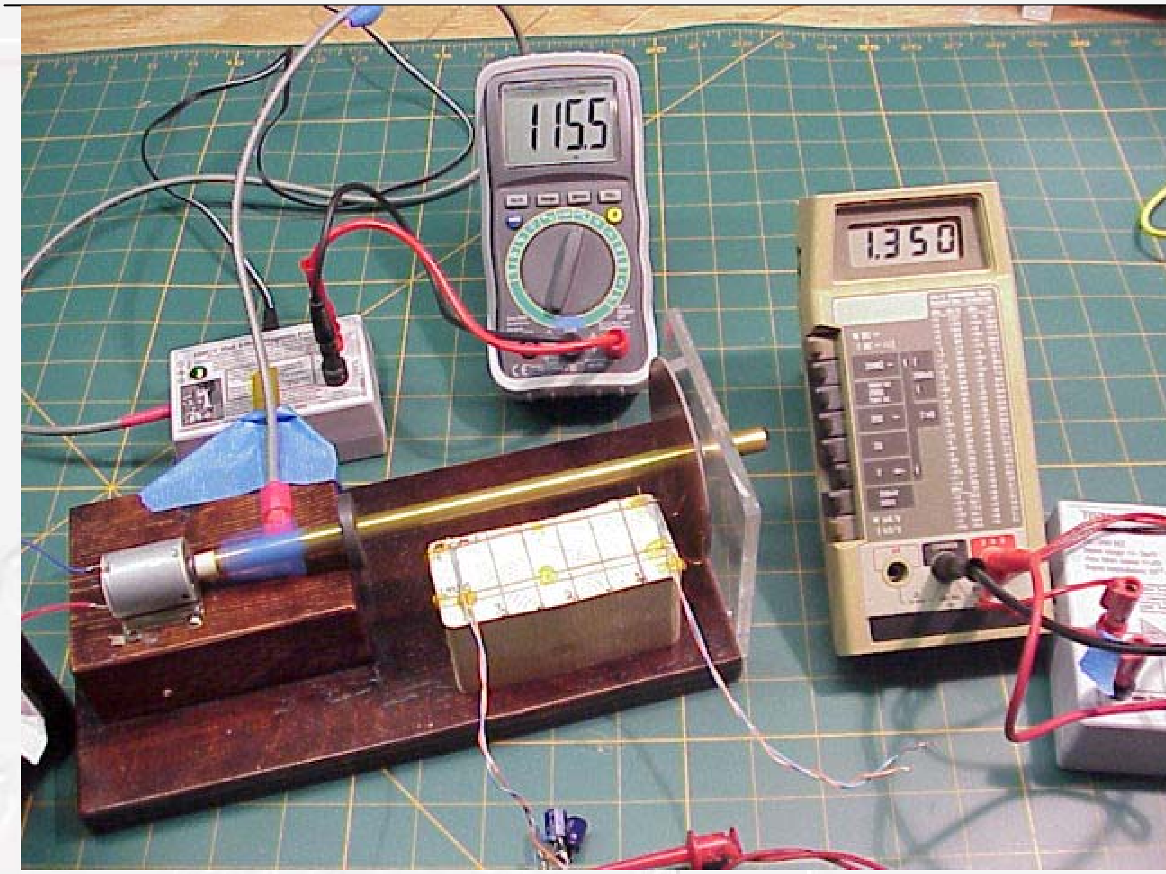

Figure 2-10

You will notice that the readings are identical to the previous experiment. This shows experimentally that choice of the closing path does not affect the developed emf.

And the software says:

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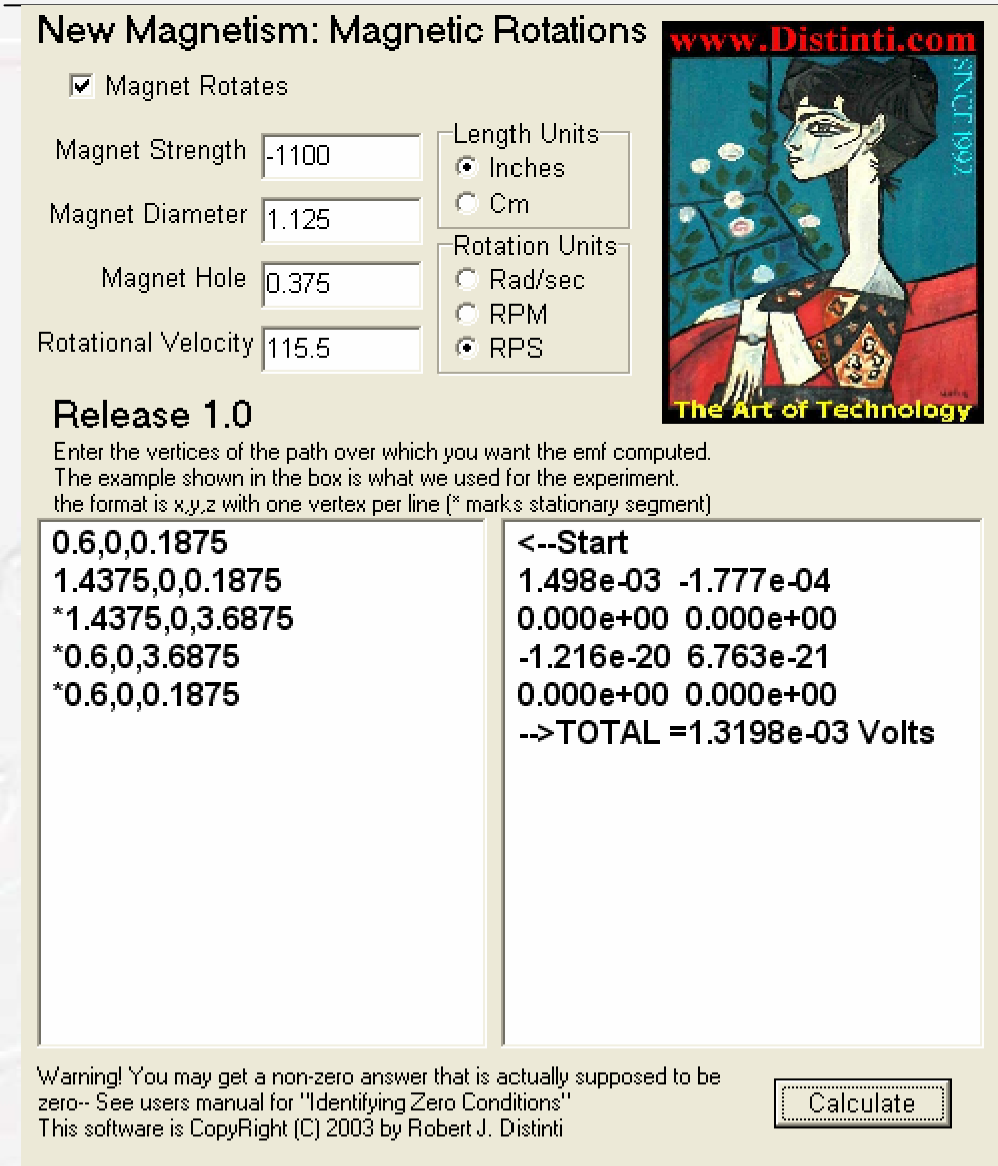

Figure 2-11

Note: the little generator was built with the north faces of the magnets in the negative Z direction, this is why we enter (-1100) into the strength field.

Next, we add the second magnet back and see how it affected the results

2.2.4 Two magnets / inner closing path

The following is the scope screen capture of the test. CH1 is the reading from the DVMx1000 and the CH4 reading is the output of the 100GV Hall Effect probe (used to measure frequency of rotation).

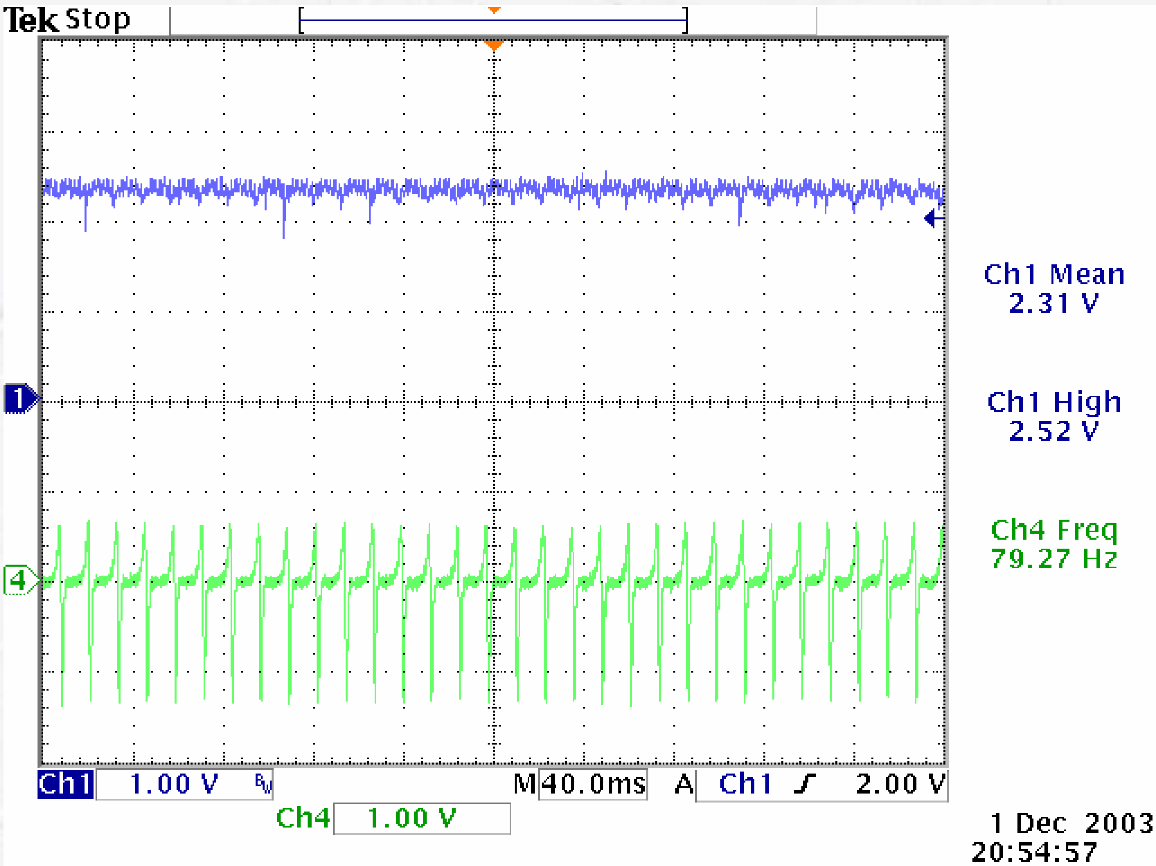

Figure 2-12

The result is 2.31 mV (the above is passed through the DVMx1000).

Running the software for the rear magnet yields 906 uV as shown in the following screen capture.

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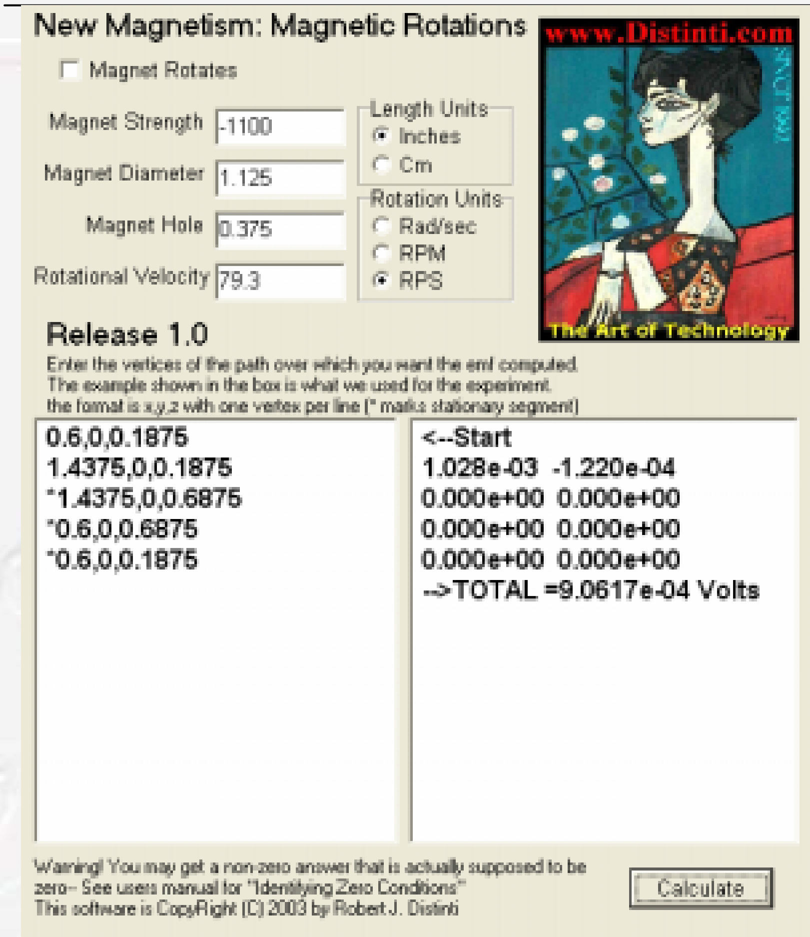

Figure 2-13

(OOPS we forgot to check the magnet rotates box – good thing it does not matter).

For the front magnet we use the following dimensions

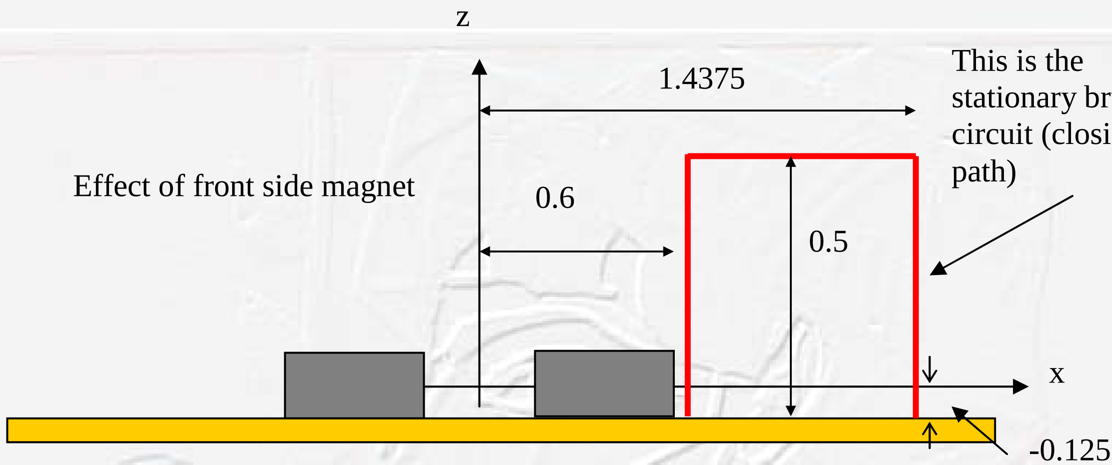

Figure 2-14

Because the stationary brush circuit contributes nothing, why bother to type it in? The following are entered into the software:

Note: the little generator was built with the north faces of the magnets in the negative Z direction, this is why we enter (-1100) into the strength field.

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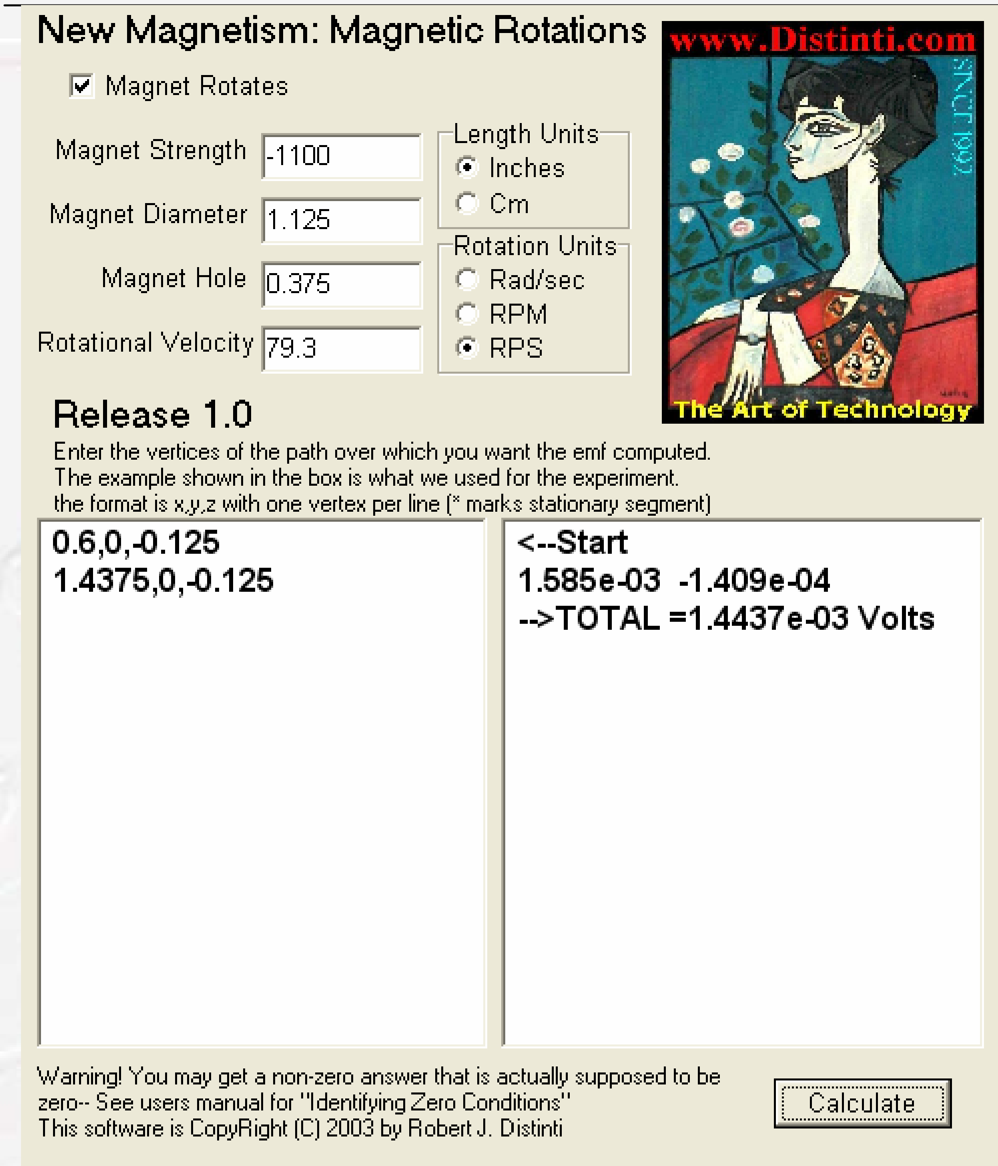

Figure 2-15

Which yields 1.444 mV; summing the two results:
1.444+0.906=2.35 mV

This is in excellent agreement with the 2.31 mV measured DC (mean) output reading.

2.3 For simplicity

Use the following to simplify your analysis

2.3.1 Combine two magnets to one

To simplify future calculations, just calculate with one magnet (the front) with strength of 1800. Running the software results in

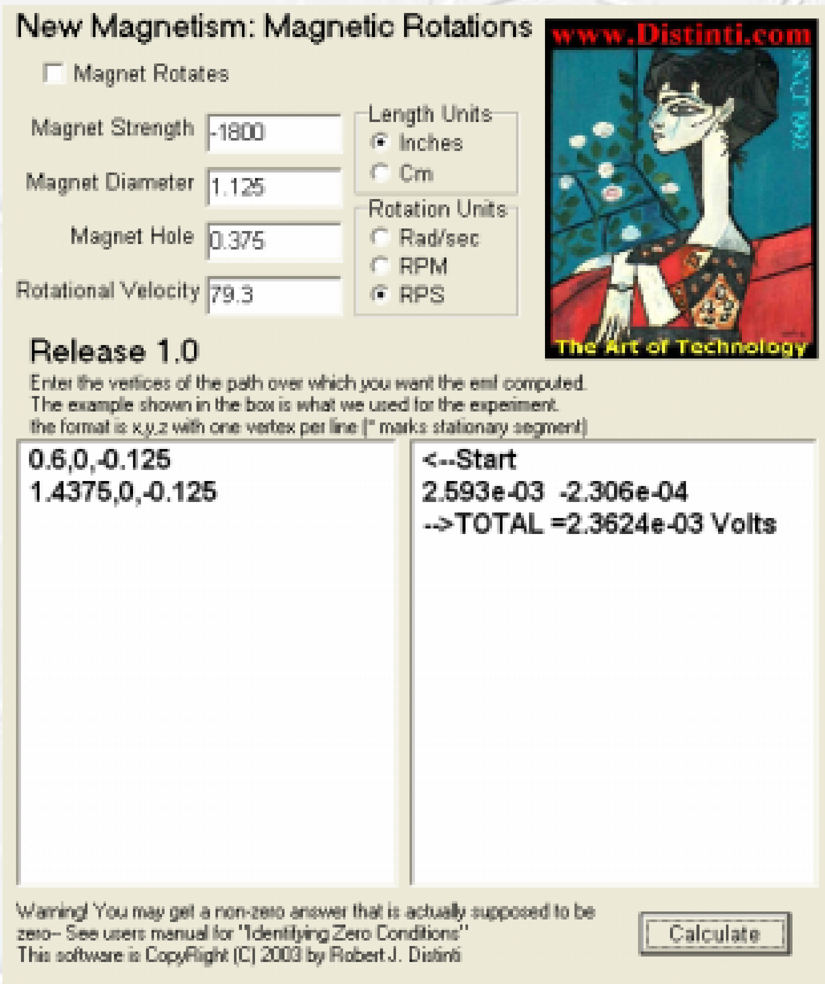

Figure 2-16

This gives us the same results except that we only need to run the software once for each experiment. Note: the above value (1800) was found by trial and error.

2.3.2 Don't bother with the closing path

Since the software does not show any contribution resulting from the stationary closing path (the brush circuit), why bother typing it in? The software does not need a closed path to compute results; however, you will need a closed path in order to measure results.

Note: Many classical theorists contend that the closing path is the source of the emf in the type of generator shown previously in this publication. We are developing an experiment which will prove that New Magnetism is correct and the closing path is not the source of the emf.

2.3.3 Rotation of the magnet has no effect

Selecting or deselecting the "magnet rotates" check box does not affect the results.

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3 What's Next

We are developing a much more elaborate software package which will enable the user to specify magnets of variable geometries and multiple reference frames in various modes of translation/rotation. The software will have a proper project type interface that will enable the engineer to save and load systems for test. This new software package is to be available by in 2004 and is the precursor to our GEM3 product which has been on hold for a while. This new software package will be made available to those who have purchased the printed version of New Magnetism

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4 Special Features of the software

4.1 Output to the clipboard

When the calculations are finished, the software makes a screen capture of itself to the clipboard. This enables you to paste the results (as a picture) into a report or other document (that's how the screen captures were done for this manual). This enables you to keep exact records of your experiments and research.

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5 Other Considerations

5.1 Detecting zero conditions

As described in the text for Figure 2-8, the software may show a line (partial result) or a result that should be zero and yet reads a non-zero value. The non-zero condition is the result of numerical integration residuals and does not represent a measurable phenomenon. This section enables you to determine if a value is actually a zero condition.

Later software packages will incorporate our proprietary fractal algorithms that are much more accurate and reduce problems arising from standard numerical integration residuals.

5.1.1 The 1/1000 rule:

If any value is less than one tenth of one percent (1/1000th) of the maximum result (either partial or total) then it should be considered a zero condition.

5.1.2 The too small to measure rule.

Any result below 1e-9 is most probably a zero condition.

The above are only generalizations. To be absolutely sure, hand integration of the New Electromagnetism models or an experiment may be required.

5.2 Be weary of capacitors

Many types of capacitors generate power from thermal energy. Though this power is only a few millivolts, it represents a major problem when measuring the no-load voltage of a small HPG such as the one shown in this publication. It is very important that your brushes make good contact a majority of the time such that the energy developed in the capacitor is

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shunted and does not affect your readings. For more information on this phenomenon, see Capacitor Anomaly (cap_anom.pdf) at our site.

When first testing small devices such as the HPG in this publication, we had many cases where the brushes only made intermittent contact (by design or by sloppy construction). According to classical wisdom, this is electronically equivalent to a sampled circuit which is effectively the same as charging the "Brush smoothing" capacitor through a resistor. However, because the capacitor contributes its own energy during the intervening time, the readings made in certain experiments were much different than expected.

6 Conclusion

The software outlined in this paper models magnet behavior using New Magnetism research. The software is only available to readers of the printed version New Magnetism (BK001) through the online book support pages.

New Magnetism shows that the rotational velocity of the magnet and the stationary closing path do not contribute to the power generated in a Homopolar device. These predictions are supported by an experiment that is almost complete and will be added to this document. The experiment is being developed using the software shown in this publication.

New Magnetism explains all modes of operation of the Homopolar device (see http://www.distinti.com/docs/homopolar.pdf) and explains what is known as Faraday's Final riddle without contradicting relativistic physics.

Unlike classical attempts to explain the operation of these devices, we have shown theoretical predictions along side of experimental results in complete detail without over complicating the issue. The exact mathematical expressions used for the software will be published in the online support pages for the printed version of New Magnetism only (SKU BK001).

We have seen many attempts by classical physicists to explain the paradoxical behavior of the Homopolar device in which experiments (some very elaborate) are run and results reported. The results are then used to support some kind of logical theory about how the device works (some are ridiculous). To this date, we have not yet seen any of these theories used in such a manner to predict quantitatively the outcome of their experiments (as we do).

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