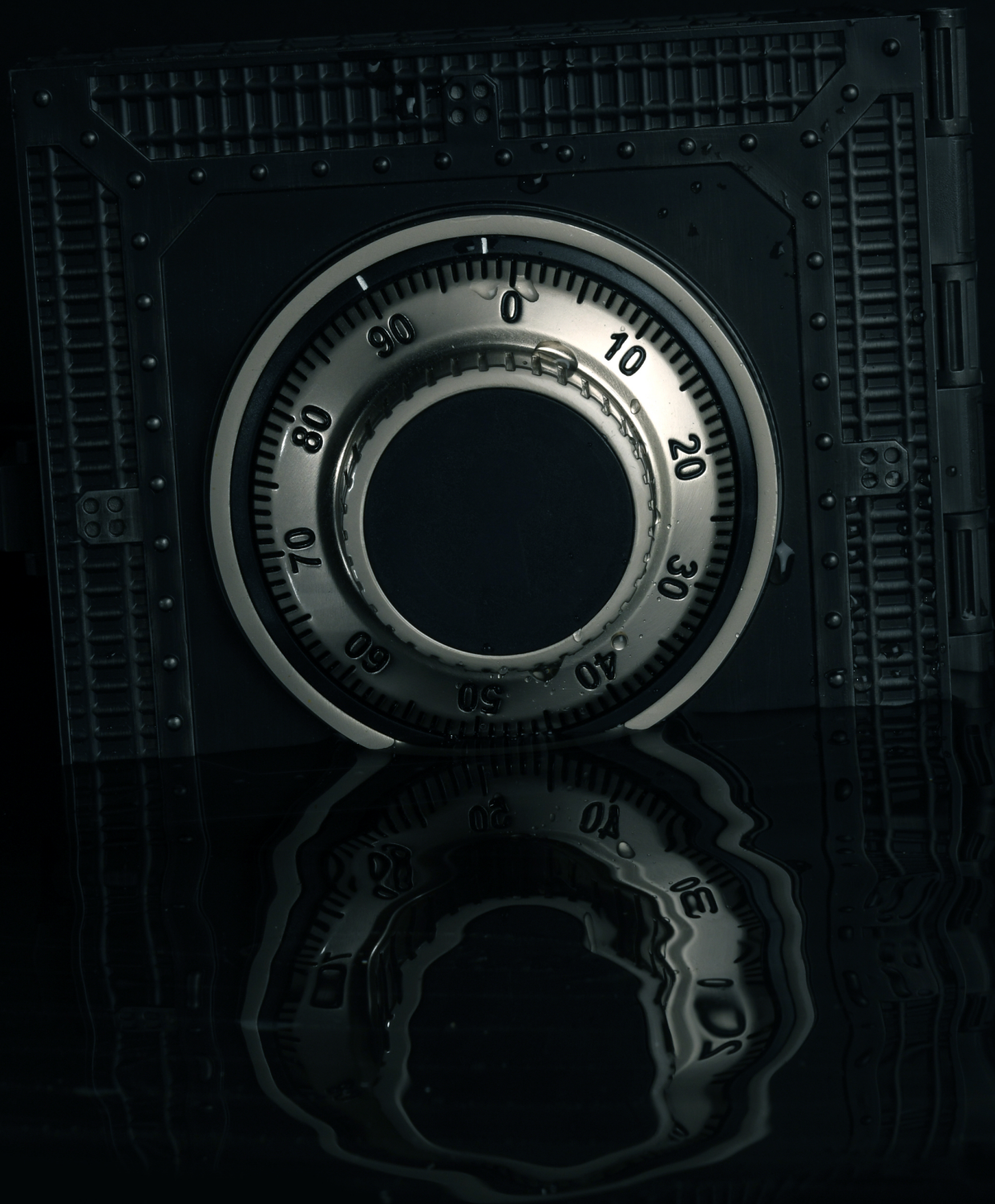


# CRACKING THE CODE

Your Guide to Safe Manipulation



**SPARROWS VAULT OPS MANUAL  
2019**

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**WARNING!**

**Sparrows Manufacturing Corp produces this manual for training purposes only. Only work on and manipulate safes that you have been granted the owners permission to work on.**

**Stay Safe Stay Legal**

## Code Entry and Code Change

### Understanding The Dial

Please read all instructions carefully before operating your SPARROWS VAULT. Two techniques are of primary importance when entering or changing the code.

**Technique #1:** "Turn" the dial; do not "spin" the dial. It should be turned smoothly and at a reasonable speed. If you hear anything more than gentle, soft clicks as you operate the dial, you are turning it too quickly.

**Technique #2:** Precisely align the numbers on the dial with the appropriate index line. The SPARROWS VAULT dial is a precision instrument and its numbers must be exactly aligned.

The dial has two fixed index lines. The line directly above the dial in the "12 o'clock" position is the OPENING Index Line. The line to the left in the "11 o'clock" position is the CHANGING Index Line. (See figure 1.) These are the marks used to align the code numbers when they are dialed in.

**CW** = Clockwise (Right Turn)  
**CCW** = Counterclockwise (Left Turn)

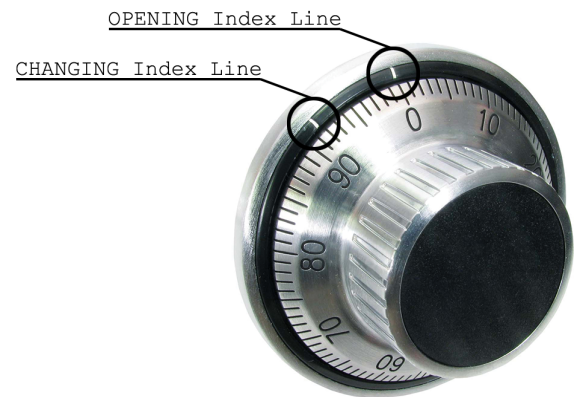


Figure 1. Dial index lines

### Opening Your Safe

The factory code for your SPARROWS VAULT can be found in the envelope marked "DO NOT OPEN." If you find the struggle too much for you, you can open the envelope to reveal the factory code. For the following instructions, we will use a fictional code of **35 / 80 / 53**. Substitute this code with your own at any time using the "Changing The Code" instructions on page 11. To open your safe, follow these steps using the OPENING Index Line for alignment. (See figure 1.)

- 1) Reset the dial by turning it **CCW** at least four complete turns.
- 2) Turn the dial **CCW** until exactly aligned with the first number, **35**, and **STOP**.
- 3) Turn the dial **CW** and go *past* the second number, **80**, two complete times and when reaching it for the third time, **STOP** exactly on **80**.
- 4) Turn the dial **CCW** going *past* the third number, **53**, one complete time and when reaching it for the second time, **STOP** exactly on **43**.
- 5) Turn the dial **CW** until the safe bolt retracts and comes to a hard stop. The safe is now unlocked and you may open the door. To return your safe to its locked condition, close the door and turn the dial **CCW** at least four complete times.



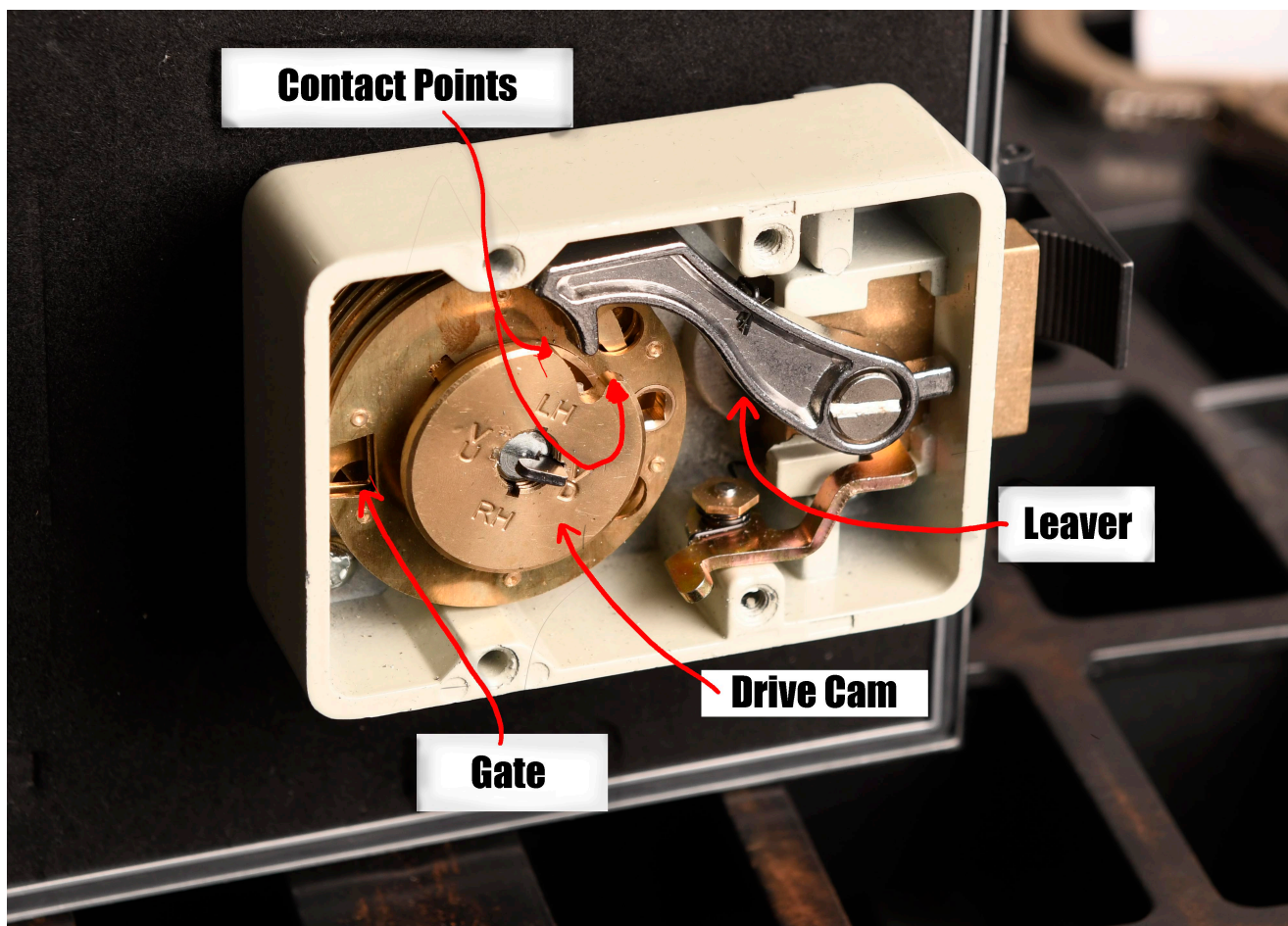
## Cracking the VAULT

The following steps will help to crack the VAULT open. In each step you will record the actions of one of the internal wheels while searching for clues as to where a gate is located inside. Finding gates will reveal the combination. To keep things simple at the start the VAULT is configured to open with only two numbers. You can change this to three later.

### STEP ONE - Finding the Contact points.

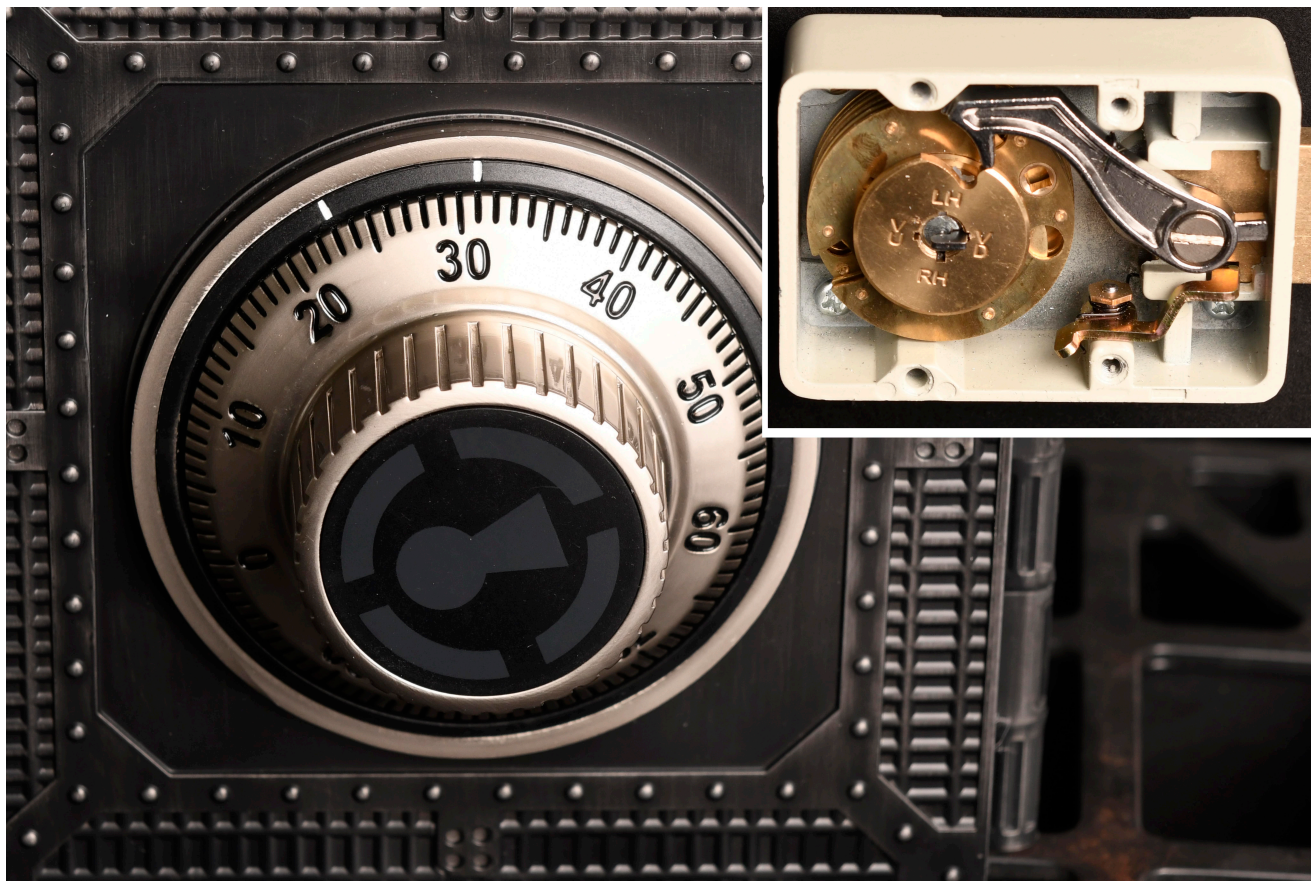
- 1) Inside the lock is a metal bar that rides on top of the wheels called the lever. Attached to the wheels is the drive cam. The drive cam is a circle that has a valley in one small section. When the lever passes over this valley the drag while turning the safe dial changes. Most importantly when the lever exits the valley of the drive cam the lever hits the slope as it is pushed back up onto the circle of the drive cam. Finding this point where the lever hits the slope is called a contact point. With the lever in the valley you will go CCW and CW hitting both sides of the slope and record the number from the safe dial where you feel the lever hits the slope. Accuracy counts record 1/2's and even 1/4's of a number.
- 2) When searching for these contact points it may help to rotate the dial back and forth while progressively moving in the correct direction. Example: if the instructions are to turn the dial CW to record left and right contacts. Go CW 15 numbers and then CCW 15 numbers. Rotate a few times in that area feeling for a hit of the contact point. If nothing is felt move on to the next bank of 15 numbers.

Lets give this a Try: Rotate the Vault dial CCW at least 4 times stopping on 0. Now slowly rotate the dial CW feeling for a contact point. It will feel like a gently click or hit. For some it helps to go back and forth as mentioned in part 2 above. Once you feel the hit look at the number on the dial exactly where it hits. That is your contact point and you will need to record the left and right side of the contact area.





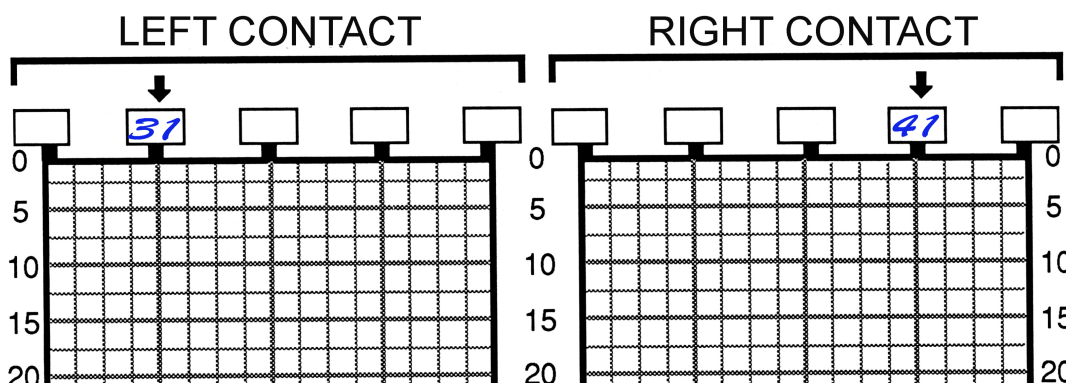
Below you can see the Left contact point being recorded at 31. Make sure you are reading off the top white mark. Inside the lock you can see how the lever is making contact with the cam drive. For our example the Right contact point where the lever hits the other side of the valley is 41.



With the contact points located it is time to start our graph. If have have not done so already print the graph that is the last page of this file. The graph has two sections a Left Contact and a Right Contact. Place your contact numbers in the boxes marked with an arrow. These are the numbers you identified in the step above. It should look similar to the graph below ... but your contact points will not be 31 & 41.

# SPARROWS VAULT GRAPH

Wheel # 3



## Graphing the First Wheel

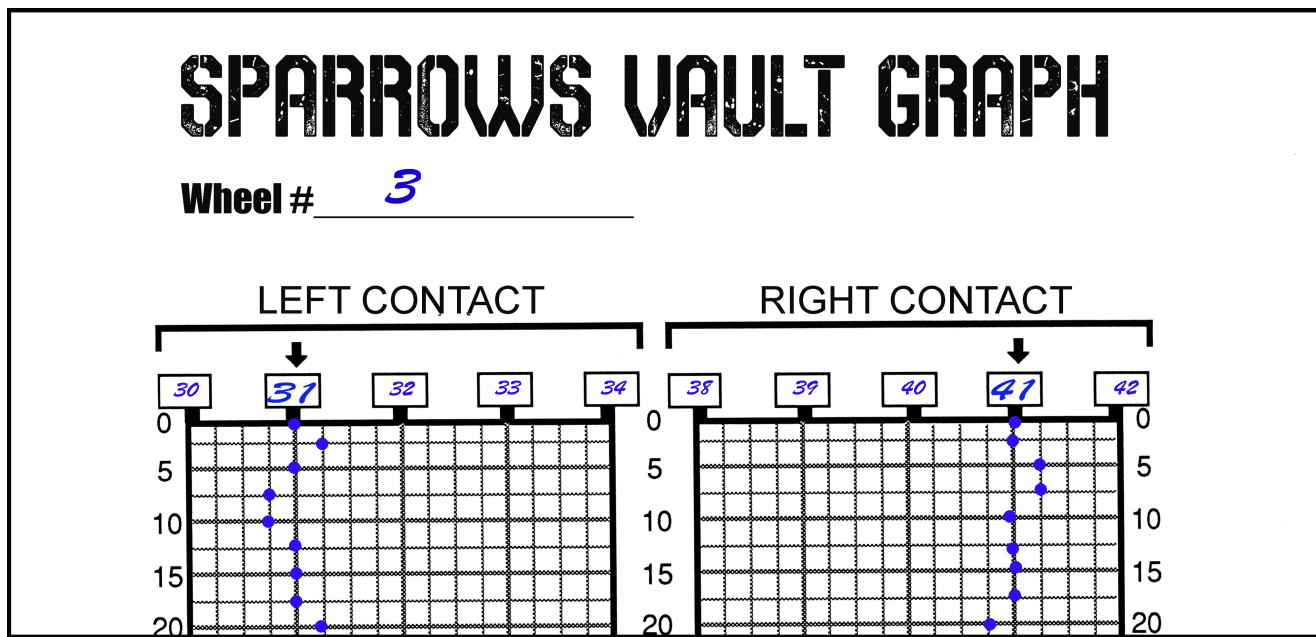
You now know how to find the contact points and where they are located. The next step is to develop a graph for one full rotation of the dial going from 0-100 but in increments of 2.5. You will check 0, 2.5, 5, 7.5, 10, 12.5 etc to 100.

The Graph has a vertical column of numbers from 0 to 100 and a horizontal grid.

This horizontal grid represents the possible contact points.

You can fill these possible contact numbers in the boxes at the top of your graph.

This will be the whole numbers ascending from left to right. For the Left Graph we entered 30,32,33,34 and the Right 38,39,40,42



To continue graphing the dial repeat the steps below adding a dot to the graph recording the contact points every 2.5 numbers for one full rotation of the dial. You should start to get a graph like the one above.

The graph shows you that when graphing 2.5 the left contact read 31.25 and the right 41. When graphing 5 the left contact was 31 and the right was 41.25.

Now its your turn to Graph you first wheel

Follow the steps below and record your results on the graph

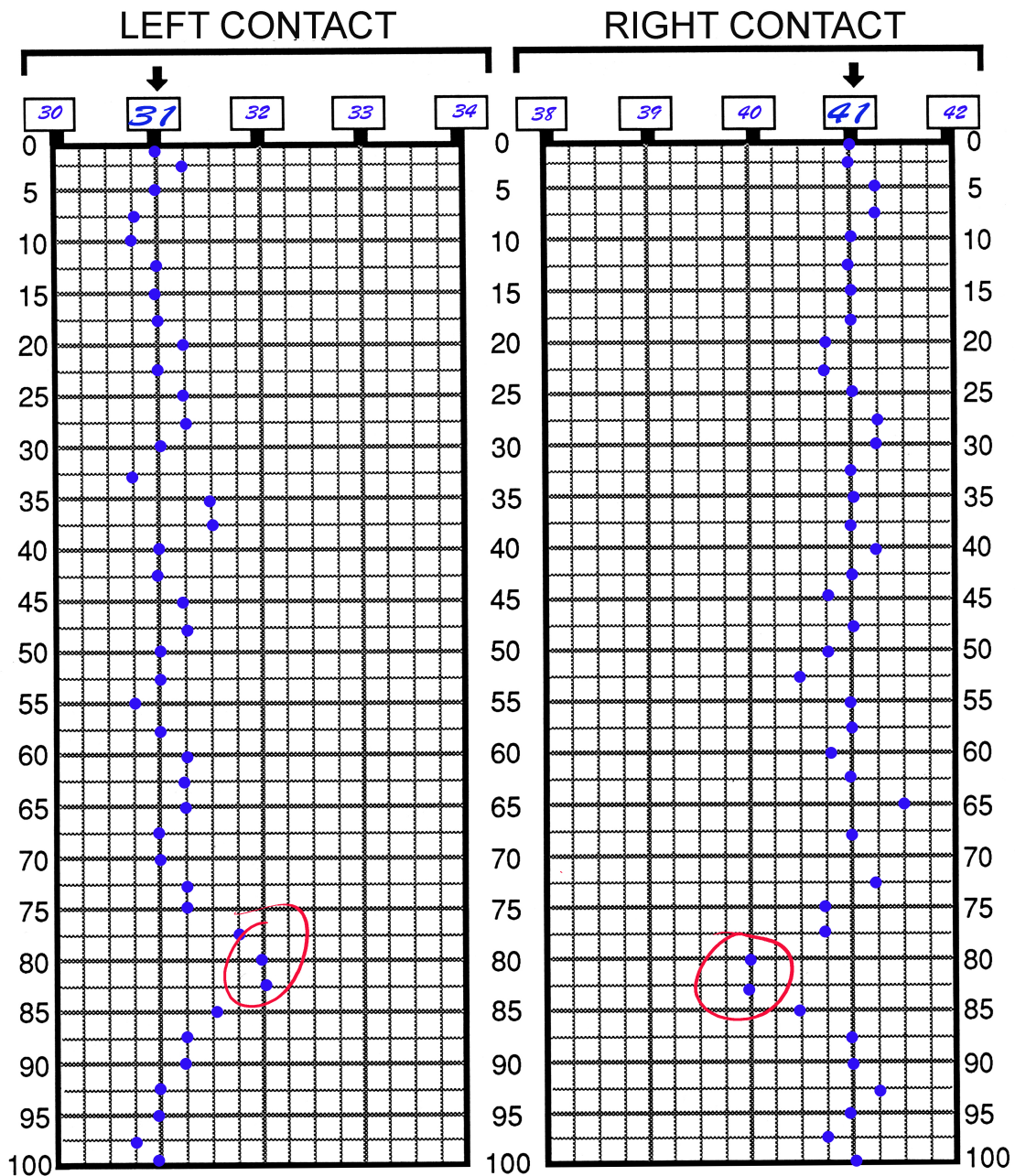
**NOTE:** For the First graph it is actually the third number in the combination you are graphing.

- 1) Reset the dial by turning it **CCW** for at least four complete turns stopping on **0**
- 2) Turn the dial **CW** to record the left and right contacts.
- 3) Turn the dial **CCW**, **STOP** exactly on **2.5**
- 4) Turn the dial **CW** to record left and right contacts
- 5) Turn the dial **CCW**, **STOP** exactly on **5**
- 6) Turn the dial **CW** to record left and right contacts
- 7) Turn the dial **CCW**, **STOP** exactly on **7.5**
- 8) Turn the dial **CW** to record left and right contacts. Continue the pattern of recording every 2.5 steps around the entire dial.

**Reading the Graph** - When you now examine your graph you should have a point where both the left and right contact points move in to each other. This is indicating a low point on the wheel inside the lock and is a strong indication of a gate location. Make note of the numbers at this indication point : Below circled in red you can see how the left and right contact points move into each other. A strong indication for a gate at #82

# SPARROWS VAULT GRAPH

Wheel # 3



**Notes:**



With our First Graph complete we now have an indication as to what one of the combination numbers might be. Time to work on the next wheel. To do this you will rotate the dial in such a way that the third wheel stays parked at the indicated number from the first graph while rotating and graphing the first and second wheel.

By reading our First Graph the most likely spot for a gate is #82 yours will be different so start a **new graph** and make notes as to what wheel and number you are working on. Graphing will be very similar to before. Mark the left and right contacts when located at the top of the graph and record these positions with a dot for the entire dial at increments of 2 1/2 going from 0-100

### Graphing the Second Wheel

- 1) Reset the dial by turning it CW for at least four complete turns stopping on 0
- 2) Turn the dial CCW going past your first graphed number once then stopping on the first graphed number for us its 82.
- 3) Turn the dial CW and record your left and right contacts on your new graph.
- 4) Repeat steps 1-3 while adding 2 1/2 to step 1 until you have gone all the way around the dial.

**Important:** If you are just starting the VAULT is designed to open with just two numbers. If while checking your contact points for the second wheel the points become extremely close the lever has fallen into the gate: If you now rotate CW the VAULT will open. You also now know the combination being the indicated number from your first graph and the last number you just graphed on the second wheel.

# CONGRATULATIONS !

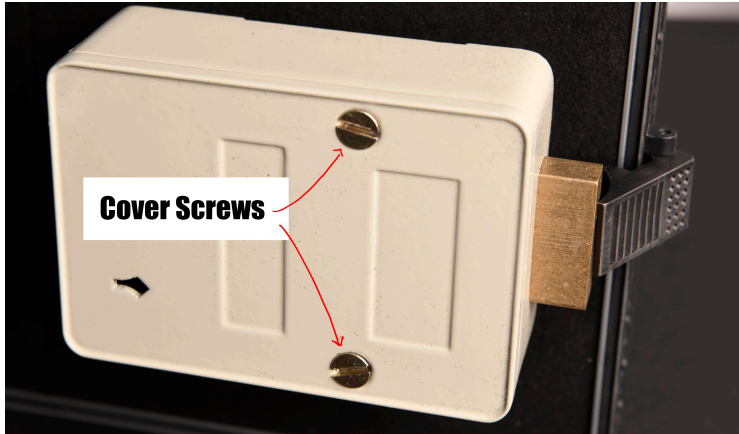
You have successfully opened your SPARROWS VAULT and are on your way to becoming a more skilled safe cracker! Now that you understand the fundamentals, it is time to make things a little more challenging.

Inside the safe and mounted on the rear of the door, you will find a box with a cover held in place by two screws. This is the *wheel housing*. Inside the wheel housing is a metal arm called the *lever*. Your safe ships with a lever configured to allow entry with only two correct numbers. Let's swap that lever out for one that will require *three* correct numbers for entry.

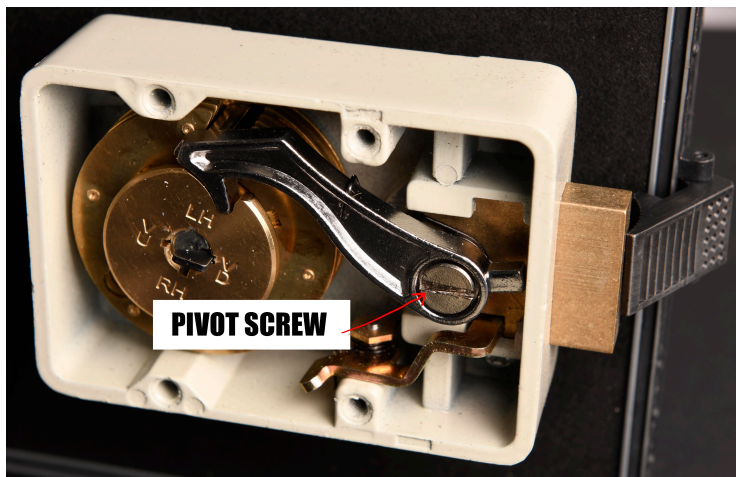


## Changing The Lever

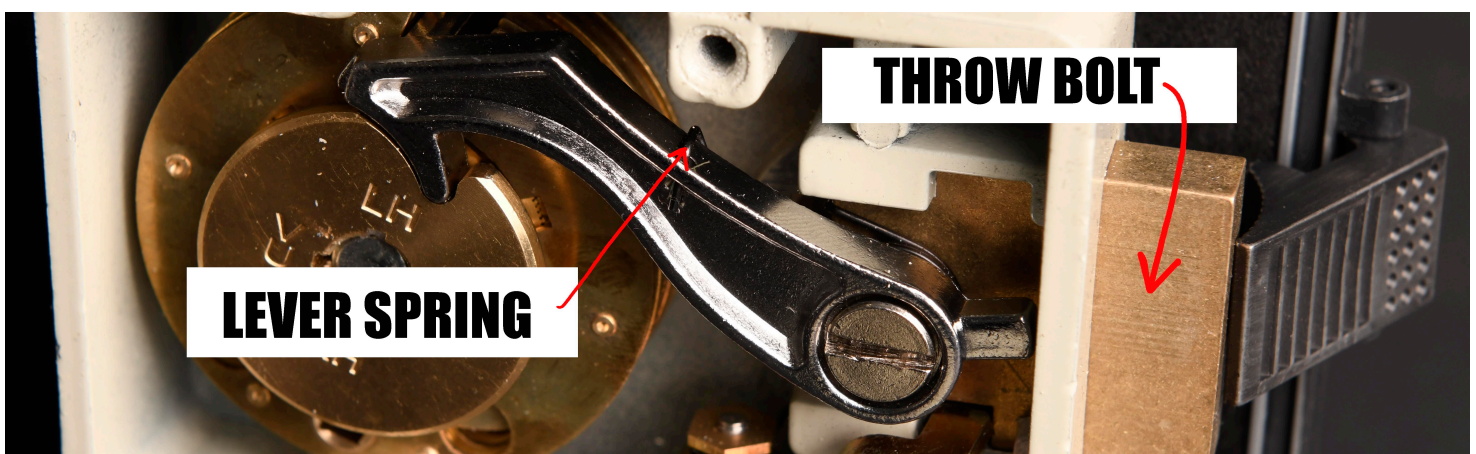
- 1) After opening the safe door, locate the included screwdriver in the parts compartment and remove the two screws holding the wheel housing cover in place. Remove the cover.



- 2) Locate the installed lever and use the screwdriver to remove the lever's pivot screw.

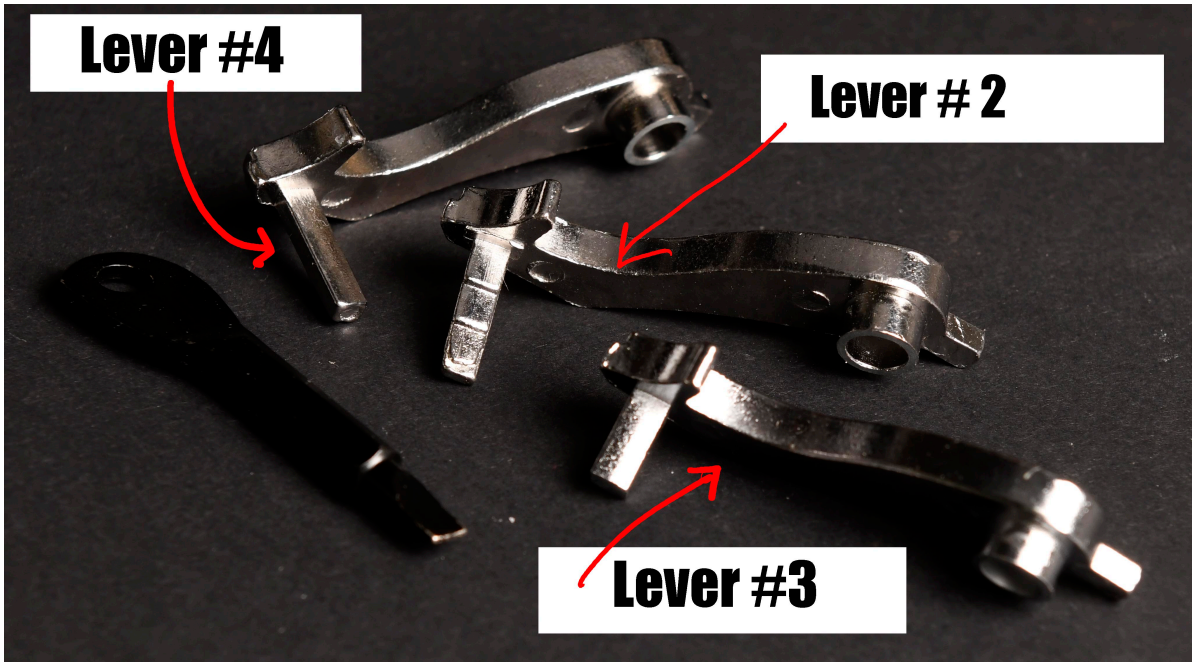


- 3) Attached to the lever is the *lever spring*. The longer leg of the lever spring is inserted in a small hole in the lever itself. The shorter leg of the spring is inserted in a small hole on the rear of the throw bolt. Taking note of how the spring rests around the lever's pivot point, gently lift the lever out of the wheel housing, disconnecting the spring from the throw bolt and then from the lever itself. You will be reinstalling it in the same way momentarily. Set the lever and the lever spring aside. The default lever you just removed is LEVER #1.





- 4) Locate LEVER #2 in the parts compartment. LEVER #2 can be identified by the bar (known as the fence) that projects out laterally from its head and has three graduated sections.



- 5) Connect the spring to LEVER #2 in the same manner that you removed it from the previous one, making sure the long leg of the spring comes to rest inside the lever spring hole.
- 6) Install LEVER #2 in the wheel housing in the reverse manner that you removed the previous one, making sure the short leg of the spring is inserted in the small hole on the rear of the throw bolt, and then lift the fence of the lever (the small bar that projects from its side) up and into the slots at the top of the wheels. (These slots are called the gates.)
- 7) Replace the lever's pivot screw and secure it using the screwdriver.
- 8) While observing the newly installed lever, reach around to the dial on the outside of the safe and gently begin to turn it clockwise. (If the dial is facing away from you, it would seem counterclockwise.) Make sure the lever you installed smoothly and properly operates the throw bolt.
- 9) Replace the wheel housing cover and re-secure it with its two screws.

You are now ready to try your hand at a more challenging safe configuration designed to be opened with a three number code instead of only two numbers. Once you have mastered LEVER #2, follow the above instructions and replace LEVER #2 with LEVER #3, provided in the parts compartment. LEVER #3 is a standard lever configuration used in authentic two wheel safes. Lever #4 is a standard lever configuration used for authentic three wheel safes. This is your final test in mastering your safe cracking skills and manual dexterity on a real safe!



## LETS GO FOR THREE

Three wheels is relatively simple now that you have the motions of getting two wheels. Follow the same steps of graphing your first wheel and second wheel. To get the number of the third wheel it is just a process of elimination. You test from 0-100 in 2 1/2 increments. For this example let's say the first graphed number was 83 and the second graphed number was 25.

Here are the steps

### Finding the 3rd number

- 1) Reset the dial by turning it CCW at least four complete turns stopping on 0.
- 2) Turn the dial CW and go past the second number, 25, two complete times and when reaching it for the third time, STOP exactly on 25.
- 3) Turn the dial CCW going past the third number, 83, one complete time and when reaching it for the second time, STOP exactly on 83.
- 4) Turn the dial CW and feel for the throw bolt to retract and the safe open.
- 5) If the safe does not open repeat steps 1-4 while adding 2 1/2 to step 1 until the safe opens.
- 6) If the safe does not open after a full rotation of the dial in step one reexamine your graphs and potentially re-graph one of the numbers

## ADVANCED STUFF LEVER #3 and #4

If you have moved up to lever #3 and 4 you might want to do a magnified graph of the indicating area in your graph. This is a second graph that is focused on just a narrow section of the dial but is done at every number. You would follow that standard steps for the wheel you are graphing but you would now record at every number

Example: If the graph indicated around 65 you do a second magnified graph for the numbers 61,62,63,64,65,66,67,68,69.

Levers #3 and #4 do not have the ground in steps so the difference between contact point readings will be much smaller. This is where it is critical to record 1/4 and if possible 1/8 of a dial number.

# MORE IMPORTANT ADVANCED STUFF

The way levers #1 and #2 are ground with steps we know that wheels #1 and #2 will be graphed first and second. When you swap in lever #4 you will need to do a test to confirm what wheels you took a reading from after the SECOND graph.

For this example our first Graph has an indicating number of 82 and a second at 25. Lets now test to see if that is wheel 1 or 2 that is indicating #82. This will involve a quick process of elimination.

To do this we will put the first wheel on 82, the second wheel on a number far from 82 lets say 70 and the third to 25. If the contact points still read low then it is the first wheel that is indicating #82. If it is high it will be the second wheel that is indicating #82

Turn the wheel CCW four turns stopping on 82  
Turn CW two rotations stopping on 82  
Turn CW around 10 numbers to 70  
Turn CCW one rotation to 70  
Turn CCW to 25  
Turn CW and check contacts  
If the reading is low the number from step one is from wheel 1

PRO TIP - From the first step of resetting the dial with four turns to the last step of opening it with one turn, the number of turns for each step decreases by one and alternates direction of turn. With the "#" symbols representing the code numbers, a simple way to remember this pattern of number of turns and their direction is:

4 CCW #, 3 CW #, 2 CCW #, 1 CW (open)

For both opening the safe and changing the code, the dial follows the same pattern of number of turns: 4, 3, 2, 1 . These turns also alternate direction in the same pattern for both opening and changing: CCW, CW, CCW, CW . Therefore, if you can remember the pattern begins with 4 CCW , the rest of it should easily follow.

## Changing The Code

Unlock the safe and open the door using the "Opening Your Safe" steps along with the proper code. Then, follow these steps using the **CHANGING Index Line** for alignment. (*NEED FIGURE*) In this example, we will change the code from the factory default of **25 / 70 / 43** to a new code of **38 / 45 / 27**.

**IMPORTANT** - When choosing your three code numbers, follow two important security guidelines:

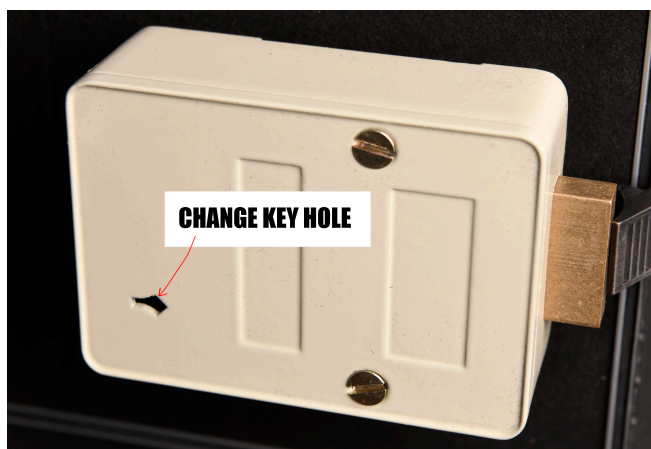
- 1) Never select numbers that only increase or only decrease from beginning to end.  
**Incorrect Examples:** 25 / 35 / 45                      80 / 70 / 60  
**Correct Examples:** 45 / 25 / 35                      60 / 80 / 70
- 2) Never select 0 - 20 for the final number. Select a number from 21 - 99 for the last one.  
**Incorrect Example:** 42 / 4 / 15  
**Correct Example:** 16 / 8 / 23

These guidelines ensure the "slots" (known as *gates*) in the tumbler wheels are never too close together, which may allow the safe to be opened with only *two* of the three code numbers.

**CW** = Clockwise (Right Turn)

**CCW** = Counterclockwise (Left Turn)

- 1) Reset the dial by turning it **CCW** for at least four complete turns.
- 2) Turn the dial **CCW** until exactly aligned with the first number, **25**, and **STOP**. (Remember, all steps in this section use the *CHANGING Index Line* for alignment.)
- 3) Turn the dial **CW** going *past* the second number, **70**, two complete times and when reaching it for the third time, **STOP** exactly on **70**.
- 4) Turn the dial **CCW** going *past* the third number, **43**, one complete time and when reaching it for the second time, **STOP** exactly on **43**.
- 5) Insert the Change Key Tool into the Change Key Hole and *gently* turn it 90 degrees **CCW** until it stops . Never force the Change Key Tool!
- 6) Repeat "Changing The Code" steps 1 - 3, substituting the original code with the new code of **38 / 45 / 27** and then proceed to step 7.
- 7) Gently turn the Change Key Tool 90 degrees **CW** back to its original position (*NEED FIGURE*) and remove it from the Change Key Hole.
- 8) *Without closing the safe door*, follow the "Opening Your Safe" steps three complete times in order to verify each time that the safe bolt retracts and the dial comes to a hard stop, demonstrating that the code change was successful. Once you have confirmed this, you may now close the door and lock your safe by turning the dial **CCW** at least four complete times.





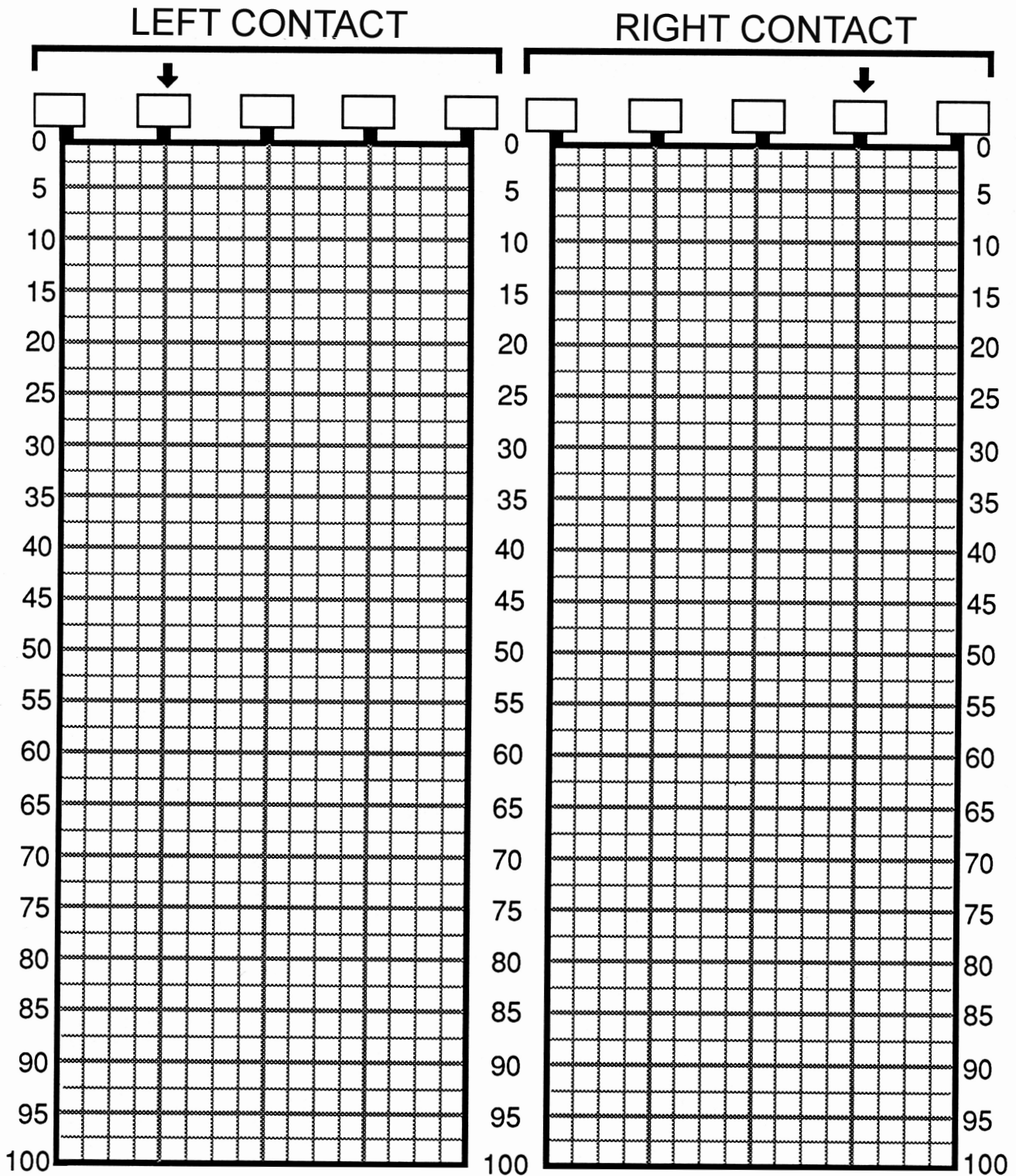
**Enjoy the VAULT and thank you for the support.**

**V/R**

**SPARROWS**

# SPARROWS VAULT GRAPH

Wheel # \_\_\_\_\_



**Notes:**