STEWART-WARNER

INDUSTRIAL BALANCER

SIMPLIFIED BALANCING PROCEDURE

MODEL 2380

This new, simplified and easy to understand balancer operational procedure makes using the StewartWarner Industrial Balancer as simple as one, two, three:

1. Fast, Easy Set-Up
2. Simple Balancing Procedure

3, Quick Change From One Part To Next

The new simplified Left-Right balancing procedure is ideal for balancing electric motor armatures, crankshafts and other parts which are as long or longer than their diameter.

QUICK CHECK LIST

SET-UP PROCEDURE

1. Set control panel switches
2. Loosen Dashpot Coupling Nuts
3. Set part on balancer and position end stops
4. Adjust spring gaps
5. Set Dashpots

BALANCING PROCEDURE

☐ 1. Lock out resonance spring on one side of balancer

☐ 2. Spin part up

☐ 3. Note position Of reference mark and peak Unbalance Meter reading while part is coasting

☐ 4. Stop part and position reference mark as noted above

☐ 5. Make weight correction in plane opposite locked side of balancer

☐ 6. Repeat procedure to balance other end of part

☐ 7. Recheck balance of both ends of part

• widest weight range • most versatile • fastest set-up time

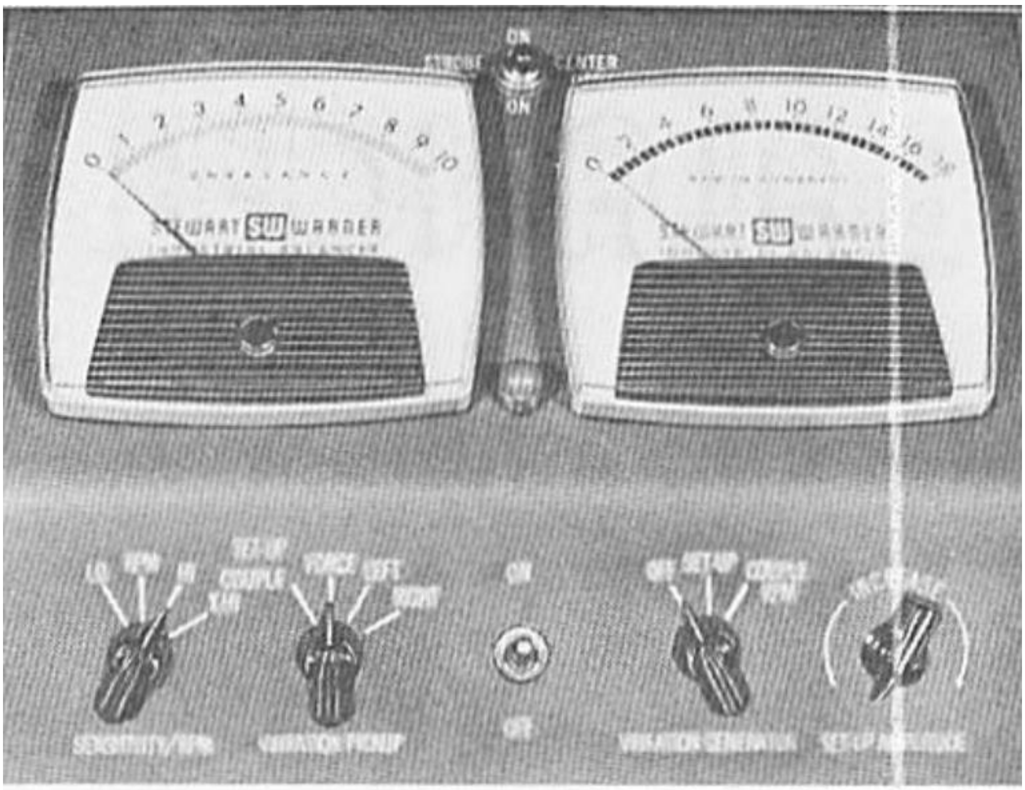
INDUSTRIAL BALANCER SALES DEPT

tnsmachines.com probaldynamicbalancing.com

Amplifier repairs: GH Balancing Gary Hildreth 847-559-1120 info@ghbalancer.com

940-668-1128

SETUP PROCEDURE



Set the switches:

Left to Right:

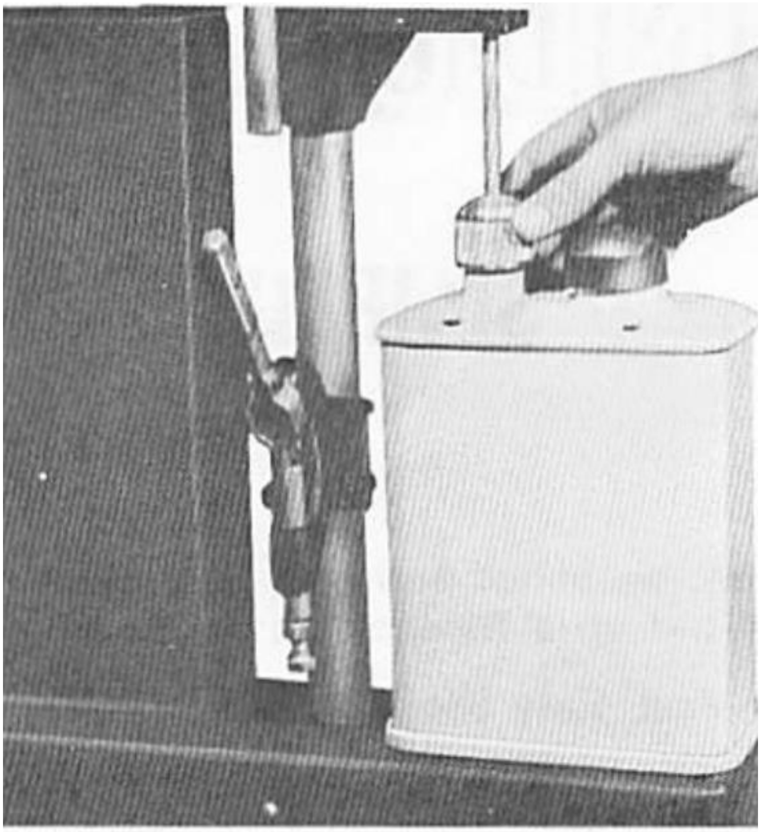
Hi

Force

On

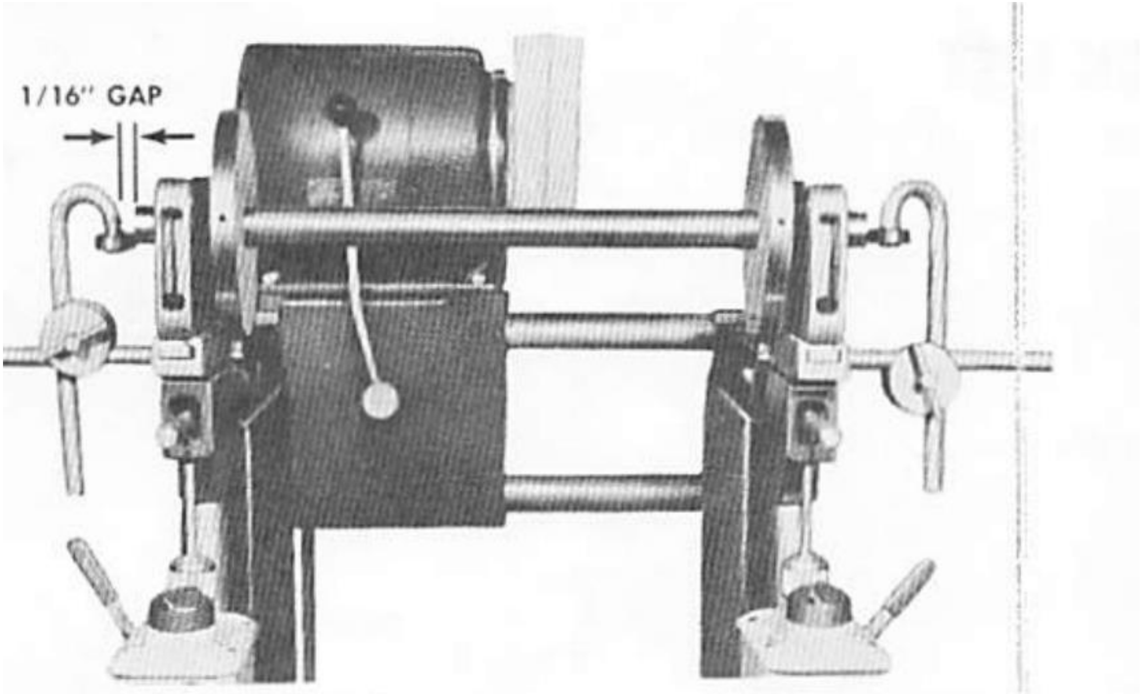
Off

Full CCW



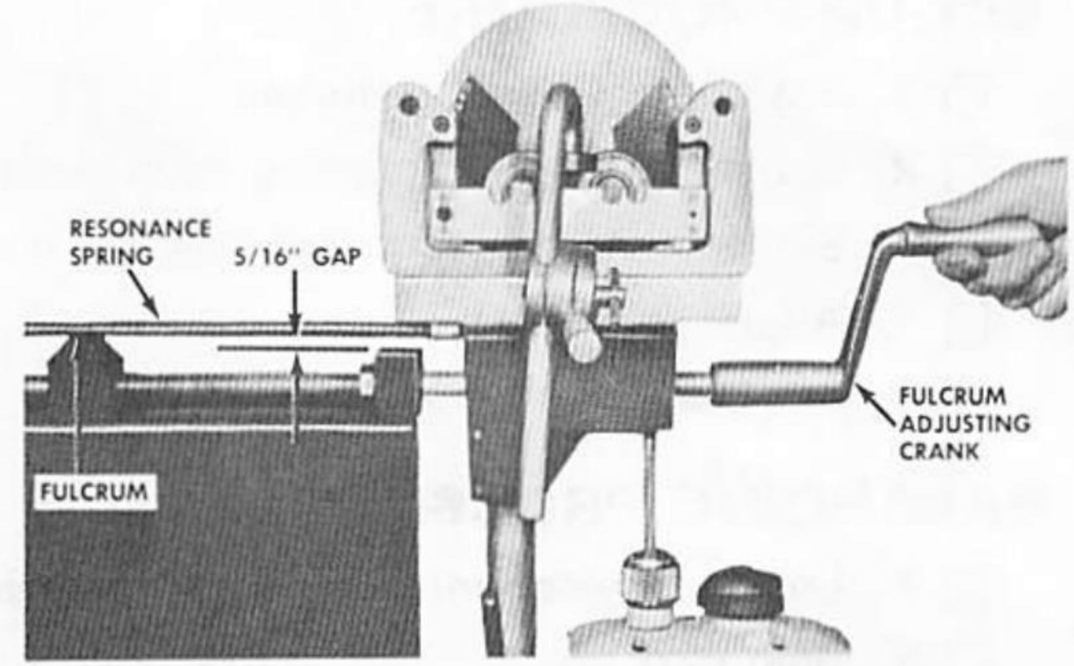
LOOSEN THE DASHPOT COUPLING NUTS

Unscrew the coupling nuts and lift the nut clear so you can inspect the split ferrule to be sure the connecting rod slides freely with the nut loose. If not take the time to polish the shaft or replace the split ferrule so it is free until clamped.



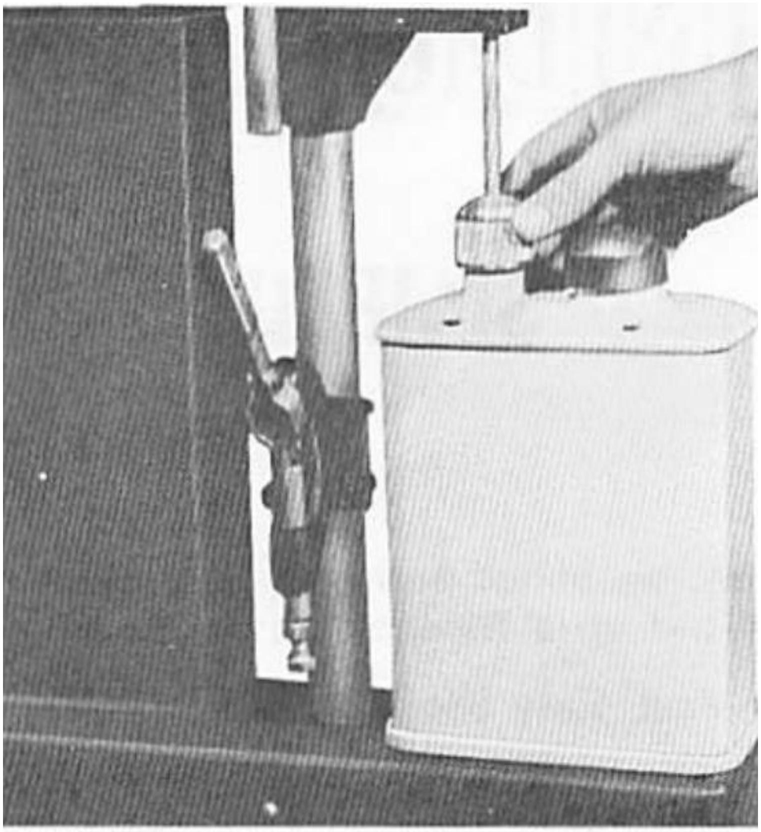
3. SET THE PART ON THE BALANCER AND POSITION THE END STOPS

Note: It is important the main journals rest on the bearings so they do not bump on the oil holes and do not contact the radius of the crankshaft.



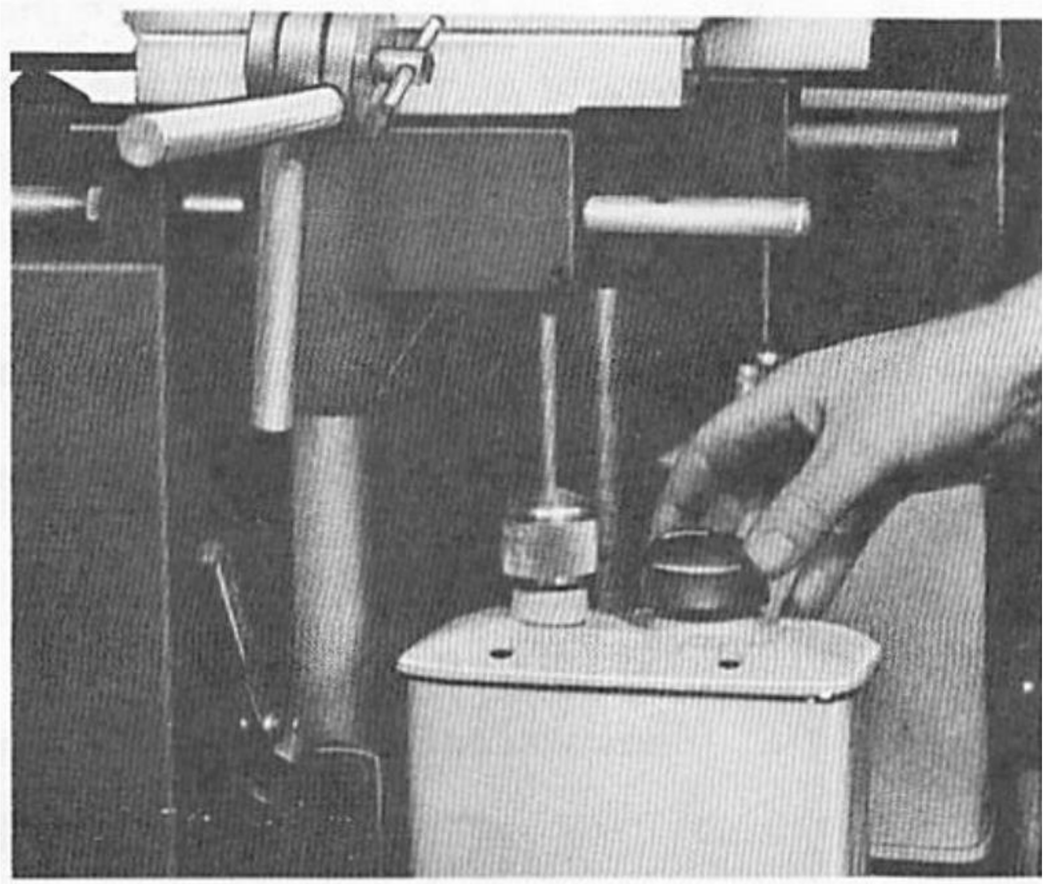
4. ADJUST THE GAP BETWEEN THE RESONANCE SPRING AND COLUMN ON BOTH SIDES OF THE BALANCER TO APPROXIMATELY 5/16" (See notes)

Tip: Use either a 5/16” piece of keystock or 5/16” drill bit and crank the fulcrum so the gap is a slip fit (coupling nuts must be loose and shaft free while making this adjustment



LOOSEN THE DASHPOT COUPLING NUTS

Tighten both coupling nuts and verify the shaft is tight by lifting the spring and watching the nuts



6. SET THE DASHPOTS ACCORDING TO THE TOLERANCE CHART
(See notes)

If the part is so far out of balance it is impossible to spin the part to speed without it bouncing of the machine set the dashpot to a higher setting to make the initial corrections. Always finish the balance at the proper dashpot setting as per the chart at the end of this instruction sheet.

Making a Test Arbor

A crude method of making a test rotor is to take an inline crankshaft that has a verified low unbalance, add weight with either clay or a magnet at a particular radius on the end counterweights of the crank.

It is best if the weights are very close to the trunnions. About 10 grams at around 3 inches is adequate for testing. Too much weight and the part will bounce too much at speed

Another method would be to use a straight shaft about 2” in diameter with two bobweights clamped to the shaft and indexed to the same angle. Balance this shaft so it is very close to zero and simply add about ten grams to one side of the bobweight. Rod Flood showed an excellent example of this in a video he posted recently.

Using chalk or a white paint marker draw an X on the side of the bobweight counterweight at the angle of the added weight.

Put a straight line mark on the side of the rod throw so it will be possible to always monitor the unbalance position while the crank is spinning. The strobe will show these marks stationary while the crank is spinning.

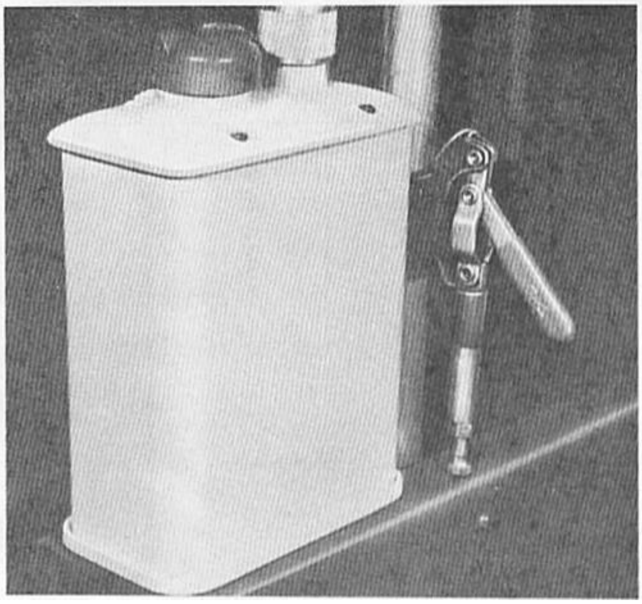
Use this test arbor to perform the following procedure.

Note: During setup it is practical to initially spin the crank slowly up to speed monitoring the reference marks. At about 80% of the resonant speed the angle will stabilize and begin to rotate. The angle will shift 90 degrees at peak resonant speed and shift 180 degrees at about 12% of peak resonance. The shaft will shake it's maximum amount at peak resonance.

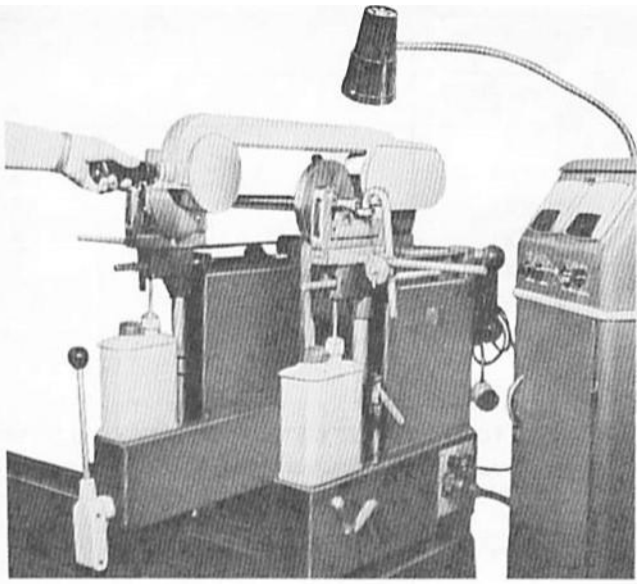
It is a good idea to use the test arbor to verify where the heavy spot is at these percent of resonant speeds. This will verify the angle of correction needed to correct an unbalance when you can't see the unbalance position and have to rely on the electronics tuning.

It is also practical to spin a part through resonance initially and make note of the speed of initial and peak resonance. This can be verified on each column by locking out the opposite column and watching the marks. Fine adjustment for the resonance speed can be made by trimming the fulcrum with the trim handle.

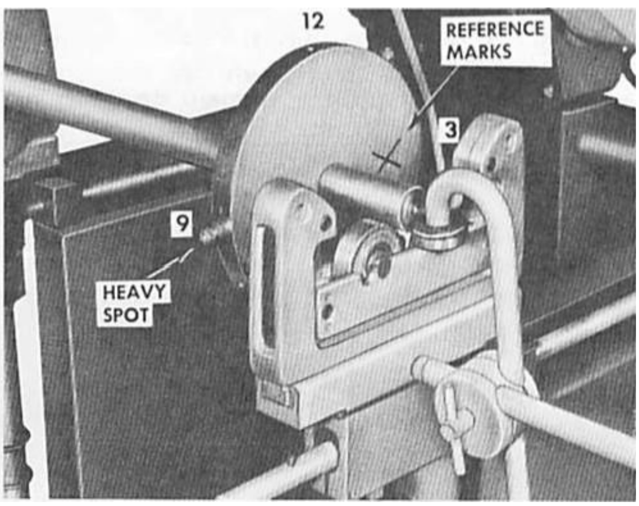
BALANCING PROCEDURE



1. LOCK THE RESONANCE SPRING ON ONE SIDE OF THE BALANCER
(See "Correction Plane" under notes)



2. SPIN THE PART UP AND NOTE THE POSITION OF THE REFERENCE MARK AND THE UNBALANCE METER READING AS THE PART COASTS DOWN



3. STOP THE PART AND POSITION THE PART WITH THE REFERENCE MARK IN THE POSITION NOTED IN STEP 2

4 MAKE WEIGHT ADJUSTMENT IN CORRECTION PLANE FURTHEST FROM THE LOCKED COLUMN

5, UNLOCK THE FIRST COLUMN AND REPEAT STEPS 1 THRU 4 TO BALANCE THE OTHER END OF THE PART

6. RECHECK THE BALANCE OF BOTH ENDS OF THE PART

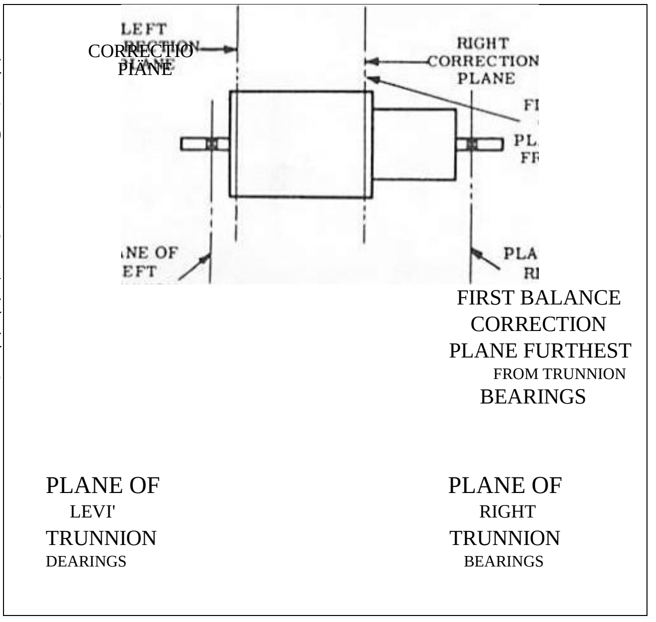
NOTES

GAP SETTING

Some parts may not be of sufficient weight to depress the springs enough to set the gaps at 5/ 16". When light parts are mounted on the balancer set the gaps at the minimum amount that can be attained, making certain the gaps are equal on both sides of the balancer. Setting larger gaps results in a higher balancing speed. Setting smaller gaps results in a lower balancing speed. On those parts which must be driven from a large diameter it may be necessary to set smaller gaps so the resulting balancing speed will be low enough to be within the part's slower rotational speed.

CORRECTION PLANE

A correction plane is any convenient place on the part at which weight corrections can be made. Parts balanced by the Left-Right method have two correction planes, one at each end of the part. Make the initial weight correction in the plane which is furthest away from the trunnion bearings. On those parts where the correction planes are equidistant from the trunnion bearings, make the initial weight correction on the end of the part which has the greatest unbalance. Choose correction planes which are as close as possible to the trunnion bearings.



Dashpot Setting and Tolerance Guide

Weight of Part in pounds	1-20	20-50	50-100	100-200	200-500	500-1000	1000-2000
Operating Speed of Part in RPM	Dash Pot Setting						
600	3	4	4	4	5	5	5
900	2	3	4	4	4	4	5
1,200	2	2	3	3	4	4	4
1,800	1	2	2	3	3	3	3
3,600	1*	1	2	2	3	3	3
7,200	1*	1*	1	1	1	1	1
15,000**	1*	1*	1*	1*	1*	1*	1*

*Sensitivity switch set on X Hi
**Balance to Unbalance Meter reading of 0.5 or less

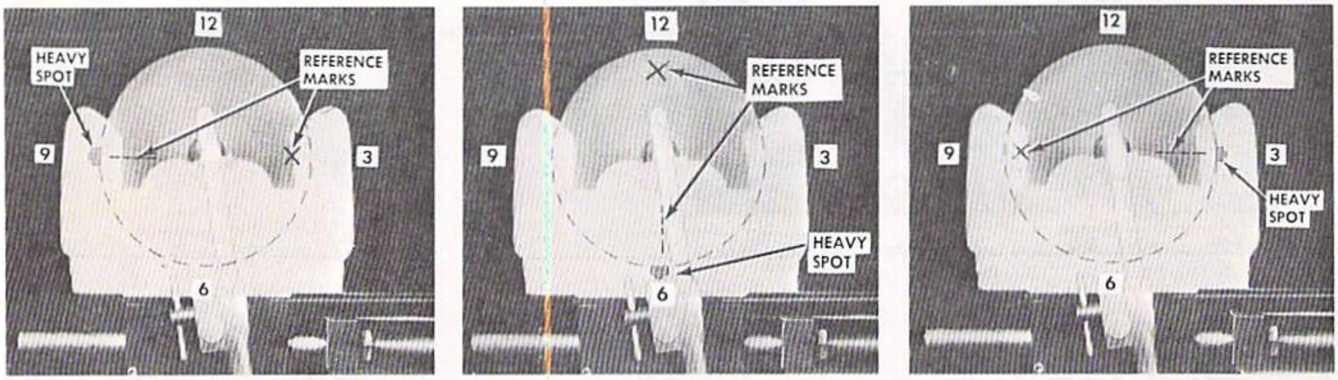
BALANCE TO UNBALANCE METER READING OF I L O OR LESS

This chart assumes an allowable vibration of .001 " Or less with the part operating under normal conditions. Specific conditions will determine final results. This chart is to be used as a guide Only.

POSITION OF THE HEAVY SPOT

The heavy spot of the part will be found at 9, 6, or 3 0'clock, as viewed from the right side of the part, and depending upon whether the position of the reference mark is read ABOVE BALANCING SPEED, "AT BALANCING SPEED," or BELOW BALANCING SPEED.

The reference mark will rotate 180 degree$ as the part approaches and passes thru the balancing speed. The rotation of the reference mark is counter clockwise as the part is coasting down. The moment the reference mark begins to rotate counter clockwise is referred to as "ABOVE BALANCING SPEED." The moment the Unbalance Meter peaks out is referred to as "AT BALANCING SPEED." The rotation of the reference mark is clockwise as the part is being accelerated. The moment the reference mark begins to rotate clockwise is referred to as "BELOW BALANCING SPEED." The choice Of which time the position of the reference mark is to be read is determined by one of the factors listed below.



ABOVE BALANCING SPEED

Light parts
Parts that slow down quickly

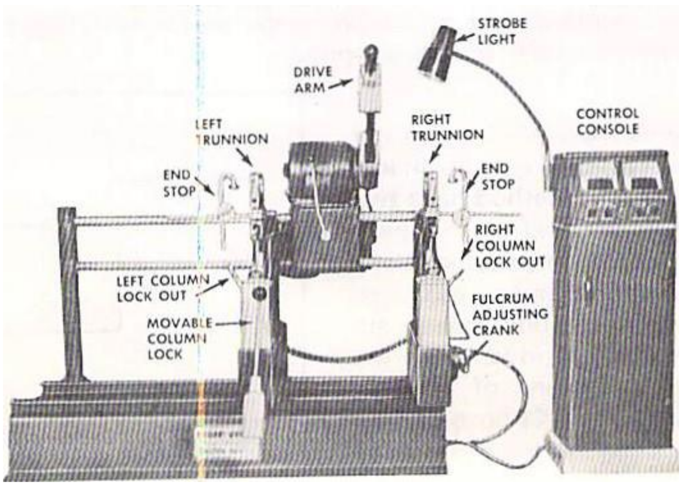
Dashpot setting 3 or less,

AT BALANCING SPEED BELOW BALANCING SPEED

Heavy par's. Very large and/or heavy parts,

Parts that •.oast easily Parts with high air drag

Dashpot setting 3 or more, Parts with excessive unbalance.



Thanks to Gary Hildreth of GH Balancing repair for his input and Scott Ouellette for some of the pictures.