

# Harmonic Balancer Torque Tester

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## Background

Harmonic balancers damp torsional vibration from the crankshaft of a car engine. Without harmonic balancers, the engine smoothness and durability are greatly decreased as the overall torsion of the crankshaft is increased. Harmonic balancers are made of three components: the hub, the inertia ring, and the rubber ring. Between the hub and inertia ring is the rubber ring. This rubber ring affects damping effects through its torsional spring rate, which is dependent on the properties of the rubber.

## Problem Statement

A machine is needed to test the functional characteristics of the rubber ring contained within a typical harmonic balancer.

Requirements:

- This test will be conducted by holding either the hub or inertia ring statically in a fixture and applying the other with a torque until the rubber ring slips or shears.
- The machine will collect live data showing the relationship of torque versus angular displacement to determine the torsional spring rate and torque resistance of the assembly.



## Project Objectives

### Mechanical

Create a mechanism which can drive a specified torque or a torque resulting in 5 degrees of angular deformation or failure

### Electrical

A fully automated testing process with sensors which can precisely record torque and the resulting angular deformation

### Coding

Develop a computer program that can convert the output from sensors into values of torque and deformation as well as summarize the data on a graphical plot

# Sharmonic Balancer Torque

**Robert R. Redfield**



**Sharmonic Balencer Torque:**

The book delves into Sharmonic Balencer Torque. Sharmonic Balencer Torque is an essential topic that needs to be grasped by everyone, ranging from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Sharmonic Balencer Torque, encompassing both the fundamentals and more intricate discussions.

1. The book is structured into several chapters, namely:
    - Chapter 1: Introduction to Sharmonic Balencer Torque
    - Chapter 2: Essential Elements of Sharmonic Balencer Torque
    - Chapter 3: Sharmonic Balencer Torque in Everyday Life
    - Chapter 4: Sharmonic Balencer Torque in Specific Contexts
    - Chapter 5: Conclusion
  2. In chapter 1, the author will provide an overview of Sharmonic Balencer Torque. The first chapter will explore what Sharmonic Balencer Torque is, why Sharmonic Balencer Torque is vital, and how to effectively learn about Sharmonic Balencer Torque.
  3. In chapter 2, the author will delve into the foundational concepts of Sharmonic Balencer Torque. The second chapter will elucidate the essential principles that need to be understood to grasp Sharmonic Balencer Torque in its entirety.
  4. In chapter 3, the author will examine the practical applications of Sharmonic Balencer Torque in daily life. The third chapter will showcase real-world examples of how Sharmonic Balencer Torque can be effectively utilized in everyday scenarios.
  5. In chapter 4, the author will scrutinize the relevance of Sharmonic Balencer Torque in specific contexts. The fourth chapter will explore how Sharmonic Balencer Torque is applied in specialized fields, such as education, business, and technology.
  6. In chapter 5, this book will draw a conclusion about Sharmonic Balencer Torque. The final chapter will summarize the key points that have been discussed throughout the book.
- This book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Sharmonic Balencer Torque.

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