SHIMADZU
Excellence in Science

Thermogravimetric Analysis (TGA) Overview

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Physical Measurement
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Objectives

- Definition
- How it works
- Applications
- Our Products
- Specifications
- Accessories

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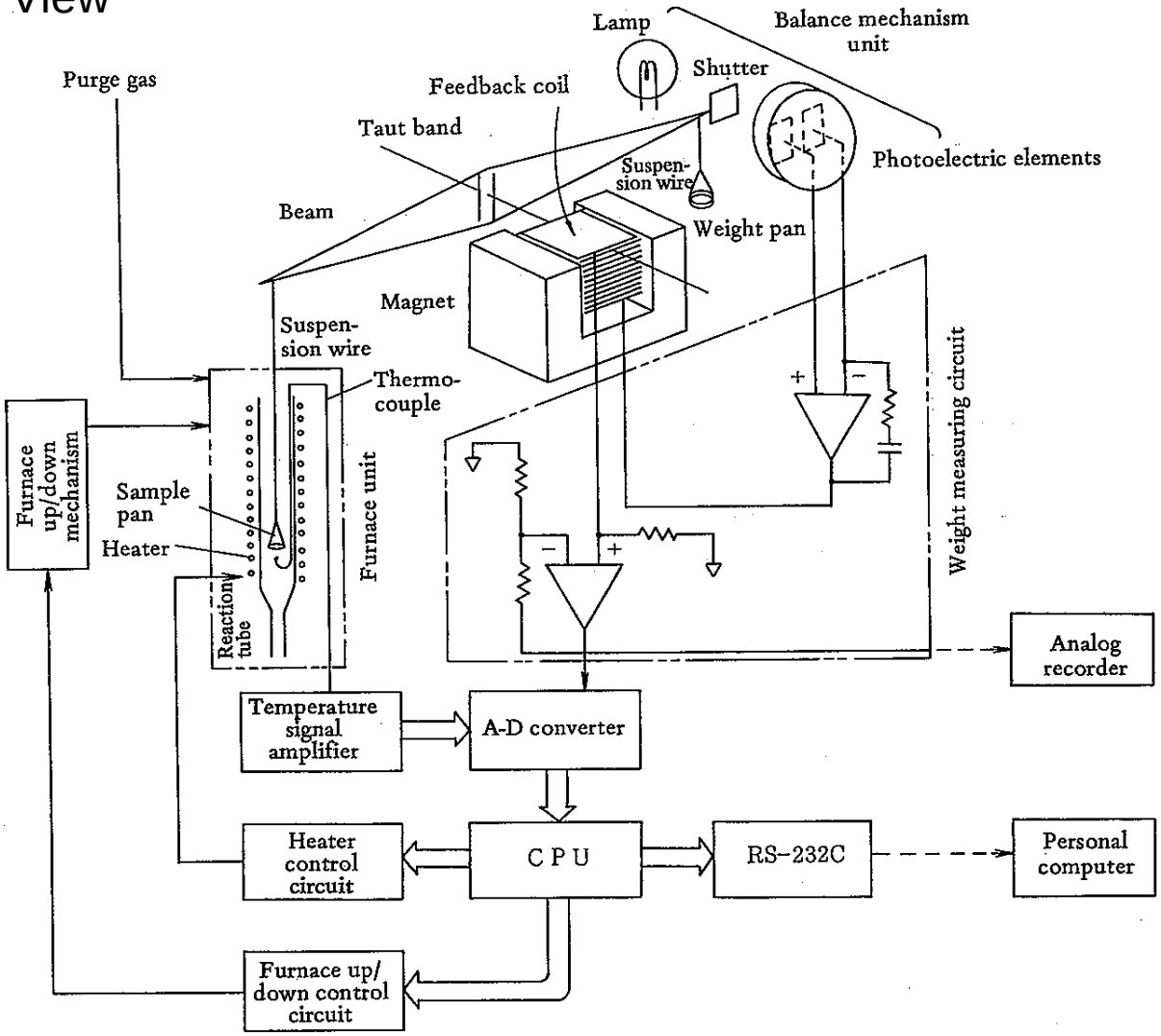
Definition

Thermogravimetric analysis is a technique used to measure the weight of a sample as it relates to a change in temperature or time.

It can measure properties involving adsorption, absorption, desorption, dehydration, sublimation, vaporization, decomposition, and so on.

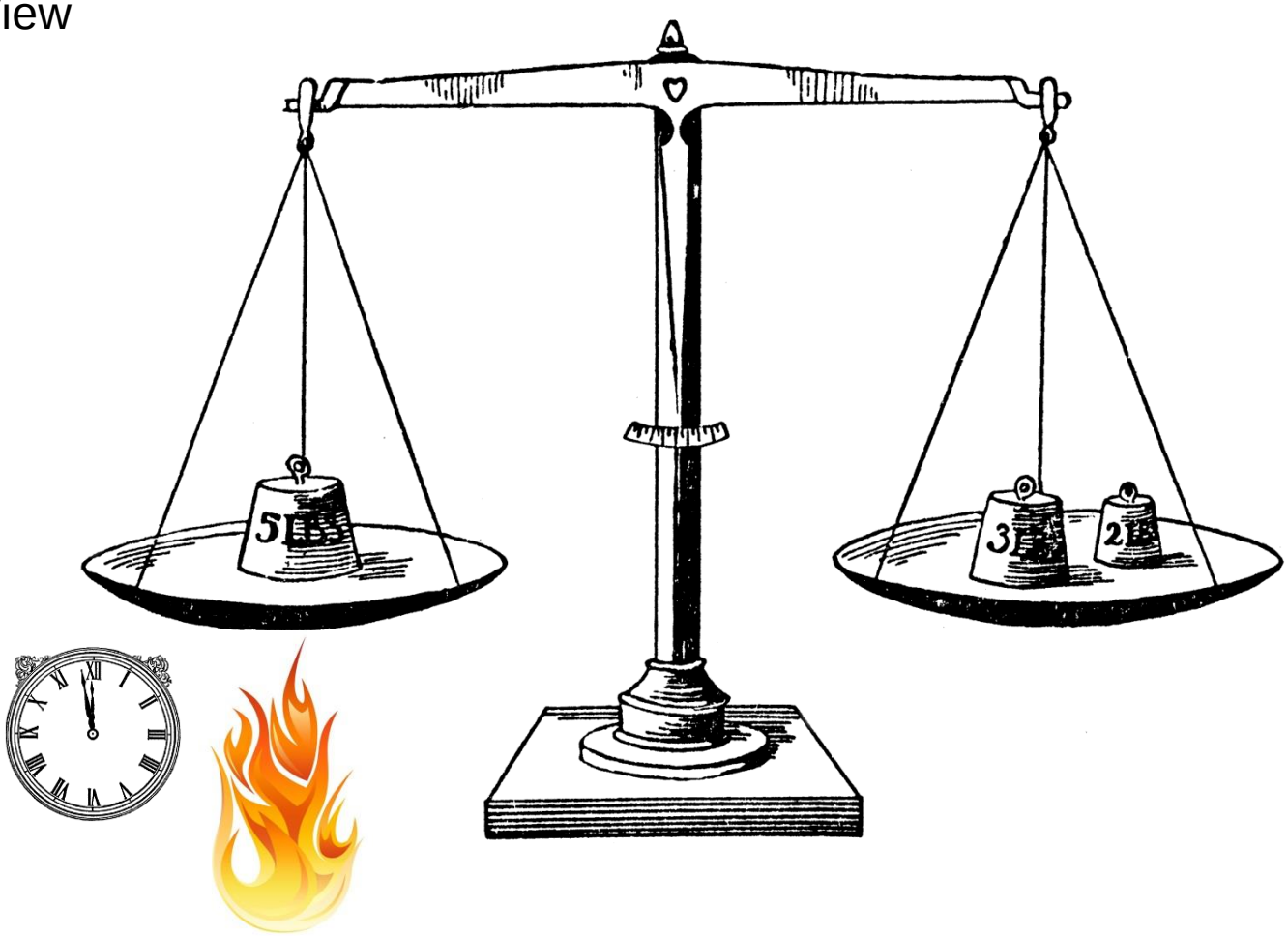
How It Works

Complicated View



How It Works

Simple View



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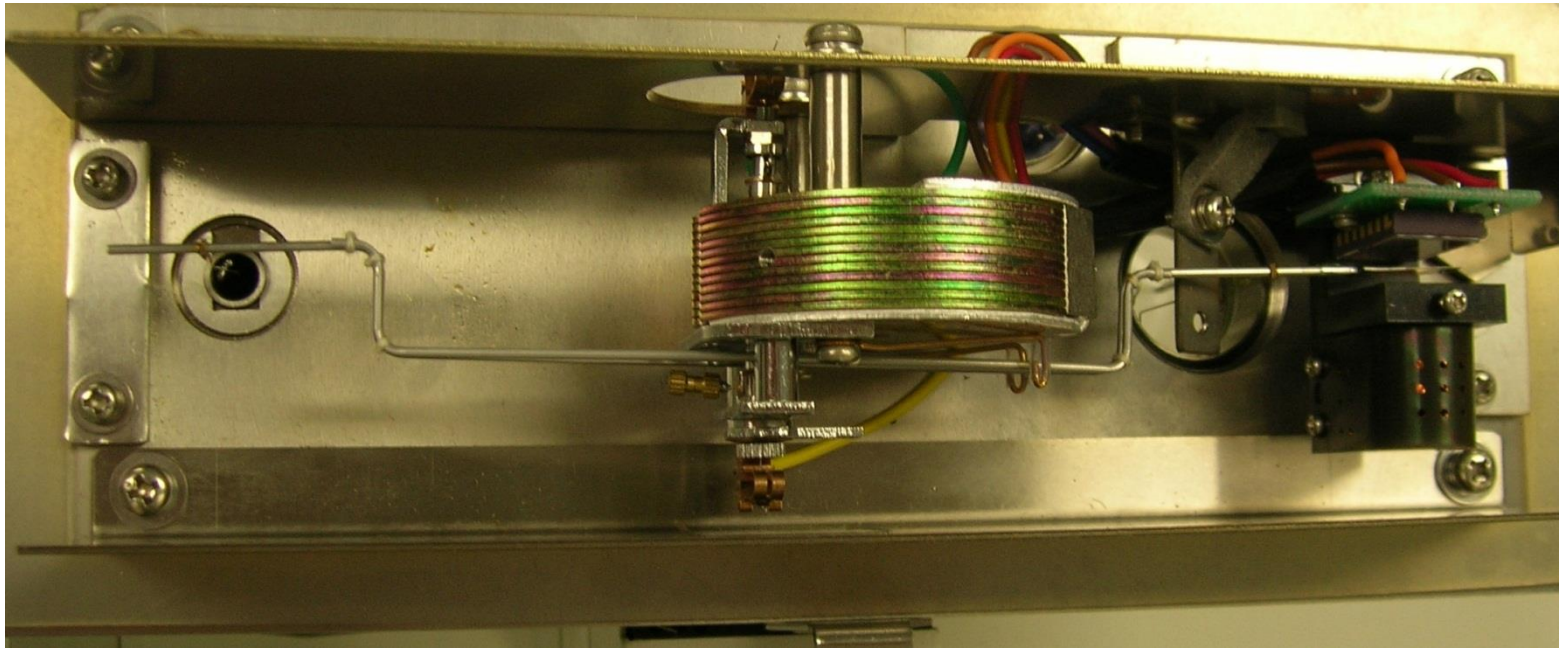
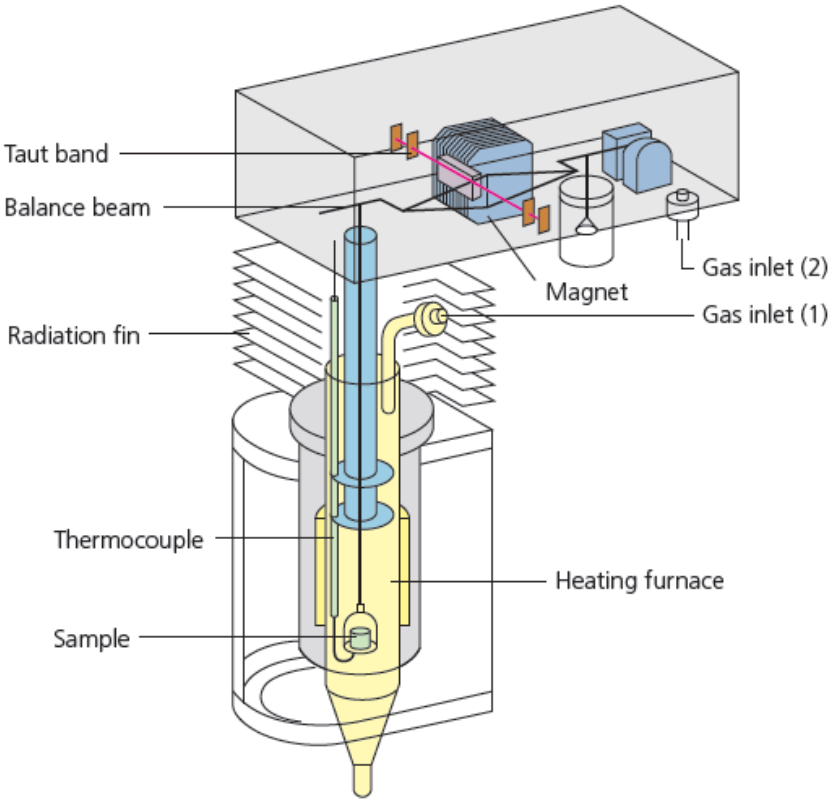
How It Works

Real View



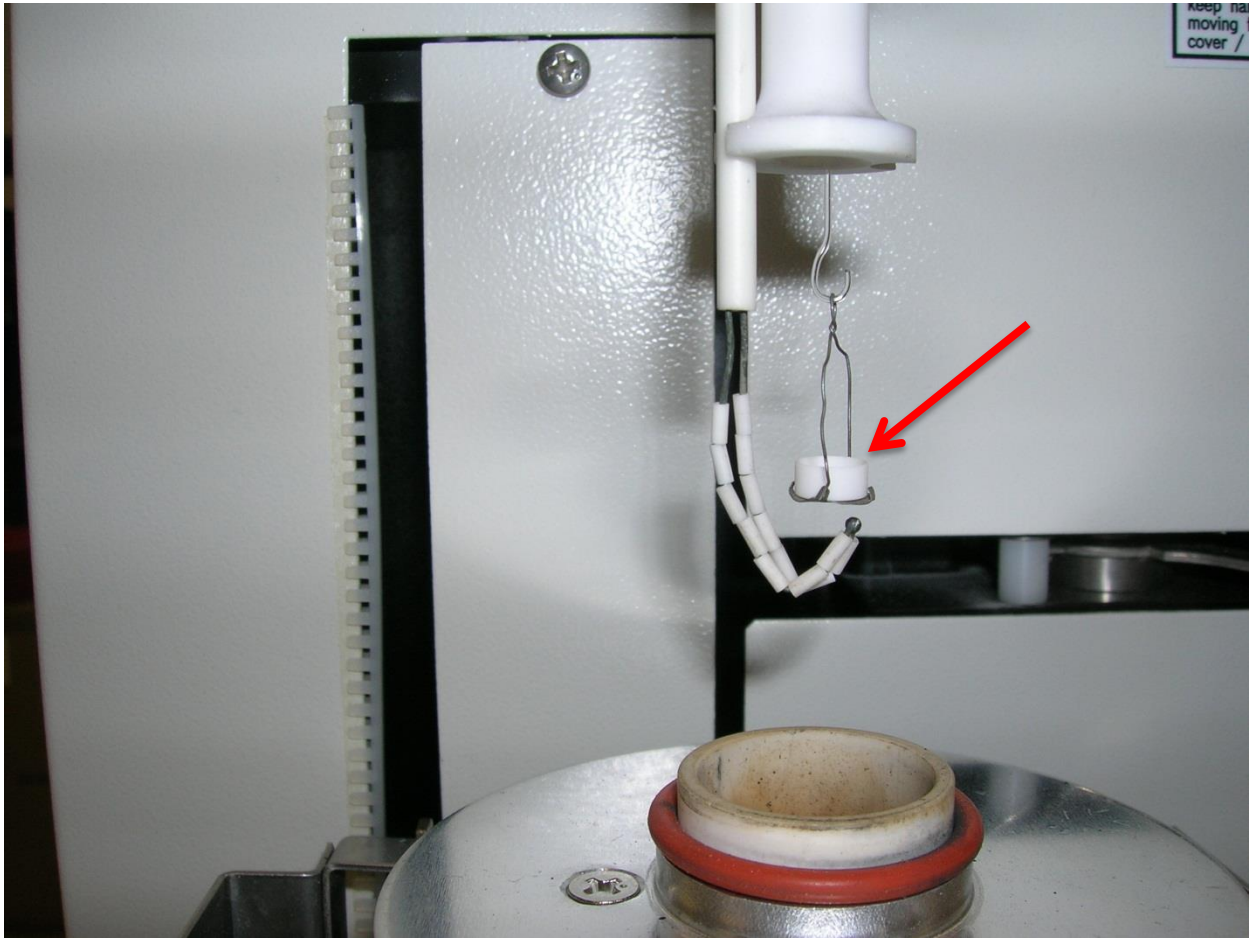
How It Works



- Measuring mass change
- Change in mass detected optically
- Electric current flows to feedback coil
- Returns balance system to its original state
- Current is proportional to mass variation

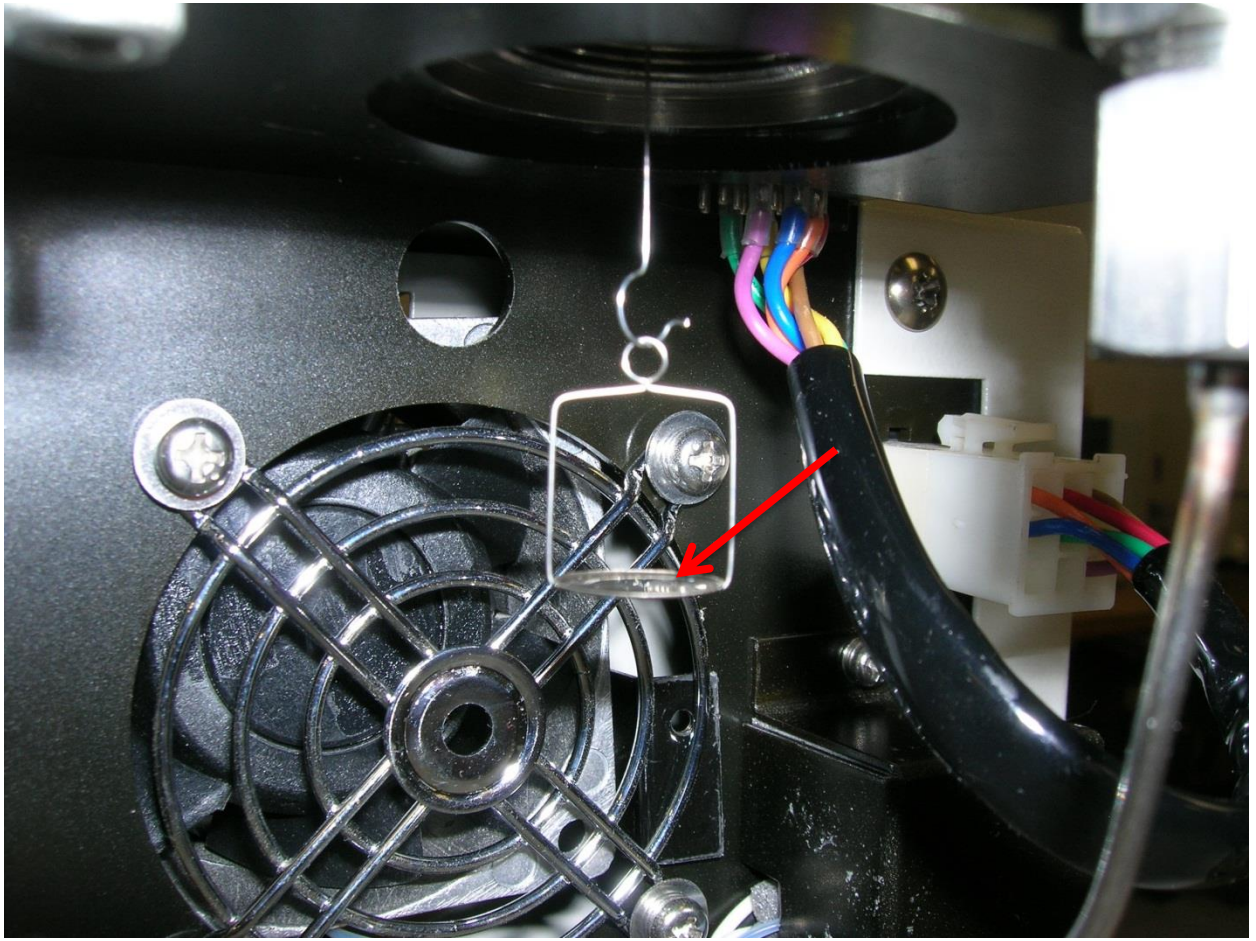
How It Works

A sample pan is hung from the precision balance.



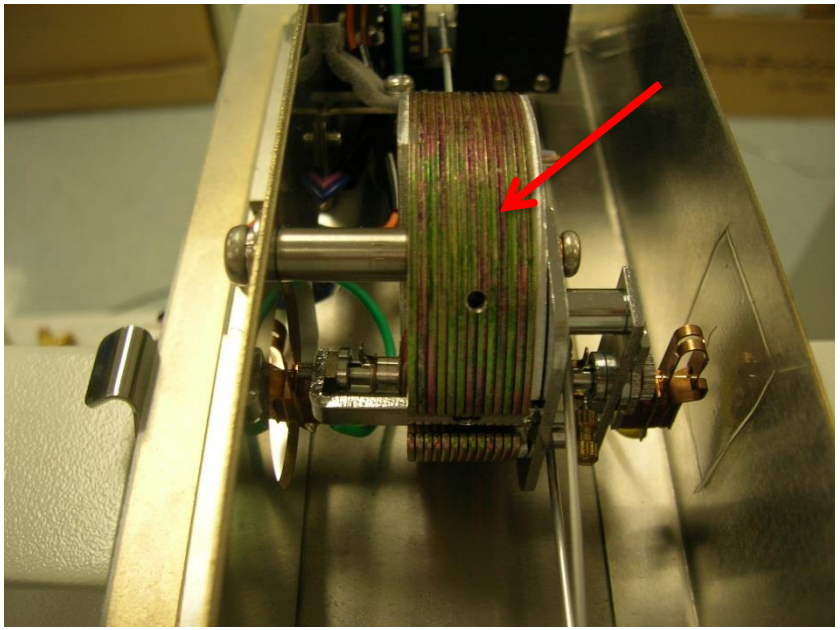
How It Works

An equivalent weight is placed in the rear pan to act as a counter balance.



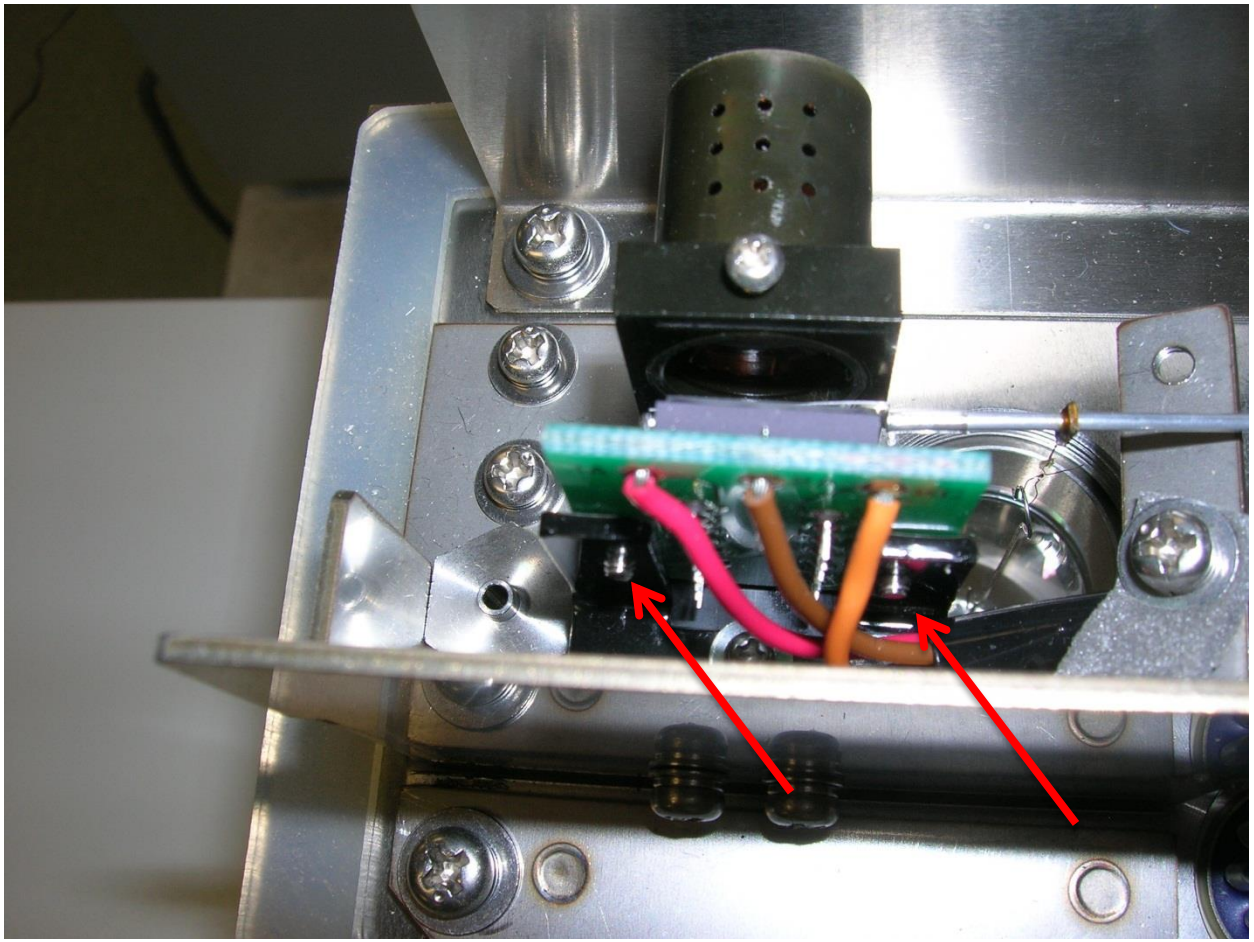
How It Works

The balance is zeroed by adjusting the current in the feedback coil.



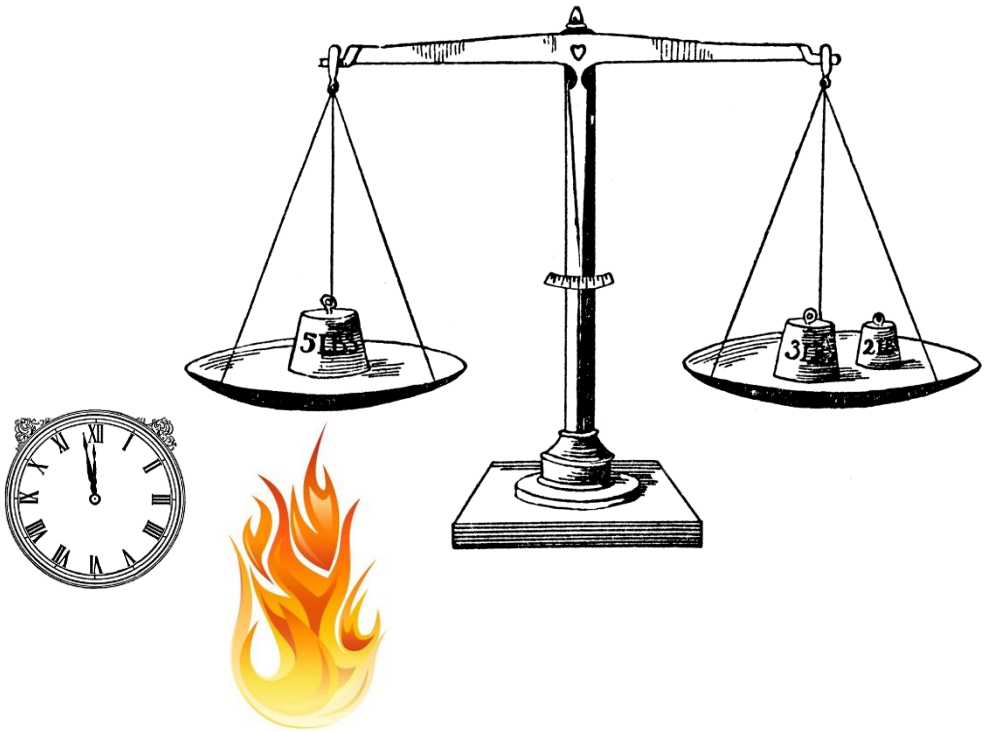
How It Works

This makes the photoelectric cell outputs equal.



How It Works

The sample will change weight as time or heat is added.



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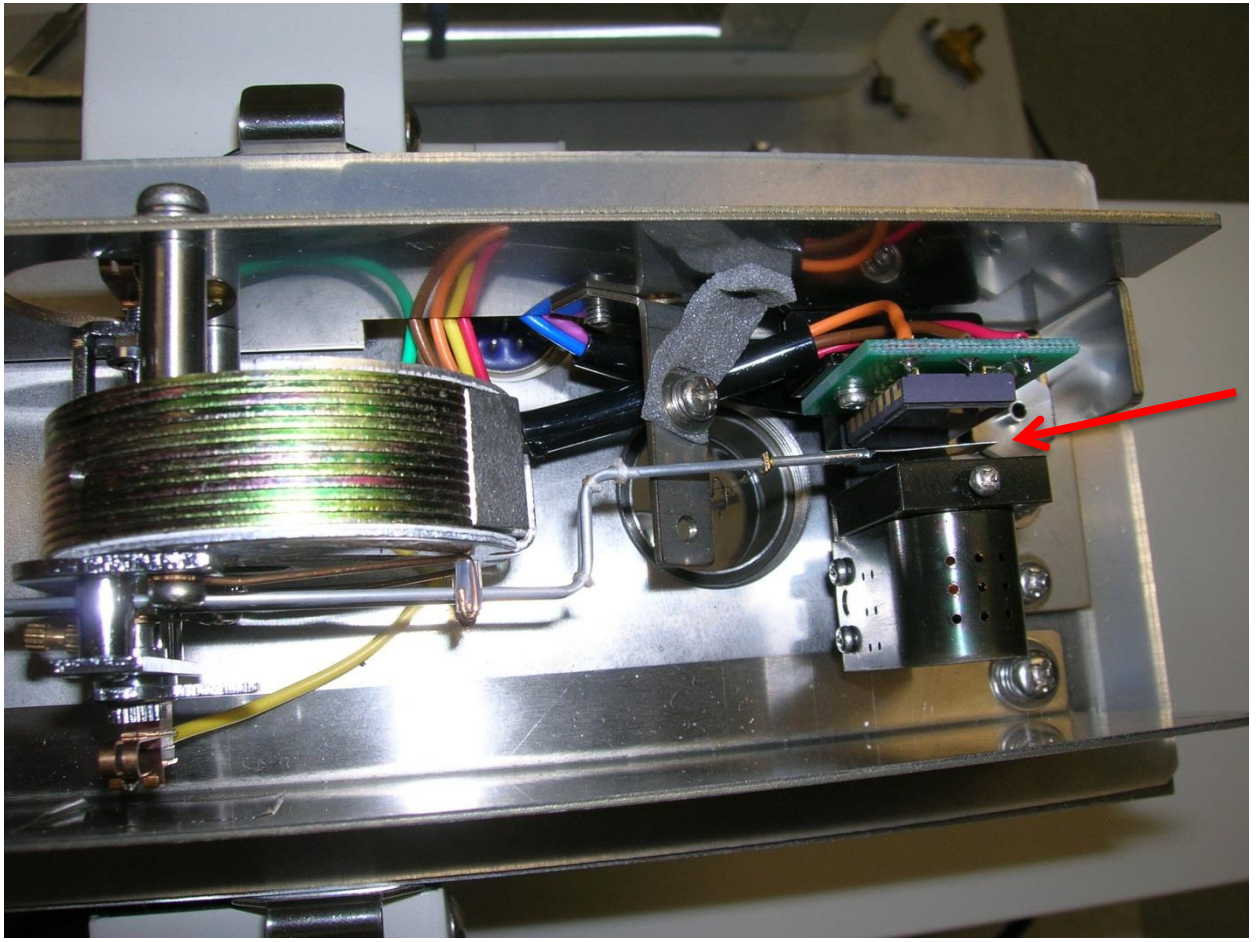
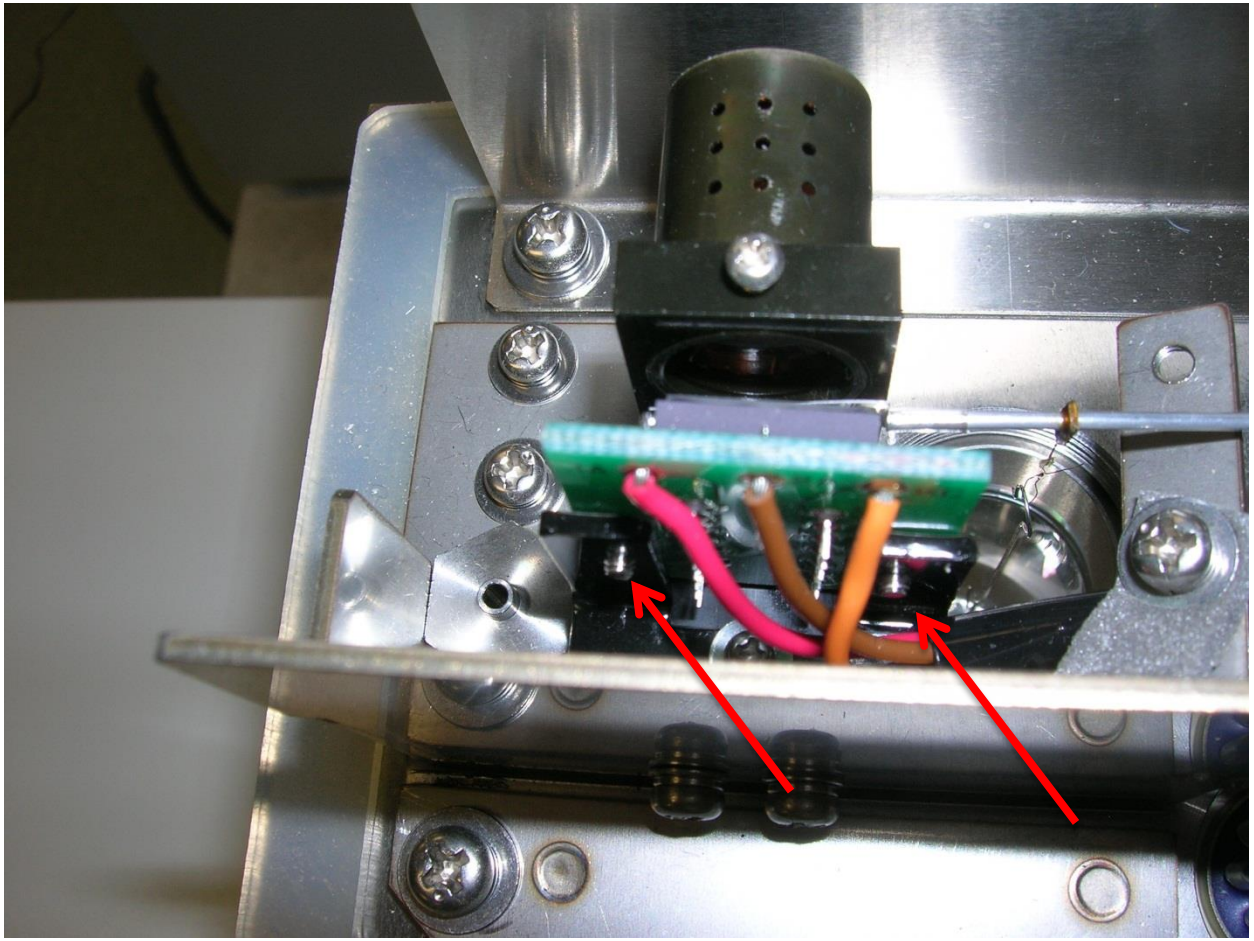
How It Works

This will move the position of the beam and therefore the shutter in the light source.



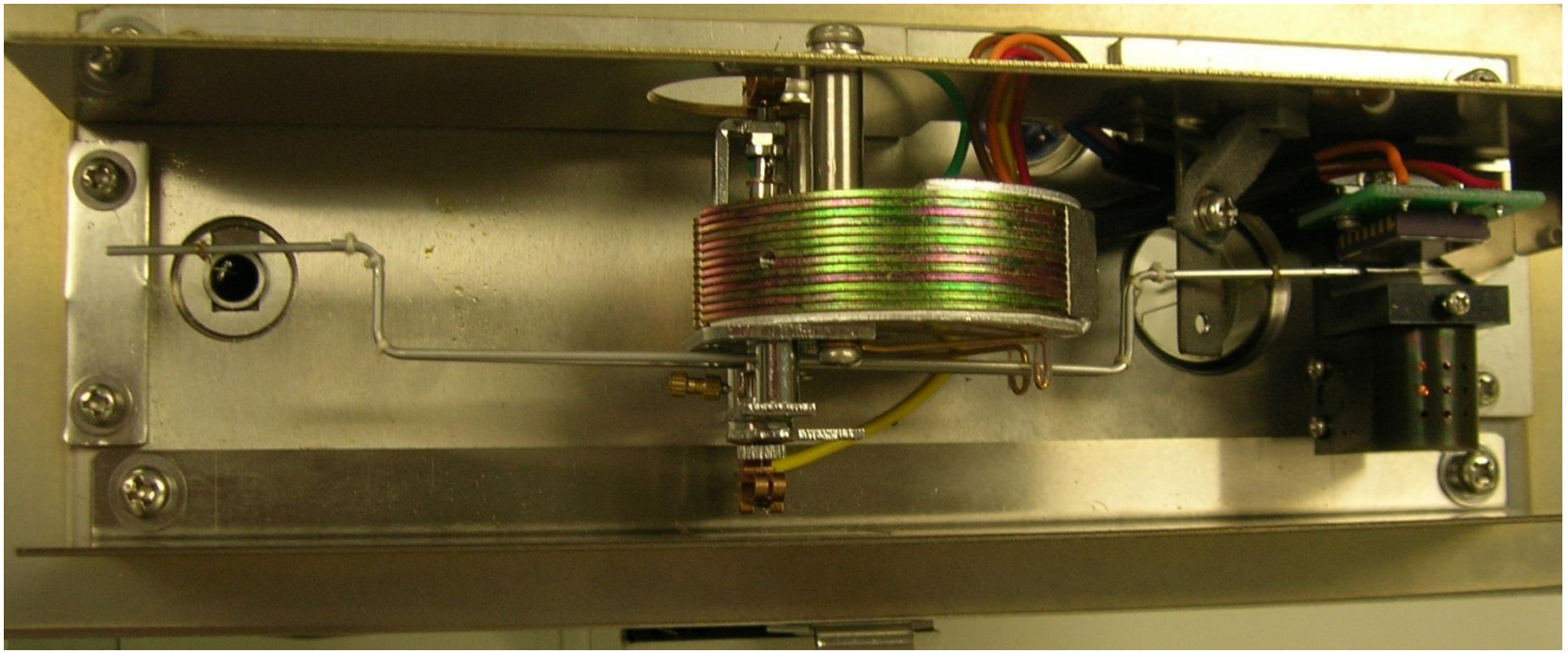
How It Works

This makes the photoelectric cell outputs not equal.



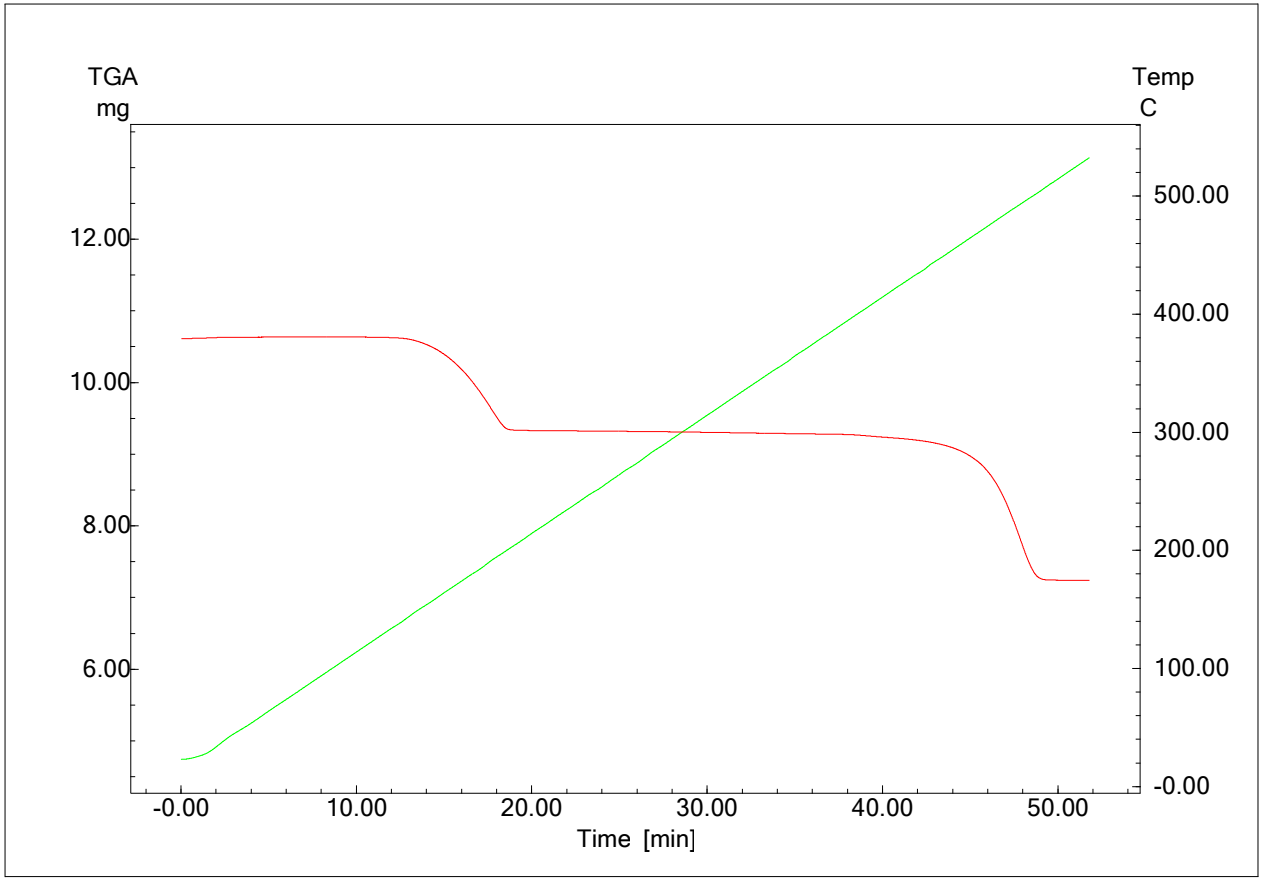
How It Works

A differential amplifier outputs a current to the feedback coil to provide a counter torque and re-balance the beam.

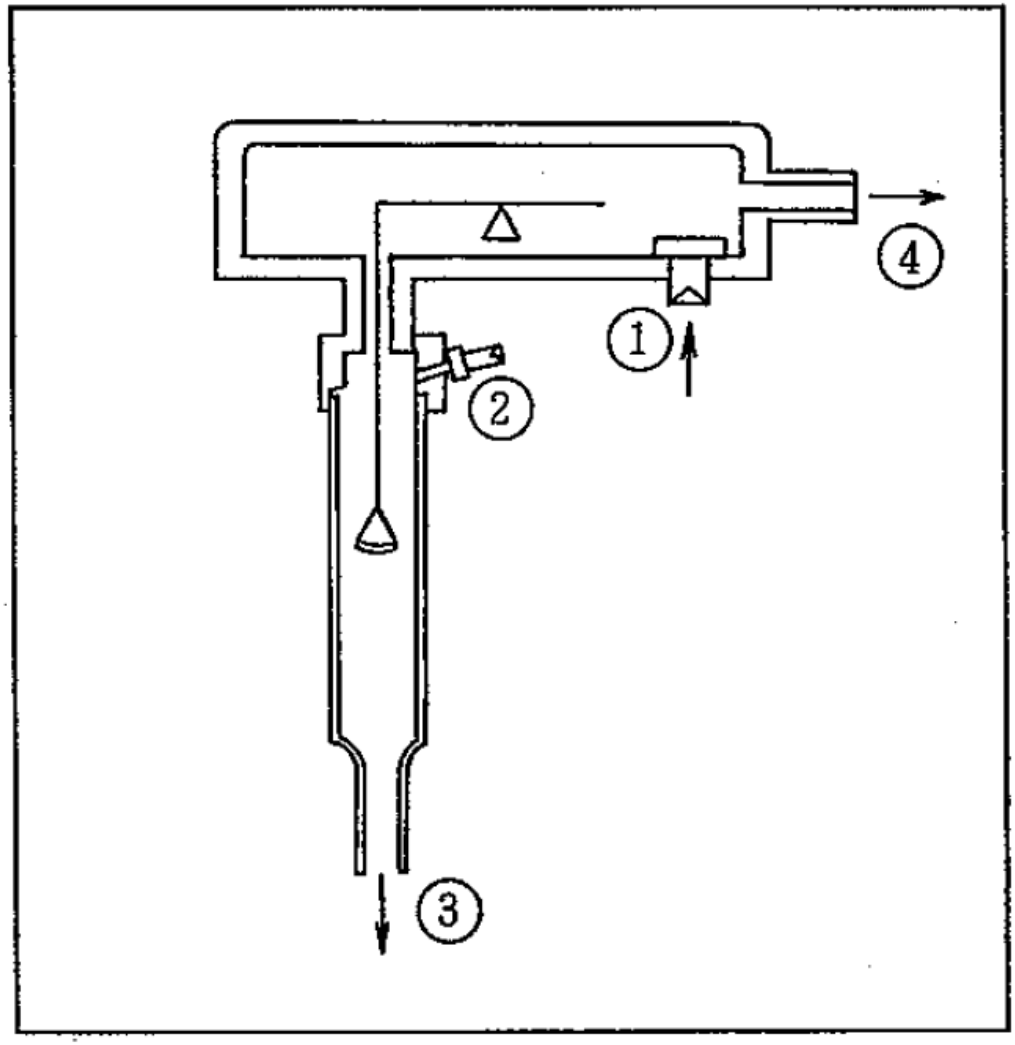


How It Works

These feedbacks are converted, sent to the CPU and displayed as thermograms.



How It Works

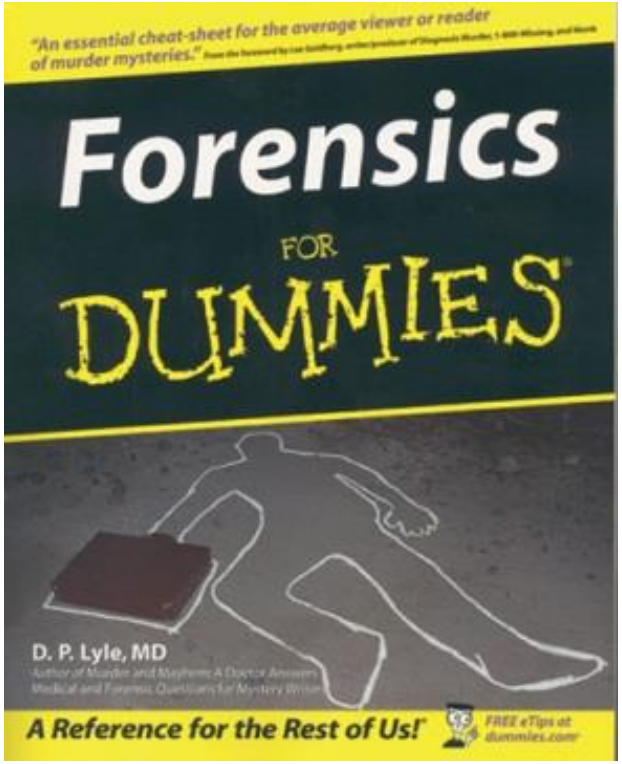


1. Purge Gas
2. Corrosive/Reactive Gas
3. Gas Discharge Port
4. Vacuum Port

Applications

Forensics

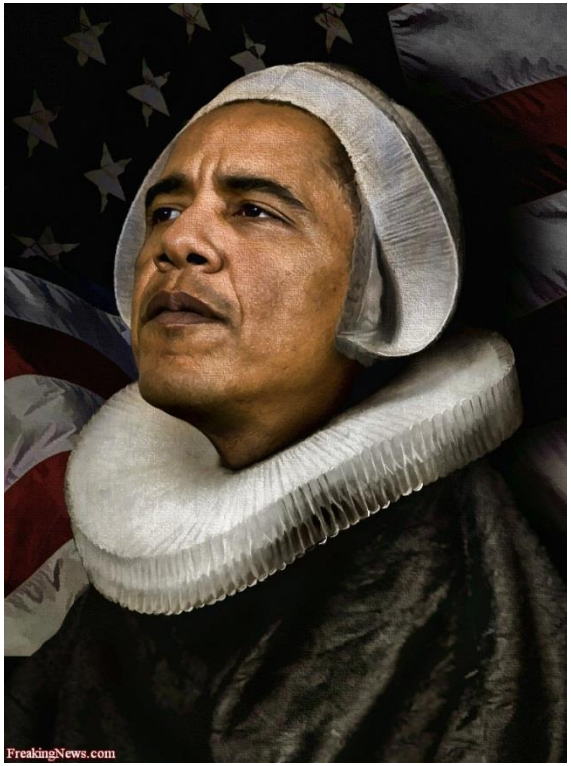
Identify varnishes and other surface coatings



Applications

Art

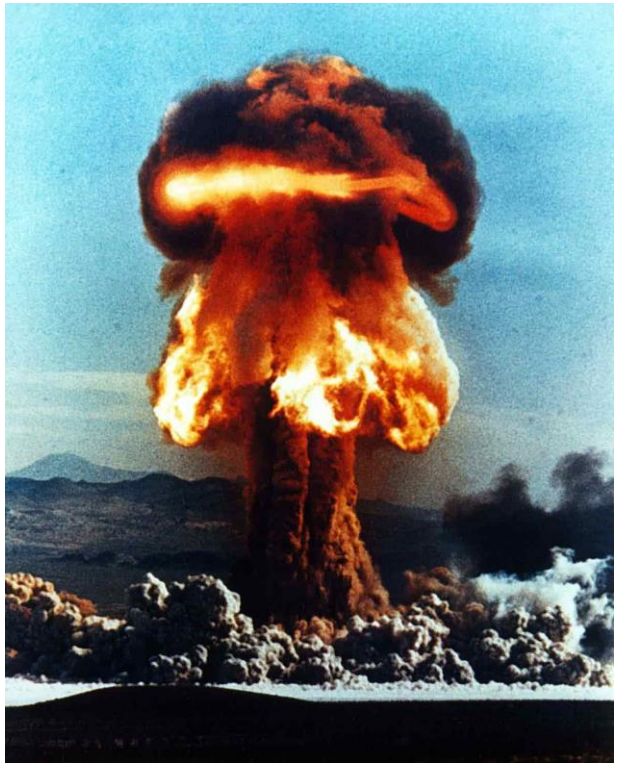
Identify age of paints and treasures



Applications

Military

Test the stability of explosives



Applications

Food

Dehydration process of crops, such as tobacco

Applications

Food

Cooking and oxidative properties of oils

Applications

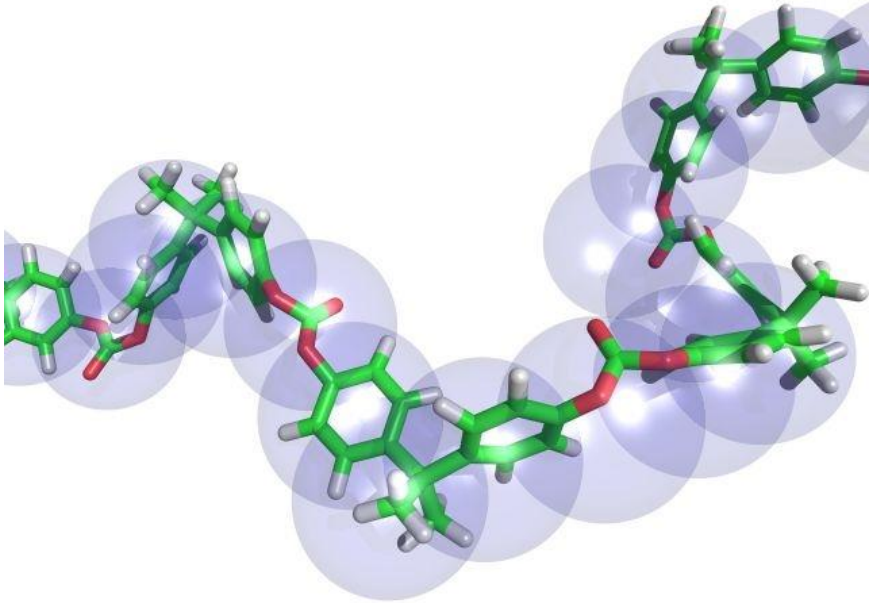
Pharmaceutical

Drug stability, rate of degradation, exposure to air

Applications

Industry

Polymers, carbon black, oil products, oxidation



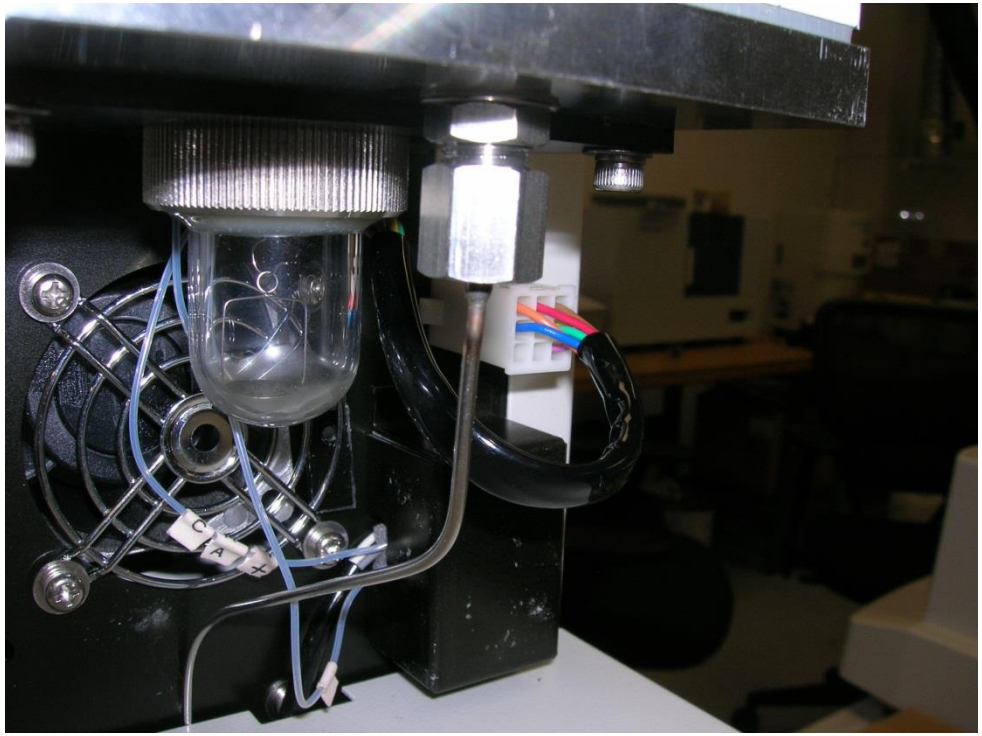
Our Products

TGA-50, TGA-50H, TGA-51, TGA-51H

Our Products

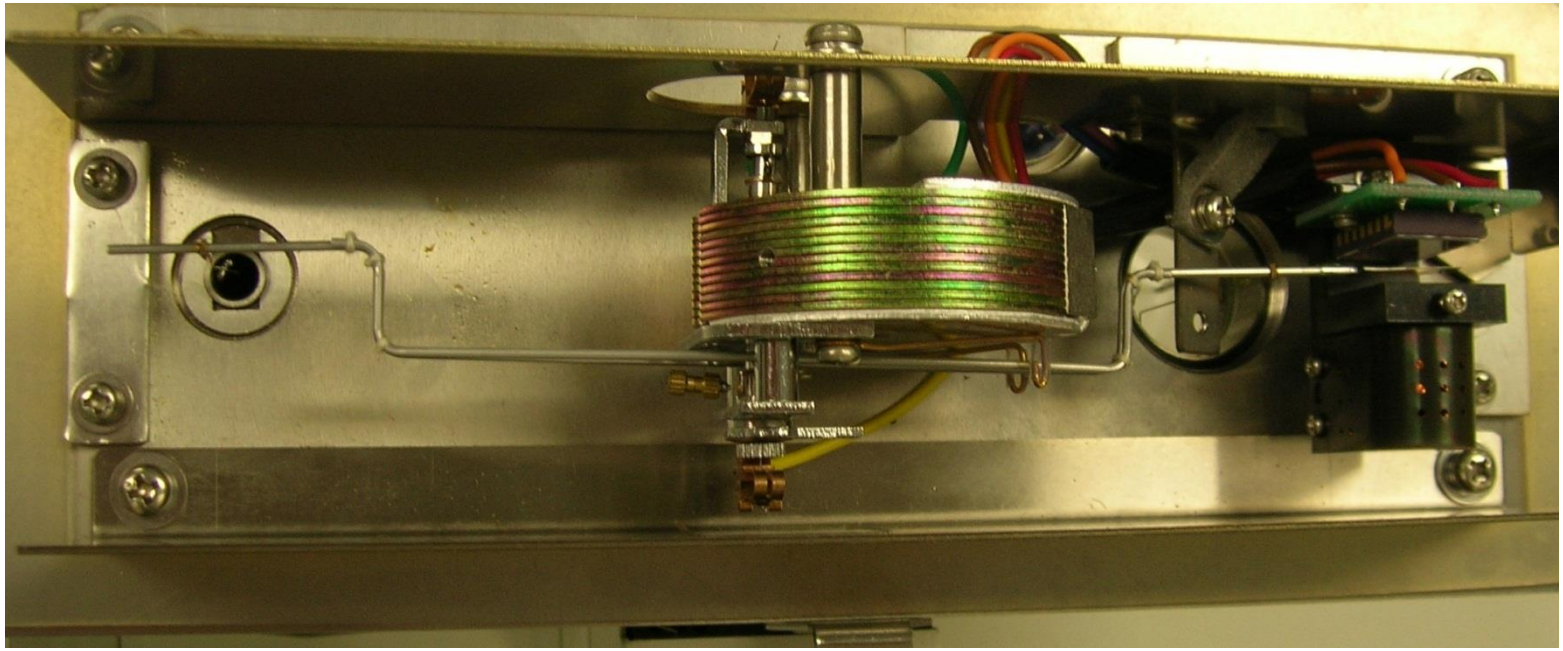
TGA-50 Front

TGA-50 Back



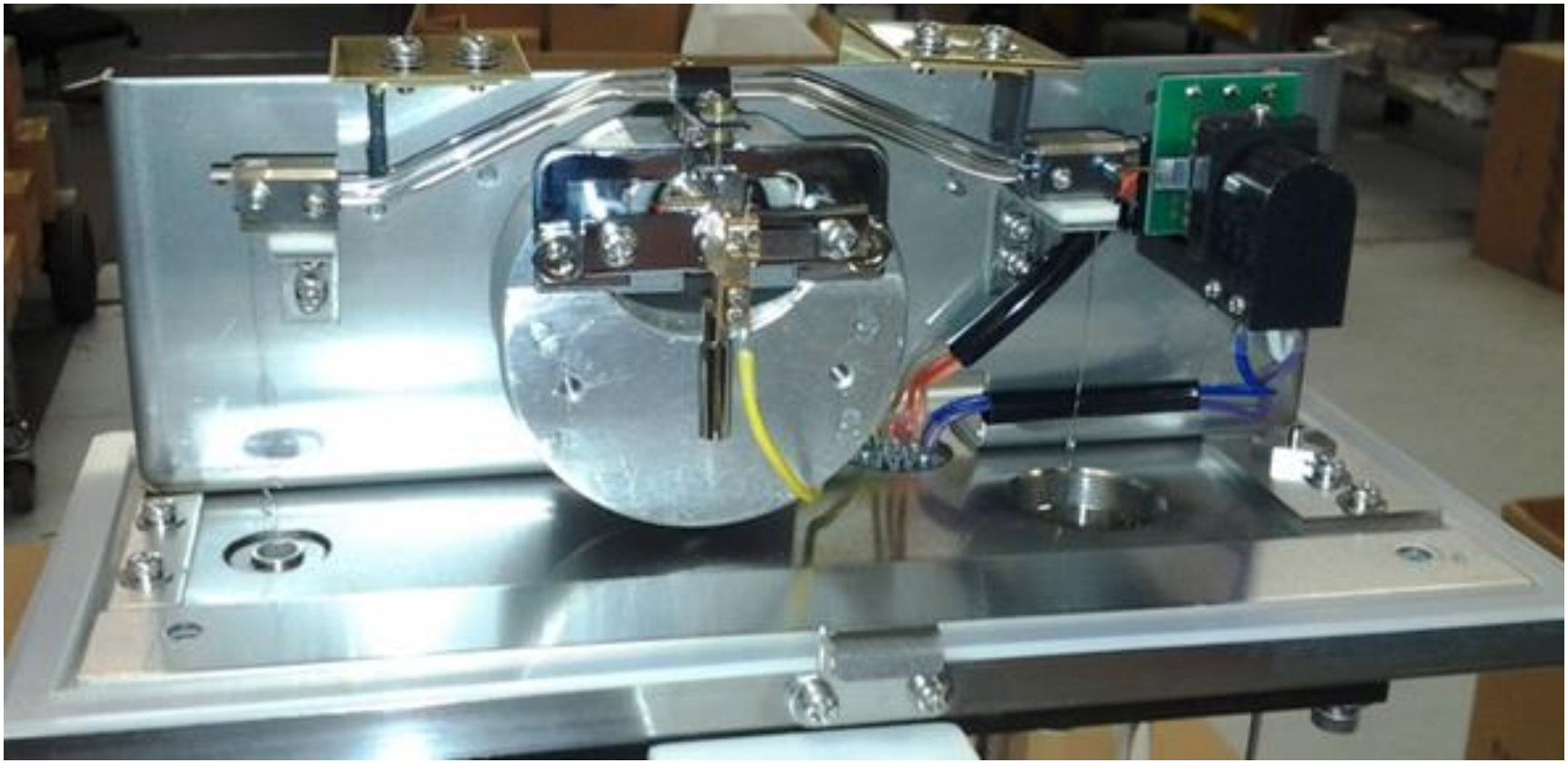
Our Products

TGA-50 Balance Mechanism



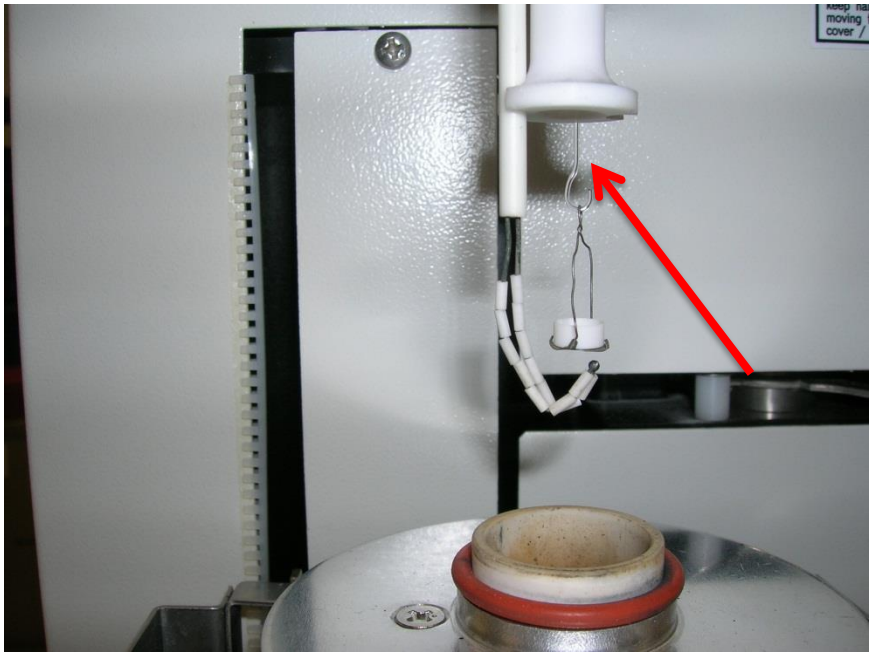
Our Products

TGA-51 Balance Mechanism



Our Products

Differences between the TGA-50 and TGA-50H



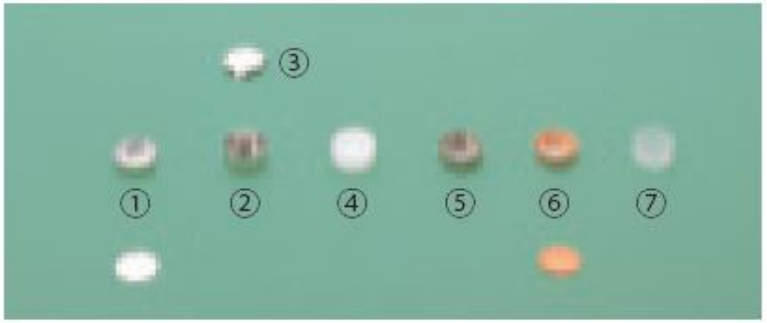
TGA-50 (Quartz Suspension Rod)
TGA-50H (Platinum Suspension Rod)

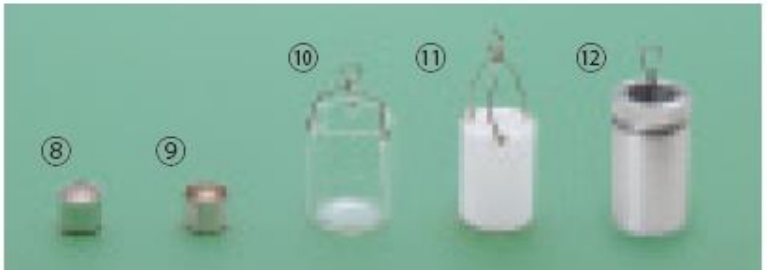
TGA-50H has a High Temperature Furnace

Specifications

	TGA-50	TGA-50H	TGA-51	TGA-51H
Temperature Range	Ambient to 1000°C	Ambient to 1500°C	Ambient to 1000°C	Ambient to 1500°C
Weight Measuring Range	±20mg, ±200mg		±20mg, ±200mg, ±2000mg	
Readability	0.001mg			
Sample Mass	1g including tare		10g including tare	
Programmable Heating Rate	0.1°C/hour to 99.9°C/min	0.1°C/hour to 50.0°C/min	0.1°C/hour to 99.9°C/min	0.1°C/hour to 50.0°C/min
Hold Time	0 to 999min, 0 to 999 hour			
Temperature program format	99 steps maximum			
Temperature program file	up to 100 files			
Cooling Method	Air-cooled			
Signal Output	Analog and digital			
Atmosphere Control	Air, inert gas, reactive gas or vacuum. Built-in gas flowmeter (250ml/min maximum)			
Dimensions	W173xD550xH500mm		W173xD600xH540mm	
Power Supply	AC100V, 120V, 220V, 240V, 500VA, 50/60Hz	AC100V, 120V, 220V, 240V, 1.2kVA, 50/60Hz	AC100V, 120V, 220V, 240V, 1kVA, 50/60Hz	AC100V, 120V, 220V, 240V, 1.5kVA, 50/60Hz

Accessories





P/N	Description
① 201-52943	Crimp Cell, A1 dia. 6 × 1.5 (50 pcs.)
② 201-51976	Platinum Cell, dia. 6 × 2.5
③ 201-56927	Platinum Cell Cap, dia. 6
④ 201-54321	Alumina Cell, dia. 6 × 2.5
⑤ 201-53102-84	Nickel Cell, dia. 6 × 2 (50 pcs.)
⑥ 201-58294-90	Copper Cell, dia. 6 × 1.5 (50 pcs.)
⑦ 201-54439	Quartz Cell, dia. 6 × 2.5

P/N	Description
⑧ 201-57268-90	Macro Cell, A1 dia. 6 × 5 (50 pcs.)
⑨ 201-53843	Platinum Macro Cell, dia. 6 × 5
⑩ 201-56782-90	Quartz Macro Cell (crucible), dia.11 × 13.5
⑪ 201-56825-90	Alumina Macro Cell (crucible), dia.10 × 14
⑫ 201-59795-91	Film Water Vapor Transmission Rate Measurement Cell (for the TGA-51)
Other cell	
201-56569-01	Platinum Mesh Cell, dia. 11 × 12

Accessories

BLW-50

FC-60A

TA-60WS