

溫度、角度、力量、振動感測器



(應用例)

范光照

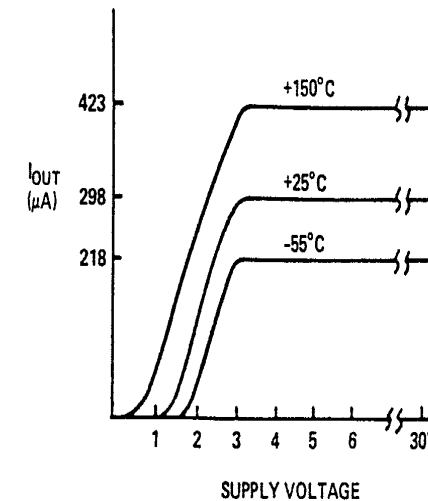
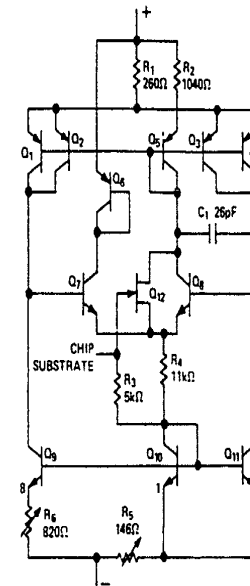
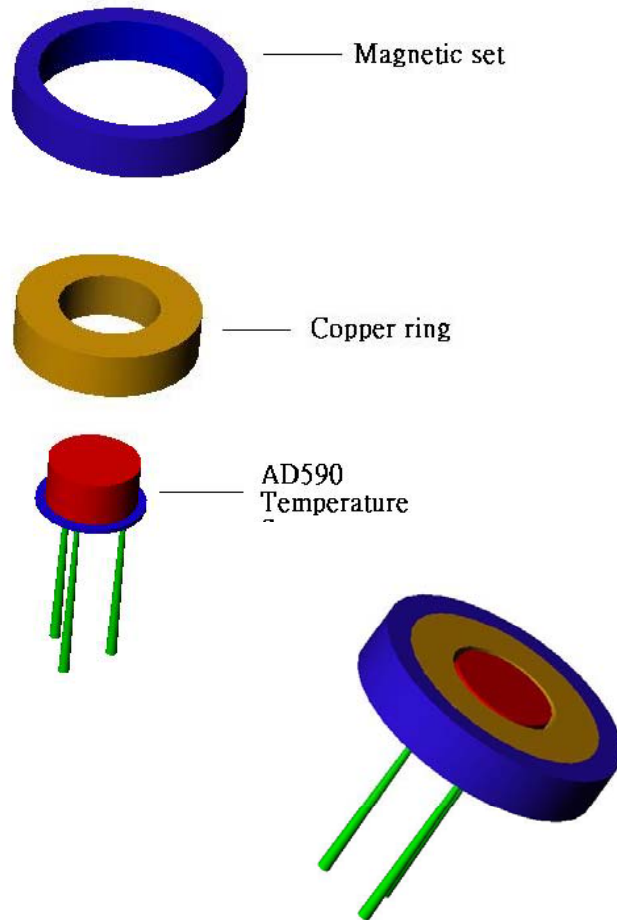
台灣大學

2012.03

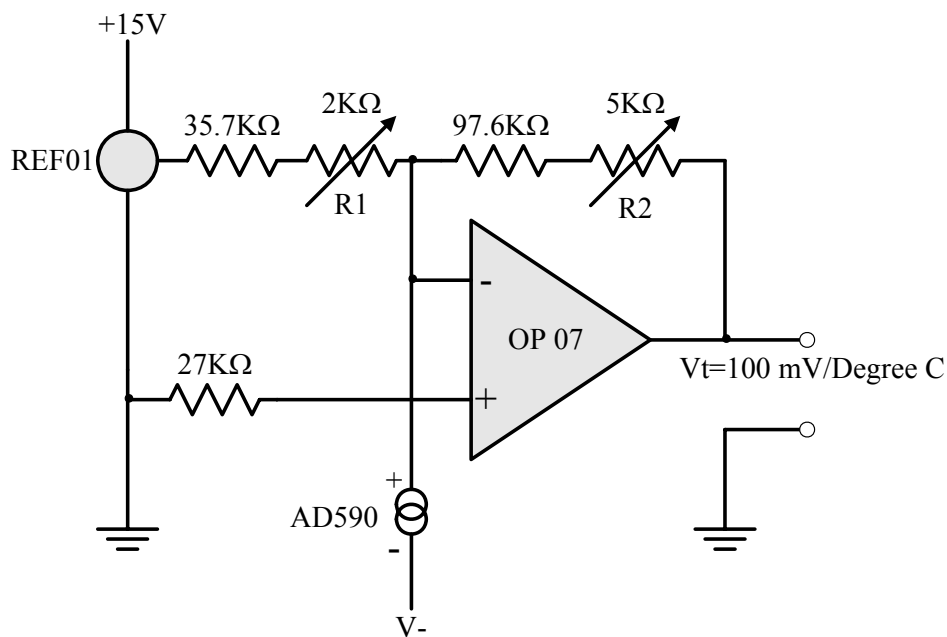


一、溫度感測器應用例

工作原理



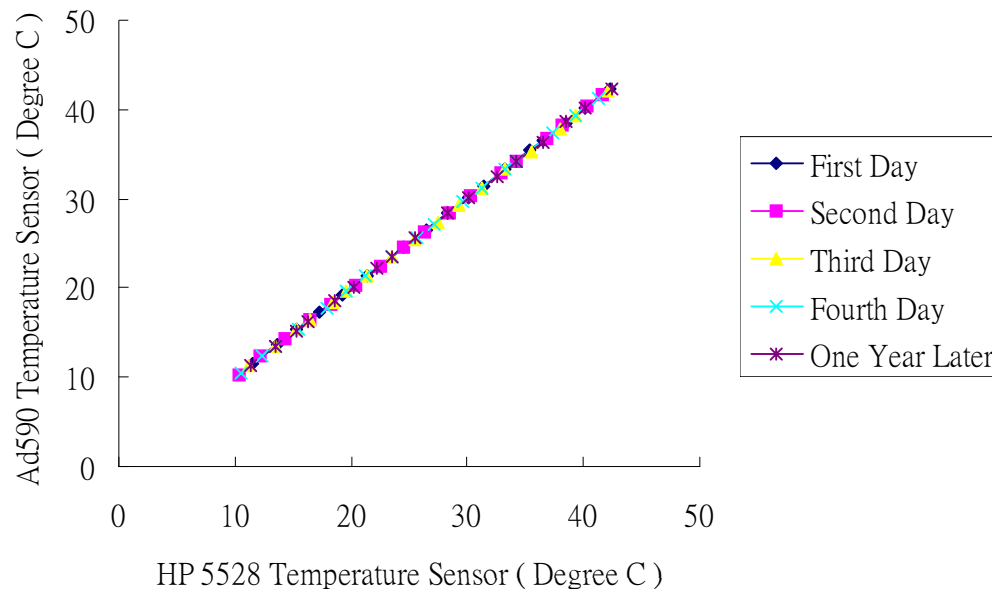
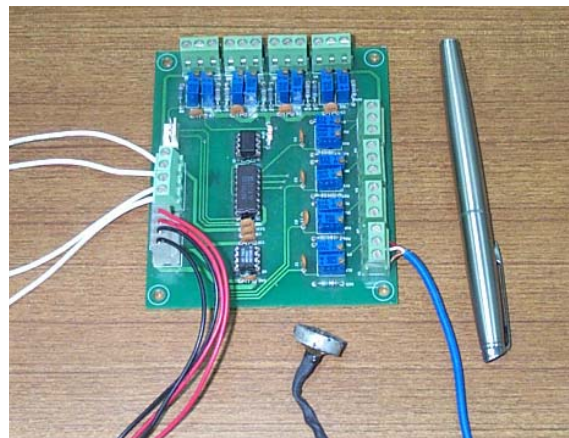
電晶體Q8、Q11產生正比於絕對溫度電壓，電阻R5、R6轉換電壓為電流，電晶體Q10使總電流正比於絕對溫度。AD590供應電壓與電流輸出特性，顯示供應電壓至少+4V以上。



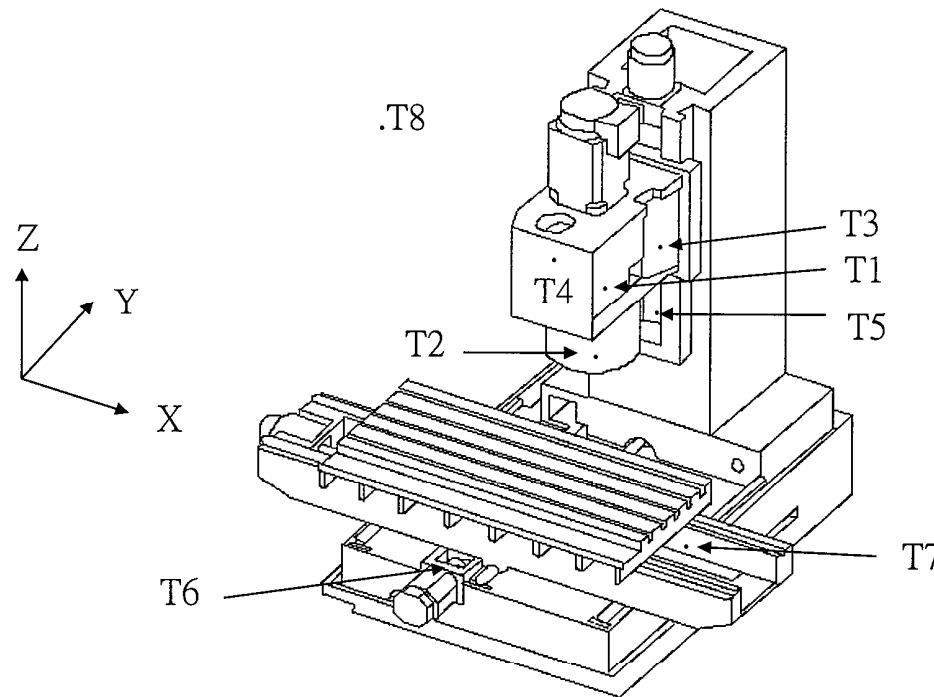
AD590在正常工作下，1K的溫度可轉換電流 $1\mu\text{A}$ ，電流信號不因導線長度不同而產生衰減差異，用一顆工作放大器(OP07)即可輕易將電流信號轉換成電壓信號

多工器(multiplexer AD7501)
 切換8顆不同溫度感測器；

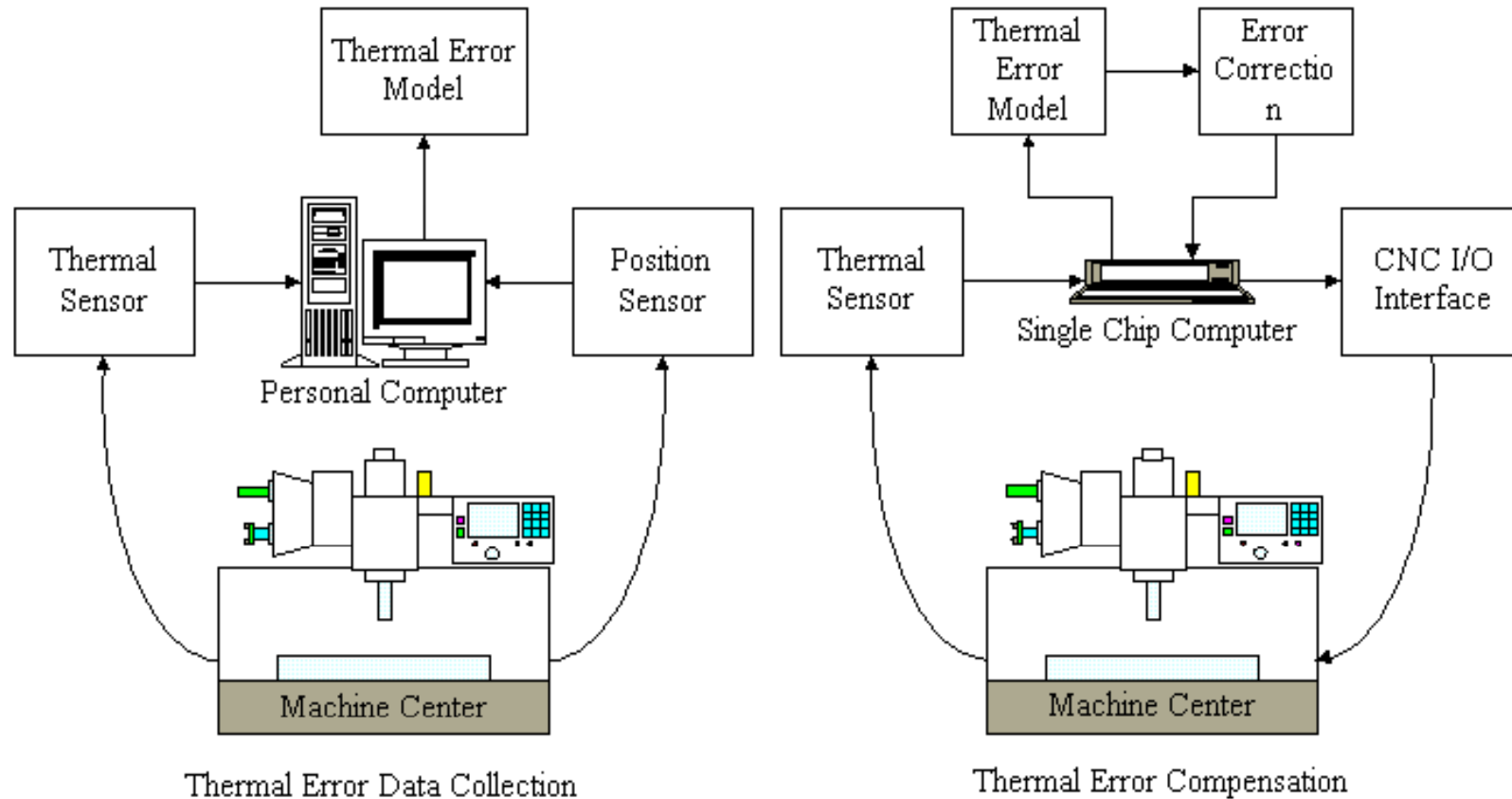
類比的電壓信號則透過A/D
 轉換成數位信號，進入微處
 理器(可選擇使用單晶片
 8051或AVR，透過 I/O 介面
 卡進入一般PC)作運算處理
 ，計算出實際溫度值。



Initial Locations for Temperature Sensors

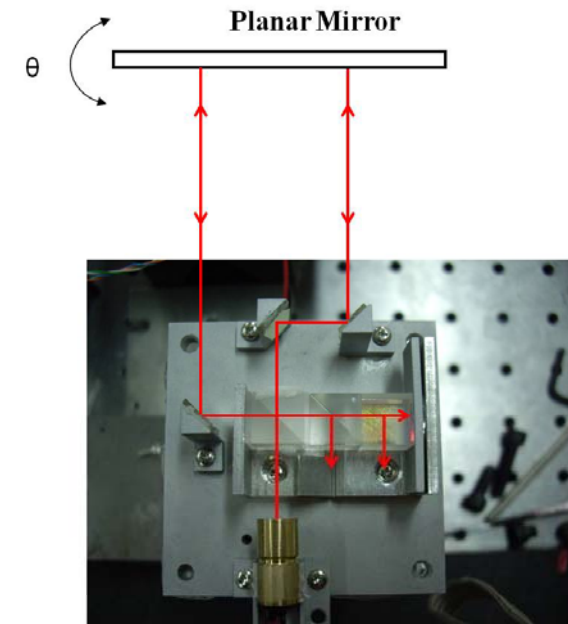
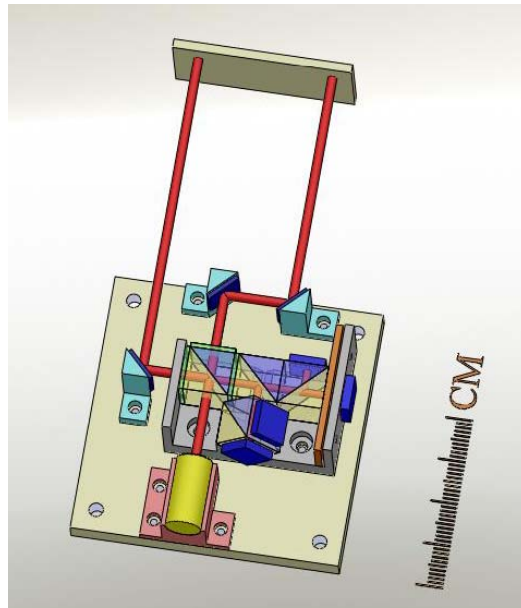
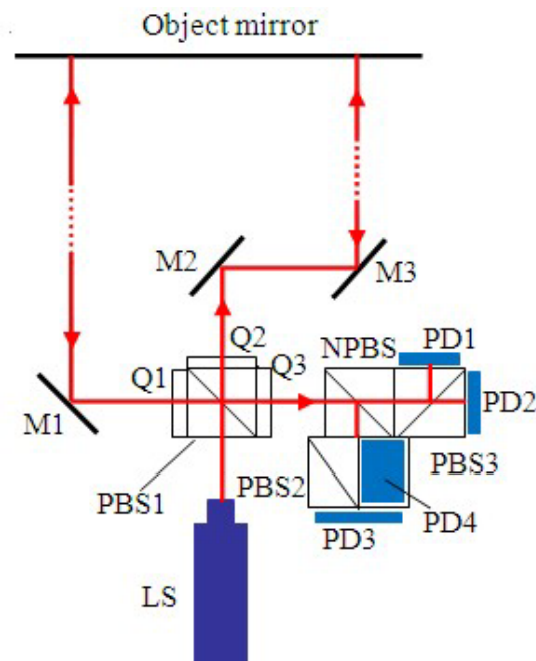


感測器號碼	吸附位置
T1	主軸頭部右側
T2	主軸套筒後方
T3	Z軸滑軌右側
T4	主軸馬達
T5	Z軸滾珠導螺桿螺帽
T6	Y軸滾珠導螺桿螺帽
T7	X軸滾珠導螺桿螺帽
T8	室溫



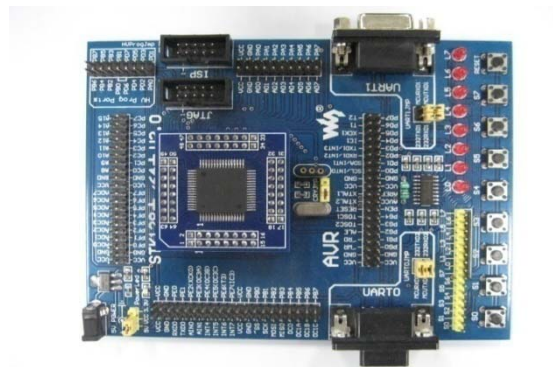
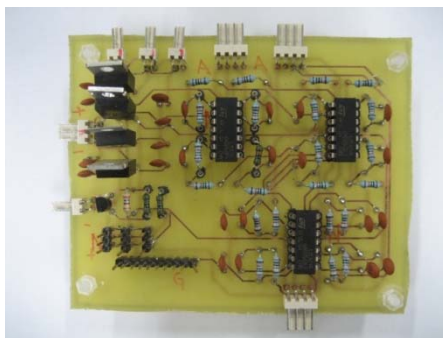
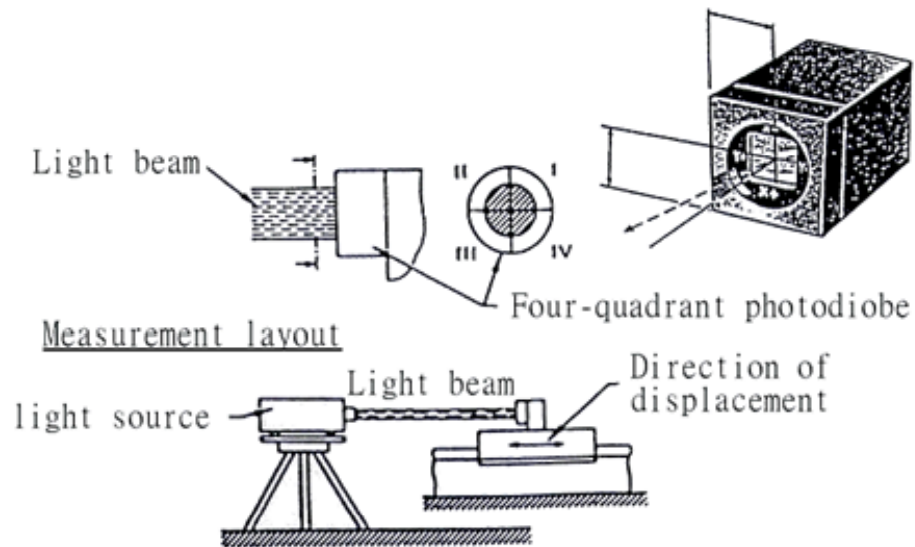
二、角度感測器應用例

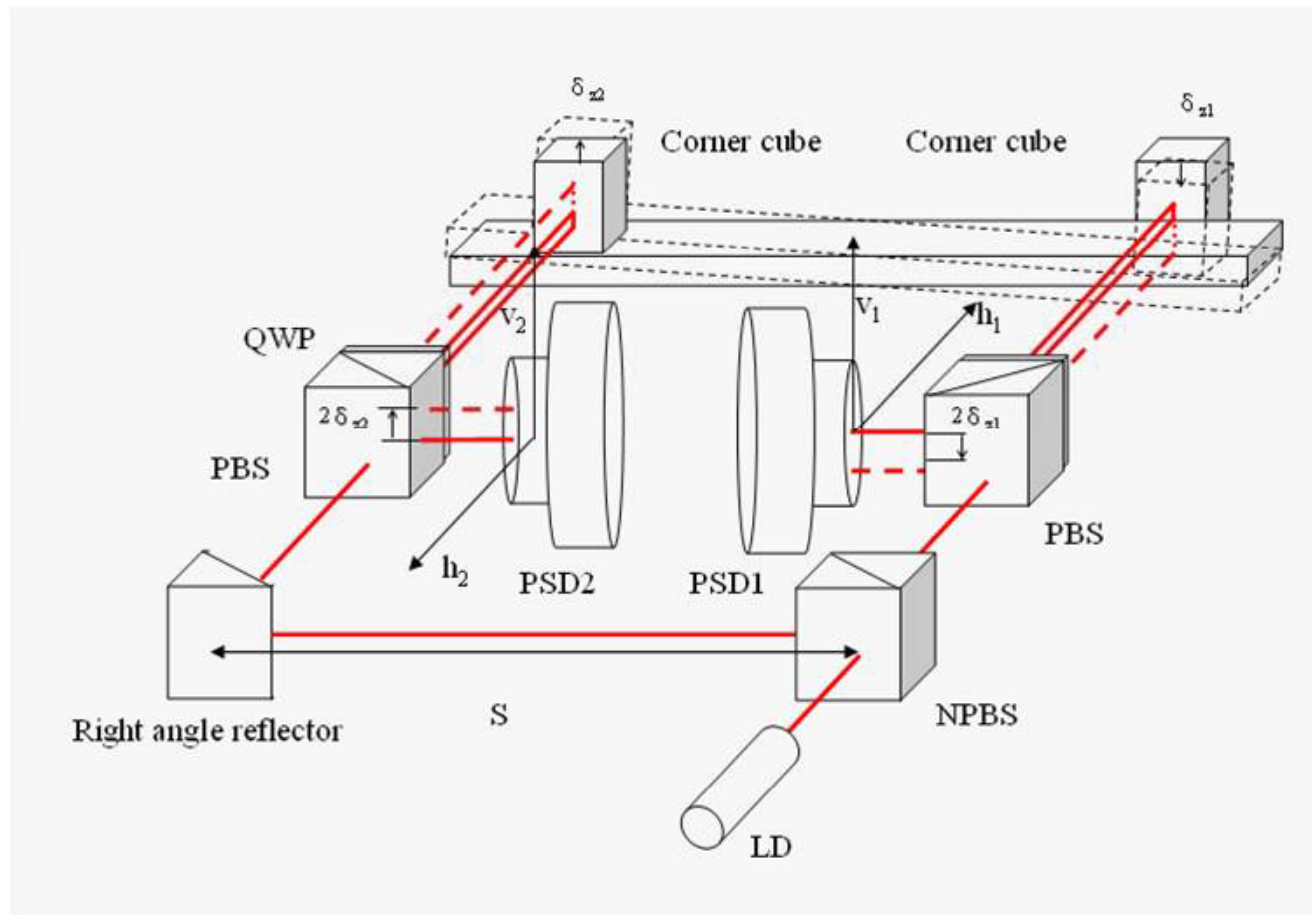
Example: a yaw interferometer



雷射準直儀原理：
準直雷射光 + 四象位光感測器

1. 四象位感測器(SPOD-9d)
2. 準直雷射(Thorlabs Laser)
3. 電流轉電壓&放大電路板
4. 單晶片處理器(AVR)
5. DAQ卡

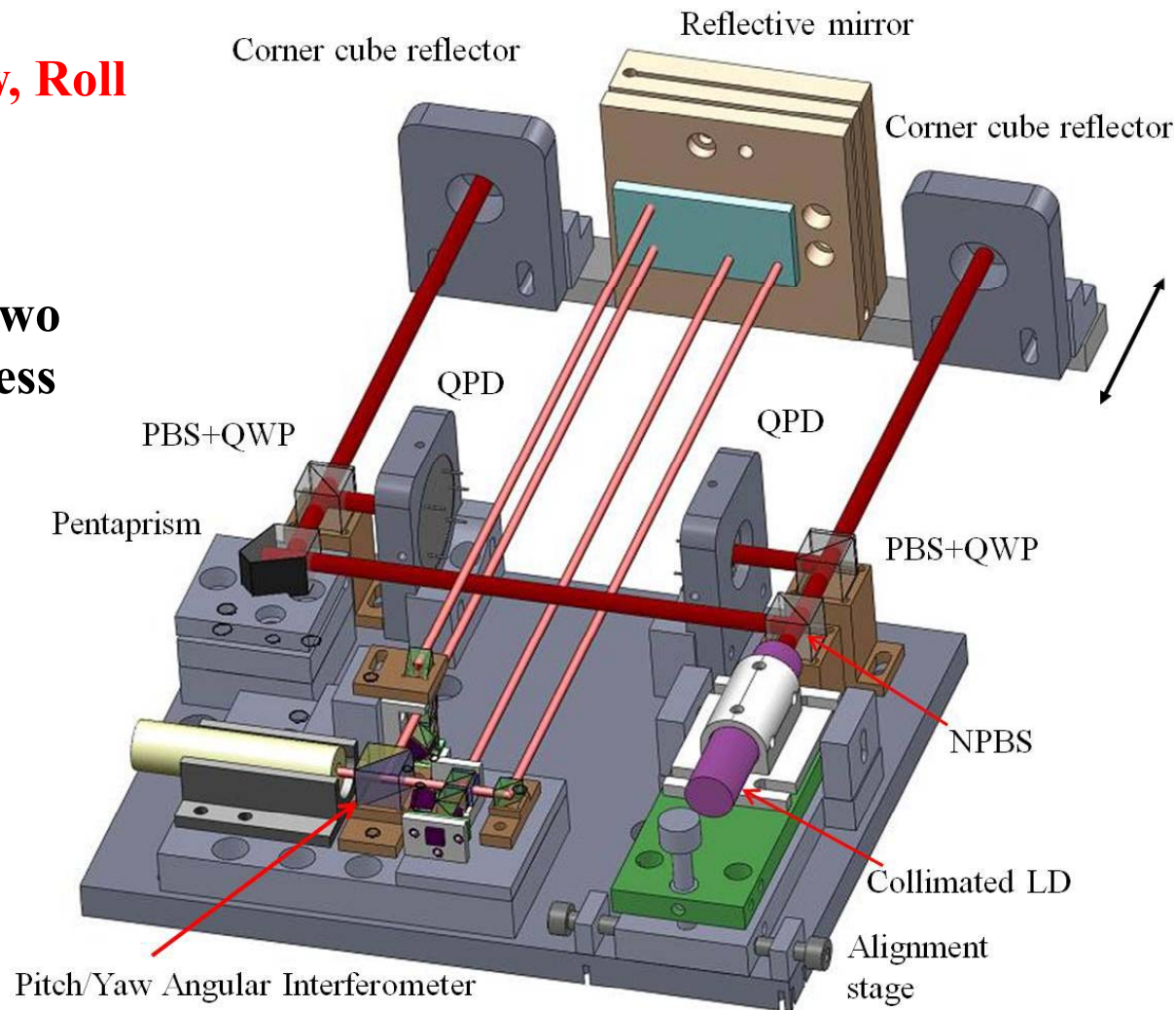




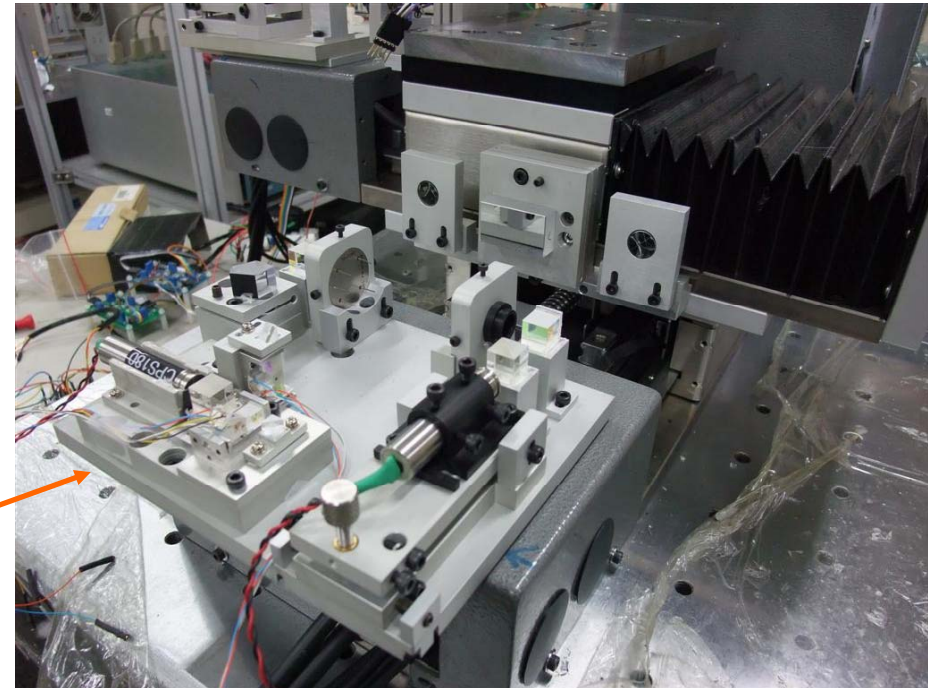
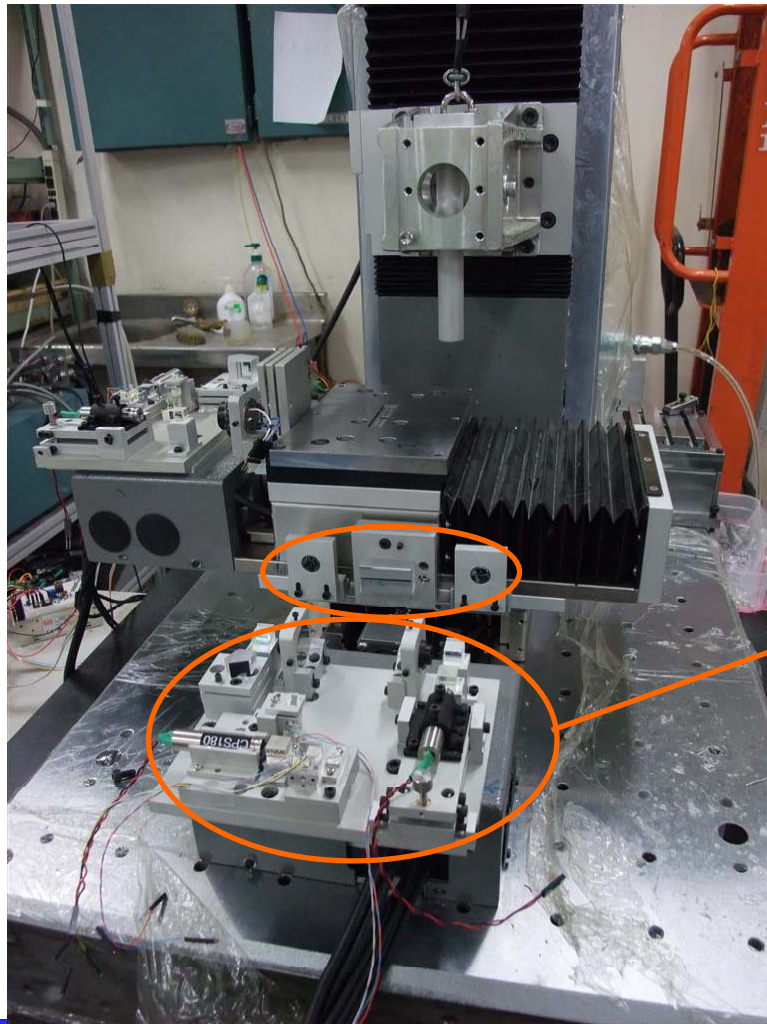
3-axis Angle Sensor System

Pitch, Yaw, Roll

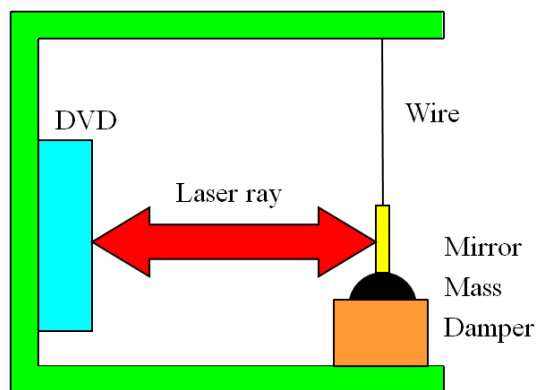
**Also for two
straightness
errors**



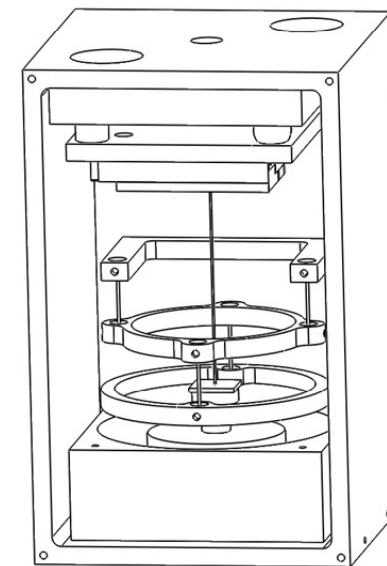
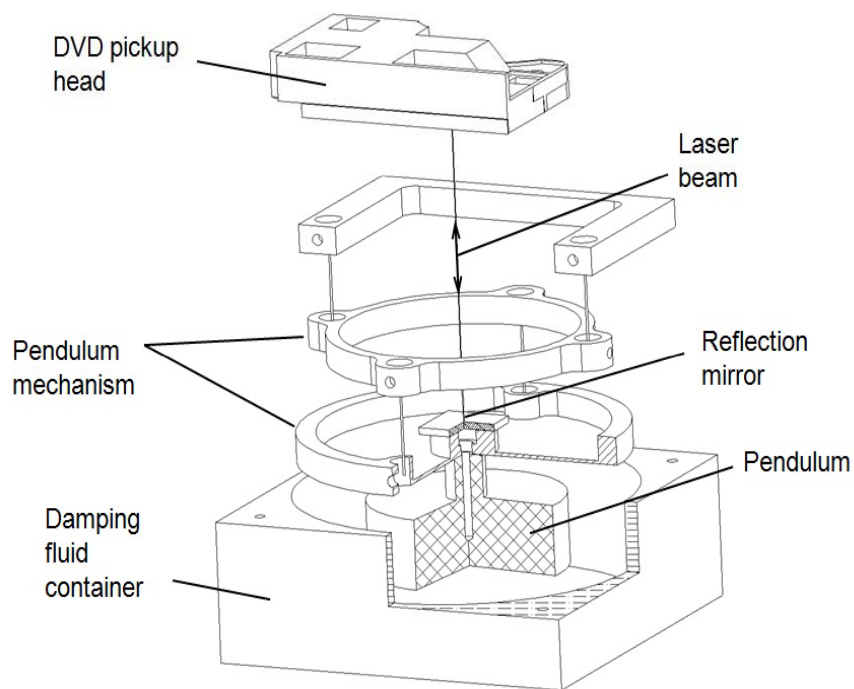
Photos of Installation in the Machine Tool



單擺原理

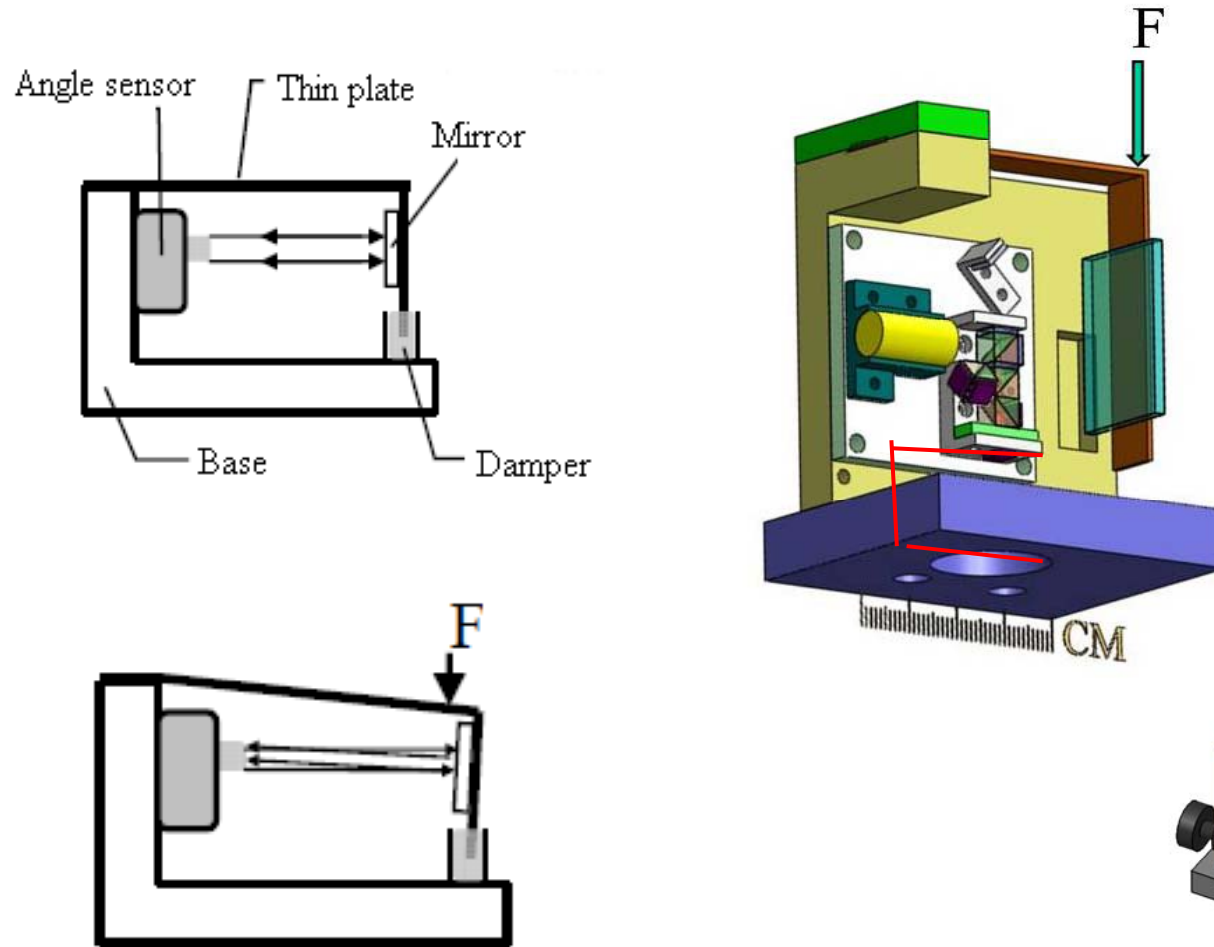


雙軸水平儀設計



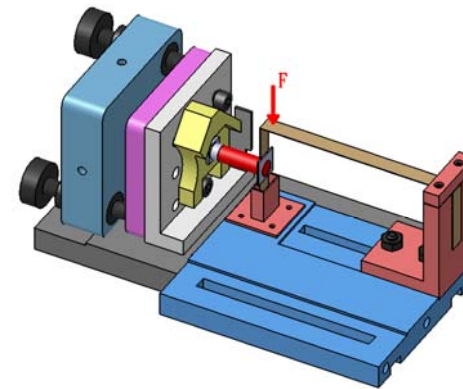


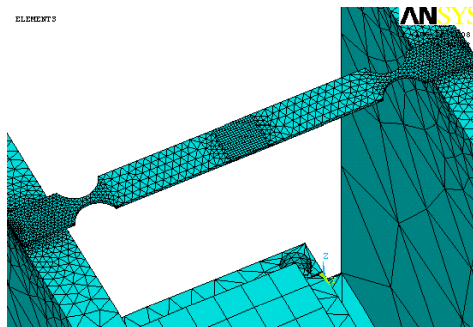
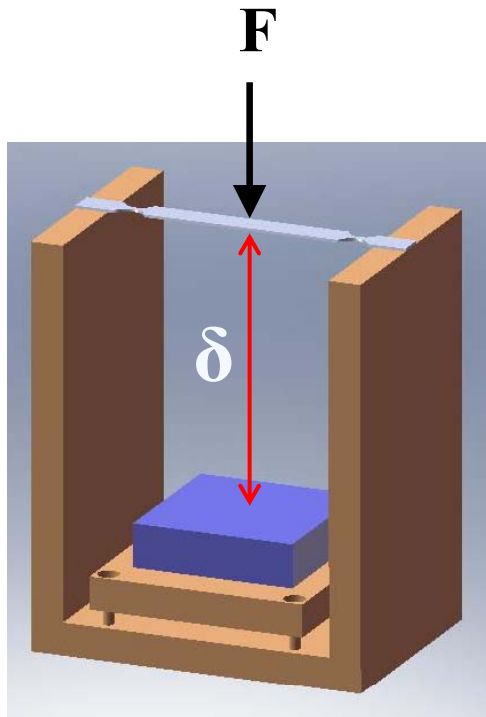
三、力量感測器應用例



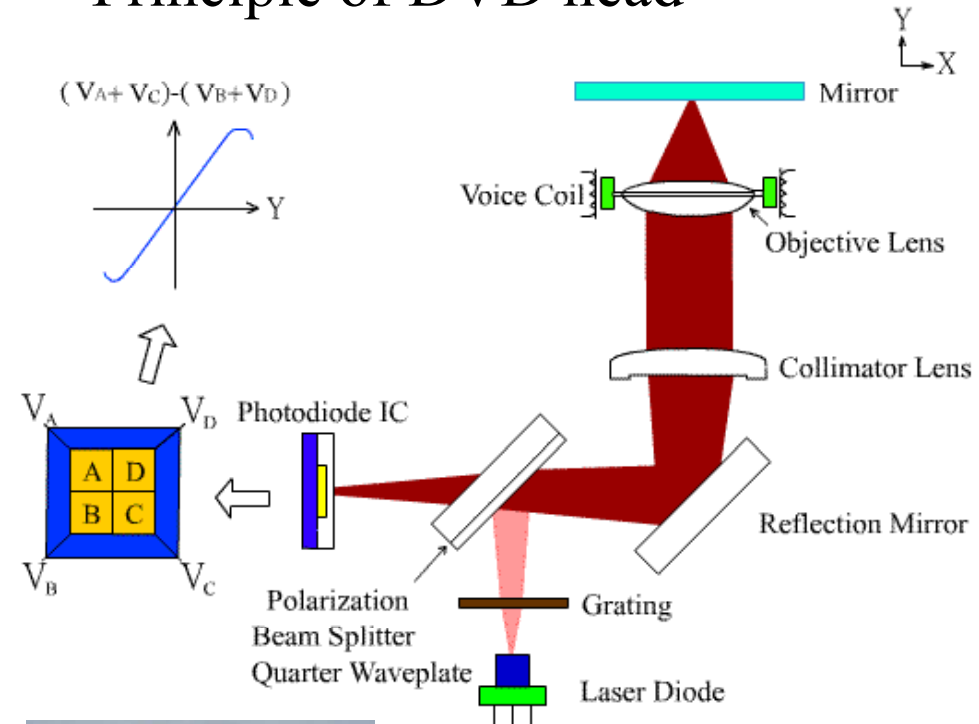
工作原理

1. 懸臂梁受力彎曲
2. 量測彎曲角度
3. 裝置角度感測器





Principle of DVD head

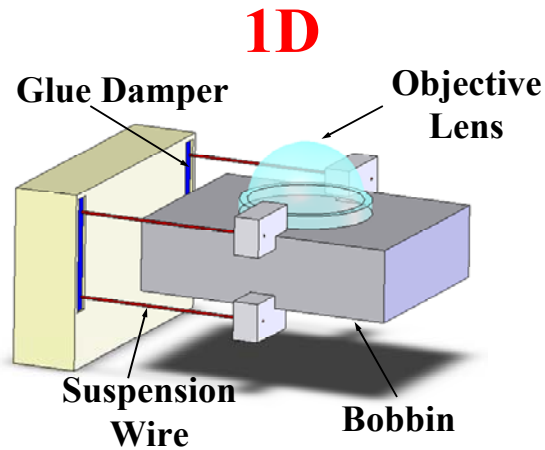


更換受力片可
改變測力大小

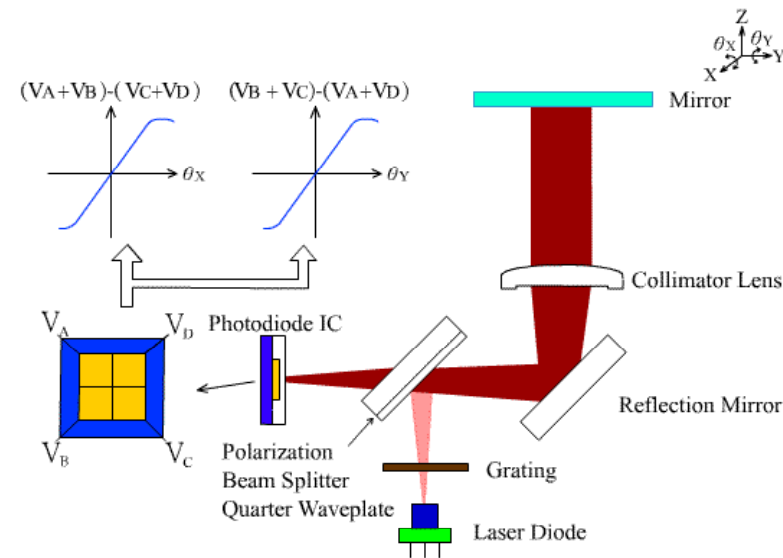
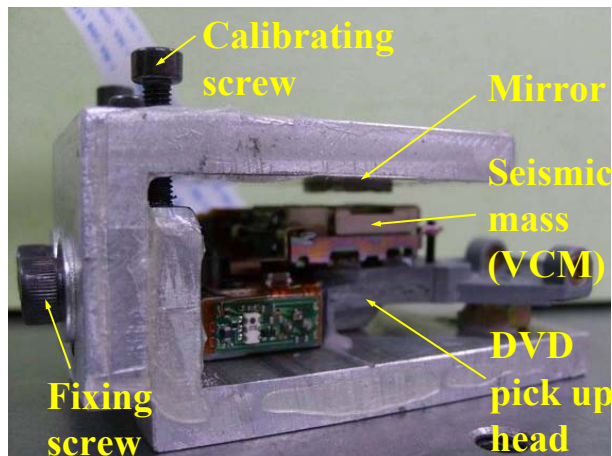
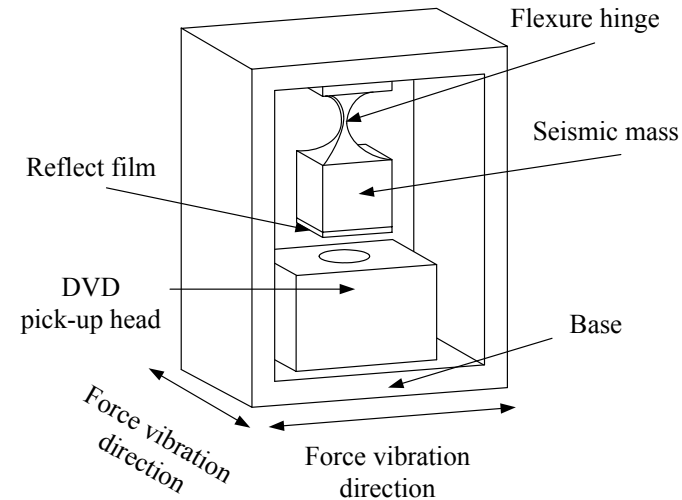


四、振動感測器應用例

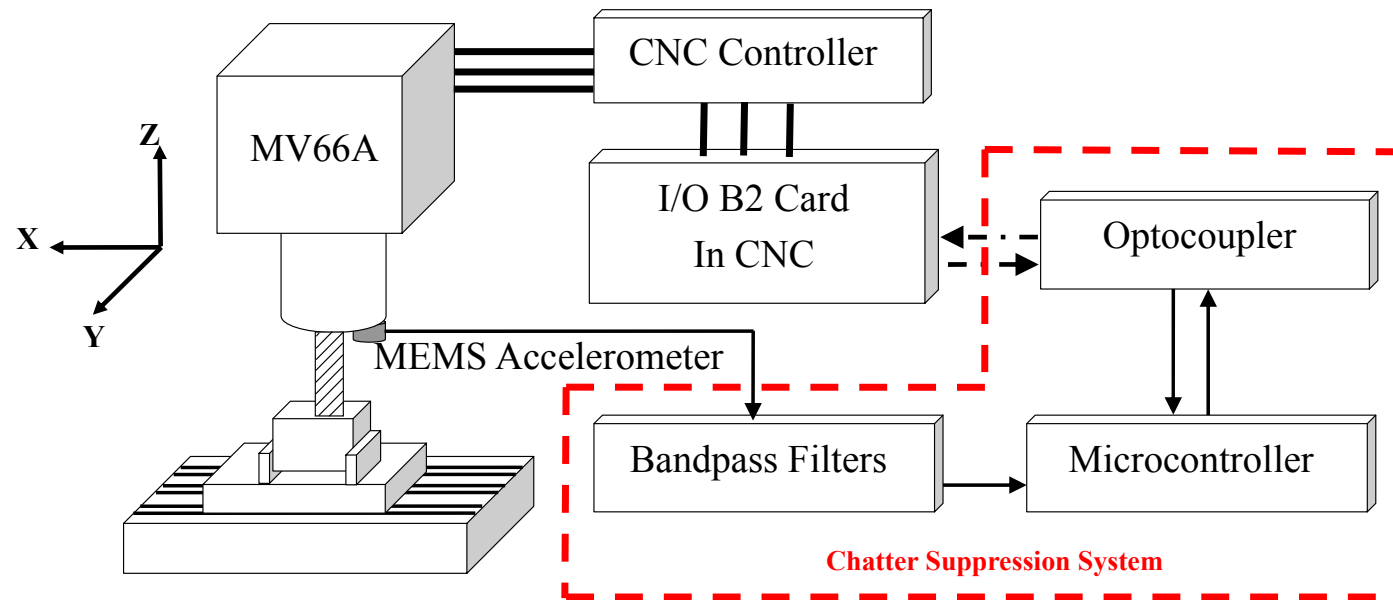
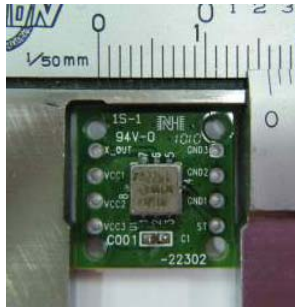
DVD Accelerometer



2D



MEMS accelerometer



Chatter marks



 Cutting Path

