捷美美實業有限公司

Jet Motor Industrial corp.

Leading Technology

Light Revolution Fan

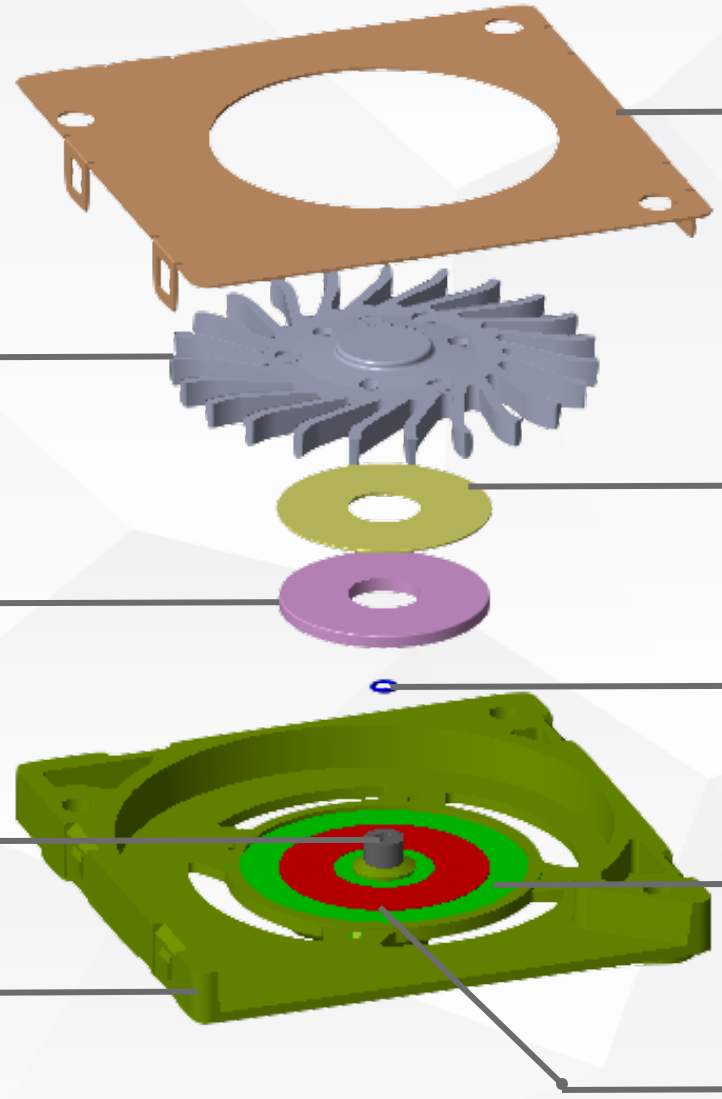
CONTENTS

A. introduction

A. Introduction

3003 mini fan- structure

Size: 30 * 30 * 3 mm



A. Introduction

The Price of MINI fan--- 1. COST 2. LIFE

dilemma

~~Medical ball bearing (high precision)~~ (too expensive)

Sleeve Bearing → The structure will be more complicated rev 1
And because of “MINI” , sacrifice the volume of oil rev 2
Both create fatal defect：LIFE

A. Introduction

The Price of MINI --- 1. COST 2. LIFE

Revolution

Rev 1 High precision injection replace complex structure

Rev 2 Wearable feature replace oil storage

Use Confidential Technology & Key Material to Achieve

Far more longer life & lower cost

A. Introduction

Wide application of MINI fan ---

Make Heat Dissipation Extremely Unleash at “ THE ERA OF PURSUEING LIGHT ”

drone

ultrabook

Mini projector

N95 mask

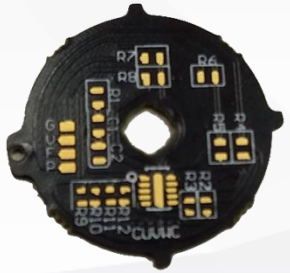
CCTV

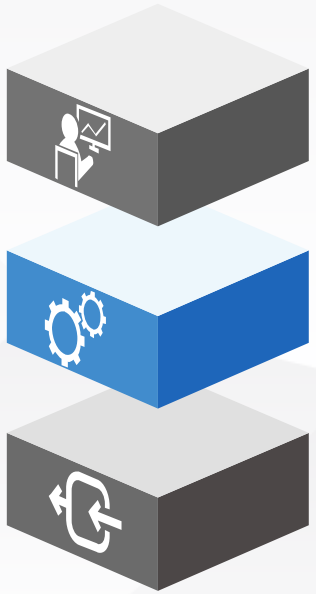
A. Introduction

Product chief outline – 3 main technology

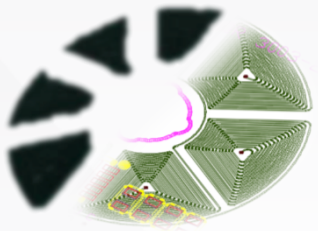
.

PCB Motor





6-slot 8-pole match



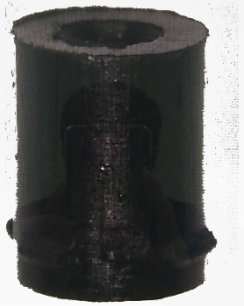
Teflon Nano Bearing

B. Key technology & advance

B. Key technology & advance

01. High Precision Teflon Nano Bearing

Using particular composite material



integrated bearing

- ✦ Self-lubricating, wearable, shockproof, dustproof
- ✦ Micro-precision-level injection technology
- ✦ Lower noise advance
- ✦ The only one waterproof bearing
- ✦ Simple structure, easy-to-make des

B. Key technology & advantage

Bearing comparison -

birth of teflon nano bearing

Ball bearing

FDB

Teflon Nano Bearing

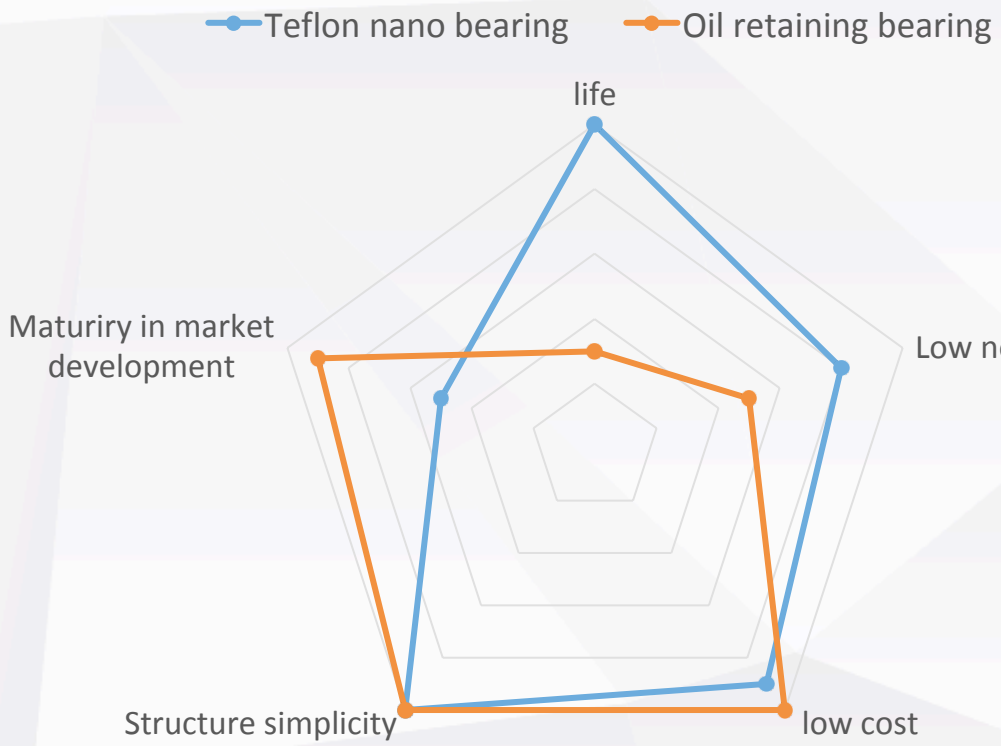
	High speed	Low noise	Low vibration	Shockproof	Long life	Waterproof	Dust-proof	Price
FDB	○	○	○	○	△	×	×	×
Ball Bearing	○	△	△	×	○	△	×	×
Telflon Nano Bearing	○	○	○	○	○	○	○	△

Remark: ○---Excellent △---Good ×---Bad

B. Key technology & advantage

TNB v.s Sleeve bearing

Better in noise, far better in life



Low cost is the largest advantage of sleeve bearing,

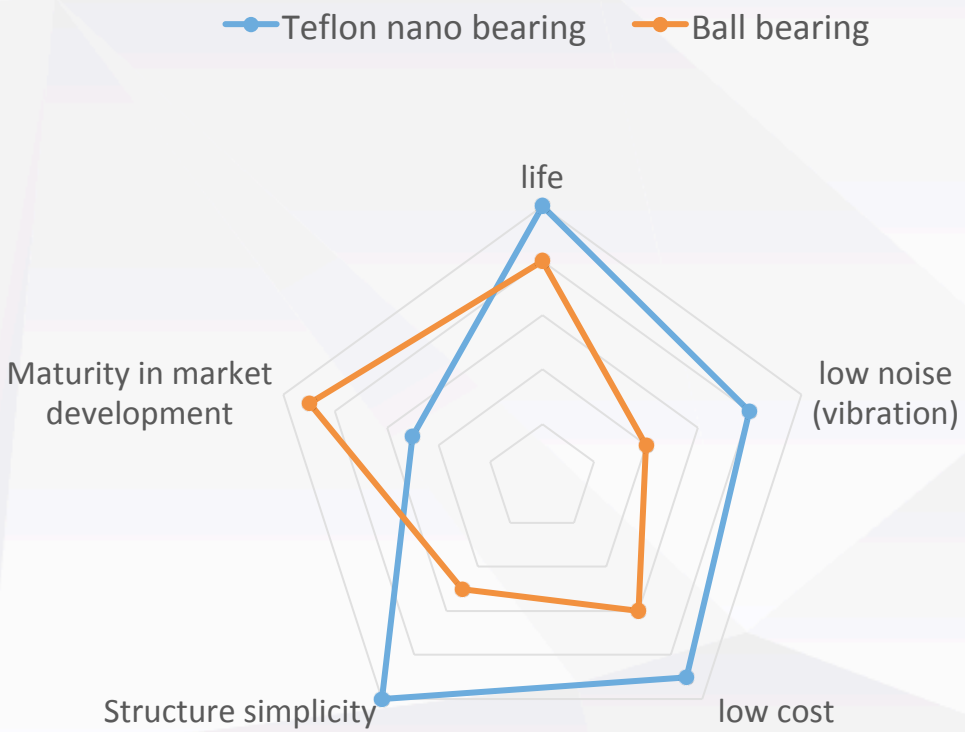
when used in larger sized fan it can narrowly maintain 30,000 h service life at 25℃.

sleeve bearing is not suitable for environment where a thin bearing is required to operate at high temperature and speed.
And oil leakage is always fatal weakness of oil retaining bearing.
Oil leakage during operation will quicken break down of fan, and general fan manufacturers mostly have no effective countermeasure, so they can only let the customer choose from price and quality, so sleeve bearing is the bearing with most restriction in fan bearing.

B. Key technology & advantage

TNB v.s. Ball Bearing

Better in both life and noise

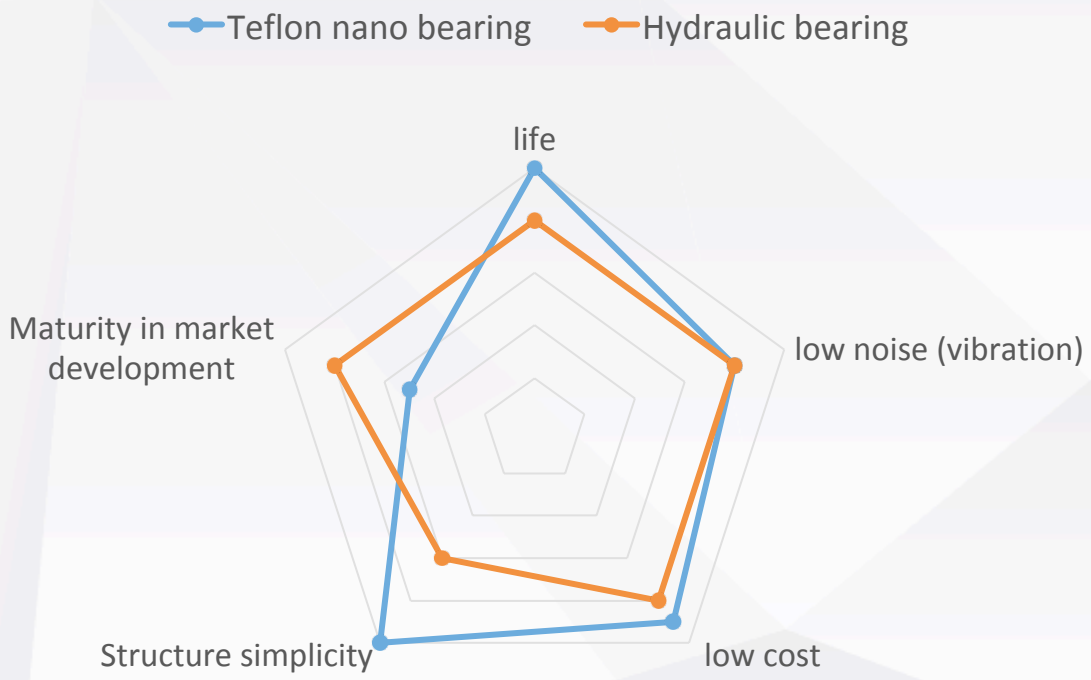


The sound of friction between TNB bearing and shaft makes it have the advantage of low noise compared to other material.
And ductile material matching hardened shaft of the fan has advantage of long life compared to other material.

B. Key technology & advantage

TNB v.s. HDB Bearing

Better in noise, far better in life

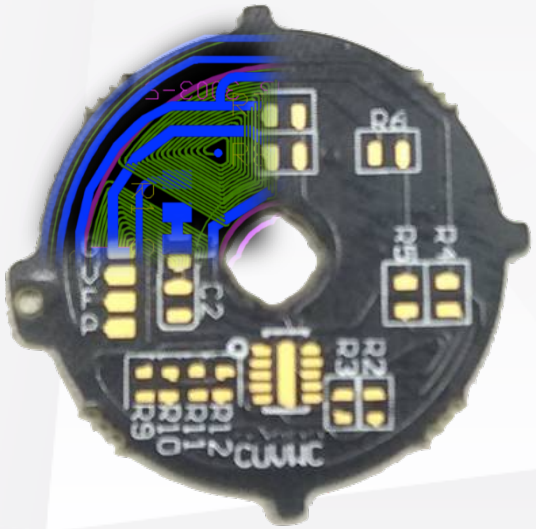


TNB Bearing itself has self-lubrication performance, without need of oiling or oil slot, so it avoids oil leakage issue, and has waterproof performance.

Because the bearing and fan frame are ejected in one piece, the body does not fall off the fan when being impacted forcefully. (note: HDB Bearing is copper material, with oil slot inside, they have oil leakage, volatilization issue once in operation, so life is till a big test)

B. Key technology & advance

02. Built-in type PCB High Precision Coiling



- ✦ Considerably improved traditional coiling defect rate
- ✦ Considerably improved shockproof ability
- ✦ Built-in type coiling significantly improved the life & protection
- ✦ “Area replace volume ” to drive the fan --- light
- ✦ one line component assembly --- cost down

B. Key technology & advance

Market Competition Advantages ---

Precision & Cost will be the winning point of Micro-era in the future

Improve the defect rate (25~40%) of traditional coiling, further, we can cost down by mass production

+

Key tech. of high precision

Micro-fan with high Cost-Performance ratio

B. Key technology & advance

03. Optimize the efficiency --- 6-slot 8-pole simulated analysis

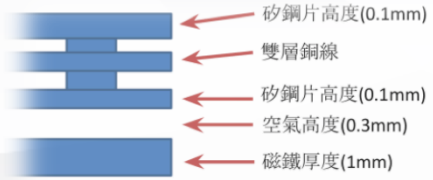
Optimize the startup torque & highest speed --- get 6-slot 8-pole

四極三槽

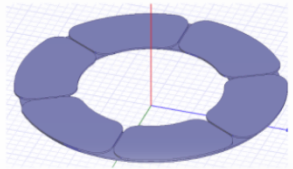
Wire width	0.06 mm
Wire height	0.04 mm
Turns (UP)	22
Turns (DOWN)	22
resistance(預估)	12 ohms
線圈個數	3
磁鐵個數	4

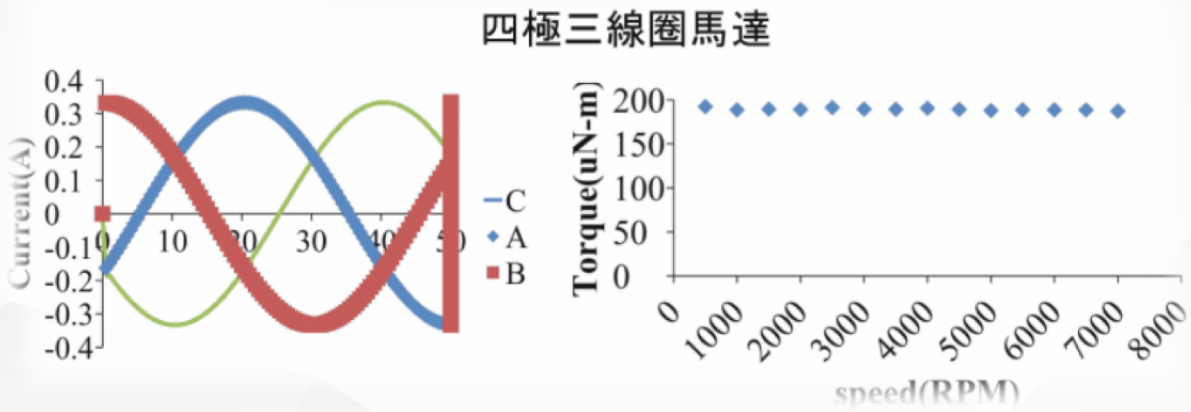
二極三槽

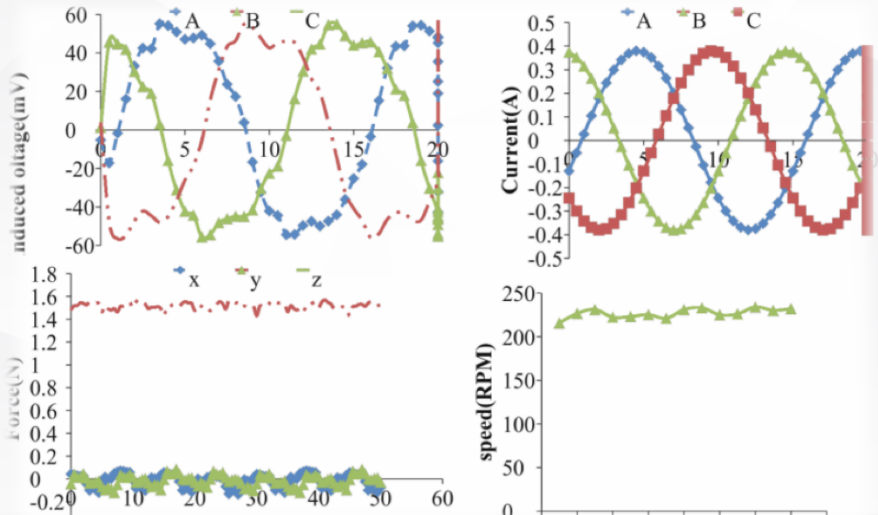
Wire width	0.06 mm
Wire height	0.04 mm
Turns (UP)	22
Turns (DOWN)	22
resistance(預估)	12 ohms
線圈個數	3
磁鐵個數	4



Wire width	0.06 mm
Wire height	0.04 mm
Turns (UP)	22
Turns (DOWN)	22
Wire length(預估)	1200 mm
resistance(預估)	12 ohms







C. Spec & parameter

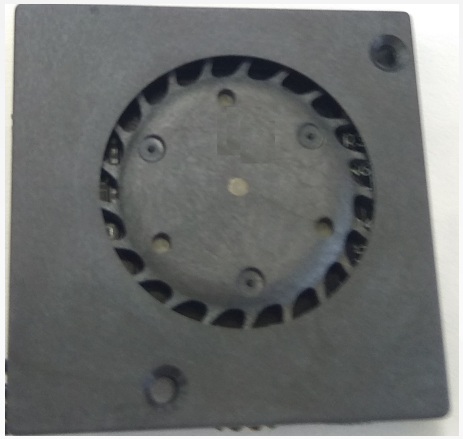
C. 規格與參數選用

3003 產品規格:

Model NO.	RLFT 3003
Thickness / Dimension	30*30*3 mm
Rated Voltage (V)	3.3V
Rated Current (A)	0.20max
Speed (RPM)	4800-12000 rmp pwm
Air Flow (CFM)	1CFM
Pressure (mmAq)	13.50mmAq
Noise (dBA)	26dBa @1米

C. 規格與參數選用

2203 產品規格：



Model NO.	RLFT 2203
Thickness / Dimension	22*22*3mm
Rated Voltage (V)	3v
Rated Current (A)	0.15
Speed (RPM)	4200-18000 rmp pwm
Air Flow (CFM)	89L/min
Pressure (mmAq)	55.8pa
Noise (dBA)	22dBa @1米

B. Key technology & advance

Test Report ---

財團法人台灣電子檢驗中心

測 試 報 告

工程編號：	ET94T-02-027-C00
委 託 者：	
廠商地址：	
檢試物品：	磁力氣壓軸承（MBB，Magnetic Barometric Bearing）
型　　號：	A128025EH
數　　量：	20 件
收件日期：	2005 年 2 月 15 日
檢試日期：	2005 年 2 月 18 日～2005 年 9 月 26 日
實驗室環境：	溫度 25±3℃，相對濕度 58±3%
檢試項目：	
	軸流散熱風扇壽命評估

台灣電子檢驗中心　　部門主管

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測 試 報 告

工程編號 ET94T-02-027-C00

測試條件：依照委託者所提供之規格

軸流散熱風扇壽命評估

本壽命評估方案之試驗執行步驟：

1.在生產線中抽取 20 件風扇作為待測樣品，分別編列為 #1～#20；

2.對此 20 件樣品進行初步之觀測，含外觀、轉數值/電壓值/電流值等電氣特性之檢查；

3.將樣品佈置在 80℃的溫控中，利用直流電源供應器提供待壽運作所需之電源，待壽命進行運轉；

4.在設定的時間點由指定的工程師進行樣品轉數值的量測與記錄；

5.抵達設定的終止試驗時間後，依照測試所得之數據進行處理與分析。

本壽命評估方案之數據處理與分析方式說明：

1.在各時間點所得到的 20 件樣品的轉數值，分別取得其算術平均值；

2.藉由此數據之分布情形可瞭解散熱風扇在此環境下的衰退趨勢；

3.經此分布情形可約略的判定其適合以線性方程或指數方程描述此一趨勢；

4.利用最小平方配適法(LMS, Least Square Method)，分別為線性方程及指數方程與此組數據之分布情形進行擬合(Fitting)，藉此取得各別參數的估計值及預估值與真實數據間的相關係數(Correlation Coefficient)；

13 - 2

測 試 報 告

工程編號 ET94T-02-027-C00

5.藉此線性方程及指數方程等二組模型，可分別預估出此組表示風扇平均轉數的數據，當其衰退至 7 成處的可能時間點。

註：

A.待測樣品之數據擷取及量測時間，分別在試驗進行前量測個別樣品之轉數值作為初始值，爾後在試驗進行至第 74、98、122、146、170、312、408、576、744、936、1248、1440、1608、1776、1944、2088、2424、2592、2832、2952、3288、3456、3816、3936、4296、4512 小時處量測各樣品之轉數值。

B.線性方程式：$y=a\cdot x+b$，參數說明：x 表時間、y 表轉數比、a 與 b 為待定係數。

C.指數方程式：$y=d\cdot e^{cx}$，參數說明：x 表時間、y 表轉數比、c 與 d 為待定係數。

測試儀器設備：

名　稱	型　號
溫槽	TABAI　PS-222
電源供應器	PHIHONG　PP-10-40
直流風扇測試設備	SP-DCF358FT2 (TEK-CHAIN)

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測 試 報 告

工程編號 ET94T-02-027-C00

80度C 60,000小時

軸流散熱風扇壽命評估：

預估之過程與結果，如表與

表一、與原數據群配適後之模　　型二之參數估計值及相關係數

模型別	預設之模型		估計值	相關係數
型一	$y=a\cdot x+b$		0005x+1	0.88918
型二	$y=d\cdot e^{cx}$	y	(-0.000005x)	0.88824

表二、以配適後之模型一與模型　　數衰減程度變化所呈之預估值

風扇轉數衰減程度 (%, 量測點之平均轉數：初始值平均轉數)	模型一之預估值 (小時)	模型二之預估值 (小時)
1.00		0.00
0.90	0.00	21052.10
0.80	0000.00	44608.71
0.70	60000.00	71314.99
0.60	80000.00	102145.10
0.50	100000.00	138609.40
0.40	120000.00	183238.10
0.30	140000.00	240774.60
0.20	160000.00	321867.60
0.10	180000.00	460497.00

註：利用模型一及模型二進行預估所得之數據的分布圖，如圖四及圖五所示。

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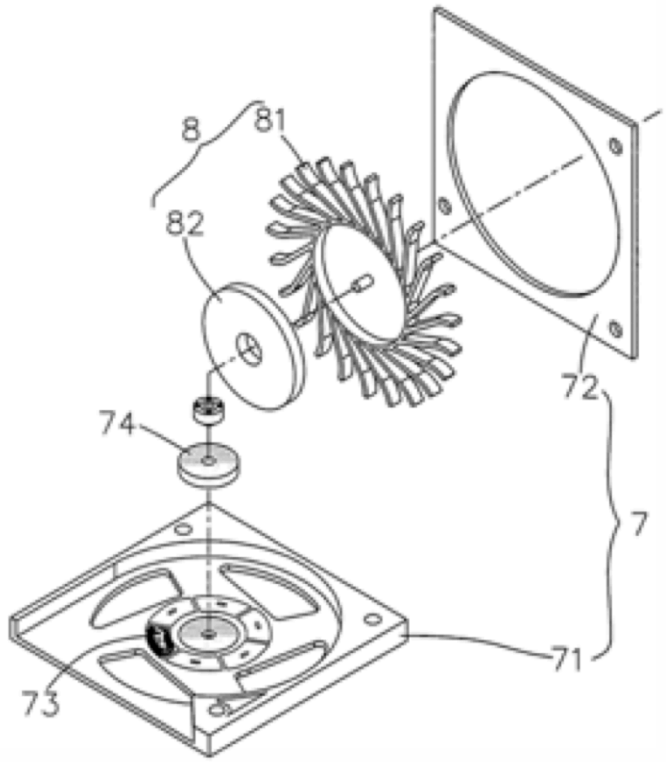
D. Patent & device

D. Patent & device

Patent：

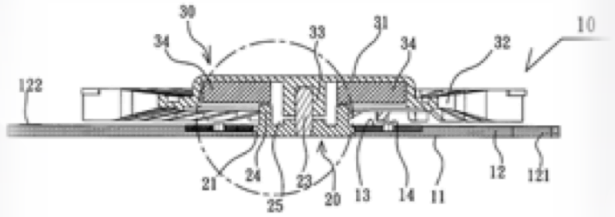
公告號	M527496 審查公開資訊
專利名稱	薄型風扇之磁吸定位結構
公告日	2016/08/21
證書號	M527496
申請日	2016/05/13
申請號	105206999 Espacenet
國際分類號 IPC	***F04D-029/60***(2006.01)
公報卷期	43-24
發明人	林君儒
申請人	捷美美實業有限公司 新北市中和區景安路42號6樓 TW
代理人	許麗紅
	本創作與薄型風扇有關，尤指一種薄型風扇之定位結構。
	按，隨著新科技及新材料的研究，電子產品朝小型化的方



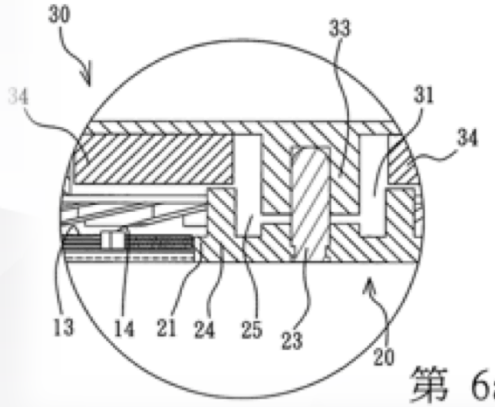
D. Patent & device

Patent：

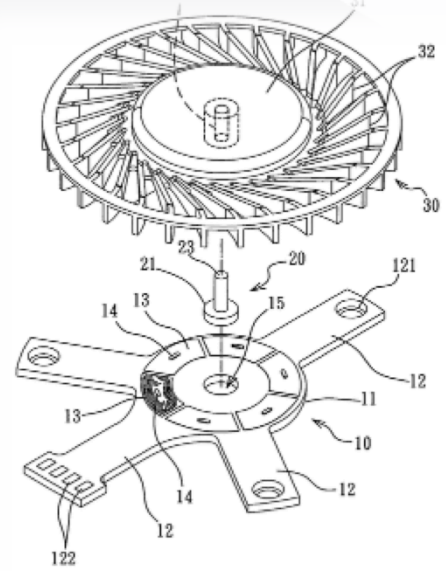
公告號	M484019 審查公開資訊
專利名稱	薄型風扇之軸心座改良結構
公告日	2014/08/11
證書號	M484019
申請日	2014/03/25
申請號	103205060 Espacenet
國際分類號 IPC	*F04D-029/04*(2006.01)
公報卷期	41-23
發明人	林君儒
申請人	捷美美實業有限公司 新北市中和區景安路42號6樓 TW
新型技術報告完成時間	2016/01/27
	本創作關於一種薄型風扇之軸心座改良結構，該薄型風扇包括 槽，於該容置槽周邊之印刷電路板係設有複數組佈線線圈繞組



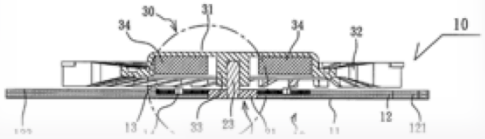
第 6 圖



第 6a 圖



第 3 圖



D. Patent & device

device：

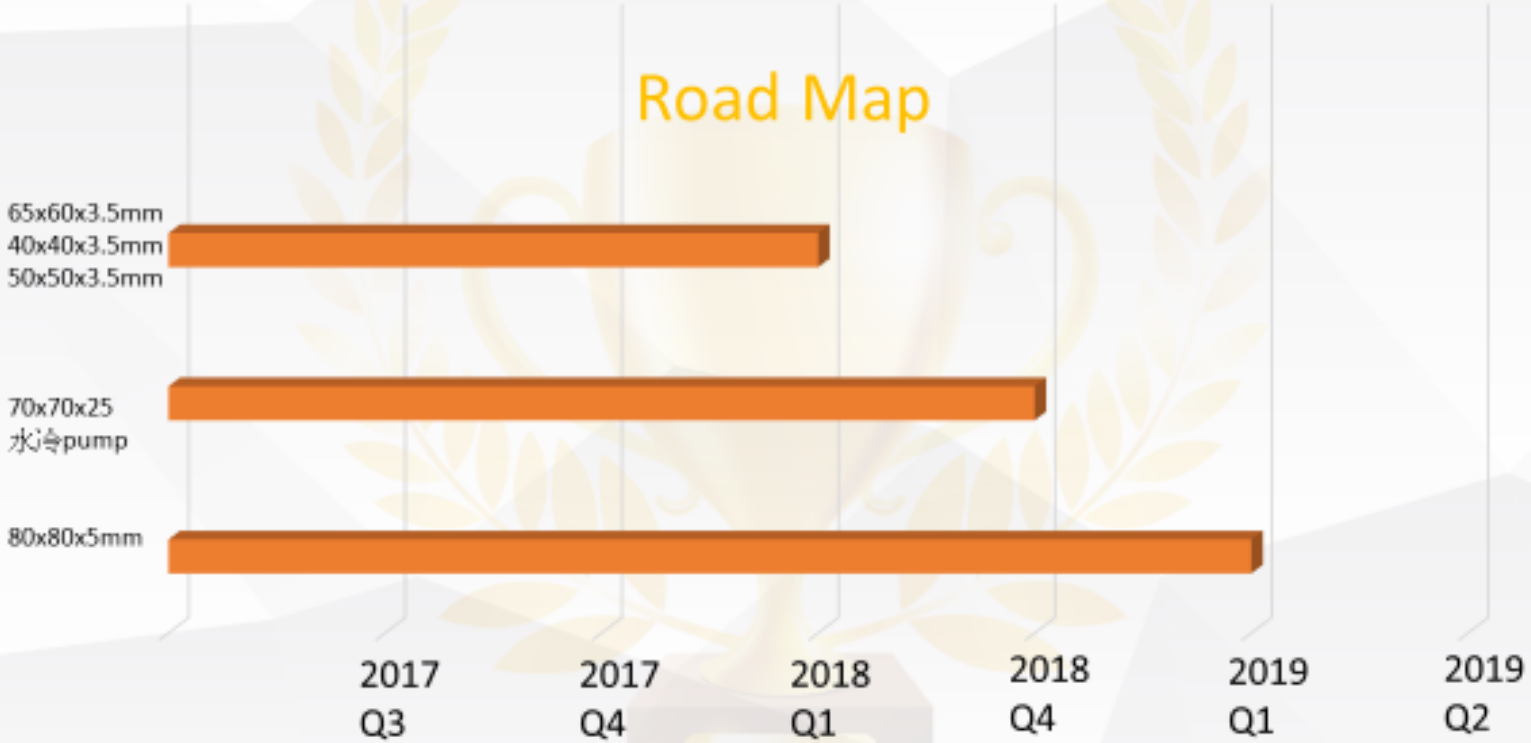
Constant temperature and humidity

Magnetizer

Balancing machine

E. Prospective Future

E. 未來展望


Road Map
65x60x3.5mm
40x40x3.5mm
50x50x3.5mm
70x70x25
水冷pump
80x80x5mm
2017 Q3
2017 Q4
2018 Q1
2018 Q4
2019 Q1
2019 Q2

THANKS

THANKS