



# Innovative Cooling Technologies

⚙️ Protechnic International



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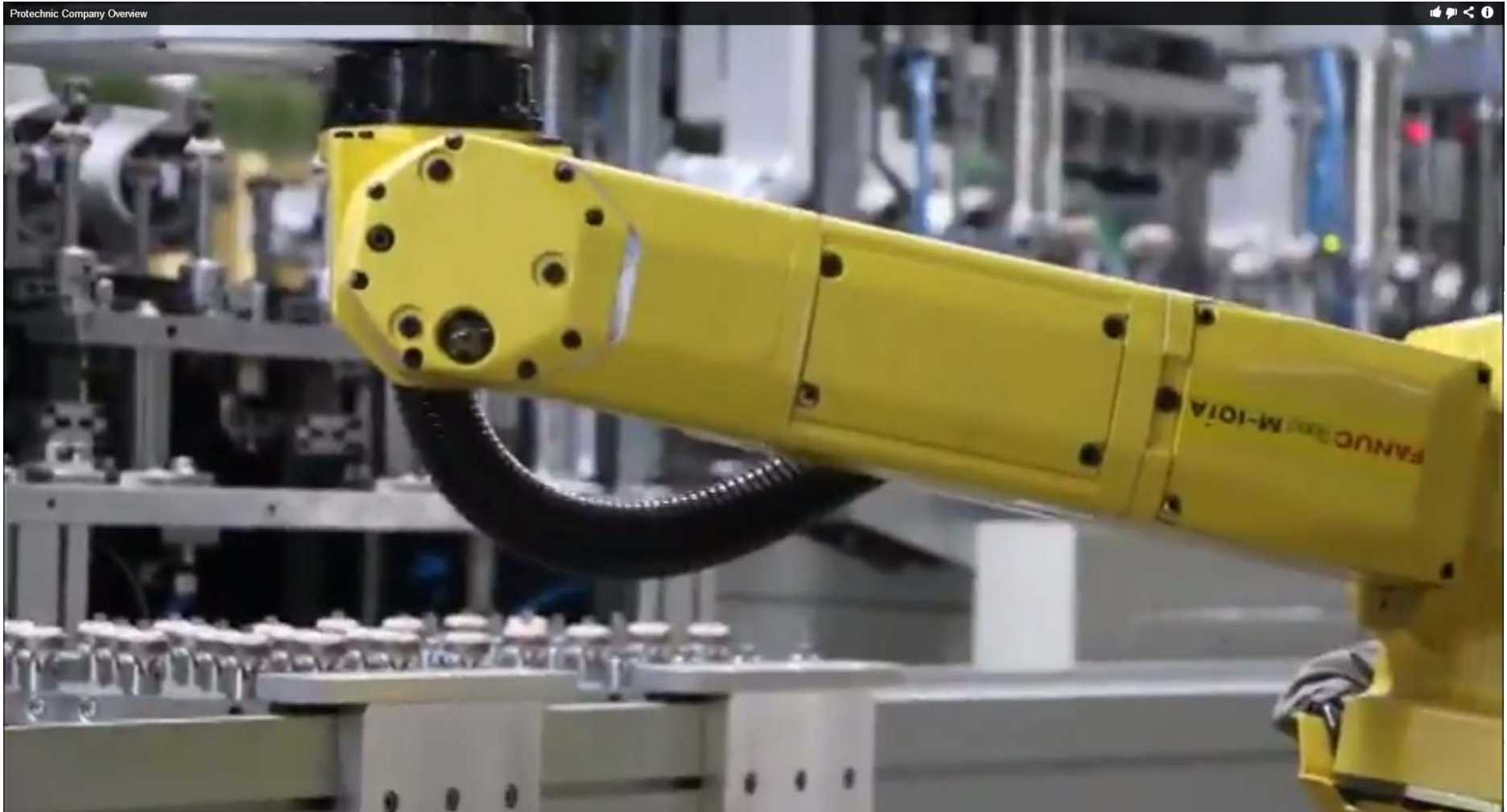
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## Background



[http://youtu.be/A4\\_sGIMf2hM](http://youtu.be/A4_sGIMf2hM)



## Product Range

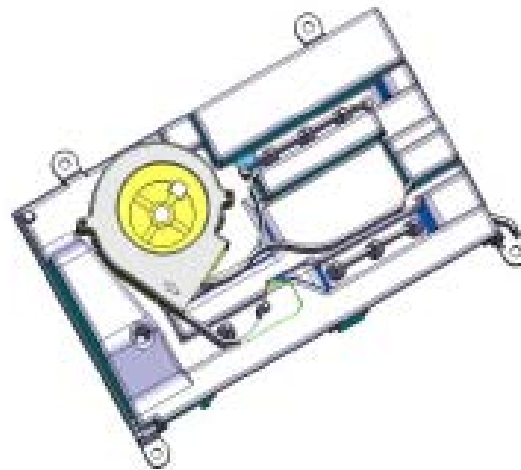
- Fans



- Blowers

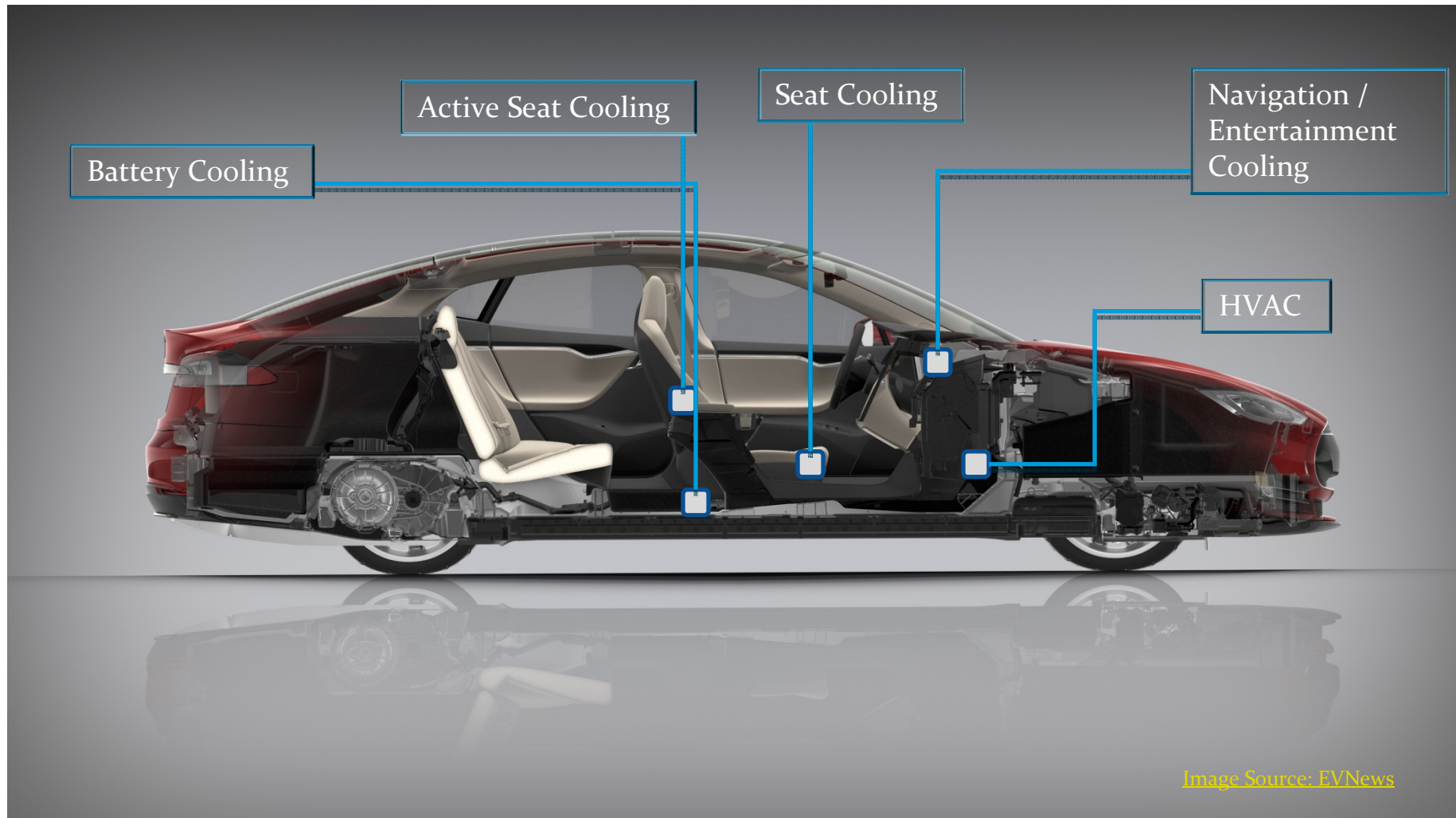


- System Solutions





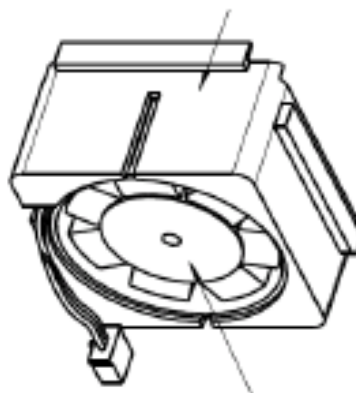
## Fan & Blower Applications







## Navigation & Entertainment

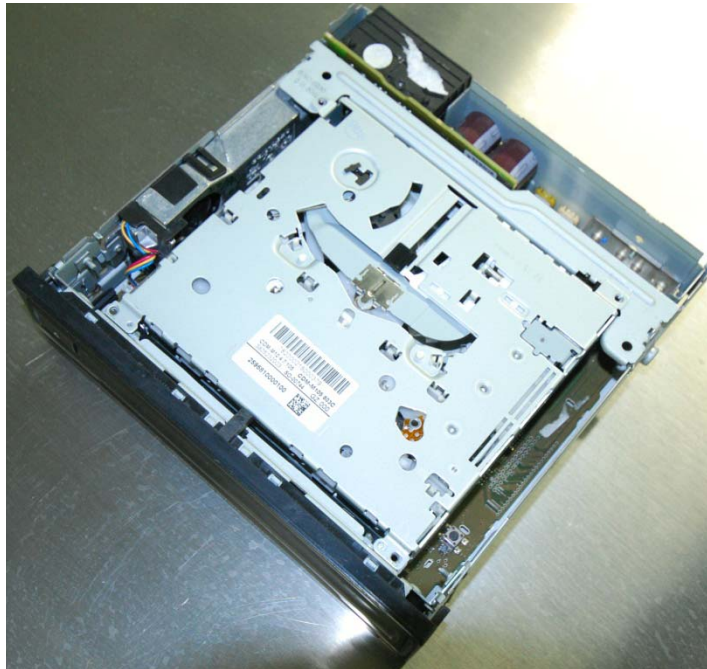


Navi/Entertainment  
Partners:

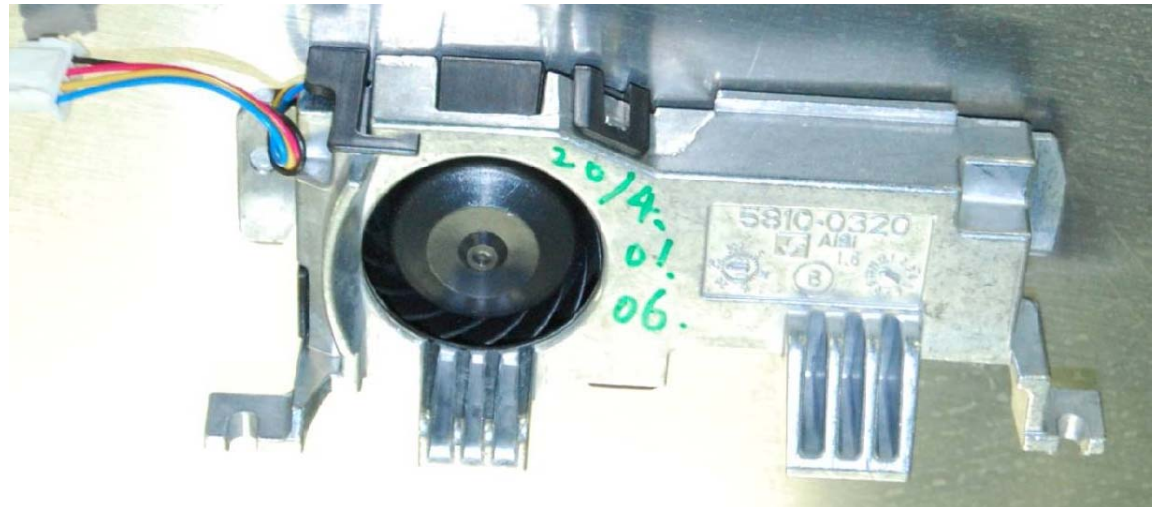




## Navigation & Entertainment



e.g. VW platform product

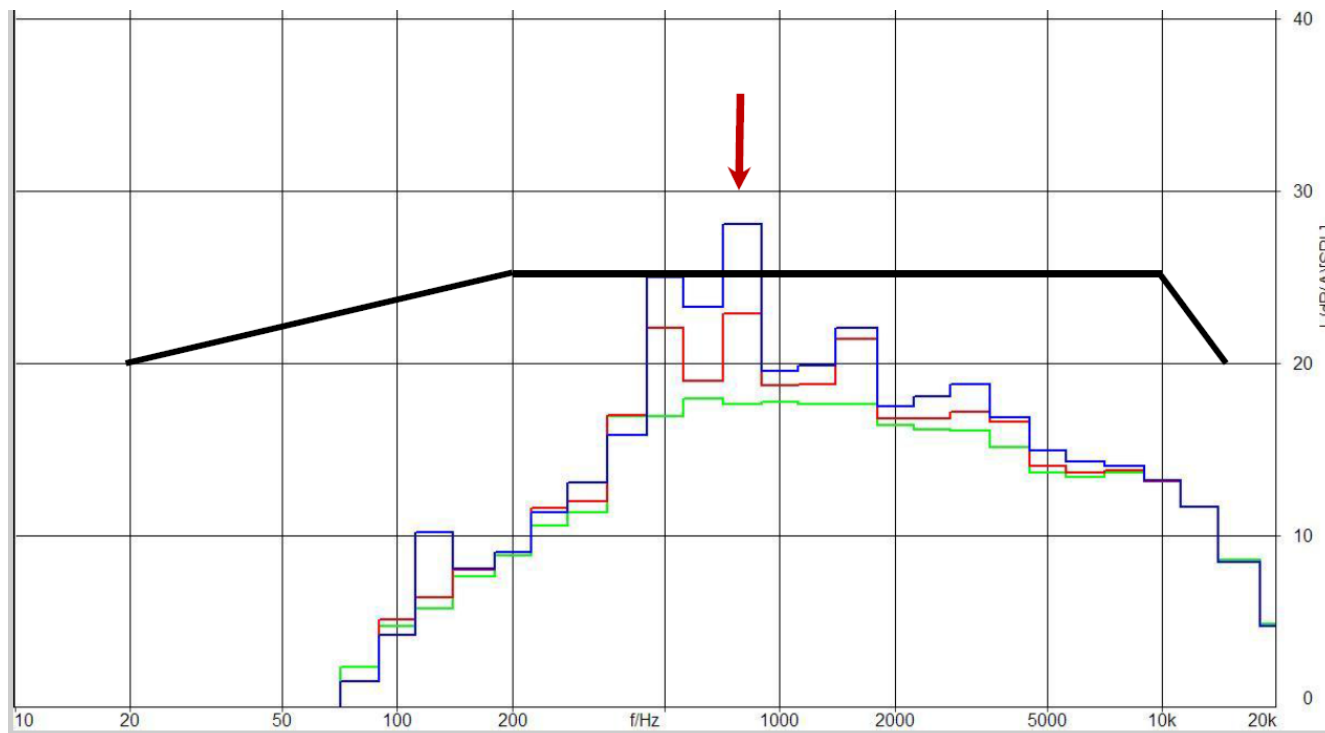




## Navigation & Entertainment

- 1. Specially designed impeller and housing create high air pressure and air flow while performing silently

I.E.: Sound Quality (each band can only be 3dB higher than the bands closest to it)



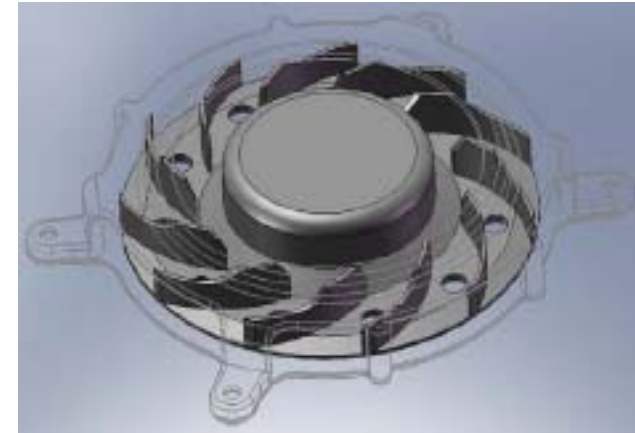




2. Vibration Check (requires Precision Dynamic balancing)
3. Convenient snap-in system for easy assembly
4. Safety-oriented design (Fan concealed)
5. Low power consumption - 0.13A operating current
6. High operating temperature range -40~+90°C



## Seat Cooling



Seat Cooling Partners:





## Active Seat Cooling



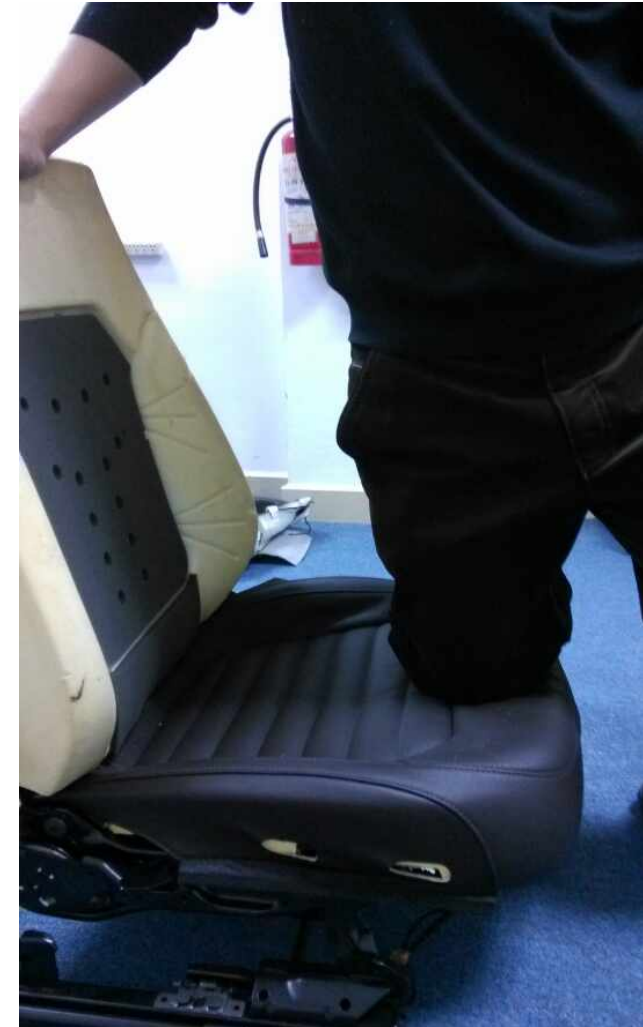
Active Cooling Partners:





## Seat Cooling Technical Details

1. Knee test up to 1000N in force/pressure. Successful test has no breakage or sound increase.

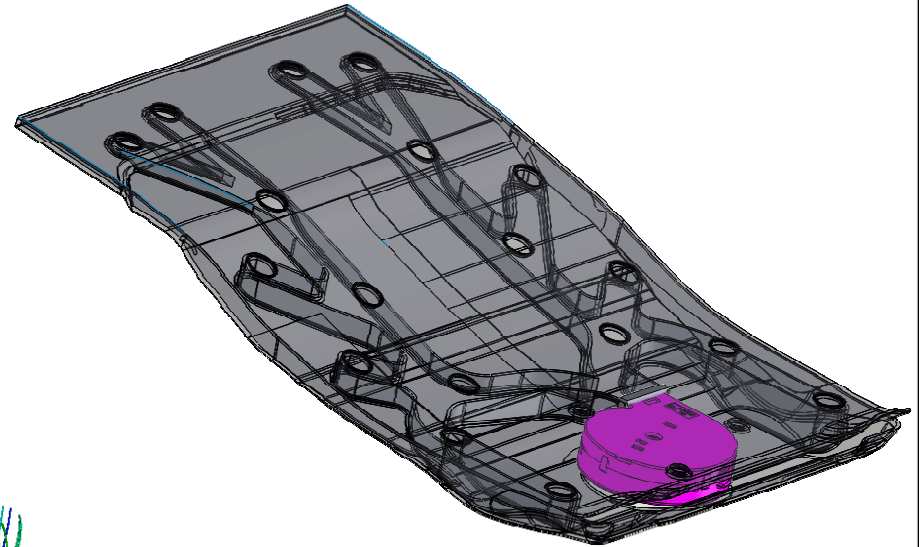
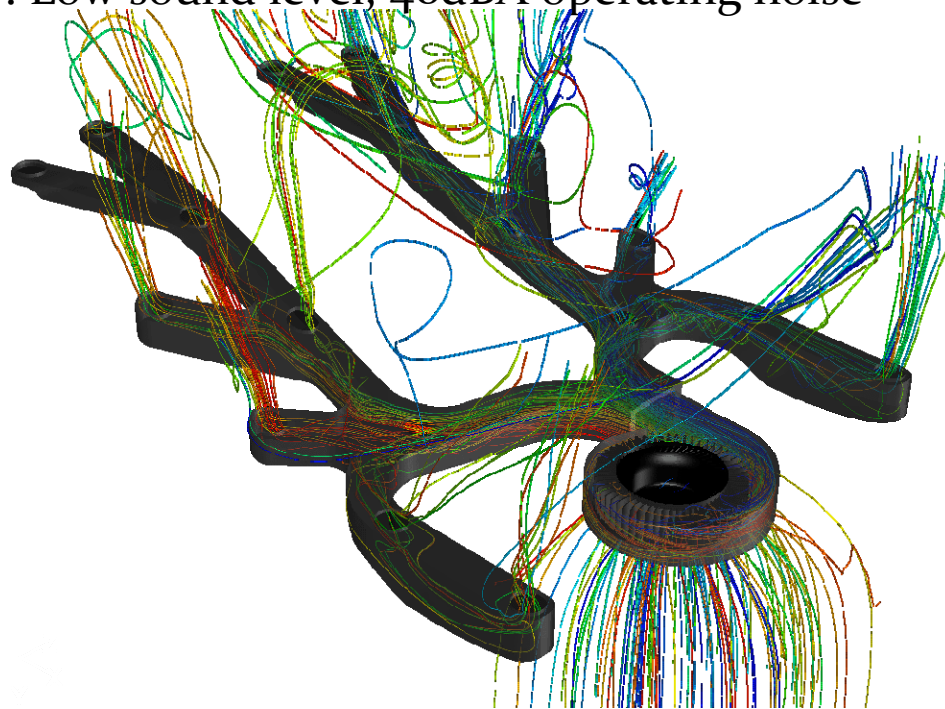






## Seat Cooling Technical Details

2. Rubber vibration-absorbing assembly
3. Extremely low standby current less than 10  $\mu A$
4. Complete aerodynamic/airflow simulation
5. LIN Interface
6. Short circuit prevention design
7. Low sound level, 40dBA operating noise







## LIN-BUS Interface



### What is LIN Bus?

- It creates a communication link between the control unit and fan/blower to monitor and/or control:
  - Status
  - Speed
  - Temperature
  - Vibration
  - Error
  - Wake up mode
  - Sleep mode
- LIN 2.1 Standard available

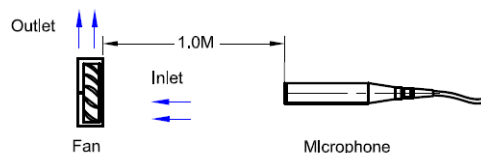


# LIN-BUS Interface

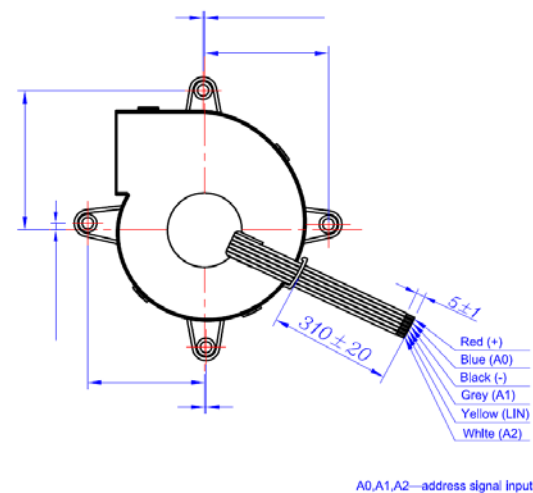
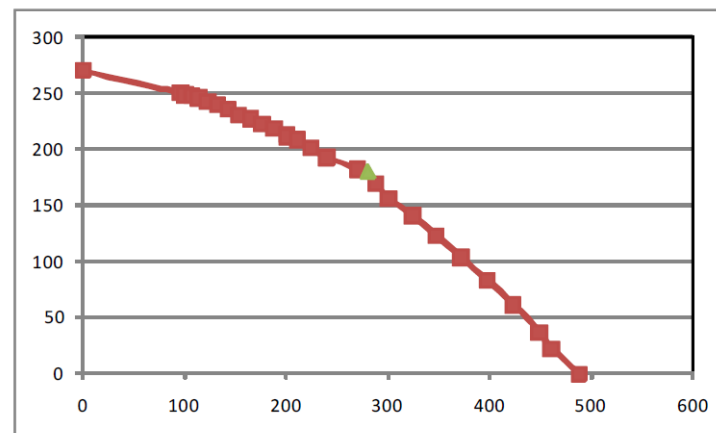
ITEMS	DESCRIPTION
Rated Voltage	D.C.12.0V
Current	0.65A (Actual current 0.54A)
Power	7.80W (Actual power 6.48W)
Speed	4350±10%rpm (At 25℃, To record speed after fan running normal, This time about 3~5minutes)
Air flow (at zero static pressure)	487.78 L/min
Air pressure (at zero air flow)	270.48 Pa
Acoustical noise	51dB(A) Max:54dB(A)
Life expectancy	70,000hrs continuous at40℃, 15~65% relative humidity
Insulation resistance	Min 10Meg Ohm between internal stator and lead wire (+) at 500VDC
Dielectric strength	5mA max at 600VAC 50Hz 1 second between frame and (+) terminal
Operating temperature and humidity	-10 to 70℃, 5% to 90% RH
Storage temperature and humidity	-40 to 70℃, 5% to 95% RH

## Noise Test: (ISO10302)

- 1.Measurement within anechoic chamber under free air condition
- 2.Microphone is placed at a distance of 1m on the axis of air intake side
- 3.Chamber background noise max 6.7dB(A)
- 4.Using microphone: G.R.A.S 1/2 Inch measure system 40AE+26CA or 1 Inch low measure system 40HF
- 5.Test system: National Instrument NI-4474 data acquisition system
- 6.Acoustical noise at rated speed

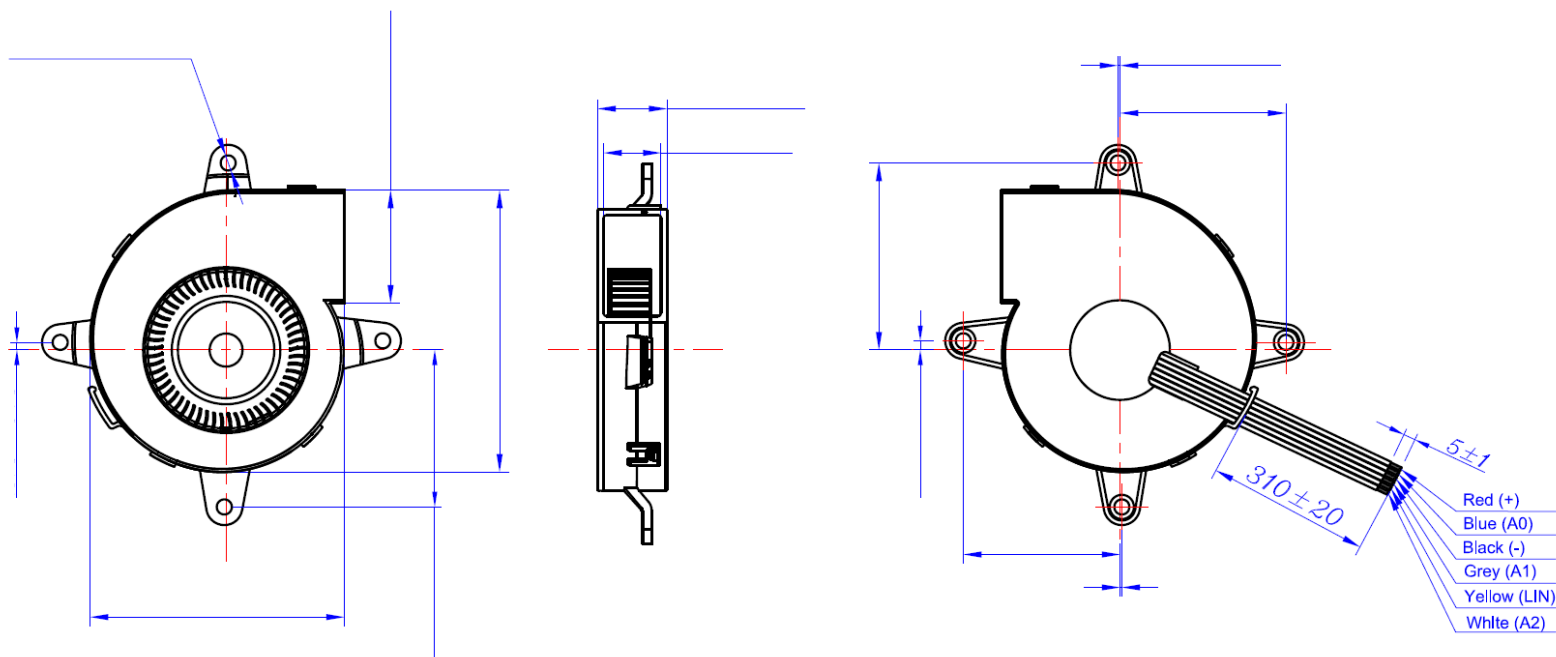


PQ curve: (Rated voltage at Different Duty Cycle if applied )





## LIN-BUS Interface



A0,A1,A2—address signal input

Full Speed:  
0B E4 80 87 0A;Lehne\_LI\_1=7

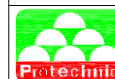
Stop:  
0B 80 80 80 0A;Aus

DC BRUSHLESS FAN



Unit

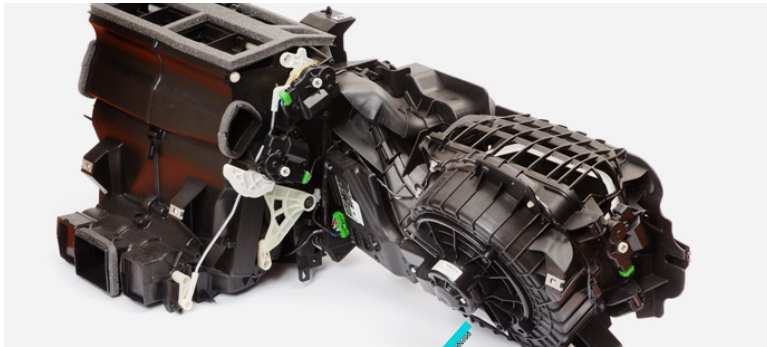
mm



PROTECHNIC ELECTRIC CO.,LTD.



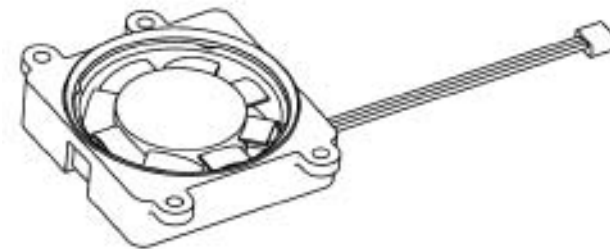
## HVAC-Blower (under development)



- LIN-Interface
- High efficiency
- Low noise design




## TV Tuner Cooling



TV Tuner Cooling Partners:

**DELPHI**

 Hirschmann Car Communication





## IP68 Capability

### Up to IP68 Rating

#### Protection Against Solids Rating

0	No special protection
1	Protected against solid objects = 50 mm
2	Protected against solid objects = 12 mm
3	Protected against solid objects = 2.5 mm
4	Protected against solid objects = 1 mm
5	Protected against dust; limited ingress
6	Full dust protection

#### Protection Against Liquids Rating

0	No protection
1	Protected against vertically falling drops of water
2	Protected against vertically falling drops of water when the unit is tilted up to 15°
3	Protected against spraying water when the unit is tilted up to 60°
4	Protected against spraying water from all directions
5	Protected against low pressure water jets from all directions
6	Protected against temporary floods of water
7	Protected against being immersed between 15 cm and 1 m
8	Protected against continuous immersion in water



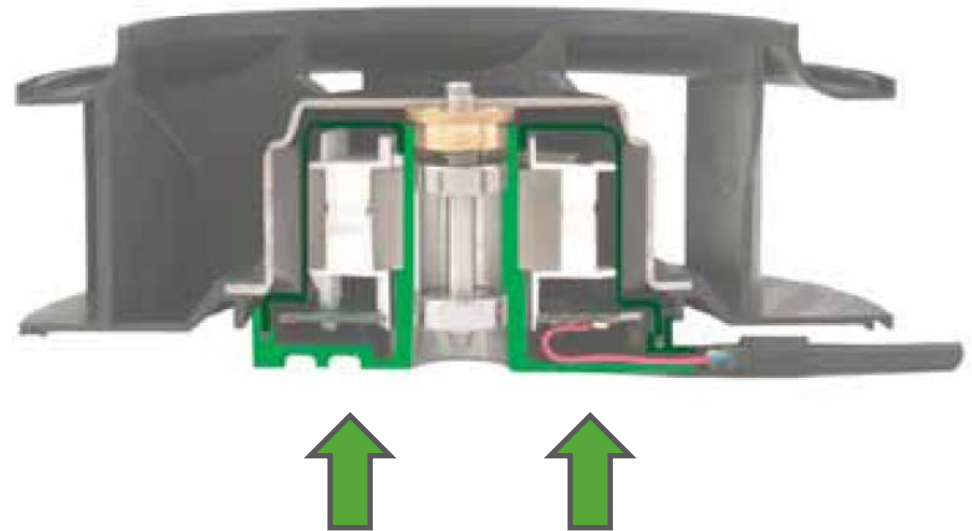
- Completely particle-proof & water-proof
- Positive pressure centrifugal seal
- Unique proprietary design



## What are the capabilities of our IP products?

### Patented IP68 Rated Blowers / Fans

- Stator and PCB assembly are completely sealed in a sealed chamber
- Wiring is sealed for added protection
- Interior receives an additional protective rubber o-ring to protect sensitive electronics
- A secondary centrifugal structure seal creates a positive pressure barrier that keeps liquid and solid particles from entering the sealed areas



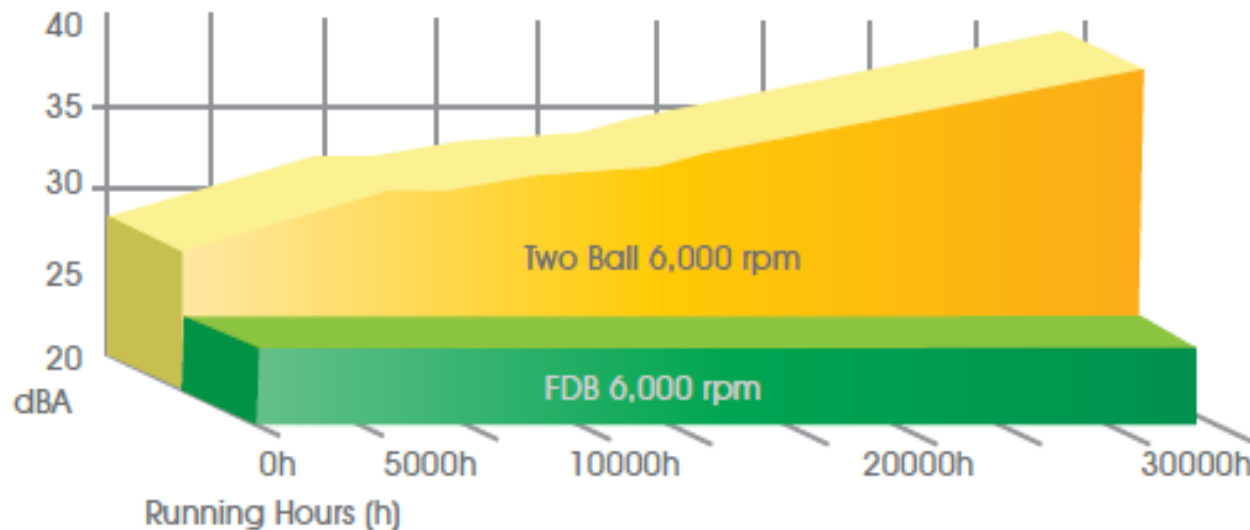
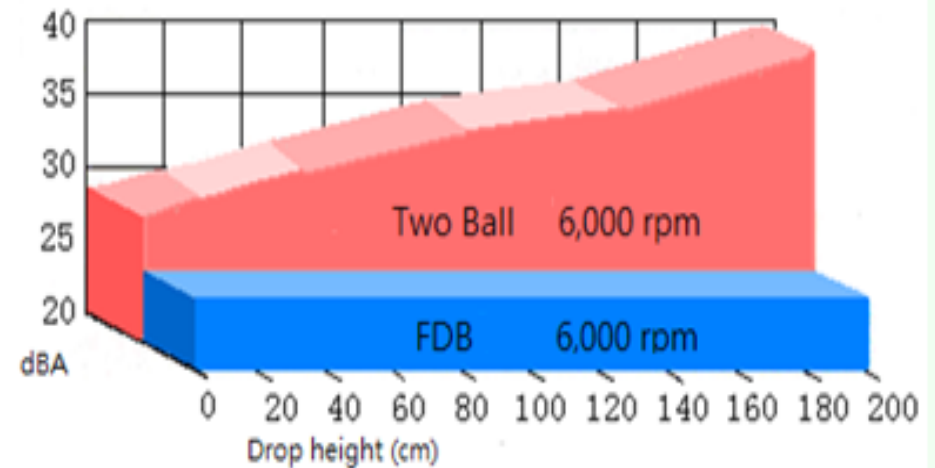
Green lines within this IP68 crosscut indicate multiple internal sealed areas



## Low Noise Operation

In-cabin fans emphasize ultra-low noise

- Protechnic engineered magnetic switching
- Ultra-low cogging motors
- Highly efficient operation



Less than 20dBA at 1500 RPM



## Summary & Proposal

### Capability

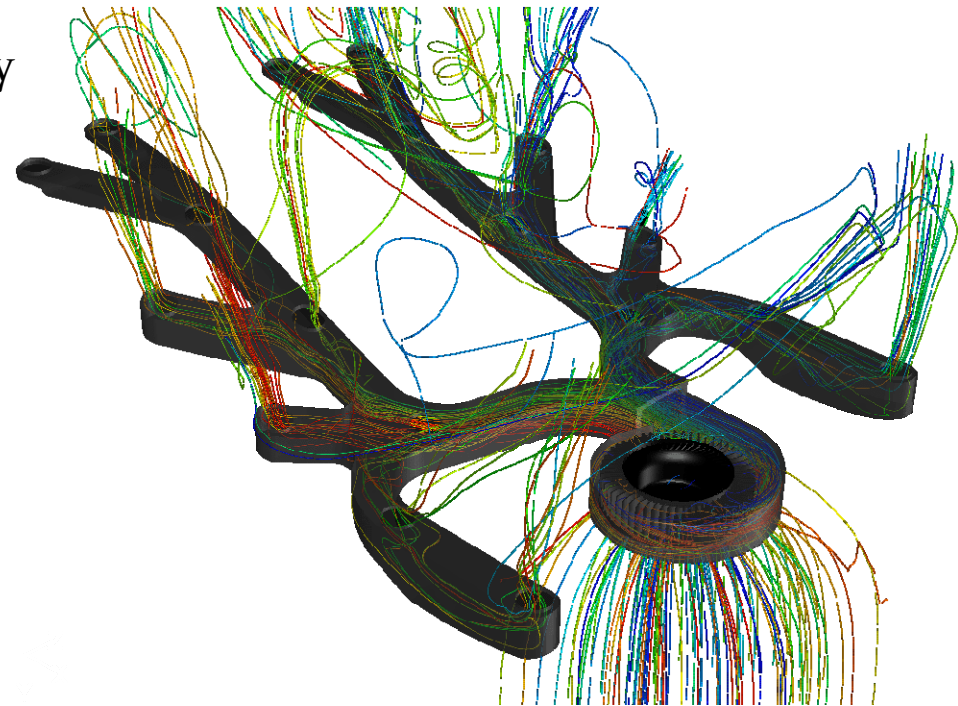
- Next-gen LIN Bus control systems integration
- Leading-edge robotic manufacturing line
- Wide range of operating temperatures
- Long-lasting, reliable, ultra low noise, high energy efficiency
- Industry-leading IP68 rating and quality
- New active seat and mobile device cooling applications
- Dedicated and experienced internal simulation and design teams

### Experience

- Qualified Vendor for Daimler, Toyota, VW, BMW, Audi
- Accustomed to high-end vehicular technologies

### Preliminary Proposal

- Provide system-wide or specific thermal optimization simulation based on your project
- Rapid prototyping to verify simulated design





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