



**Sensata**  
Technologies



**Welcome to SENSATA TECHNOLOGIES**



Sensata  
Technologies

# SENSATA OVERVIEW

森萨塔科技

— 世界所依赖的传感器与控制器

The World Depends on Sensors and Controls



# Sensata stands for...

Technologies

*A world leader and early innovator in mission critical sensors and electrical protection...*

*Satisfying the world's growing need for safety, energy efficiency, and a clean environment...*

*A partner, employer, and neighbor of choice*

# Sensata by the numbers

- **1,000,000,000**  
Devices shipped each year, all highly engineered and application specific
- **191,000**  
Different product configurations
- **400**  
Unique product families
- **4**  
Brand names we own, manufacture, and sell under:  
**Sensata<sup>®</sup>, Airpax<sup>®</sup>, Klixon<sup>®</sup>, Dimensions<sup>™</sup>**



# Sensata by the numbers

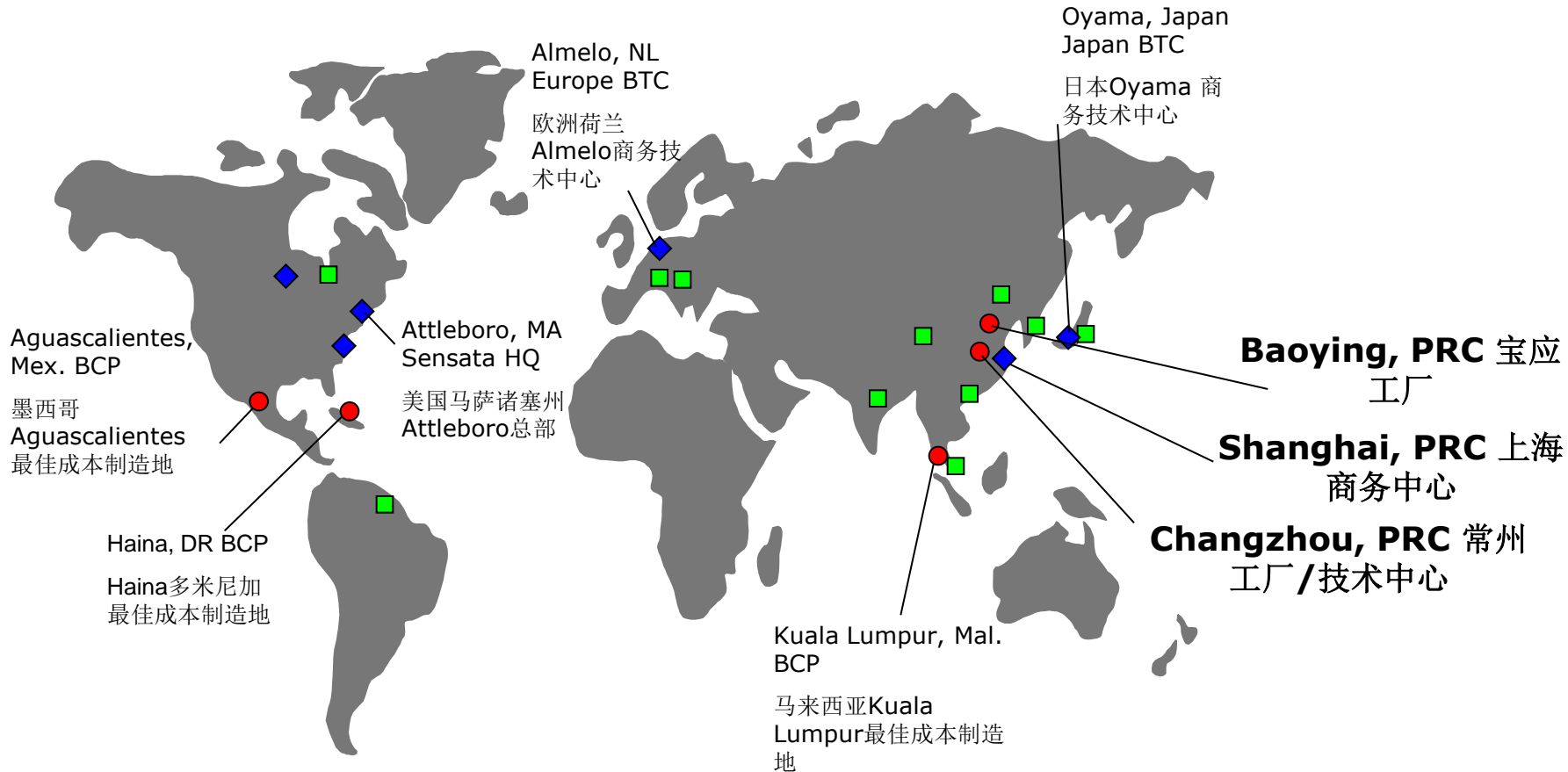
- **10,500**  
Employees worldwide, with:
  - **5,000** in the Americas  
(900 in US)
  - **5,300** in Asia
  - **200** in Europe
- **9**  
Countries where we have  
business and manufacturing  
sites (even more if you count  
our sales offices)

● U.S. BUSINESS CENTER  
IN ATTLEBORO, MASSACHUSETTS



# Sensata Technologies Worldwide

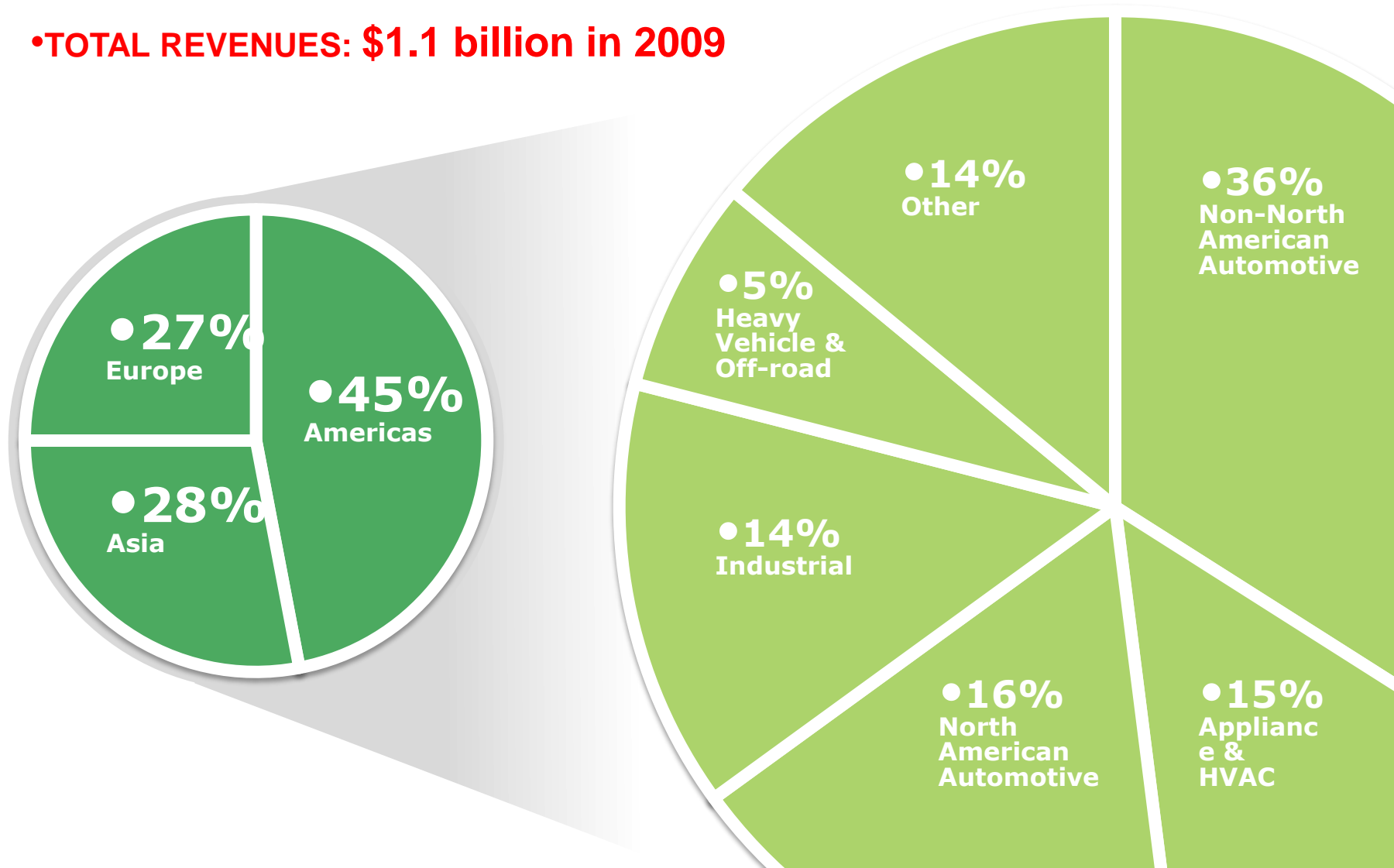
## 森萨塔机构全球分布情况



- ◆ Business & Technology Center (BTC) 商务技术中心
- Best Cost Production Site (BCP) 最佳成本制造地
- Sales Office 销售代表处

# Sensata revenue, by region and market

•TOTAL REVENUES: \$1.1 billion in 2009



# Sensata History 森萨塔发展历程



## 1916

Rathbun Willard founded the General Plate Company in Attleboro, MA, USA to provide gold plate to the jewelry industry

由Rathbun Willard在美国马萨诸塞州Attleboro创立; 生产金器

## 1930

Our first sensing product: the thermostat

第一款传感器产品热保护器问世

## 1937

Our first motor protector was introduced

开始制造第一款电机保护器

## 1955

Our expansion into Europe via Almelo, Netherlands

在荷兰Almelo开始拓展欧洲业务

## 1969

Expansion to Japan

业务拓展至日本

## 1988

Launched APT Pressure Sensor

开始生产汽车用压力传感器

## 2004

Expansion to Changzhou China

中国江苏常州工厂设立

## 2008

Set up China technical center in Changzhou

技术研发中心在江苏常州建立

## 1931

General Plate merges with Spencer Thermostat

与Spencer Thermostat 公司合并

## 1950

Our first best-cost manufacturing launch in Mexico

在墨西哥开始最优成本制造实践

## 1959

Merger with Texas Instruments

与德州仪器合并

## 1974

Expansion to Malaysia

拓展到马来西亚

## 1996

Expansion to Baoying China

设立中国江苏宝应工厂

## 2006

Sensata Technologies becomes a stand alone company following acquisition by Bain Capital

由贝恩投资收购后成为独立公司并创建森萨塔科技品牌

## 2010

Sensata Technologies listed at NYSE on March 11<sup>th</sup> (ST)

森萨塔科技在美国纽约证交所上市



# Where are Sensata devices?

## •COMMERCIAL JET

- Up to 1,500 circuit breakers and switches

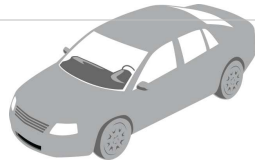


## •AVERAGE U.S. HOME

- 30 or more sensors, switches, and other safety devices

## •HIGH-END AUTOMOBILE

- Up to 50 sensors and controls



## •LARGE BOAT

- 60 or more power inverters, sensors, and protection devices

## •CONSTRUCTION VEHICLE

- 5-10 sensors, switches, and circuit breakers

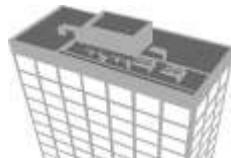


## •RECREATIONAL VEHICLE

- Over 20 sensors and switches

## •LARGE HVAC SYSTEM

- Dozens of sensors and switches



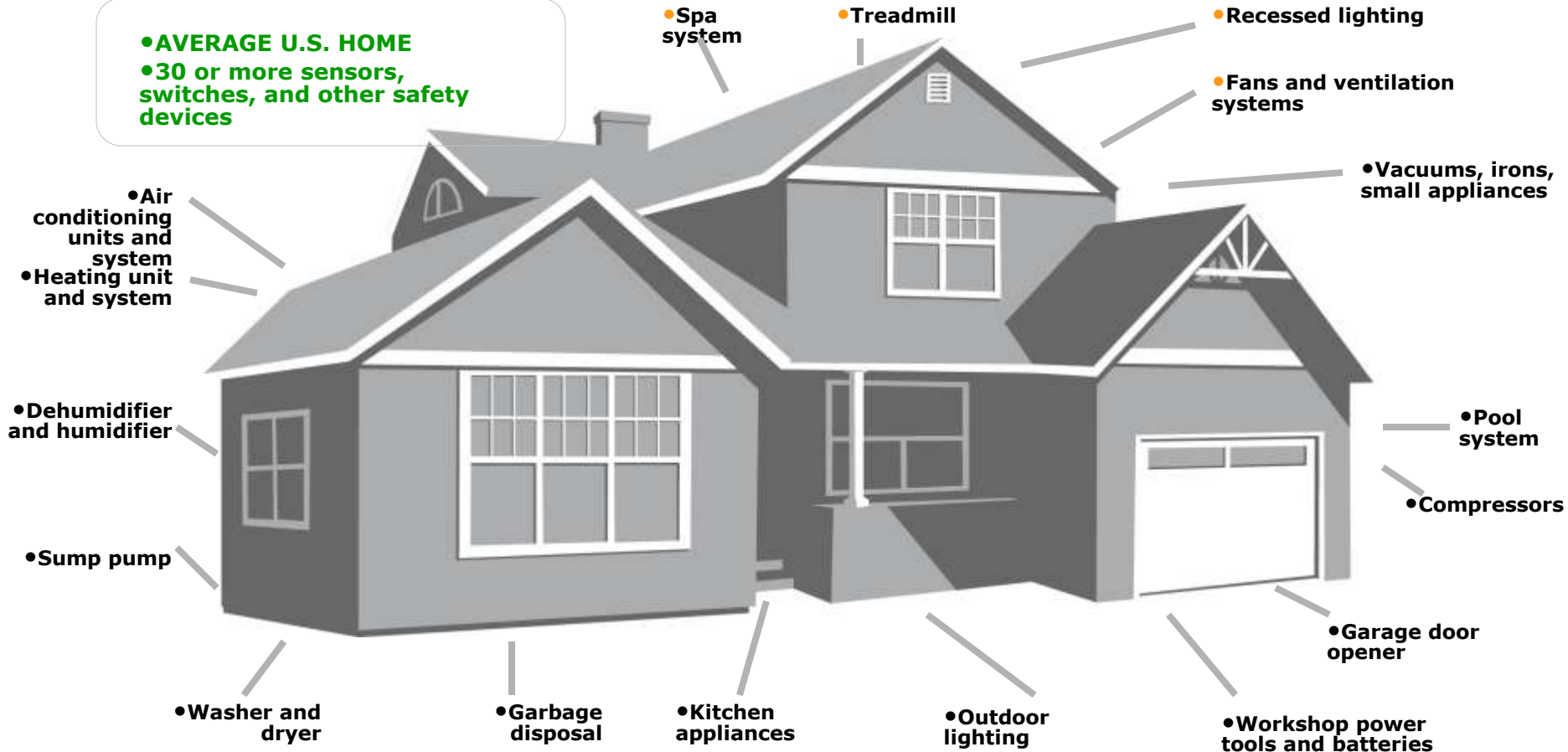
## •MOBILE PHONE SYSTEM

- 300 or more circuit breakers, sensors, and switches

- PLUS MANY OTHER APPLICATIONS

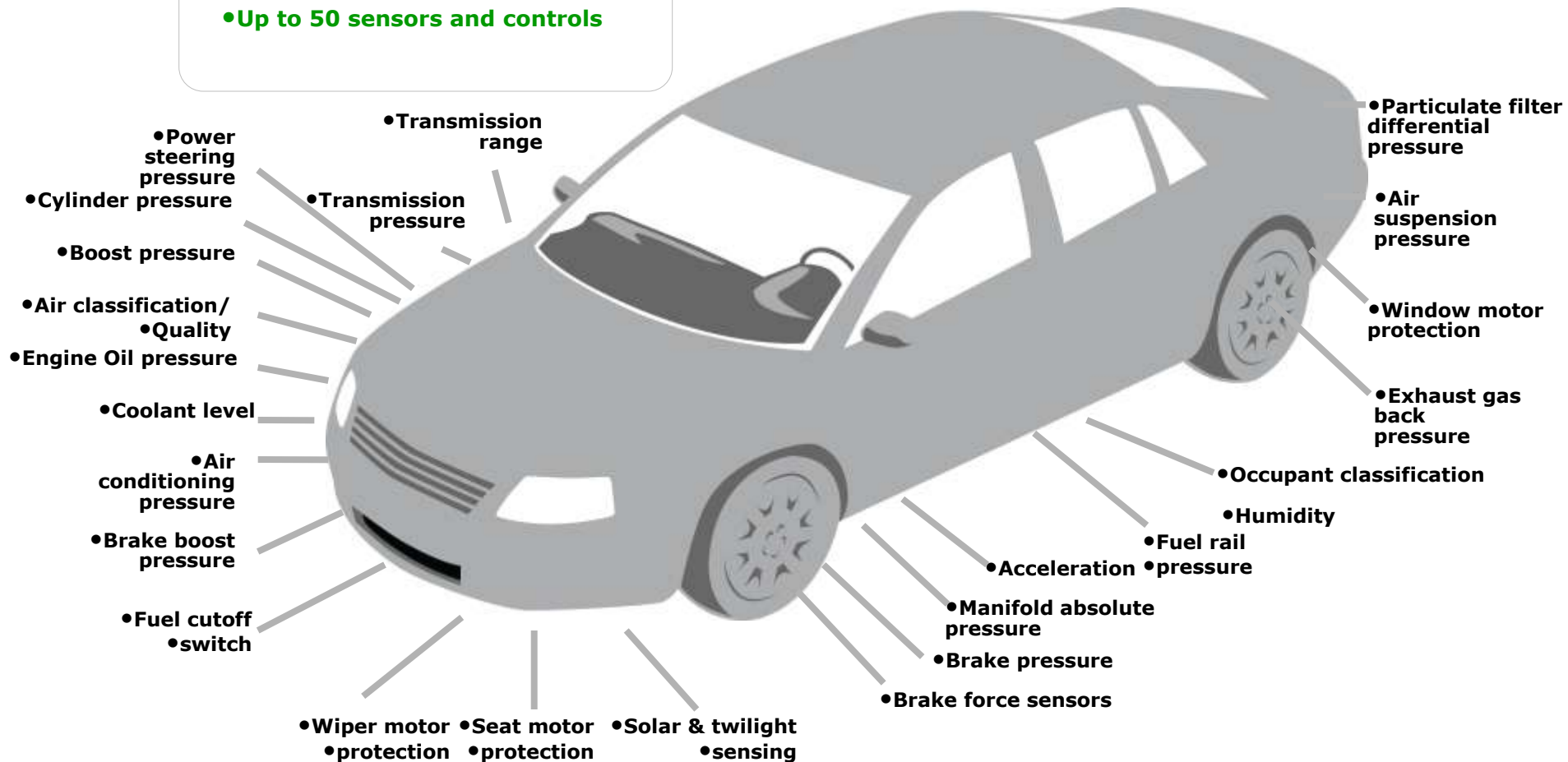
# Where are Sensata devices? Home

● **AVERAGE U.S. HOME**  
● 30 or more sensors,  
switches, and other safety  
devices



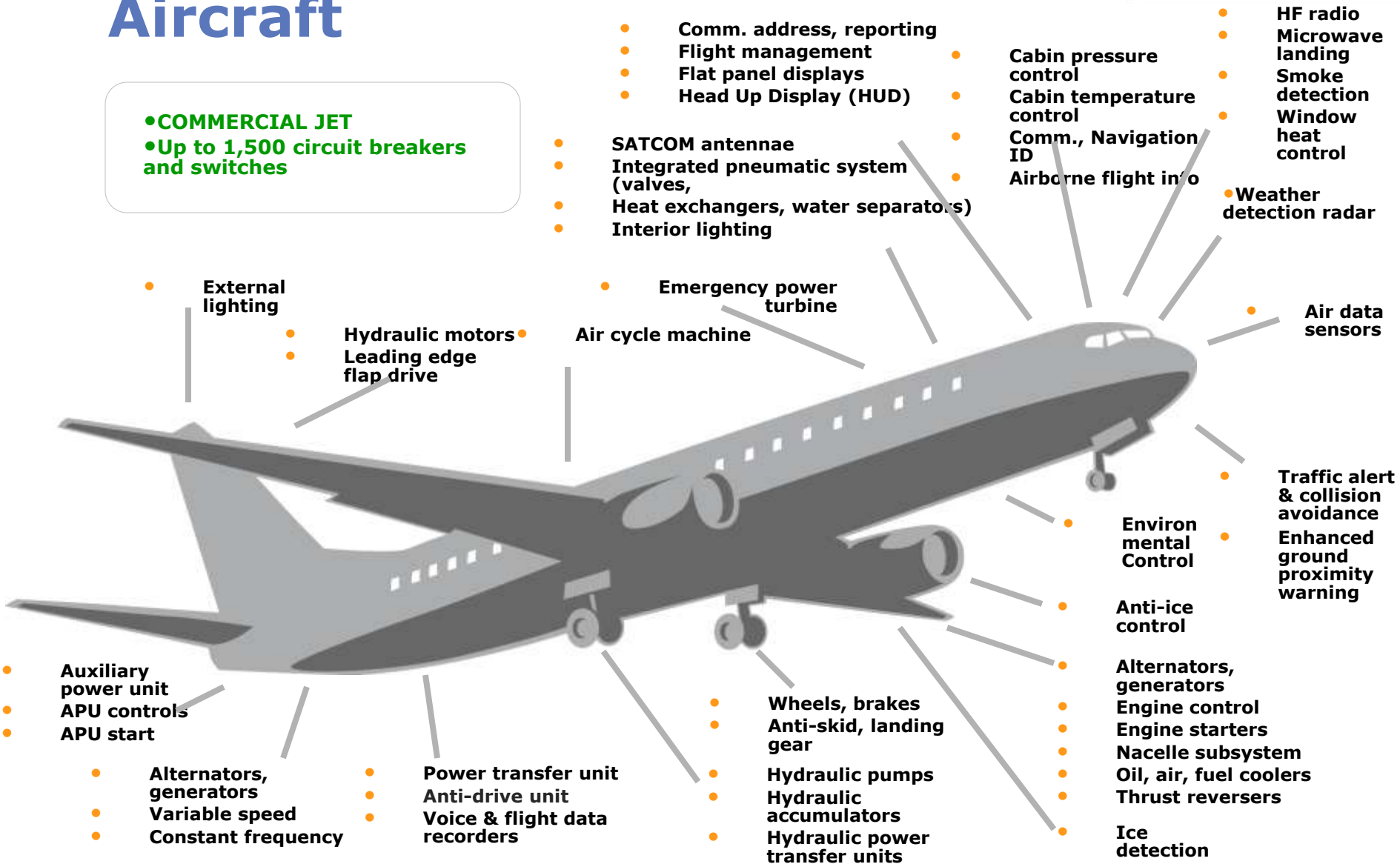
# Where are Sensata devices? Automobile

- **HIGH-END AUTOMOBILE**
- **Up to 50 sensors and controls**

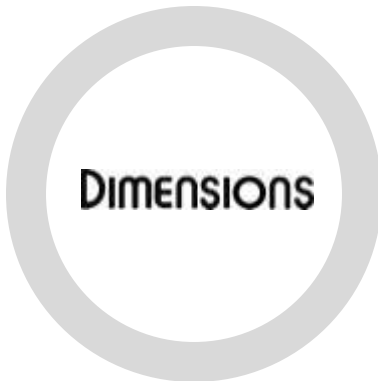


# Where are Sensata devices? Aircraft

- **COMMERCIAL JET**
- **Up to 1,500 circuit breakers and switches**



# Sensata's brand names





Sensata  
Technologies

# OUR PRODUCT

森萨塔的产品

The World Depends on Sensors and Controls

# Global Business Units

- **Sensor Products**

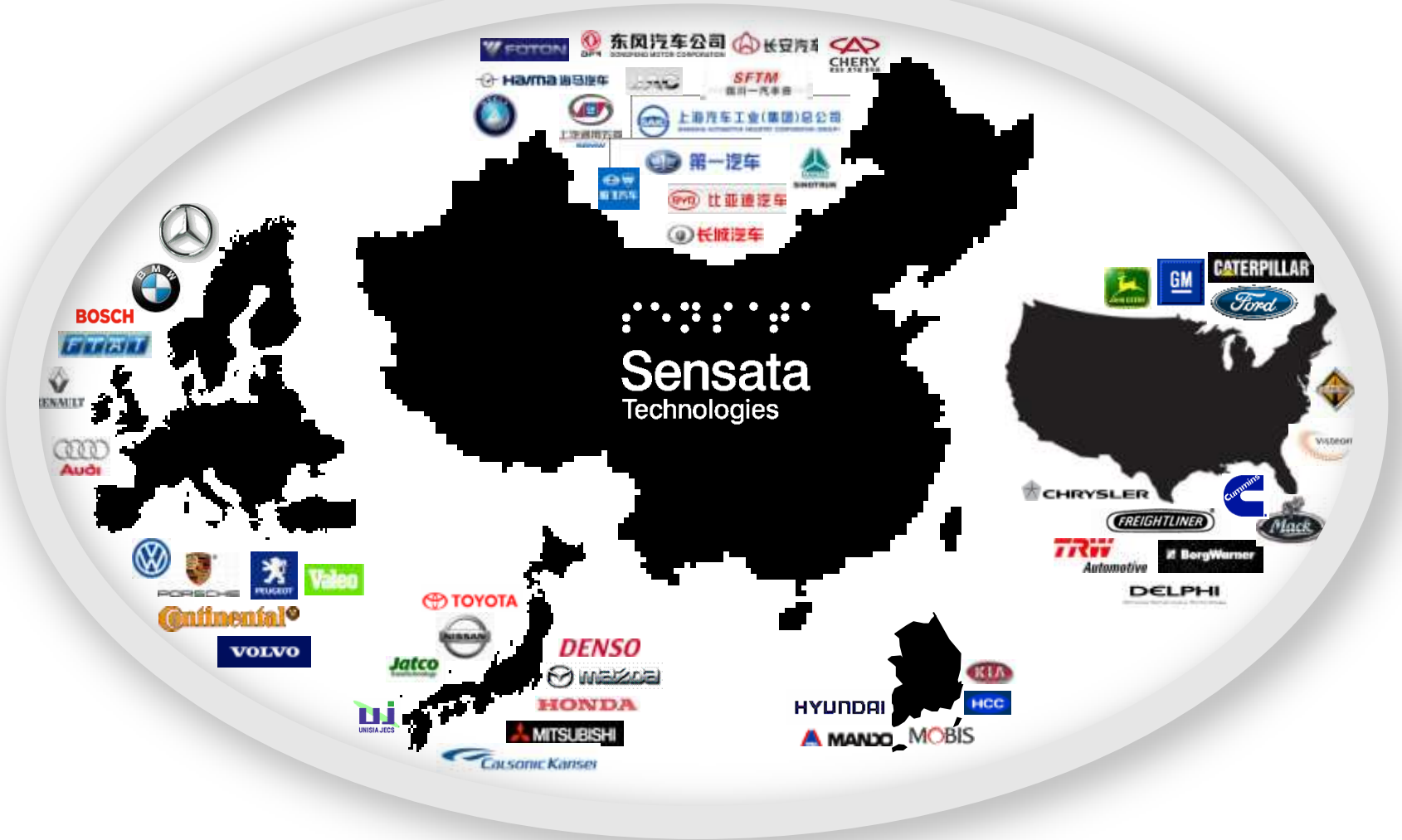


- **Control Products**



# Locally Supporting Major Global OEMs and Tier 1 System Suppliers

森萨塔中国为全球主要汽车制造商和系统集成商提供本地化支持





# Automotive Sensors 车用传感器

## Engine 发动机

(T)MAP Pressure 进气(温度)压力  
 Turbo Pressure 增压压力  
 Gas Injection Pressure 汽油喷射(油轨)压力  
 Diesel Injection Pressure 柴油喷射(油轨)压力  
 Oil Pressure 机油压力  
 Rough Road Acceleration 颠簸路面加速度  
 Cylinder Pressure 缸内压力  
 Returnless Fuel Pressure 燃油压力  
 Intake Humidity 进气湿度  
 Coolant Level 冷却液位

## Exhaust 排气/尾气

Particle Filter Pressure 颗粒捕集器压力  
 Exhaust Back Pressure 排气背压  
 EGR Pressure 废气再循环压力  
 EGR Temperature 废气再循环温度

## Cabin Comfort 车内舒适度控制

A/C Pressure 空调系统压力  
 Cabin Humidity 车内湿度  
 Air Quality 空气质量  
 Solar Sensor 阳光光照  
 Twilight Sensor 微光



## Chassis 底盘

Steering Pressure 转向压力  
 Suspension Pressure 悬架压力  
 Suspension Acceleration 悬架加速度

## Safety 安全

Stability Control Pressure 稳定性控制压力  
 Brake by Wire Force 线控制动力  
 Brake Boost Pressure 真空助力器压力  
 Air Brake Pressure 气刹压力  
 Fuel Cut Off Acceleration 燃油切断开关  
 Occupant Weight 乘员重量  
 Occupant Presence 乘员感应  
 Steering Position 转向角度

## Transmission 变速箱

AT Pressure 自动变速箱压力  
 DCT Pressure 双离合变速箱压力  
 CVT Pressure 无级变速器压力  
 AMT Pressure 自动手动变速器压力  
 Gear Select Position 档位选择开关

# Broad Pressure Sensor Portfolio

## 全系列压力传感器

<u>Pressure</u>	<u>Application</u>	<u>Type</u>	<u>Technologies</u>
1 Bar	微粒捕捉器 (柴油机)	压差式	微机电结构 (MEMS)
1 Bar	EGR	压差式	陶瓷电容 (APT)
1 Bar	歧管压力 (MAP)	绝对压力	陶瓷电容 (APT)
3 Bar	增压压力 (Boost)	绝对压力	陶瓷电容 (APT)
5 Bar	排气背压	相对压力	陶瓷电容 (APT)
6 Bar	氢燃料电池	相对压力	陶瓷电容 (APT)
7 Bar	电子油泵控制 (GDI系统)	相对压力	陶瓷电容 (APT)
8 Bar	机油压力	相对压力	陶瓷电容 (APT)
10 Bar	CNG/LPG	相对压力	硅应变片技术 (MSG)
12 Bar	自动变速箱	相对压力	陶瓷电容 (APT)
20 Bar	双离合变速箱.	绝对压力	陶瓷电容 (APT)
70 Bar	CVT, AMT	相对压力	陶瓷电容 (APT)
100 Bar	四轮驱动	相对压力	陶瓷电容 (APT)
100 – 200 Bar	汽油直喷 (GDI)	相对压力	硅应变片技术 (MSG)
200 Bar	缸压传感器	相对压力	硅应变片技术 (MSG)
400 Bar	储氢罐	相对压力	特殊的硅应变片技术 (MSG)
1800-2850 Bar	共轨压力	相对压力	硅应变片技术 (MSG)
N/A	OWS座椅承重传感	轴向力	硅应变片技术 (MSG)



**MEMS 技术**



**APT 技术**

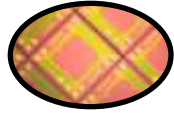


**MSG 技术**

# Sensata Sensors 森萨塔传感器

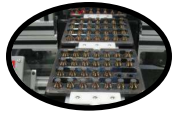
Proven designs,  
components and  
technology platforms

历经市场验证的产品设计,  
元器件选择和技术平台



90 years of best cost,  
high volume  
manufacturing

超过90年的最佳成本控制  
和大批量生产制造



1000's of highly  
engineered, application  
specific sensors

几万个精心设计的针对特  
别应用的传感器产品



Enabling state of the  
art system  
performance

使各种系统性能的提高  
成为可能



And safer, cleaner and  
more fuel efficient  
transportation

保证了交通运输业的安全  
洁净和低油耗



# Attleboro 中心研发实验室



- **寿命测试实验室**

- 多种产品品质检测仪器
- 液压、气压压力循环设备
- 热循环和热冲击测试箱

- **传感器基础实验室**

- 玻璃焊接
- 厚膜工艺
- 导线的焊接

- **电磁兼容性测试实验室**

- 大电流测试
- 带状线测试
- ESD

- **计量实验室 符合ISO10012-1要求**

- **表面分析实验室**

- SEM-EDAX - Auger microscopy

- **金相实验室**

- **环境测试实验室**

- 振动 - 湿度 - 机械冲击
- 腐蚀 - 海拔

- **化学实验室**

- 原子能辐射及吸收光谱法
- 傅立叶变换红外光谱分析
- 符合ISO/IEC指南第25款 “检定及测试实验室必备条件”



# World Class Local Sensor Manufacturing

## 在中国进行世界水准的传感器产品生产制造



Cleanroom Assembly of Sensata's Capacitive Ceramic (APT) Pressure Sensors in Chang Zhou, China

江苏常州森萨塔科技洁净厂房中的陶瓷电容(APT)压力传感器装配线

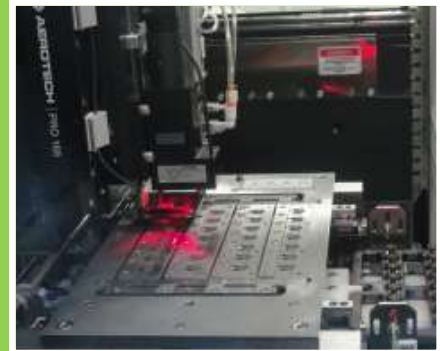
Launched in 1988, hundreds of millions of APT pressure sensors have enabled safety, fuel economy and emissions improvements through applications such as:

自1988年批量生产以来，森萨塔科技的数亿只陶瓷电容压力传感器通过多种应用，使各类车辆变得更安全，更节油和更低排放，如：

- ❑ *Advanced Air-Conditioning Control Systems*    先进的空调控制系统
- ❑ *Engine Control System and Variable Valve Timing*    发动机的控制和VVT控制
- ❑ *Transmission Control*    变速箱的控制
- ❑ *Power Steering System Control*    动力转向控制

# World Class Local Sensor Manufacturing

## 在中国进行世界水准的传感器产品生产制造



Cleanroom Assembly of Sensata's Monosilicon Strain Gage (MSG) Pressure Sensors in Chang Zhou, China

江苏常州森萨塔科技 洁净厂房中的硅应变片(MSG)压力传感器装配线

Launched in 2000, more than one hundred million MSG pressure sensors have enabled safety, fuel economy and emissions improvements through applications such as:

自2000年批量生产以来，森萨塔科技MSG压力传感器累计供货超过1亿只，广泛应用于各种控制系统中，使各类车辆变得更安全，更节油和更低排放，如：

- ❑ *Electronic stability control braking systems*
电子稳定性控制刹车系统
- ❑ *Gasoline and diesel direct injection systems*
汽油和柴油发动机的燃油直喷系统
- ❑ *Occupant safety control*
乘员安全控制系统
- ❑ *In-cylinder pressure sensing*
发动机缸内压力感测

# Rapidly Increasing Local Engineering Capability

## 快速成长的国内工程研发能力

### □ Gradually maturing local sensor design team above 20 people with >50% PhD & MS

逐渐成熟的国内传感器研发团队二十多人，其中博士和硕士达**50%**以上。

### □ Independent APT design capability for China NBOs

成熟的**APT**产品设计能力可独立支持国内业务

→ Developed and launched AC APT for **worldwide** replacement of competitor's sensor

为森萨塔全球研发并投产一款低成本空调压力传感器，成功取代竞争对手

### □ Increasing MEMS & MSG design capability

快速增长的**MEMS&MSG**产品设计能力

→ Independently developed and launched one bushing T-MAP

独立开发并投产单个安装孔的T-MAP传感器

→ Developed generic DPS for **worldwide** small volume DPS NBOs

为森萨塔全球开发出通用的DPS传感器

→ Ongoing MEMS NBOs include vacuum booster pressure sensor, NextGen T-MAP

正在进行的 MEMS 项目包括真空压力传感器，新一代T-MAP传感器

# Rapidly Increasing Local Lab Capability

## 快速增强的国内实验室能力

- Environment ovens, T-shock ovens, humidity & temperature oven, high temperature oven, vibration bench, calibration bench, pressure cyclers. Will have die/wire bonding equipment 1Q 2011. Quick support to local customer  
逐渐完备的实验室拥有各种环境温箱，热冲击箱，温湿度箱，高温箱，振动台，压力循环试验台及多台标定设备。明年1季度将拥有die/wire bonding 设备。对国内客户提供快速支持
- Can now perform 75% of typical DV/PV tests in local engineering lab  
本地实验室可完成约75%（30多项）的标准DV/PV测试项目
- Can now perform 80% of failure analysis in local engineering lab, quick response to customer  
能够对80%的返回品进行实效分析，实行对客户投诉的快速反应
- Can make sample for APT, MSG, and MEMS product in 1Q 2011. Can provide quick customization per customer request  
明年初具备几乎所有压力传感器产品的本地样件制作能力，可以为客户提供快速定制服务




# Local Laboratories

## 完善的试验设施



**Sensor Characterization & Durability Analysis ChangZhou**  
传感器性能, 可靠性测试



**Metallurgy & Failure Mode Analysis ChangZhou**  
物理特性 失效模式分析



# Global Business Units

- Sensor Products



- Control Products



# Control Business

## (RAC) Room Air-conditioning



Copeland Danfoss  
Carrier Mitsubishi  
Trane Sanyo  
Lennox Hitachi  
York Daikin  
Tecumseh Chunlan

## Aerospace & Defense



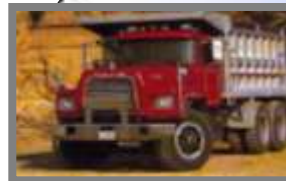
Boeing General  
Dynamics  
Canadair NASA  
Sunstrand Raytheon  
United Technologies

## (REF) Refrigerator



Whirlpool GE  
Electrolux Maytag  
LG Matsushita  
Sanyo Besco  
Haier Samsung  
Embraco Danfoss

## Off-Road/Heavy Vehicle



Caterpillar, Mack,  
Case, Paccar  
John Deere,  
Navistar

## Automotive



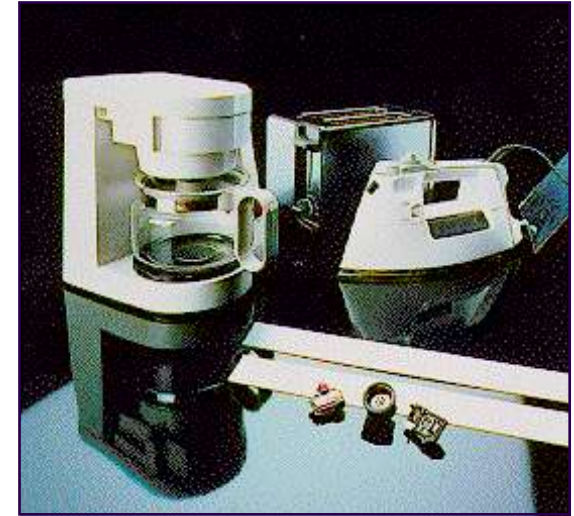
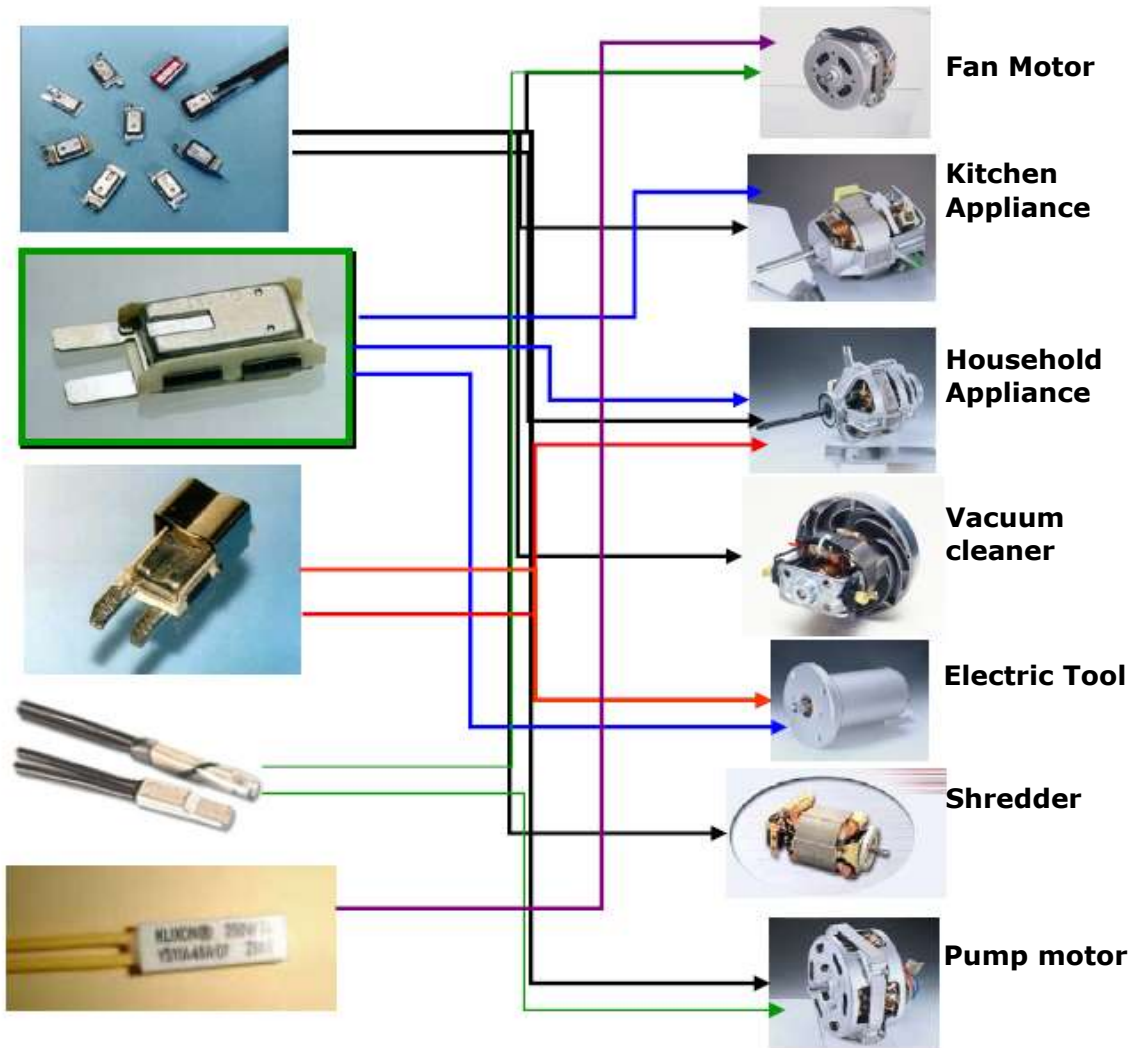
GM  
Ford  
Daimler Chrysler  
Honda  
BMW  
Volkswagon

## (L&I) Lighting/Industrial



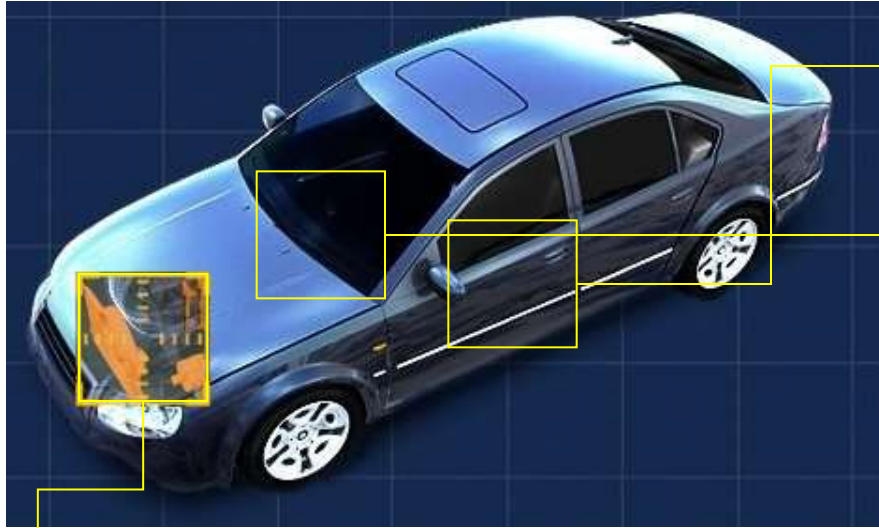
Advance Square D  
Baldor Emerson  
Magnetek Siemens  
AO Smith LG  
Samsung Bosch  
Matsushita Mitsubishi  
Kusatsu Shaibauri  
Digital Lighting

# Applications in Appliance Segment (AC)



# Applications in Automotive Segment (DC)

## Markets



### Low Current / Power



**Seat adjust**

**Window Lift**

**Sunroof**



### High Current / Power



**Blower HVAC**

**SAP (Secondary Air Pump)**

**ECS (Engine Cooling System)**

### Mid Current / Power



**Front Wiper**

**Rear Wiper**



# Room Air - Conditioning Motor Protector



# Air Conditional Compressor Motor Protectors



**External**

**Internal**

**1-Phase**

**3-Phase**

**1-Phase**

**3-Phase**



3/4 Inch

**0.5-2HP**



**3/14/15/16HM**



**18HM**



**31/32/33HM**



**34HM**



**35HM**



**37HM**

**0.5-16HP**

# Why need motor protector?

## Air-Conditioning System Fault

Hot Environment Temperature

Fan Block



Overload  
Running

Capacitor Short

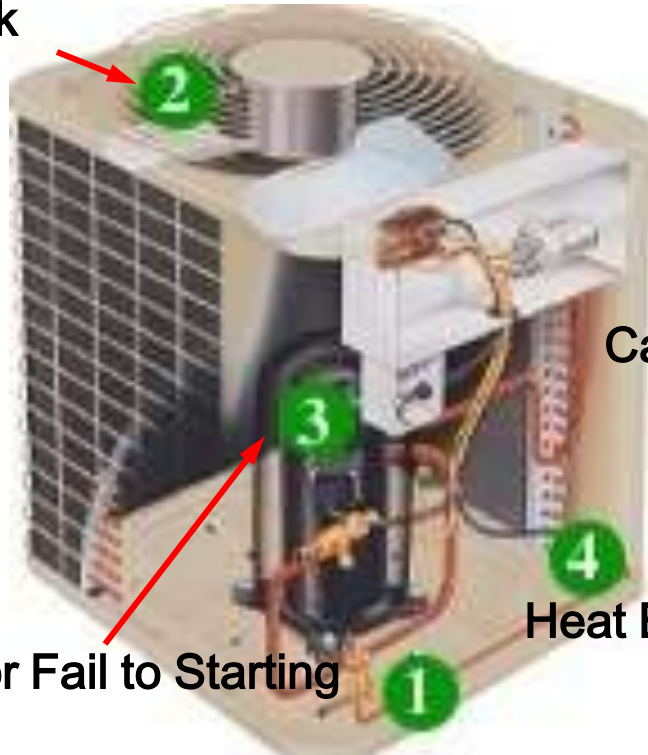


**Motor Burnt**  
**Danger of electric shock**  
**Indoor unit Fire**

Compressor Fail to Starting

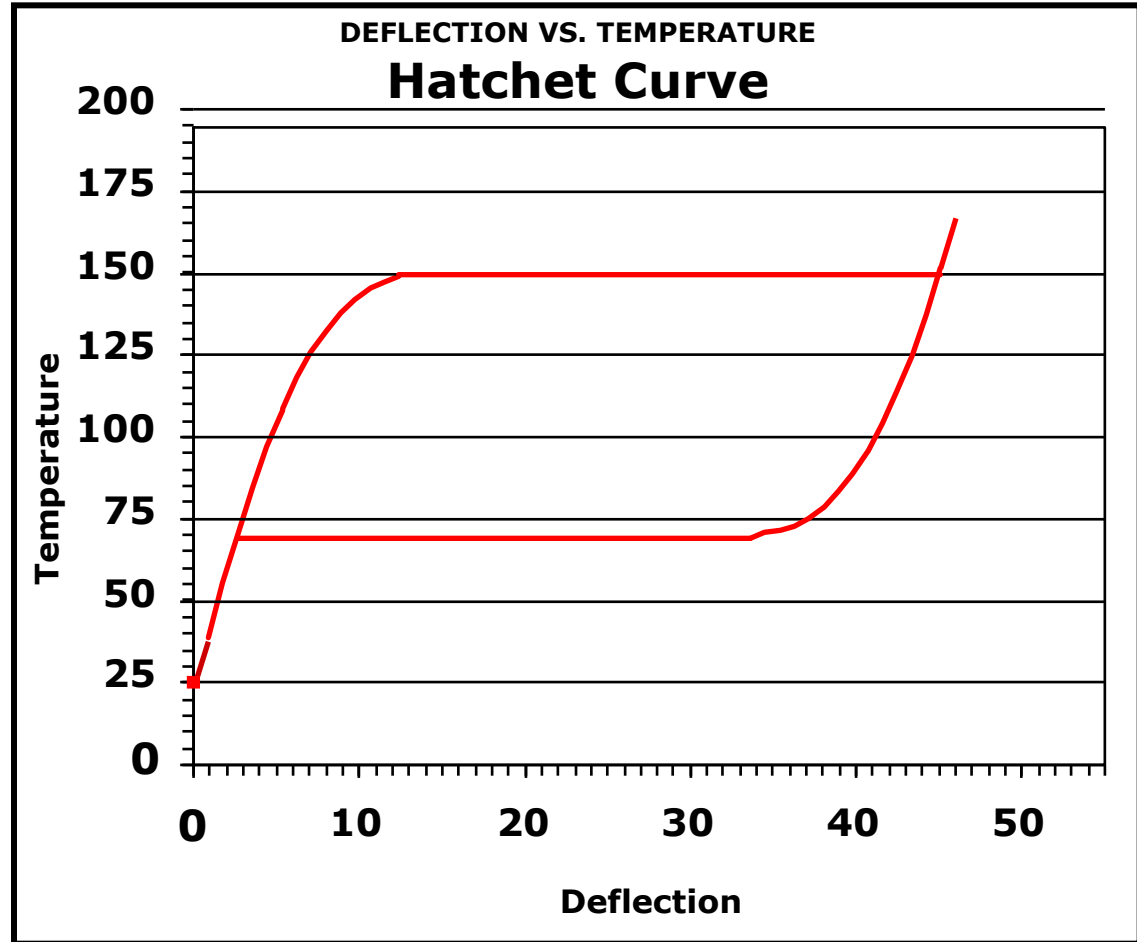
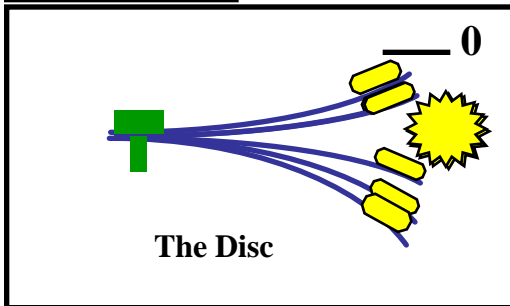
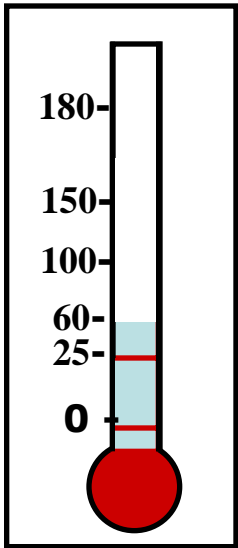
Heat Exchanger Block

Loss of Charge (Welding Leakage)





# Core Technologies

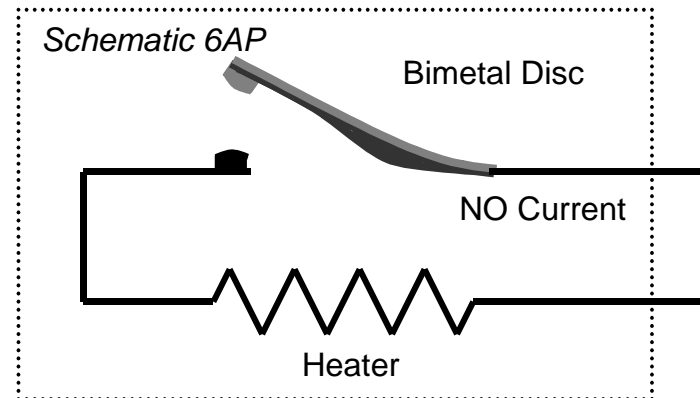
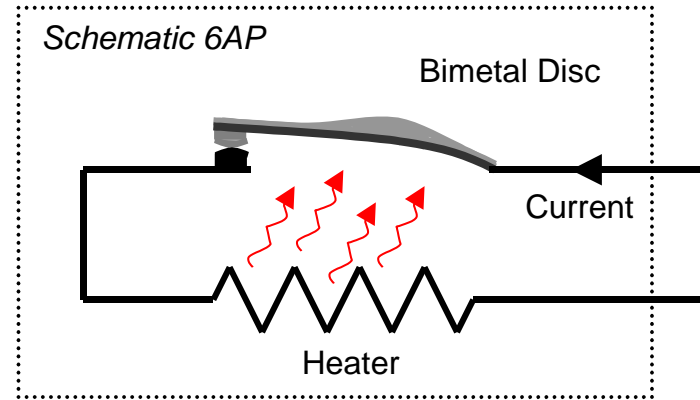
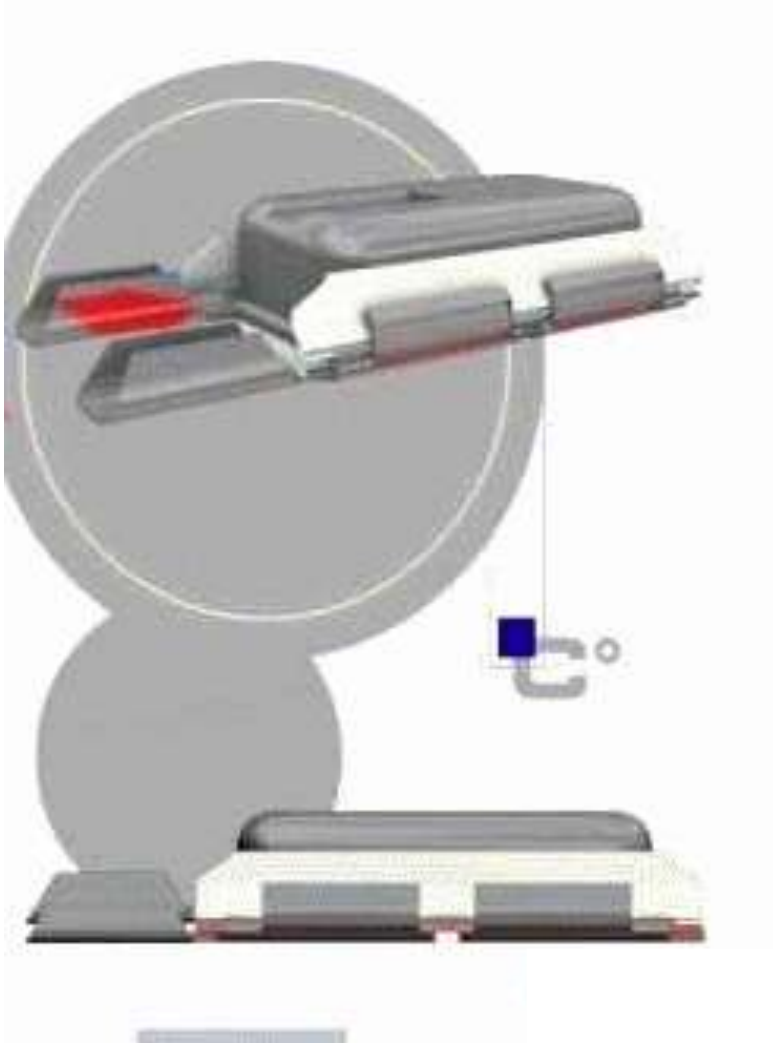


**Force = 0**

**Temperature = Varied**

**Deflection = Measured**

# Core Technologies



# Controls Laboratory in China

- [Application Test Lab](#): protector type selection, application tests. laboratory reports, advices, technical support to customers and sales
- [PPD Lab](#): Product reliability testing, environment testing, temperature check, UT testing etc.
- [Eng. Sample Line](#): 6AP sample making to support global business



Application  
lab

Eng Sample  
line

Reliability lab



Sensata  
Technologies

**SENSATA CHINA**

**森萨塔科技中国**

The World Depends on Sensors and Controls

# Sensata Technologies China

森萨塔科技中国



## Sensata Baoying 森萨塔宝应

## Sensata Changzhou 森萨塔常州

## Sensata Shanghai 森萨塔上海

- Expansive product portfolio trusted by global leaders  
提供被全球客户信赖并广泛使用的众多系列的传感器和控制器产品
- Local engineering, manufacturing, labs testing, analysis and service  
本地化研发设计, 试验, 制造, 分析和服务
- Cost-effective, best-cost manufacturing and on-time delivery  
高性价比, 最佳制造成本, 准时交货

# Welcome to CHANGZHOU SITE

## *Sensata Technologies Changzhou Co., Ltd*

Located in new Changzhou  
Electronics Park

- Started in Dec, 2004
- 4 floors @ 5000m<sup>2</sup>/floor
- 1200 manpower (Oct'2010)
- Space utilization = 80%
- ISO 9001, ISO14001, TS16949 certified
- **“Striving for Excellence”**



# SENSATA CHANGZHOU – moving up the VALUE CHAIN





**Sensata**  
Technologies

# Manufacturing Floor





# Welcome to BAOYING SITE

- 宝应工厂始建于**1996年**， 扬州外企前列
- 地处江苏宝应经济开发区， 占地总面积**3.6万平方米**， 建筑面积3.8万平方米
- **44条**生产线
- 员工人数达**2450人**， **公司可以提供免费食宿**
- 政府支持发展：**本科毕业生人才补贴/提供优秀人才廉价住房**
- **GB/T19580**卓越绩效评价准则， **ISO14000**， 产品制造和品质管理达国际先进水平
- **“Striving for excellence”**
- **“热情、挑战、未来”**





# 于2011年元月开工的5号厂房规划图：5层共3万平方米



# Shanghai Office





Sensata  
Technologies

# CULTURE & CAREER

## 森萨塔的文化与职业发展

The World Depends on Sensors and Controls



# Unique Culture

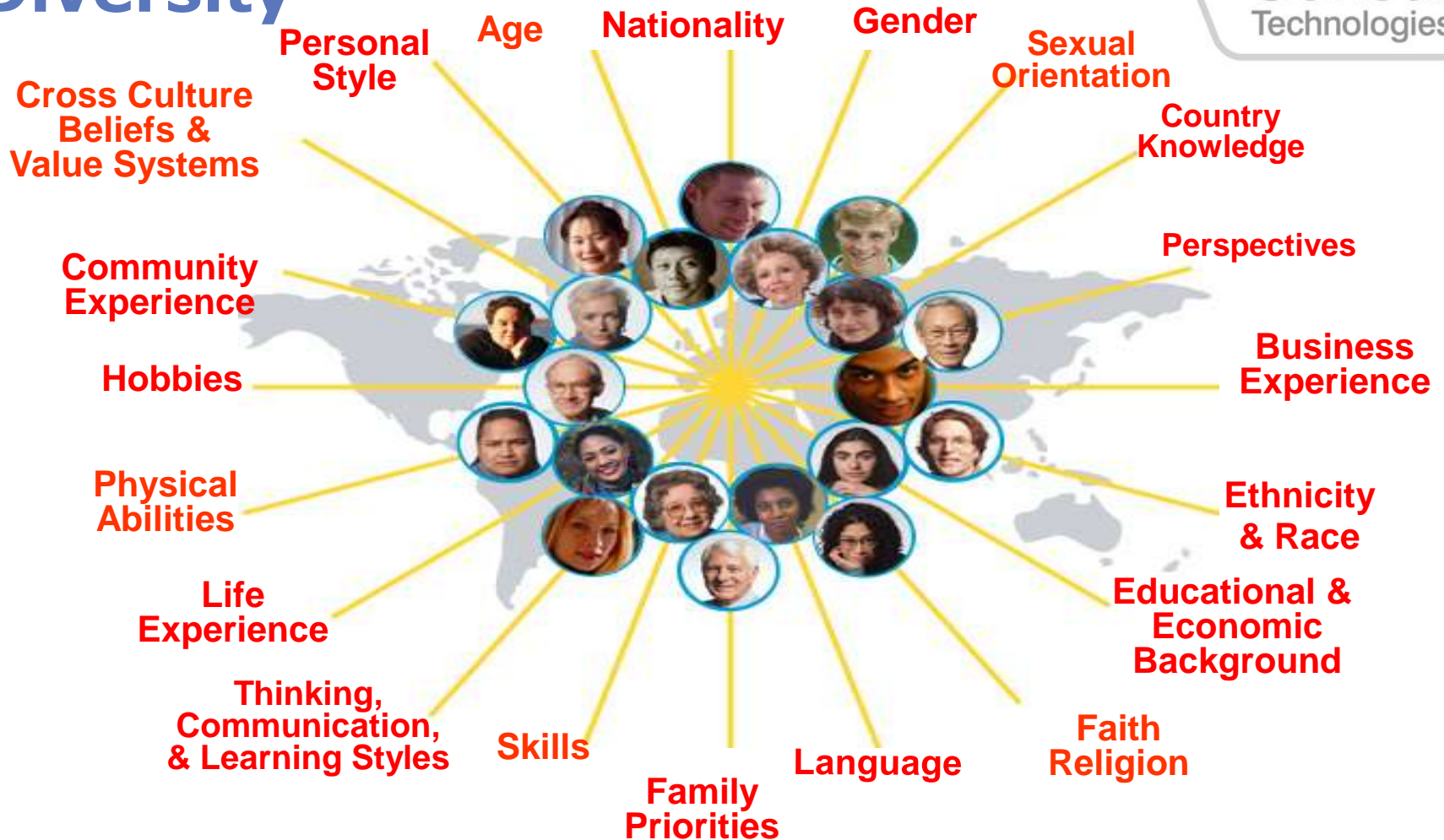


**High Ethical  
Standard**

**Winning working  
environment**

**Respect, trust and  
care for people**

# Diversity



We support an inclusive workplace in such areas as:  
customs, language, age, race, gender, exempt vs. non-exempt, geography,  
religion, education, abilities, culture, traditions, sexual orientation and more.

# Career Path in Sensata



## LEADERSHIP COMPETENCIES

- Defining technical strategy
- Effective project execution
- Influencing Customers
- Innovation
- Knowledge Sharing & Networking

Technical Leader

Manager



## MANAGEMENT COMPETENCIES

- Planning, budgeting, organizing, staffing
- Organizational development
- Employee compensation

## TECHNICAL COMPETENCIES

- Breakthrough innovation
- Automation and Mechanization
- Defect reduction
- Test engineering
- Software development

Supervisor

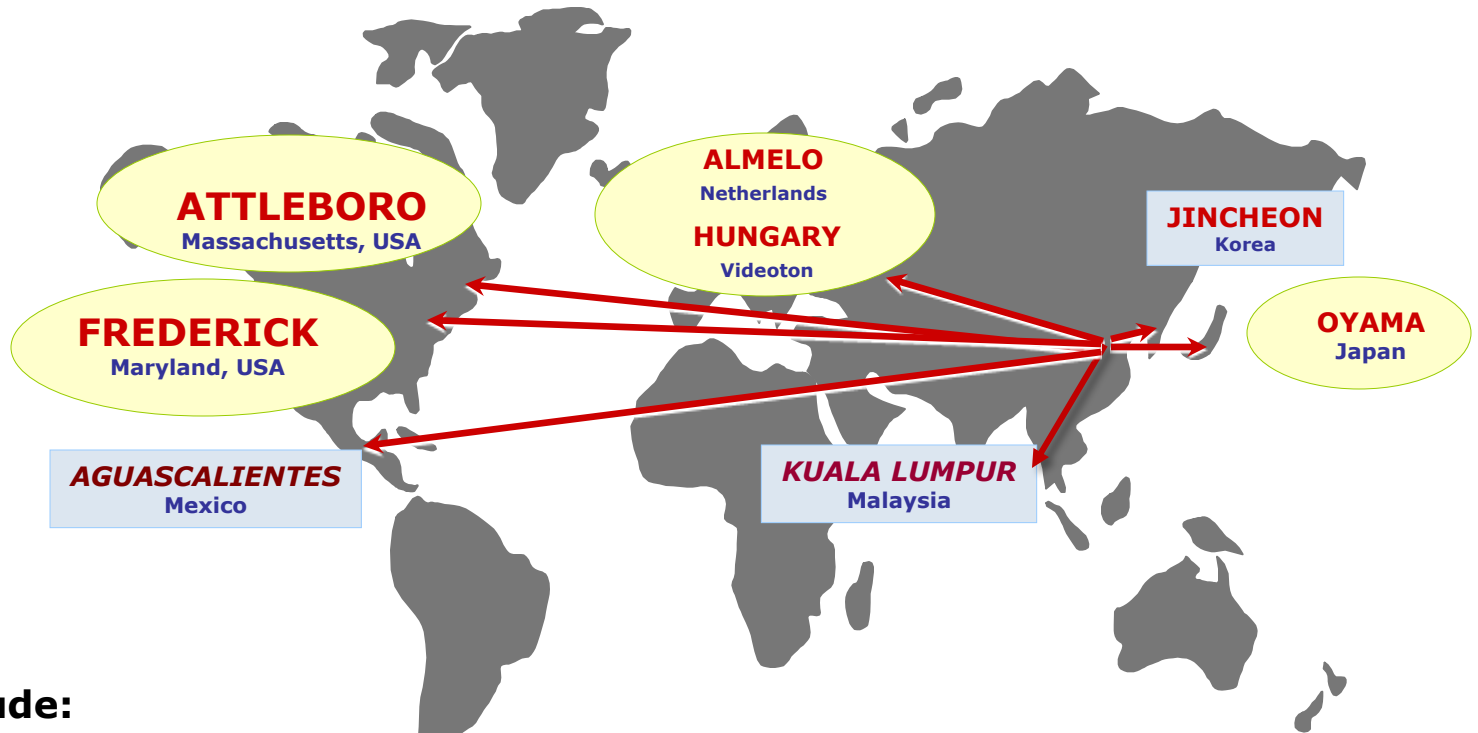
Mfg Facilitator/  
Engineer

Technician





# Overseas Training in 2007-2010



## Trainees include:

- Engineers
- Manufacturing supervisors
- Planners
- Finance group
- Technicians
- Operators

# WELCOME to join us...

## *WHY choose Sensata?*

- **Innovative products that make a real difference** (真正发挥作用的创新产品)
- **Significant personal growth and professional development opportunities** (丰富的个人成长和职业发展的机会)
- **Managers who inspire, coach and develop** (能激励、辅导和发展员工的管理层)
- **Global exposure to world-class talent** (接触世界一流的工作团队)
- **Results-driven culture and rewards system** (结果导向的文化和奖励制度)
- **Leading global company with strong, local decision making** (拥有良好地方决策的全球领先企业)
- **Valued neighbor and business partner with reputation of unwavering integrity** (诚信为本使我们成为令人信赖的邻居和商业伙伴)

**“A place where you can grow and make a real difference”**

**“森萨塔成就你不一样的未来”**

# Job Opportunities

We will provide job opportunities for the following openings in Sensata China

**For 2011 Bachelors**  
**Internship to Employment**

**For 2011 Masters**  
**Employment**

- **Mechanical Engineer (Sensors)** Location: Changzhou  
传感器产品设计；汽车客户应用问题解决
- **Mechanical Engineer (Controls)** Location: Changzhou  
控制器产品设计与测试分析；实验室管理
- **Equipment Engineering** Locations: Baoying/Changzhou  
生产制造设备性能提升以确保运营最优化
- **Process Engineering** Locations: Baoying/Changzhou  
制造工艺和良率提升以确保运营最优化

# Internship Q&A

**Q: When can I start working with Sensata if passed interviews?**

**A:** We welcome you to get onboard with us as soon as your school curriculum is completed. [For bachelor students](#), usually you will go through a 3~6 months' internship with us before you get your degree for a formal employment in July 2011. You can have your thesis project done in Sensata with the permission of your professor and it is fine for you to go back to school for thesis debating before graduation. [For master students](#), we will provide direct employment if you have your degree in hand while join us in March or April 2011.

**Q: What job will I work on and what training will I have in Sensata?**

**A** [For bachelor students during your internship](#), we will assign a mini project for you to work on; you will have an experienced supervisor/engineer to work with you as your "buddy"; mid-term and full-term evaluations to your internship performance will be the reference for your final employment. [For both master and bachelor students after employment](#), we will provide new hire orientation sessions and probation evaluation for you to get into the job and organization as quickly as possible.

**Q: What will be the pay for internship or formal employment?**

**A:** Sensata payment system is based on job grade and our pay will also move with market data. The monthly pay for [master formal employment will be around 6K](#); while it will be [4K for bachelor formal employment](#). For bachelor students [during your internship](#), a basic pay of [2K/month](#) to support your life will be provided.

**Q: Will there be any support in our relocation?**

**A:** Sensata Baoying will provide [dormitory and working meal](#) while Sensata Changzhou will provide [shuttle bus and working meal](#) to our employees. Meanwhile, Baoying county and Changzhou city [government provide special allowance to bachelor/master degree talents](#).

# Contact Us

## Sensata Technologies Human Resources China

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