



RKF Automotive

Expert in
Thermal Management Module(TMM)

I. RKF Overview

II. Product & Application

III. R&D and Production

IV. Quality Control



Basic Information

- **Founded** in 2004, national high-tech enterprise
- **Total Assets:** RMB 50,000,000
- **Plant Area:** 7000m²+10000 m² (to be constructed)
- **Staff & Equipment:** 130+ staffs, 100+ equipment
- **Capability:** Design, R&D, Mold making, Production, Inspection

The whole process is completed in-house.

- **Main products:**

Thermal Management System – TMM Thermostatic Valves

Electronic Fuel Injection - Fuel Filter

- **Annual Capacity:** TMM Thermostatic Valves- 300,000pcs,
Fuel Filter - 1,000,000pcs

- **Lead Time:** TMM Thermostatic Valves - 45 days, Fuel Filter - 30 days
- **Certificate:** IATF 16949:2016, ISO 14001:2015, ISO 45001:2018
- **Patent:** 7 Utility Model Patents



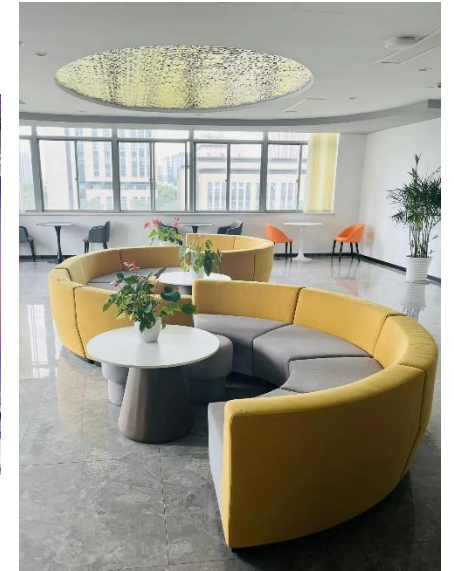
I. Company Overview

Location



Plant

Houwan Industrial Zone, Yuhuan, Zhejiang Province



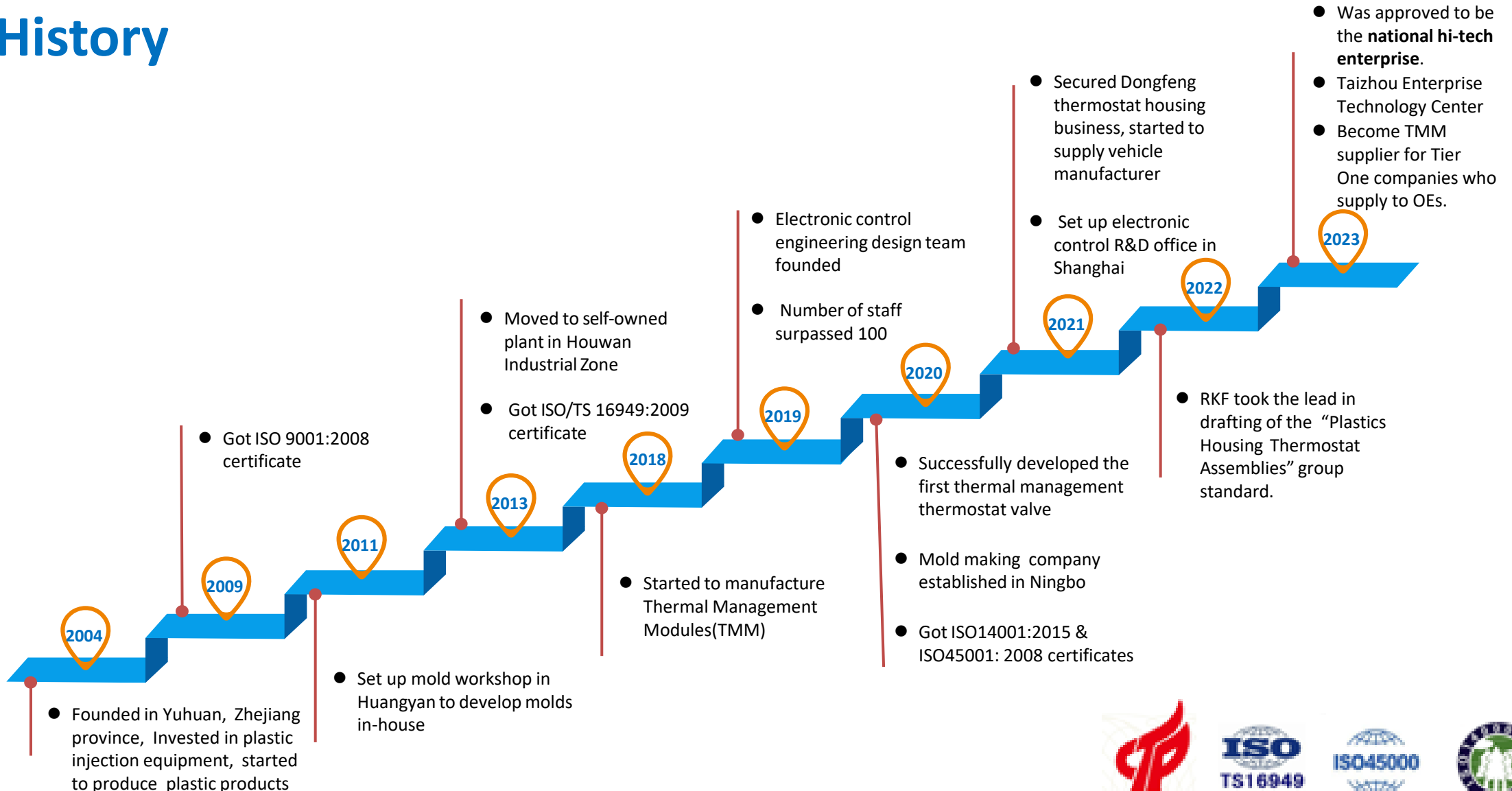
Shanghai Office

Adjacent to Xu Jiahui Core Zone
Convenient transportation



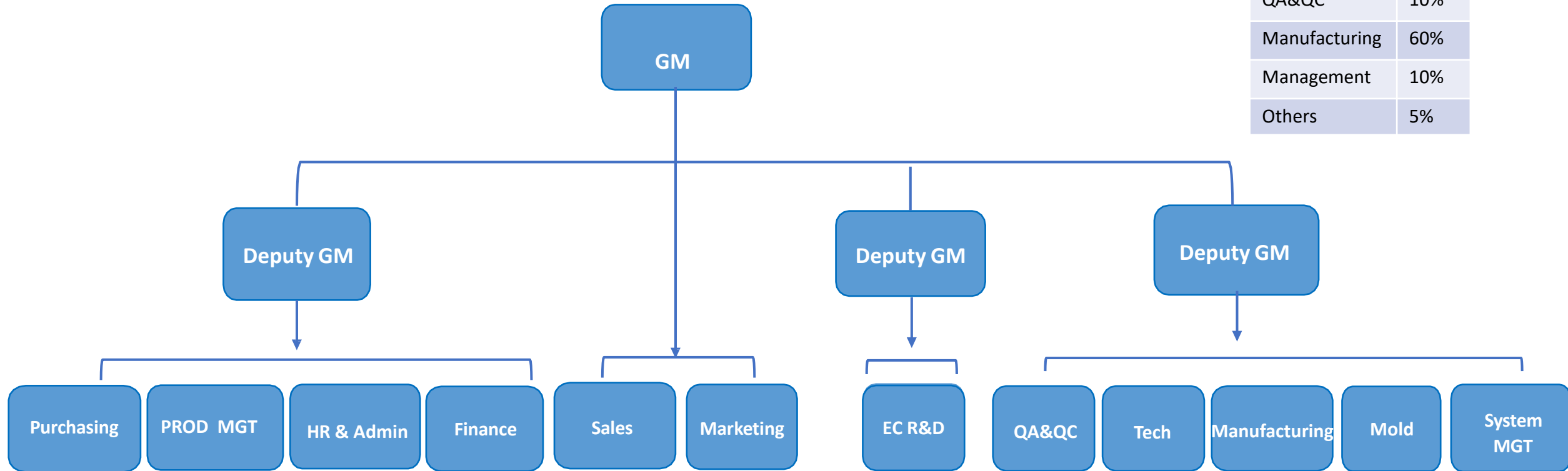
I. Company Overview

History



I. Company Overview

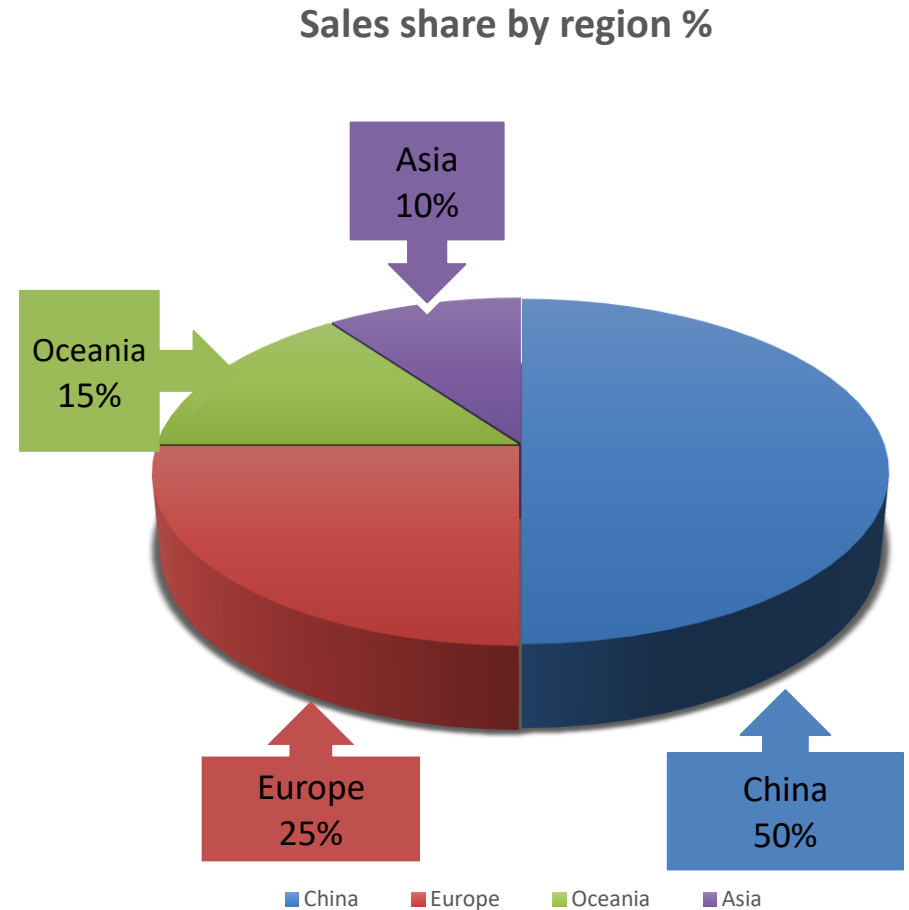
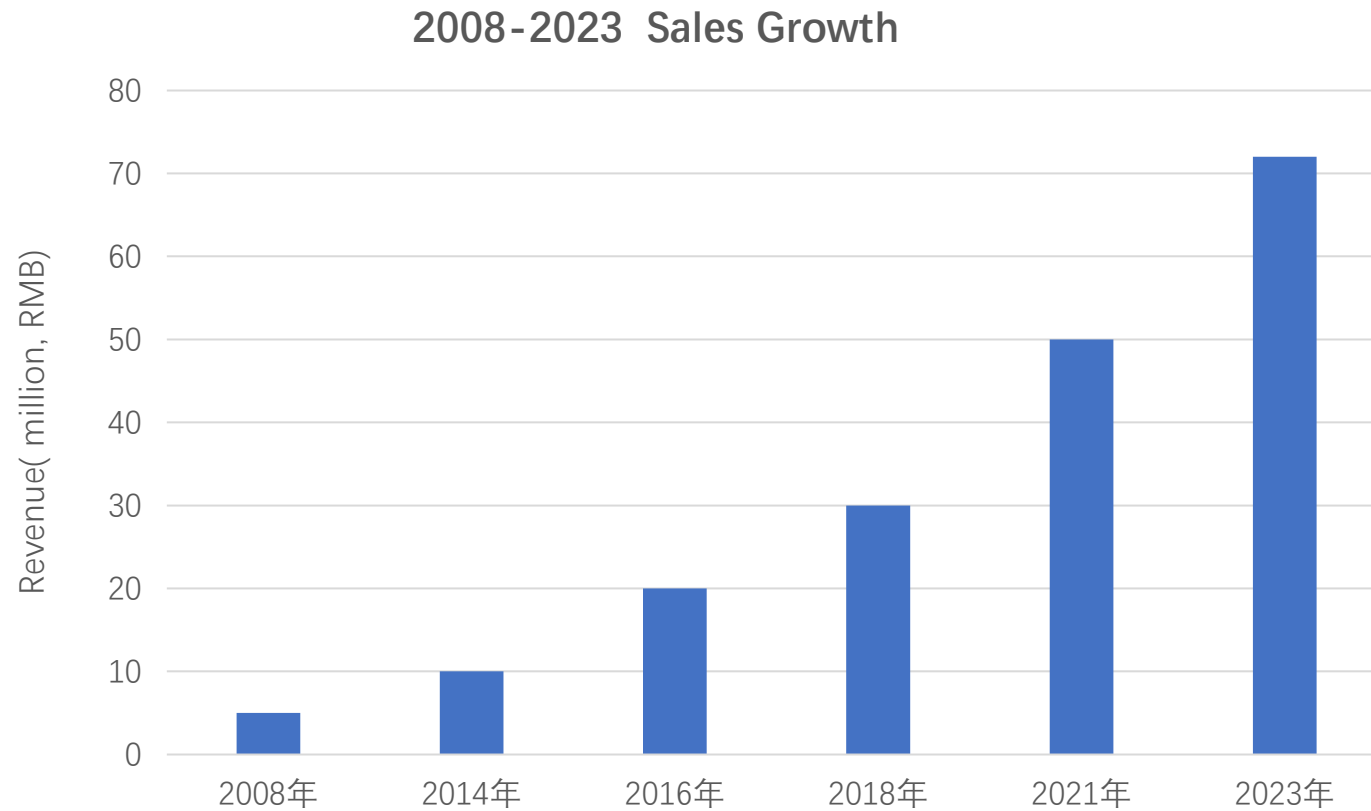
Organization Chart



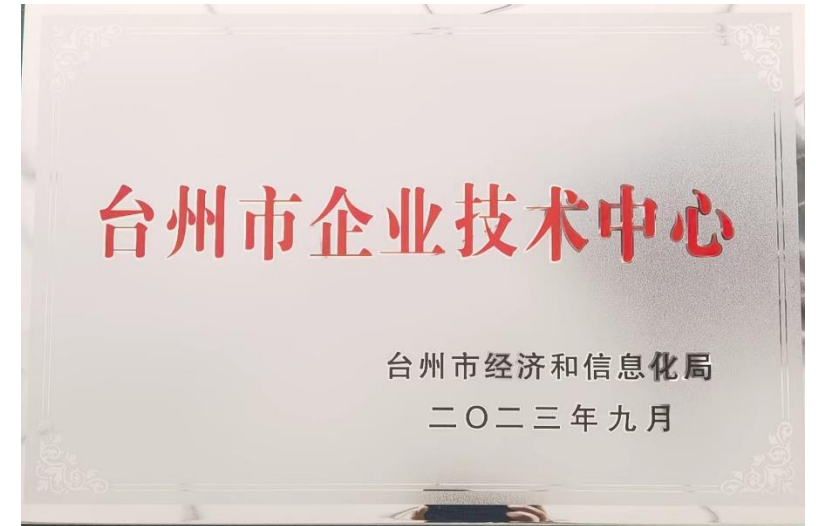
No. of Staffs	130+
R&D and Technology	15%
QA&QC	10%
Manufacturing	60%
Management	10%
Others	5%



Sales Growth and Regional Share



I. Company Overview



Certificates

IATF 16949



ISO 45001

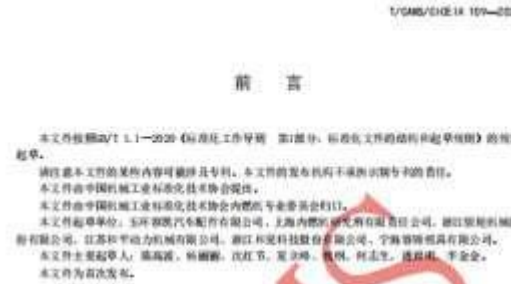


ISO 14001



Industry Contribution

RKF took the lead in drafting of below Group Standard in 2022.
 “Internal Combustion Engine - Plastics Housing Thermostat Assemblies”

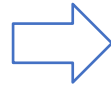


CAMS - China Association for Machinery Standardization
 CICEIA - China Internal Combustion Engine Industry Association



Thermal Management Products

OE Market



Aftermarket



Electronic Thermal Management (ETM)



Thermal Management Module (TMM)



Thermal Management Module(TMM)



Water Pump Integrated



Double Control Units



One Control Unit

- **Advantages:**
 - Raw material and component supplied by OE suppliers
 - Engineering design, R&D, and production completed in-house
 - Inspections covers whole production process
- **30+ SKU, application covers:**
 - Audi / VW
 - BMW
 - Benz
 - PSA
 - Hyundai
 - Great Wall
 - Continuous range development

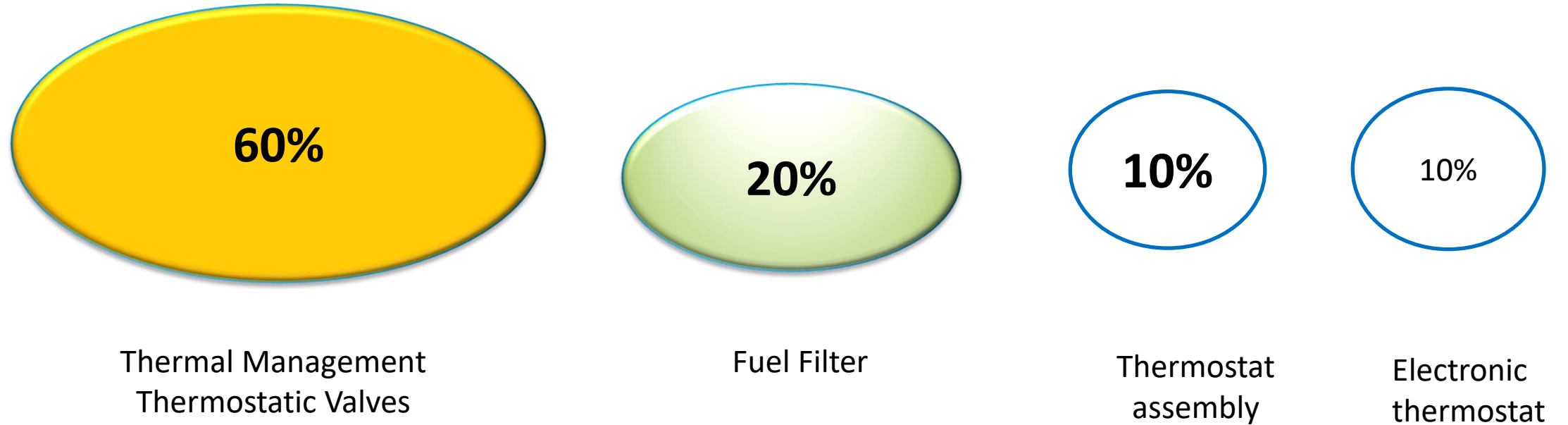
OE Performance Standard:

- Working temp.: -40 ~ 135°C
- Working Voltage: 9V ~ 16V
- Medium Temp.: -40 ~ 135°C
- Whole process Response Speed: @12V(RT)1.46S(263°)
- Rotation Stroke: 263°
- Maximum Flow: 130L/S
- Working Pressure Range: 3.6Bar
- Pressure Drop: main channel 130L/min, 160mBar

* Remarks: Performance parameters based on the corresponding products for EA888 engine.



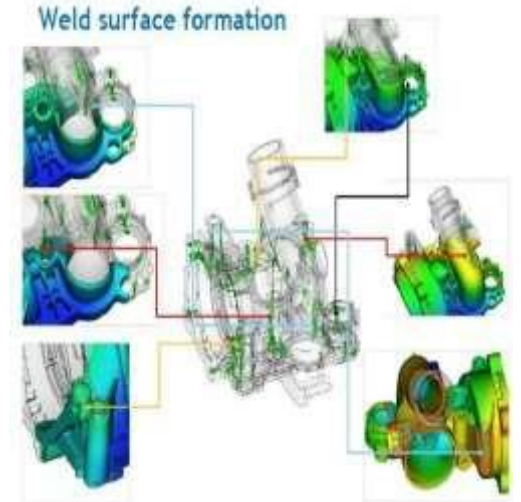
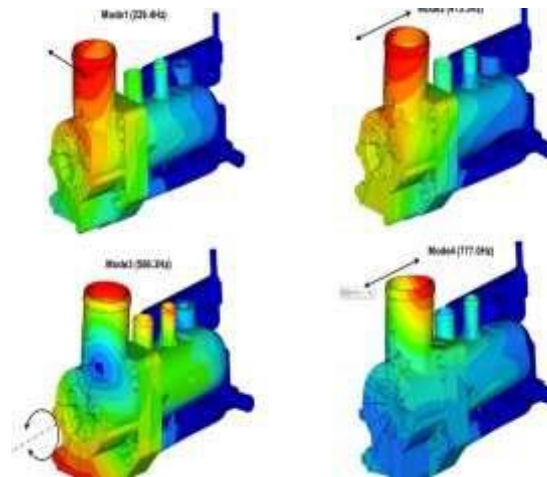
Sales Share by Product



III. R&D and Production

- Professional team with expertise Fully understand customer needs, conduct in-depth project review accordingly
- 3D printing technology Conduct preliminary analysis and product feasibility demonstration
- Design and Verification capability
 - CAE Strength and Failure Analysis
 - Model Flow Analysis
 - Reverse Optimization

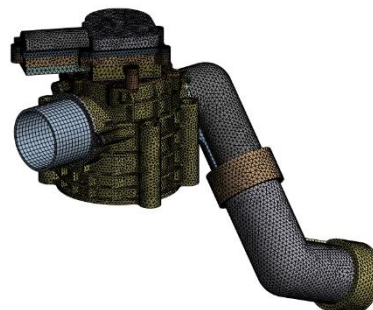
Model Flow Analysis



RFB
2024/07/12 11:04



RFB
2024/07/11 16:25



CAE Strength & Failure Analysis





3D Printer



CNC



CNC Engraving

Mold Design & Making

- Professional team, rich manufacturing experience, 1300+ mold developed by RKF in-house.
- RKF mold featured in high design precision and long lifespan in utility.
- Some molds use hot runners to prevent deformation and make dimensions more stable.
- Own high-precision mold making and processing equipment, perform inverter correction on molds.



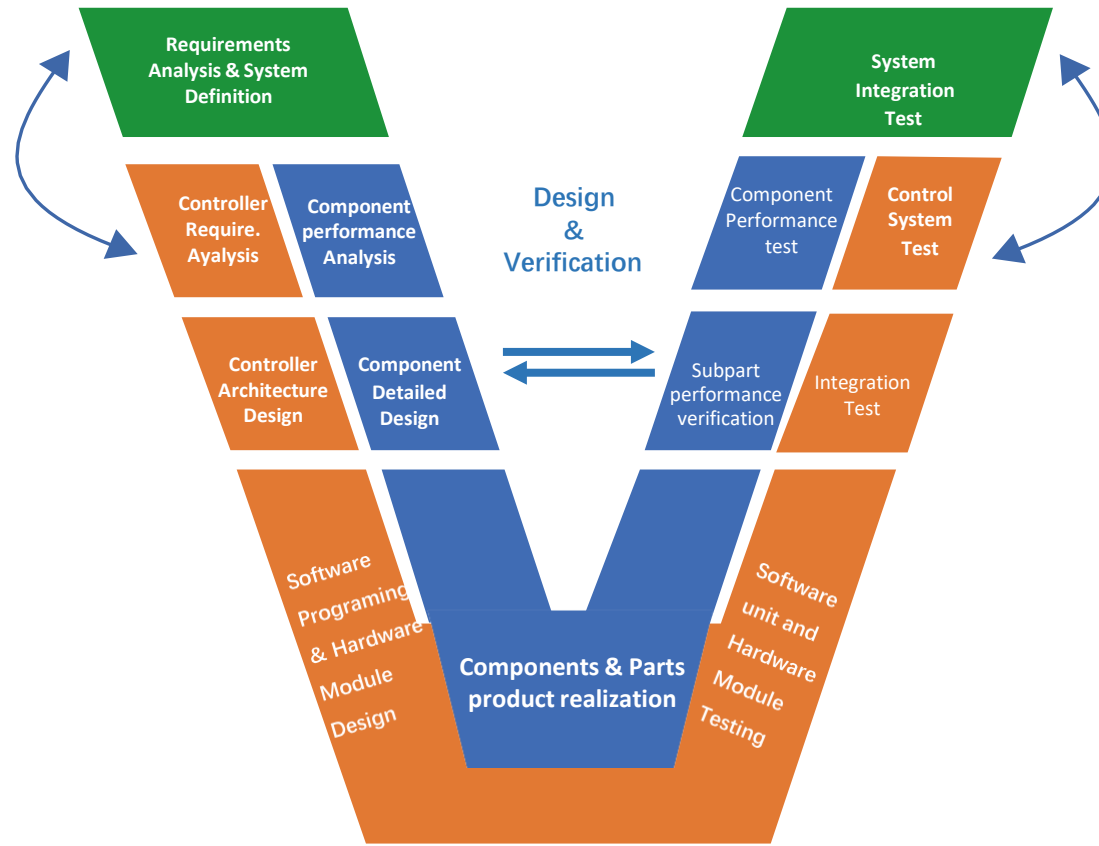
EDM



Mold Warehouse



EC R&D Process V-Shaped Principle



Reasonable teardown of software & hardware requirements \Rightarrow Lean and efficient TMM Solutions



Team of Experts

- All team members have professional background in automotive electronics.
- The full-time EC Design Team includes:
 - ✓ 2 Master Degree ENGR
 - ✓ 4 Bachelor Degree ENGR
- External Technical support advisory team includes:
 - ✓ 1 PROF in university
 - ✓ 1 Sr. ENGR
 - ✓ 2 Ph.D.
 - ✓ 2 Master Degree



Expertise

- Developed PWM control and LIN control, which have been put into mass production
- Currently developing CAN controller
- The expansion can be applied to different forms of inductance solutions (including angular displacement, linear displacement, and inductive displacement).



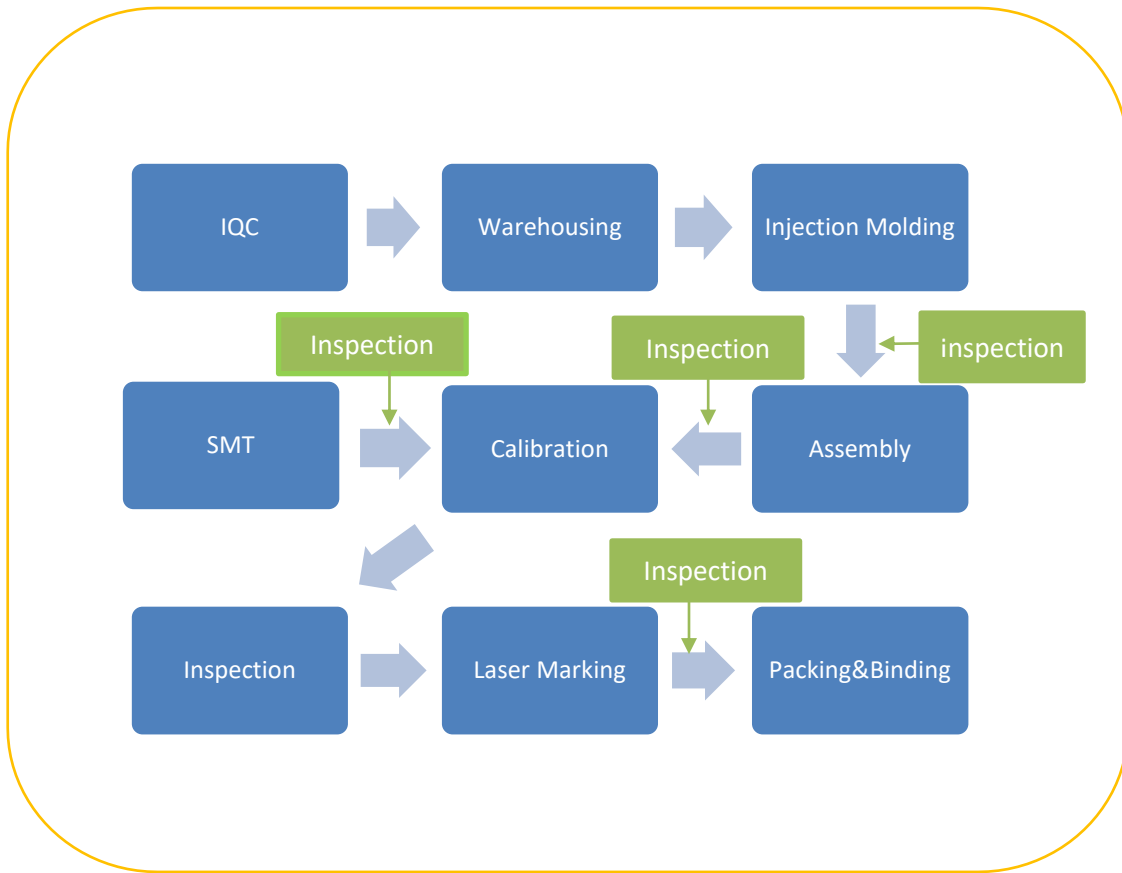
Patents

7 Utility Model Patents & Design Patents

No.	Patent Number	Patent Description
1	ZL 2020 2 2579161. 4	A split installation structure for the control actuator on the automobile thermostat control valve
2	ZL 2021 2 1591121. X	A body rotation angle testing equipment for electronic thermostat valve
3	ZL 2021 2 3047571. 5	A split installation structure for the drive execution module on the automobile thermostat control valve
4	ZL 2022 2 0515123. 9	A thermostat control valve with a silencer structure
5	ZL 2022 2 1807716. 9	A vehicle-mounted seal testing device for thermostat control valve
6	ZL 2022 2 1874496. 1	A kind of thermostat control valve for automobile cooling system
7	ZL 2022 2 1951098. 5	A plastic chamber low-stress injection molding equipment



Production Process



Thermal Management Module(TMM)



Workshop



Injection Mold Workshop



Injection Mold Workshop



Tooling Workshop



Fuel filter Workshop



TMM Workshop



Bench Test Lab



Workshop



Welding



Welding



Assembly



Manometry/Pressure Test



Inspection



Assembly Line



Featured Suppliers

Plastics



Chip



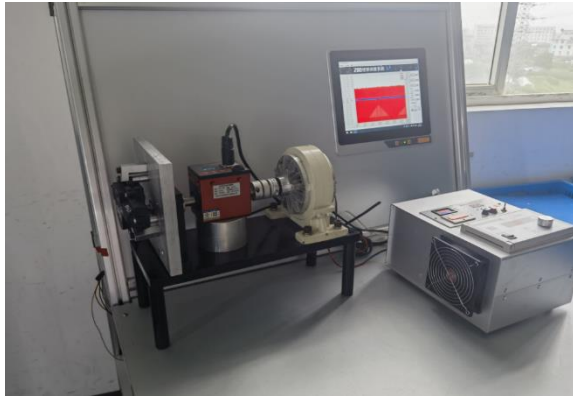
Component



Seals



IV. Quality Control



Actuator Dynamometer



Tension Test



Air Tightness Test



Blasting Test



3-Coordinate Measuring

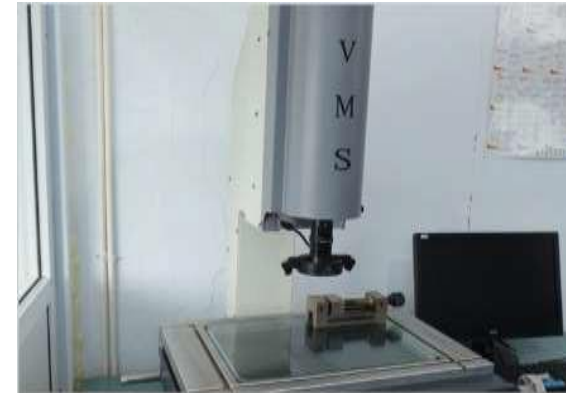


Image Measuring



IV. Quality Control



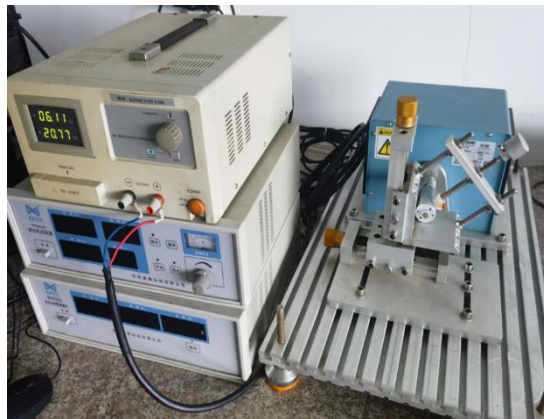
Vibration Test Bench



High-Low Temperature Test



Bench Test



Motor Performance Test Bench



Immersion Test



Intelligent Outlet Valve Driver Online Calibration



**Thermal Management Module
(TMM) Expert**

Thanks!

