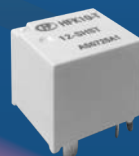
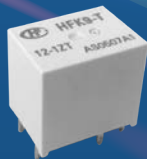


HONGFA AUTOMOTIVE ELECTRONICS

RELAY TECHNOLOGY FOR AUTOMOBILES

ISO/TS16949 ISO14001 OHSA18001 IECQ QC080000 CERTIFIED



HongFa Global Service



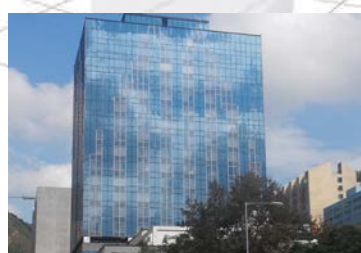
Distribution & Logistic Centers



California, North America



Germany, Europe



Hongkong, China



Shanghai, China

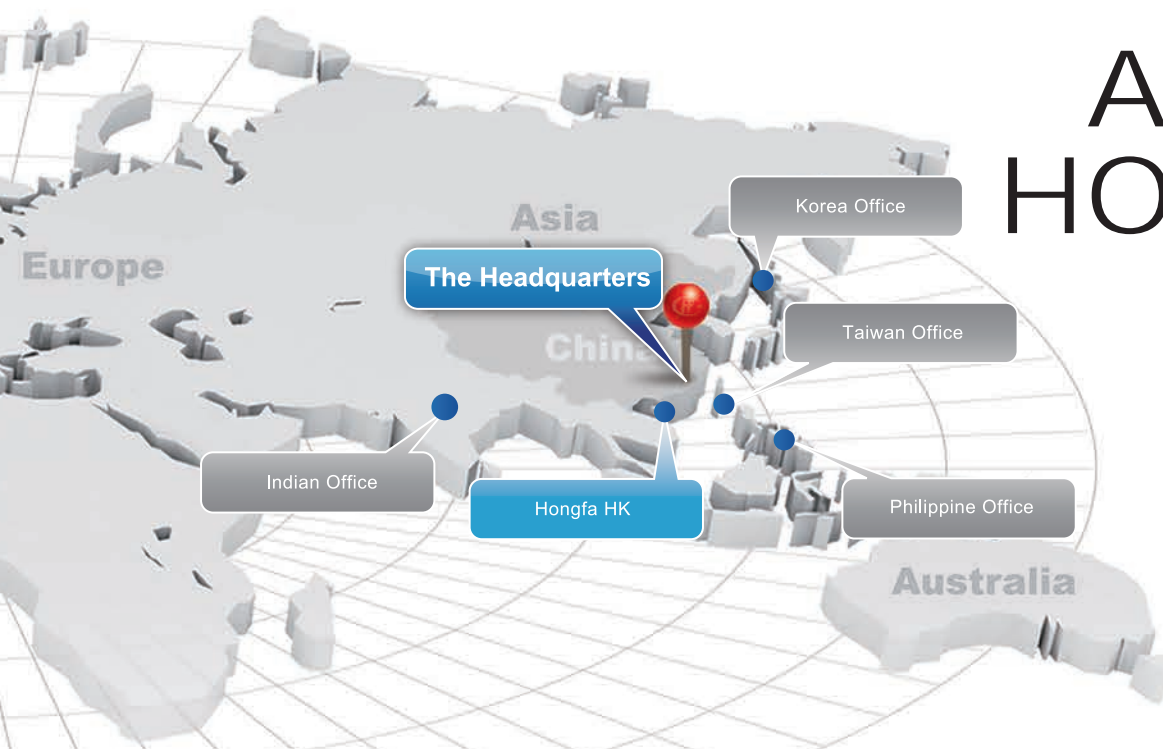
Hongfa (Hongfa stock code: SH600885) is a globally famous relay manufacturer with an annual production capability of 1.8 billion units. Hongfa has maintained the largest position in China for two decades in relay research, manufacturing, and exportation. Hongfa's enterprise spirit "Persevere for Progress, Strive for Excellence" with the operational philosophy "Focusing on the market; Winning through Quality" drives our continuous growth. Utilizing our enterprise spirit and operational philosophy, Hongfa became a first-class relay research and manufacturing company with focused over 30 subsidiaries located in 10 manufacturing campuses and multiple distribution centers with floor space of more than 740 thousand square meters (~7.64 million square feet). We export relays to more than 120 countries utilizing our local sales, customer service, application engineering, and material planners located in Europe, North America, and Asia. Our local sales and Sales & Distribution Centers work in the local regions to provide the support to our customers' needs. We service customers in the market segments of industry, energy, transportation, communication, household appliances, medical, national defense, etc.

With thirty-years of experience in relay R&D and manufacturing, Hongfa "Strives for Excellence" by embracing our technology. Hongfa focuses on product development while adopting the leading technology in this industry. Hongfa has a national level R&D center with the largest testing laboratory in this industry. Our fully-equipped facility maintains the most advanced technology. Hongfa developed the first Post-doctoral Research Program. Our engineers and scientists push the relay industry and they influence many professional and national standards.

Hongfa's Test Center endorses the Hongfa Spirit "Strive for Excellence" with the largest relay test and analysis laboratory in China. This lab utilizes modern and advanced equipment to maintain our certifications from VDE, UL and CNAS. Our products bear the agency markings of UL/CUL, VDE, TÜV and CQC. We at Hongfa believe that our sustainability and our key to success is our pursuit of exceptional and consistent quality. Our adoption of continuous improvement of our quality management system has strengthened us by conducting quality pre-planning, procedure quality control, supply chain management, etc.



ABOUT HONGFA



Beijing, China



Sichuan, China



Xiamen, China (Headquarter)

Hongfa has won global quality acknowledgments from our customers because of our continuous pursuit of the enterprise spirit.

Hongfa continues to win national recognition. Since 1995, Hongfa has unremittingly been ranked among China Top-100 Electronic Components Enterprises. Hongfa was awarded the Advanced Hi-Tech Enterprise of Torch Program by the Ministry of Science and Technology. Hongfa was the only relay operation to be awarded the first batch National Export-oriented Enterprise of Automotive Components by the Ministry of Commerce and the National Development and Reform Commission.

In 2012, the successful IPO provided the capital and expectation for rapid development and growth. As Hongfa has positioned itself to be a global leader in the relay industry, we will continuously accelerate our industry technology development, lead the national relay industry, diversify our product portfolio, and improve our products.

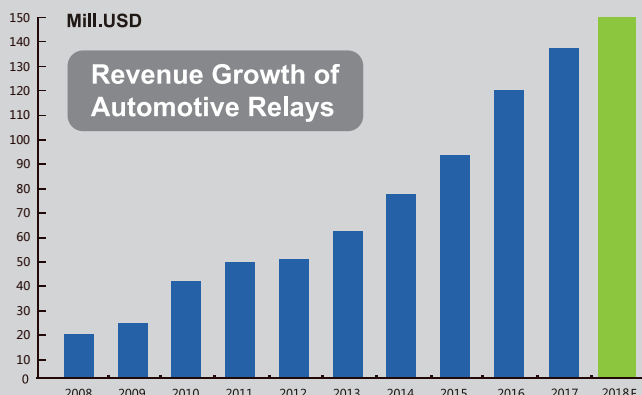
Hongfa is visionary to grow with all our global customers worldwide. It is our wish that our customers will benefit from our advancements in technology.



Hongfa Automotive Relay Production Base



PRODUCT DEVELOPMENT



Hongfa entered the automotive industry more than 20 years ago. Our Automotive R&D and technical staff “Strives for Excellence” by embracing our technology to design and built the best automotive relays in the industry. Our Automotive Group adopted our operational philosophy “focusing on the Market, Winning through Quality” that has enabled us to supply products to a number of global vehicle manufacturers. Our products are found in body control, powertrain control, safety control, vehicle information system, and convenience system, and other applications. Currently, our automotive group contributes to about 13.5% of the total revenue.

Hongfa is supplying to European, North American, and Asian OEM and Tier 1 customers. Our OEM client list continues to grow but to name a few: GWM, ChangAn, SAIC, SGM, SGMW, Chery, BAIC, Geely, GAC, FAW, ChangAn-Ford, ChangAn-Mazda, FCA, GM (Opel), Ford, Volvo, JCB, CLAAS, John Deere, etc. Our relationships and approvals with the OEM's have embraced our expanding list of Tier 1 business relationships: Magneti Marelli, Delphi, Leoni, Lear, Kostal to name a few.

Hongfa is investing capital on automotive future design and development on automotive products and automation production lines. Our roadmap for new products is following the trend of automotive industry. Our new products are focused on comfort (low noise), energy-saving (latching version – no coil power required after energization), reduction of space utilization (smaller size - sugar cube), and performance (higher current capability). We are expanding our product portfolio and production capacity through our utilization of automation production assembly lines.

Serviceable Relays (Plug-in)

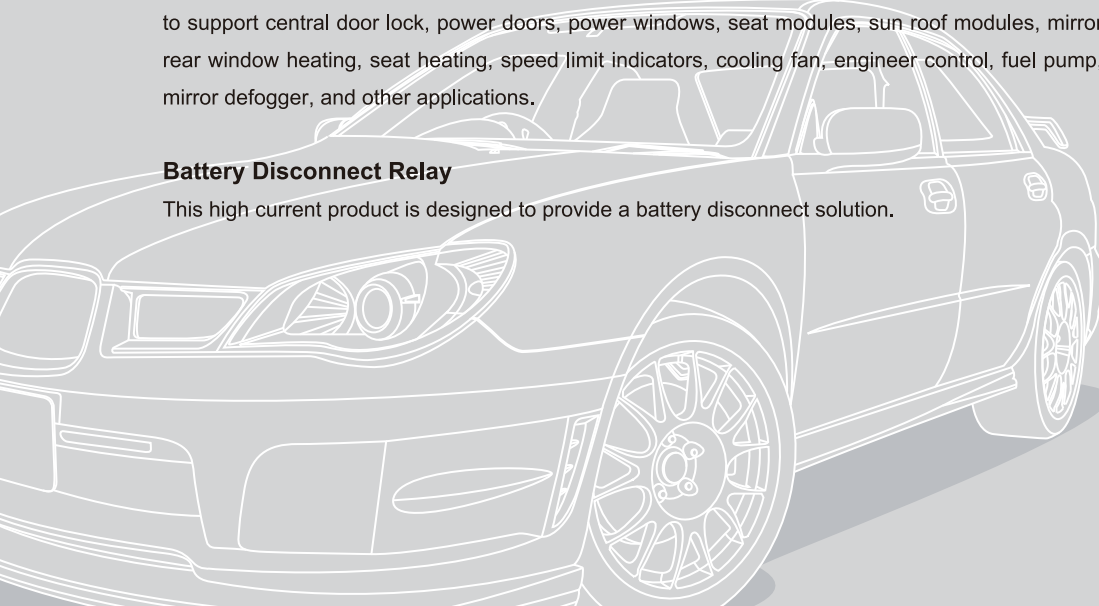
We carry a full line of 280 and ISO plug-in relays with 20A to 70A rated load capacity. Our products have dust protection, flux proof, and sealed options. Our product portfolio includes Power Mini, Mini ISO, High Current Micro ISO, High Current Micro 280, Micro ISO, Micro 280, and the Ultra Micro 280 (Space Saver).

High Reliable PCB Relays

Our high reliable PCB relay family is available for wave and reflow soldering with 15A to 70A current load capacity. These products are designed to support central door lock, power doors, power windows, seat modules, sun roof modules, mirror modules, wiper controls, lighting controls, rear window heating, seat heating, speed limit indicators, cooling fan, engine control, fuel pump, glow plug, fog lamp, headlight, window & mirror defogger, and other applications.

Battery Disconnect Relay

This high current product is designed to provide a battery disconnect solution.



Product Development

PCB Relay

HFKF



Typical Applications :
Central door lock, Power doors and windows, Seat adjustment, Sunroof motor control, Mirror adjustment.

- Features :**
- 25A motor locked load
 - Extremely small relay
 - Change-over contact version
 - Single and twin(H-bridge) version available
 - Coil wire insulation class H (180 °C)
 - HFKF-T (reflow soldering version) available
 - RoHS & ELV compliant

HFKJ



Typical Applications :
Central door lock,Power doors and windows,Seat adjustment,Sunroof motor control,Mirror adjustment.

- Features :**
- 25A motor locked load
 - Extremely small relay
 - Change-over contact version
 - Coil wire insulation class H(180 °C)
 - RoHS & ELV compliant

HFKA



Typical Applications :
Central door lock, Power doors and windows, Indicator lamp control, Seat adjustment, Sunroof motor control, Mirror adjustment, Wiper control.

- Features :**
- 25A motor locked load
 - Extremely small relay
 - Change-over contact version
 - Single and twin version available
 - Coil wire insulation class H (180 °C)
 - HFKA-T (reflow soldering version) available
 - RoHS & ELV compliant

HFKC



Typical Applications :
Central door lock, Anti-theft lock, Power doors & windows, Lighting, flashlight & indicator lamp control, Wiper control, Instrument control, Rear window and seat heating control.

- Features :**
- Subminiature automotive relay
 - The weight is only 4g for single relay
 - Extended temp. range up to 105 °C
 - The reflow soldering version available (HFKC-T)
 - RoHS & ELV compliant

HFKW



Typical Applications :
Central door lock, Power doors & windows, Turning lamp control, Mirror adjustment, Seat adjustment, Speed-limit indicator control, Warm-up control, Wiper control.

- Features :**
- Tight structure and light weight
 - High current contact capacity (Carrying current: 35A/10min 25A/1h)
 - Improved heat resistance
 - Reflow soldering version available
 - RoHS & ELV compliant

HFK7



Typical Applications :
Rear window defogger,Lamp control,Seat heaters,Powerd window.

- Features :**
- Max. Continuous current 30A
 - Max.making current 100A
 - Extended temp. range up to 125 °C
 - With highly established reliability
 - Strong resistance ability to shock & vibration
 - RoHS & ELV compliant

HFK8



Typical Applications :
Lamp control,Heater control,Motor control such as fans and pumps.

- Features :**
- Max. Continuous current 40A
 - Max.making current 120A
 - Extended temp. range up to 125 °C
 - With highly established reliability
 - Strong resistance ability to shock & vibration
 - Reflow soldering version available
 - RoHS & ELV compliant

HFK9



Typical Applications :
Lamp control,Heater control,Motor control such as fans and pumps.

- Features :**
- Max.continuous current 50A
 - Max.making current 200A
 - Extended temp. range up to 125 °C
 - With highly established reliability
 - Strong resistance ability to shock & vibration
 - RoHS & ELV compliant

Product Development



HFKT

Typical Applications :

ABS control, Cooling fan, Engine control, Fuel pump, Heating plug, Hazard warning lamp, Fog lamp & headlight, EPS, window & mirror defogger.

Features :

- Max continuous current 50A
- Max making current 200A
- Extended temp. range up to 125 °C
- With highly established reliability
- Strong resistance ability to shock & vibration
- Reflow soldering version available
- RoHS & ELV compliant



HFKT-L

Typical Applications :

Energy management, engine control, ignition, main switch/supply relay, preheating system, quiescent current management.

Features :

- Max. continuous current 60A
- Max. making current 200A
- Extended temp. range up to 125 °C
- With highly established reliability
- Strong resistance ability to shock & vibration
- No change of switching state version at breakdown of battery voltage
- Reflow soldering version available



HFKP

Typical Applications :

Central door lock, Anti-theft lock, Power doors & windows, Turning lamp, dangerous signal & scam lamp control, Seat adjustment, Air-conditioning, Fuel pump control, Low temperature control, Sunroof motor control, Audio system, Rear window defoggers, Starter solenoid switches.

Features :

- 45A switching capability
- PCB terminals
- 1 Form A & 1 Form C contact arrangement
- RoHS & ELV compliant



HFK10

Typical Applications :

Cooling fan control, Glow plug.

Features :

- Max.continuous current 70A
- Max.making current 200A
- Extended temp. range up to 125 °C
- With highly established reliability
- Strong resistance ability to shock & vibration
- Reflow soldering version available
- RoHS & ELV compliant



HFV15-P

Typical Applications :

Fog lamp & headlight control, Rear window defogger, Air-conditioning, Fuel pump control, Cooling fan control, Battery disconnection device, Star / stop control.

Features :

- 40A switching capability
- 1 Form A & 1 Form C contact arrangement
- RoHS & ELV compliant



HFV16-P

Typical Applications :

Fog lamp & headlight control, Rear window defogger, Air-conditioning, Fuel pump control, ABS, Traction control system, Cooling fan control, Battery disconnection device, High speed fan control.

Features :

- 70A switching capability
- Extended temp. range up to 125 °C
- 1 Form A contact arrangement
- RoHS & ELV compliant

ISO Relay



HFV6 (Micro)

Typical Applications :

Lighting control, Headlight control, Electromagnet control, Air-conditioning, Heaters (seat, front/rear windows), Fan motors control, Fuel pump control, Wiper motors control, A/C compressor clutch, Horn control.

Features :

- 30A switching capability
- Ambient temp. range up to 125 °C
- 1 Form A & 1 Form C contact arrangement
- Plastic sealed and dust protected types available
- RoHS & ELV compliant



HFV6V (Micro-Low Noise)

Typical Applications :

Lighting control, Heaters (front/rear windows), Front/rear fog lamp control.

Features :

- Noise level≤50dB(A)
- 30A switching capability
- Ambient temp. range up to 125 °C
- 1 Form A contact arrangement
- RoHS & ELV compliant



HFV6-G (High Current Micro)

Typical Applications :

Heaters (seat, front/rear windows), Fan motors control, Fuel pump control, Wiper motors control, Headlight control, Air-conditioning, Lighting control, Electromagnet control, Start / Stop control.

Features :

- 35A switching capability
- Ambient temp.: range up to 125 °C
- 1 Form A & 1 Form C contact arrangement
- Plastic sealed and dust protected types available
- RoHS & ELV compliant



HFV16 (Power Mini)

Typical Applications :

Fog lamp & headlight control, Rear window defogger, Air-conditioning, Fuel pump control, ABS, Traction control system, Cooling fan control, Battery disconnection device, High-speed fan control.

Features :

- 70A switching capability
- Extended temp. range up to 125 °C
- 1 Form A contact arrangement
- RoHS & ELV compliant



HFV15 (Mini)

Typical Applications :

Fog lamp & headlight control, Rear window defogger, Air-conditioning, Fuel pump control, Cooling fan control, Battery disconnection device, Star / stop control.

Features :

- 40A switching capability
- 1 Form A & 1 Form C contact arrangement
- RoHS & ELV compliant



HFV16-L (Power Mini Latching)

Typical Applications :

Power outlet switch off, Energy management.

Features :

- 70A switching capability
- 1 Form A contact arrangement
- Ambient temperature -40 °C ~ 125 °C
- Continuous carrying current 80A at 23 °C, 60A at 85 °C, 35A at 125 °C

280 Relay



HFV9 (Micro)

Typical Applications :

Lighting control, Headlight control, Electromagnet control, Air-conditioning, Heaters (seat, front/rear windows), Fan motors control, Fuel pump control, Wiper motors control, A/C compressor clutch, Horn control.

Features :

- Extended temp. range up to 125 °C
- 1 Form A & 1 Form C contact arrangement
- 2.8mm QC terminals
- RoHS & ELV compliant



HFV9-G (High Current Micro)

Typical Applications :

Heaters (seat, front/rear windows), Fan motors control, Fuel pump control, Wiper motors control, Headlight control, Air-conditioning, Lighting control, Electromagnet control, Start / Stop control.

Features :

- Extended temp. range up to 125 °C
- 1 Form A & 1 Form C contact arrangement
- 2.8mm QC terminals
- RoHS & ELV compliant

High Current Relay



HFV11 (Ultra Micro)

Typical Applications :

Headlight control, Fuel pump control, Horn control, A/C compressor clutch.

Features :

- Miniaturized package: (15.6 x 15.2 x 16.4) mm
- Extended temperature range: -40 °C to 125 °C
- 1 Form A contact arrangement
- 2.8mm QC terminals available
- RoHS & ELV compliant



HFV12

Typical Applications :

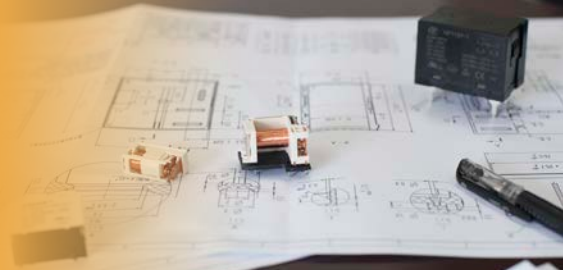
Battery disconnection in order to prevent fire caused by short circuits during an accident, Energy-management.

Features :

- Battery Disconnect Relay (Energy-management)
- 2 coils latching automotive relay
- Continuous current of 190 A at 85 °C
- Load terminal connection: screw connection (M8 bolt)
- Coil terminal connection: 4-pin connector (AMP 0.070 series)
- Weight: Approx.210g

Hongfa Automotive Electronics

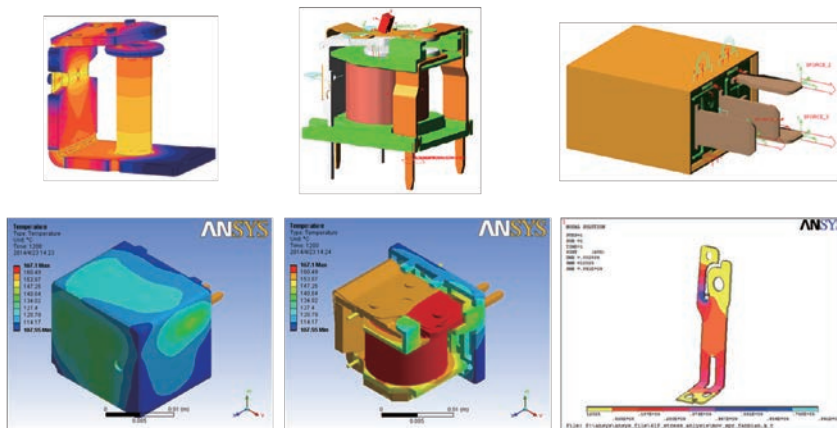
R & D



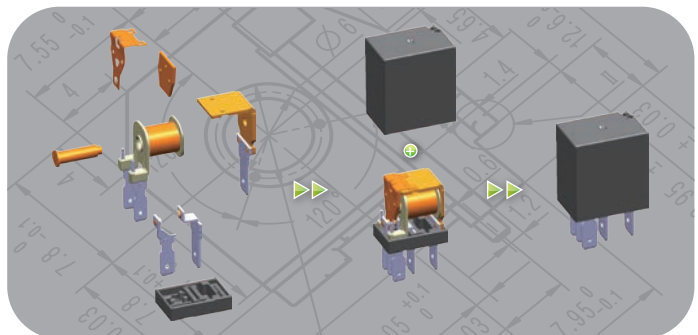
Hongfa is focused on product development while adopting leading technology.

- Favored with 850 patents, we made great progress in technical development.
- Major contributors in professional and national standards for multiple relays (i.e. national standards for six types of signal relays, equivalent to IEC61811-50 or IEC61810-1)
- Champions a Post-doctoral Research Station since 2004, the first one in the industry.
- State-accredited Technical Center.

CAE



Our world class product development and technical management system provide the tools for advanced research and development. Our technical teams utilize many advanced tools during the product development process such as CAD, CAE, DOE, Quality Engineering, DFSS, and High Speed Camera. These advanced tools allow our technical team to perform the analysis during the product development phase. Our technical staff optimizes the conceptual models to evaluate the sample validation to assure the product design meets the target quality and to shorten the product development cycle. Our technical team assures that our products meet Hongfa's the operational philosophy goal "Focusing on the market; Winning through Quality".





The test center was approved by CNAS (China National Accreditation Service) as IEC17025 test lab.

● Reliability Test:

Complete test ability to ensure the requirement for product development, quality control and customer request.

Test items include: Electrical performance, Endurance, Mechanical, Environment, EMC and Chemicals, etc.

Own the ability to develop test equipment and with profound experience to test under GM, Ford, FIAT, Volvo, Volkswagen etc.

● Test for RoHS hazardous material:

Own the ability of speedy analysis and precise test. The test could be done at the process of material approval, incoming inspection and process control.

Own the professional test engineers and test equipments such as: XRF, ICP, GC-MS and UV.

Keep developing test method to meet new environmental requirement such as REACH.

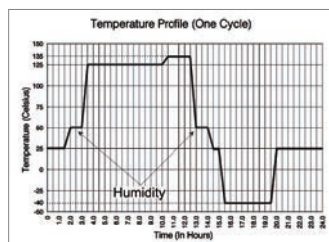


CNAS approval certificate

Endurance test



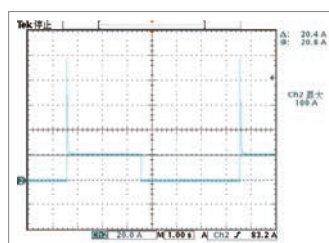
DAQ electrical endurance monitor system



Electrical endurance temperature curve



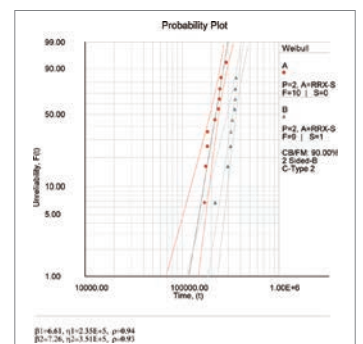
Samples



Lamp load electrical endurance load curve



Test equipment combines vibration together with environmental and electrical test.



WEIBULL Chart

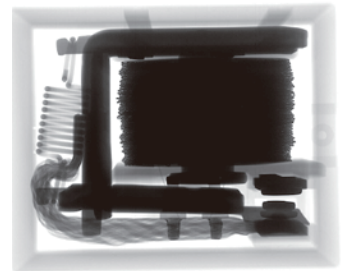
Hongfa Automotive Electronics

Analysis



Professional team is doing research on material analysis, failure analysis, product analysis and other fundamental project to improve product performance.

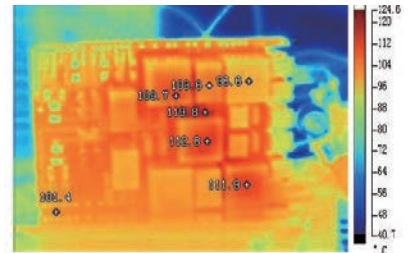
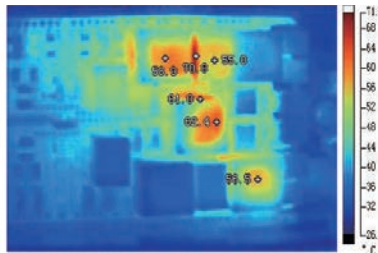
- Anti-arc contact material research.
- Analysis the components of polymer gas to prevent organic silicon contamination during manufacturing process.
- Use X-ray, Infra-red and high speed camera technology to do design validation.
- Use SEM, EDX and FT-IR to analysis the particles inside relay.



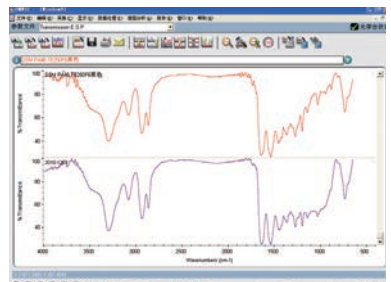
GC-MS



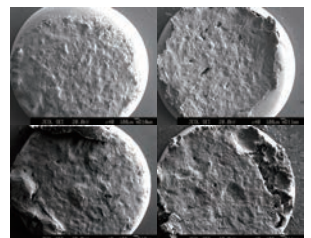
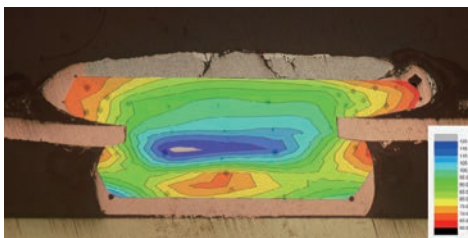
Infra-red imaging



FT-IR



Analysis of contact



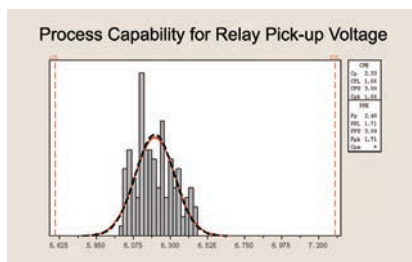
Hongfa Automotive Electronics

Quality Assurance

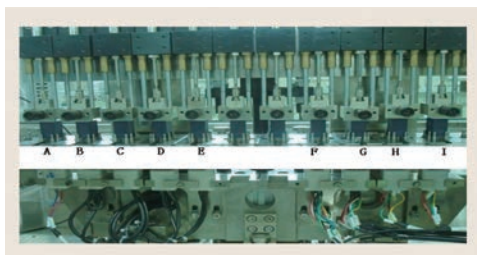
- Quality management system is based on the ISO/TS16949 and customer's specific requirements. Hongfa's enterprise spirit "Persevere for Progress, Strive for Excellence" with the operational philosophy "Focusing on the market; Winning through Quality" drives our values:
 - Strong Customer Support with Fast Response
 - Control of Non-Conformance Product
 - Risk (RPN) Reduction
 - Standard Operator Training
 - Standardized Work Instructions
 - System Audit, Process Audit & Product Audit
 - Error Proofing Verification – "Red Rabbit"
 - Lessons Learned for Continuous Improvement
 - FIFO & Traceability

- World Class Product and Process Development: Drives our origination "Winning through Quality" by utilizing DFSS (Design for Six Sigma).

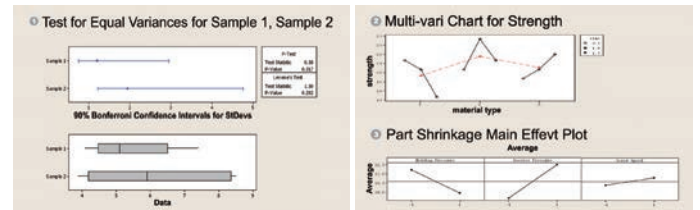
- Advanced process capability to monitor the key characteristics.



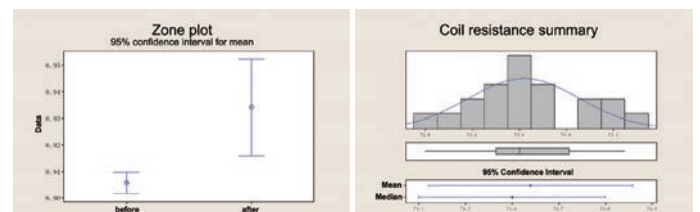
- Automation assembly lines with error-proof test devices and fixtures to minimize defect fall-out.



- Employment of modern problem solving process and continuous improvement systems: PDCA cycle, DMAIC, defect concentration diagram, ANOVA, multivariate chart, DOE, 5 Why, 8D and traditional QC tools.



- Applition of Minitab software to provide robust analytical data analysis capability.



- Implemented innovative particle control into design and manufacture process from our "Lessons Learned Process".

Hongfa Automotive Electronics

Tooling & Components

Leading Mold Designing and Manufacturing Capacity in Chinese Relay Industry.



Plastic Injection via Central Feeding System



Three-dimensional
measuring machine



LWEDM



Coordinate Measuring
Machine



CNC



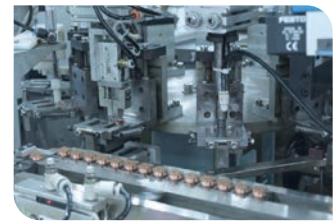
High-precision, High-speed Punch Press

Hongfa Automotive Electronics

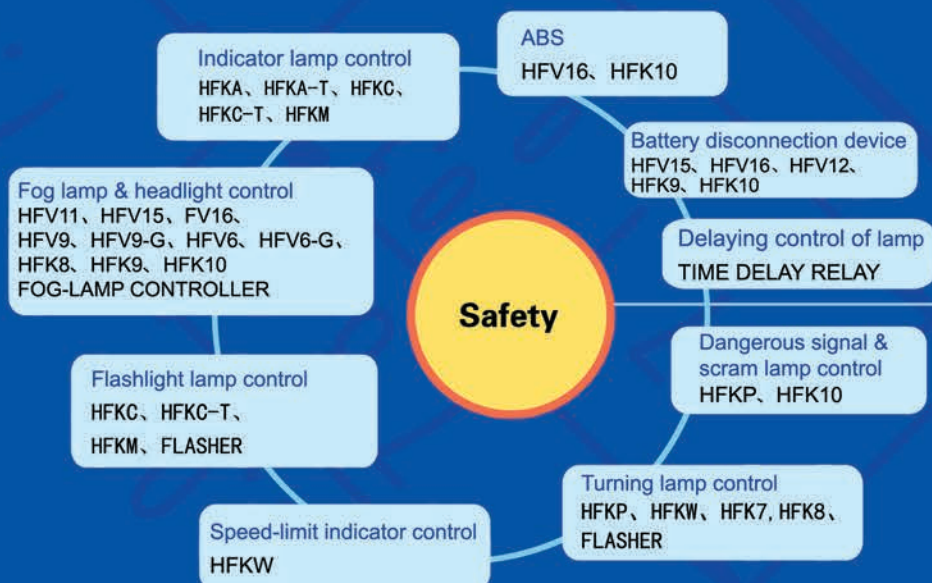
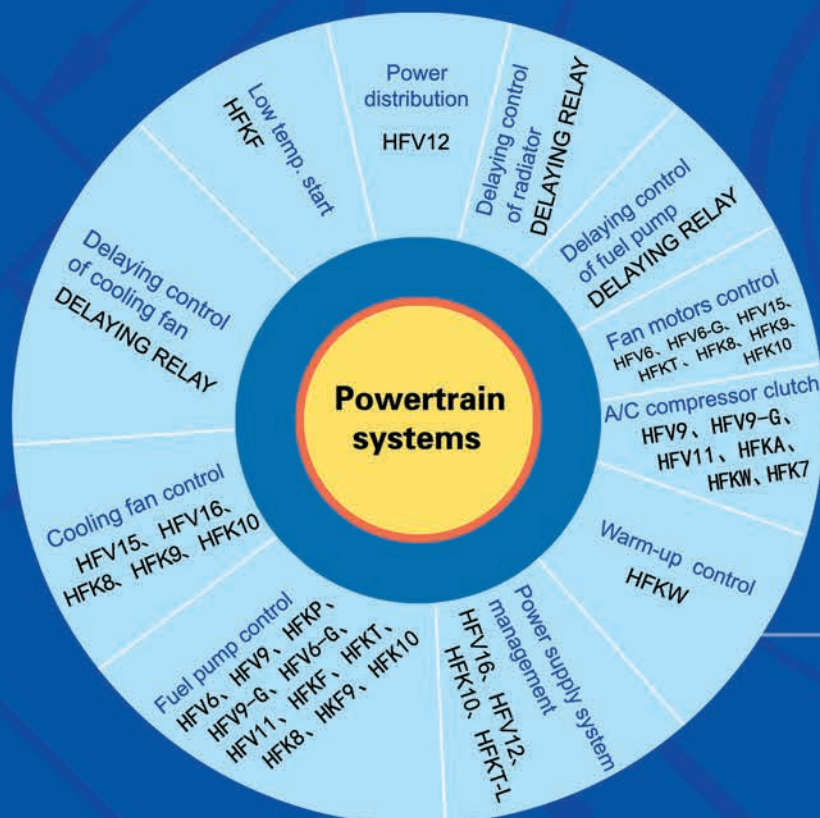
Automated Assembly

“Winning through Quality” with our world class Design and Manufacture of Automation Equipment for our relay production.

The advanced automation production equipment is designed and manufactured by our experts within the Hongfa Group. This allows our team of experts to implement error prevention by conducting online data collection, data analysis, and foreign material eradication. All of this allows our team to strive for our goal of Zero Defect.

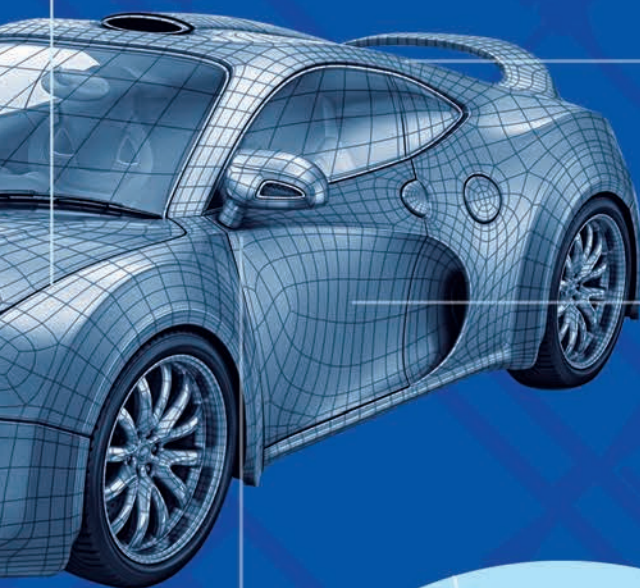


MULTI-APPLICATIONS



Chassis systems

Traction control system
HfV16, HfK10



Seatbelt prevention device
HFKA, HFKA-T, HFKE

Instrument control
HFKE, HFKE-T
HFKA, HFKA-T

Driver information

Wiper control
HFKA, HFKA-T, HFKE,
HFKE-T, HFV6, HFV6-G,
HFKE, HFKE9,
WIPER CONTROLLER

Horn control
HFV9, HFV9-G, HFV11,
HFKA, HFKE, HFKE7,
HFKE8, HFKE9

Rear window defogger
HFV15, HFV16, HFKE,
HFKE8, HFKE9, HFKE10

Body

Anti-theft lock
HFKE, HFKE-T, HFKEP

Immobilizers
HFKE, HFKA, HFKE, HFKEJ

Central door lock
HFKA, HFKA-T,
HFKE, HFKE-T,
HFKE, HFKEP,
HFKE, HFKEJ

Security

Convenience

Seat adjustment
HFKA, HFKEP
HFKE, HFKA-T,
HFKE, HFKEJ

Air-conditioning
HFV15, HFV16
HFV6, HFV6-G
HFKEP, HFKE8
HFKE7, HFKE8
HFKE9, HFKE10

Mirror adjustment
HFKA, HFKA-T,
HFKE, HFKE,
HFKEJ

Lighting control
HFKE, HFKE-T,
HFV6, HFV6-G,
HFKE7, HFKE8

Heaters (seat, front
/rear windows)
HFV6, HFV6-G
HFKE, HFKE-T,
HFV16, HFKE8,
HFKE9, HFKE10

Audio system
HFKEP

Sunroof
motor control
HFKA, HFKEP
HFKE, HFKA-T,
HFKE, HFKEJ

Power doors &
windows
HFKA, HFKE
HFKE, HFKEP,
HFKE-T, HFKE,
HFKEJ, HFKE9