# WuXi CRE New Energy Technology Co.,Ltd

# Company Profile

**Name:** Wuxi CRE New Energy Technology Co., Ltd

**Address:** No.789 Nanhu Avenue, Liangxi District, Wuxi City, Jiangsu Province, China

**Factory Area:** 33,000 m²

**Total Staff:** 325 (as of the end of 2023)

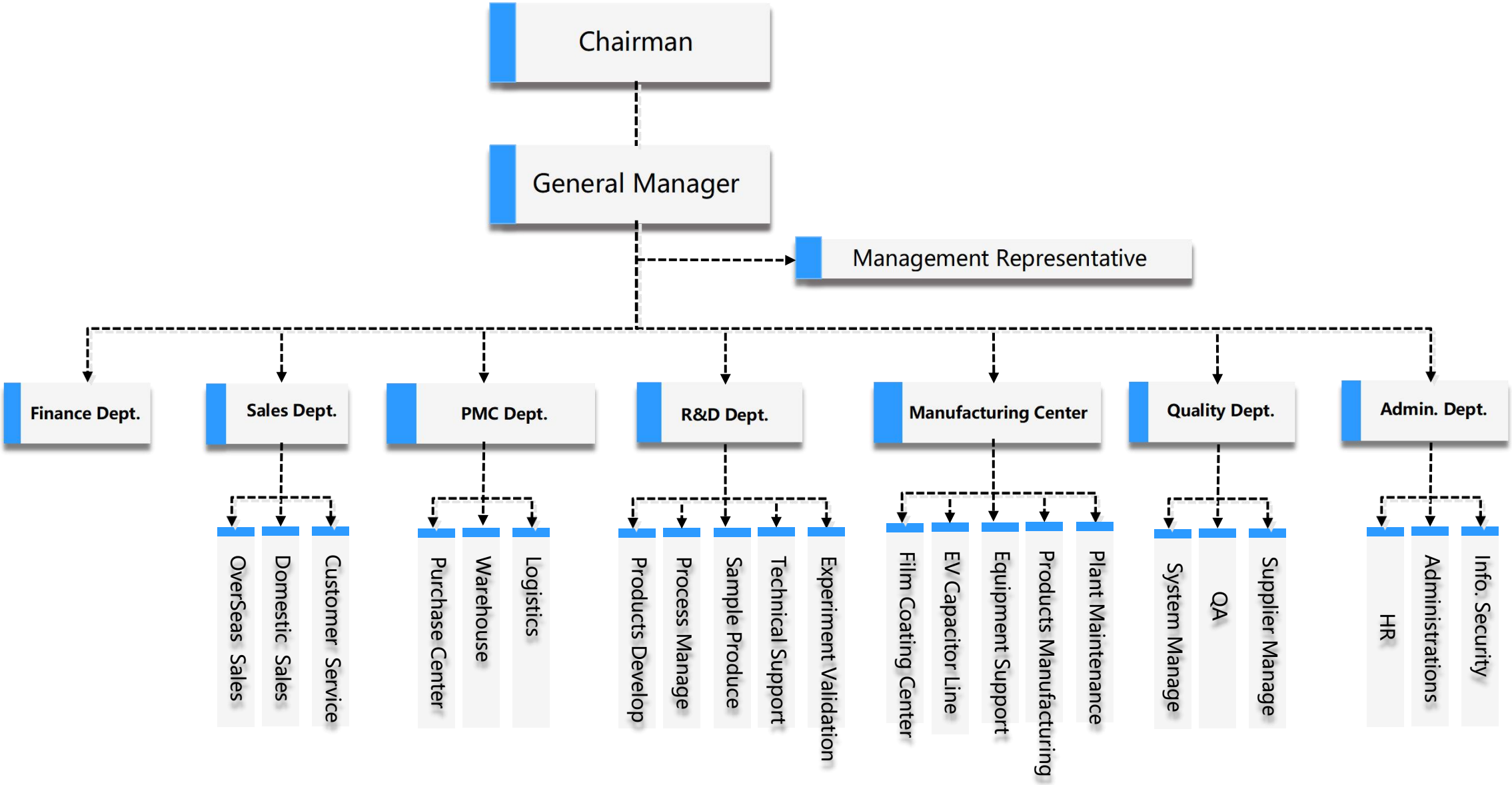
30 in the sales team  20 in the R&D process team

225 in the manufacturing team  25 in the quality team

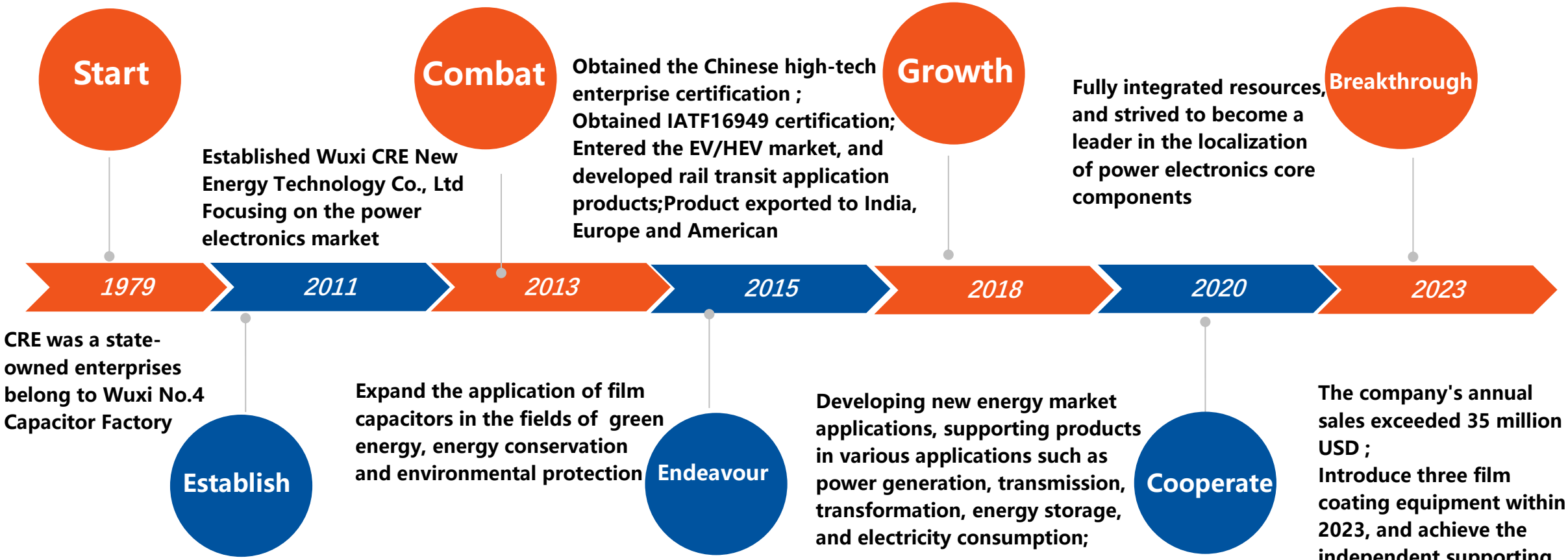
**Intellectual property rights:** more than 30 invention and utility model patents.  Participated in the drafting of 10 Chinese industry standards

**Certification:** ISO9001、ISO14001、ISO45001、IATF16949、UL、VDE

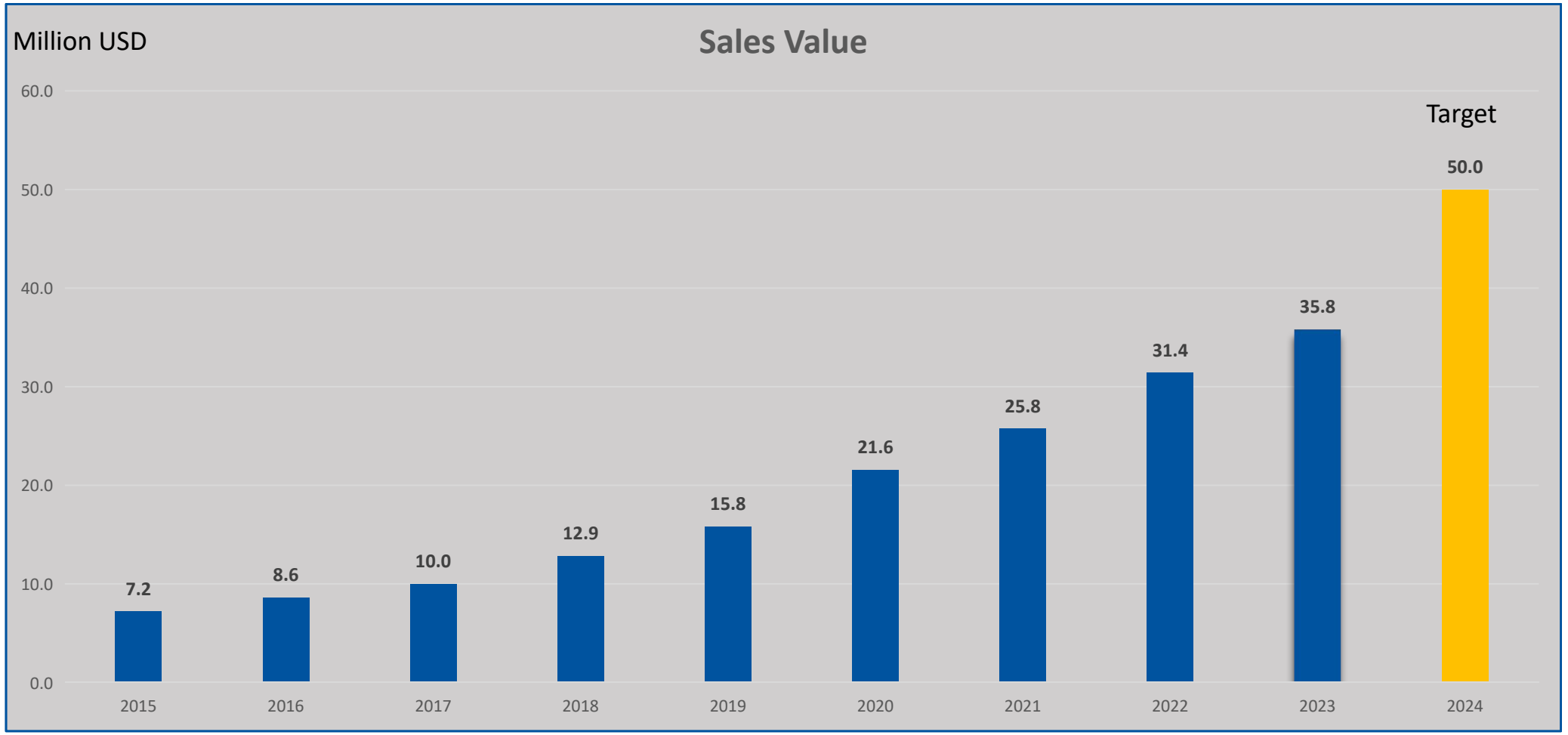
# Organizational Chart



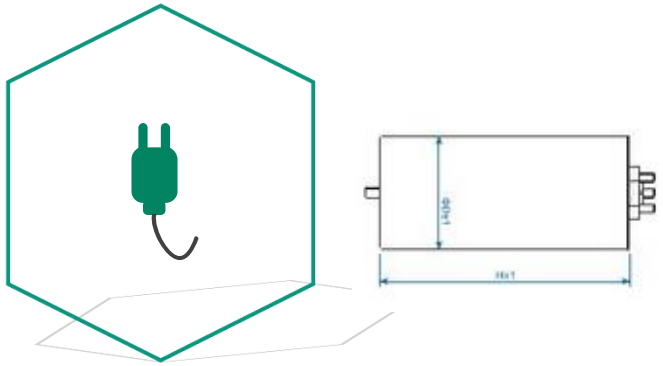
# Company Milestone

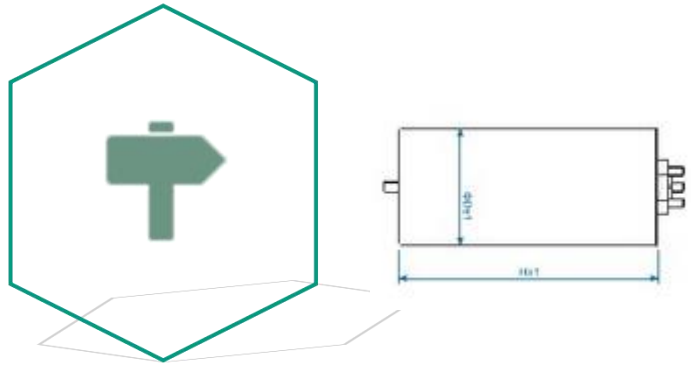


# Sales Value


Million USD
Sales Value
60.0
50.0
40.0
30.0
20.0
10.0
0.0
7.2
8.6
10.0
12.9
15.8
21.6
25.8
31.4
35.8
Target
50.0
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024

# Corporate Philosophy





**Power** **Links** **Success**

**Power:** We are in an area of energy transformation, our products are used in the transformation process of energy

**Links:** Power generation/transmission/consumption all use our products, which play a role of connection and support

**Success :** To success with our partners

# Certification & Honor












# Factory Unit

YangMin Unit
(Industrial Fields, Photovoltaic/Wind Power Production Line)

ZhanPeng Unit
(New Energy Vehicles, Rail Transit, Special Capacitor Production Line)

JinXin Unit（ Film Metalized Production Line)

# WorkShop

Previous process


# WorkShop

Packaging process

# WorkShop

Packaging process





# Application

## C1: DC-link

DKMJ-S

DMJ-MC

DMJ-PC

DMJ-MT

DKMJ-AP

DMJ-PS

## C2: Snubber

SMJ-P

SMJ-TE

SMJ-TC

SMJ-PS

## C3:AC-filter

AKMJ-S

AKMJ-MC

AKMJ-PS

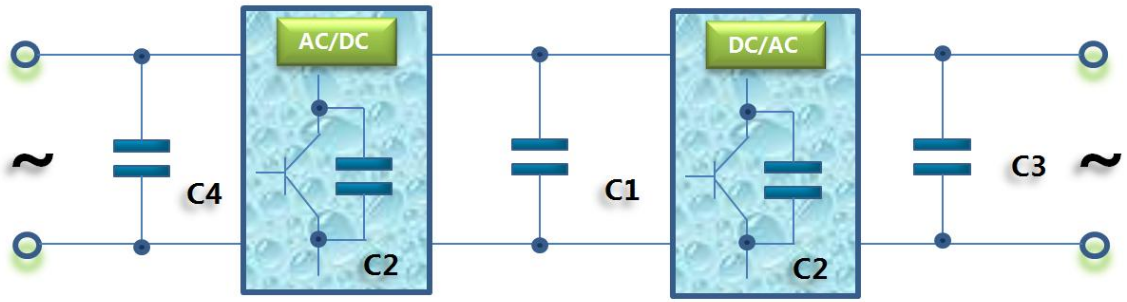
## C4: EMI-filter



X1 X2


Y1/ Y2

## Topology



# Application

## Key Industries

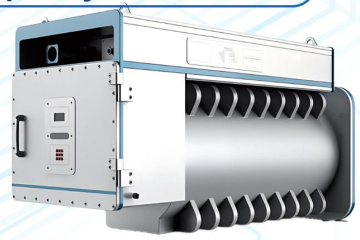
Solar Power & Wind Power

Automotive & Charging Pile

Power Quality Management System

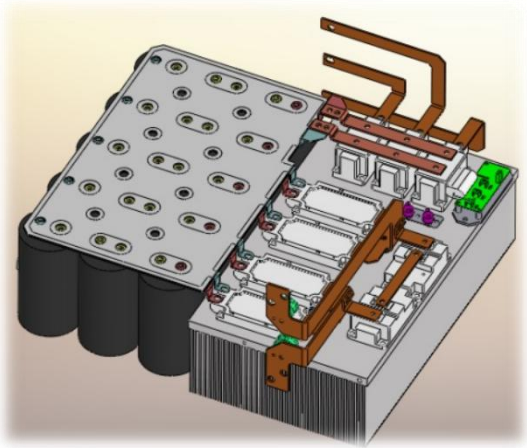
Rail Transit

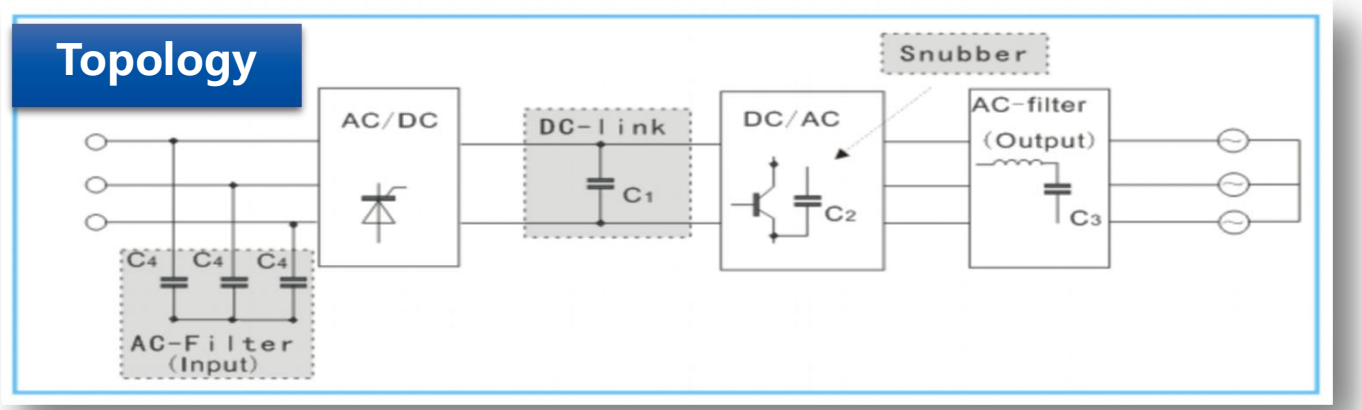
Industrial Frequency Conversion



Medical Equipment

# Inverter

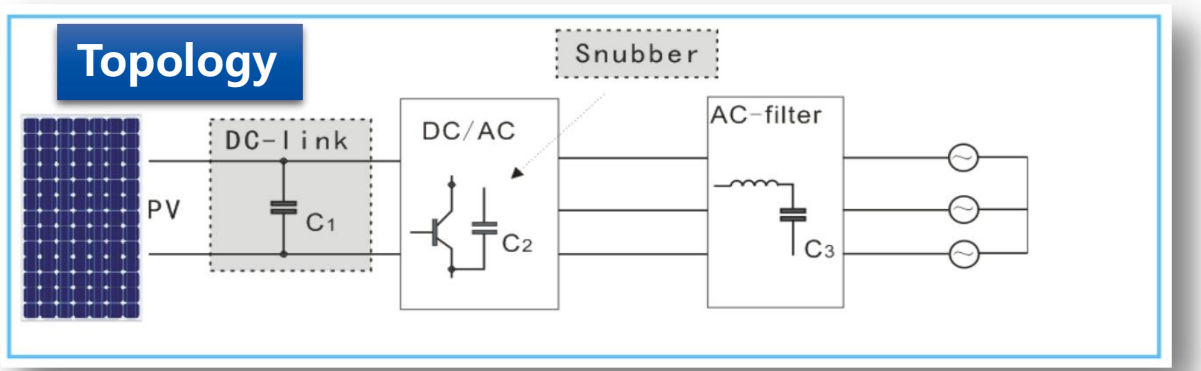





## CRE Solution

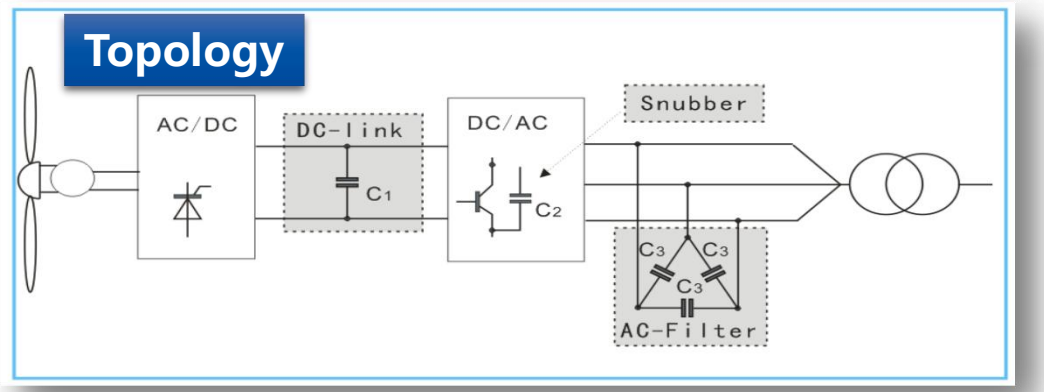
| AC-filter | | | DC-link | | | Snubber | | |
|---|---|---|---|---|---|---|---|---|
| C3,C4 | | | C1 | | | C2 | | |
|  |  |  |  |  |  |  |  |  |
| AKMJ-S | AKMJ-MC | AKMJ-PS | DKMJ-S | DMJ-MC | DMJ-PS | SMJ-P | SMJ-TE | RMJ-PS |
| **Voltage** | | | | | | | | |
| 250~6300 (VAC) (3 phase) | 250~6300 (VAC) (1 phase) | 150~1500 (VAC) (3 phase) | 150~1500 (VAC) (3 phase) | 150~450 (VAC) | 450~4000 (VDC) | 450~4000 (VDC) | 450~2000 (VDC) | 630~3000（VDC） |
| **Capacitance** | | | | | | | | |
| 3×10~1000 (UF) | 10~2000 (UF) | 3×10~200 (UF) | 10~500 (UF) | 1.5~50 (UF) | 100~20000 (UF) | 50~3000 (UF) | 2.2~150 (UF) | 0.15~4.7 (UF) |
| **Standard**：IEC-61071 | | | | | | | | |

# Photovoltaic Inverter




| CRE Solution | | | | | |
|---|---|---|---|---|---|
| AC-filter | | DC-link | | Snubber | |
| C3 | | C1 | | C2 | |
|  |  |  |  |  |  |
| AKMJ-MC | AKMJ-PS | DMJ-MC | DMJ-PS | SMJ-P | SMJ-PS |
| **Voltage** | | | | | |
| 330~850（VAC） | 330~850（VAC） | 450~2000（VDC） | 450~2000（VDC） | 630~3000 (VDC) | |
| **Capacitance** | | | | | |
| (3 phase) 3×10~200（UF） | 1.5~30 (UF) | 100~1500 (UF) | 2.2~150 (UF) | 0.1~4.7 (UF) | |
| **Standard**：IEC-61071 | | | | | |

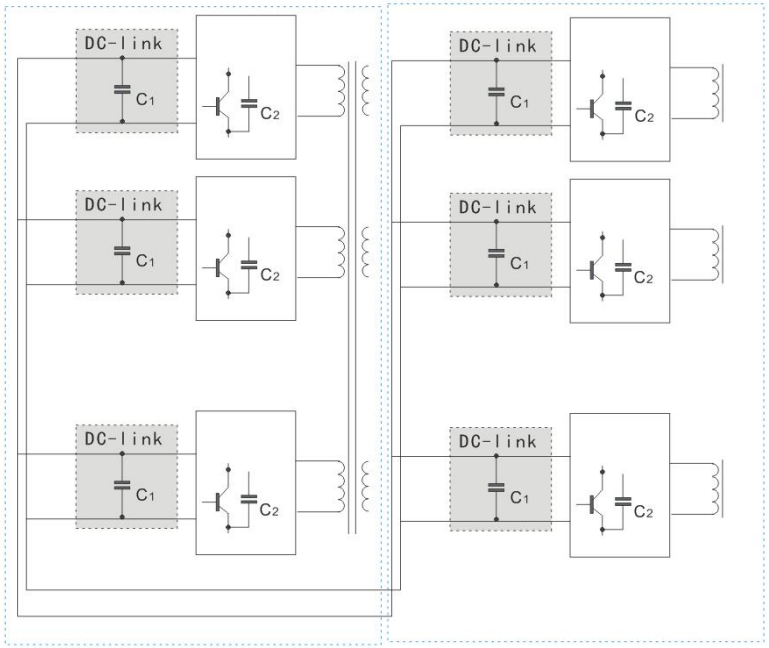
# Wind Power Generation




| CRE Solution | | |
|---|---|---|
| AC-filter | DC-link | Snubber |
| C3 | C1 | C2 |
| | | |
|  |  |  |
| AKMJ-MC | DMJ-MC | SMJ-P |
| | | |
| Voltage | | |
| 450~850（VAC）(3 phase) | 450~2000（VDC） | 630~3000（VDC） |
| Capacitance | | |
| 3×10~100（UF） | 100~1200（UF） | 0.15~4.7（UF） |
| Standard：IEC-61071 | | |

# SVG

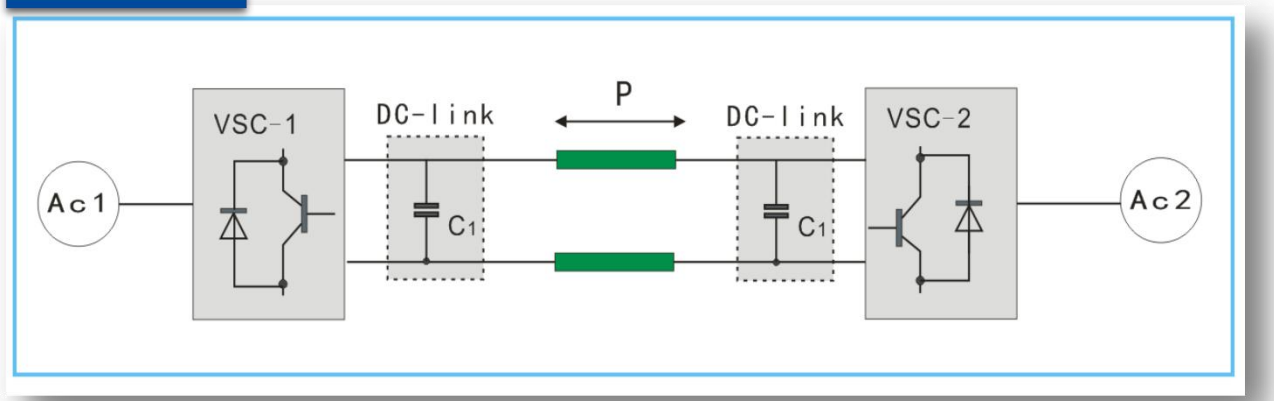
## Topology

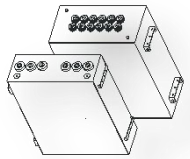



| CRE Solution | | |
|---|---|---|
| DC-link | | Snubber |
| C1 | | C2 |
|  |  |  |
| DKMJ-S | DMJ-MC | SMJ-P |
| | | |
| Voltage | | |
| 450~4500 (VDC) | 450~4000 (VDC) | 630~4500 (VDC) |
| Capacitance | | |
| 100~10000 (UF) | 50~3000 (UF) | 0.15~4.7 (UF) |
| Standard: IEC-61071 IEC-60068 | | |

# Power Flexible Transmission

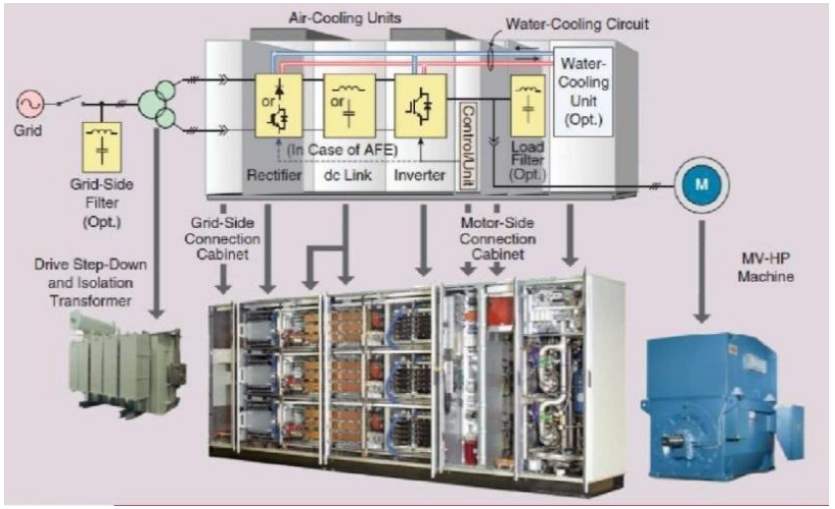
## Topology



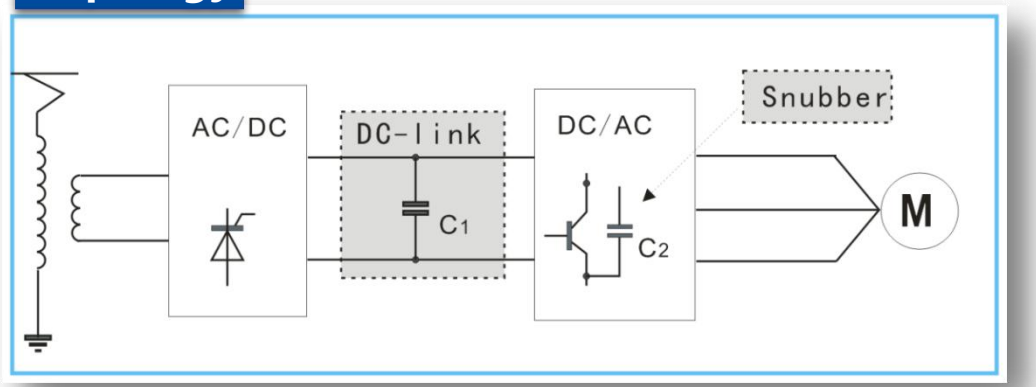



| CRE Solution |
|---|
| DC-link |
| C1 |
| |
| DKMJ-S |
| |
| Voltage |
| 1200~4500 (VDC) |
| Capacitance |
| 1000~20000 (UF) |
| Standard: : IEC-61071 IEC-60068 |

# Track Traction/ Rail Transit

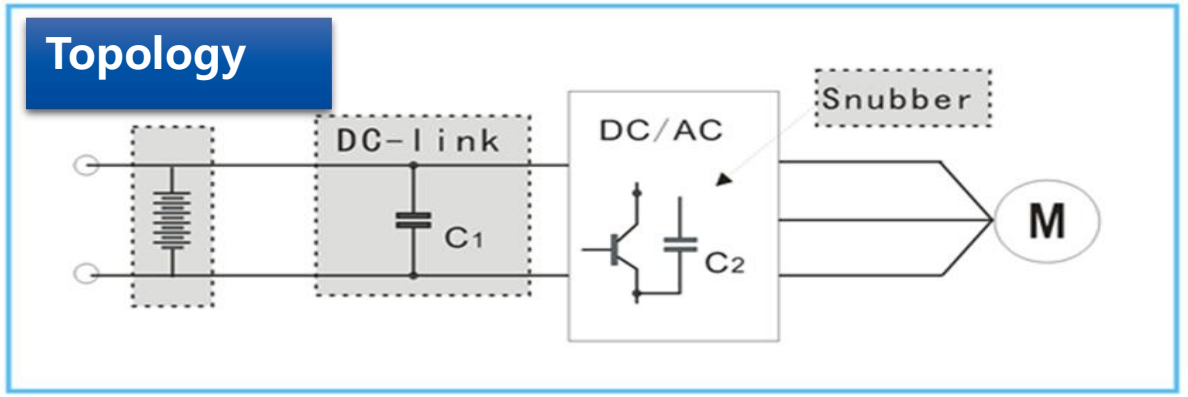



## Topology




| CRE Solution | | |
|---|---|---|
| DC-link | Snubber | |
| C1 | C2 | |
| | | |
|  |  |  |
| DKMJ-S | SMJ-P | RMJ-PC |
| | | |
| Voltage | | |
| 450~4500 (VDC) | 630~4500 (VDC) | 630~6000 (VDC) |
| Capacitance | | |
| 100~10000 (UF) | 0.15~4.7 (UF) | 0.5~20 (UF) |
| Standard: : IEC-61071 IEC-60068 | | |

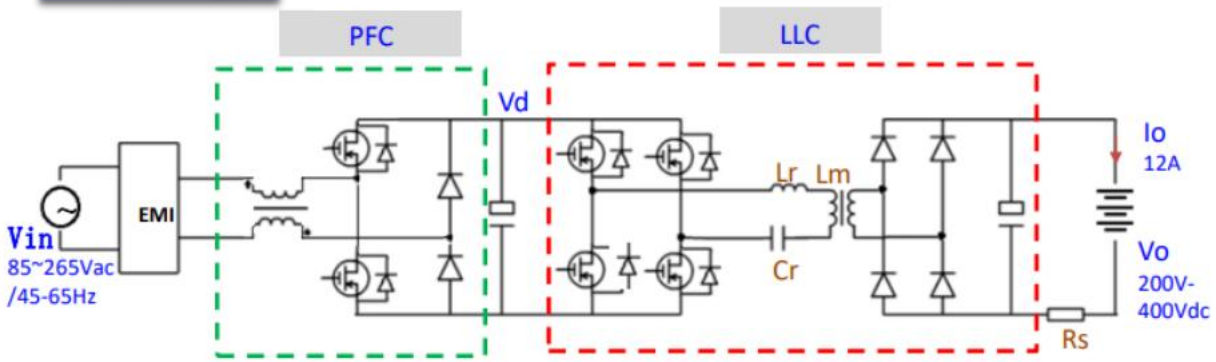
# EV & HEV


| CRE Solution | | | | |
|---|---|---|---|---|
| DC-link | | | Snubber | |
| C1 | | | C2 | |
|  |  |  |  |  |
| DKMJ-AP | DMJ-PC | DMJ-PS | SMJ-P | SMJ-PS |
| | | | | |
| Voltage | | | | |
| 450~1200 (VDC) | | | 630~2000 (VDC) | |
| Capacitance | | | | |
| 100~5000 (UF) | 10~500 (UF) | 1~150 (UF) | 0.15~4.7 (UF) | |
| **Standard**: IEC-61071 ,AEC-Q200 | | | | |

# EV & HEV Charging Pile

## Topology (OBC)

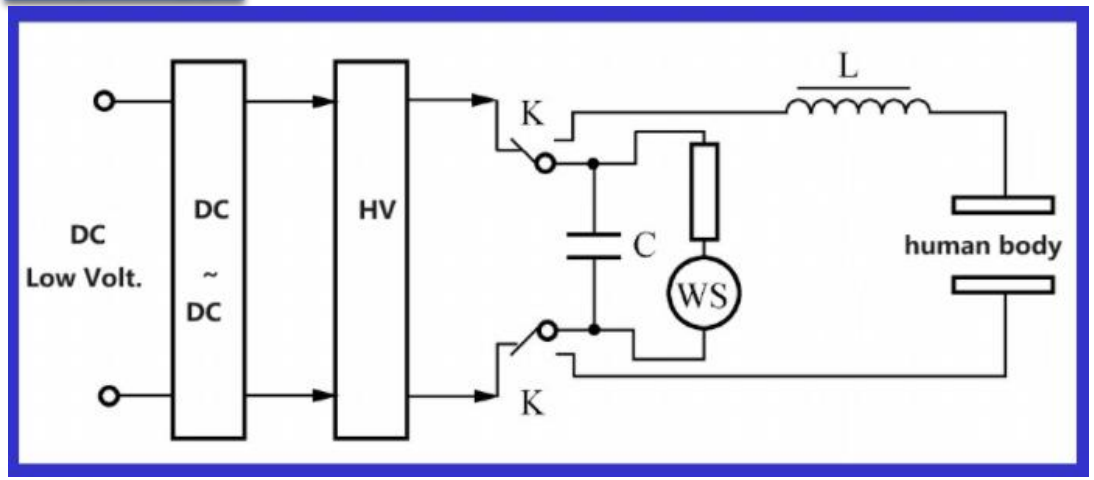



## CRE Solution

| EMC | Snubber | DC-link | |
|---|---|---|---|
|  |  |  |  |
| X2 | SMJ-PS | DMJ-MC | DMJ-PS |
| | | | |
| Voltage | | | |
| 250/275/310 (VAC) | 850~2000 (VDC) | 450~1200 (VDC) | 450~1200 (VDC) |
| Capacitance | | | |
| 0.0022×10 (UF) | 0.033~5 (UF) | 50~500 (UF) | 1~50 (UF) |
| Standard: IEC-61071 | | | |

# Cardiac Defibrillator（AED）

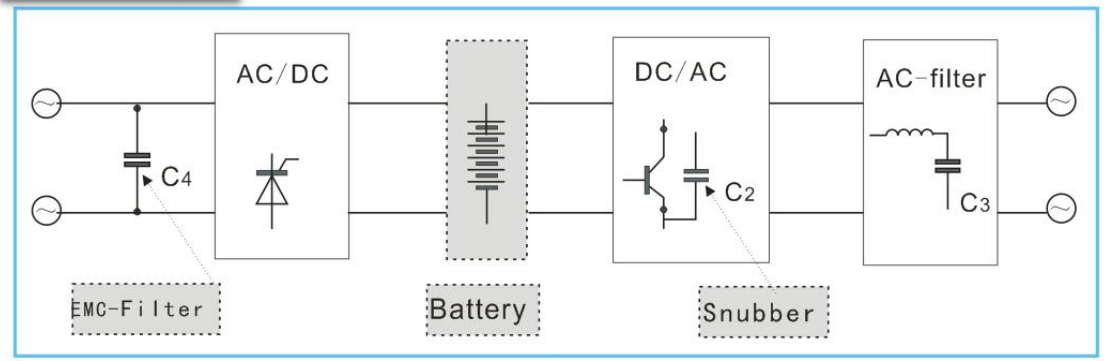

## Topology




| CRE Solution |
|---|
| DC-link |
| C1 |
| |
| DEMJ-PC |
| |
| Voltage |
| 1500~5000（VDC） |
| Capacitance |
| 32~200（UF） |
| Standard：IEC-61071 |

# Uninterruptible Power Supply (UPS)

## Topology




## CRE Solution

| EMC | Snubber | | AC Filter | |
|---|---|---|---|---|
| C2 | | | C3 | |
| | | | | |
|  |  |  |  |  |
| X2 | SMJ-P | SMJ-PS | AKMJ-MC | AKMJ-PS |
| | | | | |
| Voltage | | | | |
| 250/275/310 (VAC) | 450~2000 (VDC) | | 150~1200 (VAC) | 150~450 (VAC) |
| Capacitance | | | | |
| 0.0022×10 (UF) | 0.1~4.7 (UF) | | 5~500 (UF) | 1~50 (UF) |
| Standard: IEC-61071 | | | | |

# Production Capacity

## ①Molded Case Pin Capacitor

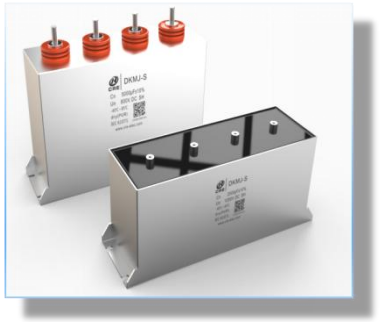
★Capacity：
3 Million/ Month

## ② Cylindrical Aluminum Case Capacitor

★Capacity：
120Kpcs/Month

## ③Customized Special Capacitor

★Capacity：
3000Pcs/Month



## ④Conventional Industrial Capacitor

★Capacity：
2 Million/Month

## ⑤EV/HEV Capacitor

★Capacity：
30K Pcs /Month

# Manufacturing Capability - Film Metalize

## Equipment Introduction

Vacuum Coating Machine (950 model) Quantity: 3
Slitting Machine: 9

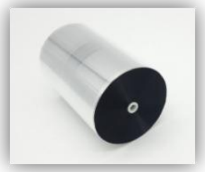

## Capacity Introduction

Thickness： 2.0~12μm(PP)
Types： Standard Sheet Resistance/High Sheet Resistance/Safety Film/Moisture-Resistant
Average Production: More than 120 tons/month

# Manufacturing Capability - Winding

## Round Element Winding Machine

Quantity：15
Capacity：Elements 15,000pcs/day



## Flat Element Winding Machine

Quantity：38
Capacity：Elements 100,000pcs/day

# Leading product: DMJ-MC

## Features

※ Cylindrical aluminum shell, dry resin package

※ Suitable for single element or multi-element parallel combination use, modular

※ The use of replaceable electrolytic capacitors,
Has higher overcurrent capability

※ High reliability, all components 100% full inspection after high temperature electrical aging

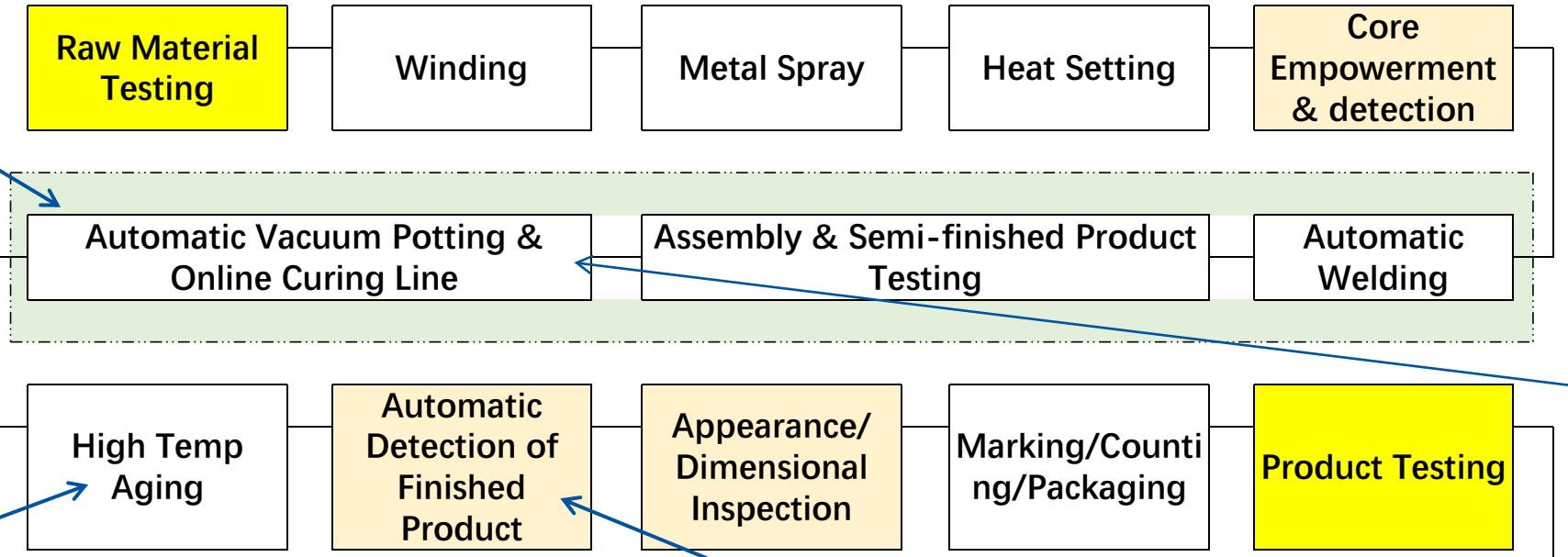

| Typical Specifications |
|---|
| 650(μF)-600VDC |
| 750(μF)-800VDC |
| 750(μF)-900VDC |
| 170(μF)-1100VDC |
| 420(μF)-1100VDC |
| 600(μF)-1100VDC |
| 420(μF)-1200VDC |
| 600(μF)-1200VDC |

## Application areas

Power quality; Photovoltaic/wind power; Inverter; inverter power supply

# Cylindrical Aluminum Case Capacitor Production Process Flow:

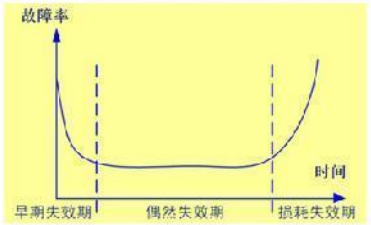
## Process Flow Diagram




※ 成品出厂前100%经过高温通电老化

※ 老化工艺条件
温度：70/85 ℃
电压：额定工作电压
时间：12h

※ 老化后成品再进行100%的电气特性复测




前期失效分析原理，产品失效分布都符合“浴盆曲线”。即绝大部分的失效发生在产品使用前期，经前期老化筛选后的元件失效率大大降低。

# Leading Product: DMJ-PS

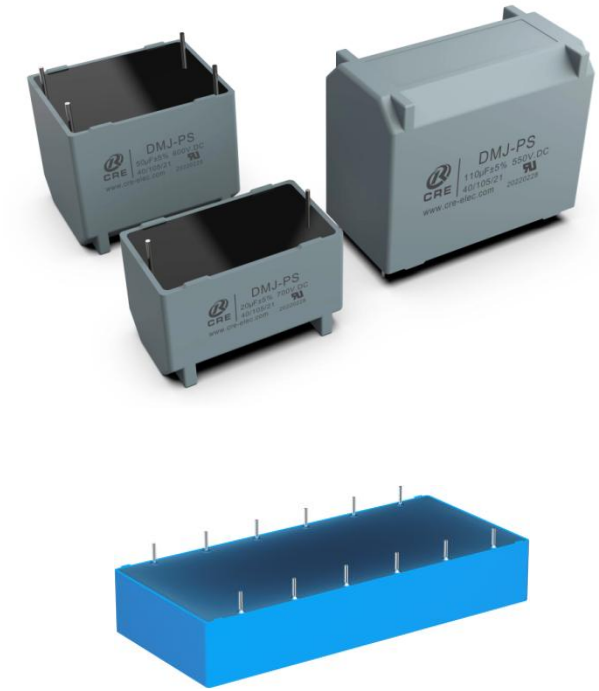
## Features

※ Plastic shell, dry resin package;

※ Suitable for PCB, multi-component series-parallel combination, modular use;

※ Process guarantee of Automated production line, good product quality consistency;

※ Meet the harsh environment such as high temperature and high humidity



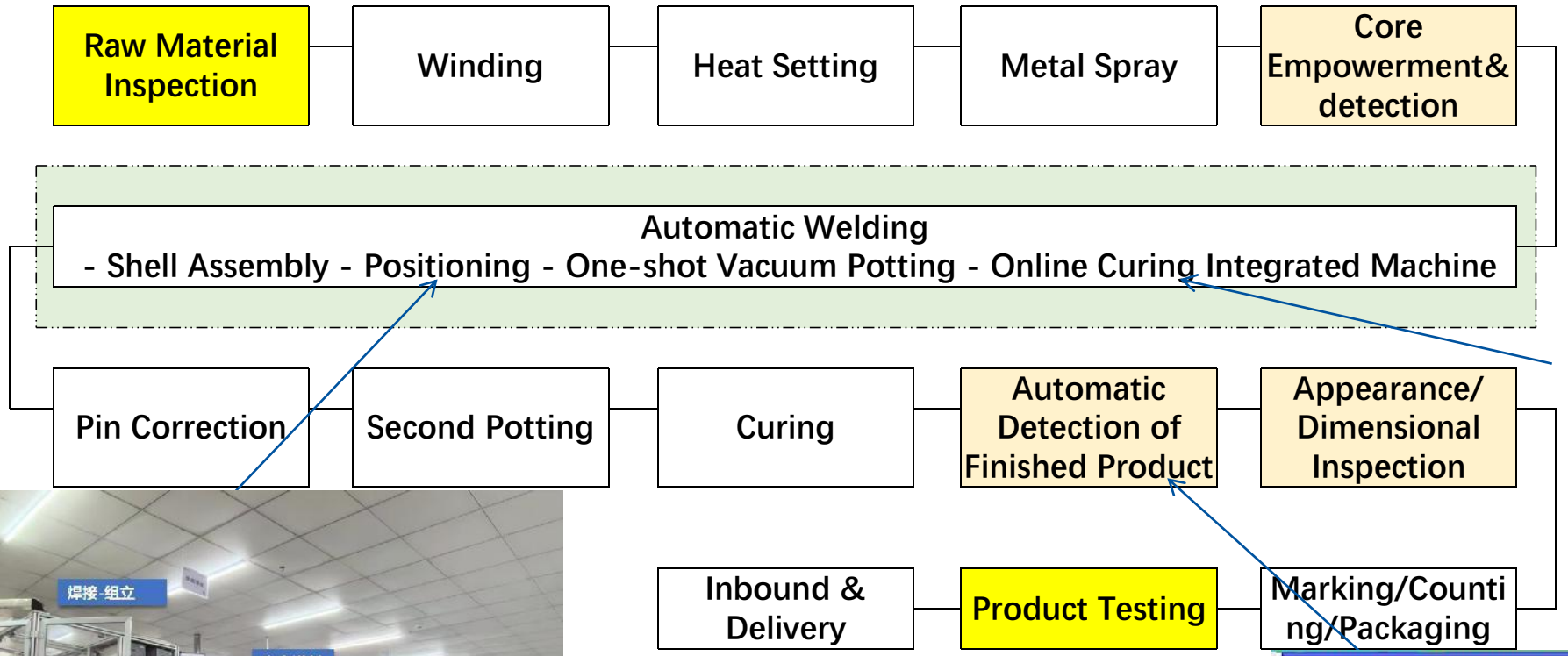

| Typical Specifications | |
|---|---|
| 2(μF)-1100VDC | 12(μF)-700VDC |
| 10(μF)-1100VDC | 12(μF)-800VDC |
| 12(μF)-1100VDC | 14(μF)-800VDC |
| 15(μF)-1100VDC | 22(μF)-800VDC |
| 25(μF)-1100VDC | 50(μF)-600VDC |
| 40(μF)-1100VDC | 50(μF)-900VDC |
| 6.5(μF)-1500VDC | 75(μF)-700VDC |
| | 110(μF)-550VDC |
| | 140(μF)-550VDC |

## Application areas

Photovoltaic inverter; energy storage;
Inverter; inverter power supply

# Square Case Pin Film Capacitor Production Process Flow

## Process Flow Diagram



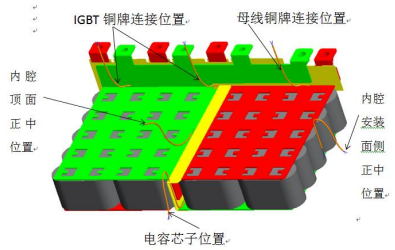


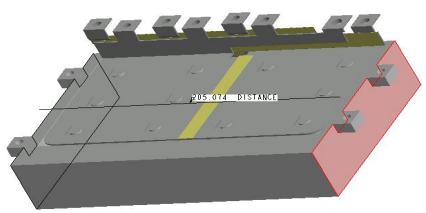
# New Energy Vehicle Capacitor

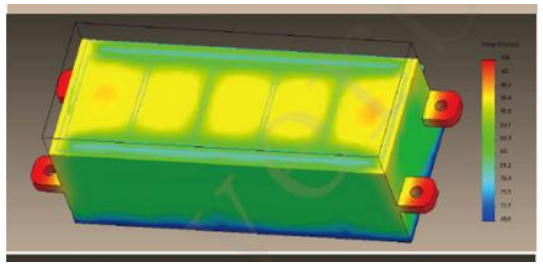
※ Customized design for EV/HEV, fast response;

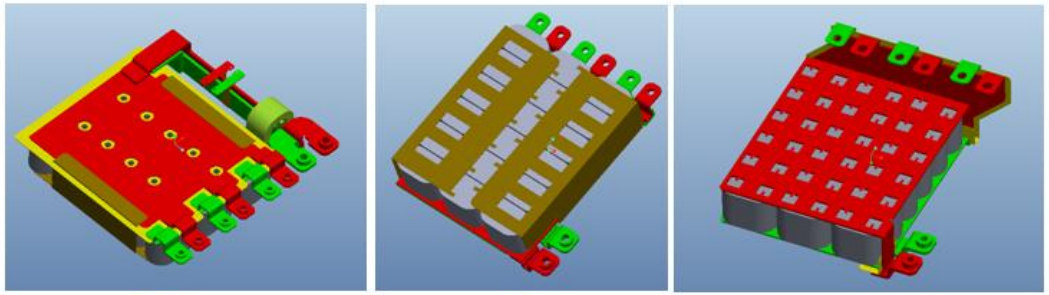
※ Smaller size, lower ESR and ESL, higher energy density;

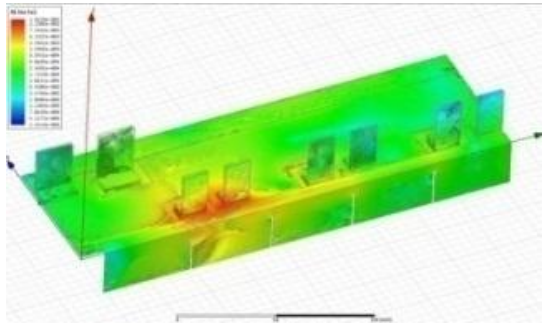
※ Comprehensive verification methods, reliable quality assurance system,the product has extremely high consistency and reliable life,meet automotive grade application requirements;

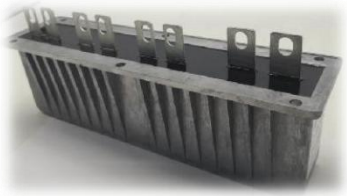






# New Energy Vehicle Capacitor Production Line

**Current Capacity: 20,000 pcs/month**

**Next Step Capacity Planning: 100,000 pcs/month**

# Metal Square Capacitor

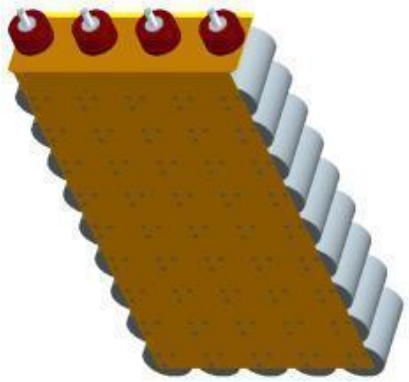
## Features:

※ Metal casing, dry resin encapsulation;

※ Highly suitable for customized design of large equipment, can achieve extremely large capacity and high voltage;can be custom-made;

※ The shape and mounting structure can be flexibly designed, easy and convenient to install;

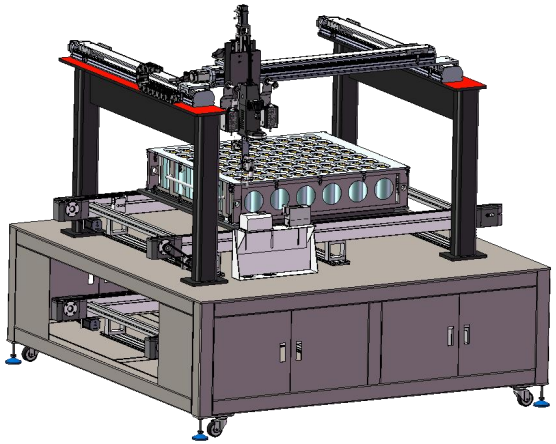
※ Low sense (ESL) internal structure design, which is conducive to the even of distribution of current flow, and has a great over-ripple current capacity through reasonable heat dissipation design;

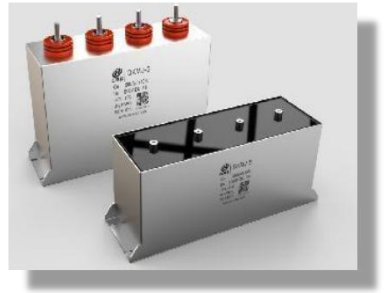



## Typical Application Fields:

Power Transmission (Flexible DC);
Special Frequency Converters;
Rail Traction;Variable Frequency Drive;

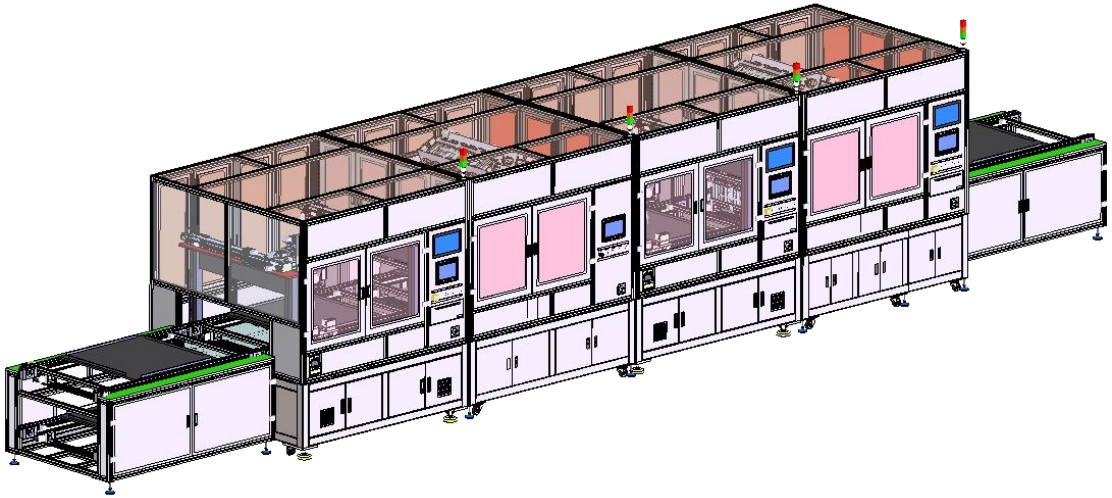
# Flexible DC Capacitor Production Line





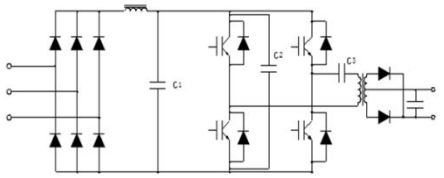
**Current Capacity：** **1.5Kpcs/month**

**Next Step Capacity Planning：** **3Kpcs/month**

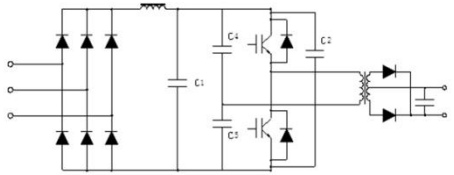


# Industry Capacitor

Inverter Welding Machine



全桥逆变焊机主电器图:



半桥逆变焊机主电器图

The development and widespread application of modern power electronics variable frequency technology have changed the design of modern welding equipment. Inverter welding equipment works at higher frequencies, is more efficient,and through optimized design, become more compact and lightweight.

| | | |
|---|---|---|
| C1: | EMC-filter | AKMJ-3 |
| C2: | DC-link | DMJ-MT<br>DMJ-PC<br>DMJ-PS |
| C3: | Snubber | SMJ-P<br>SMJ-TE |
| C4: | Resonance/ Coupling | RMJ-P |

Film capacitors are the main capacitors used, especially in the DC-link section, film capacitors have largely replaced the original electrolytic capacitors.

Welding machine capacitor production line is our company's earliest mature production line. All series have standardized production. Have been leading the market share in this field for a long time.

**Current Capacity:**
**250Kpcs/month**

# R&D Capacity

## Technology guidance

Cooperate with universities and R&D institutions to provide film capacitor solutions for various advanced technology applications

Incorporate technology development direction and R&D team building into the company's medium and long-term development plan

## Professional ability

The engineers have more than 20 years of working experience, who can optimize the design of products for the pursuit of the best cost performance, quickly respond to customer requirements and provide design solutions and samples

## Quick service

Our R&D team will respond to customer within 24h, and provide customers with solution within 48h.

# Laboratory


宸瑞科技
CRE POWER TECHNOLOGY
无锡宸瑞新能源科技有限公司
wuxi CRE New Energy Technology co.,ltd.
宸瑞科技 | 公司荣誉
高效 创新 融合 卓越
PATENT
国家发明专利
POWER LINKS SUCCESS

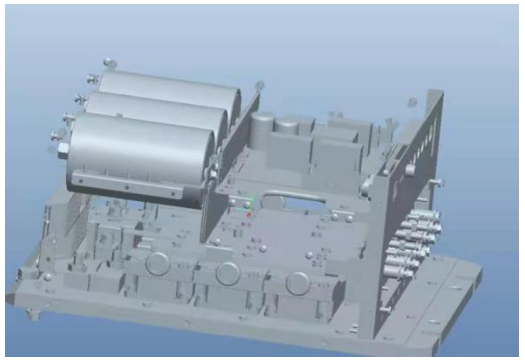
# Laboratory

**Experimental ability:**

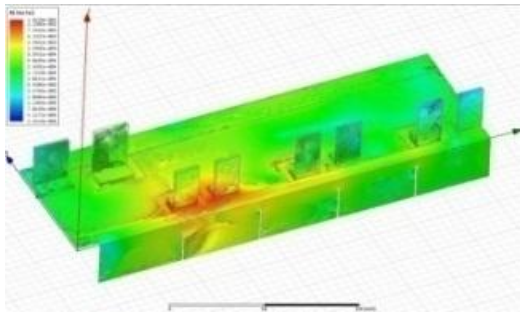
**Able to meet all testing requirements of IEC 61071 and AEC-Q200 standards**

## Advanced Experimental Platform

## Simulation platform



Structural simulation



Thermal simulation

# Cylindrical Aluminum Case Capacitor

## -Key Test Items and Verification Capabilities

### Type Test Items

- Appearance and dimension inspection
- Voltage test between terminals Ut-t
- AC voltage test between terminals and case Ut-c
- Impulse discharge test (dv/dt test)
- Capacitance and tg δ measurement
- Equivalent series resistance (ESR) measurement
- Insulation resistance measurement
- Mechanical test
- Impulse discharge test
- Self-healing test
- Environmental test
- Thermal stability test
- Resonant frequency measurement
- Endurance test
- High temperature and high humidity load test

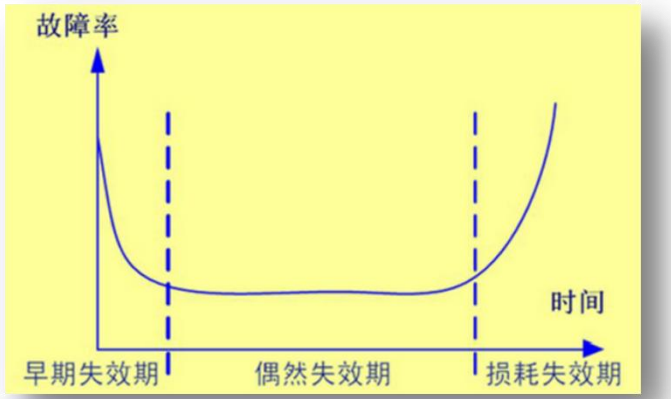
# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

### High-Temperature Power Aging

※Our biggest advantage is the 100% high-temperature power aging of the products before delivery.
※Aging at the highest operating temperature and working voltage to select bad products in the early stage.

Intelligent Aging Management System




The failure distribution of products generally follows the“Bathtub Curve”where the majority of failures occur in the early stages of product use.Components that have undergone early failure screening have a failure rate that is an order of magnitude lower than that of components that have not been aged.

Scanning each component to record data,and recording voltage and leakage current separately; long-term accumulation of data is of great help for material analysis.

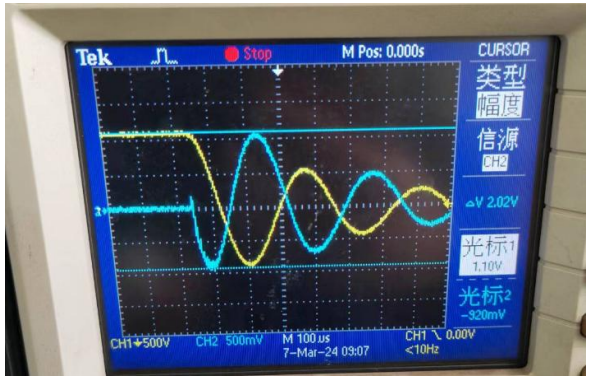
# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

## ● Impulse Discharge Test

- ■ Discharge through a short-circuit device as close as possible to the capacitor(discharge current = 1.1 * maximum impulse current Is), the capacitor should be able to withstand five such discharges within 10 minutes. Within 5 minutes following this test,perform a polarity withstand voltage test between its terminals.
- ◆ No abnormalities in the voltage withstand test.
- ◆ $\Delta C/C \leqslant \pm 1\%$, $\tan\delta \leqslant 1.2\tan\delta_0 + 1*10^{-4}$ $\tan\delta$ —the value after the test, $\tan\delta 0$ —the value before the test.
- ※ The discharge current can be limited to 1.1 × maximum impulse currentIs by adjusting the voltage and discharge resistance.

Pulse Current Test Power Supply



# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

## ● Self-healing Test

- The capacitor should withstand a test voltage of 1.5Un for 10s. If the number of breakdowns during this test is ≥5 times, the test ends;
- If the number of breakdowns during this test is<5, the voltage should be slowly increased until 5 breakdowns occur from the start of the test;
- Or until the voltage reaches 2.5 times the rated voltage. If reaching this level, still less than 5 breakdowns within 10s, the test should end.
- ◆ The change in capacitance $\Delta C/C \leq \pm 0.5\%$, $\tan\delta \leq 1.1\tan\delta_0$ initial value+$1\times10^{-4}$

Self-healing Test Bench

| 次序 | 自愈时间(S) | 自愈强度(V | 自愈高压(\ | 量化值 | 脉宽值 |
|---|---|---|---|---|---|
| 1 | 7.615860 | 0.0053 | 1190 | 43 | 10 |
| 2 | 8.721050 | 0.0039 | 1357 | 34 | 9 |
| 3 | 8.985400 | 0.0053 | 1394 | 44 | 10 |
| 4 | 9.129250 | 0.0069 | 1417 | 65 | 10 |
| 5 | 9.153410 | 0.0095 | 1424 | 90 | 11 |

# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

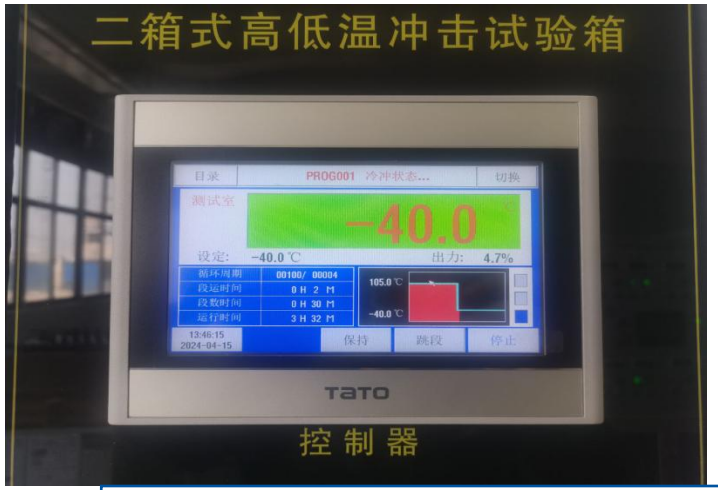
- **Environmental Test**
  - High-Temperature Storage Test
  - Low-Temperature Storage Test
  - Temperature Sudden Change Test
  - Constant Humidity and Temperature Test

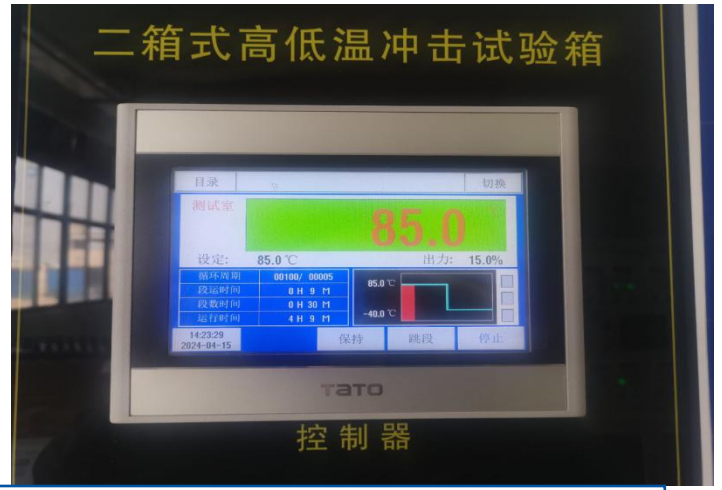
- High-Temperature Storage:Place the capacitor in a test chamber with a temperature of the upper category temperature (85° C) for 96h±4h;
- Low-Temperature Storage:Place the capacitor in a test chamber with a temperature of -40° C for 48h±2h;
- Temperature Sudden Change Test:Keep at the lowest operating temperature -40℃±3℃ for 2h; the highest operating temperature +85℃±3℃ for 2h; the transition time between the two should not exceed 3 minutes, and continue for 5 cycles;
- Constant Humidity and Temperature Test:Under the conditions of T=(40±2)℃, RH=(93±3)% for 21 days or 56 days;
- After the constant test is completed, perform a routine test between terminals voltage and a routine test between the terminal and the case voltage;
- Acceptance Criteria:

  No abnormalities in appearance;

  Capacitance change: ΔC/C≤0.5%, Ris*CN≥10000s;

High Temperature and Humidity Test Chamber




Two-chamber High-Low Temperature Shock Test Chamber-Controller

# Cylindrical Aluminum Case Capacitor

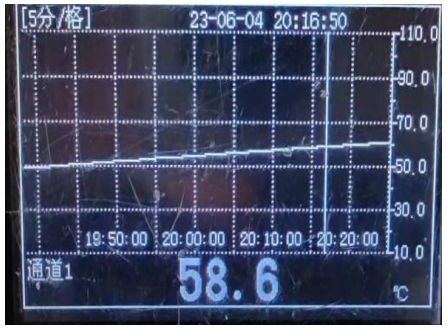
## -Key Tests and Verification Capabilities

## ● Thermal Stability Test

- Place the capacitor in a test chamber with a cooling air temperature (θamb+5)℃±2℃, apply a current source to keep the current through the capacitor constant at Imax, for a duration of ≥48 hours.During the last 6 hours of the test, the temperature near the top of the casing should be measured at least 4 times. During this entire 6 hour period, the increase in temperature rise should not exceed 1℃. If a larger change is observed, the test should be continued until the requirement is met for 4 consecutive measurements within a 6-hour period.
- ΔC/C≤±1%, tanδ≤1.2tanδ$_0$+1*10$^{-4}$, Hotspot temperature less than the upper limit value

Ripple Current Test Power Supply


High Frequency DC Ripple Power Supply




Temperature Curve Recording

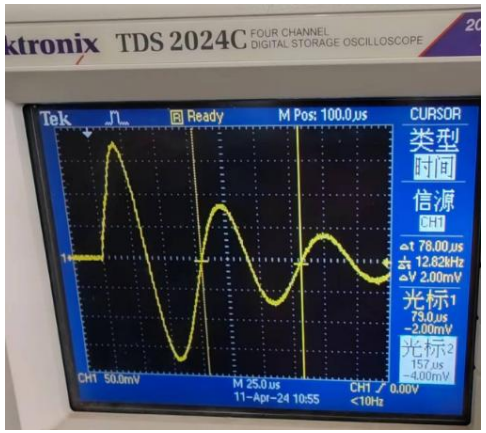
# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

- ## Resonant Frequency Measurement (ESL Measurement)

  - Use the impedance analyzer with high frequency range to sweep the frequency and obtain the impedance curve of the test sample,the frequency at the lowest point of impedance is the resonant frequency.Calculate the equivalent series inductance (ESL) based on this frequency;
  - Charge the test sample with DC electricity, then discharge it through a gap located directly at the terminals of the capacitor. Record the discharge current waveform with an oscilloscope, and calculate the equivalent series inductance (ESL) from the discharge current waveform;
  - The equivalent series inductance is less than the specified value;





# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

- **Endurance Test**
  - High Temperature Endurance Test
  - Place the capacitor in the test chamber, heat the test chamber to the operating temperature, and apply a 1.3Un DC voltage (1.25Un for AC) to the capacitor for 1000 hours under the test temperature environment.The endurance test should stop at 500 hours, and the capacitor should be powered off and cooled in the air at room temperature, and 1000 discharges should be performed on the capacitor, with a peak current of 1.4 times the maximum peak current Î, In the shortest time, re-energize the capacitor to complete the test
  - Capacitance change: ΔC/C≤±3%
  - ※ Common endurance test temperatures are 70℃、85℃ and 105℃;If the test voltage is increased by 10%, the test time can be halved.

DC Test Power Supply

AC Test Power Supply

# Cylindrical Aluminum Case Capacitor

## -Key Tests and Verification Capabilities

## ● Humidity Load Test

- ■ Place the capacitor in a temperature of 70±2℃, humidity 95±3%RH, apply the rated voltage Un, and run continuously for 1000 hours;
- ■ After the test, retest the capacitor for polarity voltage and polarity case voltage;
- ◆ Capacitance change: ΔC/C≤±2%, insulation resistance after testing $R_{is}$≥Rated Nominal Value*50%;
- ※ Common temperature and humidity combinations also include:

  T=60±2℃, humidity93±3%RH

  T=70±2℃, humidity95±3%RH

  T=85±2℃, humidity85±3%RH

High Temperature and Humidity Test Chamber


# Quality Assurance

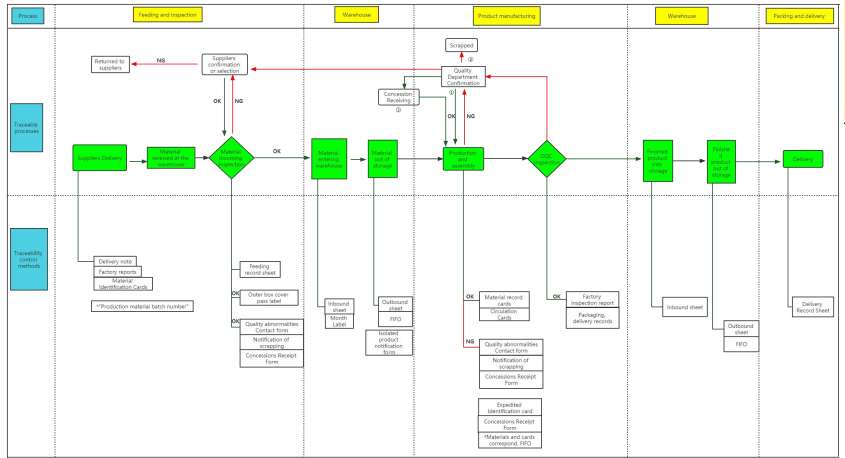
| Industrial Grade | Automotive Grade |
| --- | --- |
| Standards:<br>IEC 384-14<br>IEC 61071 | Standard:<br>AEC-Q200 |
| Quality system:<br>ISO 9001 | Quality system:<br>IATF 16949 |

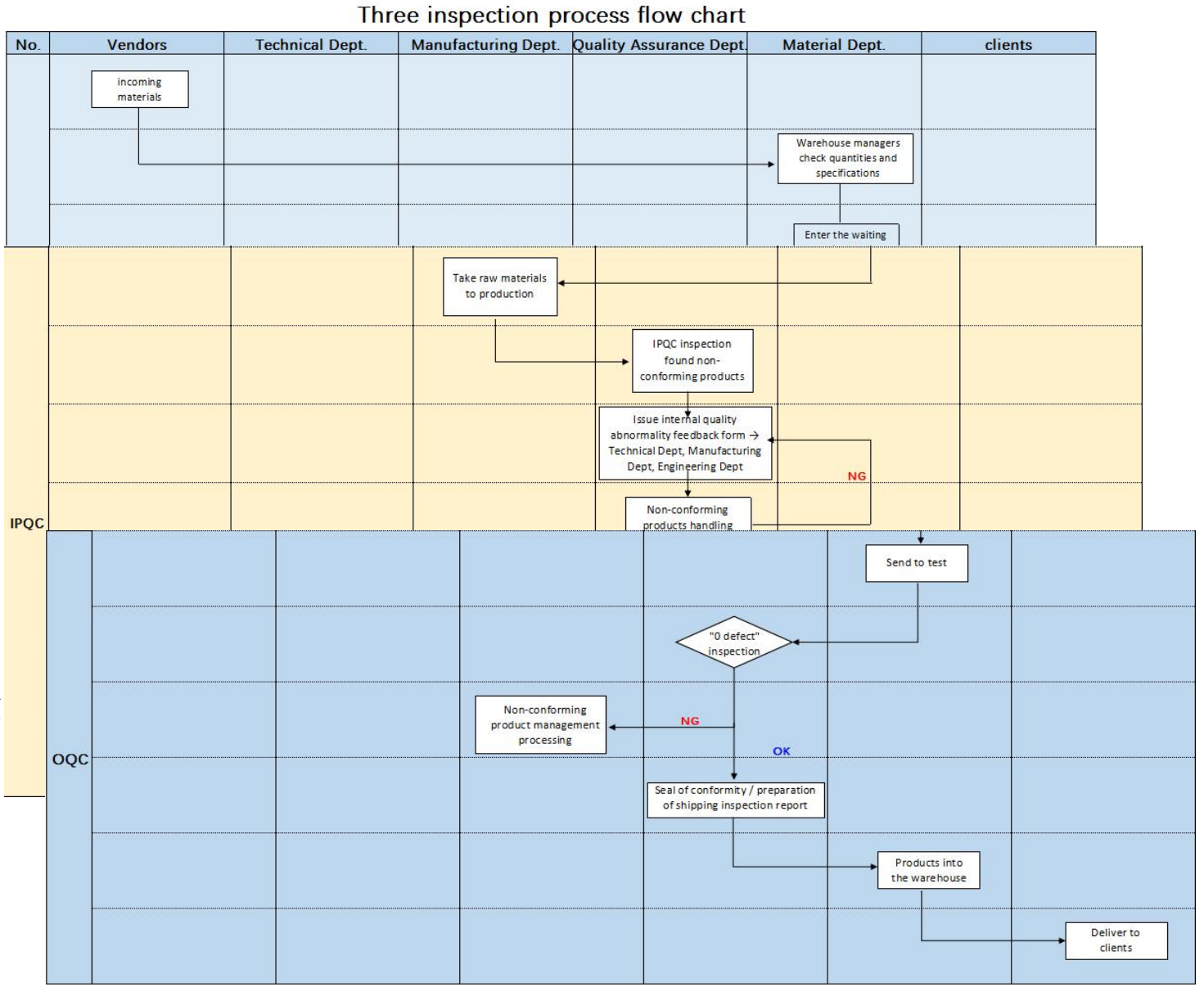
**Quality Management Thinking:**

Thinking about how to identify risks in terms of solving problems after they occur;

Preventing problems in advance for good quality planning transformation;

Maximize product stability, consistency and guarantee product quality.





# Main Customers

# Thank You

**We hope to be your trusted partner.**