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Electrical Power Unit ST-EC-EPU

The DC power supply and power distribution system of an E coating line is a core component of the electrophoretic coating process. Its primary function is to provide stable direct current to ensure uniform deposition of the coating on the workpiece surface.

1. DC Power Supply

Rectifier

The rectifier is the key component of the DC power supply, responsible for converting industrial alternating current (AC) into direct current (DC). Modern electrophoretic coating systems typically use diode or thyristor (SCR) rectifiers, which achieve rectification by controlling one-way current conduction.

Filtering Device

After rectification, the DC output may still contain AC ripple (voltage pulsation). Filtering devices—usually a combination of inductors and capacitors—are used to eliminate these pulsations, resulting in a smoother output voltage and minimizing negative effects on coating quality. In general, the voltage ripple is required to be no more than 5% of the average DC voltage.

Voltage Regulator

The output voltage can be adjusted according to process requirements. In most E coating lines, the voltage regulation range is typically 0—500 V, with the exact operating voltage determined by factors such as workpiece type and coating material characteristics.

2. Power Distribution System

Conductive Devices

These components connect the DC power supply to the workpieces and electrodes in the electrophoresis tank, ensuring reliable current transmission. Common conductive methods include:

Busbar Connection: Conductive copper busbars are installed above the electrophoresis tank, and the workpiece hangers make contact with the busbar to energize the parts.

Conveyor Track Conduction: The conveying track itself is used as a conductor to transmit current to the workpieces, although this method may cause some wear to the track over time.

Magnetic or Clamp Connections: Suitable for small workpieces or special applications, using magnetic contacts or clamps to temporarily connect electrodes to the workpieces.

Multi–Stage Power Supply Control

To improve coating quality and throwing power, some E coating equipment adopts multi–stage voltage control. For example, a lower voltage (50—100 V) is applied when the workpiece initially enters the tank to avoid intense electrolysis. In the main electrophoresis

zone, the voltage is increased to 150—250 V to ensure sufficient coating thickness and uniformity.

Safety Protection Devices

These include overvoltage protection, overcurrent protection, and leakage protection. When abnormalities occur, the system automatically cuts off the power supply to prevent equipment damage and electrical hazards.

3. Coordinated Control with the Process

The DC power supply and power distribution system must work in close coordination with other parts of the E coating line, such as the conveyor system, temperature control system, and anode system. For example, when the conveyor stops, the power supply should automatically reduce the voltage to a safe level. Since temperature fluctuations can affect paint conductivity, voltage or current compensation may be required accordingly.

Conclusion

In summary, the DC power supply and power distribution system is a critical factor in ensuring the quality of electrophoretic coating. Its stability and reliability directly affect key performance indicators such as coating thickness, uniformity, and adhesion. With proven expertise in designing and manufacturing high–performance E coating lines and E coating equipment, ShengTai Painting Equipment provides reliable and efficient solutions to meet diverse industrial coating requirements.

Please provide detailed information so that we can provide you with a more accurate solution:

1. What are the Maxminum and Minimum dimensions of your workpieces (L × W × H)?
2. What is the maximum weight of each workpiece? If available, please also provide product photos.
3. How many workpieces do you plan to coat per day (based on 8 or 16 working hours) or per month?

4. Which heating source do you prefer, such as electric power, diesel, fuel oil, or natural gas?
5. What are the dimensions of your workshop (L × W × H)? If possible, could you share a layout or drawing of the facility?
6. Prior to coating, do you require spray pre–treatment to prepare and clean the product surface?
7. What voltage and frequency standards are used in your country?

Please also share your WhatsApp or another instant messaging contact so we can communicate more efficiently.

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