### ADDITIONAL E-COAT PRODUCTS

**Warranty:**
Controlled Power Company guarantees the unit to be free from defects in material and workmanship for a period of (1) year following shipment from the factory.

**Benefits:**
- Narrows paint film deviation between various sized parts
- Reduces / eliminates undercoating
- If overcoating — reduces paint and energy consumption

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**Series 50 Rectifier**

The "Series 50" Rectifier reflects a single transformer, secondary thyristor design, and is the preferred choice for electrocoating and other metal finishing applications which require a single rectifier rated at or above 100V and 500A DC.

The "Series 50" Rectifier is available in both 6- and 12-pulse standard models: the Model 506 and the Model 5012 respectively. With either model, the rectifier controls are custom-configured to fit specific applications. A selection of manual controls are available to fit specific e-coat and other metal finishing processes. In addition, digital control and monitoring options are available on an override or external PLC.

**Contact us and/or consult our website for additional details about these and other Controlled Power Company industrial DC power supplies (rectifiers).**

**www.controlledpwr.com/DC_Power_Supplies_Rectifier.html**

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**Series 70 AutoCoat**

**Modular Anode Control Rectifier**

The "Series 70 AutoCoat" Modular Anode Control Rectifier is rated at 400V - 450V and 200A or 400A DC, and is specifically designed for automotive and general e-coat systems which require greater control of the painting process. Historically, 90-95% of e-coat lines have used a “zone system” (typically 2-3 zones), in which parts being coated are required to 2 or more voltage levels in the tank... and each zone requires a separate rectifier.

In comparison, the MAC system brings the multi-zone concept to a new level. Instead of having 2-3 zones, there are 10 or more zones. This approach provides the flexibility to control the voltage at every 2-4 anodes, which provides greater control over the application of paint.

The "Series 70 AutoCoat" is available in both 6- and 12-pulse standard models: the Model 706 and the Model 7012, respectively.

Contact us and/or consult our website for additional details about these and other Controlled Power Company industrial DC power supplies (rectifiers).
A potential calibrated AACD system can bring peace of mind to parties involved in the manufacturing, delivery, system startup, and beyond! If/when field service is necessary, Controlled Power Company will provide available parts and service for the life of each product we manufacture, delivering peace of mind to parties involved.

The durability and performance of each of our rectifiers, industrial DC power supplies (rectifiers) and control products, maximize end-user productivity and minimize downtime. Our engineers and manufacturers the industry’s highest quality material, workmanship, and operating performance of each product we build. The result is a rugged, reliable rectifier and/or control system, significantly enhancing the performance of all related equipment.

A potential automatic voltage control systems are typically designed to be very simple. In a single conveyor system, a standby rectifier can be configured to automatically control the standby rectifier when the active rectifier becomes inoperative or output out-of-tolerance error.

For Up To (2) Pumps

In a multiple zone system, the AACD device can be configured to automatically control a standby rectifier to provide optimal voltage for each zone. The AACD device can be easily configured to seamlessly control a standby rectifier for up to (2) pumps with stroke feedback for controlling second (2) counter with controls for up to two (2) pumps with stroke feedback for controlling

Optional Under-/Over-Voltage Monitor

Optional Standby Rectifier Control

The AACD can be configured to automatically restart a standby rectifier when it is brought online.

Case Study

A wheel manufacturer contacted Controlled Power Company after experiencing paint film defects — resulting in a very satisfied user. By reducing the wheel manufacturer's paint thickness, the company was able to significantly reduce labor costs and improve energy efficiency. The AACD system was configured to automatically control the paint voltage for up to two (2) pumps with stroke feedback for controlling second (2) counter with controls for up to two (2) pumps with stroke feedback for controlling

AACD Features, Benefits, & Options

The AACD controls can be configured to automatically control the standby rectifier when it is brought online. The AACD can be configured to automatically restart a standby rectifier when it is brought online.

Controlled Power Company

Case Study

In this situation, the basic common-e- problem can be easily corrected by installing a rectifier with AACD— or by retrofitting the AACD on an existing wall.
AACD (Automatic Average Current Density)

AACD is a process designed to maintain a uniform current density across the substrate's surface, regardless of part size or shape. This is achieved by continuously monitoring and automatically adjusting the output voltage to ensure that the larger parts receive more power and the smaller parts receive less power. By ensuring uniform pint thickness to each part in process, which groups vary in size and shape, the variations are greatly reduced and the parts to be painted with a .8 mil film thickness. Either by digital or analog input, or through the "Main Menu" screen (larger sizes also available). The AACD process is controlled by a microprocessor with an optional color touchscreen (larger sizes also available). As part of its failsafe design, the AACD system can be configured to control two or more rectifiers with true multiple zone control or single zone treatment. In a multiple zone system, the AACD can be programmed with as many different recipes as required. If a malfunction or output out-of-tolerance error.

AACD Features, Benefits, & Options

- Multi-zone compatible
- Optional bath temperature voltage
- Reduces energy consumption *
- Reduces / eliminates undercoating
- Narrows paint film deviation between various sized parts
- Ensures consistent and repeatable film build
- Provides an "automatic average current density" profile

Multi-zone Control System

A multi-zone system, the AACD similar to control two or more separate, independent power supplies that are being controlled by the same PLC. As such, the separate systems can be configured to control an entire production line. For Up To (2) Pumps

For Up To (2) Pumps

The AACD features on optional, programmable amp-hour or coulomb (amp-hours) meter, which is ideal for situations where the customer requires information on the amount of energy consumed. The AACD can be configured to seamlessly control a standby rectifier should a problem arise. The AACD can be easily configured to seamlessly control up to two or more rectifiers with true multiple zone control or single zone treatment. In a multiple zone system, the AACD can control a production line with as many different recipes as required. If a malfunction or output out-of-tolerance error.

Case Study - Wheel Mfg - AACD on Existing Mill Stand

This wheel manufacturer contacted Controlled Power Company with the goal in mind to improve the paint specification. The wheel manufacturer was experiencing excessive paint waste and significantly increased the bottom line of their business. The AACD was installed, their paint violations were reduced to film variations from 1.05 - 1.345 mils, which is a huge improvement. The AACD was implemented to control the entire production line, and the customer was able to meet their specification within the tolerances. The AACD has an optional programmable amp-hour or coulomb (amp-hours) meter, which is ideal for situations where the customer requires information on the amount of energy consumed. The AACD can be configured to seamlessly control a standby rectifier should a problem arise. The AACD can be easily configured to seamlessly control up to two or more rectifiers with true multiple zone control or single zone treatment. In a multiple zone system, the AACD can control a production line with as many different recipes as required. If a malfunction or output out-of-tolerance error.

ROI

ROI: One of the most important factors that any wheel manufacturer considers when deciding whether to invest in a new piece of equipment. ROI stands for Return on Investment and is a critical factor in determining whether an investment will pay off. It is calculated by dividing the net income generated by the investment by the initial investment cost. A wheel manufacturer that invests in AACD will be able to significantly reduce paint waste and improve film thickness consistency, resulting in a positive ROI.
**Experience, Quality, And Field Reliability**

Controlled Power Corp., strategically located in Littleton, Colorado, is a leader in quality industrial DC power supplies (rectifiers) and complementary rectifier monitoring and control products, capturing on over 45 years of experience in the field. This quality is reflected in the design, material, workmanship, and operation of our products. Our quality system will stand up to the rigors of 24/7 operation, even in harsh industrial environments.

The reliability and performance of each unit is determined meticulously: passively, productively and immediately. And if a field service is necessary, Controlled Power Corp. will provide whatever assistance and service for the life of each product we manufacture, a period of 5 years or 10,000 hours, whichever is other.

Controlled Power Corp. (CPC) ISO 9001:2008 certified, assuring quality and customer satisfaction — from quoting, throughout the design manufacturing, delivery, system startup, and beyond.

**What Is Automatic Voltage Control ... And Why Is It Important?**

All electro-deposition processes have a current density profile established as a guideline for power requirements, in order to achieve the desired film thickness with little or no human intervention. The current density value for the electroplating process is generally 2.5 ampere per square foot (ASF) of part to achieve the local standard. But the current density received by the electroplating material varies from the current density profile on several variable factors. As a result, the current density ratio between the parts can be as high as 4:1. For electroplating processes, the required current density ratio is 2:1. Due to the lack of automatic voltage control, this current density ratio can become major problems which lead to unnecessary energy consumption, labor waste — higher voltage results in greater power consumption (energy waste) and unnecessary labor costs — manually adjusting voltage for different parts (labor waste — poor quality)

AACD (Automatic Average Current Density)

The “HMI” might also be referred to as the “operator interface terminal” (OIT). Note: The “HMI” (human-machine interface) through the touchscreen “HMI”.

**AACD Product Design & Flexibility**

A self-configurable front panel displays the plant operator to set the desired current density profile for maximum current density scaling to the necessary loading patterns. The result is a seamless production run without the necessity of loading patterns to be set for each individual part size. The “HMI” includes output voltage and power monitoring, status, and alarm response.

**AACD Product Snapshot**

- Reduces energy consumption through automatic voltage control
- AACD automatically adjusts the voltage to accommodate the local standard
- AACD maintains the maximum voltage limits for the parts
- AACD automatically adjusts the voltage to accommodate the local standard
- AACD minimizes the maximum voltage values for the parts

**Common E-Coat Problems**

- When smaller parts enter the tank, they are often painted at the same voltage as the larger parts, resulting in the uneven film build
- Both conveyor and batch e-coat processes often have paint waste and lower real voltage due to the profile weight
- A continuous conveyor type of process has an average voltage profile for all parts

**AACD Features, Benefits, & Options**

**Benefits To Any Rectifier:**

- The AACD can be retrofitted to any rectifier, as long as there is a method of monitoring/controlling the current density profile. The AACD is a simple, easy-to-install, and low-cost modification to improve the performance of existing rectifiers.

**Optional Multiple Zone Control**

- The AACD can be used to control multiple zones (e.g., 2 zones). Each zone can be programmed with different recipes for different substrates. In each zone, the AACD can be configured to seamlessly control a standby rectifier.

**Optional Amp-Hour / Coulomb Counter**

- The AACD can be programmed with an optional, resettable amp-hour or coulomb (amp-second) counter.

**Optional Multiple Recipe Control**

- The AACD can be easily configured to seamlessly control multiple rectifiers with true multiple zone control or single zone treatment.

**Ease Of Programming And Operation**

- Prospective users can set the target film build with little or no human intervention. Monitoring & Status screen includes output voltage and power monitoring, status, and alarm response.

- The AACD can be easily configured to seamlessly control a standby rectifier.

**ROI**

- The AACD automatically adjusts the voltage to accommodate the local standard. This results in lower paint film tolerances, less paint (energy waste) and unnecessary labor costs — manually adjusting voltage for different parts (labor waste — poor quality)

- By reducing the wheel manufacturer's paint film thickness by 0.215 mils, they achieved over 0.215 mils, their annual cost savings in paint usage by over 0.215 mils, their annual cost savings in paint usage, and reduced energy usage

- The “unwanted money” from this manufacturer was increased profitability of the e-coat line.

- The AACD’s coating can be used to reduce energy consumption by 0.215 mils, their annual cost savings in paint usage by over 0.215 mils, their annual cost savings in paint usage, and reduced energy usage.
**ADDITIONAL E-COAT PRODUCTS**

**Warranty:** Controlled Power Company guarantees the unit to be free from defects in material and workmanship for a period of (1) year following shipment from the factory.

**Benefits:**
- Narrows paint film deviation between various sized parts
- Reduces / eliminates undercoating
- If overcoating — reduces paint and energy consumption

**Series 50 Rectifier**
This “Series 50” Rectifier reflects a single transformer, secondary thyristor design, and is the preferred choice for electrocoating and other metal finishing applications which require a single rectifier rated at or above 100V and 500A DC.

The “Series 50” Rectifier is available in both 6- and 12-pulse standard models: the Model 506 and the Model 5012. Each model is available in various output voltages and amperages, allowing it to be used in a variety of applications. The control panel is designed to provide optimum, reliable performance in harsh industrial environments.

**Series 70 AutoCoat Rectifier**
The “Series 70 AutoCoat” Modular Anode Control Rectifier is rated at 400V to 450V and 200A or 400A DC, and is specifically designed for automotive and general electrocoat systems which require greater control of the painting process. Historically, 90-95% of e-coat lines have used a “zone system” typically comprising 2-3 zones, in which parts being coated are exposed to 2 or more voltage levels in the tank, and each zone requires a separate rectifier.

In comparison, the MAC system brings the multi-zone concept to a new level. Now instead of having 2-3 zones, there are 10 or more zones. This approach provides the flexibility to control the voltage at every 2-4 anodes, which provides greater control over the application of paint.

The “Series 70 AutoCoat” is available in both 6- and 12-pulse standard models: the Model 706 and the Model 7012, respectively.

Contact us and/or consult our website for additional details about these and other Controlled Power Company industrial DC power supplies (rectifiers): www.controlledpwr.com/DC_Power_Supplies_Rectifier.html

**Automatic Average Current Density (AACD)**

Automatic rectifier voltage controller and paint usage optimization device for e-coat systems.
**Series 50 Rectifier**

This "Series 50" Rectifier reflects a single transformer, secondary thyristor design, and is the preferred choice for electrocoating and other metal finishing applications which require a single rectifier rated at or above 100V and 500A DC.

The "Series 50" Rectifier is available in both 6- and 12-pulse standard models: the Model 506 and the Model 5012. Both are specially designed to control the voltage at every 2-4 anodes, which provides greater control over the application of paint.

The "Series 70 AutoCoat" is available in both 6- and 12-pulse standard models: the Model 706 and the Model 7012, respectively.

**Warranty:** Controlled Power Company guarantees the unit to be free from defects in material and workmanship for a period of (1) year following shipment from the factory.

**Benefits:**
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**Additional E-Coat Products**

Automatic rectifier voltage controller and paint usage optimization device for e-coat systems.

**Product Dimensions & Basic Installation Drawings**

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<thead>
<tr>
<th>Model 506</th>
<th>Model 5012</th>
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**Series 70 AutoCoat Modular Anode Control Rectifier**

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**Contact:**
- Phone: (800) 521-4792
- Fax: (248) 528-0411
- Email: info@controlledpwr.com
- Website: www.controlledpwr.com/DC_Power_Supplies_Rectifier.html

**Summary:** Controlled Power Company guarantees the rectifiers free from defects in material and workmanship for a period of 1 year following shipment from the factory.

**Controlled Power Company**

World-renowned authority in power electronics

1925 Stephenson Hwy., Troy, MI 48083
phone: (248) 528-0411
email: info@controlledpwr.com

Manufactures and installs thousands of industrial rectifiers since the late 1960s.

Automatic Average Current Density (AACD) technology is one of the very best reasons to choose a Controlled Power rectifier. Our expertise extends into software and PLC programming, which offers a significant advantage to the OEM and user.