CRS
INDUSTRIAL POWER EQUIPMENT

QUASAR RECTIFIERS APPLICATIONS

Anodizing

Anodizing process is heavily influenced by ripple current; especially during the initial growth of the barrier layer. During the process every sudden variation of applied voltage can damage the oxide barrier layer.

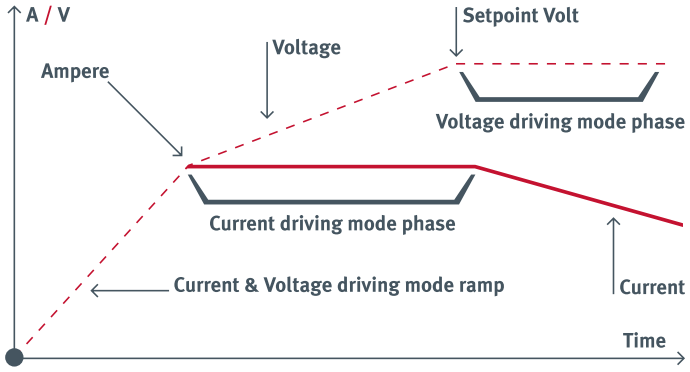
By selecting a DC rectifier with the filtered option the ripple can be maintained below 1% on the full scale. The low ripple combined with the simultaneous control of voltage and current by the QUASAR reduces the chance of barrier layer cracking. This is provided at a greater cost saving versus the traditional Thyristor phase-shift control technology. In addition thyristors are unable to provide this control when the voltage is very high.

The QUASAR microcontroller can overcome the time based control, with an algorithm called Physical Recursive Values (PRV) to manage the process based on the working physical values trend.

Following user programmable features are included:

> Simultaneous control of current/voltage derivates (dI/dt + dV/dt)
> Specific current working point
> Voltage limit vs thickness
> Low voltage limit
> Low current limit

Figure below reports an example of the generated waveform.



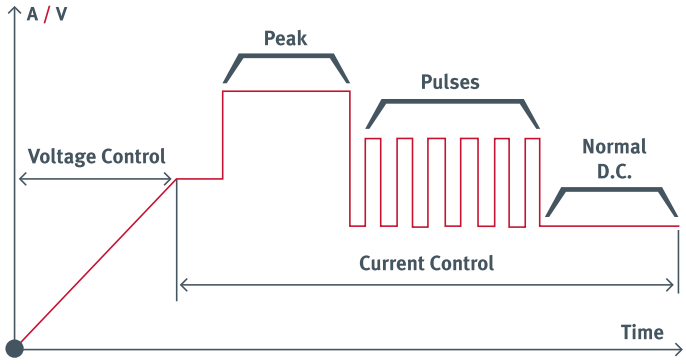
Decorative Chrome Plating

Difficulties in plating decorative chrome are well known in the plating industry. The coating might exhibit burned or not covered areas in proximity to the holes and edges. Health requirements to avoid contact over time between the skin and the under layer of nickel require and minimum thickness of 0.3µm. Achieving this minimum chrome thickness, even in a low density current area, means loosing brightness and obtaining burned edges. A good aid to the solution of these problems comes from using a CRS PP rectifier in combination with proper chemical products.

The CRS PP rectifier is driven both in DC traditional mode and in pulsed mode: after the initial ramp and peak to warm-up the pieces, the rectifier is driven in pulsed mode to take benefits of the high current values of the pulses.

Pulse duration time is very short, around few milliseconds and mainly depends upon the quality of the physical connections (copper bars or cables) between rectifier and processing tank. This pulsed treatment phase has proven to increase both deposit thickness and covering areas. In order to give the user even more flexibility, the pulsed treatment can be alternated with normal DC current phases.

Figure below shows an example of a decorative chromium waveform: please note that rectifier is driven in Voltage mode during the initial ramp only and in Current mode during the rest of the process.



www.crspower.com | sales@crspower.com | Tel. + 39 039 991.0999 | Fax +39 039 927.4399

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QUASAR RECTIFIERS APPLICATIONS

PCB (Printed Circuit Board) Applications

PCB application is a kind of electro-chemical industrial process to create electrolytic copper deposits (PCB electronic cards), printing cylinders, nano-structures creation and generally in highly sophisticated applications where different areas need different running processes.

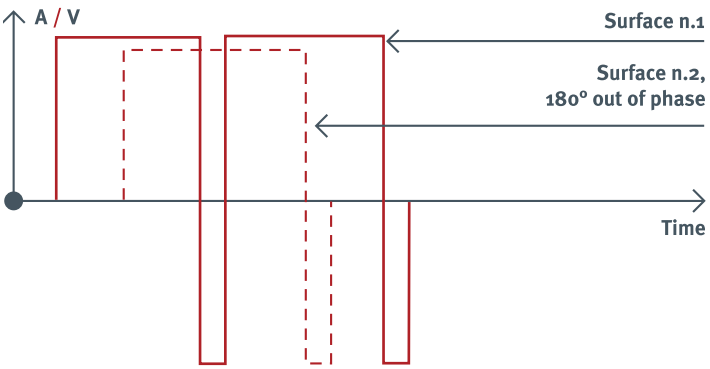
PCB application is the most performance based application type; chemical products used in PCB industry require very fast pulses (down to 1ms) and polarity reversing even faster (around 100ms). Furthermore, PCBs may have 2 different surfaces, each one requiring a different current value and, finally, PCB requires a normal DC current treatment after the pulsed phase.

Sometimes, the pulses on the 2 surfaces need to be synchronized, sometimes they need to be 180° out-of-phase, a few times they can be free running.

A CRS PPR machine in Master & Slave configuration combined with the Q63PPPCB software offer all the above features together.

Figure below reports the typical PCB pulsed pattern of two surfaces, 20ms forward pulse, 1ms negative pulse, asynchronous (180° out-of-phase). Please note that typical pattern also requires a negative pulsed value 3 times greater than positive pulse value.

The CRS PCB application allows both pulse duration and pulse value to be changed according to application needs.



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