

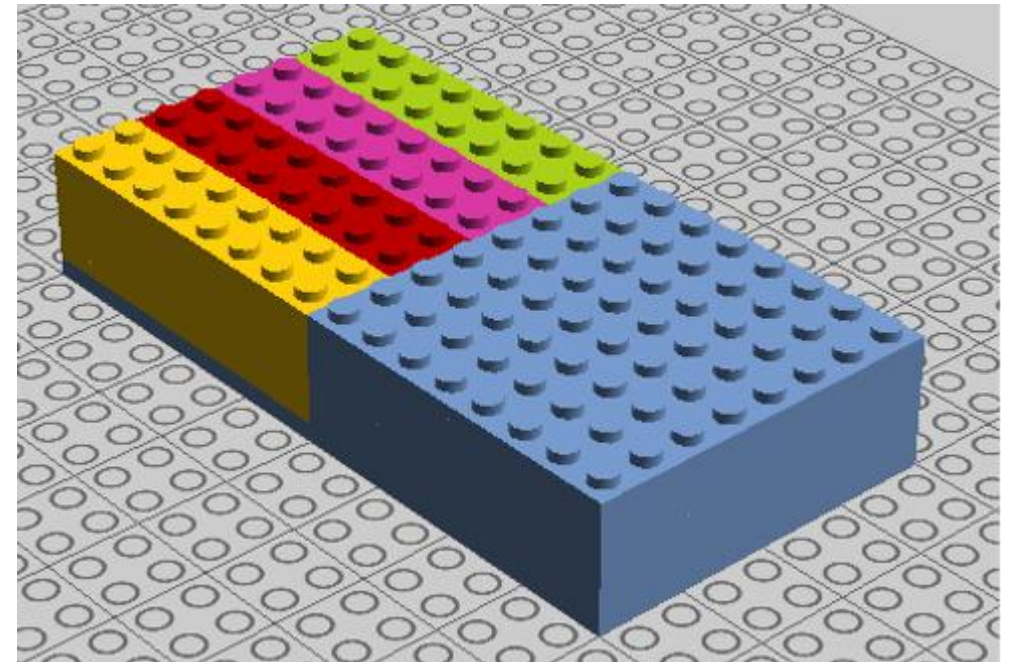
Robotic Arm & Modular Power Supply

A seminar by Don Schriek (Advanced Energy)



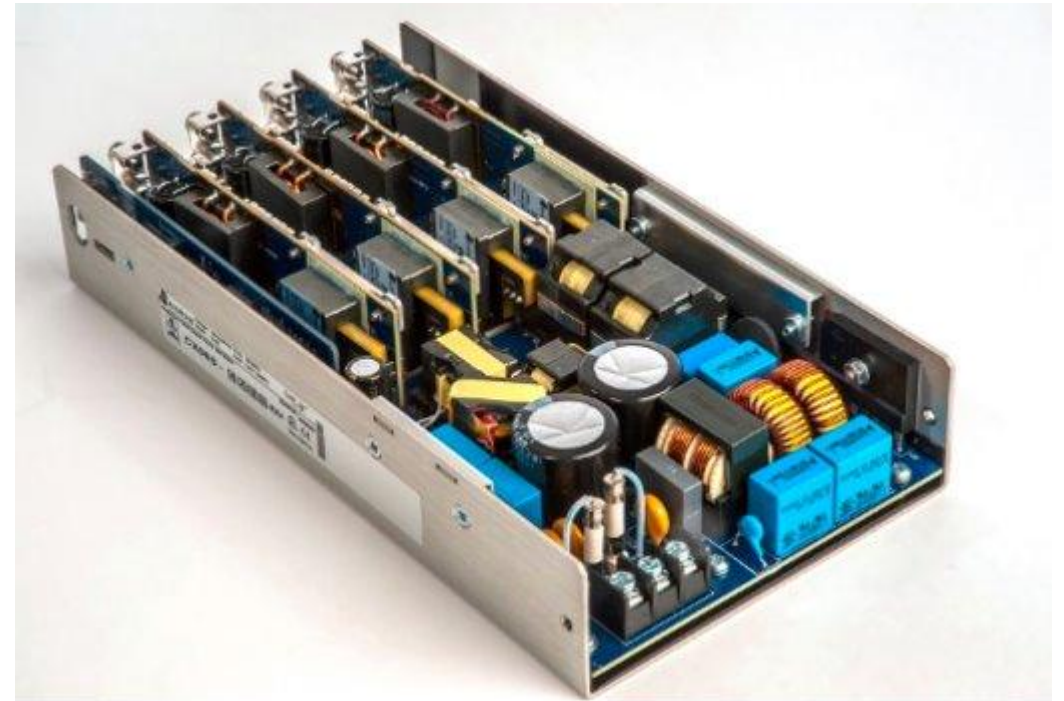
What is a Modular, Configurable Power Supply?

- Modular
 - Single front end (PFC boost stage and a main switching stage)
 - Output modules that regulate the output voltage (typ. Buck)

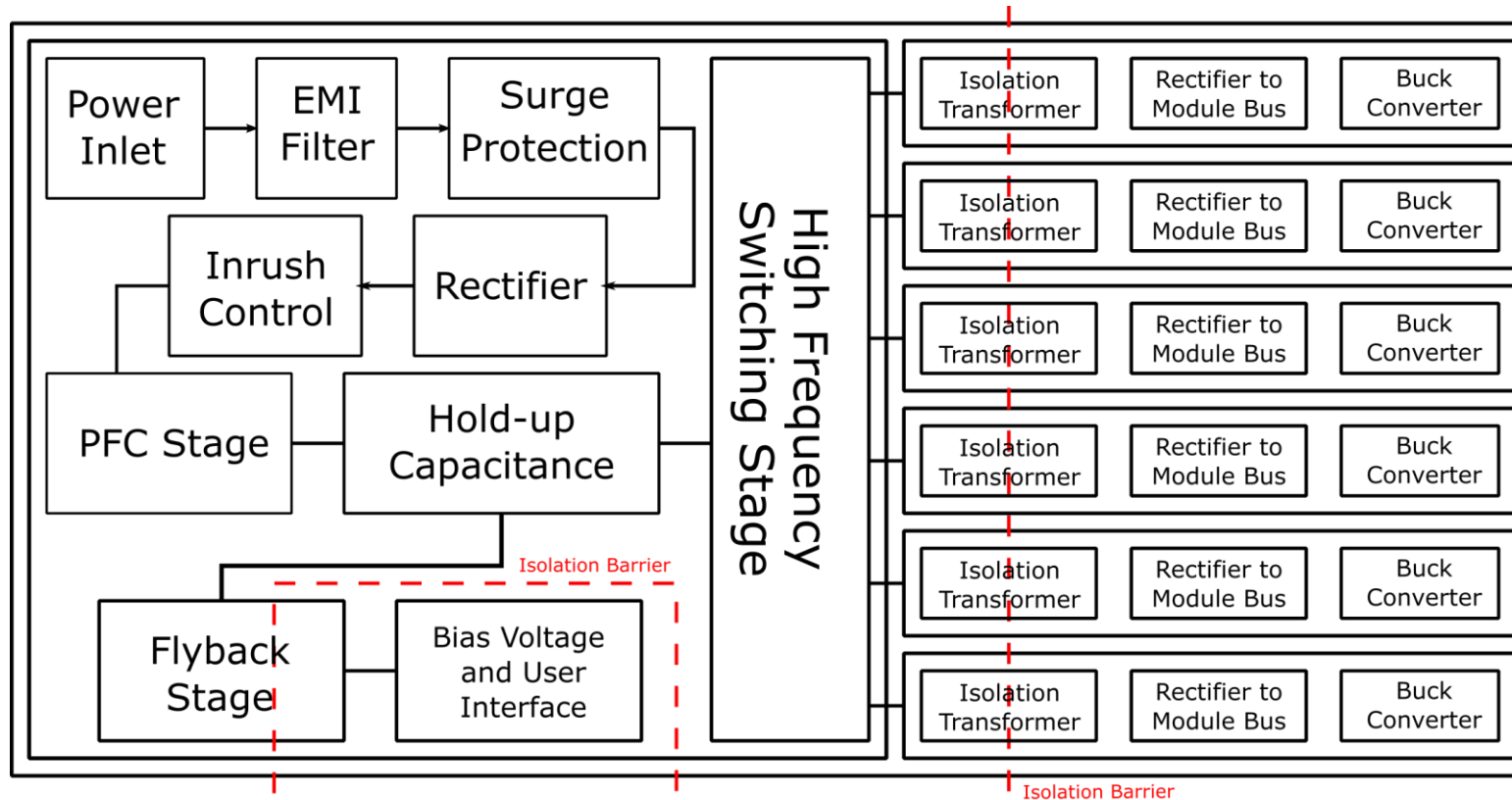


What is a Modular, Configurable Power Supply?

- Configurable
 - Different output Voltage Modules
 - Modules can be configured in series or parallel



Typical Modular Power Supply



Who makes modular power supplies

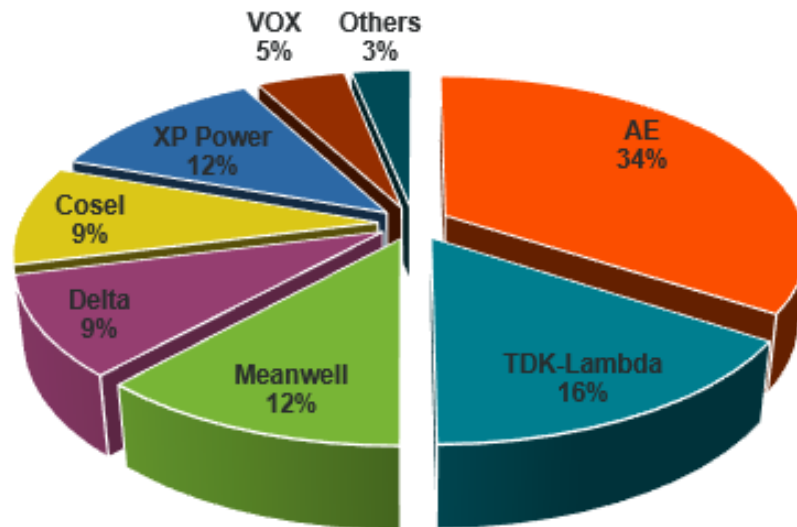


Who makes modular power supplies

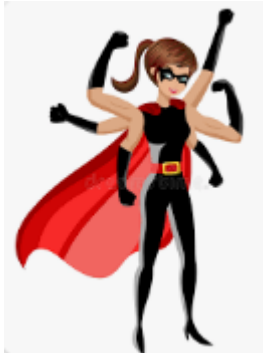


Who makes modular power supplies

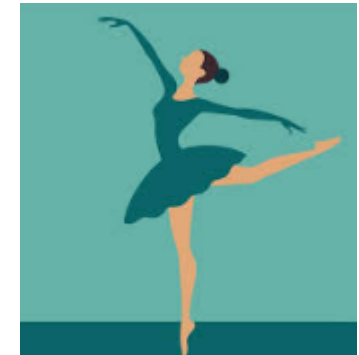
2025 Configurable Product Market
\$128M



Why use modular power supplies?



- Multiple (isolated) Outputs
- Unusual Voltages, combinations
- Complex control (CC, sequencing, adjust “on the fly”)
- “Ready Made” & safety approved
- Platform design
- EMC
- Inrush



“Flexible Multi-tasker”

Module Features solving problems

- Standard vs. Bulk Power reducing cost
- Single, Dual, Triple output reducing cost
- Wide Trim, allowing charging (or use less modules)
- Control loop tweaking
 - Analogue vs. digital
 - Protection limits
 - CC or CV mode
- High Voltage for specific applications



Insert your Wish here

Real problems solved with Modular Power Supplies

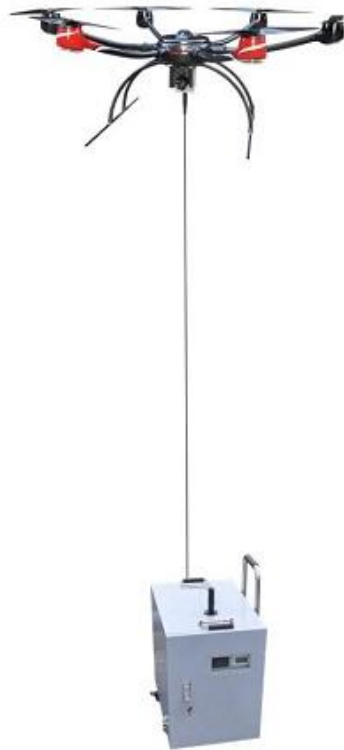
Pipe Crawler

- 72V needed to compensate voltage drop over the long cable
 - **Using two 36V modules in series**
- Other Voltages used for camera, monitoring & control



- Unusual Voltages, combinations

Real problems solved with Modular Power Supplies



Tethered Drone

- 400V needed to compensate voltage drop over the long cable
 - **Using eight 50V modules in series**
- Other Voltages used for monitoring & control

- High Voltage for specific applications

Real problems solved with Modular Power Supplies



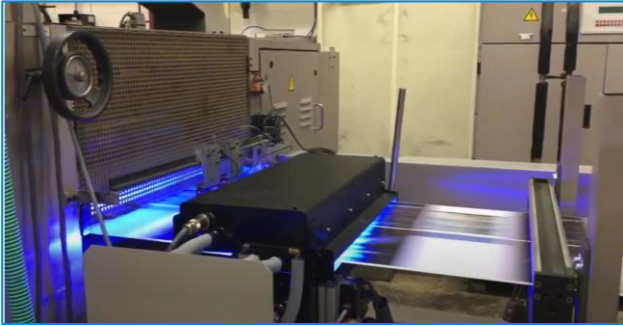
Skin treatment / Aesthetic Laser

- Wide trim modules allow cc charging of capacitor banks
- Other Voltages used for cooling, display & control



- Wide Trim, allowing charging (or use less modules)

Real problems solved with Modular Power Supplies



UV Curing

- High Voltage modules allow driving 250V lamps
- Current Source to tightly control curing process
- Other Voltages can be used for smaller lamps



Mains supply MCB to 24V DC PSU

Mains supply MCB for 2 Artesyn PSU

24V DC MCB

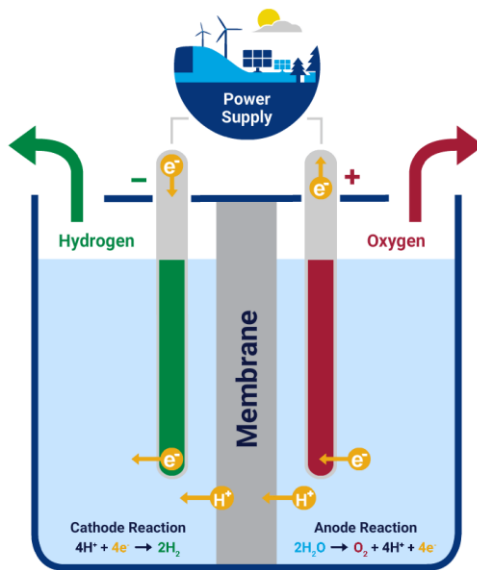
Mains Supply MCCB

Artesyn 24kW Rack mount PSU each
can operate 2 x 40" lamp heads

Standard rack mount cooler (water to air
heat exchanger)

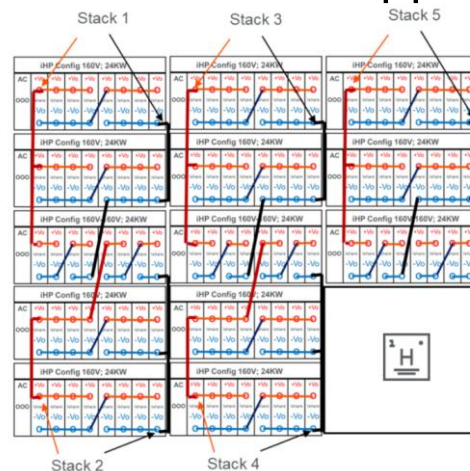
- Complex control (CC, sequencing, adjust "on the fly")

Real problems solved with Modular Power Supplies



Hydrogen Electrolyzer

- Five, 50kW stacks
- Requiring 320 – 350A (CC) @ 147-160VDC
- Interconnecting HV modules in 13 24kW modular power supplies



- Complex control (CC, sequencing, adjust “on the fly”)
- High Voltage for specific applications

Trends in Modular power

- More power, power per module
- Efficiency (90% common in modern modular psu's)
- Digital Control (internal & external)
- Less PM Bus, more MOD bus
- Customisation

Please come to meet the Robotic Arm





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