


**GREEN  
HYDROGEN  
SOLUTIONS**

Hydrogen  
zero emission

**Power Conversion Equipment**

An aerial night view of a city, likely Cape Town, South Africa, with a prominent mountain (Table Mountain) in the background. The city lights are illuminated, creating a vibrant scene against the dark night sky.

**“Without a  
paradigm  
power-shift,  
it’s all over.”**

**CONNECTING  
POWER TO**

**ENERGY EVOLUTION**

The drive toward economic and environmental harmony is mission critical, as we race to balance the health of our industries with the health of our planet. Dynapower stands committed to advancing this goal, helping the industries it partners with move toward sustainable practices and inexhaustible resources.



# Powering the potential of green hydrogen.

## PROVEN SOLUTIONS FOR ELECTROLYZERS

For decades, Dynapower has designed and manufactured large multi-megawatt scale power conversion solutions — the type needed in the production of hydrogen. Today, this experience allows us to support the hydrogen production industry with deep knowledge and expertise.

Our proven power conversion solutions cover all topologies, including IGBT chopper rectifiers, SCR/thyristor rectifiers, back-to-back DC/DC converters and IGBT boost rectifier systems.

## THE DYNAPOWER DIFFERENCE

With a full suite of reliable, high-performance products, we have the technology for any hydrogen production power supply challenge — from power factor correction and harmonic current mitigation to DC ripple current sensitivity and power supply response speed. We support hydrogen applications from centralized plants, distributed plants, and direct connection to renewable resources.

What's more, we partner with you for the entire lifecycle of your equipment, including 24/7/365 worldwide support.

## PRODUCT HIGHLIGHTS

- IGBT Chopper rectifier and transformer
- SCR Thyristor rectifier and transformer
- Highly flexible IGBT boost rectifier solutions
- Highly scalable solutions covering 125kW to >20MW electrolyzers, 480V to distribution voltage
- Direct connect renewables integration options (AC/DC & DC/DC)
- Options for off-grid operation of remote sites
- IEEE 519 grid harmonics compliant options negating the need for external filtration

# Technologies



## IGBT CHOPPER RECTIFIERS

1MW - 20+MW

### Advantages

- Mature technology
- Constant high power factor
- Low harmonics
- Simplified transformer design
- Low ripple
- High efficiency
- Easy operation & maintenance
- Excellent control of the load current
- Very rapid software protections
- Scales to very high power levels

### Considerations

- IGBT Chopper frequently has all-in lower CAPEX and OPEX than SCR-based rectifiers on elimination of tap-changing transformers, harmonics filters, and associated balance of system equipment.

### Optimal Solution For

- Large-scale projects where DC & AC power quality are important.
- Renewable energy following, consistently great performance across output range.



## SCR THYRISTOR RECTIFIERS

50KW - 20+MW

### Advantages

- Mature technology
- Robust
- High efficiency
- Easy operation & maintenance
- Good control of the load current
- Scales to very high power levels

### Considerations

- Often requires more complex transformer design (higher K-factor, interphase, tap changers, etc.).
- Often requires line harmonic filters and power factor correction.
- Slower fault response time (~100ms to turn off) compared to IGBT chopper (~100us) can increase stress to components during fault turn off.

### Optimal Solution For

- When rectifier load is small relative to interconnect (thus a tolerance for harmonics & low PF) and load tolerant to DC ripple at low output.
- Large projects where operation is consistently at full output V & I (full output minimizes harmonics and DC ripple).



## IGBT BOOST RECTIFIERS

1-6MW building blocks

### Advantages

- All of the Pros of IGBT Chopper (high power factor, low harmonics, low DC ripple, simple transformer, high efficiency, easy operation & maintenance, excellent control of the load current, very rapid software protections).
- Can use in conjunction with transformer with integral fused disconnect switch to eliminate separate switchgear.
- Utility interactive advanced grid support modes facilitate utility approval of very large projects .
- Designed specifically for utility interconnection.

### Considerations

- Topology has a minimum DC voltage that it must be above to operate, thus it can't ramp from 0V to setpoint and uses either AC precharge or small auxiliary DC voltage supply for startup voltage.
- Acceptable parallel converter count (common AC & common DC) is limited, so loads requiring large number of inverters will increase transformer count, so may lose economies of scale on transformer (more smaller transformers for large plants).

### Optimal Solution For

- Large-scale projects where DC & AC power quality are important.
- Renewable energy following, consistently great performance across output range.
- Higher DC voltages



## DC/DC CONVERTERS

500KW building block

### Advantages

- Very flexible, many configuration possibilities.
- High efficiency due to minimization of power conversions .
- Very low DC current ripple .
- Easy operation & maintenance.
- Excellent control of the load current, very rapid software protections.

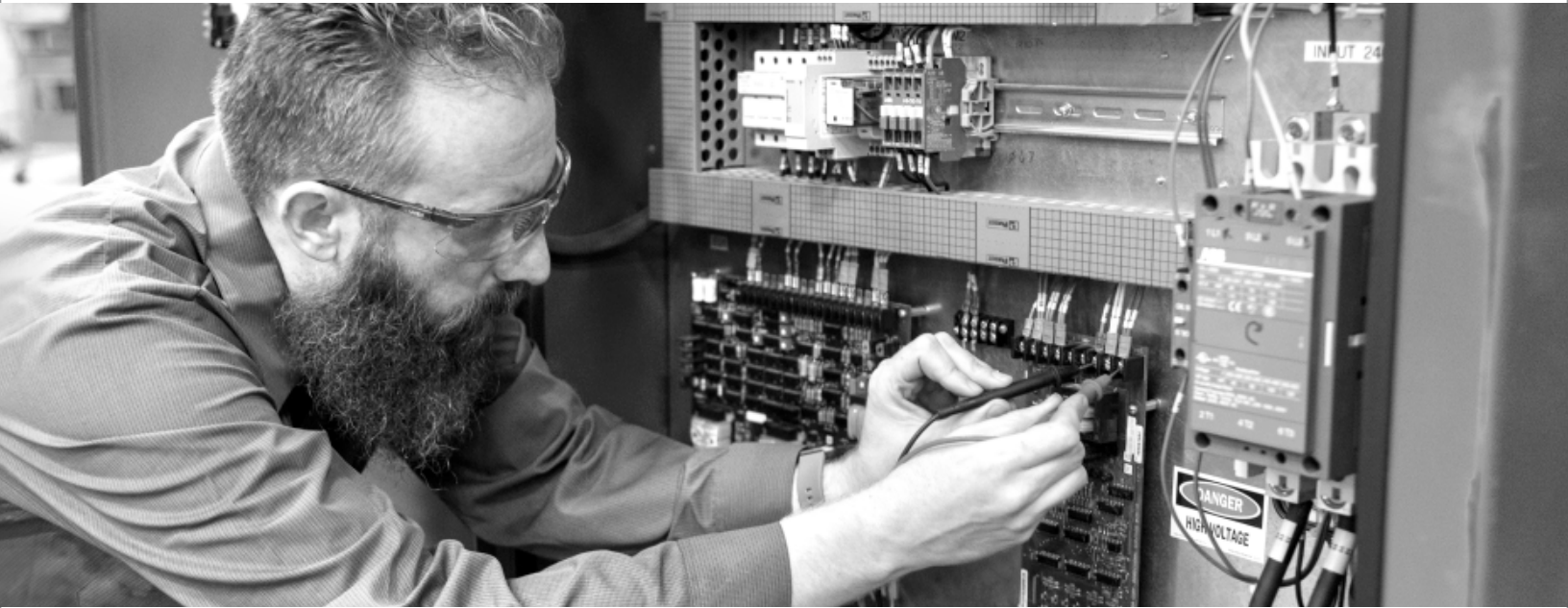
### Considerations

- DC output is capacitive, so DC fault current magnitude can be limiting factor of how many DC converters can service a common DC load.

### Optimal Solution For

- Connecting large DC sources to large DC loads where power quality is important
- DC sources/loads in the 1000Vdc range
- Co-location of renewables

# Services



## COMMISSIONING

To ensure your power conversion system is in accordance with project specifications, we work closely with you during the commissioning and start-up phase. Our deep knowledge and expertise allow for effective planning, troubleshooting, and execution.

## FIELD SERVICE

We help ensure the reliability and availability of your equipment with on-site equipment evaluation, repairs, maintenance, and planning. With a large field service staff, we can handle any job — big or small, high precision or high volume — anywhere in the world.

## PREVENTATIVE MAINTENANCE

Equipment inspections and adjustments at regular intervals extend mean-time-between-failures, raise overall equipment effectiveness, and allow your production to stay on schedule. We offer four levels of Preventative Maintenance Plans that cover a range of health, safety, performance, and compliance checks.

## SPARE PARTS

High-quality spare and replacement parts help ensure maximum uptime for your equipment. We supply thousands of spare parts, including control boards, amp and volt meters, potentiometers, fuses, thermal switches, diodes, thyristors, IGBTs, contactors, relays, and fans.

## REMOTE MONITORING

When you have up-to-the-minute knowledge, you're able to make better decisions and avoid costly downtime and unplanned maintenance. We offer precise, real-time data on the health and useful life of your Dynapower equipment with remote condition monitoring.

## 24/7 TECHNICAL SUPPORT

We provide worldwide support and technical expertise any time of day or night, with technical support specialists, field service technicians, customer service reps, and a full complement of electrical and mechanical engineers. For immediate assistance, you can call us at (800) 332-1111 or visit our online support portal.

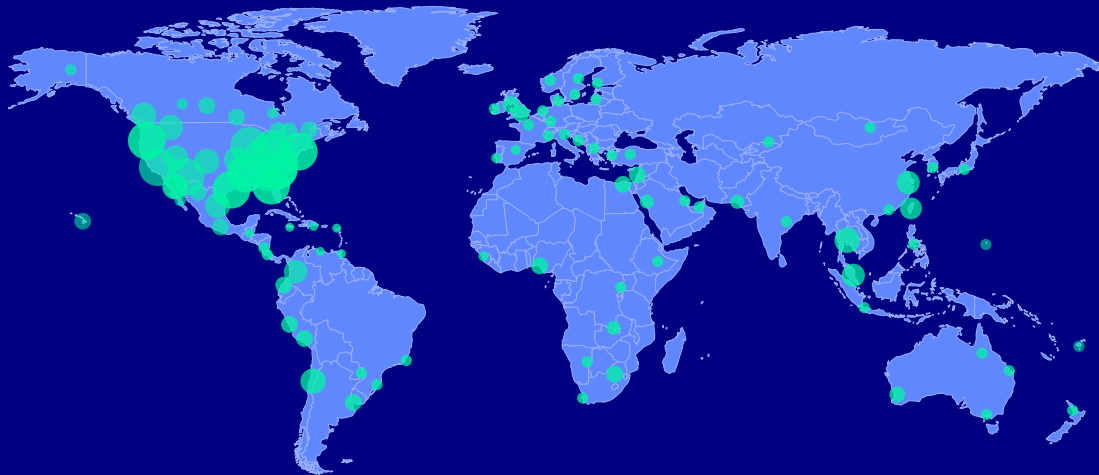
# Why Dynapower?



We're dedicated to continual product development and refinement, with a relentless focus on cost optimization, performance, and reliability.

Our industry-leading time to market is backed by a consistent record of successful and impactful product launches.

- ✓ Producer of high power rectifiers for global applications for over 3 decades
- ✓ Trusted supplier to North America's largest dedicated Green Hydrogen production and storage hub
- ✓ World leader in DC coupled solar plus storage



**>1 GW**

Clean energy products deployed

**>60**

Countries across the globe

**>28k**

Units of equipment installed

# About Dynapower



## CONNECTING POWER TO PURPOSE

Since 1963, Dynapower has provided power electronics solutions and an array of aftermarket services to an ever-expanding global customer base, with a focus on continuous reliability and efficiency.

We are a trusted leader in all types of power conversion equipment, including high-power rectifiers, inverters, DC-DC converters, integrated battery energy storage systems, and transformers for use in clean energy, industrial, and defense applications.

Powered by the pursuit of a greener future, we are rolling up our sleeves and pushing the boundaries of science and innovation to shift the way our world uses power.

### LET'S POWER UP TOGETHER.

Take the first step toward a higher level of performance and reliability.

Call or email us today to discuss your options and get the right solution for your green hydrogen production needs.

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