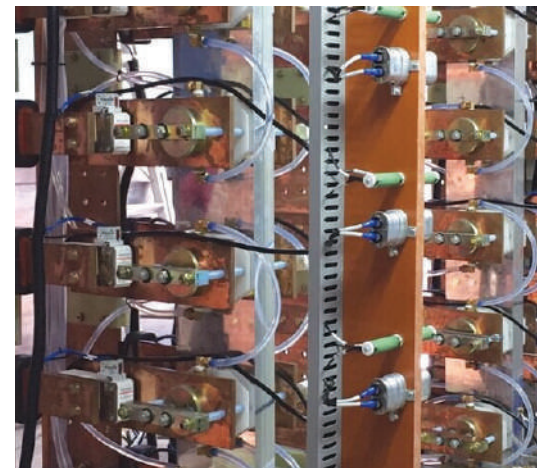
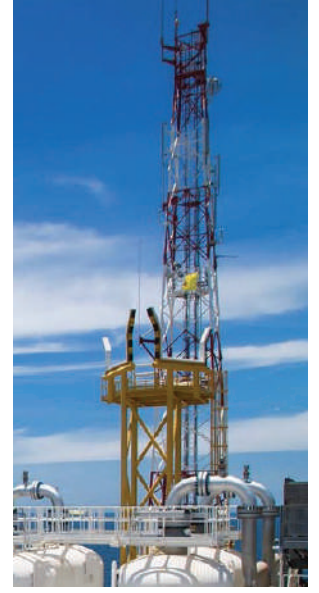




High Power *Rectifier*

Up to 30kA 1000Vdc



Chlor-Alkali Application



COMPANY PROFILE

01.

About us

CBC International is a engineering and trading company for Power Quality and Control Solution. For 20 years we have been at forefront in UPS, High Power Rectifier for Electrochemical, Automatic Voltage Regulator, and Lithium Iron battery in Thailand market. CBC is a pioneer to bring Lithium Iron battery to distribute in Telecom industry. Today we have more than 5.28MWh Lithium Iron battery installed in telecom industry. CBC is only Thai company who can make High Power Rectifier up to 30,000A/0-1000Vdc and Power up to 20MW 22kV system.



We provide one-stop services for *Power Quality Control Solutions*

Find products to solve your problems and increase your profit

- Line Interactive UPS
- Online Transformerless UPS
- Online Transformer based UPS
- Online Modular UPS
- Industrial UPS
- Automatic Voltage Regulator (AVR)
- Smart Capacitor Power Factor Compensation
- Static Var Compensation (SVC)
- Active Power Filter (APF)
- High Power Rectifiers
- VRLA Lead acid batteries
- Home Solar Roof and Energy Storage

High Power Thyristor Rectifier

CBC is only Thai company who can design and build High Power Thyristor Rectifiers which have been running well for 20 years. To meet our clients' special needs, we offer an unrivaled range of products to suit every type of application. CBC's fully staffed degreed engineering department provides clients with custom units.

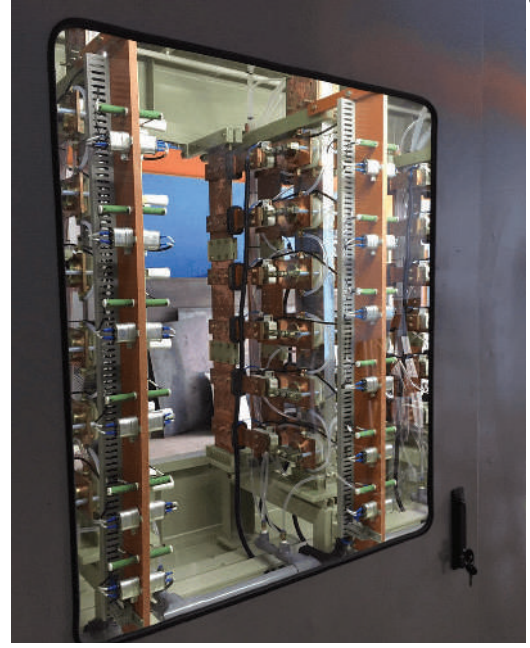
Design and Manufacturing

- Our dc power supply product range encompasses 1000 ADC power supplies up to 30,000 ADC 1000Vdc system.
- We design and manufacture in the supply of 6, 12, 18 and 24 pulse rectification systems. With agencies becoming more and more stringent on harmonic requirements, CBC can help customers meet these challenges. We can supply transformers up to 50 MVA.
- Our DC Rectifiers are equipped with world class quality equipment such as mainly ABB Thyristors, Enerpro-inc Trigger Firing boards, DUA liquid cooling plats, LEM DynAmp Current transducers, FLOHE DC High power switches, Siemens PLC system
- Rectifier Transformer voltage is up to 30kV
- Cooling system dWFWF, dWFAF
- Applications are mainly Electrochemical for Electrolyzer to produce Chlorine
- Design, manufacture and test according to IEC and IEEE standards.



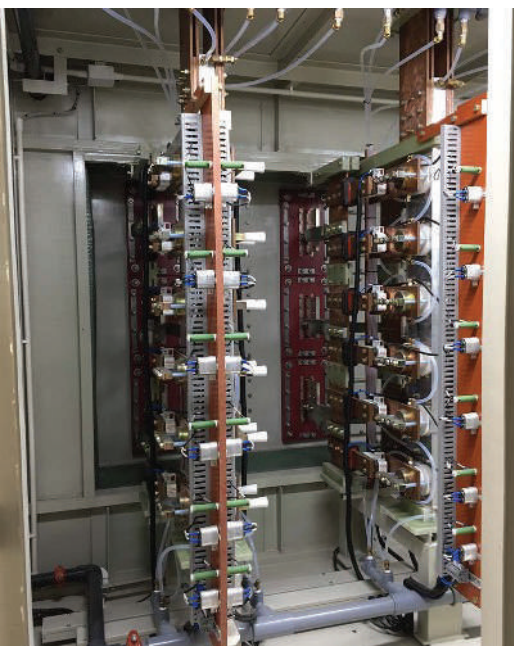


Walk-in access easy to maintenance

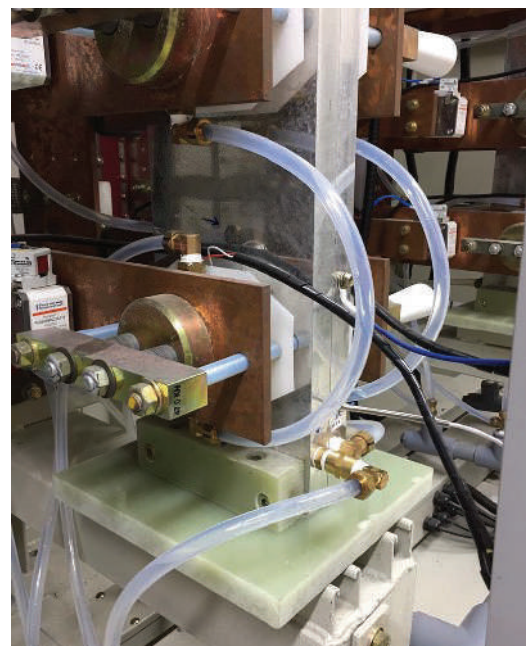


Side glass for visual inspection

Professional design and assembly



Deionized WF/WF/AF/WF closed loop cooling system



Proper mounting force with DYNEX semiconductor clamps

World Class Quality Equipments inside

CBC Rectifiers

Enerpro Firing boards from USA



FCOG61HV Hi Voltage Firing Board

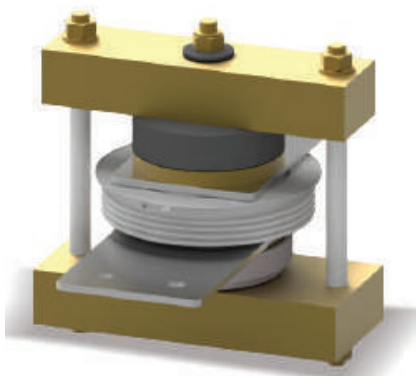
The FCOG61HV firing board combines the circuitry of the FCOG6100 firing board with high voltage tolerant, high output gate pulse transformers and increased creepage distances. This provides enhanced isolation for AC line voltages to 900 Vac and enhanced gate trigger current for large area devices.



FCOREM60 Auxiliary Firing Board

The FCOREM60 is used in applications where the control circuitry and SCRs are separated by long distance (remote operation) and require higher output pulses. It can also be used with the FCOG6100 or FCOVF6100 to provide high output pulses in order to fire parallel SCRs, or in combination with the FCOG61HV firing board, allowing 4-quadrant operation at mains voltage up to 900 VAC.

DYNEX Semiconductor Clamps



CBC Rectifiers use Dynex semiconductor clamps which provide a range of standard clamps designed to accommodate press pack semiconductors with tie rod centres from 75mm to 210mm and clamping force from 5kN to 138kN.

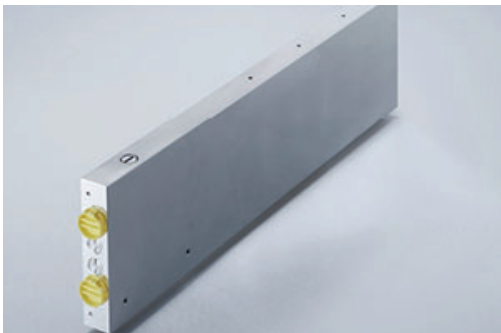
The set clamps use Disc Springs to DIN 2092/2093 to apply the clamping force over a wide temperature range. The clamps also incorporate pressure indicators to make installation simple. Isolation is provided by a high quality moulded insulator and PTFE sleeving.

DAU Liquid Cooling Plates



Manufactured by Vacuum Brazing Technology

- Optimum design of the cooling path based on the layout of the semiconductors
- Lowest possible thermal resistances
- Leak free, high strength and high mechanical load carrying capacity with burst pressures up to 1150 psi
- No structural changes in the material
- Clean parts without residual flux
- High reliability, durability and life cycle
- Low distortion due to uniform heating and cooling during brazing



Thyristors cooling system use custom size of base profiles, sealed with a unique patented technology that can withstand an working pressure up to 200 bar offers an optimal cooling unit for nearly every resistor size. At a certain volume custom specific profiles can be initialized. The volume depends on the size of the profile.

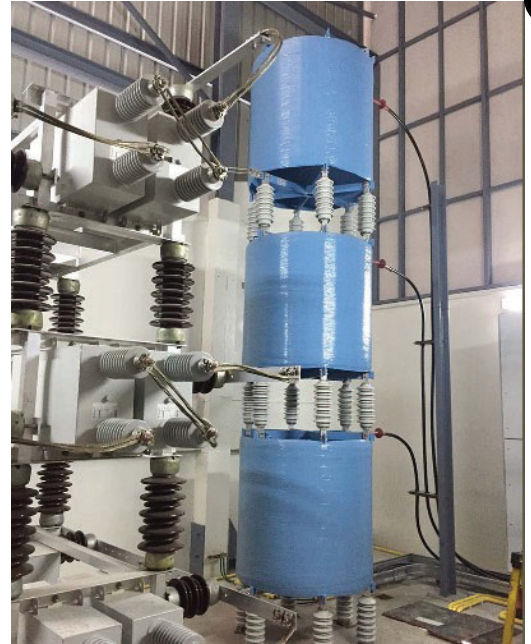


Polarizer rectifiers use heat pipe system

The high heat flux density generated by the semiconductors is absorbed by the heat spreader block and then, furthermore by the heatpipes. Then the Heatpipes transmit the heat isothermally to the fins.



Polarizer Rectifier

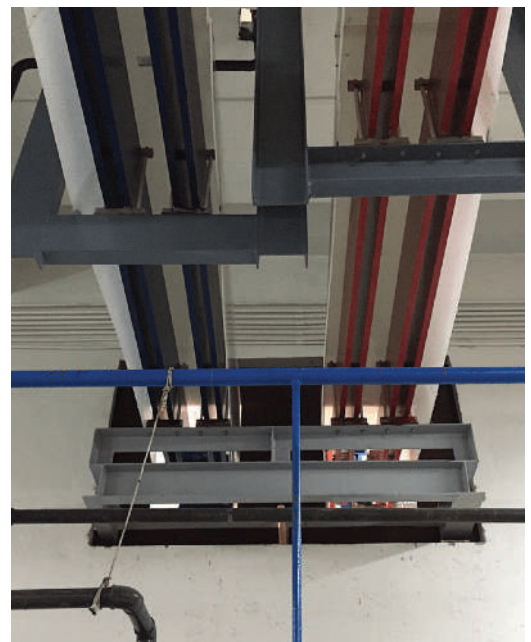


Harmonic Filters follows IEEE 519 requirement

Complete package design with



Remote Control Panel



Aluminum busbar design and installation

Assembly workshop



Clean assembly floor with overhead crane 5 tons



Cutting machine and facility support crane 5 tons



Engineering and design



Power Section Assembly



Final inspection



Transformer inspection and testing

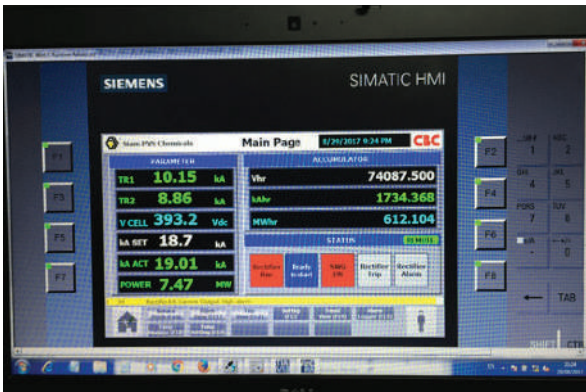
Site commissioning



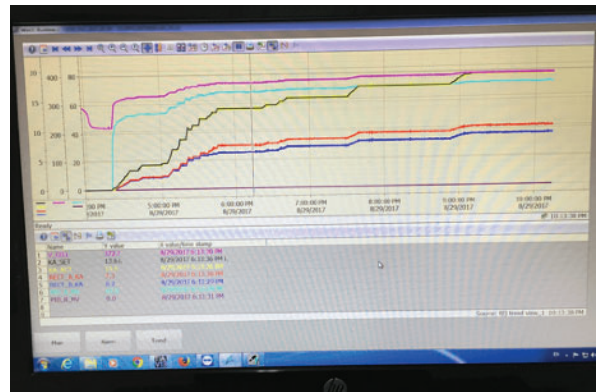
Commissioning team



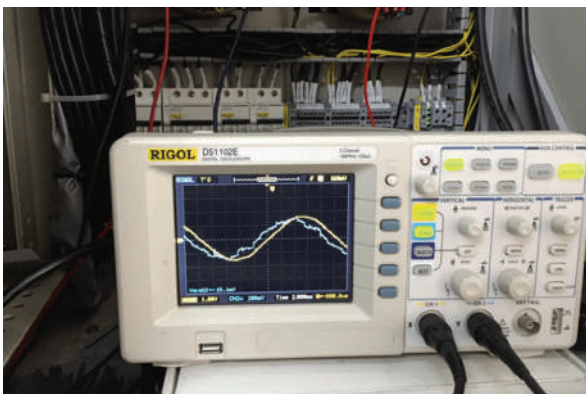
Temperature inspection



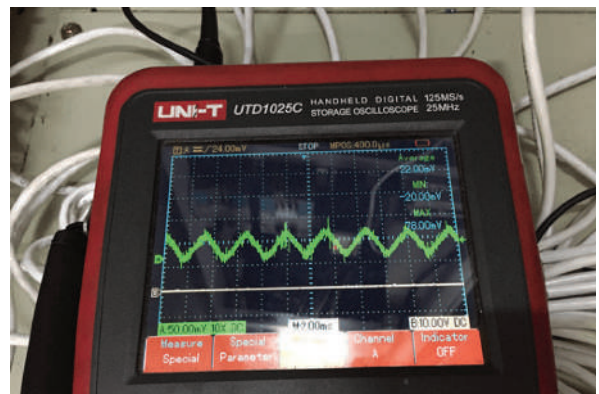
Commissioning and Test run



Smart commissioning



Synchronizing checking



DC current analysis

High Power Rectifier Project references



- 12 Pulse Thyristor Transformer Rectifier

Power Output: 24kA480Vdc

Input voltage: 24kV

Installed date: 5/2016

- 12 Pulse Thyristor Transformer Rectifier

Power Output: 22kA440Vdc

Input voltage: 24kV

Installed date: 5/2010

Application: Bipolar Chlor-alkali Electrolyzer

Client: Siam PVS Chemical / Bangpoo Industrial Estate Samut Prakan Thailand



2 units of 12 Pulse Thyristor Rectifier

Power Output: 12kA150Vdc

Input voltage: 11kV

Application: Chlor-alkali Electrolyzer

Client: BLCP Power Plant / Map Ta Phut Industrial Estate Rayong Thailand

Installed date: 12/2012



12 Pulse Thyristor Transformer Rectifier

Power Output: 40kA220Vdc

Input voltage: 22 kV

Application: Zinc Electrolysis refining

Client: Padaeng Industry Plc. / Tak Thailand

Installed date: 2/2003

High Power Rectifier Project references



Renovate 6 Pulse Thyristor Rectifier

Power Output: 20kA220Vdc

Input voltage: 6.6 kV

Application: Zinc Electrolysis refining

Client: Padaeng Industry Plc. / Tak Thailand

Installed date: 6/2004



Renovate 12Pulse Diode Rectifier to Thyristor Rectifier

Power Output: 80kA101Vdc

Input voltage: 22 kV

Application: Mono-polar Chlorine Electrolyzer

Client: Thai Plastic and Chemical Plc. / Map Ta Phut Industrial Estate Rayong Thailand

Installed date: 5/2010



6 Pulse Thyristor Rectifier

Power Output: 1000A400Vdc

Input voltage: 12 kV

Application: Electro deposit painting

Client: Toyota MotorThailand / Sumrong plant
Samut Prakan Thailand

Installed date: 4/2004



6 Pulse Thyristor Rectifier

Power Output: 5000A50Vdc

Input voltage: 6.6 kV

Application: Copper Electrolysis refining

Client: Padaeng Industry Plc. / Tak Thailand

Installed date: 1/2006

Polarizer Rectifier references



- Polarizer Rectifier
Power Output: 60A440Vdc
Input voltage: 400V
Installed date: 5/2010
- Polarizer Rectifier
Power Output: 60A480Vdc
Input voltage: 400V
Installed date: 5/2016

Application: Chlor-alkali Electrolyzer
Client: Siam PVS Chemical / Bangpoo Industrial Estate Samut Prakan Thailand



- Polarizer Rectifier
Power Output: 130A240Vdc
Input voltage: 400V
Installed date: 11/2010
- 2* Polarizer Rectifier
Power Output: 150A550Vdc
Input voltage: 400V
Installed date: 11/2012

Application: Chlor-alkali Electrolyzer
Client: Vinythai Plc. Map Ta Phut Industrial Estate Rayong Thailand



- Polarizer Rectifier
Power Output: 200A250Vdc
Input voltage: 400V
Installed date: 11/2003
- Polarizer Rectifier
Power Output: 50A410Vdc
Input voltage: 400V
Installed date: 4/2005

Application: Chlor-alkali Electrolyzer
Client: Vinythai Plc. Map Ta Phut Industrial Estate Rayong Thailand

Polarizer Rectifier references



- Polarizer Rectifier
Power Output: 30A360Vdc
Input voltage: 400V
Installed date: 12/2005
- Polarizer Rectifier
Power Output: 50A490Vdc
Input voltage: 400V
Installed date: 11/2013

Application: Chlor-alkali Electrolyzer

Client: Aditya Birla Chemical (Thailand) Co.Ltd.
Map Ta Phut Industrial Estate Rayong Thailand

Aluminum busbar installations



Aluminum busbar installation



DC Switch installation



DC Current transducer DynAmp installation

Operating characteristics

Connection	Full Wave: Bridge - Double Bridge (Series or Parallel)
Semiconductor type	Diode, Thyristor
Thyristor design	N-1 Thyristor redundancy
DC Output Current	Up to 30kA per one Rectifier cubicle
DC Output Voltage	Up to 1000Vdc
Cooling	Air, Water, Deionized Water
Control	SIMATIC S7-1500 for process control and PID voltage and current loop control system
Thyristor Firing	Enerpro Firing Boards 6, 12 pulse from USA
Communications	Data communication via Ethernet support TCP/IP, MOSBUS TCP
Regulation	Voltage, Current and Power
Efficiency	>97% at full load
Installation	Indoor, Outdoor

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To be Thai International Power
 and Green Energy Company