Special Systems for Global Railway Applications

Dubas offers wide range of high performance power electronics products and systems. The products can be designed and constructed to meet the specific railway application and specified testing standards.

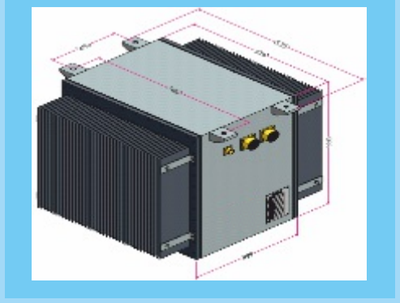
Dubas offer range cover Auxillary Power Units comprising

- INVERTERS
- INTERMEDIATE VOLTAGE POWER SUPPLIES
- BATTERY CHARGERS
- DC-DC Converters

Dubas offers great advantage in designing and building power electronics products and systems to suit the Global railway requirements. Having successfully delivered various range of special product solutions to industry, defence and railways, Dubas undertakes programs for designing and supplying specialized power electronics products for railway applications for global market. All products use components which are proven in railway and defence applications. Dubas also undertakes testing programs as per standards to provide compliance certification for its products. Our products offer several advantages like -

- Capability to operate from specified source and immune to source fluctuations and transients.
- IGBT based PWM technology for AC-DC conversion limiting input current harmonics to < 3% and near unity Power Factor.
- High reliability and high efficiency based design and construction.
- Light weight and small footprint. Dimensions and mechanical fitment to suit the installation location restrictions.
- Modular construction, for reliability, ease of maintenance and spares management.
- Wireless paralleling philosophy both for AC and DC systems for scale-up and built-in redundancy for the product.
- Excellent protection scheme to suit the general and specific application demands.
- Excellent diagnostics and remote monitoring and control features.
  IP65 / IP68 compliant construction options.
- Compliance to EMI /EMC standards specified.
- Compliance to shocks and vibration standards specified.
- Compliance to operating environment standards specified.

INVERTER in IP65 enclosure



24V-300Amps SMPS
in IP65 enclosure

DC-AC CONVERTER MODULE

Service Support

Dubas provides pan India service support through 24 regional service centers. All the regional service centers are handled by trained Dubas personnel. Essential spares are made available through local stock of spares. Dubas provides product services its international customers by customer training as well by deputation of its service personnel to such sites.

• Ahmedabad • Bangalore • Bellary • Bhopal • Bhubaneshwar • Cochin • Coimbatore • Chennai • Gulbarga • Goa • Guwahati • Hyderabad • Jaipur • Karwar • Kolkata • Lucknow • Mangalore • Mumbai • Mysore • Nagpur • New Delhi • Pune • Surat • Visakhapatnam

ALWAYS ON DUBAS

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ALWAYS ON DUBAS

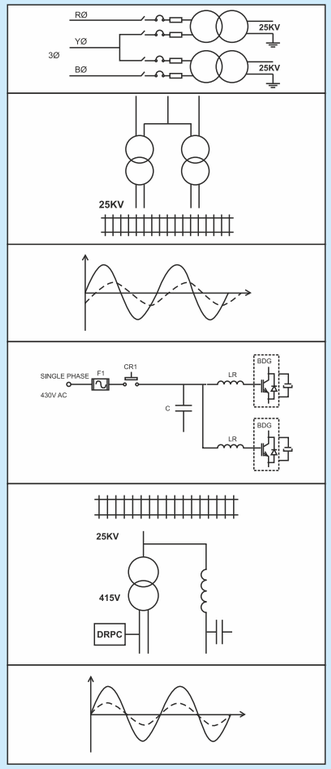
The Power To Go On

Railway Power Systems

DUBAS offers a comprehensive range of power electronics solutions for Railway Transport, both for traction as well for railway infrastructure. Starting from Secure AC and DC systems, Dubas product line ranges to Dynamic Reactive Power Compensation Equipments(DRPCE), Underslung inverters and a host of custom built products. Dubas has been a active vendor to Indian railways and Metro Rail supporting critical installations across India.

Dynamic Reactive Power Compensation Equipment (DRPCE)

The Railways employ single phase 25 KV Traction sub-station (TSS) for supplying power to Electric Traction loads. The traction loads have high load dynamics and usually inject lower order harmonics and suffers from wide supply voltage variation. In order to improve power quality at the TSS and reduce or avoid the Utility penalties for poor power factor (leading or lagging) as well to manage the maximum load demand, it is imperative to maintain the power factor at 0.95 or better dynamically. Conventional power factor controllers cannot maintain a good power factor dynamically at the incoming supply lines due to load dynamics. Railway has introduced Dynamic Reactive Power Compensation (DRPC) to meet this critical requirement of traction sub stations.



Important Features of DRPCE:

- Instantaneous (response time of less than a cycle) smooth power electronics based dynamic compensation.
- Operates dynamically to compensate capacitive, inductive and unbalanced loads.
- Economic solution by having a hybrid configuration with the existing capacitor banks.

Dubas offers IGBT based DRPCE system in compliance to Research & Design Standards Organization (RDSO) specifications. Dubas is approved by RDSO for the DRPCE system.

Dubas' DRPCE systems are based on dubas ePFC philosophy and is an IGBT based PWM system with DSP based digital control. DRPCE system is a hybrid combination of several ePFC panels and HT capacitor bank to reach desired compensation capacity. Dubas DRPCE systems are approved by RDSO and are in compliance to RDSO specifications. Dubas offers the DRPCE system on a turnkey basis including HT to LT conversion transformer, HT capacitor, Reactor and all protection systems along with Dubas range of IGBT based panels.

Powerful ePFC at the heart of DRPCE

At the heart of the DRPCE is the most powerful power quality control system - ePFC. ePFC is an active solid state power factor controller capable of correcting both displacement and distortion power factors, compensating the reactive current drawn by the load with a priority to correct displacement power factor. ePFC with adequate sizing, improves the power factor to near unity (>0.99) dynamically. Since it is an active compensator, compensating both inductive and capacitive (+ and-) reactive power is achieved. This avoids dangers of resonance and overcompensation like in thyristor switched capacitor banks. Power factor capacitors can be fully eliminated in this configuration. Systems can also be programmed and set to provide a specified PF if desired.

Under the same STATCOM product series, Dubas offers H-Filters, a dynamic harmonic compensator. These are DSP controlled equipments using IGBT as switching devices. The harmonic compensation is provided till the 40th harmonic with excellent dynamic response. These are ideal for all kinds of applications wherein high harmonic currents are present. Installation of adequately sized H-Filters can completely nullify the harmonic problems in the network.

Dubas also offers a hybrid version of ePFC and H-Filters combined in a single panel. This provides both active power factor control and harmonic compensation. This is arguably the best tool for power quality management for today's dynamic load profile of the users.

TECHNICAL SPECIFICATIONS	
RATING OFFERED	**1200 KVAR – 6000 KVAR**
CONFIGURATION	HYBRID WITH THE HT CAPACITOR BANKS
INPUT	25KV, SINGLE PHASE AC, 50 Hz
ePFC Panel	
Principle	IGBT based Active power factor controller
Rating	Each panel rated for 100KVAR or 150 KVAR or 200KVAR
Configuration	Bus paralleled for the desired capacity.Can parallel upto 32 panels
Input voltage	415V ± 10%
Input Frequency	50 Hz ± 6%
Response time	< 20 msec
PF Compensated Level	0.99
Protections	ON / OFF Isolation, Under voltage / Over voltage, Over current, Over load, Short circuit, Thermal
METERING	LCD display for key parameters
IP RATING	IP31 / IP 41 / IP 54 options
TEMPERATURE	Operating: 0 to 40°C
COMMUNICATION	RS232 / MODBUS

Typical Example	
TOTAL COMPENSATION	3000 KVAR
HT CAPACITOR CAPACITY	1800 KVAR
DRPCE PANEL TOTAL CAPACITY	1200 KVAR
COMPENSATION RANGE	600 KVAR - 3000 KVAR
TYPICAL PF OF TRACTION SYSTEM (BEFORE DRPCE)	0.7
PF OF THE SYSTEM AFTER DRPCE INSTALLATION	> 0.97 DYNAMIC

Features

- IGBT based PWM technique with DSP based digital control.
- Seamlessly parallelable.
- Dynamic system to maintain input PF near unity irrespective of the load dynamics.
- Can be configured upto 6000KVAR capacity and offer most cost economic solution through Hybrid model in combination with existing / new HT capacitor banks.
- Compensates both Inductive and Capacitive reactive power.
- Avoids dangers of over compensation and resonance.
- System is expandable by adding incremental rating panels in parallel with the existing DRPCE panels.
- Improves power quality.
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The DRPCE in three phase version or single phase version can also be used in many other applications like-

- Automotive, welding plants,
- Steel plants, Furnace applications,
- Wind mills,
- Offshore drilling,
- Shipyards, Ships.

Underslung Inverters for Railway Coaches

Dubas has been supplying 2.5KVA and 5KVA underslung inverters to Indian railways for over 10 years. Over a thousand installations in various coaches have proven the product endurance. Dubas Inverters are built on a famed Dubas IGBT based PWM converter, which provides high reliability by design. Dubas underslung inverters are tested for the extreme operating conditions to withstand the vibrations and shocks. The products are IP65 compliant and performs against harsh environmental conditions of rain, humidity and changing temperature cycles across India.

Dubas has been making ruggedized high rating military power systems for quite many of the defence applications, which have gone through various types of qualification tests. With our experience of the Railway supplies of underslung inverters and capability to build higher rating ruggedized systems, we have introduced 25KVA and 30KVA underslung inverters in line with the Specifications and guidelines laid out by the Research and Design Standards Organization. These systems are built on the DSP based digital control platform and are built to meet the rigorous requirement of Indian railways.

Salient Features:

- Product built on DSP based digital platform and employs IGBT based PWM conversion technique.
- High efficiency of > 94% and time tested design platform of Dubas to meet high surge loads.
- Ip65 Compliant construction and built to withstand extreme operating conditions.
- Remote panel and versatile communication interface.

All specifications are not detailed. Please request for any specific detail / requirement. R &D being a continuous program, the product specifications can change without prior notice.