GROW CONTROL
POWER TECH PVT. LTD.

We Provide Solutions....

AN ISO 9001:2015 COMPANY

Magnetron Modulators

Klystron Modulators

High Voltage DC Power Supplies

Capacitor Charging Power Supplies

Solid State RADAR TWT Power Supplies

DC-DC Convertors

LASER Power Supplies

Pulsed Power Systems

Plasma Power Supplies

Providing

Power Electronics Solutions

for

Aerospace and Defence Industries

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About Us

GROW CONTROL is a leading Indian company renowned for its expertise in power electronics technology. With a rich history spanning over two decades, GROW CONTROL has established itself as a trusted and innovative player in the industry.

With a core competency in Power Electronics, ***GROW CONTROL*** caters to Defence, Nuclear science, Space science, Research and General Industry Globally

GROW CONTROL prides itself on its commitment to developing and deploying indigenous power electronics solutions. This approach not only fosters self-reliance but also ensures that the company's products are well-suited to the specific needs and conditions of the Indian market.

With over two decades of experience, ***GROW CONTROL*** has a deep understanding of the power electronics landscape. This extensive knowledge base along with the State -Of-The-Art Infrastructure that enable us to meet stringent defense production requirements, reinforcing our position as a trusted partner in critical applications.

GROW CONTROL is actively involved in development of Power Electronic solutions for Electronic Warfare Systems, viz., Directed Energy Weapons, HPM systems, Marx generators, Pulsed Power sources, Magnetron modulators, TWT modulators, Klystron modulators, Rail gun Power supplies and LASER Power supplies.

GROW CONTROL is committed to develop advanced technology solutions from concept to final product. We provide power supply solutions fully compliant with MIL - STD - 461F, MIL - STD - 810G, MIL - STD - 704E, MIL - STD - 1275D and also in compliance with CE Standards.

GROW CONTROL is having successful track record of developing Pulsed Power systems, RADAR Power supplies & modulators, High Voltage Power supplies, LASER Power supplies, Solid-State High Voltage switches, High Power inverters for Defence, Nuclear science, Space science and general industry for last 20 years.

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Our Expertise

Core competency in Power Electronics, Pulsed Power, Magnetics, Thermal management and allied fields.
We specialize in Technology Intensive Power Electronics Solutions for Defence, Research and Industrial applications. With Creative and Innovative ideas, we design and implement Solutions from Concept to Product level.

Services Offered

- Power Electronics Systems Designing Proto- type Development and Manufacturing
- Technology Development & Transfer
- Contract Research
- Technical Consultancy
- Indigenisation / Upgradation of existing systems
- Manufacturing Services
- Thermal Management Solutions
- Simulation Services

In House Facilities

- Electronics Systems Design and Development
- Electronics Simulation Lab
- Magnetics Design and Fabrication
- Dust Free Electronics Assembly and testing
- High-Voltage Lab
- Thermal Management Lab
- Vacuum Impregnation and Encapsulation System

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AIRBORNE Power Supplies

GROW CONTROL **AIRBORNE AC-DC Converters** are designed with cutting-edge indigenous technology to meet the rigorous demands of defense and aerospace applications. These converters are engineered for high performance, reliability, and efficiency under extreme environmental conditions, making them ideal for use in military aircraft, helicopters, UAVs (Unmanned Aerial Vehicles), and other airborne platforms.

Indigenous Technology:
100% designed, developed, and manufactured in India, reducing dependency on foreign systems and supporting India's defense self-reliance.

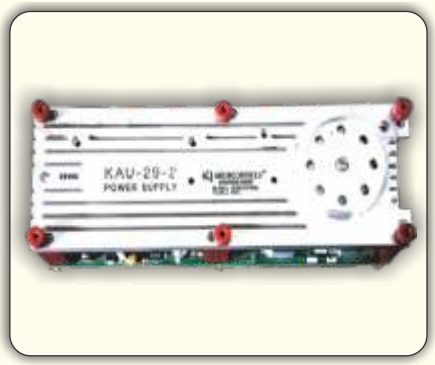
Energy-Efficient Design:
The High-Efficiency design ensures minimal power loss, translating to longer operational time and reduced cooling requirements for airborne platforms.

Compliance with Defense Standards:
Airborne AC-DC converters comply with **MIL-STD-704E/F** and **MIL-STD-810E/F/G** , ensuring they meet the most stringent defense requirements.

DC-DC Converters

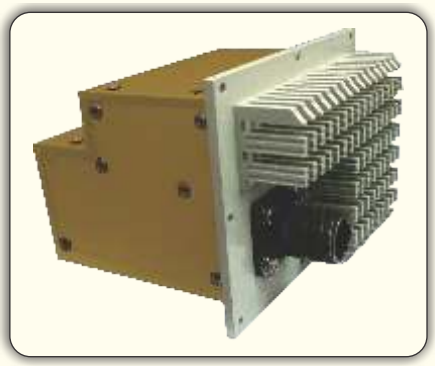
GROW CONTROL has developed Resonant topology based DC-DC Converters for Defence and Aerospace applications. Our custom designed DC-DC Converters operate at very high frequency. These converters generate minimum EMI. High Frequency resonant operation makes the converters very compact, light weight and reliable.

Resonate conversion eliminates switching losses, thereby generates less heat, effective thermal management facilitates the converters to operate over wide ambient temperature range.



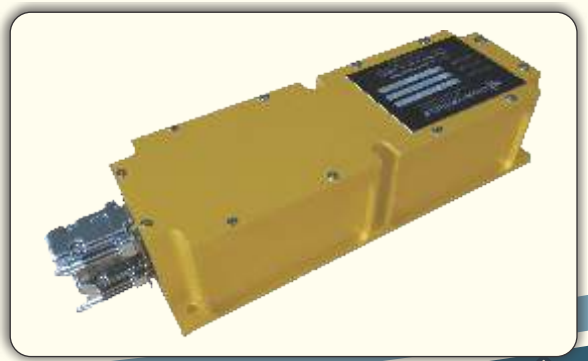
Features

- Custom specific design
- Wide input operating range
- Resonant Conversion topology
- Very compact
- Low EMI generation
- Multiple regulated outputs possible.
- High reliability
- Wide operating temperature -45^{0} C to +80^{0} C.
- Meets MIL STDs



Applications

- Directed Energy Weapons
- RADAR Power Supplies
- Missile Sub systems
- LASER Drivers
- Electronic Warfare



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NAVAL POWER SUPPLIES

DC-DC Converters for Indian Navy Applications

GROW CONTROL specializes in designing and manufacturing robust, high-performance DC-DC converters tailored for the stringent requirements of Indian Navy applications. These converters are engineered to deliver reliable power in harsh maritime environments, ensuring seamless operation of mission-critical systems onboard ships, submarines, and shore-based installations.

Product Features

- Rugged Design
- High Efficiency
- Wide Input Voltage Range
- EMI/EMC Compliance
- Compact and Lightweight
- Isolated Output
- Customizable Solutions

Applications

- Naval platforms, Communication systems, Radar,
- Sonar, and other critical Navy systems
- Communication Systems
- Navigation Systems
- Radar and Sonar Systems
- Weapon Control Systems
- Submarine Applications
- Automation and Monitoring Systems

Customization Options

- Specialized Enclosures : IP-rated and corrosion-resistant casings for marine environments.
- Output Configurations : Multi-output models for powering multiple systems simultaneously.
- Extended Operating Range : For applications requiring extreme temperature resilience.
- Redundancy and Fault Tolerance : Ensures continuous operation in mission-critical scenarios.

ARMY POWER SUPPLIES

GROW CONTROL offers robust AC-DC, DC-DC, and DC-AC converters designed for the unique and demanding requirements of Indian Army applications. Our converters are engineered with indigenous technology to ensure high reliability, ruggedness, and efficiency under extreme conditions. These converters are essential for powering communication systems, radar, field equipment, and more.

AC-DC Converters

Features:

- Wide Input Voltage Range
- High Efficiency
- Rugged Enclosure
- Power Ratings from 50W to 50kW with customizable options.
- Designed to meet MIL-STD-810 and MIL-STD-461 standards.

DC-DC Converters

Features:

- Wide Input Voltage
- Multi-Output Options
- Isolation
- Compact Design

Applications :

- Tactical Vehicles
- Portable Equipment
- Drones and UAVs

DC-AC Converters

Features:

- Pure Sine Wave Output
- Wide Power Range
- High Reliability
- Temperature Range from -40°C to +85°C.

TWT Amplifier Power Supplies

GROW CONTROL has developed high frequency resonant converter based High Voltage High Density Power Supplies with integral Floating-Deck Modulator for TWT Amplifiers & Microwave Power Modules. These rugged power supplies are highly efficient, reliable, protected against overload and short circuits. High frequency resonant converters are very compact, have low output ripple and very low arc dump energy. Stabilized feedback loop ensures highly stable helix voltage.

Various levels of voltages are generated, rectified filtered and stabilised as required by helix and various collectors of TWT.

Typical modulator parameters are:

(i) Pulse width : 200 ns to 500 ms & CW

(ii) PRF : >300 kHz

(iii) Rise Time : 30 ns

(iv) Fall Time : 30 ns

(v) Throughput Delay : 100 ns

Our TWT power supplies finds it's applications extensively in Electronics War fare in Defence sector.

TWT Test Jig Power Supplies

TECHNICAL SPECIFICATIONS:

Cathode voltage	: 0V to -30kV settable
Cathode current	: 2A peak
Heater voltage	: 0V to 15V DC settable
Modulating pulse width	: 100nsec to CW
Pulse rise /fall time	: 100ns
Pulse repetition frequency	:1hz to 800kHz
Number of collectors	: Upto 5
Collector voltage	: 0kV to 30kV
Collector current	: 2A peak

Special Features

- Cathode arc protection
- Ethernet communication
- Fast electronic crowbar

Applications

- Functional Testing various band TWTs
- Life test of TWTs

High Power Pulse Modulators

GROW CONTROL has developed Solid-State High Power Modulators for Magnetrons and other High Power MICROWAVE Devices.

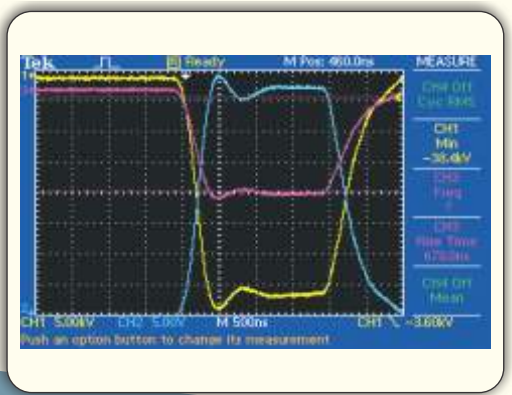
This modulator uses IGBTs and partial turn induction adder to generate High Power & High Voltage Pulses suitable for High Power Microwave devices.

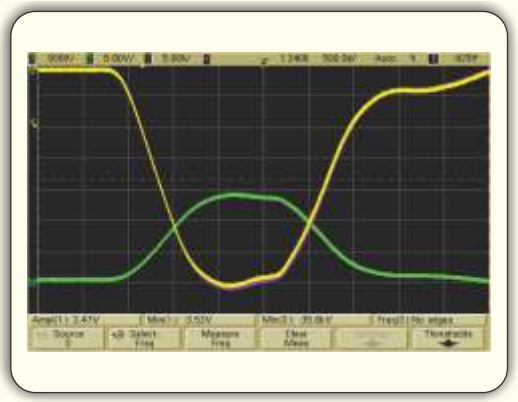
Features

- Completely Solid-State
- Latest IGBT / MOSFET Technology
- MW level Peak Power
- Faster Pulse rise time

Applications

- RADAR
- Electronic Warfare
- Defence
- Medical
- Research





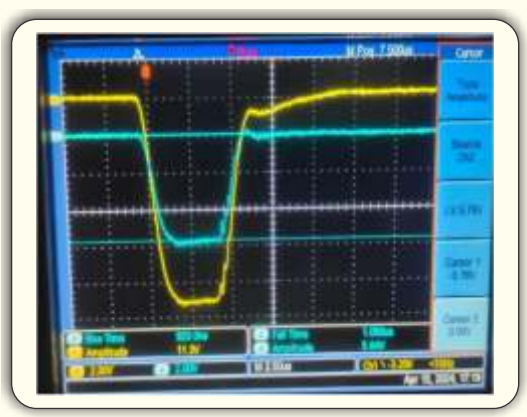
IGBT BASED KLYSTRON MODULATOR

GROW CONTROL Solid-State Klystron Modulator is a high-performance, indigenously developed system designed to supply precise, high-voltage pulses required for powering klystron amplifiers. This modulator is engineered to meet the demanding requirements of radar systems, communication equipment, particle accelerators, and other advanced applications. Built with rugged solid-state technology, it ensures reliability, compactness, and ease of maintenance.

Features

- High Voltage Output : Capable of delivering up to 30kV pulses with exceptional precision.
- Pulse Fidelity : Minimal jitter and high stability for applications demanding precise signal timing.
- Solid-State Design : Enhanced reliability, long lifespan, and reduced maintenance compared to traditional tube-based modulators.
- Compact and Modular : Space-efficient design for ease of integration and transportation.
- Built-In Protection : Features over-voltage, over-current, and thermal protection for safe operation.
- EMI/EMC Compliance : Conforms to MIL-STD-461 for electromagnetic interference and compatibility.

- **Input Voltage : 415V, 3-Ph**
- **Output Voltage : 30kV**
- **Output Current : 2000A**
- **Output Pulse width : 6usec max**
- **Output PRF : 500Hz**
- **Output Avg Power : 100kW**
- **High Speed Protection**
- **Digital Control and Interface**

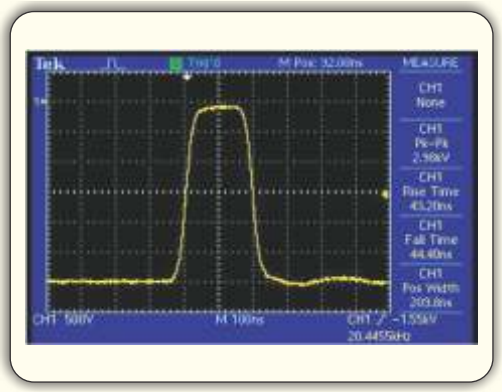


EIK Power Supply, Modulator & Control Unit

GROW CONTROL has successfully developed high-voltage power supply, Floating Deck Modulator and Control Unit for GRID MODULATED EXTENDED INTERACTION KLYSTRON. The system is having complete operating and protection features suitable for EIK. This system consists of manual control panel as well PC interface with LAN connectivity.

Technical Specifications :

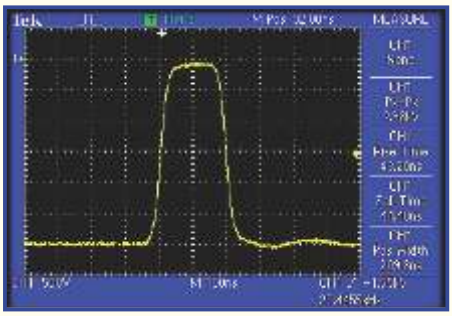
Heater Voltage	:	6.3V@1.1 A
Cathode Voltage	:	-18 kV adjustable
Collector Voltage	:	-4.9 kV
Grid bias	:	-3 kV
Grid Modulation	:	MOSFET based Floating Deck Modulator, rise and fall times < 50 ns
Pulse width	:	200 ns CW
PRF	:	Up to 40 kHz
Duty Cycle	:	5%



Floating Deck Modulator

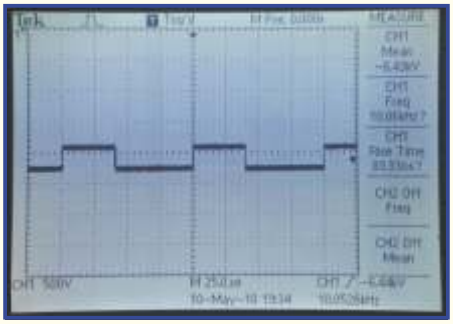
RADAR, Electronic Warfare systems require floating deck modulators, these modulators float at very high voltages. The challenge is to modulate these voltages with logic level signals from control system and the through put delay, rise and fall times of modulating voltage should be very minimum.

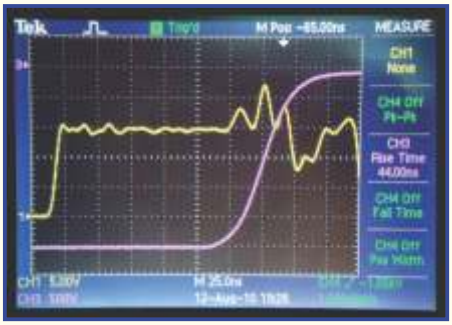
GROW CONTROL has developed optically coupled / current loop coupled floating deck modulators with minimum through-put delay and modulating pulse frequencies > 300 kHz.



Features

- Optically / Current Loop Isolated
- Solid State Switches
- Floating Voltages > 100 kV
- Through-Put Delay < 50 ns
- Rise Time < 40 ns





Capacitor Charging Power Supplies

GROW CONTROL has developed resonant converter based capacitor charging power supplies for LASER and EMP technology areas. These advanced technology systems will provide current source output characteristics which are fundamental requirement for any capacitor charging application.

Specifications

Input	:	415V, 3-Ph or 230V, 1-Ph 50 Hz AC
Output Power	:	Up to 100 kJ/s
Output Voltage	:	> 100 kV
Output Cycle Time	:	<10 ms
Duty	:	Continuous
Topology	:	IGBT based resonant converter with computer interface

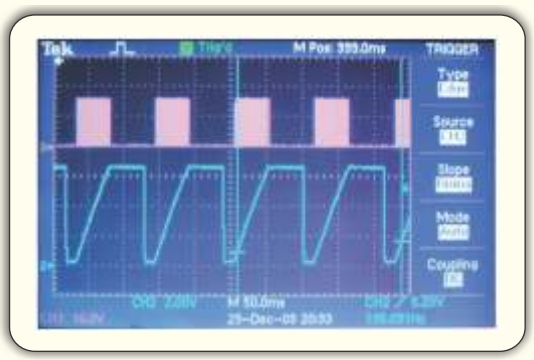
Capacitor Charging Power Supplies

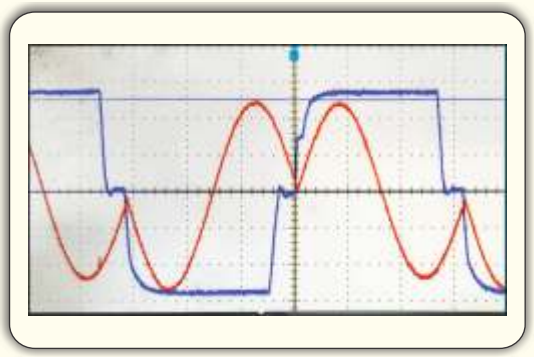
Pulsed Power is the basic requirement of Electronic Warfare systems.

GROW CONTROL has developed resonant current source output power supplies suitable for capacitor charging applications.

Features

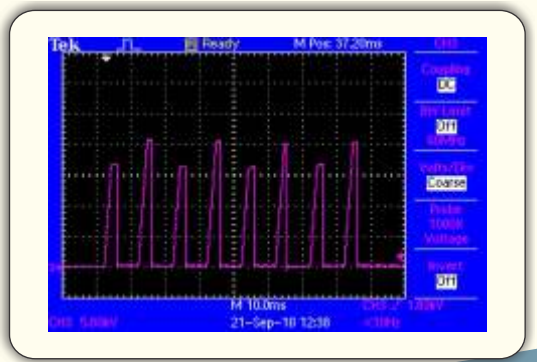
- Resonant Inverter Topology
- Constant Current Output
- Output Power can be extended to MW Range
- Capacitor Charging Voltage can be >100 kV
- Programmable Charging Current / Voltage
- Systems can be interfaced to PC/PLC
- Optical Fibre Interface





Applications

- Rail Gun System
- Electronic Warfare
- UWB
- LASER
- RADAR
- Magnetic Pulse Formimg
- PLASMA



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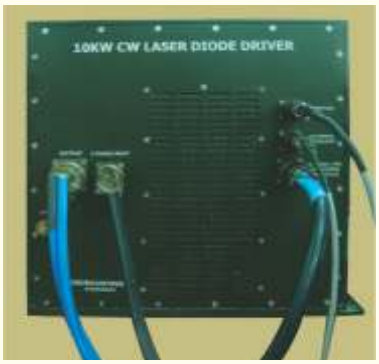
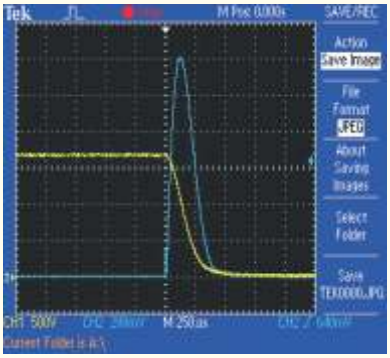
Laser Power Supplies

GROW CONTROL has developed LASER Power Supplies for Flash Lamp / Arc Lamp based LASER systems and Diode LASERS. We have also developed Q-Switch drivers, TEC controllers and other subsystems for LASER applications.



Features

- Solid - State Design
- PFN NETWORKS for Discharge Lamps
- Diode LASER DC Power Supplies
- Q-Switch Driver
- TEC Controller
- Computer Interface & Control



Laser Power Supplies

GROW CONTROL has developed CW laser diode drivers up to 10kW power level for military vehicle applications.

GROW CONTROL has developed QCW laser diode drivers pulsed width from 10 ns to 100 ms with single shot to 10 MHz PRF. These laser diode drivers have inbuilt TEC controller up to 300W power and Q-switch drivers up to 3 kV voltage and rise times less than 50 ns

Features

- Solid - State Design
- PFN NETWORKS for Discharge Lamps
- Diode LASER DC Power Supplies
- Q-Switch Driver
- TEC Controller
- Computer Interface & Control

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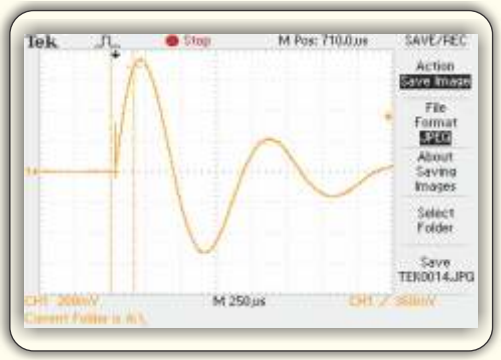
Pulsed Power Systems

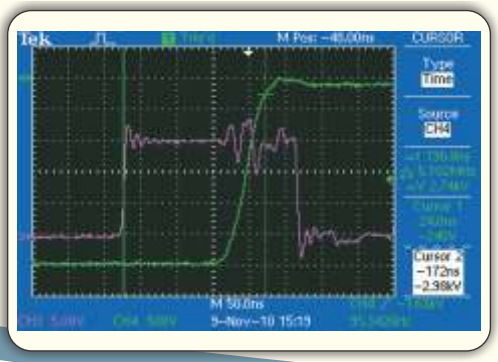
Electronic Warfare Systems, Scientific research and Industrial applications have requirements for Pulsed Power of milliwatt to gigawatt Range.

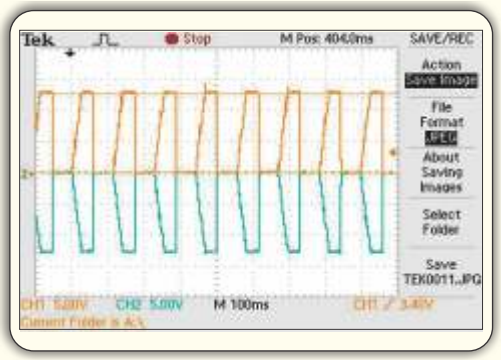
Having expertise in Power Electronics ***GROW CONTROL*** is developing Pulsed Power Systems consisting of Capacitor Charging Power Supply, Capacitor Bank, High Voltage - High Current Switches, Trigger Units etc.



Features

- Solid State Current Sources Capacitor Charging Power Supply
- Pulse Capacitor Banks
- Rail - Gap, Spark - Gap, Thyratron, Psuedo Spark Switch, Solid State Switches are used as per System Requirement
- Customer Specific Design

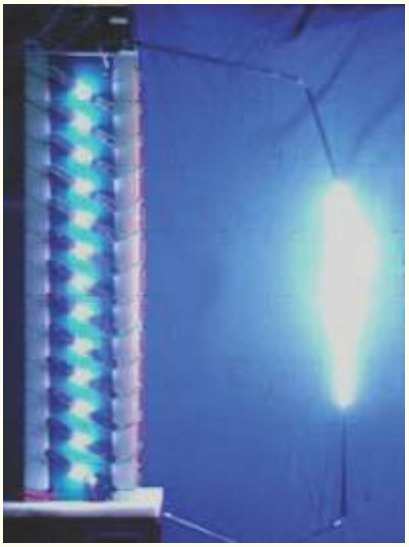




Impulse Generators

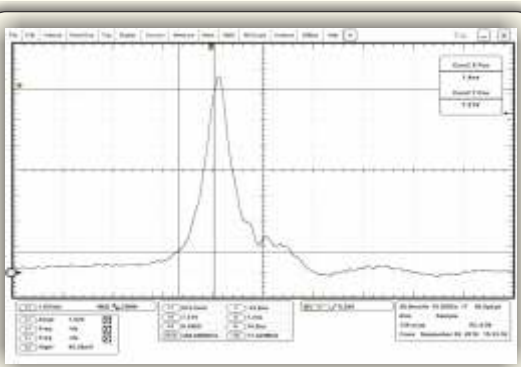
Electronics Warfare Systems require fast rising High Voltage Pulses of very High Amplitude and High Power. To meet this requirement ***GROW CONTROL*** has developed Marx generators, using different topologies as per system requirements.

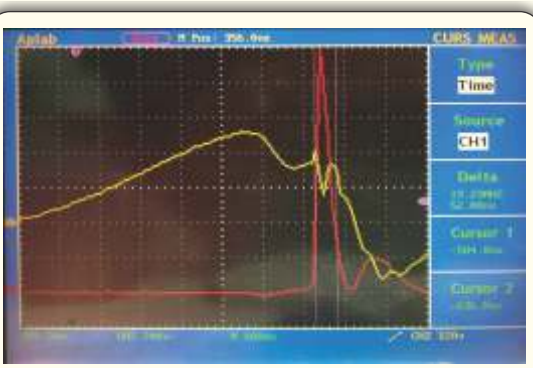
We have developed Triggered Spark - Gap based Marx - Generators Solid state switch based Marx - Generators & Induction adder Systems.



Applications

- Electro - Magnetic Pulse (EMP) Systems
- Electronic Warfare
- Plasma Applications
- Q-Switch



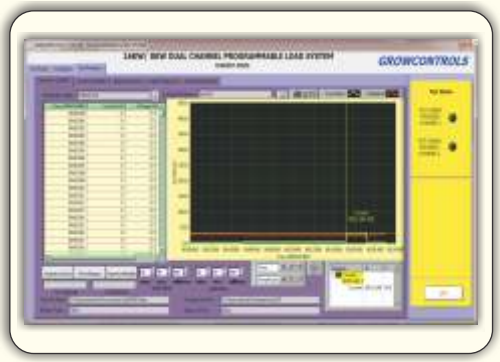


Data Acquisition and Control

In Electronic Warfare, Digital systems & Software functionality is very vital. ***GROW CONTROL*** being involved in Electronics Warfare Systems, have developed several Data Acquisition and Control Systems, Digital Interfaces between Critical Subsystems, Lab-test Equipments for Defence organisations.

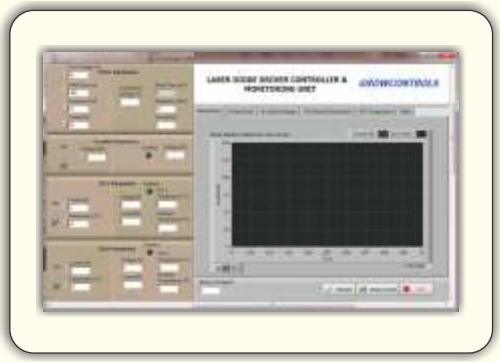
GROW CONTROL is having expertise in digital systems. Over 20 Years of experience in data acquisition & control,we have developed customized solutions using Microcontrollers, DSP , FPGA and Computer control.

GROW CONTROL is the best source for design and development of digital systems for better data accuracy, faster data acquisitions, dynamic response and control, data security and data-integrity for the mission critical systems.



Features

- EMI/EMC hardened design
- Highly Reliable in field conditions
- Wide temperature range Operations
- Faster response time down to nano-second levels
- Meets respective MIL STDs



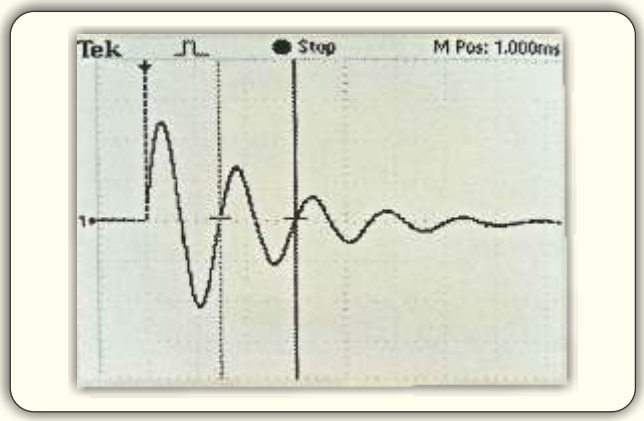
Magnetic Pulse Forming Systems

Magnetic pulse forming / welding is a cold welding process finds applications in Defence ammunition manufacturing process.

GROW CONTROL having expertise in pulsed power field. We have developed magnetic pulse forming system for Crimping of stabilizing rings to ammunition shell bodies and other application.

Features

- Resonant inverter based capacitor Charging Power Supply
- Solid State Design
- Compact & Reliable
- Solid State High Voltage / High Current Switches
- Customised design for specific job requirement



High Voltage Power Supplies

Most of Defence systems require rugged, reliable and compact light weight high voltage power supplies.

GROW CONTROL has developed High Voltage Power supplies using latest technology in Power Electronics. Resonant inverter topology, special multiple winding rectification scheme, completely encapsulated High Voltage section ensures highly reliable power supplies in demanding Defence environments.

Applications

- Directed Energy Weapon Systems
- TWT / Klystron Power Supplies
- Magnetron Power Supplies
- RADAR Power Supplies
- Electronic Warfare Systems
- Marx Generators
- Capacitor Charging Power Supplies
- LASER Power Supplies
- PLASMA Power Supplies

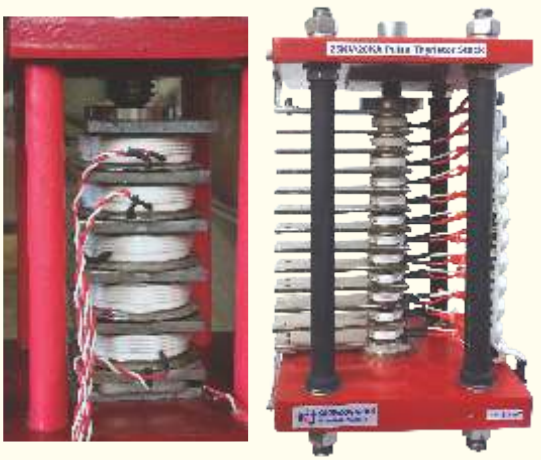
High Voltage Switches

Modern Electronic Warfare Systems require Pulsed Power. Generation of High Voltage, High Current pulses in demanding environment requires highly reliable switching elements.

GROW CONTROL has developed High power switches with Thyristors, IGBTs, MOSFETs, Thyratrons, Psuedo spark - gaps, Triggered Spark - gaps and Rail - gaps to match specific requirements. Specially designed trigger sources are developed for specific components.

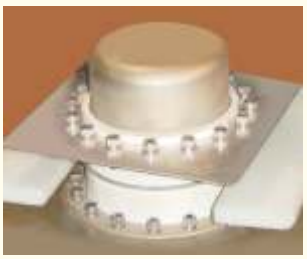
Features

- Fast switching
- milliwatt to gigawatt power output
- Wide range of component selection for system specific requirement
- Customised design for specific application
- Optical fibre or current loop isolation



Applications

- Magnetron Modulators
- RADAR Power Systems
- Klystron / TWT Modulators
- LASER Power Supplies
- Electronic Warfare
- Marx Generators
- Magnetic Pulse Compression



Programmable DC Power Supplies

GROW CONTROL has indigenously designed, developed and manufactured custom built Programmable DC Power Supplies of diverse range of rugged and reliable. These power supplies are fully compliant with all military stds.

GROW CONTROL Programmable DC Power Supplies designed and developed for precision ranging from 10W to 100's of kW delivers variable voltage and variable current, bench and Rack Mountable power supplies delivered to R&D, test and measurement, process control, power bus simulation and power conditioning applications across a wide variety of Defence applications.

Features

- High Efficiency
- Compact in Size, Rugged, Durable and Reliable
- RS232 / USB / LAN / Ethernet Control
- Single / Three Phase AC input
- Single / Dual / Multi Outputs
- Wide Temperature Range -45°C to 80°C
- Zero voltage switching (soft switching)
- Advanced digital monitoring & control features

Applications

- Battery Charging
- Vacuum / Plasma Processing
- Nanotechnology applications
- Electrostatics Applications
- Electro-spinning

Frequency Converters

GROW CONTROL Frequency Converter is an advanced power electronics solution designed to convert electrical energy from one frequency to another. This technology is critical for a variety of applications, including motor control, renewable energy integration, and telecommunications systems. Utilizing GROW CONTROL's indigenous technology, our frequency converters offer high efficiency, reliability, and precise control, ensuring optimal performance across diverse industrial and research settings.

GROW CONTROL Frequency Converter offers a high-performance solution for a variety of applications requiring efficient and reliable frequency conversion. Utilizing indigenous technology, these converters are engineered to meet the demands of industrial, research, and defense sectors, delivering exceptional performance and versatility.

Features

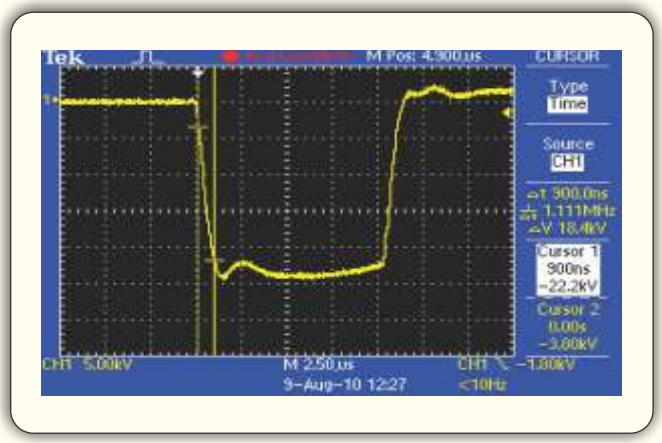
- Wide Frequency Range
- High Efficiency
- Compact and Modular Design
- Advanced Control Algorithms
- User-Friendly Interface
- Integrated Protection Mechanisms
- EMI/EMC Compliance

Applications

- Industrial Drives
- Renewable Energy Systems
- Telecommunications
- Defense Systems
- Aerospace Applications
- Research and Development

Technologies / Systems Developed

- TWT Amplifier Power Supplies
- Electronic Warfare Power Supplies
- Marx Generators
- Magnetron / Klystron Modulators
- RADAR Power Supplies / Floating Deck Modulators
- LASER Power Supplies
- PLASMA Power Supplies
- EMP Test Setup
- Pulsed Power Systems
- Capacitor Charging Power Supplies
- High Voltage Switches
- HVDC Power Supplies
- SONAR Amplifiers
- Power Supply Testing Jigs



Technology Development & Contract Research

GROW CONTROL is a company dedicated to transforming innovative concepts and detailed specifications into high-quality power supplies. Our process begins with a thorough understanding of the client's needs and the specific requirements of the project. Whether it's a unique idea or a detailed technical specification, we ensure that every aspect is meticulously analyzed and understood before moving forward.

Once the concept is clearly defined, our team of experienced engineers and designers gets to work. Using state-of-the-art technology and industry best practices, we develop a comprehensive design that meets all the specified criteria. This phase involves rigorous testing and validation to ensure that the design is not only functional but also efficient and reliable.

GROW CONTROL serves specialized sectors such as defense electronics and high voltage electronics, delivering power supplies that meet the stringent demands of these industries. Our commitment to quality and customer satisfaction doesn't end with delivery; we offer ongoing support and maintenance to ensure that our products continue to perform optimally. By taking a concept or specification and turning it into a tangible, high-performance power supply, Grow Control demonstrates its expertise and dedication to excellence in every project.

OUR CLIENTS

AIR FORCE
INDIAN ARMY
BHARAT ELECTRONICS
adani Defence and Aerospace
THERMAX
BHARAT FORGE
and many more

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