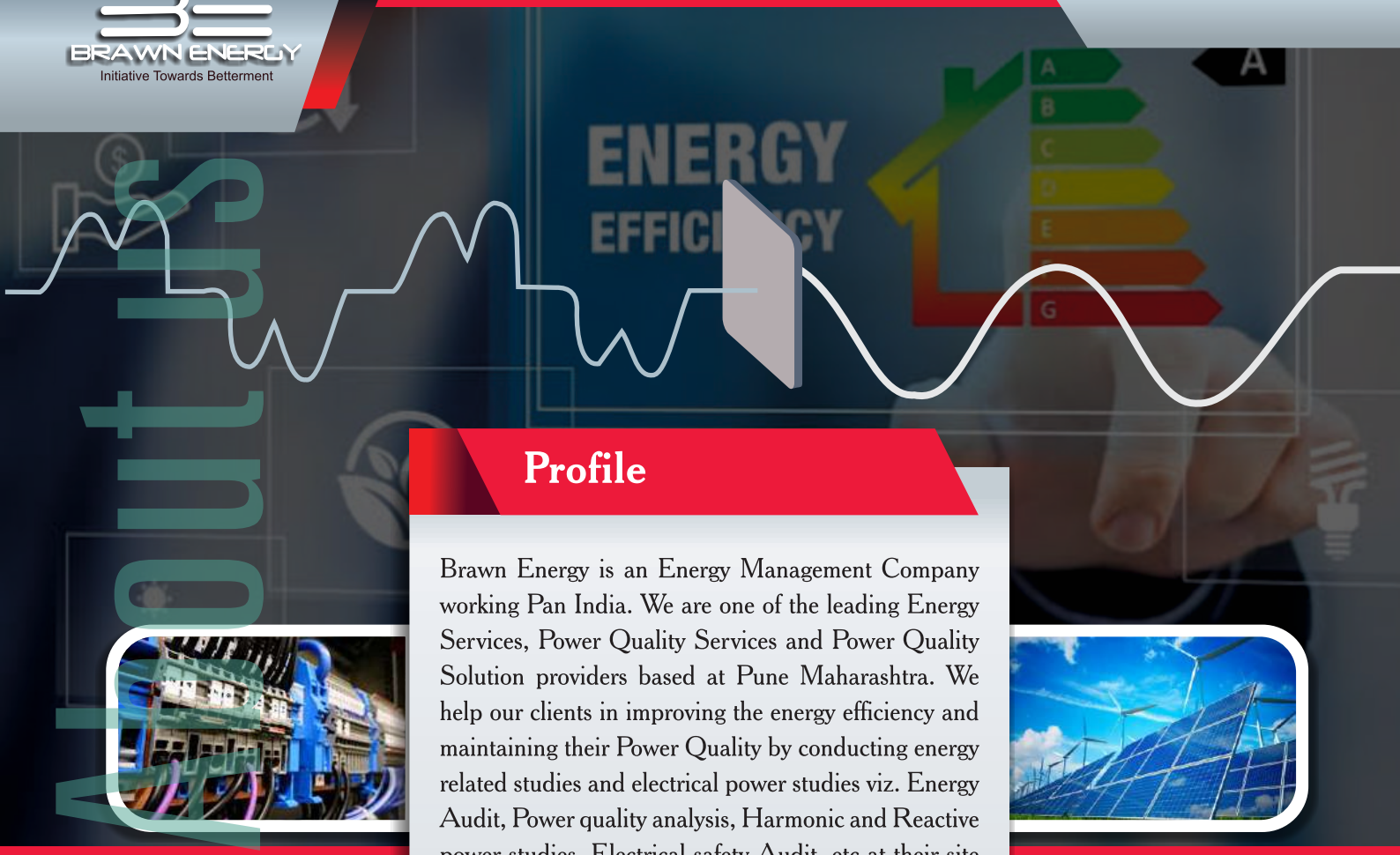
BRAWN ENERGY

Initiative Towards Betterment

Energy Management, Power Quality Studies & Power Quality Solutions

BRAWN ENERGY
Initiative Towards Betterment

About Us

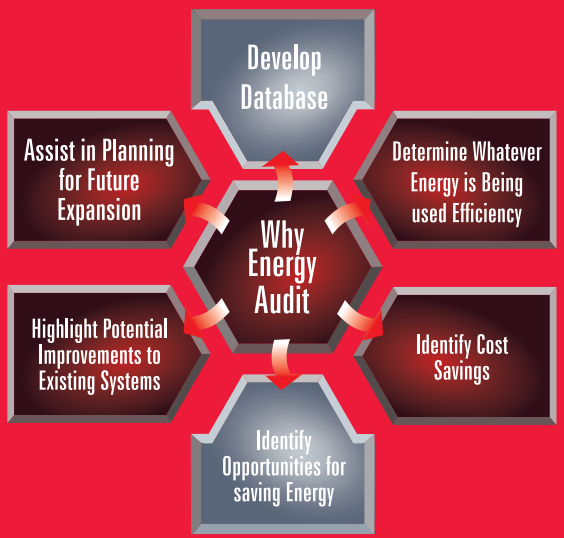


Profile

Brawn Energy is an Energy Management Company working Pan India. We are one of the leading Energy Services, Power Quality Services and Power Quality Solution providers based at Pune Maharashtra. We help our clients in improving the energy efficiency and maintaining their Power Quality by conducting energy related studies and electrical power studies viz. Energy Audit, Power quality analysis, Harmonic and Reactive power studies, Electrical safety Audit, etc at their site and recommending optimum energy and power correction methods, designing and installing the right product which minimizes the losses present in plant / facility , electrical network and increases power quality. This equips the system to function optimally. This not only increases the efficiency of the system but also plays a relevant role in saving power. No matter what type of facility you have, whether it is a power plant, an industrial facility, an IT setup, a school, college campus, hotel or a hospital we have all the equipment necessary to carry out Energy and power related studies. We have many more satisfied clients from all industrial sectors across India. Based on our expertise and industrial standards, we customize our solutions for the needs of the industry.

We design and provide wide range of power systems products in various industrial segments. These products consist of Power factor Correction Panels (RTPFC / APFC panel), Passive Harmonic filters, Active Harmonic Filters, Static VAR Generators, Thyristor Switching module, LT Capacitors, Detuned filters/reactors, Power Factor Controllers etc

SERVICES



Energy Audit

BRAWN ENERGY offers comprehensive energy audit service. We provide end to end solutions to our clients designed to meet their energy requirements. We carry out both Walk Through and detailed Energy Audits.

Our team consists of certified Energy Auditors from the BEE(Bureau of Energy Efficiency), an agency of the Government of India. Our certified Energy Auditors are the best in class and are very well experienced. Our Auditors have worked all across India helping many of companies. Our team has over 15 years of expertise in carrying out such an Audits for a variety of facilities including hospitals, hotels, small, medium and large scale industrial plants etc. Our teams are equipped with all necessary instruments such as Power Analyzers, Flue Gas Analyzers, Ultra Sonic Flow Meters, Lux Meters, Infrared Thermometers, Thermal Insulation Scanner, Tachometer, Manometer, Distance meter and etc.

Our Energy Audit analyze your energy systems and provide a detailed energy audit report on your current electricity and thermal consumption and annual energy. This study will be done without disturbing your facility/plant routine.

Benefits of Energy Audit:

- It helps to reduce energy costs in your plant / facility.
- With a reduction in production costs, the competitiveness of your company will be improved.
- It helps you to lower energy bills.
- It enables you to increase the comfort of those in the facility.
- It helps you to increase the life span of the equipment in your facility.
- It discovers any unaccounted consumption that may exist at the facility.

BRAWN ENERGY
Initiative Towards Betterment

Safety Audit

Electrical Safety Audit

BRAWN ENERGY carries out Electrical Safety Audit according to systematic procedures in order to evaluate potential electrical hazards, and recommends measures to minimize/prevent these hazards (i.e. electrical shocks, electrical arcs, and electrical blasts). We conduct Electrical safety audit and assist clients in reducing risk and help to ensure compliance with applicable Safety Standards and Regulations. Our Electrical Safety Audit is a loss prevention program – property/production loss (e.g. electrical fire hazards) and loss of life/injuries to personnel.

Electrical safety audit is extremely important for public organizations like Hospitals, Collages, malls, industries, etc.

We conduct Electrical Safety Audit (ESA) with following scope:

- Verification of statutory compliance with respect to India hhhn Electricity standards. (CEA 2010)
- Physical inspection to identify electrical hazards and to suggest electrical safety related solutions.
- Review of plant lightning protection system to check whether it is adequate or what.
- Review of electrical preventive maintenance system (including tests, documentation, history cards, etc).
- Review of the importance given to electrical safety in the company safety policy, safety committee, continuously ethical risk identification, etc.
- Review of the earthing system of each electrical panel using on site close loop earth resistance measurement process.
- Cable Validation - To identify areas of overloading by carrying out load current measurements and compare against cable current carrying capacity calculation
- Switchgear Validation – Actual measurement of power, current and voltage parameters using high end power analysers to identify braking system during fault condition.
- Hotspot detection using infra-red camera - detection equipment/ thermal imaging to locate loose contact in electrical distribution.

Benefits of Electrical Safety Audit:

- Identification of Hazards area.
- Helps to enhance uptime of the particular area/facility or plant.
- Identification of Electrical hazards helps to minimize the risk of accidents like fire due to short-circuiting.
- Identification of areas of risk or vulnerability in the existing electrical systems and installations.

BRAWN ENERGY
Initiative Towards Betterment

Power Quality Analysis

Power Quality Analysis

Electric power quality study is a systematic analysis to identify power qualities issues, look for the root causes and recommendations for improvement in an electrical system. Those issues are such as surges, harmonics, high frequency noise, transient voltages, wave distortion, interruptions, frequency variations, etc. Power quality studies are also meant a focused and systematic approach to solve complex problems in a power system. Power quality analysis is for new builds and for existing plants / facility.

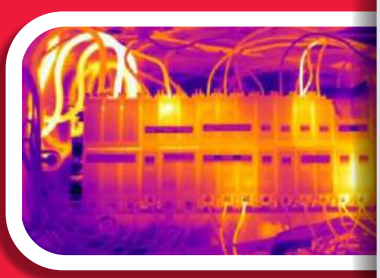
The sensitivity of today's electronic equipment makes it susceptible to power disturbance. For some devices, a momentary disturbance can cause scramble data, interrupted communication, a frozen mouse & system crashes or equipment failure. Monitor the quality of power routed from source to the plant/facility to identify the pollution in the electrical network related to power.

We can make electrical system and loads operation run smooth and more efficient by conducting detailed Power Quality Analysis

Benefits of Power Quality Studies and Analysis

- Increased reliability of better power grids
- Improve electricity infrastructure
- Reduces equipment failure
- Increase machine life
- Reduce energy consumption with significant energy savings
- Optimization of the electrical network
- Avoid electricity bill penalties

Thermography



Infrared Thermography

Electrical systems are the most critical infrastructure within office buildings and industrial applications. Thermography is a method of inspecting electrical equipment by obtaining heat distribution pictures. This inspection method is based on the fact that most components in a system show an increase in temperature when malfunctioning. The increase in temperature in an electrical circuit could be due to loose connections. By observing the heat patterns in operational system components, faults can be located and their seriousness evaluated. The inspection tool used by Thermographer is the Thermal Imager. These are sophisticated devices which measure the natural emissions of infrared radiation from a heated object and produce a thermal picture. As physical contact with the system is not required, inspections can be made under full operational conditions resulting in no loss of production or downtime. The thermography inspection is designed for plant condition monitoring and preventative maintenance of electrical equipment's. The outcome of the IR Thermography report will itself highlight the problem areas and corrective measures can be carried out by the maintenance staff to avoid any electrical mishaps in the future. The thermography service in India are increasing day by day which results the positive output of increase in production.

Benefits of IR Thermography

- It is a non-contact inspection technique and can be carried in running condition
- It is an easier, safer and faster method for identifying anatomy.
- Inspection, over time, of equipment under same running conditions, allowing thermal anomalies to be easily detected
- Reduction of production losses due to unplanned downtime, thus increasing productivity and profitability
- Reduction of time necessary for planned shutdown
- Reduction of maintenance and repair costs
- Increased equipment lifetime and mean time between failures.
- The thermal Imaging helps in identifying the hot spots in the electrical circuits. Due to the hot spots their stats overheating which further increase the current pass through the circuits.

BRAWN ENERGY
Initiative Towards Betterment

Harmonic Analysis

Harmonic distortions are one of the most common and irritating problems in industrial environment. We need to identify the source of harmonics and suppress them for a better power quality supply. Harmonics are integer multiple of fundamental frequency. The frequency of each harmonic component is known as harmonic frequency. Power system harmonics are low-frequency phenomena. Voltage and current harmonics have undesirable effects on power system operation and power system components. The distorted voltage waveform can affect equipment performance. Such distorted voltages and currents can result into overheating of cables, transformers etc. and can also cause excessive voltage drops. If large amount of harmonic currents are demanded by load and are required to be supplied by utility company, the utility company equipment is also subjected to ill effects of these power quality disturbances.

In view of limiting commercial impact of this demand raised by consumer, normally utility companies bind consumer into legal compliance requirements related to power quality. Such requirements usually are based on some international standards. One such standard related to harmonic compliance applicable at "Point of common coupling" or PCC is IEEE 519 2014. We use this IEEE-519 standards for harmonic analysis studies. Harmonic analysis is the process of identifying the harmonic distortions occur in the electrical distribution system.

Benefits of Harmonic Analysis:

- It helps to know harmonic generating loads.
- Identify source of harmonics with their individual contribution in total load.
- Determine the allowable compliance limit by calculating Isc/IL as per IEEE 519
- Solution to mitigate the system harmonics
- Safety measures against harmonics
- Decrease the liability of failure of electrical equipments occurred due to harmonics
- Improved system efficiency
- Avoids line loading and losses

Reactive Power Analysis

Reactive power is an imaginary power, but still, it is needed in the Power System. If reactive power is in excess in Power System than voltage may go up and in case of shortage of reactive power voltage may be low. Reactive power (VAR) is required to maintain the voltage to deliver active power (Watt) through electrical distribution network. Managing the reactive power flow in addition to real power flow becomes a very important task for operators to ensure voltage stability throughout the system. In many industries, capacitors have been installed to compensate reactive power. While reducing reactive power to help improve the power factor and system efficiency. One of the disadvantages of reactive power is that a sufficient quantity of its required to control the voltage and overcome the losses in the network. This is because if the electrical network voltage is not high enough, active power cannot be supplied. But having too much reactive power flowing around in the network can cause excess heating. (I^2R Losses). The reactive power compensation is important to run power network system. We conduct detailed reactive power analysis using high end power measurement equipment's.

Benefits of Reactive Power Analysis:

- It helps to know exact requirement of reactive power for running industry.
- Improvement of power factor
- To balance the real power drawn from the system
- Compensate voltage regulation
- To eliminate current harmonics
- Avoid excess electricity bill wherever KVAH based billing is applicable

PRODUCTS

RTPFC Panel

Thyristor switched Real time PFC - High speed electronically switched (RTPFC Panel)

LV RTPFC Panel TSM based up to 2000KVAR– 440V to 690V

Salient features:

- Latest thyristor zero-voltage switching system – cycle-to-cycle correction
- High speed – transient free switching of PFC capacitors within 20 ms.
- Designed to achieve precisely unity power factor. Close to unity to get maximum PF rebate and avoid leading PF
- Suitable for rolling mills, welding loads, ports, steel mills, cement and paper, etc wherever load are variable.
- Available for balanced as well as un-balanced loads, 1-ph and 3-phase loading
- Power factor correction in four quadrants (Import / Export)
- Enhanced capacitors life due to transient-free, zero inrush current switching
- Maintenance-free because of static switching, no wear and tear of contactors
- Alarm output for low PF, Step failure, over temp., undervoltage, etc.
- Auto/Manual Mode facility, fuse/MCCB protection for each step of panel.
- Hybrid version also available – contactor + thyristor switching for cost effectiveness
- Enclosures with CRCA sheet steel, seven tank pre-treated for anti-rust and powder coated, modular CNC construction also available.

APFC Panel

Automatic Power Factor Correction panels (APFC Panel)

LV APFC Panel contactor based up to 2000KVAR – 440V to 690V

Salient features:

- Intelligent APFC with microprocessor-based controller
- Automatic switching of PFC capacitors Contactors based on load variations of plant
- Steps designed to achieve power factor close to unity
- Available for balanced as well as un-balanced loads, 3-phase
- Less maintenance by optimized design, low loss and has long service life
- Display of all electrical parameters like KW, KVAr, KVA, p.f., THD, V, I , etc.
- Alarm output for low PF, Step failure, over temp., undervoltage, etc.
- Auto/Manual Mode facility, protection for each capacitor step
- Light weight, compact design suitable for ambient temp upto 55° C
- Enclosures with CRCA sheet steel, seven tank pre-treated, powder coated
- Manufactured as per relevant national and international standards.
- PFC capacitors MPP, Super Heavy Duty (SHD) or Heavy Duty (HD), Gas Filled or APP type capacitors as per requirement
- Iron core harmonic filter reactors with Copper/Aluminium winding, low loss in series of capacitors.

BRAWN ENERGY
Initiative Towards Betterment

PRODUCTS

Static VAR Generator

Static Var Generator (SVG)

(3P3W/3P4W)

SVG also known as real time power factor compensators or instantaneous stepless reactive power compensators are the ultimate answer to power quality problems caused by low power factor and reactive power demand for a wide range of segments and applications. The SVG correct power factor for inductive as well as capacitive loads instantly.

- Multifunctional: Reactive power and imbalance compensation.
- Wide capacity range: 30kvar to 100kvar for a single cabinet, unlimited parallel operation.
- Excellent reactive compensation: High speed, Precise (-0.99≤Cos□≤0.99), Step-less, Bi-directional (capacitive and inductance) compensation.
- Excellent imbalance correction: Both negative and zero sequence, mitigates neutral current
- Wide input voltage & frequency range, adapts to tough electrical environment
- Low thermal loss (≤3% of rated SVG capacity), efficiency ≥ 97%
- Flexible application: Modular design, embedded in standard or customized cabinet
- Communications ports: - RS485, CAN, and network port
- Easy installation and maintenance: Easy installation for SVG module replacement and expansion
- Environmental adaptability: 10 to 50°C temperature, compatible with diesel generators
- Complete protection: Grid over/under voltage, SVG over current, over temperature, and others.
- All faults recorded inevent log, convenient for failure analysis
- Protection class: IP20

Passive Harmonic Filter

Passive Harmonic Filter

Available for system voltage from 440V to 850Volt

A passive harmonic flter is a combination of capacitors and inductors that are tuned to resonate frequency. In power systems, passive flters are used to suppress harmonic currents and decrease voltage distortion appearing in sensitive parts of the system.

Passive flters work by exhibiting different impedance values at the resonant frequency. A flter connected in series should present high impedance to the harmonic frequency that needs to be blocked. Although a series confguration is possible, it is more common to connect flters in parallel. Such a shunt confguration diverts harmonic currents to ground, and simultaneously provide reactive power, which may be used to correct the power factor. We have successfully installation of passive harmonic filters at induction furnace end up to 850volt.

Before connecting passive harmonic filter, the detailed harmonic study should be conducted to design the right tuning of the filter.

- Operating system Voltage : 415VAC to 850Volt
- Operating Frequency : 50/60Hz –
- Type : 3 Phase 3 Wire
- Total harmonic Current Distortion : 5% at 100% load
- Efficiency : >98% for rated voltage and Power
- Line Voltage unbalance : <1%
- Overload Capability : 1.3 x Rated current for 1min(Once/hr)
- Temperature range : 5°C to 70°C
- Cooling : External Cooling or Internal fan cooling.

Benefits to Client :

- Meets the voltage and current distortion limits as per harmonic standard IEEE-519
- Saves energy by eliminating the wasted energy associated with harmonics, therefore reducing the true RMS KVA demanded from your power source.
- Increases equipment's life by reducing heat associated with harmonic currents
- Improves power factor

PRODUCTS

Active Harmonic Filters

Active Harmonic Filters

- Essential to reduce harmonic levels under IEEE 519 limits
- Available from 30 to 600 A, 415 V, 50/60 Hz
- Available in both versions : 3P3W & 3P4W
- Operation modes : Harmonic filtering, power factor correction, and phase balancing with neutral and without neutral compensation.
- PF compensation, Leading as well as lagging
- Programmable selective harmonic elimination
- User Interface with advance graphics display – 7 inch SVGA Colour display
- Close loop active filter with source current sensing.
- Internal CAN Communication.
- IGBT base power electronic technology
- Neutralizes harmonic currents by phase opposition signals
- Capable to filter 2nd to 50th harmonic orders
- Ultra-fast reaction time : < 200 milisec
- Noise level :Up to 65 dB
- Standards : IEEE 519, IEC EN 62040-0
- Ambient temperature :Up to 50° C
- Cooling : Forced air cooling

Detuned Harmonic Filter Reactor

(High Linearity Low Loss)

Why use a harmonic filter reactor in a power factor correction capacitor bank ?

- Capacitors are required to improve power factor and possible harmonic interaction may occur with the installation of a plain capacitor bank.
- Permissible distortion limits of the local utility of IEEE-519 are exceeded and filters are required to reduced them.
- A combination of PFC capacitors with detuned harmonic filter reactors will result in limiting harmonics.

Benefits of using detuned reactors

- Extends life of PFC capacitors by reducing harmonic overloading with respect to voltage & current.
- Reduces amplification of system harmonics thereby restoring sinusoidal waveform.
- Reduce over heating of busbars, cables & transformer by correcting power factor.

- Available detuning factors : 7%, 14%, 5.67%
- Anti-resonance series reactors
- High Linearity : up to 200%
- Low loss design
- Overload capacity : 150% for 1 minute and 100% continuous
- Insulation : Class F 155°C
- Noise level : Max 60 dB
- Insulation Level : 2.5 KV
- Ambient Temperature : 50° C
- Cooling : Natural
- Over-temperature protection
- Inrush current limiting reactors 0.2% also available
- Tuned Reactors for 5th, 7th, 11th, 13th harmonics available

PRODUCTS

Thyristor Switch Modules(TSM)

Ultra Fast Switching

Thyristor Switching Modules are free of mechanical wear and tear, operate without noise and provide practically transient free switching eliminating inrush currents which are associated with Electromechanical Contactor Switching. An unlimited number of switching operations, without applying significant stress to the capacitors.

BRAWN ENERGY's TSM is made using high quality components. With Semikron IGBT, and other high-quality components to minimise heat losses. The protection is provided to PCB (Conformal Coating) and busbar to prevent corrosion in difficult environments.

Salient features

- Thyristor Switch Modules (TSM)
- Suitable for real-time capacitor switching
- Available from 1KVAR to 100KVAR
- Available in 1800, 2200 & 4000 PIV
- SCR-DIODE control, thyristors - SEMIKRON make
- Most advanced thyristor firing card
- Compact and heat efficient design
- LED indication : Supply ON / Signal ON / R-Phase ON / B-Phase ON / Over Temp. Cut Off
- Ambient Temperature : 50° C
- Over temperature protection : thermal cut-off switch
- Control voltage : 24/12 Vdc
- Cooling : Natural / Forced (Force cooling above 75KVAR rating)
- Easy to install and maintenance free
- No inrush current limiting reactors required
- Number of Switching without delay
- No noise emission during switching operation

Applications

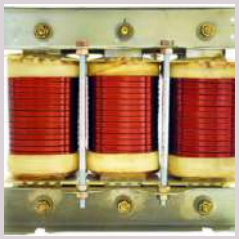
Fast switching - Real Time (Dynamic) Power Factor Correction.

- Press loads
- Welding machines
- VMC & CNC machine loads
- Cranes and Elevators
- Rolling Mills

Power Factor Correction Solutions And Accessaries

APFC Controllers

MPP Capacitors



Detuned Harmonic Filter

We designed panels and filters which allows easy handling to the user.

BRAWN ENERGY

BRAWN ENERGY

1, Sai Siddharth, Ektanagari, Anandnagar,
off Sinhgad Road, Pune - 411 051, (Maharashtra), India

+ 91 97640 22672

info@brawnenergy.co.in

+ 91 90750 11250

www.brawnenergy.co.in