

Technology
Quality
Profitability



Total Power Quality Solutions

NEELKANTH POWER SOLUTIONS
simply WORLDCLASS

About Power Quality

Simplest definition of Quality is “Fitness for Use”

Power Quality refers to the “fitness of electrical supply that permits any equipment to function without unintended financial losses”.

The quality of power supply becomes deficient due to disturbances and distortions in voltage or current wave forms. The source of distortions could be within or outside the facility where equipment is in use. For example, equipment inside a factory may be causing electrical disturbances for another machine working next to it.

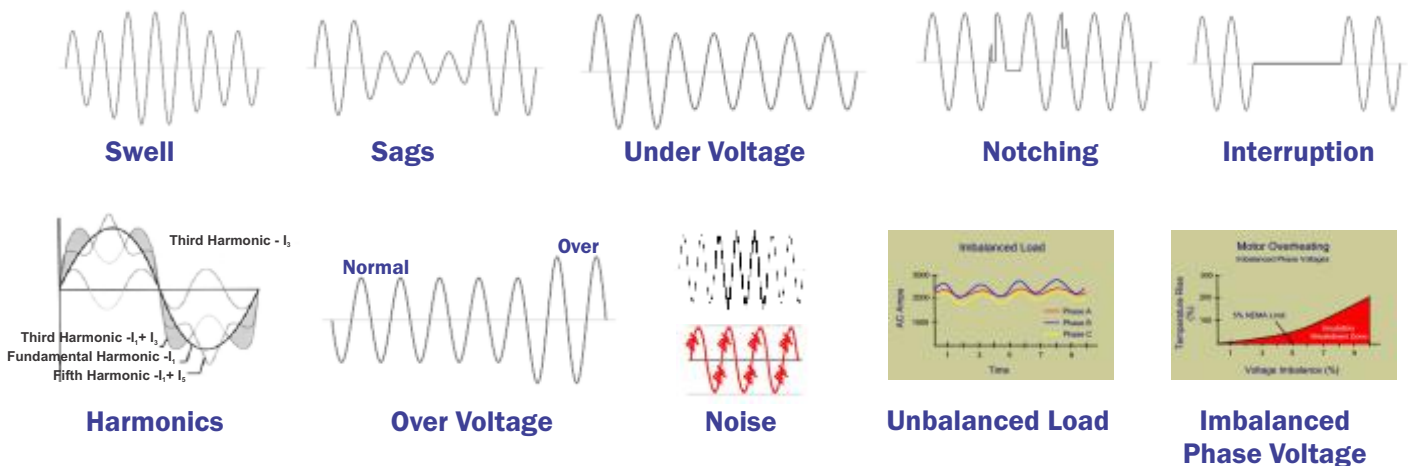
Moreover, the Power quality parameters deemed fit for one equipment, may be unfit for another.

Deficient power quality results into one or many types of losses such as reduced operating efficiency, higher energy consumption, unexpected equipment behavior, production down time, reduction in service life of equipment, high maintenance and replacement costs, premature equipment failures, missed shipment deadlines, impact on customer goodwill affecting future business, unsatisfied customers and so on.

Financial losses due to unfit power quality are many times higher than investment required for tackling the pollutants or disturbances in electrical supply to the equipment. Typically, a fit power quality can be realized with investments as low as 2 to 3 percent of the cost of equipment to be protected.

From a business perspective the down time, interruptions and production losses cost significantly even if a power quality disturbance may last for only few milliseconds.

Some common types of phenomena affecting power quality:



IMPROVING POWER QUALITY IS OUR BUSINESS

About us

NEELKANTH POWER SOLUTIONS is established by Mr. Hemant Mehta, the founder partner of Neel group of companies including Neel Controls Since the year 1979.

Primarily responsible for product design, development, manufacturing, quality assurance and reliability: Mr. Mehta has developed many innovative products and customized solutions for mitigating "Power Quality Disturbances".

We have number of satisfied customers from diverse industries such as

- | | | |
|---------------------------|---------------------------------|------------------------|
| * Aerospace, | * Atomic Research, | * Automotive, |
| * CNC Machinery, | * Defense, | * Earth Moving, |
| * Gas and Petrochemicals, | * Heavy Electrical/Electronics, | * Medical Electronics, |
| * Power Distribution, | * Printing, | |
| * Pharmaceuticals, | * Process Industries, | |
| * Railways, | * Assembly Lines | |
| * Robotics, | * Process Controls | |
| * Steel, | * Elevators | |
| * Telecommunications, | * SMT Production | |
| * Textiles | | |

Accreditation certified

Our Strengths

- One source solutions for all Power Quality issues.
- Proven technology since three decades.
- Designing expertise to prove customized solutions.
- Advanced R & D and test facilities.
- World class quality assurance and management systems.
- Well trained staff and workforce.
- Nationwide pre sales and post sales support.

Our Objectives

- ⇒ To provide world-class products to market on-time, on budget and on quality.
- ⇒ Continuous improvements.
- ⇒ Design Innovations.



PRODUCTS SIGNIFICANTLY IMPROVED OVER THE ORIGINAL DESIGN
due to continuous upgradation in design and technology



Servo Voltage Stabilisers

AC mains voltage fluctuations are a common phenomenon in power supply system. Such fluctuations may result into erratic behavior, malfunction or even break down leading to expensive repairs, production loss and missed commitments.

These Voltage Stabilizers are designed to ensure that their output voltage remain constant irrespective of the voltage swings in the incoming power supply.

Their high efficiency and the ability to withstand instant load variations make them an ideal choice for protection of expensive and sensitive equipment.

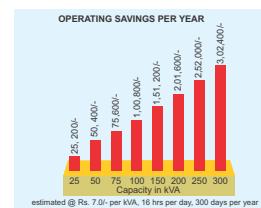
Ratings of Standard Products

Supply System	Input Voltage	Output Voltage	KVA
Single-phase (Air-Cooled)	170 ~ 270 VAC	230 VAC	1 ~ 40
Three-phase (Air-Cooled)	340 ~ 480 VAC	415 VAC	10 ~ 1500
Three-phase (Oil-Cooled)	340 ~ 480 VAC	415 VAC	50 ~ 2000

*Other voltages available on request

Why Neel is Preferred

- 1) The use of variable speed servo motor along with proportional type of control circuit ensures that the voltage fluctuations are corrected quickly without any oscillations at the output so as to protect the end equipment.
- 2) Hunting, oscillation, and noise generation is eliminated.
- 3) The rate of voltage correction is 2-3 times faster than our competitors.
- 4) Designed to work on Unbalanced Line & Load conditions wherein each phase is individually controlled with separate variable speed Motor & Electronic Controls.
- 5) The response time of stabilizer quick at 10 msec.
- 6) The improved efficiency of 98% compared to typical 95% available in the market will reduce running costs. Substantial saving in the electric bill (lower power losses) will pay back the cost of equipment in 2/3 years.



- 7) D. G. Set compatibility: Special RMS sensing circuit ensures no drift in output voltage even with distorted waveform, generally observed in D. G. Set. This avoids nuisance tripping of advanced electronic equipment, otherwise observed.

Confirms to stringent defense standards JSS 55555

Technical Specifications

Output voltage Accuracy	1%	Unbalanced Line and Load	Independent phase sensing and control provides for 100% load imbalance within the range of equipment
Rate of Correction Upto	105 V / Sec	Control Panel	Full function Auto / Manual controls
Frequency	47 - 53 Hz	Output Voltage Protection	Electronics Adjustable Output Under and Over Volt alarm / time delay Circuit / Trip and bypass facility
Wave form Distortion	Nil (Same as input)	Servo Motor Protection	Voltage Cut-off for Servo Motor at input Under / Over volts
Effect of Load Power Factor	Nil	Environment	Temperature range- 0 to 45°C Suitable for Indoor Tropical use 90% RH (non-condensing)
Harmonic Distortion	None		
Enclosure finish	RAL 7035		
Construction	Enclosure to IP 21 / BS EN5490		

Types of Stabilisers- Analog control and Micro processor control

Advantages of Micro Controller Based Servo Voltage Stabiliser

- 1) 20 x 4 LCD Display for 3 phase Electrical Parameters
- 2) Real time clock with date
- 3) Three stage output UV & OV monitoring & trip
- 4) Input UV & OV monitoring & trip
- 5) Three stage overload monitoring & trip
- 6) Advance diagnostic feature with date & time log
- 7) Transformer less sensing
- 8) Less inventory
- 9) Advance algorithms for monitoring & protection
- 10) Ease of setting of parameters
- 11) Integrated energy metering
- 12) Individual prominent fault display
- 13) Plug & play universal card
- 14) RS 485 port for remote data monitoring
- 15) Better reliability
- 16) Password protected for unintentional input

* Some of above features are optional

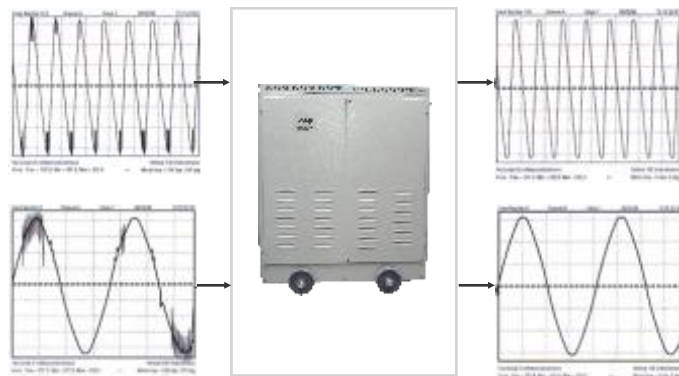


Ultra Isolation Transformer

Performance

All the types of electrical noises, predominantly common mode noises can be eliminated by Ultra Isolation Transformers. Since it isolates primary and secondary or separates neutral to ground bond on the secondary side, can be used to create separately derived source to combat current loops.

The Ultra Isolation Transformers are available in different levels of noise attenuation capabilities. The most commonly used are 100 & 120 dB. The coupling capacitance between primary and secondary is direct 1:1 relationship with dB levels. Some of the graphs herewith indicate different types of electrical noises observed in typical Engineering Industries & successfully eliminated.



Electrical noises are generated due to

- Switching of electrical utilities like Capacitors, MCCBs, ACB's...etc. Larger the inductance of the system and larger the current change during switching, larger the magnitude of electrical noises.
- The inductive loads like big Motors, Compressors, Overhead Cranes, Elevators, Presses etc. also generates substantial switching noises
- Switching equipment like Invertors, Converters, SMPS etc. generate electrical noises due to switching of Thyristors, Transistors, Relays etc.
- Welding systems pollutes earthing systems, adds notches and high frequency noises in the wave form, generating power quality anomalies.
- Lightening, precipitation of static charges and electrical discharges in the atmosphere are the natural cause of generation of various electrical noises.

Effects

- Electrical noises are observed to occur over a wide band of frequency ranging from 1 KHz to 100 MHz and above. In magnitude observed to be as high as 4000 to 6000 Volts on 3 phase supply system.
- The high frequency noise can interfere with digital electronic equipment causing untraceable data errors, change of program, loss of memory, erratic behaviors, etc.
- The high voltage spikes can cause the failure of Thyristors or Transistor, Micro Processors and other sensitive devices.
- The radiated noise can interfere in operation of remote control equipment like Cranes, Digital Controls or Telecom Equipment.

Uses

- Protect Computers, CNC Machines and Telecommunication equipment from damage due to electrical noises, spikes etc. If ground potential of system units are different from each other and are exposed to the effects of instability at high frequencies.
- If ground of the equipment cannot be earthed.
- To shield large number of electronic equipments which individually are producing different types of electrical noise at a common busbar typically CNC machines, Drives, Hardening equipment etc.
- The use of NCT, being bidirectional, prevents damage due to circulating noise interference within them.
- To Protect against strong lightening, impulse noise, bus short-circuit, accidental discharge of capacitors
- When multiple Noise Cut-off transformers are used, the suppression effects increase in proportion. Therefore, the effects of cascading Noise Cut-off Transformers is remarkable.



Power Conditioner

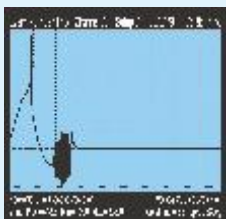
The two-in-one for voltage and spikes correction

Large amount of CNC breakdowns are attributed to fluctuations in voltage and various types of electrical noises like spikes, surges, H. F. noises, ground noises, etc. Electrical noises are generated due to switching action of breakers, heavy machinery, capacitor switching, induction hardening, cranes, welding etc. The use of invertors, DC drives, SMPS, further pollutes the electrical environment, causing severe power quality disturbances to various CNC machines, installed in the plant. Advanced CNC machines demand stringent standards of power quality for their smooth and trouble-free operations.

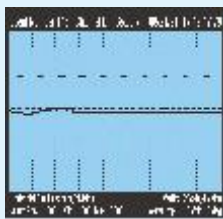
Neel Powercon eliminates major electrical disturbances and provides clean power to your CNC machines.

Performance Graphs

Before

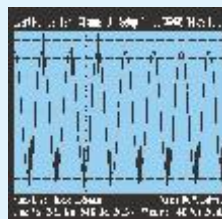


After

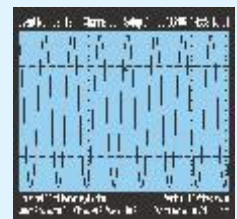


Switching impulses of 1100 Volts and welding noise of 587 Volts between neutral-earth being eliminated by Neel Powercon

Before



After



High Frequency switching noises of inverter drives are successfully eliminated by Neel Powercon

Features

- Quick response and fast rate of correction upto 105V/Sec.
- High torque, low inertia variable speed servo motor and proportional control circuit to avoid output voltage oscillations.
- Isolated servo drive without relays/triac free operations.
- High overload capabilities for frequent starting and regenerative currents of CNC machines.
- Use of prime CRGO, laminations and electrolytic grade conductor for low losses and higher efficiency.
- Multi-layer shielding and control of leakage inductances for high noise attenuating capabilities.
- Stringent quality assurance program, for high reliability and consistency of performance.
- Manufacturing facilities approved by Director General, Quality Assurance Defense Services.
- D. G. set compatibility.
- Preferred by CNC manufacturers, Automotive industries, Defense, Railways and others.

Technical Specifications

Input voltage	340-480 or 300-480 V AC
Phase	3 phase 4 wire
Frequency	47-53Hz
Output Voltage	380 or 415 or 200 V AC
Regulation	± 2% steady state ± 5% dynamic
Rate of correction	Upto 105V/sec
Cooling	Aircooled
Ambient	0 - 45°C, 90% R.H.
Common mode noise rejection	100 dB
Normal mode noise rejection	40 dB
Duty	100% continuous 110% for 60 sec 200% for 10 sec
Metering	Voltage and currents
Protection	Under and over voltage Overload and short circuit
Enclosure	IP 21
Ratings	10,15, 20, 25, 30, 40, 50, 60, 75, 100, 125, 150, 200, 250 kVA



'K'- Rated Isolation Transformer Performance

K-factor is defined as a ratio between the additional losses due to harmonics and the eddy current losses at 50Hz. It is used to evaluate transformers for non-linear loads. Transformers with a rated K-factor of 4, 7, 13, 20 and 30 are available.

The ANSI/IEEE C57.110 has derived a system of weighing how much harmonic load currents a transformer can handle without exceeding its maximum temperature rise level. A K factor of 1 indicates no harmonics, while a K factor of 50 is the harshest harmonic environment possible. Typically a K Factor of 13 is sufficient for most applications. K factor must be determined to calculate the right size transformer that is needed.

Applications

- Data Centres, Call Centres, IPO
- Induction Heaters/Inverters
- UPS, VFD'S & Drives
- HID Lightings
- Hospitals/Medical Centres, Research Labs
- Corporate, Banking and Financial Institutions

Effects of Harmonics

- Overheating
- Equipment Malfunctioning
- Equipment Vibrations
- Breakers Tripping

Special Features of Neel 'K'- Rated Transformers

- Copper windings
- Lower Output impedance
- Excellent transverse mode noise attenuation
- Coil design is optimized for low eddy current loss and high harmonic current carrying capacity.
- Cores designed for reduced flux densities to compensate for harmonic voltage distortion
- Double size neutral terminal
- Core of high quality electrical steel
- Quiet operation
- Ref Standard UL-1561, IEEE – C-57-110, I

Technical Specifications

NEEL Dry type K factor Transformers available from K1 upto and including K20

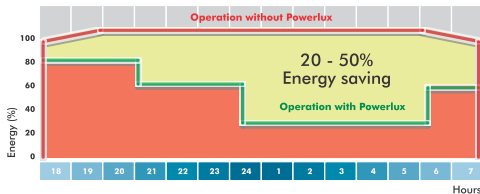
kVA rating	upto 2000 kVA
Impedance	3-4%
Input voltage	415 volts (other voltages on request)
Output Voltage	415 / 200 volts (other voltages on request)
Input/ Output configuration	Delta/Star or Zig-Zag
Construction	dry type, double wound, air cooled, common core, varnished & vacuum impregnated
Windings	Copper
Neutral conductor rating	200%
Frequency	50 / 60 Hz
Insulation class/level	H / 180 deg C
Maximum temperature rise	125 deg C
Enclosure type	M.S. enclosure as per IP21
Enclosure finish	Siemens grey, RAL 7035 (other colours available on request)
Flash test /H.V test	2500 volts between winding to winding and winding to earth
Ambient temperature	0 to +45 deg C
Operating Humidity	0 to 90%, non condensing
Reference standards	UL-1561, IEEE-C 57-110, IS- 11171



Powerlux
Lighting Energy Management System



Powerlux is a comprehensive Lighting Energy Management and savings system which is compatible with Lighting loads of all kinds. The system is fully programmable via embedded controller.



Lighting energy constitutes a substantial part of the overall energy consumption in commercial and industrial centres. Upto 40% energy can be saved, while reducing losses, wastage and over lighting conditions. Powerlux enables corporations to save energy by eliminating waste via facility wide dimming and switching. Using the software, the facility operator can locally access Powerlux.

Features

- Embedded Microcontroller based technology
- 20x4 LCD display with backlight, Time/Date and current preset level
- Fully programmable - 8 slot per day
- Output Voltage Setting between 200 to 230 Volt
- Auto Start (Optional)
- Display 3 phase power & energy parameters
- Ratings available upto 350 kVA
- View power usage and energy consumption.
- Change Over / Powerlux bypass switch
- Memory Backup
- Password protection

Unlike dimming ballasts or retrofit devices, this system can be used without any expensive changes in existing wiring or lamp fixtures.



Medical Grade Isolation Transformers

Neelkanth Medical Grade Isolation Transformers are designed as per UL 60601 to provide completely isolated power as per the needs of the hospital requirement

Features

- Electrostatic shield between primary and secondary winding
- Grounded to enclosure
- Input line filter as per UL 1283
- Input filter leakage current max 5 uA
- Output leakage current max 20 uA
- Class H insulation
- Max 40° C temperature rise above ambient
- Over temperature cutoff
- Optional audio alarm for over temperature and leakage current
- Standard 2 pole circuit breaker at input
- Fuse at input
- Stainless still enclosure with fitting fastener- IP 20

Technical Specifications :

Rating : 300 VA to 20 kVA

Primary : 230 V 50/60 Hz

Secondary : 230 V / 220 V / 110 V 50/60 Hz

Regulation : <5%

Terminal Block for Input output cable



KVAR PLUS

FAST RESPONSE, TRANSIENT FREE

REAL TIME POWER FACTOR CORRECTION SYSTEMS

Types available

Basic Systems: Includes reactors to limit the inrush current

Detuned Systems: Includes iron core reactors that detune the network to prevent resonance and absorb harmonics

Unbalanced Systems: Individual phases are separately corrected, line to line or line to neutral

Ratings: Available from 100 to 2000 kVAR

Applications

- Fast variable loads like CNC machines, welding, induction heating/melting, drives, extruders, etc.
- Sensitive electronic equipment like IT data centres, R&D labs, corporate offices, telecommunications, hospitals and airports.
- Welding, rolling mills, elevators, cranes, traction, etc.
- Big motors, pumping stations, sewage and water-treatment plants, air-conditioning plants

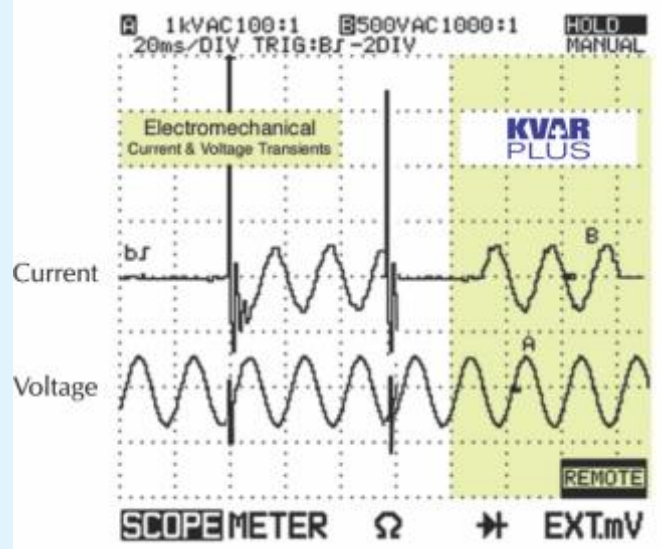
Advantages

- Transient free capacitor group switching, using electronic switching elements
- Enhances capacity of transformers, local generator systems, such as diesel and windmill generators
- Avoids wave form distortions, since capacitors are connected and disconnected during zero crossing
- Prevents damage to sensitive electronic equipment
- Saves energy by reduced max. demand, PF bonus & saving in transformer losses
- Accurate power factor control, even in the presence of harmonics
- Dramatically increases the life expectancy of switching elements and capacitors
- Built-in network analyzer, measuring all network parameters including harmonics
- Modular and upgradable with increased plant load

Smooth and transient free operations

Connection and disconnection of the capacitor to and from the network occurs at zero crossing. This smooth connection avoids transient effects like waveform distortions, generation of switching spikes etc., typically created by electro mechanically switched contactor based APFC systems.

The response time is only 1 to 2 cycles which is much faster than electro mechanically switched APFC systems.





Online UPS System

The smartest way to tackle power failure

Features

- True on-line double conversion
- Compact and silent in operation
- Advanced PWM, IGBT technology
- Suitable for CNC machines and industrial applications
- Built-in static by-pass switch
- Programmable battery-low alarm
- RS-232 Interface available for m/c interlock
- User friendly applications

Technical Specifications

Input	Voltage	230 VAC, (+15%-20%) Single Phase 415 Volts (+15%-20%) 3 Phase 4 wire
	Frequency	47 to 53 Hz
Output	Rating	1/2/3/7.5/15/20 kVA, Single Phase 10/20/30/40/ 50/ 60/75/ 100/120/ 150 /200/250/ 300/400/ 500 kVA, 3 Phase
	Voltage	220/230/240 Single Phase 380/400/415 V, 3 Ø
Efficiency	Inverter Efficiency	Better than 95%
	Overall Efficiency	Better than 92%
Reference Standards	IEC 146-(IV), EN 50091-1, EN 50091-2	

True on-line double conversion micro-controller based UPS system.



Furnace Transformer

Application:

Induction Furnaces / Arc Furnaces / Submerged Arc Furnaces / Ladle Furnaces

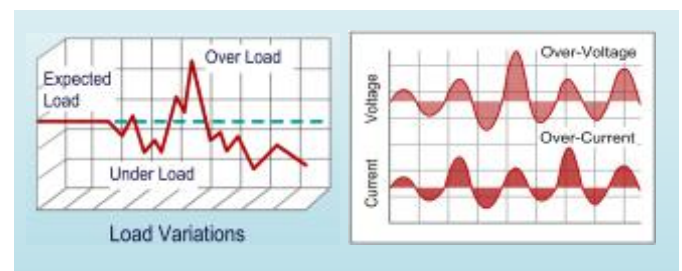
Special features of NEEL make Furnace Transformers.

Higher cross section & use of multistrend copper conductors to reduce Eddy current losses.

Use of high permeability, Low losses electrical steel used at a lower flux density to reduce harmonic frequency losses.

Provision of electrostatic earth shield between windings to protect rectifier elements against Line voltage surges.

Confirming to IS standard - 2026 / 11171



Increased productivity and least cost of Ownership.

Easy to install and maintain.

Work well in Areas of the flexible demand.

Technical Specifications :

Capacity : Up to 2.5 MVA

Input Voltage : Up to 33 KV

Output Voltage : As Required

(Available in Dry type and Oil-cooled)



Our Services

- 1) Power Quality Audit and Harmonic Analysis
- 2) Annual Maintenance Contract
- 3) Preventive Maintenance (PM)
- 4) Fault Diagnostic & Repairs On Call Basis
- 5) Consultancy

Power Quality Audit and Harmonic Analysis

Most electrical problems like tripping of switchgear, blowing of fuses, failure of electronic equipments, flicker, high energy costs etc. are because of disturbances in the electrical network.

We specialize in the field of Power Quality Solutions since last 30 years. Using modern state of the art equipments, we are actively conducting Power Quality Audits and Power monitoring at various Automobile, Engineering, Aerospace, Pharmaceutical, IT Data centers, Printing, Textiles, Defense & Railway establishments at an all India level. Our design exposure to drives, automation, PLCs, Motors etc. and close associations with designers and foreign principals has provided us valuable insights and knowledge in this field to provide detailed analysis and solutions.

We can provide a comprehensive range of on-site services which includes:

- Power Quality Audit
- Power monitoring and Load analysis
- Harmonic and Reactive power analysis
- Transient and Flicker analysis
- Compliance monitoring

Our state of the art monitoring equipments are from internationally renowned vendors like Dranetz BMI, Fluke. The measurements carried out are compliant to various industry standards like IEC 61000-4-30 Class A, EN50160, IEEE 1519, and IEC 61000-4-15.

Using advanced software tools, we can generate detailed graphical waveforms, event reports, trend sheets and summary reports for various nodes in the electrical network.

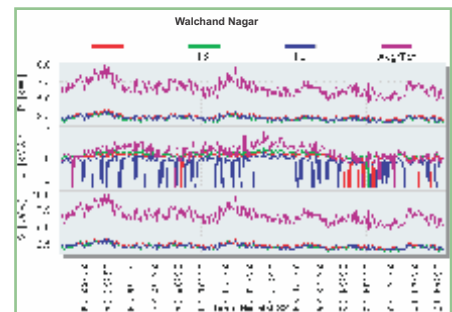
We also provide recommendations and solutions to rectify the problem with their cost benefit analysis.

The typical power quality disturbances observed at various sites are: Voltage fluctuation, Harmonics, Frequency variation, Earth leakage, Transients, Surge, Sags, High frequency noise, Glitch, Notches etc.

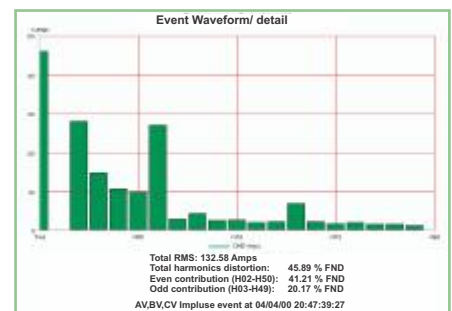
Some sample reports and graphs from monitoring at various client sites are shown.



Power Quality Audits



Power Monitoring



Harmonic Analysis



Transient Analysis

Some of our valued Customers and End users



* Logo / Trademark belongs to respective owners



NEELKANTH POWER SOLUTIONS

simply WORLDCLASS

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- Servo Voltage Stabilisers
- Power Conditioners
- Power Lux
- Ultra Isolation Transformers
- Furnace Transformers
- 'K'- Rated Isolation Transformers
- Online UPS
- Real Time Power Factor Correction System
- Power Quality & Load (Energy) Audit

- Ahmedabad • Bangalore • Chennai • Delhi • Gurgaon • Haridwar
- Indore • Jalandhar • Jamshedpur • Kolkatta • Kanpur • Pune • Rajkot • Hyderabad • Surat



Due to continuous product improvements, technical specifications are subject to change.