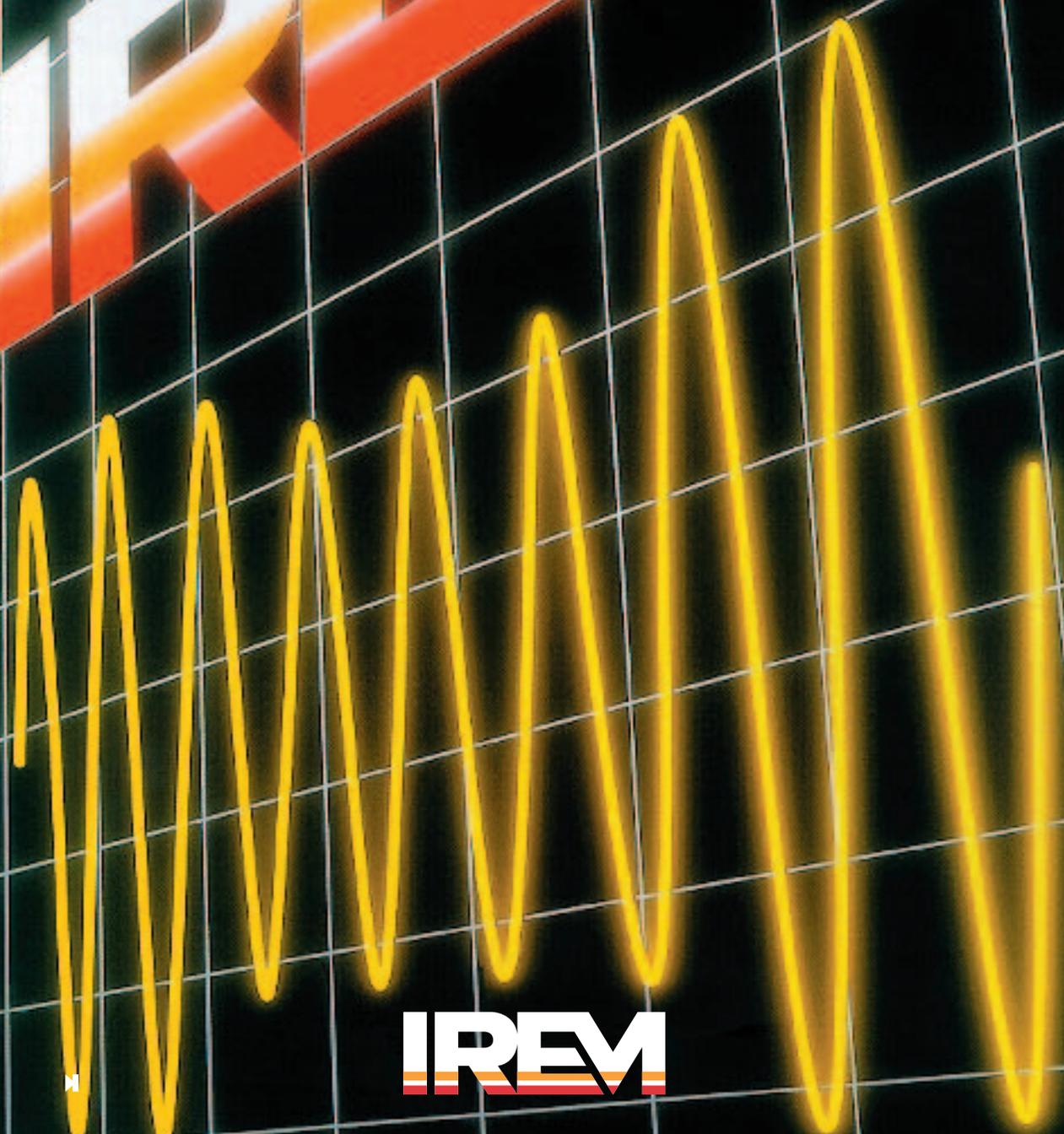


**IPPE**



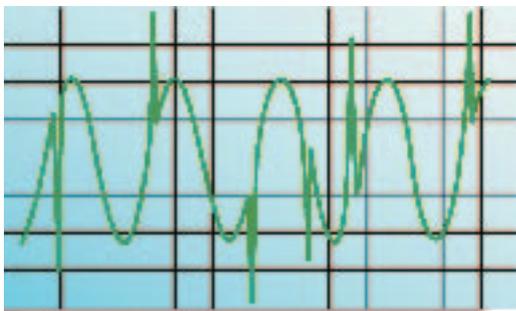
**IREM**

*A RANGE OF SOLUTIONS FOR ELECTRICAL DISTURBANCES*

# Protection against mains power faults

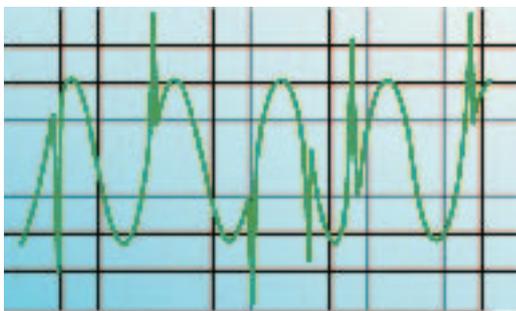
A wide range of devices is nowadays available to improve the power supply quality and ensure the best protection to professional equipment highly sensitive to electrical disturbances. As a matter of fact, any equipment needs a correct powering to ensure its performance. When this condition is not complied with, there are failures, errors and premature ageing. To protect sensitive equipment, it is possible to have recourse to several devices which, depending on their characteristics, complexity and cost, ensure different levels of efficacy. The choice should be made by assessing the degree of protection required, the entity of failures and the direct and indirect costs these may cause. It is therefore useful to know the most common electrical faults in order to adopt the most adequate protection and avoid inefficiency and failures.

## Electrical faults



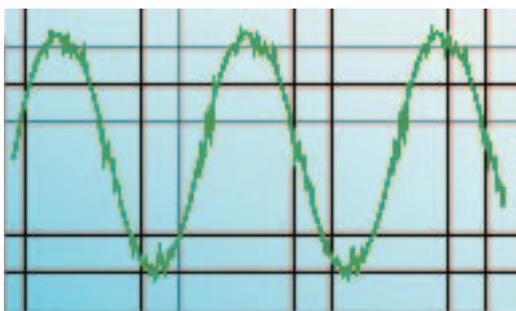
### **(A) Voltage variations**

Being subject to continual load variations, distribution lines are unable to supply perfectly even voltage levels. This is why any electrical equipment is built to accept shifts of at least  $\pm 5\%$  as to the nominal value. As a matter of fact, electricity boards contractually provide for fluctuations up to  $\pm 10\%$ . However, this limit is often exceeded due to “slow variations” (voltage drops caused by under-dimensioned lines and overloads), “over-voltages” (considerable increases of the mains voltage value arising when industries drastically cut down their energy consumption), “fast variations” (drops caused by the connection of equipment such as: discharge lamps, punching machines, electric motors etc.).



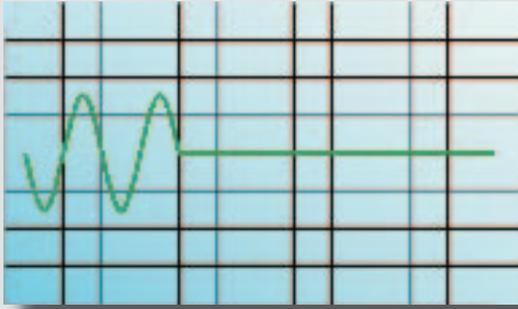
### **(B) Voltage spikes**

These are very brief pulse disturbances extremely dangerous for the most sensitive equipment since the voltage values may reach thousands of volts. They are caused by several events, like e.g. switching of high voltage lines, connection of power factor correction capacitors, lightning, disconnection of loads with high reactive powers, and also by lower power loads such as photocopier machines and air conditioners connected to the same line powering the sensitive equipment. Spikes are not detectable by means of an ordinary voltmeter due to their short duration; however they are one of the main causes of failures and malfunctions.



### **(C) High frequency disturbances**

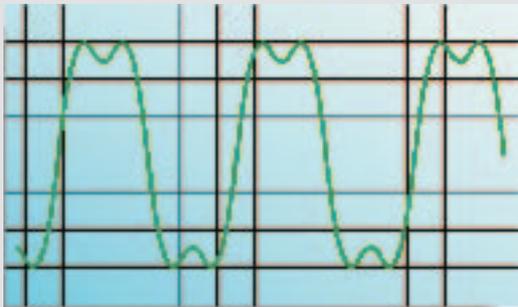
They are very common and easily detected by anyone watching TV. They are the cause of the “snowstorm” effect and those fastidious lines that sometimes appear on the screen. They are caused by the sparks generated in the AC commutator motors, the “corona effect” on the high voltage lines, the igniters of luminous signs and burners, and by the magnetic fields irradiated by radio and TV stations. Line disturbances, also known as HF noise, do not generally create problems on electromechanical equipment, but can often damage a sensitive electronic equipment.



### Ⓓ **Blackouts**

This is the most obvious event (though less frequent) because everybody perceives it. It may happen accidentally on production plants or distribution lines, or it can be programmed to reduce energy consumption.

There are also micro-interruptions, which may last between microseconds and a few tenths of milliseconds, caused by short circuits or line switching. These faults are not noticed by electromechanical equipment, but they can cause damage to an electronic equipment. The switching power supplies used in almost any electronic equipment can normally compensate interruptions lasting a few milliseconds. A longer blackout can cause loss of data, program cancellations and system failures.



### Ⓔ **Harmonic distortions**

They are caused by the ever increasing use of electrical equipment with non linear absorption such as: rectifiers, converters, drives, switching power supplies.

This fault can cause heavy overloads on lines and transformers, explosion of power factor correction capacitors, incorrect indications on measuring equipment and, generally speaking, the malfunction of any electrical equipment.

## *Choosing the “right” protection*

The letters **Ⓐ** **Ⓑ** **Ⓒ** **Ⓓ** **Ⓔ** alongside each range of products are a useful guide to find the most suitable equipment to ensure the required protection. Each letter represents one of the previously described electrical faults that the product is able to remove, correct or attenuate, whereas the colour indicates the efficiency level.

The **●** colour indicates that the function is performed with the maximum degree of efficiency.

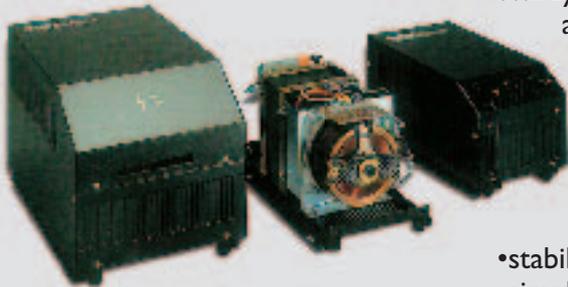
The **●** colour indicates that the function is performed with a good degree of efficiency.

The **●** colour indicates that the small spikes damping is performed with the help of optional devices.

## Electrodynamic voltage stabilisers

### Ministab series M...E

A



Suitable for any type of load, they deliver a “true RMS” stabilised output voltage, even when strong harmonic distortions are present on the line. They are of simple but sturdy construction and are particularly suitable for those applications requiring:

- high reliability due to installation in areas with difficult access and/or subject to critical environment conditions;
- capability to compensate wide voltage variations, even up to  $\pm 25\%$ ,  $\pm 30\%$  or  $+15\% -35\%$ ;
- high accuracy of the stabilised voltage;
- stabilisation of equipment with high inrush currents;
- simple and limited servicing.

Standard versions in power range from 1 to 33 kVA single-phase and from 3.5 to 17 kVA three-phase.

### Ministab series M...L

A B



The basic characteristics are the same of the M...E models, the difference being in their even higher precision:  $\pm 0.5\%$  instead of  $\pm 1.5\%$ . Thanks to their special casing they can be easily installed in 19” rack cabinets.

The standard fittings include: circuit breaker, pilot lamp, voltmeter, “out of range” indicator and trimmer for the adjustment of the stabilised voltage. Overload protection, electronic voltage relay and tripping coil can be supplied as optional protections. Available in single phase models with power rating from 3 kVA to 15 kVA.

### Ministab and Sterostab series M...AN, T...AN, Y...AN

A B



These models have the same basic characteristics of the M...E models, but are available for higher powers. They are housed in metal cabinets and are fitted

with voltmeter and pilot lamps. Upon request, they can be equipped with bypass, soft start, overload protection, reversed phase sequence and phase failure protection, over/under voltage protections, ammeters, frequency meters, lightning arresters a.s.o. These models are a reliable, affordable and tested solution for problems caused by voltage variations on medium-high industrial plants.

A wide range of single-phase and three-phase models is available in the power range from 9 to 3300 kVA. These voltage regulators can be supplied in metallic cabinets with protection degree in IP21, IP44, IP54 or in “open frame” versions IP00 for installation into electric panels.

## Electronic line conditioners

### Ministatic series TS, TST

A B C



These models offer a high protection level for sensitive electronic equipment connected to lines disturbed by voltage variations, high frequency interferences and voltage spikes.

They combine in one unit:

- spike suppressor;
- two RF filters;
- isolating transformer
- electronic voltage regulator.

They are also available in special versions for telecommunication, robotics and automation, suitable to supply 230V or 110V single-phase loads which are connected to three-phase lines without neutral.

The Ministatic range includes single-phase and three-phase models with power rating from 500 VA to 24 kVA.

## Electrodynamic line conditioners

### Steroguard series Y...LC

A B C



They ensure the highest protection level to high power sensitive equipment connected to electrical mains perturbed by voltage variations, high frequency interferences and voltage spikes.

The regulation system is based on magnetic components capable to withstand loads with high inrush currents. The electronic components are used for the control board and to drive the magnetic parts stabilising voltage. Thanks to these features, the electrodynamic line conditioners ensure a high electromagnetic immunity and are very sturdy.

All Steroguard systems consist of:

- an input thermal-magnetic circuit breaker
- spike suppression,
- FR filter,
- a high attenuation isolating transformer,
- an electrodynamic voltage regulator.

The simple constructive design guarantees easy servicing which can also be performed by people with general knowledge in electrical installations.

On request, they can be also equipped with the same fittings of Ministab/Sterostab series.

It is also possible to supply single-phase and three-phase versions with input voltage different from the nominal output value.

The Steroguard range includes three-phase models with power rating from 9 to 800 kVA.

# Uninterruptible power systems

## Minipower series USF

A B C D E



On line double conversion 1PH UPS characterized by PWM technology with IGBT and modern microprocessor control. They ensure high performance with perfectly sinusoidal output wave form, stabilised powering voltage without spikes and high frequency interferences. They represent the ideal solution against blackout and electrical faults for small sensitive equipment, like e.g. data processing systems and networks, electro-medical appliances, telecommunication plants, industrial automation. In those applications requiring the highest protection level, it is available a specific **Minipower USF** range equipped with high attenuation isolating transformer. **Minipower USF** are fitted with RS232 serial interface and are supplied with communication software "UPS Network Monitor 2". This permits monitoring and communication with the most common operating systems.

## Minipower series UPX

A B C D E



On line double conversion 1PH UPS characterized by high reliability and sturdiness, designed to protect:

- high-value equipment for which a power failure during operation would result in considerable risks and/or costs;
- sensitive electronic equipment used in an industrial environment where, apart from power failure, temporary voltage fluctuations and strong harmonic distortions can occur.

**Minipower UPX** series is characterized by the DSP microprocessor (Digital Signal Processor) capable to manage digitally 100% of the UPS functions. The DSP-based technology ensures a drastic reduction in electronic components with a consequent increase in reliability. Flexibility and modular design are two further peculiarities of the Minipower UPX series permitting, even after installation, to increase UPS power, autonomy and functions. The Hot-Swap function enables battery replacement without switching off the UPS and while the load is powered.

A wide range of models - with or without isolating transformer, in tower or 19" rack version - is available in power rating from 3.5 kVA to 9 kVA.



## *Multi-function power supplies*

### *Series AI*

**B C**



This is a range of equipment specially designed for telecom applications ensuring:  
protection of radio and TV stations against atmospheric discharges;

safety for maintenance people servicing telecom plants;  
implementation of a compact distribution system for all the loads present in the transmitter stations (FM-TV repeaters), e.g.: receiver RX, transmitter TX, auxiliary devices, service consumers.  
The AI multi-function power supply includes an isolating transformer with electrostatic shield between the windings, an auto-regenerable magnetic blow-out lightning arrester, input and output circuit breakers and an alarm device signalling insulation breakdown.

The range consists of single-phase models housed in 19" rack cabinets, with power rating from 1 kVA to 7.5 kVA.

## *Isolating transformers for TLC Plants*

### *Series IT*

**B C**



These isolating transformers are specifically designed to meet the main requirement of the TLC plant operators, i.e. ensure continuity of operation to transmitter plants usually installed in remote areas, exposed to atmospheric discharges and connected to electric lines subject to important voltage drops. All

models of this series are characterized by a low output impedance and are unaffected by load power factor.

To ensure an excellent galvanic insulation and high common mode attenuation, these transformers are equipped with electrostatic shield and recessed concentric windings.

The present range consists of single-phase and three-phase models up to 120 kVA. Upon request, it is possible to produce customized versions with different electrical and mechanical characteristics. Some models are fitted with lightning arrester for protection against voltage spikes and some transformers are in Class II.

# IREM. Experience and Quality

IREM is a leading company in the manufacture of electromechanical and electronic equipment for the control of the mains power in the following sectors:

- **powering of discharge lamps for professional applications;**
- **protection of electric users against line disturbances;**
- **luminous flux regulation in lighting plants;**
- **power generation by micro hydroelectric plants.**



Since its foundation in 1947, IREM has gained wide recognition due to the reliability and innovative content of its high-tech products. A reliable company deserving the Oscar-Award. In 1992, in Los Angeles, **Mario Celso** - founder of IREM - was granted the **"Scientific-Technical Award"** by the Academy of Motion Picture Arts and Sciences.

Two production plants, a philosophy based on "quality upgrading" as the company's primary concern and direct export exceeding 50% of the global turnover are a warranty of continuity and development.

Experience, quality and professional skill: these are the factors that permitted IREM to achieve in 1993 the certification of its quality system in compliance with **UNI EN ISO 9001** standard, a further confirmation of IREM commitment to constant improvement to ensure the maximum satisfaction of the customer and its capacity to guarantee:

- a constant quality standard
- precision and repeatability of all working processes
- dropping of acceptance control at the customer's plant
- identification and traceability of a product through the years.

In year 2000, IREM obtained the certification of its environment management system according to **UNI EN ISO 14001** standard. This certification is a firm demonstration of the company's will to protect the environment not just through its products, but also via precise patterns of behaviour.

