ESE®

EFFICIENCY
SAVING
ENVIRONMENT

powered by clesi®

Our story

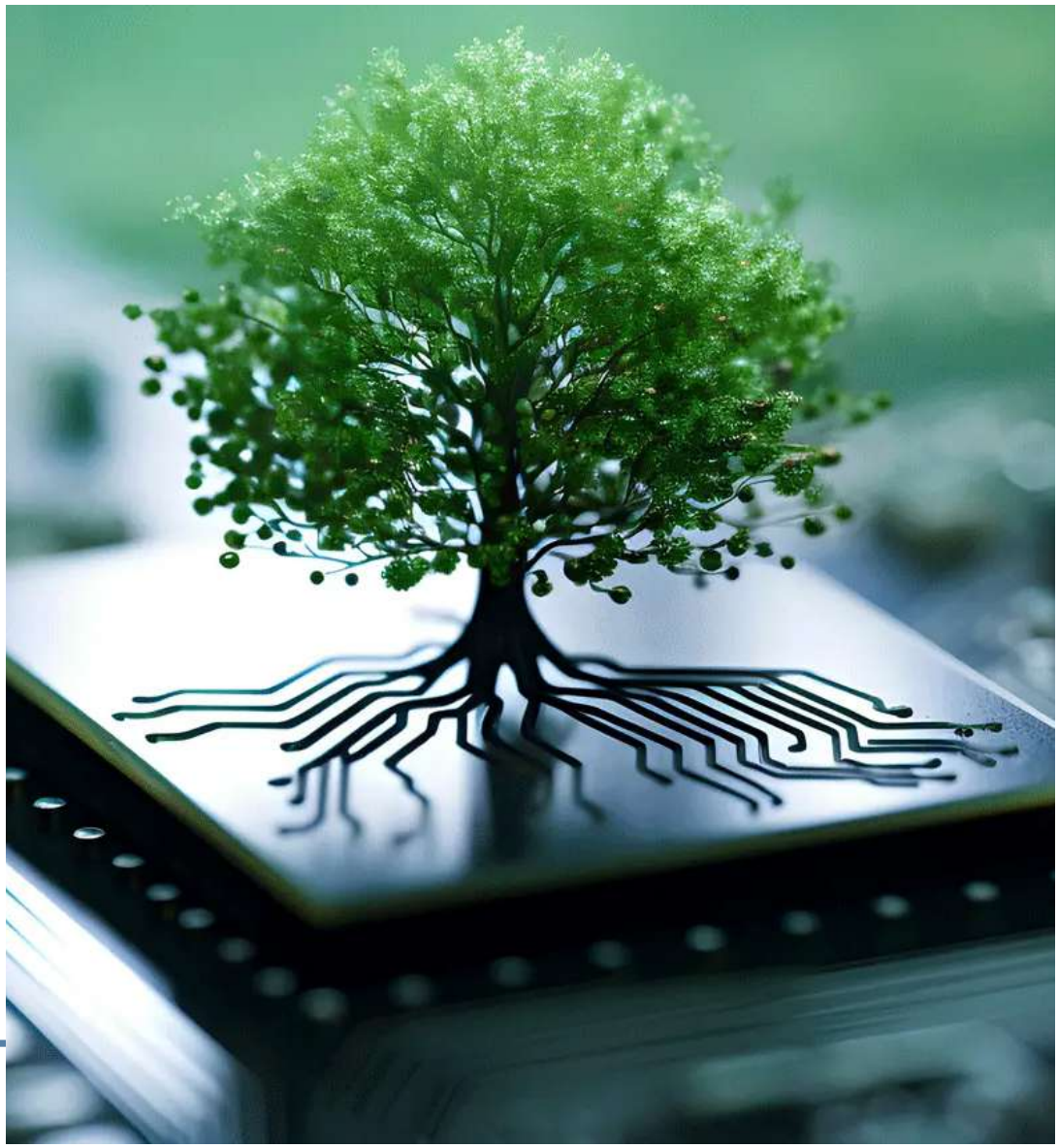
Imagine a world where energy is managed wisely, efficiently and in an environmentally friendly manner

Welcome to the universe of innovation at the service of energy efficiency. ESE is a cutting-edge company in the energy sector, focused on the production of technologically advanced machinery designed to transform energy management in companies, businesses and the hotel, food and large-scale retail sectors.

Thanks to its market strategies, investment in research and development and fruitful collaboration with universities, including CESMA (Centre for Advanced Metrological and Technological Services) of the Federico II University of Naples, ESE is among the most dynamic companies in terms of results and research and development. ESE operates throughout Italy.

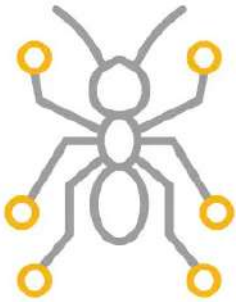
ESE's key to success is its customer focus and multi-disciplinary approach, which translates into a structured and in-depth offer to identify waste and areas for improvement, and with the identification of priority actions to increase the efficiency of the capacities used and thus energy consumption.

Our mission is to drive change towards a sustainable energy future by offering innovative, state-of-the-art solutions in the field of energy efficiency



A planet loaned to us by our children, we are committed to reducing our environmental impact by designing and manufacturing machinery that contributes to reducing CO2 emissions and optimising energy resources

ANT - control, protection, savings



ANT has a 2-year warranty with the possibility of extension to 10 years

The ANT system is an energy efficiency device produced by ESE, based in Benevento. This revolutionary system is designed to improve energy consumption and efficiency, helping to reduce waste and optimise the management of energy resources.

Installed at the main electricity withdrawal point, ANT constantly monitors loads and optimises power quality thanks to its state-of-the-art technology. The device is able to detect and correct inefficiencies and anomalies in energy consumption in real time, thus ensuring optimal management of electrical systems and reducing operating costs.

Version (ANT 2.0) brings significant improvements to the design, further enhancing its performance. Here are a few:

1. Soft Start and Soft Bypass: these two new functions optimise the process of activating and deactivating the device, gradually aligning its operation to the network conditions. Soft Start and Soft Bypass ensure a smoother and safer start and can be activated remotely.
2. Advanced error monitoring: the new software integrates a state-of-the-art error monitoring system capable of diagnosing anomalies on individual motherboards and per phase and transmitting them to the control centre for more precise and timely intervention in the event of anomalies.
3. Modbus TCP/IP interconnection: unlike the previous system based on serial Modbus, the new software uses the Modbus TCP/IP protocol, ensuring faster, more reliable and secure communication between machine control systems.
4. Maximum efficiency even at 100% load: the new device is able to operate efficiently even at loads close to 100% of maximum capacity, significantly improving system performance and reliability.
5. Improved power factor: the power factor for linear loads has been improved, making the device perform better. For linear loads, the factor increased from 0.8 to 1.
6. New CPU: the CPU has been upgraded with a 5-fold increase in performance in order to be able to handle the considerably larger amount of information in real time than its predecessor processed by the new interconnection system
7. Support for lower input voltages: the new device supports input voltages lower than -25% compared to the rated one, further improving the previous value of +-15%, offering greater flexibility and adaptability to different operational needs.
8. MLC filters: ANT 2.0 is equipped with specially designed MLC filters (multi-layer ceramic capacitors),
which guarantee better suppression of harmonics and electromagnetic interference, protecting connected devices and increasing their lifetime. This results in a significant decrease in breakdowns and maintenance costs due to problems and voltage fluctuations, ensuring a more stable and reliable operation of industrial equipment.
9. The new CPU is installed externally, allowing operators to work more safely without having to open the machine cabinet and exposing themselves to the risks of contact with live surfaces.
10. Overload management: the new ANT 2.0 system is able to withstand significantly more impactful overloads than the previous version: 125% for 1 minute - 150% 10 seconds - over 151% 0.2.
11. On request for machines that are to be installed in production, especially where there is production of ferrous materials, an IP54 category Cabinet can be requested, which guarantees complete protection against contact and internal dust deposits and against splashing water from any direction without causing damage.
12. Surge protection Class I and II: Class I is the highest category of protection against lightning and overvoltages of atmospheric origin. These devices are designed to handle direct lightning strikes or other extremely powerful surges that could seriously damage the electrical system. Class II devices are designed to deal with more common and less powerful surges than those faced by Class I devices, which focus on protection against direct lightning strikes.

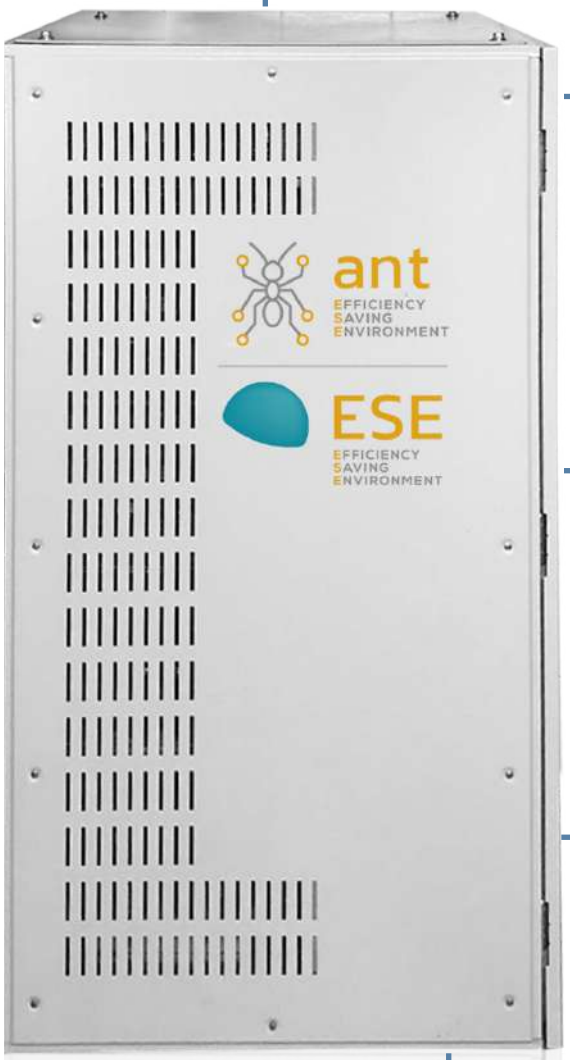
ANT 2.0 offers a number of substantial improvements over the previous version, both on the hardware and software side. These updates make the system more versatile, reliable and efficient.

Thanks to these innovations, our customers will benefit from greater control over production processes and more efficient and effective operation of their devices.

All the benefits for companies

REDUCING ENERGY CONSUMPTION

with its advanced monitoring and control system, ANT identifies and corrects energy inefficiencies, allowing companies to save on energy and maintenance costs.



POWER QUALITY IMPROVEMENT

ANT constantly optimises the quality of electricity, reducing waste and ensuring a more stable and safe operation of electrical devices.

REAL-TIME MONITORING

ANT provides continuous monitoring of electrical loads, quickly detecting anomalies to enable timely intervention.

EASY INSTALLATION AND MAINTENANCE

designed to be easily installed and services, reducing the complexity and cost of servicing.

CANCELLING TECHNICAL FAULTS

protects electrical devices from supply problems, overloads and voltage fluctuations, preventing damage and reducing breakdowns and service interruptions. ANT is also effective in cancelling micro-interruptions from a few thousandths of a second to 0.3 sec

TECHNICAL SUPPORT AND ASSISTANCE

ESE provides high-quality technical support and after-sales assistance, ensuring a satisfying and hassle-free experience for customers.

Our ranges

LITE

The Lite product range includes devices with sizes from 15 kVA to 120 kVA and is aimed at businesses and shops of all kinds. The device is to be installed downstream of the meter and does not require any invasive work.

INDUSTRY

The Industry range, on the other hand, includes sizes from 150 kVA to 7000 kVA. ESE offers a product range, generally aimed at manufacturing companies, health care facilities, shopping centres, public and private buildings where there are many different requirements, that is highly innovative and modular and capable of covering any power size.

Areas of specialisation

RESTAURANTS

MASS RETAIL

HOTEL

INDUSTRY

HEALTH CARE

SHOPS

More opportunities for companies that want to improve Power Quality and save on electricity costs.

ESE provides a hardware and software platform to companies that want to improve Power Quality, optimise consumption and further reduce energy costs.

Each company, according to laboratory tests and surveys of ANT devices, has energy savings of 10 to 25% with peaks of 30%.

FAQ

Why make your company's power quality efficient?

Efficient power quality in your company is important for a number of reasons:
1. Operational Reliability: High-quality, stable power quality ensures trouble-free operation of the systems and equipment. This reduces the risks of business interruptions due to failures or malfunctions caused by voltage or power quality problems.
2. Increased Efficiency: high-quality energy allows more efficient use of electricity. This results in reduced operating costs, as equipment operates more efficiently and consumes less energy.
3. Energy Savings: efficient power quality contributes to energy savings. By reducing energy losses caused by poor quality voltage, companies can save money and reduce their environmental impact.
4. Optimal Performance of Electronic Devices: electronic devices and sensitive equipment, such as computers, CNC machines and automation systems, require high power quality to function optimally. Unstable or poor quality voltage can cause failure or deterioration in performance.
5. Reducing Economic Losses: Power quality problems can lead to significant costs, including equipment failures, production losses, damaged electronics and additional maintenance costs. Optimising power quality reduces these economic losses.
6. Compliance with Regulations: In many jurisdictions, companies are required to comply with power quality standards and regulations. Maintaining adequate power quality helps to comply with these regulations.
7. Improving Corporate Image: Demonstrating a commitment to high power quality can enhance a company's image. Customers, business partners and investors might appreciate this focus on quality and sustainability.
8. Reducing Downtime Risk: Optimising power quality reduces the probability of downtime due to failures and malfunctions. This is especially important for companies that depend on critical systems 24/7.
9. Sustainability and Social Responsibility: The focus on power quality is an integral part of corporate sustainability and corporate social responsibility. By reducing energy waste and ensuring efficient energy use, companies contribute to reducing CO2 emissions and environmental impact.
10. Competitiveness: Companies with optimised power quality are more competitive in the market. They can offer high quality products and services at competitive prices, thus improving their position in the industry.

In summary, making corporate power quality more efficient brings numerous benefits, including increased operational reliability, energy savings, cost reductions and improved corporate image.
These benefits contribute to the sustainability and competitiveness of the company.

Why is optimising consumption a smart choice in companies?

Optimising energy consumption in companies is smart and beneficial for several reasons:
1. Economic Savings: reducing energy consumption directly leads to savings in energy costs. Electricity bills decrease, which translates into increased profitability for the company. Moreover, energy efficiency improvements often require upfront investments, but these costs are often amortised over time through the savings achieved.
2. Increased Competitiveness: companies that optimise energy consumption become more competitive in the market. They can offer products or services at more competitive prices, thus improving their competitive position and attracting more customers.
3. Environmental Sustainability: by reducing energy consumption, companies contribute to the reduction of greenhouse gas emissions and the greenhouse effect. This is crucial to combat climate change and contribute to a more sustainable environment.
4. Reducing Market Risks: dependence on non-renewable energy sources and unstable energy prices can be a risk for companies. By improving energy efficiency, companies can reduce their vulnerability to energy price fluctuations.
5. Regulatory Compliance: many jurisdictions require companies to take energy efficiency measures to comply with regulatory obligations. Regulatory compliance is essential to avoid sanctions or penalties.
6. Improving Corporate Image: a company's commitment to energy efficiency demonstrates corporate social responsibility and can enhance its corporate image. This can be attractive to customers, investors and stakeholders who are sensitive to environmental issues.
7. Energy Safety: by reducing energy consumption, companies become less dependent on energy imports and improve their energy safety. This is particularly important in times of geopolitical instability or fluctuating energy prices.
8. Job Creation: energy efficiency often requires specialised skills for the design, implementation and maintenance of efficient energy systems. This can contribute to the creation of jobs in the sustainable

energy sector.

In summary, optimising energy consumption is a smart choice as it brings economic, competitive, environmental and strategic advantages. Companies that adopt energy efficiency measures can improve their sustainability and resilience, reducing operating costs and contributing to the fight against climate change.

How many kg of co2 would be avoided if companies in Italy were to be 10% more efficient in their electricity consumption?

The calculation of CO2 emissions avoided as a result of a 10% energy efficiency in Italy depends on various factors, including the size of the industrial sector, the composition of the Italian energy mix and the amount of energy consumed. However, we can make a rough estimate using average data.
According to statistics and reports on energy in Italy, the country's total energy consumption in 2021 was approximately 300 TWh (terawatt hours). The Italian energy mix comprises a combination of sources, including oil, natural gas, coal, renewables and nuclear energy.
A 10% reduction in energy consumption would result in a reduction of 30 TWh of energy consumed. To calculate avoided CO2 emissions, it is necessary to know the CO2 emission factor per unit of energy produced in Italy, which can vary depending on the energy mix and technologies used.
However, for rough estimation purposes, an average CO2 emission value for electricity in Italy can be used, which is usually between 0.4 and 0.5 kg of CO2 emitted per kWh of energy produced. Taking an average value of 0.45 kg CO2 per kWh, this is how the avoided CO2 emissions can be calculated:

- CO2 emissions avoided = energy savings (in kWh) x CO2 emission factor (kg CO2/kWh)
- CO2 emissions avoided = 30,000,000 MWh x 0.45 kg CO2/kWh
- CO2 emissions avoided ≈ 13,500,000 tonnes of CO2

Thus, according to this rough estimate, a 10% efficiency improvement in the electricity consumption of companies in Italy could avoid the emission of around 13.5 million tonnes of CO2 per year. This would be a significant contribution to reducing greenhouse gas emissions and combating climate change.

Making the energy consumption of companies in Italy 10% more efficient would have a number of significant economic and environmental effects and benefits, such as?

Certainly, making the energy consumption of companies in Italy 10% more efficient would have a number of significant effects and benefits. Here is a closer look at these aspects:
1. Direct Economic Savings: reducing energy consumption by 10% would result in significant cost savings for companies. This saving would result in lower energy bills and operating costs. Companies could use these funds more effectively for investment, expansion or innovation.
2. Increased Competitiveness: companies with more efficient energy consumption would be more competitive in national and international markets. They could offer products or services at more competitive prices, increasing their market share and commercial success.
3. Environmental Sustainability: reducing energy consumption would contribute significantly to environmental sustainability. This would lead to a decrease in greenhouse gas emissions and pressure on energy production systems, reducing the overall environmental impact.
4. Long-Term Savings: energy efficiency may require initial investment, but over time it results in long-term savings. More energy-efficient buildings require less maintenance and reduce operating costs continuously.
5. Technological Innovation: the adoption of energy-efficient technologies and solutions can stimulate innovation in the sector. Companies that develop and use efficient technologies become leaders in sustainable energy.
6. Employment Growth: energy efficiency usually requires specialised skills. Consequently, promoting energy efficiency projects can contribute to the creation of new jobs in the sustainable energy and green technology industry.
7. Energy Security: by reducing energy consumption, Italy would become less dependent on energy imports. This would improve the country's energy security by reducing vulnerability to international energy price fluctuations.
8. Regulatory Compliance:: many jurisdictions require companies to take energy efficiency measures to comply with regulatory obligations. Reducing energy consumption by 10% could help companies meet these requirements.
9. Improving Corporate Image: energy efficiency demonstrates the company's commitment to sustainability and corporate social responsibility. This can improve the corporate image and perception by customers, investors and stakeholders.
10. Reducing Energy Demand: reducing the demand for electricity could avoid the need to build new power

plants and reduce the use of non-renewable energy sources, thus contributing to the transition to a more sustainable energy system. In summary, energy efficiency is a winning strategy from both an economic and environmental perspective.

In sum, energy efficiency is a winning strategy both economically and environmentally. Reducing energy consumption brings a number of benefits that contribute to corporate sustainability, the environment and market competitiveness.

Reducing electricity waste is an important goal to improve energy efficiency and reduce environmental impact. There are many practices that companies, organisations and individuals can adopt to reduce electricity waste.

Here are some strategies:
1. Energy Efficiency: improve the efficiency of electrical devices, e.g. by using energy-efficient electrical appliances and LED lightbulbs. Energy efficiency is often the most effective way to reduce waste.
2. Turning off Lights: turn off lights when they are not needed and use natural lighting whenever possible. The installation of motion sensors and timers can help reduce energy waste in lighting.
3. Energy Management: use energy management systems to monitor and control energy consumption in a building or facility. These systems can optimise energy use in real time.
4. Thermal Insulation: improve the thermal insulation of the building to reduce the loss of heat or cold, thus reducing the need for electric heating or cooling.
5. Preventive Maintenance: carry out regular preventive maintenance on electrical and electronic equipment to ensure that they function optimally. Dirty or non-serviced equipment can consume more energy.
6. Electronics on Standby: switch off or disconnect electronic devices on standby. Many appliances continue to consume energy even when not in use.
7. Load Optimisation: distribute electrical loads evenly and in an optimised manner over time. Avoid peaks in electricity consumption that can lead to higher costs.
8. Energy Management System: implement an energy management system to monitor and manage energy consumption in real time. These systems can reveal savings opportunities and enable automation of energy-saving processes.
9. Instruction and Training: make employees and users aware of the importance of saving energy and provide training on how to reduce energy waste.
10. Use of Renewable Energy: if possible, invest in renewable energy sources such as solar panels or wind turbines to generate clean electricity and reduce dependence on non-renewable energy sources.
11. Data Analysis: use data and analysis to identify sources of energy waste within the organisation. This analysis may reveal areas where significant improvements can be made. 12. Policies and Objectives: define energy-saving policies and goals within your organisation to maintain an ongoing focus and commitment to energy saving.

Reducing electricity waste not only leads to financial savings, but also helps mitigate the effects of greenhouse gas emissions and conserve energy resources.

What is Impedance Optimisation?

Impedance optimisation is a practice that aims to improve the electrical fit between electrical devices or components in a circuit in order to maximise energy efficiency and ensure the proper functioning of the electrical system. Impedance is a measure of the resistance and reactance (inductive reactance or capacitive reactance) of an electrical component or circuit. Impedance is expressed in ohms (Ω) and is a measure of resistance to alternating current (AC) flow.

This is how impedance optimisation can be applied in different contexts:
1. Electrical Systems: in electrical systems, impedance optimisation can be used to maximise the efficiency of power transmission and distribution. This may involve the design of electrical transmission lines with adequate impedance to reduce energy losses.
2. Electronics: in electronics, impedance optimisation is important to ensure that electrical signals are transmitted without unwanted reflections or significant attenuation. This can be crucial in applications such as audio, wireless communication and high-frequency circuits.

3. Industrial Automation: in industrial automation systems, impedance optimisation can help ensure the stability and efficiency of control and power supply circuits, avoiding undesirable phenomena such as overvoltage, overcurrent or interference.
4. Earthing networks: in electrical installations, optimising the impedance of the earth network is crucial to ensuring safety and protection against electrical faults. Properly optimised earth impedance reduces the risk of dangerous electrical discharges.
5. Audio and Video Applications: in audio and video transmission, impedance optimisation is crucial to

ensure the quality of signal reproduction and transmission. For example, speakers and cables must have adequate impedance to avoid sound distortion.

Impedance optimisation may require the design of specific electrical components, the use of transformers or the use of technologies such as impedance adapters. Practice focuses on correctly matching the impedance of the load (the equipment or device) with the impedance of the source (e.g. a signal source). This ensures that maximum power transfer takes place between devices and that signals are transmitted without significant losses or distortions.

How are avoided emissions calculated?

To calculate the avoided CO2 emissions due to reduced energy consumption, use the following formula:
Avoided Emissions (kg CO2) = Reduction kWh x Emission Factor (kg CO2/kWh)
The 'Emissions Avoided' formula calculates the amount of CO2 emissions that have been prevented or reduced as a result of a decrease in energy consumption, as a result of energy efficiency measures or an overall reduction in energy consumption. Let's look at this formula in detail:
1. Emissions Avoided (kg CO2): this is the amount of carbon dioxide (CO2) c emissions that have been avoided into the atmosphere by reducing energy consumption.
2. kWh reduction: this value represents the reduction in energy consumption in kilowatt-hours (kWh) achieved through energy efficiency measures or changes in behaviour. For example, if you reduced your electricity consumption by 10,000 kWh per year, this would be the value to enter.
3. Emission Factor (kg CO2/kWh): this value represents the amount of CO2 emissions associated with the production of one kWh of electricity in your country or region. The emission factor takes into account the energy mix (e.g. how much energy is produced from renewable sources, natural gas, coal, etc.) and can vary from place to place. It must be expressed in kg of CO2 emitted per kWh of electricity consumed. You can get this value from government sources, energy regulators or reliable environmental studies.

When calculating avoided emissions, you multiply the reduction in consumption in kWh by the appropriate emission factor. The result will be the number of kilograms of CO2 that have not been emitted into the atmosphere as a result of your energy efficiency actions.

Example:

Reduction kWh = 10,000 kWh
Emission Factor = 0.5 kg CO2/kWh
Emissions avoided = 10,000 kWh x 0.5 kg CO2/kWh = 5,000 kg CO2 avoided

So, in this example, you avoided the emission of 5,000 kg (or 5 tonnes) of CO2 by a reduction in energy consumption of 10,000 kWh.

How can I calculate the reduction of cO2 emitted into the atmosphere by reducing the kw/h consumed?

To calculate the reduction in CO2 emissions resulting from the reduction in kWh consumed, a series of steps must be followed. Here is how you can do it:
1. Determine the Initial Energy Consumption (kWh): start by collecting data on the initial energy consumption of the target building, process or activity. This value represents energy consumption before any intervention to improve energy efficiency.
2. Calculate the Reduction in Energy Consumption: then calculate the difference between the initial energy consumption and the new energy consumption after the implementation of energy efficiency measures. The formula will be:
Reduction kWh = Initial Consumption (kWh) - Consumption After Improvement (kWh)
3. Determine the Emission Factor: every kWh of electricity consumed generates a certain amount of CO2 emissions, which varies depending on the energy mix of your country or region. Check the data on the CO2 emission factor, which is usually expressed in kg CO2 per kWh.
4. Calculate Avoided Emissions: to calculate the avoided CO2 emissions due to the reduction of energy consumption, use the following formula:
Avoided Emissions (kg CO2) = Reduction kWh x Emission Factor (kg CO2/kWh)
5. Result: the result will be the amount of CO2 emissions that have been avoided into the atmosphere by reducing energy consumption.

For example, if you have reduced your electricity consumption by 10,000 kWh per year and the CO2 emission factor is 0.5 kg CO2 per kWh, you will have avoided the emission of 5,000 kg (or 5 tonnes) CO2 per year. Please note that this is a simplified calculation. For a more accurate assessment, you may want to consider additional factors such as the energy efficiency of specific energy sources and the type of fuel used for heating or heat production. Also, make sure you have accurate data on energy consumption and CO2 emissions for reliable results.

What are 'White Certificates'?

White Certificates are an incentive mechanism in the field of energy efficiency in Italy. Officially known as 'Energy Performance Certificates' (EPC), they represent a system for measuring and verifying energy savings achieved through energy efficiency projects and the consequent right to sell or transfer these certificates on the market.

This is how White Certificates work:

1. Implementation of Energy Efficiency Projects: companies, institutions or organisations implement energy efficiency projects aimed at reducing energy consumption.
2. Metering and Verification: after the projects are implemented, independent measurements and verifications are carried out to determine the actual energy savings achieved.
3. Issue of Certificates: based on the measured energy savings, corresponding White Certificates (EPC) are issued. Each EPC represents a specific amount of energy saved, usually expressed in MWh (megawatt hours).
4. Trade and Sale: holders of EPC may sell or transfer them to other bodies that could use them to meet regulatory requirements or as an investment in energy efficiency.
5. Regulatory Compliance: some bodies, such as energy companies or regulators, may be required by law to demonstrate a certain number of EPCs as part of their energy efficiency obligations.
6. Economic Incentives: EPCs can have an economic value on the market and provide economic incentives to organisations that hold them, helping to cover part of the costs of energy efficiency projects.

White Certificates are a tool that encourages organisations to invest in energy efficiency projects and demonstrate their results in a transparent manner. This mechanism has been used in several countries, including Italy, to promote energy efficiency and reduce overall energy consumption.

Why does optimising power quality prevent or reduce plant downtime?

Reducing plant downtime through power quality optimisation systems is an important objective for many companies and industrial facilities. Power Quality refers to the quality of electrical energy supplied to a plant, which includes parameters such as voltage, frequency, waveform and stability of electrical energy. Poor power quality can lead to unexpected power supply interruptions, which can cause damage to devices and equipment, as well as interruptions in operations, causing production and economic damage.

Here's how power quality optimisation systems can help reduce plant downtime:

1. Voltage Stabilisation: power quality optimisation systems can constantly monitor the voltage and adjust it to keep it within acceptable limits. This prevents voltage fluctuations that can damage equipment.
2. Harmonic Filtering: these systems are able to filter out unwanted harmonics that may be generated by non-linear loads. Harmonics can cause overheating and faults in electrical devices.
3. Reducing Interruptions: optimisation systems can provide a temporary backup power source, such as UPS (Uninterruptible Power Supply) systems, to ensure a constant power supply during short power failures or voltage spikes.
4. Real-Time Monitoring and Analysis: Power Quality optimisation systems provide detailed data and real-time information on the status of the electrical energy in the plant. This allows power quality problems to be identified and resolved quickly before they cause interruptions.
5. Preventive Maintenance: the analysis of data collected by optimisation systems can detect early signs of malfunctions or deterioration in electrical equipment. This allows preventive maintenance to be planned to avoid unplanned shutdowns.
6. Proactive Interventions: with continuous monitoring and data analysis, optimisation systems can detect critical situations in advance and initiate corrective measures or the activation of backup systems before plant downtimes occur.
7. Staff training: optimisation systems can provide useful information for staff to better understand how to manage and respond to low power quality situations and prevent potential problems.

In summary, power quality optimisation is crucial to ensuring that a plant operates reliably and without unexpected interruptions. Optimisation systems keep power quality within acceptable limits, preventing damage to electrical equipment and minimising plant downtime.

What are the measuring instruments for certificates?

Certified multimeters are electrical measuring instruments that have passed specific tests and evaluations to ensure their accuracy and compliance with the quality and safety standards required by regulations or technical specifications. Certification is an important process to ensure that electrical measuring instruments are reliable and safe for use.

Here are some of the key features and considerations associated with certified multimeters:
1. Precision: certified multimeters are known for their accuracy and reliability in measurements. They undergo regular calibration and verification to ensure that measurements are accurate and consistent.
2. Safety: electrical measuring instruments must meet relevant safety standards to ensure that they are safe for users and comply with electrical safety regulations.
3. Calibration: certified multimeters undergo regular calibration procedures to verify and adjust their performance to ensure that measurements are always accurate and reliable.
4. Compliance with Standards: certified multimeters must comply with the relevant regulations and technical standards that establish requirements for electrical measuring instruments.
5. Specific Applications: some multimeters are designed for specific applications and require special certifications to ensure their suitability for certain environments or industries.
6. Markings and Certifications: certified multimeters may have specific markings indicating compliance with relevant standards and regulations. These markings may include specific symbols or acronyms to indicate the type of certification obtained.

When purchasing multimeters, it is advisable to look for products with internationally recognised certifications to guarantee the quality and reliability of measurements. Certifications may vary depending on the region and sector in which the multimeters are used. Our ANTs can be equipped with this level of technology, with some of the most efficient and reliable instruments on the market.

Termination of warranty on ANT machines if safety seals are removed. Why should they not be removed?

The termination of warranties on machinery following the removal of safety seals is a common practice in many companies and industries, especially those where user safety or compliance with regulations is of paramount importance. Here is what you should know about it:
1. Warranty Terms: warranty terms and conditions are usually specified by the manufacturer or supplier of the machine. These terms often include a clause stating that the guarantee will be invalidated if safety seals are removed or unauthorised modifications are made to the machine.
2. Rationale for the Policy: the policy of invalidating warranties in the event of removal of safety seals is intended to ensure that the machinery is used in a safe and compliant manner. Removing seals could lead to a safety risk or non-compliance with regulations.
3. Safety Checks: safety seals are often applied by specialised technicians during the production or maintenance of machinery. Removal of seals could indicate that the machine has been tampered with or that unauthorised modifications have been made.
4. Laws and Regulations: in some jurisdictions, the removal of safety seals from complex devices may be considered illegal or may violate specific regulations.
5. Authorised Maintenance: many companies require that maintenance and repairs be carried out only by authorised technicians or service centres. The removal of seals could make authorised maintenance impossible.

Before removing safety seals or making modifications to a machine that is still under warranty, it is essential to carefully consult the terms of the warranty provided by the manufacturer or supplier. If you feel it is necessary to make changes or perform maintenance work involving security seals, you should seek the manufacturer's authorisation and guidelines to do so without invalidating the warranty. In general, it is important to follow the procedures and policies of the manufacturer or supplier to ensure that the warranty is upheld and that the machinery is used in a safe and compliant manner.

Why is it important to reduce committed power?

Reducing the committed power in an electrical system is important to contain energy costs and improve efficiency. Committed power is the amount of electrical power a user constantly requires from the electricity grid. Reducing this power can result in significant savings.
Here are some strategies to reduce the committed power:
1. Load optimisation: identify and remove unused loads or reduce the power required by equipment that is not always needed. For example, turn off devices in standby mode and reduce the brightness of lights when not needed.
2. Planning: distribute electrical loads evenly throughout the day, avoiding simultaneous power peaks. This can be done by scheduling working hours or sequencing the start-up of equipment.
3. Power factor correction: as discussed above, the use of power factor correction capacitors to improve the power factor can reduce the reactive power, thus reducing the committed power.
4. Energy management systems: use energy management systems to monitor and control loads in real time. These systems can help identify peak times and optimise energy use.

5. Energy saving: implement energy-saving measures such as the use of more energy-efficient equipment and thermal insulation of buildings.
6. Energy supply contracts: if possible, negotiate energy supply contracts with your electricity supplier that allow a lower tariff based on the committed power. This may provide an incentive to reduce the committed power.
7. Staff training: educate staff on the importance of energy saving and actions that can be taken to reduce the power consumption. Use of energy management systems.
Using energy management systems: Implementing energy management systems to monitor and control energy consumption more efficiently.

Reducing committed power can result in significant energy savings by reducing energy supply tariffs and optimising the overall efficiency of energy use. This is particularly important for companies and industrial facilities, but can also be applied in residential areas to reduce energy costs.

What is power factor correction?

Active voltage regulation is a process by which the voltage in an electrical system is actively monitored and controlled to keep it within predetermined limits. This technique is used to ensure that voltage levels remain stable and constant, which is essential for the reliable operation of electrical appliances and the safety of the electrical system.
This is how active voltage regulation works:
1. Monitoring: in an electrical system, sensors and measuring equipment are installed to constantly monitor voltage levels at different points in the power grid.
2. Control: the data collected by the sensors are sent to a centralised control system. This system analyses the data and determines whether the voltage levels are outside the permitted limits.
3. Intervention: if the control system detects a variation in voltage levels outside the preset limits, it can activate active regulation devices to correct the voltage. These devices may include automatic voltage regulators (AVR), power factor correction capacitors or distribution transformers with adjustable taps.
4. Real-time response: active voltage regulation can respond in real time to voltage fluctuations and keep the voltage within the desired parameters.

The benefits of active voltage regulation include:
1. Improved reliability: keeping the voltage within limits prevents faults and interruptions in the electrical system.
2. Energy efficiency: constant voltage levels contribute to more efficient operation of electrical appliances.
3. Reduction of energy losses: by maintaining an adequate voltage, energy losses during transmission and distribution are reduced.
4. Prolonging the life of the equipment: supplying a stable voltage can help to avoid harmful overvoltages or undervoltages to equipment.

Active voltage regulation is particularly important in electrical distribution networks, where voltage fluctuations can be caused by changes in the load or in the operation of electrical devices. This technology ensures a reliable and stable power supply for industrial, commercial and residential users.

What are MLC filters?

MLC filters (Multilayer Ceramic Capacitors) are passive electronic devices mainly used for frequency management in electrical circuits. They are also known as multilayer ceramic capacitors and are one of the most common types of ceramic capacitors.
Here are some features and functions of MLC filters:
1. Frequency management: MLC filters are used to filter electrical signals at certain frequencies, separating desired frequencies from unwanted ones. They can be used both to suppress unwanted harmonics in an electrical circuit and to ensure that a specific frequency is transmitted or received efficiently.
2. Bandwidth: the bandwidth of an MLC filter may vary depending on its design Some MLC filters are designed to operate over a wide frequency range, while others are specific to a narrow frequency or band.
3. Thermal stability: MLC filters are known for their thermal stability, which means that their filtering characteristics remain relatively constant under varying temperatures. This makes them suitable for applications in environments with significant temperature variations.
4. Compact size: MLC filters are known for their small size. This makes them ideal for applications where space is limited.
5. Reliability: multilayer ceramic capacitors are known for their reliability and long life. They are resistant to wear and tear and environmental stress.

6. Common Applications: MLC filters are widely used in a variety of applications, including telecommunications, consumer electronics, automotive electronics, medical equipment and more.

MLC filters are available in different configurations and capacitive values to meet specific application requirements. They can be used in combination with other electronic components, such as inductors and resistors, to create complex filter circuits that meet specific filter requirements

What are Passive Harmonic Filters?

A passive harmonic filter is an electronic device that is designed to reduce or eliminate harmonics in an electrical signal. Harmonics are additional sinusoidal components occurring at frequencies multiple of the fundamental frequency in an electrical power system. These harmonics can cause problems such as transformer overheating, waveform distortion, loss of energy efficiency and electrical interference.

A passive harmonic filter is called 'passive' because it requires no external power supply to work. It relies on passive components such as capacitors, inductors and resistors to reduce harmonics. The main types of passive harmonic filters include:
1. Low-pass filter: this type of filter allows frequencies below a certain cut-off frequency to pass through, attenuating the higher frequencies. It is used to eliminate high-frequency harmonics, allowing only the fundamental frequency to pass through.
2. High-pass filter: a high-pass filter does the opposite of a low-pass filter, allowing frequencies above the cut-off frequency to pass through and attenuating lower frequencies. It is used to eliminate low-frequency harmonics.
3. Band-pass filter: this filter allows a specific range of frequencies to pass between two cut-off frequencies. It is useful for eliminating specific harmonics.
4. Notch (rejection) filter: this filter is designed to selectively attenuate or block a specific frequency, such as a specific harmonic. It is often used to eliminate particularly problematic harmonics.

The effectiveness of a passive harmonic filter depends on its design, the specifications of the harmonics to be eliminated and the characteristics of the electrical load. Such filters are often used in industrial and commercial applications to improve power supply quality and reduce problems associated with harmonics, such as overloads, overheating and service interruptions.

What are harmonics?

In an electrical context, harmonics are sinusoidal components of a signal occurring at frequencies multiple of the fundamental frequency. The fundamental frequency is the main frequency of a periodic signal and is usually the frequency at which an electrical system is designed to operate.

Harmonics can be the result of disturbances or distortions in the waveform of the electrical signal.
They are represented by integer multiples of the fundamental frequency. Harmonics can cause several problems in an electrical system, including:
1. Heating and energy losses:harmonics increase the effective current and voltage in an electrical system, thus causing increased energy losses and heating in cables, transformers and other equipment.
2. Waveform distortion: harmonics can distort the signal waveform, causing a non-sinusoidal voltage. This distortion can affect the operation of sensitive devices, such as computers, and cause overheating or faults in electrical equipment.
3. Electromagnetic interference: harmonics can generate electromagnetic fields that can interfere with other electronic devices, causing electromagnetic compatibility (EMC) problems.
4. Overheating of transformers: harmonics can cause overheating in transformers, reducing their service life and efficiency.
5. Equipment malfunctions: harmonics can affect the operation of electrical equipment and motors, leading to sub-optimal operation, reduced efficiency and more frequent breakdowns.

To address these problems, it is often necessary to use filters, power factor correction capacitors and other devices to eliminate or reduce harmonics in electrical systems. Standards and technical guidelines set acceptable limits for harmonics in distribution systems and provide guidelines for handling harmonics to ensure a high quality power supply.

What are IP21 and IP54 protection ratings?

The 'IP21' acronym is a classification that is part of the IP (Ingress Protection) code used to classify and define the degree of protection of an enclosure or electrical device against the ingress of solid particles and

water. The acronym 'IP' stands for 'Ingress Protection,' and is followed by two digits or a letter and a digit. In the case of 'IP21,' the number '2' represents protection against the ingress of solid particles, while the number '1' indicates protection against the ingress of water droplets.

Here is what it means in detail:
1. Protection against solid particles (initial digit '2'): '2' indicates that the casing or device has limited protection against the ingress of solid particles larger than 12.5 millimetres in diameter. This means that the object is protected against solid objects of significant size, such as fingers or other relatively large particles.
2. Protection against water (final digit '1'): '1' indicates that the casing or device is protected against the ingress of falling vertical drops of water. However, it is not considered completely impermeable to water.
In general, the IP rating is used to classify electrical and electronic equipment and to ensure that it is suitable for specific applications and environments. The 'IP21' classification suggests that the device has limited protection against the ingress of large solid particles and water droplets, but is not suitable for conditions where it might be exposed to moisture or significant water splashes. IP protection can vary from 'IP00' (no protection) to 'IP68' (complete protection against dust ingress and water immersion).

The 'IP54' classification is part of the IP (Ingress Protection) code used to classify and define the degree of protection of an enclosure or electrical device against the ingress of solid particles and water. The acronym 'IP' stands for 'Ingress Protection,' and is followed by two digits.
In the case of "IP54," the digit "5" represents protection against the ingress of dust or solid particles, while the "4" indicates protection against the ingress of water droplets. Here is what it means in detail: 1. Protection against solid particles (initial digit '5'): '5' indicates that the enclosure or device has fairly solid protection against the ingress of dust. It is considered quite protected from solid particles of significant size.
2. Protection against water (final digit '4'): '4' indicates that the casing or device is protected against splashing water from all directions. However, it is not completely impermeable to water.

The IP54 rating suggests that the device is quite robust against dust ingress and can withstand water splashes from different directions, but it is not suitable for water immersion or extremely wet environments. This classification is common for electronic devices that will be used in environments where some level of exposure to moisture or dust may occur, but are not exposed to extreme weather conditions or immersion in water.

What is phase shifting?

"Phase shift" in an electrical or physical context refers to the delay or advance between two periodic quantities, such as voltage and current in an electrical circuit, or between two waves. This delay can be measured in terms of angle or time. Here is some more detailed information:
1. Phase shift in electricity: in the electrical context, the phase shift angle represents the delay or advance between the voltage waveform and the current waveform in an AC (alternating current) circuit. This phase shift is caused by the presence of reactive elements, such as inductances (L) and capacitances (C), in the circuit. In a purely resistive ideal circuit, voltage and current are in phase, i.e. there are no phase shifts.
However, in the presence of reactive components, a phase shift occurs. This phase shift can be expressed in degrees or radians.
2. Phase shift between waves: in wave physics, phase shift refers to the delay or advance between two waves with the same frequency. This may be due to differences in the initial phase of the waves or differences in their propagation speed. The phase shift between waves can influence the interference between them, creating constructive or destructive interference phenomena.
3. Applications: phase shift is important in many fields, including electrical, electronic, sound, optics and others. For example, in the field of audio, the phase shift between audio signals can cause cancellation or feedback problems. In optics, the phase shift between light waves can affect the polarisation of light. 4. Phase shift correction: in some applications, it is necessary to correct or compensate for the phase shift between voltage and current in an electrical circuit to improve efficiency or avoid problems. This can be done by using devices such as capacitors or inductors to balance the reactive and resistive load in a circuit.

Phase shift is a key concept in the understanding of AC circuits, waves and other periodic phenomena. Knowledge of the degree of phase shift between various signals or waves is essential for designing and analysing electrical and electronic circuits and systems.

What is voltage?

Voltage is a measure of the intensity of the electrical force or potential difference between two points in an electrical circuit. It is one of the basic electrical quantities and is commonly indicated in volts (V). Voltage represents the 'pressure' of electricity in an electrical circuit and is responsible for the movement of the flow of electrical charge, i.e. electrons.

Here is some key information on voltage:
1. Unit of measurement: voltage is measured in volts (V). One volt represents a potential difference of one joule of energy per coulomb of electric charge.
2. Potential difference: voltage represents the difference in electrical potential between two points in a circuit. This potential difference is responsible for the flow of electrical charge from one point to another.
3. Direct and alternating voltage: there are two main types of electrical voltage: direct (DC) and alternating (AC). Direct voltage is constant over time, while alternating voltage periodically changes direction.
4. Voltage sources: voltage sources are devices that provide a constant or variable electrical potential difference. Batteries and generators are examples of voltage sources.
5. Ohm's law: voltage is one of the factors influencing the electric current in a circuit, as described by Ohm's law. According to this law, the current (I) in a circuit is directly proportional to the voltage (V) and inversely proportional to the resistance (R), i.e. I = V / R.

Voltage is a fundamental quantity in electrical circuits and is essential for the proper supply and operation of electronic devices and electrical equipment. Understanding voltage is crucial for design, maintenance and troubleshooting in electrical and electronic systems.

What is overload?

The term 'overload' in an electrical or electronic context refers to a situation in which a device, circuit or component receives an amount of current or power in excess of that for which it was designed or capable of handling safely. Overload can have several causes and can lead to potentially harmful problems. Here is some important information on overloading:
Common causes of overload include:
1. Overvoltage: higher than expected electrical voltage can cause overloading, especially if the connected devices are not protected by overvoltage protection devices such as lightning arresters.
2. Overcurrent: excessive current flowing through a component or circuit can cause overheating and damage. This can happen due to short circuits, component failures or deliberate overloading (e.g. connecting too many devices to one circuit).
3. Excessive load: connecting too many devices or equipment to an electrical circuit can exceed its rated capacity and cause an overload.
Effects of overload:
4. Overheating: overloading can cause cables, electrical components or devices to overheat, which can lead to fire or permanent damage.
5. Reduced service life: overheating and stress caused by overloading can reduce the service life of electrical and electronic components.
6. Faults: in the event of prolonged overloading, electronic or electrical components can fail beyond repair.
7. Loss of efficiency: continuous overloading can cause loss of energy efficiency and an increase in operating costs.

To avoid overloading, it is important to comply with the current and voltage specifications of electrical devices and circuits. The use of protective devices, such as fuses, circuit breakers and voltage regulators, can help prevent or limit damage caused by overloads. In addition, it is essential to distribute loads correctly and ensure safe electrical management in homes, businesses and industries to avoid dangerous situations.

What is Fourier's Law?

Fourier's law is a fundamental principle in thermodynamics and heat conduction that describes how heat propagates through a conducting material. This law was formulated by Joseph Fourier, a French mathematician and physicist, in 1822. Fourier's law is often used to analyse heat flow and predict how temperature will change over time in a structure or object.

Fourier's law states the following:
The heat flow (Q) through a material is directly proportional to the cross-sectional area (A) that the heat propagates through, the temperature difference between two sides of the material (ΔT) and the inverse of the distance (d) between these two sides:
$Q = -k * A * \Delta T / d$
where:

- Q is the heat flow (in watts, W) through the material.
- A is the cross-sectional area that the heat propagates through (in square metres, mΔ).
–ΔT is the temperature difference between the two sides of the material (in degrees Celsius, °C or in kelvins, K).
- d is the distance between the two sides of the material through which heat conduction occurs (in metres, m).
- k is the thermal conductivity of the material (in watts per metre per kelvin, W/(mΔK)).
Fourier's law provides an equation that describes how heat propagates through a conducting material,

such as a solid. The greater the temperature difference between the two sides of the material, the greater the heat flow. At the same time, the higher the thermal conductivity of the material, the easier it is for heat to propagate through it.

Fourier law is applied in a wide range of situations, from the thermal design of electronic devices to predicting the heating or cooling of buildings, to analysing heat diffusion in industrial processes. It provides a fundamental basis for understanding and controlling heat conduction in a variety of contexts.

What are micro power failures?

Micro power failures are short, very rapid interruptions in the power supply that generally last less than a second. These events can affect the continuity of the power supply, but are usually so brief that many people may not notice them without careful observation. However, they can have significant impacts on sensitive electronic devices.
These micro-failures can occur for several reasons, including:
1. Problems in the power grid: voltage fluctuations or temporary overloads can cause micro failures.
2. Atmospheric events: lightning or other atmospheric interference can cause brief power failures.
3. Manoeuvres on the power grid: maintenance, repair or switching operations on the grid may cause micro failures.
4. Temporary failures in electrical components: problems with components in electrical substations or transmission lines may cause brief interruptions.

Micro failures can affect sensitive electronic devices, such as computers, servers, network equipment, sensitive machinery and other devices.

In addition, they can cause reliability problems in automatic control systems and industrial equipment.

What are Class I and Class II SURGE PROTECTION Surge Protectors?

Voltage surge arresters, or surge protective devices (SPDs), are devices designed to protect electronic devices and systems from surges. SPDs are classified according to their ability to handle different categories of overvoltages. The main classes of SPDs are Class 1 and Class 2, each designed to deal with specific sources of surges.
1. Class I (Level 1 SPDs): these SPDs are designed to deal with direct surges caused by lightning. They are installed upstream of the main electrical installation, at the point where the power supply enters the building (entry point). Their main role is to protect against external overvoltages of atmospheric origin, such as direct lightning strikes.
2. Class II (Level 2 SPDs): Class 2 SPDs are designed to deal with indirect surges and voltage spikes of internal origin, such as those generated by interruptions or switching in the power grid. They are usually installed upstream of electronic devices or sensitive equipment, protecting against surges that may originate from the internal electrical system or the public grid.

The combined installation of Class 1 and Class 2 SPDs provides comprehensive protection against various sources of overvoltage, offering an effective defence for a building's entire electrical system. This layered approach to surge protection helps prevent damage to electronic devices and increase the reliability of electrical systems.

It is important to note that surge protection should be addressed in a comprehensive and integrated manner, considering the installation of Class 1, Class 2 and, if necessary, Class 3 SPDs (to protect individual devices).

What are ABB SACE EMAX 2 circuit breakers?

ABB Emax 2 circuit breakers are high-voltage electrical switching and protection devices manufactured by ABB, a well-known manufacturer of electrical equipment. These switches are designed to provide reliable protection and control over high-voltage electrical networks and are used in a wide range of industrial and commercial applications. Here are some of the main features of the ABB Emax 2 switches:
1. High voltage: ABB Emax 2 circuit breakers are designed to operate on high-voltage electrical networks, typically at voltages above 1 kV (kilovolt) up to 36 kV or more.
2. Overcurrent protection: These circuit breakers offer overcurrent protection, which is essential to prevent damage to electrical equipment and protect the electrical system from failure.
3. Modularity: Emax 2s are often modular, which means that they can be customised to the specific needs of the application. This feature allows greater flexibility in installation and updating.
4. Monitoring and communication: many versions of ABB Emax 2 circuit breakers are equipped with monitoring and communication capabilities. This makes it possible to detect and report faults in the electrical system and facilitates remote management and control.

5. High breaking capacity: Emax 2 circuit breakers are designed to have a high breaking capacity, which means that they are capable of safely interrupting large electrical currents.
6. Advanced technology: they use advanced technologies to ensure greater energy efficiency and reliable operation. This can help reduce energy losses and improve plant reliability.

ABB Emax 2 circuit breakers are widely used in a variety of sectors, including industry, energy, transport and many others, where reliable protection and control of high-voltage electrical networks is essential. They are available in different variants to meet different application requirements.

Limitless quality. Advanced intelligence, unrivalled precision on the market, SACE Emax 2 open circuit breakers redefine standards in the industry. Developed and manufactured in Italy, they are the only ones that protect electrical circuits and offer unbeatable measurement accuracy, even with minimal variations.
Their strengths are the Ekip Touch intelligent protection release and pre-configured load control and switching logics that do not require external control units. Connectivity is also superior: cloud integration with Intelligent Distribution systems enables advanced data management in complex projects, via the ABB AbilityTM Energy and Asset Manager platform. These are the prime numbers of our SACE Emax 2 open circuit breakers:
1. 6300 A: as maximum size.
2. 1 user experience: the same for the whole range.
3. 0.4% of In, as the minimum reading threshold in current measurements.
4. 1% accuracy on energy and 0.5% on current.
5. - 30% time spent on wiring.
6. - 15% time to perform installation.

ABB SACE EMAX2

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