ORTEA
BY ORTEA NEXT

VOLTAGE SAGS ARE THE MOST COMMON CAUSE OF EQUIPMENT MALFUNCTIONS IN AUTOMATED INDUSTRY

OXYGEN
SAG COMPENSATOR

GENERAL SALES CONDITIONS
downloadable from our website

ABOUT ORTEA

Founded in 1969, ORTEA SpA is a leading company in manufacturing and engineering Power Quality solutions.

Fifty years in the business and ongoing technical research have made of ORTEA SpA a competitive and technologically advanced company.
Close co-operation between design, production and marketing enables to meet the requirements of a constantly growing number of customers.
Beside standard production, ORTEA SpA can be extremely flexible in developing and manufacturing special equipment according to User's specification. All this thanks to the experience gained over many years of applied technological development. Such development includes IT tools that enable the technical staff to elaborate electrical and mechanical designs for each "custom product" on a quick and cost-effective basis.

The ORTEA SpA products are installed and working in a large number of countries, and, thanks to strategically positioned offices and distributors, guarantee rapid and competent support.

QUALITY CERTIFIED

The belief that product quality and Customer satisfaction are the core of a modern organisation, led to the implementation of a certified Company Managing System.

CERTIFIED
ISO 9001 · ISO 14001
ISO 45001

A modern Company that wants to accept the challenge of today's business scenario cannot do so without conforming to standardized organizational criteria.
Customer satisfaction, product quality and responsible occupational practices are the basis on which the Company's activities can be consolidated. ORTEA SpA understood this a long time ago: the first ISO 9001 approval dates back to 1996.

Today ORTEA SpA Integrated Managing System is approved by Lloyd's Register according to the main Standards:

- ISO9001 (Quality management systems).
- ISO14001 (Environmental management systems).
- ISO45001 (Occupational health & safety management systems).

This means that ORTEA SpA can ensure that its performance is optimized in terms of internal process management, commitment towards environmental issues and attention to health & safety at work within the frame of a single Managing System.

ORTEA POWER QUALITY SOLUTIONS

Companies are more and more sensitive to Power Quality issues because they can cause troubles and damages to equipments and processes, up to interrupting the production cycle.

ORTEA SpA, with his brands ORTEA, ICAR and ENERSOLVE, offers a unique range of products and services for Power Quality and Energy Efficiency of low voltage electrical networks: voltage stabilisers, sag compensator, power factor correction systems, transformers and active harmonic filters.

VOLTAGE VARIATION	VOLTAGE STABILISERS	ORTEA
SAGs/DIPs	SAG COMPENSATOR	ORTEA
EXCESSIVE REACTIVE POWER	POWER FACTOR CORRECTION SYSTEMS	ICAR
UNPROTECTED LOADS	LV TRANSFORMERS	ORTEA
HARMONIC POLLUTION	ACTIVE HARMONIC FILTERS	ICAR
WASTE OF ENERGY	ENERGY EFFICIENCY SMART DEVICES	ENERSOLVE

ORTEA NEXT

IMPROVE YOUR POWER QUALITY

EXPERIENCE

Founded in 1969, ORTEA SpA has gained experience and know-how that enabled continuous growth and evolution. This never-ending process has allowed the Company to assume a leading role worldwide in designing and manufacturing Power Quality solutions.

RELIABILITY

Thanks also to its long-established Quality System, ORTEA SpA can ensure the production of reliable and long lasting products, each one of them accurately tested.

FLEXIBILITY

In addition to the standard production, the extremely flexible organization of ORTEA SpA is able to develop and manufacture cost-effective special equipment based on the Customer's specification.

QUALITY

Aiming at providing for the best quality, the manufacturing process includes checks during production and detail test sessions for each equipment.
The certified Integrated Managing System ensures the control of every manufacturing phase, starting from checking the components at reception and ending with the best package in relation to the transport type.

RESEARCH & DEVELOPMENT

ORTEA SpA constantly collaborates with Universities and Business Partners in the research and development of new products and new technologies.

SYNERGY

By working together, marketing, design, production and after-sales service allow the Company to meet the necessities set forth by an increasingly globalised and competitive market.

EXPERTISE

ORTEA SpA pre- and after-sales organization is able to intervene quickly, analyzing the problems and providing the correct solution.

CUSTOMER SERVICE

The continuous monitoring and analysis of requests and claims carried out by the after-sales service enables the improvement the quality of both products and service to the Customer.

VOLTAGE IS NEVER PERFECT

Modern industry is becoming more automated and the sensitivity of processes to Power Quality events is increasing.
It is generally recognized that quality is an important aspect of the electricity service. Not only low prices are important, also high-quality matters to customers.
Price and quality are often complementary aspects; together they define the value that customers derive from consuming electricity.
In practice the voltage is never perfect.

60% OF POWER QUALITY COSTS ARE CONSEQUENCE OF VOLTAGE SAGS

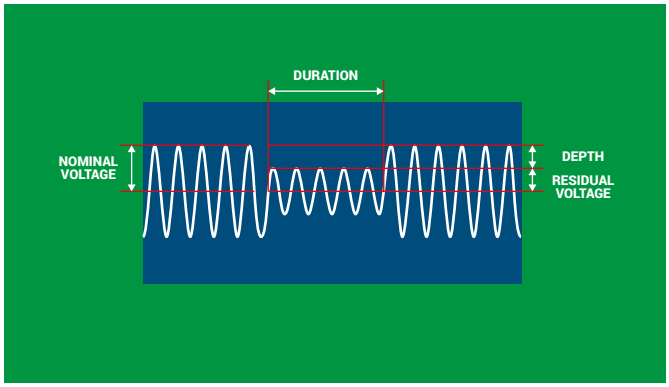
If the quality of electricity supplied to the plants drops below a certain level, equipment no longer works properly and customers are likely to experience problems.
Sensitive industry sectors may incur a Power Quality cost up to 4% of their turnover, with about 60% of those costs caused by voltage SAGs and short interruptions (source: Leonardo Energy).
The cost of a voltage SAG is usually lower than the cost of an interruption, either short or long, but SAGs are much more frequent.
An interruption will affect all (unprotected) services, SAGs may affect only those that are most sensitive.

OXYGEN: THE SOLUTION

Many businesses require voltage or power conditioning rather than battery back-up power, provided by UPS system.
In those cases where back-up power is unnecessary, a voltage conditioner provides superior protection and additional power quality functions, such as protecting against over/under voltage, voltage fluctuations, SAGs.
Moreover protecting a whole plant by UPS, which can guarantee SAGs immunity, may be very costly, due to battery and maintenance costs.
Oxygen: the right solution.

WHAT ARE VOLTAGE SAGS?

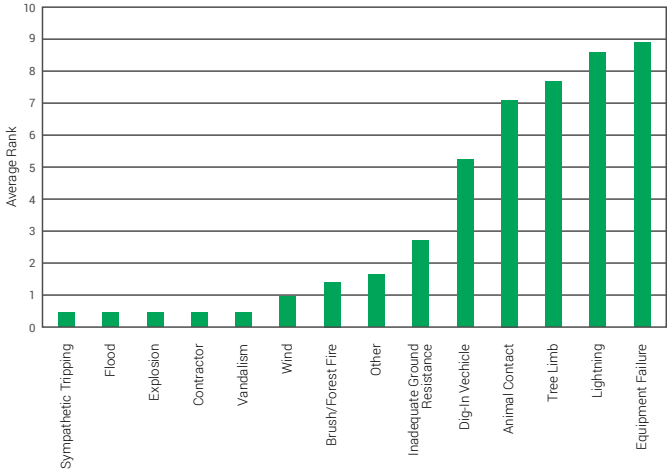
A voltage SAG is a temporary reduction of the Voltage RMS below a specific threshold at an electrical supply line point.



Generally voltage SAG happens when the residual voltage decreases between 10 and 90 percent of nominal voltage for one-half cycle to one minute. Voltage SAG duration is considered within 10ms up to 1min. The great deal of Voltage SAG have a duration lower than 1 second and a residual voltage higher than 40% of the rated value.

VOLTAGE SAGS CAUSES

Voltage SAGs are generally caused by faults in the public network or in the installations of network users, in some cases by transient overloads due to the starting of large motors or the insertion of large loads.



Voltage SAG causes, source EPRI, Electric Power Research Institute.

Motor drives, including variable speed drives, are particularly susceptible.
Data processing and control equipment is also very sensitive to voltage SAGs and can suffer from data loss and extended downtime.

SAG STARTS WHEN VOLTAGE GOES LOWER THAN 90% OF NOMINAL VALUE AND ENDS WHEN VOLTAGE RESUME ABOVE THIS VALUE

SAGS ARE IMPREVEDIBLE AND RANDOM

MOST VOLTAGE SAGS LAST LESS THAN ONE SECOND AND HAVE A RESIDUAL VOLTAGE EXCEEDING 40%

VOLTAGE SAG COST IS NORMALLY LOWER THAN A VOLTAGE SUPPLY INTERRUPTION ONE, BUT THE FIRST IS BY FAR MORE FREQUENT

WHERE DO THE VOLTAGE SAGS COME FROM?

- The voltage SAG propagates from the higher voltage levels to the lower ones, the load is often connected to a voltage level lower than the point of failure.
- Faults in the network cause deep voltage SAGs if they occur near loads.
- According to an Italian CESI study, the incidence of voltage SAGs is much greater in the case of an aerial MV network than with underground cables.

RELEVANCE OF VOLTAGE SAGS

The more modern the equipment is and the more electronics is required, the more serious are the problems caused through voltage SAG. With the increasing number of regenerative energy sources, energy sags, fluctuations and frequency deviations also increase.

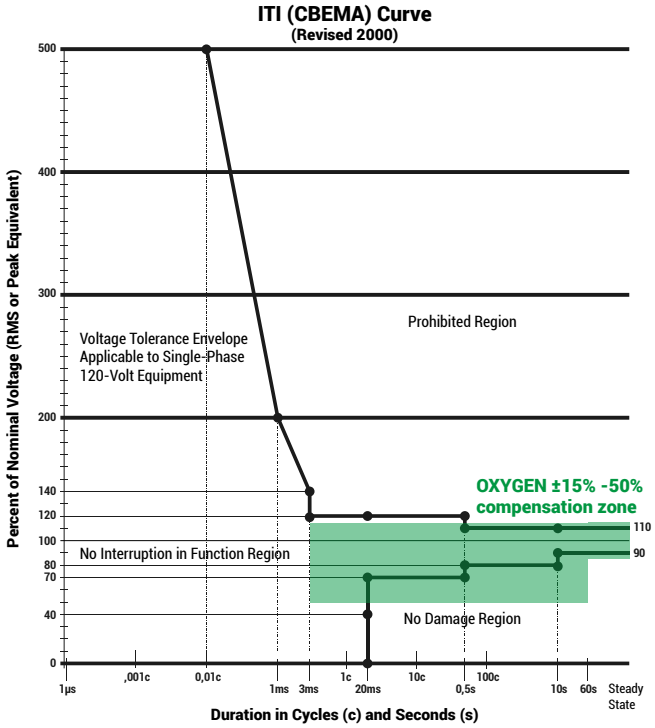
Example of costs due to voltage SAGs:

- Costs for unproductive personnel due to the sudden termination of the production cycle.
- Costs for raw materials and production lost.
- Costs for damages and/or malfunctions of machineries (repairs to them, temporary hire of new ones).
- Penalties caused by contractual shortcomings.
- Sanctions for damage to the environment.
- Increase in general insurance costs.

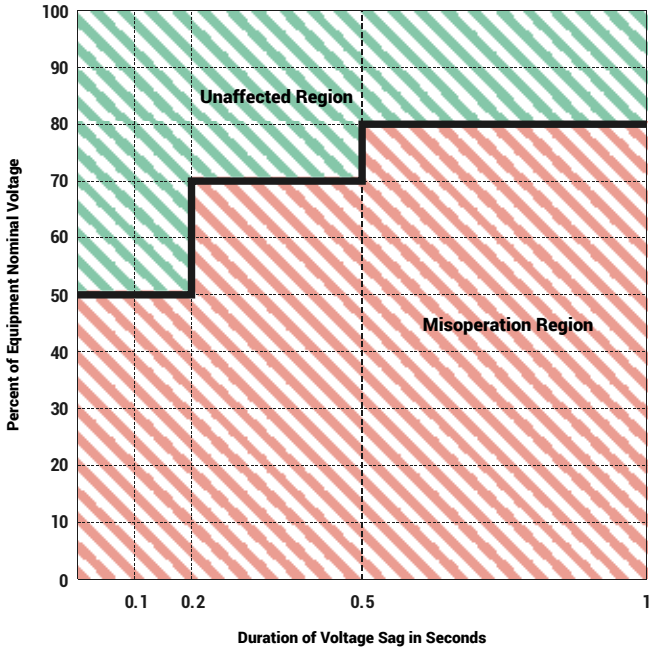
IMMUNITY OF EQUIPMENT TO DISTURBANCES COMING FROM THE NETWORK

Temporary increase of RMS voltage at a point of electrical supply line and above a specific threshold.
Curve developed by ITIC (Information Technology Industry

Council) and CBEMA (Computer and Business Equipment Manufacturers' Association) allows to understand the capabilities and limitations of computers and business equipment and their voltage stability requirements.



SEMI, the industry association for the semiconductor industry, has developed the SEMI F47 voltage SAG immunity standard.
SEMI F47 is important because semiconductor plants require high levels of POWER QUALITY due to the sensitivity of equipment and process controls.
They must tolerate sags to 50% of equipment nominal voltage for duration of up to 200ms, sags to 70% for up to 0.5 seconds, and sags to 80% for up to 1.0 second.

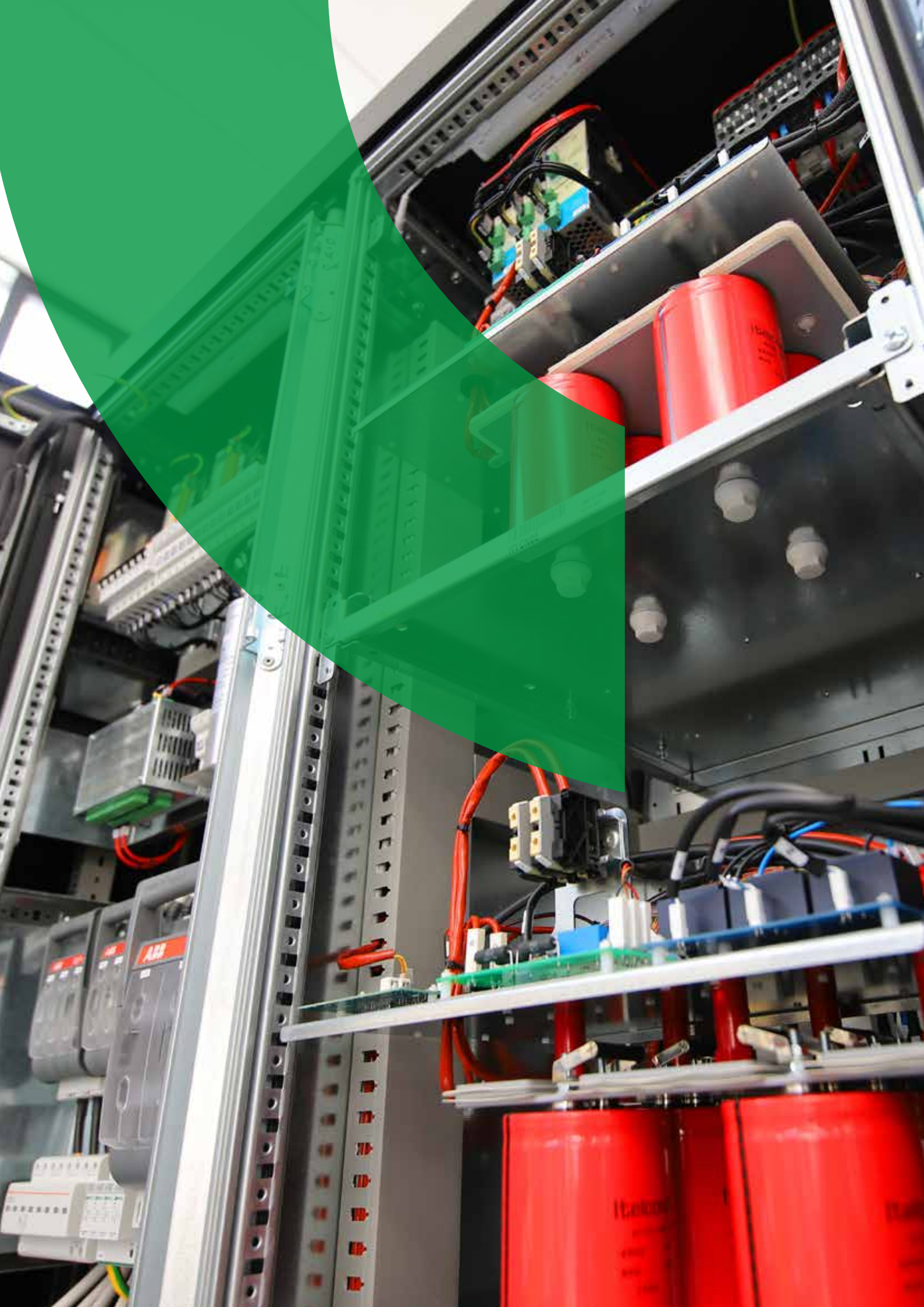


TROUBLES COME:

- LOWER THAN 90% OF NOMINAL VOLTAGE AND STARTING FROM 10 SEC
- ABOVE 110% OF NOMINAL VOLTAGE AND STARTING FROM 0.5 SEC

(CBEMA)

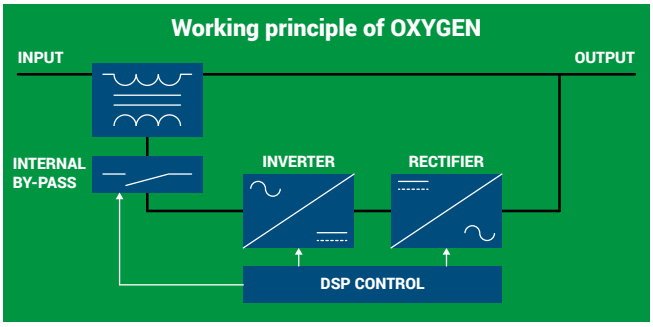
THE EQUIPMENT MUST BE ABLE TO CONTINUOUSLY OPERATE WITHOUT INTERRUPTION DURING CONDITIONS IDENTIFIED IN THE AREA ABOVE THE DEFINED SOLID BLACK LINE



OXYGEN

Oxygen, thanks to a suitable sizing of the power components and a remarkable response speed (<3 milliseconds) is able to face lowering (SAG) of the grid voltage of a maximum duration of one minute.
The energy required is taken directly from the network.
Current models are able to cover network downing up to 50% of the nominal value (-50%).
The voltage compensation on the buck/boost primary winding is performed by IGBT static switches controlled by a microcontroller. The microcontroller system monitors the output voltage and determines the opening or closing of the IGBT contacts ensuring the best regulation.
The use of the double conversion technology guarantees the insulation from the disturbances and the distortions of the network and, together with the help provided by the electrolytic capacitors, makes it possible to build machines for high power loads.
This SAG Compensator can operate with a load variation range for each phase from 0 to 100%, it is not affected by the power factor of the load and it can work with or without the neutral wire (on request).
Oxygen can operate with different input and, consequently, output voltage (380V or 415V) from the nominal one (400V).
The main components are:

- IGBT microcontroller-based electronic control boards running the system in terms of regulation and alarm management. They compare the output voltage value to the set one: if a difference is detected, they generate the compensation necessary to bring back the output voltage to the nominal value (provided that said difference falls in the working range).
- Conversion units (AC/DC rectifier and DC/AC inverter):
  Rectifier: it converts the phase to phase voltage of the AC mains into DC voltage by means of a fullycontrolled IGBT bridge. The rectifier is sized in order to supply the inverter at full load.
  Inverter: it converts the DC voltage coming from the rectifier into AC voltage, stabilised in amplitude. The inverter uses the same IGBT technology as the rectifier.
- Internal by-pass static switch enabling load supply in case of fault condition.
- Buck/boost transformer adding or subtracting the voltage necessary to compensate for the mains fluctuation.
- Touch Display.



The user interface is created using a multilingual “touch panel” (10”); through the selection menu, it is possible to display electrical values and set the operating parameters.
It is also possible to communicate with the electronic component via the RS485 serial bus using the Modbus protocol.
The standard cabinet is metallic with RAL9005 color and IP21 protection degree.

APPLICATIONS

Voltage SAGs and interruptions disturb many types of device connected to the network. They are the most frequent cause of power quality problems.

The most sensitive applications are:

ELECTRONICS INDUSTRY

Sensitive machinery, semiconductor.

FOOD & BEVERAGE

High speed bottling, packaging lines.

CONTINUOUS PRODUCTION LINES

Printing, steelworks, paper mills, petrochemicals, fibre and film, automotive.

MEDICAL

Sensitive medical equipment, Hospitals.

PHARMACEUTICAL

Packaging lines, continuous processes.

COMPUTER EQUIPMENT

Data processing centres, banks, telecommunication.

SAG CORRECTION UP TO -50% WITH CONTINUOUS ONLINE REGULATION UP TO ±15%
Correction in less than 3 millisecs.

HIGH EFFICIENCY
>98% at nominal power.

INDUSTRIAL DESIGN
Designed for standard industrial loads.

MODULAR CONSTRUCTION
Fast & Easy maintenance.

WITHOUT ENERGY STORAGE
Minimum maintenance and increased reliability.

INTERNAL ELECTRONIC BY-PASS
Internal by-pass static switch that protects the power electronics from short-circuiting on the load side and enabling load supply in case of fault condition.

CONNECTIVITY
Modbus TCP/IP.

MULTILINGUAL TOUCH SCREEN INTERFACE
Easy to understand with simple user controls, events log.

KEY BENEFITS

Protection from the most common Power Quality problem.

Voltage SAGs are the most common cause of equipment malfunctions in automated industry. SAGs correction up to -50% for 1 min.

Economical solution: no maintenance and operation costs.

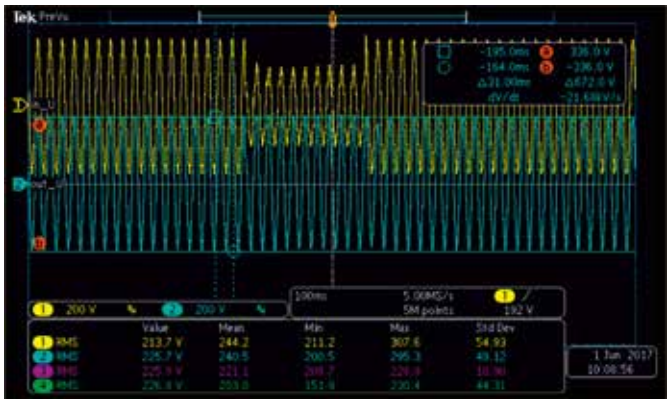
No battery energy storage required. Efficiency >98%.

Compared to a UPS...

Oxygen solution is specific for voltage SAGs with considerable benefits in terms of:

- Reduced cost.
- Less maintenance.
- Smaller footprint and occupied space.

Application example



Giallo: without Oxygen - Blu: with Oxygen

TECHNICAL FEATURES

INPUT

Available nominal voltage*	380-400-415V (440-460-480V 60Hz only)
Maximum supply voltage	Max continuous voltage +10%
Frequency	50Hz ±5% or 60Hz ±5%
Power system	3 phases + N (no neutral wire on request)

OUTPUT

Voltage	The same of input nominal voltage (output voltage can be adjusted)
Admitted load variation	Up to 100%
Admitted load imbalance	100%
Admitted overload	110% continuous, 120% for 1 minute (<120% electronic by-pass intervention)

PERFORMANCE

Efficiency	>98%		
SAG correction response	<3 millisecs		
Output voltage accuracy	±0,5%		
SAG correction accuracy	±4%		
Continuous regulation range	Oxygen 10-40: ±10%, Oxygen 15-50: ±15%		
SAG correction capability	**Input**	**Output**	**Time**
Oxygen 10-40	-40%	100%	1 minuto
	-50%	90%	45 secondi
	-60%	80%	36 secondi
Oxygen 15-50	-50%	100%	1 minuto
	-60%	90%	45 secondi

PROTECTION

Internal automatic by-pass	Thyristor switch with capacity of 150% of model rating
Overvoltage protection	Class I input surge arrestor / Class II output surge arrestor

BUCK/BOOST TRANSFORMER

Type	Dry transformer
Frequency	50Hz or 60Hz

ENVIRONMENT

Operating temperature range	0°C to 40°C (32°F to 104°F)
Operating altitude	< 1000m without derating (for higher altitudes contact us)
Inverter cooling	Forced Ventilation
Transformer cooling	Natural convection
Max relative humidity	<95% (non-condensing)
Pollution degree rating	2

** Output voltage can be adjusted by choosing one of the indicated values. Such choice sets the new nominal value as a reference for all the stabiliser parameters.*

ENCLOSURE

Protection degree	IP2X (other on request)
Material	Electro-galvanized steel
Finish	Standard epoxy-polyester powder coating textured finish
Colour	RAL 9005 (others on request)
Enclosure access	Hinged doors with key lock

SERVICE

Diagnostics	Non-volatile event & log

USER INTERFACE

HMI	10" colour touch panel, multilingual
Touch panel	Full parameters control, system & voltage event log
Remote duplication	On request by dedicated software connected to the same network (Ethernet)
Communication	Modbus TCP/IP

POWER QUALITY EVENT MONITOR

Events recorded	Voltage SAGs, Overloads, Overtemperatures, Phase sequence, Phase loss, Max/Min voltage alarms, Alarms specific to the power electronics module

STANDARDS & CERTIFICATIONS

Quality	ISO9001
Environmental	ISO14001
Health & Safety	OHSAS18001
Marking	CE
Performance	IEC 61439-1/2

CE

All ORTEA equipments are designed and built in compliance with the Low Voltage and Electromagnetic Compatibility European Directives with regard to the CE marking requirements.
ORTEA products are built with suitable quality components and that the manufacturing process is constantly verified in accordance with the Quality Control Plans which the Company applies in compliance with the ISO 9001 Standards. The commitment towards environmental issues and safety at work issues is guaranteed by the certification of the Management System according to the ISO14001 and OHSAS18001 Standards. In order to obtain better performance, the products described in the present document can be altered by the Company at any date and without prior notice.
Technical data and descriptions therefore do not hold any contractual value.

OXYGEN RANGE

Type	Rated power	Input voltage range	Max input current (peak)	Output voltage	Rated output current	Eff.	Correction time	Cabinet dimensions*	Weight*
	[kVA]	[V]	[A]	[V]	[A]	[%]	[ms]	WxDxH [mm]	[kg]
Oxygen 10-40 | input voltage compensation: ±10% continuous / -40% for 1 minute (100% nominal output voltage)									
200-10-40	200	360-440	321 (481)	400	289	97.6	<3	1200x800x2000	1200
250-10-40	250	360-440	401 (601)	400	361	97.6	<3	1200x800x2000	1250
320-10-40	320	360-440	513 (770)	400	462	97.6	<3	1200x800x2000	1250
400-10-40	400	360-440	642 (962)	400	577	>98	<3	1200x1000x2200	1400
500-10-40	500	360-440	802 (1203)	400	722	>98	<3	1200x1000x2200	1650
630-10-40	630	360-440	1010 (1516)	400	909	>98	<3	2600x1400x2200	2950
800-10-40	800	360-440	1283 (1925)	400	1155	>98	<3	2600x1400x2200	3200
1000-10-40	1000	360-440	1604 (2406)	400	1443	>98	<3	4200x1000x2200	4000
1250-10-40	1250	360-440	2005 (3007)	400	1804	>98	<3	4200x1000x2200	4600
1600-10-40	1600	360-440	2566 (3849)	400	2309	>98	<3	4800x1400x2400	5100
2000-10-40	2000	360-440	3208 (4811)	400	2887	>98	<3	4800x1400x2400	5600
2500-10-40	2500	360-440	4009 (6014)	400	3609	>98	<3	4800x1400x2400	6100
Oxygen 15-50 | input voltage compensation: ±15% continuous / -50% for 1 minute (100% nominal output voltage)									
200-15-50	200	340-460	340 (577)	400	289	97.6	<3	1200x800x2000	1310
250-15-50	250	340-460	425 (722)	400	361	97.6	<3	1200x1000x2200	1330
320-15-50	320	340-460	543 (924)	400	462	97.6	<3	1200x1000x2200	1650
400-15-50	400	340-460	679 (1155)	400	577	>98	<3	2600x1400x2200	2700
500-15-50	500	340-460	849 (1443)	400	722	>98	<3	2600x1400x2200	3000
630-15-50	630	340-460	1070 (1819)	400	909	>98	<3	2600x1400x2200	3500
800-15-50	800	340-460	1359 (2309)	400	1155	>98	<3	4200x1000x2200	4400
1000-15-50	1000	340-460	1698 (2887)	400	1443	>98	<3	4800x1400x2400	5100
1250-15-50	1250	340-460	2123 (3609)	400	1804	>98	<3	4800x1400x2400	5600
1600-15-50	1600	340-460	2717 (4619)	400	2309	>98	<3	4800x1400x2400	6100

The values listed in the tables are referred to 400V nominal voltage
** Size and Weight may change*

Optional accessories

- Input automatic circuit breaker
- Short circuit output protection
- Manual maintenance by-pass
- Input isolating transformer
- EMI/RFI filters

OXYGEN K RANGE

Type	Rated power	Input voltage range	Max input current (peak)	Output voltage	Rated output current	Eff.	Correction time	Cabinet dimensions*	Weight*
	[kVA]	[V]	[A]	[V]	[A]	[%]	[ms]	LxPxH [mm]	[kg]
Oxygen 10-40 | input voltage compensation: ±10% continuous / -40% for 1 minute (100% nominal output voltage)									
200-10-40K	200	360-440	321 (481)	400	289	97.6	<3	1600x800x2000	1350
250-10-40K	250	360-440	401 (601)	400	361	97.6	<3	1600x800x2000	1400
320-10-40K	320	360-440	513 (770)	400	462	97.6	<3	1600x800x2000	1400
400-10-40K	400	360-440	642 (962)	400	577	>98	<3	1800x1000x2200	1600
500-10-40K	500	360-440	802 (1203)	400	722	>98	<3	1800x1000x2200	1900
630-10-40K	630	360-440	1010 (1516)	400	909	>98	<3	3200x1400x2200	3200
800-10-40K	800	360-440	1283 (1925)	400	1155	>98	<3	3200x1400x2200	3500
1000-10-40K	1000	360-440	1604 (2406)	400	1443	>98	<3	4800x1000x2200	4500
1250-10-40K	1250	360-440	2005 (3007)	400	1804	>98	<3	5400x1000x2200	5300
1600-10-40K	1600	360-440	2566 (3849)	400	2309	>98	<3	6000x1400x2400	5800
2000-10-40K	2000	360-440	3208 (4811)	400	2887	>98	<3	6000x1400x2400	6600
2500-10-40K	2500	360-440	4009 (6014)	400	3609	>98	<3	6000x1400x2400	7200
Oxygen 15-50 | input voltage compensation: ±15% continuous / -50% for 1 minute (100% nominal output voltage)									
200-15-50K	200	340-460	340 (577)	400	289	97.6	<3	1600x800x2000	1435
250-15-50K	250	340-460	425 (722)	400	361	97.6	<3	1800x1000x2200	1455
320-15-50K	320	340-460	543 (924)	400	462	97.6	<3	1800x1000x2200	1775
400-15-50K	400	340-460	679 (1155)	400	577	>98	<3	3200x1400x2200	3000
500-15-50K	500	340-460	849 (1443)	400	722	>98	<3	3200x1400x2200	3300
630-15-50K	630	340-460	1070 (1819)	400	909	>98	<3	3200x1400x2200	4300
800-15-50K	800	340-460	1359 (2309)	400	1155	>98	<3	4800x1000x2200	5000
1000-15-50K	1000	340-460	1698 (2887)	400	1443	>98	<3	6000x1400x2400	5800
1250-15-50K	1250	340-460	2123 (3609)	400	1804	>98	<3	6000x1400x2400	6600
1600-15-50K	1600	340-460	2717 (4619)	400	2309	>98	<3	6000x1400x2400	7100

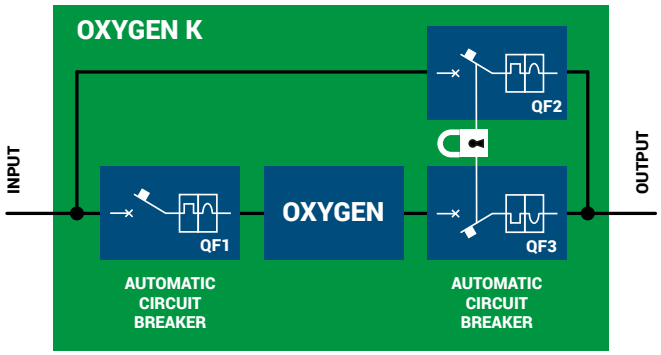
The values listed in the tables are referred to 400V nominal voltage
** Size and Weight may change*

Compared to the standard model, the K model is equipped with:

- Input automatic circuit breaker
- Output automatic circuit breaker
- Manual by-pass line with interlocked automatic circuit breaker

Optional accessories

- Input isolating transformer
- EMI/RFI filters



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ORTEA NEXT

IMPROVE YOUR POWER QUALITY

Companies are more and more sensitive to Power Quality issues because they can cause troubles and damages to equipments.

Our Power Quality solutions:

VOLTAGE STABILISERS
SAG COMPENSATOR
LV TRANSFORMERS
PFC SYSTEMS
ACTIVE HARMONIC FILTERS
ENERGY EFFICIENCY SMART DEVICES

CERTIFIED LR
ISO 9001 · ISO 14001
ISO 45001

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