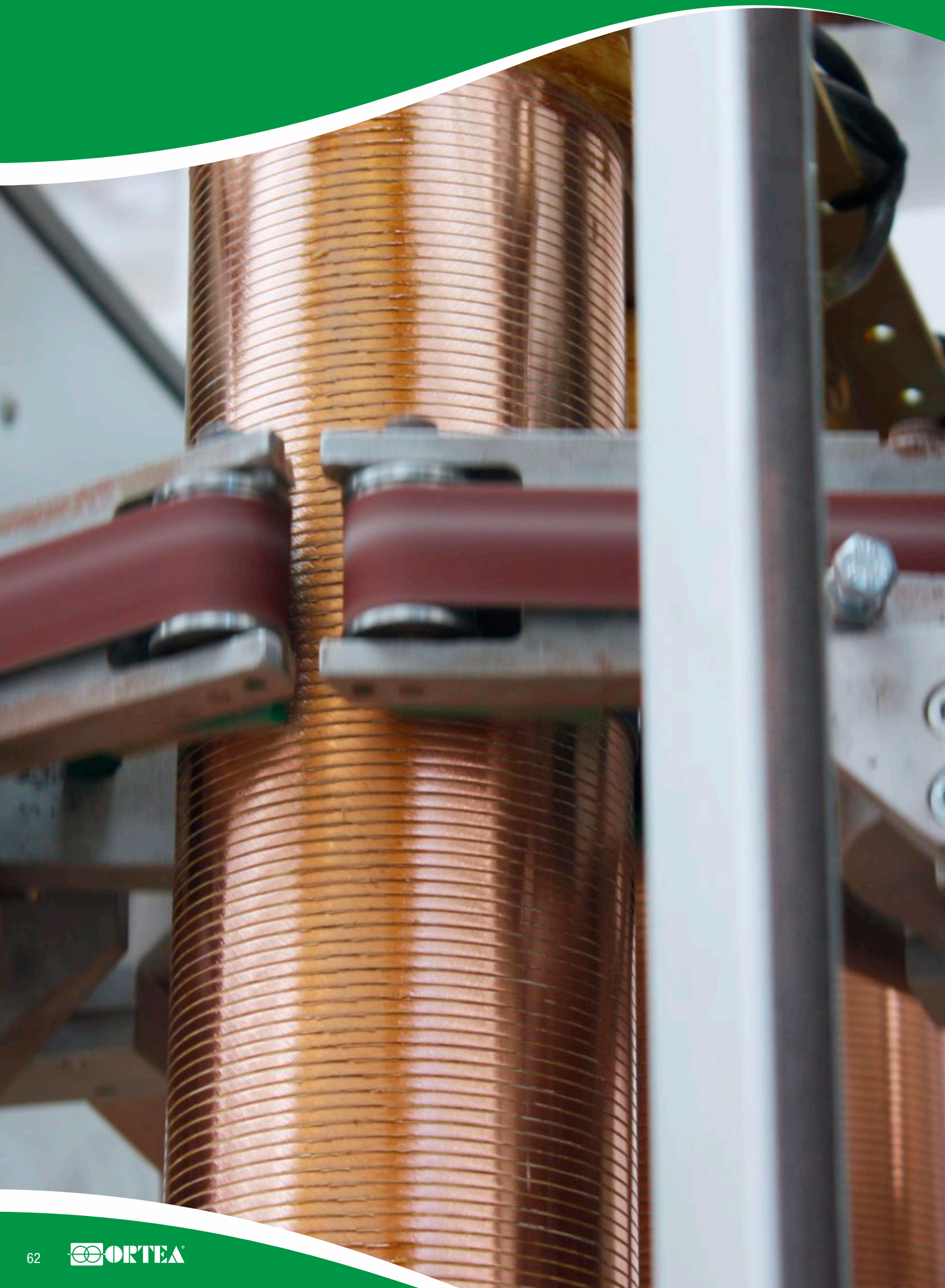
«Special» voltage stabilisers

Beside designing and manufacturing **customised stabilisers** tailored on the Customer's requirements, ORTEA developed product series particularly **thought** and **optimised** for **specific necessities** and/or **applications**.
Here below is a list summarizing said series.

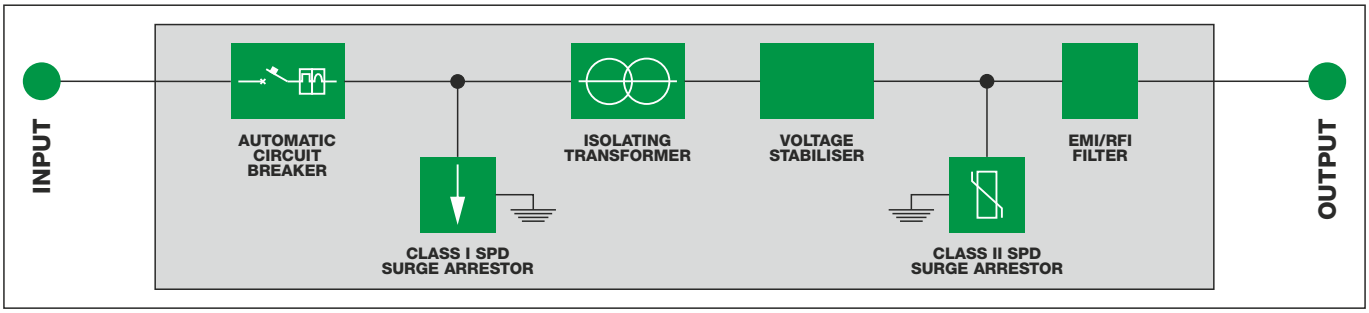
DLC series	**Line conditioners**
OPTInet series	**Line optimisers**
BTS series	**Telecommunication (TLC)**
BC series	**Broadcasting**
AOT series	**Mains filters**
OUTDOOR series	**Outdoor installations**
F&B series	**Food & Beverage, packaging and bottling industry**



DLC series

ORTEA product range is completed by a range of **line conditioners** based on voltage stabilisers and provided with **additional protective devices**.
The following sketch shows the typical line conditioners:

- **Input automatic circuit breaker** (protection against short-circuit).
- Delta/Star or Delta/Zig-zag **input isolation transformer** (complete galvanic isolation between the mains and the load and cancellation of third and triplen harmonics).
- **Class 1 SPD surge protective device** (protection against lightning).
- **Class 2 SPD surge protective device** (protection against transients).
- **EMI/RFI filter** (protection against electro-magnetic and radio-frequency noise).

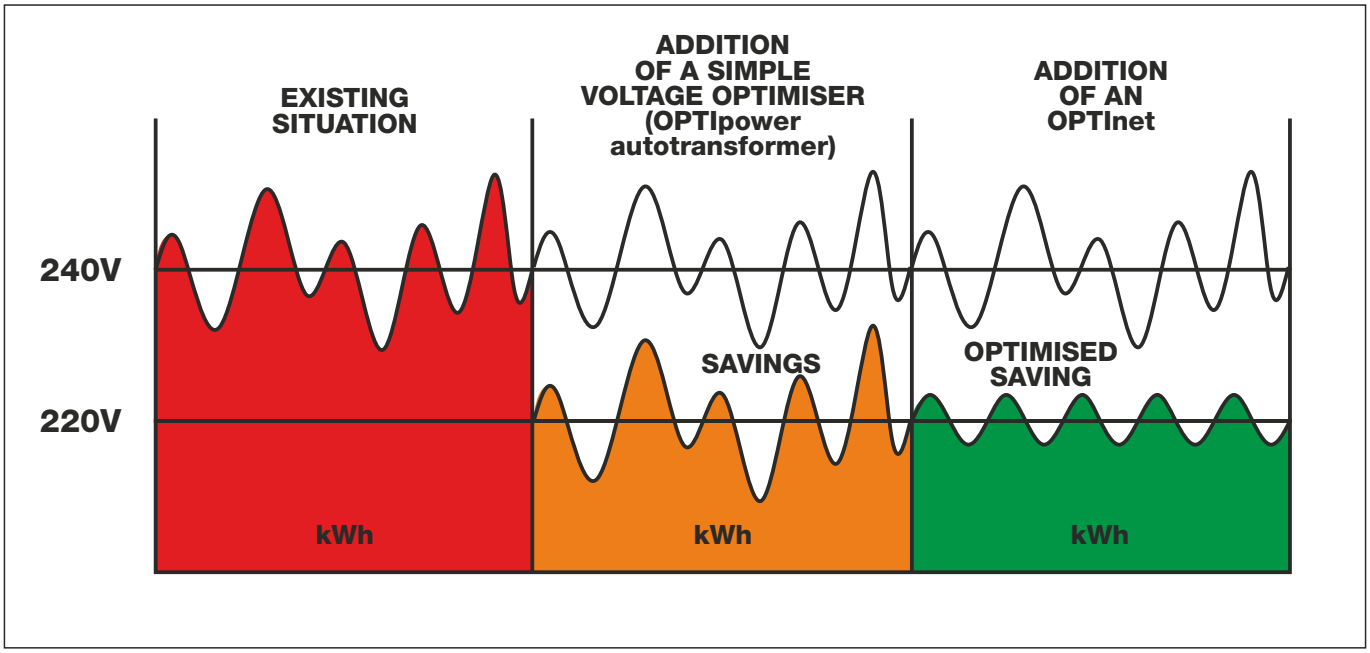


Lybra	Single-phase	**Vega/Antares** + advanced protection package	**0.3-135kVA**
Aries	Three-phase	**Orion** + advanced protection package	**2-250kVA**
Aries plus	Three-phase	**Orion plus** + advanced protection package	**30-1250kVA**
Discovery	Three-phase	**Sirius** + advanced protection package	**60-6000kVA**

Electrical equipment is usually designed to withstand a range of input voltages rather than just the nominal voltage. Nevertheless, **supplying a device a voltage higher** than the rated one implies **higher consumption** and decrease of the expected life.
The IEC 60038 Standard states that the nominal voltage should be:
– 230V ±10% (207V-253V) for single-phase devices;
– 400V ±10% (360V-440V) for three-phase devices.
However, the attempt to harmonise the nominal voltage across Europe to the 230/400V scheme has yet to be fulfilled and at the moment there is no scheduled date for a single distribution system for all the Countries member of the European Union.
This means that 220/380V and 240/415V systems are still present, although the established tolerances allow for an overall 'coverage' of the different possibilities.
Moreover, the legislation concerning CE marking requires for all the devices produced or marketed in Europe to be able to work over the wide range of distributed voltage.
In relation to the UK market, for example, it must be highlighted that most of the equipment imported from continental Europe are designed for working at a voltage level lower than the supplied one. Such units are therefore forced to function with a voltage 10 or 20 Volts higher than the one for which they were designed, which means that they consume more energy than necessary.
In case of resistive loads, supplying 240V instead of 230V implies approximately 10% increase in the power consumption.
Moreover, higher supplying voltage might induce problems in magnetic components such (possibility of core saturation).
Finally, other elements, such as proximity to power plants or distribution stations and voltage supplied at high level to cover the far end of distribution lines, might affect performance of the supplied loads and energy bills.
The first step towards an **optimised use of energy** is to have the load analysed by a qualified technician, so that further actions can be planned and the **potential energy savings estimated**.
To summarise, the elements allowing for an estimate of the energy savings can be reduced to:
– Mains voltage different from the rated voltage: the higher the gap, the higher the energy savings
– Type of load: the load can be more or less sensitive to voltage variations.

●	**Incandescent, fluorescent and discharge lamps**	Consumed power is in this case directly proportional to the square of the supply voltage and the load can be defined as voltage dependant. Using an optimiser can extend the expected life of the load by preventing the supplying voltage from being higher than the nominal one.
●	**LED lamps**	No advantage with these lamps due to the fact that they are supplied a constant voltage.
●	**Asynchronous motor**	Low rating motors (typically under 20/25kW), widely spread at a level both domestic and industrial, are considered as voltage dependant.
●	**Inverter driven asynchronous motors**	If the motor is driven by an inverter (speed electronic control) then it becomes voltage independent.
●	**Production lines**	Usually, voltage dependant loads (low rating motors and heating systems) are mixed with voltage independent loads (electronic devices). Only a careful investigation can establish the energy savings entity. A typical application is provided by the refrigerating banks used in supermarkets, made of combination of small motors directly fed by electronic units.
●	**Electronic devices**	Small equipment such as computers, office machines and telecom systems are generally fed via power supplies, which are insensitive to voltage variations.

● a little sensitive to voltage variation
● sensitive to voltage variation



A precise analysis will enable the choice of the **best solution** in terms of size. Sometimes, for example, the installation of optimizing units on individual loads could be the most efficient choice.
OPTInet is a specially developed **voltage stabiliser** that adjusts the voltage incoming from the distributing line to a level closer to the level for which the load had been designed. OPTInet optimizes the performance of the supplied equipment, thus achieving **lower consumption**, **energy savings**, **costs reduction** and **longer life expectancy**. While a traditional voltage stabiliser is designed to compensate for input voltage variations within a certain range (for example, ±20% of the nominal voltage), OPTInet has been specially developed to only **reduce the input voltage** still maintaining the stabilization characteristics.

OPTInet is therefore **equally efficient** and **reliable**, but **financially more suitable** for the purpose. In the standard configuration, the output phase voltage can be adjusted between 200V and 240V, with an input voltage up to 15% higher than the output one.

OPTInet is available in three different versions:
– **Basic** - simple design still with electronic control. Reliable performance and economical.
– **Plus** - more sophisticated control system, user-friendly panel with phase status and alarm signals, local PC connection
– **Advanced** - top of the range control system, local LCD display showing settings and operating parameters, user-friendly panel with phase status and alarm signals, local PC connection, possibility of remote monitoring.

OPTInet basic	Three-phase	**90-260A / 65-185kVA**
OPTInet plus	Three-phase	**160-1000A / 115-720kVA**
OPTInet advanced	Three-phase	**400-6000A / 290-4300kVA**

OPTInet

Standard features

	OPTInet Basic	OPTInet Plus	OPTInet Advanced
Voltage stabilisation	Independent phase control		
Selectable output voltage	220-230-240V (L-N) 380-400-415V (L-L) selectable	from 210V to 255V (L-N) from 360V to 440V (L-L) PC selectable	from 210V to 255V (L-N) from 360V to 440V (L-L) PC / Ethernet selectable
Output voltage range	±0.5%		
Frequency	50/60Hz ±5%		
Admitted load variation	Fino al 100%		
Admitted load imbalance	100%		
Cooling	Natural air ventilation (aided with fans over 45°C)	Natural air ventilation (air extraction over 45°C)	
Ambient temperature	-25/+45°C		
Storage temperature	-25/+60°C		
Max relative humidity	95%		
Admitted overload	200% 2 min.		
Harmonic distortion	None introduced		
Colour	RAL 7035		
Protection degree	IP21		
Installation	Indoor		
Overvoltage protection	Output class II surge arrestor	Output class II surge arrestor	Input class I surge arrestor Output class II surge arrestor

RoHS 2002/95/EC CE APPROVED MANAGING SYSTEM

All ORTEA stabilisers are designed and built in compliance with the 2006/95/EEC (Low Voltage) and 2004/108/EEC (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 9001:2008 Standards. The commitment towards environmental issues and safety at work maters is guaranteed by the certification of the Management System according to the ISO14001:2004 and OHSAS18001:2007 Standards.
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OPTInet series

Type	Nominal current*	Rating	Efficiency η	Losses (approx)	Speed regulation	Enclosure	Weight
	[A]	[kVA]	[%]	[kW]	[ms/V]	[Type]	[kg]
OPTInet Basic **+15%**							
OPTInet Basic 90A	90	65	>97	1.5	16	23	200
OPTInet Basic 125A	125	90	>98	1.3	16	31	320
OPTInet Basic 160A	160	115	>98	2.2	16	40	390
OPTInet Basic 200A	200	145	>98	2.8	16	41	490
OPTInet Basic 260A	260	185	>98	3.4	16	41	580
OPTInet Plus **+15%**							
OPTInet Plus 160A	160	115	>98	2.2	18	60	430
OPTInet Plus 200A	200	145	>98	2.9	18	60	490
OPTInet Plus 260A	260	185	>98	3.5	18	60	580
OPTInet Plus 300A	300	215	>98	4.1	18	55	710
OPTInet Plus 350A	350	250	>98	4.9	18	55	760
OPTInet Plus 400A	400	290	>98	6.0	18	55	850
OPTInet Plus 450A	450	325	>98	6.5	18	55	950
OPTInet Plus 500A	500	360	>98	6.8	18	55	1000
OPTInet Plus 600A	600	430	>98	8.2	18	55	1100
OPTInet Plus 700A	700	500	>98	9.5	18	55	1200
OPTInet Plus 800A	800	575	>98	10.9	18	55	1300
OPTInet Plus 1000A	1000	720	>98	13.7	18	55	1400
OPTInet Advanced **+15%**							
OPTInet Advanced 400A	400	290	>98	3.8	20	55	900
OPTInet Advanced 500A	500	360	>98	4.8	20	55	950
OPTInet Advanced 600A	600	430	>98	5.4	20	55	1050
OPTInet Advanced 700A	700	500	>98	6.8	20	55	1300
OPTInet Advanced 800A	800	575	>98	6.8	20	55	1300
OPTInet Advanced 900A	900	650	>98	8.5	20	56	1400
OPTInet Advanced 1000A	1000	720	>98	8.5	20	56	1400
OPTInet Advanced 1100A	1100	800	>98	10.1	20	62	1700
OPTInet Advanced 1250A	1250	900	>98	10.1	20	62	1700
OPTInet Advanced 1400A	1400	1000	>98	12.8	24	63	2200
OPTInet Advanced 1500A	1500	1100	>98	12.8	24	63	2200
OPTInet Advanced 1750A	1750	1250	>98	16.0	24	63	2400
OPTInet Advanced 2000A	2000	1450	>98	16.0	24	63	2400
OPTInet Advanced 2500A	2500	1800	>98	20.0	24	64	3000
OPTInet Advanced 3000A	3000	2200	>98	25.6	24	70	4000
OPTInet Advanced 4000A	4000	2900	>98	30.0	24	70	4300
OPTInet Advanced 5000A	5000	3600	>98	37.5	30	80	6000
OPTInet Advanced 6000A	6000	4300	>98	48.0	30	80	7300

* Current (calculated @ 415V nominal voltage).
Other configuration available on request.

BTS series

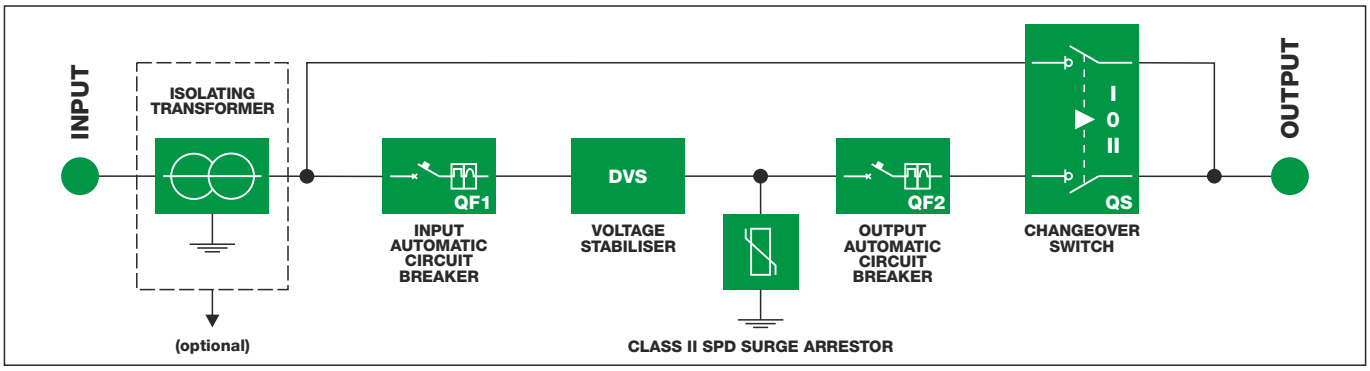
The acronym **BTS** stands for **Base Transceiver Station** and is used to indicate all the transmitting and receiving devices that enable the radio coverage in a telecom cell.
This is definitely an application where **high quality voltage supply**, regardless of the incoming fluctuation, is very often the key for ensuring **efficiency** and **reliability**, fundamental qualities to guarantee operating continuity.
Disrupted service, loss of data, security failure, inaccurate information and general inconvenience are examples of possible problems caused by unstable supply. Of course, all this results in increased costs.
A **voltage stabiliser** is a device able to respond to changes in the voltage level on the input line caused by sags (due to undersized distribution lines, connection of large loads to the network, ground faults, etc.) and surges (generated by disconnection of large loads, increased voltage at the generating plant, atmospheric events, etc.)
The duration of such phenomena depends on their cause and is not easily predictable. Sags are generally more common especially where the distribution is not efficient

The voltage stabiliser **specifically designed for BTS** sites has proved to be an efficient solution in the telecommunication field.
The stabiliser is fitted with:
– Metallic enclosure for outdoor installation.
– IP54 protection degree.
– Manual bypass.
– Input and output circuit breakers.
– Input digital voltmeter.
– Output Class II surge arrestors.
– Optional isolating transformer.

The stabilisers can be single-phase, three-phase or specifically designed for receiving a three-phase input and releasing a single-phase output. With the three-phase configuration, the regulation is performed independent on each phase and the voltage stabiliser requires the neutral wire presence for a correct operation. If the neutral wire is not available, the addition of a D/Y isolating transformer or neutral-point reactor is required.
Three-phase stabilisers can be used with three-phase loads and up to 100% unbalanced single-phase loads, even in case of asymmetric mains.
The **instrumentation** is installed on the cabinet door. An output digital multimetre provides with information on the line downstream the voltage stabiliser (phase and linked voltages, current, power factor, active power, apparent power, reactive power, etc). Minimum voltage, maximum voltage, internal overheating and overload on the voltage regulator are signalled by an acoustic alarm.
The stabiliser exploits a **microprocessor-based control logic**.

Main features
– Power design based on the maximum input current.
– Regulation based on the «rms voltage» and insensitivity to harmonics on the mains.
– Full functionality with load charge variable from 0 to 100%.
– Up to 30% harmonic content admitted on the load current.
– Insensitivity to the load power factor.
– No generation of noticeable harmonics in the output voltage.

Protections and signals
– Motor rotation stop due to regulation reaching the limit switches.
– Maximum and minimum line voltage alarm.
– Ambient thermostat (set to 65°C).
– Automatic circuit breaker to protect the voltage regulator.
– Fuses to protect the auxiliary circuits.
– Class II surge arrestors.



Standard features

	BTS1	BTS3	BTS3/1
Number of phases	1	3	3-1
Output voltage	220-230-240V (L-N)	380-400-415V (L-L)	380-400-415V (L-L) INPUT 220-230-240V (L-N) OUTPUT
Nominal rating	from 5kVA to 80kVa		
Input voltage range	±15% - ±20% - ±25% - ±30% - +15%/-25% - +15%/-35% - +15%/-45%		
Output voltage range	±0.5%		
Frequency	50/60Hz ±5%		
Admitted load variation	Fino al 100%		
Admitted load imbalance	n.a.	100%	n.a.
Cooling	Natural air ventilation (air extraction over 45°C)		
Ambient temperature	-25/+45°C		
Storage temperature	-25/+60°C		
Max relative humidity	95%		
Admitted overload	200% 2 min.		
Harmonic distortion	None introduced		
Colour	RAL 7035		
Protection degree	IP54		
Installation	Outdoor		
Overvoltage protection	Output class II surge arrestor		

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BC series

The acronym **DVB** stands for **Digital Video Broadcasting** and is used to indicate all the devices transmitting and receiving digital signal. The availability of **high quality voltage supply** is the key for ensuring operating continuity.
The **BC series** is specifically designed for DVB stations and consists of a **digital voltage stabiliser** able to compensate for voltage variation on the input line generated by sags or surges, completed by **additional devices** for the **protection** against transients and electric noise generated by electronic appliances.
Usually, a BC stabiliser includes:

– Digital voltage stabiliser.
– Isolating transformer.
– Input & output automatic circuit breakers.
– Input Class I surge arrestors.
– Output Class II surge arrestors.
– EMI/RFI filter.
– Instrumentation (voltmeter/multimetre).

For outdoor installation, the unit is housed in an IP54 **metallic enclosure**. Small power units can be assembled in enclosures suitable for **19" rack mounting**, thus advantaging practicality and ergonomics.

AOT series

AOTs (wave absorbers) are obtained by assembling in a cabinet a combination of **protective devices** to deal with transients carried by the distributing lines.
In order to achieve the most complete protection level, the AOT combines two complementary concepts: **smoothing** and **filtering**.
The task is performed through surge arrestors, isolating transformers, detuning reactors and capacitors.
AOTs must be installed upstream and in series to the equipment that needs protection in order to avoid inductive and /or capacitive effects on the lines.
Usually, AOTs include:

- Input automatic circuit breaker.
- Parallel surge arrestors (redundant system).
- Isolating transformer.
- Capacitors.
- Detuning/blocking reactor.
- Output automatic circuit breaker.

The operation can be divided in three phases:

1. The surge arrestors discharge to ground the direct overvoltage energy
2. The isolating transformer ensures galvanic isolation between the mains and the equipment to be protected
3. The filtering module eliminates the residual energy.

OUTDOOR series

All ORTEA voltage stabilisers can be assembled in cabinets specifically designed for **outdoor installation**.
The standard outdoor cabinets are built for an **IP55** protection degree and are painted with powder paint for **C3** anti-corrosion class (**C4** on request).
On request, ORTEA is also able to provide with units destined to be installed in particularly aggressive environments (for example, AISI304 and AISI316 stainless steel cabinets).

F&B series

Specifically designed for **food & beverage**, **packaging** and **bottling industries**, these voltage stabilisers are housed in an IP54 cabinet cooled via **air conditioning units**.
The stabiliser is therefore protected against dust or other volatile substances and liquid sprays.
The configuration includes **raised feet**, so that normal cleaning routines can be performed underneath the stabiliser.
On request, the cabinet can be in stainless steel.